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ABSTRACT

This dictionary contains about 55,000 terms with approximately 150,000 definitions. These terms are of both a technical and local nature and apply to metal mining, coal mining, quarrying, geology, metallurgy, ceramics and clays, glassmaking, minerals and mineralogy, and general terminology. Petroleum, natural gas, and legal mining terminology, unless of a general nature, has been excluded, as has been foreign terminology where there is an English equivalent. Those Spanish-American and Mexican terms still used in the Southwestern United States have been retained. Many terms are identified by the country or area of origin. Others can be identified by examining the source following each definition. These sources are completely identified, with full bibliographical information, in the list of authorities and sources in the back of the dictionary. A consultation of this list can also aid in establishing the recency of the definition. (Author/PR)

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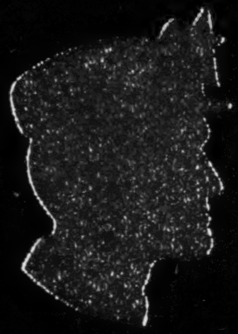

a dictionary of mining, mineral, and related terms

SE 012 482

a dictionary of mining, mineral, and related terms

compiled and edited
by Paul W. Thrush
and the Staff of
the Bureau of Mines

U.S. DEPARTMENT OF THE INTERIOR

1968

Created in 1849, the Department of the Interior—America's Department of Natural Resources—is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

UNITED STATES DEPARTMENT OF THE INTERIOR
STEWART L. UDALL, *Secretary*

BUREAU OF MINES
WALTER R. HIBBARD, JR., *Director*

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foreword

This *Dictionary of Mining, Mineral, and Related Terms* is the result of an effort by the Bureau of Mines extending over many years. The work began as a revision of Bureau of Mines Bulletin 95, *A Glossary of the Mining and Mineral Industry,* by Albert H. Fay, first published in 1918, and reprinted in 1947. Fay's Glossary, as it came to be known, has long been the standard authoritative reference work for technical and specialized terms related to mining and the mineral industries.

In the nearly 50 years that have elapsed since the first publication of Fay's Glossary, the expansion of the minerals industries and the development of new mining and related technologies have resulted in considerable extension of the vocabulary of mining and minerals. Hence, the need has grown for an up-to-date, comprehensive, and authoritative reference work. The increased scope and detailed treatment of the work justify its identification as *A Dictionary of Mining, Mineral, and Related Terms.*

Many individuals, especially those comprising the Bureau's staff of engineers, scientists, and technologists, contributed to the preparation of this comprehensive publication. Much of the credit for the direction and professional conduct of the task is due to Paul W. Thrush, who has served effectively as Editor in Chief.

The Bureau of Mines has prepared and published this dictionary in the expectation that it will be a useful tool in pursuing modern applications of one of the oldest industries in the world.

Walter R Hibbard Jr

WALTER R. HIBBARD, Jr.
Director
June 20, 1967

preface

This dictionary is published by the Bureau of Mines as a contribution to the mining and mineral literature in the belief that it will fill a recognized need.

Several attempts have been made over the years to revise Albert Fay's *Glossary of the Mining and Mineral Industry* which first appeared in December of 1918. Frank L. Hess of the Bureau of Mines worked on a revision, but his untimely death prevented its completion. Subsequently, the writer was employed to compile and edit this dictionary in cooperation with the technical staff of the Bureau of Mines.

Fay's glossary contained about 18,000 terms with 27,000 definitions; the present compilation contains about 55,000 terms with approximately 150,000 definitions. These terms are of both a technical and local nature, and they apply to metal mining, coal mining, quarrying, geology, metallurgy, ceramics and clays, glassmaking, minerals and mineralogy, and general terminology. Petroleum, natural gas, and legal mining terminology, unless of a general nature, has been excluded, as has been foreign terminology where there is an English equivalent. Several thousand Spanish-American mining terms that appeared in Fay's compilation have been removed to make way for the thousands of new English terms that have evolved over the years. Those Spanish-American and Mexican terms still used in the Southwestern United States have been retained.

Fay's compilation included terminology from the entire English-speaking world. This objective has been maintained in this dictionary. Many terms are identified by the country or area of origin. Others can be identified by examining the source following each definition. These sources are completely identified, with full bibliographical information, in the list of authorities and sources in the back of the dictionary. A consultation of this list can also aid in establishing the recency of the definition. Several thousand terms from Fay that might be considered obsolete were retained because it was felt that we had an obligation to preserve the historical record.

The list of authorities and sources in the back of the dictionary is only a partial listing of the sources consulted in compiling this dictionary. The items in this list are for the most part dictionaries, glossaries, or other tools that were found to be fruitful sources of information. Abbreviations of sources and references and other symbols used in the dictionary are identified in alphabetical sequence in the list of authorities and sources. Many additional citations from textbooks, research reports, and periodicals are given individually throughout the body of the dictionary following each definition. Geographical abbreviations are also listed in the back of the dictionary.

It is too much to hope that the first edition of a volume such as this will be free from error. The Bureau of Mines will appreciate having errors pointed out, and will welcome suggestions for the inclusion of additional terms that may appear to be desirable. Communications should be addressed to the Office of Mineral Information, Bureau of Mines, U.S. Department of the Interior, Washington, D.C. 20240.

PAUL W. THRUSH
Pittsburgh, Pa.
June 20, 1967

acknowledgments

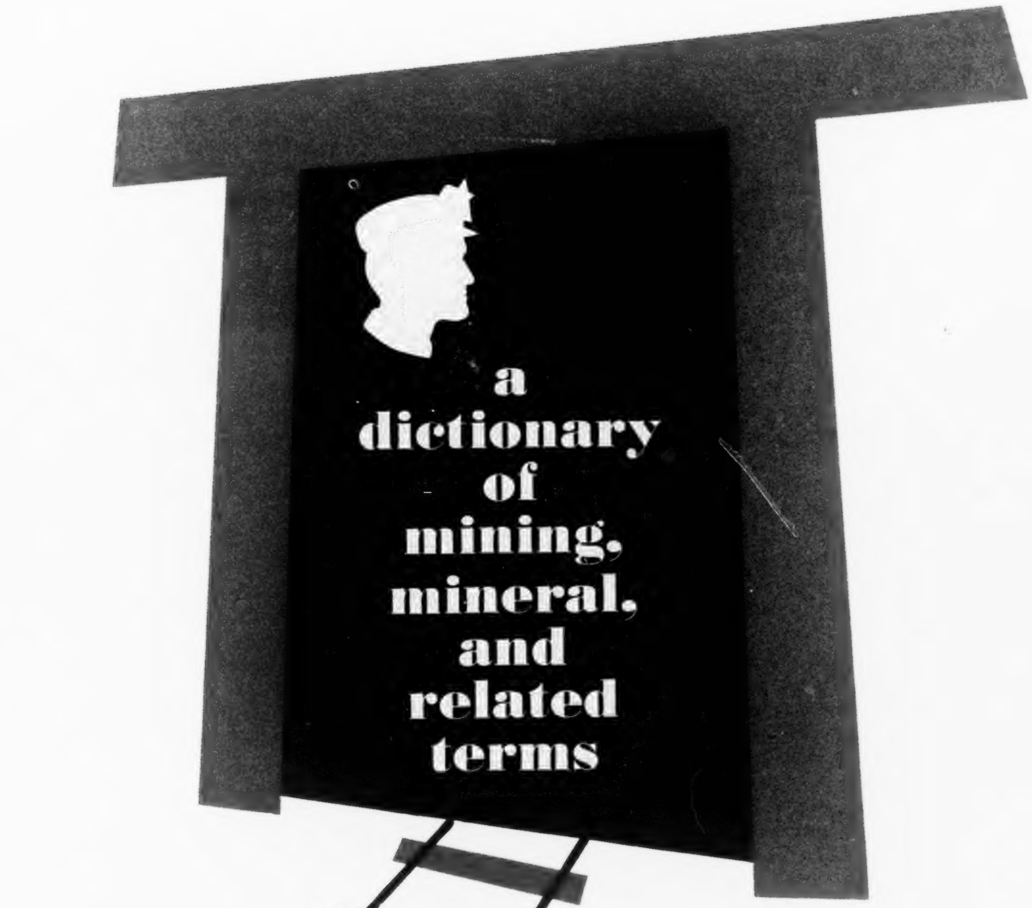
In the compilation of this dictionary, the Bureau of Mines gives credit for each definition as indicated in the list of authorities and sources quoted. Definitions credited *Webster 3d* in the text have been reproduced by special permission from Webster's Third New International Dictionary, copyright 1966 by the G. & C. Merriam Co., publishers of the Merriam-Webster Dictionaries. Reprinting of these definitions herein in truncated form is not to affect in any way the validity of the proprietary rights of the G. & C. Merriam Co. to the reprinted definitions. Definitions credited *Webster 2d* in the text have been reproduced by special permission from Webster's New International Dictionary, Second Edition, copyright 1959 by G. & C. Merriam Co., publishers of the Merriam-Webster Dictionaries, and their reprinting herein in truncated form is not to affect in any way the validity of the proprietary right of G. & C. Merriam Co. to the reprinted definitions. Material quoted from Webster's 2d Edition is of historical importance or is material not retained in Webster's 3d Edition.

In all, several hundred specialists of the Bureau of Mines read various sections of this dictionary for technical review. No section was read by fewer than two specialists. Since a listing of individual names would be extensive, grateful acknowledgment is here made for their efforts and for the suggestions and changes recommended by them. James E. Hill and Dr. C. Meade Patterson reviewed the mineral list; Taber de Polo and the late Howard P. Hamlin reviewed the ceramics list; and Dr. Patterson reviewed the general list and part of the geology list, and compiled a list of single-letter abbreviations that has been incorporated in the dictionary. Other Bureau personnel whose services deserve special acknowledgment include Earle P. Shoub, who reactivated the project after Hess' death; A. L. Julian, Jr., whose enthusiastic support reinforced my efforts over the past 6 years; Carl Rampacek and Robert P. Willing, both of whom gave valuable assistance and administrative counsel; Hazel J. Stratton, who gave valuable advice on editorial style; and Marion Hatch, whose unexcelled proficiency in library services helped to make the task easier. Special acknowledgment is due Charles W. Merrill, whose continuing interest and professional counsel played a major role in insuring the final completion of the project. In the final phase of the project, Dr. Miles J. Martin of Washington and Meyer Reiness of Pittsburgh provided the administrative authority and guidance needed to bring this long-standing project to a conclusion.

Finally, several people outside the Bureau deserve recognition for their help. I am indebted to Mr. Daniel R. Pfoutz, Head of the Science and Technology Department of Carnegie Library of Pittsburgh, Pa., who relaxed the rules and permitted me to use many noncirculating reference tools outside the library for this project; and to Mrs. Virginia R. Fischel, retired professor of library science at the Carnegie Institute of Technology, whose suggestions of sources led to the inclusion of several thousand terms in this compilation.

The contributions of three persons deserve special recognition. Mrs. David Mishelevich, formerly with the Bureau of Mines and now with the U.S. Geological Survey, made many significant contributions in the early stages of this project. To Marilyn Pantone and Pauline Mekon I owe my deepest gratitude and enduring regard for their cooperation and superior performance. Both of them started with me in 1961 and have remained loyal and dedicated through many vicissitudes. Without their invaluable assistance, this seemingly endless task could not have been completed.

P. W. T



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a a. Abbreviation for atom; atomic. *Webster 3d*. b. Symbol for surface per unit volume. *Zimmerman, p. 104*. c. Abbreviation for acre. Also abbreviated A. *Zimmerman, p. 3; Handbook of Chemistry and Physics, 45th ed., 1964, p. F-97*. d. Abbreviation for are (land area). *Zimmerman, p. 11*. e. Abbreviation for air. *Webster 3d*. f. Symbol for one of the three crystallographic axes *a, b, c*. Each axis is designated the a axis in the isometric crystal system in which all three axes are equal. Also given as *a*. *Bureau of Mines Staff*. g. Abbreviation for acceleration and the symbol for linear acceleration. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98; Webster 3d*. h. Abbreviation for aqua. *Webster 3d*. i. Abbreviation for anterior. *Webster 3d*. j. Abbreviation for asymmetric. *Webster 3d*. k. Symbol in structural petrology for the direction of tectonic transport, similar to the direction in which cards might slide over one another. Striations in a slickensided surface are parallel to direction a. *A.G.I., p. 1*. l. As a subscript, the symbol for adsorbed. *Zimmerman, p. 168*. m. Abbreviation for activity. *Zimmerman, p. 4*. n. Symbol for major axis of an ellipse or of an ellipsoid. *Zimmerman, p. 13*. o. Symbol for the standard temperature gradient of the atmosphere. *Zimmerman, p. 106*. p. Symbol for the characteristic of barometric tendency or of a barograph trace, during the past 3 hours. *Zimmerman, pp. 428, 439*.

a a. Symbol for surface per unit volume. *Zimmerman, p. 146*. b. Symbol for activity; chemical activity. *Zimmerman, pp. 145, 150*. c. Symbol for acceleration. *Zimmerman, p. 148*. d. Symbol for the velocity of sound. *Zimmerman, p. 368*. e. With subscript O, as a_0, the symbol for one of the unit-cell parameters, a_0, b_0, c_0. *Bureau of Mines Staff*. f. As a subscript, the symbol for adsorbed. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98*. g. With subscript 1, as a_1, the symbol for the Bohr radius. *Zimmerman, p. 163*. h. Symbol for aperture; slit width. *Zimmerman, pp. 148, 165*. i. Symbol for the coefficient of accommodation. *Zimmerman, 1. 152*. j. Symbol for standard temperature gradient of the atmosphere. *Zimmerman, p. 426*.

a-; an-. Prefix indicating absence, for example, amorphous (without crystalline form); anhydrous (not containing water). *Pryor, 3*.

a-(direction). In structural petrology, the direction of tectonic transport, similar to the direction in which cards might slide over one another. Striae in a slickensided surface are parallel to *a*. *A.G.I.*

A a. Abbreviation for angstrom; angstrom unit. Also abbreviated a; Å. *BuMin Style Guide, p. 58; Webster 3d; Zimmerman, p. 10*. b. Abbreviation for absolute temperature. *Zimmerman, p. 3*. c. Formerly the chemical symbol for argon, but Ar, has replaced it. *CCD 6d, 1961*. d. Symbol for mass number. *Webster 3d*. e. Abbreviation for area; cross-sectional area; surface area. *Zimmerman, pp. 11, 32, 104*. f. Abbreviation for air. Also abbreviated a. *Zimmerman, p. 5; Webster 3d*. g. Abbreviation for asbestos. *Zimmerman, p. 214*. h. Abbreviation for ampere. *Webster 3d*. i. Abbreviation for amplitude. *Zimmerman, p. 8*. j. Abbreviation for anode. Also abbreviated a. *Zimmerman, p. 10*. k. Abbreviation for Arctic. *Zimmerman, p. 6*. l. Abbreviation for arroyo. *Zimmerman, p. 11*. m. Abbreviation for arch. *Zimmerman, p. 11*. n. Abbreviation for aperture. Also abbreviated a. *Zimmerman, p. 10*. o. Symbol for hail. *Zimmerman, p. 52*. p. Symbol for attenuation constant in acoustics. *Zimmerman, p. 13*. q. Symbol for magnetic vector potential. *Zimmerman, p. 162*.

A a. Symbol for atomic weight. *Zimmerman, p. 151*. b. Symbol for area; surface area; cross-sectional area; total cross-sectional area. *Zimmerman, pp. 151, 170, 185, 365*. c. Abbreviation for amplitude. *Zimmerman, p. 150*. d. Abbreviation for aperture. *Zimmerman, p. 148*. e. Symbol for the refracting angle of a prism. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98*. f. Symbol for power gain of amplifier; power amplification of amplifier; voltage gain of amplifier; voltage amplification of amplifier; amplification of amplifier voltage. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98; Zimmerman, pp. 150, 156*. g. Symbol for attenuation constant in sound transmission. *Zimmerman, p. 189*. h. Symbol for sheet current density. *Zimmerman, p. 260*.

aa Abbreviation for acetic acid. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-74*.

aa (pronounced ah-ah). A Hawaiian term for lava consisting of a rough assemblage of clinkerlike scoriaceous masses. It is contrasted with pahoehoe used to designate the smoother flows. *Fay; Hess*.

Aalenian. Lowermost Middle or uppermost Lower Jurassic. *A.G.I. Supp*.

A-alloy. An alloy containing 3 per cent copper, 20 percent zinc, and 77 percent aluminum; developed by the Alloys Research Committee of the British Institution of Mechanical Engineers; very susceptible to corrosion. *Chem. & Met. Eng., v. 26, April 12, 1922, p. 690.*

AAPG Abbreviation for the American Association of Petroleum Geologists. *Williams.*

Aasby diabase. An olivine diabase containing biotite, ilmenite, and apatite in addition to labradorite, augite, and olivine; from Aasby, Sweden. *Holmes, 1928.*

AASHO (American Association of State Highway Officials) compaction. *See* compaction test. *ASCE P1826.*

a-axis. In structural petrology, the direction of movement or transport in a tectonite. This may be parallel to lineation, as in many shear zones (slickensides), or normal thereto, as in regionally folded metamorphic terranes. *A.G.I.*

ab- A prefix added to the names of the practical electrical units to indicate the corresponding unit in the cgs (centimeter-gram-second) electromagnetic system, or the electromagnetic unit (emu); for example, abampere; abcoulomb; abvolt. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-29.*

abalone. The mollusc Haliotis, also known as an ormer or ear shell. From the Pacific waters of California; Mexico; Japan; and New Zealand. *See also* Haliotis. *Shipley.*

abalone pearl. A colored pearl from the abalone. Usually a blister pearl although a true pearl is found occasionally, especially in Mexico and in California. Usually of pronounced green, pale green, or pink hues. *Shipley.*

abamp. Abbreviation for absolute ampere. *BuMin Style Guide, p. 58.*

abampere. The centimeter-gram-second (cgs) electromagnetic unit of current, that is, that current which, in a one-turn circular conductor of 1 centimeter radius in a vacuum, produces a magnetic intensity of 2π oersteds at the center of the circuit. Equals 10 absolute amperes. *Hess.*

abandon. To stop drilling and remove the drill rig from the site of a borehole before the intended depth or target is reached. *Long.*

abandoned cliff; ancient cliff. Cliff abandoned by the sea in consequence of negative movements of the sea level. *Schieferdecker.*

abandoned mine. *See* abandoned workings.

abandoned well. An oil or gas well abandoned because its yield has fallen below that necessary for profitable production. *A.G.I. Supp.*

abandoned workings. Excavations, either caved or sealed, that are deserted and in which further mining is not intended and opening workings which are not ventilated and inspected regularly. *U.S. BuMines Federal Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. I Underground Mines, October 8, 1953.*

abandonment. The act of abandoning; relinquishment. *Webster 3d.* Abandonment of a mining claim may be by failure to perform work, by conveyance, by absence, and by lapse of time. The abandonment of a mining claim is a question of intent. To constitute an abandonment of a mining claim, there must be a going away, and a relinquishment of rights, with the intention never to return, and with a voluntary and independent purpose to surrender the location or claim to the next comer. *Compare* forfeiture. *Fay.*

abandonment plans. Gr. Brit. The plans, drawings, and sections required by law to be sent to the District Inspector of Mines, following the abandonment of a seam or mine. *B.S. 3618, 1963, sec. 1.*

abas. The Persian weight for pearls, about 2.66 troy grains. *Shipley.*

abate. In metalworking, to lower the temper of. *Standard, 1964.*

abatis; abattis. Leic. Walls or ranges of rough wood, for example, cordwood placed crossways to keep the underground roads open for ventilation, etc. *Fay.*

Abbcite. Ammonia dynamite containing a high percentage of alkali chloride. Used as an explosive in coal mining. *Bennett 2d, 1962.*

Abbe jar. In mineral processing, a porcelain jar used for laboratory batch grinding tests in ceramic ware. *Pryor, c.*

Abbe number; Abbe value. A measure of the optical dispersion of a glass. *Dodd.*

Abbe theory. The visibility of an object under the microscope is directly proportional to the wavelength of light, and inversely as aperture of lens. *Pryor, 3.*

Abbe tube mill. A gear-driven tube mill supported on a pair of riding rings and distinguished by an Archimedes spiral, through which the ore is fed and discharged. Grinding is effected by flint pebbles fed into the mill. *See also* ball mill. *Liddell 2d, p. 355.*

Abbe value. *See* Abbe number. *Dodd.*

A.B.C. Process of Sewage Disposal. Precipitation of sewage sludge by the use of alum, blood, charcoal, and clay. *Ham.*

ABC system. A method of seismic surveying by which the effect of irregular weathering thickness may be determined by a simple calculation from reciprocal placement of shotholes and seismometers. The method was originally used to solve refraction problems arising from irregularities in the top of the high-velocity layer. *A.G.I.*

Abegg rule. Maximum positive valence plus maximum negative valence usually totals 8, notably with 4th, 5th, 6th, and 7th group elements. *Pryor, 3.*

Abel flashpoint apparatus. Used for determining the flashpoint of petroleum. *Bennett 2d, 1962 Add.*

Abel heat test. A test used to assess the chemical stability of an explosive, and this test can also be used to determine the degree of deterioration that may have occurred during long periods of storage. *McAdam II, p. 21.*

Abelite. Ammonium nitrate and trinitrotoluene composition used as an explosive. *Bennett 2d, 1962.*

Abel's reagent. Etching agent consisting of 10 percent chromium trioxide in water. Used in the analysis of carbon steels. *Bennett 2d, 1962.*

abernathyite. A rare, yellow secondary mineral, $K(UO_2)AsO_4.4H_2O$, of the meta-autunite group; a potassium analogue of uranospinite, containing 52.8 percent uranium; tetragonal. Small yellow crystals from the Temple Mountains, Utah. *Frondel, p. 175; Spencer 21, M.M., 1958.*

aberration. The failure of a lens or mirror to bring the light rays to the same focus. When aberration is due to the form of the lens or mirror it is called spherical aberration. When due to the different refrangibility of light of different colors, it is called chromatic aberration. When present in magnifiers it often causes inaccurate decisions as to flawlessness or color of gems. *Shipley.*

Aberson machine. *See* soft-mud process. *Dodd.*

abime. A large, steep-sided vertical shaft opening at the surface of the ground. *A.G.I.*

abioglyph. A marking (hieroglyph) of inorganic origin. *Pettijohn.*

A bit. A nonstandard, obsolete size diamond-drill bit. *Long.*

ablation. a. The formation of residual deposits by the washing away of loose or soluble minerals. *Fay.* b. The wearing away of rocks, or surface melting of glaciers. *Standard, 1964.* c. The combined processes that decrease the size of a glacier. *Mather.*

ablation area. That part of a glacier or snowfield where ablation exceeds accumulation. Also called area of dissipation; dissipator. *A.G.I.*

ablatograph. An instrument that records ablation by measuring the distance which a snow or ice surface sinks during the period of observation. *A.G.I.*

A.B. Meco-Moore. An improved form of Meco-Moore—the pioneer of cutter loaders in Great Britain. A bulky machine which cuts a deep web of coal up to 6 feet and used in cyclic mining in medium to thick seams. It runs on the floor of the seam and does not require a prop-free front. It carries two horizontal jibs, one cutting at floor level and the other at a height depending on seam conditions. The use of the Meco-Moore is declining. *Nelson.*

Abney level. A surveying instrument for taking levels up steep slopes; also used as a clinometer. *Ham.*

abnormal. Deviating from the normal; differing from the typical; irregular; unusual. *Webster 3d.*

abnormal place. A working place in a coal mine with adverse geological or other conditions and in which the miner is unable to earn a wage, based on the pricelist, equal to or above the minimum wage. A term generally associated with stalls or pillar methods of working. *Nelson.*

Aboglas. Sheeting of asbestos and glass fibers. Used as an insulator. *Bennett 2d, 1962 Add.*

ab-plane. In structural petrology, the surface along which differential movement takes place. A is the direction of displacement —that is, the direction of tectonic transport; b lies in this surface of movement and is perpendicular to a. *A.G.I.*

abradant. An abrading substance, as emery, sand, etc., used in grinding, polishing, etc. *Standard, 1964. See also* abrasive. *Fay.*

abrade. a. To rub or wear off; to waste or wear away by friction, as to abrade rocks. *Webster 3d.* b. As used in the sharpening-stone industry, abrading means cutting, as the steel composing the tool is cut away rather than worn away. *Fay.* c. The wearing away of diamonds, drill-bit matrices, and drill-stem equipment by frictional contact with the rock material penetrated or by contact with the cuttings produced by the action of the drill bit in drilling a borehole. *Long.*

abrading. Wearing away any substance with an abrasive. *Mersereau, 4th, p. 285.*

Abram's law. Strength of concrete depends on water-to-cement ratio of mixture. Minimum needed for chemical action is 0.35 to 1. *Pryor, 3.*

abraser. A device for assessing the wear resistance of surfaces. The specimen to be tested is rubbed alternately by the flat faces of two weighted abrasive wheels. These wheels revolve in opposite directions through frictional contact with the specimen and exert a combined abrasive, compressive, and twisting action twice in each revolution of the specimen holder. *Osborne.*

abrasion. a. The wearing away by friction. *A.G.I.* b. The act of wearing or rubbing off. *A.G.I.* c. Wearing away by rubbing or friction, the chief agents being currents of water laden with sand and other rock debris and by glaciers. *A.G.I.* d. The operation of wearing away by aqueous or glacial action. *A.G.I.*

abrasion hardness. Hardness expressed in quantitative terms or numbers indicating the degree to which a substance resists being worn away by frictional contact with an abrasive material, such as silica or carborundum grits. Also called abrasion resistance; wear resistance. *Compare* scratch hardness. *Long.*

abrasion index. The percentage of a specially prepared 3 in.–2 in. sample of coke remaining on a ⅛-inch mesh B.S. test sieve after the sample of coke has been subjected to a standardized abrasion procedure in a rotating drum. *B.S. 1016, 1961, Pt. 16.*

abrasion of refractories. Wearing away of the surfaces of refractory bodies in service by the abrading action of moving solids. *HW.*

abrasion platform. An uplifted abrasion platform of large areal extent is a marine peneplain or a marine plane, according to the smoothness of the surface produced by wave erosion. *A.G.I.*

abrasion resistance. The degree to which a porcelain enamel will resist attack by abrasive materials. *ASTM C286-65. See also* abrasion hardness.

abrasion shoreline. *See* shoreline of retrogradation. *Schieferdecker.*

abrasive. A substance used for grinding, honing, lapping, superfinishing, polishing, pressure blasting, or barrel finishing. It includes natural materials such as garnet, emery, corundum, and diamond, and electric-furnace products like aluminum oxide, silicon carbide, and boron carbide. *ASM Gloss.* Natural abrasives in order of hardness include diamond, corundum, emery, garnet, and pumice. Artificial abrasives include borazon, carborundum, corundum (sold as alundum, aloxite, etc.), boron carbide. For preparing polished surfaces on mineral specimens, carborundum, levigated alumina, jeweler's rouge, and magnesia are much used, diamond-impregnated paste being employed at final stage. *Pryor, 3.*

abrasive belt. A coated abrasive product, in the form of a belt, used in production grinding and polishing. *ASM Gloss.*

abrasive disk. a. A grinding wheel which is mounted on a steel plate, with the exposed flat side being used for grinding. *ASM Gloss.* b. A disk-shaped, coated abrasive product. *ASM Gloss.*

abrasive drilling. A rotary drilling method in which drilling is effected by the abrasive action of the drill steel or drilling medium which rotates while being pressed against the rock. *Fraenkel, v. 1, Art. 8:30, p. 21.*

abrasive finishing. The final cuts taken with a grinding wheel to obtain the accuracy and surface desired. *ACSG, 1963.*

abrasive formation. A rock consisting of small, hard, sharp-cornered, angular fragments, or a rock, the cuttings from which, produced by the action of a drill bit, are hard, sharp-cornered, angular grains, which grind away or abrade the metal on bits and drill-stem equipment at a rapid rate. Also called abrasive ground. *Long.*

abrasive ground. Synonym for abrasive formation. *Long.*

abrasive hardness test. This test employs a rotating abrasive wheel or plate against which specimens are held. The specimens are abraded for a given number of revolutions and the weight of material lost is a measure of the abrasive hardness. *Lewis, p. 574.*

abrasive tumbling. *See* barrel finishing. *ACSG, 1963.*

abraum salts. *See* abraumsalze.

abraumsalze; abraum salts. Ger. Mixed sulfates and chlorides of potassium, sodium, and magnesium overlying the rock salt in the Stassfurt salt deposits. *Holmes, 1928.*

abriachanite. An earthy, amorphous form of crocidolite. *Dana 6d, p. 400.*

abros. A stainless and corrosion-resisting alloy containing 10 percent chromium, 88 percent nickel, and 2 percent manganese. *Campbell.*

abs Abbreviation for absolute. *BuMin Style Guide, p. 58.*

absarokite. An alkalic basalt consisting of about equal amounts of olivine, augite, labradorite, and sanidine, with accessory biotite, apatite, and opaque oxides. Leucite is sometimes present in small amounts. Absarokite forms a series with shoshonite with decreasing amounts of olivine and increasing amounts of plagioclase and sanidine. *A.G.I.*

abscissa. The axis at right angles to the axis of ordinates. *Crispin.*

absolute. a. In chemistry, free from impurity or admixture. *Hess.* b. In physics, not dependent on any arbitrary standard. *Hess.* c. Frequently used in the trades to indicate a thing as being perfect or exact. Abbreviation, abs. *Crispin.*

absolute ampere. a. The current which, when flowing in a circular conductor of 1 centimeter radius, produces at the center a field strength of 2π gauss. The ampere normally used in electrical engineering is one-tenth of this quantity. *C.T.D.* b. One-tenth of an abampere. *Hess.*

absolute atmosphere. An absolute unit of pressure equal to 1 million times the pressure produced on 1 square centimeter by the force of 1 dyne. *Fay.*

absolute chronology. The geologic chronology expressed in years. *Schieferdecker.*

absolute daily range. During the 24 hours of the day the difference between the maximum easterly and maximum westerly values of the magnetic declination at any point. *Mason, v. 2, p. 719.*

absolute drought. In Great Britain, a minimum period of 15 consecutive days during which not more than 0.01 inch of rain has fallen; this definition is not accepted internationally. *Ham.*

absolute humidity; humidity of air. The number of grams of water vapor per cubic meter of the air. From the mine ventilation aspect, the relative humidity is the important factor. *See also* saturated air. *Nelson.*

absolute isohypse. A line that has the properties of both constant pressure and constant height above mean sea level. Therefore, it can be any contour line on a constant-pressure chart, or any isobar on a constant-height chart. *H&G.*

absolute ownership. In law, an unqualified title to property and the unquestioned right to immediate and unconditional possession thereof. *Standard, 1964.* Applies to mining claims and properties. *Hess.*

absolute permeability. A measure of possible flow of a standard liquid under fixed conditions through a porous medium when there is no reaction between the liquid and the solids. This measure is arbitrarily taken for isothermal viscous flow. It can be duplicated with gases if tests are so conducted that extrapolation to infinite pressure can be made; specific permeability. *Hess.*

absolute potential. True potential difference between a metal and the solution in which it is immersed. *Pryor, 3.*

absolute pressure. a. Total pressure at a point in a fluid equaling the sum of the gage pressure and the atmospheric pressure. *Webster 3d.* b. Pressure measured with respect to 0 pressure, in units of force per unit of area. *C.T.D.*

absolute roof. a. The entire mass of strata overlying a coal seam. *See also* nether roof, a. *Nelson.* b. In mine subsidence, the entire mass of superjacent rocks. *Briggs, p. 61.* c. The entire mass of strata overlying a subsurface point of reference. *Bureau of Mines Staff.*

absolute scale. *See* Kelvin temperature scale.

absolute temperature. Temperature reckoned from the absolute zero. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-29.*

absolute time. Geologic time measured in terms of years. *Compare* relative time. *Leet.*

absolute valency. The valence numerically equal to the number of electrons of an atom engaged in attaching other atoms. *Pryor, 3.*

absolute viscosity. The force required to move a plane surface of area 1 square centimeter over another parallel plane surface 1 centimeter away at a rate of 1 centimeter per second when both surfaces are immersed in the fluid. This force (the unit of absolute viscosity) is called the poise. *Francis, 1965, v. 1, p. 210.*

absolute zero. The temperature at which a gas would show no pressure if the general law for gases would hold for all temperatures. It is equal to −273.16° C or −459.69° F. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-29.*

absorb. To drink in or to suck up as a liquid by a solid like a sponge or fuller's earth. *Fay.*

absorbed dose. Usually expressed as rads, which represents the energy absorbed from the radiation per gram of specified body tissue. *BuMines Bull. 630, 1965, p. 747.*

absorbed water. Water held mechanically in a soil mass and having physical properties not substantially different from ordinary water at the same temperature and pressure. *ASCE P1826.*

absorbent. A substance that absorbs. *Crispin.*

absorbent formation. A rock or rock material, which, by virtue of its dryness, porosity, or permeability, has the ability to drink in or suck up a drilling liquid, as a sponge absorbs water. Also called absorbent ground. *Long.*

absorbent ground. Synonym for absorbent formation. *Long.*

absorbents. Substances, such as wood meal and wheat flour, which are also forms of low explosive when mixed with metallic nitrates, and tend to reduce the blasting power of the explosives making them suitable for coal blasting. *Cooper, pp. 345–346.*

absorber. a. An apparatus in which gases are brought into intimate contact with an extended surface of an absorbing fluid so that they enter rapidly into solution. Absorbers are used in saving casinghead gasoline. *Hess.* b. The resistance and condenser in series which is placed across a break in an electrical circuit in order to damp any possible oscillatory circuit, which would tend to maintain an arc or spark when a current is interrupted. Also called a spark absorber. *C.T.D.* c. Any material that absorbs or stops ionizing radiation. Strong neutron absorbers like boron, hafnium, and cadmium are used in control rods. Lead, concrete, and steel attenuate gamma rays and neutrons in nuclear reactor shields. A thin sheet of paper or metal will stop or absorb alpha particles and all but very energetic beta particles. *See also* poison. *L&L.*

absorber plant. A plant that has the ability to take on the characteristics of some elements in its cycle of life (for example, piñon tree absorption of a radioactive substance and the consequent radioactivity released by some piñon trees). *Ballard.*

absorbing well. A well sunk for the purpose of draining away water. *Ham.*

Absorbite. Trade name for activated charcoal. *Hess.*

absorptiometer. A device for measuring the solubility of a gas in a liquid. *Bennett 2d, 1962.*

absorptiometry. Measurement of the loss through absorption by homogeneously colored solution of monochromatic light. Absorption (Beer's Law) is proportional to the number of molecules through which the light passes. The Bougner-Beer Law is

$$I = I_0 \times 10^{-kc1}$$

Where I is intensity; 1 is distance traveled; I_0 is original intensity; k is an extinction coefficient; c is concentration (grams per liter). Measuring instruments are called absorptiometers or spectrophotometers; much used types being the Lumetron and the Spekker. The method is used where light (including ultraviolet) can be employed as an analytical colorimetric medium. It is much used in mineral dressing control analysis and research. *Pryor, 3.*

absorption. a. Taking up, assimilation, or incorporation; as, the absorption of gases in liquids, as distinguished from adsorption. Sometimes loosely used in place of adsorption. *A.G.I.* b. The act or process of absorbing, imbibing, swallowing, or engulfing mechanically. *Fay.* c. A taking in or reception by molecular or chemical action. *Fay.* d. The phenomenon observed when a pleochroic mineral is rotated in plane polarized light. In certain positions, the mineral is darker than in others, owing to the absorption of light. *Fay.* e. In hydrology, a term applied to the entrance of surface water into the lithosphere by all methods. *A.G.I.* f. As applied to ceramic products, the weight of water which can be absorbed by the ware, expressed as a percentage of the weight of the dry ware. *HW.* g. The process by which a liquid is drawn into and tends to fill permeable pores in a porous solid body; also, the increase in weight of a porous solid body resulting from the penetration of a liquid into its permeable pores. *ASTM C125–66.*

absorption hygrometer. A type of hygrometer with which the water vapor content of the atmosphere is measured by means of the absorption of vapor by a hygroscopic chemical. The amount of vapor absorbed may be determined in an absolute manner by weighing the hygroscopic material, or in a nonabsolute manner by measuring a physical property of the substance that varies with the amount of water vapor absorbed. The lithium chloride humidity strip and carbon-film hygrometer element are examples of the latter. *H&G.*

absorption loss. a. The loss of water occurring during initial filling of a reservoir in wetting rocks and soil. *Ham.* b. That part of the transmission loss which is due to dissipation or the conversion of sound energy into some other form of energy, usually heat. This conversion may take place within the medium itself or upon a reflection at one of its boundaries. This loss is a critical factor in the effectiveness of sonar equipment. *Hy.*

absorption of gases. The solution of gases in liquids or the absorption of gases by solids. In mining, the entry of oxygen into coal or carbonaceous matter may initiate slow combustion and fires when the conditions are favorable. *See also* spontaneous combustion. *Nelson.*

absorption oil. Oil containing little or no gasoline, for example, mineral seal oil, used in the absorption process for extracting gasoline from natural gas. *Bennett 2d, 1962.*

absorption plant. Plant for recovering gasoline from natural gas by absorption. *Bennett 2d, 1962.*

absorption process. A method of treating wet gas by passing it through an absorber in which large surfaces of mineral seal oil or a similar oil are exposed and absorb the heaviest fraction of the gas. This is later distilled from the oil and is known as casing-head gasoline. The oil is recirculated and the gasoline is piped to a condenser and then to an accumulator. *Hess.*

absorption rate. a. The rate, expressed in quantitative terms, at which a liquid, such as a drilling circulation medium, is absorbed by the rocks, or rock materials, penetrated by the drill bit. *Long.* b. The amount of water absorbed when the brick is partially immersed for 1 minute; usually expressed either in grams or ounces per minute. Also called suction rate; initial rate of absorption. *ACSG.*

absorption ratio. *See* saturation coefficient. *Dodd.*

absorption refrigeration. A process whereby a secondary fluid absorbs the refrigerant, and in doing so, gives up heat, then releases the refrigerant, during which it absorbs heat. *Strock, 10.*

absorption spectrum. The series of dark bands crossing a continuous spectrum, seen when white light has been transmitted through a colored vapor, liquid, or solid. *Anderson, p. 354.* When white light passes through a colored stone, light of certain wavelengths is absorbed more strongly than others, the colors least absorbed combining to produce the color of the stone. When viewed through a spectroscope, the colors most strongly absorbed may show as dark bands crossing the spectrum in characteristic positions. Such a spectrum is known as an absorption spectrum, and provides a useful means of identification. *Anderson.*

absorption tower. A tower in which a liquid absorbs a gas. *Bureau of Mines Staff.*

absorptivity. The ratio of the radiant energy absorbed by a body to that falling upon it. It is equal to the emissivity for radiation of the same wavelength. *Strock, 10.*

abstract. To absorb the waters of a neighboring stream by abstraction; said of watercourses. *Standard, 1964.*

abstraction. In geology, the draining of water from a stream by another having more rapid corrading action. *Standard, 1964.*

abteilung. a. Ger. A part or district of a mine assigned to the care of a fireman or deputy. *Fay.* b. Ger. A stratigraphical formation or series. *Holmes, 1928.*

abundant vitrain. A field term denoting, in accordance with an arbitrary scale established for use in describing banded coal, a frequency of occurrence of vitrain bands comprising 30 to 60 percent of the total coal layer. *Compare* dominant vitrain; moderate vitrain; sparse vitrain. *A.G.I.*

abutment. a. A surface or mass provided to withstand thrust, for example, the end supports of an arch or bridge. In coal mining, (1) the weight of the rocks above a narrow roadway is transferred to the solid coal along the sides, which act as abutments of the arch of strata spanning the roadway; and (2) the weight of the rocks over a longwall face is transferred to the front abutment, that is, the solid coal ahead of the face and the back abutment, that is, the settled packs behind the face. *See also* pressure arch. *Nelson.* b. The structural portion of a furnace that withstands the thrust of an arch. *A.R.I.*

abutment load. In underground mining, the weight of rock above an excavation which has been transferred to the adjoining walls. *Pryor, 3.*

abysmal. *See* abyssal.

abysmal sea. That part of the sea which occupies the ocean basins proper. *Fay.*

abyss. a. A very deep, unfathomable place. The term is used to refer to a particularly deep part of the ocean, or to any part below 3,000 fathoms. *H&G.* b. Synonym for pit; pot; pothole; chasm; shaft. *Schieferdecker.*

abyssal; abysmal. a. Of, or pertaining to, deep within the earth. Synonym for plutonic. *A.G.I.* b. Of, or pertaining to, the oceanic deeps below 1,000 fathoms (6,000 feet). *A.G.I.* c. Referring to the great depths of seas or lakes where light is absent. *A.G.I.* d. In oceanography, relating to the greatest depths of the ocean; relating to the abyssal realm. *C.T.D.* e. Deep-sea region below the mean sphere level. *Schieferdecker.*

abyssal assimilation. *See* assimilation. *Hess.*

abyssalbenthic. A zone comprising all of the deep-sea benthic system below the archibenthic zone, or below 800 to 110 meters. *A.G.I.*

abyssal deposit. A deposit of the deep sea, accumulating in depths of more than 1,500 fathoms of water; these deposits comprise the organic oozes, various muds, and red clay of the deepest regions. *C.T.D.*

abyssal injection. The process by which magmas, originating at considerable depths, are considered to have been driven up through deep-seated contraction fissures in the earth's crust. *Hess.*

abyssal intrusion. An alternative name for a plutonic intrusion. *C.T.D.*

abyssal plain. a. An area of the ocean floor with a slope of less than 1 in 1,000. *Schieferdecker.* b. Flat, nearly level areas which occupy the deepest portions of many ocean basins. *A.G.I.*

abyssal realm. The deep waters of the ocean below 1,000 fathoms, or 2,000 meters, or

6,000 feet. *Bureau of Mines Staff.*

abyssal rock. A plutonic or deep-seated igneous rock. The word was suggested and especially used by Brögger. *Fay.*

abyssal theory. A theory of the origin of ores involving the separation of ore from silicates during the cooling of the earth from the liquid stage. *A.G.I.*

abyssal zone. The marine-life zone of the deep sea embracing the water and bottom below a depth of 6,000 feet. *Stokes and Varnes, 1955.*

Abyssinian gold. a. Talmi gold. Brass having a thin facing of gold applied by rolling. Used for costume jewelry. *CCD 6d, 1961.* b. A yellow- or gold-colored aluminum bronze containing 5 to 10 percent aluminum, the remainder being copper. *CCD 6d, 1961.*

Abyssinian well. Pointed and perforated tube driven into the ground by a light pile-hammer. Water is extracted by pumping. *Ham.*

abyssobenthic. Relating to that part of the abyssal realm which includes the ocean floor; pertaining to or living on the ocean floor at great depths. *C.T.D.*

abyssolith. Literally, a bottomless body of rock material; a molten mass of eruptive material passing up without a break from the zone of permanently molten rock within the earth. *A.G.I.*

abyssopelagic. a. Relating to that part of the abyssal realm which excludes the ocean floor; floating in the depths of the ocean. *C.T.D.* b. Pertaining to that portion of the deep waters of the ocean which lie below depths of 2,000 meters (6,000 feet). *A.G.I.*

ac Abbreviation for alternating current; acid. Also abbreviated AC, a-c, a c. *BuMin Style Guide, p. 58; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-74; Zimmerman, p. 7.*

Ac Chemical symbol for actinium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

acadialite. A reddish variety of chabazite. *Dana.*

Acadian. A series name applied to the Middle Cambrian strata of the Atlantic Province in North America (Newfoundland, Nova Scotia to eastern Massachusetts). *C.T.D.*

Acadian orogeny. Late Devonian diastrophism. *A.G.I. Supp.*

acanthite. A silver sulfide, Ag_2S; monoclinic; color and streak, blackish lead-gray; Mohs' hardness, 2 to 2.5; specific gravity, 7.2 to 7.3. *Dana 17.* Contains 87 percent silver. *Sanford.*

acarreos. a. Mex. Float rock. *Fay.* b. Mex. Drift composed of rounded rocks, pebbles, and gravel. *Fay.*

acaustobiolith. a. An incombustible sediment resulting from biologic activity, for example, limestone. *A.G.I.* b. Noncombustible, organic deposits of purely mineral character. *A.G.I.*

acaustophytolith. A rock formed wholly from pure accumulation of organically produced mineral matter, such as those formed from diatoms (silica) and nummulites (calcite). *A.G.I.*

accelerated weathering test. A test to indicate the effect of weather on coal, in which the coal is alternately exposed to freezing, wetting, warming, and light; the alternation may be varied to suit. This test may be applied to other bituminous material. *Hess.*

accelerating points. Each position of an electric controller which increases the current through the motor is known as an accelerating point. *NEMA MB1-1956.*

acceleration. That due to the gravitational attraction of the earth is 980.665 centimeters per square second (32.174 feet per-square second) for a free-falling body in vacuum. *International Committee on Weights and Measures.* True value varies slightly with isotatic effect, latitude, longitude, and the departure of the planet from a truly spherical shape. *Pryor, 3.*

accelerator. a. A machine that accelerates electrically charged atomic particles to high velocities. Electrons, protons, deuterons, and alpha particles can be accelerated to nearly the speed of light for use in nuclear research. Types of accelerators include the betatron, cyclotron, linear accelerator, and synchrotron. Familiarly known as atom smasher. *L&L.* b. In the case of stucco, plaster, mortar, concrete, etc., a substance which will hasten the set. *ASTM C11-60.* c. A device controlling the rate at which fuel is injected into a combustion-type engine and hence controlling its speed. Also called throttle. *Long.* d. A substance added to increase the rate of a chemical reaction. *See also* catalyst. *Nelson.*

accelerometer. An instrument used to measure acceleration; specifically, a seismograph designed to measure earth particle accelerations. *A.G.I.*

acceptance operations. In mineral processing, rejection of material hoisted as run-of-mine ore because of inferior quality. *Bureau of Mines Staff.*

acceptor levels. Energy levels formed within the energy gap by a deficiency of electrons. *VV.*

accessory. a. Applied to minerals occurring in small quantities in a rock. The presence or absence of these minor minerals does not affect the classification or the naming of the rock. *Holmes, 1928.* b. Fragments derived from previously solidified volcanic rocks of related origin, that is, the debris of earlier lavas and pyroclastic rocks from the same cone. *See also* accessory mineral, b. *Bureau of Mines Staff.* c. In a strict sense, only those tools or small parts, etc., normally supplied with a drill machine by the manufacturer without their being specifically ordered by the buyer of the drill. In a general sense, the term is commonly and synonymously used for auxiliary. *See also* auxiliary, a. *Long*

accessory ejecta. Pyroclastic materials derived from previously solidified volcanic rocks of consanguineous origin, that is, the debris of earlier lavas and pyroclastic rocks from the same cone. Such ejecta correspond to the materiaux paleogenes of Lacroix. *A.G.I.*

accessory elements. Synonym for minor elements; trace elements. *A.G.I.*

accessory mineral. a. One of those mineral constituents of a rock that occur in such small amounts that they are disregarded in its classification and definition. Opposite of essential mineral. *Fay.* b. Primary type minerals which were associated with the parent clay-forming material usually mica, feldspar, and quartz, (that is, decomposition of granite to kaolin with accessory minerals mica, feldspar, and quartz. *Bureau of Mines Staff.*

accessory plate. a. The quartz wedge inserted in the microscope substage above the polarizer in order to estimate birefringence and to determine optical sign of uniaxial minerals. *Pryor, 3.* b. The selenite plate which gives the sensitive tint of a specimen between crossed nicols. *Pryor, 3.* c. The mica plate which retards yellow light. *Pryor, 3.*

access road. A route constructed to enable plant, supplies, and vehicles to reach a mine, quarry, or opencast pit. In remote and isolated regions, the provision of an access road may be very costly. *Nelson.*

access time. That required to locate data in the memory. *Pryor, 3, p. 31.*

accident. Gr. Brit. An incident or event at work in which someone sustains a bodily injury which causes the injured person to be away from work for more than three days. A certain degree of harm to an individual is the criterion. The event is then usually classified as a fatal, a serious nonfatal, or a minor or plus 3-day accident. *See also* near accident. *Nelson.*

accidental. A broken fragment derived from volcanic rock, not of the magma involved during an eruption, but from other igneous, metamorphic, or sedimentary rocks through which the vent was developed *Hess.*

accidental block. A solid chip of igneous, metamorphic, or sedimentary rock torn from the subvolcanic basement and ejected from a volcano. Synonym for noncognate block. *A.G.I.*

accidental error. Unpredictable, arising from special cause. *Pryor, 3, p. 159.*

accidental inclusion. An enclosed crystal or fragment having no genetic connection with the igneous rocks in which they occur. *See also* accidental. *Hess.*

accidental pearl. Genuine natural pearl as distinguished from (artificially induced) cultured pearl. A term not used in the trade as it is of questionable meaning. *Shipley.*

accident-cause code. A system sponsored by the American Standards Association. Under this code accidents are classified under eight defective working conditions and nine improper working practices. *Nelson.*

accident frequency rate. The number of all disabling injuries (fatal, permanent-total, permanent-partial, and temporary lost-time injuries) per million man-hours of exposure. *Hess.*

accident-prone. Accident statistics reveal that certain individuals have a predisposition to sustain more accidents than others exposed to the same hazard. This suggests that there is a certain defect or propensity in some miners which makes them accident-prone cases. It is also suggested that such cases tend to sustain an undue number of injuries even at home or at sports. *Nelson.*

accident severity rate. The number of days of disability resulting from all injuries (fatal, permanent-total, permanent-partial, and temporary lost-time injuries) per thousand man-hours of exposure. *Hess.*

acclimatization. A man completely new to a hot mine will find great difficulty in doing any appreciable amount of work. Within a short period, his body will have improved its mechanism for heat loss, the rate at which the man can sweat will be much increased, pulse rate decreases, body temperature falls, and the man is then said to be "acclimatized" to hot working conditions. A minority never become acclimatized and are said to be "heat intolerant." *Roberts, I, p. 132.*

acclinal valleys. Those that run in the direction of the dip. *A.G.I.*

accompt. a. (Corn.) Account day; the usual settling day. *Fay.* b. The place of meeting, or account house. *Fay.*

accordant tributary. A tributary that enters the main trunk stream at grade, that is, at the same elevation as the main stream. *Stokes and Varnes, 1955.*

accordion roller conveyor. A roller conveyor with a flexible latticed frame which permits variation in length. *ASA MH4.1—1958.*

account. The record of the transactions affecting one party; as any one party may be the receiver or debtor in one transaction and the giver or creditor in another, an account has two sides, a debtor and a creditor side. *Truscott, p. 280.*

accountancy. The continuous recording of transactions on a money basis in a manner to show clearly at any time the financial position of a business, what profit or loss has been made over any period, and where that profit or loss was made. *Truscott, p. 280.*

account day. *See* bill day. *Nelson.*

accretion; aggradation. a. The process by which inorganic bodies increase in size by the addition of fresh particles to the outside. *Fay.* b. The gradual addition of new land to old by the deposition of sediment carried by the water of a stream. *A.G.I.* c. May be either natural or artificial. Natural accretion is the gradual buildup of land over a long period of time solely by the action of the forces of nature, on a beach by deposition of waterborne or airborne material. Artificial accretion is a similar buildup of land by reason of an act of man, such as the accretion formed by the groin, breakwater, or beach fill deposited by mechanical means. *H&G.*

accretionary lapillus. A pellet, often exhibiting concentric structure owing to the accretion of fine ash or dust around raindrops falling through an explosion cloud, or to similar accretion around a nucleus fragment which rolls along the ground. Accretionary lapilli are also called mud pellets; pisolites. *A.G.I.*

accretionary lava balls. Rounded balls of lava found on the surfaces of many aa flows, formed by the rolling up and adhesion of viscous lava around some fragment of solidified lava as a center. *A.G.I.*

accretionary limestone. A limestone which has formed in place by slow accumulation of organic remains. Many such deposits belong to the reef or bioherm subclass. *A.G.I.*

accretion coast. *See* shoreline of progradation. *Schieferdecker.*

accretion hypothesis. Any hypothesis of the origin of the earth which assumes that it has grown from a small nucleus by the gradual addition of solid bodies, such as meteorites, asteroids, or planetesimals, formerly revolving about the sun in independent orbits, but eventually drawn by gravitation to the earth and incorporated in it. *Fay.*

accretion vein. A vein formed by the repeated filling of a channelway and its reopening by the development of fractures in the general zone undergoing mineralization. *Forrester, p. 115.*

accumulation. a. In coal mining, bodies of firedamp that tend to collect in higher parts of mine workings and at the edge of goaves and wastes. They are found in cavities, at ripping lips, at other sheltered places protected from the ventilating current, and at the higher sides of rise faces. *Mason, v. 1, p. 262.* b. The concentration or gathering of oil or gas in some form of trap. Commercial accumulation is a volume or quantity sufficient for profitable exploitation. *A.G.I.* c. A collected mass of material. *Jones.*

accumulator. a. A cylinder containing water or oil under pressure of a weighted piston for hydraulic presses, hoists, etc. It is between the pumps and the presses, keeps a constant pressure on the system, and absorbs shocks. *Bureau of Mines Staff.* b. A storage battery. *Bureau of Mines Staff.* c. In oceanography, a spring of rubber or steel attached to a trawling warp, to lessen any sudden strain due to the trawl catching. *C.T.D.*

accumulator conveyor. Any conveyor designed to permit accumulation of packages or objects. Usually roller, live roller conveyor, roller slat conveyor, or belt conveyors. *ASA MH4.1-1958.*

accumulator metal. An alloy of 90 percent lead, 9.25 percent tin, and 0.75 percent antimony; condenser foil. *Campbell.*

accumulator plant. In geobotanical prospecting, a plant or tree that acquires an abnormal content of a metal where growing in metal-bearing soil. *A.G.I.*

accuracy. a. The practical limit of accuracy in building work is about one-eighth of an inch for placing of walls and floors, and about 1 inch for a long tunnel driven through a mountain. A modern air survey, plotted to a scale of 1 in 500, can give an accuracy of plus or minus 3 inches vertically or horizontally. *Ham.* b. The closeness of approach of a measurement to the true value of the quantity measured. Since the true value cannot actually be measured, the most probable value from the available data, critically considered for sources of error, is used as the truth. *Compare* precision. *ASM Gloss.*

accuracy of a method. A measure of the ability of a method to provide accurate results, that is, results which are precise and free from bias. The accuracy of a method must not be confused with its precision. A determination may be made with great precision, and the standard deviation of a number of determinations on the same consignment of coal may therefore be low, but the results will only be accurate if they are free from bias. *B.S. 1017, 1960, Pt. 1.*

accuracy of a result. The closeness of agreement between an experimental result and the true value. *B.S. 1017, 1960, Pt. 1.*

acerado. Mex. Gray copper ore; any gray steely ore. *Fay.*

acetamide; acetic acid amide; acetic acid amine; ethanamide. Colorless; deliquescent crystals; mousy odor; CH_3CONH_2. Used in explosives and as a soldering flux. *CCD 6d, 1961.*

acetic acid; ethanoic acid. Produced during the dry distillation of wood followed by alkali and acid (sulfuric) treatment and further distillation; by the oxidation of diluted alcohol ($HC_2H_3O_2$); specific gravity, 1.0492 (at 20° C, referred to water at 4° C). Vinegar is a preparation of acetic acid and it contains a legal minimum of 4 percent of acetic acid. Used in the porcelain enameling industry to prepare graining-board surfaces and for analytical work. *Hansen.*

acetic acid amine; acetamide; acetic acid amide; ethanamide. *See* acetamide. *CCD 6d, 1961.*

acetone; dimethyl ketone; 2-propane. A flammable liquid; C_3H_6O. Used widely in industry as a solvent for many organic substances. *Shell Oil Co.*

acetylene; ethyne; ethine. The most brilliant of illuminating gases; C_2H_2. It may be produced synthetically from its elements, by incomplete combustion of coal gas, and commercially from calcium carbide (CaC_2) by reaction with water. *Standard, 1964.* Used in manufacturing explosives. *Bennett 2d, 1962.* Also used formerly as an illuminating gas in mines and around drill rigs. When combined with oxygen, acetylene burns to produce an intensely hot flame and hence now is used principally in welding and metal-cutting flame torches. *Long.*

acetylene black. Graphitic type of carbon black obtained by incomplete combustion of acetylene; apparent density, 0.21. *Bennett 2d, 1962.*

acetylene lamp. *See* carbide lamp. *Zern.*

acetylene tetrabromide; symmetrical tetrabromoethane; Muthmann's liquid. Yellowish liquid; $CHBr_2CHBr_2$; specific gravity, 2.98 to 3.00; boiling point, 239° to 242° C with decomposition (at 760 mm); also, boiling point, 151° C (at 54 mm); melting point, 0.1° C; and refractive index, 1.638. Used for separating minerals by specific gravity; a solvent for fats, oils, and waxes; a fluid in liquid gases; and a solvent in microscopy. *CCD 6d, 1961.*

acetylite. Calcium carbide treated with glucose to give a slower and more uniform production of acetylene gas than can be obtained from the untreated calcium carbide. *Crispin.*

achavalite. Iron selenide, FeSe, occurring with other selenides at Cacheuta, Argentina. *Spencer 18, M.M., 1949.*

Acheson furnace. A resistance-type furnace for the production of silicon carbide and synthetic graphite. *Henderson.*

Acheson graphite. Artificial graphite made from coke by electric furnace heating. *Bennett 2d, 1962.*

Acheson process. A process for the production of artificial or synthetic graphite. It consists of sintering pulverized coke in the Acheson furnace at 5,000° to 6,000° F. *Henderson.*

achiardite. Same as dachiardite. *English.*

achirite. Same as dioptase. *Standard, 1964.*

achondrite. A rare, stony meteorite without chondrules. *A.G.I. Supp.*

achrematite. A pale sulfur-yellow to orange and red arsenochlormolybdate of lead, $35Pb0.3PbCl_2.9As_{2}0_{5}.4Mo0_3$; Mohs' hardness, 3 to 4; specific gravity, 5.965. From the mines of Guanacere, Chihuahua, Mexico. *Hess.*

achroite. A colorless variety of tourmaline. *Fay.*

achromatic. Free from hue. *See also* achromatic color; achromatic loupe. *Shipley.*

achromatic color. White, black, or any tone of neutral gray, that is, gray containing no tinge of any hue. *See also* chromatic color. *Shipley.*

achromatic loupe. Any loupe containing an achromatic lens. *Shipley.*

achromatic triplet. A loupe corrected for chromatic aberration. *See also* loupe. *Shipley.*

achua. A Chilean term for a small earthenware dish used in making tests in the patio process. *Hess.*

acicular. A mineral consisting of fine needlelike crystals, for example, natrolite. *Nelson.*

acicular bismuth; aciculite. Synonym for aikinite. *Hess.*

acicular powder. In powder metallurgy, needle-shaped particles. *ASM Gloss.*

acid. a. Sharp or biting to the taste; sour. Having acid-forming constituents present in excess of the proportion required to form a neutral or normal compound. *Webster 3d.* b. A compound that dissociates in a water solution to furnish hydrogen ions. *ASTM STP No. 148-D.* c. A substance which tends to lose a proton. *C.T.D.* d. A substance containing hydrogen which may be replaced by metals with the formation of salts. *C.T.D.* e. In geology, a test for composition of rocks. Application of strong acid dissolves carbonates and other components, leaves silica. *Hy.* f. *See* acidic, a.

acid anhydride. An oxide of a nonmetal, so called because such an oxide may be formed from an acid by the abstraction of water; for example, SO_3 is the anhydride of H_2SO_4. *A.G.I.*

acid annealing. An annealing process in which ferrous metal shapes are coated with acid before and in conjunction with the annealing. *ASTM C286–65.*

acid bath. A vessel containing an acid solution strong enough to attack and dissolve the diamond-matrix metal in a worn or dull bit crown, thereby releasing the diamonds, which can be recovered and reset in another bit or reused in some other manner. *Long.*

acid Bessemer converter. One liner with acid refractories. *Bureau of Mines Staff.*

acid bottle. Acid-dip bottle used in survey of boreholes. A soda-lime glass tube charged with dilute hydrofluoric acid, left in the borehole for 20 to 30 minutes to measure inclination. May be fitted in a clinometer. *Pryor, 3.* Also called acid-dip bottle; acid-dip test tube; acid-etch tube; acid-etch vial; acid-test tube; acid tube; acid vial; angle-test tube; culture tube; etch tube; sargent tube; vial. *See also* acid-dip survey. *Long.*

acid bottom and lining. The inner bottom and lining of a melting furnace consisting of materials like sand, siliceous rock, or silica brick that give an acid reaction at the operating temperature. *ASM Gloss. See also* acid refractories.

acid bronze. An acid-resisting alloy sometimes used for mine pumps. It is said to contain 1.5 percent nickel, 17.0 percent lead, 8.0 percent tin, and 73.5 percent copper. *Camm.*

acid calcium phosphate. *See* calcium phosphate, monobasic. *CCD 6d, 1961.*

acid clay. a. A naturally occurring clay which, after evaluation, usually with acid, is used mainly as a decolorant or refining agent, and sometimes as a desulfurizer, coagulant, or catalyst. *Institute of Petroleum, 1961.* b. A clay which yields hydrogen ions in a water suspension. A hydrogen clay. *Hess.*

acid coke. A byproduct obtained in treating dry run tar, at an elevated temperature with sulfuric acid; it is a soft, solid coke containing free carbon, complex heavy hydrocarbons, free sulfur, and sulfuric acid. *Hess.*

acid copper. a. Copper electrodeposited from an acid solution of a copper salt, usually copper sulfate. *ASM Gloss.* b. The solution referred to in definition a. *ASM Gloss.*

acid cure. In uranium extraction, sulfation of moist ore before leach. *Pryor, 3.*

acid-dip bottle. Synonym for acid bottle. *Long.*

acid-dip survey. A method of determining the angular inclination of a borehole in which a glass, test-tubelike bottle partly filled with a dilute solution of hydrofluoric acid is inserted in a watertight metal case. When the assemblage is lowered into a borehole and left for 20 to 30 minutes, the acid etches the bottle at a level plane from which the inclination of the borehole can be measured. Also called acid-dip test; acid test. *Long.*

acid-dip test. Synonym for acid-dip survey. *Long.*

acid-dip test tube. Synonym for acid bottle. *Long.*

acid electric furnace. An arc furnace having an acid refractory hearth. *Bureau of Mines Staff.*

acid embossing. The etching of glass with HF or a fluoride. *Dodd.*

acid embrittlement. A form of hydrogen embrittlement which may be induced in some metals by acid treatment. *ASM Gloss.*

acid-etch tube. Synonym for acid bottle. *Long.*

acid-etch vial. Synonym for acid bottle. *Long.*

acid flux. Metallurgically acid material (usually some form of silica) used as a flux. *Bennett 2d, 1962.*

acid frosting. The etching of glass hollow ware with HF or a fluoride. *Dodd.*

acid gold. A form of gold decoration for pottery introduced in 1863 by Mintons Ltd., Stoke-on-Trent, England. The glazed surface is etched with dilute HF prior to application of the gold; the process demands great skill and is used for the decoration only of ware of the highest class. A somewhat similar effect can be obtained by applying a pattern in low-melting flux on the glaze and gold-banding on the fluxed area; this is known as mock acid gold. *Dodd.*

acidic. a. Applied to those igneous rocks containing more than 66 percent SiO_2, contrasted with intermediate and basic. Sometimes loosely and incorrectly used as the equivalent of felsic and of oversaturated, but these terms include rock types (for example, nepheline syenite and quartz basalt, respectively) which are not generally considered acidic. *Fay.* b. Less frequently used in reference to the composition of feldspars, based on their content of silica. *A.G.I.* c. When referring to hydrothermal, pegmatitic, or other aqueous fluids, the term is used in its chemical sense of high hydrogen ion concentration (low pH); very loosely used in reference to solutions containing salts of the strong acids (chlorides, sulfates, etc.) regardless of pH. *A.G.I.* d. In furnace practice, a slag in which silica is present in excess of the amount required to form a neutral slag with the earthy bases present. *A.G.I.*

acidic oxide; acid anhydride. The oxide of a nonmetal that reacts with water to form an acid; for example, sulfur dioxide, SO_2. *Bennett 2d, 1962.*

acidic salts. These contain replaceable hydrogen and are formed when a polybasic acid reacts with a quantity of a base insufficient to replace the whole of the replaceable hydrogen. *Cooper.*

acidimetry. a. The determination of the concentration of acid solutions or of the quantity of acid in a sample or mixture. This is usually done by titration with a solution of base of known strength (standard solution) and an indicator is used to establish the end point. *See also* pH. *CCD 6d, 1961.* b. The determination of the quantity of acid in a solution. *Hansen.*

acid ion. One which forms an acid molecule through combination with one or more protons. *Pryor, 3.*

acidity. The extent to which a solution is acid. *See also* pH. *C.T.D.*

acidity coefficient. *See* coefficient of acidity.

acidization. The process of forcing acid into a limestone, dolomite, or sandstone in order to increase permeability and porosity by dissolving and removing a part of the rock constituents. It is also used to remove mud injected during drilling. The general objective of acidization is to increase productivity. *A.G.I.*

acidize. To treat a limestone or dolomitic formation with dilute hydrochloric acid to enlarge its void spaces. *Wheeler.*

acidizing. *See* acidization. *Institute of Petroleum, 1961.*

acid-jointing. Special use of certain asbestos varieties. *Sinclair, W. E., p. 483.*

acid leach. a. Metallurgical process for dissolution of uranium values by means of acidulated solution (used on sandstone ores of low lime content). *Ballard.* b. In uranium extraction, dissolution of uraninite in presence of sufficient oxygen to render accompanying iron ferric, satisfying the equation: $2U_3O_8 + 6H_2SO_4 + O_2 \rightarrow 6UO_2SO_4 + 6H_2O$. *Pryor, 3.*

acid lining. *See* acid bottom and lining.

acid metal. An alloy intended to resist corrosion by acids; contains 88 percent copper, 10 percent tin, and 2 percent lead. *Campbell.*

acid mine drainage. Acidic drainage from bituminous coal mines containing a high concentration of acidic sulfates, especially ferrous sulfate. *ASTM STP No. 148-D.*

acid mine water. a. Mine water which contains free sulfuric acid, mainly due to the weathering of iron pyrites. A pit water, which corrodes iron pipes and pumps, usually contains a high proportion of solids per gallon, principally the sulfates of iron, chiefly ferrous and alumina. *Nelson.* b. Where sulfide minerals breakdown under chemical influence of oxygen and water, the mine drainage becomes acidic and can corrode ironwork. If it reaches a river system, biological damage may also result. *Pryor, 3.*

acid neutralizers. Calcium carbonate ($CaCO_3$), magnesium carbonate ($MgCO_3$), and china clay, which neutralize free acids, thereby preventing explosives from decomposing in storage. They also have a cooling effect and tend to reduce the sensitivity of the explosive. *Cooper, p. 345.*

acid number. Milligrams of K.OH required to neutralize the free fatty acids in 1 gram of material. *Pryor, 3.*

acid open-hearth furnace. An open-hearth furnace used in the refining of hematite iron; little such iron is now made. The particular feature is that the hearth is made of acid refractories—silica bricks covered with a fritted layer of silica sand. *Dodd.*

acid open-hearth steel. Low-phosphorus pig iron treated in an acid (silica or sand)-lined furnace. *Mersereau, 4th, p. 481.*

acid ores. Siliceous ores. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 205.*

acid polishing. A method of polishing cut decorations on glassware by immersing the article in an acid bath for a few minutes, rinsing in water and brushing out the cut parts. *C.T.D.*

acid process. a. A steelmaking process, either Bessemer, open-hearth, or electric, in which the furnace is lined with a siliceous refractory, and for which pig iron low in phosphorous is required, as this element is not removed. *See also* basic process. *C.T.D.* b. One which employs an acid slag. *Bureau of Mines Staff.*

acidproof brick. Brick having low porosity and permeability, and high resistance to chemical attack or penetration by most commercial acids and some other corrosive chemicals. *HW.*

acid radical. That part of the acid which cannot be replaced by a metal; for example, SO_4 in sulfuric acid (H_2SO_4). *Cooper.*

acid-recovery operator. In the coke products industry, one who recovers sulfuric acid used in processing coke-gas byproducts by cooking sludge with steam in acid regenerator pots. Also called acid regenerator. *D.O.T. Supp.*

acid refractories. Refractories containing a substantial amount of silica that may react chemically with basic refractories, basic slags, or basic fluxes at high temperatures. *ASTM C-71-64.*

acid refractory material. A general term for those types of refractory material that contain a high proportion of silica, for example, silica refractories (greater than 92 percent SiO_2) siliceous refractories (78 to 92 percent SiO_2). The name derives from the fact that silica behaves chemically as an acid and at high temperatures reacts with bases such as lime or alkalies. *Dodd.*

acid refractory products. Forming those made of clay-silica mixtures or pure silica. *Rosenthal.*

acid regenerator. *See* acid-recovery operator. *D.O.T. Supp.*

acid resistance. The degree of resistance of the ceramic surface to attack by acids, (that is, porcelain enamels, chemical stoneware, glazes, etc.). *Bureau of Mines Staff.*

acid resistance of vitreous enamelware. In the United States the acid resistance of vitreous enamelware at (nominal) room temperature is determined by exposing the enameled surface to 10 percent citric acid for 15 minutes at 80° F *ASTM C282.* Five classes of enamelware are distinguished according to their subsequent appearance:

AA: no visible stain and passes dry-rubbing test;
A: passes blurring-highlight test and wet-rubbing test;
B: passes blurring-highlight test; fails wet-rubbing test;
C: fails blurring-highlight test; passes disappearing highlight test;
D: fails disappearings highlight test.

Dodd.

acid-resistant brick. Brick suitable for use in contact with chemicals usually in conjunction with acid-resistant mortars. *ASTM C43-65T.*

acid rock. Loosely used in petrology, generally to mean one of the following: (1) An igneous rock containing 66 percent or more of silica, free or combined, in this sense being nearly equivalent to acidic; (2) an igneous rock in which minerals high in silica, such as quartz, alkaline feldspar, and muscovite are dominant; and (3) very loosely, an igneous rock composed dominantly of light-colored minerals. In all three senses contrasted with basic. The term is misleading, undesirable, and becoming obsolete. As used in the first sense, it is being replaced by silicic or persilicic; as used in the second sense, it should be replaced by felsic or a term denoting the dominant mineral; and as used in the third sense, it should be replaced by leucocratic. *See also* acidic, a. *Fay.*

acid salt. a. A salt containing hydrogen, (for example, $KHSO_4$). *A.G.I.* b. A salt which dissolves to yield a solution containing an excess of H^+ ions over OH^- ions, whether or not it contains hydrogen in its formula, (for example, $FeCl_3$). *A.G.I.*

acid-scaling. Raw shapes dipped in acid or sprinkled with acid and annealed. *Bryant.*

acid slag. One which contains substantial amounts of active silica. *Bureau of Mines Staff.*

acid sludge. Products of refining of tar, shale oil, petroleum in which sulfuric acid reacts to form a sulfonic acid mixture, green acids, and mahogany acids and salts. Used in the flotation process, and in proprietary collector agents for flotation of iron ores. *Pryor, 3.*

acid soil. A soil deficient in available bases, particularly calcium, and gives an acid reaction when tested by standard methods. *Stokes and Varnes, 1955.*

acid steel. Steel melted in a furnace with an acid bottom and lining and under a slag containing an excess of an acid substance, such as silica. *ASM Gloss. See also* acid process.

acid, strength of. Related to ability to liberate hydrogen ions to solution, and hence-to-electrical conductivity of equivalent aqueous solutions of acids. *Pryor, 3.*

acid sulfate. Compound containing or dissociating to give the ion, HSO_4. *Pryor, 3.*

acid test. a. Synonym for acid-dip survey. *Long.* b. A severe or decisive trial, as of usability or authenticity. *Long.*

acid tube. Synonym for acid bottle. *Long.*

acid treatment. The process of agitating petroleum products with sulfuric acid to remove undesirable compounds. *Hess.*

acid tube. Synonym for acid bottle. *Long.*

acidulae. Cold mineral waters, especially those impregnated with carbonic acid. *Fay.*

acid vial. Synonym for acid bottle. *Long.*

acid-vial culture tube. Synonym for acid bottle. *Long.*

acid water. Water charged naturally with carbon dioxide. Also applied to natural waters containing sulfur compounds, especially sulfates. *Bureau of Mines Staff.*

acieral. An alloy containing 92 to 97 percent aluminum and offered as a metal of strength and lightness and noncorrosive, suitable for use in the construction of automobiles, aircraft, military equipment, railroad cars, valves, hardware, and for the manufacture of helmets. It is silver white, and has a specific gravity of 2.82 and a melting point of 1,382° F. Its tensile strength in castings is given as 30,000 pounds per square inch, and in rods and sheets as 28,000 to 64,000 pounds and heat-treated as upward of 70,000 pounds per square inch. *Fay.*

aciform. Needle-shaped. *Shipley.*

aciniform. From the Latin acinus, meaning grape or grapestone. A mineral aggregate or a cluster of minerals shaped like a cluster of grapes, or clustered like grapes. Also, full of small kernels like a grape. *Bureau of Mines Staff.*

acinose. a. Grapelike; applied to the structure of clustered mineral aggregates. Synoynm for aciniform; acinous. *Bureau of Mines Staff.* b. Granulated; like grape seeds; applied to the texture of some mineral aggregates. *Bureau of Mines Staff.*

acinous. Synonym for aciniform; acinose. *Bureau of Mines Staff.*

aclinal; aclinic. Having no inclination or dip; situated where a magnetic needle if suspended freely has no dip or inclination and assumes a horizontal position, as the aclinic line or magnetic equator. *Webster, 3d.*

aclinic line; dip equator; magnetic equator. The line through those points on the earth's surface at which the magnetic inclination is zero. The aclinic line is a particular case of an isoclinic line. *H&G.*

ACL kiln; Lepol kiln. ACL is a trademark of the Allis-Chalmers Manufacturing Company in the United States. Lepol is a trademark of Polysius Company, Germany. Both terms refer to a traveling grate preheater for a portland cement batch prior to its being fed to a rotary cement kiln; with this attachment, the length of a rotary cement kiln can be halved. *Dodd.*

acme thread. A screw thread, the section of which is between the square threads and the V threads. Used extensively for feed screws. *Crispin.*

acmite. A brown or green silicate of sodium and iron, essentially NaFe ' ' ' (Si_2O_6), belonging to the pyroxene group and often found in long prismatic crystals characteristically pointed. The variety aegirite, which is common in certain igneous rocks, occurs in bluntly terminated crystals and also in capillary and fibrous forms. *Webster 2d.* Monoclinic; Mohs' hardness, 6 to 6.5; specific gravity, 3.5. *Dana 17.*

acmite trachyte. A trachyte in which the pyroxene is acmite or aegirine and the feldspar is anorthoclase. It differs from normal trachyte in that its predominant alkali is soda instead of potash. Acmite trachyte is intermediate between true trachyte and phonolite. First described from the Azores and also found in the Crazy Mountains, Mont. *Fay.*

acopolado. Mex. Ore containing 50 to 60 ounces of silver per ton. *Hess.*

acoustic. Used when the term which it modifies designates something which has the properties, dimensions, or physical characteristics associated with sound waves. *Hy.*

acoustic absorptivity. The ratio of the sound energy absorbed by a surface to that incident upon it. *Hess.*

acoustical. The adjective acoustical is used when the term being qualified does not innately contain some property, dimension, or physical characteristic which is intimately associated with sound. *Hy.*

acoustical well logging. Any determination of the physical properties or dimensions of a borehole by acoustical means, including measurement of the depth of fluid level in a well. *A.G.I.*

acoustic attenuation log. In theory, a log designed to measure the manner in which the energy of elastic waves is dissipated in passing through rock. Although no practical log of this type has yet evolved, the belief that a log of this parameter would permit the estimation of the permeability of formations would seem to insure such a development since no log has been developed to record permeability. *Wyllie, p. 169.*

acoustic axis. *See* axis of acoustic symmetry. *H&G.*

acoustic dispersion. Acoustic dispersion is the change of speed of sound with frequency. *H&G.*

acoustic impedance. The acoustic impedance of a given surface area of an acoustic medium perpendicular, at every point, to the direction of propagation of sinusoidal acoustic waves of given frequency, and having equal acoustic pressures and equal volume velocities per unit area at every point of the surface at any instance, is the quotient obtained by dividing (1) the phasor corresponding to the acoustic pressure by (2) the phasor corresponding to the volume velocity. *H&G.*

acoustic intensity. The limit approached by the quotient obtained by dividing the power of the acoustic energy being transmitted at a given time through a given area by the magnitude of this area as the magnitude of this area approaches zero. *H&G.*

acoustic interferometer. An acoustic interferometer is an instrument for making physical observations upon standing waves. It may be used, for example, to measure velocity, wave length, absorption, or impedance. *H&G.*

acoustic log. A continuous record made in a borehole showing the velocity of sound waves over short distances in adjacent rock; velocity is related to porosity and nature of the liquid occupying pores. *A.G.I. Supp.*

acoustic methanometer. An instrument to determine the concentrations of methane at points in the underground firedamp drainage pipes. It is based on the principle that sound travels much more rapidly in methane than in air and the intermediate velocity in a simple mixture can be used as a measure of the proportion of the two gases. A range of 40 to 90 percent methane is usually covered. New regulations which became effective in July 1961 call for automatic shutdown of methane drainage plants if the drained gas falls below 40 percent methane. *Nelson.*

acoustic radiation pressure. The acoustic radiation pressure is a unit directional steady-state pressure exerted upon a surface exposed to an acoustic wave. Such a steady pressure is usually quite small in magniture and is really observable only in the presence of very intense sound waves. *H&G.*

acoustic radiometer. An instrument for measuring acoustic radiation pressure by determining the unidirectional steady-state force resulting from reflection or absorption of a sound wave at its boundaries. *H&G.*

acoustic resistance. Product of longitudinal wave velocity and density, being the property that controls the reflective power at a boundary plane. *Schieferdecker.*

acoustics. The science of sound, including its production, transmission, and effects. *Hy.*

acoustic scattering. The irregular reflection, refraction, or diffraction of sound waves in many directions. *Hy.*

acoustic sounding. The indirect evaluation of water depth, using the principle of measuring the length of time necessary for a sound wave to travel to the bottom, reflect and travel back to the water surface. *H&G.*

acoustic strain gage; sonic gage. An instrument for measuring strains, for example, in concrete linings to shafts or roadways. It contains a length of fine wire under tension, the tension being varied by the strain to which the gage is subjected. The measurement made is that of the frequency of vibration of the wire when it is plucked by means of an electromagnetic impulse and this measurement can be made with great accuracy. The gage is highly stable and readings can be made over a period of years without any fear of zero drift. *See also* electrical resistance strain gage; mechanical extensometer. *Nelson.*

acoustic theodolite. An instrument designed to provide a continuous vertical profile of ocean currents from the bottom to the surface in a specific location. *H&G.*

acoustic waves. a. The waves which contain sound energy and by the motion of which sound energy is transmitted in air, in water, or in the earth. The wave may be described in terms of change of pressure, of particle displacement, or of density. *A.G.I.* b. Used increasingly to study the physical properties of rocks, and composition of gases. Investigations may be made both in situ and in the laboratory. *Nelson.*

Ac-plane. In structural petrology, a plane at right angles to the surface of movement. The ac-plane contains *a,* the direction of tectonic transport, and *c,* the axis perpendicular to the surface of movement. *A.G.I.*

acre. a. A measure of surficial area, usually of land. The statute acre of the United States and England contains 43,560 square feet (4,840 square yards or 160 square rods); abbreviation, a. The so-called Scotch acre contains about 6,150 square yards, and the Irish acre 7,840. There are various special or local acres in England (as in Cheshire or among the hop growers), varying from 440 to more than 10,000 square yards. *Standard, 1964.* b. Can. In Quebec, a linear measure that equals the square root of 43,560, or approximately 208.7 feet. *Fay.* c. For the calculation of coal reserves, a convenient rule is to allow 1,200 tons per foot (coal thickness) per acre. For known and dependable areas, 1,500 tons per foot per acre may be used. *Nelson.*

acreage rent. Royalty or rent paid by the lessee for working and disposing of minerals at the rate of so much per acre. *Fay.*

acre-foot. The quantity of water that would cover 1 acre, 1 foot deep. An acre-foot contains 43,560 cubic feet. *Seelye, 1.*

acre-inch. The volume of water, soil, or other material that will cover 1 acre, 1 inch deep. *A.G.I.*

acre-yield. The average quantity of oil, gas, or water recovered from 1 acre of a reservoir. The quantity of any product obtained from 1 acre. *A.G.I.*

acrobatholithic. a. Pertaining to a stage in the erosion of a batholith in which the summits of cupolas and stocks are exposed but the surface separating the barren interior of the batholith from the mineralized upper part is not exposed. Essentially, all metals are found in one place or another around cupolas exposed in this manner. *A.G.I.* b. Pertaining to a stage in the erosion of a batholith. Cupolas are exposed but erosion has not proceeded deep enough to reveal large areas of the interior. *A.G.I.* c. Applied to mineral deposit found in or near a summit cupolas of a batholith of which large areas of the interior are not yet exposed by erosion. *Schieferdecker.*

Acrocephalus robertii. A copper flower or copper indicator plant found in the Katanga area of the Republic of the Congo, immediately north of the Rhodesian Copperbelt. It is reported as a small annual mint whose resistance to toxicity appears to be infinite. *Hawkes, 2, p. 312.*

acrometer. An instrument for determining the density of gases. *Hess.*

acromorph. Synonym for salt dome. *A.G.I.*

A-cropping. Scot. Toward the outcrop. *Fay.*

acrotomous. In mineralogy, having a cleavage parallel with the base or top. *Standard, 1964.*

actinic green. An emerald green glass of the type used for poison bottles. *Dodd.*

actinic rays. Those rays of the spectrum that are the most powerful in producing chemical changes; occurring in the blue, violet, and ultraviolet, all of which are contained in sunlight. *Standard, 1964.*

actinide elements; actinide series; actinides. a. The group of chemical elements of increasing atomic number, starting with actinium (atomic number 89) and extending through atomic number 103. The names, chemical symbols, and atomic numbers of the members of the series are: actinium, Ac, 89; thorium, Th, 90; protoactinium or protactinium, Pa, 91; uranium, U, 92, neptunium, Np, 93; plutonium, Pu, 94; americium, Am, 95; curium, Cm, 96; berkelium, Bk, 97; californium, Cf, 98; einsteinium, Es, 99; fermium, Fm, 100; mendelevium, Md, 101; and nobelium, No, 102. Element 103, discovered in 1961 and named lawrencium (symbol, Lw), is expected to be the last member of the actinide series. *CCD 6d, 1961.* b. The elements with atomic numbers above 88. According to many authorities, these elements occupy one single place in the extended periodic table, in the same group into which the rare earth elements (lanthanides) are classified. *Gaynor.* c. Radioactive elements, atomic numbers 89 to 103. *Hurlbut.*

actinides. *See* actinide elements.

actinide series. *See* actinide elements. *CCD 6d, 1961.*

actinium. A radioactive element found in nature as a constituent of all uranium ores, 1 ton of pure pitchblende contains 0.15 milligram of actinium. Actinium has an atomic number of 89 and is the first member of the actinide series of elements. The most important source of actinium is pile neutron bombardment of radium. Except for the sulfides, the compounds of actinium are colorless. Symbol, Ac; mass number of the most stable isotope, 227. *CCD 6d, 1961.*

actinium A. A name for polonium 215, a member of the actinium disintegration series; symbol, AcA; emits alpha and beta rays; and half-life, .0018 second. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-80.*

actinium B. a. A name for lead 211, a member of the actinium disintegration series. *NRC-ASA N1.1-1957.* b. A very short-lived radioactive element formed by the degradation of AcA (polonium 215); symbol, AcB; atomic number, 82; atomic weight, 211; isotopic with RaB (lead 214), RaD (lead 210), ThB (lead 212), and lead; emits beta rays; half-life, 36.1 minutes; and degrades to AcC (bismuth 211). *Hess; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-77.*

actinium C. *a.* A name for bismuth 211, a member of the actinium disintegration series. *NRC-ASA N1.1-1957.* b. A very short-lived radioactive element formed by the degradation of AcB (lead 211); symbol, AcC; atomic number, 83; atomic weight, 211; isotopic with RaC (bismuth 214), RaE (bismuth 210), ThC (bismuth 212), and bismuth; emits alpha and beta rays; half-life, 2.15 minutes; 0.3 percent of it degrades to AcC' (polonium 211); and 99.7 percent of it degrades to AcC" (thallium 207). *Hess; Glasstone, 2, p. 135; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-78.*

actinium C'. a. A name for polonium 211, a member of the actinium disintegration series. *NRC-ASA N1.1-1957.* b. An extremely short-lived radioactive element formed by the degradation of AcC (bismuth 211); symbol, AcC'; atomic number, 84; atomic weight, 211; isotopic with RaC' (polonium 214), polonium, AcA (polonium 215), and ThA (polonium 216); emits alpha rays; half-life, 0.52 second; and degrades to AcD (AcPb, actinium-lead, or lead 207). *Hess; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-80.*

actinium C". a. A name for thallium 207, a member of the actinium disintegration series. *NRC-ASA N1.1-1957.* b. A very short-lived radioactive element formed by the degradation of AcC (bismuth 211); symbol, AcC"; atomic number, 81; atomic weight, 207 or 207.16 (thallium 207); isotopic with thallium, RaC" (thallium 210), and ThC" (thallium 208); emits beta rays; half-life, 4.78 minutes; and degrades to AcD (AcPb, actinium-lead, or lead 207). *Hess; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-75.*

actinium D. The final element of the disintegration series formed by the spontaneous degradation of uranium 235 and successive elements through the actinium disintegration series, and it is the immediate descendent of AcC' (polonium 211) and AcC" (thallium 207). It is lead having an atomic weight of about 207 (lead 207) and it undergoes no radioactive change; symbol, AcD, AcPb, or Pb^{207}. It is an isotope of ordinary lead; and is not radioactive, but infinitesimal quantities of radioactive isotopic elements entangled in the lead give it an apparent radioactivity. Also called actinium-lead (AcPb). *Hess; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-77.*

actinium disintegration series; actinium decay series; actinium series. a. A disintegration series of little known radioactive elements, of which natural actinium is the best known and most stable member. These elements are produced in the radioactive disintegration of uranium 235 (actinouranium, AcU) into actinium 227 and of the actinium 227 into lead 207, which is the stable end-product of the disintegration series. *CCD 6d, 1961.* b. Uranium 235 to thorium 231 to protactinium 231 to actinium 227 to thorium 227 plus francium 223 to radium 223 to radon 219 to polonium 215 to lead 211 plus astatine 215 to bismuth 211 to polonium 211 plus thallium 207 to lead 207, the stable end-product. *Glasstone, 2, p. 135.*

actinium emanation. *See* actinon. *Hess.*

actinium K. A name for francium 223, a member of the actinium disintegration series; symbol, AcK; emits alpha and beta rays; and half-life, 22 minutes. *NRC-ASA N1.1–1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-82.*

actinium lead. The final residual product of the breaking down of uranium 235 through the actinium series; atomic weight, 207; an isotope of lead. *Hess.*

actinium series. *See* actinium distintegration series. *CCD 6d, 1961.*

actinium X. A short-lived radioactive element formed by the degradation of RdAc (radioactinium; thorium 227) and of AcK (actinium K; francium 223); symbol, AcX; atomic number, 88; atomic weight, 223 (radium 223); isotopic with radium, mesothorium I (radium 228; symbol, $MsTh_1$), and thorium X (radium 224; symbol, ThX); emits alpha rays; half-life, 11.7 days; and degrades to actinon (radon 219; actinium emanation; symbol, An or AcEm). *Hess; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-82; Glasstone, 2, p. 135.*

actinoform. Having a radiate form. *Rice.*

actinolite. A natural hydroxy-calcium-magnesium-iron silicate $Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$; green color; monoclinic; luster vitreous to silky; fibrous to granular; fibers brittle; Mohs' hardness, 5.6; specific gravity, 2.9 to 3.2. Found in the United States, Canada, and Europe. Used as a minor asbestos mineral and in building material. An amphibole. *CCD 6d, 1961.*

actinomycetes. Small fungi with characteristics intermediate between the true bacteria and the molds, and which produce a true mycelium. *BuMines I.C. 8075, 1962, p. 63.*

actinon; actinium emanation. A gaseous, inert, very short-lived radioactive element of the actinium disintegration series and formed by the degradation of AcX (actinium X; radium 223); symbol, An or AcEm; atomic number, 86; atomic weight, 219 (radon 219); isotopic with radon and thoron (radon 220; symbol, Tn); emits alpha particles; half-life 4.0 seconds; and degrades into AcA (polonium 215). *Hess; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-81.*

actinote. Synonym for actinolite. *Dana 6d, p. 389.*

actinouranium; actinium-uranium. An isotope of uranium; uranium 235; symbols, U^{235} or AcU; atomic number, 92; atomic weight, 235.04; the isotope from which the actinium disintegration series of radioactive elements descends; emits alpha particles; half-life, 7.13 X 10^8 years; and degrades to uranium Y (thorium 231; symbol, UY). If it is supposed that uranium, like other heavy elements, is formed from stellar matter, it is likely that actinouranium of odd atomic weight would be formed in smaller quantity than the main isotope of even atomic weight. Even, however, if we suppose they were formed in equal quantity, it can be shown that it would require only 3.4 X 10^9 years to bring the quantity down to the 0.28 percent that is observed. *Hess; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-86.*

actinouranium disintegration series. *See* actinium disintegration series. *NRC-ASA N1.1-1957.*

activate. A natural bleaching clay, effective in removing green color from oils. *Bennett 2d, 1962.*

activated. Chemical reaction being involved. *See also* chemisorption. *Pryor, 3, p. 7.*

activated alumina. A highly porous and granular form of aluminum oxide, Al_2O_3, having preferential adsorptive capacity for moisture from gases, vapors, and some liquids. When saturated, it can be revived or reactivated by the application of heat within the temperature range of 350° to 600° F to drive off the moisture. The cycle of adsorption and reactivation can be repeated many times. Used as a catalyst or a catalyst carrier. *CCD 6d, 1961.*

activated carbon. Carbon, mostly of vegetable origin, and of high adsorptive capacity. Used in gas masks and for decolorizing liquids. *Bennett 2d, 1962.*

activated charcoal. *See* activated carbon. *Pryor, 3.*

activated clay. A clay whose adsorbent character or bleaching action has been enhanced by treatment with acid. Bentonite clay is most frequently treated in this fashion. *CCD 6d, 1961.*

activated coal ploughs. With a view to applying the coal plough to seams too hard to be sheared by the normal cutting blade, German mining engineers have developed various types of power-operated cutters. One consists of a series of compressed-air picks mounted above each other; another, of a resonance pattern, houses two high-speed motors eccentrically mounted and rotating in opposite directions. The latter imparts a vibration to the cutting edge equivalent to 2,500 blows per minute with a stroke of 3/16 inch to 1/4 inch and a force of approximately 200 tons. *Mason, v. 2, p. 565.*

activated plough. *See* Huwood slicer. *Nelson.*

activated sludge. A process of sewage disposal in which air is blown through the sludge to stimulate bacterial action, thereby making complex harmful substances simple and innocuous. *Ham.*

activated water. The passage of ionizing radiation through water produces, temporarily, ions, atoms, radicals, or molecules in a chemically reactive state. The combined effect of all such entities is said to be due to activated water. Their identity has not been established with certainty, although evidence exists of the presence of free hydroxyl radicals and hydrogen atoms. *NRC-ASA N1.1-1957.*

activating agent. a. A substance which when added to a mineral pulp promotes flotation in the presence of a collecting agent. Also called activator. *B.S. 3552, 1962.* b. Reagent used particularly in differential mineral flotation to help cleanse the mineral surface so that a collector may adhere to it and permit or aid its floatability. Frequently used to permit floating minerals that had been previously depressed. *Mitchell, p. 574.*

activation. a. The changing of the passive surface of a metal to a chemically active state. Contrast with passivation. *ASM Gloss.* b. In the flotation process of ore dressing, the process of altering the surface of specific mineral particles in an ore pulp to promote adherence of certain reagents. *Henderson.* c. In flotation of minerals, modification of particle surface by atoms, ions, or compounds from aqueous phase, thereby aiding selective sorption of collector agents, for example, $CuSO_4$ in flotation of sphalerite. Antonym for depression. *See also* activation energy; activator; activity. *Pryor, 3.* d. The process of making a material radioactive by bombardment with neutrons, protons, or other nuclear particles. *See also* activation analysis; induced radioactivity. *L&L.*

activation analysis. A method for identifying and measuring the chemical elements in a sample to be analyzed. The sample is first made radioactive by bombardment with neutrons, charged particles, or other nuclear radiation. The newly radioactive atoms in the sample give off characteristic nuclear radiations that can identify the atoms and indicate their quantity. Activation analysis is frequently more sensitive than chemical analysis. It is being used more and more in research, industry, archeology, crime investigation, and other areas. *L&L.*

activation energy. The energy required for initiating a physical or chemical transformation, in particular a metallurgical reaction; for example, plastic flow, diffusion, or chemical reaction. The activation energy may be calculated from the slope of the line obtained by plotting the natural log of the reaction rate versus the reciprocal of the absolute temperature. *ASM Gloss.*

activator. a. In flotation, a chemical added to the pulp to increase the floatability of a mineral in a froth, or to refloat a depressed (sunk) mineral. Also called activating reagent. *C.T.D.* b. A reagent that affects the surface of minerals in such a way that it is easy for the collector atoms to become attached. It has the opposite effect of depressor. *Compare* depressor. *Newton, p. 100* c. A substance which is required in trace quantities to impart luminescence to certain crystals. Silver and copper are activators for zinc sulfide and cadmium sulfide pigments. *CCD 6d, 1961.* d. Ions which are photon emitters. *VV.* e. Any agent that causes activation. *Bennett Td, 1962.*

active agents. Surface-active substances which immunize solids against a parting liquid. *Hess.*

active centers. Areas on the surface of a solid which, by reason of position projecting, or on an edge or corner of the particle, share only a minor part of their electrostatic field with the rest of the surface. They thus have excess unabsorbed field available for external attraction, for example, adsorption and catalysis. *Pryor, 3.*

active coefficient of earth pressure. The minimum ratio of the minor principal stress to the major principal stress. Applicable where the soil has yielded sufficiently to develop a lower limiting value of the minor principal stress. *ASCE P1826.*

active earth pressure. a. The minimum value of earth pressure. This condition exists when a soil mass is permitted to yield sufficiently to cause its internal shearing resistance along a potential failure surface to be completely mobilized. *ASCE P1826.* b. The lateral force or push from the earth mass onto a wall or structure. *Nelson.*

active earths. Adsorbents, such as charcoal, roasted bauxite, or certain naturally occurring silicates, that act as decolorizing agents, or aid in the removal of unsaturated compounds, in the refining of oils and fats. *Bennett 2d, 1962.*

active entry. An entry in which coal is being mined from a portion thereof or from connected sections. *I.C. 8001, 1960, p. 1.*

active fault. One liable to further movement. *Compare* passive fault. *Carson, 2, p. 74.*

active glacier. A glacier in which some of the ice is flowing. *A.G.I.*

active lime. That portion of total lime which undergoes seasonal changes of volume. Foundations are usually taken below the active layer. *Nelson.* b. A layer of ground above the permafrost which thaws in the summer and freezes again in the winter. Also known as a mollisol. *A.G.I.*

active lime. That portion of total lime which will react with magnesium chloride in a cement. *Bennett 2d, 1962 Add.*

active mass. Number of gram-molecular weights in a solution or gas, per liter. *Pryor, 3.*

active permafrost. Permafrost which, after having been thawed due to natural or artificial causes, is able to return to permafrost under the present climate. *A.G.I.*

active state of plastic equilibrium. Plastic equilibrium obtained by an expansion of a mass. *ASCE P1826.*

active workings. All places in a mine that are ventilated and inspected regularly. *U.S. Bureau of Mines Federal Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. I Underground Mines, October 8, 1953.*

activity. a. In nuclear physics, the rate of decay of atoms by radioactivity. It is measured in curies. *Bennett 2d, 1962 Add.* b. The ideal or thermodynamic concentration of a substance, the substitution of which for the true concentration, permits the application of the law of mass action. *C.T.D.*

Actomag. Selectively calcined dolomite, essentially $CaCO_3$ and MgO containing some $CaCO_3$; used in fertilizers. *Bennett 2d, 1962.*

actual age. In geology, the age of a given feature or event expressed in years or centuries. This can seldom be ascertained accurately, and most geologic estimates are subject to wide margins of error. *Stokes and Varnes, 1955.*

actual aggregate breaking strength. The sum total of the actual tensile tests which have been made on wires before manufacture into wire rope. *Ham.*

actual breaking strength. The breaking load obtained from a tensile test to destruction on a sample of rope. *Ham.*

actual horsepower. The horsepower really developed, as proved by trial. *Standard, 1964.*

actual performance curve. A performance curve showing the results actually obtained from a coal preparation treatment. *B.S. 3552, 1962.*

actual power. *See* actual horsepower. *Standard, 1964.*

actuated roller switch. A switch placed in contact with the belt conveyor immediately preceding the conveyor it is desired to control. In the centrifugal sequence control switch a driving pulley bears against the driving belt and as the latter moves the pulley rotates and the governor weights attached to the pulley shaft are flung out and so complete an electrical pilot circuit and thus start the subsidiary belt. *Nelson.*

actuator. A device for producing a remotely controlled movement (normally rectilinear) by mechanical means. *NCB.*

acumulacion. Sp. Accumulation, oil pool. *Hess.*

acute bisectrix. The line which bisects the acute angle of the optic axes of biaxial minerals. *Fay.*

acute exposure (to radiation). Exposure to irradiation for a short period of time. *NCB.*

acyclic. Arranged in spirals, not in whorls. *A.G.I.*

aczolling. The treatment of timber with a mixture of metallic ammoniates and an antiseptic acid (derivative of phenol or naphthalene). *Liddell 2d, p. 493.*

adamant. An imaginary stone of impenetrable hardness; formerly used of the diamond and other substances of extreme hardness. *Webster 3d.*

adamantine. a. Diamond hard. A commercial name for chilled steel shot used in the adamantine drill, which is a core barrel type of rock-cutting drill with a cutting edge fed by these shots. *Pryor, 3.* b. Like the diamond in luster. *Webster 3d.*

adamantine drill; shot drill. A core drill employed in rotary drilling in very hard ground. A steel-cylinder bit with a diagonal slot cut in the lower edge is attached to a core barrel and a small quantity of chilled steel shot fed in with the water at intervals. These find their way beneath the bit and wear away the rock as the bit rotates. A core from 4 to 30 inches in diameter is obtained. *Fay.*

adamantine luster. Diamondlike luster. *Hurlbut.*

adamantine shot. Synonym for shot. *See also* shot, h. *Long.*

adamantine spar. A name for silky brown corundum. Now more generally applied to dull opaque corundum from India, ground for use as a polishing agent. Same as seal sapphire. *Shipley.*

adamellite. Quartz monzonite. *A.G.I.*

adamic earth. a. Eng. A kind of red clay. *Fay.* b. A name some have given to common clay. *Arkell.*

adamite. A rare hydrous zinc arsenate, $Zn_3As_2O_8An(OH)_2$, occurring granular or in crusts and crystallizing in the orthorhombic system. *Fay.* Weakly radioactive; variable color: yellowish, greenish, or violet, rarely colorless or white; found in the oxidized zone of zinc ore bodies. Associated with smithsonite, calcite, malachite, hemimorphite, limonite, and azurite. Small amounts of uranium have been found in some specimens of adamite. *Crosby, p. 117.*

Adams chromatic value system. A method for the quantitative designation of color in terms of (1) lightness, (2) amount of red or green, and (3) amount of yellow or blue. The system has been used in the examination of ceramic colors. *Dodd.*

adamsite. A greenish-black muscovite found in a schist at Derby, Vt.; has been called margarodite. *Dana 6d, pp. 614, 616.*

Adams process. A method for the removal of iron compounds from glass-making sands by washing with a warm solution of acid Na (sodium) oxalate containing a small quantity of $FeSO_4$. *Dodd.*

Adam's snuffboxes. Eng. Hollow, roughly rectangular pebbles lined with goethite, Lenham beds, Netley Heath, Surrey. *Compare* snuffboxes. *Arkell.*

Adams-Williamson annealing schedule. A procedure, derived from first principles, for determining the optimum annealing conditions for a particular glass. *Dodd.*

ada mud. A conditioning material which may be added to drilling mud in order to obtain satisfactory cores and samples of formations. *Williams.*

adapter; adapter flange. A form of flange used to mount wheels in which the holes are larger than the machine arbors. *See also* safety flange. *ACSG, 1963.*

adapter brick. Special arch-wedge key brick, used for permitting the use of straight brick in a roughly dome-shaped construction. *Bureau of Mines Staff.*

adapter flange. *See* adapter.

adapter trough. A short section of a shaker conveyor trough that serves as a connecting link between any two sizes of trough. *Jones.*

adaptive convergence. Synonym for convergent evolution. *A.G.I.*

adaptive metallurgy. Branch of metallurgy that deals with use of metals and alloys. *Bennett 2d, 1962 Add.*

adarce. A calcareous sediment of some mineral springs. *Standard, 1964.*

A.D.C. test. *See* sensitivity to propagation. *McAdam II, p. 19-20.*

added diamonds. As used by the diamond-bit manufacturing industry, the number or carat weight of new diamonds that must be added to the resettable diamonds salvaged from a worn bit in order to have enough to set a new bit. *Long.*

addendum. The point or portion of the tooth of a gearwheel lying outside the pitch circle. *Crispin.*

addendum circle. The outer circumference of a gearwheel. *Crispin.*

additional agent. A substance added to a solution for the purpose of altering or controlling a process. Examples: wetting agents in acid pickles; brighteners or antipit agents in plating solutions; and inhibitors. *ASM Gloss.*

additional element. Any element added in relatively small quantity to an alloy for scavenging or modifying its properties. *Bennett 2d, 1962.*

additive. A correction applied to times of seismic reflections measured from an arbitrary time origin. The additive is normally applied for the purpose of translating the time origin to correspond to the datum elevation chosen for computation, and it is algebraic in sign. *A.G.I.*

additive constant. The length which must be added to the product of the intercept, on the staff in stadia work and the multiplying constant, to give the true distance from the center of the telescope to the staff. The length is often less than 1 foot. *Ham.*

addle; adle. N. of Eng. To earn by labor. *Fay.*

addling. N. of Eng. The act of earning of labor. *Fay.*

addlings. A term used in the northern and parts of other coalfields in Great Britain to describe earnings or wages. *Nelson.*

adductor muscle. A muscle passing across from one valve of a bivalve to the other, for the purpose of closing the shell. *Shipley.*

Adelaide ruby. Blood-red pyrope from South Africa. *Hess.*

Adeline steelmaking process. A process of producing precision castings of steel or steel alloys, which comprises first forming the steel or steel alloy in molten form by the aluminothermic process, by igniting a mixture of iron ore and aluminum, then running the molten metal into a mold prepared by packing a refractory mold composition round a model made of wax or other comparatively low melting point substance and heating to melt out the wax and consolidate the mold, and finally centrifuging the mold. *Osborne.*

adelite. A gray, basic hydrous arsenate of calcium and magnesium, $2CaO.2MgO.As_2O_5.H_2O$; 48.5 to 50.0 percent As_2O_5; Mohs' hardness, 5; specific gravity, 3.71 to 3.76; probably a deep-seated tactite mineral. *Hess.*

ader wax. Crude ozocerite in leafy masses. *Fay.*

adherence. a. The degree of adhesion of a porcelain enamel or other ceramic coating to the metal substrate. *ASTM C286-65.* b. In magnetic testing, the property of a powder, either dry or in liquid suspension, which depends upon its magnetic permeability and causes it to accumulate in a well-defined area above a crack or other defect. *Rolfe.*

adherence failure. Insufficient adherence to metal to hold the coating. Visually indicated by bright metal in a fractured area. *Bryant.*

adhesion. a. Holding surfaces together with an adhesive. *See also* adhesive. *CCD 6d, 1961.* b. The sticking of two surfaces together due to molecular attraction for each other. *CCD 6d, 1961.* c. Shearing resistance between soil and another material under zero externally applied pressure. *ASCE P1826.* d. Force of attraction between the molecules (or atoms) of two different phases, such as liquid brazing filler metal and solid copper, or plated metal and basis metal. *Compare* cohesion. *ASM Gloss.* e. The attraction of the molecules in the walls of interstices for molecules of water. *A.G.I.* f. The soil quality of sticking to buckets, blades, and other parts of excavators. *Nichols.* g. In the flotation process, clinging of a particle to air-water interphase or to a bubble. Fundamentally, adhesion is the force between two unlike substances, for example, water and glass. In the concentration of diamonds from blue ground, the gems adhere strongly to a greased plane surface. Adhesion is due to molecular attraction at an interface. *Pryor, 3.* h. The coefficient of adhesion or static friction between the wheels of the locomotive and the rails, upon which the pulling power or tractive effort of the locomotive depends, is a function of the material of the wheel tires and the rails, the condition of the rails, whether wet, dry, or sanded, and to some extent on the springing and center of gravity of the locomotive. *Sinclair, V, p. 218.*

adhesion tension. Energy of attraction across an interface. *Pryor, 3.*

adhesion-type ceramic veneer. Ceramic slabs approximately 1⅛ thick, held in place by the adhesion of the mortar to the ceramic veneer and the backing wall. No metal anchors are required. *See also* ceramic veneer. *ACSG.*

adhesive. A substance capable of holding materials together by surface attachment. *CCD 6d, 1961.*

adhesive force. The frictional grip between two surfaces in contact, for example, between the driving wheel of a locomotive and the rail; the product of the weight on the wheel and the friction coefficient between the wheel and rail. *Nelson.*

adhesive slate. A very absorbent slate that adheres to the tongue if touched by it. *Standard, 1964.*

adiabatic. A change at constant total heat. An action or a process during which no heat is added or subtracted. *Strock, 10.*

adiabatic calorimeter. A calorimeter which theoretically remains unaffected by its surroundings, and neither gains nor loses heat. The sample under investigation (solid or powder) is enclosed in a tapered copper container along the central axis of which is a heating element. The sample and its container are completely enclosed by a copper radiation jacket which is maintained at the same temperature as the sample by electric heaters; the radiation jacket is, in turn, enclosed in a furnace. The furnace is evacuated or filled with inert gas, as desired. The temperature of the sample and jacket are measured with platinum/platinum—10 percent rhodium thermocouples, and the temperature difference between the sample and the radiation jacket is indicated by copper/gold palladium alloy thermocouples (the sample container and the radiation jacket act as return leads). *Osborne.*

adiabatic compression. Compression in which no heat is added to or subtracted from the air and the internal energy of the air is increased by an amount equivalent to the external work done on the air. The increase in temperature of the air during adiabatic compression tends to increase the pressure on account of the decrease in volume alone; therefore the pressure during adiabatic compression rises faster than the volume diminishes. *Lewis, pp. 665-666.*

adiabatic efficiency. This is obtained by dividing the power, theoretically necessary to compress the air and deliver it without loss of heat, by the power supplied to the fan shaft. *Roberts, I, p. 186.*

adiabatic expansion. Expansion in which no heat is added to or subtracted from the air, which cools during the expansion because of the work done by the air. *Lewis, p. 665.*

adiabatic phenomena. Those which occur without a gain or loss of heat. *Hy.*

adiabatic reaction. A reaction which takes place without transfer of heat to or from the body concerned. *Hess.*

adiabatic temperature. Theoretical maximum temperature. This means the temperature that would be attained if no heat were lost to the surroundings. *Newton, p. 135.*

adiabatic temperature changes. The compression of a fluid without gain or loss to the surroundings is work performed on the system and produces a rise of temperature. In very deep water such a rise of temperature occurs and must be considered in the vertical temperature distribution. *Hy.*

adiagnostic. Proposed by Zirkel and applied to mineral constituents of a rock that cannot be distinguished even with the aid of a microscope. *Johannsen, v. 1, 2d, 1939, p. 164.*

adinole. A dense, felsitic, contact-metamorphic rock composed chiefly of exceedingly fine-grained quartz and albite; the soda may reach 10 percent; actinolite and other minerals are in smaller quantity. Adinoles are formed by reactions following the intrusion of diabase into shale or slate (*Compare* spilosite; desmite). They also make up beds in metamorphic rocks (*Compare* porphyroid; halleflinta). *Hess.*

adion. A labile ion, adsorbed sufficiently to be held at a surface, yet free to move on that surface. *Pryor, 3.*

adipite. An aluminosilicate of calcium, magnesium, and potassium having the composition of chabazite. *Dana 6d, p. 591.*

adipocerite; adipocire. Synonym for hatchettite. *Fay.*

A-dipping. Scot. Toward the dip. *Fay.*

adit. a. A horizontal or nearly horizontal passage driven from the surface for the working or unwatering of a mine. If driven through the hill or mountain to the surface on the opposite side it would be a tunnel. *Lewis, p. 21.* Also called drift; adit level. b. As used in the Colorado statutes it may apply to a cut either open or undercover, or open in part and undercover in part, dependent on the nature of the ground. *Fay.* c. A passage driven into a mine from the side of a hill. *Statistical Research Bureau.*

adit end. The furthermost end or part of an adit from its beginning, or the very place where the miners are working underground towards the mine. *Hess.*

adit level. Mine workings on a level with an adit. *See also* adit. *Hess.*

adjacent. As generally defined and understood, means by, or near, and close, but not actually touching; nonadjacent, representing the opposite situation, means not near, and not close. *Ricketts, I.*

adjacent sea. Semienclosed sea adjacent to and connected with the oceans. The North Polar, Mediterranean, and Caribbean Seas are examples. Synonym for marginal sea. *A.G.I.*

adjoining. To be in contact; to lie next to. *Jones.*

adjustable bed. Bed of a press designed so that the die space height can be varied conveniently. *ASM Gloss.*

adjustable pipe tongs. Synonym for brown tongs. *Long.*

adjusting screw. An accurately machined screw on a surveying instrument with which final adjustments are made for leveling, focusing, or setting the instrument in the correct position. *Ham.*

adjustment. When a number of survey observations are inconsistent, an adjustment is made in order to make each observation consistent with the others. For example, if the three angles of a triangle do not add up to 180°, but to 180°6', then 2 minutes of arc must be deducted from each angle. Also refers to the operations carried out on the various components of a surveying instrument so that it will give accurate readings. *Ham.*

adjustment of error. Method of distributing the revealed irregularities over a series of results. *Pryor, 3, p. 160.*

adjutage; ajutage. Nozzle or tube from which hydraulic water is discharged. *Pryor, 3.*

adlings. *See* addlings. *Fay.*

admiralty brass. Alpha brass in which some of the zinc is replaced by tin to increase strength and corrosion resistance. Composed of 70 percent copper, 29 percent zinc, and 1 percent tin. *C.T.D.*

admiralty coal. A good quality smokeless steam coal as used in the fleet. *Tomkeieff, 1954.*

admittance; admission. a. Substitution in a crystal lattice of a trace element for a common element of higher valence, for example, lithium cations for magnesium cations. *A.G.I.* b. Substitution of a common element by a trace element with a higher valence. *Schieferdecker.*

admixture. a. Applied by Udden to one of the lesser or subordinate of several size grades of a sediment. *A.G.I.* b. A material (other than coarse or fine aggregate, cement or water) which is added in small quantities during the mixing of concrete, so as to produce some desired modification in one or more of its properties. Also called additive. *Taylor.*

admixture, coarse. Material coarser than that found in the maximum histogram class in the graphic representation of particle size analysis. *A.G.I.*

admixture, distant. The two classes at the extreme ends of a histogram representing the particle size analysis of a sediment. *A.G.I.*

admixture, fine. A material finer than that found in the maximum histogram class in the graphic representation of particle size analysis. *A.G.I.*

admixture, proximate. The two histogram classes adjacent to the maximum class in the graphic representation of particle size analysis. *A.G.I.*

admixtures. Materials added to mortar as water-repellent or coloring agents or to retard or speedup setting. *ACSG.*

adobe. a. Applied to clayey and silty deposits found in the desert basins of the southwestern United States and in Mexico where the material is extensively used for making sun-dried brick. The composition is a mixture of clay and silt together with other materials. Most adobes are calcareous. Similar deposits are found in other desert basins. The agent of deposition seems to have been mainly water and the places of deposition are more or less flat areas in the central and lower parts of desert basins. The materials, in part at least, have been produced from the rocks of the desert slopes through both decomposition and disintegration. *A.G.I.* b. The mixed earth or clay of which such bricks are made. *Standard, 1964.* c. In mining, a brick of pulverized ore mixed with clay, as in quicksilver metallurgy. *Fay.* d. Synonym for mudcap. *Long.* e. A firm sticky clay. *Long.*

adobe brick. A large clay brick, of varying size, roughly molded and sun-dried. *ACSG.*

adobe flat. A broad flat formed by deposition from sheetfloods and floored with sandy clay or adobe. The surface, when dry, is normally hard, smooth, and somewhat streaked in appearance due to the presence of fine crenulations in the direction of flow. *USGS Bull. 730, 1923, pp. 69–70.*

adobera. A mold for making adobe brick. *Hess.*

adoberia. An adobe kiln or yard. *Hess.*

adobe shot. Ordinarily referred to as a dobe shot. A stick or part of a stick of dynamite is laid on the rock to be broken and covered with mud to add to the force of the explosion. A mudcap shot. *Hess.*

adolescent river. In physical geology, a river in the stage where it has acquired a well-cut channel, sometimes reaching baselevel at its mouth, and a graded bed. *Standard, 1964.*

A drill rod. A former standard diamond-drill rod superseded in 1954 by the DCDMA standard AW drill rod. *Long.*

adsorb. To condense and to hold a gas on the surface of a solid, particularly metals. Also to hold a mineral particle within a liquid interface. *Fay.*

adsorbate. That which is adsorbed by an adsorbing substance, or an adsorbent. *Pryor, 3.*

adsorbed water. a. Water in a soil mass that is held by physicochemical forces, having physical properties substantially different from absorbed water or chemically combined water, at the same temperature and pressure. *ASCE P1826.* b. Water usually one or more molecules thick on a surface held by molecular forces. *ACSG, 1963.*

adsorbent. A substance which has the ability of condensing or holding other substances on its surface. Active carbon, activated alumina, and silica gel are examples. *CCD 6d, 1961.*

adsorption. a. A taking up by physical or chemical forces of the molecules of gases, of dissolved substances, or of liquids by the surfaces of solids or liquids with which they are in contact. *Webster 3d.* b. Physical adhesion of molecules to the surfaces of solids without chemical reaction. *ASTM STP No. 148-D.* c. A term used in the flotation process. *Bureau of Mines Staff.* d. The property possessed by some substances, notably those of a carbonaceous nature, by virtue of which they are able to compress and hold on their surface relatively large quantities of gas. Very large quantities of firedamp may be released during the working of a coal seam, and it is apparent that this gas has been stored in coal and its associated strata throughout the ages. *Roberts, I, pp. 66-67.* e. Broadly, adsorption at a solid-liquid interphase may be physical, electrochemical or chemical. With physical adsorption there is low energy, rapid reversibility and nonspecificity (for example, adsorption of soaps on paraffin-wax). With chemical adsorption high energies, irreversibility and specific action is characteristic. Ionic adsorption includes common-ion adsorption to the mineral lattice, and ion exchange between the surface lattice charges of solid and the ions in solution (the surface-modifying effects utilized in the flotation process). In physical adsorption there is capture by the solid or adsorbent at its surface of the adsorbate, and alteration in concentration at an interface, which may be positive or negative. *Pryor, 3.* f. Silica gel is an adsorber used in dehumidifying, whereas activated carbon is an adsorber used to remove odors from air. During adsorption the adsorber undergoes no permanent physical or chemical change. *Strock, 10. See also* clay adsorption, anion; clay adsorption, cation.

adsorption analysis. Separation by differential adsorption. *Pryor, c, p. 20.*

adsorption isotherm. Relation between quantity adsorbed and that not adsorbed at constant temperature. *Pryor, 3.*

adsorption surface area. Surface area of a particle calculated from data obtained from a stated adsorption method of measurement. *Pryor, 3.*

adularescence. a. A milky white to bluish sheen in gem stones. *C.M.D.* b. The changeable white to pale bluish luster of an adularia cut cabochon. *Webster 3d.*

adularia; adular. A pure or nearly pure potassium-aluminum silicate, $KAlSi_3O_8$; a variety of orthoclase. *Fay.*

adularia moonstone. Precious moonstone. *See also* adularia. *Shipley.*

adularization. The introduction of or replacement by adularia, as in the potash spilites (poenites) of Timor. *A.G.I.*

advance. a. The work of excavating as mining goes forward in an entry and in driving rooms; to extract all or part of an area; first mining as distinguished from retreat. *B.C.I.* b. S. Afr. Term used to denote the progress of a drive or shaft. *Beerman.* c. To deepen a borehole. *Long.* d. Rate at which a drill bit penetrates a rock formation. *Long.* e. Feet drilled in any specific unit of time. *Long.* f. The linear distance (in feet or meters) driven during a certain time in tunneling, drifting, or in raising or sinking a shaft. *Fraenkel.*

advance development. S. Afr. Development to provide an ore reserve in advance of mining operations. *Beerman.*

advanced gallery. A small heading driven in advance of the main tunnel in tunnel excavation. *Fay.*

advance gates. Gate roads that are driven simultaneously with the longwall coal face but which are maintained some 10, 20, or more yards in advance of the face. The area immediately ahead of the coal face is therefore preexplored and steps can be taken to cope with minor disturbances and thus prevent a serious loss of output. *See also* exploring heading. *Nelson.*

advance (of a beach). a. A continuing seaward movement of the shoreline. *A.G.I.* b. A net seaward movement of the shoreline over a specified time. Also called progression. *A.G.I.* c. (Of a glacier) the forward movement of a glacier front. *A.G.I.*

advance overburden. Overburden in excess of the average overburden to ore ratio that must be removed in opencut mining. *Institution of Mining, and Metallurgy, Symposium on Opencast Mining, Quarrying, and Alluvial Mining. London, 16-19 November 1964, Paper 14, pp. 19-20.*

advance per round. The length, measured along the longitudinal axis of the working, tunnel, or gallery, of the hollow space broken out by each round of shots. For raises, it is upward advance; for sunk shafts, downward advance. *Fraenkel.*

advance stope. A stope in which sections of the face or some pillars are a little in advance of the others. This is achieved either by beginning the stoping of the section which is to be advanced earlier, or by proceeding more quickly. *Stoces, v. 1, p. 249.*

advance stripping. The removal of barren or subore-grade earthy or rock materials required to expose and permit the minable grade of ore to be mined. The removal of these nonore materials is known as stripping. *Bureau of Mines Staff.*

advance wave. The air pressure wave preceding the flame in a coal-dust explosion. The bringing of the dust into suspension is accomplished by such a wave and the violent eddies resulting therefrom. *Rice, George S.*

advance working. Mine working that is being advanced into the solid, and from which no pillar is being removed. *Fay. See also* first working. *Kentucky, p. 332.*

advancing. Mining from the shaft out toward the boundary. *Stoces, v. 1, p. 209. See also* working out.

advancing longwall. a. Mining the coal outward from the shaft pillar and maintaining roadways through the worked-out portion of the mine. *Fay, p. 407.* b. *See* longwall advancing.

adventive cone. A subsidiary volcanic cone, usually a cinder cone, on the flank of a larger volcano. Synonymous with parasitic cone; lateral cone. *A.G.I.*

adventive crater. A volcanic crater on the flank of a large volcanic cone. *Fay.*

adventure. Corn. A mining enterprise. *Fay.*

adventurers. Eng. Shareholders or partners in a mining enterprise; in Cornwall, cost book partners. *Fay.*

adverse. To oppose the granting of a patent to a mining claim. *Fay.*

adverse claim. A claim made to prevent the patenting of part of the ground within the area in question; for example, an adverse claim is made by a senior locator to exclude the part of his claim that is overlapped by the claim of a junior locator, when the junior locator is applying for patent. *Lewis, p. 31.*

adverse intent. The terms claim of right, claim of title, and claim of ownership, when used in the books to express adverse intent, mean nothing more than the intention of the dissessor to appropriate and use the land as his own to the exclusion of all others, irrespective of any semblance or shadow of actual title. *Ricketts, I.*

advertised out. A term used to express the result of the action of a joint owner of a mining claim who by proper notices causes the interest of his coowner to be forfeited for failure to perform his share of the assessment work. *Fay.*

advp Abbreviation for avoirdupois. *BuMin Style Guide, p. 58.*

adz. A cutting tool with the blade set at right angles to the handle; used for rough dressing timber. *Crispin.* Also spelled adze. *Webster 3d.*

adz-eye hammer. Usually the claw-type nail hammer in which the eye is extended to give a longer bearing on the handle than is the case with other hammers. *Crispin.*

AEC Abbreviation for Atomic Energy Commission. *GPO Style Manual, p. 155.*

aedelforsite; edelforsite. A name given to a mixture of wollastonite, quartz, and feldspar from Edelfors, Sweden; to impure wollastonite from Gjellebak, Sweden (called also gillebackit) ; and to impure laumontite, under the impression that they were new minerals. *Hess.*

aedelite; edelite. Prehnite; $2CaO.Al_2O_3.3SiO_2.H_2O$. *Hess.*

Aegerite. Trade name for a bitumen allied to wurtzilite. *Tomkeieff, 1954.* Not to be confused with the pyroxenic mineral aegirine. *English.*

aergirine; aegirite. A scodium-ferric iron silicate, $NaFe'''(Si_2O_6)$, occurring commonly in soda-rich igneous rocks; monoclinic; Mohs' hardness, 6 to 6.5; specific gravity, 3.40 to 3.55. *Dana 17.* Synonym for acmite. *See also* pyroxene. *A.G.I.*

aegirine-augite. Intermediate between augite and aegirite. Same as aegirite-augite. *English.*

aegirite. See aegirine for pyroxene mineral; Aegerite for trade name of bitumen.

aenigmatite. A rare titanium-bearing silicate, $(Na,Ca)_4(Fe^{+2},Fe^{+3},Mn,Ti,Al)_{13}(Si_2O_7)_6$; triclinic; black color; found associated with alkalic rocks. *Dana 17, pp. 413, 597.*

aeolian. Synonym for eolian. Obsolete. *A.G.I.*

aeolotropic; eolotropic. Possessing different properties in different directions; especially, not equally elastic, or not conducting heat, light, etc. equally in all directions. *Standard, 1964.* Synonym for anisotropic. Opposite of isotropic.

Aeonite. Trade name for a bitumen allied to wurtzilite. *Tomkeieff, 1954.* Similar to elaterite. *English.*

aerate. a. To expose to the action of the air; to supply or to charge with air. *Standard, 1964.* b. To expose to air by passing air through; to aerify; to cause air to bubble through. *Webster 3d.* c. To introduce air into (a liquid) by stirring, spraying, or some similar method. *Webster 3d.* d. To supply or to impregnate with air (as soil or sand). *Webster 3d.* e. To charge with carbon dioxide or other gas, as soda water. *Standard, 1964.*

aerated concrete. Concrete with a high proportion of air spaces resulting from a foaming process; the bulk density may vary from about 35 to 90 pounds per cubic foot. Aerated concrete is chiefly used for making precast building units. It is also known as gas concrete, cellular concrete, or foamed concrete. *Dodd.*

aeration. a. The introduction of air into the pulp in a flotation cell in order to form air bubbles. *B.S. 3552, 1962.* b. In mineral dressing use of copious air bubbled into mineral pulps, (1) to provide oxygen in cyanidation; (2) to prevent settlement of solids; and (3) to remove aerophilic minerals in froth flotation by binding them into a mineralized froth which is temporarily stabilized by frothing agents. *Pryor, 3.* c. The process of relieving the effects of cavitation by admitting air to the section affected. *Seelye, 1.* d. The process of mixing air or other gases with water, sewage, etc. *Seelye, 1.*

aeration cell. An elecrtolytic cell, the electromotive force of which is due to a difference in air (oxygen) concentration at one electrode as compared with that at another electrode of the same material. Also called oxygen cell. *Osborne.*

aeriation of cement. The effect of the atmosphere on Portland cement during storage. Dry air has no effect, but if it is exposed to moist air both moisture and carbon dioxide are absorbed with erratic effects on the setting behavior. *See also* air entraining. *Dodd.*

aeration, zone of. The zone in which the interstices of the functional permeable rocks are not (except temporarily) filled with water under hydrostatic pressure; the interstices are either not filled with water or are filled with water that is held by capillarity. *Rice.*

aerator. a. An apparatus for charging water with gas under pressure, especially with carbon dioxide. *Standard, 1964.* b. Any contrivance for supplying a stream of air or gas, as for fumigating, destroying fungi, insects,etc. *Standard, 1964.*

Aerencheon apparatus. A liquid-air type of breathing apparatus which is smaller and lighter than the Aerophor apparatus. The entire apparatus is carried on the wearer's back and has a weight of only 32 pounds, which is 8 pounds lighter than the Aerophor breathing apparatus. The mouthpiece of the Aerencheon apparatus has been specially designed to prevent the involuntary inhalation of the outside atmosphere should the lip muscles become slack. *McAdam, pp. 42-44.*

Aerex fan. Trade name for an axial-flow type of mine fan. It has the advantages of high efficiency, small size, and high operating speeds. *See also* fan, a. *Nelson.*

aerial. Relating to the air or atmosphere. Subaerial is applied to phenomena occurring under the atmosphere as subaqueous is applied to phenomena occurring underwater. *Fay.*

aerial arch. An anticline, the crest of which has been eroded away. *Hess.*

aerial cableway. An arrangement of overhead cable supporting a traveling carriage from which is suspended a skip or container which can be lowered and raised at any desired point. *Nelson.*

aerial geophysical prospecting. Geophysical prospecting from an aircraft, which may be a combined aeromagnetic, electromagnetic, and radiometric survey. An airborne magnetometer survey is conducted so that the area is covered systematically, by flying along equally spaced profile lines across the area. In mineral prospecting, the aircraft is maintained at a constant height above the ground, known as profile flying. Among the mineral deposits that may be identified by a magnetometer are magnetite, ilmenite, pyrrhotite, and oil. *See also* aerial mapping; electromagnetic detector. *Nelson.* Radiometric instruments are used to detect radioactive minerals. *Bureau of Mines Staff.*

aerial magnetometer. A device used to measure variations in the earth's magnetic field while being transported by an aircraft. Same as airborne magnetometer. *A.G.I.*

aerial mapping. The taking of continuous vertical photographs from an airplane for geophysical and other purposes. One such method employs a vertically mounted 35-millimeter positioning camera, which photographs continuously the track of the aircraft. From the prints obtained, a mosaic map is constructed. The map is closely examined through double-eyepiece viewers, etc., and the possible nature of the geology and subsurface structure can be inferred by trained geologists. *See also* profile flying; radioaltimeter. *Nelson.*

aerial railroad. A system of wires from which to suspend cars or baskets, as in hoisting ore. *Standard, 1964. See also* aerial tramway. *Fay.*

aerial ropeway. System of ore transport used in rough or mountainous country. A cable is carried on pylons, and loaded buckets are (1) towed from loading point to discharge; (2) suspended from a carriage running on this cable, and then returned empty along a second cable; or (3) the whole cable moves continuously carrying buckets which hang from saddle clips and are loaded and discharged automatically or by hand control. *Pryor, 3. See also* bicable; jig-back; monocable; aerial tramway. *Sinclair, V, pp. 359–361.*

aerial spud. A cable for moving and anchoring a dredge. *Fay.*

aerial tramway. A system for the transportation of material, as ore or rock, in buckets suspended from pulleys or grooved wheels that run on a cable, usually stationary. A moving or traction rope is attached to the buckets and may be operated by either gravity or other power, as determined by topographic features or other conditions. *Fay.* An aerial tramway transports loads in carriers suspended from wire ropes forming the tracks, between fixed points, usually a long distance apart. Tramways are divided into three classes: (1) bicable, (2) twin-cable, and (3) monocable. *Peele, v. 2, sec. 26, p. 2.*

aerify. a. To infuse or to force air into; to aerate. *See also* aerate. a. *Webster 3d.* b. To change into an aeriform state; to vaporize. *Webster 3d.* c. To change into a gaseous form. *Standard, 1964.*

arites. Metallites; a word proposed to cover all ores and metalliferous matter. *Hess.*

aerobe. An organism that lives in the presence of free oxygen. The oxygen is usually used in the cell's metabolism. *I.C. 8075, 1962, p. 63.*

aeroclay. Clay, particularly china clay, that has been dried and air separated to remove any coarse paritcles. *Dodd.*

aerocrete. A patented, porous, lightweight concrete. *Bennett 2d, 1962.*

aerodynamical efficiency. This furnishes a measure of the capacity of a fan to produce useful depression (or positive pressure in the case of a forcing fan) and indicates the extent to which the total pressure produced by the fan is absorbed within the fan itself. *Sinclair, I, p. 169.*

aerodynamic fan, backward-bladed. A fan that consists of several streamlined blades mounted in a revolving casing. The cross section and spacing of the blades is designed aerodynamically. This design insures that the air flows between the blades and leaves the rotor in a steady and regularly distributed stream. This appreciably reduces frictional, conversion, and recirculation losses. Fans of a convenient size can handle large volumes of air at the highest pressures likely to be required in mine ventilation. *Roberts, I, p. 184.*

aerodynamic instability. Flutter which may occur in a structure exposed to wind force. This form of instability can be guarded against by suitable design. *Ham.*

aeroembolism. a. The formation or liberation of gases in the blood vessels of the body, as brought on by a change from a high, or relatively high, atmospheric pressure to a lower one. *H&G.* b. The disease or condition caused by the formation or liberation of gases in the body. The disease is characterized principally by neuralgic pains, cramps, and swelling, and sometimes results in death. Also known as decompression sickness. *H&G.*

aerofall mil. A short, cylindrical grinding mill with a large diameter used dry, with either coarse lumps of ore, pebbles, or steel balls as crushing bodies. The mill load is airswept to remove finish mesh material. *Pryor, 3.*

aeroflocs. Synthetic water-soluble polymers used as flocculating agents. *Bennett 2d, 1962 Add.*

aerofoil. A body shaped so as to produce an aerodynamic reaction (lift) normal to its direction of motion, for a small resistance (drag) in that plane. A wing, plane, aileron, rudder, elevator, etc. *C.T.D.*

aerofoil-vane fan. An improved centrifugal-type mine fan. The vanes, of aerofoil section, are curved backwards from the direction of rotation. This fan is popular in British coal mines and total efficiencies of about 90 percent have been obtained. *See also* fan, a. *Nelson.*

Aerofroth Frothers. Trademark for a group of surface-active agents. Used primarily as foaming agents or frothers in flotation processing of ores and minerals. *CCD 6d, 1961.*

aerograph. A device for spraying powdered glaze or color on the surface of pottery by means of compressed air. *Dodd.*

aerohydrous. a. Enclosing a liquid in the pores or cavities, as some minerals. *Standard, 1964.* b. Characterized by the presence of both air and water. *Standard, 1964.*

aeroides. A name for pale sky-blue aquamarine. *Shipley.*

aerolite. a. A stony meteorite in which silicates predominate over metallic iron. Synonym for meteoric stone; sporadosiderite. *Schieferdecker.* b. A type of meteorite consisting largely of silicates. *A.G.I.* c. An alloy of 91.93 percent aluminum, 0.12 percent zinc, 0.45 percent silicon, 0.97 percent iron, 1.15 percent copper, and 0.38 percent manganese; specific gravity, 2.74. Urea-formaldehyde cement. *Bennett 2d, 1962.*

aeromagnetic prospecting. A technique of exploration of an area using an aerial magnetometer to survey that area. *A.G.I.*

aerometer. An instrument for ascertaining the weight or the density of air or other gases. *Webster 3d.*

Aeromine Promoters. Trademark for a group of cationic flotation reagents. Used in froth flotation of ores and minerals, primarily silica and silicates. *CCD 6d, 1961.*

aerophore. a. A respirator in the form of a tank which receives the exhalations from the lungs, and containing chemicals designed to revive the air to render the air fit for breathing. *Fay.* b. A portable apparatus containing a supply of compressed air for respiration, as for a miner. *Webster 2d.*

aerosiderite. An obsolete term for siderite. *A.G.I.*

aerosiderolite. An obsolete term for siderolite. *A.G.I.*

aerosite. Same as pyragyrite. *Standard, 1964.*

aerosol. A suspension of ultramicroscopic solid or liquid particles in air or gas, as smoke, fog, or mist. *Webster 3d.*

Aerosol. Trade name of strong wetting agent based on sulfonated bi-carboxy-acid esters. *Pryor, 3.*

aerosphere. The atmosphere considered as a spherical shell of gases surrounding the earth. *Standard, 1964.*

aerugite. A grass-green to brown nickel arsenate, perhaps $5NiO.As_2O_5$; an analysis gave 48.77 percent nickel. It is an oxidized vein mineral. *Hess.*

aerugo. a. Copper rust; verdigris; especially, green copper rust adhering to old bronzes. *Standard, 1964.* b. Copper carbonate, due to weathering of the metal; especially, the patina adhering to old bronzes. *Hess.*

aeschynite. A black to transparent yellowish-brown, complex orthorhombic titanocolumbate of thorium and the cerium metals with some iron, calcium, etc.; 32 to 57 percent, Cb_2O_5; 21 to 42 percent, TiO_2; 19 to 24 percent, cerium earths; 1 to 3 percent, $(Y,Er)_2O_3$; Mohs' hardness, 5-6; specific gravity, 4.93-5.17; in pegmatites. *Hess.*

aethiops mineral. Metacinnabarite, a black isometric HgS. *Dana 6d, p. 63.*

aetite. a. A nodule consisting of a hard shell of hydrated oxide of iron within which the yellow oxide becomes progressively softer toward the center which is sometimes empty. *Fay.* b. Synonym for eaglestone. *Standard, 1964.*

AFA rammer. Apparatus designed by the American Foundrymen's Association for the preparation of test pieces of foundry sand; it has also been applied as a method for the preparation of test pieces of particulate refractory materials. The rammer operates by a 14-pound weight falling through a height of 2 inches on the plunger of a 2-inch diameter mold; normally, the weight is allowed to fall on the mold three times. *Dodd.*

affinity. In ion exchange, relative strength of attachment of competing ions for anchorage on a resin. *Pryor, 3.*

affluent. A tributary stream. *Standard, 1964.*

Afghanistan lapis. Fine blue, best quality lapis lazuli from the Badakshan district of Afghanistan, or from just over the border in Russia. Better known in the trade as Russian lapis. *Shipley.*

Afghanistan ruby. A ruby formerly mined near Kabul and also in Badakshan. *Shipley.*

AFMAG. *See* audiofrequency magnetic fields.

AFNOR. Prefix to specifications of the French Standards Association; Association Francaise de Normalization, 23 Rue Notre-Dame-des-Victoires, Paris 2. *Dodd.*

A-frame. a. Two poles or legs supported in an upright position by braces or guys and used as a drill mast. Also called double mast. *Long.* b. An open structure tapering from a wide base to a narrow load-bearing top. *Nichols, 2.*

A-frame headgear. A steel headgear consisting of two heavy plate A-frames, set astride the shaft mouth. They are braced together and carry the heavy girders which support the winding sheaves platform. It is a completely self-supporting and rigid structure and leaves more usable space around the shaft collar. It includes a guide-tower structure built over the shaft collar. A number of these headgears have been erected in the Republic of South Africa. *Nelson.*

African emerald. a. A deceiving name for green fluor; also for green tourmaline. *Shipley.* b. An emerald from the Transvaal. It is usually quite yellowish green; often dark and dull. Hardness, 7.5; specific gravity, 2.72 to 2.79; refractive index, 1.58 to 1.59; birefringence, 0.007. *Shipley.*

African jade. Green grossularite. Same as Transvaal jade. *Shipley.*

African nephrite. Same as Transvaal nephrite. *Shipley.*

African pearl. True pearl found in small quantities on the east coast of Africa between Zanzibar and Inhambane. *Shipley.*

African tourmaline. a. A trade term sometimes applied to all yellowish-green to bluish-green tourmaline whether or not from Africa. Same as Transvaal tourmaline. *Shipley.* b. A term sometimes used especially for fine, almost emerald-green tourmaline from southwest Africa. *Shipley.*

afterblast; inrush. During an explosion of methane and oxygen, carbon dioxide and steam are formed. When the steam condenses to water a partial vacuum is created, which causes an inrush or what is known as an afterblast. *Cooper, p. 195.*

afterblow. Continued blowing of air through Bessemer converter after flame has dropped, for removal of phosphorus in steel production. *Pryor, 3.*

afterbreak. In mine subsidence, a movement from the sides, the material sliding inward, and following the main break, assumed at right angles to the plane of the seam. The amount of this movement depends on several factors, such as the dip, depth of seam, and nature of overlying materials. *Lewis, p. 618.*

afterburst. a. A rock burst is sometimes followed by a further tremor as the ground adjusts itself to the new stress distribution. This is called an afterburst. *Spalding.* b. In underground mining a sudden collapse of rock subsequent to a rock burst. *Pryor, 3.*

after contraction. The permanent contraction (usually expressed as a linear percentage) that may occur if a fired or chemically bonded refractory product is refired under specified conditions of test. Fire clay refractories are liable to show after contraction if exposed to a temperature above that at which they were originally fired. *Compare* firing shrinkage. *Nelson.*

aftercooler. A device for cooling compressed air between the compressor and the mine shaft. By cooling and dehumidifying the air, and thus reducing its volume, the capacity and efficiency of the pipeline is increased. *See also* intercooler. *Nelson.*

aftercooling. The cooling of a reactor after it has been shut down. *L&L.*

afterdamp; aftergases. The mixture of gases which remain in a mine after a mine fire or an explosion of firedamp. It consists of carbonic acid gas, water vapor (quickly condensed), nitrogen, oxygen, carbon monoxide, and in some cases free hydrogen, but usually consists principally of carbonic acid gas and nitrogen, and is therefore irrespirable. *See also* blackdamp. *Fay.*

after expansion. The permanent expansion (usually expressed as a linear percentage) that may occur when a refractory product that has been previously shaped and fired, or chemically bonded, is refired under specified conditions of test. Such expansion may take place, for example, if the product contains quartz or kyanite, or if bloating occurs during the test. *Compare* firing expansion. *Dodd.*

afterfire. *See* afterrunning. *Institute of Petroleum, 1961.*

aftergases. Gases produced by mine explosions or mine fires. *Fay.*

afterheat. The heat produced by the continuing decay of radioactive atoms in a nuclear reactor after the fission chain reaction has ceased. Most of the afterheat is due to the decay of fission products. *L&L.*

afterleaving. Corn. Tailings sludge from the tin mines. *Hess.*

afterrunning; afterfire; running on. The firing of an internal-combustion engine after the ignition has been switched off. *Institute of Petroleum, 1961.*

aftershock. A shock following the principal earthquake, usually fading out slowly. *Schieferdecker.*

aftersliding. In mine subsidence, and inward movement from the side, resulting in a pull or draw beyond the edges of the workings. *Briggs, p. 43.*

Aftonian. Post-Nebraskan interglacial period. *A.G.I. Supp.*

afwillite. A hydrated calcium silicate, $3CaO.2SiO_2.3H_2O$; it is formed when portland cement is hydrated under special conditions and when calcium silicate is autoclaved (as in sand-lime brick manufacture). *Dodd.*

Ag Chemical symbol for silver. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

against the air. In a direction opposite to that in which the air current moves. To fire shots "against the air," is to fire shots in such an order that the shot firer travels against the air. *Fay.*

agalite. Fibrous talc, pseudomorphous after enstatite. *Fay.*

agalmatolite. Essentially a hydrous silicate of aluminum and potassium, corresponding closely to muscovite. A secondary or alteration product. A soft waxy mineral used for carvings by the Chinese. *See also* pinite. Also called lardstone. *Fay.*

agaphite. A variety of Persian turquoise. *Standard, 1964.*

agar. An organic substance derived from certain species of seaweed, which forms a thin, gelatinous liquid when added to boiling water and on cooling forms a firm, jellylike mass. Used in surveying drill holes with a Maas compass. *Long.*

agaric mineral. a. A soft, light, pulverulent hydrated silicate of magnesium found in Tuscany, Italy, from which floating bricks can be made. *Fay.* b. A light, chalky deposit of calcium carbonate formed in caverns or fissures of limestone. Also called rock milk. *Webster 3d.*

agate. A kind of silica consisting mainly of chalcedony in variegated bands or other patterns commonly occupying vugs in volcanic and other rocks. *A.G.I. Supp.*

agate glass. Glass made by blending two or more colored glasses or by rolling transparent glass into powdered glass of various colors during the melting. *Webster 3d.*

agate jasper. An agate consisting of jasper, containing veinings of chalcedony. *Dana 6d, p. 189.*

agate opal. Opalized agate. *Fay.*

agate shell. Same as agate snail, a large land snail of no gemmological interest. *Shipley.*

agate ware. a. An enameled iron or steel ware used for household utensils. Used extensively as table equipment in miners' camps and boarding houses. *Fay.* b. Pottery, veined and mottled to resemble agate. *Standard, 1964.* c. Bodies formed by blending differently colored clays (known as solid agate), or by coloring surfaces with differently colored slips. *C.T.D.*

agatiferous. Producing or containing agate. *Shipley.*

agatine. Like or pertaining to agate. *Shipley.*

agatize. To change into, or cause to resemble an agate. *Shipley.*

agatized wood. A variety of silicified wood which resembles any variety of agate. *Shipley.*

AGC Automatic gain control. An electronic device used in seismic reflection amplifiers to keep the overall recording level from varying more than a controlled amount. *A.G.I.*

age. a. Any great period of time in the history of the earth or the material universe that is marked by special phases of physical conditions or of organic development; an eon; as, the age of mammals. *Standard, 1964.* b. One of the minor subdivisions of geologic time, a subdivision of the epoch, and correspondent to the stage or formation: recommended by the International Geological Congress. *Standard, 1964.*

Agecroft device. A device placed in the rail track to arrest a forward runaway tram. The front axle of a descending tram traveling at normal speed depresses the catch and allows it to drop back in time for the back axle to pass over. Should the tram be traveling at excessive speed, the tail end of the catch arrests the rear axle. *Mason, v. 2, p. 530.*

aged. Approaching baselevel reduction; applied to the configuration of ground. *Standard, 1964.*

age equation. An equation which gives the time during which radioactive processes have been going on in a closed system, in terms of present values of radioactivity and of radiogenic helium or lead, or from present abundance ratios of radiogenic lead isotopes. *Hess.*

age-hardening. Hardening by aging, usually after rapid cooling or cold working. *See also* aging, d. *ASM Gloss.*

agent. a. The manager of a mining property. *Zern.* b. On a civil engineering contract, the responsible representative of the contractor, acting for him in all matters. *Ham.* c. Before nationalization in Great Britain, the term referred to the chief official of a large coal mine or group of mines under the same ownership. After nationalization, the equivalent term is group manager. *Nelson.* d. A chemical added to pulp to produce desired changes in climate of system. *Pryor, 3.*

age ratio. The ratio of daughter to parent isotope; the term is often used to indicate a ratio that is perturbed by some factor and, therefore, not indicative of the absolute age of the mineral. *A.G.I.*

agglomerate. a. A breccia composed largely or entirely of fragments of volcanic rocks. More specifically, a heterogeneous mixture of fragments of volcanic and other rocks filling the funnel or throat of an extinct or quiescent volcano. *Fay.* b. To collect into a ball, heap, or mass; hence, to gather into a mass or cluster. *Webster 3d.* c. Contemporaneous pyroclastic rock containing a predominance of round or subangular fragments larger than 32 millimeters in diameter. *A.G.I.*

agglomerate belt flotation. A coarse-fraction concentration method used in milling pebble phosphate in which conditioned feed at 70 to 75 percent solids, is placed on a flat conveyor belt traveling at a rate of about 75 feet per minute. Water sprayed on the surface of the pulp aerates the pulp causing agglomerates of phosphate particles to float to the side of the belt for removal. The silica fraction travels the length of the belt and is permitted to flow off the opposite end. Baffles are positioned at appropriate points along the belt to stir the material so that trapped phosphate particles are given an opportunity to float. Concentrate from the first belts or rougher operation, is cleaned on a second belt for further silica removal. Tailings from the cleaner belt are recycled to the rougher circuit. *Arbiter, p. 336.*

agglomerated. Bonded aggregate. *VV.*

agglomerate screening. A coarse fraction concentration method used in milling pebble phosphate that is based on flowing reagentized feed over a submerged sloping, stationary screen. Aglomerated phosphate particles float on top of the screen and are recovered at the lower end. Sand particles pass through the screen and are removed as a tailings fraction. Each screen section is approximately 3 feet wide by 4 feet long and treats 2 to 3 tons per hour of feed. *Arbiter, pp. 336-337.*

agglomerate tabling. A coarse fraction concentration method used in milling pebble phosphate that involves feeding shaking tables with reagentized pulp diluted to about 30 to 35 percent solids. Conditioned phosphate particles skim across the table as an agglomerate float. Sand particles caught in the riffles discharge into a tailings launder at the end of the table. *Arbiter, p. 336.*

agglomerating value. A measure of the binding qualities of coal but restricted to describe the results of coke-button tests in which no inert material is heated with the coal sample. *Compare* agglutinating value. *A.G.I.*

agglomeration. a. In ore beneficiation, a concentration process based on the adhesion of pulp particles to water. Loosely bonded associations of particles and bubbles are formed which are heavier than water; flowing-film gravity concentration is used to separate the agglomerates from nonagglomerated particles. *Gaudin, pp. 334–335.* In metallurgical language, agglomeration also refers to briquetting, nodulizing, sintering, etc. b. *See* kerosine flotation. *Mitchell, p. 572.*

agglutinate. A pyroclastic deposit consisting of an accumulation of originally plastic ejecta (chiefly volcanic bombs and driblet) and formed by the coherence of the fragments upon solidification. The cement is the glassy skin of the fragments at their point of contact. Distinguished from agglomerate by the presence of a glassy cement, by the occurrence of fragments of spalled-off scoria in the interstices between the blocks, and by the general absence of an ash or tuff matrix. *A.G.I.*

agglutinating power. *See* caking index. *Nelson.*

agglutinating value. A measure of the binding qualities of a coal and an indication of its caking or coking characteristics. Applicable with reference to the ability of fused coal to combine with an inert material as sand. *Compare* agglomerating value. *A.G.I.*

agglutinating-value test. A laboratory test of the coking properties of coal, in which a determination is made of the strength of buttons made by coking a mixture of powdered coal and 15 to 30 times its weight of sand. *Bureau of Mines Staff.*

aggradation. a. The natural filling up of the bed of a watercourse at any point of weakening of the current, by deposition of detritus. *Standard, 1964.* b. Specifically, the building up of fanlike graded plains by streams in arid regions by the shifting of the streams and the loss of the water in the dry soil. Contrasted with degradation. *Standard, 1964.* c. The process of building up a surface by deposition. *A.G.I.* d. The growth of a permafrost area. *A.G.I. See also* accretion.

aggradation plain. A topographic plain built up by aggradation in arid districts. It is begun by the building up of the bed of a stream, at the foot of a declivity, forming a plain with a nearly straight longitudinal profile, that may become a very broad plain of deposition. *Standard, 1964.*

aggrading stream. Synonym for upgrading stream. *A.G.I.*

aggregate. a. Sand, gravel, or any clastic material in a bedded iron ore, sometimes so abundant as to make it resemble a puddingstone. *Arkell.* b. Uncrushed or crushed gravel, crushed stone or rock, sand, or artificially produced inorganic materials, which form the major part of concrete. *Taylor.* c. To bring together; to collect or to gather into a mass. *Webster 3d.* d. Composed of mineral or rock fragments; composed of mineral crystals of one or more kinds. *Webster 3d.* e. *See* concrete aggregate; lightweight expanded clay aggregate. *Dodd.*

aggregated. Packed particles. *VV.*

aggregated ore; aggregated sulfide. Massive sulfide in which the sulfide constitutes 20 percent or more of the total volume. *A.G.I.*

aggregated sulfide. *See* aggregated ore. A.G.I.

aggregate polarization. Polarization in a rock thin section in which the constituent minerals cannot be individually recognized. *Webster 3d.*

aggregate structure. A randomly oriented mass of separate little crystals, scales, or gains that extinguish under the polarizing microscope at different times. *Fay.*

aggressive magma. A magma that forces its way into place. Synonym for invasive magma. *A.G.I.*

aggressive water. Natural water with a total hardness of less than 60 p.p.m., expressed as calcium carbonate, and carrying dissolved oxygen and carbon dioxide close to the point of saturation; water containing corrosive matter. *Bennett 2d, 1962 Add.*

Agilite. Talc. *Bennett 2d, 1962.*

aging. a. The storing of ceramic raw materials (that is, clays, clay slips, enamel slips, glazes, etc.) before processing. *Bureau of Mines Staff.* b. The change occurring in slips or powders with the lapse of time. *ASTM C286-65.* c. Curing of prepared ceramic materials by a definite period of storage under controlled conditions. *ACSG, 1963.* d. In a metal or alloy, a change in properties that generally occurs slowly at room temperature and more rapidly at higher temperatures. *See also* age-hardening; artificial aging; interrupted aging; natural aging; overaging; precipitation hardening; precipitation heat treatment; progressive aging; quench aging; strain aging. *ASM Gloss.* Also spelled ageing. e. A change in the properties of a substance with time. *Nelson.* f. In electrical engineering, aging usually implies a change in the magnetic properties of iron, for example, increase of hysteresis, loss of sheetsteel laminations, etc. *Nelson.*

Agitair flotation machine. Rectangular trough divided into interconnected square compartments, into each of which low-pressure air is stirred through a system of revolving teeth and stationary baffles to produce copious air bubbles which search the mineralized pulp flowing from feed to discharge end of the trough. These bubbles lift aerophilic particles to an overflow, froth, launder while hydrophilic ones remain in the pulp, and are separately discharged. *Pryor, 3.*

agitating lorry. A truck mixer. *Ham.*

agitation. a. Vigorous stirring of pulp in a tank by low-pressure air or mechanical means to prevent settlement. Also used in the leaching of gold and other minerals from finely ground aqueous suspension in which oxygen is essential to chemical reaction, for example, the cyanide process. *Pryor, 3.* b. A strong shaking, stirring, or moving. *Bureau of Mines Staff.*

agitation dredging. Consists in pumping the discharge directly into the sea and using the tide to carry the fines to deeper water areas. Agitation dredging is employed only during ebb tide in tidal estuaries having swift tidal flows that will disperse the accumulations of silt. *Carson, 2, p. 56.*

agitation ratio. In older type gravity concentrators, such as tables and vanners, the ratio between the average diameter of a mineral particle and the diameter of a gangue particle that travels at equal speed. *Bureau of Mines Staff.*

agitator. a. A tank in which very finely crushed ore is agitated with leaching solution. Usually accomplished by means of a current of compressed air passing up a central pipe and causing circulation of the contents of the tank. Sometimes called a mixer. *C.T.D.* b. A device used to stir or mix grout or drill mud. Not to be confused with shaker or shale shaker. *Long.* c. A device used to bring about a continuous vigorous disturbance in a pulp, frequently used to assist bubble formation. *B.S. 3552, 1962.* d. An implement or apparatus for shaking or mixing. *Webster 3d.* e. Pac. *See* settler. *Fay.*

aglaite. A pseudomorph of spodumene in which the spodumene has been replaced by muscovite either as pinite or as visible plates. Also called pihlite and cymatolite in the belief that the material was a new mineral. *Hess.*

A-glass. A fiber glass containing 10 to 15 percent alkali (calculated as Na_2O). *Dodd.*

Aglite. A trade name for a lightweight expanded clay aggregate made by the Butterley Company, Ltd., Derby, England, from colliery shale by the sinter-hearth process. The bulk density is: ½ to ¾ inch, 31 pounds per cubic foot; ½ to 3/16 inches, 35 pounds per cubic foot; finer than 3/16 inch, 50 pounds per cubic foot. *Dodd.*

agmatite. a. Migmatite containing xenoliths. *A.G.I. Supp.* b. Fragmental plutonic rock with more or less granitic cement. *A.G.I. Supp.* c. A broken rock in which pegmatite has filled the cracks and formed a three-dimensional network. *Hess.*

agnesite. Corn. An early name for bismutite. *Fay.*

agonic line. One of several lines on the earth's surface, on which the direction of the magnetic needle is truly north and south; a line of no magnetic declination. *Standard, 1964.*

agpaite. Applied to the feldspathoidal rocks of Ilimansak, Greenland, including sodalite foyaite, naujaite, lujaurite, and kakortokite. *Holmes, 1928.*

agpaitic. Applied to a process of mineral formation distinguished from an ordinary granitic process by an excess of alkali (especially sodium) as a result of which the amount of alumina is insufficient for the formation of aluminum silicates. *Hess.*

agreement. The formal document by which the contractor and the authority mutually agree to comply with the requirements of the drawings, specification, schedule, conditions of tendering, and general conditions of contract and the tender. *See also* contract. *Nelson.*

agricolite. An adamantine colorless or yellow bismuth silicate, $Bi_4Si_3O_{12}$, crystallizing in the monoclinic system. *Fay.*

agricultural drain. Earthenware or porous concrete pipes of about 3 inch internal diameter, laid end to end below ground with open joints in order to drain the subsoil. Synonym for land drain. *Ham.*

agricultural geology; agrogeology. The application of geology to agricultural problems and to soil improvement. *Schieferdeckr.*

agricultural hydrate. A relatively coarse, unrefined form of hydrated lime that is mainly used for neutralizing soil acidity and for purposes where high purity and uniformity are unnecessary. *Boynotn.*

agricultural lime. a. A lime whose calcium and magnesium content is capable of neutralizing soil acidity. *ASTM C51-47.* b. Lime slaked with a minimum amount of water to form calcium hydroxide. *CCD 6d, 1961.*

agricultural pipes. See field-drain pipe. *Dodd*

agricultural stone. A finely ground limestone used as an alternative to lime to neutralize or reduce acidity of soils. *BuMines Bull. 630, 1965, p. 886.*

Agrifos. Colloidal phosphatic clay. Used as a fertilizer. *Bennett 2d, 1962.*

agrite. A brown, mottled, calcareous stone. *Schaller.*

agrogeology. Synonym for agricultural geology. *A.G.I.*

aguilarite. A sectile silver selenide, $Ag_2S.Ag_2Se$, occurring in skeleton dodecahedral crystals. *Fay.*

ahlfeldite. A hydrate nickel selenite; probably triclinic; rose colored; vitreous luster; no cleavage; conchoidal fracture; strongly pleochroic, X rose, Y pale green, Z brown green; from Pacajake, Bolivia. *American Mineralogist, v. 39, September-October 1954, p. 850.*

A-horizon. In a soil profole, the uppermost zone from which soluble salts and colloids have been leached and in which organic matter has accumulated. Synonym for zone of eluviation. *See also* B-horizon. *A.G.I.*

aiguille. Fr. An instrument for boring holes in stone or other masonry or holes used in blasting. *Webster 3d.*

aikinite. a. A blackish, lead-gray sulfide of lead, copper, and bismuth, $3(Pb,Cu_2)S.Bi_2S_3$, that crystallizes in the orthorhombic system; needle ore. *Fay.* b. A pseudomorph of wolframite after scheelite. Obtained from Cornwall, England. *English.*

ailsyte. Derived from Ailsa Craig, Scotland, for a microgranite containing considerable riebeckite. *Fay.*

aimotolite. Hematolite. *Dana 6d, p. 802.*

AIME American Institute of Mining and Metallurgical Engineers. *Statistical Research Bureau.*

air. a. The mixture of gases that surrounds the earth and forms its atmosphere; composed by volume of 21 percent oxygen and 78 percent nitrogen; by weight about 23 percent oxygen and 77 percent nitrogen. It also contains about 0.03 percent carbon dioxide, some aqueous vapor, and some argon. *Fay.* b. The current of atmospheric air circulating through and ventilating the workings of a mine. *Fay.* c. To ventilate any portion of the workings. *Fay.* d. Atmospheric air delivered under compression to bottom of drill hole through the drill stem and used in place of water to clear the drill bit of cuttings and to blow them out of the borehole. *See also* air circulation. *Long.* e. Air piped under compression to work areas and used to operate drilling or mining machinery. *Long.*

air adit. An adit driven for the purpose of ventilating a mine. *Fay.*

air-avid surface. A surface that seems to prefer contact with air to contact with water. A particle (or mineral) of this sort will adhere to an air bubble and float out of a flotation pulp; otherwise, the particle will not float. Also called water-repellent surface. *Compare* water-avid surface. *Newton, p. 98.*

air barrage. The division of a ventilation gallery in a mine by an airtight wall into two parts; the air is led in through the one part and back through the other part. *Stoces, v. 1, p. 534.*

air base. In aerial photographic mapping, the distance between the exposure stations of two overlapping aerial photographs. *See also* base line. *Seelye, 2.*

air bell. a. In froth flotation, the small air pocket inducted or forced into the pulp at depth, for example, bell and the two-walled semistable bubble after emergence from pulp into froth have different characteristics and gas-to-liquid, area-to-volume relationships, hence the distinction. These bubbles vary in attractive and retaining power for aerophilic mineral grains, and are a critical component of the flotation process. Also called air bubble. *Pryor, 3.* b. A bubble of irregular shape formed generally during the pressing or molding operations in the manufacture of optical glass. *ASTM C162-66.*

air belt. In a cupola furnace, an annular air space around the furnace, from which air is forced into the furnace. *Henderson.*

airblast. a. A term improperly used by some diamond drillers as a synonym for air circulation. *See also* air circulation, a. *Long.* b. A disturbance in underground workings accompanied by a strong rush of air. The rush of air, at times explosive in force, is caused by the ejection of air from large underground openings, the sudden fall of large masses of rock, the collapse of pillars, slippage along a fault, or a strong current of air pushed outward from the source of an explosion. *Long.*

airblasting. A method of blasting in which compressed air at very high pressure is piped to a steel shell in a shot hole and discharged. *B.S. 3618, 1964, sec. 6.*

air block. Air trapped in the upper end of an unvented inner tube of a double-tube core barrel, which, when sufficiently compressed, acts like a solid and stops further advance of core into the inner tube. Also called air cushion. *Long.*

airborne electromagnetic prospecting. Electromagnetic surveys carried out with airborne instruments. Since 1950, an increasing proportion of such surveys have been carried out in this manner since advantages in cost reduction and speed are great. *Dobrin, p. 368.*

airborne geophysical anomaly. A geophysical anomaly related to geologic formations that can be detected by airborne equipment. *Hawkes, 2, p. 320.*

airborne magnetometer. A device used to measure variations in the earth's magnetic field while being transported by an aircraft. Same as aerial magnetometer. *A.G.I.*

airborne radiation thermometer. A device used to measure surface temperature of the ocean as a function of reflected radiation. Abbreviation, art. *Hy.*

airborne scintillation counter. Any scintillation counter especially designed to measure the ambient radioactivity from an aircraft in flight. The instrument measures gamma radiation by employing a phosphor which emits a minute flash of light on absorbing a gamma ray. A photomultiplier tube converts the light flashes into an electrical current or voltage variation which is proportional to the intensity of gamma radiation. *A.G.I.*

airborne sealing. A process for the general, as opposed to local, repair of a gas retort by blowing refractory powder into the sealed retort, while it is hot; the powder builds up within any cracks in the refractory brickwork and effectively seals them against gas leakage. *Compare* spray welding. *Dodd.*

airbound. The condition of a pipeline wherein air entrapped in a summit prevents the free flow of water through it. *Seelye, 1.*

air box. a. A rectangular wooden pipe or tube made in lengths of from 9 to 15 feet for ventilating a heading or a sinking shaft. *Fay.* b. A box for holding air. *Fay.* c. The conduit through which air for heating rooms is supplied to a furnace. *Standard, 1964.*

airbrake. A mechanical brake operated by air pressure acting on a piston. *Nelson.*

air breakers. A method of breaking down coal by the use of high-pressure compressed air. The method was first introduced in the United States about 1947. As used today, the power unit is normally an electrically driven air compressor operating at pressures of 10,000 to 12,000 pounds per square inch. The high-pressure air is conducted through a steel pipeline to the working face, and copper tubing or wire-braided rubber hose is used to connect the supply pipeline to the air-breaker shell which discharges the air in the shothole. Normally, one or two shells are in use in a working place at any one time, and the simplicity of the operation is such that the same shell can be discharged 16 to 20 times per hour. *McAdam II, pp. 91-92.*

air brick. A hollow or pierced brick built into a wall to allow the passage of air. *Fay.*

air bridge. a. A passage through which a ventilating current is conducted over an entry or air course; an overcast. *Fay.* b. *See* air crossing. *B.S. 3618, 1963, sec. 2.*

air chamber. A vessel installed on piston pumps to minimize the pulsating discharge of the liquid pumped. The chamber contains air under pressure and is fitted with an opening on its underside into which some of the liquid from the pump is forced upon the delivery stroke of the piston. The air acts as a cushion to lessen the fluctuation of the liquid flow between the suction and delivery strokes of the piston. *Crispin.*

air change. The quantity of infiltration or ventilation air in cubic feet per hour or per minute divided by the volume of the room gives the number of so-called air changes during that interval of time, and tables of the recommended number of such air changes for various-type rooms are used for estimating purposes. *Strock, 10.*

air channels. In a reverberatory furnace, flues under the hearth and fire bridge through which air is forced to avoid overheating. *Henderson.*

air circulation. a. A large volume of air, under compression, used in lieu of a liquid as a medium to cool the bit and eject the cuttings from a borehole. Also called air flush. *Long.* b. A form of air travel in which the air returns almost all the way back to the point from which it started and some may even return the entire way and make recirculation possible. *Lewis, p. 729.*

air clamp. Any type of clamping device operated by pneumatic pressure. *Crispin.*

air classification. a. In powder metallurgy, the separation of powder into particle-size fractions by means of an airstream of controlled velocity; an application of the principle of elutriation. *ASM Gloss.* b. Sorting of finely ground minerals into equal settling fractions by means of air currents. These are usually controlled through cyclones which deliver a coarse spigot product and a relatively fine vortical overflow. *See also* infrasizer. *Pryor, 3.* c. A method of separating or sizing granular or powdered materials such as clay, through deposition in air currents of various speeds. This principle is widely used in continuous pulverizing of dry materials, such as frit, feldspar, limestone, and clay. *See also* air classifier; air elutriator. *Enam. Dict.*

air classifier. An appliance for approximately sizing crushed minerals or ores by means of currents of air. *See also* air elutriator. *C.T.D.*

air cleaning. A coal cleaning method that utilizes air tables to remove the dust and waste from coal. Air cleaning requires that the coal contain less than 5 percent of surface moisture as a rule. It is effective only in the coarse sizes (plus 10 to 28 mesh) and is best suited to coals having a sharply defined line between coal and refuse material. Predrying to reduce the moisture content of the coal head of the air table treatment is not uncommon. It is a less expensive and also a less accurate method of cleaning coal than the wet cleaning method. *Kentucky, pp. 299-300.*

air clutch. Either a friction or mechanical clutch that is engaged by air pressure and generally disengaged by spring action. *ASM Gloss.*

air cock. a. Petcock-type valve for bleeding off air trapped in pumps, pump lines, or hydraulic systems. *Long.* b. A cock for letting off air. *Fay.*

air compartment. An airtight portion of any shaft, winze, raise, or level used for ventilation. *B.S. 3618, 1963, sec. 2.*

air compressor. A machine which draws in air at atmospheric pressure, compresses it, and delivers it at a higher pressure. It may be of the reciprocating, centrifugal, or rotary (vane) type. *C.T.D.* *See also* aftercooler; air receiver; compressed air; duplex compressor; power-driven compressor; rotary compressor; straight-line compressor; Sullivan angle compressor; turbocompressor. *Lewis, pp. 671-672.*

air conditioning. The simultaneous control, within prescribed limits, of the quality, quantity, and temperature-humidity of the air in a designated space. It is essentially atmospheric environmental control. Control of only one or two of these properties of the atmosphere does not constitute air conditioning. The definition and correct usage require that the purity, motion, and heat content of the air must all be maintained within the prescribed limits. *Hartman, p. 3.*

air-conditioning processes. When conditioning is designed to perform only one or a limited number of functions, then it should be so designated. These are more correctly termed air-conditioning processes, and they include dust control, ventilation, dehumidification, cooling, heating, and many others. *Hartman, p. 3.*

air course. a. Ventilating passage underground. *Pryor, 3.* b. A passage through which air is circulated. Particularly a long passageway driven parallel to the workings to carry the air current. *Fay.* c. *See* airway. *Nelson.*

air coursing. The system of colliery ventilation, introduced about 1760, by which the intake air current was made to traverse all the underground roadways and faces before passing into the upcast shaft. *Nelson.*

air creep. Stain formed by air entering at edges of mica sheets and penetrating along cleavage planes. *Skow.*

air crossing. A bridge where a return airway passes over (overcast) or under (undercast) an intake airway. It is generally constructed with bricks, or concrete and steel joists, and the whole made airtight to prevent intermixing of the two air currents. The act requires an air crossing to be so constructed as not to be liable to be damaged in the event of an explosion. *Nelson.* Also called air bridge.

air current. a. The flow of air ventilating the workings of a mine. Also called airflow; air quantity. *B.S. 3618, 1963, sec. 2.* b. A body of air moving continuously in one direction. *Jones.*

air cushion. a. Air trapped in the bottom of a dry borehole by the rapid descent of a tight string of borehole equipment. *Long.* b. Synonym for air block. *Long.*

air cyclone. Primarily a vessel for extracting dust from the atmosphere. *See also* cyclone. *Nelson.*

air displacement pump. A pump consisting of a closed vessel from which water is expelled through a delivery valve and pipe by means of compressed air admitted to the top of the vessel. Also called displacement pump. *B.S. 3618, 1963, sec. 4.*

air distribution. Supplying air in the desired amounts to the various working places in a mine. *Hartman, p. 250.*

air dome. A cylindrical or bell-shaped container closed at the upper end and attached in an upright position above and to the discharge of a piston-type pump. Air trapped inside the closed cylinder acts as a compressible medium, whose expansion and contraction tends to reduce the severity of the pulsations imparted to the liquid discharged by each stroke of a pump piston. Also called bonnet; pressure dome. *Long.*

air door. a. A door erected in a roadway to prevent the passage of air. When doors are erected between an intake and a return airway they may be known as separation doors. Also called door; separation door; trapdoor. *B.S. 3618, 1963, sec. 2.* b. A door in a ventilating network that directs air in a required direction by closing part of the circulating system. *Pryor, 3.*

Airdox. A system for breaking down coal by which compressed air, generated locally by a portable compressor at 10,000 pounds per square inch, is used in a releasing cylinder, which is placed in a hole drilled in the coal. Thus, slow breaking results, with no flame, in producing a larger percentage of lump coal than is made by using explosives. Its principal advantage is that it may be used with safety in gaseous and dusty mines. *See also* compressed-air blasting. *Lewis, p. 114.*

air drain. A passage for the escape of gases from a mold while the molten metal is being poured in. *Standard, 1964.*

air-dried. Of minerals, naturally dried to equilibrium with the prevailing atmosphere. *Pryor, 3.*

air-dried basis. An analysis expressed on the basis of a coal sample with moisture content in approximate equilibrium with the surrounding atmosphere. *B.S. 3323, 1960.*

air drift. a. A roadway, generally inclined, driven in stone for ventilation purposes. *B.S. 3618, 1963, sec. 2.* b. A drift connecting a ventilation shaft with the fan. *Fay.*

air drill. a. A small diamond drill driven by either a rotary or a reciprocating-piston air-powered motor, used principally in underground workings. *Long.* b. As used by miners, a percussive or rotary-type rock drill driven by compressed air. *Long.*

air-drill operator. See jackhammer operator. *D.O.T. 1.*

air drive. Forcing compressed air into an oil-bearing bed in order to increase the flow of oil from wells. *Hess.*

air-dry. a. Dry to such a degree that no further moisture is given up on exposure to air. *Webster 3d.* Most air-dry substances contain moisture that can be expelled by heating them or placing them in a vacuum. *Fay.* b. Said of timber, the moisture content of which is in approximate equilibrium with local atmospheric conditions. *C.T.D.*

air duct. a. Tubing which conducts air, usually from an auxiliary fan, to or from a point as required in the mine. *B.S. 3618, 1963, sec. 2.* b. An air box, canvas pipe, or other air carried for ventilation. *Hess.*

aired ware. Pottery ware that has a poor glaze as a result of volatilization of some of the glaze constituents. The term was used more particularly when ware was fired in saggers in coal-fired kilns, air escaping from a faulty sagger into the kiln while kiln gases at the same time penetrated into the sagger. The term is also sometimes applied to a glaze that has partially devitrified as a result of cooling too slowly between 900° and 700° C. *Dodd.*

air elutriation. Method of dividing a substance into various particle sizes by means of air currents. The particles formed are of uniform density. *Bennett 2d, 1962.*

air elutriator. An appliance for producing, by means of currents of air, a series of sized products from a finely crushed mineral (for example, for the paint or abrasive industries). *See also* air classifier. *C.T.D.*

air embolism. *See* caisson disease. *Ham.*

air endway. A narrow roadway driven in the coal seam parallel and close to a winning headway chiefly for ventilation. The air endway usually acts as a return and is connected at intervals of 10 yards or so to the headway by crosscuts. *See also* companion heading. *Nelson.*

air-entrained concrete. Concrete used for road construction in the United States, having about 5 percent of air in its composition. Although less dense than ordinary concrete, it has very high resistance to frost. The strength loss as compared with ordinary concrete is about 5 percent for each 1 percent of air entrained. *Ham.*

air entraining. The addition of a material to portland cement clinker during grinding, or to concrete during mixing, for the purpose of reducing the surface tension of the water so that 4 to 5 percent (by volume) of minute air bubbles become trapped in the concrete. This improves workability and frost resistance and decreases segregation and bleeding. The agents used as additions include: 0.025 to 0.1 percent of alkali salts of wood resins, sulfonate detergents, alkali naphthenate, or triethanolamine salts; or 0.25 to 0.5 percent of the Ca (calcium) salts of glues (from hides); or 0.25 to 1.0 percent of Ca (calcium) lignosulfonate (from papermaking). *Dodd.*

air-entraining agent. An admixture to portland cement or to a concrete mix. It is usually a resin which entrains the air in very fine bubbles. Its purpose is to increase both workability of the wet concrete and its frost resistance when hardened. *Ham.*

airfield soil classification. Classification published in Casagrande in the United States in 1948, based on sieve analyses and consistency limits. Cohesive soils can be divided into those with a liquid limit above or below 50 percent. The former are, in general, clays and the latter, silts. *Ham.*

air filter. A device for cleaning compressed air. *Hansen.*

air-float clays. Clays of a fine state of subdivision as the result of separation by an air process, after grinding. *CCD 6d, 1961.*

air-float table. Shaking table in which ore is worked dry, air being blown upward through a porous deck so as to dilate the material. *Pryor, 3.*

airflow. *See* air current, a. *B.S. 3618, 1963, sec. 2.*

airflow equalizing device. A flow-equalizing device which is fitted to tube breathing apparatus. There are two kinds in general use, one consisting of a flexible corrugated rubber tube and the other a canvas fabric bag. On inspiration, air is drawn partly from the equalizer, which is reduced in volume, and partly from the tube. On expiration, the equalizer restores itself to its original volume and in doing so draws air through the tube. Thus the air is kept flowing very nearly in a continuous stream, and the wearer, without the aid of bellows or rotary blower, experiences very little resistance to breathing. *Mason, v. 1, p. 327.*

airflow meter. An instrument which measures and shows directly on a scale the flow of air in a pipe or hose in cubic feet per minute. *Nelson.*

air flush. Synonym for air circulation. *Long.*

air flushing. The circulation of air through the drilling apparatus during drilling to cool the bit and to remove the cuttings from the hole. *B.S. 3618, 1963, sec. 2.*

air foam extinguisher. An extinguisher which produces a foam somewhat similar to that produced by a chemical foam extinguisher, therefore, it can be used for the same purposes. However, unlike the chemical foam type, this extinguisher can be recharged underground by simply filling the outer container with water and inserting a sealed metal charge holding foam concentrate and a propellent charge of carbon dioxide. *McAdam, p. 117.*

airfoil fan. A fan with an airfoil-shaped blade which moves the air in the general direction of the axis about which it rotates. *Strock, 10.*

air furnace. Malleable iron furnace. *Bureau of Mines Staff.*

air gap. a. The distance between the surface of the electrode and the oscillator plate. It is usually necessary to avoid particular gap dimensions in which resonance damping occurs with acoustic waves generated by the oscillator plate. *AM, 1.* b. The distance between passing material and tip of attracting magnetic pole, in a magnetic separator. *Pryor, 3. c.* The gap between rotor and stator of a dynamo or an electric motor. *Pryor, 3.*

air gas. a. A combustible gas made by charging air with the vapor of some volatile hydrocarbon mixture (as gasoline) and used for lighting and heating. *Webster 3d.* b. A producer gas consisting chiefly of carbon monoxide and nitrogen and made by blowing air into a producer. *Webster 3d.*

air gate. a. Mid. An underground roadway used principally for ventilation. *Fay.* b. An air regulator. *Fay.* c. In molding, an orifice through which the displaced air and gases escape from the mold while the molten matter is filling it. *Fay.*

airhammer. a. Sharp, vibratory impacts in a liquid pump or piping system caused by entrapped air. *Long.* b. Reciprocating motion induced in a drill string by excessive air pressure at face of drill bit when air is used in lieu of a liquid as a bit coolant and cuttings removal agent. *Long.* c. A pneumatically actuated hammer. *Long.* d. A tool in which a hammerhead is activated by means of compressed air. The air is conducted to the tool through a hose. A trigger starts or stops the admission of air to the hammer. *Crispin.*

airhammer operator. One who breaks asphalt, concrete, stone, or other pavement, who loosens earth, digs clay, breaks rocks in trimming bottom or sides of trenches or other excavations, or who reduces the size of large stones, using an airhammer. *D.O.T. Supp.*

air-hardened steels. Alloy steels in which a certain degree of hardness has been induced merely by air cooling under controlled conditions. *Camm.*

air-hardening refractory cement; air-hardening refractory mortar. *See* chemically bonded refractory cement. *Dodd.*

air-hardening refractory mortar. *See* air-hardening refractory cement. *Dodd.*

air-hardening steel. Steel containing sufficient carbon and other alloying elements to harden fully during cooling in air or other gaseous mediums from a temperature above its transformation range. The term should be restricted to steels that are capable of being hardened by cooling in air in fairly large sections, about 2 inches or more in diameter. Same as self-hardening steel. *ASM Gloss.*

airhead; airheading. S. Staff. A smaller drift driven parallel to the main haulageway for an air course. A connecting crosscut is called a spout. *Fay; Hess.*

air heater. An appliance to warm the air as it enters the downcast shaft or intake drift. In countries where the winter is very cold, such as Poland and Russia, nearly all mines are equipped with air heaters. A few British mines have oil-fired air heaters, mainly to prevent the accumulation of ice in wet downcast shafts or on winding ropes. *Nelson.*

air-heating furnace. A furnace used for heating air to warm a room or building. *Hess.*

air heave structure. Small crumplings, which die out downward, found in laminated sands and which are presumed to be formed by rise of air trapped in sand at low tide. *Pettijohn.*

air hoist. a. Hoisting machinery operated by compressed air. *Fay.* b. A small portable hoisting machine usually mounted on a column and powered by a compressed air motor. Also called tugger. *Long.*

airhole. a. A small excavation or hole made to improve ventilation by communication with other workings or with the surface. *See also* cundy. *B.S. 3618, 1963, sec. 2.* b. A venthole in the upper end of the inner tube of a double-tube core barrel to allow air and/or water entrapped by the advancing core to escape. *Long.* c. A void, cavity, or flaw in a casting or bit crown. *Long.*

air horsepower. a. The rate at which energy is used in horsepower units, in moving air between two points. *B.S. 3618, 1963, sec. 2.* b. The horsepower in an air current is usually expressed in the form: Horsepower

$$(\text{hp}) = \frac{P \times Q}{33{,}000},$$

where P equals ventilating pressure in pounds per square feet and Q equals quantity of air in cubic feet per minute. *Nelson.*

air hp Abbreviation for air horsepower. *BuMin Style Guide, p. 58.*

airing. Smelting operation in which air is blown through molten copper in a wire bar or anode furnace. Sulfur is removed as SO_2 and impurities are slagged off. *Pryor, 3.*

air intake. A device for supplying a compressor with clean air at the lowest possible temperature. A simple screen in the form of a box over the end of the intake pipe may be used if the air is normally quite free from dirt, but if much dirt is in the air, some form of air filter of suitable design should be provided. The cooler the intake air, the greater is the capacity of the compressor; a drop of 5° in temperature represents a gain in capacity of approximately 1 percent. In hot climates the intake should be placed on the coolest side of the compressor house. *Lewis, p. 671.*

air jig. A machine in which the feed is stratified by means of pulsating currents of air and from which the stratified products are separately removed. *B.S. 3552, 1962.*

air lance. Length of piping down which compressed air is blown, to stir settled sands or to free choked passages. *Pryor, 4.*

air lancing. a. Removing or cutting away loose material by means of compressed air, using an air lance; airblasting. ***Henderson.*** b. In founding, a cleaning operation, as cleaning sand from molds and castings, using an air lance; airblasting. ***Henderson.*** c. Also means opening passages for molten materials. *Bureau of Mines Staff.*

air leakage. a. The short-circuiting of air from intake to return airways (through doors, stoppings, wastes, and old workings) without doing useful work in flowing around the faces. The total air leakage is usually within the range of 35 to 55 percent of that passing through the surface fan. *Nelson.* b. The leakage of air in the transmission lines may be determined by filling the entire system with air at normal operating pressure and then closing the valves on both ends of the line. Assuming that the valves are tight and all loss in pressure is due to leakage, the cubic feet of free air lost per minute through leakage is: $Q = \frac{5V}{2T}$, where Q equals leakage in cubic feet per minute of free air at time of shutting down, V equals total volume of air in the system at time of shutting down reduced to cubic feet of free air, and T equals time in minutes from shutting down until the gage has dropped to zero. *Lewis, p. 679.*

air leg. a. A cylinder operated by compressed air, used for keeping a rock drill pressed into the hole being drilled. *Ham.* b. A device, incorporating a pneumatic cylinder, providing support and thrust for a jackhammer. *B.S. 3618, 1964, sec. 6.*

air-leg support. An appliance to eliminate much of the labor when drilling with handheld machines. It consists of a steel cylinder and air-operated piston, the rod of which extends through the top end of the cylinder and supports the drilling machine. The air leg and machine can be operated by one man. *Nelson.*

airless end. The extremity of a stall in longwall workings in which there is no current of air. The air is kept sufficiently pure by diffusion, and by the ingress and egress of tubs, men, etc. *Fay.*

air level. Eng. A level or airway (return airway) of former workings made use of in subsequent deeper mining operations for ventilation. *Fay.*

air lift. a. An apparatus used for pumping water from wells either temporarily or for a permanent water supply; for moving corrosive liquids such as sufuric acid; for unwatering flooded mines; for elevating mill tailings, sands, and slimes in cyanide plants; and for handling the feed to ball mills. In operation, compressed air enters the eduction pipe and mixes with the water. As the water and air rise, the air expands and is practically at atmospheric pressure at the top of the discharge pipe. The efficiency of the air lift is calculated on the basis of the foot-pounds of work done in lifting the water, divided by the isothermal work required to compress the air. *Lewis, pp. 686-689.* b. A method used in petroleum exploitation in which gas pressure is increased artificially by driving air or natural gas into the deposit under pressure from a neighboring borehole, thereby forcing the petroleum out. *Stoces, v. 1, p. 478.*

air-lift dredges. Dredges in which solids suspended in a fluid are lifted. By injecting air into a submerged pipe at about 60 percent of the depth of submergence, the density of the fluid column inside the pipe can be lessened, forcing the fluid column to rise in the pipeline. *Mero, p. 251.*

air-lift efficiency. The efficiency of an air lift is generally calculated on the basis of the foot-pounds of work done in lifting the water, divided by the isothermal work required to compress the air. *Lewis, p. 689.*

air line. A fault, in the form of an elongated bubble, in glass tubing; also known as hair line. *Dodd.*

air-line lubricator. Synonym for line oiler. *Long.*

air-line main. The pipe column to supply the air from the compressors to the quarry face A steel pipe is often used near the working area as a safeguard against damage by blasting or by vehicles. *Nelson.*

air lock. a. A casing at the top of an upcast shaft to minimize surface air leakage to the fan. It consists of a large double casing enveloping the whole of the upcast shaft top and extending into the headgear. Some are fitted with power-operated doors and allow high-speed winding with little leakage. A modern light alloy structure raised through spring-loaded attachments by the top of the cage on ascending has proved efficient. *See also* caisson sinking. ***Nelson.*** b. An air pocket or bubble in a pipeline which impedes the flow of liquid. ***Nelson.*** c. A system of doors arranged to allow the passage of men or vehicles through it without permitting appreciable airflow. *B.S. 3618, 1963, sec. 2.* d. *See* shaft casing *B.S. 3618, 1963, sec. 2.*

air machine. A machine for forcing fresh air into and withdrawing bad air from a mine, as a fan. *Fay.*

airman. a. A man who constructs brattices. *Hess.* b. Synonym for brattice man. *Fay.*

air mat. A mat made of porous material, usually canvas, and used to subdivide and distribute air in certain pneumatic-type flotation machines. *Hess.*

air-measuring station. A place in a mine airway where the volume of air passing is measured periodically. The station should be straight, smooth and of uniform section to obtain, as near as possible, streamline flow. Permanent air-measuring stations are usually constructed in concrete or brickwork. *See also* anemometer. *Nelson.*

air motor. A motor driven by compressed air; it may be either a vane- or gear-type rotary or a reciprocating piston-type motor. *Long.*

air mover. A portable compressed-air appliance, which may be used as a blower or exhauster. It converts the compressed air into a large induced volume of moving air. The compressed air is fed through a side inlet and is expanded at a high velocity through an annular orifice. It is useful for emergency ventilation in workings where auxiliary fans cannot be installed. *Nelson.*

air of combustion. The weight of air required to burn 1 pound of a combustible substance. *Hess.*

air oven. A heated chamber for drying samples of ore, coals, etc. *Zern.*

air permeability. *See* permeability. *Dodd.*

air pipes. a. Pipes for conveying air for ventilation or for other purposes. *Fay.* b. *See* ventilation tubing. *Nelson.*

air pit. *See* air shaft. *B.S. 3618, 1963, sec. 2.*

airplane ore. A term used in Tennessee for bauxite. *Hess.*

airplane strand wire rope. A small 7- or 19-wire galvanized strand made from plow steel or crucible steel wire. *H&G, p. 129.*

air pockets. Pockets of air sometimes found in clay during wedging or throwing. *ACSG, 1963.*

air pollution recorder. Instrument collects atmospheric samples of particulate matter and aerosols on a continuous filter tape. Sampling is performed at a uniform rate by means of a motor-driven pump or other vacuum source. Evaluation is by visual observation, in the case of dust and carbon particles, or by photoelectric comparison. Colorless dusts can be made visible by chemical reagents. Used for atmospheric pollution studies in the vicinity of industrial plants, mines, smelters, etc. *Bests, p. 589.*

air pressure. For rock drills, the air pressure ranges from 70 to 90 pounds per square inch, the most economical pressure for such machines being from 90 to 95 pounds per square inch, when high drilling speed is attained. *Ham.*

air-pressure drop. The pressure lost or consumed in overcoming friction along an airway. It can be calculated from the formula $P = \frac{RQ^2}{5.2}$, where P equals pressure drop in inches water gage, R equals resistance in Atkinsons, and Q equals air quantity in thousands of cubic feet per second. Suitable values of R for different types and sizes of airways are obtained by reference to tables in which the resistance in Atkinsons, per 100 yards of airway, is given. *See also* ventilation. *Nelson.*

air propeller. A rotary fan for circulating air. *Webster 3d.*

air pump. A pump for exhausting air from a closed space or for compressing air or forcing it through other apparatus. *Compare* vacuum pump. *Webster 3d.*

air pumping. Pumping oil wells by means of the air-lift principle. *Porter.*

air puncher. A machine introduced in 1904 to the mining industry that consisted essentially of a reciprocating chisel or pick, driven by air. A compressor plant, usually located outside the mine near the boiler room, provided the air for the puncher. *Kentucky, p. 340.*

air quantity. The amount of air flowing through a mine or a segment of a mine, in cubic feet per minute. Air quantity is the product of the air velocity times the cross-sectional area of the airway. *BuMines Bull. 589, 1960, p. 2. See also* air volume; air current, a.

air ramming. A method of forming refractory shapes, furnace hearths, or other furnace parts by means of pneumatic hammers. *HW.*

air receiver. A vessel into which compressed air is discharged to be stored until required. *C.T.D.*

air-reduction process. *See* roasting and reaction process. *Fay.*

air-regulating dampers. Shutters fitted to the isolating doors in the fandrift in order to reduce or regulate the underground airflow in an emergency. Such an emergency would be a large open fire in the workings and it is decided to reduce the flow of air past the fire. *Nelson.*

air regulator. An adjustable door installed in permanent air stoppings to control ventilating current. *Bureau of Mines Staff.*

air requirements. The quantity of air required to maintain adequate ventilation of the mine. This quantity will depend on (1) the length of face room in production; (2) the average distance from the shafts to the faces; (3) the gas emission rate; (4) the depth of the workings, and (5) the volumetric efficiency of the mine ventilation. *Nelson.*

air-cooled blast furnace slag. The material resulting from solidification of molten blast furnace slag under atmospheric conditions. Subsequent cooling may be accelerated by application of water to the solidified surface. *ASTM C125-66.*

air rig. A drill machine powered by an air-driven motor. *Compare* air drill. *Long.*

air rod puller. *See* rod puller. *Long.*

air saddle. A surface saddle or depression produced by erosion at the top of an anticline. *Fay.*

air sampling. The taking of air samples in mine workings for analysis in the laboratory. The usual method is by air pump and bottle. The air in the bottle is replaced by a sample of mine air by means of the hand pump and then closed tightly by a rubber cork. *See also* sampling instrument. *Nelson.*

air-sampling pump. A pump, designed to collect air samples in laboratory or field, and may be used in conjunction with filters, impactors, impingers, and bubblers, depending on the model. Operating principle may depend on graphite ringed pistons activated by a split phase motor, on the movement of air by a rotating vane blower, or on other vacuum induction apparatus. *Bests, p. 578.*

air-sand process. *See* Fraser's air-sand process. *Mitchell, p. 529.*

air seal. A method for the prevention of the escape of warm gases from the entrance or exit of a continuous furnace, or tunnel kiln, by blowing air across the opening. *Dodd.*

air separation. In powder metallurgy, the classification of metal powders into particle size ranges by means of a controlled airstream. *Rolfe.*

air separator. A machine for the size classification of the fine ceramic powders, for example, china clay; the velocity of an air current controls the size of particles classified. *Dodd.*

air set. a. The property of a material to develop high strength when dried, an example being air-setting mortars. *A.R.I.* b. In a material such as a castable refractory, refractory mortar, or plastic refractory, the ability to harden without the application of heat. *A.I.S.I. No. 24.*

air-setting refractories. Compositions of ground refractory materials which develop a strong bond upon drying. These refractories include mortars, plastic refractories, ramming mixes, and gunning mixes. They are marketed in both wet and dry condition. The dry compositions require tempering with water to develop the necessary consistency. *HW.*

air-setting refractory moratr. A composition of finely ground materials, marketed in either a wet or dry condition, which may require tempering with water to attain the desired consistency and which is suitable for laying refractory brick and bonding them strongly upon drying and upon subsequent heating at furnace temperatures. *ASTM C71-64.*

air shaft. A shaft used wholly or mainly for ventilating mines, for bringing fresh air to places where men are working, or for exhausting used air. It may either receive or discharge the circulating current. *See also* downcast, a; upcast. *Fay; B.C.I.*

air shooting. The generation of a seismic wave in crustal rocks by an explosion in the air above the area. In rock shattering, an air shot is one in which pockets of air are left when charging the blasthole, to reduce shatter. *Pryor, 3. See also* compressed-air blasting.

air shot. A shot prepared by loading (charging) in such a way that an airspace is purposely left in contact with the explosive for the purpose of lessening its shattering effect. *Fay.*

air shrinkage. The volume decrease that a clay undergoes in drying at room temperature. *Fay.*

air-slaked. Slaked by exposure to the air; as lime. *Standard, 1964.*

air-slaked lime. Contains various proportions of the oxides, hydroxides, and carbonates of calcium and magnesium which result from excessive exposure of quicklime to air that vitiates its quality. It is partially or largely decomposed quicklime that has become hydrated and carbonated. *Boynton.*

air-slaking; air-slacking. Exposure of quicklime to the atmosphere to give slow hydration. *Pryor, 3.*

air slit. a. York. A short heading driven more or less at right angles to and between two headings or levels for ventilation. *Fay.* b. *See* stenton. *B.S. 3618, 1963, sec. 2.*

air slug. A mass of air under compression entrapped in the liquid circulated through a borehole drill string or a liquid-piping system. *Long.*

air sollar. A compartment or passageway carried beneath the floor of a heading or of an excavation in a coal mine for ventilation. *See also* sollar. *Fay.*

air-space ratio. The ratio of a volume of water that can be drained from a saturated soil under the action of force of gravity to a total volume of voids. *ASCE P1826.*

air split. a. The division of the main current of air in a mine into two or more parts. *Fay.* b. A separate ventilation circuit formed by dividing a current of air. *B.S. 3618, 1963, sec. 2. See also* split, b.

air stack. Penna. A chimney used for ventilating a coal mine. *Fay.*

air stain. Gas trapped beneath cleavage surfaces in flattened pockets, tiny bubbles, or groups of closely spaced bubbles. *Skow.*

air starter. A starter used on large coal haulers that permits the elimination of all batteries except the 6-volt units for the headlights. These starters are operated by compressed air supplied at 100 pounds per square inch from a storage tank on the tractor. Trucks can stand idle for 4 or 5 days and there is still enough air in the tanks to start the engines. *Coal Age, v. 71, No. 8, August 1966, p. 233.*

air streak; chain. In mica, a series of air inclusions connected (or nearly connected) to form a relatively long, thin streak. Also known as silver streak. *Skow.*

air survey. a. A map production from an interconnected series (mosaic) of aerial photographs made in conjunction with fixes by a theodolite of locating points on the ground. *Pryor, 3.* b. In mining, a check on ventilation, gas, and dust in a mine. *Pryor, 3.*

air-swept ball mill. *See* ball mill. *Dodd.*

air-swept mill. A tumbling mill used in dry grinding, from which finished material is removed by means of regulated air currents which can be so controlled as to produce a closed circuit. *Pryor, 3.*

air swivel. A device similar to a water swivel but designed to conduct air under compression into a rotating drill stem when air instead of a liquid is used as an agent to flush drill cuttings out of a borehole. *Compare* water swivel. *Long.*

air-stowing machine. The machine used for blowing the stone chippings into the waste area in pneumatic stowing. It consists of a steel paddle wheel revolving in an adjustable casing. Stowing dirt is fed continuously from a hopper to the machine which in turn blows the material through 5- to 6-inch-diameter pipes into the waste area. *See also* pneumatic stowing. *Nelson.*

air table; pneumatic table. A shaking table used when water is scarce to effect gravity concentration of sands. Air is blown upward through a porous deck, over which a layer of finely crushed ore passes. The heavy and light minerals stratify and gravitate to separate discharge zones. *Pryor, 3.*

airtight. So constructed or sealed as to prevent any inlet or outlet of air. *Crispin.*

air tongs. Air-actuated breakout tongs. *See also* breakout tongs. *Long.*

air-track drill. A heavy drilling machine for quarry or opencast blasting. It has caterpillar tracks and is operated by independent air motors. It tows its own portable rotary compressor and drills 3- or 4-inch-diameter holes at any angle but is chiefly used for vertical holes up to 80 feet in depth. *Nelson.*

air transport. A method employed in some mines in which the filling material is transported and stowed pneumatically through pipelines. *Stoces, v. 1, p. 190.*

air trap. a. A device for shutting off foul air or gas from drains or sewers. *Webster 3d.* b. An air pocket. *Webster 3d.*

air trunk. A large pipe or shaft for conducting air, as for ventilation, or to a furnace. *Fay.*

air tub. The cylinder on a blowing engine that pumps the blast of wind or air. *Fay.*

air-tube breathing apparatus. A device consisting of a smoke helmet, a mask, or a mouthpiece, and which is supplied with fresh air by means of a flexible tube leading from a source of fresh air to the wearer. The passage of air through the tube is maintained either by the inspiratory efforts of the wearer or by forcing the air through by means of bellows or rotary blowers. *McAdam, p. 71.*

air turbolamp. a. A lamp coupled to the compressed air mains, which may be at any pressure between 40 and 100 pounds per square inch. It consumes from 5 to 6 cubic feet per minute of free air. The electrical power is produced by a small turbo-alternator with a 6-pole permanent magnet rotor. Certain types have been approved for use at the coal face in British mines. *Nelson.* b. *See* compressed-air-driven lamps. *Mason, v. 1, p. 259.*

air twist. Twisted capillaries as a form of decoration within the stem of a wine glass. *Dodd.*

air valve. a. A device used to release unwanted or entrapped air from a waterline, pump, or hydraulic system. *See also* air cock, a. *Long.* b. A device to regulate volume of compressed air fed into, or released from, an air-driven machine or piping system. *Long.* c. The valve which controls the alternate admission and release of compressed air to each cell of a Baum-type washbox. *B.S. 3552, 1962.*

air velocity. The rate of motion of air in a given direction; in mine ventilation it is usually expressed in feet per minute. This is usually found by conducting a vane anemometer traverse over a selected cross section, the area of which is also measured. *Roberts, I, p. 38.*

air vessel. A small air chamber fixed to the pipeline on the discharge side of a reciprocating pump which acts as a cushion to minimize the shock produced by the pulsations of the pump. *Nelson.*

airveyor. A device for handling dusty materials, built on the principle of a pneumatic cleaner. The system used is a suction system, whereby the material (soda ash, salt cake, cement, or powdered lime) is drawn from the car through a flexible hose into a vacuum tank designed to recover a large percentage of the dust floating in the air. *Hess.*

air-void ratio. The ratio of the volume of air space to the total volume of voids in a soil mass. *ASCE P1826.*

air volcano. A miniature crater resembling a true volcano in shape and often provided with a cone; produced by explosions of gas and the emission of mud. *Fay.*

air volume; air quantity. In mining, the quantity of air flowing in cubic feet per minute. It is obtained by multiplying the average velocity in feet per minute by the area of the airway in square feet, that is, $Q = AV$. *See also* air requirements. *Nelson.*

air washer. Air washers make use of water sprays or cooling coils for evaporative and sensible cooling of mine air. Their use has largely been limited to shallow coal mines in the United States where it is desirable to reduce the dry-bulb temperature of the intake air during the hot summer months to prevent slaking of the roof due to excessive expansion. An air washer is essentially a heat exchanger and is similar to the type of unit employed for heat transfer with refrigeration or evaporative cooling systems. *Hartman, p. 342.*

air wave. The acoustic energy pulse transmitted through the air as a result of the detonation of a seismic shot. *A.G.I.*

airway. Any underground gallery or passage through which a portion of the ventilation passes, that is, the air is carried. Sometimes referred to as an air course. *Fay; B.C.I.* Also called wind road.

airway repairer. A repairer employed in the return airways at a coal mine. He clears falls of ground, sets supports and enlarges roadways where required. *Nelson.*

Airy isostasy. That hypothesis of equilibrium for the earth's solid outer crust in which the crustal density is supposed constant so that mountains are compensated by roots analogous to the underwater extensions of icebergs floating in the ocean. *A.G.I.*

Airy's spiral. The four-rayed spiral curve that appears when sections of right-handed and left-handed quartz crystals are placed together between crossed polarizers. Named for G. B. Airy, its discoverer. *Hess.*

aish; ash. Eng. Fine-grained, argillaceous limestone, drying very white; used for holystone, Lower Purbeck beds, Portland. Aish is an obsolete variant of ash. *Arkell.*

aisle. An elongated, high, narrow, traversible passage. *A.G.I.*

Aitch piece. That part of the pipe range of a pumping set in which the valves are fixed. *Nelson.*

aithalite. Asbolite. *Dana 6d, p. 258.*

Ajax. A high strength, high density gelatinous permitted explosive having good water resistance; used for dry and wet conditions in both rock and in the breaking of hard coal. *See also* blasting; Polar Ajax. *Nelson.*

Ajax-Northrup furnace. Coreless induction furnace in which the metal acts as secondary and a water-cooled coil, carrying high-frequency current, as primary. *Bennett 2d, 1962.*

Ajax-Wyatt furnace. Core-type induction furnace, operating at low frequencies. *Bennett 2d, 1962.*

ajkaite; ajkite. A pale yellow to dark reddish-brown fossil resin from Ajka, Hungary. Amorphous. *English.* Found in brown coal. *Tomkeieff, 1954.*

AJO breathing apparatus. Consists of a small oxygen cylinder attached to a Siebe-Gorman mining gas mask with a canister which neutralizes mining gases, such as carbon monoxide, sulfureted hydrogen, and nitrous fumes. It should only be used as a gas mask, that is, in atmospheres containing sufficient oxygen to sustain respiration. Should the wearer encounter air containing less than 16 percent of oxygen, he can open the valve of the oxygen cylinder and get an emergency supply of oxygen which lasts for about 8 minutes. *McAdam, p. 64.*

à jour. Fr. Literally, allowing light to penetrate. Used to describe the method of setting a gem in any mounting which permits a view of its pavilion. *Shipley.*

ajutage. Roman term designating size of water delivery pipes and outlet spouts. *Sandstrom.*

akaganeite. Natural beta FeO(OH), occurring at the Akagane mine, Iwate prefecture, Japan. Named from locality. *Hey, M. M., 1964; Fleischer.*

akenobeite. A light-colored igneous rock containing oligoclase and less orthoclase, quartz, and very little ferromagnesian mineral. *Johannsen, v. 2, 1932, p. 360.*

akerite. A plutonic rock consisting of sodic orthoclase, sodic plagioclase, and augite, with accessory quartz, biotite, apatite, and opaque oxides. A quartz-bearing augite syenite. *A.G.I.*

akermanite. A slag mineral inferred to be a silicate chiefly of calcium but with magnesium, manganese, and iron. *Hess.*

akerose. One of the subrangs in the Cross Iddings, Pirsson, and Washington (C.I.P.W.) classification. *Rice.*

Akins' classifier. A classifier for separating fine-size solids from coarser solids in a wet pulp consisting of an interrupted-flight screw conveyor, operating in an inclined trough. *Fay.*

akori. A porous coral which, previous to the beginning of the 18th century, was fished, fashioned, and prized by the Negroes of the West African Coast. It is of a red, blue, or violet color. Has also been fished in Samoa; probably still used as a gem by the natives. The name has more recently been applied to substitutes such as rock, glass, and pearl with little nacre. *Shipley.*

akrochordite. A yellowish red-brown hydrous arsenate of manganese and magnesium, $Mn_3As_2O_8.MnOH.MgOH.5H_2O$. Minute, spherical crystal aggregates. Monoclinic. From Langban, Sweden. *English.*

aksaite. Orthorhombic blades in impure halite, $MgB_6O_{10}.5H_2O$, from Ak-sui, Kazakhstan, U.S.S.R. Named from locality. *Hey, M.M., 1964; Fleischer.*

akthosphere. Introduced by Barrell for that outer part of the centrosphere which theoretically stores up the stress produced by the progressive changes toward contraction in the inner earth (the barysphere). *Hess.*

Al Chemical symbol for aluminum. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Alabandine ruby. Originally, almandine garnet from ancient Alabanda, Turkey. Now sometimes applied to violetish-red spinel. *Shipley.*

alabandite. A massive, granular sulfide of manganese, occurring in veins in Romania. Also called manganblende. *C.T.D.* A vein mineral, MnS; isometric; black; Mohs' hardness, 3.5 to 4; specific gravity, 4.0. *Dana 17.*

alabaster. A massive form of gypsum, pleasingly blotched and stained. Because of its softness, it can be easily carved and polished. Widely used for ornamental purposes. Chemically it is $CaSO_4.2H_2O$. It is a beautifully banded form of stalagmitic calcite occurring in Algeria and in Egypt. Same as oriental alabaster; onyx marble. *C.M.D.*

alabaster glass. A milky-white glass which diffuses light without fiery color. *ASTM C162-66.*

aladzha. Impure ozokerite containing an admixture of country rocks and found in the region of the Caspian Sea. *Tomkeieff, 1954.*

alalite. A light-green variety of diopside from the Ala valley, in northwestern Italy. *Webster 3d.*

alamosite. A silicate mineral, $PbSiO_3$, belonging to the cyclosilicate group. Found as a vein mineral of the oxidized zone of Alamos, Sonora, Mexico. Closely related to wollastonite; monoclinic. *E.C.T. v. 12, pp. 277, 301; Hess; English.*

alandier. Fr. A special fireplace at the base of a porcelain kiln, fed from the outside. *Standard, 1964.*

alargan. A German alloy of aluminum and silver over the surfaces of which platinum black is dusted and hammered or pressed into the alloy. Used as a substitute for platinum in jewelry and in commercial work. If platinum is added to the alloy, it is known as platalargan. Platnik is another substitute alloy composed of nickel and platinum. *Hess.*

Alaska diamond. Rock crystal. *Shipley.*

alaskite. a. A plutonic rock containing orthoclase, microcline, and subordinate quartz, with a few or no mafic constituents. Plagioclase may or may not be present. A leucocratic variety of granite. *A.G.I.* b. In the feldspar trade, the term defines specifically a granitic mass found near Spruce Pine, N.C., from which the feldspar is produced. *AIME, p. 340.*

alaskite-quartz. A quartz-feldspar rock containing so much quartz, that it is a transitional phase between typical alaskite and typical quartz. *Hess.*

albafite. A hard, greenish to brownish variety of bitumen, which, on exposure to air, develops a white tinge, due probably to moisture escaping from submicroscopic pores. It contains up to 15 percent oxygen. Fusible. Insoluble in organic solvents. Varies from soft to hard, and from porous to compact. Atomic ratio H/C, 1.75 to 2.25. *Tomkeieff, 1954.*

albandine. Same as almandine. *Shipley.*

Albany clay. A clay found in the neighborhood of Albany, N.Y. Because of its fine particle size and high flux content, this clay fuses at a comparatively low temperature to form a greenish-brown glaze suitable for use on stoneware and electrical porcelain. *Dodd.*

Albany slip. A clay with a natural glaze composition used for glazing various types of ceramic ware. The clay is mixed with water to form a slip and when applied to the ware and fired produces a smooth even-flowing glossy, dark brown glaze. Found in New York and Michigan. *Bureau of Mines Staff.*

albarium. White lime used for stucco and obtained by burning marble. *Standard, 1964.*

Alberene. Trade name for a dense gray soapstone quarried in Albemarle County, Va. *Hess.*

alberene stone. A stone having properties similar to those of polyphant stone. *See also* polyphant stone. *Dodd.*

albert coal. *See* alberite.

Alberti furnace. A continuous reverberatory furnace used in the distillation of mercury from its ores. *Pryor, 3.*

albertite. A black variety of bitumen with a brilliant luster and a conchoidal fracture. It is practically insoluble in alcohol. *A.G.I.* Also called albert coal in Nova Scotia. *Fay.*

albert shale. An early name for albertite. *Tomkeieff, 1954.*

Albian. Indicating or referring to the lowest subdivision of the Upper Cretaceous of Europe. *Standard, 1964.*

albino asphalt. Asphaltic resin. *Bennett 2d, 1962.*

albite. A sodium aluminum silicate, $NaAlSi_3O_8$; color, white, translucent; Mohs' hardness, 6 to 6.5; streak, vitreous; specific gravity, 2.6 to 2.62; triclinic. This feldspar is used as a glaze in ceramics. *Pryor, 3.*

albite diabase. An altered diabase containing albite in place of the usual plagioclase, purple-brown augite more or less replaced by epidote, chlorite, calcite, and titaniferous magnetite; the intrusive equivalent of spilite. *Holmes, 1928.*

albite-epidote-amphibolite facies. Metamorphic rocks produced under intermediate temperature and pressure conditions by regional metamorphism or in the outer contact-metamorphic zone. *A.G.I. Supp.*

albite law. Twinning in which the twinning plane is the brachypinacoid. It is common in albite, and gives rise to the fine parallel striations on one of its cleavage surfaces. *Webster 2d.*

albite moonstone. A variety of albite, exhibiting adularescence, which is more pale greenish to yellowish, although other colors appear simultaneously. From Pennsylvania; New York; and Canada. *See also* peristerite. *Shipley.*

albitite. A coarse-grained dike rock consisting almost entirely of albite. Common accessory minerals are muscovite, garnet, apatite, quartz, and opaque oxides. *A.G.I.*

albitization. The process in which albite replaces the more calcic plagioclase feldspar of an igneous rock. *Webster 3d.*

albitophyre. A dike rock containing large, polysynthetically twinned phenocrysts of albite. In the groundmass are microlites of albite, together with chlorite and limonite. *Compare* orthophyre. *Fay; Hess.*

albolite; albolith. A plastic cement, consisting chiefly of magnesia and silica. *Webster 3d.*

albond. A kaolinite clay found in Dorsetshire, England. It is used as a low percentage addition to natural molding sands. *Osborne.*

alboranite. Olivine-free hypersthene basalt. *Johannsen, v. 1, 2d, 1939, p. 239.*

Albrecht condenser. A condenser used in petroleum distillation, to separate the distillate into its various fractions. *Fay.*

Albrecht viscometer. *See* viscometer. *Fay.*

alchemy. a. The immature chemistry of the Middle Ages, characterized by the pursuit of the transmutation of base metals into gold, and the search for the alkahest and the panacea. *Standard, 1964.* b. To coat or to alloy with another metal. *Fay.*

alchymy. A white film, usually composed of carbonates, found in joints of coal, ironstone, and other rocks. *Arkell.*

alclad. Sheet metal composed of a layer of pure aluminum (corrosion-resistant) with a layer of duralumin for strength. *Pryor, 3.*

alcohol; ether alcohol; ethanol; ethyl hydrate; ethyl hydroxide. C_2H_5OH; made from grain. Not to be confused with methyl hydroxide or methanol. *Crispin.*

alcoholate. Compound in which the hydrogen from the OH-group is replaced by a metal, for example, O Na-. *Pryor, 3.*

alcomax. A permanent magnet alloy of nickel, iron, and aluminum. *Pryor, 3.*

alcove. a. A large, deep niche formed by a stream of water in a precipitous face of approximately horizontal strata. *Standard, 1964.* b. A narrow channel to convey molten glass from refiner to forehearth, or to the revolving pot where it is gathered by the Owens machine. *ASTM C162-66.*

alcove lands. Name proposed by Powell where mud rocks or sandy clays and shales, of which the hills are composed (bad lands), are interstratified by occasional harder beds, the slopes are terraced; and when these thinly bedded, though harder rocks prevail, the outlines of the topography are changed and present angular surfaces giving rise to another type of topographic feature. *A.G.I.*

aldehyde. A generic term for a class of compounds derived from a hydrocarbon by oxidation, that is, by the substitution of one oxygen atom for two hydrogen atoms. They contain the CHO group. *Gaynor.*

Alencon diamond. Rock crystal. *Shipley.*

Aleppo stone. Eye agate. *Shipley.*

Alethopteris. A fernlike tree of the coal forest with large fronds. *Nelson.*

aleutite. Proposed by Spurr for those members of his belugites having a porphyritic texture with an aphanitic or finely crystalline groundmass. *Fay.*

alexanderite. A misspelling of alexandrite which has been used deceivingly for alexandritelike synthetic sapphire or synthetic spinel. *Shipley.*

Alexandrian turquoise. A trade term for Egyptian turquoise. *Shipley.*

Alexandria shel. Mother of pearl. *Shipley.*

alexandrine. Incorrect name for alexandritelike sapphire; also for so-called synthetic alexandrite. *Shipley.*

alexandrite. a. Alexandritelike synthetic spinel or synthetic sapphire. *Shipley.* b. A variety of chrysoberyl, emerald green in daylight, red to violet by ordinary artificial light. From the U.S.S.R., and Ceylon. *Shipley.*

alexandrite cat's-eye. A chatoyant variety of alexandrite. *Shipley.*

alexandritelike andalusite. Andalusite of various colors which become reddish under lamplight and most other artificial light. *Shipley.*

alexandritelike sapphire. A sapphire; blue in daylight, changing to violet, purple, or reddish under most artificial light. So named because alexandrite also changes color under similar conditions. Also called alexandrine sapphire. *Shipley.*

alexandritelike tourmaline. Same as chameleonite. *Shipley.*

alexeyevite; alexjejevite. A waxlike white to brown resin from Kaluga, U.S.S.R. Resembles compact turf. *Tomkeieff, 1954; English.*

alexjejevite. *See* alexeyevite.

alferphyric. Having phenocrysts containing aluminum and ferric iron. *C.I.P.W.*

Alfrax. Electrically fused alumina, Al_2O_3; used as a refractory. *Bennett 2d, 1962.*

alga. One of the most primitive plants consisting of a single cell or a cell aggregate of low organization and without vascular system; algae live only in water and include diatoms and ordinary seaweeds. *A.G.I. Supp.*

algae. Marine, brackish, and freshwater plants ranging in size from microscopic unicellular plants to the giant kelps. Marine algae often have leaflike and stemlike parts similar to those of terrestrial plants, but differ from them in cellular structure. They may be red, blue, green, or brown in color due to the presence of different respiratory pigments. The microscopic algae are the food supply for many of the animals in the deep scattering layer and of whales. *Hy.*

algal. Of, pertaining to, or composed of algae. *A.G.I.*

algal balls. *See* stromatolite. *Pettijohn.*

algal biscuits. Probably a variety of stromatolites. *See also* stromatolite. *Pettijohn.*

algal cannel. Cannel coal in which algae are subsidiary but in significant proportions. Same as boghead cannel. *Tomkeieff, 1954.*

algal coal. Coal composed mainly of algal remains, such as Pila, Reinschia, etc. *Tomkeieff, 1954.* Also called boghead coal. *A.G.I.*

algal limestone. A limestone composed largely of the remains of calcium-secreting algae or in which such algae serve to bind together the fragments of other lime-secreting forms. *A.G.I.*

algal reef. An organic reef composed largely of algal remains and in which algae are or were the principal lime-secreting organisms. *A.G.I.*

algal structure. A deposit, usually calcareous, which shows banding, irregular concentric structures, crusts, pseudopisolites or pseudoconcretionary forms, resulting from organic, colonial secretions, and precipitation. Some so-called algal structures may be of inorganic origin. *A.G.I. See also* stromatolite; fucoid.

algam. *In Wales, a common term for tin. Fay.*

algarite. A general term for a bitumen derived from algae. *Tomkeieff, 1954.*

algarvite. A melteigite with more biotite and less nepheline than the rock from the original locality. *Johannsen, v. 1, 2d, 1939, p. 239.*

alga sapropel. Equivalent to peat of the humic coal series. *A.G.I.*

Algerian coral. Trade term for coral of inferior quality from the Mediterranean Sea. More specifically only that from the coast of Algeria. *Shipley.*

Algerian onyx. Another name for oriental alabaster. *C.T.D.*

algerite. An alteration of scapolite that probably is related to pinite. *Hess.*

alginates. The salts of alginic acid are hydrophilic colloids derived from certain marine algae, such as the giant kelp of the Pacific Coast. Sodium alginate is the most common form, but ammonium alginate is usually preferred in the ceramic industry, due to its lower ash content. Alginate solutions possess marked suspending, thickening, emulsifying, stabilizing, and water-holding properties. In addition, they act as binders in ceramic processing, either in the body or the glaze. They can be used as a replacement for the various water-soluble gums used in the industry. Some forms of alginates have been used as a flotation agent for enamels. *Lee.*

alginate. a. This term was introduced by V. Hevia in 1953. It designates the characteristic maceral of boghead coal. In reflected light it is very difficult to recognize the cellular structure of the algae. The reflecting power of the maceral is much weaker than of vitrinite and weaker also than that of sporinite in coals of low rank. In transmitted light, alginite sometimes shows structure (of colonies of algae). The color is yellow to orange. Alginite is best recognized by luminescent microscopy; it shows marked luminescence of varying color—silvery blue, green, yellowish brown. The humic constituents are either not luminescent or show a different kind of luminescence to the alginite. *IHCP, 1963, part I.* b. Synonym for algite. *A.G.I. Supp.*

algite. The constituent petrological unit, or maceral, of algal material present in considerable quantity in algal or boghead coal. *A.G.I.*

algodonite. Arsenide of copper occurring as a white incrustation in the Algodona silver mine, Chile. *C.T.D.*

Algoman granite. One of the great acid intrusives comprising gneissic syenites and granites yielding gold in Ontario, Canada; of post-Timiskaming age and thus younger than the Laurentian granites. *C.T.D.*

Algoman orogeny. Post-Archean diastrophism. *A.G.I. Supp.*

algon. Estuary mud; distinguished from limon, mud resulting from an inundation, and boue, oceanic mud; vase is the mud of estuaries along the Atlantic Coast of Europe and Africa from the Seine to the Gulf of Guinea, consists of about 70 percent inorganic material, partly sand (grain size 0.1 to 0.02 millimeter) which may be quartzose or calcareous, with accessory clay minerals. For the remaining 30 percent, the name algon is proposed; it consists of finely divided remains of algae or, in the upper parts of the estuary, of land vegetation; it forms a viscous binding material, always contains iron, and envelops H_2S when kept moist. *Hess.*

Algonkian; Proterozoic. a. In the nomenclature of the U. S. Geological Survey, the second in order of age of the systems into which the stratified rocks of the earth's crust are divided; also, the corresponding period of geologic time. Some authorities use Proterozoic in the same sense. *Fay.* b. As physical age measurements accumulate, the use of this term is changing. The Am. Comm. Strat. Nomen. (1954) suggests substituting Late Precambrian for Algonkian. *A.G.I.*

algovite. Proposed by Winkler for a group of rocks, practically diabases, or porphyritic phases of diabases, in the Algauer Alps. They also embrace gabbros, according to Roth, and are doubtless textural varieties of an augite-plagioclase magma. Obsolete. *Fay.*

Ali Baba. Popular name for a large chemical stoneware jar of the type used for the bulk storage of acids; these jars are made in sizes up to 5,000 liters capacity. *Dodd.*

alidade. a. In mine surveying, a movable arm used to read horizontal angular distances in surveying. *Pryor, 3.* b. A device having a level bubble combined with a quarter or a half circle graduated in degrees, that is used by drillers to determine the inclination of a drill stem and/or borehole at the collar of the borehole. Also called angle level; angle rule; clinometer; clinometer rule. *Long.* c. An instrument used in planetable surveying, consisting of a telescope or sighting device pivoted to swing through a vertical graduated arc atop a vertical stand attached to a steel rule, one edge of which is parallel with the sight line of the telescope. *Long.* d. Sometimes incorrectly used as a synonym for transit; theodolite. *Long.*

alien. The location by an alien and all the rights following from such location, are voidable, not void, and are free from attack by any one except the government. *Ricketts, I.*

alien filling. Filling material brought from the surface or from some place other than the mine. *Stoces, v. 1, p. 271.*

alien locator. A foreigner who locates a mining claim on the public domain. *Fay.*

align. Synonym for aline. *Long.*

alignment. *See* alinement.

alimentation. Generally, the process of providing nourishment or sustenance; thus in glaciology, the combined processes which serve to increase the mass of a glacier or snowfield; the opposite of ablation. The deposition of snow is the major form of glacial alimentation, but other forms of precipitation along with sublimation, refreezing of melt water, etc., also contribute. The additional mass produced by alimentation is termed accumulation. *H&G.*

aline. a. To position a drill so that its drill stem is centered on a point and parallel to a predetermined angle and compass direction. Also called line in; lineup. *Long.* b. To reposition a drill and bring its drill stem over the center and parallel with a newly collared drill hole. *Long.*

alinement; alignment. a. The planned direction of a tunnel or other roadway driven irrespective of coal seam or ore body structure; the planned direction of longwall panels or face lines. *Nelson.* b. Formation or position in line, or, more properly, in a common vertical plane. *Seelye, 2.* c. In railway or highway surveying, the ground plan, showing the alinement or direction of the route to be followed, as distinguished from a profile, which shows the vertical element. *Seelye, 2.* d. The laying out of the axis of a tunnel by instrumental work. *See also* ranging. *Stauffer.* e. *See* coplanning. *B.S. 3618, 1963, sec. 1.* f. The act of laying out or regulating by line; adjusting to a line. *Fay.* g. The line of adjustments. *Fay.*

alinement chart. Nomogram. *Pryor, 3.*

alinement clamp. A setscrew-equipped, universal-type clamp from one side of which a slotted angle-iron wand, about 18 inches long, extends outward from a clamping device at 90°. May be made to fit any size drill rod and is used in pairs, leapfrog fashion, to orient successive rods in a specific compass direction as they are lowered into a borehole being surveyed by the acid-bottle method. By this means the bearing and inclination of a drill hole may be determined in formation or under conditions where a Maas- or other-type magnetic compass cannot be used. *Long.*

aliphatic. Of, relating to, or derived from fat; fatty; acyclic. Applied to a large class of organic compounds characterized by an open-chain structure and consisting of the paraffin, olefin, acetylene hydrocarbons and their derivatives (as the fatty acids). *Webster 3d.*

alipite. A massive apple-green hydrated magnesium-nickel silicate similar to genthite. *Standard, 1964.*

aliquot part. Fraction of material or solution so taken as to be representative, so that information yielded by its analysis can be calculated for the original amount. *Pryor, 3.*

alisonite. A massive, deep indigo-blue copper-lead sulfide, $2Cu_2S.PbS$. It contains 53.63 percent copper and 28.25 percent lead. Tarnishes quickly. *Hess.*

alite. The name given to one of the crystalline constituents of portland cement clinker by A. E. Törnebohm. Alite has since been identified as the mineral $3CaO.SiO_2$ *Dodd.*

Aliva concrete sprayer. A compressed-air machine for spraying concrete on the roof and the sides of mine roadways. Used in coal mines for the fireproofing of roadways, for reducing air leakages, and for spraying tunnels supported by roof bolts. *See also* gunite. *Nelson.*

alive. a. The productive part of a lode. *Nelson.* b. A cable or conductor through which electricity is flowing. *Nelson.* c. Alive means either electrically connected to a source of potential difference or electrically charged to have a potential different from that of the earth. The term is sometimes used in place of the term current carrying where the intent is clear, to avoid repetition of the longer term. Also called live. *ASA M2.1-1963.* d. Said of coal when it makes a rustling sound, similar to the rustling of a crawling crayfish, as it bursts, cracks, and breaks off while under pressure. The rising of methane from the coal also causes a rustling. *Stoces, v. 1, p. 270. Compare* dead, d.

alkali. a. A substance which dissolves in water to form an alkaline solution, especially the hydroxides of sodium and potassium. Alkalies are often spoken of as bases, but the term base has wider significance. *C.T.D.* The common alkali elements are potassium, sodium, and lithium. *Bateman.* b. A term first used to designate the soluble parts of the ashes of plants; chemically, alkalies may be regarded as water in which part of the hydrogen is replaced by metallic radicals, for example, potassium or sodium. They neutralize acids and form salts with them. Alkalies are introduced into ceramic mixtures, for example, by the addition of feldspar or Cornish stone, and are used in the preparation of frits for glazes. They decrease the vitrification and melting points of ceramic mixtures and are also used in the preparation of casting slips. The oxides of calcium, strontium, and barium are called alkaline earths. *Rosenthal.*

alkali-aggregate reaction. A chemical reaction, involving sodium or potassium ions and reactive silica, which generates expansive forces in hardened concrete that may be of sufficient magnitude to cause disruption. The sodium and potassium ions are derived from portland cement and sometimes from alkaline mixing water. *Taylor.*

alkali bentonite. A bentonite containing easily exchangeable alkali cations and having original properties that are not permanently destroyed by the action of sulfuric acid but can be restored by treatment with an alkali salt followed by regulated dialysis. This group includes Wyoming-type bentonite and other similar bentonites. *BuMines Tech. Paper 609, 1940, p. 24.*

alkalic. Refers to a solution containing alkali cation; an igneous rock containing more of the alkali elements than are contained in the feldspars, therefore, such minerals as feldspathoids are present; an igneous rock with more of the alkali elements than the average for its clan; an igneous rock with an alkali-lime index less than 51; and igneous rocks of the Atlantic series, obsolete. *A.G.I. Supp.*

alkali-calcic series. Those igneous rock series having alkali-lime indexes in the range 51 to 55. *A.G.I.*

alkali chlorapatite. A name for an artificial member of the apatite group. *Hey, M. M., 1964.*

alkalic igneous rock. A term rather loosely used to mean one of the following: (1) more than average alkali ($K_2O + Na_2O$) for the clan in which they occur; (2) containing feldspathoids or other materials, such as acmite, so that the molecular ratio of alkali to silica is higher than 1 to 6; or (3) embracing those rock series having a low alkali-lime index (less than 51). *A.G.I.*

alkalic series. One of the four chemical classes of igneous rocks distinguished by Peacock based on the alkali-lime index. This term comprises those rock series with alkali-lime indexes less than 51. *Schieferdecker.*

alkali earth. One of a group of elements (group II) forming bivalent cations, including calcium, strontium, and barium. *Hurlbut.*

alkali-earth subbentonite. A decayed volcanic ash containing an alkali-earth metal that can be replaced by hydrogen and in which the hydrogen can, in turn, be replaced by an alkali metal; the resulting product, however, does not possess the same properties as a natural bentonite containing an exhangeable alkali metal. Most clays used in oil refining are alkali-earth subbentonites. *Hess.*

alkalies. A chemical group that possesses the power of neutralizing acids, and turns red litmus blue. *Gordon.*

alkali feldspar. An alkali-bearing feldspar such as microcline, orthoclase, albite, and anorthoclase. *A.G.I.*

alkali flat. A level area in an arid or semiarid region that is encrusted with salt or alkali (as the dried bed of an evaporated pond or lake). *Webster 3d.*

alkali garnet. A general term for members of the sodalite group that are closely related crystallographically and chemically to the true garnets. *English.*

alkali granite. A coarse-grained. plutonic rock carrying free quartz and alkali feldspar. *C.M.D.*

alkali-lime series. Igneous rocks which contain soda-lime (plagioclase) feldspars. *Hess.*

alkali metal. A metal in group IA of the periodic system; namely, lithium, sodium, potassium, rubidium, cesium, and francium. They form strong alkaline hydroxides; hence, the name. *ASM Gloss.*

alkalimeter. a. An apparatus for measuring the strength or the amount of alkali in a mixture or solution. *Webster 3d.* b. An apparatus for measuring the amount of carbon dioxide (as that liberated from a weighed sample of carbonate-containing material by reaction with acid). *Webster 3d.*

alkalimetry. The determination of the amount of alkali contained in a solution by titration with a standard acid solution. *Cooper.*

alkaline. a. Having the qualities of a base, synonym for basic. *A.G.I.* b. Containing sodium and/or potassium in excess of the amount needed to form feldspar with the available silica; for example, an alkaline rock (in this sense, sometimes written alkalic). *A.G.I.* c. Containing ions of one or more alkali metals; for example, an alkaline ore solution. *A.G.I.* d. Containing cations, of the strong bases in excess of the anions of strong acids; for example, an alkaline ore solution. Geologic usage gives alkaline solution so many different meanings that it is ambiguous without further qualification; it is therefore recommended that alkalic be used when definitions b or c are intended. *A.G.I.*

alkaline cleaner. A material blended from alkali hydroxides and such alkaline salts as borates, carbonates, phosphates, or silicates. The cleaning action may be enhanced by the addition of surface-active agents and special solvents. *ASM Gloss.*

alkaline earth. The oxide of barium, strontium, or calcium, and sometimes the oxide of beryllium, magnesium, or radium. *A.G.I.*

alkaline-earth bentonite. A bentonite containing easily exchangeable alkaline-earth cations and, either before or after acid treatment, capable of being made to assume properties of an alkali bentonite by treatment with an alkali salt followed by regulated dialysis. *BuMines Tech. Paper 609, 1940, p. 24.*

alkaline-earth metal. A metal in group IIA of the periodic system; namely, beryllium, magnesium, calcium, strontium, barium, and radium; so called because the oxides or earths of calcium, strontium, and barium were found by the early chemists to be alkaline in reaction. *ASM Gloss.*

alkaline igneous rock. *See* alkalic igneous rock. *A.G.I.*

alkaline metal. *See* alkali metal.

alkaline storage battery. Electric storage battery in which the positive plates consist of nickel and nickel peroxide, and the negative plates of finely divided iron. A concentrated solution of potassium hydroxide acts as electrolyte. The normal voltage varies between 1.0 and 1.5 volts per cell. *Bennett 2d, 1962.*

alkali neutralizer. *See* neutralizer. *Dodd.*

alkalinity. a. The combining power of a base as measured by the maximum number of equivalents of an acid with which it can react to form a salt. *Brantly, 1.* b. The extent to which a solution is alkaline. *See also* pH. *C.T.D.* c. In sea water, the excess of hydroxyl ions over hydrogen ions, generally expressed as milliequivalents per liter. *H&G.*

alkalinity, protective. Lime added to auriferous pulps to insure alkalinity, without which cyanidation cannot be successful. *Pryor, 3.*

alkali pyroxenes. Sodium iron silicates with some calcium, aluminum, and magnesium; $NaFe'''(Si_2O_6)$; subtransparent; color, brown or green; Mohs' hardness, 6.0 to 6.5; streak, vitreous; specific gravity, 3.5. Occur in igneous soda-rich rocks, for example, nepheline syenite. *Pryor, 3.*

alkali resistance. The degree of resistance of a ceramic surface to attack by aqueous alkaline solutions (that is, enamel glazes, stoneware, chemical stoneware, etc.). *Bureau of Mines Staff.*

alkali rock. One of the igneous rocks in which the abundance of alkalies in relation to other constituents has impressed a distinctive mineralogical character; generally indicated by the presence of soda pyroxenes, soda amphiboles, and/or feldspathoids. *Compare* calc-alkalic series. *A.G.I.*

alkali soil. A soil that has either so high a degree of alkalinity, pH 8.5 or higher, or so high a percentage of exchangeable sodium, 15 percent or higher, or both, that the growth of most crop plants is reduced. *Stokes and Varnes, 1955.*

alkali spinel. A black or dark green variety of spinel containing small amounts of alkalies, 1.38 percent Na_2O and 1.31 percent K_20; isometric; minute octahedrons. Found in the Mansjö Mountain, northern Sweden. *English.*

alkali subbentonite. A bentonite containing easily replaceable alkali bases but having original properties that are destroyed by acid treatment. *BuMines Tech. Paper 609, 1940, p. 24.*

alkali test. A process by which kerosine is treated with a solution of caustic soda, making it purer and more suitable for illuminating. The kerosines are divided into classes according to the results given by this alkali test and a fixed scale constructed. *Fay.*

alkali wash. In the cyanide process, a preliminary treatment of the pulp with an alkaline solution, commonly of lime, the chief object being to secure the neutralization of free acid before adding the strong cyanide solution, thus avoiding the undue consumption of cyanide. *Fay.*

alkali waste. Waste material from the manufacture of alkali; specifically, soda waste. *Webster 2d.*

alkali water. A water having a bitter or soda-like taste. If strongly alkaline, the water is unfit to drink or use in mixing cements. *Long.*

alkane. A member of the paraffin series as methane, ethane, etc. *Pryor, 3.*

alkene. A member of the hydrocarbon group series, C_nH_{2n}, for example, ethylene, propylene, etc. *Pryor, 3.*

alkinite. A compound of lead, copper, bismuth, and sulfur occurring in lead-gray, needle-shaped crystals; also massive. *Fay.*

alkyne; alkine. A member of the hydrocarbon series of the general formula C_nH_{2n-2}, for example, acetylene, allylene, etc. *Pryor, 3.*

allactite; allaktit. A vitreous brownish-red hydrous manganese arsenate; $7MnO \cdot As_2O_5 \cdot 4H_2O$; MnO 62.2, As_2O_3 28.8; Mohs' hardness, 4.5; specific gravity, 3.84; apparently a metamorphic mineral. It is monoclinic and resembles axinite. *Larsen, p. 199.*

alladinite. A case-in resin used as a mold material for many mold objects. *Shipley.*

allagite. A heavy dull red or green altered carbonated rhodonite. *Fay.*

allalinite. A completely altered gabbro with euhedral pseudomorphs and original texture. *A.G.I.*

allanite; orthite. A monoclinic member of the epidote group. Composition, variable; formula, $(Ca, Ce, La)_2(Al, Fe, Mg)_3(SiO_4)_3(OH)$. Commonly contains a little thorium and may be metamict. *A.G.I.* Is weakly to moderately radioactive; black to dark brown but commonly greenish, grayish, yellowish, or even white due to alteration. Typically an accessory mineral in granites, syenites, diorites, and pegmatites; also in gneisses and amphibolites, and as a contact metamorphic mineral in limestones; found associated with magnetite, biotite, epidote, euxenite, betafite, titanite, and zircon; frequently found as inclusions in biotite, and when radioactive, forms pleochroic halos. Allanite is analogous in composition to epidote and is to be considered an epidote in which cerium, etc., substitute for aluminum and ferric iron, and ferrous iron substitutes for calcium. *Crosby, pp. 65-66.* Mohs' hardness, 5.5 to 6; specific gravity, 3.5 to 4.2. *Dana 17.*

Allan (red) metal. Mechanical mixture (not a true alloy) containing approximately equal parts of copper and lead; used primarily for bearings. *Bennett 2d, 1962.*

allargentum. A name given to the hexagonal phase know in the synthetic system silver antimony, silver containing 8 to 15 percent antimony. Found associated with dyscrasite and cubic antimonian silver from Cobalt, Ontario, Canada. *American Mineralogist, v. 39, July-August 1954, p. 691.*

all-basic furnace. Abbreviation for all-basic open-hearth steel furnace. The whole of the superstructure of such a furnace, hearth, walls, roof, ports, ends—is built of basic refractories. These furnaces were introduced in Europe in 1935, the object being to make it possible to operate at a higher temperature than that possible with basic open-hearth, furnaces having a silica roof. *Dodd.*

allcharite. Small acicular crystals, resembling stibnite, on realgar and orpiment. Chemical composition unknown. Orthorhombic. From Allchar, Macedonia. *English.*

alleghanyite. A pink basic fluosilicate of manganese, $2Mn_2SiO_4.Mn(OH,F)_2$. Monoclinic. Rounded crystals and grains. From Bald Knob, Alleghany County, N. C.; Colorado. *English.*

Alleghenyan. Lower Middle Pennsylvania. *A.G.I. Supp.*

Alleghenyan orogeny. Late Permian diastrophism. *A.G.I. Supp.*

Allegheny formation. The second in order of age of the formations comprised in the Pennsylvanian series of strata in the bituminous coal districts of the northern Appalachian field. It overlies the Pottsville formation, comprises all the beds from the base of the Brookville coal to the top of the Upper Freeport coal, and is succeeded by the Conemaugh formation. It was formerly called the Lower Productive Coal Measures. *Fay.*

allemontite. A metallic compound of antimony and arsenic, AsSb; rhombohedral or amorphous; hexagonal; tin white or reddish gray; Mohs' hardness, 3 to 4; specific gravity, 5.8 to 6.2; one cleavage. *Dana 17.* Also called arsenical antimony. *Fay.*

Allen cone. Conical tank used in mineral dressing to receive pulp and separate sand, via float controlled spigot, from slime which overflows peripherally. *Pryor, 3.*

allenite; allenita. A mineral in the chalcanthite group, $MgSO_4.5H_2O$. A dehydration product of epsomite ($MgSO_4.7H_2O$) as distinct from hexahydrite ($MgSO_4.6H_2O$). Not to be confused with allanite. Synonym for magnesium chalcanthite; pentahydrite. *Spencer 19, M.M., 1952.*

Allenite. A trade name for tungsten carbide tools. *Spencer 19, M.M., 1952.*

Allen-O'Hara furnace. A horizontal, double-hearth furnace for calcining sulfide ores. *Fay.*

Allen screws. Cap screws and setscrews having hexagonal socket in the head. Such screws are adjusted by means of a hexagonal key. *Crispin.*

alley stone. Synonym for websterite; aluminite. *Fay.*

alley tender. *See* card tender. *D.O.T. 1.*

all-flotation. The concentration of ores using only the flotation process. *Henderson.*

all-geared drive. The transmission of power for feeds and speeds on a machine by means of gears instead of by belts and pulleys. *Crispin.*

alliaceous. Applied to minerals having the odor of garlic; for example, arsenical minerals. *Fay.*

Alliance coupling. A coupling designed for a maximum drawbar pull of 5 tons or, in special alloy steels, of 7 tons. Its horizontal gathering range is 18°. The coupling is provided with a swing knuckle and a forged steel pin, which is lifted to uncouple, and a forged steel tail bolt with a spiral spring. *Sinclair, V, p. 278.*

alligator. a. Synonym for safety clamp. *Long* b. A prolonged, steel hingelike device by means of which the abutting ends of a falt drive belt can be fastened or laced together. *Long.* c. Aust. A self-tipping tank used for raising rock or coal. *Fay.* d. Can. Stern-wheel steamboat which negotiates land as well as water. *Hoffman.* e. Any of several types of machines for metalworking, rock crushing, etc., in which work is accomplished by two massive jaws, one or both of which move as, for example, alligator shears (preferably, lever shears) or alligator crusher (preferably, lever crusher). *Henderson.*

alligator hide. A defect characterized by an extreme roughness of the porcelain enamel surface; a severe case of orange peel. *ASTM C286-65.*

alligatoring. The longitudinal splitting of flat slabs of metal in a plane parallel to the rolled surface. Also called fishmouthing. *ASM Gloss.*

alligator wrench. A wrench having a fixed flaring jaw with teeth on one side. *Webster 3d.*

allignite. A fossil resin related to amber from Switzerland. *See also* succinite. *Fay.*

allite. A rock name including both bauxites and laterites. *Hey 2d, 1955.*

allivalite. A variety of gabbro composed essentially of anorthite and olivine. Augite, apatite, and opaque iron oxides are accessories. An olivine gabbro containing calcic plagioclase. *A.G.I.*

all-mine pig. Iron smelted entirely from raw ore. *Standard, 1964.*

allobar. A form of element having a different atomic weight from the naturally occurring form. A form of element differing in isotopic composition from the naturally occurring form. *NRC-ASA N1.1-1957.*

allochem. Sediment formed by chemical or biochemical precipitation within a depositional basin. Includes intraclasts, oolites, fossils, and pellets. *A.G.I. Supp.*

allochetite. A fine-grained dike rock with phenocrysts of labradorite, orthoclase, nepheline, and augite in a groundmass of indistinct minerals with augite and hornblende. *Holmes, 1928.*

allochroite. A calcium-chromium garnet. *Fay.*

allochromatic. a. Descriptive of crystals that exhibit electric conductivity under the influence of light. *Hess.* b. A gem stone with a coloring agent extraneous to its chemical composition. Opposite of idiochromatic. *Hess.*

allochromatic minerals. Minerals which would be colorless if chemically pure, but which commonly exhibit a range of colors due to the presence of small quantities of one or more coloring elements. Chief among these elements are those having atomic numbers, 22 to 29; namely, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, and copper. Corundum, beryl, spinel, and quartz are examples of allochromatic gem stones. *See also* idiochromatic minerals. *Anderson.*

allochromatic stone. A mineral that in its purest state would be colorless or white, but is often colored by submicroscopic impurities or inclusions of other minerals. Most gemstones are allochromatic. *Shipley.*

allochthon. A rock that has been moved a noticeable distance from its original place of deposition by some tectonic process, generally related to overthrusting or recumbent folding, or perhaps to gravity sliding. The opposite of autochton. *Billings, 1954, p. 189.*

allochthonous. a. Originated by Gumbel and applied to rocks, the dominant constituents of which have not been formed in place. *Compare* autochthonous. *Holmes, 1920.* b. Coal formation according to the drift theory. *Nelson.*

allochthonous coal. Coal originating from accumulations of plant debris that have been transported from their place of growth and deposited elsewhere. The debris can be differentiated as coming from near or from far, and likewise whether it represents recent (dead or still living) or already fossilized material. *See also* drift theory. *A.G.I.* Also called drift coal. *Tomkeieff, 1954.*

allochthonous peat. Drift peat of lacustrine character. It is subdivided into Gyttja type and Dry type. *Tomkieff, 1954.*

alloclasite; alloclase. A steel-gray cobalt-arsenic-bismuth sulfide, CO(AsBi)S, usually with part of the cobalt replaced by iron; crystallizes in the orthorhombic system. *Fay.*

allogene; allothigene. A mineral or rock which has been transported to the site of deposition. *A.G.I.*

allogenic. Generated elsewhere; applied to those constituents that came into existence outside of, and previously to, the rock of which they now constitute a part; for example, the pebbles of a conglomerate. *Compare* authigenic. *Holmes, 1928.*

allogonite. Herderite. *Dana 6d, p. 760.*

allomeric. Of the same crystalline form but of different chemical composition. *See also* allomorphous. *Henderson.*

allomorph. Synonym for paramorph. Obsolete. *A.G.I.*

allomorphism. Changes produced in minerals without loss or gain of components, for example, the alteration of kyanite to sillimanite. *Johannsen, v. 1, 2d, 1939, pp. 165, 190.*

allomorphite. Barite. *Dana 6d, p. 902*

allomorphous. Of the same chemical composition but of different crystalline form. *See also* allomeric. *Henderson.*

allopalladium. A nearly silver-white palladium, found in hexagonal plates in the Harz Mountains, Germany. *Fay.*

allophane. A colloid that has been considered to be a hydrous aluminum silicate, but has neither definite molecular structure nor chemical composition; it may carry as much as 9.23 percent P_2O_5, and also zinc, copper, iron, or SO_3. It forms incrustations, thin seams, or rarely stalactic masses; may be clear and colorless or translucent, blue, pale green, brown, or yellow. *USGS Prof. Paper 185, 1934-35, pp. 144-148.*

allophanite. A white, amorphous, hydrous aluminum silicate, found near Salt Lake City, Utah. *English.*

allophanoids. Clays of the allophane, halloysite, and montmorillonite groups. *English.*

allophite. A grayish-green mineral, probably a form of serpentine. Found in limestone in Silesia, Germany. *Hess.*

allothigene. *See* allogene. *A.G.I.*

allothimorph. A constituent of a metamorphic rock which, in the new rock, has not had its original crystal outlines changed. *Johannson, v. 1, 2d, 1939, p. 165.*

allotriomorphic. Proposed by Rosenbusch and applied to those minerals of igneous rocks that are not bounded by their own crystal faces, but which have their outlines impressed on them by the adjacent minerals. Rocks that consist predominantly of an allotriomorphic mineral assemblage are said to have an allotriomorphic-granular (xenomorphic-granular) texture. Contrasted with automorphic; idiomorphic; euhedral. Synonym for xenomorphic; anhedral. *A.G.I.*

allotriomorphic-granular. Used to indicate the texture of igneous rocks if almost all the constituents are xenomorphic and of the same size. Synonym for xenomorphic-granular. *Schieferdecker.*

allotrope. One of the forms assumed by an allotropic substance; for example, diamond is an allotrope of carbon. *Standard, 1964.*

allotropic. Applied by Berzelius to those substances which exist in two or more forms, as diamond and graphite. *A.G.I. See also* polymorphism.

allotropy; allotropism. The existence of a substance, especially an element, in two or more different modifications usually in the same phase, as different crystalline forms of carbon, iron, phosphorus, and sulfur. *Webster 3d.*

all over. End of a shift; when the breaker at a colliery shuts down for the day it is said to be "all over." *Fay.*

allowable bearing value. The maximum pressure that can be permitted on foundation soil giving consideration to all pertinent factors, with adequate safety against rupture of the soil mass or movement of the foundation of such magnitude that the structure is impaired. Also called allowable soil prsesure. *ASCE P1826.*

allowable pile-bearing load. The maximum load that can be permitted on a pile with adequate safety against movement of such magnitude that the structure is endangered. *ASCE P1826.*

allowable stress; working stress. If a member is so designed that the maximum stress as calculated for the expected conditions of service is less than some certain value, the member will have a proper margain of security against damage or failure. This certain value is the allowable stress, of the kind, and for the material and condition of service in question. The allowable stress is less than the damaging stress because of uncertainty as to the conditions of service, nonuniformity of material and inaccuracy of stress analysis. The margin between the allowable stress and the damaging stress may be reduced in proportion to the certainty with which the conditions of service are known, the intrinsic reliability of the material, the accuracy with which the stress produced by the loading can be calculated, and the degree to which failure is unattended by danger or loss. *Compare* damaging stress; factor of safety; factor of utilization; margin of safety. *Ro.*

allowance. a. Eng. Refreshment of bread, cheese, and beer supplied by the lessees or owners of a mine to surveyors. *Fay.* b. Eng. Ale given to workmen on having to work under unusual conditions, for example, when they are wet through. *Fay.* c. The calculated difference between the volume occupied by a cement slurry when mixed and the volume it will occupy on setting. *Long.* d. Living expense or premium wage paid to drill-crew members working in remote areas under rigorous conditions. e. Sometimes incorrectly used as a synonym for tolerance. *See also* tolerance. *Long.* f. The specified difference in limiting sizes (minimum clearance or maximum interference) between mating parts, as computed arithmetically from the specified dimensions and tolerances of each part. *ASM Gloss.*

allowance coal. Eng. *See* collier's coal. *Fay.*

alloy. A substance having metallic properties and being composed of two or more chemical elements of which at least one is an elemental metal. *ASM Gloss.*

alloyage. The act or process of alloying; specifically, in minting, of alloying the precious metals with baser ones to harden forming an alloy. *Standard, 1964.*

alloy balance. An adjustable balance that is in equilibrium when the metals in the scalepans are in the proper proportions for forming an alloy. *Standard, 1964.*

alloy cast iron. Cast iron containing alloying elements. Usually it is some combination of nickel, chromium, copper, and molybdenum. These elements may be added to increase the strength of ordinary irons, to facilitate heat treatment, or to obtain martensitic, austenitic, or ferritic irons. *C.T.D.*

alloy elements. Chromium, tungsten, iron, molybdenum, and other elements which aid in making alloys heat resistant and corrosion resistant. *Bennett 2d, 1962.*

alloying. The process of adding to a metal one or more different elements to form an alloy. *Henderson.*

alloying element. An element added to a metal to effect changes in properties, and which remains within the metal. *ASM Gloss.*

alloy, nonferrous. Any alloy based on metals other than iron, that is, usually on copper, aluminum, lead, zinc, tin, nickel or magnesium. *C.T.D.*

alloy plating. The codeposition of two or more metallic elements. *See also* alloy. *ASM Gloss.*

alloy powder. In powder metallurgy, a powder of which each particle is composed of the same alloy or two or more metals. *ASM Gloss.*

alloy scrap. Scrap metal in the form of alloys. *Newton, p. 39.*

alloy sludger. In metallurgy, a laborer who salvages sludge from furnace pots for use in recovery of metals. Also called sludger. *D.O.T. Supp.*

alloy steel. Steel containing significant quantities of alloying elements (other than carbon and the commonly accepted amounts of manganese, silicon, sulfur, and phosphorus) added to effect changes in the mechanical or physical properties. *ASM Gloss.*

alloy system. All the alloys that can be made by mixing two metals form a binary alloy system, three metals form a ternary alloy system, and so on. The limits of temperature and composition within which the constituents in a system are stable are represented by the constitutional diagram. *C.T.D.*

allport oven. A pottery bottle oven in which the hot gases from the fire-mouth enter the oven nearer to its center than the usual points of entry around the oven walls; another feature is preheating of the secondary air. *See also* bottle oven. *Dodd.*

all-position electrode. In arc welding, a filler metal electrode for depositing weld metal in the flat, horizontal, overhead, and vertical positions. *ASM Gloss.*

all-rowlock wall. A wall built with two courses entirely of stretchers on edge alternating with one course of headers on edge *Crispin.*

all-sliming. a. Crushing all the ore in a mill to so fine a state of subdivision that only a small percentage will fail to pass through a 200-mesh screen. *Fay.* b. Term used on the Rand for treatment of gold ore which is ground to a size sufficiently fine for agitation as a cyanide pulp, as opposed to division into coarse sands for static leaching and fine slimes for agitation. *Pryor, 3.*

alluaudite. a. A yellowish-green to greenish-black phosphate of sodium, divalent manganese, and trivalent iron, essentially $(Na, Fe''', Mn'')(PO_4)$; Mohs' hardness, 5 to 5.5; specific gravity, 3 to 4–3.58. *Dana 7, v. 2, p. 674.* b. Synonym for dufrenite. *Hey 2d, 1955.*

all-ups. Leic. A mixture of every quality of coal, excepting fine slack, raised from one seam, and sold as such. *Fay.*

alluvia. Referring to material such as loose gravel, sand, and mud deposited by streams. *Jones.*

alluvial. a. Of or pertaining to alluvium. Adjectively used to identify particular types of, or minerals found associated with, deposits made by flowing water as, alluvial fan, alluvial terrace, alluvial gold, alluvial tin. *Bureau of Mines Staff.* b. A term commonly, although incorrectly, used by some drillers as a synonym for overburden. *Long.*

alluvial clay. One that has been deposited by water on land, usually in association with rivers or streams. *ACSB–1.*

alluvial coast. *See* alluvial-plain shoreline. *Schieferdecker.*

alluvial cone. Loose material washed down the mountain slopes by ephemeral streams and deposited at the mouth of gorges may assume the form of a conical mass of low slope descending equally in all directions from the point of issue. To such a form, Gilbert applied the name alluvial cone. An alluvial fan differs from an alluvial cone in having greater width in proportion to its thickness and in showing signs of stratification. *A.G.I.*

alluvial deposit; placer deposit. Earth, sand, gravel, or other rock or mineral materials transported by and laid down by flowing water. *Compare* alluvium. *Bureau of Mines Staff.* Alluvial deposits generally take the form of (1) surface deposits; (2) river deposits; (3) deep leads; and (4) shore deposits. *See also* alluvial mining. *Nelson.*

alluvial diamond. A diamond found in river gravels; also, loosely used for a diamond found in beach and desert gravels. *A.G.I.*

alluvial fan. a. The outspread sloping deposit of boulders, gravel, and sand left by a stream where it leaves a gorge to enter upon a plain or an open valley bottom. *Fay.* b. The land counterpart of a delta. An assemblage of sediments marking the place where a stream moves from a steep gradient to a flatter gradient and suddenly loses its transporting power. Typical of arid and semiarid climates, but not confined to them. *Leet.*

alluvial flat. A generally narrow plain, having a slope of 5 to 20 feet to the mile, built of fine sandy clay or adobe brought down by an ephemeral stream, having a smooth surface that is usually unmarked by stream channels, but where so marked the channels are insignificant. *USGS Bull. 730, 1923, p. 86.*

alluvial gold. Gold found associated with waterworn (water-transported) material. *Fay.*

alluvial mining. The exploitation of alluvial deposits by dredging, hydraulicking, or drift mining. *See also* placer mining. *Nelson.*

alluvial ore deposit. An ore deposit in which the valuable mineral particles have been transported and deposited by a stream. *Schieferdecker.*

alluvial plain. a. If a stream is swift in one part of its course and slow in another, the swifter part may carry a load which the slower cannot carry. Deposits will then be made in the valley where the current is sluggish. In this way, floodplains are constructed. Floodplains produced by the filling of a valley are alluvial plains. We commonly think of alluvial plains as made of fine mud, but alluvial plains may be made of sand or gravel, under the proper circumstances. *A.G.I.* b. A plain resulting from the deposition of alluvium by water. In the southwestern United States, most alluvial plains are formed by streams having a considerable grade, and therefore, they are generally referred to as alluvial slopes. *USGS Bull. 730, 1923, p. 86.*

alluvial-plain shoreline; alluvial coast. Shoreline or coast formed by a plain composed of fluvial, fluviomarine or marine alluvial material. *Schieferdecker.*

alluvial slope. A surface composed of alluvium that slopes away from the sides of mountains and merges with the plain or broad valley floor upon which it rests. The alluvial slope near the mountains may be as much as 300 feet per mile. The plain is built by the union of the alluvial fans of tributary streams, which are commonly intermittent, and it is sometimes called a fan apron, debris apron, or piedmont plain or slope. *USGS Bull. 730, 1923, p. 86.*

alluvial stone. A mineral that has been transported and deposited by water. *See also* alluvial deposit. *Shipley.*

alluvial tin. Stream tin, or cassiterite pebbles in the gravel along the courses of valleys and rivers on the bedrock. Generally, the purest tin ore. *Fay.*

alluvial values. In placer mining, the minerals recoverable from the alluvium. These include cassiterite, gold, diamond and gem stones, zirconia, rutile, monazite, and platinum. *Pryor, 3.*

alluviation. a. The process of building alluvial cones and deltas. *Standard, 1964.* b. A hydraulic effect on solids suspended in a current of water, whereby the coarsest and heaviest particles are the first to settle out on diminution of slope or velocity of the stream, and the finest muds the last. *Pryor, 3.*

alluvium. a. Clay silt, sand, gravel, or other rock materials transported by flowing water and deposited in comparatively recent geologic time as sorted or semisorted sediments in riverbeds, estuaries, and flood plains, on lakes, shores, and in fans at the base of mountain slopes, and estuaries. The term is not applied to subaqueous sediments deposited in seas or lakes or to nonsorted sediments carried or deposited by glaciers. *Compare* till. *Bureau of Mines Staff.* b. As incorrectly used by some drillers, the broken, earthy rock material directly below the soil layer and above the solid, unbroken bed or ledge rock. *Long.*

allwork. Derb. A term formerly used for longwall. *Fay.*

almagra. Sp. A deep red ocher originally from Andalusia, Spain, similar to Indian red. Used as a pigment and in polishing glass and metals. *Standard, 1964.*

almagre. Mex. Red ocher. *Fay.*

almagrerite. Zinkosite. *Dana 6d, p. 912.*

almandine; almandite. A variety of garnet, $Fe_3Al_2(SiO_4)_3$, sometimes referred to as precious garnet. Its color is a fine deep red, it often shows a violet tinge, and it resembles rubies in most properties. Used as a gem. Also called almond stone. Mohs' hardness, 7; specific gravity, 4.25; isometric. *Fay; Dana 17, p. 597.*

almandine sapphire. A reddish-purple sapphire. *Shipley.*

almandine spinel. A violet-colored type of ruby spinel. *C.M.D.*

almandite. *See* almandine.

almashite. A green or black variety of amber that is poor in oxygen; from the Almash valley, Moldavia, Romania. *Tomkeieff, 1954.*

almeria ore. A Spanish hematite. *Osborne.*

almond furnace. A furnace in which the slags of litharge left in refining silver are reduced to lead by being heated with charcoal. *Fay.*

almond rock. Same as amygdaloid. *Standard, 1964.*

almond stone. *See* almandine.

almost atoll. Atoll with a minute noncoral island generally of volcanic origin. *Schieferdecker.*

alnico. *See* magnetic alloys. *Pryor, 3.*

alnoite. A lamprophyre consisting of biotite, augite, olivine, and melilite. Apatite, perovskite, nepheline, and opaque oxides are common accessories. *See also* lamprophyre. *A.G.I.*

aloes rope. A special kind of rope made from aloe fibers, formerly used as a drive-hammer rope because it was more durable and stronger than jute- and hemp-fiber ropes. *Long.*

Alomite. Trade name for the fine blue sodalite quarried at Bancroft, Ontario, Canada, used as an ornamental stone. Also called princess blue. *Shipley.*

alongshore current. *See* littoral current; longshore current. *A.G.I.*

Alowalt. Trade name for fused aluminum oxide. *Hess.*

Aloxite. Trade name for form of fused, crystalline alumina, or artificial corundum. Used as an abrasive. *English.*

Alpax. Aluminum-silicon alloy, containing about 13 percent silicon. Has good casting properties and corrosion resistance, low specific gravity (2.66), and satisfactory mechanical properties. Tensile strength, 10 to 12 tons per square inch; elongation, 5 to 8 percent. Used mainly for castings. Also called Silumin. *C.T.D.*

alpha. The first letter (α) of the Greek alphabet. Commonly used as a prefix to show that a mineral, the condition of a metal, or other thing or property is one of several closely related species, or one of a series; beta (β) the second letter, and gamma (γ), the third letter are used likewise, for example, alpha rays, beta rays, and gamma rays and alpha quartz and beta quartz. *Hess.*

alpha alumina. A white, anhydrous, nonhygroscopic powder, Al_2O_3, produced when precipitated $Al(OH)_3$ is calcined at 1,000° C. It is the natural product of the Bayer process and other processes used (or proposed) to treat bauxite, clay, or other aluminum-bearing materials. *Newton, pp. 476-477.*

alpha-beta brass. An alloy of 57 to 63 percent copper and 37 to 43 percent zinc, with a possible small addition of lead. Used in hot working. *Pryor, 3.*

alpha brass. An alloy of 70 percent copper and 30 percent zinc, perhaps with a small addition of lead. Used in heavy cold working. *Pryor, 3.*

alpha carnegieite. A sodium anorthite, $NaAlSiO_4$, produced by heating nepheline to 1,248° C. It can be preserved by quenching at temperatures above 690° C, at which point it passes into beta carnegieite. Isometric; rounded grains. *English.*

alpha celsian. A silicate of aluminum and barium, $BaAl_2Si_2O_8$. An artificial feldspar, similar to anorthite, but containing barium instead of calcium. Hexagonal prisms. Uniaxial, negative. *English.*

alpha compounds. The ash-free portion of coal nonextractable with pyridine. *Hess.*

alpha fergusonite. Synonym for fergusonite as distinct from beta fergusonite. *See also* beta fergusonite. *Hay, M.M., 1964.*

alpha hyblite. A porcelain-white, hydrous asic sulfosilicate of thorium with some uranium, iron, and lead; isotropic. An alteration product of thorite. From Hybla, Ontario, Canada. *English.*

alpha iron. The body-centered cubic form of pure iron, stable below 1,670° F. *ASM Gloss.*

alpha mullite. A variant of mullite. *Hey 2d, 1955.*

alpha particle; alpha radiation; alpha ray. A positively charged particle emitted by certain radioactive materials. It is composed of two neutrons and two protons, hence, it is identical with the nucleus of a helium atom. It is the least penetrating of the three common forms of radiation (alpha, beta, and gamma), being stopped by a sheet of paper. It is not dangerous to living things unless the alpha-emitting substance is inhaled or ingested. *L&L.*

alpha quartz. A form of quartz, apparently hexagonal, trapezohedral, tetartohedral, formed at temperatures below 573° C; occurs in veins, geodes, and large permatites. *English.* Also called low quartz.

alpha rays. a. One of the three types of rays (alpha, beta, and gamma) emitted by radioactive substances. *Crispin.* b. Streams of alpha particles. *C.T.D.*

alpha uranium. The allotropic modification of uranium metal which is stable below 667° C. It is orthorhombic. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-143.*

alpha zircon. A mineralogical name for any zircon with properties about specific gravity, 4.7; refractive index, 1.92 to 1.98. Strongly birefringent, 0.059. Almost no other type is used in jewelry. *See also* beta zircon; gamma zircon. *Shipley.*

alphatite. Proposed by Salomon for clays and silts consisting largely of rock flour, such as the fine material produced by glaciers. There seems little reason for the term, and extreme difficulty in its application because of inability to determine that a clay is a rock flour and not composed of particles of many origins brought together by wind or water. *A.G.I.*

Alpides. Great east-west structural belt including the Alps of Europe and the Himalayas and related mountains of Asia, folded mostly in the Tertiary period. *A.G.I. Supp.*

alpine. Of, pertaining to, or like the Alps or any lofty mountain. Resembling a great mountain range of southern Europe called the Alps. Implies high elevation, particularly above tree line, and cold climate. *A.G.I.; A.G.I. Supp.*

Alpine diamond. Pyrite. *Shipley.*

alpine glacier. A glacier occupying a mountain valley and fed by snow fields in the higher mountains. *Standard, 1964.*

Alpine revolution. That period of earth movement in the Tertiary period (mainly in the Miocene) when the Alps and other mountain chains came into existence. *C.T.D.*

alquifou. A coarse-grained galena, used by potters in preparing a green glaze. *Standard, 1964.*

alsbachite. A plutonic igneous rock containing sodic plagioclase, quartz, subordinate orthoclase, and accessory garnet, biotite, and muscovite. Quartz and orthoclase occur in part as phenocrysts in a granular groundmass. A quartz-rich variety of granodiorite. *A.G.I.*

alshedite. A variety of titanite containing yttria; found in Sweden. *Standard, 1964.*

Alsilox. Product of fusion of lead oxide and silica; used in ceramic glazing. *Bennett 2d, 1962.*

Alsing cylinder. A particular type of ball mill. *See also* ball mill. *Dodd.*

alstonite. *See* bromlite. *Fay.*

alt Abbreviation for altitude. *BuMin Style Guide, p. 58.*

altaite. A tin-white lead telluride, PbTe, found in Colorado. Originally found in the Altai Mountains of Asia. Isometric. *Sanford; Dana, 17.*

Alta mud. Trade name for bentonite clay which is colloidal and gel-forming. Used for drilling in oil wells and to case and cement holes in penetrating overburden. Also used in cementing rock cavities. *Cumming.*

altar. A step in the wall of a graving dock. Its purpose is to take the thrust from the shores supporting a ship when the dock is empty. *Ham.*

altazimuth. a. An instrument consisting of a telescope mounted so that it can swing horizontally and vertically. It is used for observing the altitude and azimuth of a celestial body. *Webster 3d.* b. Any of several other instruments (as a theodolite) mounted so that it swings in the same way. *Webster 3d.*

alteration. Change in the mineralogical composition of a rock, typically brought about by the action of hydrothermal solutions. Sometimes classed as a phase of metamorphism but usually distinguished from it because it is milder and more localized; also applied to secondary (supergene) changes in rocks or minerals. *A.G.I.*

altered mineral. A mineral that has undergone more or less chemical change under geological processes. *Fay.*

altered rock. A rock that has undergone changes in its chemical and mineralogical composition since it was originally deposited. *Weed, 1922.*

altered stone. Any stone of which the appearance, especially the color, has been changed by any artificial means, whatsoever. Such change may be either external or internal. *See also* treated stone; coated stone; heated stone; stained stone. *Shipley.*

altern. A crystal form having opposite parts corresponding in form, but alternating with each other in the position of sides and angles. *Standard, 1964.*

alternate immersion test. A corrosion test in which the specimens are intermittently immersed in and removed from a liquid medium at definite time intervals. *ASM Gloss.*

alternate pillar and stope. *See* square-set stoping.

alternate polarity. Arrangement in magnetic separator whereby ore travels alternately through normal concentration and entropy fields, thus stirring attracted material and shaking out entrained nonmagnetics. *Pryor, 3.*

alternating current. Current, the direction of which is reversed at regular intervals, usually 120 reversals per second or 60 cycle current. *Kentucky, p. 263.*

alternating-current ampere. That current which will produce heat at the same rate as a direct-current ampere, when flowing through a given ohmic resistance. *Kentucky, p. 263.*

alternating-current generator. A generator for the production of alternating currents and voltages. *See also* direct-current generator. *Nelson.*

alternating-current motor. An electric motor of either single or polyphase type operated by an alternating current. *Crispin.*

alternating-current transformer. A device used to raise or lower the voltage of an alternating circuit. It consists of an induction coil having a primary and secondary winding and a closed iron core. *Crispin.*

alternating motion. Up and down, or backward and forward motion. *Zern.*

alternator. A generator producing alternating current by the rotation of its rotor, which is driven by a steam or water turbine. A gas turbine or a diesel engine can be used as a prime mover in certain cases. *Ham.*

altimeter. An instrument for measuring altitudes. *Crispin.*

altitude. a. In surveying: (1) the angle of elevation of a point above the plane of the horizon, and (2) the height of a point above some datum plane, usually mean sea level. *C.T.D.* b. The vertical distance or elevation above any given point or base-level, as the sea; height; hence, also, such distance expressed numerically. Abbreviation, alt. *Standard, 1964.*

alto. a. Sp. A bluff; height; hill. *Standard, 1964.* b. Mex. A hanging wall. *Fay.*

altogether-coal. Eng. Large and small coal mixed. *Fay.*

alugenite. $Al_2(SO_4)_3.18H_2O$; white monoclinic or triclinic mineral; specific gravity, 1.65 to 1.8; Mohs' hardness, 1.5 to 2; and soluble in water. *Bennett 2d, 1962.*

alum. a. A hydrous double sulfate of aluminum and potassium, found in nature as the mineral kalinite. *Fay.* b. In chemistry, any one of a group of salts which are hydrous double sulfates of aluminum, chromium, iron, or manganese and one of the alkali metals. *Fay.* c. In mineralogy, one of a group of minerals, which are hydrous sulfates of aluminum and potassium, sodium, or ammonium. *Fay.* Alum is sometimes used in the refining of koalin, being added in small quantities to settling tanks as a flocculating agent. Commercial alum, which is aluminum sulfate, is more generally used now by the clay producers. *Lee.*

alum cake. A product of the action of sulfuric acid on clay, consisting chiefly of silica and aluminum sulfate. *Webster 3d.*

alum coal. A variety of an argillaceous brown coal rich in pyrite which weathers with a formation of alums. *Tomkeieff, 1954.*

alum earth. An argillaceous rock, commonly a shale, containing marcasite or pyrite which, as it decomposes, forms sulfuric acid that attacks the shale and produces alum. Many such rocks are carbonaceous. *Hess.*

alumel. A nickel-base alloy containing about 2.5 percent manganese, 2 percent aluminum, and 1 percent silicon; used chiefly as a component of pyrometric thermocouples. *ASM Gloss.*

alumetizing. Process for spraying a protective coating of aluminum on a metal. *C.T.D. Supp.*

alum feather. *See* iron alum. *Standard, 1964.*

alumina. An important constituent of all clays, Al_2O_3, determining their suitability for firebrick and furnace linings. Used in the preparation of paints called lakes, in dyeing, and in calico printing. Also, it is widely used in granular form for abrasive purposes, in grinding or cutting materials of high tensile strength, such as alloy and high-speed steels, annealed malleable iron, tough bronze, etc. Also called oxide of aluminum. *Crispin.* Crystalline alumina occurs naturally as corundum, of which sapphire and ruby are respectively blue and red varieties. Emery is an intimate mixture of alumina and magnetite or hematite. Beauxite, diaspore, and gibbsite are hydrated oxides. Aluminum oxide is made in the electric furnace by fusing bauxite or corundum. Fused aluminum oxide is crushed and used as an abrasive, a refractory, a heating element for electrical heaters, or as a filtering medium. Fused aluminum oxide is sold under the following trade names: Adamite, Alowalt, Aloxite, Alundum, Carboalumina, Coralox, Corowalt, Corubin, Exolon, Lionite, Oxalumina, and Rex. *Hess.*

alumina, activated. *See* activated alumina. *CCD 6d, 1961.*

alumina ceramic. Any ceramic whiteware in which alumina, (Al_2O_3), is the essential crystalline phase. *ACSB-4.*

alumina crucible. A crucible made from alumina mixed with highly heated calcium aluminate. Such crucibles are said to withstand sudden changes of temperature. Bauxite has been used to replace the alumina. *Hess.*

alumina-diaspore fireclay brick. A group of brick, which includes the 50, 60, and 70 percent alumina grades. *Bureau of Mines Staff.*

alumina gel. *See* aluminum hydroxide, gelatinous. *CCD 6d, 1961.*

alumina hydrate. *See* alumina trihydrate. *CCD 6d, 1961.*

alumina, natural abrasive. *See* corundum; emery. *ACSG, 1963.*

alumina porcelain. A vitreous ceramic whiteware for technical application in which alumina, (Al_2O_3), is the essential crystalline phase. *ASTM C242-60.*

alumina-silica refractories. Refractories consisting essentially of alumina and silica, and including high-alumina, fire clay, and kaolin refractories. *HW.*

alumina, sintered. Alumina, sometimes containing a small amount of clay or of a mineralizer, and fired at a high temperature to form a dense ceramic. Sintered alumina has great mechanical strength and abrasion resistance, high dielectric strength, and low power factor. Because of these properties, sintered alumina is used in thread guides, tool tips, and grinding media; as the ceramic component of sparking plugs, electronic tubes, ceramic-to-metal seals, etc. Sintered alumina coatings can be applied to metals by flame-spraying. *Dodd.*

aluminate. a. A compound having the general formula, $MAlO_2$ or M_3AlO_3, in which M indicates a monovalent metal. *Bennett 2d, 1962.* b. A salt of aluminic acid. Sodium aluminate is a common one, used to good advantage as a mill addition, to set up acid-resisting enamels and certain cast-iron ground coats. Mineral aluminates, like $MgAl_2O_4$, are termed spinels. *Enam. Dict.*

alumina trihydrate; aluminum hydroxide; alumina hydrate; hydrated alumina; hydrated aluminum oxide; gibbsite; hydrargillite. $Al_2O_3.3H_2O$ or $Al(OH)_3$; monoclinic; white; crystalline powder, balls, or granules; specific gravity, 2.42; insoluble in water; and soluble in mineral acids and caustic soda. Obtained from bauxite. Used in glass and ceramics and as a source of aluminum. *CCD 6d, 1961.* Sometimes used in sintered bodies because of possible high reactivity. Used in the placing and firing of various ceramic products to prevent sticking of the ware and the setter. *Lee.*

aluminian ferroanthophyllite. A mineral, $Fe_5Al_2Si_6Al_2O_{22}(OH)_2$, from the southern Kitakami mountainland, northeastern Japan. A variety of orthorhombic amphibole. *American Mineralogist, v. 42, No. 7-8, July-August 1957, p. 506.*

aluminilite. An old name for alunite. *Hess.*

aluminite. A hydrous sulfate of aluminum, $Al_2O_3SO_8.9H_2O$, usually occurring in white reniform masses. *Fay.*

aluminium. British spelling of aluminum. *See also* aluminum. *Webster 3d.*

aluminizing. Forming an aluminum or aluminum alloy coating on a metal by hot dipping, hot spraying, or diffusion. *ASM Gloss.*

aluminocopiapite. A variety of copiapite in which X in the formula, $X(OH)_2Fe'''_4(SO_4)_6.nH_2O$, is mainly $Al(Al_2O_3 1.72–4.45$ percent). *Compare* ferricopiapite. *Spencer 18, M.M., 1949.*

aluminosilicate refractory. A general term that includes all refractories of the fire clay, sillimanite, mullite, diaspore, and bauxite types. *Dodd.*

aluminosilicates. Compounds of aluminum silicate with metal oxides or other radicals. Used as catalysts in refining petroleum and to soften water. *See also* zeolites. *CCD 6d, 1961.*

aluminothermic reaction. In thermit welding, the chemical reaction which occurs when powdered aluminum is ignited with the oxides of other metals. The aluminum extracts the oxygen from these metals and burns fiercely, melting them and forming the weld. *Ham.*

aluminothermy. A process of producing great heat and strong chemical reduction by oxidizing finely divided aluminum with oxygen taken from another metal, this metal being thus reduced from its oxide (as molten iron is obtained from iron oxide in welding by the thermite process). *Webster 3d.*

aluminous. Of the nature of alumina or clay. *Fay.*

aluminous abrasive. An abrasive produced by fusing aluminum oxide. *Mersereau, 4th, p. 285.*

aluminous fire clay refractory. This type of refractory material is defined in British Standard 1902 as an aluminosilicate refractory containing 38 to 45 percent Al_2O_3. *Dodd.*

aluminous ores. Iron ores in which the gangue consists principally of alumina. *Osborne.*

aluminous refractory goods. Those which contain more than 45 percent alumina. *Rosenthal.*

aluminum. A light, silvery-white, ductile metal with high electrical conductivity and good resistance to corrosion. Obtained from bauxite. It has numerous uses and is the bases of many light alloys. Symbol, Al; valences, 3, 4, 5, and 6; atomic weight, 26.98; atomic number, 13; isometric; specific gravity, 2.705 (at 20° C); specific electrical resistivity, 2.825 microhms per cubic centimeter (at 20° C); mass conductivity, 212.9 percent of standard annealed copper; and melting point, 660.2° C. *C.T.D.* After magnesium, it is the lightest of the metals in general use commercially. About half of our consumption comes from bauxite mined domestically (chiefly in Arkansas); the remainder is imported, especially from Surinam. *Barger.*

aluminum alloys. A general term for numerous alloys in which aluminum is the basis (that is, predominant) metal; for example, aluminum-copper and aluminum-silicon alloys, Duralumin, Y-alloy, etc. Also called light alloys. *C.T.D.*

aluminum amalgam. An amalgam prepared by adding fine aluminum filings to a 5-percent solution of mercury chloride for 2 or 3 minutes, afterward washing the product with alcohol. The resulting amalgam decomposes water at ordinary temperatures, liberating hydrogen. *Camm.*

aluminum antimonide. AlSb; melting point, 1,080° C; and the crystals are hard, brittle, and metallic. Prepared by melting together pure aluminum and pure antimony in alumina crucibles under an inert or a reducing atmosphere. A semiconductor for electronic applications. *Lee.*

aluminum borate. A white, granular powder; approximately $2Al_2O_3.B_2O_3.3H_2O$. Used in the glass and ceramics industries. *CCD 6d, 1961.*

aluminum boride. The usual compound is AlB_2 this dissociates above 980° C to form AlB_{12} and Al. *Dodd.*

aluminum brass. Brass to which aluminum has been added to increase its resistance to corrosion. It contains 24 to 42 percent zinc, 55 to 71 percent copper, 1 to 6 percent aluminum. Used for condenser tubes, etc. *Nelson.*

aluminum bronze. An alloy of aluminum and copper resembling pale gold; used in cheap jewelry, etc. *Standard, 1964.* As a powder, used in gilding. *Fay.*

aluminum enamel. A porcelain enamel specifically designed for application to aluminum. *ASTM C286-65.*

aluminum detonator. *See* Briska detonator. *Higham, p. 61.*

aluminum fluoride; aluminum fluoride, anhydrous. AlF_3; molecular weight, 83.98; triclinic; colorless, transparent; specific gravity, 3.07; melting point, 1,040° C; and soluble in water. *Bennett 2d, 1962.* Used as a flux in ceramic glazes and enamels. *CCD 6d, 1961.*

aluminum fluoride hydrate. A white crystalline powder; $AlF_3.3\frac{1}{2}H_2O$; and insoluble in water. Used in the production of white enamel. *CCD 6d, 1961.*

aluminum fluosilicate; aluminum silicofluoride. A white powder; $Al_2(SiF_6)_3$. Used in artificial gems, enamels, and glass. *CCD 6d, 1961.*

aluminum gold. An alloy said to be ruby red containing 22 percent aluminum and 78 percent gold; melting point 1,060° C. *Camm.*

aluminum hydroxide. *See* alumina trihydrate. *CCD 6d, 1961.*

aluminum hydroxide, gelatinous; hydrous aluminum oxide; alumina gel. A white, gelatinous precipitate; $Al_2O_3.xH_2O$. Used in the manufacture of glassware and in ceramic glaze. *CCD 6d, 1961.*

aluminum metaphosphate. $Al(PO_3)_3$; molecular weight, 263.91; white crystalline powder; melting point, 1,700° C; and insoluble in water. Used in glass, china, and porcelain. *Bennett 2d, 1962.*

aluminum minerals. Alunite, amblygonite, andalusite, bauxite, corundum, cryolite, cyanite, diaspore, sillimanite, spinel, topaz, turquoise, wavellite, and many silicates. The commercial ores of aluminum are cryolite, a fluoride of sodium and aluminum, found in Greenland; and bauxite, a hydrous compound of alumina, ferric oxide, and silica, found in Arkansas, Georgia, and Tennessee. *Fay.*

aluminum nitride. AlN; hexagonal; and clear white crystals. Used to make crucibles for melting aluminum by reacting aluminum powder with nitrogen. *Lee.*

aluminum orthophosphate. a. $AlPO_4$; molecular weight, 121.95; orthorhombic plates; specific gravity, 2.566; melting point, above 1,500° C; insoluble in water; and soluble in acids. Used in ceramics. *Bennett 2d, 1962.* b. White crystals; insoluble in alcohol; and soluble in alkalies. *CCD 6d, 1961.*

aluminum oxide. *See* alumina.

aluminum-potassium sulfate; alum; potassium alum. $AlK(SO_4)_2.12H_2O$; molecular weight, 474.38; isometric or monoclinic; colorless; specific gravity, 1.75; melting point, 92° C; no boiling point because it loses $9H_2O$ at 64.5° C; Mohs' hardness, 2 to 2.5; and soluble in water. *Bennett 2d, 1962.*

aluminum powder. Aluminum in the form of tiny flakes, made by stamping; used as a pigment in paints, inks, etc., usually after coating with a lubricant to gain luster and leafing characteristics. *Bennett 2d, 1962.*

aluminum silicate. Approximately $Al_2O_3.3SiO_2$; molecular weight, 282.0; white lumps or powder; and insoluble in water. Used in manufacturing glass and ceramics. *Bennett 2d, 1962.*

aluminum silicates. Varying proportions of Al_2O_3 and SiO_2. Occur naturally in clays. Used in the glass and ceramics industry. *See also* aluminosilicates. *CCD 6d, 1961.*

aluminum silicofluoride. *See* aluminum fluosilicate. *CCD 6d, 1961.*

aluminum silver. A bright alloy of aluminum and silver, used in instruments where lightness is desirable. *Standard, 1964.*

aluminum-sodium sulfate; sodium-aluminum sulfate; soda alum. Colorless; isometric; $Al_2(SO_4)_3.Na_2SO_4.24H_2O$; saline astringent taste; effloresces in air; soluble in water; and insoluble in alcohol. Used in ceramics. *CCD 6d, 1961.*

aluminum solder. An alloy of gold, silver, and copper, sometimes with a little zinc; used for soldering aluminum bars. *Fay.*

aluminum spinel. Octahedral crystals obtained in the manufacture of synthetic corundum giving chemical analyses corresponding to Al_3O_4. *Hey, M.M., 1961.*

aluminum sulfate. $Al_2(SO_4)_3$; colorless when pure; and crystallizes with 18 molecules of water (as in alunogen) but is commonly desiccated to about 14 molecules of water. Usually made by treating bauxite with sulfuric acid. Used in petroleum refinery processes and as a waterproofing agent for concrete. *CCD 6d, 1961; Webster 3d.* Used in coagulating suspended matter in water. *Bennett 2d, 1962.*

aluminum therapy. Therapy intended mainly for prophylaxis (prevention) rather than therapy (treatment) of silicosis. The therapy provides for inhalation of powdered aluminum and alumina (Al_2O_3) dust by miners in the change house. The prescribed number and length of treatments is claimed to be effective in (1) preventing pneumoconiosis from developing and (2) lessening its effects if already contracted. The action apparently is a combined chemical-physical one, with the aluminum forming a complex, inactive silicate with silica dust particles in the lungs or perhaps coating each particle with an inert layer of aluminum oxide. *Hartman, p. 69.*

aluminum thiocyanate; aluminum sulfocyanate. A yellowish powder; $Al(SCN)_3$; soluble in water; and insoluble in alcohol and ether. Used in manufacturing pottery. *CCD 6d, 1961.*

aluminum tristearate. A white powder; approximately $Al(C_{18}H_{35}O_2)_3$; specific gravity, 1.070; and melting point, 115° C. Used as a cement additive. *CCD 6d, 1961.*

alumite. A mineral, $KAl_3(SO_4)_2(OH)_6$, hexagonal rhombohedral, usually in white, gray, or pink masses in hydrothermally altered feldspathic rocks. *A.G.I.*

alumoberezovite; alumochrompicotite. Members of the spinel group with the composition $(Fe,Mg)O.(Cr,Al)_2O_3$ (alumoberezovite) and $(Mg,Fe)O.(Cr,Al)_2O_3$ (alumochrompicotite). *Spencer 15, M.M., 1940.*

alumnobritholite. An aluminian variety of britholite, $(Ca,Ce,Y)_3(Al,Fe)_2$- $\{(Si,Al,P)O_3\}_3(F,O)$, from a Siberian locality. *See also* pravdite. *Hey, M.M., 1964.*

alumocalcite. A variety of opal with alumina and lime as impurities. *Fay.*

alumochrompicotite. *See* alumoberezovite. *Spencer 15, M.M., 1940.*

alumogel. An amorphous aluminum hydroxide. Synonym for kliachite; sporogelite. *Compare* siderogel. *Spencer 20, M.M., 1955.*

alumohydrocalcite. A white, pale blue, etc., hydrous carbonate of calcium and aluminum, $CaO.Al_2O_3.2CO_2.5H_2O$. Monoclinic. Chalky masses consisting of radially fibrous spherulites. From Khakassky District, Siberia, U.S.S.R. *English.*

alum salts. Natural salts from which alum can be made. *See also* halloysite; kaolinite. *Sanford.*

alum schist. *See* alum shale.

alum shale. A clayey rock containing carbonaceous material and marcasite or pyrite. When decomposed, the iron sulfide forms sulfuric acid which attacks the alumina and potash of the rock, forming common alum. Also called alum schist; alum slate. *Hess.*

alum slate. See alum shale.

alumstone. An impure siliceous alunte. *Fay.*

aludel. Part of furnace or condenser used in distillation of mercury. *Pryor, 3.*

Alundum. Registered trademark for a proprietary fused alumina used in the manufacture of abrasive and refractory materials. *C.T.D.* Alundum has the same chemical composition as the natural mineral corundum. *Fay.*

alunite; alumstone. A basic potassium aluminum sulfate, $KAl_3(OH)_6(SO_4)_2$. Crystal system, rhombohedral; color, white, gray, or reddish; Mohs' hardness, 4; specific gravity, 2.6–2.8. *Dana, 17, pp. 369-370.* Closely resembles kaolinite and occurs in similar locations. Generally the result of the action of water, containing sulfuric acid, on feldspathic rocks, as when pyrite in granite porphyry is oxidized. *Fay.*

alunitization. The introduction of or the replacement by alunite. *A.G.I.*

alunogen. A mineral consisting of a white fibrous aluminum sulfate, $Al_2(SO_4)_3.18H_2O$, frequently found on the walls of mines and quarries. Also called feather alum; hair salt. *Webster 3d.*

alurgite. A purple to red variety of manganese mica from St. Marcel, Quebec, Canada. *Fay.*

alvanite. Light blue-green rosettes, monoclinic, near $Al_3VO_4(OH)_6.2\frac{1}{2}H_2O$, in the argillaceous anthraxolitic vanadiferous deposits of Kurumsak and Balasanskandyk, Karatau, Kazakhstan, U.S.S.R. Named from composition, aluminum vanadate. An anion has probably been overlooked, as the mineral is stated to give off acid when heated. *Hey, M.M., 1961.*

alvarolite. A supposed new mineral subsequently shown to be mangantantalite. *Fleischer.*

alveolar. Having small cellular structures like a honeycomb. *A.G.I.*

alveolar exchange. The transposition of oxygen to the blood and the removal of carbon dioxide in the alveolae of the lungs. *H&G.*

alveoli. The lungs can be thought of as two elastic bags containing millions of little distensible air sacs. These air sacs or alveoli are all connected to the air passages, which branch and rebranch like the twigs of a tree. *H&G.*

alvite. A zirconium mineral; a source of hafnium, containing 16 percent HfO_2; tetragonal. *E.C.T., v. 15, p. 286 & v. 7, p. 341.* Obtained from Alve, Norway. *Webster, 2d.*

alyphite. A variety of bitumen which on distillation yields a high percentage of open-chain alyphatic hydrocarbons consisting mainly of the olefinic and paraffinic series. It is light yellow in color, soft, infusible, and insoluble in organic solvents. *Tomkeieff, 1954.*

Am. Chemical symbol for americium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

amagrosite. A hydrous silicate of magnesium and aluminum, $MgO.Al_2O_3.5SiO_2.7H_2O$. It is commonly known as natural soap or soaprock. A trade name for a bentonite from the Amargosa River, Calif. The same as montmorillonite. *English.*

amain. Eng. With great force or speed. Wagons or tubs are said to run amain, if by accident they go over an incline, bank, or dump, without the rope being attached; or through the rope becoming detached or broken. *Fay.*

amakinite. A mineral, $(Fe,Mg)(OH)_2$; rhombohedral; oxidizes rapidly in air; occurs as thin veins in kimberlite; U.S.S.R. *Hey, M.M., 1964; Fleischer.*

amakusa. The Japanese equivalent of china stone. *See also* china stone. *Dodd.*

amalgam. a. An alloy of mercury with one or more other metals. *ASM Gloss.* b. The pasty amalgam of gold and mercury, about one-third gold by weight, obtained from the plates in a mill treating gold ores. *C.T.D.* c. A native compound of silver and mercury, in which the percentage of silver ranges from 27.5 to 95.8. Native gold amalgam carrying 39 to 42.6 percent gold has also been found. *Sanford.*

amalgam arc. An arc in a vacuum tube having electrodes of mercury amalgamated with zinc, cadmium, or other metal. The spectra of such arcs contain the bright lines of the metals in the electrodes. *Webster 2d.*

amalgamate. a. To unite (a metal) in an alloy with mercury. *Standard, 1964.* b. To form an amalgam with; as, mercury easily amalgamates gold. *Standard, 1964.*

amalgamated claims. Eng. Mining claims adjoining one another that have been grouped into one claim for more economical working. *Fay.*

amalgamating barrel. A short, cylindrical vessel or barrel with solid ends turned to fit bearings. The barrel is used for amalgamating battery accumulations and other material. It is run with intermittent charges, and contains a load of steel balls or pebbles to effect comminution and to bring the mercury into contact with the metal to be amalgamated. Charging and discharging are done through suitable doors. *Fay.*

amalgamating table. A sloping wooden table covered with a copper plate on which the mercury is spread in order to amalgamate with the precious metal particles. *C.T.D.*

amalgamation. a. The production of an amalgam or alloy of mercury. *Fay.* b. The process by which mercury is alloyed with some other metal to produce an amalgam. It was used at one time for the extraction of gold and silver from pulverized ores, now superseded by the cyanide process. *Barger.*

amalgamation pan. A circular cast-iron pan in which gold or silver ore is ground, and the precious metal particles are amalgamated with mercury added to the pan. *C.T.D.*

amalgamation process. A process of gold or silver recovery in which the ore, finely divided and suspended in water, is passed over a surface of liquid mercury to form an amalgam. The amalgam is subjected to fire-refining processes for the recovery of the gold or silver. *Henderson.*

amalgamator. a. An apparatus used in mining for bringing pulverized ore into close contact with mercury to extract free metal from it by amalgamation. *Standard, 1964.* b. *See* amalgamation pan; amalgamating barrel. *Fay.*

amalgamator I. In ore dressing, smelting, and refining, one who tends mercury-coated plates, used in amalgamation process, over which finely ground ore is passed to collect particles of free gold liberated from waste minerals by crushing (gold combines with mercury to form an amalgam). Also called plateman. *D.O.T. 1.*

amalgamator II. In ore dressing, smelting, and refining, one who charges crushed gold ore and proper amount of mercury in a barrel or other equipment; also, operates a power unit to rotate the barrel or to otherwise agitate the mixture of ore and mercury, thus causing particles of free gold to amalgamate with mercury. *D.O.T. 1.*

amalgam barrel. A small cylinder batching mill used to grind auriferous concentrates intimately but gently with mercury. *Pryor, 3.*

amalgam gilding. A process of gilding in which a metallic surface is coated with gold amalgam and the mercury driven off by heat. *Standard, 1964.*

amalgam pan. A muller mill with a horizontal rotating disk bearing on a fixed plate, with gold-bearing material and mercury flowing pulpwise between. *Pryor, 3.*

amalgam plate; amalgam table. A sheet of metal (copper, muntz, etc.) with an adherent film of mercury that seizes gold from flowing pulp. *Pryor, 3.*

amalgam retort; still. The vessel where the mercury is distilled off from the gold or silver amalgam obtained in amalgamation. *Nelson.*

amalgam silvering. A process of silvering similar to amalgam gilding. *Standard, 1964.*

amalgam table. *See* amalgam plate. *Pryor, 3.*

amalgam treatment. *See* amalgamation process. *Bennett 2d, 1962.*

amang. Term used in Malay States for the heavy iron, tungsten, and other associated minerals found with the deposits of cassiterite. *Lewis, p. 395.*

amarantite. A monoclinic hydrousferric sulfate, $Fe_2O_3.2SO_3.7H_2O$. *Fay.*

amarillite. A pale greenish-yellow hydrous sulfate of sodium and ferric iron, $Na_2O.Fe_2O_34SO_3.12H_2O$; monoclinic; crystals; analagous to tamarugite. Vitreous to adamantine luster; astringent taste; good cleavage; found in veins cutting massive coquimbite. From Tierra Amarilla, Chile. *English; Hess.*

amaryl. A synthetic corundum of a clear, green color; named from the similarity of the color to that of the leaves of an amaryllis. *Hess.*

amatrice. *See* variscite. *Fay.*

amause. Same as trass. *Shipley.*

amausite. An extremely fine grained crystalline rock such as a devitrified glass. *Hess.* Same as petrosilex. *Standard, 1964.*

amazonite. A bright green laminated variety of microcline. Used more as an ornamental stone than as a gem stone. Opaque; Mohs' hardness, 6 to 6.5; specific gravity, 2.5; refractive index, 1.52 to 1.53. From the U.S.S.R.; Virginia; and Pike's Peak, Colo. Same as amazonstone. *See also* feldspar. *Shipley.*

Amazon jade. Amazonite. *Shipley.*

amazonstone. The earlier and still popular name for amazonite. *Shipley.*

ambar. The Russian name given to excavations dug around a derrick forming small reservoirs, where the sand raised from the borehole is deposited. Also used as a temporary reservoir for oil. *Fay.*

amber. A very hard, yellowish to brownish, translucent fossil resin that is found in alluvial soils, in beds of lignite, or on some seashores. It takes a fine polish, and is used chiefly in making ornamental objects (as beads and mouthpieces). *Webster 3d.*

amber colophany. Same as amber pitch. *Shipley.*

amber drop. A term describing a shape in which amber occurs. *Shipley.*

amber forest. A forest whose trees yielded the resin that fossilized into amber. *Webster 3d.*

Amberg kaolin. A white-firing micaceous kaolin from Hirschau, Oberpflaz, Germany. A quoted analysis: 48.0 percent SiO_2, 37.5 percent Al_2O_3, 0.5 percent Fe_2O_3, 0.2 percent TiO_2, 0.15 percent CaO, 2.6 percent alkalies, and 12.2 percent loss on ignition. *Dodd.*

ambergris. A waxy substance found floating in tropical seas; a morbid secretion in the sperm whale, from where it is believed to have come. Valued in perfumery. Not used in jewelry. Often popularly confused with amber. *Shipley.*

Amberine. A local trade name of a yellowish green chalcedony from Death Valley, Calif. *English.*

amberite. *See* ambrite. *Tomkeieff, 1954.*

amber lac. Amber pitch powdered and dissolved in turpentine or linseed oil. Same as amber varnish. *Shipley.*

amberoid. A name for pressed amber. *Shipley.*

amber, oil of. A reddish brown distillation of amber. *Shipley.*

amber opal. Brownish-yellow variety stained by iron oxide. *Shipley.*

amber pitch. The residue resulting from the distillation of oil of amber. *Shipley.*

amber tear. A term describing a shape in which amber occurs. *Shipley.*

amber varnish. *See* amber lac. *Shipley.*

ambeti; ambitty. Decorative glass containing specks of opaque material; the effect is produced by allowing the glass to begin to crystallize. *Dodd.*

ambitty. *See* ambetti. *Dodd.*

ambivalence. Ability of certain elements, for example, carbon, lead, tin, to form basic or acid part of compound. *Pryor, 3.*

ambient. a. The environment surrounding a body but undisturbed or unaffected by it. *Hy.* b. Encompassing on all sides; thus, ambient air is the air surrounding. *Strock, 10.*

amblygonite. A natural fluophosphate of aluminum and lithium having the approximate formula, $2LiF.Al_2O_3.P_2O_5$. Theoretically, it contains 10.1 percent lithia, although actual samples average about 8.2 percent, due to partial replacement of the lithia by soda and potash, partial alteration of the mineral to nonlithium minerals, and the presence of impurities. It is found chiefly in the Black Hills area in the United States and in Brazil and Africa. It constitutes the least expensive source of alumina-phosphate and is the highest lithia-containing lithium mineral. It has been used to promote opacity in glass dinnerware, but the more general use of amblygonite is restricted due to its relatively limited availability. *Lee.*

amblystegite. A dark brownish-green to black magnesium-iron metasilicate, $(Mg,Fe)SiO_3$, that crystallizes in the orthorhombic system, and is closely related to hypersthene. *Standard, 1964.*

ambonite. A variety of hornblende-biotite andesite characterized by the presence of cordierite; named from Ambon Island, Moluccas, East Indies. *Holmes, 1928.*

Amboy clay. An American siliceous fire clay; it is plastic and has a pyrometric cone equivalent above 32. *Dodd.*

ambrite. A resinous substance occurring in large masses in several coalfields of New Zealand. It is a yellowish-gray, subtransparent, amorphous resin with a conchoidal fracture and an approximate formula of $C_{40}H_{66}O_5$. *A.G.I.*

ambroid. A reconstructed amber, made by heating and uniting by pressure fragments of amber; manufactured at Kaliningrad (Königsberg), U.S.S.R. *Standard, 1964.*

ambrosine. A yellowish to clove-brown amber found in the phosphate beds near Charleston, S.C.; it may be a modern resin that has been subjected to the action of salt water. *Fay.* Rich in succinic acids. *Tomkeieff, 1954.*

ambulance. A conveyance for injured persons. *Jones.*

ambulance car; mine ambulance car. A mine car fitted with first-aid equipment and a stretcher. *Pryor, 3.*

amenability. Characteristic reaction of minerals to basic methods of mineral processing, studied in preliminary testwork on unknown ores. *Pryor, 3.*

amercement. Derb. A fine in the barmote court, imposed on a miner for violation of the laws. *Fay.*

American. Permissible explosive used in coal mines. *Bennett 2d, 1962.*

American-Belgian furnace. A direct-fired Belgian furnace employed in the United States, conforming essentially to the Liege design, but presenting minor differences because of local adaptation. *Fay.*

American bond. The same as common bond. This bond is in very general use as it is quickly laid and is as strong as other bonds. Every fifth or sixth course consists of headers, while the other courses consists of stretchers. *Crispin.*

American boring system. A rope system of percussive boring comprising a derrick from 70 to 80 feet in height, which enables the complete set of boring tools—about 60 feet in length—to be raised clear of the hole and thus ease the task of cleaning the hole with a sludger. The method has been used extensively in the United States when prospecting for oil, natural gas, and brine. An average speed of 40 to 50 feet per day is obtained with two to three men. The system is not suitable in cases where geological information is required. Modern boring plants are capable of giving much higher speeds including rock cores where required. *See also* churn drill. *Nelson.*

American disk filter. A continuous rotary filter in which the separating membranes are disks, each which rotates through an individual pulp tank in which the lower part of the disk is immersed while vacuum is applied internally. Ore pulp in a tank is drawn to the membrane on which a solid cake forms while filtrate passes to discharge. The cake is removed before return of the rotating segment of the disk to the tank. *Pryor, 3.*

American forge. *See* Catalan forge; Champlain forge. *Fay.*

American gold. *See* coin gold.

American green jade. A Chinese trade name for a poor variety of light-green jade, which because of its cheapness, became very popular with American tourists and exporters in China. The name was unheard of before World War I. *Shipley.*

American hotel china. A vitreous body, white or colored, moderately translucent, having great strength and covered with a moderately hard glaze. *ACSG, 1963.*

vesuvianite. *Shipley.*

American jet. Jet from Colorado and Utah. The former takes a high polish but the latter is full of cracks. Inferior to Whitby jet. *Shipley.*

American pearl. A term often used to refer to freshwater pearl of North America. *Shipley.*

American pump. A special kind of bailer, used in oilfields for cleaning out wells. *See also* bailer, a. *Fay.* Synonym for sand pump.

American ruby. Red garnet. *Shipley.*

American screw gage. A standard gage for checking the diameter, pitch, and number of threads of wood screws and machine screws. *Crispin.*

American standard pipe threads. The thread used on wrought iron or steel, steam, gas, and water pipes. Formerly known as Briggs pipe thread standard. *Crispin.*

American system. *See* churn drill, a. *Long. See also* American boring system.

American system drill. Synonym for churn drill. *Long.*

American system of drilling. *See* cable system. *Fay.*

American turquoise. Turquoise from the southwestern United States. Usually pale blue or bluish green to greenish blue. Also known as Mexican turquoise. *Shipley.*

American vermilion. A pigment usually consisting of a lead molybdate or a basic lead chromate (as chrome red). *Webster 3d.*

americium. An artificially produced, transsuranic, silvery-white metallic element, not found in nature. Atomic number, 95; mass number of the most stable known isotope, 243; and valences, 3, 4, 5, and 6. First produced by Seaborg, James, and Morgan by cyclotronic bombardment of uranium 238 with high-energy (40 mev) alpha particles. Symbol, Am. *Gaynor.* Specific gravity, 11.7; melting point, below 1,100° C. *Webster 3d.*

amesite. An apple-green silicate mineral belonging to the phyllosilicate group and occurring in foliated hexagonal plates. *E.C.T. v. 12, p. 277; Webster 3d.*

Ames limestone. Conemaugh formation, upper Coal Measures of Pennsylvania, Ohio, etc. *Rice.*

amethiste basaltine. Pale violet or reddish beryl. *Hess.*

amethyst. Purple or violet transparent form of quartz, color being due to trace of manganese. *Pryor, 3.*

amethyst basaltine. A name for pale reddish-violet beryl. *Shipley.*

amethystine. A color designation meaning violet to purplish, used as in amethystine glass and amethystine sapphire. *Shipley.*

amethystine quartz. A phenocrystalline variety of quartz colored purplish or bluish-violet by manganese. *Standard, 1964.*

amethystine sapphire. Violet to purplish sapphire. *Shipley.*

amethystoline. Liquid inclusions of an unknown nature in amethyst. *Hey 2d, 1955.*

amethyst point. Hexagonal amethyst crystal from an amygdaloidal geode. Usually possesses only the six (or sometimes three) termination crystal faces and usually graduated as to color with best color at point or apex and often colorless at base. *See also* burnt amethyst. *Shipley.*

amethyst quartz. A term loosely used by some members of the trade to designate badly flawed cabochon amethysts, especially those cut from amethystine quartz. *See also* amethystine quartz. *Shipley.*

Amex process. In uranium leaching, the solvent extraction of uranium ions from aqueous liquor by means of amines dissolved in kerosine. *Pryor, 3.*

Amherst stone. *See* bluestone. *A.G.I.*

amianthus. Ancient term for long silky fibered asbestos. *Pryor, 3.*

amiantoid. a. Having the appearance of asbestos. *Standard, 1964.* b. An olive-green, coarse, fibrous variety of asbestos. *Standard, 1964.*

amianthinite. Asbestos. *Standard, 1964.*

amigo. A stick, tied to the end of a rope, on which men sit when being raised or lowered in shafts. *Hess.*

amino. The radical, NH_2. *Pryor, 3.*

aminoffite. A hydrous silicate of calcium, beryllium, and aluminum, $Ca_8Be_3AlSi_8O_{28}(OH)\cdot 4H_2O$. Colorless tetragonal crystals; related to meliphane, from Sweden. *Spencer 15, M.M., 1940.*

Ammanian. Middle Upper Cretaceous. *A.G.I. Supp.*

ammeter. An instrument for measuring electric current in amperes by an indicator activated by the movement of a coil in a magnetic field or by the longitudinal expansion of a wire carrying the current. *Webster 3d.*

ammines. Complex inorganic metal-ammonia compounds, NH_3, taking the place of water of crystallization. *Pryor, 3.*

ammiolite. A red or scarlet earthy substance, probably a mixture of antimonate of copper and cinnabar, said to be found in a number of Chilean mines. *Dana 6d, p. 865.*

ammite. Same as oolite; roestone. *Standard, 1964.*

ammonal. An explosive used mainly for heavy quarry blasts in dry boreholes. It consists of TNT, ammonium nitrate, and powdered aluminum. *See also* blasting. *Nelson.*

ammonia. A colorless, gaseous alkaline compound; NH_3; lighter than air; pungent smell and taste; very soluble in water; and can be easily condensed by cold and pressure to a liquid. It is a byproduct of the gas and coke industry and it forms ammonium salts by combination with acids and forms many organic derivatives, such as amines, amino acids, amides, and alkaloids. Used both free and combined. Used in making fertilizers and explosives. *Webster 3d.*

ammonia alum; aluminum-ammonium sulfate; ammonium-aluminum sulfate. a. $AlNH_4(SO_4)_2.12H_2O$. Used as a setting-up agent for acid-resisting or stainless enamels. *Hansen.* b. Tschermigite. *Dana 6d, p. 952.*

ammoniac; ammoniac gum. A gum resin from the stems of the perennial herb, Dorema ammoniacum, appearing as rounded tears; having a peculiar odor; and a sweetish-bitter, somewhat acrid taste. From Iran, northern India, and southern Siberia. Used as an ingredient of porcelain cements. *CCD 6d, 1961.*

ammoniac gum. *See* ammoniac. *CCD 6d, 1961.*

ammonia compressor. A machine for compresssing ammonia in refrigeration. *Hess.*

ammonia dynamite. Dynamite in which part of the nitroglycerin is replaced by ammonium nitrate; used in mining. *Bennett 2d, 1962. See also* extra dynamites.

ammonia gelatin. An explosive of the gelatin dynamite class containing ammonium nitrate. *Webster 3d.*

ammonia liquor; gas liquor; ammoniacal liquor. A condensed watery solution obtained in the destructive distillation of a bituminous coal in gas or coke manufacture, composed of ammonia and ammonium compounds, and containing hydrogen sulfide and cyanogen. Used in the production of anhydrous ammonia, aqua ammonia (ammonium hydroxide), ammonium sulfate, and other ammonium salts and as a source of ammonia in the Solvay process for producing soda ash. *CCD 6d, 1961.*

ammonia niter; ammonia nitre. Ammonium nitrate, $(NH_4)NO_3$; nitrammite. *Spencer 19, M.M., 1952.*

ammonia-soda process. *See* Solvay process. *CCD 6d, 1961.*

ammonia stillman. In the coke products industry, one who extracts ammonia from liquor for use in producing ammonium sulfate by circulating substances through stills and auxiliary equipment. Also called stillman, ammonia; pump-and-still operator; stillman, byproducts. *D.O.T. Supp.*

ammonioborite. A white hydrous borate of ammonium, $(NH_4)_2O.5B_2O_3.5H_2O$, found in fumarolic deposits. Aggregates of minute plates; monoclinic or triclinic. Differs optically from larderellite, which has the same composition. From Larderello, Tuscany, Italy. *English.*

ammoniojarosite. A pale yellow hydrous sulfate of ammonium and ferric iron, $(NH_4)_2Fe_6(OH)_{12}(SO_4)_4$. Lumps of tabular grains. Rhombohedral. From west side of Kaibab fault, Southern Utah. *English.*

ammonite. a. An extinct fossil cephalopod found in rocks of Mesozoic age, particularly characteristic of the Jurassic period. Frequently coiled in a plane. *C.T.D.* Various species of ammonites are Mesozoic era index fossils. *Bureau of Mines Staff.* b. An Ammonium nitrate explosive, containing from 70 to 95 percent ammonium nitrate, besides combustible components, which are so-called carbon carriers, as resin, meal, and naphthalene. *Fay.*

ammonium. A hypothetical univalent alkaline radical (NH_4), acting chemically like a basic element; analogous to potassium and sodium. *Standard, 1964.*

ammonium acid fluoride. *See* ammonium bifluoride. *CCD 6d, 1961.*

ammonium amalgam. A pasty, metallike mass which results from the passage of an electric current through ammonium chloride placed in contact with mercury at the negative electrode of a battery, or from pouring sodium amalgam into a solution of ammonium chloride. *Standard, 1964.*

ammonium bicarbonate; ammonium-hydrogen carbonate; ammonium acid carbonate. NH_4HCO_3. Used in conjunction with fluorides to produce an acid bath for etching certain types of glassware, as in producing frosted surfaces on electric light bulbs. *Lee.*

ammonium bifluoride; ammonium acid fluoride; ammonium-hydrogen fluoride. White; orthorhombic or tetragonal; deliquescent; $(NH_4)FHF$. Used for processing beryllium; in electroplating; as a chemical reagent; in etching glass (white acid); and in ceramics. *CCD 6d, 1961.*

ammonium carbonate; ammonium sesquicarbonate. A mixture of ammonium acid carbonate and ammonium carbamate; $(NH_4)HCO_3.(NH_4)(NH_2)CO_2$; colorless crystal plates or a white powder; and unstable in air, being converted into the carbonate. Used in ceramics. *CCD 6d, 1961.*

ammonium chloride; sal ammoniac. NH_4Cl; isometric; and colorless. When dissolved in water, it is used as an electrolyte for some primary cells. Obtained as a byproduct in gas manufacture. Used as a flux in soldering. *Crispin.*

ammonium fluoride. NH_4F; hexagonal; white; and specific gravity, 1.31. Used in glass etching. *CCD 6d, 1961.*

ammonium fluosilicate; ammonium silicofluoride; cryptohalite. White; isometric or hexagonal; $(NH_4)_2SiF_6$; and specific gravity, 2.01. Used in glass etching, in light metal casting, and in electroplating. *CCD 6d, 1961.*

ammonium hydroxide. A solution of ammonia in water; NH_4OH. *C.T.D.*

ammonium metavanadate. NH_4VO_3. Used in certain ceramic glazes, especially in the trivanadium yellow glazes, and as a base for ceramic greens. Can be combined with tin to produce tin-vanadium yellows. *Lee.*

ammonium nitrate. NH_4NO_3; molecular weight, 80.04; colorless; orthorhombic; specific gravity, 1.725 (at 25° C); melting point, 169.6° C; soluble in water; and soluble in ethyl alcohol. Used in explosives and as a fertilizer. *Bennett 2d, 1962.*

ammonium nitrate gelignites. These explosives are similar to the straight gelatins except that the main constituent is ammonium nitrate instead of sodium nitrate. Ammonium nitrate is a more active explosive ingredient than sodium nitrate, therefore ammonium nitrate can be substituted for nitroglycerin in much larger quantities and still give explosives of high weight strength. The nitroglycerin content is usually 25 to 35 percent and the ammonium nitrate content varies from about 30 to 60 percent. Ammonium nitrate gelignites are characterized by plastic consistency; high densities of 1.5 to 1.6 grams per cubic centimeter; medium velocity of detonation of 2,500 meters per second; and good fume properties. The ammonium nitrate gelignites are useful all-purpose explosives and they are widely used in metal mines, nongassy coal mines, quarries, tunneling, and construction work. Their wide range of strengths enables a suitable grade to be selected for blasting almost every variety of rock from hard to soft. *McAdam II, pp. 30-31.*

ammonium oxalate. Colorless; orthorhombic; $(NH_4)_2C_2O_4.H_2O$. Used in the manufacture of safety explosives and in rust and scale removal from metals. *CCD 6d, 1961.*

ammonium paratungstate; ammonium tungstate. White crystals; soluble in water; insoluble in alcohol; $(NH_4)_6W_7O_{24}.6H_2O$. Used in the preparation of ammonium phosphotungstate and other tungsten compounds. *CCD 6d, 1961.*

ammonium selenite. Colorless or slightly reddish crystals; $(NH_4)_2SeO_3.H_2O$. Used in the glass industry (red glass). *CCD 6d, 1961.*

ammonium silicofluoride. *See* ammonium fluosilicate. *CCD 6d, 1961.*

ammonium stearate; anhydrous ammonium stearate. A tan-colored, waxlike solid; free from ammonia odor; $C_{17}H_{35}COONH_4$. Used in integral waterproofing of cements, concrete, and stucco. *CCD 6d, 1961.* Molecular weight, 301; melting point, 74° C; and soluble in water. *Bennett 2d, 1962.*

ammonium sulfate. $(NH_4)_2SO_4$; orthorhombic; and colorless. Sometimes added as a minor ingredient in glass batches since it is claimed to shorten the melting time and to be more effective than salt cake as an accelerating agent, both in melting and refining. *Lee.* Obtained as a byproduct of the distillation of oil shales, lignite, and bituminous coals. Widely used as a fertilizer. *Hess.*

ammonium sulfocyanate. *See* ammonium thiocyanate. *CCD 6d, 1961.*

ammonium sulfocyanide. *See* ammonium thiocyanate. *CCD 6d, 1961.*

ammonium thiocyanate; ammonium sulfocyanide; ammonium sulfocyanate. Colorless; deliquescent; monoclinic; soluble in water, alcohol, acetone, and ammonia; NH_4SCN. Used in pickling iron and steel; in electroplating; and as a separator of zirconium and hafnium, and of gold and iron. *CCD 6d, 1961.*

ammonium uranate. $(NH_4)_2U_2O_7$; molecular weight, 624.36; reddish-yellow powder; insoluble in water; and soluble in acid. Used for painting on porcelain. *Bennett 2d, 1962.*

ammonium vanadate. NH_4VO_3; used as a source of vanadium in ceramic pigments, for example, tin-vanadium yellow, zirconium-vanadium yellow and turquoise, etc. *Dodd.*

amoeboid. Describes the irregular structural trends, unrelated to diastropic patterns, associated with compaction folds. *A.G.I.*

amoibite. Gersdorffite. *Dana 6d, p. 90.*

amole. An Ethiopian term for blocks of rock salt. *Hess.*

amorphism. The state or quality of being amorphous; especially, the absence of crystalline structure. *Standard, 1964.*

amorphous. a. Without form; applied to rocks and minerals having no definite crystalline structure. *Fay.* b. Volcanic glass is usually amorphous. *Bureau of Mines Staff.* c. Literally, without shape. An amorphous substance is one in which the internal arrangement of the atoms or molecules is irregular and which in consequence has no characteristic external form. *Anderson.*

amorphous graphite. One of three major types of natural graphite, the other two being lump and crystalline flake. It is found in metamorphosed coalbeds and is used for foundry facings. *BuMines Bull. 585, 1960, p. 358.*

amorphous metal. Metal in which the regular arrangement of atoms characteristic of the crystalline state has been destroyed. It has been shown to be produced on the surface by polishing, but does not exist at crystal boundaries nor on slip planes. *C.T.D.*

amorphous mineral. A mineral with no definite crystalline structuri. *Nelson.*

amorphous peat. A type of peat in which the original structure of the plants has been destroyed as the result of decomposition of the cellulose matter. It is heavy, compact, and plastic when wet. *Tomkeieff, 1954.*

amorphous phosphorus; red phosphorus. A reddish-brown, nontoxic form obtained by heating common phosphorus to about 250° C in airtight vessels. Used for safety matches. It does not ignite until heated to 260° C; it conducts electricity; and it forms red solutions with alcoholic potash. *Standard, 1964; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-125.*

amorphous substance. A substance in which the crystalline form is absent; for example, glass, charcoal, or pitch. *Cooper.*

amorphous sulfur. The insoluble residue used in vulcanization of rubber and is produced by extracting flowers of sulfur with carbon disulfide. *BuMines Bull. 630, 1965, p. 903.*

amorphous type of coal. A somewhat inaccurate term for a coal in which distinct plant material is not discernible. *Tomkeieff, 1954.*

amortization. a. The process of estimating whether an investor is justified in hazarding a sum of money to purchase a mine and its equipment. *Hoov, p. 158.* b. A general term for the redemption of prepaid assets of whatever sort. *Truscott, p. 271.* c. The placing aside or application of sums for the final extinguishing of securities, loans, or a debt. In mining, this insures that the face value of capital invested will be redeemed. *Pryor, 3.* d. The return of capital with interest, invested in a mine during the life of the mine. *Nelson.*

amortization schedule. A table that shows the principal remaining due or outstanding immediately after the annual payment, the interest for the interval, and the amount of principal repaid. *Fay.*

amortize. To provide for the gradual extinguishment of an obligation (as a mortgage or a bond issue) by payment of a part of the principal or by contribution to a sinking fund usually with or at the time of each periodic interest payment. *Webster 3d.*

amosite. A monoclinic mineral in the cummingtonite-grunerite series. *Sinclair, W. E., p. 27.*

amp Abbreviation for ampere. *BuMin Style 1961, p. 770.*

ampangabeite. a. A rare, strongly radioactive, massive, orthorhombic mineral, $(Y,ER,U,Ca,Th)_2(Cb,Ta,Fe,Ti)_7O_{18}$. It is light yellow-brown, deep brown, and brownish-black, occurring in potash-rich pegmatites associated with columbite, beryl, microcline, euxenite, strueverite, monazite, garnet, and muscovite; also found with betafite and malacon. *Crosby, p. 5.* b. A discredited term equal to samarskite. *American Mineralogist, v. 46, No. 5-6, May-June 1961, p. 770.*

ampasimenite. A rock containing nepheline, titaniferous augite, hornblende, and magnetite, in a brown, fine-grained groundmass; related to pasinite. *Hess.*

ampelite. a. Same as cannel coal; carbonaceous schist. *Webster 3d.* b. An obsolete name for bituminous or carbonaceous shale. *Tomkeieff, 1954.*

ampelitis. An ancient name applied to a variety of bituminous earth used as an insecticide sprinkled ovr vines. *Tomkeieff, 1954.*

amperage. The strength of a current of electricity expressed in amperes. *Webster 3d.*

ampere. The practical unit of electric current. The current produced by 1 volt acting through a resistance of 1 ohm. Abbreviation, amp. *Webster 3d.*

ampere-foot. A 1-ampere current flowing through 1 foot of an electric conductor. A wire 20 feet long conducting a current of 6 amperes has 120 ampere-feet (20 feet times 6 amperes). Abbreviation, amp ft. *Standard, 1964.*

ampere-hour. The quantity of electricity carried past any point of a circuit in 1 hour by a steady current of 1 ampere; 1 ampere-hour equals 3,600 coulombs. Abbreviation, amp hr. *Webster 3d.*

amperemeter; ammeter. An instrument for measuring the strength of an electric current in amperes. *Standard, 1964.*

ampere-turn. The meter - kilogram - second (mks) unit of magnetomotive force equal to the magnetomotive force around a path that links one turn of wire carrying an electric current of 1 ampere; 1 ampere-turn being equal to 0.4π or 1.257 gilberts. *Webster 3d.*

ampere volt. A watt. *Standard, 1964.*

amphibole. A mineral group, $A_{2-3}B_5(Si,Al_4)O_{11}(OH)_2$, where A is mainly Mg,Fe'',Ca, and Na; B is mainly Mg,Fe'', Al, and Fe'''. The amphiboles are common rock-forming minerals. Following are the most important amphiboles: anthophyllite, $(Mg,Fe)_7Si_8O_{22}(OH)_2$, orthorhombic; the cummingtonite-grunerite series, $(Mg,Fe)_7Si_8O_{22}(OH)_2$, monoclinic; the glaucophane, riebeckite series, $Na_2(Mg,Fe'',Al,Fe''')_5Si_8O_{22}(OH)_2$, monoclinic; the tremolite-actinolite series, $Ca_2(Mg,Fe'')_5Si_8O_{22}(OH)_2$, monoclinic; hornblende, $(Ca,Na)_3(Mg,Fe'',Al,Ti)_5(Si,Al)_8O_{22}(OH,F)_2$, monoclinic; crocidolite, nearly $Na_2Fe_4'''Si_8O_{22}(OH)_2$, monoclinic. *A.G.I.*

amphibole-magnetite rock. A granular, more or less, banded rock containing grünerite, other ferruginous silicates and magnetite, produced by the contact metamorphism of ferruginous cherts, such as taconite, jaspillite, tc. *Holmes, 1928.*

amphibolite. A crystalloblastic rock consisting mainly of an amphibole and some plagioclase. Quartz is absent, or present in small amounts only. When quartz is more abundant, there is a gradation to hornblende-plagioclase gneiss. *A.G.I.*

amphibolite facies. An assemblage of minerals formed at moderate to high pressures between 850° and 1,300° F (450° and 700° C) during regional metamorphism. *Leet.*

amphibolization. The development of an amphibole mineral in a rock as a secondary mineral. *A.G.I.*

amphibololite. A general designation for phanerocrystalline igneous rocks composed entirely, or almost entirely, of amphiboles. *Holmes, 1928.*

amphigenite. Basaltic lava containing amphigene or leucite; an old name for leucite tephrite. *Standard, 1964.*

amphilogite. Greenish or grayish muscovite in fine scales; doubtfully supposed to contain $CaCO_3$. Synonym for didymite; didrimite. *Dana 6d, p. 614.*

amphimorphic. Formed by a twofold process, as the action of mineral-bearing thermal springs upon sedimentary argillaceous deposits during deposition. *Fay.*

amphisapropel. Cellulose ooze containing coarse plant debris. *Tomkeieff, 1954.*

amphitheater. A relatively flat valley or gulchlike depression, generally oval or circular in outline, formed by glasiation in alpine mountains at or near the head of drainage. *See also* cirque. *A.G.I.*

ampholyte. Substance which can function either as proton-acceptor or donor; forms salts either with bases or with acids. *Pryor, 3.*

amphoteric. a. Having both acidic and basic properties. *C.T.D.* b. Capable of acting either as a base or an acid. *Hess.*

amphoteric element. An element which may behave as a metal (loses electrons) or as a nonmetal (accepts or shares electrons) depending on its environment. *VV.*

amphoterite. An achondrite (stony meteorite) that is chiefly bronzite and olivine. *Hess.*

amp hr Abbreviation for ampere-hour. *BuMin Style Guide, p. 58.*

amplitude. The maximum displacement from the mean position in connection with vibration. *Taylor.*

ampul. A glass container designed to be filled and sealed by fusion of the glass neck. *ACSG, 1963.*

ampullar pearl. Any pearl, such as a true pearl formed in the ampulla or epidermis of the mollusc, as distinguished from cyst pearl and muscle pearl. *Shipley.*

ampul tubing. Tubing of special composition suited to the manufacture of ampuls. It must work well in the blowpipe flame, and must resist the action of the materials stored in the ampul. *C.T.D.*

amu Abbreviation for atomic mass unit. *BuMin Style Guide, p. 58.*

amygdale; amygdule. Vesicle or vapor cavity of volcanic and occasionally of intrusive rocks, which has become filled (partly or completely) with secretionary products usually of late magmatic origin, such as zeolites, chlorite, forms of silica, and calcite. Amygdule is the diminutive of amygdale, and consequently the terms are not strictly synonymous. *Stokes and Varnes, 1955.*

amygdaloid. A vesicular or cellular igneous rock, ordinarily basaltic, in which the vesicles have been partly or completely filled with a secondary deposit of calcite, quartz, epidote, native copper, or zeolites. The term is used in the form of the adjective, amygdaloidal, and should be limited to this. As a noun, it is also employed for secondary fillings of the cavities, which are usually calcite, quartz, or some mineral of the zeolite group. The filled cavities are called amygdules or amygdales. Amygdaolidal rocks are of interest in the United States because certain basaltic lava sheets on Kewennaw Point, Lake Superior, have amygdules filled with native copper and are important sources of the metal. Amygdaloidal cavities are limited to the upper and lower portions of lava sheets. The name is derived from the Greek word for almond. *Fay.*

amygdaloidal. a. Containing amygdules. Like or pertaining to an amygdaloid. *Bureau of Mines Staff.* b. Almond-shaped. *Zern.*

amygdaloidal geode. A geode which has formed in an amygdaloid. *Shipley.*

amygdaloidal rock. A rock containing amygdules and/or amygdales, or the structure of a rock resulting from their presence. *Schieferdecker.*

amygdule. a. A small gas bubble in lava or other igneous rocks filled partly or completely with a secondary mineral, such as a zeolite, calcite, quartz, etc. *A.G.I. Supp.* b. An agate pebble. *A.G.I. Supp.*

amygduler. A lava in which the steam holes have been filled by chalcedony or other minerals. *Hess.*

amyl alcohol. $C_5H_{11}OH$; a frothing agent with 8 isomers. *Pryor, 3.*

amyl xanthate. A powerful collector agent used in the flotation process. *Pryor, 3.*

anabohitsite. A variety of olivine pyroxenite containing hypersthene and hornblende, with a high proportion of magnetite and/or ilmenite; from Anabohitsy, Malagasy Republic. *Holmes, 1928.*

anabranch. An effluent of a stream which rejoins the main stream, forcing an island between the two watercourses. *Standard, 1964.*

anaclinal. Descending in a direction opposite to that of the dip of the strata, as an anaclinal river. Opposite of cataclinal. *Webster 3d.*

Anaconda method. A bunch blasting method in which 6 to 15 fuses, cut to respective lengths but 2 inches longer than required, are tied together near one end by two ravelings of fuse spaced about 5 to 6 inches apart. A special cutter cuts the fuses off evenly between the two ties, leaving the fuses tied together and offering a smooth face of cut ends. Another bunch is made from the fuses of the remaining holes in the round. By using a short notched fuse as a spitter, the flame is directed against the cut end of one bunch of fuses. As soon as this bunch ignites, it is held close to the face of the second bunch, moving slowly to contact all fuses with the flame from the first bunch. Bunches should be held at least 6 inches back from the end to avoid burning the hands. By this method all the holes of a round are fired in only two groups and by one spitter. *Lewis, pp. 120-121.*

Anaconda process. A method for the shaping of silica refractories formerly used at some refractories works in the United States. The bricks were first slop-molded, then partially dried, and finally repressed. The name derives from the town of Anaconda, Mont., where the process was first used early in the present century by the Amalgamated Copper Company. *Dodd.*

anaerobic. Pertaining to organisms that live without oxygen. *Bateman.*

anagenite. A bright green chromiferous clay, close to selwynite. Chrome ocher. *Dana 6d, p. 697.*

anaglyph. A map so drawn in two colors that a three-dimensional picture is obtained when seen through a special viewing device. *B.S. 3618, 1963, sec. 1.*

Anakie sapphire. *See* Queensland sapphire *Shipley.*

analar. Chemically, a reagent of high purity. *Pryor, 3.*

analbite. High-temperature albite; inversion occurs at about 700° C. *A.G.I. Supp.*

analcime; analcite. A colorless or white, transparent to translucent hydrous sodium-aluminum silicate, $Na(AlSi_2O_6)H_2O$. Crystal system, isometric; Mohs' hardness, 5.0 to 5.5; specific gravity, 2.27; and luster, vitreous. *Dana 17, p. 507.*

analcimite. a. A rock that was probably a nepheline syenite originally but now is altered and contains over 50 percent analcite (analcime). *Webster 3d.* b. The same as analcitite. *Webster 3d.*

analcimization. The replacement of feldspars or feldspathoids by analcite (analcime), usually in igneous rocks and the result of late-magnetic or post-magnetic reactions. *A.G.I.*

analcimolith. An igneous rock composed of analcite (analcime), either primary or secondary. *Hess.*

analcite. *See* analcime.

analcite basalt. An olivine-bearing basaltic rock, in which the predominant felsic mineral is analcite; feldspar, if present, is merely accessory. *Compare* leucite basalt; nepheline basalt. *Holmes, 1928.*

analcite diabase. A diabase, containing analcite, usually as an interstitial constituent. The term is often used synonymously with teschenite, but it is preferable to reserve the latter term only for varieties containing soda pyroxenes and/or soda amphiboles. *Compare* crinanite. *Holmes, 1928.*

analcite essexite. A gray to almost black, fine to coarse, granular igneous rock containing labradorite, orthoclase, andesine, oligoclase, and hornblende, both as phenocrysts and as small grains; also, a little augite and magnetite. Analcite is in the fine-grained groundmass. *Holmes, 1928.*

analcite tinguaite. Tinguaite with considerable analcite. *Fay.*

analcitite. Pirsson's name for olivine-free analcite basalt. *Fay.*

analcitization. The replacement of feldspars of feldspathoids by analcite of late-magmatic or post-magmatic processes. *Holmes, 1928.*

anallatic lens. The additional lens fitted to the telescope of a surveying instrument so that it is internally focusing. When used for stadia work, the additive constant is zero. *Ham.*

analog computer. One which works by creating an analogy of the problem, mathematically. *Pryor, 3, p. 31.*

analog indicator. A device which translates a measured variable to a pointer deflection or other visual quantity which is continually proportional to and generally calibrated in terms of the measured function. *ASM Gloss.*

analogus. a. Corresponding to or resembling something else in some way, as in form, proportion, etc. *Bureau of Mines Staff.* b. Designating that pole (end) of a pyroelectric crystal to which heating gives a positive charge. *Compare* antilogous. *Bureau of Mines Staff.*

analogy. Comparison between two effects. Alternating current is used as an analogy in the study of tides. Electrical analogies are also applicable to such studies as seepage of water through sand, and to the solution of certain structural problems. *Ham.*

analysis. a. A quantitative statement of the experimentally determined physical and chemical characteristics of a coal. *See also* air-dried basis; dry ash-free basis; dry mineral matter basis. *B.S. 3323, 1960.* b. The determination of the whole or part of the constituents of a coal, rock, or mineral. *See also* assay; chemical constitution of coal. *Nelson.* c. The process of reducing a problem to its primary components; the assessment of causes or faults from survey data, etc. *Nelson.* d. The separation of compound substances into their constituents by chemical processes. *Webster 3d.* e. The determination, which may or may not involve actual separation, of one or more ingredients of a substance either as to kind or amount. Also, the tabulated result of such a determination. *Webster 3d.*

analytical chemistry. Qualitative or quantitative composition of materials. *Pryor, 3, p. 80.*

analyze. To separate into constituent parts or elements for study. *Mersereau, 4th, p. 413.*

analyzer. a. One of two nicol prisms or polaroid discs in the petrological microscope, between which thin rock sections are studied with transmitted polarized light. *Pryor, 3.* b. The part of a polariscope that receives the light after polarization and exhibits the properties of light. *Webster 3d.*

anamesite. Suggested by von Leonhard in 1832 for finely crystalline basalts that are texturally between dense typical basalt and the coarser dolerites. The name is from the Greek phrase, in the middle. *Fay.*

anamigmatism. High-temperature, high-pressure remelting of sediments to form magmas. Considered by some to be the next more intense process after anatexis. *A.G.I.*

anamorphic zone. A zone corresponding to the zone of rock flowage. It is especially characterized by silicatization involving decarbonation, dehydration, and deoxidation; the processes are constructive. *See also* katamorphic zones. *Fay.*

anamorphism; anamorphosis. Metamorphism at considerable depths in the earth's crust and under great pressure, resulting in the formation of complex minerals from simpler ones. *Fay.* The term contrasts with katamorphism, which designates the breaking-down processes that take place at or near the surface of the earth, such as weathering. *Stokes and Varnes, 1955.*

anapaite. A greenish-white hydrous phosphate of calcium and iron, $(Ca,Fe)_3(PO_4)_2.4H_2O$. Crusts of tabular crystals on limonite. Triclinic. From Anapa, Black Sea, U.S.S.R. *English.*

anastomosing. a. An anastomosing stream is a braided stream. Branching, interlacing, intercommunicating, thereby producing a netlike or braided appearance. *A.G.I.* b. Netted; interveined. *A.G.I.*

anatase. Titanium oxide, TiO_2; never primary, but alters from titanium minerals; found in shale, sandstone, limestone, granite, dolerite, etc. *Nelson.* Same as octahedrite. *Standard, 1964.*

anatectic. *See* anatexis. *Hess.*

anatexis. a. A high-temperature metamorphic process by which plutonic rock in the deeper levels of the crust is dissolved and regenerated as a magma. *Compare* syntexis. *A.G.I.* b. The complete melting of crustal rocks to form granitic magma, as opposed to rheomorphism or mobilization, which implies merely the development of sufficient liquid to permit movement. Some include both processes under the term anatexis. *A.G.I.*

anauxite. A clay mineral near kaolinite, but containing excess silica, probably as interlayered sheets. Monoclinic. *A.G.I.; Dana 17.*

Anbauhobel. A rapid plough for use on longwall faces. The machine is superior to the original Loebbe Hobel and can negotiate small faults or washouts on the face by the use of more than one plough. It is suitable for seams from 2 to 8 feet thick, with reasonably good roof and floor. The plough travels along the face at a speed of 75 feet per minute with a cutting depth from 1½ to 3 inches and the broken coal is loaded by the plough-shaped body on to an armored conveyor. The machine can be operated independently of the face conveyor. *See also* Rehisshakenhobel. *Nelson.*

anchaduar. Fillings of old workings in a mine, and said to carry gold of recent deposition. This is a product which deposits in most of the old stopes throughout the mine. In some instances, the whole stope for 20 feet wide is filled. It is apparently siliceous material with more or less pyrite. *Hess.*

anchi-. A prefix meaning almost in petrologic terms. *A.G.I.*

anchieutectic. Applied to magmas which are incapable of undergoing further notable mainstage differentiation because their mineral composition is practically in eutectic proportions. *A.G.I.*

anchimonomineralic. Applied to those rocks which are composed almost entirely of one mineral; for example, anorthosite, bronzitite, dunite, etc. *Holmes, 1920.*

anchor. a. To fasten down or hold in place. *Long.* b. A heavy object buried in ground to which a guy or snake line may be attached. Also called deadman. *Long.* c. A buried log, mass of masonry, or other device to which may be fastened lines or rods for holding in place any object, such as the casing of a high-pressure well, a derrick, a pole in a curving line, the cables of a suspension bridge, etc. *Hess.* d. A length of tubing extended below the working barrel of a pumping well. *Hess.* e. An anchor-shaped rabble used in drawing coke from a coke oven. *Hess.*

anchorage. That portion of any beam or structure designed to resist pulling out or slipping of the beam or structure when subjected to stress. *Nelson.*

anchorage distance. That distance behind a quay wall at which a deadman must be fixed to insure that it will not slip with the wall but will provide an efficient anchorage for it. *Ham.*

anchor and collar. A heavy metal hinge for lock gates, built into masonry or concrete of the lock and carrying a projecting hole to take the pintle of the gate. *Ham.*

anchor bolt. a. A bolt with the threaded portion projecting from a structure, generally used to hold the frame of a building secure against wind load or a machine against the forces of vibration. Also known as holding-down bolt; foundation bolt. *Ham.* b. A bolt or other device used to secure a diamond-drill base to a solid foundation. It may or may not be threaded. *Long.* c. A lag screw used to anchor the drill base to a platform or sills. *Long.*

anchor charge. Means of fastening an explosive charge in a seismic shot hole to allow several charges to be preloaded. At each stage the bottom charges fired first, the upper charges being held down by anchors. *A.G.I.*

anchored dune. Sand dune stabilized by growth of vegetation. *A.G.I. Supp.*

anchored tower. A steel, towerlike derrick designed to serve as a drill platform and for support of drive pipe or casing in drilling boreholes in formations underlying bodies of water. The tower is held upright in the water by lines fastened to anchors. *Long.*

anchored-type ceramic veneer. Ceramic slabs approximately 2 to 2½ inches thick, held in place by wire anchors and a grout space in which vertical pencil rods are placed. The slabs are anchored to the rods, which, in turn, are anchored to the backing wall. *See also* ceramic veneer. *ACSG.*

anchor ice. Ice formed below the surface of a body of water and attached to the bottom or to submerged objects. Also called ground ice; bottom ice. *Webster 3d; Fay.*

anchorite. A nodular and veined variety of diorite, the normal facies of the rock being variegated with dark mafic segregation patches and light felsic contemporaneous veins. From Anchor Inn, Caldecote, Nuneaton, England. *Holmes, 1928.*

anchor jack. *See* jack.

anchor line. Cable connecting anchor with drill barge, float, other vessel, or drilling tower. *Long.*

anchor oven. An oven from which coke is removed with an anchor. *Standard, 1964.*

anchor plates. Plates attached to a drill base used to anchor or fasten the drill to the drill platform or platform sills with anchor bolts or lag screws. *Long.*

anchor prop. *See* stell prop. *Nelson.*

anchylose. To unite solidly; to grow together into one. *Rice.*

ancient beach placers. Deposits found on the coastal plain along a line of elevated benches. *BuMines Bull. 419, 1939, p. 326.*

ancient cliff. *See* abandoned cliff. *Schieferdecker.*

ancillary. Synonym for auxiliary, a. *Long.*

colored by iron. *Shipley.*

ancylite. A very rare, weakly radioactive, orthorhombic mineral, $(Ce,La)_4(Sr,Ca)_3(CO_3)_7(OH)_4.3H_2O$. Its color range is pale yellow, yellowish brown, brown, gray; occurs as short prismatic crystals and also in groups and crusts of small rounded crystals; found in pegmatitic veinlets in druses associated with aegirite, albite, microcline, zircon, synchisite, cordylite, and eudidymite. From Narsarsuk, Greenland; Kola Peninsula, Russian Lapland. *Crosby, p. 94; English.*

Ancylostoma. The type genus of Ancylostomatidae comprising hookworms that have buccal teeth resembling hooks and are parasites in the intestines of man and various mammals. *Compare* Necator. *Webster 3d.*

ancylostomiasis; ankylostomiasis. Infestation with or disease caused in man or animals by hookworms; specifically; a condition in man marked by lethargy, severe anemia, and relative eosinophilia due to loss of blood through the feeding of hookworms in the small intestine. A common disease among miners in the tropics. Also called miner's worm; miner's anemia; hookworm; tunnel disease. *Webster 3d.*

andalusite. A mineral, Al_2SiO_5; trimorphous with kyanite and sillimanite; orthorhombic. Commonly occurs in schists and gneisses. *A.G.I.* Sometimes used as a semiprecious stone. *Fay.*

andalusite hornstone. A compact, contact-metamorphic rock containing andalusite. It is usually produced by the metamorphism of shale or slate by intrusions of granite. *Fay.*

andendiorite. A tertiary quartz-augite diorite that occurs in the volcanic rocks of the Chilean Andes. The quartz crystals are remarkable for their inclusions of glass and of fluids containing salt crystals. *Fay.*

andengranite. A biotite-bearing hornblende granite, similar in occurrence and microscopic features to andendiorite. *Fay.*

andersonite. A very rare, strongly radioactive, hexagonal, secondary mineral, $Na_2Ca(UO_2)(CO_3)_3.6H_2O$. It is bright yellow-green and occurs as an efflorescence with gypsum, schroeckingerite, bayleyite, and swartzite. *Crosby, p. 6.*

Anderton shearer loader. A widely used cutter loader in which the ordinary jib of the longwall coal cutter is replaced by a shear drum which cuts a web from 16 to 22 inches depending on its width. The machine travels on an armored conveyor and requires a prop-free-front for working. It shears the coal in one direction and the front coal is loaded by a plough deflector, and then returns along the face (without cutting) and loads the remainder of the broken coal. The ordinary Anderton is suitable for coal seams above 3 feet 6 inches thick. *See also* shearer loader. *Nelson.*

andesilabradorite. An andesitic lava with phenocrysts of calcic plagioclase (labradorite). *Hess.*

andesine. One of the plagioclase feldspars, $Ab_{70}An_{30}$-$Ab_{60}An_{50}$; intermediate between albite and anorthite. A silicate of sodium, calcium, and aluminum, with the sodium in excess of the calcium. Triclinic. An important constituent of andesite and diorite. *Dana 17; Fay.*

andesinite. Proposed by Turner for a granular igneous rock composed almost entirely of andesine. *Hess.*

andesite. A volcanic rock composed essentially of andesine and one or more mafic constituents. Usually, the plagioclase is strongly zoned and may range in composition from about An_{35} to An_{70}, but the average composition usually falls within the range of andesine. When the rock is porphyritic, the plagioclase phenocrysts are usually more calcic than the plagioclase in the groundmass, and in addition, the groundmass may contain small amounts of microcrystalline or occült potassic feldspar and cristobalite. Pyroxene, hornblende, or biotite, or all three in various proportions, may constitute the mafic constituents. *A.G.I.* Also called greenstone.

andesite line. A map line designating the petrographic boundary of the Pacific Ocean. Extrusive rocks on the Pacific side of the line are basaltic and on the other side andesitic. *Leet.*

andorite. A dark, steel-gray sulfantimonite of lead and silver, $2PbS.Ag_2S.3Sb_2S$. Crystals prismatic. Orthorhombic. From Felsobanya, Romania; Oruro, Bolivia. Sundtite and websterite are identical with andorite. *English.*

andra; andrew; awn. A direction between bord and end line. Sometimes also spelled horn. *TIME.*

andradite. The common calcium-iron garnet, $Ca_3Fe_2(Si_4O)_3$; isometric. *Dana 17.*

andre. A direction of coal face roughly halfway between the main (bord) and secondary (end) cleavages; on the cross. *Mason.*

Andreasen pipette. An instrument used in the determination of the particle size of clays, by the sedimentation method. *Dodd.*

Andrews' elutriator. A device for particle-size analysis. It consists of (1) a feed vessel or tube; (2) a large hydraulic classifier; (3) an intermediate classifier and, (4) a graduated measuring vessel. *Dodd.*

andrewsite. A bluish-green phosphate of iron and copper; formula uncertain; in globular forms with radial structure. *Hess.*

anegite. A rock consisting of pyroxene, spinel, pyrope, and hornblende characterized by the absence of feldspar and olivine as essential constituents. Mineralogically equivalent to pyroxenites but chemically allied to gabbro. *Hess.*

anelasticity. a. The property of solids by virtue of which strain is not a single-valued function of stress in that low stress range in which no permanent set occurs. *ASM Gloss.* b. Time-dependent strain in the elastic range. *VV.*

anemoclastic. That broken by wind erosion and rounded by wind action. *A.G.I.*

anemogram. A continuous record of wind speed and direction given by an anemograph. *Ham.*

anemograph. A self-recording anemometer giving a continuous trace of the direction and velocity of surface wind. In the Dines tube anemograph the wind pressure acts upon the opening of a tube arranged as a vane to face in the direction of the wind. Pressure is transmitted through the tube to a float carrying a pen, the height of which indicates the wind velocity. *Ham.*

anemolite. a. An upturned form of calcite stalactite; its form is supposed to have been caused by air currents. *English.* b. A stalactite which has one or more changes in its axis of growth. Synonym for helictite. *A.G.I.*

anemometer. An instrument for measuring air velocity. It consists of a small fan from 3 to 6 inches diameter which is rotated by the air current. By simple gearing, the number of revolutions of the fan is recorded on dials. It is held in the mine airway for the exact number of minutes (N), the instrument being moved steadily over the entire area. The difference between the initial and the final readings on the dials, divided by N, gives the velocity of the air in feet per minute. Instruments are available for velocities from near zero to 6,000 feet per minute, also with extension and remote control handles. *See also* air-measuring station; self-timing anemometer. *Nelson.*

aneroid barograph. Consists essentially of an aneroid barometer and a revolving drum. The movement of the evacuated spring can is transmitted and magnified through a system of levers so that it is finally traced by means of a stylo on the graph paper attached to the revolving drum. The drum is rotated by clockwork, and can be of either the 24-hour or the 7-day type. The graph paper is usually marked off in hourly intervals, so that a complete record of the atmospheric pressure at any instant may be obtained. These barographs are used extensively in mining and in meteorological offices. *Morris and Cooper, p. 70.*

aneroid barometer. An instrument for measuring atmospheric pressure, built first by Lucien Vidie in about 1843. Basically, variation in pressure with changes in altitude is determined by the movements of the elastic top of a metallic box from which the air has been partly exhausted. Used generally in measuring altitude. *A.G.I.*

AN-FO. Ammonium nitrate-fuel oil blasting agents. *Bureau of Mines Staff.*

A.N./fuel oil explosive. A quarry or opencast explosive consisting of a mixture of ammonium nitrate and fuel oil. A mixture of 6 percent by weight of fuel oil to ammonium nitrate is oxygen balanced, but 5 percent of fuel oil gives the best results.

The speed of the decomposition reaction is double that obtained with dry additions. *See also* blasting; molasses/A.N. explosive. *Nelson.*

angelardite. The corrected form of anglarite, so named after the locality Angelard (not Anglar), France. It is a massive, blue variety of vivianite, with the formula $3FeO.P_2O_5.8H_2O$. *English; Hess.*

A.N. Gelatin dynamite 75. A nonpermitted gelatinous explosive of high strength, high density and good water resistance; used for blasting hard rock on the surface and underground (where permitted). *See also* blasting; Roxite. *Nelson.*

angelellite. A triclinic, blackish-brown mineral, $Fe_4(As,Sb)_2O_{11}$, occurring as globular and crystalline incrustations on andesite from the Cerro Pululus tin mine, northwestern Argentina; adamantine to semimetallic luster; conchoidal fracture. *American Mineralogist, v. 44, No. 11–12, November-December 1959, No. 1322–1323.*

anglarite. a. A name given erroneously, first in 1837 to vivianite, and again in 1848 to berthierite. *Dana 6d, p. 115.* b. *See* angelardite. *Hey 2d, 1955.*

angle. a. The figure formed by two meeting lines (plane angle), two meeting planes (dihedral angle), or three or more planes meeting in a point (solid angle). *Webster 3d.* b. The difference in direction of two lines. *Webster 3d.* c. A projecting corner; a pointed form or sharp fragment. *Webster 3d.*

angle bead. A special type of wall tile. *Dodd.*

angle beam. a. A two-limbed beam used for turning angles in shafts, etc. *Zern.* b. *See* angle iron. *Hess.*

angle brace. A brace used to prevent mine timbers from riding or leaning; a brace across an interior angle. *Fay.*

angle brick. Any brick shaped to an oblique angle to fit a salient corner. *ACSG, 1963.*

angle bung No. 102. A straight brick with one end cut at an angle. *Bureau of Mines Staff.*

angle-cut. Drill holes converge, so that a core is blasted out. This leaves an open or relieved cavity or free face for the following shots, which are timed to ensue with a fractional delay. *Pryor, 3, p. 48.*

angledozer. a. A power-operated machine fitted with a blade, adjustable in height and angle, used for digging and side casting, and for spreading loose excavated material; used at opencast pits and dumping sites. *Nelson.* b. A bulldozer whose blade can be turned at an angle to the direction of travel. Useful in cutting away the toes of earth embankments. *Carson, p. 75.*

angle drilling. *See* inclined drilling; inclined borehole.

angle fishplates. These fishplates serve two purposes, to join the rails and to prevent the rail joint from sagging. The latter is accomplished to a certain extent with long angle fishplates. Angle fishplates are found on main entries where heavy cars and locomotives are used. *Kiser, 2, p. 15.*

angle hole. A borehole that is drilled at an angle not perpendicular to the earth's surface. Also called incline hole. *Long.*

angle iron. A bent piece of iron used for joining two or more parts of a composite structure at an angle. Also, a rolled shape largely used in structural work. *Fay.*

angle level. *See* alidade, b. *Long.*

angle of a crossing. The angle between the running edges of the rails forming the vee of the crossing. *Sinclair, V, p. 270.*

angle of attack. In mine fan terminology, the angle made by the direction of air approach and the chord of the aerofoil section. *Roberts, I, p. 193.*

angle of bite. In rolling metals where all the force is transmitted through the rolls, the maximum attainable angle between the roll radius at the first contact and the line of roll centers. If the operating angle is less, it is called the contact angle or rolling angle. *ASM Gloss.*

angle of dip. The angle at which strata or mineral deposits are inclined to the horizontal plane. In most localities, earth movements subsequent to the deposition of the strata have caused them to be inclined or tilted. *See also* apparent dip; true dip. *Nelson.* Synonym for dip. *Fay.*

angle of drain. Approach to perpendicular of a surface necessary for satisfactory draining of coating. *Bryant.*

angle of draw. a. In coal mine subsidence, this angle is assumed to bisect the angle between the vertical and the angle of repose of the material and is 20° for flat seams. For dipping seams, the angle of break increases, being 35.8° from the vertical for a 40° dip. The main break occurs over the seam at an angle from the vertical equal to half the dip. *Lewis, pp. 618-619.* b. The angle between the limit line and the vertical. *Nelson.*

angle of external friction; angle of wall friction. The angle between the abscissa and the tangent of the curve representing the relationship of shearing resistance to normal stress acting between soil and surface of another material. *ASCE P1826.*

angle of extinction. When transparent or translucent thin sections of anisotropic minerals are rotated between crossed nicols in a polarizing microscope light ceases to be transmitted when the mineral's planes of vibration are parallel to a nicol plane. The angle of extinction is the angle between a vibration-plane and a crystallographic direction, and is specific to the mineral. It may be straight or parallel, oblique or symmetrical, and is of value in identification. Measurement made by turning specimen to extinction position and reading angle on microscope stage. Cleavage or crystal edge is then turned parallel with eyepiece crosswire aligned with nicol plane, and stage-reading noted. Difference is angle of extinction. *Pryor, 3.*

angle of friction. The angle between the perpendicular to a surface and the resultant force acting on a body resting on the surface, at which the body begins to slide. *Ham.*

angle of incidence. The angle formed by the line of incidence and a line drawn from the point of contact perpendicular to the plane or surface on which the incident ray or body impinges. *Fay.*

angle of inclination. The angle of slope from the horizontal. *Bureau of Mines Staff.*

angle of internal friction. The angle between the abscissa and the tangent of the curve representing the relationship of shearing resistance to normal stress acting within a soil. *ASCE P1826.*

angle of nip. a. In roll, jaw, or gyratory crushing, the entrance angle formed by the tangents at the two points of contact between the working surfaces and the assumed spherical particle. *ASM Gloss.* b. The angle included between two approaching faces at or below which a particle is seized. Approximately 23° for most minerals. *Pryor, 4.*

angle of obliquity. The angle between the direction of the resultant stress or force acting on a given plane and the normal to that plane. *ASCE P1826.*

angle of polarization. a. That angle, the tangent of which is the index of refraction of a reflecting substance. *Fay.* b. The angle of reflection from a plane surface at which lighti s polarized. *Hess.*

angle of pull. The angle between the vertical and an inclined plane bounding the area affected by the subsidence beyond the vertical. Applied to slides of earth. *Fay.*

angle of reflection. The angle which a reflected ray of light, on leaving the exterior or interior surface of an object, such as a transparent stone or crystal, makes with the normal to that surface. *Shipley.*

angle of refraction. The angle which a refracted ray of light, upon leaving the surface of an object, makes with the normal to that surface. *Shipley.*

angle of repose. *See* angle of rest. *Bureau of Mines Staff.*

angle of rest; angle of repose. The maximum slope at which a heap of any loose or fragmented solid material will stand without sliding or come to rest when poured or dumped in a pile or on a slope. *Bureau of Mines Staff.*

angle of shear. The angle between the planes of maximum shear which is bisected by the axis of greatest compression. *Rice.*

angle of shearing resistance. The value of ϕ in Coulomb's equation for cohesive soils, determined by experiment. It is zero for a saturated clay sheared without variation of moisture content, but for silts and clays in different conditions the value differs. *Ham.*

angle of slide. The slope, measured in degrees of deviation from the horizontal, on which loose or fragmented solid materials will start to slide; it is a slightly greater angle than the angle of rest. *Bureau of Mines Staff.*

angle of swing. The number of degrees through which the dipper moves horizontally from the filled position to the dumping position. *Carson, p. 48.*

angle of thread. The angle included between the sides of the thread, that is, the spread of the "V". *Crispin.*

angle of total reflection. Same as critical angle. *Shipley.*

angle of wall friction. *See* angle of external friction. *ASCE P1826.*

angle plate. Used in setting up work, generally for machinery; made of cast iron, being formed of two plates of metal at right angles with each other, and pierced with holes or slots for the reception of bolts. *Crispin.*

angle rule. Synonym for clinometer rule *Long.*

anglesite. A brittle, lustrous lead sulfate, $PbSO_4$; orthorhombic; color transparent to opaque; Mohs' hardness, 2.5 to 3; specific gravity, 6.3. Valuable lead ore oxidized from galena in upper part of lode. Concentrated by gravity and/or flotation. *Pryor, 3; Dana 17.*

angle tile. A purpose-made clay or concrete tile for use in an angle in vertical exterior tiling. *Dodd.*

angle to the right. Horizontal angle measured clockwise from the preceding line to the following one. *Seelye, 2.*

angle trough. A short curved section of a shaker conveyor trough inserted in a trough line to change the angle of direction. Up to 15° of turn the angle trough does not employ any means of support other than connection to adjacent troughs. For a greater degree of turn, a fulcrum jack and a swivel device are employed with the trough section. *Jones.*

angleur furnace. A furnace for the distillation of zinc. *Fay.*

angling. Rope will only coil closely on the drum within the distance between the centers of the pulleys. Spread or diagonal coiling will result outside this distance unless the drum is grooved: this is known as outside angling and with a grooved drum may amount to 1½°. After the normal between the pulley and the drum is passed, the coils attempt to get back to this normal line and this produces friction crushing between the coils and a danger of coils mounting one over the other: this is known as inside angling and should be kept below 2°. The amount of angling for a given distance between the pulleys will depend upon the distance between the headgear pulleys and the drum. Grooving the drum reduces the difficulties associated with angling. *Sinclair, V, p. 33.*

angling dozer; angledozer. A bulldozer with a blade that can be pivoted on a vertical center pin, so as to cast its load to either side. *Nichols.*

Anglite. A trade name for cast tungsten carbide. *Hess.*

Angola. A diamond from the Angola district, Africa; also, a diamond having the appearance characteristic of those produced in the Angola district. *Long.*

Angoumian. Upper Turonian. *A.G.I. Supp.*

angrite. An achondrite (meteoric stone) that is chiefly purple titaniferous augite (over 90 percent) and olivine. *Hess.*

angstrom; angstrom unit. a. A unit of linear measurement in the centimeter-gram-second system. Named in honor of Swedish physicist Anders J. Angström (1814-1874). As a unit, the initial letter a of angstrom is sometimes capitalized. The symbol for the unit is usually the capital letter A, but sometimes AU or A.U. (for angstrom unit or units) is used. It equals 10^{-10} meter, 10^{-8} centimeter, 10^{-4} micron, or 10^{-1} millimicron. Such ultramiscroscopic distances as the dimensions of atoms, molecules, unit cells, and short wavelengths are expressed in angstroms. *Bureau of Mines Staff; Webster 2d; Webster 3d.* b. Either of two units of wavelength; (1) 10^{-10} meter, called the absolute angstrom, or (2) the wavelength of the red spectrum line of cadmium divided by 6438.-4696, called also the international angstrom. *Webster 3d.*

angular. *a.* A roundness grade showing very little or no evidence of wear, with edges and corners sharp. *A.G.I.* b. Of particles, sharp-edged or of roughly polyhedral shape. *Pryor, 3.*

angular cross-bedding. Cross-bedding in which foreset beds meet underlying surface at sharp, discordant angle. *Pettijohn.*

angular cutter. A milling cutter on which the cutting face is at an angle with regard to the axis of the cutter. *Crispin.*

angular gears. Bevel gears. *Crispin.*

angularity. The conformity to or deviation from specified angular dimension in the cross section of a shape or bar. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24, Glossary of terms used in the aluminum extrusion industry.*

angularity test. Synonym for slope test. *Williams.*

angular shear. An inclination between two cutting edges to reduce the amount of shearing pressure necessary. *ASM Gloss.*

angular unconformity. An unconformity in which the older underlying strata dip at a different angle (generally steeper) than the younger overlying strata. *A.G.I. See also* disconformity. *A.G.I. Supp.*

angular velocity. The time rate of angular displacement usually expressed in radians per second, or in revolutions per second, or per minute being a vector, the direction and sense of which are such that the motion appears clockwise to one looking in the direction of the vector. *Webster 3d.*

Angus-Smith compound. A protective coating for valves, fittings, and pipes used for underground work, composed of coal tar, tallow, resin, and quicklime. *B.S. 3618, 1963, Sec. 4.*

anhedral. a. Applied to those minerals of igneous rocks that are not bounded by their own crystal faces, but which had their imperfect form impressed on them by the adjacent minerals during crystallization. *A.G.I.* b. Having an imperfect form determined by the surrounding minerals. The term is applied to minerals in a granular igneous rock. Synonym for allotriomorphic; xenomorphic. Contrasted with euhedral and subhedral. *Fay.* c. Lacking planar surfaces. *VV.*

anhedron. Any individual mineral component of an igneous rock that lacks its own crystal boundaries. Allotriomorphic, anhedral, and xenomorphic are adjectives having the same meaning, without crystal faces. *Fay.*

anhydrate. Dehydrate. *Sandstrom.*

anhydride. a. A compound derived from another compound (as an acid) by the removal of the elements of water. *Webster 3d.* b. An oxide of a nonmetallic element or an organic radical, capable of forming an acid by uniting with the elements of water, or of being formed from an acid by the abstraction of the water, or of uniting with basic oxides to form salts. *Webster 2d.* c. A compound formed from another or others by the abstraction of water. *See also* acid anhydride. *Webster 2d.*

anhydrite. Calcium sulfate, $CaSO_4$; orthorhombic; transparent to translucent; Mohs' hardness, 3 to 3.5; specific gravity, 2.93. A source of cement, sulfuric acid, and plaster. *Pryor, 3; Dana 17.*

anhydrock. A rock composed chiefly of anhydrite. *A.G.I.*

anhydrous. a. Without water, especially water of crystallization. *Webster 3d.* b. Applied to oxides, salts, etc., to indicate that they do not contain water of crystallization or water of combination. *C.T.D.* c. Minerals which do not contain water in chemical combination. *Gordon.*

anhydrous ammonia. Purified ammonia gas (NH_3) liquefied by cold and pressure. Used for refrigeration. *Crispin.*

anhydrous borax. Borax glass. *CCD 6d, 1961.*

anhydrous crystals. These contain no water of crystallization as do hydrated crystals; for example, calcium carbonate. *Cooper.*

anhydrous rasorite. An anhydrous sodium borate concentrate containing approximately 90.5 percent Na_2O, 2 percent B_2O_3, and 9.0 to 9.5 percent of a complex insoluble clay. It offers a more economical source of B_2O_3 than the refined sodium borates and can readily be substituted for either borax or anhydrous borax on an equivalent basis. *Lee.*

Anhydrox. Brand name for a compound to prevent or overcome anhydrite or gypsum contamination in drilling mud, by pretreatment of the mud to remove calcium and sulfate ions. *CCD 6d, 1961.*

aniline point. An approximate measure of the aromatic content of a mixture of hydrocarbons. It is defined as the lowest temperature at which an oil is completely miscible with an equal volume of aniline. *Francis, 1965, v. 1, p. 294.*

anilos. a. Mex. A set of shaft timbers. *Fay.* b. Mex. Shells for crushing rolls. *Fay.*

animal dogger. York. Hard band of sulfurous shale, in the Jet Rock series, Upper Lias, Saltwick Nab. So called because of the fish remains contained in it. *Arkell.*

Animikean system. The middle subdivision of the Proterozoic era, sometimes known as the Upper Huronian or Penokean. *Fay.*

animikite. A white to gray silver antimonide, Ag_9Sb, found in fine granular masses in the Lake Superior region. *Standard, 1964.*

anion. a. A negatively charged ion, such as a hydroxide, a chloride, or a sulfate ion; opposite of cation. *Webster 3d.* b. The ion is an electrolyzed solution that migrates to the anode where it is discharged and liberated or deposited. *Webster 3d.*

anion clay adsorption. *See* clay adsorption, anion. *ACSG, 1963.*

anion exchange capacity. A measure of the ability of a clay to adsorb or exchange anions; usually expressed in milliequivalents of anion per 100 grams of dry clay. *ACSG, 1963.*

anionic-cationic selective flotation. A process developed by the U.S. Bureau of Mines for recovering ground mica fines from wastes. The feed is first pulped by being thoroughly mixed with water and then conditioned by adding small quantities of chemicals to separate the clay from the mica particles. The separation proceeds as the pulp or slurry passes through a series of agitation tanks or flotation cells. At separate stages oleic acid (an anionic reagent) and an amine acetate (a cationic reagent) are added, allowing the mica particles to be captured by air bubbles that rise through the pulp. The mica, free of slimes and clay, comes to the surface where it is skimmed off and washed. *Bureau of Mines Staff.*

anionic collector. A flotation reagent in which the reactive group is acid in character. In these collectors the hydrocarbon group is in the anion. *Bureau of Mines Staff.* The most common anionic collectors are fatty acids (carboxylic acids). They occur naturally as complex mixtures in which the hydrocarbon chain is saturated or unsaturated. *Fuerstenau, p. 431.*

anionic current. Negative ion electrical current. *Bureau of Mines Staff.*

anionic detergent. A detergent in which the anion (negative ion) is the active part. *ASM Gloss.*

anionic exchange. *See* ionic exchange. *Dodd.*

anionic flotation. a. A flotation process employing anionic collectors. Anionic collectors are those in which the negative ion (anion) is the effective part. Opposite of cationic flotation which employs cationic, or positive, ion collectors. *Bureau of Mines*

Staff. b. A flotation process in which the undesirable impurities, instead of the metal ores, are floated. It is used with some success in the treatment of low-grade iron ores. *Henderson.*

anisodesmic compound. A compound in which the bonds joining different metallic cations to an anion are of different relative strengths. *A.G.I. Supp.*

anisodesmic structure. In a crystal, a bonding so coordinated that there is pronounced quantitative difference between the bond strengths. *Pryor, 3.*

anisomerite. A rock of porphyritic texture in which the chief minerals are embedded in a matrix or groundmass. Obsolete. *A.G.I.*

anisometric. a. Having unsymmetrical parts; not isometric; applied to crystals with three unequal axes. *Webster 3d.* b. Of or relating to a rock of granular texture but having mineral constituents of unequal size. *Webster 3d.* c. A textural term applied to granular rocks in which the grains are of different sizes. Obsolete. The term seriate expresses the same texture when the crystals vary gradually or in a continuous series. *Johannsen, v. 1, 2d, 1939, p. 201.*

anisotropic. Having physical properties that vary in different directions. Specifically in optical crystallography showing double refraction. Characteristic of all crystalline substances, including minerals, except those belonging in the isometric system, which are isotropic. Opposite of isotropic. *Fay; A.G.I.*

anisotropic fabric. One in which there is preferred orientation in space of the elements of which the rock is composed. *A.G.I.*

anisotropic mass. A mass having different properties in different directions at any given point. *ASCE P1826.*

anisotropy; anisotropism. a. The property of being anisotropic, or exhibiting properties (such as velocity of light transmission, conductivity of heat or electricity, or compressibility) with different values when measured along axes in different directions. *Webster 3d.* b. The condition of having different properties in different directions. For example, the state of geologic strata of transmitting sound waves with different velocities in the vertical and in the horizontal directions. *A.G.I.*

ankaramite. A mafic olivine basalt composed mainly of pyroxene, with lesser amounts of olivine and plagioclase, and accessory biotite, apatite, and opaque oxides. *A.G.I.*

ankaratrite. Olivine nephelinite. *A.G.I.*

ankerite. A white, red, or grayish calcium-magnesium-iron carbonate, $CaCO_3(Mg,Fe,Mn)CO_3$; commonly occurring in the partings of coal; rhombohedral. *Dana 17; B.S. 3323, 1960.*

ankylostomiasis. *See* ancyclostomiasis. *Webster 3d.*

annabergite. A mineral, $Ni_3(AsO_4)_2.8H_2O$, usually found as green incrustations as an alteration product of nickel arsenides. Monoclinic. Also called nickel bloom. *A.G.I.; Dana 17.*

anneal. a. To heat, fire, bake, or fuse, as glass, earthenware, ore, etc. *Fay.* b. To heat, as glass, earthenware, or metals in order to fix colors. *Fay.* c. To treat, as glass, earthenware, or metals, by heating and gradually cooling, so as to toughen them and remove brittleness. *Fay.* d. To prevent or remove objectionable stresses in glassware by controlled cooling from a suitable temperature. *ASTM C162-66.*

annealed steel. Steel that has been softened or had strains removed by heating followed by slow cooling. *Hess.*

annealed wire. Softened wire. *Bureau of Mines Staff.*

annealed wire rope. A wire rope made from wires that have been softened by annealing. *Zern.*

annealing. a. Heating to and holding at a suitable temperature and then cooling at a suitable rate for such purposes as reducing hardness, improving machinability, facilitating cold working, producing a desired microstructure, or obtaining desired mechanical, physical, or other properties. When applied to ferrous alloys, the term annealing, without qualification, implies full annealing. When applied to nonferrous alloys, the term annealing implies a heat treatment designed to soften a cold-worked structure by recrystallization or subsequent grain growth or to soften an age-hardened alloy by causing a nearly complete precipitation of the second phase in relatively coarse form. *ASM Gloss.* b. The variation of the cooling rate at different temperatures of porcelain, glass, and other ceramic ware containing large quantities of vitreous material to prevent defects such as dunting, crazing, cracking, crystallization, etc. *Bureau of Mines Staff.* c. The process by which glass and certain metals are heated and then slowly cooled to make them more tenacious and less brittle. Important in connection with the manufacture of steel castings, forgings, etc. *Fay.* d. *See* malleable castings. *Fay.* e. The process of heating metal shapes to a red heat or above, prior to cleaning. *See also* fine annealing. *ASTM C286-65.*

annealing arch. The oven in which glass is annealed. *Fay.*

annealing box. A box in which articles to be annealed are enclosed while in the furnace. *Standard, 1964.* Also called annealing pot. *Fay.*

annealing color. The hue taken by steel in annealing. *Standard, 1964.*

annealing furnace. *See* annealing oven. *Fay.*

annealing oven. An oven for heating and gradually cooling metals or glass to render them less brittle. *Standard, 1964.* Also called annealing furnace. *Fay.*

annealing point. Temperature at which the viscosity of glass is 10^{13} poises. Formerly defined as $10^{13.4}$ poises. The internal stresses are substantially relieved in 15 minutes at this temperature. *VV.*

annealing pot; annealing box. A pot in which articles are placed to be annealed. It is closed to prevent oxidation. *Fay.*

annealing range. The range of glass temperature in which stresses in glass articles can be relieved at a commercially desirable rate. For purposes of comparing glasses, the annealing range is assumed to correspond with the temperatures between the annealing point and the strain point. *ASTM C162-66.*

annerodite; aanerodite. A submetallic black uranium-yttrium pyroniobate, crystallizing in the orthorhombic system. An intergrowth of samarskite and columbite. *Fay; Crosby, p. 40.*

annite. a. Lepidomelane; $(H,K)_2Fe_3(Fe,Al)_4SiO_4)_8$; Mohs' hardness, 3; specific gravity, 3.0 to 3.2; a black, rather brittle mica, characterized chiefly by the large content of ferric iron. *Dana 6d, p. 634.* b. Synonym for hydroxylannite. *Hey 2d, 1955.*

annivite. Tennanite, $4Cu_2S.As_2S_3$, in which part of the arsenic is replaced by bismuth and antimony. *Dana 6d, pp. 138-140.*

annual labor. Same as assessment work, on mining claims. *Fay.*

annual layer. a. A sedimentary layer deposited, or presumed to have been deposited, during the course of a year; for example, a glacial varve. *A.G.I. Supp.* b. A dark layer in a stratified salt deposit containing disseminated anhydrite. *A.G.I. Supp.*

annual value. The annual value of a property is the estimated annual surplus of revenue over expenditure in process of liquidating the mineral reserves. In the usual case, that of a property owned by a company, it is the dividend estimated maintainable annually over the whole computed life, the regular distribution of mining profit. *Truscott, p. 234.*

annuity. a. An annual allowance, payment, or income. *Standard, 1964.* b. The return from an investment of capital, with interest, in a series of yearly payments. *Standard, 1964.*

annular. Ring-shaped. The space between casing and the wall of the hole or between drill pipe and casing is an annular space. *Brantly, 1.*

annular bearing. A ring bearing which carries the radial lode of a shaft. If a ball bearing, the balls are held in a race and run on a hard band around the shaft. *Petroleum Age, V. 11, January 15, 1923, p. 37.*

annular borer. Any tubular tool used to obtain a cylindrical core as a sample. *Compare* core drill; diamond drill; shot drill. *Long.*

annular drainage pattern. A ringlike draining pattern. It is subsequent in origin and is associated with a maturely dissected dome or basin structure. *A.G.I.*

annular kiln. A kiln having compartments. *Standard, 1964.*

annular wheel. A ring gear with teeth fixed to its internal circumference. Also called internal gear. *Crispin.*

anode. a. The electropositive pole. *A.G.I. Supp.* b. The positive terminal of an electrolytic cell. *Webster 3d.* c. The electrode at which electrons leave a device to enter the external circuit; opposite of cathode. *Webster 3d.* d. The negative terminal of a primary cell or of a storage battery that is delivering current. *Webster 3d.* e. The electron-collecting electrode of an electron tube. *Webster 3d.*

anode compartment. In an electrolytic cell the enclosure formed by a diaphragm around the anodes. *ASM Gloss.*

anode copper. Special-shaped copper slabs, resulting from the refinement of blister copper in a reverberatory furnace, used as anodes in electrolytic refinement. *ASM Gloss.*

anode corrosion. The dissolution of a metal acting as an anode. *ASM Gloss.*

anode effect. The effect produced by polarization of the anode in the electrolysis of fused salts. It is characterized by a sudden increase in voltage and a corresponding decrease in amperage due to the anode's being virtually separated from the electrolyte by a gas film. *ASM Gloss.*

anode efficiency. Current efficiency at the anode. *ASM Gloss.*

anode fall. A very thin space-charge region in front of an anode surface, characterized by a steep potential gradient through the region. *BuMines Bull. 625, 1965, p. VII.*

anode film. a. The portion of solution in immediate contact with the anode, especially if the concentration gradient is steep. *ASM Gloss.* b. The outer layer of the anode itself. *ASM Gloss.*

anode furnace. A copper or nickel refining furnace, in which blister copper or impure nickel is refined. *Bureau of Mines Staff.*

anode metals. Metals used for electroplating. They are as pure as commercially possible, uniform in texture and composition, and have the skin removed by machining. In addition to pure single metals, various alloys are produced in anode form, such as Platers' brass and Spekwite, the last named yielding a white plate harder than nickel. *Brady, 4th ed., 1940, pp. 39-40.*

anode mud; anode slime. A deposit of insoluble residue formed from the dissolution of the anode in commercial electrolysis. Sometimes called anode slime. *ASM Gloss.* In copper refining, this slime contains the precious metals which are recovered from it. *C.T.D.*

anode pickling. *See* electrolytic pickling. *Dodd.*

anode scrap. Remnants of anode copper retrieved from electrolytic refining of the metal. *Pryor, 3.*

anode slime. *See* anode mud.

anodic cleaning. Electrolytic cleaning where the work is the anode. It is also called reverse-current cleaning. *ASM Gloss.*

anodic coating. A film on work resulting from an electrolytic treatment at the anode. *ASM Gloss.*

anodic pickling. Electrolytic pickling where the work is the anode. *ASM Gloss.*

anodic zone; positive zone. In the electrical self-potential method of geophysical prospecting, if the chemical composition of the soil or subsoil is such as to give electrical polarization, the zone of electropositive potential is the anodic zone. *A.G.I.*

anodized aluminum. Aluminum which has been made the anode or positive electrode of an electrolytical chemical bath containing sodium phosphate or other solution. On passing a current through the bath, the aluminum is chemically oxidized on the surface, giving it a fine matte appearance. *Camm.*

anodizing. Forming a conversion coating on a metal surface by anodic oxidation; most frequently applied to aluminum. *ASM Gloss.*

anogene. An obsolete term for rocks that have risen from below; that is, eruptive rocks. *Fay.*

anogenic. Applied to deep-seated or plutonic metamorphism or replacement. Obsolete. *Johannsen, v. 1, 2d, 1939, p. 166.*

anolyte. The electrolyte adjacent to the anode in an electrolytic cell. *ASM Gloss.*

anomalite. A lightweight alteration product of jeffersonite; a pyroxene, $(Mn,Zn,Fe,Mg)O.CaO.2SiO_2$; blood red in thin section; contains 30 percent Mn_2O_3 with copper and nickel. *Hess.*

anomalous double refraction. Double refraction in a normally singly refractive substance. Caused by internal strain. Seen by irregular extinction when substance is observed between crossed nicols, as in synthetic spinel and sometimes in garnet. *Shipley.*

anomalous magma type. An unusual magma type that was formed by or affected by assimilation. It is to be distinguished from magma types formed by differentiation alone. *A.G.I.*

anomaly. a. Any deviation from uniformity. A distinctive local feature in a geophysical or a geochemical survey over a larger area. An area or a restricted portion of a geophysical survey, such as a magnetic survey or a gravity survey, that differs from the rest of the survey in general. The anomaly might be associated with petroleum, natural gas, or mineral deposits, or provide a key to interpreting the underlying geologic structure. Drilling for economic mineral deposits might be conducted in the area of a geophysical anomaly. In seismic usage, anomaly is generally synonymous with structure, but it is also used for spurious or unexplainable seismic events or for local deviations of potential functions which cannot be exclusively attributed to a unique cause. *A.G.I.* b. Any departure from the normal magnetic field of the earth is a magnetic anomaly. It may be a high or a low, subcircular, ridgelike or valleylike, or linear and dikelike. *A.G.I.* c. A gravity anomaly is the difference between the theoretical calculated gravity and the observed terrestrial gravity. In comparing any set of observed data with a computed theoretical curve, the difference of an observed value and the corresponding computed value, or the observed minus the computed value. Excess observed gravity is a positive anomaly, and a deficiency is a negative anomaly. *See also* Bouguer anomaly; free-air anomaly; isostatic anomaly. *A.G.I.; A.G.I. Supp.* d. A crystallographic anomaly is the lack of agreement between the apparent external symmetry of a crystal and the observed optical properties. *Schieferdecker.*

anomaly drilling. Boreholes drilled to explore the formations in or adjacent to an anomaly. *Long.*

anomite. A variety of biotite. *Standard, 1964.*

anorogenic. Applied to a geologic feature that formed during a period of tectonic quiescence between orogenic periods. *A.G.I.*

anorogenic granite. A granite, the emplacement of which is not connected with an orogeny. *Schieferdecker.*

anorogenic time. A geologic time when significant deformation of the earth's crust did not occur. *A.G.I.*

anorthic. The same as triclinic. *Fay.*

anorthite. An end-member of the plagioclase feldspar series, $Ab_{10}An_{90}$-$CaAl_2Si_2O_8$, consisting of calcium-aluminum silicate and containing no sodium. The intermediate plagioclases may be regarded as mixtures of anorthite with the other end-member, albite. Triclinic. *Compare* albite. *Fay; Dana 17.*

anorthite basalt. Basalt, containing anorthite (An_{90}-An_{100}) as the essential feldspathic mineral. *Holmes, 1928.*

anorthitite. a. Proposed by Turner for a granular igneous rock composed almost wholly of anorthite. *Hess.* b. A coarsely crystalline granitoid igneous rock that consist almost entirely of anorthite. The rock is a feldspathic extreme of the gabbro group, an anorthosite formed of anorthite. *Fay.*

anorthoclase. A triclinic feldspar closely related to the orthoclase group. Chiefly a soda-potash feldspar, $K(AlSi_3O_8)$-$Na(AlSi_3O_8)$. *Dana 17.*

anorthoclase sanidine. Synonym for sanidine-anorthoclase. *Hey 2d, 1955.*

anorthoclasite. An igneous rock composed of anorthoclase. *Johannsen, v. 1, 2d, 1939, p. 240.*

anorthosite. A plutonic rock composed almost entirely of plagioclase, which is usually labradorite. It is a monomineralic equivalent of gabbro but lacking in essential monoclinic pyroxene. *Bureau of Mines Staff.*

anorthositization. The process of formation of anorthosite by replacement of metasomatism. *A.G.I.*

anoxia. Oxygen deficiency in the blood cells or tissues of the body in such degree as to cause psychological and physiological disturbances. Anoxia may result from a scarcity of oxygen in the air being breathed or from an inability of the body tissues to absorb oxygen under conditions of low ambient pressure. Also called hypoxia. *H&G.*

A.N.S. amphibian apparatus. An underwater breathing apparatus consisting essentially of a breathing bag worn around the neck, and an oxygen cylinder, reducing valve, and carbon dioxide absorbent canister worn at the left side. A counterbalance weight is worn on the right side. When the cylinder is fully charged with pure oxygen, this apparatus can be used up to 40 minutes at depths of down to 30 feet. *McAdam, pp. 163-164.*

antagonizing screws. On a theodolite, clip screws used to eliminate index error of a vertical circle. *Pryor, 3.*

antecedent. a. Pertaining to streams, valleys, or complete drainage systems that were established before upwarping, faulting, or folding, and that maintained their original courses despite subsequent deformation. A slow rate of uplift is implied. The term contrasts with consequent and superimposed (or superposed). *Stokes and Varnes, 1955.* b. Pertaining to or characterizing the internal movements of the earth concerned in the elevation of continental masses and their exposure to degradation. Contrasted with consequent. *Standard, 1964.*

antecedent stream. A stream that retained its early course in spite of geologic changes since its course was assumed. *Fay.*

antecedent valley. A stream valley that existed before uplift, faulting, or folding occurred and which maintained itself during and after the uplift, faulting, or folding. *Bureau of Mines Staff.*

anteconsequent stream. a. In a deformed region may be found, therefore, true antecedent streams, and streams that were consequent upon the form of the surface assumed as the result of early movement but are antecedent to later movements of the same series. Such a stream might be termed antecedent, condequent or anteconsequent. *A.G.I. b.* A stream that is consequent on some early stage of the warping and antecedent to the rest. *A.G.I.*

Antero aquamarine. *See* Colorado aquamarine. *Shipley.*

ant hill. In blast-hole drilling, the cuttings around the hole collar. *Krumlauf, p. 50.*

anthodite. Gypsum or aragonite radiating in clusters of long needle or hairlike crystals on the roof or the wall of a cave. *A.G.I.; A.G.I. Supp.*

anthoinite. A hydrous aluminum tungstate, $Al_2O_3.2WO_3.3H_2O$, as white chalky material; from Republic of the Congo. *Spencer 18, M.M., 1949.*

anthonyite. A mineral, $Cu(OH,Cl)_2.3H_2O$; monoclinic; lavender-colored pleochroic crystals; unstable in dry air. From the Centennial mine, Calumet, Mich. *Compare* calumetite. *Hay, MM, 1964; Fleischer.*

anthophyllite. A clove-brown orthorhombic amphibole, $(Mg,Fe)_7Si_8O_{22}(OH)_2$, usually massive, and normally occurring in metamorphic rocks; a metasilicate of magnesium and iron. It is a variety of asbestos. *C.M.D.; Dana 17.*

anthra; anthrac; anthraco. From Greek anthrax, coal; also, a precious stone; combining forms used commonly to denote substances resembling or derived from coal, or fossils found in the coal measures. *Standard, 1964.*

anthracene. Obtained by the distillation of coal tar. Used in the manufacture of dyestuffs. *Crispin.*

anthracene oil. A heavy green oil that distills over from coal tar above 270° C and is the principal source of anthracene, phenanthrene, and carbozole. *Webster 3d.*

anthraces. An old name for charcoal later transferred to mineral coal. *Tomkeieff, 1954. See also* anthrax.

anthracides. A group name for coal, anthracite, peat, etc. *Tomkeieff, 1954.*

anthraciferous. Containing or yielding anthracite. *Webster 3d.*

antracita. Mex. Anthracite. *Fay.*

anthracite. a. A hard, black lustrous coal containing a high percentage of fixed carbon and a low percentage of volatile matter. Commonly referred to as hard coal, it is mined in the United States, mainly in eastern Pennsylvania, although in small quantities in other states. *B.C.I., 1947.* b. Nonagglomerating anthracite coal having 92 percent or more, and less than 98 percent of fixed carbon (dry, mineral-matter-free) and 8 percent or less, and more than 2 percent of volatile matter, (dry, mineral-matter-free). *A.S.T.M. D388-38.* c. A black coal with semimetallic luster, semiconchoidal fracture, and volatile-matter content usually less than 7 percent. Carbon content is 80 to 83 percent in France, 85 to 93 percent in Pennsylvania, and 88 to 95 percent in Wales compared to 70 to 85 percnt carbon in bituminous or soft coal. Anthracite ignites with difficulty, produces no smoke, burns at first with a very short blue flame that disappears after the coal is thoroughly ignited, and produces an intensely hot fire. Also called hard coal; Kilkenny coal; stone coal. *Hess.*

anthracite auger. *See* large-diameter boring machine.

anthracite coal base carbon refractory. A manufactured refractory comprised substantially of calcined anthracite coal. *ASTM C71-64.*

anthracite coal sizes.

Name of size		Will pass through
Broken	4 3/8	in. round mesh
Egg	3 1/4-3	" " "
Stove	2 7/16	" " "
Chestnut	1 5/8	" " "
Pea	13/16	" " "
Buckwheat		
" No. 1	9/16	in. round mesh
" No. 2 (Rice)	5/16	" " "
" No. 3 (Barley)	3/16	" " "
" No. 4	3/32	" " "
" No. 5	3/64	" " "

Name of size		Will not pass through
Broken	3 1/4-3	in. round mesh
Egg	2 7/16	" " "
Stove	1 5/8	" " "
Chestnut	13/16	" " "
Pea	9/16	" " "
Buckwheat		
" No. 1	5/16	in. round mesh
" No. 2 (Rice)	3/16	" " '
" No. 3 (Barley)	3/32	" " "
" No. 4	3/64	" " "

Webster 3d.

anthracite duff. In Wales, fine anthracite screenings used in making pitch-bonded briquets and for mixing with bituminous coal to be burned in cement kilns, on chain grate stokers, and as powdered fuel. *Hess.*

anthracite fines. The product from an anthracite coal-preparation plant, usually below one-eighth inch. *See also* duff; fines; grain. *Nelson.*

anthracite silt. Minute particles of anthracite too fine to be used in ordinary combustion. *Webster 3d.*

anthracite stove. A closed-in type of domestic stove specially designed to burn anthracite. It is used mainly for heating purposes, and is very economical in fuel consumption. The stove can be kept burning for long periods with only the occasional removal of ash and refueling. *Nelson.*

anthracitic. Of, belonging to, or resembling anthracite. *Webster 3d.*

anthracitization. The process of transformation of bituminous coal into anthracite. *Tomkeieff, 1954.*

anthracoal. A mixture of small particles of anthracite coal and a cement of practically pure carbon, formed from the distillation of coal tar, pitch, or other suitable bitumen. It is a hard, dense, homogeneous mass, with a silvery luster and in color varies from silvery to grayish black. When pushed from the oven it has a tendency to remain in blocky masses. *Hess.*

anthracography. Petrographical study of coal, the science of coal. *Tomkeieff, 1954.*

anthracoid. a. Resembling anthrax. *Webster 3d.* b. Resembling charcoal or carbon. *Webster 3d.*

anthracolite. a. Same as anthraconite. *Standard, 1964.* b. An old and now obsolete name for anthracite. *Tomkeieff, 1954.*

anthracolithic. Containing anthracite or graphite. *Webster 3d.*

Anthracolithic. Synonym for Carboniferous and Permian. *A.G.I. Supp.*

anthracolitization. Same as coalification. *Tomkeieff, 1954.*

anthracology. a. The science of coal. *Tomkeieff, 1954.* b. Coal petrography, a branch of geology dealing with the physical constitution of coal in much the same way that petrography deals with the mineral composition of rocks. It is concerned with the physical variations in coal that make it possible to classify coal material by type. *A.G.I.*

anthracometer. An instrument for determining the amount of carbon dioxide in a mixture of gases. *Standard, 1964.*

Anthracomya. A Coal Measures freshwater shell in which the umbones occupy a position intermediate between those of Carbonicola and Naiadites. *See also* Mollusca. *Nelson.*

anthraconite. A coal-black bituminous marble or limestone usually emitting a fetid smell when rubbed. *Webster 2d.* Also called stinkstone; swinestone. *Fay.*

anthracosilicosis. Massive fibrosis of the lungs marked by shortness of breath from inhalation of carbon and quartz dusts. Also called miner's phthisis. *Webster 3d.*

anthracosis. A benign deposition of coal dust within the lungs from inhalation of sooty air. *Compare* anthracosilicosis. *Webster 3d.*

anthracoxene. A brownish resin found in brown coal and partly soluble in ether, the remaining insoluble black powder is called anthracoxenite. *Tomkeieff, 1954.*

anthracoxenite. An insoluble black powder obtained from a resin in the coalbeds of Brandeisl, near Schlan in Bohemia. The resin is treated with ether which dissolves the schlanite, leaving the insoluble portion, anthracoxenite. *Fay.*

anthrafilt. Anthracite used for filtration purposes. *Jones.*

anthrafine. Sizes of anthracite smaller than barley. *Jones.*

anthragenesis. Synonym for coalification. *A.G.I. Supp.*

anthrasilicosis. Variant of anthracosilicosis. *Webster 3d.*

anthrasol. Yellow oil obtained from the distillation of coal tar. *Bennett 2d, 1962.*

anthrax. a. A gem stone of the ancients; probably identical with the carbuncle. *Standard, 1964.* b. An old name for charcoal later transferred to mineral coal. Synonymous with anthraces. *Tomkeieff, 1954.*

anthraxolite. a. A highly graphitic coal. One specimen contained 97.7 percent fixed carbon. *A.G.I.* b. Anthracitelike asphaltic material occurring in veins in Precambrian slate of the Sudbury district, Ontario, Canada. *A.G.I. Supp.*

anthraxylon. a. From the Greek anthrax meaning coal and xylon meaning wood. The vitreous appearing components of coal, which in thin section are shown to have been derived from the woody tissues of plants, such as stems, limbs, branches, twigs, roots, including both wood and cortex, changed and broken up into fragments of greatly varying sizes through biological decomposition and weathering during the peat stage, and later flattened and transformed into coal through the coalification process, but still present as definite units. *A.G.I.* b. Introduced by R. Thiessen in 1920. Viewed microscopically, anthraxylon generally reveals some of the original plant structure. Cellular inclusions indigenous to the original plant structure. Cellular inclusions indigenous to the original plant tissue are assigned to the anthraxylon when present. Conventionally, anthraxylon must be more than 14 microns thick perpendicular to the bedding plane. Microscopic material resembling anthraxylon in color and translucency but less than 14 microns wide is included with translucent humic degradation matter. Color is orange to red to brownish-red; the depth of color increasing with rank and the thickness of the thin section. Cellular inclusions may vary in color from reddish-brown to light yellow. In general, plant structure is revealed by slight differences in the tint of cell walls and cell fillings. Anthraxylon that is transitional into semifusain shows a darker tint than normal anthraxylon of the same rank, and cell structure is more clearly shown. It is present in quantities exceeding 5 percent in all varieties of common banded coal. Bright-banded bituminous coal frequently contains 50 to 70 percent of anthraxylon; banded bituminous coal of dull luster contains lesser amounts of anthraxylon. *IHCP, 1963, part I.*

anthraxylous coal; anthraxylous-attrital coal. A bright coal (composed of anthraxylon and attritus in which the translucent cell-wall degradation matter or translucent humic matter predominates) in which the ratio of anthraxylon to attritus is from 3:1 to 1:1. *Compare* attrital coal. *A.G.I.*

anthropozoic. Pertaining to or designating the time that has elapsed, or the rocks that have been deposited, since man appeared upon the earth. *Webster 2d.*

antibreakage device. A cushioning device to reduce the impact of coal in motion against objects with which it may come into contact, with a view to avoiding fracture of the coal. *B.S. 3552, 1962.*

anticaustic. a. Checking or preventing the corrosive action of caustics. *Standard, 1964.* b. Any remedy for arresting or mitigating the action of caustics. *Standard, 1964.*

anticlinal. a. Inclining in oppositee directions. Having or relating to a fold in which the sides dip from a common line or crest. Of or pertaining to an anticline. The opposite of synclinal. *Webster 3d.* b. The crest of an anticlinal roll may be the apex of a vein. *Fay.* c. When the strata assume an arch-shaped form. *Gordon.*

anticlinal axis. a. The medial line of a folded structure from which the strata dip on either side. *Fay.* b. If a range of hills, or a valley, is composed of strata, which on the two sides dip in opposite directions, the imaginary line that lies between them and towards which the strata on each side rise, is called an anticlinal axis. *A.G.I.*

anticlinal bend. An upwardly convex flexure in which one limb dips gently towards the apex and the other limb dips more steeply away from it. *Compare* unicline; monocline. *A.G.I.*

anticlinal flexure; anticlinal fold. *See* anticlinal; anticline. *Fay.*

anticlinal mountain. Using the terms anticlinal and synclinal in their commonly accepted sense, we propose to apply the phrases anticlinal or synclinal mountain or range to designate ridges formed respectively by a convex and concave flexure of the strata. *A.G.I.*

anticlinal theory. The theory that water, oil, and gas accumulate in the order named in upbowed strata, provided such a structure contains reservoir rocks in proper relation to source rocks and an impervious barrier. *A.G.I.*

anticlinal valley. A valley which follows an anticlinal axis. The term was used as early as 1862 by C. H. Hitchcock. *A.G.I.*

anticline. a. Applied to strata which dip in opposite directions from a common ridge or axis, like the roof of a house, and the structure is termed an anticline or saddleback. *A.G.I.* b. When beds are arched so as to incline away from each other, they form an anticline. *A.G.I.* c. In this type of fold (anticline) the sides or limbs of the fold typically slope away from the plane of the axis on either side. Every anticlinal axis pitches in two directions, that is, toward the two ends of the fold. *A.G.I.* d. A fold or arch of rock strata dipping in opposite directions from an axis. *Fay.* e. An uparched fold in stratified rocks. *Bateman.*

anticlinorium; geanticline. A series of anticlines and synclines, so grouped that taken together they have the general outline of an arch; opposite of synclinorium. *Webster 3d.*

anticlise. An upwarp of a platform that has become otherwise rigid. The platform is beneath the sea and a cover of sediments is being deposited on it as the warping proceeds. A similar downwarp is a syneclise. *Challinor.*

anticrack reinforcement. A close mesh of light steel rods placed just below the surface of concrete in order to minimize surface cracking. *Ham.*

antidune. a. A sand wave contrasted with a dune in its direction of movement; it travels against the current instead of with it. Its downstream slope is eroded and its upstream slope receives deposits. The antidune travels much faster than a dune, and its profile is more symmetric. *USGS Prof Paper 86, 1914, p. 31.* b. A transient form of ripple on the stream bed analogous to a sand dune; an antidune progressively moves upstream. *See also* regressive sand wave. *A.G.I.* c. Term has been applied to flame structure. *See also* flame structure. *Pettijohn.*

antiedrite. Edingtonite; a hydrous silicate of barium and aluminum; $BaO.Al_2O_3.3SiO_2.3H_2O$. *Dana 6d, p. 599.*

antiferroelectric. Spontaneous electrical polarization with equal numbers of dipoles in opposite directions. *VV.*

antiferromagnetic. Spontaneous magnetic orientation of atoms with equal magnetic moments aligned in opposite directions. *VV.*

antiferromagnetic material. A material wherein interatomic forces hold the elementary atomic magnets (electron spins) of a solid in alignment, the state being similar to that of a ferromagnetic material but with the difference that equal numbers of elementary magnets (spins) face in opposite directions and are antiparallel causing the solid to be weakly magnetic, that is, paramagnetic instead of ferromagnetic. *ASM Gloss.*

antiflood valve. A check valve. *Bureau of Mines Staff.*

antifoaming. Pertains to decreasing the stability of a foam. *ASM Gloss.*

antiform. An anticlinelike structure, may be an overturned syncline. *A.G.I. Supp.*

antifouling composition. A coating applied to underwater structures or to the hull of a ship to prevent formation of marine growths, such as barnacles. *Bennett 2d, 1962.*

antifouling paint. Marine paint which prevents attachment of sea organisms to surfaces. *Hy.*

antifriction bearing. A bearing consisting of an inner and outer ring, separated by balls or rollers held in position by a cage. *Nichols.*

antifriction metal. Any alloy having a low coefficient of friction; used for bearing surfaces. *Standard, 1964.*

antigorite. A lamellar variety of serpentine, $Mg_6(Si_4O_{10})(OH)_8$, recognized by its variegated green color and greasy luster. Used as an ornamental stone. *Dana 17.*

antigua. In Mexico, a mine worked by Spaniards or Mexicans at a time so remote (from 50 to 300 years) that particulars have been forgotten; sometimes valuable, but every antigua is not a bonanza. *Weed, 1922.*

anti-incrustator. A substance used to prevent scale forming on the internal surface of vessels containing water, such as steam boilers. *See also* hard water. *Nelson.*

Antilles pearl. Not a pearl but mother of pearl of a sea snail. *Shipley.*

antilog. Abbreviation for antilogarithm. *BuMin Style Guide, p. 58.*

antilogous. Designating that pole (end) of a pyroelectric crystal which is negative while the crystal is being heated and positive as it cools. *Compare* analogous. *Standard, 1964.*

antimatter. Matter in which the ordinary nuclear particles (neutrons, protons, electrons, etc.) are conceived to be replaced by their corresponding antiparticles (antineutrons, antiprotons, positrons, etc.). Normal matter and antimatter would mutually annihilate each other upon contact and be converted into gamma rays. *L&L.*

antimonate. a. A salt or ester of antimonic acid; a compound containing the radical SbO_4^{-3}, SbO_3^{-1}, or $Sb_2O_7^{-4}$ (diantimonate) in which antimony has a +5 valence. *A.G.I.* b. A salt containing pentavalent antimony and oxygen in the anion. *Webster 3d.*

antimonial arsenic. A native compound of arsenic and antimony of which the antimony forms a comparatively small part. *Compare* allemontite. *Hess.*

antimonial copper. Synonym for chalcostibite. *Dana 6d, p. 113.*

antimonial glass. *See* antimony glass. *CCD 6d, 1961.*

antimonial red silver. Synonym for pyrargyrite. *Dana 6d, p. 131.*

antimonial silver. a. Silver ore or alloys containing variable quantities of antimony. *Bennett 2d, 1962.* b. Same as dyscrasite. *Standard, 1964.*

antimonide. A binary compound of antimony with a more positive element. *Webster 3d.*

antimonite. a. A salt or ester of antimonious acid or antimonous acid; a compound containing the radical SbO_3^{-3} or SbO_2^{-1} in which antimony has a +3 valence. *A.G.I.* b. The native sulfide of antimony; stibnite. *Fay.*

antimonpearceite. A mineral, $(Ag,Cu)_{16}(Sb,As)_2S_{11}$, the antimony end-member corresponding to polybasite, and members of this series with antimony greater than arsenic. Dimorphous with polybasite, which has a unit-cell 8 times as large. *Hey, MM, 1964; Fleischer.*

antimony. a. A trivalent and pentavalent metalloid element that is commonly metallic silvery white, crystalline, and brittle yet rather soft but is known also in black amorphous, unstable yellow, and explosive forms, that occurs in the free state but more often combined in minerals (as stibnite, kermesite, valentinite, and cervantite) and in ores of other minerals (as lead), that is prepared chiefly from stibnite usually by roasting and smelting, and that is used especially as a constituent of alloys (as antimonial lead, type metals, and bearing metals). Symbol, Sb; atomic weight, 120.2; specific gravity, 6.7; rhombohedral. *Webster 3d; Webster 2d; Dana 17.* b. An industrial term for an oxide of antimony. *ASTM C162-66.*

antimony alloys. Antimony is not used as the basis of important alloys, but it is an essential constituent in type metals, bearing metals (which contain 3 to 20 percent), in lead for shrapnel (10 percent), storage battery plates (4 to 12 percent), roofing, gutters, and tank linings (6 to 12 percent), cable sheaths, etc. *C.T.D.*

antimony black. Metallic antimony in the form of a fine powder produced by electrolysis or chemical action in an antimony salt solution. Used as a bronzing pigment for metals and plaster casts. Antimony black is also used to refer to antimony sulfide. *CCD 6d, 1961.*

antimony blende. Same as kermesite. *Fay.*

antimony bloom. *See* antimony oxide. *CCD 6d, 1961.*

antimony crude. *See* crude antimony. *Bennett 2d, 1962.*

antimony crudum. The name given to the molten, high-grade sulfide that drains away from the gangue residue when stibnite (antimony sulfide) is melted by liquation. *Newton, p. 282.*

antimony electrode. One sometimes used in pH measurement. Metallic antimony with a surface coating of Sb_2S_3. *Pryor, 3.*

antimony fluoride. *See* antimony trifluoride. *CCD 6d, 1961.*

antimony glance. Synonym for stibnite. *Hey 2d, 1955.*

antimony glass; vitreous antimony; vitreous anitmony sulfide; antimonial glass. a. A vitrified product of variable composition obtained by partial roasting and subsequent fusion of antimony trisulfide; a transparent dark ruby-red mass. Used for tinting glass and porcelain yellow. *CCD 6d, 1961.* b. Transparent red mass. Used for coloring glass and porcelain. *Bennett 2d, 1962.*

antimony minerals. Minerals containing antimony, the principal one being stibnite, Sb_2S_3. *Bureau of Mines Staff.*

antimony ocher. Synonym for stibiconite. *Fay.*

antimony 124. Radioactive antimony of mass number 124; half-life, 60 days; and radiation, beta and gamma. Used as a tracer especially in solid state studies and as a marker of interfaces between products in pipe lines. The gamma ray has the proper energy to eject neutrons from beryllium. Convenient portable neutron sources, which may be reactivated in a nuclear reactor, are made by such an irradiation of an antimony pellet encased in a beryllium shell. *CCD 6d, 1961.*

antimony ores. Native antimony; stibnite (sulfide of antimony); valentinite and senarmontite (oxides). *Fay.*

antimony oxide; antimony trioxide; antimony bloom; antimony white; white antimony. a. Sb_2O_3 is derived principally from stibnite but it is also produced by the oxidation of antimony metal. Used as an opacifier in certain porcelain enamels both in the frit and as a mill addition; in lead glazes to produce yellow colors; and has also been used as a body stain. In glasses, antimony oxide is important as a decolorizing agent, especially in optical glass batches and in ruby-red compositions. Antimony has a specail advantage in that glasses decolorized with it do not change color upon solarization as do glasses decolorized with arsenic oxide. *Lee.* b. A white, odorless, crystalline powder. Used as a paint pigment; in glass manufacture; in opacifying white enamels; and in infrared transparent glass. *CCD 6d, 1961.* c. A durable paint pigment especially valuable as a flame retardant. Formed in flues and in dust chambers of antimony roasting furnaces. *CCD 6d, 1961.* d. A nonpoisonous, white pigment that produces a slow-drying paint with properties similar to those of titanium-oxide paint. *Crispin.*

antimony regulus. An impure product of the smelting process; largely antimony sulfide. *Standard, 1964.*

antimony star. The fernlike marking on the upper surface of the metal antimony when well crystallized. *Fay.*

antimony sulfate; antimonous sulfate; antimony trisulfate. $Sb_2(SO_4)_3$; molecular weight, 531.68; white powder; deliquescent; specific gravity, 3.625 (at 4° C); insoluble in water; and soluble in acid. Used in explosives. *Bennett 2d, 1962.*

antimony trifluoride; antimony fluoride. White to gray; orthorhombic; SbF_3; hygroscopic; melting point, 292° C; and specific gravity, 4.58. Used in porcelain, in pottery, and in dyeing. *CCD 6d, 1961.*

antimony trisulfide; antimony sulfide; antimonious sulfide; antimony sulfuret; stibnite. a. Sb_2S_3; molecular weight, 339.69; orthorhombic; gray or grayish-black; specific gravity, 4.64; and melting point, 550° C. *Bennett 2d, 1962.* b. Commercial grade Sb_2S_3 contains a minimum of 70 percent antimony. It is sometimes used in glass batches for obtaining a cloudy-amber or ruby glass. In the production of opal glass, it is occasionally used in small amounts to assist the action of the opacifying agents. Antimony sulfide is used to some extent in the hollowware industry in the production of mottled gray enamels. Based on experience gained in hollowware enameling, a new trend is developing in the application of a single white coat (titania) directly on steel. By introducing sulfur and antimony simultaneously in the form of antimony sulfide (commonly called black needle antimony) adherence of white enamel to steel is said to be enhanced. *Lee.* c. Source of antimony. *Bureau of Mines Staff.*

antinode. A point, line, or surface in a standing wave system where some characteristic of the wave field has maximum amplitude. Antinodes, like nodes, may be of several types, such as pressure or velocity. *ASM Gloss.*

antipathy of minerals. The incompatibility of certain rock-forming minerals, according to the theory of fractional crystallization, result from their being too far apart in a crystallization sequence to be associated in such quantities as to make up the entire rock. Thus, a rock made up of quartz and calcic plagioclase is unknown among igneous rocks. *Hess.*

antiperthite. An integrowth of a sodic and a potassic feldspar generally considered to have formed during slow cooling by the unmixing of sodium and potassium ions in an originally homogeneous alkalic feldspar. In an antiperthite, the potassic member (usually orthoclase) forms thin films, lamellae, strings, or irregular veinlets, within the sodic member (usually albite). *See also* perthite. *A.G.I.*

antipitting agent (**antipit**). An addition agent for electroplating solutions to prevent the formation of pits or large pores in the electrodeposit. *ASM Gloss.*

Antipoys apparatus. An air-tube breathing apparatus of the inspiratory type without bellows or a blower. *McAdam, p. 77.*

antique glass. Flat glass made by cylinder process and with textured surfaces resembling old glass; it is used in the making of stained-glass windows. *See also* cylinder process; Cathedral glass. *Dodd.*

antiscale compound. A preparation that is applied to burning tools to protect them from scaling in service. *ASTM C286-65.*

antisepsis. The process of inhibiting the growth and multiplication of microorganisms; the prevention or treatment of sepsis by antiseptic means. *Webster 3d.*

antislip metals. Metals with abrasive grains cast in them, used for floor plates, stair treads, and car steps. The metal may be iron, bronze, or aluminum, and the abrasive may be sand or aluminum oxide. *Brady, 4th ed., 1940, p. 43.*

antistatic. Descriptive of materials which normally have high insulating qualities, for example, rubber hoses, belts, which have been rendered conductive to reduce risk of sparks or electric shocks in mines, or other places where there is a fire risk. *Pryor, 3.*

antistatic tiles. Floor tiles of a type that will dissipate any electrostatic charge and so minimize the danger of sparking; such tiles are used in rooms, for example, operating theaters, where there is flammable vapor. One such type of ceramic tile contains carbon. The National Fire Protection Association in the United States stipulates that the resistance of a conductive floor shall be less than 1 megohm as measured between two points 3 feet apart; the resistance of the floor shall be over 25,000 ohms between a ground connection and any point on the surface of the floor or between two points 3 feet apart on the surface of the floor. *Dodd.*

antistress mineral. a. A mineral, such as anorthite, potash feldspars, pyroxenes, forsterite, andalusite, etc., the formation of which in metamorphosed rocks, is favored by conditions controlled by thermal action and hydrostatic pressure and not by shearing stress; contrasted with stress minerals (chlorite, amphiboles, kyanite, etc.). *Holmes, 1928.* b. A mineral, such as leucite, nepheline, alkalic feldspar, andalusite, and cordierite, that cannot form or is unstable in an environment of high shearing stress, and hence, does not occur in highly deformed rocks. *Stokes and Varnes, 1955.*

antithetic fault. A fault that dips in the opposite direction from the direction in which the associated sediments dip. Opposite of synthetic fault. *A.G.I.*

antithetic shear. *See* antithetic fault. *McKinstry.*

antitoxic. Counteracting poison. *Webster 3d*

antitropal ventilation. Ventilation by a current of air traveling in the opposite direction to that of the flow of mineral out of the mine. *B.S. 3618, 1963, sec. 2. See also* ascensional ventilation.

antlerite. A natural basic sulfate of copper, $Cu_3(OH)_4SO_4$, found in the oxidized portions of copper deposits in Chile. Luster, vitreous; green color; Mohs' hardness, 3.5 to 4; specific gravity, 3.9; orthorhombic. An ore of copper. *CCD 6d, 1961; Dana 17.*

AN-TNT slurries. Mixtures of ammonium nitrate and trinitrotoluene used as an explosive. *Lewis, p. 111.*

antofagastite. Synonym for eriochalcite. *Hey 2d, 1955.*

ant oil, artificial. *See* furfurol. *CCD 6d, 1961.*

antozonite. A dark violet fluorite from Wölsendorf, Germany, that emits a strong odor often causing nausea among miners. The odor was attributed to a substance called antozone, later shown not to exist. The odor has also been ascribed to free fluorine. A similar odor is found in other rocks. *Hess.*

anvil. *a.* The stationary serrated jaw piece or plate of a safety clamp, adjustable pipe wrench, or jaw-type rock crusher. Also sometimes incorrectly used as a synonym for drive hammer. Also called anvil block; anvil heel; anvil jaw; heel. *Long.* b. An iron block placed between a stamp-mill mortar box and the foundation block; generally used in light mortars and concrete foundations. *Fay.* c. In drop forging, the base of the hammer into which the sow block and lower die part are set. *ASM Gloss.* d. A block of steel upon which metal is forged. *ASM Gloss.*

anvil block. A massive block of cast iron which is placed beneath the anvils of steam and other heavy hammers, for the absorption of the vibration due to the blow. It is often embedded in masonry or concrete. *Crispin.*

anvil jaw. *See* anvil. *Long.*

anvil stone. Eng. Blue building stone, forming a bed of irregular anvil-shaped blocks. *Arkell.*

anvil vise. A vise with an anvil on one jaw. *Standard, 1964.*

apachite. Suggested by Osann, from the Apache or Davis Mountains of western Texas, for a variety of phonolite, that differs from typical phonolites. It has almost as much amphibole as pyroxene, whereas amphibole is rare in normal phonolite. The feldspar of the groundmass is generally microperthitic. *Fay.*

apatelite. A hydrous ferric sulfate, found in yellow nodules in clay. *Fay.*

apatite. a. Fluoapatite, $Ca_5F(PO_4)_3$ and $3Ca_3P_2O_8CaF_2$; hexagonal; transparent to opaque; low gray polarization colors; Mohs' hardness, 5; specific gravity, 3.2. Rock phosphates ex guano deposits and beds of bone have no definite chemical composition. *Pryor, 3* b. Chlorapatite, $Ca_5Cl(PO_4)_3$ and $3Ca_3P_2O_8.CaCl_2$; hexagonal; transparent to opaque; low gray polarization colors; Mohs' hardness, 5; specific gravity, 3.2. Phosphate content less than 90 percent. Rock phosphates ex guano deposits and beds of bone have no definite chemical composition. *Pryor, 3.*

aperoidical damping. Case whereby damping is carried to the extreme so that the mass returns into the position of equilibrium without oscillating. Synonym for critical damping. *Schieferdecker.*

apex. a. The highest or uppermost point; the summit; the top; the peak. For example, the apex of a mountain. The end, edge, or crest of a mineral vein nearest the surface. *Webster 3d* b. The highest point of a stratum, as a coalbed. *Standard, 1964* c. The top of an anticlinal fold of strata. *Fay* d. The point of highest elevation on an alluvial fan, usually at the point where the stream emerges from the mountain. *A.G.I.* e. In United States mining law used to designate the highest limit of a vein. *Ballard* f. The top of an inclined haulage plane. *See also* brow; landing. *Nelson* g. Point in center of the face of a concave, noncoring bit. *Long* h. Of classifier or hydrocyclone, the underflow aperture through which the coarser and heavier fraction of the solids in a pulp is discharged in accordance with its minimum cross section. *Pryor, 3.*

apex angle. Included angle measured between the slopes of the inside faces of a concave, noncoring bit, which may range from as small an angle as 70° to a maximum of about 120°. *Long.*

apex law. a. This law gives the owner of a properly located claim on a vein the right to an indefinite extension on the dip of the vein beyond the vertical planes through the side lines of his claim. In order to secure this right, the owner must lay out the endlines of the claim parallel and of substantial length. A triangular claim would have no apex right and cannot be patented. Also called law of extralateral rights. *Lewis, p. 32.* b. Obsolescent mining law allowing the owner of a lode to follow it in depth, regardless of the vertical extension of the legal surface boundaries. *Pryor, 3; Bureau of Mines Staff.*

aphanesite. Synonym for clinoclase. *Hey, 2d, 1955.*

aphaniphyric. A texture of porphyritic rocks with microaphanitic groundmass. Synonym for felsiphyric. *Johannsen, v. 1, 2d, 1939, p. 201.*

aphanite. A dense, homogeneous rock, the mineral constituents of which are too small to be distinguished by the unaided eye. *A.G.I.*

aphanitic. Applied to a texture of rocks in which the crystalline constituents are too small to be distinguished with the unaided eye. It includes both microcrystalline and cryptocrystalline textures. *A.G.I.*

aphanophyre. A porphyritic igneous rock having a groundmass which the unaided eye cannot distniguish as either crystalline or noncrystalline. *CIPW.*

aphanphyric. Containing phenocrysts in an aphanitic groundmass; some porphyritic igneous rocks. *Fay.*

aphrite. A foliated or scaly white pearly calcite. *Standard, 1964.* Also called earth foam; foam spar. *Fay.*

aphrizite. A black variety of tourmaline. *Standard, 1964.*

aphorlita. Scoriaceous basaltic lava characterized by a rough, jagged, clinkery surface. Synonymous with aa. Obsolete. *A.G.I.*

aphthalose. Aphthitalite. *Dana 6d, p. 897.*

aphthitalite. A white saline potassium-sodium sulfate, $(KNa)_2SO_4$; crystallizing in the rhombohedral system. *Fay.*

aphothonite. A steel-gray argentiferous variety of tetrahedrite. *Standard, 1964.*

aphyric. A rock texture showing two generations of the same mineral but having no phenocrysts; Rosenbusch's incorrect porphyritic. *Hess.*

API Abbreviation for American Petroleum Institute. *Zimmerman, p. 7.*

API gamma-ray unit. This unit is an arbitrary one and is defined as 1/200 of the difference between the deflections produced on a log by the radiation from two standard formations in a test pit in Houston, Texas. The two standard formations are artificial. One is of very low radioactivity while the other has a radioactivity which is approximately twice as great as an average mid-continent shale. *Wyllie, p. 153.*

API gravity. The standard American Petroleum Institute (API) method for specifying the density of crude petroleum. The density in degrees API equals $\frac{141.5}{P} -$ 131.5 where P is the specific gravity of the particular oil at 60° F. This is one of several so-called Baume scales for comparing lighter liquids with water. *A.G.I.*

API neutron unit. This unit was devised by the American Petroleum Institute and permits the calibration of the scales of neutron logs. It was devised from a test pit built in Houston, Texas which contains limestone having a porosity of 19 percent. This limestone is saturated with fresh water and is penetrated by a 7½-inch diameter hole. The API neutron unit is defined as 1/1000 of the response of a logging tool in this formation. With this system neutron logs show deflections of a few hundred to a few thousand API units for the usual range of borehole and formation conditions. *Wyllie, p. 118.*

apjohnite. A silky-white or faintly rose-green or yellow manganese alum, $MnO.Al_2O_3.4SO_3+24H_2O$; in fibrous masses, crusts, or efflorescences; Mohs' hardness, 1.5; specific gravity, 1.782; tastes like ordinary alum but not as strong. *Dana 6d, p. 955.*

Apjohn's formula. A formula for calculating the pressure of water vapor in the air. *Bureau of Mines Staff.*

aplanachromatic lens. A lens free from both chromatic aberration and spherical aberration. *See also* aplanatic lens. *Shipley.*

aplanachromatic loupe. A loupe containing an aplanachromatic lens. *Shipley.*

aplanatic lens. A lens free from spherical aberration. *See also* aberration. *Shipley.*

aplanatic loupe. A loupe containing an aplanatic lens. *Shipley.*

aplanatic triplet. An aplanatic lens composed of three portions cemented together to eliminate spherical aberration. A more popular name for this is the term triple aplanat. *Shipley.*

aplastic. *See* grit. *ACSG, 1963.*

aplite. a. A dike rock composed almost entirely of light-colored minerals and having a characteristic fine-grained granitic texture. Aplites may range in composition from granitic to gabbroic, but when the term is used without a modifier, it is generally understood to be granitic, that is, consisting essentially of quartz and orthoclase. *A.G.I.* b. A rock mined in Virginia for use in glass manufacture; it consists principally of albite, zoisite, and sericit. *Dodd.*

aplite vane sheet. A sheet of aplite parallel to the structure of the country rock but not necessarily following the foliation. *G.S.A. Memo 7, 1939, p. 322.*

aplitic. a. Applied to igneous rocks that are free from dark minerals and comparatively fine-grained and even-grained. Microscopically, the boundaries between grains are ordinarily uneven. *Hess.* b. Having the texture characteristic of aplites. *A.G.I.*

aplodiorite. A light-colored variety of biotite granodiorite containing little or no hornblende. *Holmes, 1920.*

aplogranite. A light-colored rock of granitic texture consisting essentially of alkali feldspar and quartz, with subordinate biotite; muscovite may be present or absent. *Compare* alsakite. *Holmes, 1920.*

aplome. A variety of andradite having its dodecahedral faces striated parallel to the shorter diagonal; dark brown, yellowish-green, and brownish-green. *Dana 6d, p. 443.*

apo-. A prefix implying the metasomatic derivation of one kind of rock from another. Applied to volcanic rocks, indicating they have devitrified; to sedimentary rocks, that they have undergone metamorphism without destruction of the original texture. *Holmes, 1928.*

apobsidian. A former obsidian (volcanic glass) which is now completely devitrified. Synonym for petrosilex. *A.G.I.*

Apocal. A nongelatinous permissible explosive. Used in coal mining. *Bennett 2d, 1962.*

A-polar. Surface, usually nonpolar, adsorbs nonpolar compounds. *Pryor, 3, p. 7.*

Apold-Fleissner process. A method of roasting carbonate iron ore in a shaft furnace. The ore sinks continuously down the furnace while a current of hot air or flue gas, with a flow carbon dioxide content, is passed through the body of the ore and a current of cold air is passed upwards through the lower part of the shaft, this part acting as a cooling chamber for the ore and as a preheating flue for the air, which rapidly oxidizes the ferrous oxide in the upper regions of the furnace. The quantity and temperature of the hot gases and cold air are carefully regulated, so as to keep the carbon dioxide content of the flue gas at a minimum, and thereby to ensure thorough roasting of the ore at the lowest possible temperature. A furnace roasting 200 to 450 tons per day requires about 160,000 to 200,000 kilograms-calories per ton, giving a heat efficiency of 73 percent. *Osborne.*

apogmagmatic. a. Applied to mineral deposit of magmatic origin developed in surroundings which do not reveal its immediate relationship to a body of parent eruptive rock; the existence of the latter may, however, still be determined from the presence of dikes, the phenomena of contact metamorphism, etc. *Schieferdecker.* b. Applied to deposit in the area surrounding the intrusive center at a moderate distance. *A.G.I.*

apophyllite. Calcium potassium silicate with water; color white to pink with strong pearly luster on the face parallel to the cleavage plane; common in cavities in volcanic rocks. *Sinkankas.*

apophysis. a. A branch from a vein or a dike to which it is attached. An epiphesis is the same, but it is not attached. *Fay.* b. A small dike or sill injected from a larger intrusive body into adjacent rocks. *A.G.I.*

aporhyolite. A former rhyolite, the groundmass of which was once glassy but is now devitrified. *A.G.I.*

aposandstone. A metamorphosed sandstone. Synonym for quartzite. *A.G.I. Supp.*

apostle gem. One of the gems that were sometimes used to symbolize the apostles in the Middle ages: Jasper, St. Peter; sapphire, St. Andrew; chalcedony, St. James; emerald, St. John; sardonyx, St. Philip; carnelian, St. Bartholomew; chrysolite, St. Matthew; beryl, St. Thomas; chrysoprase, St. Thaddeus; topaz, St. James the Less; hyacinth, St. Simeon; and amethyst, St. Matthias. *Hess.*

apotectonic. Post orogenic. *A.G.I.*

Appalachian. The system of mountains in the eastern United States, or the coal producing area extending from northern Pennsylvania to Alabama. *Jones.*

Appalachian coalfield. The coal-producing area extending from northern Pennsylvania to Alabama, in and adjacent to the Appalachian mountains. *Fay.*

Appalachian orogeny; Appalachian revolution. a. Late Paleozoic era diastrophism beginning perhaps in the Late Devonian period and continuing until the end of the Permian period. *A.G.I. Supp.* b. A period of intense mountain-building movements in the late Paleozoic era, during which the deposits in the Appalachian and Cordilleran geosynclines were folded to form the Appalachian and Palaeocordilleran mountains. Equivalent to the Armorican and Hercynian movements in Europe. *C.T.D.*

Appalachian revolution. *See* Appalachian orogeny.

apparatus. a. N. of Eng. The screening appliances upon the pit bank (at or near a mine). *Fay.* b. Any complex device or machine designed or prepared for the accomplishment of a special purpose. Also, a collection of tools, appliances, materials, etc., as that necessary to the pursuit of a profession, as chemical apparatus. *Standard, 1964.*

apparent angle. Synonym for etch angle. *Long.*

apparent cohesion. a. In soil mechanics, the resistance of particles to being pulled apart due to the surface tension of the moisture film surrounding each particle. Also called moisture film cohesion. *H&G.* b. Cohesion in granular soils due to capillary forces. *ASCE P1826.*

apparent crater. In explosion-formed crater nomenclature, the crater remaining after fall-back material has returned. *Mining and Minerals Engineering, v. 2, No. 2, February, 1966, p. 65.*

apparent day. Solar day; interval between successive transits of sun's center across observer's meridian. The time thus measured is not uniform or clock time. *Pryor, 3.*

apparent density. a. The weight of an object or material divided by its exterior volume less the volume of its open pores. *ACSG, 1963.* b. Weight per apparent volume. *VV.* c. In powder metallurgy, the weight of a unit volume of powder, determined by a specified method of loading and usually expressed in grams per cubic centimeter. *ASM Gloss.*

apparent dip. The dip of a rock layer as measured in any exposed section, or direction, not at a right angle to the strike. It is a component of, and hence, always less than, the true dip. *Stokes and Varnes, 1955.*

apparent elastic limit; useful limit point. The stress at which the rate of change of strain with respect to stress is 50 percent greater than at zero stress. It is more definitely determinable from the stress-strain diagram than is the proportional limit, and is useful for comparing materials of the same general class. *Compare* elastic limit; proportional limit; yield point; yield strength. *Ro.*

apparent heave. For normal faults, the gap between the horizontal projections of the fault traces, measured perpendicular to the strike of the disrupted bedding plane. *Schieferdecker.*

apparent horizon. The apparent or visible junction of earth and sky as seen from any specific position. Also called visible horizon. *A.G.I.*

apparent initial softening. When applied to the refractoriness-under-load test, this term has the specific meaning of the temperature at which the tangent to the curve relating the expansion/contraction and the temperature departs from the horizontal and subsidence begins. *See also* refractoriness-under-load test. *Dodd.*

apparent movement of a fault. The apparent movement observed in any chance section across a fault is a function of several variables: The attitude of the fault; the attitude of the disrupted strata; the attitude of the surface upon which the fault is observed; and the true movement (net slip) along the fault. *A.G.I.*

apparent particle density. Mass to volume excluding open pores of particle, but including closed pores. *Pryor, 3.*

apparent plunge. The inclination of a normal projection of lineation in the plane of a vertical cross section. *A.G.I. Supp.*

apparent porosity. The ratio of the volume of open pore space in the specimen to the exterior volume. It is obtained by measuring the difference in weight of a rock which is dessicator dried and then water saturated. The porosity of a rock so determined is also an indication of its granular structure. *Lewis, p. 574.*

apparent powder density. Mass to volume occupied under defined conditions of packing. *Pryor, 3.*

apparent resistivity. A quantity that is determined from the measurements in the resistivity method and that, in the case of an electrically homogeneous surface, is equal to the resistivity of the subsurface material. *Schieferdecker.*

apparent solid density. A term used when considering the density of a porous material, for example, a fireclay or silica refractory. It is defined as the ratio of the mass of the material to its apparent solid volume. *See also* apparent solid volume; true density. *Dodd.*

apparent solid volume. A term used when considering the density and volume of a porous solid, particularly a refractory brick. It is defined as the volume of the solid material plus the volume of any sealed pores and also of the open pores. *Dodd.*

apparent specific gravity. a. The ratio of the weight in air of a given volume of the impermeable portion of a permeable material (for example, the solid matter including its impermeable pores or voids) at a stated temperature to the weight in air of an equal volume of distilled water at a stated temperature. *ASCE P1826.* b. This property is determined by the standard method of dividing the weight of a rock by the weight of an equal volume of water. The term apparent specific gravity is used because water cannot penetrate the closed pore spaces inside the rock, and hence the specific gravity measured by water displacement methods includes the effect of internal pore spaces as well as that of the constituent minerals. *Lewis, p. 575.*

apparent stress. The stress corresponding to a given unit strain on the assumption of uniaxial stress. It is calculated by multiplying the unit strain by the modulus of elasticity, and may differ from the true stress because the effect of transverse stresses is not taken into account. *Ro.*

apparent superposition. The actual or visible order in which strata lie in any locality. *Standard, 1964.*

apparent velocity. Differential quotient of the distance along a line on the surface over the increase in time of arrival of a wave. *Schieferdecker.*

apparent volume. True volume + closed-pore volume. *VV.*

apparent width. The width of a vein or other tabular formation as determined by borehole intercepts. This width will always be greater than the true width if the borehole intersects the vein at any direction other than perpendicular to the surface of the vein. *Long.*

appearance. The look or sight of a porcelain enameled surface. *Hansen.*

appinite. A group term applied to melanocratic (lamprophyric) varieties of syenite, monzonite, and diorite which are high in hornblende. *Holmes, 1920.*

applanation. All physiographic processes which tend to reduce the relief of a district and, dominantly, by adding material to the area or areas affected, cause the topography to become more and more plainlike. *Hess.*

apple coal. Scot. Soft or loose coal which is easily mined and breaks into small applelike lumps. *Standard, 1964.*

appliances of transportation. As applied to a coal mine, these include parts of the locomotive, mobile, conveyor, and elevator transportation systems for the removal of coal. *Bureau of Mines Staff.*

application. The act of depositing a coating of enamel on a prepared metal surface. *Hansen.*

applied mechanics. Treats of the laws of mechanics as applied to construction in the useful arts. *Crispin.*

Appolt oven. An oven for the manufacture of coke, differing from the Belgian in that it is divided into vertical compartments. *Fay.*

apposition fabric; primary fabric. A primary orientation of the elements of a rock that is developed or formed at the time of deposition of the material. Fabrics of most sedimentary rocks belong to the apposition or primary type. *A.G.I.*

appraisal. The estimation or fixing of a money value on anything such as a gemstone. Differs from valuation and evaluation. *Shipley.*

appraisal curve. A curve or plotted relationship showing, for oil or gas wells operating under similar conditions, the production for a given time or period as compared to the ultimate production. Usually, the abscissa of the curve expresses barrels (or gas volumes) produced during the year and the ordinate indicates the ultimate production. *A.G.I.*

approach distance. The linear distance, in the direction of feed, between the point of initial cutter contact and the point of full cutter contact. *ASM Gloss.*

appropriation. In the mining law, the posting of notice at or near the point where the ledge is exposed; next the recording of the notice; next the marking of the boundaries. *Ricketts, I.*

appropriation account. An account showing the manner of disposal of earned profit. *Pryor, 3.*

approval plate. A label which the U.S. Bureau of Mines requires manufacturers to attach to every completely assembled machine or device sold as permissible mine equipment. By this means, the manufacturer certifies to the permissible nature of the machine or device. *ASA C42.85:1956.*

approved. Accepted as suitable by a competent committee, board, or organization designated by those adopting the rules; applies to permissible explosives, safety lamps, motors, etc., as passed upon by the U.S. Bureau of Mines. *Fay.*

approved apparatus. Gr. Brit. Apparatus, not necessarily flameproof or intrinsically safe, that has been approved by the Minister of Power, under the Mines and Quarries Act, 1954, or Regulations made thereunder, for use in mines. *B.S. 3618, 1965, sec. 7.*

approved flame safety lamp. A flame safety lamp which has been approved for use in gaseous coal mines. *Bureau of Mines Staff.*

Apricotine. Trade name for yellowish-red, apricot-colored quartz pebbles from near Cape May, N.J., used as gemstones. *English.*

apron. a. A canvas-covered frame set at such an angle in the miner's rocker that the gravel and water in passing over it are carried to the head of the machine. *Fay.* b. An amalgamated copper plate placed below the stamp battery, over which the pulp passes. The free gold contained in the pulp is caught by the quicksilver on the plate. *See also* copper plates. *Fay.* c. A hinged extension of a loading chute. Commonly called lip in Arkansas. *Fay.* d. A broad shallow vat used for evaporating. *Webster 3d.* e. A receptacle for conveying material (as rock) by means of a cableway and trolley. *Webster 3d.* f. An endless belt for conveying material of any kind. Also called a traveling apron. *Webster 3d.* g. A series of apron pans which, when attached to a chain or pivotally attached one to another forms the conveying medium for an apron conveyor. *ASA MH4.1-1958.* h. The front gate of a scraper body. *Nichols.* i. A short ramp with a slight pitch. *Nichols.* j. A sheet of sand and gravel lying for some distance in front of the terminal moraines of a glacier. *Standard, 1964.* Also called frontal apron; morainal apron. *Fay.* k. Where an ice sheet ends in a broad face, as did the ancient continental glaciers, numerous streams flow from it and spread their debris in front of the terminal moraine, forming a broad fringing sheet or apron (outwash plain) along it. *A.G.I.* l. A floor or lining of concrete, timber, etc., to protect a surface from erosion, such as the pavement below chutes or spillways, or at the toes of dams. *Seelye, 1.*

apron conveyor. a. A series of overlapping metal plates or aprons running in an endless chain for transferring material from one place to another. Often used to feed raw material from a bin. *ACSG, 1963.* b. A conveyor so contrived as to provide a moving platform on which coal can be carried and, if necessary, cleaned by picking. *Zern.*

apron feed. A method of feeding material forward on an articulated platform. *Nelson.*

apron feeder; plate-belt feeder; plate feeder. A feeder in which the material is carried on an apron conveyor and in which the rate of feed is adjusted either by varying the depth of material or the speed of the conveyor, or both. *B.S. 3552, 1962. See also* conveyor-type feeder.

apron plate. Sheet of copper, Muntz metal, or special alloy set in front of stamp battery and coated with mercury, to trap and amalgamate gold. *Pryor, 3.*

apron roll. A support of a traveling apron, as in a wood-planing machine. *Standard, 1964.*

apron rope. The operating rope for the blade front of a scraper. *Ham.*

apron wall. That part of a panel wall between the window sill and the support of the panel wall. *ACSG.*

Aptian. Lower Cretaceous, between Barremian and Albian. *A.G.I. Supp.*

apyrite. A little-used name for peach-bloom colored tourmaline. *Shipley.*

apyrous. a. Not changed by extreme heat, as mica; distinguished from refractory. *Standard, 1964.* b. Noncombustible. *Webster 3d.*

aqua ammonia. Ammonia water; especially, a solution of ammonia containing 10 percent of ammonia by weight. *Webster 3d.*

aquafortis; nitric acid. a. HNO_3. *Crispin.* b. Etching in which nitric acid is used as a mordant. *Webster 3d.*

Aquagel. Brand name for a proprietary product. A gel-forming colloidal bentonite clay used in drilling muds. *CCD 6d, 1961.*

Aquagem. Trade name for a light-blue synthetic spinel, that is, a synthetic aquamarine spinel. *Shipley.*

aqualung. A lightweight apparatus used for underwater exploration. It consists of tanks of compressed air or oxygen carried on the back of a diver, a breathing tube, and a face mask for breathing that permits underwater observations to depths of about 300 feet uncomplicated by an air hose leading to the surface. Also called scuba or SCUBA, the letters of which stand for self-contained underwater breathing apparatus. *A.G.I. Supp.; C.T.D. Supp.*

aquamarine. Pale blue (gem) variety of beryl. ($Be_3Al_2SiO_6O_{18}$). *Pryor, 3.*

aquamarine chrysolite. Greenish-yellow beryl. *Shipley.*

Aquamarine emerald. Trade name for a genuine beryl or aquamarine triplet. *See also* emerald triplet. *Shipley.*

aquamarine glass. A term loosely used for any light-blue or greenish-blue glass, regardless of its chemical composition or physical properties. *Shipley.*

aquamarine sapphire. Pale blue sapphire. *Shipley.*

aquamarine topaz. Greenish topaz. *Shipley.*

aquamarine tourmaline. Pale greenish-blue, sometimes pale blue tourmaline. *Shipley.*

aquamarine triplet. A genuine triplet which is used to imitate an emerald, and often incorrectly called an emerald triplet. It consists of two portions of aquamarine with a cemented layer of green coloring matter between them. *Shipley.*

aquametry. Analytical procedures used in measuring water. *Bennett 2d, 1962 Add.*

aqua regia; nitrohydrochloric acid; nitromuriatic acid. A very corrosive, fuming, yellow liquid made by mixing nitric and hydrochloric acids, usually in the proportion of 1 part by volume of pure nitric acid with 3 parts by volume of pure hydrochloric acid. Used in dissolving metals and in etching. *Webster 3d.* It dissolves gold and platinum. *Standard, 1964.*

aqueduct. A conduit for conveying water over long distances; a bridge supporting such a conduit. *Ham.*

aqueo-. A combining form for aqueous, denoting aqueous and. For example, aqueoigneous meaning of water and heat. *Webster 2d.*

aqueoglacial. Of, pertaining to, or resulting from the combined action of ice and water. *Webster 2d.*

aqueoigneous. Of or pertaining to ore resulting from the joint influence of heat and water. *Webster 2d.*

aqueous. a. Of, relating to, or having the characteristics of water; watery. Made from, with, or by means of water. Produced by the action of water. *Webster 3d.* b. Pertaining to water; also, to sediment deposited by water. *A.G.I.*

aqueous current ripple mark. *See* water-current ripple mark. *A.G.I.*

aqueous deposit. Sedimentary material deposited by or in water. *Schieferdecker.*

aqueous fluid dispersion. Responsible for deposition of most mineral deposits, while the fluids are moving through channelways in rock. As the fluids pass through the channels they are subjected to a constantly changing physical and chemical environment, with consequent reactions in the fluid and between the fluid and the wall rock to maintain chemical equilibria. *Lewis, p. 300.*

aqueous fusion. a. Melting in the water of crystallization. *Fay.* b. Melted with water, as deep-seated magmas. *Hess.*

aqueous homogeneous reactor. *See* homogeneous reactor. *L&L.*

aqueous lava. The mud lava formed by the mixture of volcanic ashes with condensing volcanic aqueous vapors or other water. *Standard, 1964.*

aqueous liquor. Uranium-rich liquor. Pregs and Royals, usually so designated after filtration. In the resin-in-pulp (RIP) process, the aqueous pulp. In the ion-exchange (IX) process, the feed to the exchange columns. *Pryor, 3.*

aqueous oscillation ripple mark. *See* wave ripple mark. *A.G.I.*

aqueous ripple mark. One of the ripple marks made by waves and water currents as distinguished from ripple marks made by the wind that are called eolian ripple marks. *A.G.I.*

aqueous rock. Applied to a rock deposited through the agency of water; most sedimentary rocks are of this type. *Hess.*

aquiclude. A formation which, although porous and capable of absorbing water slowly, will not transmit it fast enough to furnish an appreciable supply for a well or spring. *A.G.I.*

aquifer. a. A formation, a group of formations, or a part of a formation that is water bearing. *A.G.I.* b. A stratum or zone below the surface of the earth that is capable of producing water, as from a well. *A.G.I. Supp.* c. An underground stratum that will yield water in sufficient quantity to be of value as a source of supply. An aquifer is not a stratum that merely contains water, for this would apply to all strata in the groundwater area. An aquifier must yield water. *Carson, p. 180.*

aquifuge. a. Suggested by Bedier, as the opposite of aquifer. *A.G.I.* b. A rock which contains no interconnected openings or interstices and therefore neither absorbs nor transmits water. *A.G.I.*

Aquitanian. Lower lower Miocene or uppermost Oligocene. *A.G.I. Supp.*

Ar a. Chemical symbol for argon. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.* b. Symbol for aryl. *Webster 3d.*

arabesquitic. Applied to the texture of certain prophyries, the apparently homogeneous groundmasses of which break up, when examined under crossed nicols, into irregular patches, supposed to resemble arabesques. *Johannsen, v. 1, 2d, 1939, p. 202.*

Arabian luster. The original type of on-glaze luster used by the Moors from the 9th century onwards for the decoration of pottery; the sulfides or carbonates of copper and/or silver are used, the firing-on being in a reducing atmosphere so that an extremely thin layer of the metal is formed on the glaze. *Dodd.*

Arabian magic diamond. Synthetic colorless or light golden sapphire. *Shipley.*

aragonite. Form of calcium carbonate, $CaCO_3$, perhaps with some impurity, for example, strontium. *Pryor, 3.*

aragonite group. Aragonite, bromlite, witherite, strontianite, and cerusite. *Standard, 1964.*

Aralo-Caspian. In physical geography, applied to the extensive basin or depressed area occupied by the Aral and Caspian Seas, and which is a true basin of continental streams, having no communication with the ocean. *Fay.*

aramayoite. An iron-black silver sulfantimonite and sulfobismuthite, $Ag_2S.(Sb,Bi)_2S_3$; perfect cleavage; triclinic. From Animas mine, Chocaya, Bolivia. *English.*

arapahite. A very dark basalt containing about 50 percent magnetite. *Hess.*

arbitrary line. A reference line, the direction of which does not necessarily coincide with cardinal direction. *B.S. 3618, 1963, sec. 1.*

arbitration bar. A test bar, cast with a heat of material, used to determine chemical composition, hardness, tensile strength, and deflection and strength under transverse loading in order to establish the state of acceptibility of the casting. *ASM Gloss.*

arbor. a. In machine grinding, the spindle on which the wheel is mounted. *ASM Gloss.* b. In machine cutting, a shaft or bar for holding and driving the cutter. *ASM Gloss.* c. In founding, a metal shape imbedded in greensand or dry-sand cores to support the sand or the applied load during casting. *ASM Gloss.*

arbor collar. A hollow cylindrical spacer that fits an arbor and that is used to position and secure a cutter. *ASM Gloss.*

arborescent. a. Applied to minerals having a treelike form, especially when fairly massive. If the mineral formation is so thin as to resemble the painting of a tree, it is generally called dendritic. *Fay.* b. Synonym for dendritic. *A.G.I.*

arborescent powder. *See* dendritic powder. *ASTM B243-65.*

arbor hole. The central hole used for mounting a cutter or grinding wheel on an arbor. *ASM Gloss.*

arbor press. A machine used for forcing arbors or mandrels into drilled or bored parts preparatory to turning or grinding. Also used for forcing bushings, shafts, or pins into or out of holes. *ASM Gloss.*

arbor support. A brace or carrier to support the outer end or an intermediate point of an arbor. *ASM Gloss.*

arbor-type cutters. Cutters having a hole for mounting on an arbor and usually having a keyway for a driving key. *ASM Gloss.*

Arbuckle orogeny. Mid-Pennsylvanian diastrophism. *A.G.I. Supp.*

arc. a. Islands or mountains arranged in a great curve. *A.G.I. Supp.* b. As applied to circles, any portion of a circumference; as applied to electricity, the luminous bridge formed by the passage of a current across a gap between two conductors or terminals. *HW.*

arcanite. Same as aphthitalite. *Fay.*

arc-back. A failure of the rectifying action which results in the flow of a principal electron stream in the reverse direction due to the formation of a cathode spot on an anode. *Coal Age, 1.*

arc blow. The swerving of an electric arc from its normal path because of magnetic forces. *ASM Gloss.*

arc brazing. Brazing with an electric arc, usually with two nonconsumable electrodes. *ASM Gloss.*

arc cutter. A device consisting of a bit attached to knuckle-jointed rods used to drill a curved borehole or branched holes from a parent borehole. *Compare* whipstock. *Long.*

arc cutting. Metal cutting with an arc between an electrode and the metal itself. The terms carbon arc cutting and metal arc cutting refer, respectively, to the use of a carbon or metal electrode. *ASM Gloss.*

arc furnace. A furnace in which material is heated either directly by an electric arc between an electrode and the work, or indirectly by an arc between two electrodes adjacent to the materials. *ASM Gloss.*

arch. a. A portion of a rock left standing at the intersection of a wall and roof usually to support the roof. *Bureau of Mines Staff.* b. Ground unworked near a shaft. *Fay.* c. An anticline. *A.G.I.* d. In plutonic rocks, the planar or linear flow structures may form a dome that extends across the whole pluton. In an arch, the flow structures are confined to the borders of the pluton. *A.G.I.* e. A curved structural member used to span openings or recesses; also built flat. Structurally, an arch is a piece or assemblage of pieces so arranged over an opening that the supported load is resolved into pressures on the side supports and practically normal to their faces. *ACSG.* f. A part of a furnace; a crown. *ASTM C 162-66.* g. To heat a pot in a pot arch. *ASTM C 162-66.* h. One of the fire chambers of a brick kiln; also, the fire chamber in certain kinds of furnaces and ovens. Named from the arched roof. *Webster 3d.* i. The roof of a reverberatory furnace. *Fay.* j. Curved roof of underground opening. *BuMines Bull 587, 1960, p. 2.*

archaeolithic; archeolithic. Of or pertaining to the time of the earliest use of stone implements by man. *Hess.*

arch-bend. The place of maximum curvature on a fold, especially on a recumbent fold. *A.G.I.*

arch blocks. Applied to the wooden voussoirs used in framing a timber support for the tunnel roof, when driving a tunnel on the so-called American system. These blocks are made of plank, superimposed in three or more layers and breaking joint. *Stauffer.*

arch brick. a. A brick with both large faces equally inclined toward a long, narrow side (for use in arch construction). *VV.* b. A brick shape having six plane faces (two sides, two edges, and two ends), in which two faces (the sides) are inclined toward each other and one edge face is narrower than the other. *HW.*

arch dam. A dam in which water is dammed up against an arch-shaped abutment. *Bureau of Mines Staff.*

Archean. a. An adjective meaning ancient that has been generally applied to the oldest Precambrian rocks. The usage is changing as more physical measurements of geologic time are made. The Am. Comm. Strat. Nomenclature has recommended substituting Early Precambrian. *A.G.I.* b. The older of two Precambrian systems. Obsolete. Synonym for Archeozoic. *A.G.I. Supp.*

arched. Corn. Said of the roads in a mine, when built with stones or bricks. *Fay.*

Archeozoic. a. An adjective meaning ancient life that is applied to the last of three subdivisions of Archean time when the lowest forms of life probably existed. *Fay.* b. The era during which, or during the later part of which, the oldest system of rocks was made. *Fay.* c. As more physical measurements of geologic time are made, this term becomes more obsolete. It is now considered part of the Early Precambrian. *A.G.I.* d. The older of two Precambrian eras. The term is not recognized by the U.S. Geological Survey. *A.G.I. Supp.*

arch forms. Forms or patterns on which sprung arch brick are laid to insure the proper arch contour. *Bureau of Mines Staff.*

arch furnace. In furnace construction, a structure which usually spans two walls and may be supported by them. *ACSG, 1963.*

arch girder. A normal H-section steel girder bent to a circular shape. The usual form consists of halves joined together at the crown by bolts and two fishplates. The arch girder is usually splay legged or straight legged in shape but horseshoe shapes are also in use. *See also* steel support; wood stilt. *Nelson.*

Archibenthic Zone. *See* Benthic division. *Hy.*

Archimedes limestone. One of the subordinate beds of the Lower Carboniferous series. *Fay.*

Archimedes' principle. The apparent loss of weight which occurs when a heavier-than-water body is immersed in water equals the weight of liquid displaced. Used to determine the density of minerals insoluble in water. *Pryor, 3.*

Archimedes' screw. A device consisting of a tube bent spirally around an axis or a broad-threaded screw incased by a hollow open cylinder and used to raise water by rotating the apparatus when partly immersed in a slantwise direction. *Webster 3d.*

arching. a. Curved support for roofs of openings in mines; constructed archways in masonry. *Bureau of Mines Staff.* b. The development of peripheral cracks around an excavation due to the difference in stress between the skin rock and the rock in the stress ring. *Spalding. See also* V-arching. c. The folding of schists, gneisses, or sediments into anticlines. *Bureau of Mines Staff.* d. The transfer of stress from a yielding part of a soil mass to adjoining less-yielding or restrained parts of the mass. *ASCE P1826.* e. The fretting away of the periphery of a rock tunnel, usually converting it from a rectangular to a circular or elliptical section. The effect in the back is sometimes referred to as the "natural arch." The putting in of a lining built to an arch shape should not be referred to as arching but as "lining" or "putting in the arch." *Spalding, p. 159.*

arching action. The natural process by which a fractured, pulverulent, or a plastic material acquires a certain amount of ability to support itself partially through the resolution of the vertical component of its weight into diagonal thrust. *Woodruff, v. 1, p. 42.*

arching to a weakness. *See* V-arching. *Spalding, p. 23.*

archipelago. A group of islands. *Schieferdecker.*

architectural terra cotta. Plain or ornamented (machine-extruded or handmolded) hard fired clay building units, generally larger in size than brick and most facing tile, and having a glazed or unglazed ceramic finish in an unlimited variety of colors. *See also* ceramic veneer. *ACSG.*

archless kiln. Alternative name for scove. *See also* scove. *Dodd.*

archolithic. Of or pertaining to the earliest stone implements used by man. *Standard, 1964.* Not in common usage. *Fay.*

arch rib. The main load-bearing member of a ribbed arch. *Ham.*

arch set. Steel assemblies used to support mine workings. *Pryor, 3.*

arch structure. *See* abutment, a; pressure arch. *Nelson.*

arc-image furnace. *See* image furnace. *Dodd.*

arc melting. Melting metal in an electric arc furnace. *ASM Gloss.*

arc of contact. The portion of the circumference of a grinding wheel or cutter touching the work being processed. *ASM Gloss.*

arcose. Same as arkose. *Standard, 1964.*

arc-oxygen method. This method may be used for both cutting and welding underwater and is similar to electric welding on the surface except that, for cutting, the electrode is tubular and hollow. The method combines the use of the electric arc as a source of heat with pure oxygen under pressure as a means of rapidly oxidizing the molten metal. *Cerson, 2, p. 52.*

arc plasma. The space between arc terminals in which gaseous conduction of electricity takes place. Approximately equal numbers of electrons and ions virtually neutralize the space charge, but ionization and excitation are generally intense. The potential gradient is low. *BuMines Bull. 625, 1965, p. VII.*

arc shear machine. *See* universal machine.

arc shooting. A method of refraction seismic prospecting in which the variation of traveltime with azimuth from a shot point is used to infer geologic structure. The term also applies to a refraction spread placed on a circle or a circular arc with the center at the shot point. *A.G.I.*

arc-spraying. *See* plasma spraying. *Dodd.*

arc-through. A loss of control resulting in the flow of a principal electron stream through the rectifying element in the normal direction during a scheduled nonconduction period. *Coal Age, 1.*

Arctic suite. The basaltic and associated rocks of the Brito-Arctic Province do not belong to either the Atlantic or the Pacific suite, but occupy a petrographic position of an intermediate character, corresponding with their geographical situation, between the alkalic rocks of the Atlantic islands and the andesitic rocks of the Pacific borders. *Holmes, 1928.*

arc time. The time the arc is maintained in making an arc weld. *ASM Gloss.*

arctolite; arktolite. An uncertain hydrous silicate of calcium, magnesium, and aluminum, possibly $H_2O.(Ca,Mg)O.Al_2O_3.3SiO_2$; in small, colorless to yellowish or greenish curved plates in marble on Hvitholm, near Spitzbergen. *Dana 6d, p. 705.*

arculite. Crystallites grouped in a bow-shaped aggregate. *Schieferdecker.*

arc voltage. The voltage across a welding arc. *ASM Gloss.*

arcwall coal cutter. A special type of electric or compressed-air coal cutter for undercutting or overcutting a coal seam in narrow work. The machine is fixed in the center of the heading and the jib, while cutting, rotates horizontally through an arc of about 180°. It may be arranged on wheels for a rail track or with a crawler track. *See also* shortwall coal cutter. *Nelson.*

arcwall machine. *See* slabbing machine.

arcwall machineman. *See* radial machineman. *D.O.T. 1.*

arc welding. A group of welding processes wherein coalescence is produced by heating with an electric arc or arcs, with or without the application of pressure and with or without the use of filler metal. *Coal Age, v. 66, No. 3, Mar. 1961, p. 91.*

arc-welding electrode. *See* electrode. *ASM Gloss.*

ardealite. A white or light yellow hydrous double salt of calcium sulfate and acid phosphate, $CaHPO_4{\cdot}CaSO_4{\cdot}4H_2O$; fine powdery; minutely crystallized. Found associated with brushite and gypsum in a cavern at Ciclovina, Romania. *Hess; English.*

Ardeer double cartridge test. *See* sensitivity to propagation. *McAdam II, pp. 19-20.*

ardennite. A yellow to yellowish-brown vanadiosilicate of aluminum and manganese that crystallizes in the orthorhombic system. *Fay.*

are. The metric unit of area, which is 100 square meters or 119.6 square yards. *Bureau of Mines Staff.*

area, British and Metric units.

British
1 square inch = 6.45 square centimeter
1 square foot = 929 square centimeter
1 square mile = 2.59 square kilometers
Metric
1 square centimeter = .16 square inch
1 square meter = 1,550 square inch
Pryor, 3.

area cover. The area within a group of boreholes drilled in advance or around an underground opening for the purpose of detecting the presence of water-bearing fissures or formations. *Compare* cover, b. *Long.*

areal density. Synonym for surface density. *NRC-ASA N1.1-1957.*

areal eruption. A volcanic eruption resulting from the collapse of the roof of a batholith. The volcanic rocks grade into the parent plutonic rock. *A.G.I. Supp.*

areal geology. That branch of geology which pertains to the distribution, position, and form of the areas of the earth's surface occupied by different types of rock or by different geologic units, and to the making of geologic maps. *Fay.*

areal map. A geologic map showing the horizontal area or extent of rock units exposed at the surface. *A.G.I.*

areal pattern. A channel dispersion pattern resulting from widespread alteration. Areal patterns of dispersed mineral alteration patterns may outline the outer boundaries of a group of deposits and thus limit the area which it is necessary to prospect in detail. *Lewis, p. 301.*

area measurement, mine roadway. *See* Craven Sunflower method; planetable method; tape-triangulation method. *Roberts, I, pp. 59-60.*

area monitor. Any device for detecting and/or measuring radiation levels at a given location for warning or control purposes. *NRC-ASA N1.1-1957.*

area of airway. In mine ventilation, the cross-sectional area of the entry or duct through which the air flows, expressed in square feet. *BuMines Bull. 589, 1960, p. 2.*

area of contact. The total area of the surface of a grinding wheel in contact with the work. *ACSG, 1963.*

area of influence of a well. The area surrounding a well within which the piezometric surface has been lowered when pumping has produced the maximum steady rate of flow. *ASCE P1826.*

area of settlement. The surface area affected by subsidence. *Briggs, p. 23.*

area wall. The masonry surrounding or partly surrounding an area; also the retaining wall around basement windows below grade. *ACSG.*

arenaceous. Applied to rocks that have been derived from sand or that contain sand. Not to be confused with siliceous. *Fay.*

arenaceous clay. Sandy clay. *ACSG, 1963.*

arenaceous rock. A sedimentary rock composed essentially of sand grains, that is, composed of quartz and rock fragments down to 0.005 millimeter in size. Conglomerates, sandstones, grits, and siltstones fall into this category. *C.T.D.*

arenarious. Composed of sand; sandy. *Stand-*

ard, 1964.

arenated. Reduced to or mixed with sand. *Standard, 1964.*

arenation. A sandbath. *Hess.*

arendalite. a. Fr. A garnet rock. *Holmes, 1928.* b. A dark-green crystalline epidote, from Arendal, Norway. *Standard, 1964.*

areng. A Bornean term for a yellowish gravelly earth, sometimes containing diamonds. *Fay.*

Arenigian. Upper Lower Ordovician. *A.G.I. Supp.*

arenilitic. Resembling sandstone; having the quality of sandstone; composed of sandstone. *A.G.I.*

arenite; arenyte. A consolidated rock having the texture of sand regardless of its composition. *A.G.I.*

arenolite. An artificial siliceous-argillaceous-calcareous stone. *CCD 3d, 1942.*

arenose. Full of grit or fine sand; gritty. *Standard, 1964.*

Arents tap. An arrangement by which the molten lead from the crucible of a shaft furnace is drawn through an inverted siphon into an exterior basin from which it can be ladled without disturbing the furnace. *Fay.*

areometer. An instrument for measuring the specific gravity of liquids. *Compare* Baumé scale; Marsh funnel; Twaddell hydrometer; specific-gravity hydrometer. *Long.*

arete. An acute and rugged crest of a mountain range, or a narrow subsidiary ridge between two mountains, or of a mountain spur, such as that between two cirques. *A.G.I.*

arfvedsonite. A slightly basic metasilicate of sodium, calcium, and ferrous iron, $Na_2Ca_{0\cdot5}Fe_{3\cdot5}''Fe_{1\cdot5}'''(Si_{7\cdot5}Al_{0\cdot5})O_{22}(OH)_2$ with more Fe" than Mg; monoclinic. One of the amphibole group. *American Mineralogist, v. 43, No. 7–8, July-August 1958, pp. 797–798; Dana 17.*

argal. *See* argol. *Fay.*

Argall furnace. A reverberatory roasting furnace of which the hearth has a reciprocating movement whereby the ore is caused to move forward by the action of rabbles extending across the hearth. *Fay.*

Argall tubular furnace. A tubular roasting furnace consisting of four brick-lined steel tubes 30 feet long nested together inside two steel tires, which revolve upon steel-faced carrying rolls. *Fay.*

argental mercury. A silver amalgam. *Standard, 1964.*

argentate. a. A salt in which silver acts as an acid radical; as, ammonium argentate (fulminating silver). *Standard, 1964.* b. Having a silvery appearance. *C.T.D.*

argentation. The act or process of coating or plating with silver. *Standard, 1964.*

argentic. Of, pertaining to, or containing silver. Used especially for compounds in which silver is in the bivalent state; for example, argentic oxide (AgO). *Webster 3d; CCD 6d, 1961.*

argentiferous. Containing silver. *Fay.*

argentiferous galena. *See* silver lead ore.

argentiferous lead. Lead which contains silver. *C.M.D.*

argentina. In ceramics, unglazed porcelain coated by a chemical process with gold, silver, or copper. *Standard, 1964.*

argentine. a. A lamellar variety of calcite with a pearly-white luster. *Fay.* b. Silver-coated white metal. *Standard, 1964.* c. A finely divided tin moss or sponge obtained from a solution of tin by precipitation with zinc. *Standard, 1964.*

Argentine plate. German silver. *Standard, 1964.*

argention. Ionized silver. *Standard, 1964.*

argentite; silver glance. A mineral, Ag_2S. Monoclinic; pseudoisometric. An important ore of silver. *A.G.I.*

agentojarosite. A yellow, brownish hydrous basic sulfate of iron and silver, $Ag_2Fe_6(OH)_{12}(SO_4)_4$. Small scales. Hexagonal. From Dividend, Utah. *English.*

argentopyrite. A questionable silver iron sulfide said to occur in small six-sided twin crystals. *Hess.*

argentous. Of, pertaining to, or containing silver. Used especially for compounds in which silver is in the univalent state; for example, argentous oxide (Ag_2O). *Webster 3d; CCD 6d, 1961.*

argil. a. Potter's clay; white clay. *Standard, 1964.* b. Same as aluminite. *Standard, 1964.*

argillaceou. Applied to all rocks or substances composed of clay, or having a notable proportion of clay in their composition, as roofing slate, shale, etc. Argillaceous rocks are readily distinguished by the peculiar odor they emit when breathed on and which is known as the argillaceous odor. Applied to a rock containing appreciable clay. *Compare* pelitic; lutaceous. *A.G.I.*

argillaceous hematite; ironstone clay. A variety of natural ferric oxide containing an appreciable portion of clay or sand as impurity. A hard brown to deep red mineral, with submetallic to nonmetallic luster and a red streak. *CCD 6d, 1961.*

argillaceous limestone. A limestone with appreciable clay as impurity. Certain varieties are useful as raw material for cement manufacture and are called cement rock. *CCD 6d, 1961.*

argillaceous material. Clay material. *Mersereau, 4th, p. 234.*

argillaceous ores. Iron ores in which the gangue is mainly clay. *Osborne.*

argillaceous rock. A sedimentary rock composed of clay-grade particles, that is, composed of minute mineral fragments and crystals less than 0.002 millimeter in diameter; containing much colloidal-size material. In addition to finely divided detrital matter, argillaceous rocks consist essentially of illite, montmorillonite, kaolinite, gibbsite, and diaspore. *C.M.D.*

argillaceous sandstone. A sandstone containing a considerable proportion of clay. *Fay.*

argillaceous slate. Clayey slate. *Sandstrom.*

argillation. The development of clay minerals by the weathering of aluminum silicates. *A.G.I. Supp.*

argillic. Synonym for argillaceous. *A.G.I. Supp.*

argillic alteration. A rock alteration in which certain primary and/or secondary minerals are converted to clay minerals. *A.G.I.*

argillic clay minerals. Minerals occurring in sulfide ore and that are characteristically of an earlier formation than sericite. Chemical data indicates that calcium and sodium are generally removed from the rock to a significant degree, whereas potassium and silica remain constant or increase slightly. *Lewis, p. 606.*

argillite. A rock derived either from siltstone, claystone, or shale, that has undergone a somewhat higher degree of induration than exists in those rocks. Argillite is intermediate between the rocks named and slate. Its cleavage is approximately parallel to its bedding, thereby differing from slate. An argillite may be argillaceous, bituminous, calcareous, carbonaceous, ferruginous, siliceous, etc. *A.G.I.*

argillization. The replacement or alteration of feldspars to form clay minerals, especially in wall rocks adjacent to mineral veins. *A.G.I.*

argilloarenaceous. Composed of or containing clay and sand. *Standard, 1964.*

argillocalcareous. Composed of or containing clay and calcium carbonate. *Standard, 1964.*

argillocalcite. A clayey calcite. *Standard, 1964.*

argillomagnesian. Composed of or containing clay and iron minerals. *Standard, 1964.*

argilloferruginous. Composed of or contain-clay and magnesium minerals. *Standard, 1964.*

argol; argal. The hard crust of potassium acid tartrate deposited from grape juice during fermentation; crude cream of tartar. According to the color of the grape, argol is dark red or whitish pink. *Standard, 1964* Used extensively in assaying for its reducing power. Also spelled argoll; argall; orgal. *Fay.*

argon. A colorless, odorless, monatomic gas, constituting almost 1 percent by volume of the atmosphere, from which it is obtained by the fractionation of liquid air. It is a zerovalent element. Used in gas-filled electric lamps and in argon-arc welding. The gas does not combine with any known element. Symbol, A or Ar; atomic number, 18; atomic weight, 39.944; melting point, −189.2° C; and boiling point, −185.7° C. *C.T.D.*

Argon. Trade name for a kaolin brick with a large proportion of calcined grog. *Hess.*

argon-arc welding. Welding in an inert atmosphere using an arc struck between an electrode (generally tungsten) and the work. The inert atmosphere is provided by directing argon or helium (heliarc welding) into the weld area through a sheath surrounding the electrode. *Ham.*

Argosite. Bentonite. *Bennett 2d, 1962.*

Argovian. Lower Lusitanian. *A.G.I. Supp.*

argulite. A variety of asphaltic sandstone. *Tomkeieff, 1954.*

argyrite. Same as argentite. Also called **argyrose.** *Standard, 1964.*

argyrodite. A double sulfide of germanium and silver, $4Ag_2S.GeS_2$; the mineral in which the element germanium was first discovered. *C.T.D.; BuMines Bull. 585, 1960, p. 343.*

argyropyrite. A silver-iron sulfide, $Ag_3Fe_7S_{11}$, similar to argentopyrite, that crystallizes in the hexagonal system. *Standard, 1964.* Probably the same as argentopyrite. *Fay.*

argyrose. Same as argentite. *Standard, 1964.*

argyrythrose. Same as pyrargyrite. *Standard, 1964*

arid. a. Without moisture; excessively dry; parched and barren; specifically, having insufficient rainfall to support agriculture, and usually less than 10 to 15 inches annually. *Webster 3d.* b. Applied to a climate in which the rainfall is insufficient to support vegetation. *A.G.I.*

arid erosion. That form of erosion or general wearing away of rocks which takes place in arid countries, such erosion being due largely to the wind. The term is equivalent to desert erosion, and is in contradistinction to normal (stream), glacial, and marine erosion. *A.G.I.*

aridized plaster. Plaster that has been treated, while being heated in the kettle, with a deliquescent salt, for example, $CaCl_2$; it is claimed that this produces a strong plaster having more uniform properties. *Dodd.*

ariegite. Given by Lacroix to a special family of granitoid rocks, consisting primarily of monoclinic pyroxene and spinel. Subvarieties result from the presence of amphibole and garnet. The rocks are found in the French Pyrenees, in the Department of Ariege, from which they take their name. They are most closely related to the pyroxenites. *Fay.*

Arikareean. Lower Miocene. *A.G.I. Supp.*

arite. A nickel mineral intermediate between niccolite and breithauptite. *Dana 7, v. 1, p. 237.*

arithmetic mean. In statistical methods,

$$A.M. = \Sigma \frac{\text{observations}}{\text{number}}$$ *Pryor, 3.*

arithmetic mean particle diameter. A measure of the average particle size obtained by summing the products of the size-grade midpoints times the frequency of particles in each class, and dividing by the total frequency. *A.G.I.*

Arizona peridot. Peridot from Arizona, usually found in small sizes and light tones. *Shipley.*

Arizona ruby. A pyrope from Arizona. *C.M.D.*

Arizona spinel. *See* Arizona ruby. *Hess.*

arizonite. a. A name for a type of ore. The principal vein matter is micaceous iron, iodide of silver, gold, sulfurets of iron, and antimony. *Hey, M.M., 1961.* b. A dike rock composed mostly of quartz, some orthoclase, and with accessory mica and apatite. Obsolete. *A.G.I.*

ark. a. A flat boat in which coal was floated down the rivers to tidewater. It made one trip and was broken up at its destination, the timber sold, and the hardware returned to the point of origin. *Korson.* b. A large vat used in the pottery industry for the mixing or storage of clay slip. *Dodd*

Arkansas diamond. a. Rock crystal from Arkansas. *Shipley.* b. A diamond from a mine near Murfreesboro, Arkansas. *Shipley.*

Arkansas pearl. Freshwater pearl from rivers in Arkansas, once a larger producer of parls than any other state. *Shipley.*

Arkansas stone. A true novaculite used as an oilstone for sharpening tools or instruments. Found in the Ozark Mountains, Ark. *See also* novaculite. *Fay.*

arkansite. A brilliant, iron-black variety of brookite from Magnet Cove, Ark. *Fay.*

arkelite. The cubic phase of ZrO_2. *Hey, M.M., 1964.*

arkite. A feldspathoidal rock composed largely of pseudolucite and nepheline, with subordinate melanite and pyroxene, and accessory orthoclase, apatite, and sphene. The pseudoleucite usually occurs as phenocrysts. *A.G.I.*

arkose. a. A rock of granular texture formed principally by mechanical aggregation. It is composed essentially of large grains of clear quartz and grains of feldspar, either lamellar or compact, or like clay. These two minerals are often mixed in almost equal quantities, but more often, quartz is dominant. *A.G.I.* b. A sedimentary rock composed of material derived from the disintegration of acid igneous rocks of granular texture. There is usually little sorting of material. Also used as an adjective with sandstone or conglomerate to indicate the presence of little sorted products of granitic decay. *A.G.I.* c. A sandstone containing 25 percent or more of feldspars, usually derived from the disintegration of acid igneous rocks of granitoid texture. The constituent minerals of an arkose may accumulate in place or be transported. *A.G.I.*

arkose quartzite. Synonym for arkosite *A.G.I.*

arkosic. Having entirely or in part the character of arkose. *Fay.*

arkosic bentonite. If the original volcanic ash from which the bentonite was derived contained a large proportion of detrital crystalline grains (and they remain essentially unaltered and retain their original characters), the rock is called a sandy bentonite, an arkosic bentonite, or a bentonitic arkose. Synonym for bentonitic arkose. *A.G.I.*

arkosic limestone. An impure clastic limestone containing a relatively high proportion of grains and/or crystals of feldspar, either detrital or formed in place. *A.G.I.*

arkosic sandstone. a. A sandstone containing much feldspar. It may range from unassorted products of granular disintegration of fine- or medium-grained granite to a partly sorted, river-laid, or even marine, arkosic sandstone. *A.G.I.* b. It has been used for various other kinds of rock including graywacke. *A.G.I. Supp.*

arkosic wacke. Graywacke containing more feldspar than rock fragments; synonym for feldspathic graywacke. *A.G.I. Supp.*

arkosite. A quartzite with a notable amount of feldspar. Synonym for arkose quartzite. *A.G.I.* b. A variety of impsonite. *Tomkeieff, 1954.*

arks. Storage bins. *Noke.*

arles; earles. N. of Eng. Earnest money formerly allowed to colliers at the time of hiring them. *Fay.*

arm. a. The inclined member or leg of a set or frame of timber. *Fay.* b. An inlet of water from the sea or other body of water. *Webster 3d.*

armadura. Mex. The country rock of metalliferous veins or other ore deposits. *Hess.*

armangite. A black manganese arsenite, $Mn_3(AsO_3)_2$; prismatic; rhombohedral. From Langban, Sweden. *English.*

armature. a. A piece of soft iron or steel that connects the poles of a magnet or of adjacent magnets to preserve the intensity of magnetization, produce signals (as in the telegraph), or do mechanical work by its motions to and from the magnet. *Webster 3d.* b. The part of a dynamoelectric machine carrying the conductors whose relative movement through the magnetic field between the pole pieces causes an electric current to be induced in the conductors (as in the dynamo); or which by having a current passed through them are caused by electromagnetic induction to move through this field (as in the motor). *Webster 3d.*

arm conveyor. A conveyor consisting of an endless belt, or one or more chains, to which are attached projecting arms, or shelves, for handling packages or objects in a vertical or inclined path. *ASA MH4.1-1958.*

Armenian stone. a. Lapis lazuli. *Shipley.* b. An old name for azurite. *Shipley.*

armenite. a. A hydrated aluminosilicate or calcium and barium, $BaCa_2Al_6Si_8O_{28}.2H_2O$; as colorless pseudohexagonal (orthorhombic?) crystals; from Armen mine, Kongsberg, Norway. Named from locality. *Spencer 15, M.M., 1940.* b. A synonym for azurite; Armenian stone. *Fay.*

armor. An outer cable covering that may be either metallic or nonmetallic. *BuMines Coal-Mine Inspectors' Manual, June 1966, pt. 3-18e, p. 52.*

armored apron. An apron in which each pan is provided with a separate wearing plate. *ASA MH4.1-1958.*

armored cable. A cable that is wrapped with metal, usually steel wires or tapes, primarily for physical protection. *ASA M2.1-1963.*

armbored flexible conveyor; snaking conveyor. A heavy, chain-type flexible conveyor capable of being advanced with the face without dismantling. It is designed to carry a coal cutter or cutter loader or to guide and hold a plough against the face. It may be advanced by horizontal hydraulic rams which are fixed at about 20-feet intervals on the waste side of the conveyor. It is often employed on prop-free-front faces with hand filling, and has a capacity of about 200 to 300 tons per hour. *Nelson.*

armored mud balls; pudding balls. Subspherical balls of mud, 5 to 30 centimeters in diameter, coated with coarse sand and fine gravel. *Pettijohn.*

armored relict. An unstable relict enveloped by a crystal or by a reaction shell which prevented its reaction with the other constituents of the rock. *Schieferdecker.*

armoring. Metal protection for the refractory brickwork at the top of the stack of a blast furnace; its purpose is to prevent abrasion of the refractories by the descending burden (that is the raw materials charged to the furnace). *Dodd.*

armorplate. Specially heavy alloy steelplate forged in hydraulic presses, hardened on the surface; used for the protection of warships. An approximate composition is 0.2 to 0.4 percent carbon, 1.0 to 3.5 percent chromium, 1.5 to 3.5 percent nickel, and 0 to 0.5 percent molybdenum. *C.T.D.*

arms. S. Wales. The upright side posts of a timber set. The upper ends are suitably notched to fit the crossbar or collar. *See also* Welsh notch. *Nelson.*

Armstrong air breaker. *See* compressed airblasting. *Nelson.*

Armstrong joint. A two-bolt, flanged or lugged connection for high pressures. The ends of the pipes are peculiarly formed to properly hold a gutta-percha ring. It was originally made for cast-iron pipe. The two-bolt feature has much to commend it. There are various substitutes for this joint, many of which employ rubber in place of gutta-percha; others use more bolts in order to reduce the cost. *Strock, 3.*

arnimite. An orthorhombic, calcium-free variety of devillite with the formula, $Cu_5(SO_4)_2(OH)_6.3H_2O$; bright green; forming crusts of short acicular or scaly crystals. Possibly antlerite, $Cu_3(SO_4)(OH)_4$. *American Mineralogist, v. 39, September-October 1954, p. 851; Dana 6d, p. 963.*

arochlors. Chlorinated diphenyl materials that are useful as vehicles for pigments used in glass decoration since they volatilize without leaving a carbon residue. Arochlors provide a grinding and dispersing media for nonaqueous slurries of pigments and ceramic bodies; also, they can be used in combination with waxes to provide moisture-proof coatings. *Lee.*

A rod bit. A Canadian standard noncoring bit having a set diameter of 1.865 inches, more commonly called 1⅞. A drill-rod bit. *Long.*

aromatic compounds. Compounds derived from the hydrocarbon benzene, C_6H_6, distinguished from those derived from methane, CH_4. *Standard, 1964.*

aromatic hydrocarbon. A compound of carbon and hydrogen that contains in its molecular structure a closed and saturated ring of carbon atoms; for example, benzene, naphthalene, and anthracene. *Hackh's Chem. Dict.*

aromatite. A bituminous stone resembling myrrh in color and odor. *Standard, 1964.*

aromite. A very hydrous sulfate of magnesium and aluminum, $6M_gSO_4.Al(SO_4)_3$-$54H_2O$; resembles epsomite. From the Pampa de Aroma, northern Tarapaca, Chile. *Dana 6d, p. 954.*

arquerite. A silver amalgam containing a very small quantity of mercury; $Ag_{12}Hg$; contains 86.5 percent silver. From Coquimbo, Chile. *Dana 6d, p. 23.*

arrage. A sharp edge or corner in a drift. Also called arris. *Standard, 1964.*

arrastra. *See* arrastre.

arrastre; arrastra. A circular rock-lined pit in which broken ore is pulverized by stones attached to horizontal poles fastened in a central pillar and dragged around the pit. *Weed, 1922.* This primitive form of grinding mill is still used for ores in Central America and for cement in Europe. *C.T.D.*

arrested anticline. a. Proposed by Orton for a gentle monocline in the natural gas fields of Ohio. *Fay.* b. Proposed for a structural feature produced by the arrest or suppression of the prevailing dip of the rocks for a given space and the establishment of a terrace or a level bench in its place. *A.G.I.*

arrested crushing. Comminution in jaw or gyratory crushers in which the crushing surfaces are arrested at a given distance or set apart. The set controls the size of the crushed product. *Nelson.* The crushing is so conducted that choke conditions are not reached during passage of ore. There must be free discharge of material broken to below the set dimensions at the narrowest discharge point. *Pryor, 3.*

arrested decay. A stage in coal formation when biochemical action ceases. *Tomkeieff, 1954.*

arrester. a. Any mechanical contrivance or device used to stop or slow up motion. *Crispin.* b. Mechanism for the purification of a gas stream which may contain suspended liquids or solids. *Bennett 2d, 1962.*

arrest points. Discontinuities on heating and cooling curves, due to absorption of heat during heating or evolution of heat during cooling, and indicating changes occurring in a metal or alloy. *C.T.D.*

arris. a. The sharp edge of a building brick or ridge tile. An arris tile is a specially shaped tile for use in the ridge or hip of a roof. The arris edge on glass is a bevel up to one-sixteenth of an inch wide and at an angle of 45°. *Dodd.* b. Same as arrage. *Fay.*

arris cleat. Aust. A strip of wood having a triangular cross section used for keeping brattices in position. *Fay.*

arrissing tool. A tool similar to a float, used in road construction to round off the edge of a concrete slab. *Ham.*

arrival dealings. Dealing in ores, concentrates, and metals in transit from source to market. *Pryor, 3.*

arroba. A Spanish liquid measure of 25.36 pounds, avoirdupois; Portuguese, 32.38 pounds. *Weed, 1922.*

arrojadite. A dark green phosphate of iron, manganese, etc., $4R'_3PO_4.9R''_3P_2O_8$. Cleavable massive. Monoclinic. From Picuhy, Brazil; Black Hills, S. Dak. *English.*

arrow. A sharp-pointed, thin metal rod about 1 to 2 feet long with a ring at the other end and used in surveying; a thin metal peg. *Mason.*

arrow points. Indian arrowheads mostly made of quartz, more rarely of obsidian or other fine-grained rock. *Schaller.*

arroyo. a. The channel of an ephemeral stream or an intermittent stream, usually with vertical banks of unconsolidated material 2 feet high, or higher. *USGS Bull. 73, 1923, p. 86.* b. The vertical-walled, flat-floored channel of an ephemeral stream in the semiarid southwestern United States. *A.G.I.* c. Sp. A small stream; a gutter. Usage varies and in some Latin-American countries arroyo includes gorges of major porportions. *McKinstry.*

arsenargenite. Possibly a silver arsenide, Ag_3As. *Dana 6d, p. 43.*

arsenate. A salt or ester of an arsenic acid; a compound containing one of the three radicals in which arsenic has a +5 valence: AsO_4^{-3} (orthoarsenate), AsO_3^{-1} (metaarsenate), or $As_2O_7^{-4}$ (pyroarsenate). *A.G.I.; Handbook of Chemistry & Physics, 42d ed., 1960.*

arsenic. A trivalent and pentavalent metalloid element; commonly metallic steel-gray; hexagonal rhombohedral; and brittle. Also known in black amorphous and yellow isometric forms. Occurs in the free state (as native arsenic in tarnished granular or kidney-shaped masses having a specific gravity of 5.73); also combined in minerals of (as arsenopyrite, orpiment, realgar, arsenolite); and in ores of other metals (as copper, gold) from which it is usually separated as a byproduct in the form of arsenic trioxide. Used in small amounts in alloys (as an alloy with lead for shot) and in the form of its compounds chiefly as poisons (as insecticides) and in glass. Symbol, As; atomic number, 33; atomic weight, 74.92; specific gravity (gray), 5.73; melting point, 814° C (at 36 atmospheres); and no boiling point because it sublimes at 615° C. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-100.* b. An industrial term for an oxide of arsenic. *ASTM C162-66.*

arsenic acid; orthoarsenic acid. White translucent crystals; $H_3AsO_4.\frac{1}{2}H_2O$. Used in glassmaking. *CCD 6d, 1961.*

arsenical antimony. Synonym for allemontite. *Hey 2d, 1955.*

arsenical copper. Copper containing up to about 0.6 percent arsenic. This element slightly increases the hardness and strength and raises the recrystallization temperature. Used for firebox stays, etc. *C.T.D.*

arsenical nickel. Synonym for niccolite. *Fay.*

arsenical pyrite. Synonym for arsenopyrite. *Fay.*

arsenic chloride. *See* arsenic trichloride. *CCD 6d, 1961.*

arsenic disulfide; realgar; red orpiment. As_2S_2; molecular weight, 213.97; red-brown; monoclinic; specific gravity, (alpha), 3.506 (at 19° C) and (beta), 3.254 (at 19° C); melting point, (alpha), 267° C and (beta), 307° C; boiling point, 565° C; and insoluble in water. *Bennett 2d, 1962.*

arsenic furnace. A furnace for making white arsenic from arsenopyrite. *Hess.*

arsenicite. Synonym for pharmacolite. *Hey 2d, 1955.*

arsenic minerals. The dominant mineral is arsenopyrite. Arsenic is mainly a byproduct in the flue dust of furnaces that treat ores for gold, copper, etc. Two colored sulfides, realgar and orpiment, are used as pigments. *Pryor, 3.*

arsenic trichloride; arsenic chloride. A colorless or pale yellow, oily liquid; $AsCl_3$. Used in ceramics. *CCD 6d, 1961.*

arsenic trioxide; white arsenic; arsenious oxide. a. A white, odorless, tasteless powder; As_2O_3. Used in the manufacture of pigments, glass, and other arsenic compounds; ceramic enamels, aniline colors; and is mixed with soda ash for boiler compounds. *CCD 6d, 1961.* b. Isometric and monoclinic crystals. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-153.*

arsenic trisulfide; orpiment. As_2S_3; molecular weight, 246.04; yellow or red; monoclinic; specific gravity, 3.43; melting point, 300° C; boiling point, 707° C; and soluble in water and in ethyl alcohol. *Bennett 2d, 1962.*

arsenic, white. See arsenic trioxide.

arsenide. A compound in which arsenic is the negative element; for example, cobalt arsenide ($CoAs_2$). *Standard, 1964.* Arsenic unites with most metals to form arsenides; for example, with iron to form iron diarsenide, $FeAs_2$. Arsenides are decomposed by water or by dilute acids with the formation of arsine. *C.T.D.*

arsenious. Of, relating to, or containing arsenic. Used especially in compounds in which arsenic is trivalent. *Webster 3d.*

arsenious acid. A white crystalline compound; H_3AsO_3. *Standard, 1964.*

arsenism. Chronic arsenical poisoning. *Hess.*

arsenite. A salt or ester of arsenous (arsenious) acid. A compound containing the radical AsO_3^{-3} or AsO_2^{-1}. *A.G.I.*

arsenobismite. A yellowish-green, hydrous bismuth arsenate, $2Bi_2O_3.As_2O_5.2H_2O$; cryptocrystalline aggregates. Found in the Tintic district, Utah. *English.*

arsenoclasite. *See* arsenoklasite. *Hey 2d, 1955.*

arsenoklasite. A cleavable, red, basic hydrous arsenate of manganese, $Mn_3(AsO_4)_2.2Mn(OH)_2$; orthorhombic; from Langban, Sweden. *English.*

arsenolamprite. A metallic lead-gray variety of native arsenic containing bismuth. *Standard, 1964.* Spectrographic analysis showed arsenic major, iron, calcium, magnesium, aluminum, and silicon minor, silver, antimony small, beryllium, bismuth, chromium, copper, mercury, manganese, lead, titanium, zinc traces. The calcium, magnesium, aluminum, and silicon are attributed to admixed carbonate, the silver and mercury to native silver, the iron in part to loellingite and a chloritelike mineral. Orthorhombic; from Cerny Dul, where it occurs as dark gray plates and veinlets in carbonate. *American Mineralogist, v. 45, No. 3-4, March-April 1960, pp. 479-480.*

arsenolite. A white, arsenious oxide, As_2O_3, with an occasional yellow or red tinge, crystallizing in the isometric system. *Standard, 1964.*

arsenopyrite; mispickel. A tin-white sulfarsenide of iron, FeAsS; monoclinic; pseudo-orthorhombic. *A.G.I.; Dana 17.*

arsenostibite. Arsenian stibiconite. *Fleischer.*

arsenosulvanite. A mineral, isomorphous with sulvanite with vanadium largely replaced by arsenic, $Cu_3(As,V)S_4$; cubic; from Mongolia. *Spencer 20, M.M., 1955.*

arsenpolybasite. A mineral, $(AgCu)_{16}(As,Sb)_2S_{11}$, the arsenic end-member corresponding to polybasite, and members of this series with arsenic greater than antimony. Dimorphous with pearceite, with a unit-cell 8 times as large. *Hey, M.M., 1964.*

arsenuranocircite. Synonym for heinrichite; it is not clear which name has priority as applied to a natural mineral. *Hey, M.M., 1961.*

arsenuranylite. The arsenate analogue of phosphuranylite, which it closely resembles except for a deeper orange color, $Ca(UO_2)_4(AsO_4)_2(OH)_4.6H_2O$. Named from the composition and in analogy with phospluranylite. *Hey, M.M., 1961.*

arshine. A Russian measure of volume equal to 12.7 cubic feet. *Fay.*

arsoite. An olivine-bearing diopside trachyte. *A.G.I.*

arsotrachyte. An olivine trachyandesite containing phenocrysts of sanidine, oligoclase, augite, and olivine in a trachytic groundmass containing interstitial glass. The lava of Ischia Island, Italy. *Holmes, 1928.*

art. *See* airborne radiation thermometer. *Hy.*

arterial road. A main road with secondary roads joining it. *Ham.*

arterite. a. A migmatite that was produced by regional contact metamorphism in the course of which residual magmas were injected into the host rock. *See also* migmatite; venite. *A.G.I.* b. A gneiss containing veins formed from the solutions rising from a deep-seated intrusion of molten granite. *A.G.I.* c. A veined gneiss in which the vein material was injected from a magma. Venite is a veined gneiss of similar aspect and composition, but differs from arterite in that the vein material was derived by secretion from the rock itself. Where it is impossible to distinguish between arterite and venite, the term phlebite is used. *A.G.I.*

arteritic migmatite. Injection gneiss supposed to be produced by the introduction of pegmatite, granite, or aplite into schist parallel to the foliation. *A.G.I.*

artesian. a. Refers to ground water under sufficient hydrostatic head to rise above the aquifer containing it. *A.G.I. Supp.* b. Pertaining to underground water that is confined by impervious rock or other material under sufficient pressure to raise it above the upper level of the saturated rock or other material in which it occurs, if this rock or material is penetrated by wells or natural fissures. Formerly, the term was applied only to water under sufficient pressure to raise it to the surface of the earth. *Stokes and Varnes, 1955.*

artesian aquifer. An aquifer that contains artesian water. *A.G.I.*

artesian basin. A geologic structural feature or a combination of such features in which water is confined under artesian pressure. *A.G.I.*

artesian casing. Steel pipe well casing of the desired diameter with screw joints. *Hess.*

artesian discharge. The process of discharge from a well by artesian pressure, and also the quantity of water discharged. The artesian pressure is aided by the buoyancy of the natural gas that enters some wells with the water. *Stokes and Varnes, 1955.*

artesian leakage. The slow percolation of water from artesian formations into the confining materials of a less permeable but not of a strictly impermeable character. Such percolation causes a reduction in artesian pressure, depending on the relative impermeability of the materials in the confining formations. *A.G.I.*

artesian spring. A spring, the water from which issues under artesian pressure, generally through some fissure or other opening in the confining bed that overlies the aquifer. *A.G.I.*

artesian water. a. Ground water that is under sufficient pressure to rise above the level at which it is encountered by a well, but which does not necessarily rise to or above the surface of the ground. *A.G.I.* b. Ground water that is confined within a permeable bed and that rises under pressure to approximately the height of the intake. If the outlet (well or spring) is appreciably below the height of the intake, the water will flow out under pressure. If even with or above the height of the intake, the water will rise in the well but it will not flow out. *Bateman.*

artesian well. a. A well in which the water level rises above the top of the aquifer, whether or not the water flows at the land surface. *A.G.I.* b. Formerly, only applied to a well drilled to a depth where, owing to the structure of the strata, the water pressure was high enough to raise the water to the surface. *Standard, 1964.* c. Often applied to any deep well, even where pumping is necessary, as in an ordinary driven well. *Standard, 1964.*

Arthropoda. Consist of animals divided into a number of parts in series, each equipped with a pair of legs. It includes Crustacea, like lobsters and crabs, spiders and insects. The most important fossil type is the trilobite which in its various forms lived in Paleozoic times only. It consisted of segments divided into three portions, the segments are joined to the head with jaws and antennae and the tail and chest portions have feet for swimming and gills for breathing. *Sinclair, II, p. 67.*

arthurite. Thin apple-green crusts on quartz consisting of an intimate mixture of pharmacosiderite and $Cu_2Fe_4(AsO_4)_3(OH)_7.6H_2O$; from Hingston Down Consols Mine, Calstock, Cornwall, England. *Hey, M.M., 1964.*

articulation. a. A movable joint. *A.G.I. Supp.* b. A manner of joining adjacent mineral grains in a rock; the contact may be smooth and plane, curved or sinuous, angularly interlocked or sutured, or one mineral may completely enclose another. *A.G.I. Supp.*

articulite. Synonym for itacolumite. *A.G.I.*

artificial aging. Aging above room temperature. *See also* aging; precipitation heat treatment. *Compare* natural aging. *ASM Gloss.*

artificial cementing. Consolidation of loose soils for which three methods are generally used: (1) cementation, (2) the Joosten process of chemical consolidation, and (3) freezing. *Ham. See also* soil stabilization.

artificial earthquake. Resulting from industrial or traffic commotion, explosions, etc. *Schieferdecker.*

artificial harbor. A harbor constructed by building breakwaters around an area of sea to provide protection for shipping. *Ham.*

artificial heavy spar. *See* blanc fixe.

artificial horizon. In surveying, a surface of liquid mercury used in connection with measurement of height of sun by means of sextant. *Pryor, 3.*

artificial liquid fuels. Fuels created by the hydrogenation of coal, the destructive distillation of coal, lignite, or shale at low temperature, and by a recombination of the constituents of water gas in the presence of a suitable catalyst. *Bureau of Mines Staff.*

artificial mineral; synthetic mineral. A mineral formed artificially (synthetically) in the laboratory, as distinguished from a mineral occurring naturally. *Fay.*

artificial nourishment. The process of replenishing a beach by artificial means, for example, by the deposition of dredged material. *H&G.*

artificial refractories. Materials manufactured in electric furnaces and used for special purposes; for example, zirconium carbide, titanium carbide, and silicon carbide. *Newton. pp. 261-262.*

artificial respiration. The restoration or initiation by manual or mechanical means of breathing that has failed or that has never begun. It consists essentially of forcing air into and out of the lungs to establish a rhythm of inspiration and expiration. *Webster 3d. See also* Silvester method; Schafer method; Holger-Nielsen method; Eve method; Drinker method; Schafer-Nielsen-Drinker method; hip-lift back pressure method; hip-roll back pressure method; inflation method; direct method; Laborde method. *McAdam, pp. 84-92.*

artificial rock asphalt. A mastic or powder manufactured from bituminous rock after it has been reduced to powder and additional bitumen added as required. *Nelson.*

artificial soft porcelain. Porcelain in which the body is formed of a natural clay suspended in a fluxing material artificially prepared. *Standard, 1964.*

artificial stone. a. A special kind of concrete, resembling a natural stone, made by mixing chippings and dust of natural stone with Portland cement (colored if necessary) and water. This mixture is pressed into molds, later allowed to dry out, and finally is seasoned in the open air for some months before use. *C.T.D.* b. A stony substance formed from certain basic natural materials which in the course of manufacture undergo chemical changes whereby an entirely new material is created. This new substance is then crushed, graded, molded into desired shapes, and baked under intense heat in kilns or ovens. Often used as an abrasive. *Fay.*

artificial upwelling. Concept of having nuclear reactor sitting on bottom of ocean in cold, sterile parts of the sea to create warmth needed to bring turbulence and subsequent fertility to the area. *Hey.*

artificial ventilation. The inducing of a flow of air through a mine or part of a mine by mechanical or other means. *B.S. 3618, 1963, sec. 2.*

artificial zeolites. Compounds related to naural zeolites and made by mixing solutions of sodium aluminate and sodium silicate with other mineral salts. Usually white or gray and in grains of 0.5 to 2 millimeters in diameter. The sodium is replaceable by calcium, magnesium, and iron. Used as water softeners. *Hess.*

artinite. A snow-white basic hydrous carbonate of magnesium, $MgCO_3.Mg(OH)_2.3H_2O$. Loose spherical aggregates of scales, composed of minute prismatic crystals. Orthorhombic. From Lombardy and Piedmont, Italy; Hoboken, N.J. *English.*

Artinskian. Upper Lower Permian. *A.G.I. Supp.*

art tile. Fancy tiles for walls, fireplaces, etc. *Mersereau, 4th, p. 260.*

aruppukarans. A gold-washing caste in Madras, India. *Fay.*

arvonian rock. A rock consisting of quartz felsites, halleflintas, and breccias, characteristic of the Cambrian or an earlier period in Wales. *Fay.*

aryl. a. A univalent aromatic radical (as phenyl or tolyl) derived from an arene by removal of one hydrogen atom from a carbon atom of the nucleus. *Webster 3d.* b. A compound of one or more aryl radicals with a metal. *Webster 3d.*

arzunite. A blue-green double salt of basic lead sulfate and a basic copper chloride, $PbSO_4. PbO. 3(CuCl_2. H_2O). Cu(OH)_2$. A drusy incrustation of small prisms. Orthorhombic. From Challacollo, Tarapaca, Chile. *English.*

As Chemical symbol for arsenic. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

ASA. Prefix to specifications of the American Standards Association, 70 East 45th Street, New York 17, New York. *Dodd.* The name of the American Standards Association was changed in late 1966 to the United States of America Standards Institute.

asbeferrite. A columnar or fibrous iron-manganese amphiboles. *Hess.*

asbestiform. Formed like or resembling asbestos; fibrous; said of stones. *Standard, 1964.*

asbestine. a. A silicate of magnesium much used in paint. It serves as an aid in holding paint pigment in solution and in binding paint films together. Also marketed under such names as French chalk and talc. *Crispin.* b. Of, pertaining to, or having the characteristics of asbestos; incombustible. *Webster 3d.*

asbestos. A name applied to a group of naturally fibrous minerals. The principal variety is chrysotile, a hydrous magnesium silicate having the theoretical formula $3MgO.2SiO_2.2H_2O$. Other commercial varieties are amosite, a complex iron-magnesium silicate, $(FeMg)SiO_3.1 -5$ percent H_2O; and crocidolite, a sodium-iron hydrous silicate, $NaFe(SiO_3)_2. FeSiO_3. H_2O$. Of minor importance are tremolite, $Ca_2Mg_5Si_8O_{22}(OH)_2$, and anthophyllite, $(MgFe)_7Si_8O_{22}(OH)_2$. Chrysotile is the principal variety of commerce. *BuMines Bull. 630, 1965, p. 82.* Also called earth flax; mountain cork; amianthus. *Fay.*

asbestos crusher man. In the asbestos products industry, one who operates a machine that crushes asbestos-bearing rock; and controls the flow of rock into the crusher by opening or closing gates in the chute and by breaking jams in the chutes with a metatl bar. *D.O.T. 1.*

asbestosis. A lung disease caused by breathing asbestos dust. *BuMines Bull. 400, 1937, p. 265.*

asbestos minerals. Certain minerals which have a fibrous structure, are heat resistant, chemically inert and possessing high electrical insulating qualities, and are of sufficient flexibility to be woven. The two main groups are serpentine and amphiboles. Asbestos proper is actinolite. Chrysotile is fibrous serpentine; amosite is fibrous anthophyllite; crocidolite is fibrous soda-amphibole. Used in fireproof buildings, insulating, paint materials, brake-linings, clutches, insulation against heat, electricity, and acid. *Pryor, 3.*

asbestos yarn. Yarn consisting of either asbestos fiber; asbestos and vegetable fibers; asbestos and vegetable fibers and wire; or asbestos and vegetable fibers with an insert of cotton or other yarn reinforcement. Metallic asbestos yarn is yarn consisting of plain asbestos yarn twisted with brass, copper, or other fine wire. It is also called wire inserted yarn. Plain asbestos yarn is yarn consisting of either asbestos fiber or asbestos and vegetable fibers. *Hess.*

asbolane; asbolite. A form of wad; a soft, earthy manganese dioxide, containing up to about 32 percent cobalt oxide. *C.M.D.* Sometimes referred to as earthy cobalt.

asbolite. *See* asbolane.

ascendant. The vector representing the rate of increase of a property. *See also* gradient. *Hy.*

ascensional ventilation; antitropal ventilation. A mine ventilation system in which the fresh intake air flows down to the bottom end of the workings and then ascends along the faces to the main return. The air is heated as it travels along the face which assists its uphill flow. The system is advantageous in gassy mines as the firedamp also tends to flow upwards. *See also* descensional ventilation. *Nelson.*

ascension theory. a. The theory of infiltration by ascension in solution from below. It considers that ore-bearing solutions rise from the heated depths of the earth and deposit their minerals at diminished temperatures and pressures. *Fay.* b. The theory that the minerals filling fissure veins were introduced in solution from below. *Fay.*

aschaffite. A dike rock occurring near Aschaffenburg, Bavaria, Germany. It was defined by Rosenbusch as a dioritic dike rock containing quartz and plagioclase, with biotite as the chief dark silicate. *Fay.*

aschenstruktur. Ash texture, the texture of glassy tuffs. *Hess.*

aschistic. Pertaining to rocks of minor igneous intrusions that have not been differentiated into light and dark portions and that have essentially the same composition as the larger intrusions with which they are associated. *Stokes and Varnes, 1955.*

aschistic rock. Usually a dike rock, which presumably did not result from splitting during its formation, that is, it has the same composition as the parent magma. The opposite of diaschistic. *A.G.I.*

aschisite. A rock which has the same composition as the parent magma, that is, it is undifferentiated or aschistic. A rock that has undergone differentiation is called diaschistic. Aschistic and diachistic are unfortunate words because they incorrectly suggest a relationship to schist. *Johannsen, v. 1, 2d, 1939, pp. 5, 167.*

aseismic region. a. An area in which earthquakes are rare. *Schieferdecker.* b. A region that is not subject to earthquakes. *A.G.I.*

aseptic precautions. Handling with care to exclude microorganisms in contrast to antiseptic or disinfectant chemical treatments. *I.C. 8075, 1962, p. 63.*

A.S.F. coupler. A coupler fitted with a spring-loaded lock swinging back into the coupler body, the locks of the mating couplers sliding over each other when engaging. The draft gear is similar to that provided on the Willison coupler. When buffing, the impact forces are taken by the flanges on the coupler head and not by the locks. The mating couplers are identical. The coupler is designed for a drawbar pull of 9 tons. *Sinclair, V, pp. 279-280.*

ash. a. The inorganic residue remaining after ignition of combustible substances. The ash content is determined quantitatively by definite prescribed methods. Ash may not be identical, in composition or in quantity, with the inorganic substances present in the material before ignition. In the case of coal and coke, the methods employed shall be those prescribed in the Standard Methods of Laboratory Sampling and Analysis of Coal and Coke (ASTM Designation: D 271) of the American Society for Testing and Materials. *ASTM D121–62.* b. The inorganic residue after the incineration of coal to constant weight under standard conditions. In general, it differs in weight and composition from the original mineral matter. *B.S. 3618, 1964, sec. 5.* c. Volcanic dust and particles less than 4 millimeters in diameter. *A.G.I. Supp.* d. Tuff that, in color, texture, and general appearance resembles ashes. Also called volcanic ash. *Fay.*

ash ball. Shrop. A mixture of small fragments of greenish clay quartz, etc. *Fay.*

ash bed. A deposit or a bed of volcanic ash. *Fay.*

ash-bed diabase. A rock on Keweenaw Point, Lake Superior, resembling a conglomerate, but which was considered by Wadsworth to be a scoriaceous amygdaloidal sheet into which much sand was washed in its early history. *Fay.*

ash cone. A volcanic cone built primarily of unconsolidated ash and generally shaped something like a saucer, with a rim in the form of a wide circle and a broad central depression often nearly at the same elevation as the surrounding country. They usually show maximum growth on the leeward side. Individual ash beds forming the cone dip both inward and outward, those in the high part of the rim approaching the angle of repose. Ash cones are believed to be the result of violent hydroexplosions caused when lava erupts under water or under water-saturated rocks close to the surface. In form, ash cones bear a general resemblance to maars. Consolidated ash cones are called tuff cones or tuff rings. *USGS Bull. 994, 1953, p. 68.*

ash content. The percentage of incombustible material in a fuel; that portion of a laboratory sample remaining after heating under standard conditions to constant weight, that is, until all the combustible matter has been burned away. *See also* extraneous ash; inherent ash. *Nelson.*

ashcroftine. A pink hydrous silicate of sodium, potassium, calcium, magnesium, manganese, and aluminum, $NaK(Ca,Mg,Mn)Al_4Si_5O_{18}.8H_2O$. Small needles. Tetragonal. From Narsarsuk, Greenland. Formerly called kalithomsonsite. *English.*

ash curve. A graph that shows a relation between the specific gravity of fractions of a coal sample floated in liquids of step-by-step increased density, and the percentage of ash in each such fraction. *Pryor, 3.*

ash drawers. Early name applied to tourmaline because of its electrical property. *Shipley.*

ash error. The difference between the percentage ash of a product of a separation and that shown by the washability curve (based on the reconstituted feed) of a product with the same properties (usually percentage of ash). *B.S. 3552, 1962.*

ashes. The residue left after the fuel has been burned. Also called cinder. *Newton, p. 246.*

ash fall. a. A rain of airborne volcanic ash falling from an eruption cloud. It is a characteristic of explosive volcanic eruptions. *A.G.I.* b. A deposit of volcanic ash resulting from such a fall and lying on the ground surface. *A.G.I.*

ash field clay. A fire clay of Yorkshire, England. The raw clay contains approximately

57 percent SiO_2, 27 percent Al_2O_3, 1.7 percent Fe_2O_3, and 1.5 percent alkalies. *Dodd.*

ash flow. a. An avalanche of volcanic ash. Generally, a highly heated mixture of volcanic gases and ash traveling down the flanks of a volcano or along the surface of the ground and produced by the explosive disintegration of viscous lava in a volcanic crater or by the explosive emission of gas-charged ash from a fissure or a group of fissures. The solid materials contained in a typical ash flow are generally unsorted and ordinarily include volcanic dust, pumice, scoria, and blocks in addition to ash. *A.G.I.* b. A deposit of volcanic ash and other debris resulting from such a flow and lying on the ground surface. *A.G.I.* c. Synonym for ignimbrite. *A.G.I. Supp.*

ash furnace. A furnace or oven for fritting materials for glassmaking. Also called ash oven. *Webster 3d.*

ash fusibility. A measure, in terms of temperature, of the ease of fusion of coal ash prepared and tested under standard conditions. *B.S. 3323, 1960.*

ash fusion temperature. Indicates the temperature at which a special test cone made from particles of ash obtained from the coal will (1) begin to deform, that is, soften, or (2) completely deform or fuse into a blob. *Nelson.*

Ashgillian. Upper Upper Ordovician. *A.G.I. Supp.*

ashlar. a. A block of stone, as brought from the quarry. *Standard, 1964.* b. A squared stone. *Standard, 1964.* c. Masonwork of squared stones. *Standard, 1964.* d. A facing of cut stone applied to a backing of rubble or rough masonry or brickwork. *Zern.* Also called bastard ashlar. *Fay.* e. A thin squared and dressed brick for facing a wall of rubble or brick. *Webster 3d.* f. Rectangular block having a sawed, planed, or rock-faced surface. *BuMines Bull. 630, 1965, p. 877.*

ashlar masonry. Masonry composed of rectangular units of fired clay or shale, or stone, generally larger in size than brick and properly bonded, having sawed, dressed, or squared beds, and joints laid in mortar. *ACSG, 1963*

ash metal. A low-grade brass made from metal skimmings and ash from brass foundries. *Camm.*

ash oven. Same as ash furnace. *Webster 3d.*

ashpit. The receptacle for ashes under a grate. *Fay.*

ash rock. Rock composed of the material of arenaceous texture produced by volcanic explosions. *A.G.I.*

ash, sedimentary. Applied to ashes and cinders deposited in beds by the agency of water after having been ejected from fissures or from craters into the sea. *A.G.I.*

Ash's furnace. A furnace for refining zinc in which the molten metal passes through four tanks in order to allow lead and other impurities to settle out. *Fay; Hess.*

ash shower. A rain of airborne volcanic ash falling from an eruption cloud, generally of short duration. *See also* ash fall. *A.G.I.*

ash/specific-gravity curve. The curve obtained from the float-and-sink analysis by plotting the ash contents of successive fractions against specific gravity. *B.S. 3552, 1962.*

ashstone. a. An ash-gray, friable, porous hypersthene trachyandesite which looks like hardened volcanic ash. It is used as a building stone in Japan because it is easily quarried. *Hess.* b. Indurated volcanic ash composed of volcanic rock particles and mineral particles ranging in size from 0.06 to 0.001 millimeter. *A.G.I.*

ash, total. Residue of the mineral matter obtained by incinerating coal under standard conditions. *B.S. 3552, 1962.*

ash, volcanic; tuff. Uncemented pyroclastic material concisting of fragments that are mostly less than 4 millimeters in diameter. Coarse ash ranges from ¼ to 4 millimeters in grain size, and fine ash is below ¼ millimeter. Without a qualifying adjective, the term should be applied only to essential ejecta. *A.G.I.*

ashy grit. a. Pyroclastic material of sand size and smaller. *A.G.I. Supp.* b. A mixture of ordinary sand and volcanic ash. *A.G.I. Supp.*

asiderite. Daubree's term for stony meteorites that do not contain metallic iron. *Fay.* Essentially synonymous with aerolite. Obsolete. *A.G.I.*

Askania statascope. A special form of aneroid barometer in which the displacement of the vacuum chamber diaphragm, with variations in pressure, is prevented by altering the tension on a spring which is controlled by means of a knob situated at the center of the dial on the outside of the instrument. The amount by which the knob has been rotated to return the diaphragm to its original position is transmitted to a pointer which indicates the pressure change on a graduated scale. *Roberts, I, p. 23.*

aslope. Corn. In a slanting position. *Fay.*

ASM Abberviation for American Society for Metals. *Zimmerman, p. 8.*

asmanite. An orthorhombic variety of silica found in meteoric iron. *Standard, 1964.*

asparagus stone. A greenish-yellow variety of apatite. *Fay.*

aspect. a. The gross or overall lithologic or biologic characteristics of a stratigraphic unit as expressed at any particular point. *A.G.I.* b. The angle made by a target with the line joining it to the observation point is known as the aspect of the target. *H&G.*

aspect of facies. The appearance, composition, or inferred environmental implications of a particular rock body or fossil assemblage. *A.G.I. Supp.*

aspect ratio. In a duct, the depth of elbow along (parallel) to the axis of bend divided by the width in the plane of the bend. *Strock, 10.*

asperite. Suggested by Becker for rough cellular lavas, the chief feldspar of which is plagioclase. *Fay.*

asperolite. A variety of chrysocolla, containing more than the usual percentage of water. *Fay.*

asphalt. a. A bitumen of variable hardness comparatively nonvolatile, composed principally of hydrocarbons containing relatively little or no crystallizable paraffins. The nonmineral constituents are fusible and largely soluble in carbon disulfide. *A.G.I.* b. A brown to black solid or semisolid bituminous substance occurring in nature, but also obtained as the residue from the refining of certain petroleums and then known as artificial asphalt. Asphalt melts between 150° and 200° F and is soluble in carbon disulfide. It belongs to the group of solid and semisolid hydrocarbons, the others being asphaltites and asphaltic pyrobitumens. *A.G.I.* c. A complex compound of various hydrocarbons, part of which are oxygenated. Related in origin to petroleum. It is brown or brownish black, melts at 90° to 100° F, and is mostly or entirely soluble in turpentine. *See also* albertite; elaterite; gilsonite; grahamite; impsonite; nigrite; wurtzilite. Also called mineral pitch. Same as asphaltum. *Fay.* d. To cover or treat with asphalt. *Fay.*

asphalt-base petroleum. Crude oils which, upon processing, yield relatively large amounts of asphaltic residues. *A.G.I.*

asphalt cement. A fluxed or unfluxed asphalt specially prepared as to quality and consistency for direct use in the manufacture of bituminous pavements, and having a penetration at 25° C (77° F) of between 5 and 300, under a load of 100 grams applied for 5 seconds. *Urquhart, Sec. 2, p. 81.*

asphalt content. The percent by weight of 100-penetration asphalt contained in an asphaltic product. *Shell Oil Co.*

asphalt cutback. An asphalt cement which has been made liquid by thinning it with a volatile petroleum distillate, such as gasoline or kerosine. *Shell Oil Co.*

asphalte. A name applied in Europe to unconsolidated limestone impregnated with asphalt. *Hess.*

asphalted. Coated with asphalt. Usually Californian oil (which has an asphaltic base), coal tar, gilsonite, or elaterite are added to give the right consistency to suit the average temperature that prevails when the coating is used. *Fay.*

asphalt emulsion. Asphalt bitumen, water, and a suitable emulsifying agent giving an emulsion which can be used in roadbuilding, without the necessity of heating the asphalt before application. *Bennett 2d, 1962.*

asphaltene. One of the components of the bitumen in petroleums, petroleum products, asphaltic cements, and solid native bitumens, that are soluble in carbon disulfide but are insoluble in paraffin naphthas. *Fay.*

asphalt furnace. A portable furnace in which asphalt is heated for use in roofing, paving, etc. *Fay.*

asphaltic. a. Similar to, or essentially composed of, asphalt. *Fay.* b. Saturated with viscous or solid, low gravity hydrocarbon. *Wheeler.*

asphaltic bitumen. Term formerly used for bitumen. *Ham.*

asphaltic cement. Asphalt or bitumen or blends of these with one another or with flux oils, the material having adhesive qualities suitable for the manufacture of road or building asphalts. *Ham.*

asphaltic coal. Synonym for albertite. *Tomkeieff, 1954.*

asphaltic concrete. A surface made by mixing proportioned quantities of graded aggregate and asphalt at a central plant, conveying the completed mix to the point of placement, and spreading by mechanical finisher. It must be completed when in the heated condition. *API Gloss.*

asphaltic earth. Asphalt mixed with earthy material. *Tomkeieff, 1954.*

asphaltic flux. A residuum in the cracking of asphalt-base oils which is also known as pressure tar, and is too viscous for fuel oil. It is added to hard or stiff asphalts to make them workable. *Hess.*

asphaltic limestone. A limestone impregnated with asphalt. *Tomkeieff, 1954.*

asphaltic ore. Asphaltlike ore carrying invisible uranium values. *Ballard.*

asphaltic pyrobitumen. a. A species of pyroalbertite, impsonite, and asphaltic pyrobitumen, including dark-colored, comparatively hard, and nonvolatile solids, substantially free from oxygenated bodies, infusible and largely insoluble in carbon disulfide. It includes elaterite, wurtzilite, albertite, impsonite, and asphaltic pyrobituminous shales. *Tomkeieff, 1954.* b. One of the solid hydrocarbons that differs from asphalts in being infusible and generally insoluble in carbon disulfide. *A.G.I.*

asphaltic rock. Any rock, naturally impregnated with asphalt. It is usually a sandstone or a limestone. *A.G.I.*

asphaltic sand. A natural mixture of asphalt with varying proportions of loose sand grains. The quantity of bituminous cementing material extracted from the sand may be as high as 10 percent, and this bitumen is composed of a soft asphalt which rarely has a penetration as low as 60°. *A.G.I.*

asphaltic sandstone. *See* sandstone; asphalt rock. *Fay.*

asphaltite. a. Black to dark brown naphtha bitumen, melting above 110°C, substantially soluble in carbon disulfide or in chloroform; for example, gilsonite, glance pitch, and grahamite. *Schieferdecker.* b. A dark-colored, solid, difficultly fusible, naturally occurring hydrocarbon complex, insoluble in water, but more or less completely soluble in carbon disulfide, benzol, etc. *Fay.* c. One of the harder of the solid hydrocarbons with melting points between 250° and 600° F. *A.G.I.* d. Similar to anthraxolite. Same as asphaltum. *Crosby, p. 66. See also* asphalt, c.

asphalt mastic. The mixture of asphalt cement and mineral material which on heating becomes a thick mass and may be poured and troweled. *Shell Oil Co.*

asphaltness. The quantity of asphalt contained in petroleum expressed as a percentage of the total mass. *Petroleum Age, v. 1, February 1, 1923, p. 37.*

asphalt oil. Oil containing asphalt or having an asphalt base, as distinguished from oil having a paraffin base. *Crispin.*

asphalt primer. A liquid asphaltic road material of low viscosity which, upon application to a nonbituminous surface, is completely absorbed. Its purpose is to waterproof the existing surface and prepare it to serve as a base for further construction. *Shell Oil Co.*

asphalt rock; asphalt stone. Limestone impregnated with asphalt. Also applied to asphaltic sandstone. *Webster 3d.*

asphalt seal. The creation of a trap by the decrease in permeability of a reservoir as the result of the transformation of petroleum into asphalt. *A.G.I.*

asphalt stone. *See* asphalt rock. *Webster 3d.*

asphaltum. *See* asphalt, c. *Fay.*

asphyxia. Local or systemic deficiency of oxygen and excess of carbon dioxide in living tissues usually as a result of interruption of respiration. *Webster 3d. See also* carbon monoxide asphyxia. *McAdam, p. 98.*

asphyxiate. To suffocate; to choke. *Mason.*

aspirating. *See* dedusting. *Mitchell, p. 716.*

aspirator. a. An appliance, such as a suction pump, exhaust fan, or the friction of a water jet, for causing a movement of gases or liquids by suction. *Hess.* b. A device made of wire gauze, cloth, or of a fibrous mass held between pieces of meshed material to prevent dusts entering the lungs; or having a canister of activated charcoal or other substances through which the air breathed must pass to prevent the passage of noxious gases into the lungs. Also called inhaler; muzzle. *Hess.*

assay. a. To test ores or minerals by chemical or blowpipe examination; to determine the proportion of metals in ores by smelting in the way appropriate to each. Gold and silver require an additional process called cupelling, for the purpose of separating them from the base metals. *See also* fire assay. *Fay.* b. An examination of a mineral, an ore, or an alloy differing from a complete analysis in that it determines only certain ingredients in the substance examined, whereas an analysis determines everything it contains. *Fay.* c. A means of ascertaining the commercial value of a mineralized substance, as, for example, ore or black sand, or the product of a mill or smelter, either by a fire or a wet process, and is termed ordinary assays, commercial assays, specimen assays, control assays, and umpire assays. *See also* crucible assay; dry assay; scorification; wet assay. *Ricketts, I.*

assay balance. A very sensitive balance used in the assaying of gold, silver, etc., for weighing the beads. It usually has magnifying lenses for reading the graduations. *Webster 3d.*

assay, complete. One sufficiently detailed to show structural associations of required elements, or to account adequately for all the constituents of the ore. *Pryor, 3.*

assayer. One who analyzes ores and alloys, especially bullion, to determine the value and properties of their precious metals; separates precious metals from dross materials by solution, flotation, or other liquid processes, or by dry methods, such as the application of heat to form slags of lead, borax, and other impurities; weighs residues on calibrated balances to determine the proportion of pure gold, silver, platinum, or other metals in the laboratory sample. *D.O.T. 1.*

assay foot. The assay value multiplied by the number of feet across which the sample is taken. *Fay. Compare* assay inch.

assay grade. The percentage of an element or compound in a representative sample, as found by analytical test (assay). *Pryor, 4.*

assay inch. In valuation of an ore body, the assay value multiplied by the number of inches along which a sample of ore has been cut by grooving or channeling. The distance is normal to enclosing rocks so as to refer the sample to true width of deposit. *Pryor, 3. Compare* assay foot.

assay limit. The limit of an ore body established by the low content of valuable mineral as determined by assays. *A.G.I.*

assay master. A chief or official assayer. *Standard, 1964.*

assay office. A laboratory for examining ores, usually gold and silver ores, in order to determine their economic value. *Standard, 1964.*

assay plan. Map of a mine showing the assay, stope, width, etc., of samples taken from positions marked. Used to control grade and quality of ore mined and milled. *Pryor, 3.*

assay plan factor; correction factor. In sampling, a term used to describe the rate which the head value bears to the mine sampling. This percentage figure is useful in reducing any extant or subsequent mine-sampling average to that which in actual production it will likely prove to be. In South Africa this is generally known as the "mine call factor." *Truscott, pp. 98-99.*

assay pound. A varying weight, sometimes half a gram, used by assayers as proportionately representing a pound. *Standard, 1964.*

assay split. Agreed average value as between buyer's and seller's assay, used as pricing basis in sale of mineral. *Pryor, 3.*

assay ton. For a long ton (2,240 pounds avoirdupois) 32.667 grams, and for a short ton (2,000 pounds avoirdupois) 29.1667 grams. The number of milligrams of bullion obtained from one assay ton equals the number of ounces (troy) of bullion per ton of ore. *Pryor, 4.*

assay value. a. The amount of the gold or silver, in ounces per ton of ore, as shown by assay of any given sample. An average assay value is the weighted result obtained from a number of samples, by multiplying the assay value of each sample by the width or thickness of the ore face over which it is taken, and then dividing the sum of these products by the total width of cross section sampled. The result obtained would represent an average face sample. *Fay.* b. The standard value of gold everywhere. An average assay value of several samples cannot be taken as an absolute mathematical demonstration of the value of an ore body nor is the assay return necessarily conclusive of the value of the thing assayed; it may, however, tend to prove discovery. *Ricketts, I.* c. The percentage of a specified element or compound in a given sample. Trace values may be reported in other ratios, for example, parts per million. *Pryor, 3.*

assay walls. The planes to which an ore body can be profitably mined, the limiting factor being the metal content of the country rock as determined from assays. *Hess.*

ASSE Abbreviation for the American Society of Safety Engineers. *Williams.*

assemblage zone. A biostratigraphic unit defined and identified by a group of associated fossils rather than by a single index fossil. Synonym for cenozone. *Compare* range zone; faunizone; florizone. *A.G.I. Supp.*

assembled cameos. Cameos made of two or more portions cemented together. *See also* assembled stone; composite stone. *Shipley.*

assembled stone. Any stone constructed of two or more pieces of gem materials whether they be genuine, imitation, or both. An alternate term, composite stone, was later suggested. *See also* doublet; Foil back; triplet. *Shipley.*

assembly rod. An external bolt holding a machine together. *Nichols.*

assessment. a. The sum that the officers of a mining company levy on the stock held by shareholders. *Fay.* b. *See* assessment work. *Fay.*

assessment drilling. Drilling done to fulfill the requirement that a prescribed amount of work be done annually on an unpatented mining claim to retain title. *Long.*

assessment labor. Refers to the annual labor required of the locator of a mining claim after discovery and not to work before discovery. *Ricketts, I.*

assessment work. The annual work upon an unpatented mining claim on the public domain necessary under the United States law for the maintenance of the possessory title thereto. Same as annual labor. *Fay.* After filing location notice and performing the required discovery work, the prospector has a year from the following July 1, at noon, to do $100 worth of work to protect his claim. This amount of work must be done each year if the claim is to be held without patenting. *Lewis, p. 27.*

asset. Property with cash sale value. In mining, the dominant asset is the proved ore reserve. *Pryor, 3.*

assignment. Transfer by deed of asset from holder to another, the assignee. *Pryor, 3.*

assimilation. a. The process by which rock from the containing walls of an intrusion is absorbed by solution in the invading magma, either in situ (or nearly so) at the contacts; or in depth, by the sinking into the magma of blocks or fragments of country rock stoped from the roof above the intrusion. *Hess.* b. The incorporation into a magma of material originally present in the wall rock. The term does not specify the exact mechanism or the results. The assimilated material may be present as crystals from the original wall rocks, newly formed crystals including wall-rock elements, or as a solution in the liquid phase of the magma. The resulting rock is called a hybrid. Also, the process is termed magmatic assimilation. *A.G.I.*

assistant colliery manager. An official appointed at many large collieries in Great Britain with a status between the undermanager and manager, although he has no legal authority over the undermanager. He is often delegated to give concentrated supervision to any special operations, thus allowing the undermanager to carry on with his routine duties. He is often a graduate with a first-class certificate of competency who may be in need of managerial experience. *Nelson.*

assistant mine foreman. A person employed to assist the mine foreman in the performance of his duties and to serve in his place, in the absence of the mine foreman. *U.S. BuMines Federal Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. I Underground Mines, October 8, 1953.*

Assmann psychrometer. A wet- and dry-bulb hygrometer in which air is drawn over the thermometer bulbs by an integral fan. *B.S. 3618, 1963, sec. 2.*

associated compounds and liquids. Those in which simple molecules of the same type can associate to form complex molecular structures, the action being reversible. Water is such a liquid. *Pryor, 3.*

associated gas-oil ratio. The ratio of production of gas to the oil with which it was directly associated in the reservoir. When no free gas cap production exists, this differs from production gas-oil ratio only because of the slippage in the reservoir, and becomes identical with solution gas-oil ratio. It is usually expressed in cubic feet per barrel. *Hess.*

associated natural gas. Natural gas existing in a free state in a reservoir containing oil, the gas being in contact with but not in solution in the oil of the reservoir. *See also* gas cap. *A.G.I.*

association of igneous rocks. A group of igneous rocks having chemical and petrographic characteristics in common, and usually occurring together. *See also* petrographic province. *A.G.I.*

association placer location. A placer location made by an association of persons in one location covering one hundred and sixty acres is not eight locations covering twenty acres each. It is in law a single location, and as such a single discovery is sufficient to support such a location; the only assessment work required is as for a single claim. *Ricketts, I.*

assumed north. A direction assumed to be north for reference purposes. *B.S. 3618, 1963, sec. 1.*

assured mineral. In valuation of ore body, quantity and value ascertained by measurement and assay following physical entry or drilling to specified pattern adequate for proof. *Pryor, 3. See also* developed reserves. *Nelson.*

assymmetrical. Fold in which the axial plane is inclined. *McKinstry, p. 641.*

assyntite. A plutonic rock composed mainly of orthoclase and pyroxene, smaller amounts of sodalite and nepheline, and with accessory biotite, sphene, apatite, and opaque oxides. A sodalite-nepheline syenite. *A.G.I.*

Astartian. Synonym for Sequanian. *A.G.I. Supp.*

astatic. Not taking a fixed or definite position or direction; as an instrument in which a negative restoring force has been applied so as to aid any deflecting force, thereby rendering the instrument more sensitive and/or less stable. *A.G.I.*

astatic gravimeter. A gravity meter or gravimeter constructed so that a high sensitivity is achieved at certain positions of the elements of the system employed, that is, the equilibrium becomes neutral at such positions. *See also* gravimeter. *A.G.I.*

astatic pendulum. Having almost no tendency to take a definite position of equilibrium. *Schieferdecker.*

astatine. A very rare radioactive element in group VII (halogens) of the periodic table, atomic number, 85, first announced by Allison and Murphy as alabamine in 1929. Renamed astatine by Segre, McKenzie, and Corson who produced astatine 211 in 1940 by a bombardment of bismuth with high-energy (32 mev) alpha particles. Symbol, At; valences, 1, 3, 5, and 7; and the mass number of the most stable isotope, 210. *Gaynor.*

astatization. The application of a negative restoring force to a moving element of a physical system in such a manner as to drive the moving element away from its rest position and to aid any deflecting force, so as to increase sensitivity. *A.G.I.*

astatki; ostatki. A Russian name for a petroleum residue now used as fuel. Up until 1870 it was considered a useless article, and was disposed of by burning in open pits near the refineries. *Fay.*

astel. An overhead boarding or arching in a mine gallery. *Fay.*

asteria. A precious stone which, when cut en cabochon, displays a 6- or 12-rayed star due to asterism. Star sapphire and star ruby display this character. *C.T.D.*

asteriated. Like a star, with rays diverging from a center. *Shipley.*

asteriated beryl. A variety of beryl which in thin sections exhibits diasterism. As yet of no gemmological importance. *Shipley.*

asteriated quartz. Quartz having whitish or colored radiations within the crystals. *Standard, 1964.*

asteriated stone. A stone, such as asteriated ruby, sapphire, etc., exhibiting a star by either reflected or transmitted light. *See also* star stone. *Shipley.*

asteriated topaz. Asteriated yellow corundum, wrongly called Oriental topaz. *Schaller.*

asterism. a. Starlike rays of light observed in some minerals when viewed from certain directions, particularly if the mineral is cut en cabochon. Minerals having this feature are called asteriated or star. Asteriated or star beryl, chrysoberyl, crocidolite, emerald, quartz, ruby, and sapphire are known. *Hess.* b. A starlike effect observed in certain minerals either by transmitted or by reflected light. *A.G.I.*

asthenolith. a. Hypothetical magma and migma accumulation at the base of the sialic crust, from which the energy may be derived for the mountain-building processes. *Schieferdecker.* b. A body of magma locally melted anywhere at any time within any solid portion of the earth. *A.G.I. Supp.* c. A local radiogenic magma pocket. *A.G.I. Supp.* d. An accumulation of sialic magma of low viscosity and very small residual strength at the upper surface of the salsima layer. *A.G.I. Supp.*

asthenosphere. The hypothetical, concentric, spherical shell within the earth, tens of kilometers below the surface and of undefined thickness, which is a shell or zone of weakness where plastic movements take place to permit isostatic adjustments. *A.G.I.*

Astian. Upper Pliocene. Synonym for Piacenzian. *A.G.I. Supp.*

astite. A mica-andalusite hornfels, in which mica and andalusite are the dominant minerals, obtained from Cima d'Asta, Italian Alps. *Holmes, 1928. See also* edolite; hornfels; leptynolite; proteolite; spotted slate. *A.G.I.*

ASTM Abbreviation for American Society for Testing and Materials. *GPO Style Manual, p. 155.*

ASTM coal classification. A system based on proximate analysis in which coals containing less than 31 percent volatile matter on the mineral matter free basis (Parr formula) are classified only on the basis of fixed carbon, that is, 100 percent volatile matter. They are divided into five groups: above 98 percent fixed carbon; 98 to 92 percent fixed carbon; 92 to 86 percent fixed carbon; 86 to 78 percent fixed carbon; and 78 to 69 percent fixed carbon. The first three of these groups are called anthracites and the last two are called bituminous coals. The remaining bituminous coals, the subbituminous coals and the lignites, are then classified into groups as determined by the calorific value of the coals containing their natural bed moisture, that is, the coals as mined but free from any moisture on the surface of the lumps. The classification includes three groups of bituminous coals with moist calorific value from above 14,000 to above 13,000 British thermal units per pound; three groups of subbituminous coals with moist calorific value below 13,000 to below 8,300 British thermal units per pound; and two groups of lignitic coals with moist calorific value below 8,300 British thermal units per pound. The classification also differentiates between consolidated and unconsolidated lignites and between the weathering characteristics of subbituminous and lignitic coals. *Francis, 1965, v. 1, p. 34.*

astochite. A blue to grayish-violet monoclinic amphibole from Wermland, Sweden. Locally known as blue rhodonite. Synonym for soda richterite. *Hess; Hey 2d, 1955.*

astragalus; astragalus pattersoni. An absorber and indicator of selenium. It has a tendency to grow near carnotite. Flowers are cream with a purple dot on the keel. Foliage has garliclike odor due to selenium. Also called loco weed. *Ballard.*

astrakanite. Synonym for bloedite. *Hey 2d, 1955.*

astral. Applied to the stage in the formation of the earth when it glowed with incandescent heat like a star. *Fay.*

Astralit. An ammonium nitrate explosive containing some nitroglycerin. Used in mining. *Bennett 2d, 1962.*

astralite glass. Similar to aventurine glass (goldstone), but exhibits a bluish glitter in a dark groundmass. Probably contains metallic bluish inclusions. *Shipley.*

A-stretching. Scot. In the line of the strike of the strata; level course. *Fay.*

astridite. An ornamental stone, consisting mainly of chromojadeite. From Manokwari, New Guinea. *English.*

astringent. a. A taste that puckers the mouth; descriptive of certain minerals, such as alum. *Fay.* b. Causing contraction, shrinking, or puckering. *Webster 3d.*

astrolabe. An instrument for measuring the altitudes of celestial objects. There are three general types used in surveying: pendulum, planespheric, and prismatic. *A.G.I.*

astronomical coordinates. Latitude and longitude as observed astronomically. *Seelye, 2.*

astronomical eyepiece. The eyepiece of a telescope designed to have minimum loss of light. *Ham.*

astronomical triangle. A spherical triangle which includes as its apexes the observed celestial body, the zenith, and the elevated pole. *Pryor, 3.*

astrophyllite. A rare titanium-bearing silicate, found associated with alkalic rocks, $(Na,Ca)_5(Fe^{+2},Al,Ti)_{15}(Si_2O_7)_6(F, OH)_8$; orthorhombic. *Dana 17.*

A-structure. A series of cross grains that intersect at an angle of about 60°. *Skow.*

Astrumite. Trade name for gray-green Tibet stone. *Shipley.*

Asturian orogeny. Mid-Upper Carboniferous diastrophism. *A.G.I. Supp.*

astyllen. a. Corn. A mine stopping to prevent the flow of water; a dam. *Fay.* b. A wall to separate ore from waste. *Fay.*

asymmetrical. a. Without proper proportion of parts; unsymmetrical. *Standard, 1964.* b. Crystals not divisible into similar halves by a plane; triclinic. *Standard, 1964.* Also used in geology in describing structural features. *Fay.* c. In crystallography, having no center of symmetry, no plane of symmetry or no axis of symmetry. *A.G.I.*

asymmetrical bedding. A term indicative of the order in which lithographic types or facies follow one another, for example, the sequence 1—2—3—1—2—3—1—2—3, etc. *Compare* symmetrical bedding. *A.G.I.*

asymmetrical crystal. An irregular crystal. *A.G.I.*

asymmetrical ripple mark. The normal form of ripple mark, which has a short downstream slope and a comparatively long gentle upstream slope. *See also* water-current ripple mark. *A.G.I.*

asymmetrical vein. A crustified vein with unlike layers on each side. *A.G.I.*

asymmetric class. The class of crystal forms without any symmetry. *Fay.*

asymmetric dispersion. The dispersion that produces an interference figure without any symmetry or color distribution. *Fay*

asymmetric fold. A fold in which one limb dips more steeply than the other. If one limb is overturned, the term overturned fold or overfold is used. *A.G.I.*

asymmetric laccolith. A laccolith in which the beds it has uplifted dip at conspicuously different angles in different sectors. *A.G.I.*

a t Abbreviation for ampere turn; assay ton. *Zimmerman, pp. 8, 12.*

At Chemical symbol for astatine. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

atacamite. A mineral, $Cu_2Cl(OH)_3$; blackish-green color, orthorhombic. *A.G.I.; Dana 17.* Also called greensand of Peru. *Fay.*

atatschite. An igneous rock with a glassy base; containing small quantities of sillimanite, and locally cordierite. Orthoclase, augite, and biotite occur as microscopic crystals; from Atatsch Mountain, southern Urals, U.S.S.R. *Holmes, 1928.*

ataxic. Proposed by Keyes (1901) to be applied to unstratified ore deposits, as contrasted with ore deposits that are stratified, or eutaxic. *Holmes, 1920.*

ataxite. a. A brecciated, or irrgularly mottled, composite volcanic rock in which the broken fragments of one lava flow are irregularly distributed in another. A similar structure to which the term may also be applied occurs in certain minor intrusions. *Holmes, 1928.* b. A general term for siderites (iron meteorites) which contain less nickel than hexahedrites or more nickel than octahedrites, and in which the structure of the lamellae is interrupted. *Holmes, 1928.*

atectonic. Applied to a geologic event that occurs when orogeny is not taking place. Synonym for nontectonic. *A.G.I.*

atectonic pluton. A pluton that is emplaced when orogeny is not occurring. *A.G.I.*

atelestite. A sulfur-yellow adamantine bismuth arsenate, $H_2Bi_3AsO_8$, crystallizing in the monoclinic system. *Standard, 1964.*

atelite. A green copper hydroxychloride, $H_6Cu_3O_5Cl_2$, found near volcanoes. *Standard, 1964.*

athermal transformation. A reaction that proceeds without benefit of thermal fluctuations; that is, thermal activation is not required. Such reactions are diffusionless and can take place with great speed when the driving force is sufficiently high; for example, many martensitic transformations occur athermally on cooling, even at relatively low temperatures, because of the progressively increasing driving force. In contrast, a reaction that occurs at constant temperature is an isothermal transformation; thermal activation is necessary in this case and the reaction proceeds as a function of time. *ASM Gloss.*

athlete's foot. This disease is infectious and therefore likely to be spread in such places as pithead baths where men walk about barefoot. It is caused by a fungus which lives and multiplies in warm, moist conditions and can be spread from the floor of a pithead bath from one person to another. In medical terminology, it is known as epidermophytosis. *Sinclair, I, p. 195.*

Atkinson. The resistance of a section of roadway in which there is a pressure of 1 pound per square foot throughout the section, when a volume of 1,000 cubic feet per second (1 kilocusec) of dry air at 60° F and 30 inches barometer is passing. *See also* modified Atkinson formula. *Nelson.*

Atkinson formula. *See* modified Atkinson formula. *Nelson.*

Atkinson's friction coefficient. The measure of the pressure expended per 1,000 feet per minute per square foot of surface traversed in order to create motion under the conditions prevailing. It is expressed as pounds per square foot per 1,000 feet per minute. *See also* Atkinson. *Nelson.*

Atlantic series; Atlantic province; or Atlantic suite. One of two great groups of igneous rocks (the other being the Pacific group) based on their tectonic setting. The Atlantic series rocks are found in nonorogenic areas, are often associated with block sinking and with large-scale crustal instability, and are erupted along faults and fissures or through explosion vents. The Atlantic series was originally described as occurring in the coastal districts of the Atlantic Ocean basin. Later, it became evident that there was no intrinsic connection with the Atlantic Ocean; the Hawaiian lavas, for example, are of Atlantic type. Hence, the name intra-Pacific is synonymous with Atlantic province. The exact connotation varies with different authors. In general, the term Atlantic is used to include those (alkalic) magma series having low alkali-lime indices and yielding undersaturated residiuums; for example, rhyolites and dacites. A third group, the Mediterranean series, has also been proposed. The terms Atlantic and Pacific, as applied to rock kindreds, have been generally abandoned. *A.G.I.*

Atlantic type of coastline. The trend of the folded mountain belts is transverse to the coast. *Compare* Pacific type of coastline. *A.G.I.*

atlantite. An olivine-bearing nepheline tephrite. *A.G.I.*

atlasite. A cupric carbonate containing chlorine. Probably a mixture of atacamite and azurite. *Standard, 1964.*

Atlas ore. Malachite. *Shipley.*

Atlas pearls. White satin spar. *Shipley.*

Atlas spar. Same as satin spar. *Shipley.*

Atlas stone. Same as satin spar. *Shipley.*

atm Abbreviation for atmosphere. *BuMin Style Guide, p. 58.*

atmidometer. An instrument for measuring the evaporation of water, ice, and snow. *Osborne.*

atmoclast. Proposed by Grabau for a rock fragment broken in situ either by chemical or mechanical means. *A.G.I.*

atmoclastic rock. A rock consisting of materials broken in situ by chemical or mechanical atmospheric influences. Synonym for atmoclast. *Schieferdecker.*

atmogenic. Applied to rocks of atmospheric origin, whether derived by condensation (as snow, névé, and glacier ice), by wind action, or by deposition by volcanic vapors; used chiefly for rocks and minerals. *Stokes and Varnes, 1955*

atmolith. A rock precipitated from the atmosphere; for example, snow, névé or firn, and snow ice. *A.G.I.*

atmometer. An instrument for measuring the rate of evaporation. Many instruments have been devised for measuring evaporation, variously known as atmidometers, atmidoscopes, atmismometers, evapometers, evaporation gages, evaporators, evaporimeters, evaporometers, and vaporimeters. *Standard, 1964.*

atmophile. Found in, attracted to, or having a tendency to occur in the atmosphere. Applied especially to chemical elements or compounds. *Webster, 3d.*

atmophile element. a. One of the elements relatively concentrated in the atmosphere. *Schieferdecker.* b. One of the most typical elements of the atmosphere (nitrogen, oxygen, argon, carbon, neon, helium, krypton, and hydrogen). *A.G.I.* c. An element which occurs either in the uncombined state, or which, in a volatile compound, will concentrate in the gaseous primordial atmosphere. *A.G.I.*

atmosphere. a. The gaseous envelope surrounding the earth. The atmosphere is odorless, colorless, tasteless; very mobile, flowing readily under even a slight pressure gradient; elastic, compressible, capable of unlimited expansion, a poor conductor of heat, but able to transmit vibrations with considerable velocity. Its weight has been calculated as 5.9 x 10^{15} tons. One-half the mass of the atmosphere lies below 3.46 miles above sea level. The ordinary term for the mixture of gases comprising the atmosphere is air, which also includes water vapor and solid liquid particles. *A.G.I.* b. A unit of pressure. A normal atmosphere is equal to the pressure exerted by a vertical column of mercury 760 millimeters in height at 0° C, and with gravity taken as 980.665 centimeters per square second. It equals 14.66 pounds per square inch. *A.G.I.* c. The entire continuous spherical layer of air surrounding the earth. *See also* atmospheric pressure. *Bureau of Mines Staff.* d. In a furnace, the mixture of gases resulting from combustion. *Bureau of Mines Staff.* e. The kind of air prevailing in any place, as within a kiln during firing. *Kinney.*

atmosphere, composition of. Volume composition of dry air at sea level (average values): 20.95 percent oxygen; 78.08 percent nitrogen; 0.03 percent carbon dioxide, and traces of other elements. The presence of water vapor will influence comfort, because it reacts upon the body's heat-loss control mechanism. *Nelson.*

atmosphere, pressure of. That pressure which will support a column of mercury 760 millimeters high (29.92 inches) at 0° C, sea level, 1 normal atmosphere equals 14.7 pounds per square inch (approximately). *Nelson*

atmospheric condenser. One using water at atmospheric pressure. *Strock, 10*

atmospheric pressure. a. The force per unit area exerted by the atmosphere in any part of the atmospheric envelope. Some of the expressions for the normal value of the atmospheric pressure at sea level are: 76.0 centimeters of mercury; 760 millimeters of mercury; 29.92 inches of mecury; 1,033.3 centimeters of water; 33.9 feet of water; 1,033.3 grams per square centimeter; 1,013,250.0 dynes per square centimeter; 14.66 pounds per square inch; 1.01325 bars (1 bar equals 1 million dynes per square centimeter); and 1,013.25 millibars. *A.G.I.* b. The weight of a vertical column of air of constant unit cross section from sea level, or from any altitude above sea level, to the upper limit of the earth's atmosphere. The standard atmospheric pressure at sea level, or corrected to sea level, equals 14.66 pounds for the weight of a vertical column of air, having a square cross section, measuring 1 inch on a side, to the upper limit of the atmosphere; or 1,013.25 millibars for the weight of a vertical column of air, having a square cross section, measuring 1 centimeter on a side, to the upper limit of the atmosphere. One standard atmosphere, or the standard atmospheric pressure, will support a column of mercury 760 millimeters high, or 29.92 inches high, in a barometer. *McGraw-Hill Encyclopedia of Science and Technology, v. 1, 1960, pp. 155-157.*

atmospheric radiation. The radiation emitted by the atmosphere in two directions: upward to space and downward to the earth. It consists mainly of the long-wavelength terrestrial radiation plus the small amount of short-wavelength solar radiation absorbed in the atmosphere. Figuring on the basis of a year and using a heat unit of 10^{22} calories, it has been calculated that of the 201 heat units absorbed in the atmosphere, 134 heat units are returned to the earth as the so-called back radiation, and 67 heat units are lost to space. In summer, this back radiation equals or exceeds one-half of the incoming solar radiation in all northern latitudes. In winter, it exceeds the total incoming solar radiation at all latitudes above 15° N. *A.G.I.*

atmospheric water. Water which exists in the atmosphere in the gaseous, liquid, or solid state. *A.G.I.*

Atokan. Lower Pennsylvanian, above Morrowan. *A.G.I. Supp.*

atoll. a. A coral island of circular form enclosing a lagoon. *Fay.* b. A ringlike island or islands encircling or nearly encircling a lagoon. The term coral island for most of these tropical islands is incorrect because calcareous algae often form more than 50 percent of them. *A.G.I.*

atoll reef. A ring-shaped coral reef, often carrying low sand islands, enclosing a body of water. *A.G.I.*

atoll texture. A texture sometimes observed in a thin section of a rock, in which a ring of one mineral occurs with another mineral or minerals inside and outside the ring. *Bureau of Mines Staff.*

atom. a. According to the atomic theory, the smallest particle of an element that can exist either alone or in combination with similar particles of the same element or of a different element. The smallest particle of an element that enters into the composition of a molecule. *Webster 3d.* b. A particle of matter indivisible by chemical means. The fundamental building block of chemical elements. The elements, such as iron, lead, sulfur, differ from each other because they contain different atoms. Atoms are unbelievably small. There are 6 sextillion (6 x 10^{21}) atoms in an ordinary drop of water. According to current theory, an electrically neutral atom contains a dense inner core (the nucleus) and a much less dense outer domain consisting of electrons in motion around the nucleus. *L&L.*

atomic bomb. A bomb, the energy of which comes from the fission of heavy elements, such as uranium and plutonium. *See also* hydrogen bomb. *L&L.*

atomic bond. The attraction exerted between atoms and ions. There are four types of atomic bond: (1) metallic; (2) ionic or polar; (3) homopolar or coordinate; and (4) residual or van der Waals. Bonding may be intermediate between these types. *A.G.I. Supp.*

atomic charge. Electrical charge density due to gain or loss of one or more electrons. *Pryor, 3.*

atomic clock. A device that uses the vibrations of atomic nuclei or molecules to measure time intervals. These vibrations remain constant with time. Since they are extremely fast, short intervals can be measured with very high precision. *L&L.*

atomic cloud. The cloud of hot gases, smoke, dust, and other matter that is carried aloft after the explosion of a nuclear weapon. The cloud frequently has a mushroom shape. *L&L.*

atomic distance. That between two atom centers. *Pryor, 3.*

atomic energy. Energy that can be liberated by changes in the nucleus of an atom, as by fission of a heavy nucleus or by fusion of light nuclei into heavier ones with accompanying loss of mass. *Webster 3d. See also* nuclear energy.

atomic heat. The thermal capacity of an atom, that is, the product of the atomic weight and specific heat of an element. *Cooper.*

atomic hydrogen welding. An arc-welding process wherein coalescence is produced by heating with an electric arc maintained between two metal electrodes in an atmosphere of hydrogen. Shielding is obtained from the hydrogen. Pressure may or may not be used and filler metal may or may not be used. *Coal Age, v. 66, No. 3, Mar. 1961, pp. 91-92.*

atomicity. Of an element or compound, the number of atoms contained in its molecule. *Cooper.*

atomic kernel. Part of atom left when outer shell's valency electrons have been removed. *Pryor, 3.*

atomic mass. The mass of any species of atom, usually expressed in atomic mass units. *Webster 3d.*

atomic mass unit. A unit of mass for expressing the masses of atoms, molecules, or nuclear particles, being equal to 1/16 of the atomic mass of the most abundant oxygen isotope, ${}_8O^{16}$, which is about 1.66035 x 10^{-24} gram, or in terms of equivalent energy to about 931 electron volts. Also called mass unit. *Webster 3d.*

atomic moisture meter. A device designed by the U.S. Bureau of Mines to monitor the moisture in coal passing through a preparation plant, by using radiation that is sensitive to hydrogen atoms. The coal is bombarded with neutrons, some of which strike hydrogen atoms and bounce back to a detector tube, thus providing a continuous measure of moisture content. This meter will permit the moisture content of coal to be measured instantaneously, continuously, and automatically. *Bureau of Mines Staff.*

atomic number. a. The number of protons in the nucleus of an atom. Each chemical element has its own atomic number and together the atomic numbers form a complete series from 1 (hydrogen) to 103 (lawrencium) in order of increasing atomic weight. There are several exceptions. *See also* atomic weight. *L&L.* b. The number of an element when arranged with others in order of increasing atomic weight. It is equal to the total number of positive charges in the nucleus of the number of orbital electrons in an atom of the element. *C.T.D.*

atomic percent. The number of atoms of an element in a total of 100 representative atoms of a substance; often written a/o. *ASM Gloss.*

atomic plane. Any one of the layers into which atoms form themselves in an orderly pattern during the growth of a crystal. *Shipley.*

atomic power. A popular synonym for nuclear power. *See also* nuclear energy. *NRC-ASA N1.1-1957.*

atomic proportions; atomic ratios. The proportions or ratios in which the various atomic species occur in a substance. It is obtained by dividing the weight-percent of each substance by the atomic weight of the substance. When recalculated to atoms per 100 atoms total, the values are atom-percent. *A.G.I.*

atomic radius. The radius of an atom or the average distance from the center to the outermost electron of the neutral atom. It is commonly expressed in angstrom units (10^{-8} centimeters). *A.G.I.*

atomic ratio. Ratio of quantities of different substances in terms of the number of atoms of each. *NRC-ASA N1.1-1957.*

atomic reactor. *See* nuclear reactor. *L&L.*

atomic scattering factor. Mean amplitude of wave of X-rays scattered by atoms in a crystal lattice plane. *Pryor, 3.*

atomic structure. The arrangement of atoms in a substance. *Shipley.*

atomic susceptibility. Change in magnetic moment of 1 gram atom on application of magnetic field of unit strength. *Pryor, 3.*

atomic theory. The theory which asserts that all substances are composed of infinitesimally small particles or atoms. *Crispin.*

atomic volume. a. The space occupied by a quantity of an element as compared with its atomic weight. Obtained by dividing the specific gravity of the element by its atomic weight; also called specific volume. *Standard, 1964.* b. The volume occupied by 1 gram atom of an element. *C.T.D.*

atomic weight. a. The average relative weight of an element as it occurs in nature referred to some element taken as a standard. Hydrogen is sometimes assigned an atomic weight of 1 but oxygen with an atomic weight of 16 is usually taken as a basis. *Webster 3d.* b. The average relative weight of the atoms of an element referred to an arbitrary standard of 16.0000 for the atomic weight of oxygen. The atomic-weight scale used by chemists takes 16.0000 as the average atomic weight of oxygen atoms as they occur in nature. The scale used by physicists takes 16.00435 as the atomic weight of the most abundant oxygen isotope. Division by the factor 1.000272 converts an atomic weight on the physicists' scale to the corresponding atomic weight on the chemists' scale. *A.G.I.*

Atomite. Natural water-ground calcium carbonate; used as filler in rubber. *Bennett 2d, 1962.*

atomization. a. In powder metallurgy, the dispersion of a molten metal into particles by a rapidly moving stream of gas or liquid. *ASM Gloss.* b. A patent process for producing a metallic dust, such as zinc dust. *Fay.*

atomized metal powder. Metal powder produced by the dispersion of molten metals, or alloys, into particles, as by impingement of a rapidly moving gas, or liquid, stream, or by mechanical dispersion. *ASTM B243-65.*

atomizer. a. A simple device, operating on the scent-spray principle, for producing a fine mist for the suppression of airborne dust in mines. It is operated by compressed air and is used in hard headings, at transfer points and in the track of a coal-cutter jib. *See also* mist projector. *Nelson.* b. Synonym for jet mixer. *Long.* c. Synonym for line oiler. *Long.* d. One who, or that which, reduces to atoms or fine particles. Specifically, a hand sprayer, operated by compressing an air bulb. *Standard, 1964.* e. A nozzle through which oil fuel is sprayed into the combustion chamber of an oil engine or a boiler furnace. Its function is to break up the fuel into a fine mist, so as to insure good dispersion and combustion. *C.T.D.*

atomizing spray. System which produces a fine mist of water, used to wet down dust arising from underground blasting. *Pryor, 3.*

atom smasher. *See* accelartor. *L&L.*

atopite. A variety of romeite. *Hey 2d, 1955.*

at rest (coefficient of earth pressure). The ratio of the minor principal stress to the major principal stress. This is applicable where the soil mass is in its natural state without having been permitted to yield, or without having been compressed. *ASCE P1826.*

at rest (earth pressure). The value of the earth pressure when the soil mass is in its natural state without having been permitted to yield or without having been compressed. *ASCE P1826.*

Atritor. Trade name; a machine that simultaneously dries and pulverizes raw clay containing up to 18 percent moisture; it consists of a feeder, metal separator, pulverizer, and fan. *Dodd.*

attached carbon dioxide. Carbon dioxide dissolved in water and in equilibrium with the dissolved salts but not contained in bicarbonate ions. *A.G.I. Supp.*

attached crystal. One which is attached to the mother rock, usually singly terminated. *Shipley.*

attached dune. A drift of sand which the wind adds or attaches to an obstacle in its path to make the shape of the obstacle less resistant to the wind. Such a dune, which may occur on the windward and/or leeward sides of the obstacle, may range widely in size and form. *A.G.I.*

attached groundwater. That portion of the subsurface water adhering to the pore walls. It is assumed to be equal in quantity to the pellicular water, and it is measured by specific retention. *A.G.I.*

attached island; land-tied island. An island which has become attached to the mainland by tectonic movements or by sedimentation. *Schieferdecker.*

attack rate. Planned rate of ore extraction from mineral deposit. *Pryor, 3.*

attal. *See* attle. *Fay.*

attapulgite. A light green, magnesium-rich clay mineral, named from its occurrence at Attapulgus, Ga., where it is quarried as fuller's earth. Crystallizes in the monoclinic system. Also called palygorskite. *A.G.I.; E.C.T., v. 4, p. 32.*

attendance signaling system. A signaling system that operates between the surface lamp room and the underground office, indicating the men in attendance at the beginning of the shift. *See also* self-service lamp room. *Nelson.*

attenuation. a. The fractional decrease of the intensity of an energy flux, including the reduction of intensity resulting from geometrical spreading, absorption, and scattering. *ASM Gloss.* b. All losses in sound intensity as the sound wave travels through the medium. *Hey.*

attenuation anomaly. That part of the propagation anomaly which may be identified with that portion of the total loss which appears as a constant fractional change per unit length of path. *H&G.*

Atterberg limits. In 1911 Atterberg suggested the concept of boundaries to the four states in which soil may exist, namely: the liquid limit, the boundary between the liquid and plastic states; the plastic limit, the boundary between the plastic and semisolid state; and the shrinkage limit, the boundary between the semisolid and solid state. These boundaries are empirical, because the material often grades imperceptibly from one state to the next and the boundaries must be determined by a set procedure. Test for plastic limit and shrinkage limit have remained the same since Casagrande defined the limits by reference to moisture content of soil under certain conditions. *Ham.*

Atterberg scale. A proposed particle-size scale or grade scale for the classification of sediments based on a decimal system beginning with 2 millimeters. The limits of the subclass are obtained by taking the square root of the product of the larger grade limits. The subdivision thus made follows the logarithmic rule. This is the accepted European standard for classification of particle size. *A.G.I.*

Atterberg test. A method for determining the plasticity of clay in terms of the difference between the water content when the clay is just coherent and when it begins to flow as a liquid. The test was first proposed by A. Atterberg. *Dodd.*

Attican orogeny. Late Miocene diastrophism. *A.G.I. Supp.*

attitude. The relation of some directional feature in a rock to the horizontal plane. The attitude of planar features (bedding, foliations, joints, etc.) is described by the strike and the dip. The attitude of a linear feature (fold axis, lineation, etc.) is described by the strike of the horizontal projection of the linear feature and its plunge. *A.G.I.*

attle; attal. a. Corn. Rubbish; rock; containing too little ore to be worth working. *Fay.* b. N. of Eng. To arrange or settle, as an account. *Fay.*

attraction, capillary. Surface tension effect. *Pryor, 3.*

attraction, electrical. Force between plus and minus charges. *Pryor, 3.*

attraction, local. Effect on the horizontal direction of the compass needle produced by the proximity of magnetic materials or electrical currents. Attraction is the same in principle as what is called deviation by navigators. *Seelye, 2.*

attraction, magnetic. Force exercised by magnetized body on one susceptible to magnetization. Proportional to $\frac{1}{\text{distance}^2}$. Attractive or repulsive. *Pryor, 3.*

attrital anthraxylous coal. Same as attrital coal. *A.G.I.*

attrital coal. A bright coal (composed of anthraxylon and of attritus in which the translucent cell-wall degradation matter or translucent humic matter predominates) in which the ratio of anthraxylon to attritus is less than 1:3. *Compare* anthraxylous-attrital coal. *A.G.I.*

attrition. a. The act of rubbing together or of wearing down. The condition of being worn down or of being ground down by friction. The wear of rock particles while being moved about by wind, stream currents, waves, or glaciers. Also, the removal of ice from a glacier by melting or evaporation. *Webster 3d.* b. The act of wearing and smoothing of rock surfaces by the passage of water charged with sand and gravel, by the passage of sand drifts, the descent of glaciers, etc. *See also* corrosion. *A.G.I.* c. The wear and tear that rock particles in transit undergo through mutual rubbing, grinding, knocking, scraping, and bumping with resulting comminution in size. *Compare* abrasion. *A.G.I.*

attrition mill. a. One which grinds abrasively, using rubbing action to disintegrate material, not impact shattering. *Pryor, 3.* b. A disintegrator depending chiefly on impact to reduce the particle size of the charge. Attrition mills are sometimes used in the clay building materials industry to deal with the tailings from the edge-runner mill. *Dodd.*

attrition milling. Milling which reduces the gangue, including a large percentage of heavier materials present in diamondiferous concentrates, to slime or sizes smaller than the diamond particles to be recovered. As much as 90 percent of the gangue can be removed as slime by attrition milling without any noticeable loss of diamond due to wear. This operation is also reported to clean the diamond and make it easier to recover in subsequent steps. The mills are run at about one-third to one-half the critical speed to avoid cascading or heavy impact of the grinding media thus minimizing fracture of diamond particles. Quartz and flint pebbles, steel balls, and large pieces of ore or rock are used as grinding media. Water is usually used. Sizes of tube mills vary, the larger being 20 feet in length and 6 feet in diameter. *I.C. 8200, 1964, p. 65.*

attritious wear. Wear of abrasive grains in grinding such that the sharp edges gradually become rounded. A grinding wheel that has undergone such wear usually has a glazed appearance. *ASM Gloss.*

attritus. a. Introduced by R. Thiessen in 1919 to designate the thin bands of dull coal interlaminated with the bright, glossy coal bands that he called anthraxylon. Macroscopic in appearance; dull with granular surface texture. Microscopically it consists of intimately mixed, tightly compacted remains of varied morphological form and origin. Attritus is a collective term, not directly comparable with any one of the microlitho-types of the Stopes-Heerlen nomenclature but consists of an intimate association of varying proportions of macerals of the vitrinite, exinite, and inertinite groups. It is present in practically all types of coal. In bright-banded coal it is secondary in importance to anthraxylon, but in splint it is the dominant component, and nonbanded attrital coals consist entirely of attritus. *IHCP, 1963, part I.* b. The dull-gray to nearly black, frequently striped portion of material that comprises the bulk of some coals, and the alternating bands of bright anthraxylon in well-banded coals. It was derived from all sorts of comminuted and macerated plant matter, especially from the plants that were more resistant to complete decomposition. It consists of humic degradation and opaque, charred, resinous, and mineral matter; fats, oils, waxes, cuticles, spores and spore exines, and other constituents of the plants forming the coal. *A.G.I.* c. Coal components consisting of a mixture of microscopic fragments of vegetable tissues. It is classified into opaque attritus and transparent attritus. Generally, it corresponds to cull coal or durain. *Tomkeieff, 1954.*

Au Chemical symbol for gold (aurum). *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

AU Abbreviation for angstrom; angstrom unit. Also abbreviated au. *Zimmerman, p. 10.*

aubergine purple. A ceramic color containing manganese, introduced in the 18th century, when it was used for underglaze decoration. *Dodd.*

aubrite. A general term for enstatite achondrites (meteorites) consisting almost wholly of crystalline granular enstatite (and clinoenstatite) low in calcium and practically free from ferrous oxide, with accessory oligoclase. *A.G.I.*

Audibert-Arnu dilatometer. Used for evaluating the development of plastic properties (softening and swelling under heat) of coal in the E.C.E. classification. This dilatometer method measures, inter alia, the softening temperature and the temperature of maximum dilatation (swelling) of a coal. *Francis, 1965, v. 1, p. 152.*

audiofrequency. Any frequency corresponding to a normal audible sound wave. (Ranges roughly from 15,000 to 20,000 cycles per second). *H&G.*

audiofrequency magnetic fields. An electric prospecting technique closely related to the telluric and particularly to the magnetotelluric method. The method is based on the measurement of natural magnetic fields at audiofrequencies and subaudiofrequencies. The basic principle is to measure the tilt of the plane of polarization of the audiofrequency fields. The azimuth is first determined to the nearest 10° or so with a detecting unit. The tilt is then measured along this azimuth, as a dip angle, with an accuracy of plus or minus 1° or 2°. The dip angles are plotted in profile form; anomalies on the profile can be interpreted on the basis of experience gained over known conducting bodies. Abbreviation, AFMAG. *Dobrin, pp. 365–366.*

auganite. Suggested by Winchell for augite andesite. *Holmes, 1928.*

augelite. A massive, colorless or pale red hydrous phosphate of aluminum, $2Al_2O_3 \cdot P_2O_5 \cdot 3H_2O$; from Westana, Scania, Sweden. *Dana 6d, p. 847.*

augen. a. The German word for eyes; used as a prefix before various rock names, especially gneiss, to describe larger minerals or aggregates of minerals, that are in contrast with the rest of the rock. In the gneisses, feldspar commonly forms the augen, which are lenticular with laminations passing around them in a way suggesting an eye. Seldom used in the United States in any other connection than gneiss. *Fay.* b. Applied to large lenticular mineral grains or aggregates of minerals which in cross section have the shape of an eye. They usually occur in metamorphic rocks, especially gneisses, in which they are commonly formed of potassium feldspar. *A.G.I.*

augen gneiss. A gneissic rock containing lenticular, or lens-shaped, crystals or aggregates. The augen (eyes) may represent uncrushed fragments or porphyroblasts. *See also* augen schist; autoclastic schist; cataclasite; flaser gabbro; flaser gneiss; flaser granite; gneiss; granite gneiss; mylonite; mylonite gneiss; orthogneiss; protoclastic gneiss; zobtenite. *A.G.I.*

augenkohle. German name for eye coal. *Tomkeieff, 1954.*

augen schist. A mylonitic rock characterized by the presence of recrystallized minerals in schistose streaks and lenticles. *See also* augen gneiss; autoclastic schist; cataclasite; flaser gneiss; kakirite; mylonite; mylonite gneiss; phyllonite. *A.G.I.*

augen structure. A structure in some gneisses and granites in which certain mineral constituents were squeezed into elliptical or lens-shaped forms and, especially if surrounded by parallel flakes of mica, resemble eyes. *A.G.I.*

auger. a. A drill for seismic shotholes or geophone holes modeled after the conventional carpenter's screw auger. Hence, any seismic shothole drilling device in which the cuttings are mechanically continuously removed from the bottom of the bore during the drilling operation without the use of fluids. A rotary drilling device used to drill shotholes or geophone holes in which the cuttings are removed by the device itself without the use of fluids. *A.G.I.* b. Any of various augerlike tools designed for boring holes in wood or for boring into soil and used especially for such purposes as prospecting, drilling for oil or water, and digging postholes. *Webster 3d.* Also, a tool for drilling holes in coal for blasting. *Fay.* c. The process of drilling holes using auger equipment. *Long. See also* coal auger; horizontal auger. d. An extruder for clay, or clay body, the column being forced through the die by rotation of a continuous screw on a central shaft. *Dodd.*

auger bits. Hard steel or tungsten-carbide-tipped cutting teeth used in an auger run on a torque bar or in an auger-drill head run on a continuous-flight auger. *Long.*

auger boring. The hole and/or the process of drilling a hole using auger equipment. *Long.*

auger-drill head. Tool that holds the auger bits (cutting teeth), run on continuous-flight augers. *Long.*

auger fork. A tool used to span the top of an auger-drill hole and engage and support the weight of a string of continuous-flight augers. *Long.*

auger head. Synonym for auger-drill head. *Long.*

auger hole. A hole drilled with power-driven augers. *Williams.*

augering. Drilling holes with auger equipment. *Long.*

auger machine. a. A machine for the manufacture of zinc-distillation retorts. Similar to machines used for manufacturing drain pipes. *Fay.* b. In ceramics, a machine for extruding plastic clay through a die by means of a revolving auger or screw to form clay products such as brick, sewer pipe tile, retorts, drain tile, etc. *Bureau of Mines Staff.*

auger mining. A mining method often used by strip-mine operators when the overburden gets too thick to be removed economically. Large-diameter, spaced holes are drilled up to 200 feet into the coal bed by an auger. Like a bit used for boring holes in wood, this consists of a cutting head with screwlike extensions. As the auger turns the head breaks the coal and the screw carries it back into the open and dumps it on an elevating conveyor; this, in turn, carries the coal to an overhead bin or loads it directly into a truck.

Auger mining is relatively inexpensive, and it is reported to recover 60 to 65 percent of the coal in the part of the bed where it is used. *Bureau of Mines Staff.*

auger-nose shell. Eng. A clearing tool used in boring for coal, etc., having an auger-shaped end. *See also* wimble. *Fay.*

auger stem. The iron rod to which the bit is attached in rope drilling. *Standard, 1964.*

auger-stem guides. Iron bars (usually four) fastened on drill tools to make them fit the hole more closely and prevent deviation. Also called sinker-bar guides. *Hess.*

auger system. The downhole assemblage of auger rods, bit, etc., used when augering a borehole. *Long.*

auget; augette. A priming tube, used in blasting. *Fay.*

augite. An aluminous silicate of calcium, iron, and magnesium (pyroxene group), $(CaNa)(Mg,Fe',Fe''',Al)(Si,Al)_2O_6$, crystallizing in the monoclinic system, and occurring in many igneous rocks, particularly those of basic composition. It is an essential constituent of basalt, dolerite, and gabbro. *C.M.D.; Dana 17.*

augite bronzite. One of a group of pyroxenes intermediate between bronzite and the calcium-bearing monoclinic pyroxenes. *English.*

augite diorite. A diorite in which augite is a prominent constituent. *Sinkankas.*

augite leucophyre. An igneous rock with a light-colored aphanitic groundmass and augite phenocrysts. *CIPW.*

augite melaphyre. An igneous rock with a dark-colored aphanitic groundmass and augite phenocrysts. *CIPW.*

augitite. A volcanic rock consisting of abundant phenocrysts of augite in a glassy groundmass containing microlites of nepheline and plagioclase, with accessory biotite, apatite, and opaque oxides. *A.G.I.*

augitophyre. A porphyry containing augite phenocrysts. *CIPW.*

augitophyric. In petrology, containing distinct crystals of augite. *Fay.*

Augustin process. This process for silver extraction consists of chloridizing-roasting; leaching with hot solutions of common salt in wooden vats; precipitating the silver on copper and casting into silver bars; precipitating the copper on scrap iron and casting it into shot to be used again. *Liddell 2d, p. 493.*

auralite. Altered iolite. *Standard, 1964.*

aureole. a. A zone in the country rock surrounding an igneous intrusion, and in which zone, contact metamorphism of the country rock has taken place. Also called a contact aureole or a contact zone. *A.G.I.* b. In some thin sections of rocks, an outer zone of a mineral or of minerals that surrounds another mineral. *Bureau of Mines Staff.*

auri-argentiferous. Applied to minerals containing both gold and silver. *Standard, 1964.*

auric. Of, pertaining to, or containing gold in the trivalent state; for example, auric chloride ($AuCl_3$). *Standard, 1964.*

aurichalcite. A basic carbonate of zinc and copper, $2(Zn,Cu)CO_3 \cdot 3(Zn,Cu)(OH)_2$; monoclinic; green to blue color. *Dana 17.*

auricupride. Synonym for cuproauride. *Spencer 19, M.M., 1952.*

auriferous. Containing gold. *Fay.*

auriferous deposits. Gold-bearing deposits; lodes, sands, gravels, or their indurated equivalents, which contain gold in detrital grains or nuggets. *See also* banket; placer deposit; saddle reef. *Nelson.*

auriferous pyrite. Iron sulfide in the form of pyrite, containing gold, probably in solid solution. *C.T.D.*

aurigerous. Gold-bearing; auriferous. *Standard, 1964.*

aurobismuthinite. A doubtful sulfide containing bismuth, gold, and silver; lead-gray in color. It may be a mixture of $(Bi,Au,Ag_2)S$, or possibly of a gold-silver alloy, and bismuthinite, Bi_2S_3. From Nacozari, Sonora, Mex. *English.*

aurosmirid. A silver-white solid solution of gold and osmium in cubic iridium (as distinct from a solid solution of iridium, etc., in hexagonal osmium). Isometric. Grains. From the Urals, U.S.S.R. *English.*

aurostibite. A mineral, $AuSb_2$, cubic with pyrite structure, as minute grains in gold ores from Canada. *Spencer 19, M.M., 1952.*

aurous. Of, pertaining to, or containing gold in the univalent state; for example, aurous chloride ($AuCl$). *Standard, 1964.*

Austausch coefficient; eddy conductivity. A measure of turbulent mixing. The product of mass and transverse distance traveled in a unit of time by the fluid in turbulent motion as it passes through a unit area that is conceived as lying parallel to the general direction of flow. *A.G.I.*

austempering. Quenching a ferrous alloy from a temperature above the transformation range, in a medium having a rate of heat abstraction high enough to prevent the formation of high-temperature transformation products, and then holding the alloy, until transformation is complete, at a temperature below that of pearlite formation and above that of martensite formation. *ASM Gloss.*

austenite. A solid solution of one or more elements in face-centered cubic iron. Unless otherwise designated (such as nickel austenite), the solute is generally assumed to be carbon. *ASM Gloss.*

austenitic stainless steels. The so-called 18-8 grades contain from 16 to 26 percent chromium and 6 to 20 percent nickel. They are not hardenable by heat treatment, and are nonmagnetic in the annealed condition. *Henderson, p. 378.*

austenitic steel. An alloy steel whose structure is normally austenitic at room temperature. *ASM Gloss.*

austenitizing. Forming austenite by heating a ferrous alloy into the transformation range (partial austenitizing) or above the transformation range (complee austenitizing). *ASM Gloss.*

Austin chalk. A white limestone of Cretaceous age, ranging in thickness from 1,500 feet on the Rio Grande River to 600 feet at the type locality, Austin, Tex., and to less than 100 feet in Colorado. It passes laterally into the Benton group. *C.T.D.*

austinite. A colorless or yellowish, orthorhombic, fibrous or bladed, readily cleavable hydrous arsenate of calcium and zinc, $CaZn(AsO_4)(OH)$; found in Gold Hill, Utah; Lomitos, Bolivia. Has also been described as brickerite. *Dana 7, v. 2, pp. 804, 809.*

Austin Red-D-Gel. Gelatinous permissible explosive; used in mining. *Bennett 2d, 1962.*

Austin red diamond. High explosive used in mining. *Bennett 2d, 1962.*

Australian bentonite. Trade name for highly plastic clays from Trida, New South Wales, Australia. *New South Wales, p. 48.*

Australian choutchouc. An early name for coorongite. *Tomkeieff, 1954.*

Australian jasper. Jasper speckled with red and light-gray flecks. *Shipley.*

Australian opal. Any opal from Australia, but the term is often restricted to mean only the black opal. Usually fashioned in flat, polished slabs with beveled or perpendicular sides, instead of in cabochons. *See also* black opal. *Shipley.*

Australian ruby. A misnomer for red garnet. *Shipley.*

Australian sapphires. Sapphires from Australia, most of which are olive green or bluish green. The blue variety is usually very dark greenish or blackish. As a trade term, very dark blue or blackish sapphires. *Shipley.*

Australian zircon. Genuine zircon from Australia including (1) brown, red, or yellow varieties from near Anakie, in Queensland, which are especially sensitive to light or heat, the light yellow becoming blue by heat; (2) hyacinth from Campbell Island, and (3) colorless and dark red zircon from New South Wales. *See also* Tasmanian zircon. *Shipley.*

australite. An Australian tektite. *A.G.I. Supp.*

Austrian cinnabar. A variety of chrome red. *Webster 2d.*

Austrian emerald. An emerald whose occurrence and inclusions are similar to Russian emerald. Usually cloudy to almost opaque, and of dark emerald green, or light-green color, which is sometimes irregularly distributed. Rarely of gem quality. From near Salzburg, Austria. *Shipley.*

Austrian orogeny. Mid-Cretaceous diastrophism. *A.G.I. Supp.*

Austrian vermilion. Synonym for Austrian cinnabar. *Webster 2d.*

autallotriomorphic. An aplitic texture in which all the mineral constituents crystallized at the same time and mutually interfered. Synonymous with saccharoidal. *Johannsen, v. 1, 2d, 1939, p. 202.*

authigene. A mineral which has not been transported and which was formed in situ. Synonym for authigenic mineral. *A.G.I.* Opposite of allothigene. *Hess.*

authigenesis. In situ formation of minerals. *Schieferdecker.*

authigenic. a. Generated on the spot. Applied to the mineral constituents that came into existence with, or after, the formation of the rock of which they are a part; for example, the primary and secondary minerals of igneous rocks and the cements in sedimentary rocks. *Compare* allogenic. *Holmes, 1928.* b. Applied to a mineral formed by a sedimentary process as a crystallographic unit at the place of its occurrence. *A.G.I.* c. Applied to a mineral which originated in sediments at the time of, or after, their deposition. The term indicates local derivation rather than from transported matter. *A.G.I.* d. Applied to growth in the place of occurrence. Secondary enlargement is included. *A.G.I.* e. Pertaining to a mineral that was formed, at the location where it now occurs, before the burial and consolidation of the containing sediment. An authigenic mineral is the product of chemical and biochemical action. *A.G.I.*

authigenic mineral. Synonym for authigene. *A.G.I.*

authigenous; authigenic. An adjective introduced by Kalkowsky to describe a mineral which formed in sediments after the deposition of the sediments, as, for instance, during metamorphism. The term indicates the local origin of the mineral as contrasted with that of some other minerals which may have been brought from a distance. *Fay.* The mineral constituents of any rock that have formed in place, as in an igneous rock. *Compare* allogenic. *Johannsen, v. 1, 2d, 1939, p. 4.*

authimorph. A constituent of a metamorphic rock which, in the formation of the new rock, had its crystal outlines or boundaries altered. *Johannsen, v. 1, 2d, 1939, p. 167.*

authorized fuels. In Great Britain, under the regulations made by the Minister (Smoke Control Areas—Authorized Fuels—Regulations, 1956), authorized fuels include coke of all kinds, anthracite, low volatile steam coals, Phurnacite, Coalite, Rexco, etc., as well as oil, gas, and electricity. *Nelson.*

authorized person. An authorized person is either one appointed or permitted by the official designated by State mining laws to be in charge of the operation of the mine or one appointed to perform certain duties incident to generation, transformation, and distribution or use of electricity in the mine. This person shall be familiar with construction and operation of the apparatus and with hazards involved. *ASA M2.1-1963.*

auto-. A combining form meaning self, from the Greek autos. *Webster 2d.*

autobrecciation. The fragmentation process in which portions of the first consolidated crust of a lava flow are incorporated into the still-fluid portion. *A.G.I.*

autochthon. a. In Alpine geology, a succession of beds that was moved comparatively little from the original site of formation, although the beds may be intensely folded and faulted. *A.G.I.* b. A fossil occurring where the organism lived, and therefore the fossil has not been transported. *A.G.I. Supp.*

autochthonous. Applied to a rock the dominant constituents of which have been formed in situ; for example, rock salt. *Compare* allochthonous. *Holmes, 1920.*

autochthonous coal. Coal believed to have been formed from accumulations of plant debris at the place where the plants grew. Two modes of origin are distinguished: terrestrial and aquatic. Also called indigenous coal. *See also* in situ origin theory; swamp theory. *Stutzer and Noe, 1940, p. 132.*

autochthonous granite. A granite which is surrounded by great aureoles of migmatites and metamorphic rocks and which formed in place by granitization. *Schieferdecker.*

autochthonous peat. Peat that formed in place by the gradual accumulation of plant remains in water. It is subdivided into low-moor peat and high-moor peat. *Tomkeieff, 1954.*

autochthonous stream. A stream flowing in its original channel. *A.G.I.*

autochthony. An accumulation of plant remains in the place of their growth. The term itself can be distinguished between autochthonous elements of growth (eu-autochthony) and autochthonous elements of sedimentation (hypautochthony). *IHCP, 1963, part I.*

autoclastic. Applied to a rock that has been brecciated in place by mechanical processes; for example, a crush breccia. Synonym for protoclastic. *See also* crush conglomerate. *Holmes, 1920.*

autoclastic rock. A fragmentary rock produced by folding caused by orogenic forces when the rocks are not so heavily loaded as to be rendered plastic. The materials in its composition must have been derived from the beds containing it. *A.G.I.*

autoclastic schist. A schist that was formed in place from massive rocks by crushing and squeezing. Autoclastic describes any rock which has been brecciated in place by mechanical processes. *See also* augen gneiss; augen schist; cataclasite; crush breccia; crush conglomerate; mylonite; phyllonite; protoclastic. *A.G.I.*

autoclave. A closed strong vessel for conducting chemical reactions or sterilization under high pressures. *Bennett 2d, 1962.*

autoclaved lime. A special form of highly hydrated dolomitic lime, largely utilized for structural purposes, that has been hydrated under pressure in an autoclave. *Boynton.*

autocombustion system. An electronically controlled impulse system for the oil firing (from the top or side) of ceramic kilns. *Dodd.*

autoconsequent stream. A stream the course of which is constantly changing because its course is controlled by the slopes of the alluvium the stream deposits itself as fans or alluvial plains, for example. *A.G.I.*

autofrettage. Prestressing a hollow metal cylinder by the use of momentary internal pressure exceeding the yield strength. *ASM Gloss.*

autogenetic drainage. a. Drainage by streams the courses of which have been determined solely by the conditions of the land surface over which they flow. *Compare* epigenetic drainage. *Webster 3d.* b. A self-established drainage system developed solely by head-water erosion. *A.G.I.*

autogenetic land forms. The primary and most widely extended class of land forms are those due to the action of the falling rains and flowing rivers upon land surfaces having free drainage to the sea and not disturbed by orogenic movement. Rivers developed upon such surfaces, the valleys which they quickly excavate, the confluent ravines and gorges, and the longer valleys of the tributaries, the hills defined by the main and minor valleys, and the entire surface eventually formed are classed as autogenetic. *A.G.I.*

autogenetic topography. The conformation of land due to autogenetic drainage. *Standard, 1964.*

autogenic soldering. The process of uniting pieces of metal by merely fusing them together. *Fay.*

autogenous. a. In the dense-media separation process, fluid media partly composed of a mineral species selected from ore being treated. *Pryor, 4.* b. Selectively sized lumps of ore used as grinding media. *Pryor, 4.*

autogenous grinding. The secondary grinding of coal or ore by tumbling the material in a revolving cylinder with no balls or bars taking part in the operation. Appreciable savings are claimed for the practice. *Nelson.*

autogenous healing. The closing and disappearance of cracks which occur in concrete when it is kept damp and the cracks are in contact. In prestressed concrete, the cracks will close up without damping provided that sufficient release of stress is allowed for the cracks to disappear after application of overload. *Ham.*

autogenous roasting. Roasting in which the heat generated by oxidation of the sulfides is sufficient to propagate the reaction. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 379.*

autogenous stream. The type of stream independently developed on an undisturbed emergent surface. *A.G.I.*

autogeosyncline. A parageosyncline that subsides as an elliptical basin or trough but which has no associated highlands. *A.G.I.*

autohydration. The development of new minerals in an igneous rock by the action of its own magmatic water on already existing magmatic minerals. *Schieferdecker.*

autoinjection. Synonym for autointrusion. *G.S.A. Memo 6, 1938, p. 200.*

autointrusion. A process by which the residual liquid of a differentiating magma is drawn into rifts formed in the crystal mesh at a late magmatic stage by deformation of unspecified origin. *Schieferdecker.*

autolith. a. A fragment of igneous rock enclosed within another igneous rock of later consolidation, each being regarded as a derivative from a common parent magma; same as cognate inclusion. *Holmes, 1928.* b. In granitoid rocks, a round, oval, or elongated accumulation of iron-magnesium minerals of uncertain origin; segregation; clot. *G.S.A. Memo 5, 1937, pp. 10–12.* c. An inclusion or a fragment of an older igneous rock that is genetically related to the rock containing it. Same as cognate xenolith. *A.G.I.*

autolysis. a. The process of self-digestion; for example, the albitization of a more calcic plagioclase in a lava by soda from the lava itself rather than by soda introduced from an outside source. *A.G.I.* b. The return of a precipitated substance to solution; for example, the phosphate extracted from sea water by plankton returns into the sea water when the plankton die and decay *A.G.I. Supp.*

automatic ash analysis. The coal sample passes to a conditioning unit, which dries and grinds it, then to an X-ray analysis unit. The analysis is based on the difference in the reflection of X-rays by the combustible and noncombustible components of the sample. The reflection is compared photoelectrically with a reference sample. *Nelson.*

automatic belt takeup. A device used with certain types of belt conveyors for the taking up or storage of belt during reversible operation. *Jones.*

automatic chuck. a. A hydraulically actuated drill chuck. Also called hydraulic chuck. *Long.* b. A self- or power-rotated chuck on a pneumatic rock drill, as a stoper, drifter, or jackhammer. *Long.*

automatic clip; automatic coupling. An appliance for attaching and detaching mine trams or cars without manual effort. They are generally attached at inbye clipping stations and detached at the shaft bottom. *See also* haulage clip. *Nelson.*

automatic-closing door. A wooden separation door arranged to close automatically when released by setting the hanging post with a slight lean in the direction of closing. *Nelson.*

automatic clutch. A clutch whose engagement is controlled by centrifugal force, vacuum, or other power without attention by the operator. *Nichols.*

automatic control. Control by means of any device other than a manually operated switch or pushbutton. *B.S. 3618, 1965, sec. 7.*

automatic controller. In flotation, a device which operates automatically to regulate a controlled variable in response to a command and a feedback signal. *Fuerstenau, p. 541.*

automatic control system. One that operates without human intervention. *Fuerstenau, p. 541.*

automatic counter. Is affixed to the end of an enamel mill to determine the number of times the mill has revolved. *Hansen.*

automatic coupling. A device which automatically couples cars when they bump together. *Zern. See also* Alliance coupling; Willison coupler; A.S.F. coupler. *Sinclair, V, pp. 278-279.*

automatic cutting table. A table upon which a column of clay travels and is cut automatically into bricks by descending wires. *Mersereau, 4th, p. 260.*

automatic cyclic winding. A system of automatic winding in which the complete installation operates without human aid and winding continues automatically as long as coal is available at the shaft bottom and is cleared at bank. *See also* pushbutton winding control; Ward-Leonard control. *Nelson.*

automatic dam. In placer mining, a dam with a gate that automatically discharges the water when it reaches a certain height behind the dam. The flood of water is used to wash away the muck and barren gravel in a stream valley. *Hess.*

automatic door. a. A mine door operated by pressure of the locomotive wheels on an arrangement along the rails approaching the doors which closes the door automatically after the trip has passed. These doors are preferable to regular mine doors and the expense of having a door attendant is eliminated. However, they must be carefully maintained to keep them in a safe operating condition. *Kentucky, pp. 88–89.* b. A wooden separation door arranged to close automatically when released by setting the hanging post with a slight lean in the direction of closing. *Nelson.*

automatic doors. Air doors on a haulage road that are automatically operated by a passing vehicle or train of tubs, or other means. *B.S. 3618, 1963, sec. 2.*

automatic dryer. A dryer in which the changes in condition of air are regulated by control treatment. *ACSG, 1963.*

automatic dust sampler. A dust-sampling instrument driven by compressed air and controlled by clockwork mechanism. Separate samples are taken on a filter-paper spool and adjusted to take a sample at regular intervals throughout the shift. The spool advances each time and samples are thus developed separately in continuity. As the density of the resulting dust stains is measured photoelectrically, a period record covering one or more shifts can be obtained. *Nelson.*

automatic feed. a. A hydraulic-control system of valves that when once set and without the manual assistance of a drill runner will reduce or increase feed pressure applied to drill stem as hardness of rock penetrated changes. *Long.* b. A pneumatic rock drill equipped with a power-actuated feed mechanism. *Long.*

automatic feed off. A weight-sensitive device, which may be installed on the drill hoist line and used to maintain automatically a preset feed weight on the drill bit by feeding the drill string downward when drilling off the hoist with a kelly. *Long.*

automatic feed sampler. An automatic sampling device used at mill feeds and other plants. A cutter mounted on rollers and track guides is actuated by a reciprocating air cylinder so that it moves backwards and forwards through the ore stream at predetermined intervals. The time interval is controlled by an electronic timer, and the amount of sample taken at each cut is governed by the speed of the cut which is controlled by restricter valves. *Nelson.*

automatic heating. A central heating system operated without manual attention. It usually means oil-, gas-, or stoker-fired furnaces and boilers. *Strock, 10.*

automatic plating. a. Full-mechanical plating in which the cathodes are automatically conveyed through successive cleaning and plating tanks. *Lowenheim.* b. Semimechanical plating in which the cathodes are conveyed automatically through only one plating tank. *Lowenheim.*

automatic press. A press in which the work is fed mechanically through the press in synchronism with the press action. An automation press is an automatic press which, in addition, is provided with built-in electrical and pneumatic control equipment. *ASM Gloss.*

automatic pump control. The starting and stopping of a pump by a mechanism actuated by the level of water in the suction well or pump, or by the level or pressure of water in a discharge tank. *B.S. 3618, 1963, sec. 4.*

automatic pumping. An arrangement to stop and start a mine pump automatically by means of a float switch. *Nelson.*

automatic reclosing relays. These are used to automatically reclose electrically operated circuit breakers. They limit the duration of power failures in many instances where faults clear themselves quickly. Most reclosing relays attempt to close a breaker three times before locking it out. The time interval between reclosures is predetermined. Lockout means that after the third attempt fails to keep the breaker in, the relay will not function until it is reset manually. Such relays can be designed to operate more than three times before locking out, with the number of reclosures depending on the requirements and design of the system. *Coal Age, v. 71, No. 8, August, 1966, p. 270.*

automatic recorders. Appliances for recording the working time of machines such as cutter loaders, conveyors, etc. A vibrating type, fitted on the equipment itself, marks on a chart a straight line when the machine is idle and an oscillating one when working. *See also* M.O. mine safety indicator. *Nelson.*

automatic sampler. An instrument designed to take samples of gases as a predetermined point during an explosion or preceding or following it, as desired. *Rice, George S.*

automatic sampling. Removal from a passing stream of ore, pulp, or solution of a sample at timed intervals and under controlled conditions by means of automatically operated devices. *Pryor, 3.*

automatic snagging. Snagging by use of semiautomatic grinders where pressure between wheel and work and traverse over work is controlled mechanically or hydraulically from a station removed from the wheel. *See also* snagging. *ACSG, 1963.*

automatic spider. A foot and/or hydraulically actuated drill-rod clamping device similar to a Wommer safety clamp. *See also* Wommer safety clamp. *Long.*

automatic sprinkler. A water sprinkling device closed by a metallic alloy which melts at a low temperature. In case of fire the alloy melts, releasing a water spray. These devices are used in wood-lined shafts and timbered bottoms, sometimes by legal requirements. *Zern.*

automatic strake. Sloping deck, around which an endless band of corduroy is moved, the concentrate being washed off as the corduroy bends around at the departure end. *Pryor, 3, p. 109.*

automatic takeup. Any mechanism which maintains a predetermined tension in the conveyor belt. This tension may be applied to the movable pulley by gravity weights, pneumatic or hydraulic pressure, or electric power. *NEMA MB1-1961.*

automatic-type belt tensioning device. Any mechanism which maintains a predetermined tension in a conveyor belt. The most common type is the gravity takeup in which a weight acts upon a takeup pulley. *NEMA MB1-1956.*

automatic wagon control. The use of equipment to keep the speed of wagons within certain designed limits. The system may consist of small hydraulic units fixed at intervals along the inside of the track, and may include wagon retarders, wagon booster retarders, and wagon arresters. *Nelson.*

automatic welding. Welding with equipment which performs the entire welding operation without constant observation and adjustment of the controls by an operator. The equipment may or may not perform the loading and unloading of the work. *Coal Age, v. 66, No. 3, Mar. 1961, p. 91.*

automatic winding. This term includes at least three different systems: (1) fully automatic winding in which no driver, banksman, or onsetter is employed; (2) pushbutton automatic winding, similar to the above except that the operation is started by a pushbutton by the banksman or onsetter; and (3) cyclic winding in which the driver takes off the brakes and throws over his control lever at the beginning of the wind. *Sinclair, V, p. 124.*

automation. a. The concept of a system for automatic processing. Full automation involves an element of decision and embodies the automatic control of all operations including materials handling, manipulation and positioning, machining and processing, assembly and inspection, and packaging and warehousing. Partial automation may involve but one operation, or a part of one operation. *ASA MH4.1—1958.* b. In mining, the automatic control of production machines and ancillary operations by electronic control equipment, photoelectric cell, remote control, instrumentation, etc. The technique is now applied to powerhouses, pumping units, mine fans, winding operations, ore processing plants, and many other mining activities. *See also* coal-sensing probe; thermocouple. *Nelson.*

automation press. *See* automatic press. *ASM Gloss.*

autometamorphism; automorphism. a. The metamorphism of an igneous rock by the action of its own volatile fluids, such as the formation of spilite from basalt. *Compare* autopneumatolysis. *Hess.* b. Metamorphism caused by the lowering of temperature in a newly congealed igneous rock in which residual hydrothermal solutions react with the igneous minerals; for example, the albitization of basalt to form spilite. *A.G.I.* c. The alteration of an igneous rock by its own residual liquors. *A.G.I.*

autometasomatism. a. The replacement of early formed minerals in an igneous rock by later minerals through the action of its own mineralizing agents. *Schieferdecker.*

b. The process of alteration in a newly crystallized igneous rock by its own last, water-enriched, liquid fraction which is trapped with the rock mass, generally by an impervious chilled border zone. *A.G.I. Supp.*

automolite. A dark green to nearly black zinc spinel. *Schaller.*

automorphic. Applied to those minerals of igneous rocks that are bounded by their own crystal faces. Rocks that are composed predominantly of an automorphic mineral assemblage have an automorphic-granular or panidiomorphic-granular texture. Contrasted with allotriomorphic, xenomorphic, and anhedral. Synonym for idiomorphic; euhedral. *A.G.I.*

automorphosed. Applied to a solidified igneous rock that is metamorphosed by solutions from its own hot interior. A contraction of autometamorphosed. *Hess.*

auto-oxidation. Oxidation of minerals on exposure to atmosphere without use of auxiliary reagents. *Pryor, 3.*

autopatrol. A self-propelled motor grader for preparing the subgrade of a road. *Ham.*

autopiracy. Stream capture that only involves the parts of a single stream which generally shortens its course, as in the cutting off of a meander. *A.G.I. Supp.*

autopneumatolysis. a. A subdivision of the term autometamorphism. It probably should be restricted to metamorphic changes occurring in the pneumatolytic stage of a cooling magma, when the temperatures are approximately 400° to 600° C. *A.G.I.* b. The development of late minerals in an igneous rock by the action of its own gaseous mineralizing agents; for example, the formation of sanidine, sodalite, biotite, etc., in the leucite tephrites of Mount Vesuvius, Italy. *Holmes, 1920.*

autoradiography. An inspection technique in which radiation spontaneously emitted by a material is recorded photographically. The radiation is emitted by radioisotopes that are produced in or added to a material. The technique serves to locate the position of the radioactive element or compound. *ASM Gloss. See also* radiography. *L&L.*

autosite. A rock similar to kersantite (a dark plagioclase-biotite rock) but without feldspar. *Hess.*

autospray. A device for spraying dust carried by loaded conveyors. A liquid medium is sprayed on the conveyor load only when moving and not when stationary, or when the belt is running unloaded. The spray control is placed centrally beneath the conveyor belt and a load causes the belt to deflect and rotate the driving pulley which causes the controller valve to open. A belt stoppage or no load causes the valve to close. *Nelson.*

autostoper. A stoper or light compressed-air rock drill, mounted on an air-leg support which not only supports the drill but also exerts pressure on the drill bit. *Nelson.*

autotransformer. A special-type transformer whose use in mines is limited to apparatus for starting induction motors of the squirrel cage type. The winding is a common one for primary and secondary, and the two circuits are electrically in contact with each other. *Mason, v. 2, p. 427.*

autotroph. An organism capable of growing in the absence of organic matter. *I.C. 8075, 1962, p. 63.*

autotrophic bacteria. Microbes which thrive in acid solutions and make their own food. They manufacture a potent combination of sulfuric acid and ferric sulfate by oxidizing certain iron and sulfur compounds. Are being used commercially to recover copper remaining in the wastes or tailings from copper mills, and studies indicate that they may prove beneficial in processing other lower grade ores. *Bureau of Mines Staff.*

autrometer. An automatic multielement indexing X-ray spectrograph, capable of the qualitative and quantitative determinations of as many as 24 elements in a single sample. Choice of the elements may be made from magnesium through all the heavier elements. The device measures the intensity of an emitted wavelength band from a standard sample and compares it with the intensity of a like band from an unknown sample. This data is presented in the form of a ratio of one intensity to the other. *Nelson.*

Autunian. Lower Permian. *A.G.I. Supp.*

autunite. A mineral, $Ca(UO_2)_2(PO_4)_2.8\text{-}12H_2O$; occurring in yellow plates; tetragonal; fluorescent. One of the important uranium minerals. Strongly radioactive; found in the oxidized zone of most uranium deposits resulting from the alteration of uraninite, pitchblende, gummite, uranophane, and uranium-bearing columbates. *A.G.I.; BuMines Bull. 585, 1960, p. 919; Crosby, pp. 6-7.*

Autun shale oil. An illuminating oil extracted from bituminous shale found at Autun, France. *Fay.*

auxiliary. a. Tools or other equipment, such as a pump, drill rods, casing, core barrel, bits, water swivel, safety clamp, etc., required for use with a drill machine to carry on specific drilling operations. *Compare* accessory, c. *Long.* b. A helper or standby engine or unit. *Nichols.*

auxiliary anode. A supplementary anode placed in a position to raise the current density on a certain area of the cathode to get better plate distribution. *ASM Gloss.*

auxiliary collectors. Auxiliary collectors used in practice are usually hydrocarbons (fuel oils of varying grades, including Bunker grades, kerosine, etc.). *Fuerstenau, p. 434.*

auxiliary cylinder. A cylinder, operated by compressed air, which is used to assist the main engine of a compressed-air shaker conveyor, especially where the conveyor cannot develop a sufficient amount of forward acceleration due to grades. The auxiliary cylinder is attached to the conveyor by a driving chain and to a prop by a fixing chain. *Jones.*

auxiliary fan; secondary fan. A small fan installed underground for ventilating narrow coal drivages or hard headings which are not ventilated by the normal air current. An auxiliary fan is usually from 18 inches to 2 feet in diameter, and delivers up to 10,000 cubic feet per minute, or more. It is driven by compressed air or electricity. In the latter case, the motor is placed in the intake airway. *Nelson.*

auxiliary fault. A branch fault. A minor fault ending against a major fault. *A.G.I. Supp.*

auxiliary mineral. In the Johannsen classification of igneous rocks, any light-colored, relatively rare mineral, or mineral occurring in small quantities, such as apatite, muscovite, corundum, fluorite, and topaz. *A.G.I.*

auxiliary operations. In metallurgy, diverse operations, such as storing in bins, conveying (by conveyors, feeders, elevators, or pumps), sampling, weighing, reagent feeding, and pulp distribution. *Gaudin, p. 9.*

auxiliary plane. A plane at right angles to the net slip on a fault plane, as determined from the analysis of seismic data for an earthquake. *A.G.L. Supp.*

auxiliary telescope. A telescope, fitted parallel to the main telescope of a theodolite, for measuring and setting out horizontal and vertical angles where the main telescope cannot be used. *B.S. 3618, 1963, sec. 1.*

auxiliary ventilation. A method of supplementing the main ventilating current in a mine by using a small fan to draw air from the main current and force it through canvas or galvanized iron pipe to some particular place, such as the ends of drifts, crosscuts, raises or other workings driven to develop the mine. If the pipeline is long, it may be necessary to place a second fan at some intermediate point in the pipeline. Jets of compressed air may be used in ventilating pipes to force air short distances. *Lewis, p. 706. See also* air mover; exhaust ventilation; forced auxiliary ventilation; overlap auxiliary ventilation; reversible auxiliary ventilation; two-fan auxiliary ventilation. *Roberts, I, pp. 219-221.*

auxite. Same as lucianite. *English.*

available energy. That part of the total energy which can be usefully employed. In a perfect engine, that part which is converted to work. *Strock, 10.*

available lime. a. Those constituents of a lime which enter into a desired reaction under the conditions of a specific method or process. *ASTM C51–47.* b. Represents the total free lime (CaO) content in a quicklime or hydrate and is the active constituent of a lime. It provides a mean of evaluating the concentration of lime. *Boynton.*

available lime index. The calcium-oxide fraction that is available for immediate chemical reactivity, as in a neutralization reaction. *Bennett 2d, 1962 Add.*

available moisture. The moisture in soil that is available for use by plants. *A.G.I. Supp.*

available nitrogen. Water-soluble nitrogen compounds plus that which is rendered soluble or converted to free ammonia. *Bennett 2d, 1962 Add.*

available nutrients. Consist of ions that are either dissolved in the soil moisture or that are absorbed on the clay minerals of the soil in readily exchangeable form. These nutrients constitute the mineral content of the soil that is immediately available for uptake by the plant. *Hawkes, 2, p. 291.*

available power. The rate at which a given source would deliver energy to a load having an impedance which is the conjugate of the source impedance is designated as the available power of that source. *H&G.*

available power loss. The available power loss of a transducer connecting an energy source and an energy load is the transmission loss measured by the ratio of the source power to the output power of the transducer. *H&G.*

available relief. a. The vertical distance between the altitude of the original surface after uplift, and the level at which grade is first attained. *A.G.I.* b. The relief that is available for erosion. *Bureau of Mines Staff.*

available silica. Refers to the amount of silica present in a flux which is not slagged by impurities in the flux itself. *Newton, p. 390.*

avalanche. a. A falling mass of snow which, having been detached from a great height in the mountains, acquires enormous bulk by fresh accumulations of snow as it descends, and when it falls into the valleys below, it often causes great destruction. *Fay.* b. An accumulation of snow or of snow and ice, which descends from precipitous mountains like the Alps into the valleys below. An avalanche originates in the higher regions of a mountain and begins to descend when the gravity of its mass becomes too great for the slope on which it rests, or when thawing destroys its adhesion to the surface. *A.G.I.* c. A large mass of snow or ice, sometimes accompanied by other material, that moves rapidly down a mountain. *A.G.I.*

avalanche protector. Guardplates that prevent loose material from sliding into contract with the wheels or tracks of a digging machine. *Nichols.*

avalanching. In ball mills, turning at the speed at which balls break clear of crop load and fall freely. *Pryor, 3. See also* cascading; critical speed.

avalite. An impure variety of muscovite containing chromium oxide. *Standard, 1964.*

avasite. A black hydrated iron silicate. Probably only siliceous limonite. *Standard, 1964.*

aven. A vertical shaft leading upwards from a cave passage, and at times, connecting with passages above. *A.G.I.*

aventurescence. A word used to describe the metallic spangled effect seen, in reflected light, in aventurine and aventurine feldspar. A sort of schiller but more scintillating. *Shipley.*

aventurine. a. A glass containing opaque sparkling particles of foreign material, which is usually copper or chromic oxide. With copper particles, it is called gold aventurine, and with chromic-oxide particles, it is called chrome aventurine or green aventurine. *Webster 3d.* A glass containing gold-colored inclusions. *A.G.I.* b. A translucent quartz that is spangled throughout with scales of mica or of some other mineral. *Webster 3d.* c. As an adjective, having the brilliant spangled appearance of aventurine. *Webster 3d.* Applied especially to transparent or translucent quartz or feldspar containing shiny inclusions. *A.G.I.*

aventurine feldspar. Orthoclase, albite, or oligoclase that is more or less transparent, with fiery reflections from enclosed flat mineral particles, that are probably hematite or goethite. Sunstone is aventurine oligoclase. *Hess.*

aventurine glass. A glass supersaturated with either iron, chromium, or copper oxide, (or a combination of the oxides) that is melted and cooled under controlled conditions to cause the excessive oxides to crystallize, forming platelike crystals or spangles. *Bureau of Mines Staff.*

aventurine glazes. Transparent glasses containing thin platelike crystals or spangles in the glassy matrix. Ferric, chromium, and copper oxides are used in these glazes. *Bureau of Mines Staff.*

aventurine quartz. *See* aventurine, b.

avenue. A broad, high, relatively straight primary passage. *A.G.I.*

average assay value. *See* assay value.

average clause. Eng. A clause that, in granting leases of minerals (coal, ironstone, and clay in particular), provides that lessees may, during every year of the term, make up any deficiency in the quantity of coal, etc., stipulated to be worked, so as to balance the dead or minimum rent. *Fay.*

average depths. The average water depths based on soundings reduced to low water datum. *Hy.*

average error. Mean of all errors (plus and minus). *Pryor, 3, p. 159.*

average gradient. The slope of the straight line joining two points of specified density on the characteristic curve. *ASM Gloss.*

average igneous rock. A theoretical rock the chemical composition of which is believed to be similar to the average composition of the outermost shell of the earth to a depth of about 10 miles. This composition is calculated in different ways, and there is not complete agreement or how an average should be reached or its significance. *A.G.I. Supp.*

average-level anomaly. A gravity anomaly related to the average topographic level in an area having a 37- or 104-mile radius. *A.G.I. Supp.*

average life; mean life. The average of the individual lives of all the atoms of a particular radioactive substance. It is 1.443 times the radioactive half-life. *NRC-ASA N1.1-1957.*

average limit of ice. Average seaward extent of ice during a normal winter. *Hy.*

average loading. The average number of tons of a specified material to be carried by a conveyor per hour, based on total operating-shift tonnage. *NEMA MB1-1961.*

average pressure. The average of all the pressures acting on a piston during the expansion or compression stroke. The average pressure is the effective pressure taken throughout the movement of the piston; mean effective pressure. *Petroleum Age, V.11, February 1, 1923, p. 39.*

average produce. a. The average production of coal or ore from a district mine or group of mines over a period of time. *Nelson.* b. Sometimes used to denote the quantity of pure or fine copper in 100 parts of ore. *Nelson.*

average standard. Corn. The price per ton of the fine copper in the ore, after deducting the charge for smelting. *Fay.*

average velocity. In seismology, the ratio of the distance traversed along a ray by a seismic pulse to the time required for that traverse. The average velocity is usually measured or expressed for a ray perpendicular to the reference datum plane. *A.G.I.*

avezacite. Given by Lacroix to a perculiar cataclastic rock found in veins or dikes in a peridotite at Avezac-Prat in the French Pyrenees. The rock is dense, black, and brittle, contains large basaltic hornblende and yellow sphene crystals in a fine-grained groundmass, which is a cataclastic aggregate of apatite, sphene, titaniferous magnetite, ilmenite, hornblende, augite, and rarely olivine and biotite. It may have resulted from the crushing of basic pegmatitic veins or dikes. *Fay.*

avg; av Abbreviation for average. *BuMin Style Guide, p. 58.*

avicennite. Minute black crystals; cubic, essentially Tl_2O_3; provisional formula $7Tl_2O_3.Fe_2O_3$, with a 9.12 A and z = 4 (but artificial Ti_2O_3 has only 16 $T1_2O_3$ per unit cell). *Hey, M.M., 1961.*

Avicula. The genus of saltwater bivalves allied to and in some cases including the principal pearl-bearing molluscs. *See also* Aviculidae; Meleagrina. *Shipley.*

Aviculidae. The family of bivalves which include among others the principal pearl-bearing molluscs. Same as Pteriidae. *Shipley.*

aviolite. a. A mica-cordierite hornfels from Monte Aviolo in the Italian Alps. *Holmes, 1928.* b. *See* edolite; hornfels; leptynolite; proteolite; seebenite. *A.G.I.*

avogadrite. A borofluoride of potassium and caesium, $(K,Cs)BF_4$. Tests by Carobbi show specific gravity, 2.498, and suggest that pure avogadrite is KBF_4. Orthorhombic; minute, tabular, eight-sided crystals. From Vesuvius, Italy. *English.*

Avogadro's law; Avogadro's theory; Avogadro's principle. Equal volumes of all gases under the same conditions of pressure and temperature contain the same number of molecules. *Newton, p. 119.*

Avogadro's number. Symbol, *N*. The number of molecules in 1 gram-molecular weight (or in 1 mole) of a substance is within a range of 1 percent about the value (6.02486 ± 0.00016) X 10^{23} per gram-mole (physical); 6.02322 ± 0.00016 X 10^{23} per gram-mole (chemical). *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-32.*

avoirdupois. The system of weights used in the United States and England for the ordinary purposes of trade. The fundamental unit is the pound of 16 ounces or 7,000 grains. *Standard, 1964.* The avoirdupois pound equals 14.583 troy ounces or 453.6 grams. *Fay.* Abbreviation, avdp. *BuMin Style Guide, p. 58.*

Avonian. The Carboniferous limestone; sometimes used when dealing with the subdivisions of the Carboniferous system based on fossil evidence. *Nelson.*

avulsion. a. A sudden change in the course of a stream by which a portion of land is cut off, as where a river cuts across and forms an oxbow. *Fay.* b. Where a river changes its course abruptly, as in the case of an oxbow cutoff, the land between the new and old channels remaining undisturbed, that process is avulsion. *A.G.I.* c. When an avulsion occurs on a boundary, the boundary does not follow the river, as in the previous case of erosion and accretion, but it remains in its old position. *A.G.I.*

awaruite. A native alloy of iron and nickel, $FeNi_2$, containing 32.3 percent iron and 57.7 percent nickel; found in river gravels of Gorge River, New Zealand, and in residues from gold washings, south fork of Smith River, Del Norte County, Calif. *Hess.*

away; bend away. An exclamation meaning to raise the cage or bucket in an excavation or where a derrick or windlass is used. Also called take it away. *Hess.*

AWG Abbreviation for American wire gage, and adopted as a standard for gaging the size of wires used for electrical purposes. *Crispin.*

awl. A small pointed tool for making holes for nails or screws, or, as in leather, for thread. *Crispin.*

awn. *See* andra; long awn; short awn.

awp Abbreviation for average weighted pressure. *BuMin Style Guide, p. 58.*

awu Abbreviation for atomic weight unit. *See also* atomic weight. *NRC–ASA N1.1 1957.*

axes. Crystallographic directions through a crystal; used as lines of reference. *Hurlbut.*

axes, fabric. In structural petrology, three mutually perpendicular directions in tectonites, usually denoted *a, b,* and *c,* which refer to the movement pattern. *A.G.I.*

axes of elasticity. Those axes in crystals that represent the directions of the highest, the intermediate, and the lowest indices of refraction. *Fay.*

axes of reference. The coordinate axes to which crystal faces are referred. *Fay.* Also called the crystallographic axes.

axes, reference. In structural petrology, three mutually perpendicular axes to which structural measurements are referred. The *a* axis is the direction of tectonic transport, the *c* axis is perpendicular to the plane along which the differential movement takes place, and the *b* axis lies in this plane but is perpendicular to *a. A.G.I.*

axes, tectonic. The *a, b,* and *c* fabric axes or coordinates used by structural geologists and petrologists. *A.G.I.*

axial angle. a. The acute angle between the two optic axes of a biaxial crystal. Its symbol is 2V. *A.G.I.* b. The axial angle in air (symbol 2E) is the larger angle between the optic axes after being refracted on leaving the crystal. *A.G.I.*

axial compression. In experimental work with cylinders, a compression applied parallel with the cylinder axis. It should be used in an appropriate sense only in the interpretation of deformed rocks. *A.G.I.*

axial culmination. The distortion of a fold axis upward in a form similar to an anticline. *A.G.I. Supp.*

axial elements. The axial ratio and the angles between the axes of a crystal. *Fay.*

axial figure. The interference figure that is obtained in convergent light when an optic axis of the mineral being observed in thin section or as a fragment coincides with the axis of the polarizing microscope. When a thin section of a uniaxial mineral that was cut at right angles to an optic axis is examined between crossed nicols (that is, between two polarizers, the polarization planes of which are at right angles to each other) an equal-armed shadowy cross and a series of spectrally colored, circular bands are seen. If the mineral is biaxial, two shadowy parabolic curves called isogyres and opening away from each other in a series of spectrally colored, oval bands apper. *Hess; Bureau of Mines Staff.*

axial flow. In pumping or in ventilation, the use of a propeller or impeller to accelerate the load (as against displacement pumping). *Pryor, 3.*

axial-flow compressor. One in which air is compressed in a series of stages as it flows axially through a decreasing tubular area. *Pryor, 3.*

axial-flow fan. a. A modern type of mine fan in which the mine air enters along the axis parallel to the shaft and continues in this direction outward to the atmosphere. The axial-flow fan may have fixed blades (fixed pitch fan) or adjustable blades (variable pitch fan). Two, four, or six aerofoil section blades (like an aircraft wing) are usually employed. Also called screw fan. *Compare* radial-flow fan. *See also* Aerex fan; fan, a. *Nelson.* b. The modern compressed-air auxiliary fan consists essentially of a single-stage axial-flow fan in which the rotor also forms the rotor of a compressed-air turbine. The exhaust from the turbine is added to the ventilating air. The result is a light and very compact machine, capable of the same duties as the smaller sizes of electric auxiliary fans. *Roberts, I, p. 222.*

axial jet. A flowing turbulent stream that mixes with standing water in three dimensions. *A.G.I. Supp. Compare* plane jet.

axial line. *See* axis, f. *McKinstry, p. 640.*

axial plane. a. A crystallographic plane that includes two of the crystallographic axes. *Fay.* b. A plane that intersects the crest or the trough of a fold in such a manner that the limbs, or the sides, of the fold are more or less symmetrically arranged with reference to it. *Fay.* c. The plane of the optic axes of an optically biaxial crystal. *A.G.I.*

axial-plane cleavage. A rock cleavage that is essentially parallel to the axial plane of a fold. *A.G.I. Supp.*

axial-plane folding. Large-scale secondary folding of preexisting folds in response to movements which varied considerably from those which caused the original folding. The axial planes of the original folds have been folded. *A.G.I.*

axial-plane foliation. Foliation that developed parallel to the axial plane of a fold and perpendicular to the principal deformational pressure. *A.G.I. Supp.*

axial plane of folding. A plane which intersects a fold in such a manner that the sides of the fold are more or less symmetrical. *Hy.*

axial-plane schistosity. Schistosity that developed parallel to the axial plane of a fold. *A.G.I. Supp.*

axial-plane separation. The distance between the axial planes of an anticline and its adjacent syncline, or vice versa. *A.G.I. Supp.*

axial rake. For angular (not helical) flutes, the angle between a plane containing the tooth face and the axial plane through the tooth point. *ASM Gloss.*

axial ratio. The ratio obtained by comparing the length of a crystallographic axis with one of the lateral axes taken as 1. *Fay*

axial relief. The relief or clearance behind the end cutting edge of a milling cutter. *ASM Gloss.*

axial runout. The total variation, in an axial direction, of a cutter element from a true plane of rotation. *ASM Gloss.*

axial stream. The main stream of an intermontane valley that flows along the lowest part of the valley and parallel to its long dimension, in contradistinction to the numerous streams which flow down the mountains on either side and build alluvial slopes. Also applied to a stream which follows the axis of an anticline or a syncline. *USGS Bull. 730, 1923, p. 86.*

axial surface. *See* axial plane, b.

axial trace. The intersection of the axial plane of a fold with the surface of the earth or any other specified surface. Sometimes, such a line is loosely and incorrectly called the axis. *A.G.I.*

axinite. A mineral, $H(Ca,Fe,Mn)_3Al_2B(SiO_4)_2$, in brown, violet, or green triclinic crystals. *A.G.I.*

axinitization. The replacement of rocks by axinite, as in the border zones of some granites. *A.G.I.*

axiolite. A term proposed by Zirkel for a variety of elongated spherulite in which there is an aggregation of minute acicular crystals arranged at right angles to a central axis. *Johannsen, v. 1, 2d, 1939, p. 168.*

axis. a. A straight line about which a body or a three-dimensional figure rotates or may be supposed to rotate; a straight line with respect to which a body, figure, or system of points is either radially or bilaterally symmetrical. *Webster 3d.* b. In crystallography, one of the imaginary lines in a crystal which are used as coordinate axes of reference in determining the positions and symbols of the crystal planes. *Fay.* c. Often used synonymously with anticlinal; thus, the Brady's bend axis for Brady's bend anticlinal. *See also* anticlinal axis; synclinal axis. *Fay.* d. In geology, the central or dominating region of a mountain chain, or the line of which follows the crest of a range and thus, indicates the position of the most conspicuous part of the uplift. *Fay.* e. The centerline of a tunnel. *Nichols.* f. Intersection of the axial plane (or axial surface) with a particular bed. Also called axial line. *McKinstry, p. 640.*

axis of acoustic symmetry. For many transducers the three-dimensional directivity is such that it may be represented by the surface generated by rotating a two-dimensional directivity pattern about the axis corresponding to the reference bearing of the transducer. This axis may then be described as an axis of acoustic symmetry or as the acoustic axis. *Hy.*

axis of a crystal. *See* axis, a and b. *Fay.*

axis of a fold. The line following the apex of an anticline or the lowest part of a syncline. *Hess.*

axis of elevation. Line of elevation. *Fay.*

axis of rotation. The imaginary line about which all the parts of a rotating body turn. *Fay.*

axis of symmetry. a. An imaginary line in a crystal, about which it may be rotated a certain number of degrees, so as to occupy the same position in space as before. *Fay.* b. An axis about which a crystal can be rotated so as to occupy the identical volumetric position more than once during a complete turn. If this occurs twice, the axis is diagonal; three times, trigonal; four times, tetragonal; and six times, hexagonal. *Pryor, 3.*

axis of tilt. The line of intersection of the photograph plane and a horizontal plane at the same focal distance from the lens. *Seelye, 2.*

axis of weld. A line through the length of a weld perpendicular to the cross section at its center of gravity. *ASM Gloss.*

axis, symmetry. A direction through a crystal about which the crystal is symmetrical. *Hurlbut.*

axle. *a.* A transverse bar or shaft connecting the opposite wheels of a car or carriage on which the body of the vehicle rests and on which the wheels turn or which turns with the wheels. Also known as an axletree. *Hess.* b. The spindle on which a wheel turns. Also called axletree arm. *Hess.*

axletree arm. *See* axle, b. *Hess.*

axman; axeman. a. One who clears the ground and drives the stakes for the rodman. *Standard, 1964.* b. Chainman in a survey party. *Pryor, 3.*

axstone; axestone. A species of jade. It is a silicate of magnesia and alumina. *Fay.*

axonometric projection. A method of projection which has the advantage of containing a true plan, and can therefore be set up from drawings already in existence for other purposes. The plan is turned through 45°, vertical lines being drawn from the angles on the plan to show the elevations. *Ham.*

axotomous. In crystallography, having cleavage perpendicular to an axis; said of minerals. *Standard, 1964.*

Ayrshire bauxitic clay. A nonplastic fire clay formed by laterization of basalt and occurring in the Millstone grit of Ayrshire, Scotland; there are two types, the one formed in situ, and the other being a sedimentary deposit. Chemical analysis (raw): 42 percent SiO_2, 38 percent Al_2O_3, 3 to 4 percent TiO_2, 0.5 percent Fe_2O_3, and 0.2 percent alkalies. *Dodd.*

Ayr stone. A fine-grained stone used in polishing marble and giving a fine surface to metalwork, particularly iron and steel, also as a whetstone. Also called Scotch stone. *Standard, 1964.*

azabache; azabashe. Mexican name for pitch coal or jet. *Tomkeieff, 1954.*

azimuth. a. The azimuth of a body is that arc of the horizon that is included between the meridian circle at the given place and a vertical plane passing through the body. It is measured (in surveying) from north to the right; in astronomy, it is measured from the south to the right, that is, clockwise. *Fay.* b. A horizontal circle divided into 360, or 4 sets of 90, major divisions, called degrees, and attached to a magnetic compass. *Long.*

azimuth circle. An instrument for measuring azimuth, having for its chief characteristic a graduated horizontal circle. *Standard, 1964.*

azimuth compass. A magnetic compass supplied with sights, for measuring the angle which a line on the earth's surface, or the vertical circle through a heavenly body, makes with the magnetic meridian. *Standard, 1964.*

azimuth of a line. The angle measured clockwise from the northerly direction of the geographic meridian to the direction of the line. *B.S. 3618, 1963, sec. 1.*

azimuth test. To determine the horizontal compass direction that a borehole is trending at a specific depth by means of one of several borehole surveying instruments. *Long.*

Azoic. Formerly, that part of geologic time before life represented by the Precambrian stratified rocks; also, the rocks formed during that time. Later restricted to the period and system now generally called Archean, which is now called Early Precambrian. Obsolete. *Fay; A.G.I.*

azonal peat. Same as local peat. *Tomkeieff, 1954.*

azonal soils. Any group of soils without well-developed profile characteristics, owing to their youth, conditions of parent material, or relief that prevents development of normal soil-profile characteristics. *A.G.I.*

azorite. A variety of altered zircon. *Crosby, p. 88.*

azotate. A nitrate. *Fay.*

azotine. An explosive consisting of sodium nitrate, charcoal, sulfur, and petroleum. *Webster 2d.*

Azotobaster. A genus of large flagellated gram-negative rod-shaped or spherical nonsymbiotic bacteria (order Eubacteriales) occurring in soil and sewage that fix atmospheric nitrogen in the presence of carbohydrates and derive growth energy from oxidation of carbohydrates. *Webster 3d.*

Azrock. Trade name for natural bituminized limestone rock that is quarried, crushed, and pulverized to a fine grading. *Hess.*

Aztec stone. A name for greenish smithsonite; also for green turquoise. *Shipley.*

azulinhas. Braz. Small and cloudy sapphires found with diamonds. *Fay.*

azurchalcedony. Chalcedony colored blue by chrysocolla; used as a gemstone. Same as azurlite. From Arizona. *English.*

azure. Lapis lazuli. *Satndard, 1964.*

azure malachite. Same as azurmalachite. *Shipley.*

azure quartz. *See* sapphire quartz. *C.M.D.*

azure spar. Lazulite; azurite. *Standard, 1964.*

azure stone. Same as azurite. *Fay.*

azurite. A blue carbonate of copper, $Cu_3(CO_3)_2(OH)_2$, crystallizing in the monoclinic system. Found as an alteration product of chalcopyrite and other sulfide ores of copper in the upper oxidized zones of mineral veins. When present in sufficient quantity, is a valuable source of copper. Mohs' hardness, 3.5 to 4; streak, light blue; specific gravity, 3.77 to 3.83; vitreous almost adamantine luster. Used in jewelry. Occurs in the United States, Australia, France, Siberia, and Africa. Also known as chessy copper; chessylite; azure stone. *Fay; Dana 17, p. 598; CCD, 6d, 1961.*

azurite malachite. Azurmalachite. *Schaller.*

azurlite. *See* azurchalcedony; chrysocolla quartz. *Shipley.*

azurmalachite. Intergrowth of azurite and malachite, in compact form is cut and polished as an ornamental stone. When botryoidal it is sometimes fashioned as gemstones of beauty, but it lacks durability. *Shipley.*

B

b a. Abbreviation for boils at, followed by a temperature figure; boiling at, followed by a pressure figure; boiling. *Zimmerman, p. 141.* b. Symbol for one of the three crystallographic axes, (a, b, c). *Bureau of Mines Staff.* c. Abbreviation for bar, a unit of pressure. *Zimmerman, p. 14.* d. Abbreviation for bel, a sound unit in acoustics. *Zimmerman, p. 16.* e. Abbreviation for breadth; width; width of a streambed. *Zimmerman, pp. 18, 119.* f. Symbol in structural petrology for that direction in the plane of movement at right angles to the direction of tectonic transport. In a slickensided surface b lies in this surface, but is at right angles to the striations. *A.G.I.* g. Abbreviation for bale, bath, battery, bench, blend, bottom, brass. *Webster 3d.* h. Abbreviation for brick. *Zimmerman, p. 33.* i. As a subscript, the symbol for blackbody in radiation. *Zimmerman, p. 17.* j. Symbol for the minor axis of an ellipse or of an ellipsoid. *Zimmerman, p. 13.*

b a. Symbol for one of the three crystallographic axes (a, b, c). *Bureau of Mines Staff.* b. With subscript 0, as b_0, the symbol for one of the unit-cell parameters, (a_0, b_0, c_0). *Bureau of Mines Staff.* c. Symbol for breadth; width; width of a streambed. *Zimmerman, pp. 145, 186.* d. Symbol for corrected barometer reading; barometric pressure. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-30.* e. Symbol for bel, a sound unit in acoustics. *Zimmerman, p. 189.* f. Symbol for susceptance. *Zimmerman, p. 165.* g. As a subscript, the symbol for blackbody in radiation. *Zimmerman, p. 168.*

B a. Chemical symbol for boron. *Zimmerman, p. 144.* b. Abbreviation for Baumé. *BuMin Style Guide, p. 58.* c. Abbreviation for bottoms; waste; residue of distillation. *Zimmerman, pp. 18, 91.* d. Abbreviation for brightness; symbol for brightness in illumination; luminance. Also abbreviated b, B'. *Zimmerman, p. 19; Webster 3d.* e. Abbreviation for Bay in topography. *Webster 3d.* f. Symbol for magnetic induction; magnetic induction density; magnetic flux density. *Zimmerman, pp. 57, 153; Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98.* g. Abbreviation for band; band width. *Webster 3d; Zimmerman, p. 14.* h. Abbreviation for base. *Zimmerman, p. 469.* i. Abbreviation for Bering standard time. *Zimmerman, p. 382.* j. Symbol for effective film thickness in chemical engineering. *Zimmerman, p. 45.* k. Symbol for plate-voltage supply of vacuum tube. *Zimmerman, p. 82.*

B a. Symbol for brightness in illumination; luminance. Also abbreviated B'. *Zimmerman, pp. 151, 159, 190.* b. Symbol for volume modulus of elasticity. *Zimmerman, p. 154.* c. Symbol for bottoms; waste; residue of distillation; distillation waste. *Zimmerman, p. 148.* d. Symbol for magnetic induction; magnetic flux density. *Zimmerman, pp. 171, 253.* e. Symbol for susceptance. *Zimmerman, p. 165.* f. Symbol for effective film thickness in chemical engineering. *Zimmerman, p. 147.*

Ba Chemical symbol for barium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

baaken. S. Afr. A boundary mark. *Fay.*

Babbitt metal. Either of two alloys used for lining bearings, such as (1) a tin-base alloy; especially, one containing 2 to 8 percent copper and 5 to 15 percent antimony, or (2) a lead-base alloy containing 1 to 10 percent tin and 10 to 15 percent antimony with or without some arsenic. *Webster 3d.*

Babcock and Wilcox boiler. A steam boiler of the water-tube type, consisting in its simplest form of a horizontal drum from which is suspended a pair of headers carrying between them an inclined bank of straight tubes through which the water and steam pass. It is much larger and more efficient than the fire-tube boiler. *See also* Lancashire boiler. *Nelson.*

Babcock and Wilcox mill. Dry grinding mill in which steel balls rotate in a horizontal ring, through which the feed is worked downwards. *Pryor, 3.*

Babel quartz; Babylonian quartz. Eng. A variety of quartz which, from its fanciful resemblance to the successive tiers of the Tower of Babel, has given rise to the name. *Hess.*

babingtonite. A silicate of iron, calcium, and manganese, belonging to the pyroxene group and crystallizing in the triclinic system. The essential molecule is probably $FeSiO_3$, but the iron is replaced in varying degree by calcium and manganese. It occurs as a rare constituent of granite. *C.T.D.*

Babosil. Trade name; a frit for pottery glazes; so-named because it contains barium, boron, and silica. The composition is:

$$\left.\begin{matrix} 0.06\ K_2O \\ 0.50\ Na_2O \\ 0.43\ BaO \end{matrix}\right\} \left.\begin{matrix} 0.125\ Al_2O_3 \\ 0.68\ B_2O_3 \end{matrix}\right\} 2.45\ SiO_2$$

Dodd.

baby. Eng. A balance weight near the end of a pit (shaft) rope. *Fay.*

Babylonian quartz. Same as Babel quartz. *English.*

bacalite. A variety of amber. *Tomkeieff, 1954.*

bacia. Port. A basin, as of a river; carbonifera, a coal basin. *Fay.*

bacile. A basin or deep dish of or resembling Italian enameled, lustered pottery. *Standard, 1964.*

bacillite. A rodlike crystallite made up of a number of parallel longulites. *Johannsen, v. 1, 2d, 1939, p. 168.*

bacillus coli. An organism found in potable water, originating from sewage pollution. *Ham.*

bacino. One of a class of panels of highly colored pottery, built into the walls of medieval buildings. *Standard, 1964.*

back. a. The roof or upper part in any underground mining cavity. *Fraenkel.* b. The ore body between a level and the surface, or between two levels. *Higham, p. 35.* c. A system of joints in coal oblique to the bedding at an angle from 35° to 70°. They are usually perfectly tight and close and have polished cheeks which suggests a certain amount of movement. The term back is sometimes also applied to the principal cleat. *Arkell.* d. That part of a lode which is nearest the surface in relation to any portion of the workings of the mine; thus the back of the level or stope is that part of the unstoped lode which is above. *Fay.* e. A joint, usually a strike joint, perpendicular to the direction of working. *Fay.* f. The upper surface of a beam. *Webster 3d.* g. Eng. A plane of cleavage in coal, having frequently a smooth parting and some sooty coal included in it. *Fay.* h. Eng. The inner end of a heading. *Fay.* i. Leic. To throw back into the gob, or waste, the slack, dirt, etc., made in holing. *Fay.* j. Leic. To roll large coal out of waste for loading into trams. Also called backen. *Fay.* k. As applied to an arch, the outer or upper surface. *A.R.I.* l. The pavilion of a gem stone. *Shipley.* m. To drive, force, or cause to move or act backward; to cause to retreat, or recede. *Webster 3d.*

back acter. Front-end equipment fitted to an excavator, comprising a jib with an arm and bucket. Although designed primarily for vertically sided trenching, it is also useful for bulk excavation below track level. *Nelson.*

back ampere turns. Those in the armature of a motor which exercise demagnetizing action on the field poles. *Pryor, 3.*

back and underhand stoping milling system. *See* combined overhand and underhand stoping. *Fay.*

back arch. A concealed arch carrying the backing or inner part of a wall where the exterior facing material is carried by a lintel. *ACSG.*

back balance. a. A kind of self-acting incline in a mine. A balance car is attached to one end of the rope, and a carriage for the mine car is attached to the other. A loaded car is run on the carriage and is lowered to the foot of the incline raising the balance car. The balance car in its descent raises the carriage when the carriage is loaded only with an empty car. *Fay.* b. The means of maintaining tension on a rope transmission or haulage system, consisting of the tension carriage, attached weight, and supporting structure. *Fay.*

backband. A band that goes over the brakedrum of a bull wheel or other hoisting drum. *Porter.*

backbeach. *See* backshore. *H&G.*

backblast. *See* backlash, a.

backboard. York. Work, performed underground by the deputies, which consists of drawing timbers in abandoned or worked-out places, repairing brattices, doors, and keeping the roadways in order. *See also* back-bye work. *Fay.*

backbone. A main axis, as of a mountain or ridge; or the ridge itself. *A.G.I.*

backbreak. *See* overbreak. *Bureau of Mines Staff.*

back brusher; back ripper. A ripper engaged in taking down the roof in roadways some distance back from the face. *See also* second rippings. *Nelson.*

back-bye. N. of Eng. The area and roadways between the coal face and the shaft bottom. *Trist.*

back-bye deputy. A deputy in charge of repairs, maintenance, and other work behind the face. *Nelson.*

back-bye work. General work performed behind the working faces, in contradistinction to work done at the faces. *Nelson.*

back casing. Eng. A temporary shaft lining of bricks laid dry, and supported at intervals upon curbs. When the stonehead has been reached, the permanent masonry lining is built upon it inside of the back casing. In the North of England, the use of timber cribs and planking serves the same purpose. *Fay.*

backcast stripping. A stripping method using two draglines, one of which strips and casts the overburden while the other recasts a portion of the overburden. *Woodruff, v. 3, p. 401.*

back coal. Scot. Coal which miners are allowed to carry home. *Fay.*

back coming. Scot. Working away the pillars which are left when mining coal inby. Robbing pillars; back working. *Fay.*

back cutting. Earth obtained for a railway or canal bank, when the excavated earth does not suffice for a regular cut and fill. *C.T.D.*

back draft. A reverse taper on a pattern which prevents its removal from the mold. *ASM Gloss.*

backed bearing. A form of bearing consisting of a thin brass or bronze shell lined with Babbitt. The bronze shell is called the backing of the bearing, and the Babbitt is thus said to be bronze backed. *Petroleum Age, v. 11, Feb. 1, 1923, p. 39.*

back electromotive force. Sometimes used for counter electromotive force. It refers to that electromotive force which opposes or tends to set up a current in the reverse direction to the impressed current. *Crispin.*

backen. S. Staff. *See* back, j and m. *Fay.*

back end. a. Newc. The part of a judd remaining after the sump has been removed. *See also* sump, g. *Fay.* b. Synonym for barrel head. *Long.* c. Synonym for thrust yoke. *Long.* d. Eng. The coal in a place remaining to be worked after sumping in. *SMRB, Paper No. 61.*

back-end man. A man who works behind the coal-cutter as it moves along the face. His duties may include cleaning the cuttings from behind the machine and setting props to support the roof or overhang of coal. *See also* coal-cutter team. *Nelson.*

back entry. The air course parallel to and below an entry or the entry used for secondary purposes in two-entry system of mining. Locally, any entry not having track in it. *B.C.I.*

backfill. a. Waste sand or rock used to support the roof after removal of ore from stope. *Pryor, 3.* b. Sand or dirt placed behind timber, steel, or concrete linings in shafts or tunnels. *Nelson.* c. Material excavated from a site and reused for filling, for example, the use of stones or coarse gravel for filling draining trenches. *Nelson.* d. The process of sealing and filling, and/or the material used to seal or fill, a borehole when completed to prevent its acting as a course along which water may seep or flow into rock formations or mine workings. *Long.* e. The process of filling, and/or the material used to fill, a mine opening. *Long.* f. in general, refers to the material placed "back" to refill an excavation. *Huntington, p. 1.*

back filling. a. Rough masonry built in behind the facing or between two faces; similar material used in filling over the extrados of an arch; also brickwork used to fill in space between studs in a frame building, sometimes called brick nogging. *ACSG.* b. The filling in again of a place from which the rock or ore has been removed. *Ballard.*

back-filling system. Filling lower or older workings with the waste from newer workings. *Hess. See also* overhand stoping; square-set stoping. *Fay.*

backfire. a. A fire started to burn against and cut off a spreading fire. *Nichols.* b. An explosion in the intake or exhaust passages of an engine. *Nichols.* c. The recession of a flame into the tip of a torch followed by immediate reappearance or complete extinction of the flame. *ASM Gloss.*

backfolding. Folding in which the folds are overturned toward the interior of an orogenic belt. In the Alps, the backward folds are overturned toward the south, whereas most of the folds are overturned toward the north. Synonym for backward folding. *A.G.I.*

backfurrow. a. The first cut of a plow, from which the slice is laid on undisturbed soil. b. Synonym for esker. *A.G.I.*

back gear. An arrangement of gearewheels by which the power of the driving belt is proportionately increased, as on the head of a lathe. *Crispin.*

background. a. The normal slight radioactivity shown by a counter, not due to abnormal amounts of radioactive elements in adjacent rocks, soils, or waters. The background count is contributed from three sources: cosmic rays, radioactive impurities in the counter, and the usual trace amounts of radioactivity in the vicinity of the counter. *A.G.I.* b. The abundance of an element or any chemical property of a naturally occurring material in areas where the chemical pattern has not been affected by the presence of a mineral deposit. *Hawkes.*

background radiation. The radiation of man's natural environment, consisting of that which comes from cosmic rays and from the naturally radioactive elements of the earth, including that from within man's body. The term may also mean radiation extraneous to an experiment. *L&L.*

backhand. In bituminous coal mining, one who assists either the machineman or machine loader to move and setup a coal-cutting or loading machine at the working face. *D.O.T.1.*

backhand welding. Welding in which the back of the principal hand (torch or electrode hand) of the welder faces the direction of travel. It has special significance in gas welding in that it provides postheating. *Compare* forehand welding. *ASM Gloss.*

backhaul. A line that pulls a drag scraper bucket backward from the dump point to the digging. *Nichols, 2.*

backhaul cable. In a cable excavator, the line that pulls the bucket from the dumping point back to the digging. *Nichols.*

back heading. Eng. a. The companion place to a main winning. *SMRB, Paper No. 61.* b. *See* back entry. *B.C.I.*

backhoe. The most versatile rig used for trenching. The basic action involves extending its bucket forward with its teeth-armed lip pointing downward and then pulling it back toward the source of power. *Carson, p. 153.*

back holes. In shaft sinking, raising, or drifting, the holes which are shot last. *Fay.*

back horse. S. Staff. The horse that draws the loaded skip from the loaders to the place (wagon hole) where the tramway ends. *Fay.*

back hub. Synonym for backsight hub. *Long.*

backing. a. The timbers fixed across the top of a level supported in notches cut in the rock. *Fay.* b. The rough masonry of a wall faced with finer work. *B.C.I.* c. Earth deposited behind a retaining wall. *B.C.I.* d. The pieces of soft copper wire or horseshoe nail placed under or around a diamond set in a bit by a handsetter as a filler or cushion material. Also called bedding; calking. *Long.* e. The action of a firedamp roof layer flowing uphill against the direction of the ventilation. *B.S. 3618, 1963, sec. 2.* f. In grinding, the material (paper, cloth, or fiber) which serves as the base for coated abrasives. *ASM Gloss.* g. In welding, a material placed under or behind a joint to enhance the quality of the weld at the root. It may be a metal backing ring or strip, a pass of weld metal, or a nonmetal, such as carbon, granular flux, or a protective gas. *ASM Gloss.*

backing bed. A bed in the Purbeck stone, fit only for the inside of a wall. *Arkell.*

backing deals. Boards from 1 to 4 inches thick and of sufficient length to bridge the space between timber or steel sets or between rings in skeleton tubbing. Usually, planks 9 to 12 inches in width are used. Round poles, either whole or split, light steel rails, ribbed sheet metal, and reinforced concrete slabs are sometimes used in place of planks. Backing deals tighten the supports against the ground and also prevent the collapse of material between the timber or steel sets or rings. *See also* lagging. *Nelson.*

backing off. A term used to describe the operation of removing excessive body metal from badly worn bits. *Fraenkel, v. 1, Art. 6:21, p. 33.*

backing of smoke. In underground fires, the smoke produced by the fire may roll back against the ventilating current, and it may travel far enough to prevent the firefighting equipment getting within range of the fire. The hot convection currents rising from a fire are able to overcome the ventilating current, thus allowing the smoke to travel along the roof towards the intake air. The use of a portable transverse hurdle screen is probably the most efficient way of pushing the smoke back towards the fire. This screen should be stretched across the full width of the roadway and extend about two-thirds of the way towards the roof. The increased velocity of the air current passing over the top of the screen cools the convection currents, and it is possible to make the smoke retreat towards the fire by moving the screen forward. *McAdam, p. 133.*

backing-out switch. A switch applied to winders and man-riding haulages which allows the control circuit to be energized, in order to move the conveyance out of an overwind, provided that the winder control lever or other operating mechanism is moved in the appropriate direction. *See also* overwind switch. *B.S. 3618, 1965, sec. 7.*

backing sand; filler sand. Reconditioned sand used for supporting the facing sand, and forming the main part of the mold. *Osborne.*

backing strip. A strip of metal welded to the back of a metal panel prior to its being enameled; the purpose is to prevent warping. *Dodd.*

back-inlet gully. A branch entry to a drain, provided with a water seal. It is covered by a grating but it is open to the air. The back inlet ensures greater efficiency than is found when an open-ended pipe discharges over the grating into the gully. It is generally made of cast iron or glazed earthenware. *Ham.*

backjoint. a. A joint plane more or less parallel to the strike of the cleavage, and frequently vertical. *Zern.* b. A rabbet or chase left to receive a permanent slab or other filling. *Webster 3d.*

backland. *See* hinterland, d. *Challinor.*

backlash. a. The return or counterblast, as the recoil or backward suction of the air current produced after a mine explosion. *Fay.* Also called backblast; suction blast. b. The reentry of air into a fan. *Fay.* c. The violent recoil and whipping movement of the free ends of a rope or wire cable broken under strain. *Long.* d. Lost motion, play, or movement in moving parts such that the driving element (as a gear) can be reversed for some angle or distance before working contact is again made with the secondary element. *ASM Gloss.*

back leads. Applied to black sand leads on coastlines which are above high-water mark. *Fay.*

back lye. Scot. A siding or shunt on an underground tramway. *Fay.*

back mine. Scot. A passage in a mine crosscut toward the dip of the strata. *Standard, 1964.*

back off. a. To unscrew or disconnect. *Long.* b. To lift the bit and drill stem some distance away from the bottom of, or an obstruction in, a borehole. *Long.* c. To move the drill head backward on the drill base away from the borehole. *Long.* d. A rapid withdrawal of a grinding wheel or cutting tool from contact with workpiece. *ASM Gloss.*

back-off shooting. The firing of small explosive charges for releasing stuck drilling tools in a borehole. The shock of detonation causes the joint to expand and unscrew slightly. All rods above the joint can then be removed from the hole. *See also* fishing tool. *Nelson.*

back of lode. The portion of a lode lying between a level driven in a lode and the surface. *See also* back, d. *Fay.*

back of ore. The ore between two levels which has to be worked from the lower level. *See also* back, d. *Fay.*

back-out switch. *See* hoist back-out switch.

back overman. a. N. of Eng. A man whose duty it is to look after the condition of underground workings and the safety of the men. *Fay.* b. An overman who has charge of the back lift of workers in a coal mine, that is, men on repair and maintenance work. *See also* back-bye deputy. *Nelson.*

backplate. Amalgamating plates hung at back of mortar box in stamp battery, once used in concentration of gold. *Pryor, 3.*

back pressure. a. Resistance transferred from rock into drill stem when bit is being fed at a faster rate than the bit can cut. *Long.* b. Pressure expressed in pounds per square inch (psi) applied to the underside of the piston in the hydraulic-feed cylinder to partially support the weight of the drill rods and hence reduce pressure on the bit. *Long.* c. The hydrostatic head or pressure that a pump must overcome to move liquids to a higher level. *Long.* d. Pressure caused by resistance in a pipe or opening because the opening is too small for the free escape of the gas or fluid. *Long.* e. Rock pressures affecting the uppermost portion or roof in an underground mine opening. *Long.* f. The loss, expressed in pounds per square inch, due to failure of getting the steam out of the cylinder after it has done its work. *Fay.*

back-pressure valve. A valve similar to a low-pressure safety valve but capable of being opened independently of the pressure, thereby giving free exhaust. *Fay.*

back prop. The name given to the raking strut which transfers the load from the timbering of a deep trench to the ground. These struts are provided under every second or third frame according to the type of ground being excavated. *Ham.*

back rake. The angle on a single-point turning tool corresponding to axial rake in milling. It is the angle measured between the plane of the tool face and the reference plane, and which lies in a plane perpendicular to the axis of the work material and the base of the tool. *ASM Gloss.*

back reef. The whole area, zone, or province, with the deposits contained, lying between a reef wall and the land which it fringes or to which it forms a barrier. *Schieferdecker.*

back-reef moat; boat channel. The depression between the fringing reef and the shore. *Schieferdecker.*

back ring. *See* holding ring. *Dodd.*

back ripper. *See* back brusher. *Nelson.*

back rippings. The taking down of a thickness of roof beds in roadways some distance back from the face. The thickness of roof excavated may vary from a foot or so to 6 feet and more. This work is necessary on account of the gradual reduction in height as a result of subsidence. *See also* second rippings. *Nelson.*

backrush. The seaward return of the water following the uprush of waves. For any given tide stage, the point of farthest return seaward of the backrush is known as the limit of backrush or limit of backwash. *A.G.I.*

backs. a. The height of ore available above a given working level. If the ore body has been proved by shaft sinking to a depth of 300 feet from the surface, then the ore body is said to have 300 feet of backs. *Nelson.* b. A quarryman's term for one set of joints traversing the rock, the other set being known as cutters. *Nelson.* c. The ore above any horizontal opening, such as a tunnel or drift. *See also* back, d. *Fay.* d. A system of joints in coal or stratified mineral oblique to the bedding at an angle of 35° to 75°. *See also* slips, c. *B.S. 3618, 1954, sec. 5.* e. Slips; used to denote a slip met with first at floor level. Synonymous with hugger. *TIME.*

backs and cutters. Jointed rock structures, the backs (joints) of which run in lines parallel to the strike of the strata, the cutters (cross joints) crossing them at about right angles. *Standard, 1964.*

backscatter. The emergence of radiation from that surface of a material through which it entered. Also used to denote the actual backscattered radiation. *NCB.*

backset bedding. Inclined bedding that dips into the current. Said to occur at the front of an esker. Also used for the beds deposited on the windward side of a transverse dune. *Pettijohn.*

backset beds. Inclined layers of sand developed on the gentler dune slope to the windward. These beds may constitute a large part of the total volume of a dune, especially if there is enough vegetation to trap most of the sand before it can cross over to the slip face. *Leet.*

backsheets. Black corrugated sheets sometimes placed behind the skeleton tubbing to conduct water leakages down to the shaft bottom and prevent it running into the mass concrete during walling. They are only used when the shaft is passing through wet ground and are left in permanently. *Nelson.*

backshift. a. The afternoon or night shift; any shift that does not fill coal or is not the main coal-production shift. *Mason.* b. N. of Eng. The second or middle shift of the day; varies from 9 to 10:30 a.m. until 4:30 to 6 p.m. in different pits. *Trist.*

backshore. a. That part of the shore lying above the level of normal high tides. *Schieferdecker.* b. The part of a shore reached by waves during exceptional storms. *Mather.*

back shot. A shot used for widening an entry, placed at some distance from the head of an entry. *Fay.*

back shunt. A shunt back for mine cars. *Nelson.*

backsight. a. The reading of a leveling rod in its unchanged position when the leveling instrument has been taken to a new position. *Webster 3d.* b. Any sight or bearing taken in a backward direction. *Webster 3d.* c. An observation made for verification from one station to the one behind it; opposite of foresight. *Fay.* d. The rodman who indicates, by means of a range rod, leveling staff, or plumb line, the exact location of the backsight station. *Fay.* e. The station sighted, and in plane-table triangulation, the line of the plane-table sheet by means of which the table is orientated by sighting back to the station from which the line was drawn as a foresight. *Fay.*

backsight hub. A mark or stake placed at some distance behind the position a drill will occupy in a specific compass direction from the borehole marker for an incline hole to enable the driller to set the drill and drill the borehole in the intended direction. Also called back hub; backsight. *Long.*

back skin. Newc. A leather covering worn by men in wet workings. *Fay.*

back-slagging spout. Rear spout on a cupola which has its tap hole in front. *Bureau of Mines Staff.*

back slip. A joint in a coal seam which is inclined away from the observer from floor to roof. It would be a face slip from the opposite direction. *Nelson.* *Compare* face slip.

back slope. a. S. Wales. A slope with the stalls branching off and working the seam with back slips along the face. *Nelson.* b. In geology, the less sloping side of a ridge. Contrasted with escarpment, or steeper slope; especially, the slope more nearly parallel with the strata. *Standard, 1964.* Also called structural plain. *Fay.*

back splinting. The working of the top portion of a thick seam which was left as a roof when the bottom portion was worked. The top coal is recovered by working over the goaf or packs of the first working. *Nelson.*

backstamp. The maker's name and/or trademark stamped on the back of pottery flatware or under the foot of hollowware. *Dodd.*

backstay. A drag or trailer fixed at the back of a haulage train (or set) as a safety device when going uphill. *Mason.*

backstep sequence. A longitudinal welding sequence in which the direction of general progress is opposite to that of welding the individual increments. *ASM Gloss.*

backstone. Eng. Shaly mudstone used for cooking slabs, quarried near Delph, Yorkshire. Also, a bed in the Staffordshire Coal Measures. *Arkell.*

back stope. To mine a stope from working below. *Fay.*

back stopes. Overhead stopes; stopes worked by putting in overhead holes and blasting down the ore. *C.T.D.*

back stoping; back stopes. *See* overhand stoping. *Nelson.*

back stripper. A man who breaks the large lumps of mined coal and fills the tubs at the coal face. *C.T.D.*

backstroke jigging. A process in which strong suction is advocated at all times with the dense-medium process, since none of the bone medium must be allowed to get over into the washed coal. *Mitchell, pp. 517-518.*

backswitching. A zigzag arrangement of railway tracks by means of which it is possible for a train to reach a higher or lower level by a succession of easy grades. *See also* switchback. *Fay.*

back timber. The timbering behind the working portion of a longwall face. *TIME.*

backup. a. To cushion or fill in under and around a handset diamond with pieces of soft copper or annealed malleable iron or steel, such as used for horseshoe nails. *Compare* backing, d. *Long.* b. To fill a void between timbering and unbroken ground with broken rock or pieces of scrap timber. *Long.* c. To brace, shore up, or strengthen in any manner. *Long.* d. That part of a masonry wall behind the exterior facing. *ACSG.*

backup gear. *See* reverse-feed gear. *Long.*

backup wrench. A pipe wrench, the handle of which is anchored against a solid, as the frame of a diamond drill. *Long.*

back vent. Scot. An air course alongside the pillar in wide rooms. *Fay.*

backwall. *See* gable wall. *ASTM C162-66.*

backward folding. *See* backfolding.

backwash. a. In uranium leaching, flushing from below of colloidal slime from ion-exchange column after adsorption cycle. *Pryor, 3.* b. *See* backrush. *A.G.I.* c. Water or waves thrown back by an obstruction such as a ship, breakwater, cliff, etc. *A.G.I.* d. The return flow of water on a beach after the advance of a wave. *A.G.I. Supp.*

backwash ripple marks. Ripple mark on beaches formed by the backwash. *Pettijohn.*

backwear. A worn condition on the back of an abrasive belt due to high speed and/or pressure, both of which cause friction between the belt and its backup. Wear may be reduced by the use of graphite or by otherwise reducing the friction between the back of the belt and the belt support at the point of contact with the workpiece. *ACSG, 1963.*

back weld. A weld deposited at the back of a single-groove weld. *ASM Gloss.*

back work. a. Any kind of operation in a mine not immediately concerned with production or transport; literally work behind the face; repairs to roads. *Mason.* b. Scot. *See* back coming; back splinting. *Fay.*

back working. Scot. Working a coalbed back or toward a shaft. *Fay.*

bacon. Eng. Fibrous carbonate of lime, also known as beef and horseflesh; Isle of Portland. *Arkell.*

bacon peat. Same as lard peat. *Tomkeieff, 1954, p. 25.*

bacon stone. a. An old name for a variety of steatite, alluding to its greasy appearance. *Fay.* b. Eng. Calcspar colored with iron oxide, Bristol. *Arkell.*

bacon tier. Eng. Hard, creamy, and flaggy limestone above the Aish; Lower Purbeck beds, Isle of Portland. Either so called from sometimes containing bacon, or because of a streaky appearance, as in the striped Purbeck Cliffs of Bacon Hole near Lulworth. *Arkell.*

bacor; bakor. A Russian corundum-zirconia refractory for use more particularly in the glass industry; the name is derived from baddeleyite and corundum. There are various grades, for example, bakor-20 (62 percent Al_2O_3; 18 percent ZrO_2; 16 percent SiO_2); and bakor-33 (50 percent Al_2O_3; 30 percent ZrO_2; 15 percent SiO_2). *Dodd.*

bacteria. Unicellular micro-organisms reproducing typically by transverse cell division. *I.C. 8075, 1962, p. 63.*

bacteria bed. A bed of filter media such as rock or clinker which will expose effluent from sewage to the air and thus to the action of micro-organisms which oxidize it. *Ham.*

bacterial corrosion. The destruction of a material of construction, for example, concrete, ferrous metal, copper, and rubber, by chemical processes brought about by the activity of certain bacteria. *Taylor.*

bactericidal. Capable of killing bacteria, but not necessarily spores. *I.C. 8075, 1962, p. 63.*

bacteriostatic. Capable of preventing growth or multiplication of bacteria without necessarily killing them. *I.C. 8075, 1962, p. 63.*

baculite. Crystallites appearing as dark rods. *Hess.*

bad air. Air vitiated by powder fumes, noxious gases, or insufficient ventilation. *Weed, 1922.*

baddeleyite. A weakly radioactive, colorless, yellow, brown, or black zirconium dioxide, ZrO_2, with some hafnium oxide. Monoclinic; tabular crystals, also nodules with perfect cleavage. Found in Rakwana, Ceylon; Minas Geraes and San Paulo, Brazil; Alno, Sweden; and near Bozeman, Mont., U.S. Same as brazilite. *See also* favas. *English; Crosby, p. 117.*

badenite. A steel-gray arsenide and bismuthide of cobalt, nickel, and iron, $(Co,Ni,Fe)_3(As,Bi)_4$(?). Granular, fibrous, and massive. *English.*

badging. The application, usually by transfer or silk-screen, of crests, trademarks, etc., to pottery or glassware. *See also* backstamp. *Dodd.*

bad ground. a. Soft, highly fractured, or cavernous rock formations in which drilling a borehole is a slow procedure involving time-consuming cementing or casing operations. *Long.* b. Rock formations in which mine openings cannot be safely maintained unless heavily timbered or supported in some manner. *Long.*

Badlands. A region nearly devoid of vegetation where erosion, instead of carving hills and valleys of the ordinary type, has cut the land into an intricate maze of narrow ravines and sharp crests and pinnacles. Traveling across such a region is almost impossible, hence the name. Specifically, the badlands of the Dakotas. *Fay.*

bad place. Within the meaning of a contract between the United Mine Workers and an Employers' Association, a place in which the roof cannot be made reasonably safe by the ordinary propping usually done by the miner. *Fay.*

bad top. A coal mining term indicating a weak roof. Bad top sometimes develops following a blast. *Kentucky, p. 185.*

baeumlerite. A colorless chloride of potassium and calcium, $KCl \cdot CaCl_2$. Intergrown with halite and tachyhydrite. Orthorhombic. Identical with chlorocalcite or hydrophilite. From Leintal, Germany. *English.*

bafertisite. A mineral, $BaFe_2TiSi_2O_9$, in orthorhombic crystals distinct from taramellite; from Inner Mongolia. Named from the composition, Ba—Fe(r)—Ti—Si. *Hey, M.M., 1961.*

Baffa diamond. Rock crystal. *Shipley.*

baff ends. Long wooden edges for adjusting linings in sinking shafts during the operation of fixing the lining. *Zern.*

baffle. a. Mid. To brush out or mix firedamp with air. *Fay.* b. In a hydraulic or a rake classifier, a vertical plate set across and dipping into the pool of pulped ore, to prevent it from streaming along the surface from feed to weir. *Pryor, 3.* c. A firebrick partition to guide the flue gases through a boiler. *Zern.* d. A device such as a steel plate, used to check, retard, or divert the flow of materials. *B.S. 3552, 1962.* e. A mold part used to close the delivery or baffle hole in a blank mold. *ASTM C162-66.* f. A refractory shield or wall used to protect ware in firing. *ACSG.* g. *See* deflector. *ASA MH4.1-1958.* h. *See* baffle plate. *Fay.*

baffle board. A board fitted across a compartment in an ore washer to retain the heavy ore and allow the light material to flow away. *Nelson.*

baffle mark. Mark or seam on a bottle resulting from a mold joint between blank mold and baffle plate. *ASTM C162-66.*

baffle plate. a. A loading plate attached to the frame of a belt conveyor to prevent spillage at any loading point. *Jones.* b. A tray or partition placed in a tower, a heat exchanger, or in other process equipment to direct or to change the direction of the flow of fluids. *NRC-ASA N1.1-1957.* c. A metal plate used to direct the flames and gas of a furnace to different parts so that all portions of it will be heated; a deflector. *Fay.*

baffler. a N. Staff. The lever by which the throttle valve of a winding engine is worked. *Fay.* b. A partition in a furnace so placed as to aid the convection of heat; a baffle plate. *Fay.*

baffle tube. A pipe of sufficient length to lower the temperature of hot gases before they enter a furnace. *C.T.D.*

baffle wall. A refractory wall used to deflect gases or flames from the ware and to provide better heat distribution in the furnace structure. *See also* bag wall. *Bureau of Mines Staff.*

baff week. N. of Eng. The week next after the pay week, when wages are paid fortnightly. *Fay.*

bag. a. A paper container 1 to 2 inches in diameter and 8 to 18 inches long, used for placing an inert material, such as sand, clay, etc., into a borehole for stemming or tamping. Also called a tamping bag. *Fay.* b. S. Staff. A quantity of firedamp suddenly given off by the coal seam. *Fay.* c. Scot. To swell or bulge. Also called baggit. *Fay.* d. A cavity in coal containing gas or water. *Tomkeieff, 1954.* e. York. A miner's term for a variety of inferior coal. *Tomkeieff, 1954.* f. A sack in which to ship or deliver ore, concentrates, coal, lime, nitrates, or other minerals. Made from rawhide, jute, canvas, paper-lined cloth, or paper, single or double, depending on the locality, material, and type of shipping. *Bureau of Mines Staff.* g. Flexible pipe or hose. Also called bagging. *Mason.* h. A long, woolen tube fastened at the upper end to a pipe leading from a smelter and gathered and tied at the lower end. The smoke passes through the cloth which catches the solids. The bag is periodically untied and the dust is shaken out. *See also* baghouse. *Bureau of Mines Staff.* i. A firebrick structure near the fireplace of a potter's oven which prevents the flame from striking directly on the ware. *Rosenthal.*

bagasse. a. The fibrous material remaining after the extraction of the juice from sugarcane. *HW.* Used as a fuel and as a mix in making lightweight refractories. *Bureau of Mines Staff.* b. The dried and pulverized or shredded sugarcane fibers sometimes added to a drilling fluid to plug crevices in and prevent loss of circulation liquid from a borehole. *Long.*

bagasse furnace. Usually a special boiler, similar to a Dutch oven. *See also* Dutch oven. *Bureau of Mines Staff.*

bagazo. Mex. Waste from hand jigging; mud from a drill hole. *Fay.*

bag coal. Eng. Coal put into coarse canvas bags and sold in small quantities. *Fay.*

bag filter. An apparatus for removing dust from dust-laden air, employing cylinders of closely woven material which permit passage of air but retain solid particles. *B.S. 3552, 1962. See also* filter, b.

bagga. Local Galician name for a mixture of ozocerite and clay. *Tomkeieff, 1954.*

bagger. In the asbestos products industry, a laborer who fills bags with graded asbestos fibers by fastening or holding bags under spout of a bin or bagging machine, and tripping the lever. *D.O.T. 1.*

bagging; hose. Flexible tubing for conducting compressed air, water, or steam; usually constructed from canvas and rubber. *Nelson.*

baggit. *See* bag, c.

baghouse. Chamber in which exit gases from roasting, smelting, calcining are filtered through membranes (bags) which arrest solids. *Pryor, 3*

baghouse man. One who tends a baghouse in which flue dust and fumes from melting furnaces are filtered through a large number of cotton or woolen bags to catch oxide dust of valuable metals formed during melting of ores. *D.O.T. 1.*

bag of foulness. N. of Eng. A cavity in a coal seam filled with fire damp under a high pressure, which, when cut into, is given off with much force. *See also* bag, b. *Fay.*

bag of gas. Eng. A gas-filled cavity found in seams of coal. *See also* bag, b. *Fay.*

bag powder. Originally applied to black powder loaded in bags, but now applied to a number of explosives so packed. The bags are long, cylindrical units about 6 inches in diameter and weighing 12½ pounds apiece. *Carson, p. 306.*

bag process. A method of recovering flue dust and also sublimed lead whereby furnace gases and fumes are passed through bags suspended in a baghouse. The furnace gases are thus filtered and the particles in suspension collected. *Fay.*

bagroom. A dust chamber in which bags are suspended for filtering the furnace gases in the bag process. *See also* baghouse. *Fay.*

bag system. System whereby a driller uses, and is responsible for, a specific group of drill bits given to him in a bag or box at the beginning of each shift. *Long.*

bag-wall. A firewall in a kiln which channels the course of the flame. *ACSG, 1963.*

bagwork. One type of revetment. It consists of dry concrete sewn in bags which are laid over the area requiring protection, and tamped into position. In the case of sea walls, the bagwork is held together by steel dowel rods. *Ham.*

bahamite. A consolidated limestone composed of sediment similar to that now accumulating in the Bahamas; high purity, generally fine-grained, massively bedded, widely extensive, without abundant fossils. *A.G.I. Supp.*

Bahia amethyst. Amethyst from Bahia, Brazil, generally of lighter violet tone than Uruquay amethyst but more often reddish and smoky in appearance. *Shipley.*

Bahia emerald. Light slightly yellowish-green beryl from Bahia, Brazil. *See also* Brazilian emerald. *Shipley.*

bahiaite. a. A holocrystalline igneous rock composed of dominant hypersthene, subordinate hornblende, with or without minor amounts of other minerals. *A.G.I. Supp.* b. A variety of hypersthenite containing abundant hornblende and smaller amounts of olivine and pleonaste. *Holmes, 1920.*

Bahias. Diamonds from Bahia, Brazil. *Hess.*

baikalite. A dark, dingy green variety of salite (sahlite), in crystals, from Lake Baikal, Siberia, U.S.S.R. *Rice.*

baikerinite. A thick, tarlike fluid at 15° C, which constitutes 32.61 percent of baikerite. *Fay.*

baikerite. A waxlike mineral from the vicinity of Lake Baikal, Siberia, U.S.S.R., apparently about 60 percent ozocerite. *Fay.*

bail. a. As used by the diamond- and rotary-drilling industries, (1) a U-shaped steel rod with the open ends formed into eyes fitting over two lugs projecting from the sides of a water swivel, or (2) a U-shaped steel rod with open ends attached to an open-sided, latch-equipped, circular collar, which fits around a drill rod and under the base of a water swivel. Both types of bails are designed to permit circulation of fluid through the drill rod string while the rods are suspended on the hoist line or while the rods are being raised or lowered a few feet with the hoisting cable. *Long.* b. As used by the churn drillers, to remove a liquid from a borehole by use of a tubular container attached to a wire line. *See also* bailer, a. *Long.* c. The handle on a bucket, cage, or skip by means of which it may be lifted or lowered. *Long.* d. A large clevis. *Long.* e. To unwater a mine with a skip or bailer. *Bureau of Mines Staff.* f. Hoop or arched connection between the crane hook and ladle or between crane hook and mold trunnions. *ASM Gloss.*

bailer. a. A long cylindrical vessel fitted with a bail at the upper end and a flap or tongue valve at the lower extremity. It is used to remove water, sand, and mud-laden or cuttings-laden fluids from a borehole. When fitted with a plunger to which the bailing line is attached, it sucks the liquid in as it is lifted and is then called a sand pump or an American pump. *Long.* b. A metal tank, or skip, with a valve in the bottom, used for unwatering a mine. *Fay.* c. *See* sludger, c. *Nelson.* d. In petroleum production, one who removes mud, water, and slush from the bottom of a well, using a bailer (cylinder of pipe equipped with valve at bottom for admission of fluid) supported by a cable. Also called bailing machine operator. *D.O.T. 1.* e. In bituminous coal mining, a laborer who scoops water from drainage ditches in a mine with a bucket and empties it into a water car, a ditch flowing to a natural outlet, or to a pumping station. Also called water bailer. *D.O.T. 1.*

bailer line. Wire rope or line attached to a bailer and only used to raise and lower a bailer in a borehole. *Long.*

bailer shop. A term used in all Russian oilfields, for a shop in which bailers are made and kept in repair for use at oil wells. *Fay.*

bailiff. Eng. A name formerly used for manager of a mine. *Fay.*

bailing. a. Removal of the cuttings from a well during cable-tool drilling or liquid from a well by means of a bailer. *Institute of Petroleum, 1961.* b. Unwatering a mine. *See also* bailer, b and e. *Fay.* c. Removing rock dust and other material loosened in the drilling by means of a bucket or ball. *Mersereau, 4th, p. 198.*

bailing bucket. a. Synonym for bailer, a. *Long.* b. A container into which the contents of a bailer are emptied. *Long.* c. A container attached to cable or wire rope used to lift water out of a mine shaft or other working place. *Long.*

bailing ditch. Ditch conducting liquids, emptied from a bailer, away from the borehole to a collecting pool or sump. *Long.*

bailing drum. A hoist or winding drum on a churn or other type of drill on which is wound the bailer rope or line used when bailing out a borehole. *Long.*

bailing machine operator. *See* bailer, d. *D.O.T. 1.*

bailing reel. Synonym for bailing drum. *Long.*

bailing rope. A bailing line constructed of fine steel wire. *See also* sandline. *Porter.*

bailing tub. A container into which the contents of a bailer are emptied. *Long.*

bain. Scot. Old form of ben, a. *Fay.*

bainite. A decomposition product of austenite consisting of an aggregate of ferrite and carbide. In general, it forms at temperatures lower than those where very fine pearlite forms and higher than that where martensite begins to form on cooling. Its appearance is feathery if formed in the upper part of the temperature range; acicular, resembling tempered martensite, if formed in the lower part. *ASM Gloss.*

bait. a. N. of Eng. Food taken by a miner during his shift. *Fay.* b. *See* bate. *Arkell.* c. A straight iron bar lowered horizontally into a tank of molten glass to which a web of glass clings and is lifted and started in making common flat window glass. *Mersereau, 4th, p. 328.*

bait poke. N. of Eng. A bag for carrying a miner's lunch. *Fay.*

bait stand. N. of Eng. Mealtime during a shift. *Trist.*

bajada. Sp. a. A ladderway. *Fay.* b. A broad alluvial slope extending from the base of a mountain range out into a basin and formed by coalescence of separate alluvial fans. *Webster 3d.* c. Compound alluvial fans. *A.G.I.*

baja de metales. Peru. Lowering of ores from mine to mill. *Fay.*

bajo. Colom. Low-lying alluvial mines which have to be unwatered by artificial means; generally deposits in present riverbeds. *Fay.*

Bajocian. Middle Middle or lower Middle Jurassic, above Aalenian. *A.G.I. Supp.*

bake. To dry, harden, or vitrify by exposure to heat, as in a furnace or kiln; as, to bake pottery or bricks. *Standard, 1964.*

baked core. Baked dry-sand foundry core. *Bennett 2d, 1962.*

bakelite. A resinoid or plastic made of phenol (carbolic acid and formaldehyde. Used as a substitute for amber. It can be dyed various colors. Specific gravity, 1.25 to 1.28; refractive index, 1.54 to 1.70 (usually 1.62 to 1.66). *Shipley.*

baken peat. A Scottish name for a variety of solid, tenacious, and heavy peat forming in the lower layers of a peat bog. *Tomkeieff, 1954.*

Baker bell dolphin. *See* bell dolphin. *Ham.*

bakerite. A white, compact, nodular, hydrous calcium borosilicate, resembling unglazed porcelain, $8CaO\cdot5B_2O_3\cdot6SiO_2\cdot6H_2O$. Found in Mohave Desert, Daggett County, Calif. *English.*

baking. a. A stage in the heating of a clay when the clay particles have lost their plasticity and have formed a moderately hard mass composed of particles adhering together, the mass remaining porous. *See also* vitrifying. *Nelson.* b. The process of firing shaped clay articles in kilns, in order to give them permanent hardness. *C.T.D.* c. Heating to a low temperature in order to remove gases. *ASM Gloss.*

bakor. *See* bacor. *Dodd.*

bakuin. A Russian machine oil, prepared from Baku petroleum; it has high viscosity and great power of resisting cold. *Fay.*

bal. A Cornish name for a mine; a cluster of mines. *Fay.*

Bala limestone. In Wales, a limestone belonging to the Cambrian system and equivalent to the Trenton in New York, or at least in part. *Fay.*

balance. a. Eng. The counterpoise or weight attached by cable to the drum of a winding engine to balance the weight of the cage and hoisting cable and thus assist the engine in lifting the load out of the shaft. *Fay.* b. An instrument for weighing. *See also* assay balance. *Fay.* c. *See* balance pit. *Fay.* d. A beam device specifically designed and calibrated to determine specific gravity by weighing methods, as in determining the specific gravity of drilling mud. *Long.* e. A scale consisting of two pans suspended from a pivoted beam used to determine the weight of diamonds or other precious stone or metals. *Long.* f. Dynamic, a condition existing where the principal inertia axis of a body coincides with its rotational axis. *ASM Gloss.* g. Static, a condition existing where the center of gravity of a body lies on its rotational axis. *ASM Gloss.*

balance bob. A counterbalance to take the excess weight of the pitwork, or timber beams, in a shaft; used with the Cornish type of reciprocating pump. *C.T.D.*

balance box. A large box placed on one end of a balance bob and filled with old iron, rock, etc., to counterbalance the weight of the pump rods. *Zern.*

balance brow. a. A self-acting inclined plane down which the cars of coal are lowered and the empties elevated upon a carriage or platform. Also called balance plane; back balance. *Fay.* b. Eng. An inclined roadway in which a balance is used to assist the haulage. Also called dilly brow. *SMRB, Paper. No. 61.*

balance car. a. In quarrying, a car loaded with iron or stone and connected by means of a steel cable with a channeling machine operating on an inclined track. Its purpose is to counteract the force of gravity and thus enable the channeling machine to operate with equal ease uphill and downhill. *Fay.* b. A small weighted truck mounted upon a short inclined track, and carrying a sheave around which the rope of an endless haulage system passes as it winds off the drum. *Zern.*

balanced core. A core which is supported only at one end. *Crispin.*

balanced cutter chain. A cutter chain which has the same number of bottom and top picks. It usually cuts more freely in hard material and is often used for cutting at higher than floor level. *See also* unbalanced cutter chain. *Nelson.*

balanced direct-rope haulage. A modified form of direct-rope haulage, in which a power-driven reversible pulley (surge pulley) is used instead of a drum. The full trams are hauled up on one end of the rope while the empties go down on the other end. It involves a double track or a bypass midway on the haulage plane. The descent of the empty trams assists in balancing the load being hauled upwards. *Nelson.*

balanced draught. Applied to combustion units in which forced and induced draughts are adjusted to give atmospheric pressure in the combustion chamber to avoid the infiltration of unwanted cold air. *Nelson.*

balanced earthworks. The ideal in excavation and filling work. In order to achieve maximum economy of construction, the excavation should as far as possible be equal to the embankment. *Ham.*

balanced hoisting. Arrangement of cages or skips in mine shaft in which the winding drum raises one and at the same time lowers the other, thus reducing power consumption. *Pryor, 3.*

balanced ventilation. A system of ventilation in which the districts (each with its separate split) are so arranged with regard to length and resistance, that the use of ventilation regulators is unnecessary. Regulators, although sometimes unavoidable, reduce the efficiency and increase the power required to ventilate the mine. *Nelson.*

balanced vibrating conveyor. A vibrating conveyor in which the center of gravity of the complete assembly is held constant by having movement of the trough offset by opposite movement of some other element. *ASA MH4.1-1958.*

balanced winding. The conventional method of winding in a mine shaft. As the cage containing the loaded cars ascends, the other cage containing the empties descends and thus the cages and cars are balanced. Balanced winding also implies the use of a balance rope, and thus, ignoring friction, the only load to be hoisted is the coal or mineral. *See also* winding. *Nelson.*

balance, gas. A balance used in determining the specific gravity of gases. *Porter.*

balance gate. A floodgate which revolves about a central vertical shaft, and which may be made self-opening or self-closing as the current sets in or out of a channel by giving a preponderating area to the inner leaves of the gate. *C.T.D.*

balance pit. Eng. A pit or shaft in which a balance (counterweight) rises and falls. *Fay.*

balance plane. An inclined plane up which empty cars are hoisted by the weight of descending loaded cars. Also called balance brow. *Fay.*

balance rope. A steel wire rope, generally of the same weight per foot as the main winding rope, which is attached to the bottom of the cages, and extends down to form a loop in the shaft bottom or sump. Its function is to balance out the difference in weight of the upgoing or downgoing main ropes during the wind. *See also* winding. *Nelson.*

balance sheet. A record showing the present financial obligations and resources of the company, in terms of cost or book value. *Hoov, p. 448.*

balance shot. In coal mining, a shot for which the drill hole is parallel to the face of the coal that is to be broken by it. *Fay.*

balancing. a. A term used in surveying to denote adjustment. *Ham.* b. Testing for balance; adding or subtracting weight to put a grinding wheel into either static or dynamic balance. *ACSG, 1963.*

balancing a traverse. Adjusting the observed measurements to conform to the geometrical requirements of the traverse. *Seelye, 2.*

balanzon. Mex. Main beam or balance bob of a Cornish pumping engine. *Fay.*

balas ruby. A rose-red variety of spinel (magnesium aluminate, $MgO\cdot Al_2O_3$, crystallizing in the cubic system). *See also* false ruby. *C.T.D.*

balata. A natural gum or rubberlike material used to impregnate conveyor and power transmission belts. *See also* balata belt. *Nelson.*

balata belt. A belt with normal multiply construction, and in which balata is used to impregnate the plies and provide cover. It cannot be used in high temperatures but possesses a very high resistance to water absorption and is thus well suited for wet conditions. *Nelson.*

Balbach process. Electrolytic separation of gold from silver, using the alloy as anode, graphite plate cathodes and silver nitrate solution as bath. *Bennett 2d, 1962.*

bald. Without framing; said of a mine timber which has a flat end. *Fay.*

balde. A Chilean term for a bucket for raising ore. *Bureau of Mines Staff.*

bald-headed anticline. An upfold, the crest of which has been deeply eroded prior to later deposition. Same as scalped anticline. *A.G.I.*

baldite. A very dark grayish or black, dense igneous dike rock consisting essentially of pyroxene in a groundmass of analcite, augite, and iron oxide. *Johannsen, v. 4, 1938, p. 393.*

balistite. *See* ballistite. *Fay.*

balk. a. Eng. A more or less sudden thinning out, for a certain distance, of a bed of coal; a nip or want. Also, failure of coal in a coal stratum. Also spelled baulk. *Fay.* b. A timber for supporting the roof of a mine, or for carrying any heavy load. *Fay.* c. Refusal of a drill bit to cut and/or the refusal of a drivepipe, sampling barrel, or cone penetrometer to be driven deeper. *Long.* d. Irregular-shaped masses of stone intruding into a coal seam, or bulging out of the stone roof into the seam. *Zern.* e. Eng. A round, slabbed, or squared support as distinct from a plank. *SMRB, Paper No. 61.*

balk ground foreman. A foreman whose duties are to inspect and to see that the coal is properly mined where there are balks in the mine. *See also* balk, a. *Fay.*

balkhashite. An elastic bituminous substance similar to coorongite made of algae and their decomposition products. *Tomkeieff, 1954.*

balkstone. a. Eng. A provincial name given to an impure stratified limestone. *Fay.* b. Sandstone used for whetstone. *Compare* rigget. Also called balkerstone. *Arkell.*

ball. a. A rounded mass of spongy iron, prepared in a puddling furnace; a loup. *Fay.* b. A mass of tempered fire clay, used for forming the crucible in crucible-steel production. *C.T.D.* c. A low sand ridge which extends generally parallel with the shoreline and is submerged at least by high tides. It is generally separated from the beach by an intervening trough. Also called longshore bar. *A.G.I.*

balland. N. of Eng. Pulverized lead ore after separation from the gangue. Lead concentrates. *Fay.*

ball-and-pillow structure; flow roll; pseudonodules. Structures found in sandstones and calcarenitic limestones, characterized by ball- and pillow-shaped masses, hemispherical or kidney-shaped, formed by internal readjustments, mainly under gravitation. *Pettijohn.*

ball-and-socket reamer. A borehole-reaming device consisting of a bit attached to a ball-and-socket or a knuckle-joint member, which in turn is connected to the drill rods and used in borehole-deviation drilling. Also called arc cutter. *Long.*

ball and test. A deep well pump valve in which a ball fits into a seat and prevents the backflow of oil or water. Each standing valve and each traveling valve has a ball and seat. *Hess.*

Ballantine hardness test. Method of determining hardness of surfaces, in which a soft vertical metal cylinder with a pointed hard top is struck by a weight; deformation of the cylinder represents, inversely, the hardness of the surface. *Bennett 2d, 1962.*

ballas. A hard, spherical aggregate of many very small diamond crystals, usually cryptocrystalline, arranged radially and more or less concentrically around a central point. Because of their structure, ballas are classed as industrials, which are occasionally used in diamond-drill bits and other diamond tools. Also incorrectly used as a name applied to rounded, single-crystal forms of diamond. Also called shot bort. *Long.*

ballast. a. Heavy material, such as water, sand, or iron, which has no function in a machine except increase of weight. *Nichols.* b. Rough, unscreened gravel as used to form the bed of a railway or as substratum for new roads. *Arkell.*

ballast car. A freight car (as for carrying ballast) that may be unloaded from the side or bottom. *Webster 3d.*

ballast engine. A steam engine used in excavating and for digging and raising stones and gravel for ballast. *Webster 3d.*

ballast hammer. A hammer with a long handle and two faces, used to break stone ballast. *Fay.*

ballasting. a. The act of furnishing with ballast. *Standard, 1964.* b. Material for ballast. *Standard, 1964. See also* ballast. *Fay.*

ballast shovel. A spoon-pointed iron shovel having a thick body. *Standard, 1964.*

ball bearing. A friction-reducing device consisting of hard steel balls in a circular race; also applied to some pieces of equipment, such as a swivel-type double-tube core barrel, using ball bearings as load-bearing members on rotating parts. *Long.*

ball beds. Eng. Sand with two layers of spheroidal, highly indurated, calcareosiliceous balls, Lower Calcareous Grit, Scarborough. *Arkell.*

ball breaker. a. A steel or iron ball that is hoisted by a derrick and allowed to fall on blocks of waste stone for the purpose of breaking them. *Fay.* b. A device used to indicate contact between the corer and the bottom. A hollow glass ball, 3 to 5 inches in diameter, is lightly held in a frame attached to the trigger line above the triggering weight of the corer. Above the ball is a weight with a sharp protrusion pointed downward. When the corer strikes the bottom, the line becomes slack releasing the weight which strikes the ball. The resulting implosion may be heard on some types of echo sounders or received on a Brush recorder wired to the echo sounder. *H&G.*

ball burnishing. a. Same as ball sizing. *ASM Gloss.* b. Removing burrs and polishing small stampings and small machined parts by tumbling. *ASM Gloss.*

ball clay. a. A very fine-grained sedimentary kaolinitic-type clay with unfired colors ranging from light buff to various shades of gray depending on the amount of carbonaceous material present. Ball clays are characterized by their high plasticity, high wet and dry strength, high drying and firing shrinkage, long vitrification range. The fusion or melting point is usually slightly lower than pure kaolins and the fired colors are light ivory to cream rather than white. The term "ball" originates from an early English mining practice of rolling the highly plastic clay into balls weighing 30 to 50 pounds. English ball clays are generally darker in color than American ball clays because of the higher carbonaceous content. Most American ball clay deposits are located in western Kentucky and Tennessee. *Bureau of Mines Staff.* b. A secondary clay, commonly characterized by the presence of organic matter, high plasticity, high dry strength, long vitrification range, and a light color when fired. *ASTM, C242-60.*

ball coal. A variety of coal made of spheroidal masses, which were probably formed by some process of jointing. Perhaps the same as coal apple. *Tomkeieff, 1954.*

baller-out. *See* batter-out II. *D.O.T. 1.*

ballers. White sand with large spheroidal masses of calciferous sandstone known as sand ballers or giant's marbles, some being from 3 to 6 feet in diameter. Not in the dictionaries, but presumably a variant or mishearing of bollars, a dialect form of boulders. *Compare* bowlers. *Arkell.*

ball grinder. A pulverizer or disintegrator formed by balls of metal enclosed in a rotating cylinder. The material to be crushed is broken by the attrition of the rolling balls. *Fay.*

ball head. *See* ball stamp.

balling. a. A process that occurs in the cementite constituent of steels on prolonged annealing at 650° to 700° C. *C.T.D.* b. The operation of forming balls in a puddling furnace. *C.T.D.*

balling formation. Rock or formations that, when drilled, produce cuttings and sludge, which tend to collect on, and adhere to, borehole walls and drill-stem equipment in sticky or gummy masses. *Compare* gummy; sticky. *Long.*

balling furnace. a. A kind of reverberatory furnace used in alkali works. *Fay.* b. A furnace in which piles or fagots of wrought iron are placed to be heated preparatory to rolling. *Fay.*

balling head. An appliance on a carding machine by which the wool sliver is balled. *Standard, 1964.*

balling tool. A tool used in collecting the iron in a puddling furnace into a mass preparatory to taking it to the hammer or squeezer; a rabble. *Fay.*

ball ironstone. a. Nodular iron ore. *Webster 2d. b.* S. Staff. Strata containing large argillaceous nodules of ironstone. *Fay.*

ballistic effect. The throwing of rock to a distance from the exploded charge, a thing to be avoided in rock blasting. *Stauffer.*

ballistic mortar. Heavy pendulum mortar in which a standard explosive charge is fired and the angle of recoil is measured; testing device for explosive power. *Bennett 2d, 1962 Add.*

ballistic pendulum test. A test for measuring the strength of explosives. It consists of measuring the swing of a pendulum produced by the explosion of a weighed charge of material. *Higham, p. 56.*

ballistite; balistite. A smokeless powder consisting essentially of soluble cellulose nitrates and nitroglycerin approximately in equal parts. *Webster 3d.*

ball jasper. Jasper showing a concentric banding of red and yellow. *C.M.D.*

ball joint. A connection in which the end of one member is partly spherical and fits into a corresponding spherical cavity in the other, thus permitting relative angular movement. *C.T.D.*

ball mill. A rotating horizontal cylinder with a diameter almost equal to the length supported by a frame or shaft in which nonmetallic materials are ground using various types of grinding media such as quartz pebbles, porcelain balls, etc. Ball mill is used for grinding materials for whiteware, electrical insulators, etc., has a suitable ceramic lining to reduce contamination and the material may be ground wet or dry. *Bureau of Mines Staff.*

ball mill grindability test. A test in which a crushed specimen of a given size range of particles is placed in a ball mill, and the reduction in size of particles for a given number of revolutions of the mill is interpreted in terms of a grindability index. *Lewis, p. 574.*

ball milling. A method of grinding and mixing material, with or without liquid, in a rotating cylinder or conical mill partially filled with grinding media such as balls or pebbles. *ASTM C242-60T.*

ball mill method. A grindability method based on the principle that all coals are ground to the same fineness, about that required for pulverized fuels, and then using the relative amounts of energy required for this reduction in size as a measure of grindability. *Mitchell, p. 42.*

ball mill operator. *See* grinder-mill operator. *D.O.T. 1.*

ball mine. Same as ball ironstone, b. *Fay.*

Ball-Norton magnetic separator. Dry separator for coarse ore, in which one or two nonmagnetic drums rotate outside series of fixed magnets alternating in polarity. *Pryor, 3.*

ballon. a. The metal prolong fixed to a zinc condenser. *Fay.* b. Fr. A form of geological upheaval resulting in rounded dome-shaped mountains. *Standard, 1964.*

balloon bricks. Bricks about 16 percent larger than standard bricks but perforated to reduce their weight. *Mersereau, 4th, p. 260.*

ballot. Clay. *Hess.*

ballotini. Transparent glass spheres less than about 1.5 millimeter diameter; presumably a derivative of the Italian ballotta, a small ball used for balloting. *Dodd.*

ball porphyry. A variety of quartz porphyry in which balls of felsite are developed. *Fay.*

balls. a. Common name for nodules, especially of ironstone. *Arkell.* b. In fine grinding, crushing bodies used in a ball mill. Cast or forged iron or steel, or alloys of iron with molybdenum or nickel, are used. Spherical balls are mainly used, but various shapes are favored locally, for example, concaved. *Pryor, 3.*

ball sizing. Sizing and finishing a hole by forcing a ball of suitable size, finish, and hardness through the hole or by using a burnishing bar or broach consisting of a series of spherical bands of gradually increasing size coaxially arranged. Also called ball burnishing, and sometimes ball broaching. *ASM Gloss.*

ball stamp. A stamp for crushing rock, operated directly by steampower, the stem of the stamp being at the same time the piston rod of a steam cylinder. *Fay.*

ballstone. a. Same as woolpack. *Standard, 1964.* b. N. Staff. An ancient term for ironstone. *Fay.* c. Shrop. A large crystalline mass of limestone containing coral in position of growth, surrounded by shale and impure bedded limestone. *See also* caballa balls; iron balls; crog balls. *Arkell.*

ball structure. A primary structure characteristic of some limestones and sandstones; also applied to the ball structure of coal, called ball coal. *See also* ball-and-pillow structure; armored mud balls; lake balls; sea balls. *Pettijohn.*

ball test. *See* Kelly ball test. *Dodd.*

ball tiff. *See* tiff, b. *Fay.*

ball valve. A device allowing liquids to flow unimpeded in one direction, consisting of a ball or sphere of steel or other suitable material held against a circular opening of smaller diameter than the ball by gravity or a spring. When liquid flow is from the direction of the ball toward the opening, the ball is forced against the seat and seals the opening. If flow is from the opening toward the sphere, the ball is pushed away from the opening allowing the liquid to pass. *Long.*

ball vein. A stratum in which siderite concretions occur; also, the ore itself. *Hess.*

bally seating. Underclay with nodular concretions. *Arkell.*

balmaiden. Corn. A girl employed in the mines. *Standard, 1964.*

balnstone. Eng. Stone in the roof of a coal seam; roof stone. *Arkell.*

balsa. a. Mex. A movable platform suspended from a cable, used in timbering shafts. *Fay.* b. Mex. A pool of stagnant water in a mine. *Fay.*

Baltic amber. a. In the jewelry trade, a name usually confined to succinite, which is found on the shores of all the countries on the Baltic Sea. *Shipley.* b. According to some authorities, it is succinite and gedanite, which are the only Baltic fossil resins often seen in the jewelry trade. *Shipley.*

baltimorite. A grayish-green, silky, fibrous, splintery serpentine. *Standard, 1964.*

baly. Corn. To cast up; to shovel out. *Hess.*

bamboo. Cane-colored porcelain biscuit used in making domestic utensils. *Standard, 1964.*

bamboo ware. *See* Wedgewood ware. *Standard, 1964.*

banakite. A variety of alkalic andesite consisting of plagioclase, sanidine, and biotite with minor augite and olivine. Small amounts of either quartz or leucite may be present, and analcime is also a common accessory. Banakite, in a series with shoshonite and absarokite, is transitional into shoshonite with decreasing amounts of sanidine and biotite, and increasing amounts of olivine and augite. *A.G.I.*

banalsite. A barium feldspar with sodium, $BaNa_2Al_4Si_4O_{16}$, as orthorhombic crystals from Benallt mine, Wales. Named from the chemical formula. *Spencer 17, M.M., 1946.*

banatite. A name describing the dioritic rocks connected with a series of ore deposits in the Austrian Province of the Banat. Accurate microscopical study has shown them to be of such varying mineralogy, that the name has now slight definite significance. The rocks are largely quaprtz diorites. *Fay.*

bancal. A sandbank, bed, terrace, or stratum. *Hess.*

banco. a. Sp. B. de piedra, any one bed or stratum of stone in a quarry. *Fay.* b. Mex. A hard rock which narrows a vein or makes it change its course. *Fay.*

band. a. Slate or other rock interstratified with coal. Commonly called middle band in Arkansas; also, dirt band, sulfur band, or other band, as the case may be. *Fay.* b. Applied to a stratum or lamina conspicuous because it differs in color from adjacent layers; a group of layers displaying color differences is described as being banded. *A.G.I.* c. Corn. A bed or seam of coal. *Fay.* d. S. Staff. A winding rope or chain. *Fay.* e. Any well-defined and widespread thin rock deposit which may or may not be fossiliferous, and is of value in correlation. *Nelson.* f. Synonym for brake band. *Long.* g. A flexible ribbon of steel. *Long.*

banda. Mex. Bank of a river. *Fay.*

bandaite. A general term for labradorite dacites, that is, for quartz basalts which in texture, resemble dacites or andesites; from Bandai San, Japan. *Holmes, 1928.*

band brake. A flexible, circular ribbon of steel lined with wooden blocks or asbestos-impregnated material that, through a hand-actuated or mechanically actuated lever, can be brought to bear on the surface of a projecting flange on a hoisting drum, capstan, or wheel and, through friction, control the rotation of the drum, capstan, or wheel. *Long.*

band chain. A steel or invar tape of a minimum length of 100 feet used for accurate surveying, graduated in feet. *Ham.*

band conveyor. A belt conveyor. *See also* steel conveyor band. *Nelson.*

bandeada. Mex. Banded structure of veins. *Fay.*

banded. The property of rocks having thin and nearly parallel bands of different textures, colors, or minerals. *Johannsen, v. 1, 2d, 1939, p. 203.* Banded coal has alternating bands of different type. *Pryor, 3.*

banded agate. Agate with colors usually disposed in parallel bands, which are more or less wavy. Most agate in the trade is dyed and bands are of differing tones due to their varying ability to absorb dye. *See also* agate; onyx; chalcedony onyx. *Shipley.*

banded coal. a. The common variety of bituminous and subbituminous coal. It consists of a sequence of irregularly alternating layers or lenses of homogeneous black material having a brilliant vitreous luster, grayish-black, less brilliant, striated material usually of silky luster, and generally, thinner bands or lenses of soft, powdery, and fibrous particles of mineral charcoal. The difference in luster of the bands is greater in bituminous than in subbituminous coal. Also called bright-banded coal; common-banded coal. *ASTM D493–39.* b. Usually means a banded bituminous coal, but it may well apply to other varieties of coal. *Tomkeieff, 1954.* c. Coal composed of roughly parallel, dull and bright layers. *B.S. 3323, 1960.*

banded coal types. Banded bituminous coal consists of bands made from various types of coal, formerly known as bright coal, dull coal, and mother of coal. In 1919, Stopes proposed the names vitrain, clarain, durain, and fusain for the four principal coal types. At the International Congress at Heerlen in 1935, it was proposed to adopt the termination -ite (in Germany, the termination -it) instead of -ain for coal types and the termination -inite for macerals. *Tomkeieff, 1954.*

banded constituents. Same as banded coal types. *Tomkeieff, 1954.*

banded differentiates. Igneous rocks which are made up of bands of different composition, frequently alternating between two varieties. They have been attributed to crystal settling during convection, with rhythmic effects due to cooling and injection. *A.G.I.*

banded ingredients. a. The four distinctive and visibly differing portions forming the mass of an ordinary bituminous coal which can be recognized and separated macroscopically by hand, and microscopically in thin section, and which are not, in themselves, chemical entities, that is, vitrain, clarain, fusain, and durain. *See also* rock type; primary type; type variety. *A.G.I.* b. The same as banded coal types. *Tomkeieff, 1954.*

banded ironstone. S. Afr. A rock consisting essentially of iron oxides and cherty silica, and possessing a prominent layered or banded appearance in shades of brown or red and black. *Beerman.*

banded jasper. Jasper banded like agate, frequently in distinct colors. *Shipley.*

banded obsidian. Obsidian with differently colored irregular bands. *Shipley.*

banded ore. Ore composed of bands as layers that may be composed of the same minerals differing in color, textures, or proportions, or they may be composed of different minerals. Synonym for banded texture. *A.G.I.*

banded peat. Peat composed of bands of vegetable debris alternating with bands of sapropelic matter. *Tomkeieff, 1954.*

banded quartz-hematite ore. Braz. In the Itabria Region of Minas Geraes, schistose, specular hematite forming alternate bands with sugary quartz. Some of the beds are auriferous and contain gold-palladium alloys with manganese oxides, native copper, and talc. Writers have given the rocks various names, such as iron-glance schist, jacutinga, quartz itabirite, and bandererz. *Hess.*

banded structure. a. A term applied to veins having distinct layers or bands. This may be due to successive periods of deposition or replacement of some earlier rock. *Fay.* b. A structure developed in many igneous and metamorphic rocks owing to layers which differ noticeably in mineral composition or texture. *Bureau of Mines Staff.* c. A segregated structure of nearly parallel bands alined in the direction of working. *ASM Gloss.*

banded texture. *See* banded ore. *A.G.I.*

banded vein. A vein made up of layers of different minerals parallel with the walls. Also called ribbon vein. *Fay.*

bandful. S. Staff. A cage, or strictly speaking, a rope load; for example, bandful of men. *Compare* bant. *Fay.*

banding. The application, by hand or machine, of a band of color to the edge of a plate or cup. *Dodd.*

band saw. An endless saw running on revolving pulleys, used for cutting work in wood. *Crispin.*

band scale. An arrangement under which colliers are paid an agreed sum for removing a dirt band, in addition to the usual tonnage rate. The payment varies with the thickness of the band. *Nelson.*

band screen. In hydraulics, an endless band of wire mesh. Its purpose is to remove solids from the water at the intake point in hydroengineering schemes. *Ham.*

bandsman. a. A man in charge of the band or rope to hoist cages. *Standard, 1964.* b. A hoistman. *Webster 2d.* c. A loader or filler of coal, etc., underground. *Fay.*

bandstone. White Cliff, N.S.W. Balt bands of a usually harder nature than the adjoining strata, containing more or less opal, but found either just above or below the workable seams of opal. *Fay.*

band wonder. In concentration on shaking table, the movement of a segregated band of mineral so that it no longer discharges from the table deck at the desired point and therefore is not correctly collected. *Pryor, 3.*

band wheel. A large flat pully over which runs the main drive belt transmitting power from the engine to the main crankshaft on a churn or cable-system drill. *Long.*

bandylite. Hydrated borate-chloride of copper, $CuB_2O_4 \cdot CuCl_2 \cdot 4H_2O$, as dark blue tettragonal crystals from Chile. *Spencer 15, M.M., 1940.*

bandy metal. Shale with thin sandstone bands. *Arkell.*

bang-bang control. A method of operating a control system in such a way that correcting signals always provide actuation of the servomechanism to the full extent. *NCB.*

bangerts. Eng. A coarse stopping for holding earth in place. *Fay.*

banging piece. Eng. A catch or rest to hold a cage when stopped at any landing. *Hess. See also* catches, a.

banjo. Scot. An iron frame for carrying a false clack or valve. *Fay.*

bank. a. The top of the shaft, or out of the shaft. *Zern.* b. The surface around the mouth of a shaft *Zern.* c. To manipulate coals, etc., on the bank. *Zern.* d. The whole or sometimes only one side or one end of a working place underground. *Zern.* e. A large heap of mineral on the surface. *Zern.* f. Derb. The face of the coal at which miners are working. *Fay.* g. An ore deposit or coalbed worked by surface excavations or drifts above water level. *Fay.* h. Staff. A bank (stratum) of greystone. Also used for the coal face or ore deposit. *Arkell.* i. A small country coal mine, particularly one entering a coalbed outcropping on a hillside. A coal bank; country bank. *Bureau of Mines Staff.* j. A hill or brow. *Mason.* k. A road along the coal face formed by the coal on one side and the waste or packs on the other; thus, a double-unit face has a right and left bank. *Mason.* l. Specifically, a usually steeply sloping mass of any earthly or rock material rising above the digging level from which the soil or rock is to be dug from its natural or blasted position in an open-pit mine or quarry. Also called bench face. *Bureau of Mines Staff.* m. Terracelike bench from which ore is obtained in an open-pit mine. *Long.* n. That part of the footage of a borehole drilled but not reported for purpose of reporting the footage as having been drilled at some later date. Also called lay-by. *Long.* o. Several like pieces of drilling equipment set close together in a row; for example, several diesel-powered generators would be called a power bank. *Compare* battery, 1. *Long.* p. To cover fire in a steam boiler with ashes to keep the fire burning low but alive for several hours. *Long.* q. Gr. Brit. To place in a bog where peat is dug. *Webster 3d.* r. The rising ground bordering a lake, river, or sea; on a river designated as right or left as it would appear facing downstream. *A.G.I.* s. An elevation of the sea floor of large area, surrounded by deeper water, but safe for surface navigation; a submerged plateau or shelf, a shoal, or shallow. *A.G.I.* t. In flotation, a line of cells. *Pryor, 3.* u. In uranium leaching, rubber-lined steel tanks with baffles in which baskets containing resin are raised and lowered through the pregnant solution. *Pryor, 3.*

Banka drill. A portable, manually operated system comprising 4-inch pipes in 5-foot lengths, a platform, sandpumps, chisels, augers, etc., worked by rods inside the pipes. Used in prospecting alluvial deposits to depths of 50 feet or more. *Pryor, 3.*

Banka method. A manual method of boring used for sampling alluvial deposits. Also called empire method (undesirable usage). *B.S. 3618, 1963, sec. 3.*

bank atoll. *See* pseudoatoll. *Schieferdecker.*

bank boss. In anthracite and bituminous coal mining, a foreman who is in charge of surface or underground operations at a mine. *D.O.T. 1. See also* foreman; mine foreman.

bank chain. A chain that includes the bank of a river or creek. *Zern.*

bank claim. A mining claim on the bank of a stream. *Fay.*

bank coal. Coal contained in and sometimes salvaged from, the bank. *B.C.I.*

bank engine. Eng. An engine at the mouth of a mine shaft. *Standard, 1964.*

banker. A stonecutter's workbench. *Crispin.*

banker off. Aust. The man who attends to taking skips off the cage. *Fay.*

banket. a. Originally applied by the Dutch settlers to the gold-bearing conglomerates of the Witwatersrand. It is now used more widely for similar conglomerates and conglomeratic quartzites. *C.T.D.* b. Eng. A stonemasons' or bricklayers' bench, on which to trim stone or brick. *Standard, 1964.*

bank gravel. Gravel found in natural deposits, usually more or less intermixed with fine material, such as sand or clay, or combinations thereof; gravelly clay, gravelly sand, clayey gravel, and sandy gravel indicate the varying proportions of the materials in the mixture. *Stokes and Varnes, 1955.*

bank head. a. The upper end of an inclined plane, next to the engine or drum, made nearly level. *Zern.* b. The mouth and immediate environs of a coal mine. *Webster 3d.*

bank head machinery. Eng. The hoisting, dumping, and screening equipment at a coal mining shaft. *Fay.*

bank head screenman. *See* screenman. *D.O.T. 1.*

bank height; bench height; digging height. The vertical height of a bank as measured between its highest point or crest and its toe at the digging level or bench. *Compare* berm. *Bureau of Mines Staff.*

bank hook. Mid. An iron hook with which the banksman pulls the full cars off the cage. *Fay.*

banking. a. The bringing of a cage to a stop at the rail level (the pit top or bank) and the replacement of loaded mine cars by empty ones and the release of the cage for its return journey. b. The tilting of a rail track to counteract the effect of centrifugal force. *See also* superelevation. *Nelson.* c. Mid. Sorting and loading coal at the bank. *Fay.* d. Cumb. Heaping up minerals on the surface for future sale. *Fay.* e. Closing down a blast furnace which is still full of burden. *Bureau of Mines Staff.*

banking level; pit bank. The level at which the full cages or skips come to rest and are discharged after being wound up the shaft. *B.S. 3552, 1962.*

banking out. The operation of changing the tubs in the cages at the surface. *Peel.*

banking transformers. The grouping of transformers to form a group or bank. *Crispin.*

bank-insert reef. *See* bank reef. *Schieferdecker.*

bank kiln. A primitive type of pottery kiln used in the Far East; it is built on a bank, or slope, which servs as a chimney. *Dodd.*

bank level. York. The level heading from which the bank is worked. *See also* bank, f. *Fay.*

bankman. a. In the brick, tile, and nonclay refractories industry, one who performs general laboring duties in and about a claypit or claybank. Also called a pit shoveler. *D.O.T. 1.* b. Eng. A workman about the surface property of a coal mine. *Standard, 1964.*

bank measure. a. The quantity of an excavation measured in place in the bank before being disturbed. *Carson, p. 46.* b. Volume of soil or rock in its original place in the ground. *Nichols, 2.*

bank mining. Surface mining in which the material mined is removed from above the surrounding land surface. *American Institute of Mining and Metallurgical Engineers, Technical Publication No. 604, 1935, p. 6.*

bank of cells. A row of flotation cells in line. *Pryor, 4.*

bank of ovens. A row of ovens for converting coal into coke. *Fay.*

bank out. N. of Eng. To store coal at the surface when short of wagons, or cars. *Fay.*

bank-plates. Eng. Cast-iron sheets with which a landing is floored for the more expeditious manipulation of cars. A turnsheet. *Fay.*

bank protection. Devices for minimizing scour. These include brushwood held in place by wooden pegs, embankments, grass and withy planting, groins, mattresses, revetments, and riprap. *Ham.*

bank pump. An auxiliary pump placed on the bank of a stream or a lake and used to pump water to a distant drill. Also called supply pump. *Long.*

bank reef; bank-insert; platform reef. Reef situated on locally unrimmed continental or island shelves or offshore banks and well inside the outer edge of these submarine flats. *Schieferdecker.*

bank right. The right to divert water for working a bank claim. *Pryor, 3.*

banks. The sloping parts between the hearth of an open-hearth steel furnace and the back and front walls. They are constructed of refractory bricks covered with fritted sand (acid open-hearth furnace) or burned-in magnesite or dolomite (basic open-hearth furnace). *See also* breasts. *Dodd.*

bank slope; bench slope. The angle, measured in degrees of deviation from the horizontal, at which the earthy or rock material will stand in an excavated, terracelike cut in an open pit mine or quarry. *Bureau of Mines Staff.*

bank slope stability. A slope is subject to the influence of gravity and possible pressure of ground water which tend to cause sliding or caving. It is also subject to surface erosion from running water, wind, and alternate freezing or thawing, or wetting and drying. Weathering causes changes in particle size and composition. Bank slope stability can be attained by benching, by growth of vegetation, and by artificial protections, such as masonry walls, drainage systems to intercept or remove ground water, and fences to catch rolling pieces. *See also* slope failure; stability. *Nichols, 3, pp. 8-12.*

banksman. The person in charge of the shaft and cage or skip at the surface of a colliery; the person at the surface who operates the signals from the cage or skip to the winding engineman. *Mason. See also* cager, a.

banks of a stream. *See* right bank of stream; left bank of a stream. *Seelye, 1.*

bank storage. Water absorbed by the bed and banks of a stream and returned in whole or in part as the ground-water level falls. *Seelye, 1.*

bankswomen. Eng. A woman employed at the mine to pick rock from, and clean the coal for the market. *Fay.*

bank to bank. The length of time (1) during which a miner is below ground estimated from the time he leaves the bank until he returns to same, or (2) taken by a mine car from the time it enters the cage, taken underground and to the face, loaded and returns again to bank. A period often used in time studies of the haulage, loading and winding efficiency at a mine. *Nelson.*

bank water. In placer mining, applied to streams brought to the pit in ditches, not under pressure. *Hess.*

bankwork. Eng. A system of working coal in South Yorkshire. *Fay.*

bank yards. Yards of soil or rock measured in its original position, before digging. *Nichols, 2.*

banner bank. *See* tail. *Schieferdecker.*

bannering. Truing the rim of a saggar (before it is fired) by means of flat metal or a wooden board, to ensure that the rim lies in one horizontal plane and will in consequence carry the load of superimposed saggar uniformly. *Dodd.*

bannocking dirt. *See* bannock. *Nelson.*

bannock. a. S. Staff. To hole on the top of a seam. *Fay.* b. Shrop. A brownish-gray clay suitable for making into firebrick. *Fay.* c. Eng. Any argillaceous rock forming the roof of a coal seam, Yorkshire and North Staffordshire. *Arkell.* d. Eng. A seam of dirt running in between the coal is sometimes bannocked, or taken out before the coal, Yorkshire. *Arkell.* e. To overcut coal by hand. *Mason.* f. Can. Large sourdough pancake used as a bread substitute. *Hoffman.*

banos. Mex. Water collected in old mine workings. *Fay.*

banox. An amorphous metaphosphate compound, used as a preliminary treatment before wire drawing. It is found to have excellent rust-resisting properties, and to act as a lubricant; when wire is coated, by dipping with banox before liming, it is found that the amount of lime applied is no longer critical. It can also be used with wire flash-coated with copper, where it assists rust proofing. *Osborne.*

banqueria. Bol. In alluvial mining, a thick bed of blocks of granite, schists, and quartz. *Fay.*

bant. Derb. A certain number of men, usually three or four, who, prior to the introduction of cages, used to ride up and down a shaft sitting in short loose pieces of chain attached to a hemp rope, with their knees pointing inward toward the center of the shaft. There were usually two bants, the lower or bottom bant which was composed of men, and the upper or foaley bant which was made up of lads a few feet above the heads of the men. *Compare* bont, a; tacklers. *Fay.*

bantams. Small pebbles of a banded garnet-quartz rock, which usually are associated with diamond in the concentrate obtained when washing the diamond-bearing gravels from the Vaal River in the Republic of South Africa. The occurrence of bantams in a gravel deposit is considered a good indicator of diamond. *I.C. 8200, 1964, p. 45.*

baotite. A silicate of barium, titanium, and columbium, with chloride; tetragonal. Found at Paotow, Inner Mongolia. Named from the locality. *Hey, M.M., 1961.*

bar. a. A drilling or tamping rod. *Fay.* b.

A vein or dike crossing a lode. *Fay.* c. A bank of sand, gravel, or other matter, especially at the mouth of a river or harbor, often obstructing navigation. *Webster 2d.* d. A placer deposit, generally submerged, in the slack portion of a stream. Accumulations of gravel along the banks of a stream, and, which, when worked by the miners for gold, are called bar diggings. *Fay.* e. A length of timber placed horizontally for supporting the roof. *Fay.* f. *See* sinker bar. *Fay.* g. Any band of hard rock crossing a lode. Bar of ground, and intersecting vein. *See also* cross course. *Arkell.* h. A strap or beam used to support the roof between two props or other supports. *Mason.* i. A length of steel pipe equipped with a flat cap at one end and a jackscrew on the opposite end by means of which the pipe may be wedged securely in a vertical or horizontal position across an underground workplace to serve as a base on which a small diamond or rock drill may be mounted. Also called drifter bar; drill bar; drill column. *Long.* j. A heavy steel rod with either pointed or flattened ends used as a pry or as a tool by miners to dislodge loose rock in roof or sidewalls of an underground workplace. *Long.* k. A piece of material thicker than sheet, long in proportion to its width or thickness, and whose width-thickness ratio is much smaller than sheet or plate, as low as unity for squares and rounds. *ASM Gloss.* l. An offshore ridge or mound of sand, gravel, or other unconsolidated material submerged at least at high tide, especially at the mouth of a river or estuary, or lying a short distance from and usually parallel to, the beach. *H&G.* m. A unit of pressure equal to 1,000,000 dynes per square centimeter, 1,000 millibars, or 29.53 inches of mercury. *H&G.*

baraboo. A monadnock which has been buried by a series of strata and subsequently re-exposed by the partial erosion of these younger strata. *Fay.*

baralyme. A compressed pill consisting of a blended mixture of barium octohydrate and calcium hydroxide. It is used as a carbon dioxide absorbent in rebreathing (diving) systems. *H&G.*

bararite. A hexagonal fluosilicate of ammonium, $(NH_4)_2SiF_6$, occurring with cryptohalite [cubic $(NH_4)_2SiF_6$], over a burning coal seam at Barari, Jharia coalfields, India. *Spencer 19, M.M., 1952.*

Barbados earth. A deposit consisting of the remains of radiolaria formed originally in deep water and later upraised above sea level. *C.T.D. See also* tripoli. *Fay.*

Barbados tar. The dark green or black petroleum of Barbados, West Indies, which was formerly used in medicine. *Fay.*

Barbara beryl. A term applied to beryl from near Barbara in northeastern Transvaal, a source of African emerald. *Shipley.*

bar-belt conveyor. A conveyor similar to a plate-belt conveyor but in which spaced steel rods arranged transversely are employed in place of the steel plates. *B.S. 3552, 1962.*

bar bender. A skilled tradesman who cuts and bends steel reinforcement, and who binds it in the required position prior to the concrete being poured around it; a machine for bending reinforcement. *Ham.*

Barber Greene finisher. A tamping and leveling device which has an unladen weight of 10 tons, is 10 feet wide, and can tamp, level, and finish bituminous aggregate at a rate of 80 tons per hour. It can lay such material in thicknesses ranging from a quarter of an inch to 6 inches and at speeds varying with thickness up to a maximum of 40 feet per minute. The finisher must have a fleet of lorries feeding it. *Ham.*

barbertonite. A rose-pink to violet fibrous, hydrous basic carbonate of magnesium and chromium, $Cr_3Mg_6(OH)_{16}CO_3.4H_2O$, as hexagonal scales dimorphous with the rhombohedral stichtite. Named from the locality, Barberton, Transvaal. *Spencer 16, M.M., 1943.*

barbierite. A discredited term for a type material from Kragerö, Norway, that has been shown to be finely twinned microcline with about 20 percent of unmixed albite. The name monalbite is suggested for the high-temperature monoclinic modification of $NaAlSi_3O_8$, not yet found in nature. *American Mineralogist, v. 43, No. 9-0, September-October 1958, p. 1,008.*

barboo quartzite. A quartzite of the Devil's Lake region of Wisconsin, used in silica brick manufacture. A quoted analysis: 98.2 percent SiO_2, 1.1 percent Al_2O_3, 0.2 percent Fe_2O_3, and 0.1 percent Na_2O + K_2O. *Dodd.*

barbosalite. A hydrous ferrous ferric phosphate, $Fe''Fe'''(PO_4)_2(OH)_2$, as black grains from Brazil. *Spencer 20, M.M., 1955.*

barbotine. a. A thin clay paste used in low relief ornamentation of pottery. *Standard, 1964.* b. A term applied to vases and other pieces decorated with flowers, leaves, etc., in high relief and colored in different enamels. *C.T.D.*

barchan; barkhan. a. A dune having crescentic ground plan, with the convex side facing the wind; the profile is asymmetric, with the gentler slope on the convex side, and the steeper slope on the concave or leeward side. The term is of Turkestanic origin and is said to have been introduced into the European literature by Middendorff; it is now in common use in several different languages. *A.G.I.* b. The crescent or barchan type is most characteristic of the inland desert regions. It presents a gently convex surface to the wind, while the lee side is steep and abrupt. The horns of the crescent mark the lateral advance of the sand. Its wide distribution and all but universal presence in the sandy deserts of all continents make this type the normal one for sand hills formed on an open area. *A.G.I.*

barchan dune. A moving sand dune, crescentic in shape, with horns pointing in the direction of wind movement. *A.G.I.*

bar channeler. A reciprocating drill mounted on a bar by means of which holes are drilled close together in line by shifting the drill from point to point along the bar. Thereafter, the webs between the holes are removed with a reciprocating chisel-pointed broaching tool which is substituted for the drill. This method of channeling is generally employed in the harder rocks, such as granites. *Hess.*

bar coal cutter. A coal cutter in which the cutting member was a projecting rotating bar armed with picks throughout its length. The bar cut a kerf in the seam as the machine traveled along the face. The first patent for a bar machine was taken out in 1856. The type is now obsolete. *Nelson.*

bar diggings. Pac. Gold-washing claims located on the bars (shallows) of a stream, and worked when the water is low, or otherwise, with the aid of cofferdams. *See also* bar, d; diggings, a. *Fay.*

bardiglio marble. An Italian stone obtained on Montalto, on the southern borders of Tuscany, Italy. *Fay.*

Bardine process. A process used to rejuvenate diamond-drill rods or rotary-drill pipe by relieving fatigue stresses. *Long.*

bar drill. A small diamond- or other-type rock drill mounted on a bar and used in an underground workplace. Also called bar and used in an underground workbar rig. *Long.*

bare. *a.* To cut coal by hand; to hole by hand. *Mason.* b. The uncased portion of borehole. Also called called barefoot; blank; naked; open; open hole. *Long.* c. To remove overburden. *Arkell.* d. Eng. To strip or cut by the side of a fault, boundary, etc.; to make bare. *Fay.* e. A wire or conductor not covered with insulating material. Also called bare wire. *Nelson.*

bare electrode. A filler-metal electrode, used in arc welding, consisting of a metal wire with no coating other than that incidental to the drawing of the wire. *Coal Age, v. 66, No. 3, Mar. 1961, p. 91.*

barefoot. Said of an oil well without a liner in the oil-bearing rock. *Hess.*

barelattograph. A French instrument for the automatic recording of the contraction and loss in weight of a clay body during drying under controlled conditions. *Dodd.*

bare motor. A motor without a pulley, belt-tightening base, or slide rails. *NEMA MB1-1961.*

barequear. Colom. In placer mining, to extract as much of the pay gravel as possible, without method, leaving the overburden untouched. *Fay.*

barequeo. Colom. Extracting the rich ore by crude means. *Fay.*

barequero. Colom. A placer miner who uses crude methods of alluvial washing. A spoiler. *Fay.*

barer. A workman who removes surface soil or overburdens in a quarry. *Arkell.*

barfe Saturday. N. of Eng. The Saturday upon which wages are not paid. *Fay.*

bar flight conveyor. *See* drag-chain conveyor; flight conveyor. *ASA MH4.1-1958.*

bar folder. A machine in which a folding bar or wing is used to bend a metal sheet whose edge is clamped between the upper folding leaf and the lower stationary jaw into a narrow, sharp, close, and accurate fold along the edge. It is also capable of making rounded folds such as those used in wiring. A universal folder is more versatile in that it is limited to width only by the dimensions of the sheet. *ASM Gloss.*

bargain. a. Portion of a mine worked by a gang on contract. *Zern.* b. N. of Eng. An inclusive price agreement made between a set of men and the management to complete a specified job; for example, removing a small area of coal, driving a new roadway, winning out a new face, or taking a caunch. Bargains are not subject to caviling. *Trist.*

bargain men. Newc. Men who work by the bargain or contract. *Fay.*

bargain work. a. N. of Eng. Underground work done by contract, for example, driving headings, road laying, etc. *Fay.* b. Used to denote various forms of contract work done outbye, such as ripping, stowing, and cleaning of roadways. *Nelson.*

barge loader. In the quarry industry, a laborer who controls the movement of a barge in a river as it is loaded with crushed rock. *D.O.T. 1.*

barges. Scot. Sheets of iron, zinc, or wood, used in wet shafts or workings for diverting the water to one side. *Fay.*

bar grizzly. A series of spaced bars, rails, pipes, or other members used for rough sizing of bulk material passed across it to allow smaller pieces to drop through the spaces. *ASA MH4.1-1958.*

bar-heating furnace. A furnace to heat iron or steel bars preparatory to rolling. *Hess.*

bar hook. S. Wales. Backstay. *Nelson.*

barilla. An impure sodium carbonate and sulfate obtained by burning various species of land or marine plants; soda ash. Used in making glass, soap, etc. *Standard, 1964.*

baring. a. A making bare; an uncovering. *Webster 2d. See also* strip, b. *Fay.* b. The surface soil and useless strata overlying a seam of coal, clay, ironstone, etc., which has to be removed preparatory to working the mineral. *Fay.* c. The small coal made in undercutting coal seams. *Webster 3d.*

baring dirt. York. Similar to bannock but may occur above or below a coal seam or interstratified with the coal. *Nelson.*

barite. A sulfate of barium, $BaSO_4$; orthorhombic; color, transparent to opaque, whitish; Mohs' hardness, 3.0 to 3.5; specific gravity, 4.5; and flame test, yellowish-green. Used in paints, as fillers for paper and textiles, and in oil-well drilling muds. As mined, it is conventionally called by original name, barytes. *Pryor, 3.* Also called heavy spar. *Fay.*

barite dollars. Tex.; Okla. Small, flat barite concretions. *Hess.*

barium. An element belonging to a group of metals, the oxides of which are the alkaline earths. Silvery-white; somewhat malleable; and burns easily when heated in air. Symbol, Ba; valence, 2; atomic number, 56; atomic weight, 137.34; and specific gravity, 3.5 (at 20° C). *Fay; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-101.* Melting point, 850° C and boiling point, 1,140° C. *Webster 3d.* The commercial barium minerals are barite and witherite. *Fay.*

barium aluminate. Gray pulverized mass; soluble in water and acids; $3BaO{\cdot}Al_2O_3$. Used in ceramics. *CCD 6d, 1961.* Melting point, 2,000° C. Has been recommended for use in glass batches as a means of introducing barium oxide. In vacuum tubes, cathodes coated with barium aluminate are good electron emitters. *Lee.*

barium boride. BaB_6; specific gravity, 4.32; melting point, 2,270° C; thermal expansion, 6.5×10^{-6}; and electrical resistivity, 306 microhm centimeters (at 20°C). *Dodd.*

barium carbonate; witherite. $BaCO_3$; hexagonal rhombohedral and orthorhombic; white; specific gravity, 4.275; insoluble in water; and soluble in acids but not in sulfuric acid. Occurs in nature as the mineral witherite. Used in optical glass; oil well drilling; ceramics; enamels for ironware; and in steel carburizing. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-154.* Precipitated $BaCO_3$ is obtained from barite. *Lee.*

barium chloride. A soluble salt of barium, ($BaCl_2$), sometimes used as a mill addition in acid-resisting enamels in place of calcium chloride. In some cases, barium chloride reduces scumming in enamels when added as a mill addition. *Enam. Dict.*

barium chromate. A heavy, yellow, crystalline powder; orthorhombic; $BaCrO_4$. Used in ceramics. *CCD 6d, 1961.* Decomposes at temperatures above 1,000° C. Prepared by the interaction of barium chloride and sodium chromate. Lemon yellow is the color usually produced by barium chromate and its use is chiefly in overglazes. A pale green may be made with barium chromate, whiting, and boric acid. *Lee.*

barium crown glass. An optical crown glass containing a substantial quantity of barium oxide. *ASTM C162-66.*

barium cyanide. A white, crystalline powder; $Ba(CN)_2$. Used in metallurgy and in electroplating. *CCD 6d, 1961.*

barium flint glass. An optical flint glass containing a substantial quantity of barium oxide. *ASTM C162-66.*

barium fluoride. BaF_2; colorless; isometric; and melting point, 1,280° C. A flux and an opacifier in enamel frits. *Lee.*

barium fluosilicate; barium silicofluoride. White; orthorhombic; $BaSiF_6$. Used in ceramics. *CCD 6d, 1961.*

barium glass. A glass in which barium oxide (BaO) replaces part of the calcium oxide of ordinary lime soda glass. *CCD 6d, 1961.*

barium hydroxide monohydrate. A white powder; $Ba(OH)_2{\cdot}H_2O$. Used as a sulfate-controlling agent in ceramics and as a steel-carbonizing agent. *CCD 6d, 1961.*

barium manganate. A gray to green powder, $BaMnO_4$; poisonous; and specific gravity, 4.85. Also called manganese green; Cassel's green; Rosenstiehl's green. *Bennett 2d, 1962.*

barium metaphosphate. A white, crystalline powder; $Ba(PO_3)_2$. Used as a constituent of glasses, porcelains, and enamels. *CCD 6d, 1961.* Molecular weight, 295.4; melting point, 850° C; and insoluble in water. Used as an opacifying agent in glazes and glass. *Bennett 2d, 1962.*

barium minerals. The principal industrial ores are barytes or barite ($BaSO_4$) and witherite ($BaCO_3$). Used mainly for white paints, extenders, and fillers. Also used as muds in oil-well drilling, in pyrotechnics, and in explosives. *Pryor, 3.*

barium molybdate. White powder; tetragonal; $BaMoO_4$; melting point, above 1,300° C. When smelted in porcelain enamel frits, it provides for good opacity and good adherence. Also, a good mill addition for porcelain enamel frits because of its low solubility in water. *Lee.*

barium monohydrate. *See* barium hydroxide monohydrate. *CCD 6d, 1961.*

barium monoxide. *See* barium oxide. *CCD 6d, 1961.*

barium nitrate; nitrobarite. a. $Ba(NO_3)_2$. Has been used in small amounts in certain barium optical glasses when nitrates of sodium or potassium could not be employed. It has also been used in enamels to replace alkali nitrates, and is said to give better homogeneity and opacification. Being a weaker base, it attacks the melting vessels much less than the carbonate. *Lee.* b. Lustrous; white; isometric; $Ba(NO_3)_2$. Used in ceramic glazes and explosives. *CCD 6d, 1961.*

barium oxide; barium monoxide. BaO; molecular weight, 153.34; colorless; white to yellowish powder; isometric or hexagonal; specific gravity, (isometric), 5.72, (hexagonal), 5.32; melting point, 1,923°; boiling point, about 2,000° C; and soluble in water and in alcohol. Used in glass manufacture. *Bennett 2d, 1962.* When freshly obtained from calcined barium carbonate, it is even more reactive with water than calcum oxide and forms barium hydroxide. *C.T.D.*

barium oxyapatite. The compound, $Ba_{10}(PO_4)_6O$. *Hey, M.M., 1964.*

barium phosphuranylite. Artificial $Ba(UO_2)_4(PO_4)_2(OH)_4{\cdot}8H_2O$, the barium analogue of phosphuranylite. Named from the composition. *See also* bergenite. *Hey, M.M., 1964.*

barium silicide. $BaSi_2$ (variable); molecular weight, 193.54; metallic gray lumps; melts at white heat; and the composition varies considerably through alloying in varying proportions. Used as a deoxidizing and a desulfurizing agent for steel. *Bennett 2d, 1962.*

barium silicofluoride. *See* barium fluosilicate. *CCD 6d, 1961.*

barium stannate. A white crystalline powder; $BaSnO_3{\cdot}3H_2O$. Used in the production of special ceramic insulations requiring high dielectric properties. *CCD 6d, 1961.* It is prepared by precipitation from the aqueous reaction. It loses water upon heating to 280° C or higher and becomes anhydrous barium stannate. It is used as an additive to barium titanate bodies in ceramic capacitors. This addition produces a shift in the Curie peak (point of maximum dielectric constant in a graph of this property versus temperature) to lower temperatures, the amount of shift being a linear function of the molar addition. Bodies of very high dielectric constant at room temperature may be obtained with compositions consisting of approximately 91 mole-percent $BaTiO_3$ and 9 mole-percent $BaSnO_3$. Barium stannate has also been recommended for use in glass enamel compositions to impart improved resistance to attack by alkali. *Lee.*

barium sulfate; barite. $BaSO_4$; molecular weight, 233.40; white; orthorhombic becoming monoclinic at 1,149° C; specific gravity, 4.50 (at 15° C); melting point, 1,580° C; and practically insoluble in water. *Bennett 2d, 1962.* It is formed as a heavy white precipitate when sulfuric acid is added to a solution of a barium salt. Its low solubility makes it useful in analytical chemistry for the detection and estimation of both barium and sulfuric acid. Used in paint manufacture and in the preparation of lake pigments. *C.T.D.*

barium sulfide; barium monosulfide. Colorless; isometric; BaS; melting point, above 1,660° C. Barium sulfide crucibles have been used for melting cerium and uranium. *Lee.*

barium titanate. $BaTiO_3$; melting point, above 1,400° C. The high dielectric constant of barium titanate makes it exceptionally suitable for miniature electronic and communication equipment, the demand for which arose during World War II and has increased greatly since. Bulky capacitors have been replaced in many instances by smaller titanate capacitors. Most condensers in electronic equipment, such as television and radio receivers, are ceramic types. Barium titanate ceramics are used in underwater sonar, guided missiles, dielectric amplifiers, digital calculators, ultrasonic cleaning, measuring instruments, accelerometers, and filters. *Lee;*

England, where J. Y. M. Halsall was General Manager and which was at the time associated with the Parratt pottery. *Dodd.*

barrel. a. A piece of small pipe inserted in the end of a cartridge to carry the squib to the powder. *Fay.* b. A vessel used in amalgamation. *Fay.* c. The cylindrical part of a pump from which the movement of the piston causes a liquid or gas to be forcibly ejected. Also, the cylindrical part of a hydraulic jack or of a hydraulic-feed mechanism on a diamond drill. *Long.* d. The drum of a hoist. *Long.* e. Commonly, although incorrectly, used as a synonym for core barrel. *Long.* f. A cylindrical container having a capacity of 55 gallons. Also called drum. *Long.* g. A crude-petroleum measure of quantity equal to 42 gallons. *Long.* h. The water passage in a culvert. *Nichols.*

barrel amalgamation. Batch wet grinding of auriferous mineral or concentrate followed by gentle churning with mercury in order to trap the bullion metal. *Pryor, 3. See also* barrel process; pan amalgamation.

barrel chlorination. *See* barrel process. *Fay.*

barrel cleaning. Mechanical or electrolytic cleaning of metal in rotating equipment. *ASM Gloss.*

barrel copper. Native copper in lumps small enough to be picked out of the mass of rock, and sent to the furnace without dressing. *Standard, 1964. See also* barrel work. *Fay.*

barrel-day valuation. An older method of approximate valuation of oil properties which, in each barrel of settled daily production, is valued at the selling price per barrel multiplied by one-thousand. Also, it has been known as the Pennsylvania method where it was first used. *A.G.I.*

barrel finishing. Improving the surface finish of metal objects or parts by processing them in rotating equipment along with abrasive particles which may be suspended in a liquid. *ASM Gloss.*

barreling. The removal of surface excrescences and the general cleaning of metal castings by placing them in a revolving drum, or barrel, together with coarsely crushed abrasive material, such as broken biscuit-fired ceramic ware. *Dodd.*

barrel, oil. A volumetric unit of measurement equivalent to 42 U.S. gallons. *A.G.I.*

barrel plating. Plating articles in a rotating container, usually a perforated cylinder that operates at least partially submerged in a solution. *ASM Gloss.*

barrel process. A process of extracting gold or silver by treating the ore in a revolving barrel with mercury, chlorine, cyanide solution, or other reagent. *Webster, 3d.*

barrel quartz. Applied to certain corrugated veinlets of gold-bearing quartz found in Nova Scotia. *Fay.*

barrel vault. A plain arch of semicircular cross section which is generally much longer than its diameter. Reinforced concrete barrel vaults are used for shell roofs of factories where open floor space is essential. Traditional barrel vaults are also constructed in brickwork or masonry. *Ham.*

barrel washer. A washer comprising a cylinder rotating slowly about an axis which is slightly inclined to the horizontal, and into which the raw coal, with a current of water or of a suspension, is fed near its upper end. The clean coal is carried by the water or suspension to the lower end of the cylinder over a scroll which conveys the reject to the upper end of the cylinder. *B.S. 3552, 1962.*

barrel work. In the Lake Superior region, native copper occurring in pieces of a size to be sorted out by hand in sufficient purity for smelting without mechanical concentration. Also called barrel copper. *Fay.*

Barremian. Lower Cretaceous, between Hauterivian and Aptian. *A.G.I. Supp.*

barren. a. In leaching ores, chemical solution from which valuable solute has been removed by precipitation or ion exchange (IX) before reuse. *See also* Merrill Crowe process. *Pryor, 3.* b. Said of rock or vein material containing no minerals of value, and of strata without coal or containing coal, in seams too thin to be workable. Also, pertains to land that is extremely rugged or otherwise unproductive. Also called barren ground. *Stokes and Varnes, 1955.*

barrena. Mex. a. A hand drill for blasting. B. viva, a sharp drill; b. muerta, a dull drill. *Fay.*

barrenar. Mex. To drill; to fire a round of holes. *Fay.*

barrenarse. Mex. To connect with each other (as two mines or workings). *Fay.*

barren block. The block bounded by the vertical planes passing through the traces of the fault plane. In an oilfield such a block is barren of oil, the oil sand being faulted out. *Schiefrdcker.*

barren contact. A contact vein, or a place in the contact vein, which has no mineral. *Fay.*

barren ground. Strata containing seams of coal that are not of a workable thickness. In metal mining, ground that does not contain ore. *Fay. Compare* dead ground. *See also* disturbed ground.

barren hole. Synonym for blank hole. *Long.*

barren measures. Coal measures without workable seams. *Standard, 1964.*

barren mine. A mine may be fully developed and yet, owing to the barrenness of the ore, it would be impossible to work it with profit. *Ricketts, I.*

barren solution. A solution in hydrometallurgical treatment from which all possible valuable constituents have been removed. *See also* cyanide. *Pryor, 4.*

barren trap. One that is devoid of oil or gas but may contain water. *A.G.I.*

barreta. a. Mex. A crowbar. *Fay.* b. B. perdida (Peru), dead work in unprofitable prospecting. *Fay.*

barricade. a. Asphyxiating gases are formed when there has been a fire in any mine or an explosion in a coal mine. If men are unable to escape, they should retreat as far as possible, select some working place with plenty of space, short-circuit the air from this place, build a light barricade or stopping, and remain behind it until rescued. *von Bernewitz.* b. An artificial mound of earth, usually as high as the eaves of a magazine roof, erected to deflect the force of an explosion upward and to protect the inclosed building from flying objects. *Fay.* c. Timber formwork to contain the material during hydraulic flushing in steep ore workings. *Nelson.*

barricading. a. Enclosing part of a mine to prevent inflow of noxious gases from a mine fire or an explosion. This may be done by doors or by building one or more airtight walls across mine workings using any available material, such as rock, coal, timber, brattice cloth, mud, clothing, etc., so as to enclose a maximum quantity of good air. Records of the U.S. Bureau of Mines show that more than 800 trapped coal and metal miners have been saved by barricading, and that in several cases, those that refused to enter or to remain behind barricades were asphyxiated. *Hess.* b. The building or utilization of earthen walls, mounds, or other suitable obstructions around explosives magazines or manufacturing plants to obstruct or divert the force of an explosion upward, thus protecting the surrounding area from damage. *Hess.*

barrier. a. Blocks of coal left between the workings of different mine owners and within those of a particular mine for safety and the reduction of operational costs. It helps to prevent disasters of inundation by water, of explosions, or fire involving an adjacent mine or another part of a mine and to prevent water running from one mine to another or from one section to another of the same mine. *Mason, v. 1, p. 312. See also* barrier pillar. b. A low ridge by wave action near the shore. *Fay.*

barrier bar. Barrier bars are ridges usually composed of waterworn gravel, deposited by currents in shallow water at some distance from land. Their crests are horizontal and mark the storm limit of the waves and currents that built them. In cross section, they exhibit anticlinals of deposition. *A.G.I.*

barrier beach; offshore barrier. A bar essentially parallel to the shore, the crest of which is above high water. *H&G.*

barrier gate. Eng. *See* tailgate. *SMRB, Paper No. 61.*

barrier island. A detached portion of a barrier beach between two inlets. *Schieferdecker.*

barrier materials. Materials such as lead and concrete which are used for protection from X-rays or gamma rays in radiographic installations. *Osborne.*

barrier pillar. a. A solid block or rib of coal, etc., left unworked between two collieries or mines for security against accidents arising from an influx of water. *Zern.* b. Any large pillar entirely or relatively unbroken by roadways or airways that is left around a property to protect it against water and squeezes from adjacent property, or to protect the latter property in a similar manner. *Zern.* c. Incorrectly used for a similar pillar left to protect a roadway or airway, or group of roadways or airways, or a panel of rooms from a squeeze. *Zern.*

barrier reef. a. The term barrier has been generally applied to that vast reef which fronts the northeast shore of Australia, and by most voyagers likewise to that on the western coast of New Caledonia. At one time, it was thought convenient to restrict the term but since these reefs are similar in structure and position relative to the land, like a wall with a deep moat within, encircling many smaller islands, they have been classed together. *A.G.I.* b. The name given to those coral reefs that run parallel (barrierlike) to the shores of the islands and continents but separated from them by a lagoon channel, more or less extensive. *A.G.I.* c. A reef which runs more or less parallel with the coast but at some distance from it, so as to leave a broad channel between the two. *A.G.I.* d. A coral

CCD 6d, 1961.

barium uranophane. A silicate of barium and uranium. X-ray data resembles that of cuprosklodowskite. *Hey, M.M., 1961.*

barium zirconate. $BaZrO_3$; melting point, above 1,500° C. Used as an additive to titanate or zirconate ceramics to obtain dielectric bodies with special electrical properties. *Lee.*

barium-zirconium silicate. White; $BaZrSiO_5$; a complex of BaO, ZrO_2, and SiO_2. Used in the production of electrical resistor ceramics; glaze opacifiers; and as a stabilizer for colored ground coat enamels. *CCD 6d, 1961.*

barkan. *See* barchan.

Barker-Truog process. A process described by G. J. Barker and E. Truog for the treatment of brickmaking clays with alkali, this being claimed to facilitate shaping and to reduce the amount of water necessary to give optimum plasticity. According to their patent (U.S. Patent 2,247,467) the clay is mixed with alkali to give pH 7–9 if it was originally acid, or pH 8–10 if originally nonacid; it is also stipulated that the total amount of alkali added shall be limited by the slope of the curve relating the pH to the quantity of alkali added, this slope being reduced to half its original value. *Dodd.*

barkevikite. A variety of amphibole near arfvedsonite in composition. *Fay.*

Barkhausen effect. Observed result of magnetizing a ferromagnetic substance by means of a slow magnetic field increase. Orientation of domains proceeds in abrupt steps. *Pryor, 3.*

Barkston distributor. A stone duster consisting of a drum filled with stone dust in which a steel piston slowly descends as dust is blown out by a compressed-air jet. The jet delivers a small, continuous stream of dust into the air current. *Sinclair, I, p. 260.*

barley; barley coal. A stream size of anthracite known also as buckwheat No. 3, sized on a round punched plate. It passes through ¼-inch holes. At some mines, it has to pass over 3/32-inch holes and at others over 1/16-inch holes. The American Society of Mechanical Engineers has recommended that with a screen with circular holes, barley shall pass through 3/16-inch holes and pass over 3/32-inch holes. *Fay. See also* anthracite coal sizes; bird's-eye, a.

bar loosener. *Se* roof trimmer. *D.O.T. 1.*

barman. *See* roof trimmer. *D.O.T. 1.*

barmaster. Derb. A mining official who collects the dues or royalties, presides over the barmote, etc. From the German word, bergmeister. *Fay.*

bar mining. The mining of river bars, usually between low and high waters, although the stream is sometimes deflected and the bar worked below water level. *Se also* bar diggings. *Fay.*

barmote. Derb. A hall or court in which trials relative to lead mines are held. *Fay.*

barn. a. A surface structure or place in the mine where animals or locomotives are kept. Also called motor barn; stable. *Hess.* b. A very small unit of area for measuring the cross sections of atoms, nuclei, electrons, and other particles. One barn equals 10^{-24} square centimeters. Barn is a measure of the probability that a given nuclear reaction will occur. *L&L.*

Barnach stone. A famous building stone obtained from the Lincolnshire limestone (Middle Jurassic). *C.T.D.*

barn boss. The man in charge of the mule barn on the surface or underground. *Korson.*

Barnes' formula. Used to determine flow in sewers, and states that the velocity of flow in feet per second is: $107m^{0.7}\sqrt{i}$, where m is the hydraulic mean depth in feet and i is the slope of the sewer. *See also* Crimp and Bruges' formula. *Ham.*

barnesite. The unnamed sodium analogue of hewettite. Much metahewettite is barnesite. *Hey, M.M., 1961.*

Barnesite. Trademark for a rare earth oxide containing about 45 to 48 percent CeO_2. Used in glass polishing. *E.C.T., v. 11, p. 520.*

barney. A small car, or truck, attached to a rope and used to push cars up a slope or an inclined plane. Also called bullfrog; donkey; groundhog; larry; ram; mule; truck. *Fay.*

barney pit. A pit at the bottom of a slope or plane, into which the barney is lowered to allow the mine car to run over it to the foot of the plane. *Fay.*

barnhardtite. A massive orange-yellow copper and iron sulfide. *Standard, 1964.*

bar of ground. Eng. An intersecting vein of different mineral substances; a horse. *Fay.*

barograph. A barometer which makes a continuous record of barometric changes. Barographs may be of the mercurial or aneroid variety, but are generally of the latter type. In most cases the changing temperature to which a barograph is subjected introduces small errors. It is impossible even with the best instruments to record the absolute pressure with a precision equal to that of an eye reading of a standard mercurial barometer. In general, therefore, the indications of automatic instruments are checked and corrected by reference to occasional eye readings of a standard barometer. *See also* aneroid barometer. *A.G.I.*

Baroid. Brand name for a weighting material manufactured from selected barytes (barium sulfate ore). Baroid is added to drilling muds to increase the unit weight of the mud, thus increasing the hydrostatic head on the formations being drilled in deep wells, to prevent the walls of the hole from caving. *C.C.D. 6d, 1961.*

barolite. Wadsworth's name for rocks composed of barite or celestite. *Fay.*

barometer. An instrument for measuring atmospheric pressure. There are two general types: (1) mercury, a U-shaped tube containing a liquid (commonly mercury), one end closed, the other exposed to the air. Displacement of the mercury in the tube is a measure of atmospheric pressure; and (2) aneroid (without liquid), a corrugated vacuum box sensitive to external pressure whose expansion or contraction is indicated on a graduated dial by means of mechanical devices. The dial may be graduated in terms of inches of mercury or elevation in feet or meters, or both. *A.G.I.*

barometer holiday. Derb. Any day on which no work is carried on underground, owing to the very low state of the barometer (for instance, when it drops below 29 inches), as much firedamp may be expected to be given off in the mine. *Fay.*

barometric leg. In filtering system, use of a loop more than 30 feet high between receiving vessel and vacuum pump, to protect latter against carryover of liquid. *Pryor, 3.*

barometric leveling. The density of the atmosphere varies with altitude, hence by suitable graduation of barometer can be used to record difference in height. Two instruments should be used, one recording the change in pressure at the datum point and the other taking levels at the required positions. These levels are later corrected by comparison with the first barometer. The barometer cannot be used directly for the determination of levels underground owing to the artificially reduced air pressure. The readings taken with a barometer when used underground for ventilation surveys must be corrected for differences in level. These have to be taken with a level or theodolite. *Mason, V. 2, p. 738.*

barometric pressure. The barometric pressure of the air at any point is that exerted by the weight of the atmosphere above that point. It therefore varies with the elevation of the point above or the depth below sea level. Barometric pressure is measured by the mercury barometer, and is of the order of 30 inches of mercury at sea level. *Spalding, p. 241.*

baromil. The unit length used in graduating a mercury barometer in the centimeter-gram-second system. If the barometer is located at 45° latitude at sea level and its temperature is 0° C, a length increment of one baromil will correspond to a pressure increment of one millibar. Corrections must be applied at other locations. *H&G.*

baroque. Any pearl of very irregular form. *Shipley.*

baroque pearl. Any pearl of very irregular form, including slug pearl. *Shipley.*

barotrauma. A generic term for injury caused by pressure. Although squeeze is a colloquialism, it is an excellent descriptive term for all of the phenomena which occur when a rigid closed space within the body or on its surface fails to equalize with external pressure during descent, or is for some reason vented to lower pressure than that acting at the depth. *H&G.*

barra. Mex. A share in a mine. (The ancient Spanish laws considered a mine as divided into 24 parts, each of which was called a barra.) Barra viudas or aviadas are nonassessable shares which participate in the profits, but not in the expense of mining. *Fay.*

barracks shale. One of the principal oil shale seams of Scotland. *Fay.*

barrage. A low dam, with sluice gates along its whole length, erected in a river so that its level can be controlled. *Ham.*

barranca. A deep break or hole made by heavy rain; a ravine; a precipice; used in some parts of Spanish America as the equivalent of canyon; as used in New Mexico, it is practically equivalent to cliff. *USGS Bull. 730, 1923, p. 86.*

barrandite. A bluish, reddish, greenish, or yellow-gray hydrous ferric aluminum phosphate, $(Al\text{-}Fe)(PO_4+2H_2O)$, found in spheroidal concretions. *Standard, 1964.*

Barratt-Halsall firemouth. A design for a stoker-fired firemouth for a pottery bottle oven; a subsidiary flue system links all the firemouths around the oven wall to assist in temperature equalization. The design was patented by W. G. Barratt and J. Y. M. Halsall (British patent 566,838; 16-1-45). Also known as the Gater Hall device because it was first used at the factory of Gater Hall & Company, Stoke-on-Trent, reef separated from the coast by a lagoon that is too deep for coral growth. Generally, barrier reefs follow the coasts for long distances, often with short interruptions termed passes. *A.G.I.*

barrier system. N. of Eng. An approved method of working a colliery by pillar and stall, where solid ribs or barriers of coal are left in between working places. *Fay.*

bar rig. A small diamond or other rock drill designed to be mounted and used on a bar. Also called bar drill. *Long.*

barrilla. Colom. In gold mining, wooden divisions in blanket strakes, copperplates, etc. *Fay.*

barring. a. The end and side timber bars used for supporting a rectangular shaft. The bars are notched into one another to form a rectangular set of timber. Common sizes are from 9 to 12 inches deep and from 3 to 6 inches thick and may be made from larch, white pine, or red pine. *See also* steel rectangular shaft supports. *Nelson.* b. Eng. The timbers in the workings for keeping up the roof. *Fay.* c. Scot. The timber walling or casing of shafts. *Fay.* d. York. Using an iron bar to remove loose rocks after blasting. *Fay.*

barring-down. a. N.S.W. Removing, with a bar, loose rock from the sides and roof of mine workings. *New South Wales.* b. Loosening ore in a bin by means of a bar, so it will flow through the chute. *Fay.* c. Prying off loose rock after blasting, to prevent danger of fall. *Pryor.*

barrings. A general term for the setting of bars of timber for supporting underground roadways or shafts. *Nelson.*

barring scrap. Prying adhering scrap metal from runners, ladles, or skimmers. *Fay.*

barro. a. Sp. Clay, loam, mud, or earth. *Fay.* b. Sp. B. de olleros, potters' clay. *Fay.* c. Sp. Argillaceous marl. *Fay.* d. Colom. Overburden of auriferous alluvial deposits. *Fay.* e. Braz. A layer of fine sand mixed with clay. *Fay.*

barroisite. A dark green amphibole intermediate between hornblende and glaucophane. *English.*

barrow. a. A box with two handles at one end and a wheel at the other. *Zern.* b. A wicker basket in which salt is put to drain. *Webster 2d.* c. A vehicle in which ore, coal, etc., is wheeled. *Fay.* d. Corn. A heap of attle or rubbish; a dump. *Fay.* e. Eng. A mountain or hill. *Webster 3d.*

barrowman. In mining, one who pushes shallow-bodied cars (barrows) or wheelbarrows used for transporting coal or ore along underground haulageways that are too low for ordinary mine cars. Also called buggyman. *D.O.T. 1.*

barrow tram. A shaft or handle of a wheelbarrow. *Webster 2d.*

barrowway. a. Newc. A level through which coal or ore is wheeled. *Fay.* b. Eng. Rails laid between the flat or siding and the coal face. *SMRB, Paper No. 61.*

Barry mining. *See* Nottingham system. *Nelson.*

bars. Eng. Strong timbers placed horizontally for supporting boards by which the faces of the excavation for a tunnel are supported. The "crownbars" support the upper part of the excavation; the "sidebars", the lateral portions. *Fay.*

bar salt. Bars weighing 18 to 20 pounds, formerly made in England by pouring wet grainer salt into molds, draining, and then drying. *Kaufmann.*

barsanovite. A mineral, $(Ca,Na)_9(Fe,Mn)_2(Zr,Nb)_2Si_2(O,Cl)_{37}$; monoclinic; in a pegmatite from Petrelius, Khibina Massif, Kola peninsula, U.S.S.R. *Hey, M.M., 1964.*

bar screen. A stationary inclined screen, comprising longitudinal bars, spaced at intervals, onto which the material to be screened is fed at the upper end. *B.S. 3552, 1962. See also* grizzly; stationary bar screen.

barshawite. A pinkish, even-grained igneous rock containing 16.8 percent orthoclase, 9.8 percent andesine, 17.3 percent nepheline, 11.1 percent analcite, 2.4 percent apatite, 12.5 percent titanaugite, 26.0 percent barkevikite, a trace of aegirite, and 4.2 percent iron oxides; found at Barshaw, Scotland. *Johannsen, v. 4, 1938, pp. 283-284.*

Barstovian. Upper Miocene. *A.G.I. Supp.*

bar timbering. A method of timbering mine roadways by means of horizontal and upright bars. *See also* double timber; timber set. *Nelson.*

bar tin. *See* block tin. *Bennett 2d, 1962.*

Bartlett table. A three-shelf table driven by an eccentric that gives it a vanning motion. Ore and water are fed on the upper shelf giving two products, heads and tailings. The latter are retreated on the second shelf, and the tailings go to the third or lower shelf for retreatment. *Liddell 2d, p. 385.*

bartolina. Mex. A watchman's house at the mine entrance. *Fay.*

Barton clay. A clay of the Eocene period used for brickmaking near the coast of Hampshire and in the Isle of Wight. *Dodd.*

Bartonian. Upper Upper Eocene. *A.G.I. Supp.*

Barvoys process. A sink-float process in which the medium is a suspension of clay from the raw coal and minus 200- or 300-mesh barite in water, with the volume of the clay usually equal to about twice that of the barite. Barite clay and coal suspensions can be regulated to get effective washing gravities from 1.2 to 1.8. Sizes from run-of-mine to one-eighth inch may be cleaned by this process, which has been widely adopted in Europe. Also known as the Sophia-Jacoba process in German publications. *Mitchell, p. 495.*

barybiotite. A variety of biotite containing barium. *Standard, 1964.*

barysphere. The central or deep interior portions of the earth, presumably composed of heavy metals or minerals. It is contrasted with lithosphere, the outer stony shell. *Fay.* Also called pyrosphere; centrosphere. *A.G.I.*

baryta. Barium oxide; BaO. *A.G.I.*

barytes. *See* barite. *Barger.*

baryto-. A combining form denoting the presence of barium, as in barytocalcite and barytocelestite. *Standard, 1964.*

barytocalcite. A carbonate of barium and calcium, $BaCO_3$-$CaCO_3$. *Fay.*

basal. Parallel to the basal pinacoid of a crystal; a direction perpendicular to the principal axis of a prism. *Shipley.*

basal arkose. Slightly reworked feldspathic residuum in the lower part of a sandstone. *A.G.I. Supp.*

basal cleavage. Pinacoidal cleavage; cleavage parallel to the basal pinacoid, that is, perpendicular to the long axis of a crystal. *Hess.*

basal conglomerate. A coarse, usually well-sorted and lithologically homogeneous sedimentary deposit that is found just above an erosional break. The initial stratigraphic unit overlying an unconformity, formed by a rising sea level or encroaching sea. *A.G.I.*

basal metabolism. The amount of heat liberated by a person at rest in a comfortable environment (about 40 Btu per hour). *Hartman, p. 297.*

basal pinacoid. In crystallography, a form consisting of two parallel plane faces on a crystal, so oriented as to cut only the vertical axis *c*, and to be parallel with the plane of the lateral axes *a* and *b*. *A.G.I.*

basal plane. a. A plane perpendicular to the c, or principal, axis in a tetragonal or hexagonal structure. *ASM Gloss.* b. Synonym for basal pinacoid. *A.G.I.*

basal reef. S. Afr. A gold-bearing reef regarded as the principal carrier of gold in the Orange Free State. It has been associated with the Elsburg series of the central Witwatersrand and occurs below what has become known as the leader reef. *Beerman.*

basalt. An extrusive rock composed primarily of calcic plagioclase, pyroxene, with or without olivine. The plagioclase is normally zoned and usually ranges in composition from bytownite to labradorite but less calcic varieties are known. Augite, pigeonite, and hypersthene or bronzite are the common pyroxenes. Apatite and magnetite are almost always present as accessories. Basalts rich in olivine and calcic augite are generally classified as olivine basalts; those poor in olivine and containing orthopyroxene and/or pigeonite are generally classified as tholeiitic basalts or tholeiites. The groundmass of tholeiitic basalts is commonly glassy, or if crystallized, usually contains quartz and alkalic feldspar. *A.G.I.* More generally, any fine-grained, dark-colored igneous rock. *A.G.I. Supp.*

basalte. Fine-grained black unglazed stoneware. Also called black Egyptian ware. *C.T.D.*

basalt glass. A black, glassy form of basalt. *Webster 3d.*

basal thrust plane. The basal plane underlying a pile of overthrusts. Synonym for sole. *Schieferdecker.*

basaltic. Pertaining to, formed of, containing, or resembling basalt; as, basaltic lava. *Webster 3d.*

basaltic hornblende. A variety of hornblende found in volcanic rocks. *Fay.*

basaltic rock. A fine-grained, dark-colored igneous rock, including basalt, diabase, dolerite, and andesite if dark colored. *Compare* felsitic rock; granitic rock. *A.G.I.*

basaltiform. In the form of basalt; columnar. Obsolete. *Webster 3d.*

basaltine. Same as basaltic; augite. *Standard, 1964.*

basalting. a. A pavement made of blast-furnace slag. *Standard, 1964.* b. The process or operation of covering, as a road, with slag. *Standard, 1964.*

basaltite. Basalts without olivine. *Holmes, 1928.*

basalt ware. a. A black unglazed, highly vitreous stoneware made from a high-iron body, fired in a reducing atmosphere having the appearance of basalt rock; hence the name. *Bureau of Mines Staff.* b. A black stoneware made in Staffordshire, England, which was improved, named, and made popular by "Wedgewood".

(Often called Egyptian black or balaltese ware). *Bureau of Mines Staff.*

basaluminite. Hydrous basic aluminum sulfate, $2Al_2O_3$-SO_3-$10H_2O$, as white compact material lining crevices in ironstone from Irchester, Northamptonshire. Felsobanyite with the same formula has a different X-ray pattern. So named because more basic than aluminite. *See also* hydrobasaluminite. *Spencer 18, M.M., 1949.*

basanite. An extrusive rock composed of calcic plagioclase, augite, olivine, and a feldspathoid (nepheline, leucite, or analcime). Essentially, a feldspathoidal olivine basalt. *A.G.I.*

basanitoid. Nepheline-free alkali basalts containing a soda-rich isotropic base. Also, a basaltic rock having the chemical composition of basanite, but free from feldspathoids. *Holmes, 1928.*

base. a. Foundation or supporting structure on which a drill is mounted. *Long.* b. The point or line from which a start is made. As used by drillers, a line of stakes set by an engineer or drill foreman to be used as a guide to line up and point the drill in a specific compass direction. *Long.* c. The minimum price used as a basis for determining the total cost when drilling is done on contract. *Long.* d. The most abundant metal in an alloy. *Long.* e. The basal pinacoid of a crystal. *Webster 3d.* f. The groundmass or magma of a rock. *Standard, 1964. See also* basis. *Fay.* g. A line in a survey which, being accurately determined, in length and position, serves as the origin for computing the distances and relative positions of remote points and objects by triangulation. *Webster 3d.* h. In petroleum technology, a substance precipitated by chilling (paraffin wax) or left after the distillation of both light and heavy oils from petroleum. In the latter case, the residue has usually been called asphalt, but is now referred to by the U.S. Bureau of Mines as naphthene. There are also intermediate petroleums containing both paraffin and naphthene. *BuMines R.I. 3279, 1935, pp. 1-2.* i. Readily tarnishing or oxidizing; as, base metal. *Standard, 1964.* j. Of comparatively little value; not precious. *Compare* base metal. *Webster 3d.* k. The surface on which a single-point tool rests when held in a toolpost. Also known as heel. *ASM Gloss.* l. The bottom of a bottle. *ASTM C162–66.* m. A compound, such as lime, ammonia, a caustic alkali, or an alkaloid, capable of reacting with an acid to form a salt either with or without the elimination of water. Its aqueous solutions (if it is water-soluble) have an acrid brackish taste and turn litmus blue. *Webster 3d.*

base box. A unit of quantity in the tinplate trade consisting of 112 sheets measuring 14 by 20 inches or the equivalent in area; consequently 31,360 square inches of tinplate. *Bureau of Mines Staff.*

base bullion. Crude lead containing recoverable silver, with or without gold. *ASM Gloss.*

base charge. a. The charge or tariff made by the smelter for smelting and roasting the concentrate, refining, and transport of metals or products. There may be premiums for easy ore and penalties for impure ore. *Nelson.* b. The charge loaded into the bottom of vertical holes in quarrying, usually applicable to 3-inch-diameter holes and over. *Nelson.* c. The detonating component in a detonator, initiated by the priming charge. *B.S. 3618, 1964, sec. 6.*

base coat. A fired coating over which another coating is applied. *Bryant.*

base code. Alternative name for punt code. *See also* punt code. *Dodd.*

base course; base. a. A layer of specified or selected material of planned thickness constructed on the subgrade or subbase for the purpose of serving one or more functions, such as distributing load, providing drainage, minimizing frost action, etc. *ASCE P1826.* b. The first or lowest course of a wall (as of a foundation wall or of the wall of a building above the basement). *Webster 3d.* c. The bottom layer of material laid down in the construction of a pavement. *Webster 3d.*

base exchange. a. The clay particle with its cations may be regarded as a kind of salt in which the colloidal clay particle is the anion. Certain cations may replace others, making the clay more flocculent. The cation replacement is known as the base exchange. Synonym for ion exchange. *A.G.I.* b. The physicochemical process by which one species of ions adsorbed on soil particles is replaced by another specie. *ASCE P1826.*

base-exchange capacity. The number of milliequivalents of NaOH required to neutralize the exchangeable H^+ ions adsorbed onto 100 gm of colliodal material. *VV.*

base exchange (Permutit or zeolite) process. This process removes both temporary and permanent hardness of water, and it is used by householders, water authorities, and in industry. In the household the reagents are contained in a special metal cylinder which is connected to the tap: the chemical reagents are called zeolites, the most common of which is sodium aluminum silicate (Permutit) either in natural form or specially prepared. The artificial zeolites are prepared by mixing solutions of sodium silicate and sodium aluminate, $Na_2O.Al_2O_3.2SiO_2.6H_2O$. *Cooper, p. 371.*

base failure. Same as rotational failure. *See* slope failure. *Lewis, p. 627.*

base flow. Water entering drainage system from underground sources. *Pryor, 3.*

base fracture. In quarrying, used to describe the condition of the base after a blast. It may be a good or bad base fracture. *Streefkerk, p. 16.*

base goods. Generally used to denote a material made by treating phosphate rock and some nitrogenous substance with sulfuric acid. Hair, leather, scrap fur, wool waste, feathers, shoddy, etc., are the nitrogenous materials most often used. Base is made with the same machinery that is used for making acid phosphate, and the methods of operation are about the same. *Fay.*

baselevel. a. The lowest level to which a land surface can be eroded by running water. *Mather.* b. To reduce by erosion to or toward a baselevel. *Standard, 1964.*

baseleveled plain. A baseleveled surface is any land surface, however small, which has been brought approximately to a baselevel, either general or local, by the process of gradation. When such a surface has considerable extent, it becomes a baselevel plain. Synonym for peneplain. *A.G.I.*

baselevel plain. A flat, comparatively featureless area or lowland, the elevation of which cannot be materially reduced by the erosive force of running water. *A.G.I.*

base line. A line taken as the foundation of operations in trigonometrical and geological surveys. *See also* base, g. *Fay.*

base map. A map on which information may be placed for purposes of comparison or geographical correlation. Base map was at one time applied to a class of maps now known as outline maps. It may be applied to topographic maps, also termed mother maps, which are used in the construction of many types of maps by the addition of particular data. *A.G.I.*

basement. In geology, an underlying complex that behaves as a unit mass and does not deform by folding. *AIME Trans., v. 144, 1941, p. 63.*

basement complex. A series of rocks generally with complex structure beneath the dominantly sedimentary rocks. In many places, they are igneous and metamorphic rocks of either Early or Late Precambrian, but in some places they may be much younger, as Paleozoic, Mesozoic, or even Cenozoic. *A.G.I.*

basement rock (complex). a. A name commonly applied to metamorphic or igneous rocks underlying the sedimentary sequence. *A.G.I.* b. Metamorphic and igneous Precambrian rocks. *A.G.I.* c. *See* base rock, b. *Long.*

base metal. a. Any of the nonprecious metals. *Weed, 1922.* b. A metal inferior in value to gold and silver (commonly restricted to the ore metals). *A.G.I.* c. A metal more chemically active than gold, silver, and the platinum metals. *A.G.I.* d. The metal present in the largest proportion in an alloy; brass, for example, is a copper-base alloy. *ASM Gloss.* e. The metal to be brazed, cut, or welded. *ASM Gloss.* f. After welding, that part of the metal which was not melted. *ASM Gloss.* g. A metal or alloy (as zinc, lead, or brass) of comparatively low value and relatively inferior in certain properties (as resistance to corrosion); opposite of noble metal. *Webster 3d.* h. The metal to which a coating or plating is applied; the metal existing underneath a coating or plating. *Webster 3d.* i. The metal to which porcelain enamel is applied. *ASTM C286-65.*

baseness. a. Liability to rust. *Standard, 1964.* b. Inferiority, due to alloy. *Standard, 1964.*

base, oil. The residuum from the distillation of petroleum. When paraffin is obtained from the petroleum, the original oil is said to have a paraffin base; when the residue is entirely asphaltic, the original petroleum is said to have an asphaltic base. Some petroleums have both an asphaltic and a paraffin base. *API Gloss.*

base ore. Ore in which the gold is associated with sulfides, as contrasted to free-milling ores in which the sulfides have been removed by leaching. *Newton, p. 19.*

base plate; bedplate. a. The foundation plate or support of a piece of machinery. *Crispin.* b. The steel or cast-iron plate on which a column rests. *Webster, 3d.* c. A metal plate used to provide a stable measuring point of a temporary nature. *B.S. 3618, 1963, sec. 1.*

base plug. A tapered cylinder, generally of wood, placed in a borehole and into which a delection drive wedge may be driven in a random or oriented position. Also called deflecting plub; deflection plug. *Long.*

base price. There is a minimal market price for each metal below which it cannot fall without putting the average producer out of business; this price has been called the base price. *Hoov, p. 187.*

base price (of pearls). The price of a single pearl is computed by squaring its weight in grains and multiplying the result by the base rate. This scheme of establishing the price of a pearl takes into consideration the fact that small pearls are many times more common than large ones and that their value therefore increases as the square of their weight. Expressed as a formula, it is the average size, times the total weight, times the base rate equals the price of a group of pearls. *Shipley.*

base rock. a. As used by some drillers, the solid rock immediately underlying the overburden material. *Long.* b. As used by drillers in the Midwestern United States, the igneous rock formations underlying the sedimentary rocks. Also called basement; basement rock; pavement. *Long.*

base station. Station belonging to the wide-meshed net of stations where the acceleration of gravity is determined with particular care and to which the field stations are tied in. *Schieferdecker.*

bash. S. Wales. To fill with rubbish the spaces from which the coal has been mined. *Fay.*

bashing. To build walls and nonporous stoppings for the complete isolation of a district of a mine in which a fire has occurred; the complete stowing of old workings or roadways after all equipment has been removed. *Nelson.*

basic. a. In furnace practice, a slag in which the earthy bases are in excess of the amount required to form a neutral slag with the silica present. *Fay.* b. In geology, a general descriptive term for those igneous rocks that are comparatively low in silica. About 50 or 55 percent in the superior limit. *Compare* acidic. *Fay.* c. In chemistry, (1) performing the office of a base in a salt; having the base in excess, and (2) having more than one equivalent of the base for each equivalent of acid. *Fay.* d. Alkaline. *ASTM STP No. 148-D.*

basic Bessemer steel. *See* Thomas steel.

basic bismuth nitrate. *See* bismuth subnitrate. *CCD 6d, 1961.*

basic bottom and lining. The inner bottom and lining of a melting furnace consisting of materials like crushed burnt dolomite, magnesite, magnesite bricks, or basic slag that give a basic reaction at the operating temperature. *ASM Gloss.*

basic converter. *See* basic-lined converter.

basic fiber. Unprocessed glass fibers directly from the forming equipment. *ASTM C162-66.*

basic flowsheet. A diagram of the various stages in the treatment of the raw coal in a preparation plant, usually either a process flowsheet or an equipment flowsheet. *B.S. 3552, 1962.*

basic flux. Metallurgically basic material, such as limestone or dolomite, used as a flux. *Bennett 2d, 1962.*

basic front. A zone enriched in basic constituents which are expelled from country rocks undergoing granitization. The introduced elements (mainly iron and magnesium but commonly including aluminum, calcium, potassium, hydrogen, titanium, phosphorus, and manganese) are those that are either incompatible with a granite composition or in excess of the appropriate amounts. *Schieferdecker.*

basic grade. Used to define steel produced by the basic open-hearth process. *Ham.*

basic hornfels. A hornfels derived from a basic igneous rock. *See also* beerbachite; hornfels. *A.G.I.*

basic hydroxide. A metallic oxide which will react with an acid to form salt and water only; for example, calcium hydroxide. *Cooper.*

basicity. Of an acid, the number of hydrogen atoms per molecule of it which can be replaced by a metal. *Cooper.*

basic lavas. The lavas poor in silica, less than 52 percent. The rocks are typically dark in color and heavy, and are well represented by the familiar-type basalt. *C.T.D.*

basic lead carbonate; white lead; hydrocerussite. $2PbCO_3{\cdot}Pb(OH)_2$; molecular weight, 775.60; white; hexagonal; specific gravity, 6.14; decomposes at 400° C; insoluble in water; and slightly soluble in aqueous carbon dioxide. *Bennett 2d, 1962.* Used in glazing pottery.

basic lead chloride; Turner's yellow. $PbCl_2.7PbO$; molecular weight, 1840.58; yellow; used as a pigment. Also called Cassel yellow; Verona yellow. *Bennett 2d, 1962.*

basic lead sulfate; lanarkite. $PbSO_4.PbO$; molecular weight, 526.44; white; monoclinic; specific gravity, 6.92; melting point, 977° C; and slightly soluble in water. *Bennett 2d, 1962.*

basic-lined converter. In smelting, the Pierce-Smith copper converter, which has a magnesite (basic refractory) lining. *Bureau of Mines Staff.*

basic lining. A lining for furnaces, converters, etc., formed of nonsiliceous material, usually limestone, dolomite, lime, magnesia, or iron oxide. *Fay.*

basic lining process. An improvement of the Bessemer process in which, by the use of a basic lining in the converter and by the addition of basic materials during the blow, it is possible to eliminate phosphorus from the pig iron and keep it out of the steel. *Fay.*

basic magmas. Those rich in iron, magnesium, and calcium. *Bateman.*

basic open-hearth furnace. An open-hearth furnace used in the refining of basic pig iron. The hearth is built of basic refractory bricks covered with burned dolomite or magnesite. *Dodd.*

basic ores. Another name for non-Bessemer ores. *Newton, p. 11.*

basic oxide. A metallic oxide which will react with an acid to form salt and water only; for example, calcium oxide. *Cooper.*

basic oxygen process. A steelmaking process in which oxygen is forced at supersonic speed through a retractable water-cooled lance, accelerating the burning off of unwanted elements in a charge of molten iron and scrap. *Encyclopaedia Britannica, Britannica Book of the Year, 1964, p. 469.*

basic price. a. As used by the drilling and mining industries, a guaranteed price to be paid for a specific quantity of materials, or type of service. *Long.* b. As applied to the price of metals, it is that figure at which the price is a minimum. *See also* normal price. *Fay.*

basic process. A steelmaking process, either Bessemer, open-hearth, or electric, in which the furnace is lined with a basic refractory, a slag rich in lime being formed and phosphorus removed. *C.T.D. See also* basic-lining process. *Fay.*

basic refractories. Refractories which consist essentially of magnesia, lime, chrome ore, or forsterite, or mixtures of two or more of these. *HW.*

basic refractory lining. A furnace lining, especially for a copper converter or for an open-hearth steel furnace, composed of material low in such acidic minerals as silica and high in such basic minerals as lime, chromite, dolomite, magnesite, or magnesia. *Bureau of Mines Staff.*

basic rock. A term rather loosely used in lithology generally meaning one of the following: (1) an igneous rock containing less than 55 percent of silica, free or combined; (2) an igneous rock in which minerals comparatively low in silica and rich in the metallic bases, such as the amphiboles, the pyroxenes, biotite, and olivine, are dominant; or (3) an igneous rock composed chiefly of dark-colored minerals. In all three senses contrasted with acid. The term is misleading, undesirable, and becoming obsolete. As used in the first sense above, it is being replaced by subsilicic and as used in the second sense, it should be replaced by mafic or by some term denoting the dominant mineral or minerals. *See also* basic. *Fay.*

basic salt. A salt in which the acid part of the compound is not sufficient to satisfy all the bonds of the base. *Fay.*

basic scale. See effective temperature.

basic schist. A schistose rock resulting from the metamorphism of a basic igneous rock. Also used for rocks of similar composition and texture even if origin is doubtful. *See also* beerbachite; cucalite; epidiorite; ferruginous schist; greenschist; greenstone; magnesian schist; metabasite; ophiolite; prasinite; schist. *A.G.I.*

basic slag. Slag rich in bases, such as metallic oxides; specifically, slag rich in lime, made during the basic Bessemer or basic open-hearth steel processes, and, from the quantity of phosphorus contained in it, valuable as an artificial fertilizer. *Standard, 1964.*

basic solvent. One which accepts protons from solute. *Pryor, 3.*

basic steel. Steel melted in a furnace with a basic bottom and lining and under a slag containing an excess of a basic substance, such as magnesia or lime. *ASM Gloss.*

Basifrit. Quick-setting magnesite; refractory. *Bennett 2d, 1962.*

basil. The beveled edge of a drill or chisel. *Crispin.*

basimesostasis. In diabase, the partial or entire enclosure by augite of plagioclase crystals. *Johannsen, v. 1, 2d, 1939, p. 168.*

basin. a. The lowest part of a mine or area of coal lands. *Hudson.* b. A general region with an overall history of subsidence and thick sedimentary section. *Wheeler.* c. A large or small depression in the surface of the land, the lowest part often being occupied by a lake or pond. *Webster 3d.* d. A broad area of the earth beneath which the strata dip usually from the sides toward the center. *Webster 3d.* e. A natural depression of strata containing a coalbed or other stratified deposit. *Fay.* f. The deposit itself. *Fay.* g. A depression of the sea floor more or less equidimensional in form. When the length is much greater than the width, the feature is a trough. *H&G.* h. An area in a tidal region in which water can be kept at a desired level by means of a gate. Also called tidal basin. *H&G.* i. A relatively small cavity in the bottom or shore, usually created or enlarged by excavation, large enough to receive one or more vessels for a specific purpose. *H&G.* j. Same as pouring basin. *ASM Gloss.*

basining. In geology, a settlement of the ground in the form of basins, usually due to the removal by water of soluble underlying strata; also, deformation of strata into a basin or syncline in which the beds dip from all sides toward the center; opposite of doming. *Standard, 1964.*

basin peat. Same as local peat. *Tomkeieff, 1954.*

basin range. A kind of mountain range characteristic of the Great Basin province and formed by a faulted and tilted block of strata. *Standard, 1964.*

basis; base. A term used to describe that part of a fused rock magma that in cooling fails to crystallize as recognizable minerals, but chills as a glass or related amorphous aggregate. It differs from groundmass, which is the relatively fine portion of a porphyritic rock, as distinguished from the phenocrysts. *Fay.*

basis metal. The original metal to which one or more coatings are applied. *ASM Gloss.*

basite. Synonymous with basic rock. *Bureau of Mines Staff.*

basker. Eng. Old cloth used to cover wet holes to prevent splashing while drilling. *Fay.*

basket. a. A type of single-tube core barrel made from thin-wall tubing with the lower end notched into points, which are intended to pick up a sample of granular or plastic rock material by bending in on striking the bottom of the borehole or a solid layer. Also used as a fishing tool to recover an article lost or dropped into a borehole. Also called basket barrel; basket tube; sawtooth barrel. *Long.* b. Wire-mesh strainer in the top of a core barrel to strain out bits of debris, which might clog up the water ports in the core barrelhead. *Long.* c. Synonym for basket core lifter. *Long.* d. S. Staff. A shallow pan into which small coal is raked for loading into cars. *Fay.* e. Leic. A measure of weight (2 hundredweight) occasionally used in east Lancashire. *Fay.* f. A group of several wooden stakes placed in the form of a small circle to mark and protect a point used in surveying. *Fay.*

basket barrel. a. Same as basket, a. *Long.* b. A core barrel fitted with a basket core lifter. *Long.*

basket centrifuge. A device for dewatering in which wet coal is thrown by centrifugal force against a perforated containing-surface which permits the outward passage of water and retains the coal. *B.S. 3552, 1962.*

basket core. A sample of rock or rock material recovered by using a basket tube or core barrel. *See also* basket, a. *Long.*

basket core lifter. A type of core lifter consisting of several fingerlike springs brazed or riveted to a smooth-surfaced ring having an inside diameter slightly larger than the core size being cut. Also called basket; basket lifter; finger lifter. *Long.*

basket man. *See* chute puller (anth & bit coal mining). *D.O.T. 1.*

basketware. Articles formed of plaited or woven strips of clay, to represent straw or oisters. *C.T.D.*

basket weave checker. A pattern for checkerwork such that the plan view resembles a basket weave. *A.I.S.I. No. 24.*

basket weave checkerwork. An arrangement of checker brick such that the ends of each checker brick are placed at right angles to the center of adjacent brick to form continuous vertical flues. The plan view resembles the weave of splints of a basket. *A.R.I.*

basonomelane. A variety of hematite containing titanium oxide. *Fay.* Synonym for ilmenite. *Hey 2d, 1955.*

basque. Mixture of clay and charcoal dust; used as lining for furnaces and crucibles. *Bennett 2d, 1962.*

bass. Eng. A black carbonaceous shale, Yorkshire, Lancashire, South and North Staffordshire. *Nelson.*

bassanite. A white anhydrous calcium sulfate, $CaSO_4$. Crystals with form of gypsum. Differs from anhydrite, but is transformed into it at a red heat. Monoclinic. Ejected blocks from Vesuvius, Italy. *English.*

basset. a. The outcropping edge of a geological stratum. *Webster 3d.* b. To appear at the surface; crop out. *Webster 3d.* c. The shallow or rise side of a working. *Fay.* d. Coal outcrop. *Pryor, 3.*

basse-taille. Vitreous enameled artware in which a pattern is first cut in low relief on the metal backing, usually silver; the hollows are then filled with translucent enamel, which is subsequently fired on. *Dodd.*

basset edge. An old miners' term for outcrop. *Nelson.*

basseting. a. Outcropping. *Fay.* b. The cropping out or the appearance of rock on the surface of a stratum, or series of strata.*Fay.*

bassetite. A rare, yellow, hydrous phosphate of uranium and calcium, probably $Fe(UO_2)_2(PO_4)_2 \cdot nH_2O$; does not fluoresce in ultraviolet light (difference from autunite). Monoclinic. Tabular crystals. *American Mineralogist, v. 26, No. 3, March 1941, p. 235; English.*

basset process. For the simultaneous production of hydraulic cement and pig iron by the treatment, in a rotary kiln, of a mixture of limestone, coke, and iron ore. *Dodd.*

bassy mine. Eng. Ironstone, North Staffordshire. *Arkell.*

bast. a. A black, banded carbonaceous shale. *Nelson.* b. S. Wales. A thin band of cannel-like coal in the seam. *Nelson.*

bastard. a. Of unusual make or proportion; of abnormal shape. *Webster 3d.* b. A hard, massive boulder or rock. *Fay.*

bastard amber. Cloudy amber. *Shipley.*

bastard asbestos. Miner's term for picrolite, the mineral sometimes associated with chrysotile asbestos. *Sinclair, W. E., p. 483.*

bastard cauk. Eng. Inferior baryte, Derbyshire lead mines. *Arkell.*

bastard coal; bait; bat. An impure coal sometimes found in the lower portion of the roof beds over a coal seam. It represents vegetation and muddy water and was formed during the final submergence of the coal forest; any coal with a high ash content. *Nelson.*

bastard emerald. Peridot. *Shipley.*

bastard fire clay. An inferior or impure fire clay; an underclay that does not have enough refractoriness for firebricks, but can be used for building bricks and salt-glazed ware. *Nelson.*

bastard freestone. Eng. Any inferior or impure rock, the Inferior Oolite. Bath. *Arkell.*

bastard ganister. A silica rock having many of the superficial characters of a true ganister such as color and the impression of rootlets, but differing from it in essential details, for example, an increased proportion of interstitial matter, variable texture, and incomplete secondary silicification. *Dodd.*

bastard granite. A quarry term for gneissic granites. *Fay.*

bastard jet. A soft variety of Canadian jet. *Shipley.*

bastard post. Eng. Impure sandstone, Northumberland and Durham. *Nelson.*

bastard quartz. a. A miner's term for a white, glassy quartz without other mineralization. *Fay.* b. A round or spherical-shaped boulder or quartz embedded in a soft or decomposed rock. *Long.*

bastard rock. Eng. Impure sandstone which may contain thin layers of coal or shale, North Staffordshire. *Nelson.*

bastard shale. Coal miners' term for canneloid shale. *A.G.I. Supp.*

bastard whin. Eng. Very hard rock, but not so flinty as to be called whin. *Fay.*

bast coal. A fibrous, bastlike variety of lignite. *Tomkeieff, 1954.*

bastimento. Mex. Miner's luncheon. *Fay.*

bastite. A variety of serpentine, an essentially hydrated silicate of magnesium, resulting from the alteration of orthorhombic pyroxenes. Occurs in the serpentine of baste in the Harz Mountains, Germany, and in other serpentines. *See also* schiller spar. *C.T.D.*

bastnasite; bastnaesite. A greasy, wax-yellow to reddish-brown weakly radioactive mineral, $(Ce,La)(CO_3)F$, most commonly found in contact zones, less often in pegmatites; found associated with allanite, cerite, tysonite, fluorite, and tornebohmite; hexagonal; obtained from Ryddarhyttan and Finbo, Sweden; Pikes Peak, Colo., and Mountain Pass, Calif., U.S. *Crosby, pp. 66-67.*

bastonite. A greenish-brown mica that is closely related to phlogopite. *Standard, 1964.*

bat. a. A brick or other ceramic shape which is rejected because of defects, such as warping, black coring, chipping, cracking, etc. *HPH.* b. A broken, burned brick or shape. *A.R.I.* c. A slab or disk of plaster or fired clay used for drying clay or as a platform for work in clay. *ACSG, 1963.* d. A plate of gelatin used in printing on pottery or porcelain over the glaze. *Webster 2d.* e. Any part of a brick intentionally or accidentally broken off; a piece of broken brick. *A.I.S.I. No. 24.* f. (Leic.; S. Staff.) Batting out gas was formerly a regular though unsafe thing to do. *See also* baffle, a. *Fay.* g. Eng. A compact black bituminous shale which splits into fine laminae. It is often interstratified in layers with coal. Also spelled batt; bass. *Fay.*

batavite. A hydrous silicate of magnesium and aluminum, approximately $4H_2O \cdot 4MgO \cdot Al_2O_3 \cdot 4SiO_2$. Micaceous scales of hexagonal outline. A decomposition product perhaps related to the micas or chlorites. From Passau, Bavaria, Germany. *English.*

batch. a. Corn. The quantity of ore sent to the surface by a pair of men. Also called batch of ore. *Fay.* b. A quantity of material destined for one operation. *Webster 3d.* c. A quantity of material produced at one operation. *Webster 3d.* d. The mixture of raw materials from which glass is produced in the furnace. A proportion of cullet is either added to the mixture or placed in the furnace previous to the charge. *C.T.D.*

batch cakes. Eng. Rounded masses of coral, Wenlock limestone, Daw End, Wallsall. *Arkell.*

batch charger. A mechanical device for introducing batch to the furnace. *ASTM C162-66.*

batch distillation. A distillation in which a given quantity of material is charged into a still, and the distillation is conducted without additional charge to the still. *NRC-ASA N1.1-1957.*

batch drier. A drier in which ware remains stationary while air conditions change as ware becomes heated. *ACSG, 1963.*

batch feeder. *See* batch charger. *ASTM C162-66.*

batch furnace. One in which each charge is placed, heated and withdrawn on completion of work. *Pryor, 3.*

batch grinding. In laboratory, paint, and ceramic work and in other special applications, the grinding of a charge of mineral (dry or wet) in a closed ball mill. *Pryor, 3.*

batch house. The place where batch materials are received, handled, weighed, and mixed for delivery to melting units. *ASTM C162-66.*

batching plant. A concrete mixing plant which measures accurately the different ingredients of a concrete mix. *Ham.*

batch mill. A grinding mill, usually cylindrical, into which a charge of ore and water (or paint material and liquid) is placed, and ground to completion of the required comminution. *Pryor, 3.*

batch mixer. One who dumps various kinds of dry clay, according to formula, into a tank which mixes clay before addition of water. Also called clay puddler; mixer man. *See also* mixer. *D.O.T. 1.*

batch of ores. The quantity of ore sent to bank by any pair of workmen. *Nelson.*

batch oil. A pale, lemon-colored neutral oil having a viscosity of about 80 Saybolt at 70° F. Used to keep molded materials from sticking to the molds and as a lubricant in cordage manufacture. *Porter.*

batch process. A process in which the feed is introduced as discrete charges, each of which is processed to completion separately. *NRC-ASA N1.1-1957.*

batch sintering. Presintering or sintering in such a manner that the products are furnace treated in individual batches. *Osborne.*

batch smelter. Any smelter that operates as a periodic unit being charged, fired, and discharged according to a predetermined cycle. *ASTM C286-65.*

batch test. A laboratory test on a small quantity of mineral under close control. *Pryor, 3.*

batch treatment. Treatment of a parcel of material in isolation, as distinct from the treatment of a continuous stream of ore. *Pryor, 4.*

batch-type mixer. *See* mixer. *Dodd.*

batch variation. One found when examining a set of products or batches. *Pryor, 3.*

bate. a. To enlarge a colliery road by lowering the floor. *Pryor, 3. See also* dinting. b. Eng. Cleavage in slates, especially in the Sheerbate stone. *Arkell.* c. Grain, hem, secondway in other rocks. *Arkell.* Also spelled bait.

batea. Mex. A wide and shallow vessel, usually of wood, used for panning ore. *Fay.*

bate barrel. Leic. After drawing a number of barrels of water out of a sump, the first barrel for which there is not sufficient water to fill it. *Fay.*

bateque. Lower Calif. Deposits formed by spring water, as in a ravine or at the foot of a hill. *Fay.*

batework. Newc. Short work. *Fay.*

bath. a. A medium as water, air, sand, or oil for regulating the temperature of something placed in or on it; also, the vessel containing such a medium. *Webster 3d.* b. The molten material in a reverberatory furnace. *Standard, 1964.* c. Any solution, or the vessel containing it, in which articles of any kind are immersed to expose them to its effects; as, the baths used in electroplating. *Standard, 1964.*

Bath brick. An abrasive made from a very fine-grained, quartzose clay found along the banks of the Parrett River in Southwest England. Used for scouring steel utensils. *AIME, p. 17.*

batholite. A term applied by Suess to an older massive protrusion of magma solidified as coarse crystalline rock in the deep horizons of the crust. *See also* batholith. *A.G.I.*

batholith. A huge, domed, intrusive igneous body of at least 40 square miles in extent whose sides slope gently outward, enlarging downward. It presumably has no bottom. *Bateman.*

batholithic. Pertaining to, originating in, or derived from a batholith. *Fay.*

Bathonian. Upper Jurassic, below Callovian. *A.G.I. Supp.*

Bath Oolite. A subgroup of the Lower Oolite (Jurassic) of England. *Standard, 1964. See also* Bath stone. *Fay.*

bathotonic reagent. A substance tending to diminish surface tension. *See also* depressant. *Nelson.*

Bath stone. A creamy limestone from the Bath Oolite, soft and easily worked. It was used for building in England as early as the 12th century. *Standard, 1964.*

bathvillite. A fawn-brown mineral resin found in torbanite at Bathville, Scotland. *Standard, 1964. See also* torbanite. *Fay.*

bathyal. a. Pertaining to the benthonic environment on the continental slope, ranging in depth from 200 to 2,000 meters. *A.G.I.* b. Pertaining to the bottom and overlying waters between 100 and 1,000 fathoms (600 to 6,000 feet). *A.G.I.* c. Of or pertaining to the deeper parts of the ocean; deep sea. *Webster 3d.*

bathyal zone. In oceanography, the slope from the continental shelf at 100 fathoms to the abyssal zone at 1,000 fathoms. Also called bathyal district. *Webster 3d.*

bathybic; bathybial. In oceanography, of, relating to, or living in the deepest parts of the sea. *Webster 3d.*

bathybius. A gelatinous substance precipitated by alcohol from mud dredged from the Atlantic and originally regarded as free-living protoplasm but now recognized as a form of calcium sulfate. *Webster 3d.*

bathyclinograph. In oceanography, an instrument for measuring vertical currents in the deep sea. *Webster 3d.*

bathyconductograph. A device to measure the electrical conductivity of seawater at various depths from a moving ship. Abbreviation, bc. *Hy.*

bathydermal deformation. Generally more or less plastic deformations in the lower part of the sialic crust, which is made mobile by physicochemical processes, such as migmatization. *Schieferdecker.*

bathygram. In oceanography, a record obtained from sonic sounding instruments. *Webster, 3d.*

bathylite. *See* batholith. *Fay.*

bathylith. N.S.W. A large crystalline mass of igneous rock. *New South Wales.*

bathymeter. This instrument measures temperature, pressure, and sound velocity to depths up to 7 miles. The device is completely transistorized and uses frequency modulation for telemetering. *H&G.*

bathymetric; bathymetrical. a. Relating to the measurement of depths of water in oceans, seas, and lakes. *Webster 3d.* b. Relating to the contour of the bottoms of oceans, seas, and lakes. *Webster 3d.* c. Relating to the distribution in depth of marine or lacustrine organisms. *Webster 3d.*

bathymetric chart. Chart showing depths of water by means of contour lines or by color shading. *Hy.*

bathymetry. In oceanography, the measurement of depths of water in oceans, seas, and lakes; also, the information derived from such measurements. *Webster 3d.*

bathyorographical. In oceangraphy, of or relating to ocean depths and mountain heights. *Webster 3d.*

bathypelagic. In oceanography, of, relating to, or living in the deeper waters of the ocean, especially those several hundred feet below the surface—distinguished from abyssal and pelagic. *Webster 3d.*

bathypitotmeter. In oceanography, an instrument designed to record the current velocity and water temperature at indicated depths below the surface of a sea or lake. *Compare* bathythermograph. *Webster 3d.*

bathyscaph arm. A movable arm, attached to submersibles, that can reach out and pick up materials from the ocean floor. *Hy.*

bathyscaphe. In oceanography, a navigable submersible ship that is used for deep-sea exploration, has a spherical watertight cabin attached to its underside, and uses gasoline and shot for ballast. *Webster 3d.*

bethyseism. In oceanography, an earthquake of deep origin recordable at seismographic stations the world over. *Webster 3d.*

bathysmal. In oceanography, of or relating to the bottom of the deeper parts of the sea, especially those parts between 100 and 1,000 fathoms deep. *Webster 3d.*

bathysophical; bathysophic. In oceanography, of or relating to a knowledge of the depths of the sea or of the things found there. *Webster 3d.*

bathysphere. In oceanography, a spherical diving apparatus, made large enough to contain two men and instruments; capable of resisting tremendous pressure, and therefore of descending to great depths; it is used in oceanography for the investigation of deepwater faunas. *C.T.D.*

bathysystem. A coined word for a permanent sea floor installation. *H&G.*

bathythermogram. In oceanography, a record obtained with a bathythermograph. *Webster 3d.*

bathythermograph. An instrument, which may be lowered into the sea from a vessel at anchor or underway, to record temperature as a function of depth. The temperature sensing device is a Bourdon tube, the depth finder is a bellows system. Accuracy of temperature is ± 0.1° F; depth ± 10 feet. Abbreviation, bt. *Hy.*

bathythermosphere. In oceanography, a bathythermograph. *Webster 3d.*

bathyvessel. In oceanography, a ship (as a submarine or bathysphere) designed for exploration of or navigation in water far below the surface of a sea or lake. *Webster 3d.*

batiboleo. Mex. A company of miners working a stope of high-grade ore. *Fay.*

batice. An inclination or bevel given to the upper timbers of a shaft; as the shaft has a downward and outward batice of one inch to the foot. *Standard, 1964. See also* batter, e. *Fay.*

bating. Eng. Lowering a drift or road. *See also* bate, a. *Fay.*

batisite. Dark brown orthorhombic crystals from the Inaglina pegmatite, Central Aldan, $Na_2BaTi_2(Si_2O_7)_2$. Isostructural with shcherbakovite, but contains no niobium. Named from the composition, Ba-Ti-Si. *Hey, M.M., 1961.*

bat printing. A former method of decorating pottery; it was first used, in Stoke-on-Trent, England, by W. Baddeley in 1777. A bat of solid glue or gelatin was used to transfer the pattern, in oil, from an engraved copper plate to the glazed ware, color then being dusted on. The process was still in use in 1890 and has now been developed into the Murray-Curvex machine. *See also* Murray-Curvex machine. *Dodd.*

batt. a. Thin partings of coal sometimes occurring in the lower part of shale strata immediately overlying a coalbed. *See also* bastard coal. *Raistrick and Marshall, p.* 32. b. Eng. Shale; hardened clay, but not fire clay. Same as bend; bind. *See also* bat, g. *Fay.*

battage. Fr. The operation of pulverizing or incorporating the ingredients of gunpowder by the old method of stamping with pestles. *Fay.*

batten. a. A strip of wood used for nailing across two other pieces (as to hold them together or to cover a crack). *Webster 3d.* b. A piece of square-sawn converted timber, between 2 and 4 inches in thickness and from 5 to 8 inches in width. Used for flooring or as a support for laths. *C.T.D.* c. A bar fastened across a door, or anything composed of parallel boards, to secure them and to add strength and/or reduce warping. *C.T.D.*

batter. a. To reduce the width of brickwork with succeeding courses. *A.R.I.* b. Recessing or sloping a wall back in successive courses; opposite of corbel. *ACSG.* c. A paste of clay or loam. *Webster 2d.* d. A mallet for flattening wet clay on the batting block. *Fay.* e. The inclination of a face of masonry or of any inclined portion of a frame or metal structure. *Zern.* Also called batice. *Fay.* f. A workman who makes bats. *Webster 2d.* g. A plaster block with a handle, used in making bats. *Webster 2d.* h. The inward slope from bottom to top of the face of a wall. *Nichols.* i. A pile driven at an angle to widen the area of support and to resist thrust. *Nichols.*

batter boards. Horizontal boards placed to mark a line and a grade of a proposed building. *Nichols.*

battered set. A set of mine timbers in which the posts are inclined. *Fay.*

batter legs. Sloping legs. *Sandstrom.*

batter level. An instrument for measuring inclination from the vertical. *Standard, 1964.*

batterman. A worker who makes batter for slip casting. *Bureau of Mines Staff.*

batter-out I. One who prepares bat (flat piece of pliable clay) to be formed into dish, plate, or similar ware by jiggerman. Also called batter. *D.O.T. 1.*

batter-out II. One who prepares ball of wet clay for jiggerman in making of wares, such as bowls and cups. Also called baller; baller-out; ballmaker; batter; cup baller. *D.O.T. 1.*

batter pile. A pile driven at an angle to the vertical. *Ham.*

batter rule. An instrument consisting of a rule or frame and a plumbline and bob and used to regulate the batter of a wall in building. *Webster 3d.*

battersea. Brand of cupels, scorifiers, crucibles, muffle sleeves, and similar assay equipment. *Pryor, 3.*

battery. a. A bulkhead or structure of timber for keeping coal in place. *Hess.* b. A wooden platform for miners to stand upon while at work, especially in steeply dipping coalbeds. *Fay.* c. The plank closing the bottom of a coal chute. *Fay.* d. In steeply pitching seams, a wooden structure built across the chute to hold back blasted coal. *Korson.* e. A blasting machine or exploder. *Nelson.* f. A number of stamps for crushing and pulverizing ores. *Nelson.* g. A series of stamps, usually five, operated in one box or mortar, for crushing ores; also, the box in which they are operated. *Hess.* h. A stamper mill for pulverizing stone. *Gordon.* i. A series or row of coke ovens. *Mersereau, 4th, p. 363.* j. Section of ore dressing (reduction) plant. *Pryor, 3.* k. Timbering in which the sticks are placed from foot to hanging, touching each other, in a solid mass of from three to twelve or more. The battery may be further strengthened by binding around with wire. *Spalding, p. 110.* l. A number of similar machines or similar pieces of equipment placed side by side on a single or separate base and operated by means of common connections as a unit. *Long.* m. A combination of chemically activated accumulators, which, after charging, may be used for a considerable time as a source of direct-current electricity. Also called storage battery. *Long.*

battery amalgamation. Amalgamation by means of mercury placed in the mortar box of a stamp battery. *Nelson.*

battery assay. An assay of samples taken from ore as crushed in a stamp battery. *Hess.*

battery charger. *See* lampman. *D.O.T. 1.*

battery charging station. *See* battery locomotive; charging station; locomotive garage. *Nelson.*

battery locomotive. A locomotive that is powered by a storage battery. The term "battery" is also applied to other machinery so powered, in contrast to machinery power by conducted electricity. It is a somewhat more flexible haulage device in that it requires no electrical conductor installation. *B.C.I. See also* electric mine locomotive.

battery of holes. A number of charges, in drill holes, fired simultaneously with an electric current. Also called multiple shot. *Fay.*

battery of ovens. A row or group of ovens for making coke from coal. *See also* bank of ovens. *Bureau of Mines Staff.*

battery ore. *See* manganese dioxide. *Bennett 2d, 1962 Add.*

battery solution. A cyanide, or plain alkaline solution added to the ore when being crushed in a stamp mill. *Fay.*

battery starter. In anthracite and bituminous coal mining, one who charges and sets off explosives in large lumps of coal or where these lumps have accumulated and blocked the flow of coal down chutes from the storage structures (batteries). Also called batteryman; chute tender; starter. *D.O.T. 1.*

battery wall. The wall between two furnaces, both of which are exposed to the heat. *A.I.S.I., No. 24.*

batting block. A plaster slab on which plastic clay is flattened and shaped before going to the throwing or jiggering machine. *Bureau of Mines Staff.*

batting out. The process of making a disk of prepared pottery body for subsequent shaping in a jigger. *See also* jigger. *Dodd.*

battledore. A tool used in the handmade glass industry for shaping the foot of a wine glass. Also known as a pallette. *Dodd.*

battu-uji. Malayan term for touchstone. *Fay.*

batty beds. Shrop. Nodular shaly beds in the Wenlock limestone. *Arkell.*

batty vein. Shrop. A coal seam, Clee Hill. *Arkell.*

batu kawi. In Sumatra, a red stone supposed to be an infallible sign of gold. *Fay.*

batukite. A dark leucite basalt containing phenocrysts of augite and fewer of olivine, in a groundmass of augite, magnetite, and leucite; from Batuku, Celebes, Indonesia. *Holmes, 1928.*

Baudelot cooler. An arrangement of pipes one above another through which refrigerant flows and is vaporized as it absorbs heat from the water being cooled by trickling over the tubes. *Strock, 10.*

baulk. a. A beam. *Mason.* b. *See* balk, a. *Fay.*

Baumann print. Sulfur print, made to test concentration of sulfur on metal surfaces. The metal is dampened with dilute sulfuric acid, and pressed against photographic bromide paper. A staining of silver sulfide is produced by H_2S liberated from the test piece. *Pryor, 3.*

Baumé gravity. Designating or conforming to either of the scales used by the French chemist, Antoine Baumé (1728-1804). One scale, which is used with liquids heavier than water, sinks to 0° (B or Bé, symbols for Baumé) in pure water and to 15° (B or Bé) in a 15 percent salt solution. The other scale for liquids lighter than water, sinks to 0° (B or Bé) in a 10 percent salt solution and to 10° (B or Bé) in pure water. *See also* Baumé scale. *Webster 2d.*

Baumé scale. A device for determining the specific gravity of liquids, particularly petroleum products. It has been superseded to a considerable extent by the American Petroleum Institute scale (° API, instead of ° B or Bé). *Crispin. See also* Baumé gravity.

baumhauerite. A lead- to steel-gray sulfarsenide of lead, $4PbS.3As_2S_3$; complex crystals; monoclinic; metallic luster; perfect cleavage; conchoidal fracture. From Binnenthal, Switzerland. *English.*

Baum jig. A washbox in which the pulsating motion is produced by the intermittent admission of compressed air to the surface of the water following a principle introduced by Baum. Also called Baum box; Baum-type washbox. *B.S. 3552, 1962.*

balm pot. A cavity left in roof strata over coal as a result of the dropping downward of a cast of a fossil tree stump after removal of the coal. *A.G.I.*

baum pots. Eng. Nodules in the roof of the Halifax hard bed coal. *Compare* crog balls; potlids. *Arkell.*

Baum washer. *See* Baum jig.

Bausch and Lomb dust counter. *See* konimeter. *Osborne.*

Bauschinger effect. Usually refers to the phenomenon by which plastic deformation of a polycrystalline metal, caused by stress applied in one direction, reduces the yield strength where the stress is applied in the opposite direction. Sometimes used in a broad sense to include all changes in the stress-strain characteristics of both single crystalline and polycrystalline metals that may be ascribed to changes in the microscopic stress distribution within the metals, as distinguished from those caused by strain hardening. *ASM Gloss.*

bauxite. a. A rock composed of aluminum hydroxides. Essentially, $Al_2O_3.2H_2O$. The principal ore of aluminum; also used collectively for lateritic aluminous ores. *Fay.* b. Composed of aluminum hydroxides and impurities in the form of free silica, clay, silt, and iron hydroxides. It is seemingly formed in tropical and subtropical latitudes under conditions of good surface drainage. A clay containing much bauxite should be termed bauxitic. *A.G.I.*

bauxite brick. A firebrick composed essentially of hydrated alumina and ferric oxide. Such bricks are used for the lining of furnaces where a neutral material is required. *Osborne.*

bauxite cement. A cement made from bauxite and lime in an electric furnace; hardens rapidly. Sometimes called ciment fondu, *Nelson.*

bauxitic clay. a. A clay consisting of a mixture of bauxitic minerals, such as gibbsite and diaspore, with clay minerals, the former constituting not over 50 percent of the total. The opposite of this would be an argillaceous bauxite. *ACSB-1.* b. A natural mixture of bauxite and clay, containing not less than 47 percent nor more than 65 percent alumina on a calcined basis. *HW.*

bauxitization. The development of bauxite from either primary aluminum silicates or secondary clay minerals. *A.G.I. Supp.*

bauxitland cement. *See* Kühl Cement. *Dodd.*

Bavarian cat's eye. Quartz cat's eye, from Hof, Bavaria, Germany which produces only a few stones of fine quality. Other qualities are usually sold as Hungarian cat's eye. The quartz cat's eye from the Harz Mountains of Germany is sometimes sold as Bavarian cat's eye. *Shipley.*

bavenite. a. A white hydrous silicate of aluminum, calcium, and beryllium, $9SiO_2 \cdot Al_2O_3 \cdot BeO \cdot 4CaO \cdot H_2O$; orthorhombic; earthy, radiating fibrous; platy prismatic crystals. From Baveno, Italy; Mesa Grande, Calif. *English.* b. A metallic, lead colored to steel gray sulfide of lead and copper, $4PbS.As_2S_3$. *Hess.*

Baveno law. Twinning in the monoclinic crystal system in which the clinodome acts as the twinning plane. *Hess.*

Baveno twin. A twinned crystal, a common form of orthoclase, in which the twinning plane is the clinodome, the resulting form having a nearly square cross section. *Standard, 1964.*

bavin. Eng. Impure limestone. *Standard, 1964.*

bawke. Eng. A bucket for raising coal in mines. *Standard, 1964. See also* bowk, a and b. *Fay.*

bawn. A variety of drab-colored lowland peat found in Ireland. *Tomkeiff, 1954.*

bay. a. An open space for waste between two packs in a longwall working. *See also* bord. *Zern.* b. A recess in the shore or an inlet of a sea or lake between two capes or headlands, not as large as a gulf, but larger than a cove *H&G.* c. A portion of the sea which penetrates into the interior of the land. It is usually wider in the middle than at the entrance. It may be similar to a gulf, but smaller. *H&G.* d. A portion of the sea partly surrounded by ice. *See also* bight, b. *H&G.*

bayate. A local name for a brown ferruginous variety of jasper from Cuba. *English.*

bay barrier. A sandy beach, built up across the mouth of a bay, so that the bay is no longer connected to the main body of water. *Leet.*

Bayer charcoal. Ger. Trade name for activated charcoal. *Hess.*

bayerite. A dimorph of gibbsite, long known as a synthetic product, now found as a naturally occuring mineral; contains mainly Al_2O_3 and SiO_2; from Portole, Istria. The naturally occurring bayerite from Fenyoro, Hungary, was found by X-ray study to be gibbsite. *American Mineralogist, v. 41, No. 11-12, November-December 1956, p. 959; American Mineralogist, v. 43, No. 5-6, May-June 1958, p. 626.*

Bayer process. A process for extracting alumina from bauxite ore before the electrolytic reduction. The bauxite is digested in a solution of sodium hydroxide, which converts the alumina to soluble aluminate. After the red mud residue has been filtered out, aluminum hydroxide is precipitated, filtered out, and calcined to alumina. *ASM Gloss.*

bayldonite. A grass green to blackish-green hydrous lead-copper arsenate, $4(Pb,Cu)O \cdot As_2O_5 \cdot 2H_2O$; Mohs' hardness, 4.5; specific gravity, 5.35; in minute mammillary masses; from Cornwall, Eng.; parabayldonite has less water. *Larsen, p. 143.*

bayle hill. An ancient smelting place. *Hess.*

bayleyite. A very rare, strongly radioactive, yellow mineral, $Mg_2(UO_2)(CO_3)_3.18H_2O$; monoclinic, occurring as minute, short prismatic crystals; found as an efflorescence with schroeckingerite, andersonite, schwartzite, and gypsum. Rapidly breaks down upon exposure to a lower hydrate with a strong green florescence. *Crosby, pp. 7-8.*

baymouth bar. A bar extending partially or entirely across the mouth of a bay. *A.G.I.*

baymouth barrier. *See* baymouth bar. *Schieferdecker.*

bayou. a. A sluggish or stagnant inlet or outlet from a lake or bay, or one connecting two bodies of water; also, a branch of the stream flowing through a delta; a gut. *Standard, 1964.* b. *See* oxbow. *Fay.*

bay salt. A coarse-grained variety of common salt obtained by evaporating seawater in shallow bays or pits by the heat of the sun. *Standard, 1964.*

bayshon. Som. An air stopping. *Fay.*

Bazaruto pearl. *See* African pearl. *Shipley.*

Bazin's formula. Discharge of water over a sharp-edged weir, neglecting approach velocity v is

$$Q = KbH^{\frac{3}{2}} \text{ c. ft/sec.}$$

b being length of weir (feet) and H head of water over crest. Bazin's formula for K is

$$K=3.25 + \frac{0.0789}{H}$$

Pryor, 3.

BB Abbreviation for ball bearing. Also abbreviated bb. *Zimmerman, p. 14.*

B bit. A nonstandard core bit no longer in common use except in drilling deep boreholes to sample gold-bearing deposits in South Africa. The set outside and inside diameters of a B bit are plus or minus 2$\frac{1}{16}$ and 1$\frac{3}{8}$ inches respectively. *Long.*

bbl Abbreviation for barrel. *BuMin Style Guide, p. 58.*

B Blasting powder; soda blasting powder. A mixture of nitrate of soda, charcoal, and sulfur. Used in coal mines. *Bennett 2d, 1962.*

bbl d^{-1} Abbreviation for barrels per day. *BuMin Style Guide, p. 58.*

BC Abbreviation for between centers. *Zimmerman, p. 16.*

BD Abbreviation for blowing dust. *Zimmerman, p. 17.*

bdellium. A substance variously translated by different authorities to be pearl, a red stone, a resin, or no stone at all but manna. *Shipley.*

Bé Abbreviation for Baumé. *BuMin Style Guide, p. 58.*

Be Chemical symbol for beryllium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

beach. a. The zone of unconsolidated material that extends landward from the low-water line to the place where there is marked change in material or physiographic form, or to the line of permanent vegetation (usually the effective limit of storm waves). The seaward limit of the beach, unless otherwise specified, is the mean low-water line. A beach includes foreshore and backshore. *H&G.* b. Sometimes, the material which is more or less in active transport, alongshore or on-and-off shore, rather than the zone. *H&G.* c. Eng. Pebbles and shingle or gravel, Kent and Sussex. Beachy land is stony land, sometimes denoting cinders. Also spelled beech. *Arkell.*

beach berm. A nearly horizontal portion of the beach or backshore formed by the deposit of material by wave action. Some beaches have no berms, others have one or several. *H&G.*

beachcombing. Working the sands on a beach for gold, tin, or platinum. *Fay.*

beach concentrate. Natural concentration of heavy minerals in beach sand. *A.G.I. Supp.*

beach cusp. A frequent feature of our New England beaches is a succession of stony or gravelly cusps with sharp points toward the water, situated on the upper part of the beach where the waves play only at high stages of the tide. Among the minor forms of the shore zone none has proved more puzzling than the cuspate deposits of beach material built by wave action along the foreshore. Sand, gravel, or coarse cobblestones are heaped together in rather uniformly spaced ridges which trend at right angles to the sea margin, tapering out to a point near the water's edge. These beach cusps have attracted the attention of many students. *A.G.I.*

beach deposits. Alluvial concentrations of mineral formed by the grinding action of natural forces (wind, wave, or frost) and the selective transporting action of tides and winds. *Pryor, 3.*

beach drift; shore drift; longshore drift; littoral drift; beach drifting. The movement of material along the shore by the action of the uprush and backwash of waves breaking at an angle with the shore. *Schieferdecker.*

beach drifting. *See* beach drift. *Schieferdecker.*

beach face. The section of the beach normally exposed to the action of the wave uprush. The foreshore zone of a beach. *H&G.*

beaching. Stones from 3 to 8 inches in size, laid in a layer from 1 to 2 feet thick for revetting below the level of stone pitching on an embankment or on the side of a reservoir. *See also* revet. *Ham.*

beach mining. The exploitation of the economic concentrations of the heavy minerals rutile, zircon, monazite, ilmenite, and sometimes gold which occur in sand dunes, beaches, coastal plains, and deposits located inland from the shoreline. High-grade concentrate is usually obtained from low-grade material by the use of suction dredges and spiral concentrators. *Nelson.*

beach ore. A concentration of heavy minerals on a beach by selective action of the surf. *See also* black sands. *A.G.I.*

beach placers. Placer deposits either on a present or ancient sea beach. There are a series of these at Nome, Alaska, known as first, second, or third beach, etc., due to change of shoreline. *Fay. See also* black sand; placer deposit.

beach profile. The intersection of the ground surface with a vertical plane; may extend from the top of the dune line to the seaward limit of sand movement. *H&G.*

beach ridge. An essentially continuous mound of beach material behind the beach that has been heaped up by wave or other action. Ridges may occur singly or as a series of approximately parallel deposits. In England, they are called fulls. *A.G.I.*

beach scarp. An almost vertical slope along the beach caused by erosion by wave action. It may vary in height from a few inches to several feet, depending on wave action and the nature and composition of the beach. *H&G.*

beach width. The horizontal dimension of the beach as measured normal to the shoreline. *H&G.*

bead. a. The globule of precious metal obtained by the cupellation process in assaying. *Webster 3d.* b. A glassy drop of flux (as borax) used as a solvent and a color test for several metallic oxides and salts (as of iron or manganese) that is formed by fusion in the loop of a usually platinum wire. *Webster 3d.* c. Prill. *Pryor, 3.* d. An enlarged, rounded edge of a tumbler or other glass article, or any raised section extending around the article. *ASTM C162-66.* e. A small piece of glass tubing used around a lead wire. *ASTM C162-66.*

bead catalyst. Spheroids of silica gel containing activated alumina; diameter about 3 millimeters. Used in petroleum cracking. *Bennett 2d, 1962 Add.*

beaded flange. A flange reinforced by a low ridge, used mostly around a hole. *ASM Gloss.*

beaded section. An angle or channel section of light alloy which is extruded to have bulbs at the extremities. These bulbs can easily be formed by extrusion, whereas they are difficult to form by rolling; they increase bending strength, with economy of metal. *Ham.*

beader. An operator applying beading enamel. *Bryant.*

beader off. An operator removing enamel from bead or smoothing enamel at edges. *Bryant.*

bead furnace. A furnace in which small cylinders of glass are rounded into beads. *Webster 2d.* The cylinders are heated to softening and revolved in a drum. *Fay.*

beading. a. The application of porcelain enamel, usually of a contrasting color, to the edge or rim of porcelain enameled articles. *ASTM C286-65.* b. Removal of excess slip from the edge of dipped ware. *ASTM C286-65.* c. In dry process enameling, a bead of porcelain enamel along the edge of ware. *ASTM C286-65.* d. Raising a ridge or projection on sheet metal. *ASM Gloss.*

beading enamel. A special type of porcelain enamel used for beading purposes. *Hansen.*

beading off. Wiping off enamel on bead preparatory to applying beading. *Bryant.*

beads. In ion-exchange, sized resin spheres, usually + 20 mesh so constituted as to capture ions from pregnant solutions under stated loading conditions, and to relinquish them under other (eluting) conditions. Two types are anionic and cationic. *See also* permutite; resin. *Pryor, 3.*

bead tests. In mineral identification, borax is fused to a transparent bead by heating in a blowpipe flame, in a small loop formed by platinum wire. When suitable minerals are melted in this bead, characteristic glassy colors are produced in an oxidizing or reducing flame, and serve to identify elements. *Pryor, 3.*

bead weld. A weld composed of one or more string or weave beads deposited on an unbroken surface. *ASM Gloss.*

beaker. A glass container for chemical work. It is generally round, flat-bottomed, with parallel sides, somewhat taller than wide, has a flared rim and a pouring lip, and ranges in capacity from a few milliliters (cubic centimeters) to 4 liters. *Hess.*

beaker decantation. A method of sizing finely ground, insoluble, homogenous material or classifying ore particles. Weighed quantity is dispersed in liquid and allowed to settle for a timed period, a liquid fraction then being decanted. Treatment repeated several times, the settled fraction now representing one size group (if homogenous) or settled group (if minerals of various densities are present). Decanted fluid is similarly treated for progressively lengthened settling periods. *Pryor, 3.*

beam. a. A bar or straight girder used to support a span of roof between two support props or walls. *Mason.* b. The walking beam; a bar pivoted in the center, which rocks up and down, actuating the tools in cable-tool drilling or the pumping rods in a well being pumped. *Hess.*

beam action. In crushing, seizure of rock slab between approaching jaws so as to present crushing stress above unsupported parts of the rock, thus inducing shear failure rather than failure under compression. *Pryor, 3.*

Beaman arc. *See* Beaman stadia arc. *A.G.I.*

beam and slab floor. A reinforced-concrete floor system in which the floor slab is supported by beams of reinforced concrete. This form of construction which corresponds to the double floor in timber construction is widely used for bridge decks and factories. *Ham.*

Beaman stadia arc; Beaman arc. An auxiliary attachment on an alidade consisting of a stadia arc, mounted on the outer side of the ordinary vertical arc, and enabling the observer to determine differences in elevation of the instrument and the stadia rod without the use of vertical angles. *A.G.I.*

beam bender. A machine for bending or straightening rolled steel joints. *Ham.*

beam building. A process of rock bolting in flat-lying deposits where the bolts are installed in bedded rock to bind the strata together to act as a single beam capable of supporting itself and thus stabilizing the overlying rock. Bolts should be long enough to form a monolithic beam which will be self-supporting and not be suspended from the stratum in which the bolts are anchored. For beam building, the function of bolts is only to increase friction between layers to resist shear. *Lewis, pp. 63, 66.*

beam compass. An instrument for describing large arcs. It consists of a beam of wood or metal carrying two beam heads, adjustable for position along the beam, and serving as the marking points of the compass. Also called trammel. *C.T.D.*

beam conveyor. *See* reciprocating beam conveyor. *ASA MH4.1-1958.*

beam dust. Very fine airborne particles resulting from crushing and screening rock salt, which have settled on structural members in the breaker building. *Kaufman.*

beam engine. An early type of vertical steam engine. It operated the Cornish pump. *Nelson.*

beam hanger. An attachment at the end of a walking beam above a well casing to lift the pump rods or sacked rods. *Hess.*

beam hole. A hole through a reactor shield and, generally, through the reactor reflector which permits a beam of radiation to escape. The beam is then used for nuclear experiments outside the reactor. *L&L.*

beam test. A method of measuring the modulus of rupture of concrete or mortar by casting a standard beam without reinforcement. The beam is supported and loaded in a standard way, the bending moment at the point of failure being recorded; from this the maximum tensile stress is calculated. It is a cheap and effective test. *Ham.*

beam well. A well pumped by a walking beam. *Porter.*

bean. A plug bored with a hole of reduced diameter and inserted in the pipeline from a flowing well to restrict the rate of flow. *Hess.*

bean iron ore. A coarse pisolitic iron ore, the pisolites consisting of hydrated peroxide of iron. *Schiieferdecker.*

bean ore. A name for limonite, when found in lenticular aggregations. Also called pea ore, when found in small, rounded masses. A coarse-grained pisolitic iron ore. *Fay.*

bean rock. Eng. Shingle cemented by tufa, Ventnor. *Compare* pea grit. *Arkell.*

beans. a. N. of Eng. All coal which will pass through a ½-inch screen or mesh. *Fay.* b. A cleaned and screened anthracite product ⅞ by ⅜ inch. *Nelson.*

bean shot. Copper granulated by pouring into hot water. *Fay.*

bear. a. To bear in; underholing or undermining; driving in at the top or at the side of a working. *Fay.* b. One who sells borrowed shares in the hope that the market will decline and he can then replace the shares at a lower price than that for which he sold them. This practice is known as selling short. *Hoov, p. 285.* c. Eng. A calcareous or clay ironstone nodule, Derbyshire. *Arkell.* d. The mass of iron which, as a result of wear of the refractory brickwork or blocks in the hearth bottom of a blast furnace, slowly replaces much of the refractory material in this location. Also known as salamander. *Dodd.*

bearer. a. Eng. A band of hard limestone consisting of numerous Stromatoporoids, mainly a ramose species, Wenlock limestone, Dudley. *Arkell.* b. In mechanics and architecture, a bearer is a girder, a support to a bridge or other building. *Arkell.* c. A runner beam or girder used to carry the ends of other beams or girders. *Mason.*

bearer arch. *See* rider arch. *ASTM C162-66.*

bearer bar. One of the bars that support the grate bars in a furnace. *Fay.*

bearers. a. S. Staff. Women formerly employed to carry coal out of the mines. *Fay.* b. Heavy timbers placed in a shaft at intervals of 30 to 100 feet to support shaft sets. They are usually put beneath the end plates and dividers, and rest in hitches cut in the wall. Also used to support pumping gear. *Fay.* c. Porters, such as those used on prospecting trips in many countries. *Hess.*

bearers' way. Scot. An underground road or passage along which the bearers carry coal. *Fay.*

bearing. The part of a beam or girder which actually rests on the supports. *C.T.D.*

bearing arbor-support collar. An arbor collar which fits over an arbor and in an arbor-support bearing of a milling machine. *ASM Gloss.*

bearing beds. Quick, or bearing, beds as opposed to dead beds. Beds that contain or are likely to contain ore, minerals, etc.; productive as opposed to barren. *Arkell.*

bearing capacity. a. The load per unit area which the soil or solid rock can support without excessive yield. *See also* foundation investigation. *Nelson.* b. *See* ultimate bearing capacity. *ASCE P1826.*

bearing capacity (of a pile). The load per pile required to produce a condition of failure. *ASCE P1826.*

bearing door. A door so placed as to direct and regulate the amount of air current necessary for the proper ventilation of a district of a mine. *See also* separation door. *Nelson.*

bearing-in. The depth of an undercut, or holing, from the face of the coal to the end of the undercut. *Fay.*

bearing-in shots. Boreholes tending to meet in the body of the rock; intended to unkey the face when charged and fired. *Stauffer.*

bearing load. A compressive load supported by a member, usually a tube or collar, along a line where contact is made with a pin, rivet, axle, or shaft. *ASM Gloss.*

bearing metal. Metal employed for axle bearings. *Bateman.*

bearing partition. An interior wall, one story or less in height, which supports any load in addition to its own weight. *ACSG.*

bearing piles. Piles to transmit the load of a structure to the bedrock or subsoil without detrimental settlement. They can function either as friction piles or as end-bearing piles. Friction piles derive their carrying capacity mainly from the friction and adhesion between their surfaces and the surrounding soil, which is likely to be soft or medium clay or silt. End-bearing piles derive their carrying capacity from the resistance at the pile points in firm ground such as gravel, hard clay or hard rock. *See also* piled foundation. *Nelson.*

bearing pit. Scot. A shaft up which coal was (in former years) carried by bearers. *Fay.*

bearing plate. A plate of the thickness and area required to distribute a given load, such as a plate under a beam flange resting on a wall. If the plate is 2 inches or more in thickness, it is called a slab. *Crispin.*

bearing pressure. The load on a bearing surface divided by the area upon which it rests. *Ham.*

bearing road. Scot. *See* bearers' way. *Fay.*

bearing seal. A device on the outer side of a bearing, the function of which is to prevent the leakage of lubricant from the bearing or the entry of dirt into it. *Nelson.*

bearing set. In a mine shaft, a specially substantial set of timbers used at intervals to support the linings and ordinary bearers. They are tied into the surrounding rock to give extra strength. *Pryor, 3.*

bearing stake. A stake set on a line to indicate the horizontal direction an inclined borehole is to be drilled. *Long.*

bearing stratum. The earth formation which has been selected as the most suitable to support a given load. *Ham.*

bearing strength. The maximum bearing load at failure divided by the effective bearing area. In a pinned or riveted joint, the effective area is calculated as the product of the diameter of the hole and the thickness of the bearing member. *ASM Gloss.*

bearing system. Eng. The employment of women to carry coal out of the mine. *Fay.*

bearing test. Same as azimuth test. *Long.*

bearing-up pulley. A pulley wheel fixed in a frame and arranged to tighten or take up the slack rope in endless-rope haulage. *Fay.*

bearing-up stops. a. Partitions or brattices of plank that serve to conduct air to a face. *Fay.* b. Keps or catches used to support a cage at the end of a hoist during loading or unloading. *C.T.D.*

bearing wall. A wall which supports a vertical load in addition to its own weight. *ACSG.*

bears. Derb. Calcareous nodules of clay ironstone. *Fay.*

bears' grease. Eng. Term used in Lincolnshire for mud peat. *Tomkeieff, 1954.*

bearsite. The arsenic analogue of moraesite, $Be_2(As0_4)(OH).4H_2O$; monoclinic; in the oxidation zone of an ore deposit in Kazakhstan, U.S.S.R. *Hey, M.M., 1964; Fleischer.*

bears' muck. Eng. Soft, bluish earth. Used by well sinkers in Cambridgeshire and Huntingdonshire. *Compare* caballa balls. *Arkell.*

beat. a. Eng. The surface outcrop of a lode or bed. *Fay.* b. Corn. To stope. *Fay.* c. The cutting away of a lode. *Nelson.*

beat away. A process of working hard ground by wedges and sledge hammers. *Fay.*

beat diseases. The beat diseases derive their name from the local throbbing or "beating" of the part affected. These are the hand, knee, and elbow in the order of incidence and the diseases are known as subcutaneous cellulitis or acute bursitis of these parts. Included also is synovitis of the wrist which is inflammation of the synovial lining of the wrist joint and tendon sheaths. The symptoms of these diseases are deep pain, inflammation, and swelling. They are caused by repeatedly applied or continuous pressure, or a sudden strain or repeated jarring, such as when using a pick or pneumatic pick against hard rock or coal. *Sinclair, I, p. 194.*

beat elbow. Acute bursitis over the elbow. A disability similar to beat hand caused by miners lying on their side to undercut the coal. *See also* mining diseases. *Nelson.*

beater. a. N. of Eng. A tool for packing tamping on a charge of powder in a blasthole. *Webster 3d.* b. *Mid.* A wooden mallet for consolidating, or packing, the clay in building a wall or dam to make it airtight. *Fay.* c. A laborer who shovels or dumps asbestos fibers and sprays with water to prepare them for the beating process that reduces fibers to pulp for making asbestos paper. *D.O.T. 1.*

beater mills. Mills used for impact crushing of easily broken minerals. An armature carrying swinging hammers, plates, or disks hits the falling stream of rock, dashing particles against one another and against the casing of the mill. *Pryor, 3. See also* hammer mill.

beat frequency oscillator. A device by which the output of a variable frequency oscillator is combined with that of a fixed frequency oscillator in a rectifier or detector. The output will then contain, among other constituents, a current of a frequency equal to the difference in frequency of the two oscillators, that is, a beat frequency. *AM, 1.*

beat hand. Subcutaneous cellulitis of the hand. A disability caused by the friction of the pick in the hand and its inoculation with an infective poison through an abrasion. *See also* mining diseases. *Nelson.*

bearing. a. Undercutting the coal face by holing. *Nelson.* b. The direction of a mine drivage usually given in terms of the horizontal angle turned off a datum direction, such as the true north and south line. *Nelson.* c. The horizontal angle between the meridian (true or magnetic) and any specified direction. The angle is measured from either the north or the south point, as may be required to give a reading of less than 90°, and the proper quadrant is designated by the letter N or S, preceding the angle, and the letter E or W, following it; as, N. 80° E. *Seelye, 2.* d. In Texas land surveys, a reference point to identify a land corner or a point on a survey line. *Seelye, 2.* e. A part in which a shaft or pivot revolves. *Nichols.* f. The points of support of a beam, shaft, or axle. *Fay.* g. A friction-reducing device. *See also* ball bearing. *Long.*

beat knee. Subcutaneous cellulitis over the patella. A swelling over the knee due to an enlargement of the bursa in front of the kneepan; sometimes suffered by miners working upon their knees in thin seams. *See also* mining diseases. *Nelson.*

beat out the gas. A practice widely used in coal mines, prior to the 17th century and much later, of swinging a miner's jacket or brattice sheet to dilute and remove a local accumulation of firedamp. *See also* deflector sheet; hurdle sheet. *Nelson.*

Beau de Rochas cycle. The old name for the four-stroke cycle engine. A power stroke is performed every second revolution, or in every four strokes of the piston. *Porter.*

Beaufort scale. A scale, graded from 0 to 12, devised by Admiral Beaufort in the 19th century to indicate wind strength. Thus, zero on this scale represents a calm, 12 represents a hurricane, in which the wind velocity exceeds 75 mph. This scale has been adopted internationally. *Ham.*

beaverite. A canary-yellow hydrous sulfate of copper, lead, ferric iron, and aluminum, $CuO \cdot PbO \cdot Fe_2O_3 \cdot 2SO_3 \cdot 4H_2O$. Earthy, but consisting of minute hexagonal plates. From Frisco, Beaver County, Utah. *English.*

bebedourite. An igneous rock composed essentially of diopside and biotite with accessory perofskite, apatite, and titanmagnetite. *Johannsen, v. 4, 1938, p. 452.*

beccarite. An olivine-green alpha zircon from Ceylon; specific gravity, 4.7; refractive index, 1.93 to 1.98; biaxial positive. *Shipley.*

beche; biche. Eng. A deep conical instrument about 25 inches long, and weighing

6 pounds. The hollow part extends 16 inches up into the tool, and is 1½ inches in diameter at the lower end and tapers to five-eighths of an inch at the upper end. It is used for extracting the bottom portion of a broken set of rods from a borehole. *Fay.*

bechilite. An incrustation of hydrous calcium borate, $H_8CaB_4O_{11}$, found as a deposit at the boric acid lagoons of Tuscany, Italy. *Standard, 1964.*

Becke line. *See* Becke method. *Hess.*

beckelite. A very rare, yellow to brown, weakly radioactive, isometric mineral, $Ca_3(Ce,La,Di)_4Si_3O_{15}$, with crystals resembling pyrochlore. Found in nepheline syenite. From Mariupol, U.S.S.R. *Crosby, p. 95.*

Becke method; Becke test. In optical mineralogy, a method or test for determining relative indices of refraction. A method for determining microscopically the index of refraction of a mineral compared with that of an oil or another substance, such as Canada balsam, in which it is immersed, or of two adjacent minerals in a microscopic thin section. If the mineral grain under investigation has an index of refraction lower than that of the enclosing medium or that of an adjacent mineral grain with which it has a nearly vertical contact, a line of light (called the Becke line) will move outward into the medium or into the adjacent mineral grain of higher refractive index as the barrel of the microscope is moved upward from the position of focus, and it will move into the mineral grain being investigated if the barrel of the microscope is moved downward. If the mineral grain under investigation has an index of refraction that is higher than that of the enclosing medium or that of the adjacent mineral grain with which it has nearly a vertical contact, the Becke line will move inward into the mineral grain under investigation from the boundary with the enclosing medium or inward from its nearly vertical contact with the adjacent mineral grain of lower refractive index as the barrel of the microscope is moved upward from the position of focus, and it will move outward from the boundary of the mineral grain being investigated if the barrel of the microscope is moved downward. *Bureau of Mines Staff.*

beckerite. A brown resin, occurring with amber. *English.*

Becket loop. A loop of small rope fastened to the end of a large wire rope to facilitate installation. *Ham.*

beckite. *See* beekite. *C.T.D.*

Becorit system. An overhead monorail system. *Sinclair, III, p. 209.*

becquerelite. A mineral, $CaO.6UO_3.11H_2O$, occurring in small, yellow crystals and crusts on pitchblende. Orthorhombic; strongly radioactive; an alteration product of uraninite and ianthinite. Found in Katanga, Republic of the Congo. *American Mineralogist, v. 42, No. 11-12, November-December 1957, p. 920; Webster 3d.*

Becquerel rays. A term formerly used to include the three types of rays (alpha, beta, and gamma) emitted by radioactive substances. *C.T.D.*

bed. a. The smallest division of a stratified series and marked by a more or less well-defined divisional plane from its neighbors above and below. *Fay.* b. A deposit, as of ore, parallel to the stratification, later in origin than the rock below, and older than the rock above, thus constituting a regular member of the series of formations, and not an intrusion. *Standard, 1964.* c. That portion of an outcrop or face of a quarry which occurs between two bedding planes. *Fay.* d. The level surface of rock upon which a curb or crib is laid. *Fay.* e. The bottom of a watercourse or of any body of water. *Webster 3d.* f. A mass or heap of anything (as ore), arranged in the form of a bed. *Webster 3d.* g. All the coal, partings, and seams which lie between a distinct roof and floor. Bed is preferred by the U.S. Geological Survey, state geologists, coal authorities, and the U.S. Bureau of Mines. Seam or vein should not be used to mean bed. If a coal bed is worked in benches, use the term bench (upper, middle, or lower), not seam, because seams divide beds into benches. *Hess.* h. S. Afr. The hard solid rock underlying alluvial deposits. Also called bedrock. *Beerman.* i. Perhaps the most common term in geology meaning layer or stratum. Quarrymen usually mean by beds not the stone beds in the geologist's sense but the partings between them. *Arkell.* j. A stockpile, as of ores, concentrates, and fluxes, built up of successive longitudinal layers so that transverse cutting yields a uniform mixture for furnace feed until the material is all consumed. *Bureau of Mines Staff.* k. The stationary portion of a press structure which usually rests on the floor or foundation, forming the support for the remaining parts of the press and the pressing load. The bolster and sometimes the lower die are mounted on the top surface of the bed. *ASM Gloss.* l. In mineral processing, a heavy layer of selected oversized mineral or metal shot maintained on screen of jig. *Pryor, 3.* m. That part of a conveyor upon which the load or carrying medium rests or slides while being conveyed. *ASA MH4.1-1958.* n. In bulk material conveyors, the mass of material being conveyed. *ASA MH4.1-1958.* o. A base for machinery. *Nichols.*

bed charge. The deep load of coke in the bottom of a cupola. The first charge of iron is also called a bed charge. *Crispin.*

bed claim. Aust. A mining claim lying on the bed of a stream. *Fay.*

bedded. Applied to rocks resulting from consolidated sediments and accordingly exhibiting planes of separation designated bedding planes. *Fay.*

bedded deposit. a. A term usually applied to mineral deposits that are found parallel with the stratification of sedimentary rocks and usually of contemporaneous origin. The term is used by some writers to describe layerlike deposits of replacement origin. *Stokes and Varnes, 1955. See also* bedded formation. *Fay.* b. In economic geology, a synonym for blanket deposit. *A.G.I. Supp.*

bedded formation. A formation which shows successive beds, layers, or strata due to the manner in which it was formed. A bedded deposit. *Fay.*

bedded ore deposit. Ore aggregations occurring between or in sedimentary rocks. *Schieferdecker.*

bedded ores. Ores which occur as beds or layers. The chief bedded ores in Great Britain are the iron ores of the Jurassic. Another bedded ore is that of manganese, found in the Cambrian and Ordovician rocks of North Wales. *See also* Frodingham ore; marlstone ore; Northampton sand ironstone. *Nelson.*

bedded rock. One of the two subdivisions of competent rock. To be classed as bedded rock the rock within each bed, in addition to being elastically perfect, isotropic, and homogeneous, must have a bed thickness that is small compared with the roof span, and the bond between beds must be weak. Most sedimentary rocks and some stratified metamorphic rocks fall in this group. *Bu Mines Bull. 587, 1960, p. 5.*

bedded vein. Properly bed vein (Lagergang of the Germans); a lode occupying the position of a bed, that is, parallel with the stratification of the enclosing rocks. *See also* bed, b. *Fay.*

bedded volcano. A volcano whose crater consists of layers of tuffs and lava sheets. *Fay.*

bedder. One who sets green ware in piles (bungs) with sand and clay between pieces to support and separate them during bisque-kiln firing. Also called clayingup man; sander-up. *D.O.T. 1.*

bedding. a. The arrangement of rock in layers, strata, or beds. Some writers treat bedding and stratification as strictly synonymous, some use bedding in a somewhat wider sense to include not only sediments but also the structure of igneous or metamorphic rocks when these occur in layers, and others restrict the term to layers of sedimentary rock more than 1 centimeter thick. *See also* bed. *Stokes and Varnes, 1955.* b. Used to describe rock layering; for example, thin-bedded, cross-bedder, thick-bedded, or massive. *Wheeler.* c. Pieces of soft metal placed under or around a handset diamond as a cushion or filler. Also called backing; calking. *Long.* d. Ground or supports in which pipe is laid. *Nichols.* e. Mixing on stockpile of ore or concentrate in layers, in order to blend them more uniformly. *Pryor, 3.* f. The layer of heavy and oversized material placed above the screen in jigging. Also called ragging. *Pryor 4.* g. Method of placing flatware employed by china makers. *Noke.*

bedding cave. A passage usually wide and low formed along a bedding plane in horizontal or slightly tilted rocks. *Schiferdecker.*

bedding cleavage. Cleavage that is parallel to the bedding. *Billings, 1954, p. 343.*

bedding down. Formation of layer of valueless and inert rock at points in a new flowline where material will settle from the stream of ore being treated, for example, between bottom of thickener and its rakes. *Pryor, 3.*

bedding fault. A fault that is parallel to the bedding. *A.G.I.*

bedding fissility. A term generally restricted to primary foliation parallel to the bedding of sedimentary rocks; that is, it forms while the sediment is being deposited and compacted. It is the result of the parallelism of the platy materials to the bedding plane, partly because they were deposited that way and partly because they were rotated into this position during compaction. *A.G.I.*

bedding glide. Overthrusting in which a bed, such as a coal seam, is disrupted and thrust laterally along the roof or floor parting, giving a duplication of coal. *Nelson.*

bedding joint. a. A thin layer differing in composition with the beds between which it occurs. *Schieferdecker.* b. A joint parallel to the bedding planes formed by tectonic processes. *Schieferdecker.*

bedding plane. a. In sedimentary or stratified rocks, the division planes that separate the individual layers, beds, or strata. *A.G.I.* b. Surface on which rockforming mineral has been deposited. *Pryor, 3.* c. A separation or weakness between two layers of rock, caused by changes during the building up of the rockforming material. *Nichols.*

bedding thrust. A thrust fault that is parallel to the bedding. *Billings, 1954, p. 181.*

bede. A miner's pick. *Pryor, 3.*

Bedford limestone. One of the finest and best known building stones to be found in the United States. It gets its name from its shipping point, Bedford, Ind. *Crispin.*

bed joint. a. A horizontal crack or fissure in massive rock. *Webster 3d. See also* bedding plane. *Fay.* b. One of a set of cracks or fissures parallel with the bedding of a rock. *Webster 3d.* c. A horizontal joint between courses of brick. *A.R.I.* d. The horizontal of mortar on (or in) which a masonry unit is laid. *ASCG.*

bedload. Sediment that moves on or very near the streambed, in almost continuous contact with the bed. It moves by skipping, sliding, and rolling. Motion is derived from tractional and gravitational forces. *USGS Prof. Paper 462-F.*

bed material. The material composing the channel bed. *USGS Prof. Paper 462-F.*

Bedoulian. Lower Aptian. *A.G.I. Supp.*

bedplate. a. An iron plate forming the bottom for a furnace. *Webster 2d.* b. The heavy foundation framing or plate giving support and stability to the lighter parts in a machine. *Webster 3d.*

bedrock. a. Any solid rock exposed at the surface of the earth or overlain by unconsolidated material. *A.G.I. Supp.* b. In Australia, the stratum upon which the wash dirt rests is usually called bedrock. It usually consists of granite or boulder clay (glacial) and, much more rarely, basalt. When the strata consists of slates or sandstones (Silurian or Ordovician), it is usually called reef rock. *Engineering and Mining Journal, v. 139, No. 4, April 1938, p. 55.*

bedrock (ledge). Rock of relatively great thickness and extent in its native location. *ASCE P1826.*

bedrock test. A borehole drilled to determine the character of bedrock, and the character and depth of overburden overlying such bedrock. *Long.*

bed rubber. In the concrete products and stonework industry, one who rubs down rough-sawed surfaces of marble, slate, soapstone, sandstone, or rough surfaces of concrete blocks or slabs to smooth, even finish, using a bed rubbing machine. Also called bed rubber operator; rubber; rubbing bedman; rubbing bed polisher. May be designated according to use for which stone is intended, as rubbing bedman, interior; or according to kind of stone, as marble rubber. *D.O.T. 1.*

bed separation. The thin cavities formed along bedding planes due to differential lowering of strata over mine workings; for example, a shale with its greater bending capacity will subside and separate from a higher bed of sandstone. Roof supports are so set as to keep bed separation to a minimum. *Nelson.*

bed setter. In the stonework industry, one who arranges blocks of granite on a bed of wooden beams into a compact, level unit preparatory to the polishing of the top surfaces by the granite polisher. Also called setter. *D.O.T. 1.*

beds of passage. Beds in which the fossils or rocks, from their resemblance to those contained either in the bed above or the bed below, indicate the transition character of the deposit. *Standard, 1964.*

bed stone. In milling, the lower or stationary millstone. *Fay.*

bed vein. A vein following the bedding planes in sedimentary rocks or a mineralized permeable stratigraphic horizon developed below an impervious bed. Synonym for blanket vein; manto; sheet ground. *Schieferdecker.*

bedway. A horizontal marking in granite resembling stratification. *Standard, 1964.*

beech coal. Charcoal made from beechwood. *Fay.*

beeches. Scot. Strips of hardwood fastened to pump rods to save them from wear at the collars. *Fay.*

beechleaf marl. Eng. Finely laminated brown marl of glacial origin, Lancashire. *Compare* toadback marl. *Arkell.*

beef. Eng. Fibrous carbonate of lime, so called by the Purbeck quarrymen and now in general use. In Portland it is called bacon and horseflesh. *Arkell.*

beegerite. a. A light to dark gray, metallic lustered mineral, $Pb_6Bi_2S_9$. *Dana 7, v. 1, p. 392.* b. A discredited species since it is a mixture of schirmerite and matildite. *American Mineralogist, v. 28, No. 3, March 1943, p. 214.*

beehive coke. Coke manufactured in beehive rectangular, or similar forms of ovens in a horizontal bed, where heat for the coking process is secured bv combustion within the oven chamber. *ASTM D121-62.*

beehive coke oven. One with a brick bottom, side walls, and a domed roof. *Bureau of Mines Staff.*

beehive kiln. *See* round kiln. *Dodd.*

beekite. a. A concretionary form of calcite, occurring commonly in small rings on the surface of a fossil shell (coral, sponge, etc.), which has weathered out its matrix. *A.G.I.* b. Chalcedony occurring in the form of subspherical discoid, rosette-like or doughnut-shaped accretions, generally intervoluted as bands or layers and commonly found on silicified fossils and on joint planes. *A.G.I.*

Beekmantown limestone. A magnesian limestone, 1,800 feet in thickness and characterized by curved nautiloid cephalopods, occurring in the Canadian series of North America; of Arenig age; equivalent to part of the Durness limestone of the Highlands of Scotland. *C.T.D.*

beele. Prov. Eng. A mining pickax with both ends sharp. *Standard, 1964.*

beerbachite. This rock was originally described as a basic igneous rock but it is now known to be a hornfels with large poikiloblastic crystals of olivine. *See also* hornfels. *A.G.I.*

beer stone. Eng. An argillaceous and siliceous freestone dug from quarries at Beer, 10 miles west of Lyme Regis, at the passing of the chalk into the greensand. *Fay.*

beeswax. Wax obtained from bees' honeycomb. *Shell Oil Co.*

Beethoven exploder. A machine for the multishot firing of series-connected detonators in tunneling and quarrying. *See also* exploder, c. *Nelson.*

beetle. a. A powerful rope-hauled propulsion unit, operated under remote control, for moving a train of wagons at the mine surface. A beetle runs on a narrow-gage track set within the main track, and moves wagons by passing beneath them and exerting pressure with idler rollers on arms which are extended by a forward pull on the rope to engage the wheel treads. *See also* charger. *Nelson.* b. Eng. A small compressed-air locomotive. *Fay.*

beetle stone. A nodule of coprolitic ironstone, so named from the resemblance of the enclosed coprolite to the body and limbs of a beetle. *Fay.*

beetling stones. Flat stones on which clothes were beetled. *Arkell.*

before breast. Rock or vein, which still lies ahead. *Zern.*

beginners. Points (and, may be, crossings) in railway track. *Mason.*

behead. In geology, to cut off and capture by erosion an upper portion of (a watercourse); said of the encroachment of a stronger stream upon a weaker one. *Standard, 1964.*

beheaded stream. The lower section of a stream that has lost its upper portion through stream piracy. *Leet.*

beidellite. A white, reddish, or brownish-gray component of bentonite; an aluminum montmorillonite clay, $Al_8(Si_4O_{10})_3(OH)_{12}\cdot 12H_2O$. Minute plates, probably orthorhombic. Previously described as leverrierite. Found in Beidell, Colo., and Owyhee County, Idaho. *English; Dana 17; A.G.I.*

Beien kep gear. An improved type of keps in which the kep shoes are withdrawn without previously raising the cage and thus reducing the decking time. The operation may be automatic, except for cage release, because the arrangement allows the kep shoes to trip without the position of the hand lever being altered. *Nelson.*

Beien machine. A pneumatic stowing machine which consists of a paddle wheel with six compartments working inside an adjustable airtight casing. This wheel is driven at a speed of 15 to 30 revolutions per minute by means of an air turbine through gearing. Two sizes of Beien machine are used having capacities of 30 and 60 cubic yards of stowing material per hour respectively. The dirt falls from the paddle wheel into the airstream in the pipe underneath the paddle box and passes along 6-inch-diameter pipes to the outlet, where a detachable deflector guides the stream of dirt into the required place in the pack hole. *Mason, V. 2, p. 568.*

Beilby layer. a.Flow layer resulting from incipient fusion during polishing of mineral surface, and therefore not characteristic of true lattice structure. *Pryor, 4.* b. The mirrorlike surface layer, on all well-polished stones other than diamond, which seems to be caused by a fusion of tiny surface projections on the stone during the polishing operation. In corundum and quartz this layer is crystalline; in zircon and spinel, it is amorphous and pits more easily than other stones. *Shipley.*

be in. An oil well is said to "be in" when it begins to produce. *Hess.*

bekinkinite. A feldspar-free granular igneous rock composed of barkevikite, nepheline, and olivine. Found on Mount Bekinkina, Malagasy Republic. *Johannsen, v. 1, 2d, 1939, p. 243.*

bekko ware. A yellow-brown splashed pottery made in Japan. It resembles tortoise shell. *Fay.*

bel. A unit of level when the base of the logarithm is 10. Use of the bel is restricted to levels of quantities proportional to power. *Hy.*

belemnite. An extinct type of cephalopod known from cigar-shaped fossils. *A.G.I. Supp.*

Belemnite marls. Calcareous clays characterized by the occurrence of plentiful belemnites, occurring in the English Chalk. *See also* Plenus marls. *C.T.D.*

Belfast truss. A bowstring design of girder fabricated entirely from timber components. *Ham.*

Belgian coke oven. A rectangular variation of the beehive coke oven. *Bureau of Mines Staff.*

Belgian effective temperature. A temperature scale used in Belgium for measuring the environmental confort in mines. *Roberts, I, p. 132.*

Belgian kiln. A type of annular kiln patented by a Belgian, D. Enghiens. It is a longitudinal arch kiln with grates at regular intervals in the kiln bottom; it is side-fired onto the grates. Such kilns have been popular for the firing of fire clay refractories at 1,200° to 1,300° C. *Dodd.*

Belgian oven. A rectangular oven with end doors and side flues for the manufacture of coke. *Fay.*

Belgian process. A process most commonly employed in the smelting of zinc. Roasted zinc ore, mixed with a reducing material, as coal or coke, is placed in retorts which consist of cylindrical pipes of refractory material closed at one end, of a length and diameter convenient for charging and cleaning them. A number of these retorts are placed slightly inclined in a properly constructed furnace. The open ends of the retorts are covered with a sheet-iron hood to which are connected short, conical, sheet-iron pipes discharging the molten zinc downward. *Fay.*

Belgian silex. A very hard, tough, more or less cellular quartzite resembling French buhrstone and the most favored natural mill-lining material for most purposes. It is imported in rectangular blocks that are more or less shaped to fit the curve of a mill. *AIME, p. 14.*

Belgian zinc furnace. A furnace in which zinc is reduced and distilled from calcined ores in tubular retorts. These furnaces may be classified as direct-fired and gas-fired, but there is no sharp division between these systems, which merge into one another by difficultly definable gradations. Each class of furnace may be subdivided into recuperative and nonrecuperative, but heat recuperation in connection with direct firing is rare. *Fay.*

belgite. Same as willemite. *English.*

belite. a. A constituent of portland cement clinkers. *English.* b. A synonym for larnite. *Hey, 2d, 1955.*

belith. Original spelling of belite. *Hey, 2d, 1955.*

Belknap chloride washer. This coal washer uses a calcium chloride solution of a comparatively low density and depends on mechanically induced upward currents to obtain a separation at the desired specific gravity. It produces a clean, dustless, nonfreezing coal. *Mitchell, p. 474.*

Belknap process. Old method of coal cleaning, in a bath of heavy liquid, produced by dissolving calcium chloride in water. The shale sinks and the coal floats. *Pryor, 3.*

bell. a. A cone-shaped mass of ironstone or other substance in the roof of a coal seam. Bells are dangerous as they tend to collapse suddenly and without warning. *Nelson.* b. Pot is the common Arkansas term. *Fay.* c. A gong used as a signal at mine shafts. *Fay.* d. An expanded part at one end of a pipe section, into which the next pipe fits. *Nichols.* e. *See* cone. *C.T.D.*

bellan; belland; bellund. a. Eng. Dusty lead ore. *Arkell.* b. A form of lead poisoning to which miners are subject. *Fay.*

belland. *See* bellan.

bell and hopper. *See* cup and cone. *Fay.*

bell-and-spigot joint. The usual term for the joint in cast-iron pipe. Each piece is made with an enlarged diameter or bell at one end into which the plain or spigot end of another piece is inserted when laying. The joint is then made tight by cement, oakum, lead, rubber, or other suitable substance which is driven in or calked into the bell and around the spigot. *Fay.*

bellarmine. Salt-glazed bottle or jug first made in Germany in the 15th century, usually having a bearded face stamped or engraved on the neck as a decoration. *ACSG, 1963.*

bellcrank. A triangular or L-shaped lever used to change the direction of motion of cables or rods. *Hess.*

bellcrank drive. A device used to drive an auxiliary shaker conveyor without changing the direction of the main conveyor. It consists essentially of two driving arms, placed at right angles to each other and supported at their pivot point by a fulcrum jack. When these driving arms are attached to the main and auxiliary conveyors, the reciprocating motion of the main conveyor is transmitted to the auxiliary conveyor which can then discharge its load onto the main conveyor. *Jones.*

bell damper. A damper of the sand-seal type, and bell-shaped. Such dampers are used, for example, in annular kilns. *Dodd.*

bell dolphin. Often referred to as a Baker bell dolphin after the inventor. It comprises a steel or concrete fender of bell shape, mounted on a cluster of driven piles in the open sea for mooring ships, the first example having been installed at Heysham, England. *Ham.*

Bell dresser. *See* dresser. *ACSG, 1963.*

belled. Eng. Widened; said of the enlarged portion of a shaft at the landing for running the cars past the shaft, and for caging. *Fay.*

Belleek china. A highly translucent whiteware composed of a body containing a significant amount of frit and normally having a luster glaze. Produced commercially at Belleek, Ireland. *ASTM C242-60T.*

Belleek porcelain. An extremely thin ware, decorated with a pearly luster laid over the glaze, suggesting the interior of shells; named from Belleek, Ireland, where it was originally made. *Standard, 1964.*

bell holes. a. Holes dug or excavations made at the section joints of a pipeline for the purpose of repairs. *Fay.* b. A conical cavity in a coal mine roof caused by the falling of a large concretion; or, as of a bell mold. *Fay.*

bellies. Widenings in a vein. *See also* belly, a. *Fay.*

bellingerite. A hydrous copper iodate, $3Cu(IO_3)_2\cdot 2H_2O$, as bluish-green triclinic crystals from Chuquicamata, Chile. *Spencer 16, M.M., 1943.*

bellite. a. An explosive consisting of five parts of ammonium nitrate to one of metadinitrobenzene, usually with some potassium nitrate. *Fay.* b. A lead chromo-arsenate in delicate velvety, red to orange tufts. *Webster 2d.*

bell jar. Synonym for jar collar. *Long.*

bell metal. High tin bronze, containing up to 30 percent tin and some zinc and lead; used in casting bells. *C.T.D.*

bell-metal ore. a. Corn. An early name for tin pyrite, so called because of its bronze color. *Fay.* b. Synonym for stannite. *Hey 2d, 1955.*

bell mold; bell mould; bellmouth. Som. A conical-shaped patch of a mine roof, probably originating with the fossils called sigillaria, or the roots of trees. *See also* bell, a; caldron; caldron bottom. *Fay.*

bellmouth overflow. Overflow from a reservoir through a tower which is erected from the bed to the overflow level, the water being taken from the reservoir to a discharge tunnel. *Ham.*

bellmouth socket. A horn socket equipped with a bell-like flaring mouth. *See also* horn socket. *Long.*

bellows. a. An instrument with an air chamber and flexible sides, used for directing a current of air. In a foundry, small hand bellows are used for blowing parting sand away from the faces of patterns, etc. *Crispin.* b. An expansible metal device containing a fluid that will volatilize at some desired temperature, expand the device, and open or close an opening or a switch, as in controls and steam traps. *Strock, 10.*

bell pearl. A bell- or pear-shaped pearl. *Shipley.*

bell pit. Derb. A mine working argillaceous ironstone by a system called bell work. *See also* bell work, a. *Fay.*

bell pit mining. Obsolete method of winning coal or bedded iron from shallow deposits, in which mineral was extracted and dragged to a central shaft. *Pryor, 3.*

Bell process. *See* Bell's dephosphorizing process. *Fay.*

bellringer. In anthracite and bituminous coal mining, a laborer, who signals the hoistman by means of an electric bell or a buzzer system from the shaft, slope bottom, or intermediate level in a mine to raise or lower the cage (elevator) or the skip (large metal container for hoisting coal). *D.O.T. 1.*

bells. a. Signals for lowering and hoisting the bucket, skip, or cage in a shaft usually are given by bells, the number of strokes indicating the nature of the load, the place for stopping, etc. *Weed, 1922.* b. Devices used to eliminate the escape of gases, during charging of an iron blast furnace. *Bureau of Mines Staff.*

bell screw; screw bell. An internally threaded bell-shaped iron bar, for recovering broken or lost rods in a deep borehole. *See also* biche. *Fay.*

Bell's dephosphorizing process. The removal of phosphorus from molten pig iron in a puddling furnace, lined with iron oxide and fitted with a mechanical rabble to agitate the bath. Red-hot iron ore is added. *See also* Krupp's washing process. *Fay.*

bell sheave. Aust. A sheave in the shape of a truncated cone, used in connection with the main-and-tail system of rope haulage at curves, so as to keep the rope close to the ground. *Fay.*

bell socket. Synonym for bell tap. *Long.*

bell tap. A cylindrical fishing tool having an upward-tapered inside surface provided with hardened threads. When slipped over the upper end of lost, cylindrical, downhole drilling equipment and turned, the threaded inside surface of the bell tap cuts into and grips the outside surface of the lost equipment. Also called bell; bell screw; bell socket; box bill; die; die collar; die nipple. *Long.*

bell top. Term used to describe a good roof that has a clear ringing sound. *Kentucky, p. 133.*

bellund. *See* bellan.

bell work. a. Derb. A system of working an ironstone measure by upward underground excavations, around the shafts (raises) in the form of a bell or cone. *Compare* milling, a. *Fay.* b. A method used in working salt deposits. *Standard, 1964.*

belly. a. A bulge, or mass of ore in a lode. *Fay.* b. Widened places in a borehole caused by sloughing of loose material from the borehole sidewalls. *Long.* c. The wide part of a pot. *ACSG.*

bellybuster. a. A safety rope or belt used by a driller's helper or derrickman while working in the drill derrick or tripod. *Long.* b. A railing placed at belt height around an elevated work platform, as in a drill tripod or derrick. *Long.*

belly helve. Eng. A forge hammer, lifted by a cam which acts about midway between the fulcrum and the head. *Fay.*

belly pipe. A flaring-mouthed blast pipe in an iron furnace. *Standard, 1964.*

Belomorite. Trade name for moonstone from the White Sea. *Spencer 17, M.M., 1946.*

belonesite. A white, transparent magnesium molybdate, $MgMoO_4$, crystallizing in the tetragonal system. *Fay.*

belonite. A rod- or club-shaped microscopic embryonic crystal in a glassy rock. *Fay.* Longulites, clavalites, and spiculites are included under this term. *A.G.I.*

belonosphaerite. A spherule consisting of more or less determinable substances in radially arranged crystals. *Johannsen, v. 1, 2d ed., 1939, p. 169.*

belovite. a. Arsenate-belovite is the mineral reported by E. I. Nefedov, 1953, with the formula, $Ca_3(Ca,Mg)(AsO_4)_2.2H_2O$. Near roselite. *Spencer 20, M.M., 1955; Spencer 21, M.M., 1958.* b. Phosphate-belovite is an apatitelike mineral from pegmatite, reported by L. S. Borodin and M. E. Kazakova, 1954, with the formula, $(Sr,Ce,Na,Ca)_{10}(PO_4)_6(O,OH)_2$; hexagonal. *Spencer 20, M.M., 1955; Spencer 21, M.M., 1958.*

belt. a. Can. Regional surface zone along which mines and prospects occur. *Hoffman.* b. A continuous strap or band for transmitting power from one wheel to another, or (rarely) to a shaft, by friction. *Standard, 1964. See also* conveyor belt; interwoven conveyor belt; rubber conveyor belt; solid woven conveyor belt; steel band belt; steel cable conveyor belt; stitched canvas conveyor belt; wire mesh conveyor belt. *ASA MH4.1–1958.* c. A zone or band of a particular kind of rock strata exposed on the surface. *Compare* zone. *Fay.* d. An elongated area of mineralization. *A.G.I.* e. *See* segmented belt. *ASCG, 1963.*

Belt (Beltian) series. A great thickness (perhaps 40,000 feet) of younger Precambrian rocks occurring in the Little Belt Mountains, Mont.; Idaho; and British Columbia, Canada. Argillaceous strata predominate, accompanied by algal limestones. Comparable with the Grand Canyon series in Colorado and the Uinta Quartzite series in the Uinta Mountains, Utah. *C.T.D.*

belt boy. *See* setoff man. *D.O.T. 1.*

belt capacity. The load which a belt conveyor is able to carry. It depends upon (1) area of cross section of load on belt, and (2) speed of belt. The carrying capacity can be expressed as: $P = \frac{60\ AVM}{2{,}240}$ tons, where P equals tonnage of material carried per hour, A equals area of cross section of load in square feet, V equals speed of belt in feet per minute, and M equals weight in pounds per cubic foot of loose material. This assumes no rolling nor slippage of material on the belt. The carrying capacity in an incline is rather less than that when operating on the level, due to the tendency of coal or ore to roll and slide back on the belt. On inclinations up to 10°, the difference is not pronounced. *See also* conveyor; maximum belt slope. *Nelson.*

belt cleaner. A device attached to a belt conveyor to clean or remove dirt or coal dust from the belt surface. Rotary bristle brushes are sometimes used, driven either by gearing from the conveyor or by an independent high-speed motor. Another device consists of a short scraper conveyor with rubber-faced scrapers attached at intervals. The scraper belt is driven via a chain drive from the main conveyor drum. *Nelson.*

belt conveyor. A moving endless belt that rides on rollers and on which coal or other materials can be carried for various distances. The principal parts of a belt conveyor are (1) a belt to carry the load and transmit the pull, (2) a driving unit, (3) a supporting structure and idler rollers between the terminal drums, and (4) accessories, which include devices for maintaining belt tension, loading and unloading the belt, and equipment for cleaning and protecting the belt. *See also* balata belt; cord belt. *Kentucky, pp. 231-234; Nelson.*

belt conveyor, flat. *See* flat belt conveyor *ASA MH4.1-1958.*

belt conveyor, multiple-cord. *See* multiple-cord belt conveyor. *ASA MH4.1-1958.*

belt conveyor structure. The framework for supporting the bottom strand of a belt conveyor. Two types of conveyor structures are in general use, namely the covered type where the bottom belt is covered by metal trays, and the open type in which the bottom belt is completely exposed. The former is by far the more common as coal, stone, timber, etc., cannot fall onto it. *Nelson.*

belt conveyor, troughed. *See* troughed belt conveyor. *ASA MH4.1-1958.*

belt course. A narrow, vertically faced course of masonry, sometimes slightly projected, such as window sills which are made continuous; also used to divide walls into stories and stages. Sometimes called string course or sill course. *ACSG.*

belt cover. A cover which is placed on the framework of a belt conveyor so as to prevent materials from falling on the return belt. *Jones.*

belt creep. Gentle slip. *Pryor, 3, p. 43.*

belt dressing. A compound used to improve adhesion or flexibility. *Pryor, 3, p. 43.*

belt elevator. *See* bucket elevator. *ASA MH4.1-1958.*

belteroporic. Describes crystals in rocks whose growth was determined by direction of easiest growth. *A.G.I. Supp.*

belt fastener. A device for joining conveyor and elevator belting. *Jones.*

belt feeder. Short loop of conveyor belt, or articulated steelplate, used to draw ore at a regulated rate from under a bin or stockpile; length of belt conveyor loaded with dry reagent, which can be fed slowly into flow line as the belt is inched forward. *Pryor, 3.*

belt flotation. A method sometimes used to recover diamond particles 1 millimeter or smaller. The equipment used is a 24-inch belt conveyor made of 80-mesh wire screen, about 30 feet between centers, set in a tank, and sloping so that one end is underwater. Wet feed is applied in a thin layer at the upper (or dry) end of the conveyor and advances toward the water at a speed that allows for drainage. As the feed touches the water the diamond particles float on the surface and are carried over a weir into a box. The nonfloating particles fall off the underwater end of the conveyor and are collected in a sump. Flotation is done with clear water, and a concentration ratio of 1,000 to 1 and an efficiency of 98 percent is claimed. *I.C. 8200, 1964, p. 73.*

belt friction. *See* friction. *ASA MH4.1-1958.*

belt grinding. Grinding with an abrasive belt. *ASM Gloss.*

belt horsepower. That power developed with all auxiliary equipment (such as pump and fans) attached and is consequently lower than flywheel horsepower. *Carson, p. 68.*

belt idler. A roller, usually of cylindrical shape, which is supported on a frame and which, in turn, supports or guides a conveyor belt. Idlers are not powered but turn by reason of contact with the moving belt. *Jones.*

belting. One of the main parts of a belt conveyor. The belting consists of plies of cotton duck impregnated with rubber, and with top and bottom covers of rubber. The carrying capacity of the belt will vary depending on the running speed and the width of the belt. *Sinclair, V, p. 286.*

belt kiln. A tunnel kiln through which ware is carried on an endless belt made of a wire-mesh woven from heat-resisting alloy. In the pottery industry such kilns have found some use for glost- and decorating-firing. *Dodd.*

belt, link-plate. *See* link-plate belt. *ASA MH4.1-1958.*

belt loader; elevating grader. A machine whose forward motion cuts soil with a plowshare or disc and pushes it to a conveyor belt that elevates it to a dumping point. *Nichols.*

beltman. *See* conveyor man. *D.O.T. 1.*

belt marks. *See* chain marks. *ASTM C162-66.*

belt of soil moisture. Subdivision of zone of aeration. Belt from which water may be used by plants or withdrawn by soil evaporation. Some of the water passes down into the intermediate belt, where it may be held by molecular attraction against the influence of gravity. *Leet.*

belt of variables. The belt of marine deposition extending from the coast (high watermark) to a depth of about 100 fathoms, that is, corresponding roughly with the continental shelf (in the wide sense, to include the shore); passing into the mud belt at the inner mud line. *Challinor.*

belt protection device. A device fitted to a belt conveyor to give an alarm or to cause the conveyor to stop in the event of a defect, such as belt slip, breakage, tearing, misalignment, or overload. *B.S. 3618, 1965, sec. 7.*

belt slip. The difference in speed between the driving drum and the belt conveyor. Belt slip at the drivehead can cause heating of the driving drum. Devices are available which measure the belt slip and which cut off the power when a predetermined amount of slip takes place. *See also* slip, k. *Nelson.*

belt-slip device. A device fitted to a belt conveyor to give an alarm or to cause the conveyor to stop in the event of belt slip exceeding a predetermined amount. *B.S. 3618, 1965, sec. 7.*

belt-slip protection device. An assembly which causes the power to be disconnected if the belt slips excessively on the drive pulley. *NEMA MB1-1961.*

belt table. A table incorporating a belt conveyor so arranged as to provide working space on one or both sides of the belt. *ASA MH4.1-1958.*

belt takeup. A mechanism which operates and includes a takeup pulley carrying one end of a belt loop in such a way as to provide suitable operating tension. It may also serve as a means for storing extra belt. *NEMA MB1-1961.*

belt tensioning device. A mechanism which operates on a takeup pulley carrying one end of a belt loop in such a way as to provide suitable operating tension. It is commonly known as a belt takeup. *NEMA MB1-1956.*

belt trainer. A device used for training a belt or to assist it in running in a central position. It consists of a roller, either of metal or hard wood, supported at one of the frames which likewise supports the troughing idlers, and held vertically so the edge of the belt will come against the roller surface. Also called guide idler; self-aligning idler. *Jones.*

belt tripper. A device or mechanism which causes the conveyor belt to pass around pulleys for the purpose of discharging material from it. *ASA MH4.1-1958.*

belugite. A name based upon the Beluga River, Alaska, and suggested by J. E. Spurr for a transition group of plagioclase rocks between his diorites and diabases. Spurr restricts the name diorite to those plagioclase rocks (without regard to the dark silicate) whose plagioclase belongs in the andesine-oligoclase series. The diabase group, on the other hand, contains those whose plagioclase belongs in the labradorite-anorthite series. Belugites with a porphyritic texture and a fine-grained or aphanitic groundmass are called aleutites. *Fay.*

Belugou imperfection coefficient. In coal testing, a parameter, B, applied to the ash curve: $B = \dfrac{p75 - p25}{2\,(p50 - 1)}$, where pX is the specific gravity of particles of which the fraction separated is X percent; ($p75 - p25$) is the statistical intermediate or inquartile range and $p50$, the effective density of separation in a process in which a dense medium, vertical current, or jigging action is used. Equation is used to define shape of a Tromp curve. *Pryor, 3.*

belyankinite. Platy yellowish-brown masses, $2CaO \cdot 12TiO_2 \cdot \frac{1}{2}Nb_2O_5 \cdot ZrO_2 \cdot SiO_2 \cdot 28H_2O$, optically biaxial, in nepheline-syenite-pegmatite, from Kola peninsula, Russia. *Spencer 19, M.M., 1952.*

Belynskis reagent. A 1 percent copper sulfate solution recommended as an etchant for revealing dendritic structures in high carbon steels. *Osborne.*

bemenite. a. A light gray or grayish-brown, common manganese mineral, $8MnO_5 \cdot H_2O_7$-SiO_2. *E.C.T., v. 8, p. 722.* b. An erroneous name for danburite. *Bureau of Mines Staff.*

bemiscite. A salmon-colored feldspar from Bemis, Me. *Schaller.*

ben. a. Scot. Inward; toward the workings; the workman's right to enter the pit. *Fay.* b. The day's work of a youth, indicating the proportion of a man's task which he is able or allowed to put out, is called quarter-ben, half-ben, three-quarter ben. *Fay.* c. The live or productive part of a lode. *Arkell.* d. A mountain peak; a word occurring chiefly in the names of many of the highest summits of the mountains of Scotland, as Ben Nevis. *Fay.*

benbond. A finely ground plastic clay prepared from a deposit in Essex, England, used as a bond in foundry sand mixtures. *Osborne.*

bench. a. One of two or more divisions of a coal seam, separated by slate, etc., or simply separated by the process of cutting the coal, one bench or layer being cut before the adjacent one. *Fay.* b. To cut the coal in benches. *Fay.* c. A terrace on the side of a river or lake having at one time formed its bank. *See also* benches. *Fay.* d. A small tram or car of about 7 cubic feet capacity used for carrying coal from the face to the chute down which it is dumped to the gangway platform for reloading into larger cars. *Fay.* e. To wedge the bottoms up below the holing. *Fay.* f. A level layer worked separately in a mine. *Fay.* g. A group of retorts in an oven or furnace; also, the complete oven or furnace containing a set or group of retorts for generating coal gas. *Webster 3d.* h. Eng. A ledge left in tunnel construction work, on the edge of a cutting in earth or in rock. *Fay.* i. Scot. A landing place. *Fay.* j. The horizontal step or floor along which coal, ore, stone, or overburden is worked or quarried. *See also* benching; opencast. *Nelson.* k. A stratum of coal forming a portion of the seam; also, a flat place on a hillside indicating the outcrop of a coal seam. *B.C.I.* l. In tunnel excavation, where a top heading is driven, the bench is the mass of rock left, extending from about the spring line to the bottom of the tunnel. *Stauffer.* m. In a metal mine, a long horizontal face or ledge of ore in a stope or working place. *C.T.D.* n. A ledge, which in open-pit work forms a step from which excavation will take place at constant level. *Austin.* o. A part of the face of a large excavation which is not advanced as part of the round but as a separate operation. *B.S. 3618, 1964, sec. 6.* p. A ledge, which, in open-pit mines and quarries, forms a single level of operation above which mineral or waste materials are excavated from a contiguous bank or bench face. The mineral or waste is removed in successive layers, each of which is a bench, several of which may be in operation simultaneously in different parts of, and at different elevations in an open-pit mine or quarry. *Compare* berm, a. *Bureau of Mines Staff.* q. A working level or step in a cut which is made in several layers. *Nichols.* r. A band of coal forming a part of the bed. *Hudson.* s. A shelf or ledge made in a mine tunnel or working when an upper section is cut back. *Webster 3d.* t. An elongated area of mineralization usually marked by a characteristic mineralogy or structure. *A.G.I.* u. A level or gently sloping erosion plane inclined seaward. *H&G.* v. A nearly horizontal area at about the level of maximum high water or the seaside of a dike. *H&G.* w. *See* siege. *ASTM C162-66.*

bench-and-bench. Ark. That plan of mining coal in a room which requires the blasting of the two benches of coal alternately, each a little beyond the other. Also called bench working. *Fay.*

bench blasting. A mining system used either underground or in surface pits whereby a thick ore or waste zone is removed by blasting a series of successive horizontal layers called benches. *Bureau of Mines Staff.*

bench claim. A placer claim located on a bench above the present level of a stream. *Hess.*

bench coal. A coal seam cut in benches or layers. *Tomkeieff, 1954.*

bench cut. a. In vertical shaft sinking, blasting of drill holes so as to keep one end of a rectangular opening deep (leading), thus facilitating drainage and removal of blasted rock. *Pryor, 3.* b. Benches in tunnel driving are often drilled from the top with jackhammers. The vertical shotholes are generally spaced 4 feet apart in both directions, fired by electric delay detonators, one row at a time. When bench shotholes are drilled horizontally, with the drifter drills mounted on a bar, the charges are fired in rotation, starting from the upper center. In some cases a bench may be drilled both vertically and horizontally, particularly where the benches are exceptionally high or when the headroom above the bench is inadequate for handling drill steels long enough to bottom the shotholes to grade. The lifters are drilled by machines mounted on a bar across the bottom of the tunnel, in which case the upper vertical holes will all be fired before the horizontal charges. *Ham.*

bench diggings. River placers not subject to overflows. *See also* bench placers. *Fay.*

benched foundation. Foundation excavated on a sloping stratum of rock, which is cut in steps so that it cannot slide when under load. *Ham.*

benchers. Eng. Men employed in the mine at the bottom of inclined planes. *Fay.*

benches. A name applied to ledges of all kinds of rock that are shaped like steps or terraces. They may be developed either naturally in the ordinary processes of land degradation, faulting, and the like; or by artificial excavation in mines and quarries. *Fay.*

bench face. *See* bank, 1. *Bureau of Mines Staff.*

bench flume. A conduit on a bench, cut on sloping ground. *Seelye, 1.*

bench gas. *See* coal gas. *CCD, 6d, 1961.*

bench gravel. Yukon & Alaska. Gravel beds which occur on the sides of the valleys above the present stream bottoms, representing parts of the bed of the stream when it was at a higher level. *Fay.*

bench grinder; bench stand. An offhand grinding machine supported on a bench and mounting one or two wheels on a horizontal spindle. *ACSG, 1963.*

bench height. The average height of that part of the rock to be detached by the charge. *Langefors, p. 164. See also* bank height.

benching. a. A method of working small quarries or opencast pits in steps or benches, and rows of blasting holes are drilled parallel to the free face. The benching method has certain dangers as the quarrymen must work on ledges at some height. It is possible to work benches up to 30 feet high using tripod or wagon drills. *Nelson. See also* bottom benching; top benching. b. The breaking up of a bottom layer of coal with steel wedges in cases where holing is done above the floor. *Nelson*. c. Ches. The lower portion of the rock salt bed worked in one operation. *Fay*. d. *See* bench, h. *Fay*. e. Benches collectively, as in a mine. *Webster 2d. See also* bench, f. *Fay*.

benching iron. An item of surveying equipment, comprising a triangular steel plate with pointed studs at the corners. These studs are driven into the ground in the desired position. The plate is used either as a temporary bench mark or as a change point in running a line of levels. *Ham*.

benching shot. Scot. A shot placed in a hole bored vertically downward in an open face of work. *Fay*.

benching-up. Newc. Working on the top of coal. *Fay*.

bench mark. a. permanently fixed point of known elevation used as a reference for elevations. A primary bench mark is one close to a tide station to which the tide staff and tidal datum originally are referred. *Hy*. b. A permanent mark of a suitable character for preserving and transferring vertical elevations in a tunnel. *Stauffer*.

bench of timbers. A term used to describe the header when it is complete with legs. Also called a set. *Kentucky, p. 140*.

bench placer. A tin- or gold-bearing terrace of gravel on one or both sides of a river valley. *Nelson*.

bench placers. Placers in ancient stream deposits from 50 to 300 feet above present streams. *Fay*.

bench press. Any small press that can be mounted on a bench or table. *ASM Gloss*.

bench scrap. The scrap mica resulting from rifting and trimming hand-cobbed mica. *Skow*.

bench slope. *See* bank slope. *Bureau of Mines Staff*.

bench stone. A rectangular stone measuring from 4 to 8 or 9 inches long by approximately 2 inches wide and varying in thicknesses. In use, it generally rests on the artisan's bench, whence its name. Some bench stones are made circular for those who prefer the rotary motion in sharpening chisels and similar instruments. *Fay*.

bench terrace. A more or less level step between steep risers, graded into a hillside. *Nichols*.

bench vise. The ordinary machinist's vise, either plain or swivel. *Crispin*.

bench working. The system of working one or more seams or beds of mineral by open working or stripping, in stages or steps. *Zern*. Also called bench-and-bench. *Fay*.

benchy. Forming frequent benches; said of a lode. *Standard, 1964*.

bend. Corn. Indurated clay; applied by the miner to any hardened argillaceous substance. *Fay*.

bend allowance. The length of the arc of the neutral axis between the tangent points of a bend. *ASM Gloss*.

bend angle. The angle through which a bending operation is performed. *ASM Gloss*.

bend away. *See* away.

Bendelari jig. A jig fitted with a flexible rubber diaphragm which is worked by an eccentric motion, thus producing a jigging cycle (pulsion suction). *Pryor, 3*.

bender. Eng. An iron loop on pump cylinders for attaching a hoisting rope. *Fay*.

bending brake. A press brake used in bending. *ASM Gloss*.

bending formula. The formula used to calculate the bending of beams, made of any homogeneous material, under load, $M=fz$, where M equals bending moment, f equals stress, and z equals modulus of section, from which $\frac{M=fI,}{y}$ where I is the moment of inertia of the section and y is one-half its depth. *Ham*.

bending moment. The algebraic sum of the couples or the moments of the external forces, or both, to the left or to the right of any section on a member subjected to bending by couples or transverse forces, or both. *ASM Gloss*.

bending moment diagram. A diagram giving the amount of bending moment at any point along a beam, for one loading. The position and amount of the maximum bending moment is clearly revealed by this diagram. *Ham*.

bending moment envelope. A diagram showing the worst bending moment at any point for all possible loadings on a beam, consisting of several bending moment diagrams superimposed one upon another. *Ham*.

bending of strata. *See* folding. *C.T.D*.

bending rolls. Two or three rolls with an adjustment for imparting a desired curvature in sheet metal. *ASM Gloss*.

bending schedule. A list of steel reinforcement prepared by the designer of a reinforced concrete structure, showing the shapes and dimensions of every bar and the number of bars required. The bar bender prepares the bars in accordance with this schedule. *Ham*.

bending stress. The stress produced in the outer fibers of a rope by bending over a sheave or drum. *Zern*.

bend radius. The inside radius of a bent section. *ASM Gloss*.

bend pulley. An idler pulley which is used solely for the purpose of changing the direction of travel of the belt other than at the terminals of the conveyor. *NEMA MB1-1961*.

bends. Caisson disease, brought on by too sudden return to normal pressure after working in a pressurized shaft or tunnel. *Pryor, 3*.

bend shaft. A shaft which supports a bend wheel or pulley. *ASA MH4.1-1958*.

bend tangent. A tangent point where a bending arc ceases or changes. *ASM Gloss*.

bend test. A test for determining relative ductility of metal that is to be formed, usually sheet, strip, plate, or wire, and for determining soundness and toughness of metal. The specimen is usually bent over a specified diameter through a specified angle for a specified number of cycles. *ASM Gloss*.

bend up; bend up a bit. Eng. An order to raise the cage slowly, so that it may be instantly stopped on the order "hold" being given. *Fay*.

bend wheel. A wheel used to interrupt and change the normal path of travel of the conveying or driving medium. Most generally used to effect a change in direction of a conveyor travel from inclined to horizontal or a similar change. *ASA MH4. 1-1958*.

beneficiate. a. To improve the grade by removing gangue material; to upgrade. *Ballard*. b. Originally, the reduction of ores to metal; now employed, especially in the case of iron ore, to mean improving the chemical and/or physical properties of the ore. *Barger; Bureau of Mines Staff*.

beneficiated iron ores. Usable ores that have been treated to improve either their physical or chemical characteristics. *BuMines Bull. 630, 1965, p. 459*.

beneficiation. a. The dressing or processing of ores for the purpose of (1) regulating the size of a desired product, (2) removing unwanted constituents, and (3) improving the quality, purity, or assay grade of a desired product. *Pryor, 3*. b. Concentration or other preparation of ore for smelting by drying, flotation, or magnetic separation. *ASM Gloss*.

beneficio. a. Sp. The working of mines. *Fay*. b. Sp. Profit derived from working a mine. *Fay*. c. Sp. Metallurgical processes: B. de cazo, the caldron or hot amalgamation process; b. de hierro, amalgamation reduction with the addition of fragments of iron; b. de colpa, the patio process with colpa in lieu of magistral; b. de pella de plata, amalgamation reduction with the addition of silver amalgam; b. de patio, the patio or cold amalgamation process; b. de toneles, the Freiberg or barrel amalgamation process; b. por cianuración, the cyanide process; b. por cloruración, the chlorination process; and b. por fuego, reduction by smelting. *Fay*. d. Sp. B. de metales, mechanical preparation of ores; ore dressing. *Fay*.

Benfield process. *See* hot-carbonate process.

Bengal amethyst. Purple sapphire. *Shipley*.

Bengal fire. A mixture of realgar, potassium nitrate, and sulfur. Used in pyrotechnics. *Bennett 2d, 1962*.

ben heyl. Corn. A stream, where tin ore is found. *Fay*.

benitoite. A blue barium-titanium silicate, $BaTiSi_3O_9$, so far found only in California. Used as a gem. Hexagonal. *Sanford; Dana 17*.

benjaminite. A rare sulfosalt for which the formula, $Pb_2(Ag,Cu)_2Bi_4S_9$, has been suggested. *American Mineralogist, v. 38, No. 5-6, May-June 1953, pp. 550-552*.

benk. Eng. The working face of a coalbed. A variation of bench. *Fay*.

benn. A queue of workmen waiting their turn at the pit top to enter the cage for descending or at the pit bottom for ascending the shaft. *Nelson*.

Benphosil grout. Trade name for a clay silicate grout to which has been added wet ground Trief slag, to provide a grout of increased strength and stability. This material was used in the shafts at Bevercotes, Great Britain. *See also* bentonite; Joosten process. *Nelson*.

benstonite. A rhombohedral carbonate having unit-cell contents, $3[Ca_7(Ba,Sr)_6(CO_3)_{13}]$. Obtained from a baryte mine in Hot Springs County, Ark. The name is unfortunately near bentonite. *Hey, M.M., 1961*.

bent. a. Scot. The subsidence of roof near the working face, for example, a bent roof. *Fay*. b. A framework transverse to the length of a structure (as a trestle, bridge, or long shed) usually designed to carry lateral as well as vertical loads. *Webster 3d*. c. Derb. An offshoot from a vein. *Fay*. d. A transverse structure consisting of legs, bracing, and feet used for the purpose of supporting a gallery or conveyor frame at a fixed elevation. *ASA MH4.1–1958.* e. In tunnel timbering, two posts and a roof timber. *Nichols.*

bent glass. Flat glass that has been shaped while hot into cylindrical or other curved shapes. *ASTM C162-66.*

Benthic division. A primary division of the sea which includes all of the ocean floor. The Benthic Division is subdivided into the Littoral System (the ocean floor lying in water depths ranging from the high watermark to a depth of 200 meters or the edge of the continental shelf), and the Deep-Sea System (ocean floor lying in water deeper than 200 meters). The systems are further subdivided into the Eulittoral Zone (0 to 50 meters), Sublittoral Zone (50 to 200 meters), Archibenthic Zone (200 to 1,000 meters), and the Abyssal-Benthic Zone (1,000 meters and greater). *Hy.*

benthonic. Refers to the bottom of a body of standing water. *Compare* pelagic. *A.G.I. Supp.*

benthos. All plants and animals living on the ocean bottom. *Hy.*

bentonite. A montmorillonite-type clay formed by the alteration of volcanic ash. It varies in composition and is usually highly colloidal and plastic. Swelling bentonite, for example, is so named because of its capacity to absorb large amounts of water accompanied by an enormous increase in volume. *Bureau of Mines Staff.* Occurs in thin deposits in the Cretaceous and Tertiary rocks of the Western United States. It is used for making refractory linings, water softening, decolorizing of oils, thickening drilling muds, and the preparation of fine grouting fluids. As a mud flush, bentonite is used at a concentration of about 3 pounds per cubic foot of water. *Nelson.*

bentonitic arkose. *See* arkosic bentonite. *A.G.I.*

bentonitic clay. A clay derived from decomposed volcanic ash having a high content of the mineral montmorillonite, and usually characterized by high swelling or wetting. *ASCE P1826.*

bent sieve. A stationary screen constructed in the form of an arc of a circle, and is arranged as a chute over which the clean coal from a cyclone washer passes to the orthodox rinsing screen. It is claimed to have a considerably higher screening capacity than the vibratory screen. In the United States, the bent screen is used in magnetite recovery from cyclone washers. *Nelson.*

benzene; benzol; phene. Clear; colorless; extremely flammable; liquid; C_6H_6; molecular weight, 78.11; characteristic odor; narcotic; toxic; vapor harmful; specific gravity, .8790 (at 20° C, referred to water at 4° C); melting point, 5.5° C; boiling point, 80.1° C; flash point, closed cup, —11° C; slightly soluble in water; and soluble in all proportions in alcohol, in ether, in acetone, in chloroform, in acetic acid, in carbon tetrachloride, and in carbon disulfide. An important solvent. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-146.*

benzine. This term is archaic and misleading and should not be used. The term petroleum benzin has appeared in the U.S. Pharmacopoeia for many years designating a refined light naptha used for extraction purposes. This term should only be used for material meeting the U.S. Pharmacopoeia specifications. The term benzin should never be used without the prefix petroleum. *ASTM D288-57.*

benzol. The general term which refers to commercial or technical (not necessarily pure) benzene. *API Glossary.*

benzol indicator. This is a portable instrument designed specifically for measuring low concentrations of benzol potentially dangerous to the health of personnel. Capable of indicating the concentrations quickly and easily on a dial. Used for byproduct coke, rubber, paint, varnish and chemical plants or wherever toxic quantities of benzol might be encountered. *Bests, p. 584.*

benzol stillman helper. In the coke products industry, one who assists a benzene still operator in the distillation of benzol by manipulating valves to control, charge, or drain stills, oil cooler, pumps, and auxiliary equipment. Also called stillman helper. *D.O.T. Supp.*

beraunite. A foliated and columnar, red to reddish-brown, hydrous ferric phosphate. *Fay.*

berdan. A circular, revolving, inclined iron pan in which concentrates are ground with mercury and water by an iron ball. *Gordon.*

Berea sandstone. Berea grit. A rock formation consisting of fine-grained sandstone and grit, generally considered as the base of the Carboniferous system in Ohio. It is much used as a building stone and for grindstones, and is one of the principal oil-bearing formations of the state. *Fay.*

berengelite. A dark brown, resinous, asphalt-like mineral, soluble in cold alcohol but nearly insoluble in potassium hydroxide. Found near Arica, Peru. *Fay.*

beresite. A name coined by Rose for a muscovite granite that forms dikes in the gold district of Beresovsk, in the Ural Mountains, U.S.S.R. It is, therefore, practically a synonym for aplite, as earlier defined but some of the beresites have since been shown to be practically without feldspar and to form a very exceptional aggregate of quartz and muscovite. *Fay.*

berg. a. A hill or mountain. Local in the Hudson River Valley. *A.G.I.* b. An iceberg. *A.G.I. Supp.*

bergalite; bergalith. A pitchy black dike rock containing small phenocrysts of haüyne, apatite, perovskite, melilite, and magnetite in a groundmass of the same minerals with nepheline, biotite, and brown interstitial glass; from Kaiserstuhl, Oberbergen, Baden, Germany. *Holmes, 1928; Johannsen, v. 4, 1938, p. 379.*

bergbutter. a. Ger. An impure alum or copperas efflorescence, of a butter-like consistency, oozing from alum slates. *Hess.* b. Various salts, commonly halotrichite. *Hey 2d, 1955.*

bergenite. Occurs naturally at Bergen an der Trieb, Saxony, with other uranium minerals; named from locality, the older name being rejected as implying a barian phosphuranylite rather than the barium analogue. Synonym for barium-phosphuranylite. *Hey, M.M., 1961.*

Bergius process. Manufacture of liquid fuels from coal by mixing powdered coal with oil and hydrogen under moderately high temperatures and high pressures. *Bennett 2d, 1962. See also* hydrogenation of coal; Lurgi gasifier. *Nelson.*

Berglof process. A method of direct reduction of iron ore. The reduction of the ore was carried out in interchangeable containers. The ore was heated to the reduction temperature in one container, and then this container was moved into the reducing zone. *Osborne.*

bergmehl; bergmeal. a. An infusorial earth, sometimes eaten mixed with meal or bark. Also called mountain meal. *Standard, 1964.* b. A white efflorescence of calcite, like cotton. Also called rock meal; fossil farina. *Standard, 1964.*

Berg method. *See* diver method. *Dodd.*

bergschrund. A large crevasse or series of closely spaced open fissures at the upper end of a valley glacier between the main mass of the ice and the rock walls of the confining cirque. In some cases, the bergschrund lies between the ice that is of sufficient depth and consistency to begin movement and the névé or snowfield which is not moving. *Stokes and Varnes, 1955.*

berg till. When icebergs bearing till or boulders floated out into lakes which bordered the ice sheet, deposits were made in the water which bear resemblances both to till and to lacustrine clays. If the icebergs bore till, this might be deposited intact if the icebergs grounded. If the bergs bore only boulders and stones, these were dropped into the lacustrine clay. The stones and the clay or mud might be in the relative proportions appropriate to till. Such deposits would be, in some respects, unlike ground moraine, both in physical constitution and in topography; but the two classes of deposits may so closely resemble each other that their local differentiation is no simple matter. Deposits of berg till are quite certainly existent in New Jersey. *A.G.I.*

berigem. A chrysolite-colored synthetic spinel. *Shipley.*

beringite. A dark variety of soda trachyte rich in barkevikite; from Bering Island, Kamchatka Peninsula. *Holmes, 1928.*

Berkeley clay. A plastic, refractory kaolin from South Carolina. *Dodd.*

berkelium. The element having atomic number 97, the discovery of which was announced by Thompson, Ghiorso, and Seaborg in 1950. They produced an isotope of 4.5 hours half-life, berkelium 243, by helium ion bombardment of americium 241. Symbol, Bk; valences, 3 and 4; and the mass number of the most stable isotope, 249. *NRC-ASA N1.1–1957; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-90, B-101.*

berkeyite. A blue gemstone from Brazil, afterwards identified as lazulite. *English.*

Berlin blue. In optical mineralogy, an anomalous interference color of the first order. *Fay.*

Berlin iron. A soft iron, containing phosphorus, making very fine smooth castings and used for ornaments and jewelry. *Standard, 1964.*

berlinite. A colorless to grayish or rose-red, compact, massive hydrous phosphate of aluminum, $2Al_2O_3{\cdot}2P_2O_5{\cdot}H_2O$; Mohs' hardness, 6-7; specific gravity, 2.64; from Westana, Scania, Sweden. *Dana 7, v. 2, p. 697.*

Berlin porcelain. A German laboratory porcelain, particularly that made at the Berlin State Porcelain factory. A quoted body composition is 77 percent purified Halle clay and 23 percent Norwegian feldspar, all finer than 10 microns. The ware is fired at 1,000° C, and is then glazed and refired at 1,400° C. *Dodd.*

berl saddle. A chemical stoneware shape for the packing of absorption towers; it is saddle-shaped, size about 1 inch and approximately 2,000 pieces are required per cubic foot. A packing of berl saddles provides a very large contact surface and is a most efficient type of ceramic packing. *Dodd.*

berm. a. A horizontal shelf or ledge built into an embankment or sloping wall of an open pit or quarry to break the continuity of an otherwise long slope for the purpose of strengthening and increasing the stability of the slope or to catch or arrest slope slough material. A berm may also be used as a haulage road or serve as a bench above which material is excavated from a bank or bench face. This berm is sometimes used as a synonym for bench. *Compare* bench, p. *Bureau of Mines Staff.* b. The space left between the upper edge of a cut and the toe of an embankment. *Seelye, 1.* c. An artificial ridge of earth *Nichols, 2.* d. A term agreed upon by M. R. Campbell, L. La Forge, and F. Bascom to distinguish those terraces which originate from the interruption of an erosion cycle with rejuvenation of a stream in the mature stage of its development and renewed dissection, leaving remnants of the earlier valley floor above flood level. *A.G.I.* e. A nearly horizontal portion of the beach or backshore formed by the deposit of material by wave action. Some beaches have no berms, others have one or several. *A.G.I.*

bermanite. A reddish-brown, basic hydrous phosphate, chiefly of manganese, iron, and magnesium, $R''_5R'''_8(PO_4)_8(OH)_{10}\cdot 15H_2O$ with $R''' = Mn:Fe = 9:1$; $R'' = Mn.Mg:(Ca+Na) = 19:6:2$. Orthorhombic; minute tabular crystals. Obtained near Hillside, Ariz. *English.*

berm interval. Vertical distance from crest of berm to its underlying toe, as in a bank or bench. *Bureau of Mines Staff.*

Bermudez asphalt; Bermuda asphalt. A natural asphalt from Bermudez, Venezuela, used as a road binder and for sheet-asphalt pavements. *Hess.*

bermudite. A dark lava containing abundant small biotite crystals with accessory iron minerals and apatite in an obscure analcitic base, brown to colorless augite may also be present; the effusive form of biotite monchiquite or ouachitite. Found in the Bermuda islands. *Holmes, 1928.*

bernardinite. Originally described by Stillman as fossil resin, but later shown by Stanley-Brown to be a fungus impregnated by resinous material. *Tomkeieff, 1954.*

Bernardo's process. A method for the electric welding of iron. *Fay.*

Bernoulli's assumption. This states that in any beam subjected to bending, sections which are plane before bending will remain plane after bending. *Ham.*

Bernoulli's theorem. A law of hydrodynamics that states that in a stream of liquid the sum of the elevation head, the pressure head, and the velocity head remains constant along any line of flow provided no work is done by or upon the liquid in the course of its flow and decreases in proportion to the energy lost in viscous flow. *Webster 3d.*

bernstein. a. A fossil resin found in and in association with lignite beds of Eocene age. Commonly occurring in many European localities, and is especially abundant in areas bordering the Baltic coast. *A.G.I.* b. German name for amber. *Tomkeieff, 1954.*

berondite. A type of theralite characterized by the presence of elognated crystals of brown hornblende associated with titaniferous augite. *Compare* luscladite. *Holmes, 1928.*

Berry machine. *See* soft-mud process. *Dodd.*

berthierite. A sulfide of antimony and iron, $FeS.Sb_2S_3$; dark steel-gray color. *Fay.*

berthing impact. The force imposed on piers and jetties when ships are being berthed. This force is generally estimated from the kinetic energy of a large vessel, assuming a velocity of about 6 inches per second. *Ham.*

berthonite. A discredited species equal to bournonite. *American Mineralogist, v. 28, No. 3, March 1943, p. 214.*

bertrandite. A brilliant transparent, colorless hydrous glucinum silicate, $H_2Gl_4Si_2O_9$, crystallizing in the orthorhombic system. *Standard, 1964.*

Bertrand lens. In optical mineralogy, a small lens inserted in the microscope tube to magnify the interference. *Fay.*

Bertrand process. A heavy-fluid coal cleaning process which utilizes a calcium chloride solution as separating medium and is applicable only to deslimed feed. It differs from the Lessing process in that the raw coal is introduced into the system countercurrent fashion, from water to separating solution, the purified coal and the waste being withdrawn in a similarly countercurrent fashion. Coal containing less than 1 percent ash is said to be obtained by this process. *Gaudin, pp. 242-243.*

beryl. A beryllium-aluminum silicate, $Be_3Al_2(Si_6O_{18})$. Used as a gem when clear and well-colored. The grass green variety is known as emerald; light green, beryl; blue-green, aquamarine. Contains 14 percent beryllium oxide. Hexagonal. *A.G.I.; Dana 17; Sanford.*

beryl cat's-eye. Beryl with a cat's-eye effect. Extremely rare. *Shipley.*

beryl glass. Same as beryllium glass, or fused beryl. It includes emerald glass colored with chrome oxide, and a blue glass used for imitation gems. Mohs' hardness, 6.5; specific gravity, 2.44; and refractive index, 1.51 to 1.52. *Shipley.*

berylite. A rose-colored synthetic spinel of the same color as balas ruby. *Shipley.*

beryllia. a. A refractory material with a melting point of about 2,570° C. It possesses high electrical resistance and it is claimed that articles made from it have excellent resistance to thermal shock. *Merriman.* b. Beryllium oxide, BeO. Also called glucina. *A.G.I.*

beryllides. A group of intermetallic compounds of potential interest as special ceramics. Cell dimensions and types of structure have been reported for the beryllides of titanium, vanadium, chromium, zirconium, niobium, molybdenum, hafnium, and tantalum. *Dodd.*

berylliosis. An occupational disease caused by the inhalation of fumes liberated during the reduction of beryllium. Beryllium is thought to play the principal role, aggravated by fluorine and to affect all organs, particularly the larger protective glands, rather than the respiratory apparatus alone. *Hess.*

beryllite. A hydrous silicate of beryllium, $Be_3SiO_4(OH)_2\cdot H_2O$, as an alteration product of epididymite. *Spencer 20, M.M., 1955.*

beryllium. A light, steely, silvery-white metallic element in group II of the periodic system. Symbol, Be; valence, 2; hexagonal; atomic number, 4; atomic weight, 9.0122; specific gravity, 1.85; melting point, 1,280° to 1,300° C; and hardness, 55 to 60 Brinell. The pure metal is difficult to prepare. Used as windows in X-ray tubes and in copper alloys where high elasticity and resistance to stresses are required. *C.T.D.* It occurs only in a few minerals, such as beryl and chrysoberyl. *Webster 2d.* Used in nuclear reactors because it reflects neutrons. *C.T.D. Supp.*

beryllium aluminate; chrysoberyl. a. $Be(AlO_2)_2$; molecular weight, 126.97; orthorhombic; and specific gravity, 3.76. *Bennett 2d, 1962.* b. Source of beryllium and used as a gem. *Bureau of Mines Staff.*

beryllium bronze. Alloy of copper with 2¼ percent beryllium. *Pryor, 3.*

beryllium carbide. Be_2C; decomposes above 2,950° C. Used as a moderator in nuclear application. *Lee.* Molecular weight, 30.04; yellow; hexagonal; and specific gravity, 1.90 at 15° C). *Bennett 2d, 1962.*

beryllium copper. The standard alloy contains 2.25 percent beryllium; sometimes up to 0.5 percent nickel is added to restrict grain size during annealing. In the annealed condition, the standard beryllium-copper alloy has a tensile strength of 70,000 pounds per square inch, while by cold rolling and heat treatment, its tensile strength can be still further increased. Springs of this alloy show remarkable endurance. Used for nonsparking tools. *Camm.*

beryllium disilicate; bertrandite. $2Be_2(SiO_4)\cdot H_2O$; molecular weight, 238.23; orthorhombic; and specific gravity, 2.6. *Bennett 2d, 1962.*

beryllium glass. Consisting either of the same chemical composition as that of the mineral beryl, or so closely approaching it as to be analysis proof, but not crystalline. *See also* beryl glass. *Shipley.*

beryllium gold. An alloy of beryllium and gold said to contain from 0.5 to 5.0 percent beryllium which strongly hardens the gold. Used as dental inlays and gold solders. *Camm.*

beryllium metaphosphate. A white powder or granular material; $Be(PO_3)_2$. Used as raw material for special ceramic composition. *CCD 6d, 1961.*

beryllium minerals. The gemstones emerald and aquamarine are compound silicates. Chrysoberyl is a compound oxide. Industrially, a 2 percent alloy of beryllium metal with copper confers great strength and fatigue resistance. Among other important users of this scarce element are nuclear power and the secondary metal industries. *Pryor, 3.*

beryllium monitor. Samples are collected on continuous filter strip, one sample being evaluated while the next is being collected. Recording is on strip chart. Concentrations above preset maximum levels may be made to activate alarm. *Bests, p. 584.*

beryllium nitride. Be_3N_2; molecular weight, 55.05; colorless; isometric; and melting point, 2,200° ± 100° C. *Bennett 2d, 1962.*

beryllium orthosilicate; phenacite. Be_2SiO_4; molecular weight, 110.11; triclinic; and specific gravity, 3.0. *Bennett 2d, 1962.*

beryllium oxide; beryllia; bromellite. A white powder; hexagonal; BeO. Used in the preparation of beryllium compounds and in ceramics and refractories. *CCD 6d, 1961.* Melting point, 2,570° C; and specific gravity, 3.02. Bodies high in BeO have extremely high thermal conductivity (in the range of metals) and also possesses high mechanical strength. Used in nuclear reactors because of its refractoriness, high thermal conductivity, and its ability to act as a moderator for fast neutrons, reducing them to thermal speeds. Beryllia ceramics are used for electronic components and for crucibles for melting uranium and thorium. *Lee.*

beryllium silver. An alloy of silver and beryllium containing 0.41 percent to 0.90 percent beryllium. It is claimed to remain untarnished in atmospheres charged with sulfur compounds. *Camm.*

beryllonite. A rare mineral, found at Stoneham, Maine, in decomposed granite, occurring as orthorhombic crystals. Phosphate of beryllium and sodium. *C.T.D.*

beryloid. In crystallography, the dihexagonal pyramid, common in crystals of beryl. *Standard, 1964.*

berylometer. An instrument, often portable, that detects the presence of beryllium in any mixture or mineral. The device contains radioactive antimony, which produces gamma rays; these convert ordinary beryllium into a lighter isotope, releasing neutrons which are counted by a scintillator. *Pearl, p. 62.*

beryloscope. A color filter, same as the Emerald glass. *Shipley.*

beryl preferential stain process. A quick, simple method developed by the U.S. Bureau of Mines for determining the amount of beryl in a mineral sample. The samples are placed in a hot solution of sodium hydroxide; this etches the beryl grains in the sample, which then are stained an intense blue with another chemical, so they can be easily counted under a microscope. *Bureau of Mines Staff.*

beryl triplet. Correct name for a genuine triplet made from two portions of greenish or colorless beryl with a cemented layer of green coloring matter between them. Often incorrectly called emerald triplet. *Shipley.*

berzelianite. A mineral, Cu_2Se, consisting of copper selenide, having a silver-white color when freshly broken; specific gravity, 6.7. *Webster 3d.*

berzeliite. A massive, bright, yellow, brittle, calcium-magnesium-manganese arsenate, $(Ca,Mg,Mn)_3As_2O_8$. *Fay.*

beschtauite. A soda-rich variety of quartz porphyry from Mount Beschtau, Caucasia, U.S.S.R.; synonym for quartz keratophyre. *Holmes, 1928.*

Bessemer. Any product of the Bessemer process, as Bessemer steel, iron, etc.; named from Henry Bessemer, who patented the process in 1855; used also attributively as, Bessemer converter, flame, or method. *Standard, 1964.*

Bessemer afterblow. In the basic Bessemer process of steelmaking, the continuation of the blowing cycle after the oxidation of the silicon, manganese, and carbon content of the charge is complete, and during which the phosphorus and sulfur content of the charge is reduced. *Henderson.*

Bessemer blow. In the Bessemer process of steelmaking, that period of the blowing cycle during which the oxidation of the silicon, manganese, and carbon content of the charge takes place. *Henderson.*

Bessemer converter. A pear-shaped steel shell lined with a refractory material containing a number of holes or ports in the bottom or side through which air is blown through the molten pig iron charge. The converter is mounted on trunnions about which it may be tilted to charge or tap. Molten pig iron is charged into the converter and air blown through the molten metal to oxidize the impurities, thus making steel. *Henderson.*

Bessemer iron ore. *See* Bessemer ore. *Bennett 2d, 1962.*

Bessemer matte. In the extraction of copper from sulfide ores, the liquid that remains in the converter at the end of the blow. It is essentially molten nickel sulfide or a solution of copper and nickel sulfides. *Newton, p. 351.*

Bessemer ore. Iron ore very low in phosphorus and thus suitable for use in the Bessemer process. *Standard, 1964.*

Bessemer pig iron. Pig iron with sufficiently low phosphorus (0.100 percent maximum) to be suitable for use in the Bessemer process. *ASM Gloss.*

Bessemer process. One for refining molten pig iron by blowing air up through it in a Bessemer converter. *Bureau of Mines Staff.*

Bessemer steel. Steel made by the Bessemer process. *Zern.*

best. One of several terms used to designate high quality drill diamonds. *Long.*

best cokes. *See* coke tinplate. *Bennett 2d, 1962.*

best gold. *See* burnish gold. *Dodd.*

bestowing. The cover of fired bricks (usually three courses) for the setting of a clamp. *See also* clamp. *Dodd.*

best patent wire. Wire having a tensile strength of 80 to 90 tons per square inch (125 to 140 kilograms per square millimeter). *Ham.*

best plough wire. Wire with a tensile strength of 100 to 110 tons per square inch (160 to 175 kilograms per square millimeter). *Ham.*

best selected copper. Metal of a lower purity than high-conductivity copper. It generally contains over 99.75 percent copper. *C.T.D.*

beta-. The convention alpha- for low-temperature, beta- for high-temperature phases of a compound, adopted by most mineralogists and X-ray workers, is exactly reversed by the Geophysical Laboratory, in Washington, D.C. *Hey 2d, 1955.*

beta alumohydrocalcite. A mineral having the composition of alumohydrocalcite, $(CaAl_2(CO_3)_2(OH)_4 \cdot 3H_2O$, but the fibers give straight extinction. From the shales at Nowa Ruda, Dolny Slask, Poland. *Hey, M.M., 1964; Fleischer.*

beta antimony; black antimony. An allotropic form of antimony. A black powder obtained by oxidizing antimony hydride at low temperatures. *Bennett 2d, 1962.*

beta brass. Copper-zinc alloys containing from 46 to 49 percent zinc, which consist (at room temperature) of the intermediate constituent (or intermetallic compound) known as beta. *C.T.D.*

beta carnegieite. A sodium anorthite, $NaAlSiO_4$; triclinic. It is produced from alpha carnegieite at temperatures below 690° C. *English.*

beta cristabolite. The high-temperature form of silica, SiO_2, stable between 1,470° and 1,710° C, but it may persist in a metastable condition down to about 230° C. Octahedral crystals, often spinel twins. Isometric. Occurs in Australian opals. *English.*

beta fergusonite. Natural, light yellow monoclinic fergusonite crystals; from microcline granite stocks, Central Asia. *American Mineralogist, v. 46, No. 11-12, November-December 1961, pp. 1516-1517.*

betafite. An isometric, strongly radioactive mineral, $(U,Ca)(Cb,Ta,Ti)_3O_9.nH_2O$, found in granite pegmatites with other rare-earth minerals; greenish-brown to black when fresh, but yellow to yellow-brown by alteration. It is suggested that the name betafite be reserved for members of the pyrochlore group containing 15 percent uranium or more (2.5 percent or more, uranium atoms per unit cell). Hatchettolite and ellsworthite then become intermediate members of the pyrochlore-betafite series and these names can be dropped. *Crosby, p. 9; American Mineralogist, v. 46, No. 11-12, November-December 1961, p. 1519.*

beta jaulingite. A brownish-yellow resin, obtained from the residue of jaulingite, by the action of ethyl ether, after treatment with carbon disulfide. *Fay.*

beta mullite. A variant of mullite. *Hey 2d, 1955.*

beta particle. An elementary particle emitted from a nucleus during radioactive decay. It has a single electrical charge and a mass equal to 1/1837 that of a proton. Beta particles are easily stopped by a thin sheet of metal. A negatively charged beta particle is physically identical to the electron. If the beta particle is positively charged, it is called a positron. Beta radiation may cause skin burns, and beta emitters are harmful if inhaled or ingested. *L&L.*

beta quartz. Quartz formed at a temperature between 573° and 870° C. The commonest examples are the bipyamidal quartz crystals found as phenocrysts in quartz porphyries. *Hess.*

beta ray. A ray of electrons emitted during the spontaneous disintegration of certain atomic nuclei. *ASM Gloss.*

beta-ray spectrometer. An instrument for determining the energy distribution of beta particles and secondary electrons. *NRC-ASA N1.1-1957.*

beta structure. A Hume-Rothery designation for structurally analogous body-centered cubic phases (similar to beta brass) or electron compounds that have ratios of 3 valence electrons to 2 atoms. Not to be confused with a beta phase on a constitution diagram. *ASM Gloss.*

beta tin. Metallic tin in its common, massive form. *Bennett 2d, 1962.*

betatron. A doughnut-shaped accelerator in which electrons are accelerated by changing magnetic field. Energies as high as 340 million electron volts (340 mev) have been attained. *L&L.*

beta uranium. An allotropic form of uranium that is stable between approximately 667° and 775° C; it is tetragonal. *NRC-ASA N1.1–1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-143.*

beta uranophane. The monoclinic polymorph of orthorhombic uranophane, $Ca(UO_2)_2(SiO_3)_2(OH)_2 \cdot 5H_2O$. Synonym for beta uranotile. *Spencer 21, M.M., 1958.*

beta uranotile. Synonym for beta uranophane. *Frondel, p. 176.*

beta wollastonite. Same as pseudowollastonite. *English.*

beta zircon. Mineralogical name for any zircon with properties intermediate between alpha and gamma zircons. In the heat process used to change zircon colors, the properties are converted into those of alpha zircon. *See also* **alpha zircon; gamma**

zircon. *Shipley.*

betekhtinite; betechtinit. Orthorhombic needles, $Cu_{10}PbS_6$, in ores from Mansfeld, Germany. *Spencer 21, M.M., 1958.*

Bethell's process. A process for creosoting timber (such as track sleepers) to extend its useful life. The timber is first dried, then placed in a cylinder and subjected to partial vacuum, and finally impregnated with creosote under pressure. *Nelson.*

B.E.T. method. See Brunauer, Emmett, and Teller method. *Dodd.*

beton. Fr. Concrete made after the French fashion by mixing gravel or other material with a mortar of cement and sand. *Webster 2d.*

betpakdalite. Near $CaO\cdot Fe_2O_3\cdot As_2O_5\cdot 5MoO_3\cdot 14H_2O$; perhaps essentially an arsenomolybdate of calcium and iron, as minute lemon-yellow crystals in a muscovite-quartz greisen from the oxidation zone of the Karaoba tungsten deposit, Central Kazakhstan, U.S.S.R. *Hey, M.M., 1961.*

betrunked. Deprived of its trunk or main body; said of certain river systems, whose tributaries in the dry season, for lack of sufficient water, fail to unite in a main trunk, but are dissipated in the arid ground. *Standard, 1964.*

betrunked valley. A valley that has lost its lower course by the retreat of the cliffs, often resulting in the formation of a hanging valley. *Schieferdecker.*

Better Bed fireclay. A siliceous fireclay occurring under the Better Bed coal of the Leeds area, England. *Dodd.*

betterness. Fineness of gold and silver above the standard. *Standard, 1964.* Obsolete. *A.G.I.*

betteroperic fabric. Texture depending on the shapes and arrangement of rock minerals in which grain growth from interstitial solution is determined by a direction of easiest movement. *Hess.*

Betterton-Kroll process. A process for obtaining bismuth and for purifying desilverized lead that contains bismuth. Metallic calcium or magnesium is added to the molten lead to cause the formation of high-melting-point intermetallic compounds with bismuth. These compounds separate as a surface scum and are skimmed off. The excess calcium and magnesium are removed from the lead by chlorine gas as mixed molten chlorides of lead or zinc. *CCD 6d, 1961.*

Betts process. An electrolytic process in which pure lead is deposited on a thin cathode of pure lead, from an anode containing as much as 10 percent of silver, gold, bismuth, copper, antimony, arsenic, selenium, and other impurities. The electrolyte is lead fluosilicate and fluosilicic acid. The scrap anodes and the residues of impurities associated with them are either recast into anodes or treated to recover antimonial lead, silver, gold, bismuth, etc. *CCD 6d, 1961.*

betty napper. Beds of fine-grained compact sandstone in the Coal Measures which are extremely hard to drill or blast. *Arkell.*

betun. Sp. Bitumen or asphaltum; b. marga, bituminous marl. *Fay.*

between-laboratory tolerance. The maximum acceptable difference between the means of two determinations carried out by two different laboratories on representative samples taken from the same bulk sample after the last stage of the reduction process. *B.S. 1016, 1961, Pt. 16.*

beudantite. A ferric lead sulfate or arsenate occurring in green to black rhombohedral crystals. *Fay.*

beuheyl. Corn. A live stream (vein), that is, one rich in tin. Also spelled ben heyl. *Fay.*

bev The abbreviation for billion electron volts, or 10^9 electron volts (ev). *NRC-ASA N1.1-1957.*

bevel. a. The angle that one surface or line makes with another when they are not at right angles. *Webster 3d.* b. An instrument consisting of two arms joined together and opening to any angle, for drawing angles or adjusting the surfaces of work to a given angle. *Webster 3d.* c. To slope or slant. *Webster 3d.*

bevel angle. The angle formed between the prepared edge of a member and a plane perpendicular to the surface of the member. *ASM Gloss.*

bevel bit. Synonym for bevel-wall bit. *Long.*

bevel brick. A brick having one edge replaced by a bevel. *Dodd.*

bevel cut. Applied to any style of cutting with a very large table, joined to the girdle by one or sometimes two bevels, and a pavilion which may be step cut, brilliant cut, or any style. Used mostly for opaque stones, and often intaglios. Bevel cut shapes include round, square, cushion, rectangular, oblong, oval, pendeloque, navette, heart, diamond, horseshoe, shield, pentagon, and hexagon shapes. The style is used predominantly for less valuable gems. Also known as table cut. *Shipley.*

beveled end. In concrete and similar pipe, terminal surfaces inclined at such an angle with the axis of the pipe that the end of one pipe will closely fit in the alternate end of another. *Hess.*

beveled joint. In sewer or drain pipe, a joint formed between pipes with beveled ends. *Hess.*

beveler. In the stonework industry, one who finishes slabs of slate for building purposes by beveling and smoothing edges. *D.O.T. 1.*

bevel flanging. Same as flaring. *ASM Gloss.*

bevel gear. a. A cone-shaped gear encircling the drive rod in a diamond-drill swivel head, which meshes with a matching gear attached to the drive shaft from the drill motor. By means of these gears the drill-string equipment can be made to rotate. Also called miter gear. *Long.* b. Any gear, the teeth of which are inclined to the shaft axis of the gear. *Long.* c. A gearwheel that transmits power between two shafts which meet at an angle. If at a right angle, and the wheel is of the same size, it is called a miter gear. *Crispin.*

beveling. The process of edge finishing flat glass to a bevel angle. *ASTM C162-66.*

bevelment. The replacement of an edge of a crystal by two planes equally inclined to the adjacent faces. *Standard, 1964.*

bevel-wall bit. A core bit having the inside surface of the shank cut to a taper into which a tapered-wall (split-ring) core lifter may be fitted. Also called bevel bit; taper-wall bit. Sometimes incorrectly called standard bit; standard core bit. *Long.*

bevel-wall core shell. Synonym for bevel-wall reaming shell. *Long.*

bevel-wall reaming shell. A reaming shell, the inside wall of which is tapered and into which a split-ring core lifter may be fitted. Also called bevel-wall core shell; taper-wall core shell. *Long.*

bevel wheel. *See* bevel gear. *Fay.*

bewaarplaatsen. S. Afr. Depositing sites, without mining rights, generally involving the payment of certain sums to the owners. *Beerman.*

beyerite. A carbonate of bismuth (and calcium) as minute teragonal crystals and earthy masses from Schneeberg, Saxony, Germany; Pala, Calif. Not to be confused with bayerite. *Spencer 17, M.M., 1946.*

bezel. a. All that part of a faceted gem stone lying above the girdle. *Shipley.* b. The sloping surface of the crown between the table and the girdle. *Shipley.* c. A small part of that sloping surface just above the girdle; the so-called setting edge. *Shipley.* d. The groove made in a setting to receive the girdle and the immediately adjacent section of a gem stone. *Shipley.*

bezel facets. The eight facets on the crown of a round brilliant-cut gem, the upper points of which join the table and the lower points, the girdle. If the stone is a cushion-shaped brilliant, four of these bezel facets are called corner facets. *Shipley.*

BG Abbreviation for Birmingham gage; hoop and sheet. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-97.*

bhara. A Malayan unit of weight equal to 3 piculs or 400 pounds avoirdupois. *Hess.*

B.H. bit. a. A noncoring or blasthole bit. *Long.* b. A CDDA standard-size noncoring bit having a set outside diameter of 1¼ inches. Normally referred to as a 1¼ B.H. bit. *Long.*

Bhn Brinell hardness number. *BuMin Style Guide, p. 58.*

B-horizon. The layer of a soil profile in which material leached from the overlying A-horizon is accumulated. *ASCE P1826.*

BHP Abbreviation for boiler horsepower; brake horsepower; bottom hole pressure. Also abbreviated bhp. *Zimmerman, pp 17, 18; BuMin Style Guide, p. 58.*

BHT Abbreviation for bottom-hole temperature. *BuMin Style Guide, p. 58.*

Bi Chemical symbol for bismuth. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

bianchite. A white hydrous double sulfate of zinc and iron, $FeZn_2(SO_4)_3\cdot 18H_2O$. Later shown to be an isomorphous mixture of zinc and iron sulfates, $(Zn,Fe)SO_4\cdot 6H_2O$, belonging to the hexahydrate series of salts of Zn,Ni, Co and Mg. Crystalline crusts. Probably monoclinic. *English.*

biard. *See* bearers, b. *Fay.*

bias. The tendency to obtain a value that is either persistently higher or persistently lower than the correct value. Alternatively, the numerical value of the difference between the true value and the average result obtained from a large number of determinations using a biased method. *B.S. 1017, 1960, Pt. 1.*

biased error; constant error; systematic error. Series which are always wrong in the same way, thus producing cumulative distortion. *Pryor, 3, p. 159.*

biased result. In sampling, survey measurement, etc., systematic errors due to a fault in technique or in the instrument. Such errors are cumulative (antonym random error). *Pryor, 3.*

biat; byat. Eng. A timber stay or beam in a shaft. *See also* bearers, b. *Fay.*

biaxial. The optical character of crystals belonging to the rhombic, monoclinic, and triclinic system, which exhibit double refraction, but have two directions of single refraction, that is, two optic axes. *Anderson.*

biaxiality. In a biaxial stress state. the ratio of the smaller to the larger principal stress. *ASM Gloss.*

biaxial stone. A stone having two directions of single refraction. *Shipley.*

biaxial stress. A state of stress in which only one of the principal stresses is O, the other two usually being in tension. *ASM Gloss.*

bibble. Staff. Pebble. *Arkell.*

bibbles. Derb. A soft, water-bearing stratum encountered during shaft sinking. *Fay.*

bibbly rock. S. Staff. A conglomerate or pebbly rock. *Fay.*

bible clay. Eng. Contorted Pleistocene deposits in valley bottoms, buckled by valley bulging, Burn Valley, Leighton. *Arkell.*

bibliolite. A laminated schistose rock; a bookstone. *Standard, 1964.*

bicable. An aerial ropeway using stationary track ropes along which carriers are hauled by an endless haulage rope. The carriers disengage from the haulage rope at the loading station, and negotiate all other angle and terminal points automatically. Though expensive to install, its running costs are low as little labor is required. *See also* normal monocable. *Nelson.*

bicarbonate. A salt of carbonic acid in which only one of the hydrogen atoms is replaced by a base; for example, bicarbonate of soda, $NaHCO_3$; also called monocarbonate. *Standard, 1964.*

biche. N. of Eng. A hollow, conical-headed tool for extricating broken rods from boreholes. *See also* beche. *Fay.*

Bicheroux process. An intermittent process for making plate glass, in which the glass is cast between rolls onto driven conveyor rolls or a flat moving table. *ASTM C162–66.*

bichloride. A salt containing two chlorine atoms; for example, bichloride of mercury, $HgCl_2$. *Standard, 1964.*

bichloride of mercury; mercuric chloride; corrosive sublimate. $HgCl_2$; orthorhombic; colorless or white powder. An antiseptic used for washing wounds and in surgery. It is virulent poison. The antidote is albumen (white of an egg). *Crispin.*

bichromate; dichromate. A dichromate or a salt of dichromic acid. Specifically, potassium dichromate ($K_2Cr_2O_7$) or sodium dichromate ($Na_2Cr_2O_7.2H_2O$). *Webster 3d.*

bichromate cell. a. A zinc-carbon cell having an acid bichromate (dichromate) solution as the electrolyte and developing an electromotive force of about 2 volts. *Webster 3d.* b. A primary cell with a zinc negative electrode and one or more carbon positive electrodes. The electrolyte is dilute sulfuric acid with potassium dichromate (potassium bichromate) as a depolarizer. *C.T.D.*

bicycle tires. Brilliant-cut diamonds with girdles which are too thick. *Shipley.*

bicylindroconical drum. A winding drum with a cylindrical middle portion and two conical outer portions; used sometimes where the weight of the winding rope is large compared with the coal or mineral load. The heavily loaded upgoing rope winds on the small diameter, while the downgoing rope winds off the large diameter. The effect is to compensate for the heavy torques due to rope unbalance and acceleration. *See also* winding drum. *Nelson.*

bid. To make a price on anything; a proposition, either verbal or written, for doing work and for supplying materials and/or equipment. *Nichols.*

biddix. Corn. A double pick, with spoonbill points, used for excavating alluvial or surface earth. *Standard, 1964.*

bideford black. A black ocher or earth occurring as a seam in the culm measures of north Devonshire, England. This ocher has long been used as a pigment. *Mining Magazine, London, v. 44, January 1931, p. 60.*

bidet. A French word meaning an item of ceramic sanitary ware designed to facilitate personal hygiene; bidets are used more particularly in France, Spain, and South America. *Dodd.*

bidri. a. An Anglo-Indian process of damaskeening with silver on a ground consisting of an alloy of copper, lead, and tin, blackened by the application of a solution of sal ammoniac, saltpeter, and copper sulfate. *Standard, 1964.* b. Articles made by the foregoing process; bidri ware. Also called biddery; biddery ware; bidery; bidri work; bidry. *Standard, 1964.*

bieberite. A vitreous, flesh-red to rose-red, hydrous cobalt sulfate, $H_{14}CoSo_{11}$, crystallizing in the monoclinic system. *Fay.*

bielenite. A fine-grained, blackish-gray igneous rock composed of various pyroxenes and olivine. It differs from lherzolite in containing less olivine than pyroxene. *Johannsen, v. 4, 1938, p. 437.*

bielzite. A brittle, resinous, brownish-black hydrocarbon mineral from Romania; it has a specific gravity of 1.249, and dissolves in considerable part in carbon disulfide and chloroform. *Fay.*

bifurcate. To branch or separate into two parts; sand of an ore vein. *Webster 3d; Fay.*

bifurcating feeder. One which separates objects moving in a single lane and delivers them to two lanes of movement. *ASA MH4.1-1958.*

bifurcation gate. A structure that divides the flow between two conduits. *Seelye, 1.*

Big Coal D. Nongelatinous permissible explosive; used in coal mining. *Bennett 2d, 1962.*

bigging. N. of Eng. A built-up pillar of stone or other debris in a working place or heading to support the roof, for example, "bigging the gob" means building a pack in a worked-out place. *Fay.*

bight. a. A curve or loop, especially in a rope, hose, or chain. *Webster* 3d. b. A slight indentation in the shoreline of an open coast or of a bay, usually crescent shaped. *H&G.*

Big Injun sand. A driller's name for the Burgoon sandstone, an oil and gas producing bed of the Mississippian Pocono formation in Pennsylvania. *Hess.*

Big Lime. A driller's term for thick limestone in several eastern and western fields, including the eastern Ohio fields; Clay County, W. Va.; Westbrook and Petrolia fields, Tex.; and the Yates Pool, Pecos County, Tex. *Hess.*

big-stone bit. *See* large-stone bit. *Long.*

bigwoodite. A medium-grained plutonic rock composed essentially of microcline, microcline microperthite, sodic plagioclase, and hornblende, aegerine-augite, or biotite. A variety of alkalic syenite. *A.G.I.*

Bikalith. Trademark for a series of lithium ores including lepidolite, petalite, spodumene, and amblygonite. Found in the Republic of South Africa. Used in glassmaking, ceramics, and coatings. *CCD 6d, 1961.*

bikitaite. A hydrous silicate, $LiAlSi_2O_6.H_2O$, monoclinic, as white granular aggregates with eucryptite in lithia-pegmatite from Bikita, Southern Rhodesia. Named from locality. *Spencer 21, M.M., 1958.*

bilateral transducer; reversible transducer. A transducer capable of transmission in either direction between its terminations. *Hy.*

bildar. Hind. A digger; an excavator. *Webster 3d.*

bildas; buildhouse. S. Staff. The shift working from 6 a.m. till 9 o'clock, and sometimes 10 o'clock, is termed a bildas. This was originally denominated buildhouse, from the fact of the butty (contract miner) making so much money that he was able to build many houses from the exactions thus made upon the poor men, who received inadequate remuneration. *Fay.*

bildlos. Ger. Amorphous, structureless. *Holmes, 1928.*

bildstein. Ger. A soft stone; agalmatolite. *Standard, 1964.*

bilharzia; bilharziasis. A waterborne disease due to flukes. Liable to affect people in the subtropics. Endemic and increasing over large areas in Africa. *Pryor, 3.*

Bilharz table. A side-bump table having a surface made of a plane endless traveling belt. The Corning, Luhrig, and Stein tables are similar. *Liddell 2d, p. 385.*

bilinite. A white to yellow hydrous sulfate of iron, $FeSO_4{\cdot}Fe_2(SO_4)_3{\cdot}22H_2O$. Radially fibrous masses. The iron analogue of halotrichite. From Schwaz, Bilin, Bohemia. *English.*

biliong. The Malayan adz. *Hess.*

bill day; account day. The day in each week or fortnight when the appointed official takes particulars of work done at the face or elsewhere and thus to assess the amounts to be paid to the miners and contractors for the period since the previous account was taken. *See also* measuring day. *Nelson.*

billet. a. Som. A short timber prop. *Fay.* b. A solid, semifinished, round or square product that has been hot-worked by forging, rolling, or extrusion. An iron or steel billet has a minimum width or thickness of 1½ inches and the cross-sectional area varies from 2¼ to 36 square inches. For nonferrous metals, it may also be a casting suitable for finished or semifinished rolling or for extrusion. *ASM Gloss.*

billeting roll. Set of rolls used to turn iron billets into bar. *Pryor, 3.*

billet mill. A primary rolling mill used to make billets. *ASM Gloss.*

billietite. a. Hydrous barium uranate as an amber-yellow mineral, $BaO{\cdot}6UO_3{\cdot}11H_2O$, orthorhombic plates resembling becquerelite; from Katanga, Republic of the Congo. *Spencer, 18, M.M., 1949; Crosby, p. 10.* b. A discredited term equal to a variety of becquerelite. *American Mineralogist, v. 34, No. 3-4, March-April 1949, p. 339.*

billitonite. East Indian tektite. *A.G.I. Supp.*

billy. a. (Forest of Dean) A box for holding ironstone, carried by a boy in the mine. *Fay.* b. *See* billy playfair. *Fay.* c. Aust. A name used in the Clermont district of Queensland for a bed of quartzite that caps the coal measures. *Fay.*

billy boy. A boy who attends a billy playfair. *Zern.*

billy coal. Staff. Miners' term for a thin, unworkable coal seam occurring above or below a workable seam. *Tomkeieff, 1954.*

billy cups. Whiskey rations served to laborers in Jim Thorpe (Mauch Chunk), Pa., in the 1820's. Named for Billy Speers, the dispenser. *Korson.*

billy playfair. A coal-weighing device that carries off the small coal through a trough, to be weighed separately. *Standard, 1964.*

bimaceral. Coal microlithotype consisting of a mixture of two macerals, that is, clarite, durite, and vitrinertite. *A.G.I. Supp.*

bimagmatic. The texture of porphyritic rocks having minerals of two generations. *Johannsen, v. 1, 2d, 1939, p. 203.*

bimetallism. The concurrent use of both gold and silver as money at a fixed relative value, established by law. Also, the doctrine advocating such use. *Standard, 1964.*

bimetal strip. A strip consisting of two metals which have different coefficients of expansion, one metal forming each side of the strip. The strip will curve, with change of temperature, one way or the other by an amount which can be calculated. This device is widely employed in thermostats and relays. *Ham.*

bimssand. Pumice sand. *Hess.*

bin. A container for storing material. *ASA MH4.1-1958.*

bina. Eng. Hard, clayey substance. A variety of bind. *Fay.*

binary. Composed of two chemical elements, of an element and a radical that acts like an element, or of two such radicals; thus, $NaCl$, Na_2O, Na_2SO_4, and $(NH_4)_2SO_4$, are all binary compounds. *Webster 3d; A.G.I.*

binary alloy. An alloy containing two component elements. *ASM Gloss.*

binary cycle. A cycle in which two different media are employed, one superimposed on and augmenting the cycle of the other. *Strock, 10.*

binary diagrams. Phase diagrams of two-component systems. *VV.*

binary digit; bit. Digit of a binary number; in a binary-numbered system such a digit has only one of two values instead of one of ten. Usually abbreviated to bit; signal rates are often expressed in bits per second. *NCB.*

binary granite. a. A granite consisting of quartz and feldspar only. *A.G.I.* b. A granite containing both biotite and muscovite mica. *A.G.I.*

binary system. A system consisting of two components, for example, the system MgO-SiO_2. *A.G.I.*

binary system and diagram. The alloys formed by two metals constitute a binary alloy system, which is represented by the binary constitutional diagram for the system. *C.T.D.*

binching. Som. The stone upon which a bed of coal rests. *Fay.*

bind. a. Shale or mudstone occurring in coal measures. Obsolete. *B.S. 3618, 1964, sec. 5.* b. To prevent normal operation of drill-string equipment in a borehole, such as by constriction or friction created by swelling or caving ground, settlement or balling of cuttings, an obstruction, or an offset or crooked hole, or as the result of insufficient clearance cut by use of undergage bits or reaming shells. *Long.* c. To cause to cohere; to give consistency to by means of an agent, such as by drilling mud in a loose, sandy, or fragmented formation. *Long.*

binder. a. In mining, an iron piece attached to a truck or barrel, to which to secure the pit rope. *Standard, 1964.* b. Any substance that when added to ceramic raw materials will bond the particles together. *Bureau of Mines Staff.* c. In the case of plaster and stucco, etc., a fibrous material, which will increase their cohesiveness while they are in a plastic state. *ASTM C11–60.* d. A substance used in ceramic mixes to increase the wet and dry strengths of the shapes. *Bureau of Mines Staff.* e. A substance used to effect cohesion in separated particles, as the crushed stones in a macadam road. *Standard, 1964.* f. In founding, a material, other than water, added to foundry sand to bind the particles together, sometimes with the use of heat. *ASM Gloss.* g. In powder metallurgy, a cementing medium; either a material added to the powder to increase the green strength of the compact that is expelled during sintering, or a material (usually of relatively low melting point) added to a powder mixture for the specific purpose of cementing together powder particles which alone would not sinter into a strong body. *ASM Gloss.* h. A material added to the coal during the process of briquetting to facilitate adhesion between the particles. *B.S. 3552, 1962.* i. Corn. Beds of grit in shale, slate, or clay. *Fay.* j. Streak of impurity in a coal seam, usually difficult to remove. *Fay.* k. Corn. An underground carpenter. *Fay.* l. A wood or metal guide on a haulage road bend or curve. *Mason.* m. A deposit check that makes a contract valid. *Nichols.*

binder course. Coarse bituminous aggregate containing a small percentage of asphalt, and used as an intermediate connecting link between the concrete foundation and the top wearing course of an asphalt pavement. *Petroleum Age, v. 11, April 15, 1923, p. 37.*

binderless briquetting. The briquetting of coal by the application of pressure without the addition of a binder. *B.S. 3552, 1962.*

bindheimite. A hydrous antimonate of lead; an oxidation product of jamesonite. *Sanford.*

binding. N. of Eng. Hiring of men for pit-work. *Fay.*

binding bolts. a. Scot. Bolts used to secure machinery to the foundations. *Fay.* b. Anchor bolt. *Bureau of Mines Staff.*

binding coal. S. Wales. Miners' term for coal, the small of which will bind or cake. *Tomkeieff, 1954.*

binding energy. The binding energy of a nucleus is the minimum energy required to dissociate it completely into its component neutrons and protons. Neutron or proton binding energies are those required to remove a neutron or a proton, respectively, from a nucleus. Electron binding energy is that required to remove an electron completely from an atom or a molecule. *L&L.*

binding gravel. Eng. Gravel with enough loam or fine material to bind or set on paths. *Arkell, p. 7.*

bindings. York. Scale from coal, used for road repairs. *Arkell.*

bin feeder. A man who rods or bars ore that sticks as it passes through the bin door. *Fay.*

bing. a. N. of Eng. A pile or heap of anything; specifically: (1) a heap of metallic ore, alum, etc.; (2) eight hundredweight of lead ore; or (3) the kiln of a furnace for making charcoal in metal smelting. *Standard, 1964.* b. Eng. The best quality of lead ore. *Fay.* c. Scot. A place where coal is stocked, or debris is piled at the surface. *Fay.* d. To put coal in wagons or in stacks at the surface. *Fay.*

bin gate. A device for complete shutoff or control of gravity impelled flow of materials from a bin, bunker, hopper, or other container. May be hand- or power-operated and if powered can be arranged for automatic operation. *ASA MH4.1-1958.*

Bingham plastometer. A device for the measurement of the rheological properties of clay slips by forcing the slip through a capillary under various pressures; a curve is drawn relating the rate of flow or exposure. *Dodd.*

bing hole. Derb. A hole or chute through which ore is thrown. *Fay.*

bing ore. The purest lead ore and with the largest crystals of galena. *Hess.*

bing place. Derb. The place where ore is stored for smelting. *Fay.*

bingstead. a. Eng. The place where lead ore is dressed. *Fay.* b. Eng. A place for storing ore, coal, etc. *Compare* bing, a and c. *Fay.*

bing tale. N. of Eng. Synonym for tribute. *Fay.*

binkstone. York. Knockstone, the stone bench on which lead ore is buckered or broken small for the hotching tubs. *Arkell.*

binman. A laborer who keeps ore moving in storage bins by poking it with a pole so that it will flow through chutes into cars in which it is carried to a furnace to be melted. *D.O.T. 1.*

binnite. Same as tennantite. *Standard, 1964.*

binocular hand level. A hand level with two sighting tubes. *Porter.*

biochemical deposit. A precipitated deposit resulting directly or indirectly from vital activities of an organism, such as bacterial iron ores and limestones. *A.G.I.*

biochemical prospecting. Prospecting by means of vegetation. The root systems of trees are actually powerful sampling mechanisms which bring representative samples of solutions from a large volume of earth. Much of the mineral content from these solutions is found in the leaves. Analysis of leaves may serve as a guide to prospectors. *Lewis, p. 303.*

bioclastic. Refers to rocks consisting of fragmental organic remains. *A.G.I. Supp.*

biodegradable. Used in sewage disposal and water pollution to describe those substances that can be quickly broken down by the bacteria used for this purpose at sewage disposal plants. *Bureau of Mines Staff.*

biofacies. a. A rock unit composed of one or more biotopes differing in biologic aspects from laterally equivalent biotic assemblages. *G.S.A. Memo. 39, 1949, p. 96.* b. Lateral variations in the biologic aspects of a stratigraphic unit. *A.G.I.* c. Assemblages (of animals or plants) formed at the same time under different conditions. *A.G.I.*

biogenic. Pertaining to a deposit resulting from the physiological activities of organisms. The rock thus formed is designated a biolith. *A.G.I.*

biogenic dispersion pattern. Dispersion where the patterns are the result of biological activity. *Hawkes, 2, p. 144.*

biogenous deposits. Deposits having more than 30 percent material derived from organisms. *H&G.*

biogeochemical anomaly. An area where the vegetation contains an abnormally high concentration of metals. *Hawkes, 2, p. 296.*

biogeochemical prospecting. The chemical analysis of plants as a prospecting method. *Hawkes, 2, p. 4. See also* biogeochemistry. *Compare* geobotanical prospecting. Synonymous with geochemical plant survey.

biogeochemistry. A buried ore body may give the soil above it an abnormal amount of the metal or metals it contains. The soil, in turn, may provide a large amount of the same metals to the plant cover. If the plants are systematically collected and analyzed, the results may indicate the possibility of an ore body by the abnormally high concentration of the metal corresponding to that of the deposit. The technique is called biogeochemical prospecting. *See also* geochemistry. *Nelson.*

bioglyph. A hieroglyph of biologic origin. *Pettijohn.*

bioherm. a. A moundlike or circumscribed mass built exclusively or mainly by sedentary organisms, such as corals, stromatoporoids, algae, etc., and enclosed in normal rock of different lithological character. *A.G.I.* b. An organic reef or mound built by corals, stromatoporoids, gastropods, echinoderms, foraminifera, molluscs, and other organisms. *A.G.I.*

biolite. a. A group name for minerals formed by biological action. *Hey, M.M., 1964.* b. A concentration formed of concentric layers through the action of living organisms as distinguished from pisolites, which are formed by inorganic agencies. *Hess.*

biolithe. Ger. Sediments of organic origin. *Holmes, 1928.*

biolithite. Inclusive term for organic limestone. *A.G.I. Supp.*

biological shield. A mass of absorbing material placed around a reactor or a radioactive source to reduce ionizing radiation to levels that are not hazardous to personnel. *See also* thermal shield. *L&L.*

biology. The science of life; the branch of knowledge which treats of organisms; includes fishes and pearls. *Shipley.*

bioluminescence. The emission of visible light by living organisms. *Hy.*

biomechanical deposit. A deposit due to the detrital accumulation of organic material, as in the cases of limestones and coal. *A.G.I.*

biomicrite. Limestone similar to biosparite except that microcrystalline calcite matrix exceeds calcite cement. *A.G.I. Supp.*

biopelite. Synonym for black shale. *A.G.I.*

biopelmicrite. Limestone similar to biopelsparite except that microcrystalline matrix exceeds calcite cement. *A.G.I. Supp.*

biopelsparite. Limestone similar to biosparite except that the ratio of fossils and fossil fragments to pellets ranges between 3:1 and 1:3. *A.G.I. Supp.*

biophile. An element which is required by or found in the bodies of living organisms. The list of such elements includes carbon, hydrogen, oxygen, nitrogen, phosphorus, sulfur, chlorine, iodine, bromine, calcium, magnesium, potassium, sodium, vanadium, iron, manganese, and copper. All may belong also to the chalcophile or lithophile groups. *Hess.*

biophile elements. Chemical elements accumulated by plants or animals. *Bureau of Mines Staff.*

biosparite. Limestone consisting of less than 25 percent intraclasts, less than 25 percent oolites, with volume ratio of fossils and fossil fragments to pellets more than 3:1, and calcite cement exceeding microcrystalline calcite. *A.G.I. Supp.*

biosphere. a. Zone at and adjacent to the earth's surface where all life exists. *A.G.I. Supp.* b. All living organisms of the earth. *A.G.I. Supp.*

biostrome. For purely bedded structures, such as shell beds, crinoid beds, coral beds, etc, consisting of and built mainly by sedentary organisms, and not swelling into moundlike or lenslike forms, the name biostrome was proposed; from the Greek stem bio and the Greek word stroma, which means a layer or bed. *A.G.I.*

biotite. A magnesium-iron mica, $K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$, widely distributed in igneous rocks. Monoclinic; perfect basal cleavage; dark brown to green. Often used as a prefix to many names of rocks that contain it, such as biotite andesite. *Fay; A.G.I.; Dana 17.*

biotite gneiss. A gneiss in which biotite is a prominent mineral. *Sinkankas.*

biotitite. A jet black igneous rock consisting essentially of biotite. Near Libby, Mont., such a rock has been altered to vermiculite by hot waters. *Johannsen, v. 4, 1938, p. 441.*

Biot number. The heat-transfer ratio hr/k, where h is the heat-transfer coefficient, r is the distance from the point or plane under consideration to the surface, and k is the thermal conductivity. The Biot number is a useful criterion in assessing thermal-shock resistance. *Dodd.*

bipolar electrode; intermediate electrode. An electrode that is not mechanically connected to the power supply but is so placed in an electrolyte, between the anode and cathode, that the part nearer the anode becomes cathodic and the part nearer the cathode becomes anodic. *ASM Gloss.*

bipolar field. A longitudinal magnetic field that creates two magnetic poles within a piece of material. *ASM Gloss.*

bipyramid. In crystallography, a double-ended pyramid. *Fay.*

biquartz. A quartz plate made up of a dextrorotatory and a levoratatory half. Used in detecting polarization. *Webster 3d.*

bird. A bomb-shaped unit, weighing about 70 pounds, containing the electromagnetic detector coil, used in aerial geophysical prospecting. The bird is trailed approximately 250 feel below the aircraft, at the end of 500 feet of cable. *See also* electromagnetic detector. *Nelson.*

birdcage. An imperfection occassionally occurring in bottle manufacture, a glass thread (or threads) spanning the inside of the bottle. *Dodd.*

Bird centrifuge; Bird coal filter. A fine-coal dewatering machine that consists of a tank or truncated conical shell, which is revolved at the desired speed by means of a drive sheave. A screw conveyor rotates inside the cone or bowl at a slightly lower speed in the same direction of rotation. The feed entrance, in the center of the large end of the truncated cone, is high enough to allow formation of a pool of slurry. Adjustable effluent-discharge parts are so located in the large end of the bowl that the level of liquid is maintained at the desired height. The solids are steadily moved forward by the screw conveyor as fast as deposited, being carried above the level of the pool for an interval before leaving the bowl. Discharge of both solids and effluent is continuous. *Mitchell, p. 662-665.*

Bird coal filter. *See* Bird centrifuge.

bird-foot delta. A delta formed by the outgrowth of fingers or pairs of natural levees at the mouths of river distributaries making the digitate or bird-foot form typified by the Mississippi delta. *A.G.I.*

Bird reef. S. Afr. A gold-bearing reef, or group of reefs, occurring above the Main reef series. *Beerman.*

bird's beak. A special type of wall tile. *Dodd.*

bird's-eye. a. Mixed screened anthracite passing a ½-inch screen but retained on a ⅛-inch screen. May be subdivided into buckwheat, rice, and barley. *C.T.D. See also* anthracite coal sizes. b. Eng. Applied to various rocks with small spots, in some places to a concretionary slate, and in Guernsey to a spotted variety of diorite or gabbro. *Arkell.*

bird's-eye coal. Sometimes applied to anthracite coal when very small fractures are numerous and freshly broken surfaces display rounded or oval eyelike forms, many of which have convex surfaces. *A.G.I. See also* anthracite coal sizes.

bird's-eye limestone. A very fine-grained limestone containing spots or tubes of crystalline calcite. *A.G.I. Supp.*

bird's-eye marble. A local name given to several varieties of marble in which the markings assume the appearance of a bird's-eye. *Fay.*

bird's-eye porphyry. A name given by prospectors and miners to a fine-grained igneous rock having small phenocrysts, particularly if they are quartz, from a fancied resemblance to bird's-eyes. *Hess.*

bird's-eye quartz. Jasper containing minute spherulites of usually colorless quartz. *Shipley.*

bird's-eyes. A term applied by fishermen to pearls which have slight imperfection on the best surface. *Shipley.*

bird's-eye slate. A quarryman's term for slate containing abundant deformed or squeezed concretions. *Holmes, 1928.*

bird's-nest rock. Eng. Argillaceous limestone full of black pseudo-oolitic grains. *Arkell.*

birefringence. a. The property possessed by crystals belonging to other than the isometric system of splitting a beam of ordinary light into two beams which traverse the crystal at different speeds, and as they pass out of it, produce characteristic optical effects that are recognizable with the proper instruments or, in some cases, by the eye alone. Also known as double refraction. *Fay.* b. The numerical difference between the indices of a mineral. The difference between the indices results in a display of colors in biaxial minerals when thin sections of rocks are placed between crossed polarizers. As isotropic and isometric minerals have the same index in every direction, they have no birefringence and show no colors. *Hess.*

birefringent. Exhibiting double refraction. *Stowell.*

biringuccite. A mineral, $Na_4B_{10}O_{17}\cdot 4H_2O$; monoclinic; found in recent incrustations at Larderello, Tuscany, Italy. *Hey, M.M., 1964; Fleischer.*

Birkeland and Eyde process. Obsolete method of nitrogen fixation, using electric arc to produce NO_2 from air. *Pryor, 3.*

Birmingham gage. *See* Stub's gage. *Crispin.*

birmite. Same as burmite. *English.*

birne. *See* boule. *Hess.*

birnessite. A manganese oxide, near $(Na_{0\cdot 7},Ca_{0\cdot 3})Mn_7O_{14}\cdot 2\cdot 8H_2O$, optically uniaxial negative. From manganese pan in gravel at Birness, Aberdeenshire, Scotland. Named from locality. *Spencer 21, M.M., 1958.*

Birtley coal picker. An electric picker that distinguishes between good coal and slate by their different electrical conductivities. It is said to be more unerring than the human slate picker, who, when fatigued, may fail to remove all the impure material. *Mitchell, pp. 602-603.*

Birtley contraflow separator. A pneumatic table for the dry cleaning of coal. It consists of perforated deck plates arranged in a series of lateral steps with a longitudinal inclination. A centrifugal fan provides a constant upward blast of air through the placeable portion or pilot of a noncoring or other type of bit. *Compare* core, x and y. *Long.*

bit cost. Bit-use cost generally expressed in monetary units per foot or per hundred feet of borehole drilled. For a specific diamond bit the bit cost per foot drilled usually is calculated in the manner shown as follows:

$$\frac{(R-S)Z + (CO+BL+ST-SC)}{Y} = X,$$

where R equals diamonds in original bit, in carats; S equals resettable diamond salvaged, in carats; Z equals diamond cost per carat, in dollars; CO equals cutout charge, in dollars; BL equals cost of bit blank in dollars; ST equals setting charge in dollars; SC equals credit value of scrap diamonds in dollars; Y equals number of feet bit drilled; and X equals bit costs in dollars, per foot drilled. *Long.*

bit count. Synonym for diamond count. *Long.*

bit crown. Synonym for crown. *See also* crown, d. *Long.*

bit-crown metal. Synonym for diamond matrix. *Long.*

bit die. Synonym for bit mold. *Long.*

bit disc. A bit with two or more rolling discs which do the cutting. Used in rotary drilling through certain formations. *Porter.*

bit drag; drag bit. A bit with serrated teeth used in rotary drilling. *Hess.*

bit, drilling. The cutting device at the lower end of cable drilling tools or rotary drill pipe, the function of which is to accomplish the actual boring or cutting. *A.G.I.*

bit end. The end of a reaming shell to which the bit is attached. *Long.*

bit face. That part of the bit crown that comes in contact with the bottom of a borehole. It does not include that part of the bit crown that contacts the walls of the borehole. *Long.*

bit feed. *See* feed rate. *Long.*

bit gage. The inside and/or outside diameter of a set bit; also, a tool or device used to measure such diameters. *Compare* gage ring; setting gage. *Long.*

bit gatherer. The man whose job is to gather small quantities of glass for use in decorating hand-blown glassware. *Dodd.*

bit grinder. In metal mining, one who operates bit grinding machine that shapes and sharpens cutting edges of detachable drilling bits by abrasive action of grinding wheels. Also called bit sharpener operator. *D.O.T. 1.*

bit hook. A tool for straightening a lost bit in the hole. *Porter.*

bit insert. A shaped hard-metal piece, which is inserted in a slot or hole in a bit by brazing or peening to serve as a cutting edge or abrasion-resistant point or plane. *Compare* insert bit. *Long.*

bit life. The average number of feet of borehole a bit may be expected to drill in a specific type of rock under normal operating or specified conditions. *Long.*

bit load. The weight or pressure applied to a bit in drilling operations expressed as the number of pounds or tons of weight applied. Also called bit pressure; bit weight; drilling pressure; drilling weight; drill pressure. *Long.*

bit matrix. Synonym for diamond matrix. *See also* diamond matrix, a. *Long.*

bit mold. A steel, carbon, or ceramic die in which the shape of a bit crown is incised and provided with pips, grooves, or holes in which diamonds are set and held by suction or an adhesive. Filling the die with a matrix alloy by a casting or a powder metal-sintering process affixes the shank to a diamond-inset bit crown having a shape conforming to that incised in the die. Also called bit die; crown die; crown mold. *Long.*

bit performance. The achievement of a bit as gaged by the overall cost of using a specific bit per a unit measure of borehole drilled, or by the total number of feet of borehole drilled per bit. *Long.*

bit pilot. The small cylindrical portion that is of smaller diameter and projects beyond the main body of a pilot-type noncoring bit. *Long.*

bit pressure. Synonym for bit load. *Long.*

bit reaming shell. Obsolete name for reaming shell. *Long.*

bit ring. a. *See* setting ring. *Long.* b. Obsolete name for core bit. *Long.*

bit rpm. *See* bit speed. *Long.*

bit setter. Formerly an individual skilled in the art of setting diamonds in a bit blank by a hand-peening and calking technique to produce a complete bit; currently an individual who places diamonds in pips provided in a bit die or mold used in producing a diamond bit by mechanical methods. *See also* mechanical-set bit. *Long.*

bit shank. a. The threaded part of a bit. *Long.* b. Sometimes incorrectly used as a synonym for bit blank. *Long.*

bit slug. *See* bit insert. *Long.*

bit speed. a. The number of revolutions a bit is rotated per minute. *Long.* b. Sometimes incorrectly used to express the number of bit revolutions required to advance the bit 1 inch with a screw-feed diamond-drill machine. *Long.*

bitstone. In ceramics, carefully sized fragments of quartz used to prevent the sticking of glazed ware to the bottom of saggers. Sizes range from 30 to 40 mesh to 3 or 4 mesh. *Hess.*

bit taper. The inside conical bevel or seat in a bevel-wall bit in which a core lifter is carried. *Long.*

bitter. Applied to minerals having the taste of Epsom salts. *Fay.*

bitter earth. Magnesia. *Fay.*

bittern. The bitter mother liquor that remains in saltworks after the salt has crystallized out. *Webster 3d.*

bitter spar. A pure, crystalline dolomite that consists of 1 part or equivalent of calcium carbonate and 1 part of magnesium carbonate. Also called pearl spar. *Fay.*

bit thrust. The hydraulic pressure applied to a drill bit when drilling, as shown in pounds per square inch by the pressure gages on the hydraulic-feed cylinders of a diamond drill or the total pressure in pounds as calculated by multiplying the recorded hydraulic pressure by the square-inch area of the piston in the hydraulic-feed cylinder. *Also* called drilling thrust. *Long.*

bitulithic. Composed of broken stone and bitumen or asphalt; as, bitulithic pavement, a protected proprietary name. *Standard, 1964.*

bitumen. a. A general name for various solid and semisolid hydrocarbons. In 1912, the term was used by the American Society for Testing Materials to include all those hydrocarbons which are soluble in carbon disulfide, whether gases, easily mobile liquids, viscous liquids, or solids. *See also* asphalt. *Fay.* b. A native substance of dark color, comparatively hard and nonvolatile, composed principally of hydrocarbon. The nonmineral constituents are fusible and largely soluble in carbon disulfide. *A.G.I.* c. Originally, a native mineral pitch, tar, or asphalt. The term is generally applied to any of the flammable viscid, liquid, or solid hydrocarbon mixtures, soluble in carbon disulfide; often used interchangeably with hydrocarbons. *A.G.I.*

bitumen cable. A cable notable for its resistance to moisture, but not suitable for high temperatures. The wires are tinned to prevent reaction with the sulfur in the bitumen. Outside the bitumen are layers of tape, jute, and one or two layers of steel armoring; outside each layer of steel armoring are layers of serving compound. *Mason, V. 2, p. 433.*

bitumenite; bituminite. Same as torbanite. *English.*

bitumenize. To change into, cover with, or mix with bitumen. *Hess.*

bitumen judaicum. Jew's pitch as obtained from the region of the Dead Sea. *Tomkeieff, 1954.*

bitumen lapideum. An old name for mineral coal. *Tomkeieff, 1954.*

bitumenol. A high-rank bitumiol. *Tomkeieff, 1954.*

bitumicarb. Bituminous matter of low rank in coal derived from resins, waxes, spores, exines, etc. *Tomkeieff, 1954.*

bituminate. a. To cement or cover with bitumen. *Standard, 1964.* b. To charge or mix with bitumen. *Standard, 1964.*

bituminiferous. Yielding or containing bitumen. *Standard, 1964.*

Bituminite. High explosive used in mines. *Bennett 2d, 1962.*

bituminization. a. Same as coalification. *Tomkeieff, 1954.* b. The process of enrichment in hydrocarbon compounds. *Tomkeieff, 1954.*

bituminoso. Mex. Bituminous. *Fay.*

bituminous. a. Containing much organic, or at least carbonaceous matter, mostly in the form of the tarry hydrocarbons which are usually described as bitumen. *Fay.* b. Having the odor of bitumen; often applied to minerals. *Fay.* c. Yielding volatile bituminous matter on heating (for example, bituminous coal). *A.G.I.*

bituminous brown coal. Same as pitch coal. *Tomkeieff, 1954.*

bituminous cement. A bituminous material suitable for use as a binder, having cementing qualities which are dependent mainly on its bituminous character. *Fay.*

bituminous coal. a. A coal which is high in carbonaceous matter, having between 15 and 50 percent volatile matter. Soft coal. *BCI.* b. A general term descriptive of coal other than anthracite and low-volatile coal on the one hand and lignite on the other. *B.S. 3618, 1964, sec. 5.* c. A coal with a relatively high proportion of gaseous constituents; dark brown to black in color and burns with a smoky luminous flame. The coke yield ranges from 50 to 90 percent. The term does not imply that bitumen or mineral pitch is present. *See also* coking coal; flaming coal; gas coal. *Nelson.*

bituminous concrete. A pavement composed of aggregates, such as crushed stone, gravel, sand, or slag, combined with a bituminous binder, the latter taking the place of the cement ordinarily used in concrete. *Petroleum Age, v. 11, April 15, 1923, p. 37.*

bituminous earth. Asphalt laid without an appreciable addition of sand or rock. *Petroleum Age, v. 11, April 15, 1923, p. 37.*

bituminous emulsion. a. A suspension of mi-deck. The usual layering takes place, the refuse sinking to the deck plates. The capacity of the table ranges from 6 tons per hour per foot width for sizes 1½ to 2 inches, down to 2 tons per hour per foot width for fines below 1⁄16 inch. They are built in any width up to a maximum of about 8 feet. *See also* dry cleaning. *Nelson.*

schofite. A crystalline-granular, foliated, colorless to white, hydrous magnesium chloride, $H_{12}MgCl_2O_6$. *Fay.*

scuit. a. Unglazed ceramic ware that has been fired in a biscuit or bisque oven or film. *Bureau of Mines Staff.* b. *See* bisque. *ACSG.* c. An upset blank for drop forging. *ASM Gloss.* d. A small cake of primary metal, such as uranium, made from uranium tetrafluoride and magnesium in a bomb reduction. *See also* derby; dingot. *ASM Gloss.*

iscuit-board topography. Topography characterized by a rolling upland out of which cirques have been cut like big bites and which represents an early or partial stage in glaciation. *A.G.I.*

iscuit cutter. A short core barrel, 6 to 8 inches long, sharpened at the bottom and forced into the rocks by the jars. *Hess.*

iscuit firing. The process of kiln firing pottery ware before it has been glazed. Earthenware is biscuit fired at 1,100° to 1,150° C; bone china is biscuit fired at 1,200° to 1,250° C. *Dodd.*

iscuit oven. A kiln in which ceramic ware is fired before glazing. *C.T.D.*

iscuit ware. Pottery that has been fired but not yet glazed. Biscuit earthenware is porous and readily absorbs water; vitreous ware and bone china are almost nonporous even in the biscuit state. *Dodd.*

iscuit-ware stopper. One who fills in cracks of fired pottery or porcelain ware with stopping compound, using biscuit peg (hand tool). Also called bisque-ware stopper. *D.O.T. 1.*

isectrix. A line bisecting the angle between the optic axes of a biaxial crystal. *Webster 3d. See also* acute bisectrix; obtuse bisectrix. *Fay.*

ishops' stones. Bunter pebbles. *Arkell.*

isilicate. In metallurgy, a slag with a silicate degree of 2. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 399.*

ismite. It is proposed to restrict the name bismite to the alpha polymorph of Bi_2O_3. *American Mineralogist, v. 28, No. 9–10, September-October 1943, p. 521.*

ismoclite. A pale grayish or creamy white bismuth oxychloride, BiOCl. Platty fibrous. Tetragonal (?). From Namaqualand, Republic of South Africa. *English.*

bismuth. A silvery-white metallic element in group V of the periodic system. Used as a component of fusible alloys with lead. Hexagonal rhombohedral; symbol, Bi; valences, 3 and 5; atomic number, 83; atomic weight, 208.98; specific gravity, 9.72 to 9.88; and melting point, 271° C. *C.T.D.*

ismuth blende. Same as eulytite. *Standard, 1964.*

ismuth brass. A copper-nickel-zinc alloy containing only a little bismuth, such as (1) 47.0 percent copper, 21.0 percent zinc, 30.9 percent nickel, 1.0 percent tin, and 0.1 perecent bismuth, or (2) 52.0 percent copper, 12.0 percent zinc, 30.0 percent nickel, 5.0 percent lead, and 1.0 percent bismuth. *Campbell.*

bismuth bronze. An alloy of bismuth with tin. *Standard, 1964.*

bismuth flux. A mixture of 1 part potassium iodide, 1 part acid potassium sulfate, and 2 parts sulfur. Also, a mixture of equal parts of potassium oxide and sulfur. *Fay.*

bismuth glance. *See* bismuthinite.

bismuth gold. A pinkish-white native alloy of bismuth and gold, approximately Au_2Bi; contains 65.5 percent gold. *Hess.*

bismuthinite. Bismuth trisulfied, Bi_2S_3, commonly occurring in shapeless, lead-gray masses with a yellowish tarnish. Also called bismuth glance. *C.T.D.*

bismuth minerals. Bismuth occurs free, in association with gold, silver, or copper. Main sources are native bismuth and bismuthinite. Used medicinally, in the glass industry, and for fusible alloys. *Pryor, 3.*

bismuth oxide; bismuth trioxide. a. Bi_2O_3; melting point, 820° to 860° C, and is derived from the ignition of bismuth nitrate. A constituent of optical glasses, providing greater durability and higher refractive indices than corresponding lead glasses. Used as an ingredient in fluxes for fired-on conductive silver paints. The calcined material can be used alone to bond metallic silver flake to ceramic bodies. *Lee.* b. A heavy, yellow powder; orthorhombic; and specific gravity, 8.8. Used in ceramic colors and in producing bismuth salts. *CCD 6d, 1961.*

bismuth oxychloride; pearl white. BiOCl; molecular weight, 260.46; crystals or white powder; specific gravity, 7.72; insoluble in water; soluble in acid. Also called basic bismuth chloride; bismuthyl chloride; bismuth subchloride; blanc d'Espagne. *Bennett 2d, 1962.*

bismuth oxynitrate. *See* bismuth subnitrate. *CCD 6d, 1961.*

bismuth selenide; bismuth triselenide. Bi_2Se_3; black; orthorhombic; and melting point, 706° C. Of some interest for thermoelectric applications. *Lee.*

bismuth silver. Same as chilenite; schapbachite. *Standard, 1964.*

bismuth stannate. A light-colored crystalline powder; $Bi_2(SnO_3)_3{\cdot}5H_2O$. *CCD 6d, 1961.* Melting point, above 1,300° C. Used as an additive to barium titanate ceramic capacitor compositions to produce bodies with an intermediate level of dielectric constants which show little variation with temperature. *Lee.*

bismuth subnitrate; basic bismuth nitrate; bismuth oxynitrate. A white, heavy, slightly hygroscopic powder; $4BiNO_3(OH)_2{\cdot}BiO(OH)$; and shows acid to moistened litmus paper. Used for ceramic enamels; for burning gold on ceramic ware; for bismuth luster on metals; and for producing bismuth salts. *CCD 6d, 1961.* Specific gravity, 4.928 (at 18° C) and decomposes at 260° C. It gives a pearly luster to glasses and glazes, and is also used in glasses to give a high index of refraction. *Lee.*

bismuth telluride; bismuth tritelluride; tetradymite. Bi_2Te_3; hexagonal rhombohedral; gray; and a thermoelectric material. Because it loses its semiconducting properties above 100° C, it is of value chiefly in cooling devices. *Lee.*

bismutite. An amorphous form of bismuth carbonate, occurring as a rare natural mineral. *C.T.D.*

bismutospherite. a. A yellow, dark gray or blackish-brown, spherical, fibrous bismuth carbonate, $Bi_2O_3{\cdot}CO_2$, usually found as an alteration product of bismuthinite. *Fay.* b. Preferred spelling for bismutosphärite. *English.*

bismutotantalite. A black bismuth tantalate and niobate, probably $Bi_2O_3{\cdot}(Ta,Nb)_2O_5$. Large, rough crystals. Orthorhombic. From Kampala, Uganda, East Africa. *English.*

bisphenoid. In crystallography, a form apparently consisting of two sphenoids placed together symmetrically. *Fay.*

bisque. a. A coating of wet-process porcelain enamel that has been dried, but not fired. *ASTM C286–65.* b. Biscuit, biscuit ware, as in statuettes, dolls, etc.; ware baked once but not glazed. *Standard, 1964.* c. Ceramic ware that is fired to a temperature which is adequate to produce the necessary strength for glazing and decorating. *Bureau of Mines Staff.*

bisque fire. The process of kiln firing ceramic ware prior to glazing. *ACSG, 1963.*

bisque-kiln drawer. One who removes saggers from kiln after ware has been fired and has cooled, and removes ware from saggers. When removing glazed ware from kiln, known as glost-kiln drawer. Also called kiln drawer; round-kiln drawer. *D.O.T. 1.*

bisque-kiln placer. One who packs greenware in saggers with sand and refractory clay ready for firing, and sets saggers in bisque kiln. Also called bisque placer; kiln hand. *D.O.T. 1.*

bisque oven. The same as biscuit oven. *C.T.D.*

bisque placer. *See* bisque-kiln placer. *D.O.T. 1.*

bisque-ware stopper. *See* biscuit-ware stopper. *D.O.T. 1.*

bisulfate. Acid sulfate, containing the monovalent radical HSO_4, for example, $NaHSO_4$. *Pryor, 3.*

bisulfide; disulfide. Binary compound with 2 sulfur atoms. *Pryor, 3.*

bisulfite. Acid sulfite, containing monovalent HSO_3. *Pryor, 3.*

bit. a. Any device that may be attached to, or is, an integral part of a drill string and is used as a cutting tool to bore into or penetrate rock or other materials by utilizing power applied to the bit percussively or by rotation. *Long. See also* detachable bit; drag bit. b. A pointed hammer for dressing hard stone. *Webster 2d.* c. The blade of an ax, hatchet or like tool. *Webster 2d.* d. The copper head of a soldering iron. *Webster 2d.*

bit blank. A steel bit in which diamonds or other cutting media may be inset by hand peening or attached by a mechanical process such as casting, sintering, or brazing. Also called bit shank; blank; blank bit; shank. *Long.*

Bitburg group. A group of the pallsite meteorites that are mostly nickel iron with olivine crystals in a fine brecciated trass. *Hess.*

bitches. Scot. A set of three chains for slinging pipes in a mine shaft. *Fay.*

bit clearance. a. Technically, the difference between the outside diameter of a set bit and the outside set diameter of the reaming shell. Loosely, the term is used to denote the clearing action of a bit, which is a function of the waterways and the mode in which the diamonds or other cutting media are set in the cutting face of the bit, and also the difference between the outside set diameter of a bit and the outside diameter of the bit shank. *Long.* b. Incorrectly and loosely used as a synonym for diamond exposure. *See also* diamond exposure. *Long.*

bit contour. The configuration of the crown or cutting face of a bit as seen in cross section. *Long.*

bit core. The central, removable, and renute globules of bituminous material in water or in an aqueous solution. *Urquhart, Sec. 2, p. 81.* b. A suspension of minute globules of water or of an aqueous solution in a liquid bituminous material. *Urquhart, Sec. 2, p. 81.*

bituminous fermentation. A fermentation peculiar to vegetable matter placed in such situations, as not only to exclude the external air and to secure the presence of moisture, but to prevent the escape of the more volatile principals; and which terminates in the formation of those substances termed bitumens, which in this case includes peat and coal. *Tomkeieff, 1954.*

bituminous grout. A mixture of bituminous material and sand finer than one-fourth inch, which, when heated, will flow into place without mechanical manipulation. *ASTM D1079-54.*

bituminous lignite. a. Term used in coal literature to apply to a certain kind of lignite. *A.G.I.* b. Lignite of a pitch black color with a conchoidal fracture. It is sometimes known as pitch coal. *Nelson.*

bituminous limestone. A dark-colored limestone impregnated with bituminous matter and emitting a fetid odor when rubbed. *Standard, 1964.* Also called stinkstone; swinestone. *Fay.*

bituminous macadam. Asphalt made artificially from grit or crushed stone and bonded with bitumen. *See also* tar macadam; asphalt, b. *Nelson.*

bituminous mastic. A bituminous material mixed with a very fine aggregate. *Petroleum Age, v. 11, April 15, 1923, p. 37.*

bituminous materials. Materials containing bitumen as an essential constituent. In a broad sense, the term applies to materials containing mixtures of native or pyrogenous hydrocarbons and their nonmetallic derivatives, which may be gases, liquids, viscous liquids, or solids, and which are soluble in carbon disulfide. This definition is still a matter of controversy, but has the sanction of technical use. *Hess.*

bituminous ores. Iron ores in which the gangue consists principally of coaly matter, as for example, black band ironstone. *Osborne.*

bituminous pavement. A pavement composed of stone, gravel, sand, shell, or slag, or combinations thereof, and bituminous materials thoroughly incorporated. *Fay.*

bituminous rock. Natural or rock asphalt, but the term is sometimes used to describe a rock in which the percentage of impregnation is comparatively low. *See also* artificial rock asphalt. *Nelson.*

bituminous sand. A sand naturally impregnated with bitumen or petroleum residue. *Petroleum Age. v. 11, April 15, 1923, p. 37.*

bituminous sandstone. Sandstone containing bituminous matter. *Bureau of Mines Staff.*

bituminous shale. a. A shale containing hydrocarbons or bituminous material; when rich in such substances, it yields oil or gas on distillation (for example, oil shale). *Standard, 1964.* b. Shaly sandstone or blae. *C.T.D.*

bituminous stabilization. The mixing of a bituminous material with soil to act either as a binder or as a waterproofing agent. The type and quantity of bituminous material depend on its required function, the soil type and the climatic conditions. The bituminous material increases the effective fluid content of the soil and the treatment is particularly efficient with soils whose natural moisture content is below that needed for compaction. *See also* soil stabilization. *Nelson.*

bituminous surface. In paving, a superficial coat of bituminous material, with or without the addition of stone or slag chips, gravel, sand, or material of similar character. *Fay.*

bituminous wood. A variety of brown coal resembling wood. *Fay.*

bitumiol. Bituminous matter of low rank found in oil shales, shales, marls, and limestones; derived from waxes, fats, and resins. *Tomkeieff, 1954.*

bitumogene. Organic matter, soluble in organic solvents, and present in various types of little altered or unaltered sedimentary rocks, including coal, peat, etc. *Tomkeieff, 1954.*

Bituvia. Road-treating tar. *Bennett 2d, 1962.*

bit wall. That portion of the bit between the crown and the shank of the bit. *Long.*

bit weight. a. Total weight, in carats, of the diamonds set in a diamond bit. *Long.* b. Weight or load applied to a diamond bit during drilling operation. *See also* bit load. *Long.*

bityite. A yellowish-white hydrous orthosilicate of aluminum and calcium, with small amounts of beryllium, lithium, etc., $10SiO_2 \cdot 8Al_2O_3 \cdot 5\frac{1}{2}(Ca,Be,Mg)O \cdot 1\frac{1}{2}(Li,Na,K)_2O \cdot 7H_2O$. Minute hexagonal plates. Pseudohexagonal. From Mt. Bity, Malagasy Republic. *English.*

bivalent; divalent. a. Having a valence of 2. *Webster 3d.* b. Having two valences; for example, cobalt which has valences of 2 and 3. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-107.*

bivalve. A mollusc having two shells. *See also* univalve. *Shipley.*

bixbite. A gooseberry-red beryl found to the southwest of Simpson Spring, Utah. *English.*

bixbyite. A black oxide of iron and manganese, $(Fe,Mn)_2O_3$. Isometric; cubes, often modified. Also interpreted as a manganate of iron, analogous to perovskite. *English.*

bizardite. A nepheline-bearing alnoite. *Hess.*

Bizen. A hard, unglazed pottery, usually grayish-white; made in Bizen, Japan. *Webster 2d.*

bizet. In gem cutting, the part of a brilliant (diamond) between the table and the girdle, occupying one-third of its depth and having 32 facets. *Standard, 1964.*

bjerezite. A compact porphyritic igneous rock containing numerous reddish nepheline phenocrysts; consists of 15 percent orthoclase, 25 percent andesine, 26 percent nepheline, 17 percent analcite and other zeolites, 8 percent biotite and pyroxene, and 6 percent iron ore. *Johannsen, v. 4, 1938, pp. 292-293.*

Bk Chemical symbol for berkelium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

BL Abbreviation for base line. *Zimmerman, p. 15.*

black alta. a. Shale or sandstone containing a little bituminous material. *USGS Bull. 922, 1940, p. 40.* b. An argillaceous schist, found in the New Almaden quicksilver mine, Santa Clara County, Calif. *Fay.*

black amber. A name given by amber diggers to jet that is found with amber. It becomes faintly electric when rubbed. *Fay.*

black and gold marble. A black siliceous Italian marble with golden-yellow veins. *See also* porto marble. *Hess.*

black andradite garnet. Melanite. *Shipley.*

black and white onyx. Onyx with alternate black and white bands, from which many cameos are cut. The black bands are sometimes produced (permanently) by artificial process. *Shipley.*

black annealing. Box annealing or pot annealing ferrous alloy sheet, strip, or wire. *See also* box annealing. *ASM Gloss.*

black antimony. *See* beta antimony. *Bennett 2d, 1962.*

black arsenic. An allotropic form of arsenic obtained by condensing arsenic vapor under controlled conditions. *Bennett 2d, 1962.*

black ash. a. Any of various dark-colored products obtained in industrial processes, as: (1) crude sodium carbonate obtained in the Leblanc process and (2) crude barium sulfide. *Webster 3d.* b. A black mass containing chiefly soda in the form of sodium carbonate and usually also sodium sulfide with some carbon and produced especially for recovery of its soda content by concentrating and burning black liquor in rotary furnaces. *Webster 3d.*

blackband; blackband ironstone. An earthy iron carbonate associated with coal beds. Mined as an iron ore in the United Kingdom. *Fay.*

blackband ironstone. Synonym for blackband. *A.G.I.*

black bat. A piece of bituminous shale embedded in the rock immediately over the coal measure and liable to fall of its own weight when the coal beneath it has been removed. *Compare* kettle bottom; bell mold. *Fay.*

black bear. Eng. Marly shales with iron pyrites, Lower Lias, Lyme Regis. *Arkell, p. 5.*

Blackbird black burning clay. Natural and refined clay used in manufacturing ceramics. *Bennett 2d, 1962.*

blackboard enamel. *See* chalkboard enamel. *ASTM C286-65.*

black body. As applied to heat radiation, this term signifies that the surface in question emits radiant energy at each wavelength at the maximum rate possible for the temperature of the surface, and at the same time absorbs all incident radiation. Only when a surface is a black body can its temperature be measured accurately by means of an optical pyrometer. *Dodd.*

black box. A separate and self-contained electronic unit or element of an electronic device which can be treated as a single package. The name comes from the fact that the housings of such units are often black. *NCB.*

black brick. A loose term, commonly applied to all basic brick. *Bureau of Mines Staff.*

black butts. Discolored and imperfect coke, usually found at the bottom or side of the oven because of excessive moisture existing there; may also result from improper manipulation of the oven. Also called black ends. *Fay.*

black cat. Eng. Used among North Staffordshire miners for a coaly shale. *Tomkeieff, 1954.*

black chalcedony. Correct designation for most of the so-called black onyx. *Shipley.*

black chalk. a. A variety of bluish-black clay containing carbon. *Fay.* b. A slate sufficiently colored by carbonaceous particles to answer the purpose of black lead in pencils for coarse work, such as marking stone. *Fay.*

black chondrite. A black chondritic stony meteorite composed of bronzite and olivine with chondri of various shapes, which break with the matrix; if cut by veins, it is a black chrondite, veined. *Hess.*

black clay. Eng. Decayed Derbyshire toadstone. *Arkell.*

black coal. Scot. Coal slightly burned by igneous rock. *See also* natural coke; blind coal, a. *Fay.* b. Bituminous coal or anthracite, as distinct from brown coal. *Tomkeieff, 1954.* c. Coal altered by an igneous intrusion. *Tomkeieff, 1954.*

black concentrate. The mixture of amalgam gold and magnetite obtained from behind the riffles in a gold sluice. *C.T.D.*

black copper. A name given to the more or less impure metallic copper produced in blast furnaces when running on oxide ores or roasted sulfide material. It is always an alloy of copper with one or more other metals generally containing several percent of iron, often lead, and many other impurities; it also contains from 1 to 3 percent sulfur. *Fay.*

black copper ore. An earthy, black, massive or scaley form of copper oxide, CuO. *Hess. See also* melaconite; tenorite. *Fay.*

black copper oxide. *See* copper oxide. *Bennett 2d, 1962.*

black coral. A corallike, intense black to dark brown, horny substance, distinct from precious coral; hardness, 2.5 to 3; specific gravity, 1.5. Used in beads, bracelets, art objects, etc., and highly regarded by natives of the East Indian Islands. Found in Malaya; the Red Sea; Bermuda; and the Mediterranean. Some pieces are 2½ feet long. *See also* king's coral. *Shipley.*

black core. The interior of a ceramic shape which is black in color, (that is, in most cases due to incomplete oxidation of carbonaceous material, sulfur, etc. In general, accompanied by bloating or expanding). Also called black heart. *Bureau of Mines Staff.*

black coring. A condition usually resulting from the premature vitrification of the exterior of a ceramic shape which prevents the oxidation of carbonaceous material, sulfur compounds, etc., and the interior remains in a reduced state; hence the black color. *Bureau of Mines Staff.*

black cotton; black cotton soil. In India, soil from 6 to 10 feet in thickness overlying the coal measures, which in dry weather, shrings and produces mud cracks. *Fay.*

blackdamp. Generally applied to carbon dioxide. Strictly speaking, a mixture of nitrogen and carbon dioxide. The average blackdamp contains 10 to 15 percent carbon dioxide and 85 to 90 percent nitrogen. It is formed by mine fires and the explosion of firedamp in mines, and hence forms a part of the afterdamp. An atmosphere depleted of oxygen rather than containing an excess of carbon dioxide. *Fay.* Being heavier than air it is always found in a layer along the floor of a mine. It extinguishes light and suffocates its victims. Hence, it is sometimes known as chokedamp. *Korson.*

black diamond. a. A variety of crystalline carbon, related to diamond, but showing no crystal form. Highly prized as an abrasive because of its hardness. Occurs only in Brazil. Also called carbonado. *C.T.D.* b. A term frequently applied to coal. *Fay.*

Black Diamond Nu-Gel. Permissible explosive used in mining. *Bennett 2d, 1962.*

black durain. Durain rich in spore exines, with little fusinite. It resembles cannel coal in spore content and oil yield. *Francis, 1965, v. 1, p. 42.*

black earth. a. A general term including chernozem and dark plastic clays of tropics. *Schieferdecker.* b. A kind of coal which is pulverized and used by painters in fresco. *Fay.*

black edge. The dark enamel exposed at the edge of a light-colored panel. The enamel used to produce the black. *Bryant.*

black edging. A black porcelain enamel applied over the ground coat and exposed in specified areas by brushing the cover coat bisque prior to firing. *See also* edging. *ASTM C286-65.*

black Egyptian ware. *See* basalte. *C.T.D.*

black ends. Eng. *See* black butts. *Fay.*

blackening. In founding, the process of coating the faces of a mold with graphite or similar fine powder, or with a mixture thereof with water; facing. *Standard, 1964.*

Blackett barrel washer. A coal cleaner, consisting of a barrel (partly perforated) 30 feet long and 4 feet in diameter. The axis of the barrel is inclined at 6° off the horizontal and revolves at about 11 revolutions per minute. The water and raw coal feed enter at the elevated end and the clean coal products leave at the lower end. It is a two-product washer and cleans graded sizes between 5 inches and three-fourths of an inch. On account of its cheapness, there has been a revival in the use of Blackett washers, which were developed some 50 years ago. *See also* coal-preparation plant. *Nelson.*

Blackett conveyor. A chain conveyor. *Nelson.*

black flux. A reducing flux composed of powdered carbon and alkali-metal carbonate. *Webster 3d.*

black garnet. *See* andradite. *Bennett 2d, 1962.*

black glass. Manganese or ferric oxides are added to ordinary glass. *CCD 6d, 1961.*

black gold. a. N.S.W. Free gold coated with a film of black oxide of manganese. *New South Wales, p. 115.* b. A slang American term referring to crude oil. *Bureau of Mines Staff.* c. Placer gold coated with a black or dark brown substance so that the yellow color is not visible until the coating is removed. *Bureau of Mines Staff.* d. Synonym for maldonite. *Hey, 2d, 1955.*

black granite. Diorite and other coarse-grained igneous rocks. *Arkell.*

black heart. *See* black core. *Dodd.*

black heart castings. Malleable castings, annealed in non-oxidizing packaging. *Bureau of Mines Staff.*

blackheart malleable. *See* malleable cast iron. *ASM Gloss.*

black heat. Any temperature below visible color. *Bureau of Mines Staff.*

black hematite. *See* psilomelane. *Osborne.*

black horse. Used by quarrymen in Rhode Island to denote a dark biotite gneiss in contact with the granite. *Fay.*

blacking. Carbonaceous materials, such as plumbago, graphite, or powdered carbon, used in coating pouring ladles, molds, runners, and pig beds. *ASM Gloss.*

black iron. Malleable iron untinned; distinguished from tinned or white iron. *Standard, 1964.*

black iron ore. Synonym for magnetite. *Fay.*

black iron oxide; ferrosoferric oxide; magnetic iron oxide; magnetite. Fe_3O_4; molecular weight, 231.54; isometric; black crystals; reddish-black powder; specific gravity, 5.18; insoluble in water; and soluble in hot hydrochloric acid. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-183.*

blackjack. a. Crude black oil used to lubricate mine-car wheels. *Fay.* b. Ark. Soft, black carbonaceous clay or earth associated with coal. *Fay.* c. Derb. A kind of cannel coal. *Fay.* d. Ill. A thin stratum of coal interbedded with layers of slate. A poor, bony coal. *Fay.* e. A dark variety of zinc blende or sulfide of zinc. It has a resinous luster and yields a light-colored streak or powder. *See also* blende; sphalerite. *Fay.*

black knots. Textural defects found in granites caused by dark incluisons or segregations. *AIME, p. 326.*

black latten. Milled sheet brass as used by braziers and wiredrawers. *Standard, 1964.*

black lava glass. *See* obsidian. *C.M.D.*

black lead. a. An old and obsolete name for graphite, still used in naming lead pencils, which are really made of graphite. Also called plumbago. *Tomkeieff, 1954.* b. Graphite, in impure crystalline form. *Pryor, 3.* c. Used for coating patterns and the faces of cast-iron chilling molds. *Crispin.*

blacklead ore. An early name for the black variety of cerussite. *Fay.*

blackleg. a. A worker hostile to trade unionism or acting in opposition to union policies; a strikebreaker. *Webster 3d.* b. A swindler; a professional gambler. *Webster 3d.*

black light. a. Used by miners and prospectors for ultraviolet light. *See also* fluorescence. *Ballard.* b. Electromagnetic radiation not visible to the human eye. The portion of the spectrum generally used in fluorescent inspection falls in the ultraviolet region between 3,300 and 4,000 angstroms with the peak at 3,650 angstroms. *ASM Gloss.*

black lignite. Lignite higher in rank than brown lignite. Defined by Grout as having a fixed carbon content ranging from 35 to 60 percent and a total carbon content of from 73.6 to 76.2 percent. *A.G.I.*

black liquor. The alkaline spent liquor from the digesters in the manufacture of sulfate or soda pulp. *Bureau of Mines Staff.*

black liquor recovery furnaces. Smelting or recovery furnaces in which evaporated black liquor is burned to a molten chemical smelt. *Bureau of Mines Staff.*

black list. a. Any list of persons who are for any reason deemed objectionable by the makers or users of the list, as for political or social misconduct, for joining in or assisting a strike, etc. *Fay.* b. (York.) Miners' term for impure fusain bands in the Barnsley seam. Tomkeieff, 1954.

blacklung. *See* anthracosis. *Fay.*

black magnetic rouge. A polishing material consisting of 99 percent Fe_3O_4. *Osborne.*

black manganese. *See* hausmannite. *Osborne.*

black men's buttons. Small pieces of rounded glass found in various parts of Australia and Tasmania; thought to be probably of meteoric origin. *Hess.*

black metal. *See* black shale, b. *Tomkeieff, 1954.*

black mob. Eng. Slang for workmen who refuse to join a trade union. *Fay.*

blackmorite. A yellow variety of opal from Mount Blackmore, Mont. *Hess.*

black muck; black mold. Lanc. A dark-brown powdery substance, consisting of silica, alumina, and iron; found in iron mines. *Fay.*

black mud. A mud formed in lagoons, sounds, or bays, in which there is poor circulation or weak tides. The color is black because of iron sulfides and organic matter. *A.G.I.*

black ocher. Wad; bog manganese ore. *Fay.*

black oil. A residue from petroleum or from its distillates. It varies widely in character and is used as a cheap lubricant. *Fay.*

black oil shale. Oil shale in the Eastern United States particularly common around the bituminous coal and petroleum regions. *Bureau of Mines Staff.*

black onyx. Incorrect name for black single-colored agate or chalcedony which is usually colored artificially. Properly called black chalcedony. *See also* onyx. *Shipley.*

black opal. An opal of dark tint is so called, though it is rarely black; the fine Australian blue opal, with flame-colored flashes, is typical. *C.M.D.*

black ore. a. Eng. Partly decomposed pyrite containing copper. *Fay.* b. In uranium mining, the term may mean ore containing a high percent of pitchblende, uraninite, coffinite, or vanoxite. *Ballard.* c. Cumb. A variety of hematite in hard pieces, some kidney-shaped, reaching the size of one's hand; found in a moderately soft, dark-red, brown, or nearly black mass of smit clay and manganese oxide, the whole having a most confused appearance. *Hess.*

black oxide of cobalt. *See* earthy cobalt.

black oxide of manganese. *See* pyrolusite. *Fay.*

Black pearl. A trade name which in the narrowest usage refers to a black or almost black pearl, or sometimes to a gray pearl; in its broadest sense, it refers to a brown or a dark blue, blue-green, or green pearl with a pronounced metallic sheen. *Shipley.*

black pigment. Lampblack obtained by burning common coal tar. *Fay.*

black plate. Sheet iron before tinning. *Fay.*

black post. Impure earthy limestones. *Arkell.*

blackpot. Eng. A variety of coarse unglazed pottery. *Standard, 1964.*

blackpowder. An explosive mixture of potassium nitrate, powdered charcoal, and sulfur. *See also* gunpowder, black. *Nelson.*

blackprint. *See* blueprint. *Hess.*

black-red heat. Lowest visible red heat. *Bureau of Mines Staff.*

Black reef. S. Afr. A gold-bearing reef occurring in limited patches at the base of the Transvaal system. *Beerman.*

black ring. S. Staff. A thin bed of coal as seen in the shaft sides, having the appearance of a black circle or ring. *Fay.*

Blackriverian. Lower Mohawkian. *A.G.I. Supp.*

black roast. In fluidization roasting (fluosolids process), the conversion of iron sulfide to magnetite. *Pryor, 3.*

black rouge. A precipitated black magnetic iron oxide. Used mainly in plate printing inks and in paints, but has small abrasive applications. *AIME, p. 20.*

blacks. a. Highly carbonaceous black shale. An impure cannel. *TIME.* b. Used among British miners for dark clay, coaly shale, or mudstone. *Tomkeieff, 1954.*

black sand. a. Local deposits of heavy minerals concentrated by wave and current action on beaches. The heavy minerals consist mainly of magnetite, ilmenite, and hematite, and they are associated with other minerals, such as garnet, rutile, zircon, chromite, amphiboles, and pyroxenes. *A.G.I.* b. Same as asphaltic sand. *Tomkeieff, 1954.*

black-sand beach. A beach, the sand of which contains a large percentage of dark minerals which are concentrated by the wash of the surf. *Hess.*

black satin gloss. Lampblack. *Porter.*

black seed pearl. Very small blackish pearl from the Pinna mollusc. *Shipley.*

black shale. a. Usually a very thin bedded shale, rich in sulfides (especially pyrite which may have replaced fossils) and rich in organic material, deposited under barred basin conditions causing anaerobic accumulation. *A.G.I.* b. Generally, a fine-grained, finely laminated carbonaceous shale, sometimes canneloid, often found as a roof to a coal, or, in place of a coal, resting on a fire clay. Also called black stone; black metal. *Tomkeieff, 1954.*

black shape. Fabricated shape prior to porcelain enameling operations. *Bryant.*

black silicon carbide. *See* silicon carbide. *ACSG, 1963.*

black silver. a. A nonmetallic, sulfur-bearing ore of silver and antimony, approximating Ag_5SbS_4 in composition. *Bennett 2d, 1962.* b. Same as stephanite. Also called brittle silver ore. *Standard, 1964.*

blacksmith; smith. A man skilled in the craft of working and shaping red-hot iron with a hammer on the anvil. *See also* forging. *Nelson.*

blacksmith drill. A drill made with a shank one-half inch in diameter, to fit a certain kind of holder. The shank has a flat for a setscrew. *Crispin.*

black solder. An alloy for brazing black iron, composed of copper, zinc, and a small quantity of tin. *Standard, 1964.*

black speck. A defect that appears in the fired cover coat as a small dark spot. *ASTM C286-65.*

black spit. In coal mining much of the coarser dust that is inhaled is arrested in the nose and bronchial tubes and is swept out by the action of the fine hairlike lining of these, known as the ciliated epithelium, which acts as a conveyor and transports the coarser dust back in the reverse direction to form the basis of the "black spit" of the miner. *Sinclair, I, pp. 172-173.*

Black spring brake. A brake applied in emergency and not under normal conditions of winding. It consists of a series of springs mounted between plates attached to a divided tension rod connected to brake posts. A toggle joint normally holds the springs in compression against the plates and the divided rod then acts as a rigid bar. When the automatic contrivance trips on a potential overwind, the toggle joint is withdrawn, the springs expand and draw the brake posts together in a period of 0.09 to 0.13 second, thus applying the brakes with a force depending upon the strength of the spring. By applying the normal brake, the springs are again compressed and the toggle point reset. *Sinclair, V, pp. 201-202.*

black stone. a. N. of Eng. Highly carbonaceous shale. *Fay.* b. Eng. Another name for toadstone (basalt lava) in Derbyshire. *See also* black shale, b. *Tomkeieff, 1954.*

blackstrap. A black heavy oil sometimes used as a drill-rod dope or lubricant and as a mine-car-wheel lubricant. Also called blackjack. *Long.*

black taggers. Thin sheet iron uncoated with tin. *Standard, 1964.* Black iron. *Fay.*

black telluride. *See* nagyagite. *Fay.*

black tellurium. A rare gray metallic mineral, a sulfotelluride of gold and lead with some antimony. *C.T.D.*

blacktery. S. Staff. Miners' term for black clay found in association with coal. *Tomkeieff, 1954.*

black tin. Eng. Dressed tin ore ready to be smelted; from Cornwall. *Standard, 1964.*

black truck. Aust. A box-shaped truck or car with an end door, so called because it is made black with tar. *Fay.*

black turf. An Irish name for the lowest layer of a peat deposit which is a well-matured compact organic mass. Also called stone turf. *Tomkeieff, 1954.*

black wad. An early name for several minerals, including graphite and the softer manganese oxides. *Fay.*

blackwork. a. Iron wrought by blacksmiths. *Fay.* b. Metal products (as forgings or rolled work) that have not undergone a process (as pickling or machining) that gives a bright finish. *Webster 3d.*

black-zone. A typical black section (adjacent to the gray zone) of used silica brick from steel furnace roofs, composed largely of tridymite and magnetite. *Bureau of Mines Staff.*

blade. a. Usually, a part of an excavator which digs and pushes dirt but does not carry it. *Nichols, 2.* b. The shape of a solid, defined by Zingg as one in which the ratio of breadth to length is less than two-thirds and the ratio of thickness to breadth is less than two-thirds. *A.G.I.* c. Having the appearance of blades; mineral crystals that are strongly elongated in one direction. *A.G.I.*

bladed. Decidedly elongated and flattened; descriptive of some minerals. *Fay.*

bladed structure. Consisting of individual minerals flattened like a knife blade. *Hess.*

blade mill. Trommel washer with lifting blades which aid in disintegration and scrubbing of passing feed. *Pryor, 3.*

blae. a. Scot. A hard sandstone free from joints, also an underclay with balls of ironstone. *See also* bind. Also called blaes; blaize. *Fay.* b. A soft shale or slate of bluish color. *See also* kingle. *Fay.*

blaes. A Scottish name for carbonaceous shales, of a blue-gray color, associated in the Lothians with oil shales but differing from these in having a much lower proportion of bituminous matter, in being brittle rather than tough, and in producing when weathered a crumbling mass which, when wetted, is plastic. *Dodd.*

Blagden's law. For a given salt, the depression of the freezing point is proportional to the concentration of the solution. *C.T.D.*

Blaine test. A method for the evaluation of the fineness of a powder on the basis of the permeability to air of a compact prepared under specified conditions. The method was proposed by R. L. Blaine and is chiefly used in testing the fineness of Portland cement. *Dodd.*

blairmorite. A porphyritic extrusive rock consisting predominantly of analcite phenocrysts in a groundmass of analcite, sanidine, alkalic pyroxene with accessory sphene, melanite, and nepheline. A variety of analcite phonolite. *A.G.I.*

Blair process. An improved form of the Chenot process for making sponge iron by heating crushed iron oxide and coal in retorts. *Bureau of Mines Staff.*

Blaisdell excavator. An apparatus for automatically discharging a sand tank having a central bottom opening. It consists of a central vertical shaft carrying four arms fitted with round plow disks. Sand is plowed toward a central opening and discharged on a conveyor belt. *Liddell 2d, p. 389.* Also called Blaisdell vat excavator. *Fay.*

Blaisdell loading machinery. An apparatus for loading sand tanks. It consists of a rapidly revolving disk with curved radial vanes. The disk is hung on a shaft in the tank center and the sand dropped on the disk is distributed over the entire tank area. *Liddell 2d, pp. 389-390.*

Blaisdell sand distributor. An apparatus for loading sand tanks. It consists of a rapidly revolving disk with curved radial vanes. The disk is hung on a shaft in the center of the tank, and as sand is dropped on the disk it is distributed over the entire area. *Fay.*

blaize. Scot. *See* blaes. *Fay.*

Blake breaker. A jaw breaker or particular kind of jaw crusher. *Nelson.*

Blake furnace. A furnace, the hearth of which consists of terraces rising from the outer edge to the center. The hearth is circular and revolves when in operation. *Fay.*

blakeite. a. Anhydrous ferric tellurite as reddish-brown microcrystalline (cubic?) crusts from Goldfield, Nev. *Spencer 17, M.M., 1946.* b. Titanozirconate of thorium, uranium, calcium, iron, etc., described as zirkelite from Ceylon, but differing in chemical composition and also apparently in crystalline form from the original zirkelite from Brazil. *Spencer 19, M.M., 1952.*

Blake jaw crusher. The original crusher of jaw type. A crusher with one fixed jaw plate and one pivoted at the top so as to give the greatest movement on the smallest lump. *Fay.* Motion is imparted to the lower end of the crushing jaw by toggle joint operated by eccentric. *Liddell 2d, p. 355.* This machine, or some modification of it, is used for reducing run-of-mine ore to a size small enough to be taken by the next crusher in the series during the first stage of crushing. *Newton, p. 53.*

Blakely test. *See* tuning-fork test. *Dodd.*

Blake Morscher separator. Electrostatic separator. Dry particles of ore are fed thinly to an electrically charged roll, which revolves slowly. Particles of relatively high conductivity lose charge and are thrown clear, while nonconductors cling and are carried further around. *Pryor, 3.*

blanc. A piece of plain pottery. *Standard, 1964.*

blanc de chine. A brilliant white glaze, over a fine white porcelain body. *C.T.D.*

blanc fixe; permanent white. Precipitated barium sulfate; white powder; specific gravity, 4.476; used in paint industry and as filler for textiles, rubber, etc. Also called artificial heavy spar; terra ponderosa. *Bennett 2d, 1962.*

blanch. Eng. Lead ore, mixed with other minerals. *Fay.*

blanched copper. An alloy of copper and arsenic. *Fay.*

blandine. Liquid petroleum. *Hess.*

blank. a. A parison or preliminary shape from which a finished article is further formed, or mold for producing same. *ASTM C162–66.* b. Any article of glass on which subsequent forming or finishing is required. *ASTM C162–66.* c. The piece cut from metal sheet that is to be used in forming the finished article. *ASTM C286–65.* d. A ceramic object to be decorated. *ACSG, 1963.* e. A quartz plate with approximately, or exactly, the correct edge dimensions but not yet finished to final thickness (frequency). Ordinarily applied to pieces of quartz that are in the process of being machine lapped or that are diced out but not yet lapped. *AM, 1.* f. In forming, a piece of sheet material produced in cutting dies, that is usually subjected to further press operations. *ASM Gloss.* g. In powder metallurgy, a pressed, presintered, or fully sintered compact, usually in the unfinished condition and requiring cutting, machining, or some other operation to produce the final shape. *ASM Gloss.* h. Blooms in short lengths are sometimes called blanks. *Camp, 6th ed., 1951, p. 680.* i. An interval in a borehole from which core either was not recovered or was lost, or in which no minerals of value were encountered. *Long.* j. Synonym for bit blank. *Long.*

blank bit. Synonym for bit blank. *Long.*

blank carburizing. Simulating the carburizing operation without introducing carbon. This is usually accomplished by using an inert material in place of the carburizing agent, or by applying a suitable protective coating to the ferrous alloy. *ASM Gloss.*

blanket. a. A textile material used in ore-treatment plants for catching coarse free gold and sometimes associated minerals, for example, pyrite. The blanket is taken up periodically and washed in a tub to remove the gold concentrate from which the gold is recovered by amalgamation in a rotating barrel. *Nelson.* b. *See* blanket deposit; blanket vein. *Fay.* c. A bituminous surface of appreciable thickness generally formed on top of a roadway by the application of one or more coats of bituminous material and sand. Also called carpet. *Fay.* d. Soil or broken rock left or placed over a blast to confine or direct throw of fragments. *Nichols.* e. A layer of fertile uranium 238 or of thorium 232 placed around the fissionable material in a reactor. When these fertile materials absorb neutrons, they are partially converted into fissionable plutonium 239 or uranium 233, respectively. *L&L.*

blanket deposit. A flat deposit of ore, the length and breadth of which are relatively great compared with the thickness. More or less synonymous terms are flat sheets, bedded veins, beds, or flat masses. *See also* blanket vein. *Fay.*

blanket feed. A method for charging batch designed to produce an even distribution of batch across the width of the furnace. *ASTM C162-66.*

blanketing. a. The material caught upon the blankets used in concentrating gold-bearing sands or slimes. *Webster 2d.* b. The process involved in definition a. *Fay.* c. Can. Staking but not recording claims. *Hoffman.*

blanket moss. A type of peat deposit formed at low altitudes under the influence of cold-temperate climate and an abundant rainfall. It is comparatively thin and shows little variation from top to bottom. *Tomkeieff, 1954.*

blanket sand. A body of sand or sandstone that covers a considerable two-dimensional area. Often called a sheet sand. *A.G.I.*

blanket shooting. Applied to a method of blasting on a face not exceeding 30 or 35 feet in height. It involves leaving at the quarry face a mass of shattered rock several feet in thickness that serves as a buffer, preventing the rock from being thrown far from its source, and also rendering the shot more effective. Also called buffer shooting; shooting against the bank. *Fay.*

blanket sluice. A sluice in which coarse blankets are laid, to catch the fine but heavy particles of gold, amalgam, etc., in the slime passing over them. The blankets are removed and washed from time to time, to obtain the precious metal. *Fay.*

blanket strake. A trough over which gold pulp flows. It is lined with blanket for catching coarse gold and associated minerals. *Nelson.*

blanket vein. A horizontal vein or deposit. A sheet deposit. A vein in which the ore body covers the entire area within the limits of the surface lines of a mining location. The apex of a blanket vein is coextensive with the space between the sidelines of a mining location. *See also* blanket deposit. *Fay.*

blanket washer. In ore dressing, smelting, and refining, one who cleans flannel blankets over which a mixture of finely ground gold ore and cyanide solution from Chilean mills is passed to collect free particles of gold not dissolved by the cyanide. *D.O.T. 1.*

blank flange. A flange which has not been drilled for bolts. *Ham.*

blank holder. The part of a drawing or forming die that holds the workpiece against the draw ring to control metal flow. *ASM Gloss.*

blank hole. a. A borehole in which no minerals or other substance of value were penetrated. Also called barren hole; dry hole. *Long.* b. The uncased portion of a borehole. Also called bare; barefoot; barefooted; naked. *Long.*

blanking. Cutting desired shapes out of metal to be used for forming or other manufacturing operations. *ASM Gloss.*

blank mold. The metal mold which first shapes the glass in the manufacture of hollowware. *ASTM C162-66.*

blank nitriding. Simulating the nitriding operation without introducing nitrogen. This is usually accomplished by using an inert material in place of the nitriding agent or by applying a suitable protective coating to the ferrous alloy. *ASM Gloss.*

blankoff. To line a specific portion of a borehole with casing or pipe for the purpose of supporting the sidewalls or to prevent ingress of unwanted liquids or gas. Also called case; case off; seal off. *Long.*

blank pipe. Unperforated pipe or casing set in a borehole. *Long.*

blank reaming shell. A reaming shell in which no reaming diamonds or other cutting media are inset on the outside surface. *Long.*

blank repairman. A laborer who prepares copper starting blanks for use in electrolytic refining tanks. *D.O.T. Supp.*

blanks, pressing. Optical glass formed by pressing into the rough shape and size required in the finished article. *ASTM C162-66.*

Blanton cam. A device used for locking the cam on the camshaft in a stamp mill. A wedging action is insured by means of a brass taper bushing. *Fay.*

Blasjo cut. This is a cut with a single V where all the holes on one side are parallel and meet the holes from the other side at an angle that may be as low as 30°. *Langefors, p. 194.*

blast. a. The ignition of a heavy explosive charge, particularly a large one in opencast or quarry work. *See also* blasting, a. *Nelson.* b. A miner's terms for compressed air underground. *Nelson.* c. The operation of blasting, or rending rock or earth by means of explosives. *Fay.* d. An explosion of gas or dust in a mine. *Webster 3d.* e. Scot. A fall of water in the downcast shaft to produce or quicken ventilation. *Fay.* f. Synonymous with shot. *Rice, George S.* g. The operation of increasing the diamond exposure on a bit face by removing some of the matrix metal through the abrasive action of grains of sand carried in a high-pressure stream of air. Also called sandblast. *Long.* h. A crystal formed during metamorphism, such as a porphyroblast. *Webster 3d.* i. A syllable indicating the process of recrystallization during the metamorphism of rocks. It is used as a suffix in idioblast and porphyroblast to indicate the form or relations of individual crystals. The two-syllable termination blastic is used in words like granoblastic and poikiloblastic to denote the textures of the rocks produced by metamorphism and recrystallization. The two- syllable prefix blasto appears in words such as blastogranitic, blastophitic, and blastoporphyritic to denote a relict structure, veiled but not destroyed entirely by recrystallization. *Holmes, 1920.* j. An increase in firing temperature of a kiln immediately before ending the firing operation. *Bureau of Mines Staff.* k. The period during which a blast furnace is in blast, that is, in operation. *Fay.*

blast box. A chamber into or through which the air of a blowing engine passes. *Fay.*

blast coil. Heat transfer surface, most frequently of an extended surface arrangement, over which air is blown to be heated or cooled, depending on the temperature of the fluid within the pipelike surface. *Strock, 10.*

blast draft. The draft produced by a blower, as by blowing in air beneath a fire or drawing out the gases from above it. A forced draft. *Fay.*

blasted. a. A term applied to a miner who has been injured by an explosion of dynamite or gunpowder. *Weed, 1922.* b. Rent by an explosive. *Webster 2d.*

blaster. a. A device for detonating an explosive charge. The blaster usually consists of a machine by which an operator may, by pressing downward or otherwise moving a handle of the device, generate a powerful transient electric current which is transmitted to an electric blasting cap. Also called blasting machine. *A.G.I.* b. One who sets off blasts in a mine or quarry. A shot firer. *Hess.* c. *See* blasting unit.

blaster helper. *See* powder monkey. *D.O.T. 1.*

blasters. Used in the anthracite industry to describe many anthracite workers who are certified miners, but who do not use their past training, common sense, or instructions while drilling their holes and in choosing the amount and kinds of explosives used, with the result that much of the coal is unnecessarily blown to bits. *Michell, p. 211.*

blast furnace. A shaft furnace in which solid fuel is burned with an air blast to smelt ore in a continuous operation. Where the temperature must be high, as in the production of pig iron, the air is preheated. Where the temperature can be lower, as in smelting copper, lead, and tin ores, a smaller furnace is economical, and preheating of the blast is not required. *ASM Gloss.*

blast furnace dust. A dust recovered from blast furnace gases, some of which is valuable for its potash content. *Hess.*

blast furnace gas. A low-grade producer gas, made by the partial combustion of the coke used in the furnace and modified by the partial reduction of iron ore. The gas contains more carbon dioxide, and less hydrogen, than normal producer gas made from coke, and has a lower calorific value. *Francis, 1965, v. 2, p. 383.*

blast furnace slag. The nonmetallic product, consisting essentially of silicates and aluminosilicates of lime and of other bases, which is developed in a molten condition simultaneously with iron in a blast furnace. *ASTM C125-66.*

blast gas furnace. A gas-burning furnace with forced draft. *Hess.*

blast hearth. A hearth in connection with which a blast is used, as in reducing lead ore. *Fay.*

blasthole. a. A hole for a blasting charge. *Standard, 1964.* b. The holes through which the water enters the bottom of a pump. *See also* snorehole. *Fay.* c. An opencast or quarry blasting hole that takes a heavy charge of explosive. *Nelson.*

blasthole bit. In diamond drilling, a noncoring bit. A plug bit. *Pryor, 3.*

blasthole charger. A portable unit consisting of a prilled explosive reserve tank feeding into an air-activated loading tube. The equipment should be grounded to guard against buildup of static electricity and possible accidental explosive detonation. The blasthole charger permits rapid loading of prilled explosives into blastholes drilled in any direction. *Bureau of Mines Staff.*

blasthole drill. Any rotary, percussive, fusion-piercing, churn, or other type of drilling machine used to produce holes in which an explosive charge is placed. Also called shothole drill. *Long.*

blasthole driller. *See* churn-drill operator. *D.O.T. 1.*

blasthole machine. Synonym for blasthole drill. *Long.*

Blastine. Explosive consisting of TNT, ammonium perchlorate, sodium nitrate, and paraffin wax. Used in mining. *Bennett 2d, 1962.*

blasting. a. The operation of breaking coal, ore, or rock by boring a hole in it, inserting an explosive charge, and detonating or firing it. Also called shot firing. *See also* explosive, b. *Nelson.* b. Cleaning or finishing metals by impingement with abrasive particles moving at high speed and usually carried by gas or liquid, or thrown from a centrifugal wheel. *ASM Gloss.*

blasting agent. A commercial blasting agent is a cap insensitive chemical composition or mixture which contains no explosive ingredient and which can be made to detonate when initiated with a high strength explosive primer. *DuPont, 1966, p. 47.*

blasting barrel. A piece of iron pipe, usually about one-half inch in diameter, used to provide a smooth passageway through the stemming for the miner's squib. It is recovered after each blast and used until destroyed. *Fay.*

blasting cap. a. A copper shell closed at one end and containing a charge of detonating compound, which is ignited by electric current or the spark of a fuse. Used for detonating high explosives. *Fay.* b. A small sensitive charge placed in the larger explosive charge by which the larger charge is detonated. *B. C. I. See also* electric detonator.

blasting cap, waterproof electric. *See* waterproof electric blasting cap.

blasting cartridge. A cartridge containing an explosive to be used in blasting. *Fay.*

blasting circuit. A blasting circuit is a shot-firing cord together with connecting wires and electric blasting caps used in preparation for the firing of a blast in mines, quarries and tunnels. *ASA C42.85: 1956.*

blasting compounds. Explosive substances used in mining and quarrying. *Hess.*

blasting cord, shot-firing. *See* shot-firing blasting cord.

blasting curtain. A screen erected to prevent damage to equipment and supports in the vicinity of the blasting point. It consists of round timbers about 6 inches in diameter and suspended from a cable or chain across the roof. The curtain is erected a short distance from the shothole. *See also* shot-firing curtain. *Nelson.*

blasting fuse. a. A slow-burning fuse used in blasting operations. *Standard, 1964.* b. A fine core of gunpowder enclosed in the center of jute, yarn, etc., for igniting an explosive charge in a shothole. *See also* safety fuse. *Nelson.*

blasting galvanometer. An instrument that provides a simple means for testing electric blasting circuits, enabling the blaster to locate breaks, short circuits, or faulty connections before an attempt is made to fire the shot. With its use, misfires may be prevented to a great extent. To test a circuit one wire should be placed on one terminal of the instrument and the other wire on the other terminal. If the needle is not deflected, it indicates that the circuit is broken; if it is an electric blasting cap that is being tested, this should be discarded. *Pit and Quarry, 53rd, sec. A, p. 85.*

blasting gelatin. A high explosive, consisting of nitroglycerin and nitrocotton. It is a strong explosive, and a rubberlike, elastic substance, unaffected by water. *Fay.* Taken as a standard of explosive power. *B.S. 3618, 1964, sec. 6.*

blasting hole well driller. *See* churn-drill operator. *D.O.T. 1.*

blasting machine. A portable dynamo that generates enough electric current to detonate electric blasting caps when the machine rack bar or handle is given a quick, downward push. Also called battery. *Long. See also* dynamo exploder; M.E. 6 exploder; one-shot exploder. *Nelson.*

blasting mat. a. A tightly woven covering of heavy manila rope or wire rope, or chain, made in various sizes, for spreading over material to be blasted for preventing blasted fragments from flying. *Fay.* b. A commonly used mat that consists of discarded heavy-duty tire casings cut into pieces which are then laced together with discarded wire cable. *Bureau of Mines Staff.*

blasting needle. A pointed instrument for piercing the wad or tamp of a charge of explosive, to permit introducing a blasting fuse. *Standard, 1964.*

blasting oil. Same as nitroglycerin. *Fay.*

blasting powder. a. A powder containing less nitrate, and in its place more charcoal than blackpowder. Its composition is 65 to 75 percent potassium nitrate, 10 to 15 percent sulfur, and 15 to 20 percent charcoal. In the United States, sodium nitrate is used largely in place of the potassium salt. *Compare* blackpowder. *Fay.* b. A low explosive. *See also* gunpowder, black. *Nelson.*

blasting reflection mechanism. *See* reflection mechanism, blasting. *Lewis, p. 146.*

blasting sitck. A simple form of fuse. *Fay.*

blasting supplies. A term used to include electric blasting caps, ordinary blasting caps, fuse, blasting machines, galvanometers, rheostats, etc., in fact, everything used in blasting, except explosives. *Fay.*

blasting switch. A switch used to connect a power source to a blasting circuit. It is sometimes used to short-circuit the leading wires as a safeguard against premature blasts. *ASA C42.85: 1956.*

blasting timer. An instrument that utilizes a powerline as a source of electrical current and which closes the circuits of successive blasting caps with a delay time interval. The timer provides for the circuits of 15 charges and affords positive control of the duration of intervals. *Streefkerk, pp. 46-47.*

blasting tube. A tube of explosives, as nitroglycerin, for blasting. *Standard, 1964.*

blasting unit. A portable device including a battery or a hand-operated generator designed to supply electric energy for firing explosive charges in mines, quarries, and tunnels. Also called blaster; exploder; shot-firing unit. *ASA C42.85: 1956.*

blasting unit, single-shot. *See* single-shot blasting unit.

blasting unit, multiple-shot. *See* multiple-shot blasting unit.

blast meter. An instrument to show the velocity of discharge from the nozzle of a blowing engine. *Standard, 1964.*

blast nozzle. A fixed or variable sized outlet usually tapered of a blast pipe. *Fay.*

blastogranitic. A metamorphosed granitic rock in which remnants of the original granitic texture remain. *Johannsen, v. 1, 2d, 1939, p. 204.*

blastometer. *See* Nobel blastometer. *Nelson.*

blastophitic. A metamorphosed rock which originally contained lath-shaped crystals partly or entirely enclosed in augite and in which part of the original texture remains. *Johannsen, v. 1, 2d, 1939, p. 204.*

blastoporphyritic. Applied to the textures of metamorphic rocks derived from porphyritic rocks and in which the porphyritic character still remains as a relict feature, veiled but not obliterated by subsequent recrystallization. *Holmes, 1928.*

blast pipe. A pipe for supplying air to furnaces. *Zern.*

blast roasting. Roasting conducted in a Dwight-Lloyd machine, in which roasting is accompanied by sintering. The charge is placed in small boxes, ignited, and air drawn through to burn off sulfur. *C.T.D.*

blatterkohle. Ger. Brown coal. *Hess.*

blaugas (**blue gas**). Synonym for bottle gas. *Long.*

blauschlamm. Ger. Blue mud. *Holmes, 1928.*

blauw grond. S. Afr. Blue ground; the unoxidized part of the filling in diamond pipes. Often misspelled blaauw grond. *Hess.*

blavierite. An earlier name for the rocks now called mylonites in Black Mountain, south Cavennes, France. They resemble soapstone but are pinitized feldspars and quartz; thought to be altered arkoses. *Hess.*

blaze. a. Can. Cutting a long thin section on both sides of a tree as a marker. *Hoffman.* b. A survey mark, for example, a slash on a tree trunk, to guide an exploration party. *Pryor, 3.*

blazer. Eng. Siliceous clay suitable for making firebricks, Stourbridge. *Arkell.*

bleached sand. Sand that has become pale because of bleaching. *Schieferdecker.*

bleacher. A settling tub for refining petroleum. *Standard, 1964.*

bleaching clay. A clay that possesses superior decolorizing characteristics. Used in the refining of mineral oils, petroleum, vegetable oils, and animal oils. *CCD 6d, 1961.*

bleaching powder; chloride of lime; chlorinated lime. A nearly white powder made by passing chlorine over hydrated lime. Believed to consist chiefly of compounds or mixtures of calcium hydroxide, calcium chloride, and calcium hypochlorite with varying contents of available chlorine and water. Used as a bleaching agent, a disinfectant, and a deodorant. *Webster 3d.*

bleb. a. A small, usually rounded inclusion of one mineral in another, for example, blebs of olivine poikilitically enclosed in pyroxene. *A.G.I.* b. A bubble especially in water or glass. Also, a small bit or particle of distinctive material (as of mercury ore in quartzite). *Webster 3d.* c. A ceramic blister. *Bennett 2d, 1962 Add.*

blebbing. Formation of blisters on decorated ceramics; also known as frizzling. *Bennett 2d, 1962 Add.*

bled ingot. In steelmaking, an ingot which has lost its molten center while cooling. *Standard, 1964.*

bleed. a. To drain off water or entrapped air from a piping system or container. *Compare* bleeder, a. *Long.* b. To give off or exude small amounts of droplets of water or gas, such as from a stratum of rock or coal. *Long.* c. To remove unwanted air or fluid from passages. *Nichols.*

bleeder. a. A connection located at a low place in an airline or gasoline or container so that by means of a small valve the condensed water, or other liquid, can be drained or bled off from the line or container without discharging the air or gas. *Long.* b. A fine adjustment valve (needle valve) connected to the bottom end of a hydraulic feed cylinder in swivel head of a diamond drill. By means of the bleeder the speed at which the hydraulic piston travels can be minutely controlled. *Long.* c. A pipe on top of an iron blast furnace through which gas escapes. *Bureau of Mines Staff.*

bleeder entries. Widely used for draining methane in coal mines in the United States where the room-and-pillar method is employed. *Hartman, p. 33.* They are panel entries driven on a perimeter of block of coal being mined and maintained as exhaust airways to remove methane promptly from the working faces to prevent buildup of high concentrations either at the face or in the main intake airways. They are maintained, after mining is completed, as recommended by the U.S. Bureau of Mines in preference to sealing the completed workings. *Bureau of Mines Staff.*

bleeder pipe. A pipe inserted in a seal to relieve gas pressure from a sealed area. *Grove.*

bleeder turbine. A steam turbine arranged so that low-pressure steam for heating purposes can be taken out between intermittent stages. Thus, the high-pressure boiler steam does some work before it is taken out for low-pressure heating service. *Petroleum Age, v. 11, April 15, 1923, p. 39.*

bleeding. a. Giving off of oil or gas from pore spaces or fractures. *Wheeler.* b. Draining liquid from a gasline, or water and sludge from a tank of oil. *Porter.* c. The exudation of bituminous material on the roadway surface after construction. *Fay.* d. The exudation of water from unhardened concrete. *Taylor.*

bleeding rock. Sandstone containing water. *T.I.M.E.*

bleeding surface. Any face, such as the walls of a well or borehole or the sides of a fracture, that traverses a reservoir rock or aquifer permitting the stored liquid or gas to seep (or to bleed) into the opening. *A.G.I.*

bleeding valve. A cock, as in an airbrake mechanism, the opening of which releases air. *Standard, 1964. See also* bleeder. *Fay.*

bleed off. A coal mining term used when feeders or blowers act as the means by which gas is "bled off" or dissipated to the adjoining strata or to the surface. *Kentucky, p. 24.*

Bleiberg furnace. *See* Carinthian furnace. *Fay.*

bleke. A calcareous earth found on the Isle of Gothland in the Baltic Sea. *Hess.*

blemish. In dry process enameling, an insignificant imperfection in the porcelain enamel surface. *ASTM C286-65.*

blend coal. Term used among British miners for cannel coal interstratified with ordinary coal. *Tomkeieff, 1954.*

blende. Without specific qualification, it means zincblende or the sulfide of zinc (sphalerite), which has the luster and often the color of common resin and yields a white streak and powder. The darker varieties are called blackjack by the English miners. Other minerals having this luster are also called blendes, such as antimony blende, ruby blende, pitchblende, and hornblende. Sphalerite (blende) is often found in brown shining crystals, hence its name among the German miners, from the word blenden, meaning to dazzle. *Fay.*

blended unconformity. An unconformity that is not sharp because the original erosion surface was covered by a thick residual soil that graded downward into the underlying rock. Moreover, the younger rocks above the unconformity may have incorporated some of the residual soil, making the contact more vague. *Billings, 1954, p. 248.*

blending. a. Mixing in predetermined and controlled quantities to give a uniform product. *B.S. 3552, 1962.* b. In powder metallurgy, the thorough intermingling of powders of the same nominal composition (not to be confused with mixing). *ASM Gloss.*

blending-batch. Stepwise changes in batch composition to arrive at final change in finished glass. *ASTM C162-66.*

blending conveyor. A conveyor running beneath a line of ore bins or stockpiles, and so set that each bin or stockpile can deliver onto the conveyor at a controllable rate from individual feeders. *Pryor, 3. See also* paddle-type mixing conveyor; screw-type mixing conveyor. *ASA MH4.1-1958.*

blending system. A coordinated system of conveyors and allied equipment for the purpose of blending bulk materials to obtain a product which will be uniform and homogeneous having physical and chemical properties equal to the average of the entire raw input. *ASA MH4.1-1958.*

bleu persan. A form of pottery decoration in which a white pattern was painted over a dark blue background; the name derives from the fact that the pattern generally had a Persian flavor. *Dodd.*

blibe. A fault, in glassware, in the form of an elongated bubble intermediate in size between a seed and a blister. Gray blibe consists of undissolved sodium sulfate. *Dodd.*

blick. Ger. Bright glow or flash, on gold prill at end of cupellation. *Pryor, 3.*

blikhuis. S. Afr. A house of galvanized iron. *Standard, 1964.*

blind. a. Not appearing in an outcrop at the surface, such as a blind veneer. *Webster 3d.* b. Forest of Dean. *See* afterdamp. *Fay.* c. Scot. To erect a stopping in a crosscut or other underground roadway. *Fay.* d. To drill with the circulation medium (water or drill mud) escaping into the sidewalls of the borehole and not overflowing the collar of the drill hole. *Long.* e. An underground opening not connected with other workings nearby and at about the same elevation. *Long.*

blind apex; suboutcrop. The upper edge of a lode or vein reef, near the surface but covered by superficial deposits. *Nelson.*

blind bit. Synonym for noncoring bit. *Long.*

blind borehole process. A new method in the underground gasification of coal. A borehole is drilled to a blind end having no outside connection. A tube of smaller diameter is inserted nearly the full length through which air is passed to supply a gasification reaction at the far end of the hole. The hot gases return around the outside of the tube. *Nelson.*

blind coal. a. Eng. Coal altered by the heat of a trap dike so as to resemble anthracite. *Fay.* b. Eng. Anthracite and other kinds of coal that burn without flame. *Fay. See also* black coal; natural coke. *A.G.I.*

blind creek. Aust. A creek that is dry, except in wet weather. *Fay.*

blind deposit. A deposit that does not extend to the surface of bedrock. *Hawkes.*

blind drain. *See* rubble drain. *Ham.*

blind drift. a. A horizontal passage, in a mine, not yet connected with the other workings. *See also* blind level. *Fay.* b. An inverted siphon for water in a mine. *C.T.D.*

blinde. Same as blende. *Standard, 1964.*

blinded. Scot. Not opposite. Two ends (drifts or entries) driven from opposite sides of a plane and not opposite each other, but nearly so, are said to be blinded. *Fay.*

blind flange. a. A flange which closes the end of a pipe and produces a blind end (dead end). *Porter.* b. A steel plate inserted between flanges of a pipeline, thus cutting off the line. *Porter.*

blind header. A concealed brick header in the interior of a wall, not showing on the faces. *ACSG.*

blind heading. *See* dead end. *B.S. 3618, 1963, sec. 2.*

blind hole. A borehole in which the circulating medium carrying the cuttings does not return to the surface. *Long.*

blinding. a. In uranium leaching, reduced permeability of ion-exchange resins due to adherent slimes. In sieving, blocking of screen apertures by particles. *Pryor, 3.* b. A matting of, or stoppage by, fine materials during screening which interferes with or blinds the screen mesh. *Bureau of Mines Staff.* c. Compacting soil immediately over a tile drain to reduce its tendency to move into the tile. *Nichols.* d. A layer of lean mix concrete from 2 to 4 inches thick, laid on soil in the bottom of a foundation to provide a base on which to place reinforcement. *Ham.* e. A glaze fault revealed by a reduction in gloss, and caused by surface devitrification. *Dodd.*

blind joint. An obscure bedding plane. *Zern.*

blind lead; blind lode. A vein having no outcrop. *Fay.*

blind level. a. One not yet holed through to connect with other passages. *Pryor, 3.* b. A cul-de-sac or dead end. *Pryor, 3.* c. A level for drainage, having a shaft at either end, and acting as an inverted siphon. *Fay.*

blind lode. a. A blind lead or blind vein. *Hess.* b. A lode showing no surface outcrop, and one that cannot be found by any surface indications. *See also* blind lead. *Fay.*

blind outcrop. An outcrop buried under the surface soil or sedimentary rock, only exposed by stripping overburden or pitting. *Pryor, 3, p. 283.*

blind pig. Can. Illicit distillery. *Hoffman.*

blind pit. Lanc. An interior shaft from one coalbed to another below. *Hess. See also* drop staple.

blind riser. A riser which does not extend through the top of the mold (as opposed to an open riser which extends through the sand to the surface of the mold). *ASM Gloss.*

blind road; blind way. Mid. Any underground roadway not in use, having stoppings placed across it. *Fay.*

blind roaster. A muffle furnace for roasting ore out of contact with the products of combustion. *Standard, 1964.*

blind seams. Incipient joints. *Fay.*

blind shaft. A sublevel shaft, connected to the main (daylight to depth) shaft by a transfer station. A winze. *Pryor, 3.*

blind shearing. Scot. A side cutting without undercutting. *Fay.*

blind splicing. Joining ropes or cables by laying out alternate strands of one and laying in the corresponding strands of the other so that the splice is smooth and of the same size as other sections. *Hess.*

blind stope. Secret working place underground, not marked on plans. *Pryor, 3.*

blind vein. A vein that does not continue to the surface. *See also* blind, a; blind lode; blind lead. *Fay.*

blind washer. An unperforated metal washer, used in pipelines. *Standard, 1964.*

blip. Echo trace on radar or sonar indicator screen. *Hy.*

Bliss sandstone. Massive, compact, fine-textured, fossiliferous gray sandstone varying from almost white to brown. It may be either Cambrian or Ordovician, or both, at any given locality. It represents a period of slow inetrmittent deposition of sandy material. Found in New Mexico and in Texas. *Hess.*

blister. a. In quarrying, an unconfined charge of explosive used to bring down dangerous ground that cannot be made safe by barring and that is too inaccessible to bore. *South Australia, p. 170.* b. A protrusion, more or less circular in plan, extending downward into a coal seam. It represents the filling of a streambed pothole worn into the upper surface of the coal forming material. Some blisters may have originated through differentially greater compaction of compressible mud surrounding a lens of incompressible sand directly overlying the coal. *A.G.I.* c. A defect in metal, on or near the surface, resulting from the expansion of gas in a subsurface zone. Very small blisters are called pinheads or pepper blisters. *ASM Gloss.* d. Can. Copper as a smelter product before it is refined. *Hoffman.* e. A defect consisting of a bubble that forms during fusion and remains when the porcelain enamel solidifies. *ASTM C286-65.* f. An unbroken blister is usually called a glass eye. *ACSB, 3.* g. A defect on the surface of ceramic ware that occurs during vitrification appearing as an enclosed or broken bubble. *Bureau of Mines Staff.*

blister bar. A wrought-iron bar impregnated with carbon by heating in charcoal. Used in making crucible steel. *C.T.D.*

blister copper. An impure intermediate product in the refining of copper, produced by blowing copper matte in a converter, the name being derived from the large blisters on the cast surface that result from the liberation of SO_2 and other gases. *ASM Gloss.*

blistered copper ore. A reniform variety of chalcopyrite. *Fay.*

blister furnace. A furnace for smelting ore to blister copper. *Hess.*

blister hypothesis. A hypothesis proposed by J. L. Rich (1951) as an explanation of compressional mountains. Radiogenic heat expands and melts a limited portion of the crust and subcrust causing a domed regional uplift (or blister) on a foundation of molten material having no permanent strength. Erosion and isostatic transfer initiates a marginal downwarp which is gradually filled with sediments (a geosyncline). Sliding of the crust away from the center of the dome causes crumpling and thrusting of the marginal geosynclinal sediments. Repeated sliding produces tension across the top of the dome and block faulting and copious emissions of lavas result. Finally, as the magma beneath the dome cools and congeals, sliding of the crust ceases and the upwarped area subsides. *A.G.I.*

blistering. a. The development during firing of enclosed or broken macroscopic vesicles or bubbles in a body, or in a glaze or other coating. *ASTM C242-60T.* b. *See* secondary blasting; mudcap. *Fay.*

blister pearl. Pearly concretion attached to the shell and therefore not true pearl. Flattened, irregular, and sometimes contains clay, water, etc., and occasionally a true pearl. *Shipley.*

blister rubber. One who removes blisters (air pockets) from inside of green sewer pipes by cutting them with knife. *D.O.T. 1.*

blister steel. Raw steel which has been cooled very slowly and which has a blistered appearance. The blisters having been formed by the efforts of gas to escape from within the metal. *Camm.*

blister wax. Same as blower wax. *Tomkeieff, 1954.*

blitzrohren. Ger. A fulgurite; a mass of sand or rock, usually tubular, melted by lightning. *Hess.*

blixite. A basic lead chloride, $Pb_4Cl_2O_3$ or $Pb_{16}Cl_8(O,OH)_{10-x}$ with x about 2.6, occurring as a fissure mineral at Langban, Sweden. *Hey, M.M., 1961.*

bloach. Roughened low spot on surface of ground plate glass. *Bennett 2d, 1962 Add.*

bloat. A hammer swelled at the eye. *Fay.*

bloating. a. The expanding or swelling of a ceramic shape during firing. Results in defective ware and is generally caused by overfiring or black coring. *Bureau of Mines Staff.* b. Expanding nonmetallic raw materials such as clays, shales, perlite, slates, etc., by rapid heating to produce a lightweight vesicular structure. *Bureau of Mines Staff.* c. Swelling of a refractory when in the thermoplastic state caused by a temperature in excess of that for which the material is intended, an exception being the use of this property in one type of ladle brick. *See also* secondary expansion. *A.R.I.*

bloating of refractories. Substantial swelling produced by a heat treatment that causes the formation of a vesicular structure. *ASTM C71-64.*

bloating phenomena. The expansion of certain nonmetallic materials by heating until the exterior of the particle or shape becomes sufficiently pyroplastic or melted to entrap gasses generated on the interior by the decomposition of gas-producing companies. *Bureau of Mines Staff.*

blobby veins. Eng. Veins carrying ore in blobs, Yorkshire lead mines. *Arkell.*

block. a. A division of a mine, usually bounded by workings but sometimes by survey lines or other arbitrary limits. *Fay.* b. A short piece of timber placed between the mine roof and the cap of a timber set and directly over the cap support. A wedge driven between the roof and the timber holds the set in place. *See also* blocking and wedging. *Bureau of Mines Staff.* c. A pillar or mass of ore exposed by underground workings. *See also* blocking out, a. *Nelson.* d. The frame holding the pulleys of a lifting tackle. *Nelson.* e. A short timber piece placed across the rails at the top of an incline to prevent mine cars running down uncontrolled. *Nelson.* f. Portion of an ore body blocked out by drives, raises, or winzes, so that it is completely surrounded by passages and forms a rectangular panel. If its character, volume, and assay grade are thus established beyond reasonable doubt it ranks as proved ore in the mine's assets. *Pryor, 3.* g. A block-shaped device used in haulage to stop cars, wagons, or tubs, or to hold them against a gradient. *Mason.* h. A pulley and its case. *Nichols, 2.* i. The wedging of core or core fragments or the impaction of cuttings inside a bit or core barrel, which prevents further entry of core into the core barrel, thereby producing a condition wherein drilling must be discontinued and the core barrel pulled and emptied to forestall loss of core through grinding or the serious damage of the bit or core barrel. Also called core block. *See also* grind, a. *Long.* j. An obstruction in a borehole. *Long.* k. A grooved pulley or sheave encased in a frame or shell, which is provided with a hook, eye, clevis, or strap by which it may be attached to an object. It is used to change the direction of a pull applied by a rope or cable, or, when used in pairs, to exert increased force. Blocks are classed as single, double, triple, etc., according to the number of pulleys contained in a single shell. *Long.* l. A sheave. *Long.* m. A master mold, made from an original pattern, from which case molds are produced. *See also* rubbing stone. *ACSG, 1963.*

block amber. Natural amber, as it has been found; as distinguished from pressed amber. *Shipley.*

block and fall. Synonym for block and tackle. *Long.*

block and tackle. Two blocks with reeved rope or cable. *See also* block, k. *Long.*

block bond. A style of bricklaying in which the bricks are laid crosswise and lengthwise alternately. *Standard, 1964.*

block brazing. Brazing with heat from hot blocks. *ASM Gloss.*

block brick. A brick used to bond two adjoining or intersecting walls; larger than standard or jumbo-size brick. *ACSG, 1963.*

block caving. a. A method of caving in which a thick block of ore is partly cut off from surrounding blocks by a series of drifts, one above the other, or by boundary shrinkage stopes; it is then undercut by removing a slice of ore or a series of slices separated by small pillars underneath the block. The isolated, unsupported block of ore breaks and caves under its own weight. The broken ore is drawn off from below, and as the caved mass moves downward, due to continued drawing of broken ore from below, it is broken further by pressure and attrition. The overlying capping caves and follows the broken ore downward. In the earliest applications of the caving method the block was undercut on or immediately above the haulage level, and the caved ore was shoveled into cars in drifts driven under the cave or spiled through it. This system entailed the driving and maintenance of a large number of drifts to recover the ore and has been superseded by caving to chutes or branched raises. At present the block of ore is usually undercut some distance above the haulage level, so that by driving a number of inclined branched raises a large undercut area can be tapped at closely spaced points from relatively few main-level haulage drifts, which may be placed well below the influence of the pressure induced by the caving block. With this system hand shoveling is virtually eliminated. *BuMines Bull. 390, 1936, pp. 12–15.* Also called caving system; Cumberland method of mining. *Fay.* b. An underground mining method introduced into the kimberlite mines in the Republic of South Africa in 1955 requiring little or no timbering. Cone-shaped spaces are excavated in the kimberlite and connected with concrete or steel-lined haulage drifts below them. A horizontal slice of the ore above these spaces is then removed. As the roof falls it breaks. The broken rock accumulates in these spaces and is drawn off through the drifts by a scraper, dumped into cars, and taken to an underground crushing station. By this method the ore is broken by gravity, hand shoveling is eliminated, and the number of working levels and loading stations is reduced. *I.C. 8200, 1964, p. 62.*

block caving into chutes. *See* chute caving.

block claim. Aust. A square mining claim whose boundaries are marked out by posts. *Fay.*

block coal. a. A bituminous coal that breaks into large lumps or cubical blocks; also, coal passing over certain sized screens instead of through them, such as a 5-, 6-, and 8-inch block. It is used raw, or without coking, in the smelting of iron. Found in the Indiana coalfield. *Fay; B.C.I.* b. A variety of tough coal, usually semisplint, that breaks into crudely shaped blocks. *A.G.I.*

block diagram. A view of an imaginary rectangular block of the earth's crust. It is, as if, upon a rectangular block of wood—two geologic sections had been drawn on two adjoining sides and a map on the top face, while the block itself had been sketched in a position, such that these three faces were visible. *Stokes and Varnes, 1955.*

blocked-out ore. a. Ore, the amount, content, and mineability of which have been proven by development work or by drilling developed ore. *A.G.I.* b. A body of ore exposed, explored, and sampled for valuation purposes on all four sides of the panel formed by driving, winzing, and raising. *Pryor, 3.*

blocker. In bituminous coal mining, a laborer who places wooden blocks under the wheels of mine cars to prevent their movement at the tipple or the bottom of a shaft or a incline before they are run onto the cage or attached to the haulage cable. *D.O.T. 1.*

block faulting. *See* fault block. *A.G.I.*

block fields. *See* felsenmeer. *A.G.I.*

block furnace. Same as bloomery. *Fay.*

block grease. Moderately stiff grease, prepared in blocks which fit into apertures above bearings (tunnel lubrication). *Pryor, 3.*

block handle. A cup handle of the type that is attached to the cup by a solid bar of clay (which is, of course, integral with the handle). *See also* open handle. *Dodd.*

block hole. a. A small hole drilled into a rock or boulder into which an anchor bolt or a small charge or explosive may be placed. *Long.* b. Used by drillers, miners, and quarrymen for a method of breaking undesirably large blocks of stone or boulders by the discharge of an explosive loaded into shallow holes drilled into the blocks or boulders. *Long.* c. A relief hole, designed to remove part of the burden from a subsequent shot, used in coal mining. *Fay.*

blockholer. a. A person whose duty it is to break up and reduce to safe and convenient size, by blasting or otherwise, any large blocks or pieces of rock that have been blown down by the miners. *Fay.* b. *See* jackhammer operator. *D.O.T. 1.*

block holing. The operation of drilling and blasting a detached boulder or mass of rock; the purpose being to reduce the mass to dimensions more easily handled or transported, or cut for building purposes. *Stauffer.*

block-in-course. Large stone blocks laid in courses in dock walls, having bush-hammered faces and smooth beds; such stones are generally of varied lengths but constant depth, often 12 inches. *Ham.*

blocking. a. The process of shaping a gather of glass in a cavity of wood or metal. *ASTM C162–66.* b. The process of stirring and fining glass by immersion of a wooden block or other source of bubbles. *ASTM C162–66.* c. The process of reprocessing to remove surface imperfections. *ASTM C162–66.* d. The mounting of optical glass blanks in a shell for grinding and polishing operations. *ASTM C162–66.* e. The process wherein a furnace is idled at reduced temperatures. *ASTM C162–66.* f. The process of setting refractory blocks in a furnace. *ASTM C162–66.* g. A method of bonding two adjoining or intersecting walls, not built at the same time, by means of offsets and overhanging blocks. *ACSG.* h. Obstruction of crushing zone by clayey material or rock which refuses to break down and pass to discharge. *Pryor, 4.* i. In forging, a preliminary operation performed in closed dies, usually hot, to position metal properly so that in the finish operation the dies will be filled correctly. *ASM Gloss.* j. In radiography, using diaphragms made of lead or other dense material to limit the cross section of the X-ray beam so as to prevent excessive fogging of the film because of secondary or scattered radiation. Masks mounted over or around the object being radiographed are sometimes employed. *ASM Gloss.*

blocking and wedging. A method of holding mine timber sets in place. Blocks of wood are set on the caps directly over the post supports and have a grain of block parallel with the top of the cap; wedges are driven tightly between the blocks and the roof. *Bureau of Mines Staff.*

blocking out. a. Exposing an ore body by means of development openings, on at least three sides, in preparation for continuous extraction; the opening of a deep lead deposit. *Nelson.* b. As applied to coal reserves, to acquire coal and mining rights in contiguous areas to form a continuous area and in a desirable shape for planned future mining. *Bureau of Mines Staff.* c. Aust. Laying or staking out gold-bearing gravel deposits in square blocks in order to facilitate systematic washing. *Fay.*

block insulation. Insulating black composed of mineral wool, fiber asbestos, and a high temperature binder. *Bureau of Mines Staff.*

block lava. Lava flows occurring as a tumultuous assemblage of angular blocks. Contrasted with pahoehoe, a lava with a comparatively smooth or ropy surface. Also called aphrolithic lava; aa. *Holmes, 1928.*

block layer; roadman; platelayer. A man employed on the maintenance of rail tracks underground. He is also responsible for the laying of turnouts and junctions. *Nelson.*

blocklehm. Ger. Boulder clay; drift. *Hess.*

blockmaker. *See* paving block cutter. *D.O.T. 1.*

blockmaking. Applied to the various processes involved in roofing slate manufacture which include drilling and wedging, cutting, sawing, etc. *AIME, p. 796.*

block mica. Mica with a minimum thickness of 0.007 inch and a minimum usable area of 1 square inch, full-trimmed unless otherwise specified. *Skow.*

block mil. *See* pan mill. *Dodd.*

block mold. A one-piece mold. *ASTM C162–66.*

block mountain. A mountain carved by erosion from a large, uplifted earth block bounded on one side or both sides by fault scarps. *A.G.I.*

block movement. A general failure of the hanging wall. In the gold mines of the Union of South Africa and the Michigan copper mines, block movements have been experienced. *Nelson.*

block off. a. To fill and seal undesirable openings, fissures, or caving zones in a borehole by cementation or by lining the borehole with pipe or casing. Also called blank off; case off; seal off. *Long.* b. To secure a mine opening against the flow or escape of gas, air, or liquid by erecting rock, concrete, steel, wood, or cloth barriers. *Long.* c. To erect barriers to prevent men from entering unsafe areas in underground workings. *Long.*

block ore. A local term in Wisconsin for large, cubical crystals of galena. *Fay.*

block out. To delineate the area in which a desirable mineral occurs by systematic core drilling or by underground openings. *Long.*

block pavement. The wearing surface of a road formed of rectangular blocks of stone or wood. *Ham.*

block rake. A surface blemish, having the appearance of a chain, sometimes occurring on plate glass. *Dodd.*

block reef. Aust. A reef that shows frequent contractions and bulges. A wavy vein. *Fay.*

block reek (rake). A scratch imperfection caused by cullet lodged in the felt in the polishing operation. *ASTM C162-66.*

block riffles. These consist of timber blocks, 8 to 12 inches square, set in transverse rows in the sluicebox; they are so arranged that in contiguous rows the joints are broken, the idea being to prevent the development of longitudinal cracks, and is is usual to separate the rows by means of a strip of ordinary riffle scantling. *Griffith, S. V., p. 62.*

Block's alloy. A high cobalt alloy containing 54 percent cobalt, 45 percent nickel, and 0.9 percent silicon. *Campbell.*

block sequence. A longitudinal welding sequence in which blocks of weld metal are built to a desired thickness with the intervening, longitudinal space between them being filled subsequently. *ASM Gloss.*

block spar. Feldspar ore requiring only hand cobbing, grinding, sizing, and often magnetic treatment to be prepared for market. *AIME, p. 341.*

block structure. Used in quarrying to describe granite which has three sets of joints occurring at right angles to each other. *Streefkerk, p. 30.*

block system. a. A pillar mining system in which a series of entries, panel entries, rooms, and crosscuts are driven to divide the coal into blocks of approximately equal size which are then extracted on retreat. Development openings are most commonly driven between 15 and 20 feet wide. Pillars are most commonly 40 to 60 feet wide and from 60 to 100 feet long. *Woodruff, v. 3, p. 21.* b. A system of control in which a number of units, for example, powered supports, are operated as a group. *NCB.*

block system of stoping and filling. *See* overhand stoping; Brown panel system.

block test. A shop giving power output, efficiency, and fuel consumption of a motor. *Hess.*

block tin. Solid, commercial tin. *Bennett 2d, 1962.*

block-tin lining. Copper vessels are lined or coated with tin by the application of molten tin upon clean copper with the aid of fluxing. Such coatings are sometimes called hot dippings. Tin is sometimes used for coating lead sheet or lining lead pipe, and owing to the method of fabrication, these articles may be called two-ply metal. Frequently tin is the metal chosen for making, holding, and conveying distilled water and it is used in contact with some chemicals. *CCD 6d, 1961.*

block truer. *See* green truer. *D.O.T. 1.*

blockwork. Masonry employed in the construction of breakwaters or similar marine structures, consisting of blocks weighing from 10 to 50 tons, their function being to absorb the impact of waves. *See also* rubble mound breakwater. *Ham.*

blocky. a. Rock formations in which the core produced tends to break and block or jam inside the bit or core barrel. *Long.* b. Rock that breaks away in thick blocks from the roof of a mine working. *Long.*

blockyard. An area on a construction site set apart for casting precast concrete components, which are then allowed to mature and harden before use. *Ham.*

blocky rock. Rock ore that breaks into large blocks. *Sandstrom.*

blödite. *See* bloedite.

bloedite. A colorless, water-soluble, magnesium-sodium hydrous sulfate, $Na_2O \cdot MgO \cdot 2SO_3 + 4H_2O$; no cleavage; occurs in saline deposits. Also called blödite; astrakanite; simonyite. *Dana 6d, p. 946; English.*

Bloman tube breathing apparatus. This differs from the smoke helmet in that there is neither helmet nor bellows. Fresh air is passed to the wearer through a corrugated reinforced rubber tube by means of a rotary blower. A mouthpiece having an inhalation valve, an exhalation valve, and a noseclip takes the place of the helmet. It is held in position by straps attached to a head harness. The mouthpiece can be replaced by a full-face mask. This apparatus is fitted with an equalizing device which enables the wearer to continue breathing comfortably, even should the rotary blower stop. *Mason, v. 1, pp. 326–327.*

blondin. A to-and-fro aerial ropeway, perhaps spanning an excavation. May be equipped with rope system which allows loads to be lifted from quarry and then carried to side for discharge, the ropeway then reversing its motion and returning the carrier to the loading point. *Pryor, 3.*

blond metal. Staff. A variety of blond, light-colored clay ironstone from the Coal Measures. *Arkell.*

blood agate. a. Flesh-red, pink, or salmon-colored agate from Utah. *Shipley.* b. Hemachate. *Shipley.*

blood coral. A name sometimes applied to intense red coral. *Shipley.*

blood ironstone. Hematite. *Shipley.*

blood jasper. Bloodstone. *Shipley.*

blood poisoning. A morbid state of the blood caused by the introduction of poisonous or infective matter from without, or the absorption or retention of such matter produced in the body itself. Occasionally caused by injuries, particularly in dirty mines or mills. *Fay; Hess.*

blood-red heat. A term almost as indefinite as red heat. *Bureau of Mines Staff.*

bloodstone. A variety of chalcedony or jasper, dark green in color, inetrspersed with small red spots. Used as a gem. *Sanford.* Also called heliotrope.

bloodwipe. Derb. To draw blood, at a mine, by any act of violence that one man can inflict upon another. *Fay.*

blooey line. A pipe or flexible tube conducting cuttings-laden air or gas from the collar of a borehole to a point far enough removed from drill rig to keep the air around the drill dust free. *Long.*

bloom. a. A mineral that is frequently found as an efflorescence, cobalt bloom, for example. Also called blossom. *Webster 3d.* b. To form an efflorescence; as, salts with which alkali soils are impregnated, bloom out, on the surface of the earth in dry weather following rain or irrigation. *Webster 2d.* c. The fluorescence of petroleum or its products. *Webster 3d.* d. A semifinished hot-rolled product, rectangular in cross section, produced on a blooming mill. For iron and steel, the width is not more than twice the thickness, and the cross-sectional area is usually not less than 36 square inches. Iron and steel blooms are sometimes made by forging. *ASM Gloss.* e. A surface film resulting from attack by atmosphere or from the deposition of smoke or other vapors. *See also* smoked. *ASTM C162–66.* f. A lump or mass of molten glass. *Webster 2d.*

bloomer. The mill or equipment used in reducing steel ingots to blooms. *ASM Gloss.*

bloomery; bloomary. a. A forge for making wrought iron, usually direct from the ore. The sides are iron plates; the hair plate at the back, the cinder plate at the front, the tuyere plate (through which the tuyere passes) at one side (its upper part being called in some bloomeries the merrit plate), the forespar plate opposite the tuyere plate (its upper part being the skew plate), and the bottom plate at the bottom. *Fay.* b. A machine for making blooms out of puddle balls; an establishment containing such machines. *Standard, 1964.*

bloom hook. A tool for handling metal blooms. Also called bloom tongs. *Fay.*

blooming. The process of manufacturing blooms of iron from the ore or from puddle balls. *Standard, 1964.*

blooming mill. A primary rolling mill used to make blooms. *ASM Gloss.*

blossom. The oxidized or decomposed outcrop of a vein or coal bed, or any indicating traces of a coal bed or a mineral deposit, visible at the surface. *Fay; B.C.I.*

blossom of coal. *See* coal smut. *Fay.*

blossom rock. Rock detached from a vein but which has not been transported. *Fay.*

blotched. Spotted effects, especially on stone and other marble. *Mersereau, 4th, p. 301.*

blotter. In grinding, a disk of compressible material, usually blotting-paper stock, used between the grinding wheel and its flanges to avoid concentrated stresses. *ASM Gloss.*

blout. A mass of quartz, often mineralized, that is frequently isolated and not connected with a vein. *Fay.*

blow. a. Aust. A large mass of quartz or other gangue, isolated or forming a sudden enlargement on a lode. *Fay.* b. Eng. To blast with powder. *Fay.* c. The escape of gas through a dam or stopping. *Fay.* d. York. The breaking or falling of a mine roof. *Fay.* e. Aust. The outcrop of the top of a vein. *Standard, 1964. See also* ironstone blow. *Fay.* f. A sudden escape of gas from the strata or the coal into mine workings. *See also* outburst, b. *Nelson.* g. A large outcrop of ore, frequently low grade. *Nelson.* h. In blasting, a shot which blows part of the unfired explosive out of the hole. *Pryor, 3. See also* blown-out shot. i. To fire shots. *Mason.* j. To lift; said of a floor which lifts due to gas or strata pressure. *Mason.* k. The blast of air forced through molten metal to refine it (as in a Bessemer or other converter). The time during which air is being forced through molten metal to refine it. The quantity of metal refined during that time. *Webster 3d.*

blow-and-blow machines. Machines in which the glass is shaped in two stages, but each time by blowing, as opposed, for example, to pressing or sucking. *C.T.D.*

blow-and-blow process. The process of forming hollowware in which both the preliminary and final shapes are formed by air pressure. *ASTM C162-66.*

blow count. The number of blows that must be delivered by a specific-weight, freely falling drive hammer dropping a specific distance to force a drive sampler 12 inches into a soil material. *Long.*

blowdown. a. Eng. To bring down coal or stone with explosives. *Fay.* b. To release water from a fire-tube boiler at the beginning of a workshift thereby disposing of sediment that may have accumulated. *Bureau of Mines Staff.*

blowdown fan. A fan that forces air into a mine. *Zern.*

blower. a. A fan employed in forcing air either into a mine or into one portion of a mine. A portable blower, also known as a tubing blower or room blower, is used in ventilating small dead-end places like rooms and entries or gangways. *Jones.* b. The sudden emission of firedamp from the coal seam or surrounding rock. Blowers very considerably in violence and magnitude from small emissions which make a hissing noise to severe outbursts. *Nelson.* c. Eng. A man who blasts or fires shots in a mine, or who drills the holes and charges them, ready for firing. *Fay.* d. One who forms glass by blowing. *ASTM C162-66. See also* glassblower; gaffer. *D.O.T. 1.*

blower fan. A fan to direct part of an air circuit through a tubing to a particular working face. *Bureau of Mines Staff.*

blower system. A system in which the pressure generating source is located at the entrance and raises the pressure of the air above atmospheric. *Hartman, p. 80.*

blower wax. A pale yellow soft variety of ozokerite which is squeezed out of the veins under the influence of pressure of the surrounding rocks. *Tomkeieff, 1954.*

Blow-George. Eng. A small hand-driven fan operating in an iron case, introduced in the Midland Counties about 1850. It was used for auxiliary ventilation. *Nelson.*

blow head. Part of a forming machine serving to introduce air under pressure to blow any hollow glass article. *ASTM C162-66.*

blowhole. a. An air bubble or void in a bit crown or casting. *See also* airhole. *Long.* b. A minute crater formed on the surface of thick lava flows. *Fay.* c. A hole in a casting or a weld caused by gas entrapped during solidification. *ASM Gloss.*

blow in. To put a blast furnace in operation. *See also* blowing in. *Fay.*

blowing. a. The bursting of pots from too rapid heating. *ACSG, 1963.* b. The shaping of hot glass by air pressure. *ACSG.* c. Oxidation of molten metal or matte in a converter furnace, to remove carbon and sulfur and convert impurities to slag. *Pryor 3.* d. Eng. Blasting. *Fay.*

blowing cave. A cave from which air is blown out at the entrance. *Schieferdecker.*

blowing engine. An engine for forcing air into blast furnaces under pressure, often about 1 pound avoirdupois per square inch. *Weed, 1922.*

blowing fan. A fan which forces or blows air into the mine workings either through the airways (a main fan) or through inbye air pipes (an auxiliary fan). *Nelson.*

blowing furnace. A furnace in which glassware is held to soften it when it becomes stiff in working. Also called glory hole. *Webster 2d.*

blowing house. Eng. An establishment in which blast furnaces are operated. Used specifically for smelting tin ore. *Fay.*

blowing in. Starting a blast furnace. *Bureau of Mines Staff.*

blowing in cartridges. In Germany and Austria, a method has been developed for blowing in the cartridges of explosives with compressed air through a metal tube which is inserted in the drill hole. The cartridges are given a great velocity so that they are crushed when striking the bottom. The method was originally employed for loading the chambers of sprung drill holes. In recent years it has become adopted to a certain extent for loading deep drill holes, especially in fissured rock. *Langefors, p. 88.*

blowing iron. *See* blowpipe. *C.T.D.*

blowing machines. Machines for forming molten glass into articles by the use of air under pressure. *C.T.D.*

blowing on taphole. Blowing air through the hole at casting, to clean the hearth of iron and cinder. *Fay.*

blowing on the monkey. A flame blowing from the cinder notch of a blast furnace. *Fay.*

blowing pipe. A glassblower's pipe. *Fay.*

blowing pot. In pottery works, an apparatus for distributing color over the ware before burning. *Fay.*

blowing road. S. Staff. An intake, or fresh-air road in a mine. *Fay.*

blowing tools. A small set of blasting implements. *Standard, 1964. Compare* blasting supplies. *Fay.*

blowing-up furnace. A furnace used for sintering ore and for the volatilization of lead and zinc. *Fay.*

blowing ventilation. Mine ventilation in which the air flows from the fan at the portal towards the working face. *Fraenkel, v. 3, Art. 18:01, p. 1.*

blowlamp. A portable apparatus for applying intense local heat, used by painters, electricians, and plumbers. Also called blowtorch. *C.T.D.*

blow mold. The metal mold in which a blown glass article is finally shaped. *ASTM C162-66.*

blown asphalt. A hard, friable solid obtained by blowing air at high temperature through mineral residual oils. Also known as oxidized asphalt, condensed asphalt, and mineral rubber. *CCD 6d, 1961.*

blown away. *See* hollow neck. *Dodd.*

blown bitumen. A special type of bitumen produced by blowing air, under controlled conditions, through hot bitumen. *Ham.*

blown enamel. Ridges produced when porcelain enamel is blown while wet, during spraying. *Bryant.*

blown glass. Glassware shaped by air pressure, as by mouth blowing or by compressed air. *ASTM C162-66.*

blown metal. Pig iron purified by blowing air through it. *Bureau of Mines Staff.*

blown-out shot. A shot which dissipates the explosive force by blowing out the stemming instead of breaking down the coal. It may be caused by insufficient stemming, overcharging with explosive or a burden which is too much for the charge to dislodge. *Nelson.*

blown petroleums. In roadbuilding, the semisolids or solids produced by blowing air through heated native liquid bitumens. *Hess.*

blown (or eolian) sand. Sand which has been produced, carried, deposited, or eroded by wind action. The mineral composition of blown sand depends, to a large extent, on the rocks from which it was derived. Blown sands are not well sorted. *Webster 3d; A.G.I.*

blowoff. a. A valve or drain connection on a steam or hot-water boiler so arranged to draw off water and steam with any accumulated oil, grease, and dirt. *Crispin.* b. Removal of dust and dirt from the surface of dry (bisque) enamel, prior to firing. *Bryant.*

blowout. a. A large outcrop beneath which the vein is smaller is called a blowout. *Fay.* b. A shot or blast is said to blowout when it goes off like a gun and does not shatter the rock. A blown-out or windy shot. *Fay.* c. A sudden or violent uncontrolled escape of gas, oil, or water from the well due to (1) the formation pressure being greater than the hydrostatic head of the fluid in the hole, and (2) the failure or lack of mechanical means, such as blowout preventers, to control such an occurrence. *Brantly,* 1. d. A great mass of quartz found in gold quartz veins that may show as a hill perhaps a hundred feet wide, but development may reveal a vein only a few feet wide. *Hoov, p. 101.* e. The high-pressure, sometimes violent, and uncontrolled ejection of water, gas, or oil from a borehole. *Long.* f. Used by prospectors and miners for any surface exposure of strongly altered discolored rock associated, or thought to be associated, with a mineral deposit. *A.G.I.* g. In drilling a well by the rotary method, an unexpected volume of gas under pressure sometimes "blows" the mud-laden drilling fluid from the hole, thus putting an end to drilling until controlled. The term is also used in standard tool drilling when the flow of gas is sufficient to interfere with the drilling operation. *A.G.I.* h. Used by miners and prospectors for a large, more or less isolated, usually barren quartz outcrop. Known in Australia as blow. *Hess.* i. A basin, scooped out of soft, unconsolidated deposits by the process of deflation. It ranges from a few feet to several miles in diameter. *Leet.* j. The cleaning of boiler flues by a blast of steam. *Fay.* k. The rupture of a boiler tube, steampipe, pneumatic tire, or other container through faulty construction, excessive pressure, or other cause. *Fay.* l. To put a blast furnace out of blast, by ceasing to charge fresh materials, and continuing the blast until the contents of the furnace have been smelted. *Fay.* m. To smelt the iron-bearing materials in the furnace, adding domestic coke so that the stockline is about normal. *Camp, 6th ed., 1951, p. 336.*

blowout plug. A sub (adapter) by means of which the upper end of an inner tube of a double-tube core barrel can be coupled to the fluid-circulation system of a drill. *Long.*

blowout preventer. A rotatable or stationary device attached to drivepipe or casing at the collar of a borehole, consisting of an assemblage of bypass and gate or disk valves which may be closed around the drill rods, or which can be closed completely if the drill rods are withdrawn from the borehole. Used to contain and control the flow of liquids or gases under high pressure encountered while drilling a borehole. *Long.*

blowout shot. An improperly placed or overcharged shot of black blasting powder in coal (where used) which frequntly results in a mine explosion. *von Bernewitz.*

blow-over. The thin-walled bubble formed above a blow mold in a hand shop operation to facilitate bursting off. *ASTM C162-66.*

blowpipe. a. A welding or cutting torch. *ASM Gloss.* b. A small laboratory apparatus using a mixture of air under pressure and utility gas in order to give a hot localized flame. Used in the blowpipe analysis of minerals and for laboratory glassblowing and glass bending. *C.T.D. See also* blowpipe reaction. c. A metal tube, some 4 to 5 feet long, with a bore of ¼ to ⅜ inch and a thickened nose which is dipped into molten glass and withdrawn from the furnace. The glass is subsequently manipulated on the end of the blowpipe and blown out to shape. Also called blowing iron. *C.T.D.*

blowpipe furnace. A furnace fired by having powdered fuel blown through a pipe. *Hess.*

blowpipe reaction. a. The decomposition of a compound or mineral when heated by the blowpipe, resulting in some characteristic reaction, as a coloring of the flame or a colored crust on a piece of charcoal. *Standard, 1964.* b. A method of analysis in mineralogy. *Fay.*

blowpipe spray welding. *See* spray welding. *Dodd.*

blowpiping. A rapid method for the determination of the approximate composition of minerals and ores. Blowpipe tests are merely qualitative, that is, they indicate the presence of the different constituents, but not the proportions. It consists of a plain brass tube capable of producing a flame of intense heat which may either be oxidizing or reducing. Illuminating gas from a Bunsen burner is the fuel commonly used. The color, nature, and smell of the encrustations suggest the nature of the elements present. *See also* borax bead test. *Nelson.*

blowpit. A refractory-lined tank into which pulp is blown after cooking. *Bureau of Mines Staff.*

blows. Leic. Frequent and sudden risings of quicksand in sinking through water-bearing ground. *Fay.*

blow sand. *See* dune sand. *Carson, 2, p. 82.*

blowtorch; blowlamp; blast lamp. A small, portable blast burner supplied either with gaseous fuel and air or oxygen through tubes or including a fuel tank (as for kerosine or gasoline) that is pressurized by a hand pump. *Webster 3d.*

blowtube. *See* blowpipe. *Webster 3d.* Also called blowiron.

blowup. a. Eng. An explosion of firedamp in a mine. *Fay.* b. To allow atmospheric air access to certain places in coal mines, so as to generate heat, and ultimately to cause gob fires. *Fay.*

blow well. Eng. A local term for artesian well, in the eastern coast of Lincolnshire, so called because the water often rushes up violently. *Fay.*

blue. a. An assayer's term for a solution of copper sulfate. *Fay.* b. Eng. Shale of a bluish color, Northumberland and Durham. Also called bluestone. *Nelson.*

blue alexandrite. Incorrect name for alexandritelike sapphire. *Shipley.*

blue amber. Osseous amber with a bluish tinge which is probably due to the presence of calcium carbonate. *Tomkeieiff, 1954.*

blue annealing. Heating hot-rolled ferrous sheet in an open furnace to a temperature within the transformation range and then cooling in air, in order to soften the metal. The formation of a bluish oxide on the surface is incidental. *ASM Gloss.*

blue asbestos. Crocidolite. *Pryor, 3.*

blue band. A thin, persistent bed of bluish clay that is found near the base of the No. 6 coal throughout the Illinois-Indiana coal basin. *A.G.I.*

blue billy. a. Eng. The residuum of cupreous pyrite after roasting with salt. *Hess.* b. Eng. Calcium sulfide formed as a byproduct in the Leblanc soda process. *Hess.* c. Eng. The cinder left from burning pyrite for sulfuric acid. Also called purple ore. *Hess.*

blue bind; bind. York. A rock usually smooth to the feel; largely composed of indurated clay whereas gray binds are more sandy. *Nelson.*

blue-black ore. Corvusite, extremely high-grade vanadium ore with blue-black color. *Ballard.*

blue brick. *See* engineering bricks. *Dodd.*

blue brittleness. Brittleness exhibited by some steels after being heated to some temperature within the range of 300° to 650° F, and more especially if the steel is worked at the elevated temperature. Killed steels are virtually free of this kind of brittleness. *ASM Gloss.*

blue cap. The characteristic blue halo, or tip, of the flame of a safety lamp when firedamp is present in the air. *See also* cap, c. *Fay.*

blue carbonate of copper. Same as azurite. *Fay.*

blue chalcedony. *See* sapphirine. *Shipley.*

blue chrysoprase. Chalcedony colored by inclusions of chrysocolla. Same as chrysocolla quartz; azurlite; azurchalcedony. *Shipley.*

blue coal. a. In anthracite mining, impurities occurring as bands of a bluish slaty color with a carbon content almost as high as that of good anthracite, but not acceptable because of a dull appearance. It is generally gobbed. *Mitchell, pp. 209–210.* b. A metaphorical expression used to designate windpower. *Tomkeieff, 1954.*

blue copper. Synonym for azurite and coveline. *Hey, 2d, 1955.*

blue copper carbonate. Same as blue carbonate of copper. *See also* azurite. *Fay.*

blue coral. A variety of akori. *Shipley.*

blue dust. A byproduct of zinc reduction, containing about 90 percent metallic zinc and 5 to 8 percent zinc oxide; a fine bluish-gray powder. *Bennett 2d, 1962.*

blue earth. S. Afr. The partly decomposed kimberlite from the diamond-bearing pipes. Also called blue ground. *Hess.* b. Ger. A bluish Tertiary clay in which amber is found on the Baltic coast. *Hess.*

blue elvan. Corn. Usually, a basaltic rock. *Arkell.* Synonym for greenstone. *Fay.*

blue gas. Synonym for bottle gas. *Long.*

blue glass. Cobalt oxide is added to a soda-lime glass. Cupric oxide gives a green blue. *CCD 6d, 1961.*

blue gold. a. A gold-iron alloy containing 25 to 33.3 percent iron. *Camm.* b. A bluish collodial solution of gold prepared by reducing a solution of gold chloride with hydrazine hydrate. *Camm.*

blue ground. a. S. Afr. A miner's name for the decomposed peridotite or kimberlite that carries the diamonds in the South African mines. *Fay.* b. S. Staff. Strata of the coal measures, consisting principally of beds of hard clay or shale. *See also* bind, a; bluestone, a. *Fay.* c. A material of a bluish-green color that underlies the yellow ground in kimberlite deposits. This material is less altered than the yellow ground. Usually the diamond is embedded in the blue ground without much adhesion. *I.C. 8200, 1964, p. 31.*

blue iron earth. *See* vivianite. *Fay.*

blue iron ore. *See* vivianite. *Bennett 2d, 1962.*

blue ironstone. Synonym for crocidolite. Blue asbestos. *Fay.*

bluejack. Same as blue vitriol; copper sulfate. *Webster 2d. See also* chalcanthite. *Fay.*

blue jasper. *See* Swiss lapis. *Shipley.*

blue john. A fibrous or columnar variety of fluorite found in Derbyshire, England. Used especially for vases. *Webster 3d.*

blue lead. A term for metallic lead in the lead industry to distinguish it from lead compounds with color designations, such as white lead, orange lead, and red lead. *C.T.D.*

blue lead (pronounced like the verb to lead). a. The bluish auriferous gravel and cement deposit found in the ancient river channels of California. *Fay.* b. The Tertiary gold-bearing gravel deposits of the Sierra Nevada mounatins. *Webster 3d.*

blue lead ore (pronounced like the verb led). An old name for a compact variety of galena of a bluish-gray color. *Fay.*

blue lias. Limestones of the Lower Lias of the Rhaetic beds, West of England. *Arkell.*

blue malachite. Same as azurite. *Standard, 1964.*

blue marl. Lower Lias clays. *Arkell.*

blue metal. a. A name commonly applied to the common fine-grained, bluish-gray mudstone which forms the roots of many of the coalbeds of England. *A.G.I.* b. A copper matte containing approximately 60 percent copper. *See also* bind; bluestone. *Fay.* c. *See* blue powder, a.

blue moonstone. a. Bluish chalcedony. *Shipley.* b. A term frequently applied to fine quality precious moonstone of bluish tinge; also incorrectly applied to chalcedony artificially colored blue. *Shipley.*

blue mud. a. An ocean-bottom deposit containing up to 75 percent terrigenous materials of dimensions below 0.03 millimeter. The depth range occurrence is about 750 to 16,800 feet. Colors range from reddish to brownish at the surface, but beneath the surface, the colors of the wet muds are gray to blue. *A.G.I.* b. A common variety of deep-sea mud having a bluish-gray color due to presence of organic matter and finely divided iron sulfides. Calcium carbonate is present in amounts up to 35 percent. *A.G.I.*

blue needles. Applied in the grading of quartz crystals to needlelike imperfections, often definitely oriented, which show up with a bluish-white color under the carbon arc. The color is due to the selective scattering of blue light by the minute imperfections. *AM, 1.*

blue ocher. Same as vivianite. *Fay.*

blue oil. a. A mixture of heavy oils and paraffin, obtained in the distillation of ozocerite; also a similar product from shale oil. *Webster 2d.* b. The oil produced from the heavy oil and paraffin of the Scottish shales by cooling and pressing for separation of hard paraffin scale; it is refined and fractionated into lubricating oils. *Fay.*

blue onyx. Incorrect name for single-colored blue agate or chalcedony which is dyed blue. *Shipley.*

blue opal. Synonym for lazulite. *Fay.*

blue peach. Corn. A slate-blue, very fine-grained tourmaline. *Fay.*

blue pearl. Dark-colored pearl of opaque slate-blue color sometimes caused by a layer of conchiolin near the surface. Also may be caused by a center of mud or silt, although recent investigation indicates that the color is usually caused by various impurities in the aragonite (or calcite). *See also* pearl. *Shipley.*

blue powder. A mixture of finely divided and partly oxidized metallic zinc formed by the condensation of zinc vapor into droplets; also, any similar zinc byproduct (as dross, skimmings, or sweepings). *Webster 3d.*

blueprint. Ordinarily refers to copies of maps, plans, or tests made by passing light through the object to be copied while in contact with sensitized paper which on development shows the pattern in white lines on a blue background. This is the blueprint. If a blueprint is used as the original, blue lines on a white ground, known as a whiteprint, is obtained. Frequently a very thin sensitive paper giving white lines on a black or dark-brown ground is used, giving a blackprint. Owing to the thinness of the paper and the greater contrast between lines and ground, better whiteprints with either black or blue lines are obtained. *Hess.*

blue rock. Lapis lazuli from California. *Schaller.*

blue-rock phosphate. The hard, bluish-gray, Ordovician bedded phosphates of central Tennessee. *Hess.*

blue room. The first room in a baghouse. *Fay.*

blues. Eng. Limestones in the Purbeck beds of Battle, Sussex. Also called bastard blues; main blues. *Arkell.*

blue schorl. a. The earliest name for octahedrite. *Fay.* b. Blue tourmaline. *Fay.*

blue shale. *See* blaes. *Hess.*

blue-sky law. a. A law enacted to provide for the regulation and supervision of investment companies, in order to protect the public against companies that do not intend to do a fair and honest business. *Fay.* b. A state law making it a criminal offense to sell stock without a license from a public official, who is charged with refusing to grant this license if he believes the plan of incorporation to be illegal, fraudulent, or unfair. *Hoov, pp. 263-264.*

blue slipper. Same as slipper. *Arkell.*

blue spar. Lazulite; azure spar. *Fay.*

bluestone. a. S. Wales. Hard clay or shale. *See also* bind. *Fay.* b. Same as copper vitriol; copper sulfate. *Fay.* c. Also called Amherst stone because it is quarried near Amherst, Ohio. *A.G.I.* d. A dense, hard, indurated, fine-grained feldspathic sandstone, most of which splits easily into thin, smooth slabs. It is commonly dark, or slate-gray, but the term is applied to all varieties irrespective of color. *A.S.T.M. C119-50.* e. Eng. *See* blue, b. *SMRB, Paper No. 61.* f. Synonym for chalcanthite. *Hey 2d, 1955.*

blue talc. Synonym for cyanite. *Fay.*

blue tops. Grade stakes whose tops indicate finish grade level. *Nichols.*

blue vitrol. Copper sulfate; chalcanthite. Also called copper vitriol. *Fay.*

blue water gas. Obtained by passing steam over red-hot coke, in a cyclic process comprising two main stages: (1) gasmaking, which reduces the temperature of the coke; and (2) blowing with air, which raises the temperature of the coke. It is called blue water gas because of its blue flame, a characteristic of the combustion of carbon dioxide. *Francis, 1965, v. 2, pp. 386-387.*

blue whistler. Ark. A local term for a very hard, dark-gray sideritic rock, so tough that when stray pieces reach the rolls of the bauxite, crusher fragments are thrown out with such violence as to make a whistling sound. *Hess.*

blue-white diamond. A diamond which appears blue or bluish in transmitted white light or against a white background; it relects white light when viewed edge up at right angles to the table. *Hess.*

blue zircon. Zircon which, by heating, has been changed from a naturally occurring color, usually grayish or brownish, to some hues or tones of blue. No natural occurrence of zircon of any pronounced blue color has even been authenticated, although it was once reliably reported that very pale blue, almost white, zircon had been found in Ceylon. *Shipley.*

bluff. a. Any high headland or bank presenting a precipitous front. *A.G.I.* b. A bold bank of deposits along the shore of rivers and lakes, inclining steeply on the water side. *A.G.I.* c. A high vertical bank along a river. *A.G.I. d.* A cliff or headland with a broad precipitous face. *A.G.I.* e. A high, steep bank or cliff. *A.G.I.* f. Altered country rock filling a lode. Analogous to mullock. *Fay.*

bluing. a. Subjecting the scale-free surface of a ferrous alloy to the action of air, steam, or other agents at a suitable temperature, thus forming a thin blue film of oxide and improving the appearance and resistance to corrosion. This term is ordinarily applied to sheet, strip, or finished parts. Used also to denote the heating of springs after fabrication in order to improve their properties. *ASM Gloss.* b. A process for whitening yellow lead glazes by adding a small quantity of cobalt. Also spelled blueing. *C.T.D.*

bluing salts. A solution containing 9 pounds of sodium hydroxide and 3 pounds of sodium nitrate per gallon, used at 150° C, to form an oxidized blue surface on steel. *Pryor, 3.*

blunge. To mix thoroughly, as slip. *ACSG.*

blunger. a. A wooden implement shaped like a spatula, but larger than a shovel, used in mixing clay with water; also a machine for a similar purpose. *Compare* pug mill. *Standard, 1964.* b. A cylindrical vessel containing a rotating shaft with fixed knives, used for amalgamating clay with water in making slips. *C.T.D.*

blunger loader. One who shovels feldspar, flint, and various types of clay from bins into weighing trucks or carts, setting lever of each scale for its material, and pushes carts to blunger (mixing machine) or to conveyor hoppers. Also called cart hand; clay worker; mill loader; trucker. *D.O.T. 1.*

bunger-machine operator. *See* clay maker. *D.O.T. 1.*

blunging. The wet process of blending, or suspending ceramic material in liquid by agitation. *ASTM C242-60T.*

blunging machine. A pottery machine used for mixing clays. *Crispin.*

blunt-edge stones. *See* blunt stones. *Long.*

blunted stones. *See* blunt stones. *Long.*

bluntin. Derb. A dark tough vein filling that dulls the drills readily. *Fay.*

blunting. Slightly rounding a cutting edge to reduce the probability of the edge chipping. *ASM Gloss.*

blunt stones. Rounded, waterworn carbon, or carbon whose sharp edges have been rounded by repeated use, grinding, tumbling in a ball mill, or other artificial means. *Long.*

blurring-highlight test. A test to determine the degree of attack of a vitreous enameled surface after an acid-resistance test. *Dodd.*

blushing. A pink discoloration sometimes occurring during the glost-firing of pottery; it is caused by traces of chromium in the kiln atmosphere arising, for example, from chrome-tin pink fired in the same kiln. *See also* chrome-tin pink. *Dodd.*

Blyth elutriator. Laboratory apparatus in which mineral particles suspended in water are syphoned through vertical tubes of increasing cross section, the fraction failing to rise under determined conditions of upward flow reporting as a subsieve fraction. *Pryor, 3.*

BM Abbreviation for board measure; bench mark. Also abbreviated bm. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-97; Zimmerman, p. 16.*

B.M.A.G.A. apparatus. Used in the United States for obtaining additional information on the yields of coke, tar, and gas that can be expected in high temperature practice. This is a vertical cylinder of mild steel holding up to 2 hundredweight of coal and operated at temperatures up to

1,000° C. *Francis, 1965, v. 1, p. 152.*

BN Abbreviation for blowing sand. *Zimmerman, p. 17.*

boam. Scot. A boom, as in a derrick. *Hess.*

board. a. The Federal Coal Mine Safety Board of Review. *U.S. BuMines Federal Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. I Underground Mines, October 8, 1953.* b. *See* bord, a. *Fay.* c. Lumber less than 2 inches thick and 4 or more inches wide. *Bennett 2d, 1962.* d. *See* workboard. *Dodd.*

board-and-pillar. Same as pillar-and-breast. *Fay.*

board-and-wall. Same as bord-and-pillar; pillar-and-breast. *Fay. See also* Brown panel system, b. *Hess.*

board coal. Eng. Coal having a fibrous or woody appearance. *Fay.*

board foot. The amount of lumber in a sized plank designated as 1 by 12 inches and 1 foot long. Actual width of 1 by 12 inches is 11½ inches; thickness is three-fourths of an inch. *Bureau of Mines Staff.*

board gates. York. Headings driven in pairs generally to the rise, out of which banks or stalls are opened and worked. *Hess.*

board hammer. A type of forging hammer in which the upper die and ram are attached to boards that are raised to the striking position by power-driven rollers and let fall by gravity. *See also* drophammer. *ASM Gloss.*

boarding. Eng. A bed of stone in the Chilmark quarry, Wiltshire. *Arkell.*

boardman I. One who segregates glazed and baked tile according to pencil markings (indicating shade variations) made by boardman II. Also called tile segregator. *D.O.T. 1.*

boardman II. One who sorts and marks glazed tile according to shade, to guide boardman I in subsequent segregation of tile. Also called shade classifier; tile classifier. *D.O.T. 1.*

board of trade unit; B.O.T. unit. The work done when a rate of working of 1 kilowatt is maintained for 1 hour. The British unit of electrical energy; kilowatt-hour. *Nelson.*

board rule. A graduated scale used in checking lumber for quantity. *Crispin.*

board run. The amount of undercutting that can be done at one setting of a coal mining machine, usually about 5 feet, without moving forward the board upon which the machine works. *Fay.*

board runner. One who carries boards of ware which have been dipped in liquid glaze and dried from drying room to glost-kiln placer. *D.O.T. 1.*

boards. Eng. Laminated shale over a coal seam, Bristol and Somerset coalfield. Recorded since 1760 for coal shaped or grained like boards. Also called boardstuff; boardy clift. *Arkell.*

board-way's course. Eng. At right angles to the cleat of the coal. Workings parallel to the cleat are face-on. *Hess.*

boar's back. Synonym for horseback. *A.G.I.*

boart. Synonym for bort. *Long.*

boartz. Synonym for bort. *Long.*

boasting. The rough dressing of stone with a boasting chisel. *Standard, 1964.*

boasting chisel. A flat chisel with an edge 2 inches wide, used in dressing stone. *Standard, 1964.*

boat. A gold dredge. *Fay.*

boat coal. Penn. Coal which is loaded into boats on canals, rivers, etc. *Fay.*

boat level. In Wales, a navigable adit. *Fay.*

bob; balance bob; pump bob; rocking bob. A triangular or four-sided frame of heavy timber or of iron by which the horizontal motion communicated by the engine (connecting rod) is altered to the inclined or vertical motion of pump rods or a man engine. Used in connection with a Cornish pump. *Fay.*

bobbin. a. Aust. A catch placed between the rails of the upline of an incline to stop any runaway trucks. It consists of a bent iron bar, pivoted in such a manner so that the downhill end is slightly heavier than the uphill end, which is capable of being depressed by an upcoming truck, but rises above the level of the truck axle as soon as the truck is past. Also called monkey chock. *Fay.* b. A spool or reel. *Fay.*

bobbing John. Scot. An appliance formerly used in pumping, the motive power being water run into a box at the end of a beam working on a center, the pump rods being attached to the other end. *Fay.*

bobbin man. One who winds bobbins with wire, which is used to weave wire nettings for embedding in sheet glass, using electrically powered winding machine. *D.O.T. Supp.*

bobby prop. a. Eng. A short prop nicked into the roadside to support a bar. *SMRB, Paper No. 61.* b. Eng. *See* breaking-off timber. *SMRB, Paper No. 61.*

bob pit. An excavation in which the balance box, attached to the pump rods, works. *Fay.*

Bobrowka garnet. Classified in some gem references as grossularite and in others as demantoid, with the latter classification predominating. *Shipley. See also* Uralian emerald.

bob station. *See* station. *Fay, p. 646.*

bobtail check. A slip of paper which informed the miner that he had no money coming to him at the end of a month's work. *See also* snake statement. *Korson.*

bobtail rig. One in which the standard end, that is, the end comprising the machinery supports, belt house, and standard engine-house for cable tool drilling or beam pumping, is omitted and in its place a shorter structure is built. *Hess.*

bocarte de mineral. Sp. Ore crusher. *Hess.*

bocca. a. A volcanic crater or vent. *Standard, 1964.* b. The round hole in a glass furnace by which the fused glass is taken out. *Fay.*

boccarela. It. A small mouth in a glass furnace on either side of the bocca; a nosehole. *Standard, 1964.*

bocco de fogo. Braz. Crystals of green tourmaline with pink centers. *Shipley.*

bock kiln. *See* Bull's kiln. *Dodd.*

bod; bott. Clay plug used to seal tap hole of cupola and stop flow of molten iron. *Pryor, 3.*

BOD Abbreviation for biochemical oxygen demand. *Zimmerman, p. 17.*

bo d^{-1} Abbreviation for barrels of oil per day. *BuMin Style Guide, p. 58.*

bodger. A lever, tommy bar, or poker. *Mason.*

body. a. An ore body, or pocket of mineral deposit. *Zern.* b. Synonym for bit blank. *Long.* c. The fluidity of a drilling mud expressed in the number of seconds in which a given quantity of mud flows through a given aperture, such as the aperture in a Marsh funnel. *Long.* d. Synonym for clinometer case. *Long.* e. A term used to indicate the viscosity or fluidity of a lubricating oil; for example, a heavy-body oil is thick and viscous and a light-body oil is thin and fluid. *Long.* f. The load-carrying part of a truck or scraper. *Nichols.* g. A mixture of ceramic raw materials that has been compounded to produce a definite ceramic product. *Bureau of Mines Staff.* h. The structural portion of a ceramic article, or the material or mixture from which it is made. *ASTM C242-60.* i. The attribute of molten glass, associated with viscosity and homogeneity, which is conducive to workability. *ASTM C162-66.*

body appearance (of a stone). The optical effect produced by internal structure, such as laminations or numerous small and widely distributed inclusions or fractures. Often called sheen in translucent to opaque stones. *Shipley.*

body mold. In the pressing of glass, that part of the mold which gives shape to the outer surface of the ware. *Dodd.*

body of coal. A term frequently used to indicate the "fatty," flammable property in coal, which is the basis of the phenomenon called combustion. *Fay.*

body waves. Either transverse or longitudinal seismic waves transmitted in the interior of an elastic solid or fluid and not related to a boundary surface. A perfectly sharp distinction between body waves and surface waves is difficult to make unless the waves are plane or spherical. *A.G.I.*

Boehme hammer. A device for the compaction of test pieces of cement or mortar prior to the determination of mechanical strength; it consists of a hammer, pivoted so that the head falls through a definite arc on the test piece mold to cause compaction under standard conditions. *Dodd.*

boehmite. An aluminum hydroxide, AlO(OH), orthorhombic; grayish, brownish, or reddish color; microscopic plates. In bauxites of France. A dimorph of diaspore. *English; Dana 17, p. 317; A.G.I.*

Boetius furnace. An early gas-fired Belgian furnace with Boetius regenerators. *Fay.*

Boetius producer. A furnace used for the manufacture of producer gas. *Fay.*

boffin. Originally applied to civilian scientists carrying out research for the Royal Air Force; now loosely applied to any research scientist. *NCB.*

bog. Celtic for soft. A wet, spongy morass chiefly composed of decayed vegetal matter. *Fay.*

bog butter. A substance found in Irish peat bogs and formerly believed to be a natural hydrocarbon termed butyrite or butyrellite but know known to be butter that had been buried for safe keeping and forgotten. Also called fossil butter. *Tomkeieff, 1954.*

bog coal. Earthy brown coal. *A.G.I. Supp.*

bog earth. A soil composed mostly of fine siliceous matter and partially decomposed vegetal fiber. *Webster 3d.*

bogen structure; bogenstruktur. The structure of glassy tuffs, composed largely of curved shards of glass, formed by vesicular explosions in lavas or by the breaking of pumice or other spongy, glassy rocks. *Holmes, 1928.*

boggildite. A fluoride, $Na_2Sr_2Al_2(PO_4)F_9$, from the Greenland cryolite deposit. *Spencer 20, M.M., 1955.*

boghead cannel. Cannel coal rich in algal remains. *See also* torbanite. *Tomkeieff, 1954.*

boghead cannel shale. A coaly shale rich in fatty or waxy algae. *A.G.I.*

boghead coal. a. A variety of bituminous or subbituminous coal resembling cannel coal in appearance and behavior during combustion. It is characterized by a high percentage of algal remains and volatile matter.

Upon distillation it gives exceptionally high yields of tar and oil. *A.S.T.M. D 493-39. See also* torbanite; boghead mineral; parrot coal; kerosine shale. b. A nonbanded coal with the translucent attritus consisting predominately of algae, and having less than 5 percent anthaxylon. *A.G.I.*

boghead mineral. See boghead coal; torbanite. *Fay.*

boghedite. Synonymous with torbanite. *Tomkeieff, 1954.*

bogie; bogey; bogy. a. A rail truck or trolley of low height, used for carrying timber or machine parts underground, or for conveying the dirt hoppit from a sinking pit to the dirt heap. It may also be used as a wagon spotter. *Nelson.* b. York. A small truck or trolley upon which a bucket is carried from the shaft to the spoil bank. *Fay.* c. A weighted truck run foremost or next to the rope in a train or trip. *Fay.* d. A two-axle driving unit in a truck. Also called tandem drive unit; tandem. *Nichols.*

bogie engine. An engine having its cylinders and driving wheels on a pivoted truck. *Standard, 1964.*

bogie kiln; truck chamber kiln. An intermittent kiln of the box kiln type distinguished by the fact that the ware to be fired is set on a bogie which is then pushed into the kiln; the bogie has a deck made of refractory material. *See also* box kiln; shuttle kiln. *Dodd.*

bog iron ore. a. Loose, porous form of limonite occurring in wet ground, often mixed with vegetable matter, $Fe_2O_3.nH_2O$. *Pryor, 3.* b. A deposit of hydrated iron oxides found in swamps and peat mosses. *Schieferdecker.*

boglime. a. A white powdery, calcareous deposit, precipitated through plant action on the bottom of many ponds and used in Portland cement manufacture. It is often erroneously called marl, a term which properly belongs to a calcareous clay. *Fay.* b. *See* lake marl. *Nelson.*

bog manganese. Synonym for wad. *Fay.*

bog muck. A vernacular name for peat. *Tomkeieff, 1954.*

bog oak. Oak immersed in peat bogs, semifossilized and blackened to resemble ebony by iron from the water combining with the tannin of the oak. *C. M. D.*

bog ore. A spongy variety of hydrated oxide of iron and limonite. Found in layers and lumps on level sandy soils which have been covered with swamp or bog. Includes bog iron ore, bog manganese ore, and bog lime, a calcareous deposit of similar origin. *See also* brown iron ore. *A.G.I.*

bogoslovskite. Chrysocolla carrying carbon dioxide as an impurity; from the Bogoslovsk mine, Perm, Russia. *Weed, 1918.*

bog peat. Peat consisting mainly of mosses. *Francis, 1965, v. 1, p. 12.*

bogue. Same as bayou. *A.G.I.*

bogusite. A grayish, fine, granular to porphyritic intrusive rock containing plagioclase, augite, more or less hornblende, a little biotite, and interstitial analcite. *Johannsen, v. 4, 1938, pp. 220-228.*

bogwood. Eng. The trunks and larger branches of trees dug up from peat bogs. *Fay.*

Bohemian chrysolite. Moldavite. *Shipley.*

Bohemian diamond. Rock crystal. *Shipley.*

Bohemian garnet. Yellowish-red crystals of the garnet pyrope. Occurs in large numbers in the Mittelgebirge, in Bohemia, Czechoslovakia. *C.T.D.*

Bohemian gem stones. Includes the following: garnet, ruby, topaz, pyrope, rose quartz (gem-cut), and yellow quartz (gem cut). *Pryor, 3.*

Bohemian glass. Potash-lime glass; used for hollowware. *Bennett 2d, 1962.*

Bohemian ruby. A jeweler's name for rose quartz when cut as a gem. *Fay.*

Bohemian topaz. A jeweler's name for yellow quartz when cut as a gem. *Fay.*

bohr magneton. The net magnetic moment arising from electron spins. *VV.*

boil. a. The sudden generation of steam when molten iron runs over a cold or damp spot or object in a runner. It often causes an explosion whereby molten iron is scattered about. *Fay.* b. Bubbling reaction between carbon and oxygen dissolved in steel, necessary in making clean, high quality steel. *Camp, 6th ed., 1951, p. 519.* c. An imperfection; a gaseous inclusion larger in size than seed; small bubbles. *ASTM C162–66.* d. The commotion caused by gases escaping from the melting batch. *ASTM C162–66.* e. In making plaster of Paris the point at which the heated gypsum powder gives off part of its water as steam and the mass moves like boiling water. *Hess.*

boiler. a. Portion of a steam generator in which water is changed to steam. *Bureau of Mines Staff.* b. A sunken coral reef where the sea breaks. *Schieferdecker.* c. A skid- or wheel-mounted closed vessel, usually cylindrical, used to generate steam for operating steampowered machines, such as pumps and drills. *Long.* d. A vessel in which water is converted to pressurized steam, (1) Cornish, a horizontal cylinder with one longitudinal furnace, (2) flash, coil of tube in which passing water is evaporated, (3) Lancashire, a cylinder with two furnace tubes and further tubes for hot gases, and (4) water-tube, having numerous tubes set slantwise in a heating system, between a water-holding drum below, and a steam-separating drum above. Capacity is pound per hour of steam evaporated at full load. Efficiency is ratio of heat emitted to that in fuel. Plate, mild steel. Scale, calcium, and other salts deposited on surfaces of plates and tubes. Test, hydraulic-pressure test for watertightness. *Pryor, 3. See also* steam boiler.

boiler availability. The number of days per year that a boiler remains in service without shut down for cleaning or overhaul. *Francis, 1965, v. 1, p. 135.*

boiler burner unit. A boiler designed especially for gas or oil and sold integrally with the burner. *Strock, 10.*

boiler circulating pump. A pump usually of the single-stage, single-entry, overhung type that must have low suction loss and high-temperature features since it draws water directly from the boiler drums at high saturation pressure and temperature. *Sinclair, IV, pp. 125-126.*

boiler coalman. In bituminous coal mining, one who pushes coal-loaded cars from tipple to boiler plant to maintain fuel supply. *D.O.T. 1.*

boiler efficiency. Ratio of heat absorbed by the water in the boiler to the total heat supplied to the boiler. *Brantly, 2.*

boiler feed. The water supplied to a boiler. *Hess.*

boiler furnace. A furnace under a boiler for heating water. *Hess.*

boiler heating surface. That part of the interior surface of a boiler subjected to heat on the one side and transmitting the heat to water (or steam or other fluid) within the boiler. Direct surface is that subjected to direct radiant rays of the burning fuel; other heating surface is termed indirect. *Strock, 10.*

boiler horsepower. Boiler horsepower represents the conversion of 34.5 pounds of water per hour to steam at a pressure of 14.7 pounds per square inch (normal atmospheric pressure at sea level), and at a temperature of 212° F. *Brantly, 2.*

boiler plate. Steel sheets or plates rolled for boiler or tank construction. *Mersereau, 4th, p. 426.*

boiler rating. The heating capacity of a steam boiler expressed in British thermal units per hour. *Nelson.*

boilerroom. Can. Office from which telephone calls are made to solicit stock sales. *Hoffman.*

boiler tube. One of the tubes by which heat from the furnace is transferred to the water in a boiler. *Fay.*

boilery; boilary. In law, water proceeding from a salt well belonging to one not the owner of the land. *Standard, 1964.*

boiling. a. A defect visible in the fired porcelain enamel that may take the form of numerous blisters, pinholes, black specks, dimples, or a spongy surface. *ASTM C286–65.* b. Heated to the boiling point; bubbling from the action of heat. *Webster 3d.* c. *See* puddling. *Webster 2d.*

boiling furnace. A water-jacketed reverberatory furnace for decarbonizing iron by a process in which the carbonic oxide escapes with an appearance of boiling. *Standard, 1964.*

boiling point. a. The temperature at which a liquid begins to boil or to be converted into vapor by bubbles forming within its mass; abbreviation, bp. It varies with the pressure. In water, under ordinary conditions, it is 212° F or 100° C, but it becomes lower with lowered atmospheric pressure. In ascending a mountain it is lowered about 1° F for every 550 feet of ascent. *Standard, 1964.* b. The temperature at which crude oil, on being heated, begins to give forth its different distillates. The boiling points of crude oils and the quantities of distillates obtained at specified temperatures differ considerably. *Fay.* c. The temperature at which a cooling gas becomes a liquid. *Hurlbut.*

boiling spring. A spring or fountain which gives out water at the boiling point, or at a high temperature. *Fay.*

boiling through. Describes the appearance of small black specks on the surface of the cover coat enamel after firing; this condition is often caused by the liberation of gases from an unsatisfactory enameling steel. *Hansen.*

boiling-water reactor. A nuclear reactor in which water, used as both coolant and moderator, is allowed to boil in the core. The resulting steam generally is used directly to drive a turbine. *L&L.*

boilum. Hard calcareous or siliceous nodules of irregular shape, found in the shales and underclays of the Coal Measures. *Arkell.*

bojite. A name given by E. Weinschenk to a variety of gabbro, which occurs in association with the graphite of northern Bavaria, Germany. It differs from normal gabbro in containing hornblende, in addition to augite, and the name is intended to indicate a group of hornblendic gabbros just as norite implies those with hypersthene. The original bojite contained brown hornblende, colorless pyroxene, and reddish-brown biotite. *Fay.*

boke. a. Derb. A small stringer of ore which soon dwindles out. *Fay.* b. Derb. A break or split in a vein. *Fay.*

bokite. A mineral, $KAl_3Fe_6V_6^{+4}V_{20}^{5}O_{76}\cdot 3OH_2O$; black, massive material from shales in the Balasauskandyk area, Kara-Tau, Kazakhstan, U.S.S.R. *Hey, M.M., 1964; Fleischer.*

bold coast. A prominent land mass that rises steeply from the sea. *H&G.*

Bolderberg beds. Belg. The sands and gravels of the Bolderberg Hill, representatives of the middle or Eocene Tertiaries, and often referred to by geologists. *Fay.*

bole. a. Any of several varieties of friable earthy clay usually colored red by iron oxide and consisting essentially of hydrous silicates of aluminum and less often of magnesium. *Webster 3d.* b. Claylike minerals used in medicine; some have been identified as halloysite. *Holmes, 1928.* c. A bright red, waxy or unctuous decomposition product of basaltic rocks, having the variable composition of lateritic clays. *Holmes, 1928.* d. Any cylindrically shaped object or mass. *Webster 3d.*

boleite. A deep blue pseudoisometric hydrous oxychloride of lead, copper, and silver from Boleo, Lower California. A tetragonal form of percylite. *Fay.*

Boley gage. A vernier slide gage. *Shipley.*

Boliden gravimeter. Lindblad-Malmiquist gravity meter, for measuring variations in magnitudes of earth's gravitational field. *Pryor, 3.*

Bolivian jasper. A red jasper from Bolivia. *Shipley.*

boll. N. of Eng. An ancient measure for coal containing 9676.8 cubic inches. *Fay.*

bollard. A cast-iron post anchored securely into the masonry or concrete of a guay wall as a mooring for vessel, or fixed to a curb as a protection against traffic. *Ham.*

Bolley's gold purple. A color that has been used on porcelain. A solution of stannic ammonium chloride is left for some days in contact with granulated tin and is then treated with dilute gold chloride solution. The gold purple is precipitated. *Dodd.*

bollito. It. The frit or calcined ingredients from which glass is made. *Standard, 1964.*

Bologna spar. *See* Bologna stone.

Bologna stone; Bolognian stone. The mineral barite when found in roundish masses composed of radiating fibers, being phosphorescent when calcined with charcoal. *Webster 3d.*

boloretin. A variety of hydrocarbon similar to fichtelite and found in peat. *Tomkeieff, 1954.*

bolson. a. Sp. A flat-floored desert valley that drains to a central evaporation pan or playa. *Fay.* b. Mex. A pocket of ore. *Fay.*

Bolsover experiment. Applied to a method of working by single panels. Single 100-yard panels are advanced, leaving 100-yard-wide coal pillars between them. The pillars are then worked on the retreat after the advancing faces have reached a limit line. *Nelson.*

bolster. A plate to which dies may be fastened, the assembly being secured to the top surface of a press bed. In mechanical forging, such a plate is also attached to the ram. *ASM Gloss.*

bolt. a. A nearly horizontal cylinder or prismoidal frame, usually rotating, covered with silk or other fabric with very regular meshes, for sifting and separating flour of wheat from the hull or bran. Usually different sections of its length are covered with gradually decreasing sizes of mesh. *Standard, 1964.* b. To sift or separate by passing through a bolt. *Standard, 1964.* c. In glassblowing, a cylindrical mass, as a bolt of melted glass. *Standard, 1964.* d. S. Staff. A short narrow heading connecting two others. Also called bolthole. *Fay.* e. A mild steel rod used in roof bolting. *See also* slot-and-wedge bolt; wedge-and-sleeve bolt. *Nelson.*

bolted cable coupler. Two cable coupling units with connecting pins, bolted together to form a straight through connecting box. *B.S. 3618, 1965, sec. 7.*

bolted cable plug and socket. A plug and socket designed to be held together by one or more bolts or screws, or studs and nuts, in such a way that they cannot be disengaged without the use of a tool. *B.S. 3618, 1965, sec. 7.*

bolthole. S. Staff. A short narrow opening made to connect the main workings with the airhead or ventilating drift of a coal mine. Also called bolt. *Fay.*

bolthole brush A special round brush used to remove bisque from small openings in the ware. *ASTM C286-65.*

bolting. Separation of particles of different sizes by means of vibrating sieves. *Bennett 2d, 1962.*

bolting silk. a. In oceanography, a silk cloth of very fine and regular mesh, used in the construction of tow nets for the smaller members of the surface fauna. *C.T.D.* b. Also used to cover a lap for polishing rock and mineral specimens for microscopic examination. *Bureau of Mines Staff.*

boltonite. A colored variety of forsterite, Mg_2SiO_4, crystallizing in the orthorhombic system. *Fay.*

Bolton's reagent. An etching reagent for cast iron which contains 78 volumes picric acid, 2 volumes nitric acid, and 20 volumes water. *Osborne.*

bolt sleeve. A tube of asbestos cement, steel, or manufactured board material, surrounding a bolt in a concrete wall, preventing concrete from sticking to the bolt and acting as a distance piece for keeping shuttering in its correct position. *Ham.*

boltwoodite. A hydrous potassium uranyl silicate, $K_2(UO_2)_2(SiO_3)_2(OH)_2\cdot 5H_2O$; analogous to sklodowskite with potassium in place of magnesium; orthorhombic or monoclinic; as yellow fibers from Utah. *Spencer 21, M.M., 1958.*

BOMAEC-30. An inexpensive, easy-to-build incinerator developed by the U.S. Bureau of Mines for the Atomic Energy Commission, that permits safe burning of solid waste materials contaminated with low-level radioactivity. The incinerator has a combustion chamber fed with air from ports near the top. Flowing in a rapid circular motion around the inner wall, the air descends to the bottom where it combines with the material to be burned. Combustion is initiated, and sometimes supplemented, with a gas-firing system. Gases formed as the wastes are burned are drawn through a pipe at the top of the chamber and cooled with a water spray. Then they are passed through two filter systems to remove traces of radioactive particles. The clean gas is discharged and the ashes, where most of the radioactivity has been concentrated, are removed and hauled away in metal containers for disposal. *Bureau of Mines Staff.*

bomb. a. more or less rounded mass of lava from a few inches to several feet in diameter, generally vesicular, at least inside, thrown from the throat of a volcano during an explosive eruption. *Fay.* b. An ellipsoidal, discoidal, or irregularly rounded mass of lava ejected at a high temperature during a volcanic eruption. Bombs range upwards in size from the largest lapilli. They are characterized by a well-defined crust and are often cellular or even hollow internally. *Holmes, 1928.* c. The combustion chamber of a bomb calorimeter. *Webster 3d.* d. A missile containing an explosive, as dynamite. *Fay.* e. A heavy-walled reaction vessel or autoclave. Used to carry out reactions at high pressure and high temperature. *Hurlbut.*

bomb calorimeter. A strong steel vessel used for determining the heat produced during combustion, for example, for determining the calorific value of a fuel. *Nelson.*

bombiccite. A transparent, colorless mineral, found in lignite in Tuscany, Italy; it fuses at 75°C, volatilizes at a higher temperature, and is soluble in carbon disulfide, alcohol, and ether. *Fay.*

bombillo. Mex. Cartridge (as of dynamite). *Fay.*

bombite. An amorphous, blackish-gray rock from Bombay, India. It resembles Lydian stone. *Hess.*

bonamite. A jeweler's trade name for an apple-green smithsonite, resembling chrysoprase in color, from Kelly, New Mexico. *Shipley.*

bonanza. a. In miners' phrase, good luck, or a body of rich ore. A mine is in bonanza when it is profitably producing ore. *Fay.* b. Part of a precious mineral deposit that is especially rich. *Bateman.*

Bonaril. Trademark for a hydrolyzed polyacrylamide for use in foundry sands. *CCD 6d, 1961.*

bonattite. A mineral, $CuSo_4.3H_2O$, monoclinic. Partly dehydrated chalcanthite, $(CuSo_4\cdot 5H_2O)$, from Elba. *Spencer 21, M.M., 1958.*

bond. a. The cohesion or adhesion that develops between particles of ceramic materials in the unfired or fired state. *Bureau of Mines Staff.* b. The overlapping of brick in various ways in a structure so as to provide strength. *A.R.I.* c. Tying the various parts of a masonry wall by lapping one unit over another; the pattern formed by the exposed faces of the unit. The adhesion of the mortar to the units is also referred to as the bond. *ACSG.* d. *See* adherence. *ASTM C286-65.* e. In grinding wheels and other relatively rigid abrasive products, the material that holds the abrasive grains together. *ASM Gloss.* f. In welding, the junction of joined parts. Where filler metal is used, it is the junction of the weld metal and the heat-affected base metal. *ASM Gloss.* g. The link between two atoms due to an electron pair resonating or rotating between them. If each atom contributes an electron the bond is atomic, and also homopolar (nonpolar). If held unequally, it is heteropolar (polar), for example, H_2O. If one atom contributes both electrons, the bond is molecular. In a coordinate bond each of two atoms contributes one electron to form a semicovalent bond, or to a shared pair (covalent). In a dative bond, one atom supplies both electrons of bonding pair (also called a semipolar bond). In the electrostatic bond, atoms lose or gain an electron, becoming charged and bound. In a heteropolar bond, the link is provided by valence electrons so displaced as to set up polarity. In a hydrogen bond, an H-atom links two electronegative atoms (a resonance effect). In a hydroxyl bond, an H-atom links two oxygens resonantly. In a metallic bond, valence electrons move freely in the elmental lattice. *Pryor, 3.* h. The cage used for lowering and raising men in a shaft. Also called bont. *Nelson.* i. N. of Eng. Agreement for hiring workmen. *Fay.* j. Forest of Dean. A turn made by a winding engine. *Fay.* k. N. Staff. A bed, band, or seam of ironstone. *Fay.* l. An electrical connection between any two consecutive rails of an electric railway using the rails as a part of the return circuit. *Fay.* m. To give or cure an option upon (as a mine or other property) by a bond tying up the property till the option has expired. *Webster 3d.* n. The material which holds or binds together the crystals that make up a sharpening stone or grinding wheel, more commonly spoken of in connection with artificial abrasives. *Fay.*

bondage system. *See* miner's bond. *Nelson.*

bond and lease. An agreement between a mine owner and tributor which gives the latter the option of buying the mine before the lease expires. *Nelson.*

Bond and Wang theory. A theory of crushing and grinding; the energy (h) required for crushing varies inversely as the modulus of elasticity (E) and specific gravity (S), and directly as the square of the compressive strength (C) and as the approximate reduction ration (n). The energy in horsepower hours (hp h) required to crush a short ton of material is given by the following equation, in which all quantities are in feet per second (fps) units:

$$h = \left[\frac{0.001748C^2}{SE}\right]\left[\frac{(n+2)\ (n-1)}{n}\right]$$

The theory is due to F. C. Bond and J. T. Wang. *Dodd.*

Bondaroy's yellow. An antimony yellow developed by Fourgeroux de Bondaroy in 1766: 12 parts white lead; 3 parts potassium antimonate; 1 part alum; 1 part sal ammoniac. *Dodd.*

bond cast; bonked. Arrival at colliery pit bank too late to go down for shift work. From bond, a name sometimes given to winding cage. *Pryor, 3.*

bond clay. A clay of high plasticity and high dry strength used to bond nonplastic materials; it may or may not be refractory. *A.G.I.*

bond course. The course consisting of units which overlap those below. *ACSG.*

bonded abrasives. Abrasive grains that are closely sized, bonded, and pressed or molded into a wide variety of bonded abrasives, such as grinding wheels. There are five main types: (1) vitrified or ceramic shapes, with a clay-feldspar bond, which is vitrified in ceramic kilns; (2) silicate wheels, in which sodium silicate is the binder; (3) resinoid wheels with hard synthetic resin binders; (4) rubber or elastic wheels with a hard rubber bond; and (5) shellac bond wheels. *AIME, p. 4.*

bonded products. Products in which the abrasive and a bonding agent have been intermixed and processed into a relatively inflexible unit body. *ACSG, 1963.*

bonded refractories. Refractories in which the constituents are held together by a suitable bonding material, as distinguished from fused refractories. *Henderson, p. 264.*

bonded roof. A term for the roof of a furnace when the transverse joints in the roof are staggered. *See also* ringed roof. *Dodd.*

bonder. a. A brick that is half as wide again as a standard square (rectangular or arch); such bricks are sometimes used to begin or end a course of bonded brickwork. *Dodd.* b. In mining, one who welds copper connections in place between the joints of track rails, used for trolley locomotives, to complete the electrical circuit between the sections of rails. Also called bondman; rail bonder. *D.O.T. 1.*

bonderizing. Phosphatic protective coating of steel, produced by phosphoric acid and a catalyst. *Pryor, 3.*

bond failure. Same as adherence failure. *Bryant.*

bond fire clay. *See* plastic fire clay. *ACSG, 1963.*

bonding. a. The act of improving the electric current carrying capacity of bolted rail joints by welding a short piece of flexible copper cable, or bond, to the end of each rail at the joint, thus providing a low-resistance detour around the bolted rail joint. *See also* crossbond, a. *Kentucky,* p. 246. b. The act of applying a bond. *Jones.*

bonding layer. A layer of cement mortar, ⅛ to ½ inch thick, which is spread on a moist and prepared, hardened concrete surface prior to placing fresh concrete. *Taylor.*

bond length. The length of grip of a reinforcing bar. *See also* grip length. *Ham.*

Bondley process. *See* metallizing. *Dodd.*

bondman. *See* bonder, b. *D.O.T. 1.*

bond, metallic. The linkage between atoms in metals, characterized by fairly mobile electrons not firmly held to particular atoms. *A.G.I.*

bond minder; rolley man; roadman. Eng. A man in charge of the rolley way, or main gangway. *Fay.*

bond (porcelain enamel). *See* adherence. *ACSG, 1963.*

Bond's third theory. In crushing, the total work useful in breakage that has been applied to a stated weight of homogeneous broken material is invariably proportioned to the square root of the diameter of the product particles. *Pryor, 3.*

bond strength. The strength of bond developed in a brick-mortar joint after drying or heating. *A.R.I.*

bond stress. Shear stress at the surface of a reinforcing bar, preventing relative movement between the bar and the concrete surrounding it. Bond stress is helped by adhesion, permissible bond stress normally being about one-tenth of the compressive stress in the concrete. *Ham.*

bone. a. A hard coallike substance high in noncombustible mineral matter; often found above or below, or in partings between layers of relatively pure coal. *Hess.* b. In the anthracite-coal trade, a carbonaceous shale containing approximately 40 to 60 percent of noncombustible materials. Also called bone coal; bony coal. *Hess.* c. A tough, fine-grained, gray, white, or reddish quartz. *Hess.* d. A layer of hard, impure coal which sometimes grades uniformly into the adjacent softer coal and sometimes is sharply separated from it. Bone is usually a mixture of clay shale particles with the coal, the clay particles being well distributed. *Kentucky, p. 26.*

bone amber. *See* osseous amber. *Tomkeieff, 1954.*

bone ash. The white porous residue containing chiefly tribasic calcium phosphate from bones calcined in air and used especially in making cupels, pottery, and glass and in cleaning jewelry; also, synthetic tribasic calcium phosphate used similarly. *Webster 3d.*

bone bed. Applied to strata or layers that contain innumerable fragments of fossil bones, scales, teeth, coprolites, and other organic remains. *See also* fishbed. *Fay.*

bone black; bone char; bone charcoal; animal black; animal charcoal. Black pigment made by carbonizing bones. Used in a cementation reagent; an absorptive medium in gas masks; a paint and varnish pigment; and in clarifying shellac. *CCD 6d, 1961.* Contains chiefly tribasic calcium phosphate and carbon, into which crushed defatted bones are converted by carbonization in closed vessels, and which is used especially as a black pigment and decolorizing absorbent. *Compare* activated carbon; carbon black; ivory black. *Webster 3d.*

bone breccia. A deposit (as in limestone caves) of fragments of bones of vertebrates often mixed with earth, sand, and calcium carbonate. *Webster 3d.*

bone cave. A cave yielding fossil bones, an ossiferous cave. *Challinor.*

bone china. a. A translucent china made from a ceramic whiteware body composition containing a minimum of 25 percent bone ash. *ASTM C242–60.* b. Soft porcelain of high translucency having 0.3 to 2 percent absorption, made with bone ash as a flux. *ACSG.*

bone coal. a. Term used by British miners for hard, compact canneloid coal. Also applied to shale partings in coal. *Tomkeieff, 1954.* b. The translation of the German word, knabbenkohle. *Tomkeieff, 1954.* c. Coal with a high ash content, almost rock. *B.C.I. See also* bone.

bone earth. Eng. The earthy or mineral part of bones which consists chiefly of calcium phosphate. *Fay.*

bone phosphate. The calcium phosphate of bones and of phosphatic rocks, as of North Carolina; so called in Commerce. *Standard, 1964.*

bone picker. *See* slate picker. *D.O.T. 1.*

bone porcelain. A body formed of china stone, china clay, and bone ash. *C.T.D.*

bone seeker. A radioisotope that tends to lodge in the bones when it is introduced into the body; for example, strontium 90, which behaves chemically like calcium. *L&L.*

Bone Spring limestone. The basal dark limestone series found in the Guadalupe Mountains, N. Mex., and the Delaware Mountains, Tex. *Hess.*

bone turquoise. Fossil bone or tooth, colored blue with phosphate of iron; widely used in the past and at the present as a gem stone. It is not true turquoise, and loses its color in the course of time. Also called odontolite. *C.M.D.*

boning. The procedure of setting out a slope with the aid of boning rods; a check on the amount of twist or winding on the surface of timber or stone. *Ham.*

boning rod. A staff of timber about 4 feet long made in the form of a letter T. The shorter piece, held uppermost, is employed for sighting and lining up with exactly similar rods, to obtain the formation level in excavation work. *Ham.*

boninite. A glass-rich basaltic rock containing abundant phenocrysts of bronzite and fewer phenocrysts of olivine and augite. The glass has the chemical composition of labradorite and quartz. From the Bonin Islands, Japan. *A.G.I.*

bonito. Mex. First-class silver ore, that is, assaying over 1,000 ounces per ton. *Fay.*

bonked. *See* bond cast. *Pryor, 3.*

bonnet. a. A covering over a mine cage which serves as a roof to shield it from objects falling down the shaft, thereby protecting the riders. Also called cage cover. *Fay; B.C.I.* b. A cap piece for an upright timber. *Zern.* c. *See* bell mold. *Fay.* d. Scot. Gas coal or shale overlying and worked along with a coal seam. *Fay.* e. Scot. A portion of a coal seam left for a roof. *Fay.* f. The metal casing of a miner's flame safety lamp, with openings at the top and a hook for carrying the lamp. The bonnet protects the inner gauze from damage and from the impact of high-velocity air. *See also* safety lamp. *Nelson.* g. Synonym for air dome. *Long.* h. The access cover on the valve chest of a pump or the steam chest on a steam engine. *Long.* i. The bell-shaped dome extending above the main body of a steam boiler. Also called pressure dome. *Long.* j. A cover used to guide and inclose the tail end of a valve spindle. *Strock, 3.* k. A cap over the end of a pipe. *Strock, 3.*

bonnet hip. *See* hip tile. *Dodd.*

bonnett roller. Eng. A vertical roller with a rim like a hatbrim for guiding haulage ropes. Also called bonnet pulley; bonnet sheaf. *Hess.*

bonney. Corn. An isolated body of ore. *See also* bonny. *Fay.*

Bonnot de-airing machine. An apparatus in which by a combination of working, disintegration, exposure to a vacuum and pressure, the air is largely removed from a mass of clay in order to increase strength, density and freedom from flaws. *Hess.*

bonny; bonney; bunny. Corn. A mass of ore adjacent to a vein, but not distinctly connected with it; a great collection of ore without any vein coming into or going from it. *Fay.*

Bonnybridge fireclay. A fireclay occurring in the Millstone Grit in the Bonnybridge district of Scotland. A typical analysis (fired) is: 56 to 57 percent SiO_2; 36 percent Al_2O_3; 3 to 4 percent Fe_2O_3; 0.75 percent alkalies. *Dodd.*

Bononian. Lower Portlandian. *A.G.I. Supp.*

bont. a. Eng. The cage and winding rope with attachments. *Fay.* b. Derb. A narrowing of a mineral vein. *Fay.* c. N. Staff. One of the iron hoops used to brace the outside brickwork of a bottle oven. *See also* bottle oven. *Dodd.*

bontle. Mid. A hoisting cage full of men. *Fay.*

bonus. As applied to an oil lease, a sum of money paid by a lessee to the lessor in consideration for the execution of a lease as distinguished from the return or royalty reserved by the lessor to be paid by the lessee through the term of the lease. *Ricketts, II.*

bonus payment. Extra payment for work done beyond a certain tonnage or yardage set as being a reasonable task or standard. A bonus payment is an incentive to speedy advance of development work or increased production. *See also* allowance; contract work. *Nelson.*

bony. Coal containing slaty material in its composition. *Korson.*

bony coal. *See* bone, b. *Fay.*

bony motorman. In bituminous coal mining, one who operates a mine locomotive (motor) to haul cars of bony (coal with a high percentage of slate) to dump from the picking tables where it has been segregated from coal of commercial value. *D.O.T. 1.*

bonze. Undressed or untreated lead ore. *Nelson.*

boobey. Som. A box holding 6 to 8 hundredweight of coal in which waste rock is sent to the surface. *Fay.*

book clay; leaf clay. Clay deposited in thin leaflike laminae. *Fay.*

booked mica. Lumps of mica in which laminae have not been separated into thin sheets. *Pryor, 3.*

book fashion. A method of arranging core in a box. Core representing the shallowest depth is placed in the first groove starting at the left end of the box with the core from the progressively deeper portions of the borehole arranged as one would read the words and lines in a book. *Long.*

book form; book-packed splittings. Splittings arranged and supplied in the form of individual books or bunches, each book comprising consecutive splittings obtained from the same piece of block mica or thins. Book form splittings are generally dusted with mica powder to offset residual cohesive forces. *Skow.*

book mica. Crystals of crude mica obtained from the mine in various shapes and sizes. Also called books. *Skow.*

book mold. A split mold hinged like a book. *ASM Gloss.*

bookstone. A laminated schistose rock. Synonym for bibliolite. *Hess.*

book structure. a. A peculiar rock structure resulting from numerous parallel sheets of slate alternating with quartz. *Fay.* b. Alternation of parallel slabs or slivers of rock with quartz or other gangue mineral in a vein. *A.G.I.*

book tiles. Flat, hollow shapes having two segmental edges and resembling a book in section. *Fay.*

book value. The sum at which the total assets of a company stand in the books, less the sum of the external liabilities. *Trukscott, p. 274.*

boolies. N. of Eng. A miner's term for brothers. *Fay.*

boom. a. A spar or beam projecting out over the drill floor from the tripod or derrick, by means of which heavy drill tools and equipment may be moved and safely handled. Generally installed only when deep or large diameter boreholes, requiring heavy tools, are drilled. *Long.* b. A long, adjustable steel arm on a drill jumbo on which drifter, or other type, pneumatic drills are mounted. *Long.* c. A cantilevered or overhanging member or structure that supports or contains the component parts of a conveyor. It may be fixed, hinged, or pivoted. *ASA MH4.1–1958.* d. Any beam attached to lifting or excavating equipment. *See also* dragline. *Nelson.* e. A pipe fixed across the last supports in a tunnel face to anchor the tail sheave of a scraper loader installation. *Nelson.* f. In a revolving shovel, a beam hinged to the deck front, supported by cables. *Nichols.* g. Any heavy beam which is hinged at one end and carries a weight-lifting device at the other. *Nichols.* h. Eng. A long beam which can be swung laterally and vertically above its pivot. At the far end of the pulley, the digging bucket, etc., is mounted. *Pryor, 3.*

boom cat. *See* stripping-shovel operator. *D.O.T. 1.*

boom conveyor. Any type of conveyor mounted on a boom. *ASA MH4.1-1958.*

boom ditch. a. The ditch from the dam used in booming. *Fay.* b. A slight channel cut down a declivity into which is let a sudden head of water to cut to the bedrock and prospect from the apex of any underlying lode. *Fay.*

boomer. a. In placer mining, an automatic gate in a dam that holds the water until the reservoir is filled, then opens automatically and allows the escape of such a volume of water that the soil and upper gravel of the placer are washed away. When the reservoir is emptied the gate closes and the operation is repeated. On a smaller scale it may be used merely to furnish water periodically for sluicing. Also called automatic dam; flop gate. *Hess.* b. A device, usually a pole resting on a fulcrum, used to tighten a chain or line about a loaded truck or wagon to load in place while being hauled over rough roads. *Hess.* c. Originally, an oilfield worker who migrated from one boom field to another; now, commonly, a member of a drill crew who works on one job a short time, quits, and moves on to another locality to seek employment. Also called drifter. *Long.* d. A combination ratchet and lever device used to tighten a chain or line about a loaded truck or wagon to hole the load in place. *Long.* e. A new sonar transducer, expected to be especially helpful in the exploration of bottom substrata. *Hy.*

boomerang sediment corer. This (free-instrument type) device can be dropped over the side of a moving ship where it will sink rapidly to the ocean floor, take a core of sediment, release ballast and automatically return to the surface for retrieval. It is designed for nighttime recovery. *H&G.*

booming. The accumulation and sudden discharge of a quantity of water (in placer mining, where water is scarce). In California, the contrivances for collecting and discharging water are termed "self-shooters," an idea suggested by the sudden and violent manner in which the water makes its escape. *See also* hushing. *Fay.*

boom man. In bituminous coal mining, one who manipulates the controls of a loading boom (conveyor) to regulate the height of the loading end of a boom, thus controlling the flow of coal from shaking screens or picking tables into railroad cars at the tipple. Also called boom operator; loader headman. *D.O.T. 1.*

boom operator. *See* boom man. *D.O.T. 1.*

boort. Synonym for bort. *Long.*

boose; booze. a. Eng. Lead ore which separates easily from its matrix and does not have to be buddled, Durham, Yorkshire, and Derbyshire. Hooson defines it as veinstuff and ore mixed. *See also* bowse. *Arkell.* b Derb. Gangue rock mixed with ore. *See also* bouse. *Fay.*

boosework. York. Miners' name for lumps of lead ore which are found there both in the perpendicular fissures and in the bellies. *See also* boose. *Arkell.*

booster. a. An explosive of special character used in small quantities to improve the performance of another explosive, the latter forming the major portion of the charge. *Nelson.* b. A pump or compressor inserted in the column near the outbye end to increase the pressure. *Nelson.* c. Any device or substance to augment or improve performance, volume, or force. *See also* booster fan. *Nelson.*

booster conveyor. Any type of powered conveyor used to regain elevation lost in gravity roller or wheel conveyor lines. *ASA MH4.1-1958.*

booster drive. An auxiliary drive at an intermediate point along a conveyor. *ASA MH4.1-1958.*

booster fan. A fan installed underground to improve or augment the ventilation in a district. A booster fan is installed when other means of improving the ventilation would be very costly, or too slow or perhaps ineffective. A ventilation survey is a legal obligation in Great Britain before installing a booster fan. *See also* fan. *Nelson.*

booster pump. a. A pump used to increase the pressure of fluids, such as to increase the pressure of water delivered to a drill when the source pressure is too low to be used for drilling operations. *Compare* line pump. *Long.* b. A pump that operates in the discharge line of another pump, either to increase pressure, or to restore pressure lost by friction in the line or by lift. *Nichols.*

boosters. Those people who, as local property owners, have a stake in the prosperity of their town. Legends grow rapidly on mining soil, and information advanced by boosters should be looked upon with suspicion. *Hoov, p. 221.*

booster station. In long-distance pumping of liquids or mineral slurries, an intermediate pump station. *Pryor, 3.*

boost melting. *See* electric boosting. *ASTM C162-66.*

boot. a. A projecting portion of a reinforced concrete beam, acting as a corbel to support the facing material, such as brick or stone; the lower end of a bucket elevator. *Ham.* b. A leather or tin joint connecting the blast main with the tuyere or nozzle in a bloomery. *Fay.* c. A suspended enclosure in the nose of a tank protecting a portion of the surface and serving as a gathering opening. *ASTM C162–66.* d. Eng. A short pipe of leather through which the water is drawn from a sump into a sinking pump. *Fay.* e. The bottom of a bucket elevator that receives feed for delivery into elevating bucket. *Pryor, 3.* f. Sheet-metal transformation pieces used in warm air heating and connected to horizontal round leaders on one end and to vertical rectangular stacks on the other. *Strock, 10.*

boother. A boulder from the boulder clay. Blue boother is a boulder of limestone, andesite, or similar rock. *Arkell.*

boothite. A blue, lighter than chalcanthite, hydrous sulfate of copper, $CuSO_4 \cdot 7H_2O$, differing from chalcanthite in its larger percentage of water. Monoclinic; usually massive. From Leona Heights, Alameda County, and Campo Seco, Calaveras County, Calif. *English.*

booting. The ejection of balled drill cuttings from the collar in long, tubelike masses. *Long.*

bootit. Derb. A term used by miners for loss, as "last reckoning I bootit it thirty." *Fay.*

bootjack. a. A fishing tool used in drilling wells. *Hess.* b. A piece of 1- by 4-inch lumber that is 12 to 14 inches long with a notched end that is elevated from the floor. This jack, usually found in miners' changehouses, is used by the miner to pull off his boot. The miner stands with one foot on the jack and places the heel of the boot of the other foot in the notch and pulls to take off the boot. *Bureau of Mines Staff.*

bootleg. a. A hole, shaped somewhat like the leg of a boot, caused by a blast that has failed to shatter the rock properly. *See also* gun, a. *Hess.* b. That portion or remainder of a shothole found in a face after a blast has been fired. Also called socket. *Nelson.*

bootlegger. One engaged in coal bootlegging. Applies to the worker in bootleg holes as well as the man who cleans the coal in a small, impermanent breaker, and the trucker who conveys the coal to market. Bootleggers call themselves independent miners. *Korson.*

bootlegging. The mining and/or selling of coal produced from coal owned by others and without permission or knowledge of the owner. *Bureau of Mines Staff.*

bootleg packer. To shut off water between the lowest upper water sand and the first oil sand, a truncated cone is made of canvas or leather, the small end of which fits the outside of the tubing and is wired to it with the large end of the cone turned upward. The material caving off of the walls above catches on it and forms a packer. *Porter.*

bopd Abbreviation for barrels of oil per day. Also abbreviated BOPD. *BuMin Style Guide, p. 58.*

boracic acid. *See* boric acid. *Hansen.*

boracite. The cubic, or pseudocubic, borate and chloride of magnesium, $Mg_3B_7O_{13}Cl$, occurring in hard glassy crystals, and softer white masses. It is strongly pyroelectric. Found in beds of gypsum and anhydrite at Stassfurt, Germany. *C.T.D.; Dana 17; A.G.I.; Fay.*

boral. A sandwich of boron carbide crystals in aluminum, with a cladding of commercially pure aluminum. Concentrations of up to 50 percent boron carbide can be obtained. Used as a shielding material against the passage of thermal neutrons, as in reactor shields; neutron curtains; shutters for thermal curtains; safety rods; and containers for fissionable material. *CCD 6d, 1961.*

Borascu. Borate ore. *Bennett 2d, 1962.*

borate. A salt or ester of boric acid; a compound containing the radical BO_3^{-3}. *A.G.I.*

borate glass. A glass in which the essential glass former is boron oxide instead of silica. *ASTM C162-66.*

borates. *See* boron minerals.

borax. A mineral deposited by evaporation of the waters of alkaline lakes, notably in California, Nevada, and Tibet, China. A hydrated sodium borate, $Na_2B_4O_7 \cdot 10H_2O$, occurring as a surface efflorescence, or as monoclinic crystals embedded in the lacustrine mud. *Dana 17; A.G.I.; Pryor, 3.* Main sources are borax and kernite. Chief uses are for porcelain enamel work, glass, laundering, dyeing, metal fluxing, welding, brazing, medicine, pharmaceuticals, and agriculture. *Pryor, 3.*

borax, anhydrous. *See* borax, dehydrated. *CCD 6d, 1961.*

borax bead. In blowpipe analysis, a drop of borax which when fused with a small quantity of a metallic oxide will show the characteristic color of the element; for example, a blue borax bead indicates the presence of cobalt. *Standard, 1964.*

borax bead test. A chemical test to disclose the presence of certain metals in a sample. A clear glassy bead of borax fused in a wire loop will react chemically with the salts of certain metals and yield colors that help to identify the metal, for example, manganese compounds produce a violet bead, cobalt produces a deep blue, etc. *See also* blowpiping. *Nelson.*

borax, dehydrated; borax, anhydrous; sodium tetraborate. White; free-flowing crystals; $Na_2B_4O_7$; hygroscopic; and it forms a partial hydrate in damp air. Used in the manufacture of glass, enamels, and other ceramic products. *CCD 6d, 1961.*

borax glass. Vitreous anhydrous sodium tetraborate, $Na_2B_4O_7$. *ASTM C162–66. See also* borax.

borax, octahedral. *See* octahedral borax. *English.*

Borazon. Synthesized boron nitride that is reported to be as hard as diamond and capable of withstanding higher temperatures. *BuMines Bull. 630, 1965, p. 307.*

Borcher's process. An electrolytic method for refining silver. The anode consists of granulated alloys containing about 60 percent pure silver. The cathode of sheet silver is suspended in a cell with perforated double walls on each side. The electrolyte is dilute nitric acid or a solution of nitrates, preferably copper nitrate. *Fay.*

bord. a. Newc. A passage or breast, driven up the slope of the coal from the gangway, and hence across the grain of the coal. A bord 4 or more yards wide is called a wide bord, and one less than 4 yards in width is called a narrow bord. Also spelled board. *Fay.* b. A side gallery parallel with the main road or drift. *Standard, 1964.* c. A road with solid coal sides. *Mason.* d. A narrow coal drivage in the pillar-and-stall method of working. *Nelson.* e. A joint in a coal seam. *See also* cleat, g. *Nelson.* f. Eng. A road driven at right angles to the main cleavage planes of the coal. *SMRB, Paper. No. 61.*

bord-and-pillar; pillar-and-stall; post-and-stall; board-and-wall; stoop-and-room. A method of working coal seams. First bords are driven, leaving supporting pillars of coal between. Next, cross drives connect the bords, leaving supporting coal as rectangular pillars. Finally, the pillars are mined (extracted, won, robbed) and the roof allowed to cave in. The bordroom is the space from which bord coal has been removed. *Pryor, 3.*

bord-and-pillar method. A system of mining in which the distinguishing feature is the winning of less than 50 percent coal on the first working. It is more an extension of the development work than mining. The second working is similar in principle top top slicing. The remainder of the coal is won by a retreating system, the cover being caved after each unit has been worked. The term bord-and-pillar is not used to any great extent in American mining literature, but has a place in English literature. Various names have been applied to this method, such as checkerboard system; Brown panel system; following up the whole with the broken; Lancashire bord-and-pillar system; modified room-and-pillar working; narrow working; North Staffordshire method; rearer method of working inclined seams; rock-chute mining; room system; room system with caving; Warwickshire method of working contiguous seams; wide or square work;

and pillar-and-breast. *Fay.*

bord-and-pillar working. N. of Eng. A system of mining in which interlacing roadways are driven at right angles into the seam, leaving small square or rectangular pillars of coal of from 30 to 50 yards side length, which are then wholly or partly extracted by a small group. Also called room-and-pillar; tub-and-stall; bord-and-wall. *Trist.*

bord-and-wall. *See* bord-and-pillar. *Pryor, 3.*

bord cleat. a. Eng. The main cleavage planes or joints in a coal bed. *SMRB, Paper No. 61.* b. *See* main cleat. *Mason, V. 1, p. 8.*

bord course. Aust. A direction at right angles to the main cleat or facing, that is, the length of a bord. *Fay.*

bord drivage. A coal drivage in the pillar-and-stall method of working. *Nelson.*

border facies. The outer or border zone of an igneous rock mass that has a different texture or composition from the interior owing to more rapid cooling and possibly to assimilation of substances from the enclosing rock. *Hess.*

York. A heading driven generally to the main cleats. Also called bord on face. *Nelson.* b. A coal face having a bearing coincident with the bord line. *TIME. See also* bordways.

bord gate. a. A main gate leading and at right angles to a bord face. *TIME.* b. York. A heading driven generally to the rise, out of which stalls are opened and worked. *Fay.*

bord on face. *See* bord face. *Nelson.*

bordroom. a. A heading driven parallel to the natural joints. *Fay.* b. The space excavated in driving a bord. Used in connection with the ridding of the fallen stone in old bords when driving roads across them in pillar working; thus, "ridding across the old bordroom." *Zern.* c. Eng. The width across an old bord. *Fay.*

bordroom man. A repairer who cleans and erects supports in old workings in the bord-and-pillar method of coal mining. *Nelson.*

bords and longwork. York. A system of working coal. First, the main levels are started on both sides of the shaft and carried toward the boundary. Second, the bord gates are worked in pairs to the rise and continued as far as the boundary, or to within a short distance of a range of upper levels and other bord gates. Lastly, the whole of the pillars and remaining coal are worked out downhill to within a few yards of the levels, and ultimately, all the coal between the levels is removed. *Fay.*

bordways. Eng. The direction of a place or a face being taken at right angles to the main cleavage planes of a seam. *SMRB, Paper No. 61.*

bordways course. The direction at right angles to the main cleavage planes. In some mining districts it is termed "on face." *Zern.*

bore. a. To cut a circular hole by the rotary motion of a cutting tool. *Long.* b. A circular hole made by boring. *Long.* c. A tunnel, especially during the time it is being excavated. *Long.* d. The inside diameter of a cylinder, such as the inside diameter of piston cylinders on a pump or reciprocating engine. *Long.* e. A hole or cylindrical cavity produced by a single-point or multipoint tool other than a drill. *ASM Gloss.* f. A tidal flood that regularly or occasionally rushes with a roaring noise into the mouths of certain rivers or into bays of peculiar configuration or location, and proceeds in one or more waves that often present a very abrupt front of considerable height dangerous to shipping. *Webster 3d.*

bore bit. a. An obsolete name for core bit. *Long.* b. As used by soil and foundation testing engineers, any type of cutting head or bit that is rotated to cut through or take a sample of soil, overburden, or bedrock materials. *Long.* c. A rock-boring chisel. *Standard, 1964.*

bored pile. A pile formed by pouring concrete into a hole formed in the ground by an auger, into which a framework of light steel reinforcement is generally lowered before the concrete is poured. *Ham.*

borehole. A hole with a drill, auger, or other tools for exploring strata in search of minerals, for water supply, for blasting purposes, for proving the position of old workings, faults, and for releasing accumulations of gas or water. *See also* oil well. *Fay.*

borehole cable. A borehole cable is one designed for vertical suspension in a borehole or shaft and is used for power circuits in the mines. (A borehole cable in mining may also be a cable containing signal, telephone, or control circuits). *ASA M2.1-1963.*

borehole casing. A steel pipe lining used in a borehole, particularly when passing through loose, running ground. Flush-jointed casing, that is smooth inside and outside may be either screwed or welded. The Swedish diamond core drill casing is flush-jointed, whereas that of the United States is usually coupled. A coupling adds one-half inch on the $4\frac{1}{2}$-inch-diameter casing, to an inch on that of 20 inch diameter. *Nelson.*

borehole deformation gage. A device for measuring the change in diameter of a hole. *R.I. 5978, 1962, p. 3.*

borehole logging. The determination of the physical, electrical, and radioactive properties of the rocks traversed by a borehole. *B.S. 3618, 1963, sec. 3.*

borehole logs. A record, made by the driller or geologist, of the rocks penetrated in the borehole. In the laboratory, a more detailed log is prepared giving particulars relating to lithology, paleontology, water analysis, etc. *See also* electric logs. *Nelson.*

borehole mining. The extraction of minerals in the liquid or gaseous state from the earth's crust by means of boreholes and suction pumps. Boreholes are used for mining petroleum, and for the extraction of liquid solutions of salt, sulfur, etc. *Nelson.*

borehole pump. a. Strictly, any pump which can be suspended in a borehole; usually a centrifugal pump suspended in a borehole by its pipe range and driven by a shaft inside of the pipe. *B.S. 3618, 1963, sec. 4.* b. A centrifugal pump, electrically driven, and designed in the form of a vertical narrow chamber. It may be used to provide water, for dewatering purposes; or for borehole mining. *See also* sinking pump; submersible pump. *Nelson.*

borehole samples. The samples of the rocks obtained during boring. The diamond and shot drill yield cores, while percussive drills yield sludge and chippings which are examined to determine the nature of the rocks passed through. Borehole samples may also be required during site investigations. *See also* exploratory drilling; soil core. *Nelson.*

borehole sealing. a. The sealing or closing of borehole walls where drilling fluid is lost. Quick-setting gypsum cement, with a 30- or 60-minute set, may be used. *See also* mud flush, b. *Nelson.* b. The complete filling of a borehole with cement to prevent the entry of water into mine workings. *Nelson.*

borehole spacing. The distance between boreholes drilled for exploration or sampling purposes. With bedded minerals, the holes may be positioned at the intersection points of coordinates or at the corners of equilateral triangles with sides from 100 to 500 feet apart. The spacing is closer with patchy deposits. With metallic ores following belts across country, the holes are spaced along lines crossing the ore body in order to yield cross sections of the ore at definite intervals. In the case of known and semiproved coalfields, boreholes at $\frac{1}{4}$- to $\frac{1}{2}$-mile intervals may suffice. *Nelson.*

borehole survey. a. The process of determining the course of, and the target point reached by, a borehole, using one of several different azimuth and dip recording apparatus small enough to be lowered into a borehole; also, the record of the information thereby obtained. Also called drill-hole survey. *Long.* b. The process of determining the mineralogical, structural, or physical characteristics of the formations penetrated by a borehole using electrical logging apparatus small enough to be lowered into a borehole; also, the record of the information thereby obtained. *Long.* c. Measurement of deviation from straight line in diamond drilling. Made simply by observing etch pattern of glass bottle containing hydrofluoric acid or consolidation angle of cooling liquid wax; more accurately, by a photographic record of plumb-lines, magnets, or by a gyroscope. *Pryor, 3.* d. A survey to determine the precise position of various points on the central axis of a borehole. *B.S. 3618, 1963, sec. 1.* e. A survey to obtain information about the strata intersected by a borehole. *B.S. 3618, 1963, sec. 1.*

borehole surveying. Instrumental tests to determine the amount and direction of deflection of a borehole from vertical and horizontal planes. The instrument is lowered into the hole and tested approximately every 100 feet or so of depth. The data obtained may be used to construct a scale model showing the actual course taken by the hole. *See also* crooked hole; Oehman and Payne-Gallwey instrument; oriented core. *Nelson.*

bore journal. A tabular record of the characteristics and thicknesses of strata intersected by a borehole. *B.S. 3618, 1963, sec. 1.*

bore meal. a. Eng. Mud or fine cuttings from a borehole. *Fay.* b. In rock drilling, the sludge from a borehole. *Pryor, 3.*

borer. a. A tool (as a drill) used for boring. *Webster 3d.* b. Eng. A piece of round iron with a steel point, which is driven into the rock to make holes for the purpose of blasting. *See also* drill. *Fay.*

bore rod; boring rod. Term used primarily by soil and foundation testing engineers for the equipment customarily called a drill rod by drillers and miners. *Long.*

Borgenet furnace. Belgium-type zinc furnace with a single combustion chamber. *Bennett 2d, 1962.*

boric acid; orthoboric acid; boracic acid. White; triclinic; H_3BO_3; and very soluble in water. Used as a flux in the manufacture of cast-iron and sheet-steel porcelain enamel frits. *Hansen.* On heating it loses water and forms metaboric acid, $H_2B_2O_4$; on further heating it forms tetraboric acid or the so-called pyroboric acid, $H_2B_4O_7$; on heating at a still higher temperature, it forms B_2O_3, anhydrous boron trioxide or boric oxide. It occurs as tabular triclinic crystals deposited near fumeroles, and it also occurs in solution in the hot lagoons of Tuscany, Italy. *C.T.D.*

boric oxide glass; boron oxide glass. A colorless, transparent glass or noncrystalline powder; hard and brittle; slightly bitter; B_2O_3; specific gravity, 1.83 to 1.88; boiling point, above 1,500° C; soluble in alcohol and in acids; slightly soluble in cold water with decomposition; and soluble in hot water. Used in the production of boron; in the chemical analysis of silicates; in heat-resistant glassware; and as a fire-resistant additive for paints. *CCD 6d, 1961.*

borides. A group of special ceramic materials. Typical properties are great hardness and mechanical strength, high melting point, low electrical resistivity and high thermal conductivity; impact resistance is low but the thermal-shock resistance is generally good. For the properties of specific borides see under the borides of the following elements: aluminum borides; barium borides; calcium borides; chromium borides; hafnium borides; molybdenum borides; niobium borides; silicon borides; strontium borides; tantalum borides; thorium borides; titanium borides; uranium borides; vanadium borides; tungsten borides; zirconium borides. *Dodd.*

borier. Corn. A drill. An instrument of iron that is steel-pointed to bore holes within large rocks, in order to blow them with gunpowder. *Hess.*

boring. a. The cutting or drilling of a hole for blasting, water infusion, exploration, or water or firedamp drainage. *See also* percussive boring; rotary boring. *Nelson.* b. The drilling of deep holes for the exploitation or exploration of oilfields. The term drilling is used similarly in connection with metalliferous deposits. *C.T.D.* c. Material removed by boring. *Standard, 1964.* d. A machining method using single-point tools on internal surfaces of revolution. *ASM Gloss.*

boring bar. a. A rod, made in various lengths, usually with a single chisel cutting edge, for hand drilling in rock. The blows are given by a sledge hammer. *Nelson.* b. A revolving or stationary bar carrying one or more cutters or drills for boring. *Fay.*

boring bit. Derb. A sharp piece of steel at the end of an auger stem or drill for cutting rock or other material by rotation of the auger. *See also* bit, a; bore bit, b. *Fay.*

boring contract. An agreement entered into between a producer and a contractor for the sinking of oil or gas wells on a property. *Fay. See also* drill contract.

boring contractor. Synonym for drill contractor. *Long.*

boring head. a. The part of a drill machine more commonly called swivel head by persons associated with the diamond-drilling industry. *See also* swivel head, a. *Long.* b. Synonym for drill bit. *Long.* c. The cutting end of a boring tool, especially the cutter head of a diamond drill. *Webster 3d.* d. *See* drill head, a. *B.S. 3618, 1963, sec. 3.*

boring journal. A book which contains an accurate record of the progress of the boring work, day by day. It is usually kept by the drilling master. *See also* log, e. *Fay.*

boring log. Synonym for drill log. *Long.*

boring master. A man in charge of a well-boring outfit. *Fay.*

boring rod. A rod made up of segments, carrying at its lower end a tool for earth boring or rock drilling. *Webster 3d.*

borings. Used by the soil and foundation testing profession as a synonym for boreholes and/or the materials removed from a borehole. *Compare* cuttings, a; sample, b. *Long.*

Borium. Hard-facing welding rod, consisting principally of tungsten carbide. *Bennett 2d, 1962.*

Born equation. The free energy of solvation of an ion is

$$\triangle G = \frac{Nz^2e^2}{2r}\left[1 - \frac{1}{D}\right]$$

N is the Avogadro number, z the ionic valency, e its electronic charge, D the dielectric constant of the electrolyte and r the ionic radius. *Pryor, 3.*

bornhardtite. A cobalt selenide, Co_3Se_4, cubic (linnaeite group); from Trogtal, Hartz (Harz) Mountains, Germany. *Spencer 21, M.M., 1958.*

bornite. A valuable copper ore; a sulfide of copper and iron, Cu_5FeS_4, crystallizing in the cubic system. Also called erubescite; horseflesh ore; peacock ore; variegated copper ore; purple copper ore. *Sanford; Dana 17.*

boroaluminate. *See* aluminum borate. *Dodd.*

Borod. Hard-facing welding rod composed principally of tungsten carbide. *Bennett 2d, 1962.*

borolanite. A hypabyssal rock, having a granitoid texture and consisting essentially of orthoclase and melanite with subordinate nepheline, biotite, and pyroxene. A variety of melanite-nepheline syenite found at Loch Borolan, Scotland. *A.G.I.*

Borolon. Alumina, Al_2O_3, prepared by fusing bauxite; specific gravity 4; used as an abrasive and refractory. *Bennett 2d, 1962.*

boron. Element of atomic number 5, of group III in the periodic system. A very soft, brown, amorphous powder or yellow crystals; ignites in air; symbol, B; atomic weight, 10.81; valence, 3; specific gravity, 2.45; melting point, 2,300° C; hardness of monoclinic crystals, 9.3 Mohs' scale; soluble in concentrated nitric acid and sulfuric acid; and insoluble in water, in alcohol, and in ether. Used as a catalytic agent; in ceramics and in heat-resistant glassware (a glass in which boric oxide, B_2O_3, replaces the calcium oxide in ordinary lime-soda glass); in metallurgy (alloy steels, cementation of iron); in semiconductors; and in abrasives (crystals). *CCD 6d 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-103.*

boronatrocalcite. *See* ulexite. *Fay.*

boron carbide; tetraboron carbide. Probably not a true compound, but instead a solution of varying amounts of carbon in a slightly distorted boron lattice; B_4C; black; hexagonal rhombohedral crystals; ranking next to diamond in hardness, 9.3 Mohs' scale; and melting point, 2,350° C. Used in powder form as an abrasive and in molded form as an abrasion resister. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-158.*

boron-edenite. A mineral, artificial $NaCa_2Mg_5(Si_{3.5}B_{0.5}O_{11})_2F_2$, containing 3.91 percent B_2O_3. *Spencer 21, M.M., 1958.*

boron hydride indicator. Unit tests for up to 0.1 parts per million (ppm) of pentaborane or decaborane in air and 0.1 parts per million (ppm) of diborane. Detector comprises a positive displacement hand pump, reagent solution, a dry reagent, color comparison card and a calibration chart. The number of pump strokes required to produce on filter paper a color to match a reference standard is the index of borane concentration. *Bests, p. 584.*

boron metasomatism. The replacement of minerals, as of a granite, by boron-bearing minerals, such as tourmaline, axinite, or rarely, datolite and danburite. *A.G.I.*

boron minerals. Many known minerals contain boron, but only a few are commercially valuable as a source of boron. The principal boron minerals are borax (tincal), $Na_2B_4O_7\cdot10H_2O$; kernite (rasorite), $Na_2B_4O_7\cdot4H_2O$; colemanite (borocalcite), $Ca_2B_6O_{11}\cdot5H_2O$; ulexite (boronatrocalcite), $CaNaB_5O_9\cdot8H_2O$; priceite (pandermite), $5CaO\cdot6B_2O_3\cdot9H_2O$; boracite (stassfurtite), $Mg_7Cl_2B_{16}O_{30}$; and sassolite (natural boric acid), H_3BO_3. Today the United States furnishes the bulk of world production from deposits of sodium boron minerals. Boron and boron compounds have numerous uses, including applications in glass, ceramics, welding compounds, soaps and detergents, plasters and paints, starches, fertilizers, steel, nonferrous metals, atomic reactors, radio tubes, solar batteries, abrasives, refractories, chemicals, plastics, motor fuel, antifreeze, insulation materials, adhesives, drugs, and cosmetics. *BuMines Bull, 630, 1965, pp. 149, 151.*

boron nitride. White; BN; hexagonal rhombohedral, crystals or powder; the powder has a hardness of 2, Mohs' scale; sublimes, about 3,000° C; and is anisotropic and some properties vary according to the method of preparation and the crystal form. Used as a refractory; a high-temperature lubricant, as in glass molds; in furnace insulation; and in molten-metal pump parts. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-158.*

boron oxide. *See* boric oxide. *CCD 6d, 1961.*

boron-phlogopite. A mineral, artificial $KMg_3BSi_3O_{10}F_2$. *Spencer 21, M.M., 1958.*

boron phosphate. BPO_4; specific gravity, 2.81; vaporizes at 1,400° C; related structurally to high-cristobalite. It has been used as a constituent of a ceramic body that fires to a translucent porcelain at 1,000° C. *Dodd.*

boron phosphide. Symbol, BP; melting point, greater than 2,000° C but readily oxidizes, which limits its potential use. *Dodd.*

boron silicides. *See* silicon borides. *Dodd.*

boron steel. The addition of about 0.003 percent of boron confers increased hardenability to steels in the quenched and tempered condition. The addition of this percentage of boron to low carbon, 0.50 percent molybdenum steel in the normalized condition gives double yield strength and a 30-percent increase in tensile strength, but boron has only a very slight advantage when molybdenum is less than 0.35 percent. In amounts greater than 0.03 percent, boron causes difficulty in forging. As much as 2 percent may be added to steels used in nuclear engineering. *Ham.*

borosilicate crown glass. An optical crown glass containing substantial quantities of silica and boric oxide. *ASTM C162-66.*

borosilicate glass. Any silicate glass having at least 5 percent of boron oxide, (B_2O_3).

ASTM C162-66.

boroto metal. Said to be a tin-lead-antimony white metal in which colloidal graphite is incorporated. Used as a self-lubricating bearing metal. *Camm.*

borotungstic acid; boronotungstic acid. A yellowish liquid above 45° to 51° C; B_2O_3-$(WO_3)_9 \cdot 24H_2O$; specific gravity, 3.00. Used in mineralogic assays. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-158.*

borrow pit. A special classification usually applied to material taken from some pit near an embankment when there is insufficient excavation nearby on the job to form the embankment. Borrow-pit excavation is therefore a special classification, usually bid upon as a special item in contracts. It frequently involves the cost of land, or a royalty for material taken from the land, where the borrow pit is located; it also often requires the construction of a suitable road to the pit. This type of excavation therefore usually runs higher in cost than ordinary excavation. *Hess.*

borsella. An instrument for stretching or contracting glass in its manufacture. *Standard, 1964.*

bort. a. Diamond material unsuitable for gems because of its shape, size, or color and because of flaws or inclusions. It also occurs in finely crystalline aggregates and is usually crushed into finer material. Also spelled boart; bortz; boort; boartz; borts; bowr. *I.C. 8200, 1964, p. 149.* b. Originally the term was used as a name for all crystalline diamonds not usable as gems; later it was used to designate those diamonds not usable as gems or toolstones. Currently the term commonly is applied to low-grade industrials suitable only for use in a fragmented form. *See also* fragmented bort. *Long.* c. Inferior, coarsely crystalline diamonds, many of which contain black carbon or other minerals; used for core drilling, cutting, and polishing hard materials. Various types are: (1) Stewartite bort and magnetic bort—bort picked up by a magnetic separator and containing no visible iron; (2) hailstone bort—cement-colored bort that looks like and has a concentric structure like a hailstone. The layers may be coarsely or finely crystalline diamond; (3) framesite bort—bort somewhat more granular than common bort and has little trade value; it is exceedingly difficult to saw; and (4) shot bort—bort in spherical form, and said to be very hard and especially useful in drilling machinery. *Hess.* d. Formerly used to mean the Brazilian carbonado or black diamond. *Hess.* e. Industrial diamond. *ASM Gloss.* f. Very hard, flawed or discolored diamonds used in drilling and glasscutting. *Gordon.* g. S. Afr. Rounded forms of diamond with rough exterior and radiated or confused crystalline structure, but hardness equal to that of diamond. *Beerman.*

bort bit. Synonym for diamond bit. *Long.*

borts. Synonym for bort. *Long.*

bort-set bit. Synonym for diamond bit. *Long*

bortz. Synonym for bort. *Long.*

bortz bit. Synonym for diamond bit. *Long.*

bortz-set bit. Synonym for diamond bit. *Long.*

bosh. a. A tank or tub from which horses drink. *Fay.* b. The section of the blast furnace extending upward from the tuyeres to the plane of maximum diameter. *ASM Gloss.* c. A lining of quartz that builds up during the smelting of copper ores and that decreases the diameter of the furnace at the tuyeres. *ASM Gloss.* d. A trough in which bloomery tools (or in copper smelting, hot ingots) are cooled. *Fay.*

bosh breakouts. Breakouts of the blast, gas, or coke through the bosh brickwork of an iron blast furnace. *Fay.*

bosh brick. *See* hearth and bosh brick. *ACSG.*

bosh jacket. A water jacket used for cooling the walls of a shaft furnace. *Fay.*

bosh plates. A wedge-shaped, flat bottom, oval top, hollow, water-cooled casting extending from inside to the outside face of the bosh walls of a blast furnace to cool and protect the brickwork. *Camp, 6th ed., 1951, p. 301.*

bosh tank. A water tank which receives newly cast copper shapes for rapid cooling. *Pryor, 3.*

boss. a. A person in immediate charge of a piece of work, as a mine foreman. *Fay.* b. A master workman or superintendent; a director or manager. *Ricketts, I.* c. Ark. A coal mine employee not under the jurisdiction of the miner's union. *Fay.* d. The enlarged part of a shaft on which a wheel is keyed. *Webster 3d.* e. A cast-iron plate secured to the back of a traveling forge hearth. *Fay.* f. A swage or die used for shaping metals. *Webster 2d.* g. A heavy cylindrical piece of iron (usually cast or steel) into the top of which the stamp stem fits and into the bottom of which the shoe is inserted. It is the body of the hammer into which the handle fits and which also gives heft to the blow. Also called top head. *Fay.* h. Scot. Hollow. The waste or exhausted workings of any mineral. To hole or undercut. *Fay.* i. A proturberant and often dome-shaped mass of igneous rock congealed beneath the surface of the earth and laid bare by erosion. *Webster 3d.*

boss driver. One in charge of men or boys who are driving horses or mules for hauling coal, rock, or ore at mines. *Fay.*

bossing. a. Scot. The holing or undercutting of a thick seam, as of limestone, the height of the undercutting being sufficient for a man to work in. *Fay.* b. In ceramics, the process of making a coat of color uniform, by dusting the color in boiled oil, or applying it plentifully mixed with oil, and tapping to smoothness with a boss; ground laying. *Standard, 1964.* c. A coating of oil to be employed as above. *Standard, 1964.* d. A boss, or bosslike part. *Standard, 1964.*

boss miner. a. A contract miner. *Fay.* b. In Ohio, in 1883, a mine boss. *Fay.*

Boss process. Modification of the pan-amalgamation process; ore slurry flows continuously through a series of pans and settling tanks. *Bennett 2d, 1962.*

bostonite. A rock occurring in dikes and having the mineralogical and chemical composition of trachyte, except anorthoclase (and therefore soda) is abnormally abundant and dark silicates are few or lacking. Named from Boston, Mass.; also found around Lake Champlain and in neighboring parts of Canada. *Fay.*

bostonitic. Having the texture of a bostonite; that is, laths of feldspar are so arranged that they have little parallelism. *Johannsen, v. 1, 2d, 1939, p. 204.*

bostrichites. An early synonym for prehnite. *Hey, M.M., 1964.*

B.O.T. *See* Board of Trade unit. *Pryor, 3.*

botallackite. Formerly thought to be atacamite, but has been shown to be a distinct species. Its major constituents are copper, chlorine, and hydrogen oxygen. Its formula is $Cu_4(OH)_6Cl_2 \cdot 3H_2O$. *American Mineralogist, v. 36, No. 3-4, March-April 1951, p. 384; Mineralogical Magazine, v. 29, No. 211, December 1950, p. 280.*

botanical anomaly. A geochemical anomaly in which the chemical composition, ecological assemblage, or morphology of plants indicates the presence of a mineral deposit. *Hawkes.*

bontanical prospecting. Prospecting in which differences in plant growth or family plant serve as a clue to the presence of metals beneath barren rock or a covering of sand and gravel. *Pearl, p. 40.*

botch. A worthless opal. *Fay.*

botryogen. A vitreous hyacinth-red, translulent, hydrous magnesium ferroferric sulfate, crystallizing in the monoclinic system. *Fay.*

botryoid. A form in the shape of grapes. Synonym for clusterite; grape formation. *A.G.I.*

botryoidal. Having the form of a bunch of grapes; usually applied to mineral aggregates. *Webster 3d; Fay.*

botryoidal stalactite. Round or semiround, smooth nodular growths of calcium carbonate, usually occurring in clusters on cavern walls. Synonym for botryoid; clusterite; grape formation. *Schieferdecker.*

botryolite. A radiated, columnar datolite with a botryoidal surface. *Standard, 1964.*

bott. A plug of clay for closing the taphole of a cupola or a blast furnace. *Bureau of Mines Staff.*

Böttger ware. Dark red stoneware. *ACSG, 1963.*

botting. Thrusting a bott into the taphole to stop a run of slag or metal. *Fay.*

botting clay. Prepared plastic refractory material for use in the stopping of the tapholes in cupolas. A typical composition would be 50 to 75 percent fireclay, up to 50 percent black sand, 10 percent coal dust, and up to 5 percent sawdust. *Dodd.*

bottle blower. *See* glassblower. *D.O.T. 1.*

bottle-blowing-machine operator. *See* bottle-machine operator. *D.O.T. 1.*

bottle brick. A hollow clay building unit shaped like a bottomless bottle 12 inches long, 3 inches outside diameter (o.d.), 2 inches inside diameter (i.d.), and weighing 2¼ pounds. The neck of one unit is placed in the end of another to build beams, arches, or flat slabs; steel reinforcement can be used. Bottle bricks have been used in France (where they are known as Fusées Céramiques'), in Switzerland, the Netherlands, and in South America. *Dodd.*

bottle chock. A pulley with a wide-grooved face for guiding a cable around a turn in the track, an angle sheave. *Zern.*

bottle coal. Scot. Gas coal. *Fay.*

bottled gases. The liquefied petroleum gases propane and butane. These gases are liquefied at normal atmospheric temperature (70° F) at pressures of 125 pounds per square inch and 30 pounds per square inch respectively and they are sold in cylinders or tank cars in liquid form at about these pressures. Liquid propane is sold mainly for industrial use, because of its higher pressure, and butane mainly for domestic use. *Francis, 1965, v. 2, p. 420.*

bottle gas. A gas consisting of volatile hydrocarbons, from propane to pentane, mixed with hydrogen and methane under pressure. It withstands pressure and hence may be transported in steel tanks under pressure in liquefied form. May be used as a fuel to operate combustion-type engines in lieu of gasoline. Sold under various trade names but more commonly known as propane, butane, LP gas, blau gas (or blue gas). *Long.*

bottle glass. Glass used for the manufacture of common bottles, made from a batch comprising essentially sand, limestone, and alkali. A typical glass composition may be taken as 74.0 percent SiO_2, 0.6 percent Al_2O_3, 9.0 percent CaO, and 16.3 percent Na_2O. *C.T.D.*

bottleite. Ir. Tachylyte or glassy basalt. *Arkell.*

bottle jack. Eng. An appliance for raising heavy weights in a mine. *Fay.*

bottle-machine operator. One who tends automatic machine which forms bottles from molten glass. Also called bottle-blowing-machine operator; forming-machine operator; press-and-blow-machine operator. *D.O.T. 1.*

bottlemaking machines. These may operate in various ways, the bottle being formed in two stages, that is, the parison and the finished bottle. Widemouth ware may be formed by pressing the parison and then blowing, narrow-mouth by blowing and blowing or sucking and blowing. In the last method, the glass is gathered by suction into the parison mold, in the other two, it is dropped by hand or more probably by a feeding device, hence the terms suction-fed device, suction-fed, feeder-fed machines. *C.T.D.*

bottle oven. A type of intermittent kiln, usually coal-fired, formerly used in the firing of pottery; such a kiln was surrounded by a tall brick hovel or cone, of typical bottle shape. *Dodd.*

bottle rock. An old name for olivine and obsidian. *Arkell.*

bottle, specific gravity. A bottle designed to determine the specific gravity or density of a liquid, as compared to an equal amount of water at the same temperature. *Hansen. See also* pycnometer.

bottle stone. a. An old name for chrysolite, or any other mineral, which can be melted directly into glass. *See also* bouteillenstein. *Fay.* b. Pitchstone. *Arkell.*

bottom. a. The floor in any underground mining cavity. *Fraenkel.* b. To construct the bottom of or for; said specifically of underdraining a level. *Standard, 1964.* c. To strike bedrock or clay when sinking a shaft. *Standard, 1964.* d. Penn. The stratum, rock, or floor on which a coal seam lies. *Standard, 1964.* e. The landing at the bottom of the shaft or slope. *Fay.* f. The lowest point of mining operations. *Fay.* g. To underrun (as a gold deposit that is to be worked by the hydraulic method) with a level for drainage. *Webster 3d.* h. To break the material and throw it clear from the bottom or toe of the borehole. *Fay.* i. Surface in a borehole parallel to the face of a drill bit. *Long.* j. To place a drill bit in contact with the bottom of a borehole. *Long.* k. To complete a borehole. *Long.* l. A mass of impure copper formed below the matte, in matting copper ores. *Weed, 1922.* m. In metal melting furnaces, this is usually the hearth or crucible. *Bureau of Mines Staff.* n. The footwall of a metalliferous deposit. *Nelson.* o. Barren bedrock. *Nelson.* p. The rock formation below the alluvium on which the gold or tin wash dirt is met with. *Gordon.* q. Low-lying land; especially, low-lying grassland and fields along a watercourse. *Webster 3d.* r. The continuous and gently curved or somewhat flat surface (as of earth, sand, or rock) on which a body of water (river, lake, or sea) lies. *Webster 3d.* s. In gem stones, the pavilion. *Shipley.*

bottom bed. Eng. Universally applied to the lowest bed in a quarry; for example Doulting, Somerset. Also used in Southeast England for the basal bed of the Tertiary, whether Thanet sand or Reading beds, resting on an eroded surface of the Chalk. *Arkell.*

bottom belt conveyor; bottom loading belt. A belt conveyor which carries the coal or ore on the lower strand, and often used where height is limited. *Nelson.*

bottom benching. The method by which the bench is removed from below as with a power shovel. *American Institute of Mining and Metallurgical Engineers. Technical Publication No. 604, 1935, p. 7.*

bottom board. a. Eng. The bottom of a wagon or truck which is unfastened by knocking off a catch when the wagon is required to be discharged. *Fay.* b. A flat base for holding the flask in making sand molds. *ASM Gloss.* c. A board placed on the underside of a mold during ramming. *C.T.D.*

bottom bounce. Technique by which sonar impulses are reflected off the ocean bottom one or more times before reaching the target. *Hy.*

bottom break. The break or crack that separates a block of stone from a quarry floor. *Hess.*

bottom cager. A man at the bottom of a stope or shaft in a mine to superintend the operation of the raising and lowering of the cage. *See also* cager. *Fay.*

bottom canch. In leveling an underground roadway, a part taken out below a bed. *Hess. See also* canch, b.

bottom captain. Corn. An undereground boss. *Hess.*

bottom coal. Coal below the undercut; it may or may not be removed. *Fay.*

bottom cut. a. A machine cut made in the bottom or floor of a seam before shot firing. *See also* middle cut; top cut, a. *Nelson.* b. A drill hole pattern. *See also* drag cut, b. *Nelson.* c. In drilling and blasting a tunnel, lower of two converging lines of horizontally spaced holes. Upper line is draw cut. When blasted simultaneously a wedge of rock is removed. *Pryor, 3.*

bottom cutter. A dinter; a coal cutter for making floor cuts. *Nelson.*

bottom diameter. The diameter of a circle tangent to the seating curve at the bottom of the tooth gap of a roller chain sprocket. Equal to the pitch diameter minus the chain-roller diameter. *J&M.*

bottom digger. In anthracite and bituminous coal mining, a laborer who digs out clay, earth, or rock from the bottom of haulageways with a pick and shovel and lowers track to give sufficient height for the haulageway. Also called groundman. *D.O.T. 1.*

bottom discharge bit; face discharge bit. A diamond coring bit with inner tube of the core barrel coming close to the crown of the bit. A series of holes drilled longitudinally through the wall of the bit provides a straight flow of the flushing medium past the core and directly to the face of the bit. *B.S. 3618, 1963, sec. 3.*

bottom-discharge bucket conveyor. A conveyor for carring bulk materials in a horizontal path consisting of an endless chain to which roller-supported, cam-operated, bottom-discharge conveyor buckets are attached continuously. *ASA MH4.1-1958.*

bottom-discharge conveyor bucket. A vessel generally rectangular or square in plan and having a bottom consisting of an undercut gate. *ASA MH4.1-1958.*

bottom drill. A flat-ended twist drill used to convert a cone at the bottom of a drilled hole into a cylinder. *ASM Gloss.*

bottom-dump car. *See* mine cars. *Lewis, p. 222.*

bottom-dump scraper. A carrying scraper that dumps or ejects its load over the cutting edge. *Nichols.*

bottom-dump semitrailers. Suitable for transporting free-flowing materials over a reasonably level haul route that permits a high travel speed. They can be used where the maximum flotation of a large single tire is required and where dumping in windrows over a wide area is practical. *Carson, p. 348.*

bottom dump truck. A trailer or semitrailer that dumps bulk material by opening doors in the floor of the body. Also called dump wagon. *Nichols.*

bottomed. a. A completed borehole, or the point at which drilling operations in a borehole are discontinued. *Long.* b. Said of shafts and slopes on being driven to completion when reaching base of coal seam. *Bureau of Mines Staff.*

bottom emptying skip. A skip equipped with a bottom discharge gate. This gate consists of a hinged flat which in its closed position stands practically vertical to the flow of the material. It is operated by means of two sets of levers forming a toggle joint, one set fixed to the body of the skip and the other set to the gate in such a manner that when the gate is closed the set holding the gate is turned over the dead center, thus preventing the coal load opening the gate. On arrival at the surface, the skip is automatically discharged by a roller on the link mechanism engaging with curved guides, so opening the bottom discharge gate and allowing the coal to flow into the receiving pocket. *Sinclair, V., pp. 68-69.*

bottom equipment. a. The tools or equipment attached to the lower end of a drill string and normally used at or near the bottom of a borehole. Also, the nondrilling equipment placed and operated at or near the bottom of a borehole, such as a pump unit or strainer. *Long.* b. Mine equipment used solely for work at the mine bottom, such as rotary dump and switch motor (if used to spot cars in rotary dump). *Bureau of Mines Staff.*

bottomer. a. In anthracite and bituminous coal mining, one who is stationed at the shaft bottom or at an intermediate shaft station in a mine; runs loaded cars into position near the shaft and pushes them on a cage when it is lowered to his level; and pulls empty cars from the cage and runs them onto station sidings for distribution in mine. Also called bottom cager; bottom man; footman; foot tender; stationman; station tender. *D.O.T. 1.* b. Eng. The man stationed at the bottom of a shaft in charge of the proper loading of cages, signals for hoisting of cages, etc. A cage or skip tender. Also called bottom cager. *Fay.*

bottom filler. A man who fills a barrow with ore, coke, or stone, weighs it, and then places it on the cage or elevator to be hoisted to the top of the furnace. *Fay.*

bottom floor. Eng. The lowest bed of Lias limestone in the quarry, Barnstone lime works, also at Stamford quarries, Northampshire. *Arkell.*

bottom gate. The gate road at the lower end of an inclined coalface. *See also* main gate; tailgate; top gate. *Nelson.*

bottom heading (**overhand bench**). Method of excavating tunnels, drifts, or other mine openings. The bottom heading, which may either be driven in successive stages or holed through, is subsequently enlarged by excavating the top section. *Fraenkel.*

bottom hole. A point at, or near, the bottom of a borehole. *Long.*

bottom-hole contribution. Sum of cash payable upon reaching total depth under terms of contract whether productive or dry hole. *Wheeler.*

bottom-hole pressure. a. The load, expressed in pounds or tons, applied to a bit or other cutting tool while drilling. *Long.* b. The pressure, expressed in pounds per square inch (psi), produced at the bottom of a borehole by the weight of the column of circulation or other liquid in a borehole. *Long.* c. The pressure, expressed in pounds per square inch (psi), exerted by gas or liquids ejected from the rocks at or near the bottom of a drill hole. *Long.* d. Pressure measured in a well opposite the producing formation. If the well is flowing, the flowing bottom-hole pressure" will be obtained; if the well is not and has not been producing for a sufficient time, the pressure will be the "fully built-up", or "static" bottom-hole pressure. *Institute of Petroleum, 1961.*

bottom-hole temperature. The temperature of the rock and/or other media encountered at or near the bottom of a borehole. *Long.*

bottom ice. Anchor ice. *Webster 3d.*

bottoming. a. The thinning out or ending of an ore body. Bottoming of an ore body may occur either with a structural thinning out or with a dimunition of valuable minerals with depth. So-called mineralogical bottoming may be due to the temperature or pressure gradients that existed when the minerals were deposited. Certain minerals which are sensitive to these factors may often be used as indicators. Structural changes, such as the steepening of a fault, may cause mineralogical changes. Structural bottoming may be caused by a weakening of fracturing with depth. Fractures and the compaction of breccia are seldom single control factors. In cases where the minable ore is coextensive with intense fracturing, the lower limit of the ore is of characteristic shape, ending in blunt prongs with depth. Where a fault intersects an ore body at depth, its influence on bottoming depends on its age relative to the mineralization. Pinching or swelling of replacement beds, pinching out with folding or termination of syngenetic sedimentary deposits are all of a structural nature. *Lewis, p. 295.* b. The ballasting material for making a roadbed; ballast. *Standard, 1964.* c. The act of fitting with a bottom or performing some basal operation. *Standard, 1964.* d. The lowest layer of foundation material for a road. *C.T.D.*

bottoming hole. The opening at the mouth of a furnace, before which a flint-glass article, in process of manufacture is exposed for softening. *Standard, 1964.*

bottoming tap. A tap with a chamfer of 1 to 1½ threads in length. *ASM Gloss.*

bottom joint. A joint or bedding plane, horizontal or nearly so. *Zern.*

bottom lift. *a.* The deepest columns of a pump. *Zern.* b. The lowest or deepest lift or level of a mine. *Zern.* c. The deepest lift of a mining pump, or the lowest pump. *Fay.*

bottom lifter. One who digs up the bottom of a drift, entry, or other haulageway to gain headroom. Also called brusher; dirt scratcher; groundman; ripper; stoneman. *Fay.*

bottom loading belt. A bottom belt conveyor. *Nelson.*

bottom maker. A laborer who relines bottoms of ingot soaking pits with coke dust to retard formation of oxide scale on hot ingots. *D.OT. 1.*

bottom man. *See* bottomer, a and b. *D.O.T. 1.*

bottom peat. Peat found near lakes, rivers, and smaller streams consisting of hypnum and similar plants. *Tomkeieff, 1954.*

bottom pillar. A large block of solid coal left unworked around the shaft. *See also* shaft pillar, a. *Fay.*

bottom plate. A plate supporting a foundry mold. *Webster 3d.*

bottom pouring; uphill teeming. A method of teeming molten steel from a ladle into ingot molds. The steel passes through a system of refractory fireclay tubes and enters the molds at the bottom; the refractory tubes are of various shapes—trumpet, guide-tube, center brick, and runner brick. *See also* trumpet; guide tube; center brick; runner brick. *Dodd.*

bottom-pour ingot assembly. One comprising hot tops, wood blocks, ingot mold, mold stool, lateral outlet bricks, lateral bricks, king brick, fountain bricks, funnel brick and suitable metal supporting devices. *Bureau of Mines Staff.*

bottom-pour ladle. One poured through a refractory nozzle in the bottom. *Bureau of Mines Staff.*

bottom reverberation. *See* reverberation. *Hy.*

bottom rock. Bedrock. *Austin.*

bottom roller. *See* return roller. *Nelson.*

bottoms. a. Corn. The deepest mine workings. *Fay.* b. Eng. The bottom portion of a coal seam, Lancashire. *Arkell.* c. Used in connection with the Orford process for separating nickel and copper as sulfides. When the mixed sulfides are fused with sodium sulfide, the nickel sulfide separates to the bottom. *C.T.D.* d. The material drawn off from the bottom of a tower or still. Any residue accumulating in the bottom of a process vessel. *NRC-ASA N1.1-1957.*

bottom sample. A sample obatined by collecting a portion of material on the bottom of a container or pipeline. *Bennett 2d, 1962.*

bottom sampler. In oceanography, one of various types of apparatus which, when lowered, are capable of piercing the sea bottom and retaining a sample of the deposit when brought to the surface. *See also* ocean depths. *C.T.D.*

bottomset bed. A layer of finer material carried out farther and deposited on the bottom of the sea or lake in front of a delta. As the delta grows forward, the bottomset beds are covered by the foreset beds. *See also* foreset bed; topset bed. *Fay.*

bottom settlings. Earthy matter, inert organic matter, or, in the case of Pennsylvania petroleum, an emulsion of amorphous paraffin wax and water, which accompanies crude oil. *Fay.*

bottom sheets. a. The steel plates forming the bottom of an oil still or a steam boiler. *Hess.* b. Steel sheets about three-eighths of an inch thick formerly used at small mines on wood beams spanning a sump where water-gathering sump is below coal level at mine bottom. *Bureau of Mines Staff.*

bottom slopeman. *See* bottomer, b. *D.O.T. 1.*

bottom steam. The steam admitted to the bottom of a still to prevent overheating and decomposition of the heavier components or to increase the yield of light hydrocarbons. *Hess.*

bottom stewards. York. Underground mine officials. *Fay.*

bottom stone. *See* fire clay, d. *Fay.*

bottom sediments. In unconsolidated bottom materials, all naturally occurring unconsolidated matter which comprises the sea bottom and which consists of discrete particles of any size or origin. *Hy.*

bottom tile. One of several sizes of beehive coke-oven fire clay floor tile. *Bureau of Mines Staff.*

bottom water. In oil wells, the water that lies below the productive sand and is separated from it. *Compare* top water; edgewater. *Fay.*

bott plug. A clay ball used for stopping the taphole in a cupola furnace. *Mersereau, 4th, p. 479.*

bott stick. A long stick used for inserting the bott plug into the taphole to stop the flow of metal. *Mersereau, 4th, p. 479.*

boucharde. Fr. A marble worker's tool with which the surface of marble may be roughened or furrowed. *Standard, 1964.*

boudin. One of a series of sausage-shaped segments in a boudinage structure. *Schieferdecker.*

boudinage. a. A French term for a linear structure in which beds set in a yielding matrix are divided by cross-fractures into pillowlike or sausage-shaped segments. *Schieferdecker.* b. Refers to disruption of a once continuous layer by stretching and flowage. *See also* pull-apart structure. *Pettijohn.*

bougard marble. A dark gray and white mottled marble with streaks and clouds of yellow, brown, and pink; from Nassau, Germany. *Fay.*

Bouguer anomaly. The gravity value existing after the Bouguer corrections to a level datum have been applied. *A.G.I.*

Bouguer correction. *See* Bouguer reduction. *A.G.I.*

Bouguer gravity. Gravity values after latitude, elevation, and Bouguer corrections have been applied. Used in gravitational method of geophysical prospecting. *Nelson.*

Bouguer reduction; Bouguer correction. The correction made in a gravity survey to take account of the altitude of the station and the rock between the station and sea level. *A.G.I.*

bouking. a. Scot. Segments of wood or other material used for increasing the diameter of a drum. *Fay.* b. Scot. To coil unevenly on a drum; as, the rope or cable is not bouking well. *Fay.*

boulangerite. A massive, metallic, bluish-gray, lead-sulfur-antimony mineral, $Pb_5Sb_4S_{11}$; orthorhombic. *Dana 17.*

boulder; bowlder. a. The word connotes a sense of size and boulders probably may be considered to be, in general, worn rocks a foot or more in diameter. *Hess.* b. A fragment of rock brought by natural means from a distance (this concept of transportation from a distance is not always involved in later usage) and usually large and rounded in shape. *Fay.* c. A detached and rounded or much-worn mass of rock, from 8 to 10 inches to 10 or more feet in diameter. It is typically carried some distance from the parent rock by natural forces and worn by a stream, ocean waves, or a glacier, or by weathering in situ. *Webster 3d.* d. A large rock fragment, usually rounded by weathering or abrasion, having an average dimension of 1 foot or more. *ASCE P1826.* e. A large rock which must be broken down by blasting into smaller pieces (secondary blasting) suitable for further handling. *Fraenkel.* f. In a general sense, any large, usually rounded, fragment of rock lying on the surface or embedded in soil or overburden or in glacial water-deposited materials. *Long.* g. A rock that is too heavy to be lifted readily by hand. *Nichols.*

boulder belt. A belt of glacial boulders lying transverse to the direction of glacial movement. *Standard, 1964.*

boulder blasting. a. The breaking down of large stones at quarries by small explosive charges. *See also* secondary blasting. *Nelson.* b. Secondary blasting of rocks too big to be moved conveniently in the mine's transport system. *Pryor, 3.*

boulder buster. a. A heavy, pyramidical- or conical-point steel tool, which may be attached to the bottom end of a string of drill rods and used to break, by impact, a boulder encountered in a borehole. Also called boulder cracker. *Long.* b. An explosive used to break rock fragments by blockholing or mudcapping methods. *Long.*

boulder clay. a. The stiff, hard, and usually unstratified clay of the drift or glacial period that contains boulders scattered through it. Also called till; hardpan; drift clay; drift. *See also* till; ground moraine. *Fay.* b. Glacial drift that has not been subjected to the sorting action of water and therefore, contains mixed particles ranging from boulders to clay sizes. *ASCE P1826.*

boulder cracker. A heavy iron rod to be dropped upon a rock encountered by the drill in a deep well boring. *Standard, 1964.*

boulderet. Suggested by Chamberlin for rounded erratics from 6 to 15 inches in diameter. *See also* cobble. *A.G.I.*

boulder fan. A boulder train, the width of which increases with the distance to which the boulders have been transported. *Standard, 1964.*

boulder flat. A level tract strewn with boulders. *Stokes and Varnes, 1955.*

boulder gravel. A deposit of uncemented boulders. *A.G.I. Supp.*

boulder head. A fence of piles driven in to resist the encroaching of the tide and waves upon a dike, or similar construction. *Standard, 1964.*

bouldering stone. Smooth, translucent flint pebbles, found in gravel pits, and used to smooth the faces of emery wheels and glazers by abrading any large grains of emery or other powder on their surface. *Fay.*

boulder motion. A surface quarry worked only in detached masses of rock overlying the solid rock; sometimes contracted to motion. *Standard, 1964.*

boulder opal. A term used by miners for nodules of siliceous ironstone of concretionary origin containing precious opal and occurring in the opal-bearing sandstone and clay of Queensland, Australia. *Shipley.*

boulder pavement. a. Surface of boulder-rich till abraded to flatness by glacier movement. *A.G.I.* b. Boulders in till when grouped in an approximately horizontal plane and striated on their upper surfaces in a common direction. *A.G.I.* c. A strand thickly set with boulders released from the till by wave erosion. *A.G.I.* d. A sheet of boulders on a beach or on the bottom of shallow water; derived from deposits of boulder clay, destroyed by the waves. *Standard, 1964.*

boulder pop. An alarm given when a boulder is to be broken up by a pop shot. *Fay.*

boulder quarry. A quarry in which the joints are numerous and irregular, so that the stone has been broken naturally into comparatively small blocks. A local term applied to certain marble quarries in the region of Knoxville, Tenn., where erosion has formed many large cavities and cracks, between which the rock stands up as pinnacles. The cavities are now filled with clay. *Fay.*

boulder rampart. *See* gravel ridge. *Schieferdecker.*

boulder ridge. A beach ridge composed of boulders. *A.G.I. Supp.*

boulder stone. It is well known to geologists that the surface of the earth in all countries is strewed with loose fragments of rock—they are collected into extensive deposits, filling up hollows in the subjacent strata, or forming low ridges of hills, and are then called gravel beds—they are also spread out into detached masses over the surface, and are then denominated boulder stones. *A.G.I.*

boulder till. *See* boulder clay. *Pryor, 3.*

boulder train. A train or line of glacial boulders of the same sort of rock, extending from the source or parent ledge, perhaps for many miles, in the direction the ice moved. *Fay.*

boulder wall. A glacial moraine built chiefly of boulders. *Standard, 1964.*

boule. A fused mass of material, pear-shaped, particularly as produced by the Verneuil process. Sapphire (99.9 percent Al_2O_3) boules, about 2 inches long, are produced in this way, and are used, for example, in making thread guides, bearings, and gramophone needles. *See also* Verneuil process. *Dodd.*

boulet. A small ovoid. *B.S. 3552, 1962.*

bouleur. Belg. A small girl who collects coal into heaps in the working places underground. *Fay.*

boulevard gas fluid. Highest gasoline of 76° B used for street lamps. *Hess.*

Boulton process. A process for creosoting timber under pressure, in which the timber is dried, subjected to a vacuum at a temperature ranging from 140° to 200° F (60° to 93° C), and then put under pressure with creosote. This process is particularly suitable for impregnating Douglas fir. *Ham.*

bounce. a. A sudden spalling off of the sides of ribs and pillars due to excessive pressure; a bump. *Zern.* b. A heavy sudden often noisy blow or thump; also, the sound of an explosion. *Webster 3.* c. The rapid up-and-down reciprocating motion induced in a drill string by rod vibration, drill string wrap-up, excessive volume or pressure of circulation media, or the running of a bit on and over small, loose materials on the bottom of a drill hole. *Long.*

bounce cast. Casts of short grooves (up to 5 centimeters) widest and deepest in middle and fading out at both ends; presumably formed by objects grazing against bottom and rebounding. *Pettijohn.*

bound. Corn. An area taken up for tin mining; a tin bound. *Standard, 1964.*

boundary. a. A line between areas of the earth's surface occupied by rocks or formations of different type and age; especially used in connection with geologic mapping; also, a line between two formations or cartographic units on a geologic map. *Fay.* b. That which indicates or fixes a limit or extent, or marks a bound, as of a territory. *Webster 3d.* c. A plane separating two formations or other rock units. *A.G.I. Supp.* d. The limit, border, or the termination of a coal or mineral take; a line along which workings must stop in the vicinity of a fault or old waterlogged workings. Also called march. *Nelson.* e. The limit of working a mine. *B.S. 3618, 1963, sec. 1.*

boundary conditions. As used in strength of materials, the term usually refers to the condition of stress, displacement or slope at the ends or edges of a member, where these conditions are apparent from the circumstances of the problem. Thus for a beam with fixed ends, the zero slope at each end is a boundary condition; for a pierced circular plate with freely supported edges, the zero radial stress at each edge is a boundary condition. *Ro.*

boundary fault. A major fault with a considerable displacement. A number of collieries and coalfields are limited along one side by such a fault. *Nelson.*

boundary films. Films of one constituent of an alloy surrounding the crystals of another constituent. *C.T.D.*

boundary layer. The velocity of the fluid at the surface of a solid boundary is zero. There is, therefore, a region adjacent to the boundary in the fluid across which the velocity of flow will vary from zero to maximum stream velocity. This region is termed the boundary layer, the thickness of which is dependent upon the viscosity and velocity of the fluid. *Roberts, I, p. 2.*

boundary map. A map for the purpose of delineating a boundary line and the adjacent territory. *A.G.I.*

boundary pillar. a. A pillar left in mines between adjoining properties. *Fay.* b. A pillar of coal left unworked along the limit of a colliery take. Since nationalization in Great Britain, the former boundaries to colliery takings have been rendered obsolescent. *Nelson.*

boundary plane; interface. Plane separating two media with different elastic properties. *Schieferdecker.*

bound charge. An induced electrostatic charge, held by attraction of inducing charge, which has opposite polarity. *Pryor, 3.*

bounder. a. Corn. The owner of a small patch of ground called a "bound". *Fay.* b. Corn. One who, in early times, yearly fixed or marked the bounds of tin mines. *Standard, 1964.*

bound gravel. Hard, lenticular masses of gravel surrounded by soft gravel. These masses may occur in the zone of the water table and are sometimes mistaken for bedrock. *Nelson.*

bounds. A track of tin ore ground. *Nelson.*

Bourdon pressure gage. A tube, oval in cross section, which tends to straighten as the pressure inside is increased. In civil engineering it is very useful as an instrument for measuring pore water pressure in soil.

Ham.

Bourdon tube. Pressure gage, made from elliptical curved tube which straightens somewhat under pressure, and is made to move a measuring needle over a dial. *Pryor, 3.*

bourne. Springs which only flow at certain times of the year, or only after a prolonged spell of rainy weather, form temporary streams, which are known as bournes, nailbournes, winterbournes, woe-bournes, levants, and gypsies. Some of them break out every year at the same spot; these may be called regular bournes, and are generally winterbournes. Others only come into existence after a season of great and prolonged rainfall, and these may be termed occasional bournes. *Challinor.*

bournonite. A sulfide of lead, antimony, and copper, approximately $PbCuSbS_3$; orthorhombic. Also called wheel ore. *Dana 17.*

boury ugo'. Russian name for brown coal. *Tomkeieff, 1954.*

bouse. N. of Eng. Ore mixed with veinstone; second-class ore which must undergo further preparation before going to the smelter. Also spelled boose. *Fay.*

bouse team. N. of Eng. The place where bouse is deposited outside of a mine, ready to be dressed or prepared for the smelter. *Fay.*

Boussinesq equation. This is used to calculate the influence of a concentrated load on the back fill behind a retaining wall. The horizontal pressures: $\sigma = \frac{3 \times P \times d^2 \times h,}{2 \times R^5}$ where P is the vertical load, d is the horizontal distance of P from the back of the wall, h is the depth at which horizontal pressure is being considered, and $R = \sqrt{d^2 + h^2}$. The effect of a concentrated load diminishes rapidly with increased depth. *Ham.*

bout. a. Mid. A coil of rope upon a drum. *Fay.* b. (Leic.) A dinner or other jollification given by the owners or lessees of a colliery to their workmen in honor of some special event. Also called do. *Fay.* c. Derb. A method of measuring lead ore. *Nelson.*

bouteillenstein; bottle stone. A peculiar green and very pure glass, found as rolled pebbles. Also called moldavite and pseudochrysolite, the latter from its resemblance to olivine. It is not solely a rock, as it may be prehistoric slag or glass. *Fay.*

boutgate. a. Scot. A road by which the miners can reach the surface. *Fay.* b. A passage around a shaft at a landing. *Fay.* c. A traveling road from one seam to another. *Fay.*

bouton. a. Scot. a mass of roof consisting of stone or shale. *Fay.* b. Scot. A projecting stone in a shaft or underground road. *Fay.*

Bovey asphalt. A light-yellow, yellowish-brown, green, reddish, or striped resinous hydrocarbon; gives off a resiny odor at 100° C; begins to melt at 121° C; is liquid at 160° C; and is soluble in alcohol and more readily soluble in ether. Found in Tertiary coal at Bovey, England. *Hess.*

Bovey coal. A kind of brown coal, or lignite (of the Miocene period), burning with a weak flame and generally a disagreeable odor. It is found at Bovey, England. *Webster 2d.*

bow. a. Eng. The bent iron bar or handle of a mine bucket. *Fay.* b. A short, stout, bowed piece of wood with a cutting wire stretched between its ends; used in working clay in brickmaking. *Standard, 1964.*

Bowditch's rule. Used in surveying to adjust a closed traverse, which has been made by compass. Angles and sides are assumed to be equally liable to error. The correction applicable to any line for an error in latitude is, $\frac{\text{length of line}}{\text{perimeter of traverse}}$ x total error in latitude. Correction for errors in departure is made in the same way. *Ham.*

bow drill. A small drill operated by twisting a bowstring around it and pushing the bow back and forth. Used for perforating glass and gems. *Hess.*

bowels; bowel stones. Eng. Quarrymen's name for large, coarsely botryoidal concretions in the Lower Cretaceous sands at Stone, near Aylesbury. Also called doctor's bowels, deadmen's bowels. *Arkell.*

bowenite. A fine-grained massive variety of serpentine resembling nephrite (jade) in appearance and sometimes sold as such; hardness, 5 to 5.5; specific gravity, 2.6 to 2.8; mean refractive index varies from 1.50 to 1.55. From China; New Zealand; India; and Rhode Island. *Shipley.*

bowenite jade. Same as bowenite. *Shipley.*

Bowen's reaction series. A series of minerals, in which any early formed, high-temperature mineral phase tends to react with the melt, later in the differentiation, to yield a new lower temperature mineral further down in the series. Thus, early formed crystals of olivine react with later liquids to form pyroxene crystals; these in turn may further react with still later liquids to form amphiboles. There are two different series, a continuous reaction series and a discontinuous reaction series. *A.G.I.*

bowing. a. Deviation from flatness. *ASM Gloss.* b. A tendency in a length of coated abrasive to curve, caused by excess moisture (expanding) or lack of moisture (shrinking) on one side of the strip. Usually prevented by proper storage conditions. *ACSG, 1963.*

bowk. a. S. Staff. A small wooden box in which iron ore is hauled underground. *Fay.* b. (Aust.) An iron bucket used for raising rock, etc., while sinking. *Fay.* c. A noise made by the cracking of the strata owing to the extraction of the coal beneath. *See also* thud. *Fay.* d. The noise made by the escape of gas under pressure. *Fay.* e. Bucket; kibble; hoppit, as used in sinking. *Mason.* f. A large iron barrel used for men's tools and debris when sinking a shaft. *C.T.D.*

bowl. a. The bucket or body of a carrying scraper. *Nichols.* b. Sometimes, the moldboard or blade of a dozer. *Nichols.* c. Stationary part of the Symons crusher, which surrounds the cone (the grating member). *Pryor, 3.* d. Synonym for spider, c. *Long.* e. *See* spout, d. *ASTM C162-66.*

bowl and slips. Synonym for spider and slips. *Long.*

bowl centrifuge. A centrifugal device for dewatering, usually conical or bowl-shaped, in which the containing surface is imperforated. The greater density of the solid particles causes them to collect preferentially in contact with the inside of the containing surface where they are discharged mechanically; the water usually overflows from a position nearer to the axis. *B.S. 3552, 1962.*

bowl classifier. In ore dressing, a hydraulic classifier similar to a thickener, but differs in that the current carries the fine material into the overflow; used to make separations at very fine particle size. *Newton, p. 81.*

bowlder. Variant and archaic spelling of boulder. *Long.*

bowlers. a. The common paving stones. The expression paving stones here clearly means cobbles. *Arkell.* b. Large stones scattered on the heaths. *Arkell.*

bowl metal. The impure antimony obtained from doubling, that is, from the fusion of antimony ore with iron or other antimony containing iron, so as to form iron sulfide, the removal of which eliminates both iron and sulfur. *Hess.*

bowl mill. Grinding unit for soft material, such as coal. A bowl rotates about its vertical axis, the feed being crushed between its wearing ring and spring-loaded rollers. Products are air-classified. *Pryor, 3.*

bowls. Small concretionary nodules of impure limestone in the Silurian of the Usk River, Wales and England. *Arkell.*

bowl scraper. A steel bowl hung within a fabricated steel frame, running on four or two wheels. Its bottom edge digs into the ground, the bowl being filled as it is drawn forward by a tractor; soil is ejected at the dump by a tailgate, moved by wire ropes or hydraulically. Towed scrapers transport soil, in addition to spreading and leveling it. *Ham.*

Bowmaker test. A method of forecasting the durability of refractory glasstank blocks proposed by E. J. C. Bowmaker. The loss in weight of a sample cut from the tank block is determined after the sample has been immersed for 3 hours in HF/H_2SO_4 at 100° C; the acid mixture is 3 parts by volume HF (commercial 50 to 60 percent HF) and 2 parts by volume pure concentrated H_2SO_4. The test is no longer considered valid. *Dodd.*

bowr. Synonym for bort. *Long.*

bowralite. A pegmatoid rock consisting of crystals of sanidine with subordinate soda amphibole (arfvedsonite) and aegirine from Bowral, Wales. *Hess.*

bowse. a. Lead ore as extracted from the vein. *Nelson.* b. Eng. Medium-quality lead ore, Staffordshire. Vein matter which has been worked out or wrought and which carries ore, bowse, or booze, Yorkshire lead mines. *See also* boose. *Arkell.*

bowstring girder. A girder shaped in the form of a bow and string, which may be of steel, concrete, or timber construction. Modern laminated timber girders can be prefabricated up to a maximum span of 150 feet and have been developed from the Belfast truss. *Ham.*

box. a. The part of a wheel which fits the axle. *Fay.* b. The threaded nut for the screw of a mounted auger drill. More commonly called boxing. *Fay.* c. A flask or frame for sand molding. *Webster 2d.* d. Eng. A vehicle in which coal is conveyed from the working places along the underground roadways and up the shaft; a hutch. *Fay* e. Tub, wagon, tram, or corve. *Mason.* f. N. of Eng. *See* tension end. *Trist.* g. A transmission. *Nichols.* h. A dump body. *Nichols* i. The internal-threaded portion of a coupling or connector. The DCDMA accepted standard synonym for female thread. *Long.* j. To place core samples in a lidded, traylike, partitioned container for safekeeping after they have been removed from the core barrel; also, the container in which core samples are placed after they have been removed from a core barrel. Also called core box; core tray. *Long.* k. To drill boreholes at the four corners of a square area at equal distances from a centrally located and already completed borehole. *Long. 1.* l. A unit in a sluice for washing gravel; a suicebox. *Hess.* m. Eng. *See* let into. *SMRB, Paper No. 61.*

box and pin. The female and the male members of a tool joint or a sucker rod joint which form a screwed coupling. *Porter.*

box annealing. Annealing a metal or alloy in a sealed container under conditions that minimize oxidation. In box annealing a ferrous alloy, the charge is usually heated slowly to a temperature below the transformation range, but sometimes above or within it, and is then cooled slowly; this process is also called close annealing or pot annealing. *See also* black annealing. *ASM Gloss.*

box barrow. A large wheelbarrow with upright sides. *Webster 2d.*

box bell. *See* bell screw. *Hess.*

box bill. a. A tool used in deep boring for slipoing over and recovering broken rods. *Fay.* b. *See* bell tap. *Long.*

box bottoms. Leic. The small coal or slack produced by breakage in transit underground, and by sorting at the surface. *Fay.*

box caisson. A large box of steel or concrete with an open top, built on shore and launched into a river or seaway to be floated and towed to the site chosen for a foundation. This box will form an integral part of the permanent structure; it is used for bridge piers, because it enables excavation to be done under reasonably dry conditions. *Ham.*

box canyon. A canyon from the bottom of which four almost vertical walls appear on all four sides, as the result of the zigzag course of the canyon. *Fay.*

boxcar loader. a. Any of several types of conveyors adapted by portable or hinged mounting for use in loading bulk materials into boxcars. Some types operate at high speeds and throw the materials to the ends of the car. *ASA MH4.1–1958.* b. In anthracite and bituminous coal mining, one who loads coal into railroad boxcars by mechanical shovel or conveyor loader. Also called boxcar loader operator; loader engineer; loader runner. *D.O.T. 1.*

boxcar roof. Popular name for the Kreutzer roof. *See also* Kreutzer roof. *Dodd.*

boxcar shoveler. In bituminous coal mining, one who shovels coal into far corners of boxcars that cannot be reached by mechanical shovel. *D.O.T. 1.*

box condenser. *See* box. *Hess.*

box culvert. A culvert square or rectangular in cross section. *Ham.*

box cut. The intial cut driven in a property, where no open side exists; this results in a highwall on both sides of the cut. *Austin.*

box-cut method. A method of opencast mining of coal where the dip of the seam is relatively steep. A boxlike excavation is made to the dip, or at an angle to it, and the coal seam worked to the right and left. *Nelson.*

box dam. A cofferdam which completely surrounds a given area. *Ham.*

box drain. A small brick or concrete drain, rectangular in section. *Ham.*

boxed off. Inclosed or protected by a wooden pipe or partition. *Fay.*

boxer. In the stonework industry, one who cleans and crates finished monumental and building granite and marble for shipping. Also called boxmaker. *D.O.T. 1.*

boxes. a. Penna. Wooden partitions for conducting the ventilation from place to place. *Fay.* b. More or less hollow cuboidal limonitic concretions. *Arkell.* c. Eng. Pebbles of hard brown sandstone at the base of the Red and Coralline Crags in East Anglia, containing remains of a fossil; so called by the Suffolk phosphate diggers. *Arkell.*

box feeder. A device for feeding clay to preparation machines. It consists of a large metal box, open-topped, with the bottom usually formed by a steel-band conveyor or by a conveyor of overlapping steel slats; for plastic clay the feeding mechanism may be a number of revolving screw shafts. *Dodd.*

box filling. The use of metal trays, instead of shovels, for hand filling coal into trams. The collier scooped the lumpy coal into the box and discarded the small material which had little market value. The use of a box was compulsory at many collieries until a few decades ago. *See also* fork-filled. *Nelson.*

box-flue checkerwork. *See* basket weave checkerwork. *Bureau of Mines Staff.*

box frame construction. A modern method of building flats, offices, and similar structures, using concrete slab floors supported by load-bearing walls across the shortest span of the building. It has been developed to economize in steel or reinforced concrete framework. *Ham.*

box furnace. a. A furnace in which, periodically, a load of ware is introduced, fired, and removed. *ASTM C286–65.* b. The term refers to the batch-type furnace for firing enamelware, or smelting enamel glass. *Enam. Dict.*

box girder. A hollow steel beam with a square or rectangular cross section. *Nichols.*

box groove. A closed groove between two rolls, formed by a collar on one roll, fitting between collars on another. *Fay.*

box hardening. A process of case hardening by cementation in an iron box. *Webster 2d.*

box heading. A heading driven through very loose ground with close timbering. *Nelson.*

boxhole. Corn. A short raise. *Hess.*

boxing. a. A method of securing shafts solely by slabs and wooden pegs. *Zern.* b. Continuing a fillet weld around a corner as an extension of the principal weld. Also called an end return. *ASM Gloss.*

boxing-in. A method of setting in a kiln so that, for example, special refractory shapes can be fired without being stressed and deformed; also known as pocket setting. *Dodd.*

boxing up. Packing ballast under sleepers to raise a track which has subsided. *Ham.*

box kiln. A relatively small industrial kiln of boxlike shape and intermittent in operation. *Dodd.*

box loader. In the quarry industry, one who loads broken rock into a large box, placed on a small truck running on a narrow gauge track, to be hoisted out of the quarry pit. Also called grouter; rock loader. *D.O.T. 1.*

boxmaker. *See* boxer. *D.O.T. 1.*

box metal. A brass, bronze, or antifriction alloy used for the journal boxes of axles or shafting. *Fay.*

box pile. A steel pile made from a pair of steel sheet piles, channels, angle sections, or rolled steel joists welded along their lines of contact. *Ham.*

box scraper. *See* scraper. *Lewis, p. 198.*

box sextant. A compact type of sextant contained in a small metal box. *Ham.*

Box's formula. a. In hydraulics, the increased head (h_f) needed to overcome fluid friction in delivering G gallons per minute over L yards through a pipe of diameter D (inches) is: $h_f = \frac{G^2L}{(3D)^5}$. *Pryor, 3.* b. *See* friction loss, b.

box shear test. *See* shear box test. *Ham.*

box sluice. An open wooden channel or flume for conveying placer sand. The gold or heavy minerals settle at the bottom. The method is cleaner and requires less water than ground sluicing. *Nelson.*

box stones. Eng. Masses of brown ferruginous or phosphatic sandstone, rounded or flattened in form and generally a little larger than the fist. Some enclose fossil remains; hence the name. *Holmes, 1928.*

box tap. *See* bell tap. *Long.*

box thread. The thread on the inside surface of a coupling or tubular connector. Accepted by the DCDMA as the standard term to be used in lieu of female thread. *Long.*

box-thread bit. A bit having threads on the inside of the upper end or shank of the bit by means of which the bit may be coupled to a reaming shell, core barrel, or drill rod. *Long.*

box timbering; plank timbering. Use of rectangular close frame for lining shafts or drives. *Pryor, 3.*

box to box. The two internal-threaded ends of a sub, coupling, or tubular connector piece. *See also* box, i. *Long.*

box to pin. The internal- and external-threaded ends of a sub, coupling, or tubular connector piece. *Long.*

box-type bit. Synonym for box-threaded bit. *Long.*

boxwork. Limonite and other minerals which originally formed as blades or plates along cleavage or fracture planes and then the intervening material dissolved leaving the intersecting blades or plates as a network. Usually found on the ceilings of caves. *A.G.I. See also* limonite boxwork.

boxwork texture. A texture showing a porous aggregate with plates or septa which intersect at various angles leaving open boxlike spaces. *Schieferdecker.*

boydite. Local name for probertite. *English.*

Boyle's law. States that at a constant temperature, the volume of a gas varies inversely as the absolute pressure while the density varies directly as the pressure. (That is, if the pressure on a gas is doubled the density is also doubled, but the volume is decreased to one-half of the original volume.) *H&G.*

boylom. Staff. A bluish iron ore. *See also* boilum. *Arkell.*

Boylston's reagent. A 5 percent solution of nitric acid in absolute ethyl or methyl alcohol, used for the general etching of normal carbon steels. *Osborne.*

Bozsin box. A box, with heat-insulated walls, containing a temperature recorder; it was designed by M. Bozsin to travel with the ware through a vitreous-enameling furnace. *Dodd.*

bp Abbreviation for boiling point. *BuMin Style Guide, p. 58.*

BP Abbreviation for back pressure. *Zimmerman, p. 14.*

bpd Abbreviation for barrels per day. *BuMin Style Guide, p. 58.*

BPL. Abbreviation for bone phosphate of lime, the anhydrous calcium phosphate or tricalcium orthophosphate, $Ca_3(PO_4)_2$, in which form are calculated most determinations of phosphorus in rocks to be used for making fertilizer. The determination is made of P_2O_5 and multiplied by the factor 2.184 to convert it to the equivalent BPL. *Hess.*

Br Chemical symbol for bromine. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Brabender Plastograph; Brabender Plasti-Corder. Trade names; instruments designed in the United States to assess the plasticity of clays and other materials on the basis of stress measurement during a continuous shearing process. *Dodd.*

braccianite. a. A variety of leucite tephrite, having the chemical composition of certain leucitites. *Holmes, 1928.* b. A dense basaltic rock with rare phenocrysts and composed of nearly 50 percent leucite, 8 percent augite and nepheline, olivine, 4 percent anorthite, magnetite, and apatite. *Johannsen, v. 1, 2d, 1939, pp. 245-246.*

brace. a. Corn. The mouth of a shaft. *Webster 2d.* b. A rigid piece, as of timber, to hold something, as parts of a frame, firmly in place; especially, (1) a framed diagonal piece in an angle; (2) a strut; and (3) a latent support acting in compression. *Standard, 1964.* c. Scot. An old measure of weight. The Hurlet brace was equal to 4 hundredweight. *Fay.* d. A platform or landing at the top of a shaft. The upper brace is the platform built in the headgear above the shaft collar. *Nelson.* e. A timber member in square-set stopes. *Nelson.* f. A stiffening member running at an angle, in the vertical plane, between two legs of a drill tripod or derrick. Sometimes improperly used to designate a stiffening member running in a horizontal plane between two legs of a drill tripod or derrick, which properly should be called a grit. *Long.* g. A small handtool to which may be attached a metal- or wood-boring bit and by means of which the attached bit may be rotated. *Long.* h. To shore up, or to strengthen with planks or heavy timber. *Long.*

brace head. a. A cross handle attached at the top of a column of drill rods by means of which the rods and attached bit are turned after each drop in chop-and-wash operations while sinking a borehole through overburden. Also called brace key. *Long.* b. A long handle used to turn the drill string in percussive drilling. Also called tiller. *B.S. 3618, 1963, sec. 3.* c. An appliance for giving the blows to the chisel in hand boring. It may consist of two arms (single type) or four arms (double type) made of oak or ash 2½ to 3½ feet in length and secured together by bolts at the center. Two or more men hold the arms, lift and drop the rods and chisel and while doing so gradually move around in a circle to prevent the chisel from jamming and to cut a circular hole. *See also* hand boring. *Nelson.*

brace key. Synonym for brace head. *Long.*

brachiopods. The predominant bivalve shellfish of the Paleozoic, but they are still represented by modern species. *Mason, v. 1, p. 26.*

brachy axis. The shorter lateral axis in the crystals of the orthorhombic, monoclinic, and triclinic systems. *Webster 3d.*

brachydiagonal. a. Of, or pertaining to the shorter lateral crystallographic axis in the orthorhombic and triclinic systems. *Standard, 1964.* b. The shorter lateral axis. *Standard, 1964.* c. *See* brachy axis. *Fay.*

brachypinacoid. A pinacoid parallel to the vertical axis and the brachydiagonal. *Standard, 1964.*

brachypyramid. A pyramid, the intercept of which on the brachyaxis is more than 1. *Standard, 1964.*

brachytypous. In crystallography, comparatively short. *Standard, 1964.*

bracing. a. Diagonal or horizontal members used to prevent swaying in conveyor-supporting structures. *ASA MH4.1–1958.* b. Eng. *See* lacing, d. *SMRB, Paper No. 61.*

brackebuschite. A black to reddish hydrated lead-iron-manganese vanadinite, $(Pb,Fe,Mn_3(VO_4)\cdot H_2O$, crysatllizing in the monoclinic system. *Standard, 1964.*

Brackelsberg process. A process by which fine ores are moistened with water to which a binding medium is added and the wet mass, without any heating, is rotated in a drum till it forms into spherical lumps of varying size. The moisture is then dried out by evaporation and the product remains in the form of hard and very porous balls of ore which are of great reducibility as compared with sintered ore or briquettes. *Osborne.*

bracken glass. Old English glassware made from a batch in which the ash from burnt bracken supplied the necessary alkali. *Dodd.*

bracket. A platform over a shaft entrance. *Standard, 1964.*

brackish water. Water in which salinity values range from approximately 0.50 to 17.00 parts per thousand (‰). *Hy.*

Bracklesham beds. Pale-colored clays intermingled with glauconite sand occurring in parts of Southern England and worked for brickmaking to the Southwest of London and near Southampton. *Dodd.*

brackly stone. Eng. Stone that is brittle, broken, or full of cracks, Northamptonshire. *Arkell.*

braddisher. *See* brattice man. *D.O.T. 1.*

braddish man. *See* brattice man. *D.O.T. 1.*

bradenhead. In oil-well drilling, an iron or steel head screwed into the top of the casing. The inner pipe projects up through it and is packed with some pliable substance, preferably rubber. The bradenhead is used to confine gas between the tubing and casing, or between two strings of casing, and has an outlet through which gas may be piped away. More commonly called stuffing-box casing head. *Fay.*

bradenhead gas. In oil wells, natural gas inclosed or confined by a bradenhead. It applies to all the gas that lies above the oil and through which the drill must go to reach the lower and more profitable oil sands. *Fay.*

Bradford breaker. A machine which combines coal crushing and screening. It consists of a revolving cylindrical screen 8 to 14 feet in diameter and 15 to 22 feet in length. It breaks the coal by gravity impact, which on reaching the desired size, is discharged through the plates. It can deal with run-of-mine coal up to 12 inches at a rate of 500 to 600 tons per hour, to give a product size of below 1½ inches, or according to the screen plates used. *See also* breaker; screen. *Nelson.*

Bradfordian. Uppermost Devonian, may be transitional to Mississippian. *A.G.I. Supp.*

Bradford preferential separation process. A flotation process for the treatment of mixed sulfides, in which certain mineral salts are added such as thiosulfates, to the water used in the flotation cells. The addition of the salt causes the zinc sulfide to be wetted while the lead sulfide and pyrite float. The separation of the zinc mineral from the gangue is effected later. *Fay.*

bradleyite. A double salt of sodium phosphate and magnesium carbonate, $Na_3PO_4\cdot MgCO_3$, as very fine-grained material in saline oil shale from Wyoming. *Spencer 16, M.M., 1943.*

bradyseism. Slow movement of the ground especially recognizable by an upheaval, subsidence, or a shifting of shoreline. *Schieferdecker.*

brae. a. Scot. A hillside, a slope, a bank, a hill. *Fay.* b. Scot. An inclined roadway, more commonly used in the compound form, for example, pulley brae, cuddy brae. *Fay.* c. Insufficiently charred wood, as in charcoal burning. *Standard, 1964.*

Bragg angle. In crystallography, an identifying angle measured by placing crystals in narrow X-ray beam, when its lattice layers reflect the incident ray on to photographic plate. This produces series of lines $Nh=2d \sin \theta$. θ is the glancing angle, d the spacing apart of atomic or lattice planes, and h the wavelength. n is the basic reflection. *Pryor, 3.*

braggite. A steel-gray sulfide of platinum and palladium, (Pt,Pd,Ni)S, with 3 to 5 percent nickel. Tetragonal; minute grains. Found in concentrates from the Bushveld norite of the Transvaal, South Africa. This is the first mineral to be discovered by X-ray methods. *English.*

braided sling. A sling consisting of eight separate ropes plaited in pairs to form a braid. *Ham.*

braided stream. a. A stream flowing in several dividing and reuniting channels resembling the strands of a braid, the cause of division being the obstruction by sediment deposited by the stream. *A.G.I.* b. Where more sediment is being brought to any part of a stream than it can remove, the building of bars becomes excessive, and the stream develops an intricate network of interlacing channels. *See also* anastomosing, a. *A.G.I.*

braird. Scot. To increase the height of the holding or undercutting. *Fay.*

brairding. Scot. The height of holing or undercutting at front. *Fay.*

brait. A rough diamond. *Fay.*

braize. A variant of breeze. The dust of charcoal which accumulates around the furnaces of charcoal works; coal dust; coke dust. *Fay.*

brake. a. A device, either hand- or power-operated, for applying resistance to the drum or pulley and thus controls the movement of mine cars or cages. A common form is a brakeshoe, lined with friction material, which is applied to the surface of a wheel or drum, and thus retards or even stops its movement. *See also* winder brake. *Nelson.* b. Eng. A stout, wooden lever to which boring rods are attached. It is worked by one or more men. *Fay.* c. N. Staff. To lower trams on dips by means of a wheel and rope. *Fay.* d. A device (as a block or band applied to the rim of a wheel) to arrest the motion of a vehicle, a machine, or other mechanism and usually employing some form of friction. *Webster 3d* e. A device for slowing, stopping, and holding an object. *Nichols.*

brake-and-stope feeder. One that utilizes a brake-and-stope mechanism to effect separation and delivery of objects. *ASA MH4.1-1958.*

brake band. The flexible steel-ribbon part of a band brake. *See also* band brake. *Long.*

brake beam. A horizontal beam or rod on a wagon or railroad car that operates the brakeshoes. *Webster 3d.*

brake block. a. A device for checking by friction the speed of a rope (as in a hoist). *Webster 3d.* b. The part of a brake that holds the shoe. *Webster 3d.*

brake brow. Eng. A self-acting incline. *SMRB, Paper No. 61.*

brakedrum. A rotating cylinder with a machined inner or outer surface upon which a brake band or brakeshoe presses. *Nichols.*

brake hanger. One of the bars or links suspending a brake beam. *Webster 3d.*

brake holder. *See* brakeman. *D.O.T. 1.*

brake horsepower. a. The power of an engine or other motor as calculated from the force exerted on a friction brake or absorption dynamometer applied to the flywheel or the shaft. *Webster 3d.* b. Actual power output delivered by the crankshaft of an engine. It is equal to the theoretical or indicated horsepower multiplied by the mechanical efficiency. Abbreviation, bhp. *Brantly, 2.*

brake incline. a. An incline in which the full trucks descend by gravity and pull up the empty ones. *C.T.D. See also* gravity haulage. b. Gravity plane. *Pryor, 3.*

brake-lining finisher. In the asbestos products industry, one who performs the finishing operation on asbestos lining stock. *D.O.T. 1.*

brake linings. *See* friction elements. *Dodd.*

brake magnet. One that (1) induces eddy currents in a rotating drum, and (2) magnetically applies a friction load. *Pryor, 3.*

brakeman. a. One who attends to a brake or brakes, as on a railroad car. *Standard, 1964.* b. Eng. The man in charge of a winding (hoisting) engine for a mine. Brakeman is usually used in the United States; brakesman is the British usage. The man in charge of hoisting engines, especially in the United States, is usually called a hoisting engineer. *Fay.* c. In mining, a laborer who rides on trains on trips of cars hauled by locomotive or hoisting cable or chain, and assists in their transportation to surface of shaft bottom for hoisting; operates or throws switches; couples and uncouples cars, or attaches and detaches cars to and from the cable; opens and closes ventilation doors in mines; directs movement of the train by signaling motorman. May be designated according to type of hauling machine, as dinkey operator helper. Also called brake holder; car rider; conductor; dukey rider; gang rider; motorman helper; nipper; patcher; rider; rope conductor; rope rider; set rider; snapper; tailend rider; trailer; train conductor; trainman; transfer car helper; trip rider; tub rider. *D.O.T. 1.*

brakepower. *See* brake horsepower. *Fay.*

brakeshoe. a. A wooden block or asbestos-impregnated lining attached to the surface of a bandbrake brought to bear on a flat projecting surface on a hoisting drum, capstan, or wheel. *See also* band brake. *Long.* b. A stationary portion of the brake capable of being pressed against the brakedrum for stopping the wheel. *Shell Oil Co.*

brake sieve. A jigger, operated by a hand lever. *Fay.*

brakesman. Eng. *See* brakeman, b. *Fay.*

brake staff. Eng. *See* brake, b; break staff. *Fay.*

brake stick. A stick of wood to provide leverage in operating the brake wheel of a railroad car. *Bureau of Mines Staff.*

brake wheel. a. A hand wheel for operating a brake, as on a vehicle. *Webster 2d.* b. A wheel or pulley on which a friction brake acts. *Webster 2d.* c. A heavy wheel provided with cams for controlling the movement of a triphammer. *Webster 2d.*

braking. N. of Eng. Working a winding engine. *Hess.*

braking distance; stopping distance. The distance the train will travel after the application of the brakes. It depends on the speed, the weight of locomotive and train, and the gradient. *Sinclair, V, p. 226.*

brale. A diamond penetrator of specified spheroconical shape used with a Rockwell hardness tester for hard metals. This penetrator is used for the A, C, D, and N scales. *ASM Gloss.*

brammallite. A micaceous mineral differing from illite because it contains soda in excess of potash. Found in crevices in coal measure shales from Llandebie, South Wales. Also called sodium-illite. *Spencer 16, M.M., 1953.*

brances. *See* brasses, a. *Fay.*

branch. a. Som. An underground road or heading driven in coal measures. *Fay.* b. An underground roadway turned from a level, etc. *Fay.* c. Corn. A small vein departing from the main load, and in some cases returning. *Fay.* d. A turnout where miners congregate to wait for empty cars. In mines where the seams lie flat, a spur track into a chamber from the gangway or heading. *Korson.* e. A borehole drilled at an angle diverging from a previously drilled borehole. *See also* wedging. *Long.* f. An underground working place or passageway leading away from a major work area or main passageway. *Long.* g. In ventilation surveys, a road between two junctions. *Roberts, I, p. 296.* h. Part of a ventilation circuit from which no splits are made. *B.S. 3618, 1963, sec. 2.* i. The outlet or inlet of a fitting not in line with the run, but which may make any angle. *Strock, 3.* j. In petrology, a subdivision of an igneous rock series. *A.G.I. Supp.*

branch coal. Term used among British miners for cannel coal interstratified with bituminous coal. *Tomkeieff, 1954.*

branch ell. a. Designates an elbow having a back outlet in line with one of the outlets of the run. Also called a heal outlet elbow. *Strock, 3.* b. Incorrectly used to designate side outlet or back outlet elbow. *Strock, 3.*

branch fault. A minor fault that branches from a larger fault. *Stokes and Varnes, 1955.*

branch headings. Headings which are turned off the main level at intervals for development purposes. They may proceed to the rise or dip and are adopted in longwall and pillar methods of working. *See also* opening out. *Nelson.*

branch hole. *See* branch, e. *Long.*

branching. *See* deflecting. *Long.*

branching veins. Veins extending from the main vein either into the hanging wall or the footwall. *Lewis, p. 411.*

branchite. A variety of hydrocarbon found in lignite. According to Hintz it is identical with hartite. *Tomkeieff, 1954.*

branch maker. *See* junction maker. *D.O.T. 1.*

branch rattler. Term used among British miners for an impure cannel coal. *Tomkeieff, 1954.*

branch rope. Aust. A district rope, used for hauling skips in one section of a coal mine. *Hess.*

branch tee. A tee having many side branches. *See also* manifold. *Strock, 3.*

branchwork. A branched system of cave passages in one level. *Schieferdecker.*

brandbergite. A granular igneous rock (described as aplitic) with aggregates of biotite, minor arfvedsonite, and large orthoclase twins in a fine-grained micropegmatitic groundmass. *Johannsen, v. 1, 2d, 1939, p. 245.*

brandisite. A leek-green to dark green brittle mica, $7H_2O \cdot 7CaO \cdot 16MgO \cdot 12Al_2O_3 \cdot 9SiO_2$; Mohs' hardness, 5; specific gravity, 3.0; closely related to seybertite and xanthophyllite; occurs as monoclinic hexagonal-shaped prisms in metamorphosed limestone. *Dana 6d, pp. 636, 638, 639.*

brandric. Derb. An iron guide at the foot of a pump to make the chain enter and prevent wearing. *Fay.*

brands. The leading (usually primary) producers of metallic antimony, copper, lead, tin, and zinc register their products in terms which show class, quality, or other specified standard of interest to a purchaser. *Pryor, 3.*

brandschiefer. Ger. Oil shale. *Tomkeieff, 1954.*

brannerite. A complex, black, opaque titanate of uranium and other elements in which the weight of uranium exceeds that of titanium. Except for pitchblende, it is the most radioactive opaque mineral known. It contains approximately 43.8 percent uranium oxides, 39 percent titanium oxide, 3.9 percent yttria earths, 4.1 percent thoria, and small quantities of several other oxides. Found in the placers of Stanley Basin, Idaho. A monoclinic mineral, possibly $(U,Ca,Fe,Y,Th)_3Ti_5O_{16}$; generally altered externally and internally to brown, yellow-brown, and olive-green. *Fay; Crosby, pp. 10-11.*

Brard's process. A method of testing the weathering properties of stone by boiling a sample in a solution of sodium sulfate and then allowing it to dry in the air. The amount of disintegration due to the effllorescence of the salt is a measure of the rock's resistance to weathering. *Hess.*

brash. a. A mass of loose or broken fragments of rocks resulting from weathering or disintegration on the spot. *Fay.* b. Brittle. *Fay.*

brash ice. Small fragments of sea or river ice less than 6 feet in diameter. *Hy.*

brashings. Brittle shale (the coal miner's "slate") interbedded with thin coalbeds; also, the roof of the Pittsburgh coal in western Maryland. Also called rashings; wild coal. *Hess.*

brashy. Same as brash. *Webster 3d.*

brasque. Fr. A paste made by mixing powdered charcoal, coal, or coke with clay, molasses, tar, or other suitable substance. Used for lining hearths, crucibles, etc. Also called steep. *Webster 2d.*

brasqued crucible. A crucible lined with charcoal or lampblack, and used for the reduction of oxides of metals to the metallic state. The crucible is prepared by ramming it full of lampblack or charcoal, and then excavating a portion of its contents and polishing the lining with a burnisher. *Fay.*

brasqueing. A process sometimes used for the preparation of the interior of a fireclay crucible prior to its use as a container for molten metal. The crucible is lined with a carbonaceous mixture, it is then covered with a lid and heated to redness. *Dodd.*

brass. Primarily an alloy of copper and zinc, but other elements such as aluminum, iron, manganese, nickel, tin, and lead are frequently added. *C.T.D. See also* brasses.

brassage. The minting fee for coining; now commonly called seigniorage. *Hess.*

brass balls. Nodular pyrite. *Fay.*

brass binder. Corn. A thin pyritous grit. *Fay.*

brassel; brassil; brazil; brazzle. Miners' term for iron pyrites; applied to coal seams containing pyrites. Also used for hard nodules elsewhere, as at the base of the Totternhoe stone, and sometimes applied to the Totternhoe stone itself or other hard rock bands. *Compare* ratchel; raddle; rubble. *Arkell.*

brasses. a. Term used among British miners for iron pyrites found in coal and other strata, as well as for pyritous coal *Tomkeieff, 1954.* Also called brass; brassyn; brazil. b. Mineral impurities in coal, of yellow metallic appearance, consisting mainly of iron sulfides *B.S. 3323, 1960.* c. Fittings of brass in bearing blocks, etc., for diminishing the friction of revolving journals that rest upon them. *Fay.*

brassfounder's disease. A disease affecting the general system, characterized by chronic poisoning from inhalation of metallic fumes, with symptoms like those of malarial fever. *Standard, 1964.*

brass furnace. One of two kinds of furnaces for the making and founding of brass, such as (1) a reverberatory furnace for large quantities of the alloy, or (2) a crucible furnace for small quantities. *Fay.*

brass ore. a. An early name for a mixture of spahlerite and chalcopyrite. *Hess.* b. Synonym for aurichalcite, a basic carbonate of copper and zinc. *Hey 2d, 1955.*

brass powder. a. A pulverized mixture of copper fillings and ocher. *Standard, 1964.* b. Pulverized brass fillings. *Standard, 1964.*

brass rod. A drill rod made entirely of a nonmagnetic alloy consisting essentially of copper and zinc in variable proportions. *See also* nonmagnetic rod. *Long.*

brassy bed. Eng. A bed in the Purbeck stone. *Arkell.*

brassy top. Aust. The top part of the Greta coal seam, in which there are large quantities of sulfide of iron. *Fay.*

brassyn. *See* brasses. *Tomkeieff, 1954.*

brat coal. Thin seam of impure coal usually containing carbonates and pyrites and frequently found at the roof of a seam of coal, Scotland and North England. Probably means rubbish coal. *Arkell.*

brattice. a. A board of plank lining, or other partition, in any mine passage to confine the air and force it into the working places. Its object is to keep the intake air from finding its way by a short route into the return airway. Temporary brattices are often made of cloth. Also spelled brettice; brettis; brattish. *See also* brattice cloth. *Fay.* b. Mid. A built-up pillar or cordwood sometimes like a large chock, and serving a similar purpose. *Fay.* c. Planking to support a wall or roof. *Webster 2d.* d. To provide with a brattice for separation or support; often used with up. *Webster 2d.* e. An airtight partition in a mine shaft to separate intake from return air. Also called screen. *B.S. 3618, 1963, sec. 2.* f. Used as jumpers for removing gas from a roof cavity. *Nelson.* g. Ventilating partition, usually of tarred cloth, used to move air through gassy or dusty underground workings. *Pryor, 3.*

brattice cloth. a. Fire-resistant canvas or duck used to erect a brattice. *B.C.I.* b. A heavy canvas, often covered with some waterproofing material, for temporarily forcing the air into the face of a breast or heading; also used in place of doors on gangways; then known as "sheets". *Fay.*

brattice man. In mining, one who builds doors and brattices (ventilation walls or partitions in underground passageways) of canvas or wood by rough carpentry, or erects by rough masonry or cement work, partitions of stone, brick, or concrete to control proper circulation of air through passageways and to working places. Also called airman; braddisher; braddish man; canvasman; doorman; ventilation man. *D.O.T. 1.*

brattice road. A road through the goaf supported by chocks or timber packs. *Fay.*

brattice sheeting. A curtain or screen of flexible material used to direct or control the flow of ventilating air. Also called brattice cloth; sheets. *B.S. 3618, 1963, sec. 2.*

brattice trick. Aust. A trick played on inspectors when measuring the air in a mine, the quantity of air being reduced in some districts below its normal amount, in order to increase it in the district being tested. Usually effected by placing a piece of brattice cloth across one of the return airways. *Fay.*

brattice up. *See* brattice, d. *Hess.*

brattice wall. The bratticed side of an air course or roadway. *Fay.*

bratticing; brattishing. A partition in a mine to form an air passage. *Fay.*

brattish. A variation of brattice. *Fay.*

braunite. A somewhat variable manganese silicate, approximately $3Mn_2O_3MnSiO_3$. *Sanford.*

braunkohle. Ger. Brown coal. *Hess.*

bravaisite. A clay mineral containing magnesium and potassium (Mg and K) and of doubtful structure; it has variously been stated to be a mixture of kaolinite and illite or of montmorillonite and illite. *Dodd.*

Bravais lattices. The 14 frameworks on which crystals are built. *Hurlbut.*

Bravais law. *See* Bravais rule. *Pryor, 3.*

Bravais rule; Bravais law. In a crystal, the faces which occur most frequently and are best developed conform to the lattice planes with the highest reticular density. *Pryor, 3.*

bravoite. Yellow, paler than pyrite, of which it is a highly nickeliferous variety (18 percent nickel). Possibly $(Fe,Ni)S_2$; isometric (?). Grains and crystal fragments, disseminated through vanadium ores. Possibly a mixture. From Minasragra, Peru; Mechernich, Germany. *English; Dana 17.*

braze. To solder with brass or other hard alloys. *Nichols.*

braze-jointed. United by a brazed joint or joints. *Webster 2d.*

brazen dish. Eng. The brass gage, or standard, used in the Low Peak district, Derbyshire, about 1,500. The miners formerly measured lead ore in this dish. It had a capacity of 8 quarts, and was chained at a certain public place. *Fay.*

braze welding. Welding in which a groove, fillet, plug, or slot weld is made using a nonferrous filler metal having a melting point lower than that of the base metal but higher than 800° F. The filler metal is not distributed by capillarity. *ASM Gloss.*

brazier. a. A large pan or tray for holding burning charcoal, coal, etc. *Haggar.* b. One who works in brass. *Webster 3d.*

brazil. Iron pyrites; also, coal containing much pyrites. *Webster 3d. See also* brass; brassel; brasses.

Brazilian aquamarine. a. A greenish topaz. *Shipley.* b. Aquamarine from various gem-bearing districts of Minas Geraes, Brazil. Many are of very large size, but until the discovery of the process of heat treatment to improve color, were not as fine blue as Madagascar aquamarine. *Shipley.*

Brazilian cat's-eye. Chrysoberyl cat's eye from Minas Geraes, Brazil. It is inferior to Ceylon cat's-eye, in that cat's-eye formerly found in Ceylon was less translucent and more gray brown to yellowish. *Shipley.*

Brazilian chrysoberyl. Chrysoberyl from near Minas Novas, Brazil. It is often of large size and finest greenish-yellow color. *Shipley.*

Brazilian chrysolite. A jeweler's name for yellowish-green tourmaline, cut as a gem. *Fay.*

Brazilian diamond. a. Rock crystal from Brazil. *Shipley.* b. A trade term for gem diamonds from Brazil, which are in general of better color than those from South Africa. *Shipley.*

Brazilian emerald. a. Green tourmaline. *Shipley.* b. A light yellowish-green beryl from Bahia and Minas Geraes, Brazil. The one from Bahia is probably too light to be gemmologically classed as emerald; specific gravity, 2.67 to 2.72. *Shipley.*

Brazilian gems. Include chrysolite, yellow-green tourmaline; emerald, green tourmaline; ruby, rose spinel; and sapphire, blue tourmaline. *Pryor, 3.*

brazilianite; brasilianite; brasilianita. Hydrous phosphate of aluminum and sodium, $Al_3Na(Po_4)_2(OH)_4$, as yellow-green monoclinic crystals of gem quality, from Brazil. Named from the locality. (Not the brazilianite of J. Mawe, 1818 (=wavellite). *Spencer 17, M.M., 1946.*

Brazilian onyx. An incorrect trade term for onyx marble of superior color, from Argentina. *Shipley.*

Brazlian pebble. A colorless transparent quartz, such as is used for optical purposes. *Fay.*

Brazilian peridot. Green crystals obtained from Brazil, having the typical color of peridot (olivine); they are probably specimens of chrysoberyl. *C.M.D.*

Brazilian ruby. A light rose-red spinel, or a topaz approaching a red color. *Fay.*

Brazilian sapphire. A blue variety of tourmaline. *Fay.*

Brazilian test; indirect test. A method for the determination of the tensile strength of rock, concrete, ceramic, or other material by applying a load vertically at the highest point of a test cylinder or disk (the axis of which is horizontal), which is itself supported on a horizontal plane. The method was first used in Brazil for testing of concrete rollers on which an old church was being moved to a new site. *Compare* brittle-ring test. *Dodd.*

Brazilian topaz. True topaz varying in color from pure white to blue and yellow; mined chiefly in the state of Minas Gerais, Brazil. *C.I.D.*

brazilite. A variety of baddeleyite. *Bureau of Mines Staff.*

brazilly coal. Coal rich in pyrites. *Tomkeieff, 1954.*

Brazil twin. A type of twin found in quartz in which the two crystalline individuals are of opposite kinds, one being right-handed, the other left-handed, with a face of the trigonal prism of the second order as twinning plane. Since one is not derivable from the other by any rotation, there is no twinning axis. *Hess.*

brazing. Joining metals by flowing a thin layer, capillary thickness, of nonferrous filler metal into the space between them. Bonding results from the intimate contact produced by the dissolution of a small amount of base metal in the molten filler metal, without fusion of the base metal. Sometimes the filler metal is put in place as a thin solid sheet or as a clad layer, and the composite is heated as in furnace brazing. The term brazing is used where the temperature exceeds some arbitrary value, such as 800° F; the term soldering is used for temperatures lower than the arbitrary values. *ASM Gloss.*

brazinga alloy. The same as brazing filler metal. *ASM Gloss.*

brazing filler metal. A nonferrous filler metal used in brazing and braze welding. *ASM Gloss.*

brazing sheet. Brazing filler metal in sheet form or flat-rolled metal clad with brazing filler metal on one or both sides. *ASM Gloss.*

brazing solders. Alloys used for brazing. They include copper zinc (50 to 55 percent copper), copper-zinc-silver (16 to 52 percent copper, 4 to 38 percent zinc, and 10 to 80 percent silver), also nickel-silver alloys. *C.T.D.*

brea. A viscous asphalt formed by the evaporation of petroleum from oil seeps; maltha, or mineral tar. *Webster 2d.*

breach. a. An opening made by breaking down a portion of a solid body, as a wall, a dike, or a riverbank; a break; a gap. *Fay.* b. The face of a level or drift. *Fay.* c. A large cave hole caused by undermining. *Korson.*

breached anticline. An anticline that has been more deply eroded in the center; consequently, erosional scarps face inward toward the center of the anticline. *A.G.I.*

breached cone. a. When lava rises in a cinder cone without an explosion ocurring, the cone is at once broken through on one side by the outwelling of the lava near the base, creating the characteristic horseshoe form of the breached cone. *A.G.I.* b. A cinder cone in which lava has broken through the side and carried away the broken materials. *A.G.I.*

breaching. The breaking through of a bar. *Schieferdecker.*

bread-crust structure. The compact crust around a spongy center in certain volcanic bombs. *Johannsen, v. 1, 2d, 1939, p. 204.*

breadth. Eng. A set of coal pillars formed by rearer workings, North Staffordshire. *Nelson.*

break. a. A plane of discontinuity in the coal seam such as a slip, fracture, or cleat. The surfaces are in contact or slightly separated. *See also* break detector. *Nelson.* b. A fracture or crack in the roof beds as a result of mining operations. *See also* induced fractures. *Nelson.* c. To split into pieces or smash into parts or fragments typically by a blow or stress and with suddenness or violence; to separate; to burst. *Webster 3d.* d. Scot. A reduction of the day's wage. *Fay.* e. Can. Local shear zone within which mines are found. *Hoffman.* f. A jointing plane in a coal seam. *C.T.D.* g. To unscrew, as rods, casing, drill pipe, etc. *Long.* h. To separate core from solid rock at the bottom of a borehole by a tensional pull applied to the drill string. *Long.* i. A fault rupture, fracture, or discontinuity in rock formations. *Long.* j. To twist open or disconnect. *Nichols.* k. A short rest period. *Nichols.* l. In mineral processing, optimum mesh of grind (m.o.g.), the practical size range to which ore is reduced before concentration. Not synonymous with liberation mesh. *Pryor, 3.* m. Eng. A fracture in the strata induced by the working of the coal. *SMRB, Paper No. 61.*

breakage. a. Voluntary or involuntary division of a solid. *B.S. 3552, 1962.* b. Small material produced by involuntary breakage during mechanical handling or processing. *B.S. 3552, 1962.*

breakage clause. Eng. A clause inserted in some mining leases providing for an abatement of royalty or allowance on weight for certain weight of small coal or breakage sent out in every ton of large coal, for example, 120 pounds in every collier's ton of 2,640 pounds. *Fay.*

breakage of coal. *See* degradation. *Nelson.*

breakaway chain. A chain that holds a tractor and a towed unit together if the regular fastening opens or breaks. Also called safety chain. *Nichols.*

breakback. The fractures caused by the shattering of a solid rock ledge back of the drill holes in which the charge is placed. *Fay.*

break circulation. To resume the movement of drilling fluid down the drill pipe, through the eyes of the bit, and upwards through the annulus. *Brantly, 1.*

break detector. A scraper capable of detecting breaks in a shothole. *Nelson.*

breakdown. a. Of an emulsion, the reunion of the finely dispersed particles and their separation from the medium which they form an emulsion. *C.T.D. Supp.* b. The sudden passage of current through an insulating material, as soon as the voltage exceeds a certain definite value called the breakdown voltage. *C.T.D.* c. An initial rolling or drawing operation, or a series of such operations, for the purpose of reducing a casting or extruded shape prior to the finish reduction to desired size. *ASM Gloss.* d. A preliminary press forging operation. *ASM Gloss.* e. Mechanical failure. *Pryor, 3.*

breakdown of emulsion. The separation of an emulsion into its constituents; in a bituminous emulsion, these are bitumen and water. *Ham.*

breakdown voltage. The voltage at which an insulator or dielectric ruptures; or the voltage at which ionization and conduction begin in a gas or vapor. *H&G.*

breaker. a. In anthracite mining, the structure in which the coal is broken, sized, and cleaned for market. Also known as coalbreaker. *Fay.* b. N. of Eng. A large crack formed in the roof next to the goaf. *Fay.* c. Som. A coal miner or hewer. *Fay.* d. In Italy, a collier who wedges down coal and fills it into cars. *Fay.* e. A slight furrow across a road for drainage *Webster 3d.* f. In the quarry industry, one who inserts plug and feathers (wedge and two metal strips on each tapering side) in each hole drilled in stone, or along a channel. Also called ledgeman. *D.O.T. 1.* g. A machine used for the primary reduction of coal, ore, or rock. Crushing generally refers to the finer reduction of the material. *Nelson.* h. A wave breaking into foam against the shore. Synonym for breaking wave. *Schieferdecker.*

breaker boss. A foreman who is in charge of operations in an anthracite breaker where coal is crushed, sized, and cleaned for market. *D.O.T. 1.*

breaker boy. a. Now largely obsolete, formerly a boy employed in the breaker to pick impurities from the coal. *B.C.I.* b. *See* slate picker, a. *D.O.T. 1.*

breaker, castings. *See* breaker, sprues. *D.O.T. 1.*

breaker engineer. In anthracite coal mining, one who operates and maintains a power unit and mechinery for crushing, sizing, and cleaning coal in a breaker. *D.O.T. 1.*

breaker hand. *See* slate picker. *D.O.T. 1.*

breaker picker. *See* slate picker. *D.O.T. 1.*

breaker props. Strong rigid props set along the sides of roadways, in longwall mining, to cause the explosives to shear the rock square with the roadway sides, rather than allow the force to spread over the waste area. *See also* waste edge support. *Nelson.*

breaker repairman. In anthracite coal mining, a maintenance mechanic who adjusts and repairs machinery in a breaker where coal is crushed, sized, and cleaned for market. *D.O.T. 1.*

breakers. a. The row of drill holes above the mining holes in a tunnel face. *Stauffer.* b. Eng. *See* breaking-off timber. *SMRB Paper No. 61.*

breaker, sprues. In the glass manufacturing industry, one who removes sprues from bottom of molded and cast articles and breaks apart castings, using chisel-shaped steel mallet. Also called breaker, castings; crack-off man; knocker-off. *D.O.T. 1.*

breaker worker. *See* slate picker. *D.O.T. 1.*

breaker zone. *See* surf zone. *Schieferdecker.*

breakes. Eng. Fissures in old coal workings. *See also* break, c. *Fay.*

break-even point. a. Production level at which total cost equals revenue. *Pryor, 3.* b. Value or selling price of ore, metal, or mined material which just balances total cost of operations; conversely, maximum unit costs above which there is no profit at given market values. *Bureau of Mines Staff.*

break facets. The triangular facets which adjoin the girdle of a brilliant cut; the 16 above are called top break facets and the 16 below, the bottom break facets. *Shipley.*

break-in. a. Som. To commence to hole, that is to undercut a coalbed. *Fay; Hess.* b. To start drilling operations with a new bit by rotating the bit slowly under a light load for a short period of time before full speed and load are applied to the bit. *Long.* c. To round off sharp corners and points on a carbon through use and repeated resetting in a bit. *Long.* d. To operate any new machine at less than full capacity for a short time. *Long.*

breaking. a. Eng. The breaking of poor or dradgy ore by hand with flatirons, called breaking hammers. *Fay.* b. Can. The poor part of ore ready for crushing. *Fay.* c. Size reduction of large paritcles. Also called cracking. *B.S. 3552, 1962.*

breaking band. Scot. A method of setting or fixing props in the workings, in lines running diagonally to the line of the face or wall. *Compare* breaking prop. *Fay.*

breaking capacity. The capacity of a switch, circuit breaker, or other similar device to break an electric circuit under certain specified conditions. *C.T.D.*

breaking-down machine. Eng. A mechanical appliance, worked by compressed air or by hydraulic power, for bringing down the coal after holing. *Fay.*

breaking-down rolls. A rolling mill unit used for breaking-down operations; a rolling mill used for reducing the sectional dimensions, mainly the thickness, of ingots, billets, and other rough, semifinished products, as a preliminary step to subsequent rolling operations. *Henderson, p. 273.*

breaking ground. a. The breaking and loosening of rock as a preparatory step to its loading and removal. *See also* excavation. *Nelson.* b. Attrition of ore deposit by hand, explosive, or mechanical breaking methods to reduce it to pieces of ore suitable for transport and treatment. *Pryor, 3.*

breaking in. N. of Eng. *See* hewing. *Trist.*

breaking-in shot. a. The first borehole fired in "blasting off the solid" to provide a space into which material from subsequent shots may be thrown. Also called opening shot; buster shot. *Fay.* b. In blasting a solid face, the first hole or group of holes of a round to be fired simultaneously. *See also* burn cut. *Pryor, 3.*

breaking joint. a. The laying of brick in a wall so that no two vertical joints in adjacent courses are in alinement. *A.R.I.* b. The arrangement of masonry units so as to prevent continuous vertical joints in adjacent courses. *ACSG.*

breaking joints. Unscrewing drill rods, casing, etc., at points where they are joined by threaded couplings. *Compare* breakout, a. *Long.*

breaking lag. As applied to electric blasting caps, the time elapsing between the bridge wire receiving the firing impulse and the breaking of the circuit. *Fraenkel, v. 3, Art. 16; 10, p. 5.*

breaking load. Stress or tension steadily applied and just sufficient to break or rupture. *Webster 3d.*

breaking-off timbers; breakers; bobby props. Eng. Props, or props and planks, set to prevent a charge of explosive spreading, or set to break the roof off at a prearranged line when withdrawing supports in the goaf. *SMRB, Paper No. 61.*

breaking piece. Part of a machine designed to fail if overloaded, thus providing easily replaceable safeguard. *Pryor, 3.*

breaking point. In rock crushers, a deliberate weak link that yields if excessive strain is developed. May be a scarfed toggle, weak cap bolts on pitman, a shearpin in drive, or a clutch designed to fail at a given load. *Pryor, 3.*

breaking prop. Ark. One of a row of props of sufficient strength to cause the rock above the coal to break and so limit the area of top brought down by brushing shot. *Compare* breaking band. *Fay.*

breakings. Inferior ores arranged ready for crushing. *Nelson.*

breaking strain; breaking strength; breaking stress. The least load that will break a rope. These terms are used indiscriminately to mean the load that will break a rope. The stress on a rope at the moment of breaking is the breaking stress, and the strain or deformation produced in the material by this stress is the breaking strain. *Zern.*

breaking stress. Same as fracture stress, a. *ASM Gloss.*

breaking up. Clev. A system of employment under which a skilled miner engages an unskilled man, the former paying the latter a mere laborer's wage until he becomes an experienced miner. *Fay.*

breaking wave. *See* breaker. *A.G.I.*

break in lode. A fault. *Fay.*

break in the reef. Aust. A fault in a vein. *Hess.*

break line. a. The line in which the roof of a coal mine is expected to break. *Fay.* b. The line of complete extraction of coal. *Fay.* c. A line roughly following the rear edges of the pillars that are being drawn or mined. *Fay.*

breakoff. a. Eng. A short narrow heading driven from one road to another; a breakthrough. *Fay.* b. Derb. An alteration in the vein due to an intrusion of barren rock, or to a fault. *Fay.*

breakout. a. To pull drill rods or casing from a borehole and unscrew them at points where they are joined by threaded couplings to form lengths that can be stacked in the drill tripod or derrick. *Compare* breaking joints. *Long.* b. An accidental flow of metal through a hole in a furnace lining. *Bureau of Mines Staff.* c. In dry process enameling, a defect characterized by an area of blisters with well-defined boundaries. *ASTM C286-65.*

breakout block. A block of steel made to fit the square section of a drill bit and to hold it with the rotary table while breaking the joint. *Porter.*

breakout gun. A hydraulic or compressed-air actuated device attached to breakout tongs used to couple or uncouple drill rods, drill pipe, casing, or drivepipe. Also called makeup gun. *Long.*

breakout tongs. A heavy wrench, usually mechanically actuated, used to couple or uncouple drill rods, drill pipe, casing, or drive pipe. Also called makeup tongs. *Compare* chain tongs. *Long.*

break-pressure tank. A series of small open tanks located at the level of the hydraulic gradient of a gravity water main in undulating country in order to reduce maximum pressure on the main. *Ham.*

breakrow. A row of timbers erected for the purpose of breaking the roof in pillar mining. *Hess.*

break staff. The lever for blowing a blacksmith's bellows, or for working bore rods up and down. *Zern.*

breakthrough. a. A passage cut through the pillar to allow the ventilating current to pass from one room to another. Larger than a doghole. Also called crosscut; room crosscut. *Fay.* b. The point at which a drill bit leaves the rock and enters either a natural or a manmade opening. *Long.* c. An opening made, either accidentally or deliberately, between two underground workings. *Long.* d. In an ion-exchange column used in leaching, the arrival of traces of uranium in the final column during the loading (adsorption) cycle. *Pryor, 3.* e. *See* stenton, c. *B.S. 3618, 1963, sec. 2.*

break thrust. A thrust fault that cuts across one limb of a fold. *A.G.I.*

breakup. a. Eng. An excavation commenced from the bottom of a tunnel heading and carried upward, so as to form two interior working faces. *Fay.* b. Mid. To cut away and remove the floor of an entry or other opening. *Fay.* c. The thawing and breaking of ice on a river or other body of water with the advent of spring. *Fay.*

breakup, latest. Latest reported date that landfast and pack ice begin to disintegrate prior to final clearance. *H&G.*

breakup of matt glaze. The term breakup is applied more particularly to the glazes containing rutile used on wall tiles. Some of the added rutile dissolves in the glaze, the yellow or brown titanates thus formed subsequently collecting around the undissolved rutile crystals to give the marbled effect known as the rutile break or breakup. *Dodd.*

breakup value. On exhaustion of an ore deposit or cessation of an exploitation, the value on site of buildings, equipment, stockpiles, untouched remanants of ore, concentrates, etc., in foundations of plant and any other assets still having value apart from their original use. *Pryor, 3.*

breakwater. A structure or contrivance, as a mole, mound, or wall serving to break the force of waves and protect a harbor or anything exposed to the force of the waves. *Fay.*

breakway. The running back downslope of a tram or trams (usually loaded) on an inclined haulage plane, due to the breakage of the rope or a coupling. *Nelson.*

breast. a. The face of a working. *Fay* b. In coal mines, a chamber driven in the seam from the gangway, for the extraction of coal. *Fay.* c. In Italy, a stall in a steep seam from 12 to 18 yards wide. The stalls are carried one above another from the lowest level to the rise. *Fay.* d. Leic. To take down or get a buttock (face) of coal end on. *Fay.* e. That part of the bedplate which is back of the crossheads in engines of the Corliss type. *Fay.* f. The end, in unmined rock, of an underground excavation, sometimes called the face; the vertical end surface of a block. *Nelson.* g. An anthracite term for a place where coal is mined; in the soft coal regions, it is called a room. *B.C.I.* h. The side of the hearth containing the taphole in a blast furnace; the rammed material in which the taphole is installed in a coupla. *Bureau of Mines Staff.*

breast-and-pillar. Penna. A system of working anthracite coal by bords 10 yards in width, with narrow pillars 5 yards wide between them, holed through at certain intervals. The breasts are worked from the dip to the rise. *See also* bord-and-pillar. *Fay.*

breast auger. An auger supported by a breastplate against the miner's body. Used for drilling holes in soft coal. *Fay.*

breast board. a. Planking placed between the last set of timbers and the face of a gangway or heading which is in quicksand or loose ground. *Fay.* b. The timber or boards placed horizontally across the face of an excavation, or heading, to prevent the inflow of gravel or other loose or flowing material. *Stauffer.*

breast bore. Scot. A borehole put in parallel with the seam, made and kept in advance of a working place, for the purpose of ascertaining the position of old works, tapping water, letting off gas, etc. *Fay.*

breast coal. The face of the middle or main layer of coal in a composite seam. *Nelson.*

breast drill. A small, portable hand drill customarily used by handsetters to drill the holes in bit blanks in which diamonds are to be set. The upper end of the drill is provided with a plate against which the breast of the operator is pressed to force the bit into the work. *Compare* brace, g. *Long.*

breast eyes. Lanc. Openings leading from a working face to the surface. *Hess.*

breast heads. Natural joints in rock, coal, etc. *Fay.*

breast holes. In driving a tunnel, holes blasted after the bottom cut. *Pryor, 3.*

breasting. a. N. Staff. A short leading stall, worked at right angles to and forming the face of the main levels. *Fay.* b. A wide heading or level. *Fay.* c. Eng. Taking ore from the face or head of a drift. *Fay.* d. In drift mining, breaking down the gravel underground, and retreating towards the crosscut from which the drifts were driven. *von Bernewitz.* e. Eng. In Cumberland, a place driven to open out a longwall face. *SMRB, Paper No. 61.*

breast machine. A machine used for undercutting coal in which the main frame and carriage are held stationary by roof jacks while the cutter frame advances into the kerf during the cutting operation. Since cuts do not exceed 44 inches along the face, it is necessary to relocate the machine several times before the entire face can be cut. *Jones.*

breastplate. A slightly curved iron plate fastened to the end of a coal auger to enable the miner to press the auger forward with his body. *Fay.*

breasts. The sloping parts joining the hearth of an open-hearth furnace to the furnace ends below the ports and adjoining brickwork. *See also* banks. *Dodd.*

breast stoping. A method of stoping employed on veins where the dip is not sufficient for the broken ore to be removed by gravity. The ore remains close to the working face and must be loaded into cars at that point. *See also* overhand stopping. *Fay.*

breast timber. A leaning brace from the floor of an excavation to a wall support. *Nichols.*

breast wall. a. Eng. A wall built to prevent the falling of a vertical face cut into the natural soil. *Zern.* b. The sidewall of a glass tank furnace above the tank blocks. Also called casing wall; casement wall; jamb wall. *Dodd.* c. The refractory wall between the pillars of a glassmaking pot furnace and in front of the pot. *Dodd.*

breast wheel. A waterwheel onto which the water is led at about axle height and which acts partly by impulse and partly by the weight of the descending water in the buckets. *Compare* overshot wheel; undershot wheel. *Webster 3d.*

breastworker. In the construction industry, one who works in a tunnel heading. *D.O.T. 1.*

breather. a. Eng. An apparatus enabling a man to enter and explore underground workings filled with noxious gases. *Fay* b. A device fitted in the wall of an explosion-proof compartment, or connected by piping thereto, which permits relatively free passage of air through it, but which will not permit the passage of incendive sparks or flames in the event of gas ignition inside the compartment. *ASA C42.85: 1956.*

breathing. Alternate expansion and contraction of air in breaks which allows fresh oxygen to be drawn in and oxidation to proceed. *Sinclair, I, p. 284.*

breathing apparatus. An appliance that enables mine rescuers to work in irrespirable or poisonous gases. It contains a supply of oxygen and a regenerator which removes the carbon dioxide exhaled from the supply. *See also* Gibbs apparatus; Proto apparatus; Simbal breathing apparatus; Weg rescue apparatus. *Nelson.*

breathing cave. a. A cave in which air is alternately blown out and sucked in at the entrance. *Schieferdecker.* b. A narrow part in a passage through which air blows. *Schieferdecker.*

breccia. a. It. A fragmental rock, the components of which are angular, and therefore, it is distinguished from a conglomerate in that its components are not waterworn. There are friction or fault breccias, talus breccias, and eruptive breccias. *Fay.* b. Any rock formation essentially composed of uncemented, or loosely consolidated, small, angular-shaped fragments. *Compare* broken ground. *Long.*

breccia marble. Any marble composed of angular fragments. *Fay.*

brecciated. a. Rock composed of angular fragments held together in a matrix. It produces very beautiful effects when polished. Applied to certain figures in marble. *Mersereau, 4th, p. 301.* b. Fragmental rock, often a sign of favorable ore conditions. *Hoffman.* c. Converted into, resembling, or marked by a breccia. *Webster 3d.*

brecciated structure. Characterized by agglomeration of angular fragments. May be a primary sedimentary structure related to desiccation, slump, etc., also produced by tectonic movement and other causes. *Pettijohn.*

brecciated texture. A texture showing rock or mineral fragments without notable rounding; the displacement usually is not great. *Schieferdecker.*

brecciated vein. A fissure filled with fragments of rock and in the interstices of which vein matter is deposited. *Fay.*

bredigite. The form of calcium orthosilicate that is stable from about 800° to 1,477° C on heating, presisting down to 670° C on cooling. *See also* calcium orthosilicate. *Dodd.*

breeching. a. Mid. Drawing loaded trams downhill underground. *Fay.* b. The part of a harness that passes around the breech of a draft animal and enables him to hold back a vehicle. *Webster 3d.* c. A sheet-iron or sheet-steel casing at the end of boilers for conveying the smoke from the flues to the smokestack. *Webster 3d.*

breeder reactor. Usually a reactor that creates more fissionable fuel than it consumes. In some usages, a reactor that produces the same kind of fissionable fuel that it consumes, regardless of the amount. The additional fissionable material is created when neutrons are absorbed in fertile materials. The process in both usages is known as breeding. *See also* converter reactor. *L&L.*

breeding. *See* breeder reactor. *L&L.*

breeding fire. S. Staff. Spontaneous combustion in a mine. *See also* gob fire, a. *Fay.*

breeding gain. *See* breeding ratio. *L&L.*

breeding ratio. The ratio of the number of fissionable atoms produced in a breeder reactor to the number of fissionable atoms consumed in the reactor. Breeding gain is the breeding ratio minus 1. *See also* conversion ratio. *L&L.*

breedingstone. Pebbles joined by a sparry cement. *Arkell.*

breese. *See* breeze. *Fay.*

breeze. a. Coke of small size; the undersize remaining after separating the smallest size of graded coke. *B.S. 1017, 1960, Pt. II.* b. Scot. Fine or slack coal. *Fay.* c. The dust from coke or coal. *Mersereau, 4th, p. 364.* d. An indefinite term that usually means clinker, but it may refer to coke breeze. *Taylor.*

breeze concrete. A concrete made of 3 parts coke breeze, 1 part sand, and 1 part portland cement. It has poor fire-resisting qualities but it is cheap and nails can be driven into it. *Nelson.*

breeze oven. a. An oven for the manufacture of small coke. *Fay.* b. A furnace designed to consume breeze or coal dust. *Fay.*

breezing. Buckwheat anthracite coal or coarse sand spread on seige before setting of pots. *ASTM C162-66.*

breithauptite. Nickel antimonide, NiSb. *See also* niccolite. *Fay.*

bremsstrahlung. Literally, breaking radiation in German. Electromagnetic radiation emitted by charged particles when they are slowed down by electric fields in their passage through matter. *L&L.*

brenner. Eng. A smelter, an old variant derived from the word burn; a burner. *Fay.*

Brenner gage. An instrument for the nondestructive determination of the thickness of a coating of various enamel; it depends on the measurement of the force needed to pull a pin from contact with the enamel surface against a known magnetic force acting behind the base metal. *Dodd.*

brenston. *See* brimstone. *Fay.*

Bretonian. The Upper Cambrian strata of the Atlantic seaboard of North America (Cape Breton district); of the same age as the Croixian of central and Western United States. *C.T.D.*

Bretonian orogeny. Post-Devonian diastrophism. *A.G.I. Supp.*

Breton pan. Large steel mortar, in which rolled a heavy steel pestle. Once used in grinding and amalgamation of gold ores. *Pryor, 3.*

brettice; brettis. Derb. A crib of timber filled with slack or waste. *Fay.*

brettice cloth. *See* brattice cloth, b. *Fay.*

brettis way. Derb. A road in a coal mine, supported by brattices built on each side after the coal has been worked out. *See also* brattice, c. *Fay.*

brettys. *See* british.

breunnerite. A variety of magnesite containing iron carbonate; found in Canada, central Europe, and India. Used in the manufacture of magnesite bricks. *C.T.D.*

brevium. Occasional name for protactinium 234 (protoactinium 234) in the uranium series. *C.T.D. Supp. See also* uranium X_2. *NRC-ASA N1.1-1957.*

brewster. Unit of photoelasticity; 1 brewster is equivalent to a relative retardation of $10^{-13}cm^2dyn^{-1}$. Named after Sir D. Brewster who, in 1816, demonstrated that glass becomes birefringent when stressed. *Dodd.*

brewsterite. A silicate mineral belonging to the tectosilicate group. *E.C.T., v. 12, p. 277.*

brewsterlinite. A liquid found in cavities in chrysoberyl, some quartz, and topaz; thought to be a hydrocarbon; will expand and fill the cavities under the warmth of the hand. *Hess.*

Brewster's law. The index of refraction of a crystalline substance is equal to the tangent of its angle of polarization. *Pryor, 3.*

brianchone luster. A luster decoration for pottery ware distinguished by the fact that the reducing agent necessary to form the thin deposit of metal is incorporated with the color so that a reducing atmosphere in the kiln is not needed. The usual procedure is to apply the metal as its resinate dissolved in an organic solvent. Although the easiest luster to apply, it is less durable than lusters produced in a reducing fire. *Dodd.*

Briancon diamond. Quartz crystal from southeastern France, cut in Briancon. *Schaller.*

brick. a. A molded block of clay or other material, usually fired and sintered together to form a coherent mass. The standard size building brick unit is 8½ X 4¼ X 2¼ inch, while the standard size firebrick unit is 9 X 4½ X 2½ inch. However, many firebrick consumers now prefer to use a 9 X 4½ X 3 inch brick as the standard unit. *A.I.S.I. No. 24.* b. A solid masonry unit of clay or shale, usually formed while plastic into a rectangular prism and burned or fired in a kiln. *ASTM C43-65T.* c. A block of bonded abrasive used for rubbing down castings, scouring chilled iron rolls, polishing marble, and work of like nature. *ACSG, 1963.*

brick, alumina; high-alumina brick. A refractory brick of a higher alumina content than ordinary fire clay brick. It is made from several alumina materials, such as diaspore, bauxite, kaolin, etc. A large use of brick of this type is in the hot zone portion of rotary lime, cement, or dolomite kilns as well as in the firing zone of shaft lime kilns. High-alumina brick is also used in certain portions of large boiler settings and in ceramic kilns of both the continuous and the periodic types; in brief, it finds application under certain types of conditions where the service is very severe. *See also* refractories. *CCD 6d, 1961.*

brick and brick. A method of laying brick so that the units touch each other with only enough mortar to fill the surface irregularities. *ACSG.*

brick ax. A double-ended ax for chopping off bricks. *Standard, 1964.*

brickbat. A piece, usually half, of a brick. *Mersereau, 4th, p. 260.*

brick bed; brick ledge. a. Eng. Blocks of hard stone used for walls. *Arkell.* b. Eng. Limestones and shales with pig's dirt or soft bed, and brick ledge. *Arkell.*

brick, chemical. See chemical stoneware. *CCD 6d, 1961.*

brick clamp. A stack of bricks for burning, in layers alternating with layers of breeze, or fine coal and cinders. *See also* brickkiln. *Standard, 1964.*

brick clay. An impure clay, containing iron and other ingredients. In industry the term is applied to any clay, loam, or earth suitable for the manufacture of bricks or coarse pottery. Also called brick earth. *C.T.D.*

brick coal. Eng. Small, dirty coal suitable for brickkilns and similar purposes. *Fay.*

brick coffering. A thick brick lining, formerly much used in circular shafts as a support and to exclude water. *See also* coffering. *Nelson.*

brick cutter. *See* brick-cutting machine operator. *D.O.T. 1.*

brick-cutting machine operator. One who cuts bricks from column of moist clay, using power-driven or hand-operated cutting machine. This machine is frequently operated in conjunction with an auger mill and a pug mill, the same worker tending the operation of all three machines simultaneously (auger-mill operator; pug-mill operator). When cutting tile is known as tile-cutting-machine operator. Also called brick cutter; cut-off man; tableman. *D.O.T. 1.*

brick drier. An oven for drying green bricks, so as to prepare them for burning. *C.T.D.*

brick earth. a. Loam used for making bricks. *A.G.I. Supp.* b. Brownish loam consisting of quartz and flint sand mixed with ferruginous clay. *A.G.I. Supp.* c. Any material of an earthy nature suitable for making bricks. Most brick earths consist of an irregular mixture of pure clay with sand and other minerals. *Nelson.*

brickerite. A light-yellowish, colorless, white arsenate of zinc and calcium, $4ZnO.3CaO.2As_2O_5$. It was later shown to contain water and to be identical with austinite. Minute, prismatic crystals, fibrous (resembling gypsum), and nodular. *English.*

bricker-up man. In the coke products industry, a laborer who seals beehive oven doors halfway after coke has been removed by a coke-drawing machine, using firebricks and loam. *D.O.T. 1.*

brickfield; brickyard. A field or yard where bricks are made. *Fay.*

brick fuel. In Wales, patent fuel; synonym for briquette. *Fay.*

bricking. The walling or casing of a shaft. *Fay.*

bricking curb. A curb set in a circular shaft to support the brick walling. *Nelson.*

bricking scaffold; walling scaffold. A staging or platform suspended in a sinking shaft on which the masons stand when building the brick walling. *See also* sinking and walling scaffold. *Nelson.*

brickkiln. a. A structure of unburned brick built into flues and chambers through which heat passes from a fire below, burning the brick. *Standard, 1964.* b. A permanent structure, having stacks or chimneys, in which unburned bricks are burned by heat from a central source. *Standard, 1964.* c. A pile of green bricks arched to receive underneath the fuel for burning them. *Webster 3d.*

bricklayer. a. One who lays firebrick in walls, arches, and partitions of new glass tanks or furnaces, or rebuilds old tanks from blue prints or drawings, spreading mortar on bricks, cutting bricks, and checking accuracy of wall with level and plumb bob. Also called furnace repairman. *D.O.T. 1.* b. One who repairs and rebuilds brickkilns and fireboxes. Also called brickmason. *D.O.T. 1.*

bricklayers' itch. An eruption of the skin of the hands, from the irritation of lime in laying bricks. *Standard, 1964.*

brick machine. An apparatus for molding bricks. *Fay.*

brick-machine operator. A general term used to to designate worker who operates an auger mill, brick-cutting machine, pug mill, or any combination of the three machines (auger-mill operator; brick-cutting-machine operator; pug-mill operator. *D.O.T. 1.*

brick-machine tender. *See* takeoff man. *D.O.T. 1.*

brickmason. *See* bricklayer. *D.O.T. 1.*

Brickmaster Periclase. Trademark for magnesium oxide, periclase. Used in the manufacture of refractories. *CCD 6d, 1961.*

brick, porcelain. Hard porcelain blocks of special design, made for the lining of enamel-grinding mills. *Hansen.*

brick press feeder. One who tends power press used for pressing moist cut brick into final shape. When pressing weathered bricks, known as dry-clay-press operator. Also called power-press feeder. *D.O.T. 1.*

brick-red. a. A variable color averaging a moderate reddish-brown that is redder, lighter, and stronger than mahogany, oxblood, or rustic brown, paler than Tuscan red, redder and deeper than russet tan, and yellower, lighter, and stronger than roan. *Webster 3d.* b. A moderate brown that is redder, lighter, and stronger than chestnut brown, bay, coffee, or auburn, and deeper and slightly redder than toast brown. *Webster 3d.*

brick saw. A mechanically driven abrasive disk used for cutting brick. *ACSG, 1963.*

brick scratchers. A wire comb used for texturing brick as they are extruded in a column. *ACSG, 1963.*

brick setter. *See* setter. *D.O.T. 1.*

brick sorter. *See* sorter. *D.O.T. 1.*

brickstone. Prov. Eng. A brick. *Fay.*

brick walling. A permanent support for circular shafts. On reaching the rockhead, a firm ledge is prepared to receive the first bricking curb or ring. The curb is fixed correctly with reference to the centerline of the shaft. The bricks are then built upwards from the curb, the space behind being firmly packed to the rock sides with bricks and mortar. Concrete is replacing brickwork as a shaft lining. *See also* permanent shaft support. *Nelson.*

brickwork. Masonry of brick, either structural or paving. *ACSG, 1963.*

brickwork bond. *See* bond. *Bureau of Mines Staff.*

brickyard. A place where bricks are made and stored. *Standard, 1964.*

bridal. Staff. A contrivance used in coal mining to prevent cars from overturning upon steep inclined planes having a rise of 1 foot in 3 or 4 feet. *Hess.*

bride cake; bright cake. A black, highly carbonaceous slickensided shale with Carbonicola shells, in the Adwalton stone or Flockton thick coal; also, dirty smudgy coal in the roof of the Stanley Main in the Snydale-don Pedro area. *Tomkeieff, 1954.*

bridge. a. A device to measure the resistance of a wire or other conductor forming a part of an electric circuit. *Fay.* b. A piece of timber held above the cap of a set by blocks and used to facilitate the driving of spiling in soft or running ground. *Fay.* c. *See* air crossing. *Fay.* d. Eng. A platform mounted on whels, for covering the mouth of a shaft when landing coal, rock, or men at the surface. *Fay.* e. Debris that plugs a borehole at a point above the bottom. Between the underside of the bridge and the bottom of the drill hole, the borehole is free of debris. *Long.* f. To deliberately plug a borehole at a point some distance above its bottom. *Long.* g. Refers to the overburden used for spanning the natural gap between the highwall and the spoil, when such is required to establish a temporary machine surface standing area closer to the disposal area than that provided by the virgin ground. *Austin.* h. In an electric blasting cap, the wire that is heated by electric current so as to ignite the charge. *Nichols.* i. Sometimes, the shunt connection between the cap wires. *Nichols.* j. An obstruction in an oil well. *Nelson.* k. In a cave, a rock slab in its natural position spanning a passage from wall to wall and inclining less than 45° from the horizontal (not a fallen block). *Schieferdecker.* l. A plankway or elevator used in ironworking to convey fuel or ore to the mouth of a furnace. *Webster 3d.* m. A refractory bar, or member, of fire clay placed across the surface of the batch in a tank furnace near the working end to hold back the scum, or gall. *Mersereau, 4th, p. 328.* n. The structure formed by the end walls of the adjacent melter and refiner compartments of a tank and the covers spanning the gap between the endwalls. *ASTM C162-66.*

bridge bearing. The support at a bridge pier carrying the weight of the bridge. It may be fixed or seated on expansion rollers. *Ham.*

bridge break. The time which elapses between the application of current and the fusion of the bridge wire when using instantaneous blasting caps. *Streefkerk, p. 44.*

bridge cap. The highest portion of a bridge pier upon which the bridge bearing is seated. *Ham.*

bridge conveyor. A conveyor which is supported at one of by a loading unit and at the other end by a receiving unit in such a way as to permit changes in the position of either end without interrupting the operation of the loading unit. *NEMA MB1-1961.*

bridge cover. *See* bridge wall cover. *ASTM C162-66.*

bridged. A borehole plugged by debris lodged at some point above the bottom of a hole. The hole may be bridged deliberately by introducing foreign material into the hole or accidentally by rock fragments sloughing off the sidewalls of the borehole. *Long.*

bridge deck. The load-bearing floor of a bridge, carrying and distributing the loads to the main beams. The present trend is to form such decks in prestressed concrete, welded steel, or aluminum alloy. *Ham.*

bridge operator. One who operates an ore bridge of the Gantry crane type. *Fay.*

bridge over. Collapse of well bore around the drill stem. *Williams.*

bridge pier. The support for a bridge, which may be of masonry, concrete, steel, or timber; it must be erected on a firm bearing stratum so as to provide the necessary stability, and therefore sometimes entails deep excavation. *Ham.*

bridge rails. Aust. Rails made in the form of an inverted U, generally in short lengths, which are light to handle, and can be brought within easy shoveling distance of the face. *Fay.*

bridge the hole. Deliberate plugging of a borehole at a point some distance above the bottom by introduction of some type of foreign material or a plug. *See also,* e and f. *Long.*

bridge thrust. The horizontal force exerted by the arch of an arch bridge under load. This force is resisted by a horizontal reaction at the abutment, or in a bowstring girder by tension in the tie beam. *Ham.*

bridge tramway. Consists of two steel bridge trusses braced together so as to form between them a runway on which a bucket-carrying trolley runs. The bridge is carried at or near the ends on steel towers supported on wheels which operate on rails running lengthwise of the storage. The bridge thus spans the area over which material may be piled, and the length of this area is limited only by the length of the track. Either of each end of the bridge may have a hinged extension that may be lowered to permit the trolley to run out over a ship or barge. *Pit and Quarry, 53rd, sec. C, p. 56.*

bridge truss. A truss designed to carry bridge loads, which differ from those in building structures. *Ham.*

bridge wall. A low separating wall usually of firebrick in a furnace; such a wall in a reverberatory furnace. *Webster 3d.*

bridge wall cover. Refractory blocks spanning the space between the bridge walls. *ASTM C162-66.*

bridge wire. The fine platinum wire which is heated by the passage of an electric current to ignite the priming charge of an electric blasting cap, an electric squib, or similar devices. *Fay.*

bridging. a. In crushing practice, the obstruction of the receiving opening by two or more pieces wedged together, each of which could easily pass through. *Nelson.* b. Formation of arches of keyed or jammed particles across direction of flow (of rock through aperture or of small particles through filter pores). *Pryor, 3.* c. Arching of the charge across the shaft in a blast furnace or cupola. *Bureau of Mines Staff.* d. Premature solidification of metal across a mold section before the metal below or beyond solidifies. *ASM Gloss.* e. Solidification of slag within the cupola at or just above the tuyeres. *ASM Gloss.* f. Welding or mechanical locking of the change in a downfeed melting or smelting furnace. *ASM Gloss.* g. In powder metallury, the formation of arched cavities in a powder mass. *ASM Gloss.* h. Closing of a section of a drill hole by loose blocks of rock or by squeezing of plastic shale, etc. *Bureau of Mines Staff.*

bridging oxygen. An oxygen ion placed between two silicon ions, for example, in the structure of a silicate glass. *Dodd.*

Bridgman sampler. A mechanical device that automatically selects two samples as the ore passes through. *Fay.*

bridle bar. *See* bridle rod. *Fay.*

bridle cable. An anchor cable that is at right angles to the line of pull. *Nichols.*

bridle chains. a. The chains used for supporting the cage from the winding rope. Usually four chains are used, one for each corner, and are gathered together at their upper ends to be connected to a detaching hook by a spreader plate. The plate is made large enough to receive the four D links to which the respective chains are attached. *Nelson.* b. Safety chains to support the cage if the shackle should break, or to protect a train of cars on a slope should the shackle or drawbar fail. *Fay.*

bridle hitch. A connection between a bridle cable and a cable or sheave block. *Nichols.*

bridle iron. A strong, flat iron bar so bent as to support, as in a stirrup, one end of a floor timber, etc., where no sufficient bearing can be had. *Webster 2d.*

bridle rod; bridle bar. A steel tie bar used to join the ends of two point rails to hold them to gage in the proper position. *Webster 3d.*

bridle rope. A fixed rope supporting a jib or boom. *Ham.*

brier. N. of Eng. A beam or girder fixed across a shaft top. *Fay.*

brigadesman. Member of a Rand mine rescue team equipped with Proto breathing apparatus. *Pryor, 3.*

Briggs clinophone. An instrument used in measuring borehole deviation which transmits electrical signals, communicating to the surface the position of a plumb bob fitted with a needle relative to four electrodes arranged N.S.E. and W., the needle and electrodes being immersed in the electrolyte. Signals are matched with a similar arrangement of needle and electrodes at the surface and the needle then reads the deviation and the direction of deviation. *Sinclair, II, p. 243.*

Briggs equalizer. This consists of a head harness, mouthpiece, and noseclip, corrugated breathing tube, Briggs equalizing device, 120 feet of reinforced air tubes, and a strainer and spike. It has neither bellows nor rotary blower but depends entirely on the action of the equalizer for comfortable respiration. The resistance to breathing is so low that reasonably hard work can be done by the wearer over a period of 2 hours or more. The air supply tube is attached to the waist by a strong leather body belt. *Mason, v. 1, pp. 327-328.*

Briggs stretcher carriage. A stretcher used as an ambulance trolley in transporting casualties from underground workings. The stretcher has rests which are supported by coil and tension springs to protect the patient from bumps, and also an adjustable wheel base which allows the carriage to be maneuvered around sharp corners or to remain firm and steady when attached to the mine haulage system. *McAdam, pp 105-106.*

bright annealing. Annealing in a protective medium to prevent discoloration of the bright surface. *ASM Gloss.*

bright attritus. A field term to denote the degree of luster of attritul coal compared to the brilliant luster of associated vitrain. *Compare* moderately bright attritus; moderately dull attritus; dull attritus. *A.G.I.*

bright-banded coal. Coal consisting of vitrain and clarain, more or less durain, and minor fusain. *See also* banded coal. *Compare* dull-banded coal. *A.G.I.*

bright cake. *See* bride cake. *Tomkeieff, 1954.*

bright-cherry-red heat. Division of the color scale generally given as about 815° C (1,499° F). *Bureau of Mines Staff.*

bright coal. a. The constituent of banded coal which is of a jet black, pitchy appearance, more compact than dull coal, and breaking with a conchoidal fracture when viewed macroscopically, and which in thin section always shows preserved cell structure of woody plant tissue, either of stem branch, or root. Same as anthraxylon. *A.G.I.* b. A coal composed of anthraxylon and attritus, in which the translucent cell-wall degradation matter or translucent humic matter predominates. *A.G.I.* c. A banded coal containing less than 20 percent opaque attritus and more than 5 percent anthraxylon. *Compare* semisplint coal; splint coal. *A.G.I.* d. A type of banded coal containing from 100 percent to 81 percent pure bright ingredients (vitrain, clarain, and fusain), the remainder consisting of clarodurain and durain. *Compare* semibright coal; intermediate coal; semidull coal; dull coal. *A.G.I.* e. An old mining term for lustrous coal. In 1931, R. Thiessen defined this coal as being composed of anthraxylon and attritus in which the translucent matter predominates and thereby established the concept of bright coal on a microscopic basis. In 1948, B. C. Parks and H. J. O'Donnell provided a quantitative definition based on microscopical examination. According to their definition, bright coal is a type of banded coal composed microscopically of more than 5 percent anthraxylon and less than 20 percent opaque matter, the measurements being made perpendicular to the bedding across the entire thin section (2 to 3 centimeters in width). This coal can consist entirely or in greater part of anthraxylon; it can also be attrital providing the content of opaque attritus remains below 20 percent and the content of translucent attritus may amount to 95 percent. In the Stopes-Heerlen nomenclature bright coal corresponds to the microlithotypes vitrite, clarite, and in part to duroclarite and vitrinertite. Bright coal is the most abundant of the three types of coal. It occurs in all banded coals. *IHCP, 1963, part I.*

bright dip. A solution which produces, through chemical action, a bright surface on an immersed metal. *ASM Gloss.*

brightener. An agent or combination of agents added to an electroplating bath to produce a fine-grained lustrous deposit. *ASM Gloss.*

brightening. *See* blick. *Fay.*

bright glaze. A colorless or colored ceramic glaze having high gloss. *ASTM C242-60.*

bright head. a. York. A smooth parting or joint in coal; a plane of cleavage. *Fay.* b. The principal cleat in coal. *Arkell.*

brightness; brilliance. The candlepower of a light source divided by the area of the source, and expressed in candles per square inch or candles per square foot. *Sinclair, I, p. 200.*

brightness meters. Visual-type portable photometers operated by visual comparison of brightness. Since they can be calibrated to indicate the photometric brightness of the object viewed in the sighting telescope, they are often called brightness meters. *Roberts, II, p. 51.*

Brighton emerald. Green bottle glass. *Shipley.*

bright plate. An electrodeposit that is lustrous in the as-plated condition. *ASM Gloss.*

bright range. The range of current densities, other conditions being constant, within which a given bath produces a bright plate. *ASM Gloss.*

bright-red heat. Common term usually meaning about a cherry-red heat. *See also* cherry-red heat. *Bureau of Mines Staff.*

bright rope. Rope of any construction, whose wires have not been galvanized, tinned, or otherwise coated. *Zern.*

brights; bright coal. a. Coal which reflects a large part of incident light, either in a definite beam or by scattering. Two kinds of bright coal are distinguished by M. Stopes vitrain, which reflects an incident beam in a definite direction and consequently appears light or dark according as the beam is or is not reflected into the eye; and clarain, which scatters the light and show a silky luster at whatever angle it is viewed. *Tomkeieff, 1954.* b. A commercial term for the larger sizes of bright coal. *B.S. 3323, 1960.*

bright sulfur. Crude sulfur free of discoloring impurities and bright yellow in color. *BuMines Bull. 630, 1965, p. 903.*

briha. Belg. A local name in Liege for a coal closely resembling English cannel coal. *Hess.*

brilliancy (of a gemstone). The amount of light reaching the eye as a result of (1) reflections from the internal surface of facets (called total internal reflection); and (2) reflections from the external surfaces of the table and other facets of a gemstone. *See also* total reflection; luster; scintillation. *Shipley.*

brilliant. a. The most effective form of cutting for diamond, and so usual for this mineral that the term brilliant is equivalent to brilliant-cut diamond in trade parlance. Brilliant-cut is also used for zircons and other stones. The standard brilliant has 58 facets; 33 in the crown and 25 in the base. *Anderson.* b. A relatively clear nongem or industrial diamond having smooth crystal faces that readily reflect light rays. In a strict sense, brilliant is applied to a cut gem diamond on which the facets are so arranged as to refract and reflect the maximum amount of light. *Long.*

brilliant-cut. The most popular cut for most stones; with round girdle outline and usually 58 facets, sometimes less and often more. *See also* full-cut brilliant. *Shipley.*

brimstone. A common name for sulfur. *Fay.*

brimstone frit. A lead bisilicate frit for glazes made from 1913 until 1928 by Brimsdown Lead Works, Middlesex, England. The batch consisted of litharge, silica, and Cornish stone. Although the frit contained 64 percent PbO its solubility, when tested by the Home Office method then used, was only 1 to 2 percent. *Dodd.*

brindled brick. A building brick made from a ferruginous clay and partially reduced at the top firing temperature; it has a high crushing strength. *Dodd.*

brine. a. Water saturated or strongly impregnated with common salt. *Webster 3d.* b. A strong saline solution (as of calcium chloride used in refrigeration). *Webster 3d.* c. The water of an ocean, a sea, or a salt lake. *Webster 3d.* d. A secondary liquid cooled by refrigeration and circulated to heat transfer for absorbing heat from air, water, or other fluid. *Strock, 10.* e. A concentrated solution, especially of chloride salts. *ASTM STP No. 148–D.* f. Sea water containing a higher concentration of dissolved salt than that of the ordinary ocean. Brine is produced by the evaporation or freezing of sea water, for, in the latter case, the sea ice formed is much less saline than the initial liquid, leaving the adjacent unfrozen water with increased salinity. The liquid remaining after sea water has been concentrated by evaporation until salt has crystallized is called bittern. *H&G.* g. A saturated solution of a soluble mineral in water, used either as a nonfreezing circulation medium or as a circulation medium, which, being already a saturated solution, will not dissolve a soluble mineral being cored, such as a salt brine used as a circulation liquid when coring salt or potash solution when coring potash. *Long.*

brine fields. The section of land under which quantities of rock salt or natural brine of usable strength have been discovered and a well or any number of wells, has been bored for raising the brine. *Kaufman, p. 148.*

Brinell hardness test. A test for determining the hardness of a material by forcing a hard steel or carbide ball of specified diameter into it under a specified load. The result is expressed as the Brinell hardness number, which is the value obtained by by dividing the applied load in kilograms by the surface area of the resulting impression in square millimeters. *ASM Gloss.*

Brinell hardness tester. a. In heat treating, one who determines hardness of pieces of metal by Brinell method; places piece on table of machine and causes machine to press accurately made steel ball against test surface with specified force; removes test piece from machine, measures indentation made by steel ball with special microscope, and determines hardness number of sample from chart that expresses hardness in terms of diameter of impression produced under standard test conditions. Also called Brinell operator. *D.O.T. 1.* b. The machine or instrument used to determine hardness. *Burau of Mines Staff.*

brine pit. A salt spring or well from which water is taken to be boiled or to be evaporated to produce salt. *Fay.*

brine spring. A spring of salt water. *Fay.*

brine well. A cased drill hole penetrating a salt formation through which water is introduced and brine pumped to the surface. *Bureau of Mines Staff.*

bring back. Eng. To work away the pillars of coal from the boundary toward the shaft bottom. *Fay.*

bring in. Can. Develop a mine from prospect stage. *Hoffman.*

bringing in a well. The act of completing an oil well and bringing it into production. *Nelson.*

briolette. A diamond or other gem in the shape of an oval or pear and having its entire surface cut in triangular facets. *Webster 3d.*

briquette; briquet. a. A block of compressed coal dust, used as fuel; also, a slab or block of artificial stone. *Standard, 1964.* Also called coalette; eggette; boulet; carbonet. *Fay.* b. In powder metallurgy, briquette is synonymous with compact. *Rolfe.*

briquetting. a. A process by which coke breeze, coal dust, iron ore, or other pulverized mineral commodities is bound together into briquettes, under pressure, with or without a binding agent such as asphalt, and thus made conveniently available for further processing or for commercial markets. *Bureau of Mines Staff.* b. A process or method of mounting mineral, ore, rock, or metal fragments in an embedding or casting material such as natural or artificial resins, waxes, metals, or alloys, to facilitate handling during grinding, polishing, and microscopic examination. *Bureau of Mines Staff.*

brisance. a. Shattering power developed per unit volume of an explosive. *Bennett 2d, 1962.* b. The shattering effect of an explosive. *Hess.*

briscale. It. A gypsiferous deposit occurring at the outcrop of the sulfur deposits of Sicily. *Fay.*

Briska detonator. An aluminum tube containing a main charge of tetryl (tetranitromethylaniline). On top of this are initiating charges of lead azide, PbN_6, and lead styphnate, which are more sensitive than the tetryl. A safety fuse fitted into an open space at the top is used to set off the detonator. Also called aluminum detonator. *Higham, p. 61.*

brisket. Dev. Miners' term for clay with bands of lignite. *Tomkeieff, 1954.*

Bristol brick. Bricklike blocks of very fine sand used for polishing and scouring; scouring brick. *Standard, 1964.*

Bristol diamond. A fine, transparent variety of crystallized quartz. Also called Irish diamond. *Fay.*

Bristol glaze. A raw glaze containing zinc oxide, often used in terra cotta. *ASCG, 1963.*

Bristol metal. An alloy of copper and zinc in the proportion of approximately 16 parts to 6. *Standard, 1964.*

Bristol recorder. An instrument which systematically records on a chart the performance of a hydraulic steel support, for example, it will indicate when a support is operating with a faulty valve. *Nelson.*

Bristol stone. a. Bricklike blocks of very fine sand used for polishing and scouring. *Fay.* b. Bristol diamonds—small, well-defined crystals of quartz from Bristol, England. *Fay.*

Britannia cell. In mineral processing, a pneumatic flotation cell 7 to 9 feet deep. *See also* southwestern cell. *Pryor, 3.*

Britannia metal. Alloy of from 80 to 90 percent tin with antimony, copper, lead, or zinc or a mixture of these. *Pryor, 3.*

britching. Scot. *See* breeching, b. *Fay.*

british; bretty. Scot. A variation of brattice. *Fay.*

British amber. A term which has been used for amber washed ashore on the beaches of England, probably from the Baltic Sea. It is clear or cloudy, yellow or greenish yellow, and rarely wine color. *Shipley.*

British barilla. Black ash. *Standard, 1964.*

British equivalent temperature. *See* equivalent temperature. *Strock, 10.*

British imperial gallon. A fluid gallon equal to 1.2 U.S. gallons, approximately; contain 277.42 cubic inches. There are 6.23 such gallons per cubic foot. *Nichols.*

British Standard; British Standard Specification. A numbered publication of the British Standard Institution describing the quality or dimensions of a product. By their use engineers can reduce and define items in their specifications. Abbreviation, BS. *Nelson.*

British Standard Institution; BSI. The British authority for standardizing, by agreement between all parties concerned, the methods of testing, and dimensions of materials and products as well as nomenclature and codes of practice. There are similar organizations in other countries. *Nelson.*

British thermal unit. Heat needed to raise 1 pound of water 1° F (equal to 252 calories). Symbol, Btu. *Pryor, 3.*

Britmag. Trade name; dead-burned magnesia made by the seawater process in Great Britain. *Dodd.*

brittle. A mineralogical term meaning not flexible or ductile, that is, that a stone will crumble under a knife or hammer, but not necessarily that it is fragile. *Shipley.*

brittle amber. Gedanite. *Shipley.*

brittle crack propagation. A very sudden propagation of a crack with the absorption of no energy except that stored elastically in the body. Microscopic examination may reveal some deformation even though it is not noticeable to the unaided eye. *ASM Gloss.*

brittle fracture. Fracture with little or no plastic deformation. *ASM Gloss.*

brittle material. A nonductile material which fails catastrophically under dynamic loading conditions. Ceramics are an example of a class of brittle materials. *H&G.*

brittle mica. Group of micas having brittle laminae. Chief member is chloritoid, a basic silicate of aluminum, iron, and magnesium, $H_2(FeMg)Al_2SiO_7$. *Pryor, 3. See also* margarite.

brittle mineral. a. An easily broken mineral; not tough or tenacious. *Fay.* b. If a mineral breaks into fragments or powder under a light blow or crumbles into a dust when cut, it is brittle (for example, calcite and quartz). *Stokes and Varnes, 1955, p. 149.*

brittleness. Of minerals, proneness to fracture under low stress. A quality affecting behavior during comminution of ore, whereby one species fractures more readily than others in the material being crushed. *See also* toughness. *Pryor, 3.* b. The quality of a material that leads to crack propagation without appreciable plastic deformation. *ASM Gloss.*

brittle-ring test. A test to determine the behavior of a ceramic material under tensile stress; a test piece in the form of an annulus is loaded along a diameter so that maximum tensile stresses develop on the inner periphery of the annulus in the plane of loading. *Compare* Brazilian test. *Dodd.*

brittle silver ore. Synonym for stephanite. *Fay.*

brittle substance. A substance for which the yield point and the point of rupture lie close together. *Briggs, p. 188.*

broach. a. To restore the diameter of a borehole by reaming. *Long.* b. To break down the walls between two contiguous drill holes. *Long.* c. The perpendicular grooves machined into the bit mold in which inside and outside gage stones are set. *Long.* d. A bar-shaped cutting tool provided with a series of cutting edges or teeth that increase in size or change in shape from the starting to finishing end. The tool cuts in the axial direction when pushed or pulled and is used to shape either holes or outside surfaces. *ASM Gloss.* e. A sharp-pointed chisel, used especially for rough-dressing stone. *Webster 2d.* f. A reamer. *Fay.* g. To shape (a block of stone) roughly by chiseling with a coarse tool. *Webster 3d.*

broaching. a. Trimming or straightening a a mine working. *Fay.* b. A method of rock excavation employed where it is important that the adjacent rock formation should not be shattered by explosive. A line of closely spaced holes is drilled along the required line of breakage. The rock between the holes is knocked out with a broach and removed with the aid of wedges. *Ham. See also* channeler, a. c. Removing metal stock from a workpiece with a broach. *ASM Gloss.*

broaching bit. A tool used to restore the dimensions of a borehole which has been contracted by the swelling of the marl or clay walls; also used to break down the intervening rock betwen two contiguous drill holes. A reamer. *Fay.*

broad coke oven. A special design of oven, used mainly for coking certain grades of coal. *Bureau of Mines Staff.*

broad-flanged beam. A steel joist of specially designed cross section, both useful and economical as a unit in bridge design and in kindred situations in structures. The flanges are almost as wide as the web. *Ham.*

broadgate. Eng. A main working. *Fay.*

broad glass. Window glass made by the Lorraine technique, for example, by slitting a blown cylinder of glass and flattening it onto an iron table. *Haggar.*

broad irrigation. A system of sewage disposal without the use of piped drainage. The sewage flows over and soaks into the ground, which must be carefully leveled to avoid an accumulation of sewage at any point. This system is suitable only over agricultural land or wasteland. *Ham.*

broad lode. Where two or more mining claims longitudinally bisect or divide the apex of a vein the senior claim takes the entire width of the vein on its dip, if it is in other respects so located as to give the right to pursue the vein downward outside of the sideline. In other words, a broad lode bisected by the division sidelines between two mining claims belongs to the claim having the prior location. *Ricketts, p. 328.*

broad lode or zone. The term lode has become extensively used in the classification of ore deposits that are not comprehended by the definition of a vein. Such an occurrence is called a broad lode or zone. *Ricketts, p. 129.*

broad salt. A name used in England for ground rock salt. *Kaufmann.*

broadside shooting. A refraction type of seismic shooting used to determine the structure across the strike. The broadside lines are ordinarily laid out in conjunction with the standard-type profiles that run along the strike. The shot points and detector spreads are laid out along parallel lines which are generally across the strike. The distance between each line of shots and the receiving line is chosen so that it will always be greater than the double offset distance for the refractor being followed. Generally the distance should be only slightly greater so that the primary refracted event will be received as a second arrival. When this spacing is used, the refracting point associated with the shot will be very close to that associated with the detector and each delay time will be approximately half the intercept time. A single depth point (based on half the intercept time) is then plotted midway between shot and receiver. All depth points are thus placed along the "control lines" which are located halfway between the shooting line and the receiving line. *Dobrin, pp. 96-97.*

broadstone. A paving slab, so called because it is raised broad and thin from out of the quarries, not above 2 or 3 inches in thickness. *Arkell.*

broadstone bind. Eng. Shale or clay that breaks up into large blocks or slabs. *Fay.*

broad veins. Where a broad vein apexes so that the boundary line between two claims spits the apex, the extralateral rights go to the senior locator, who takes the entire width of the vein on the dip; that is, a broad load that is bisected by the division side line between two mining claims belongs to the claim having the prior location. *Lewis, p. 34.*

brob. a. A heavy spike, driven alongside the end of an abutting timber to prevent its slipping. *Fay.* b. Mid. A short, thick timber propper or sprag for supporting the coal while it is being holed. *Fay.* c. An English term for a wrought-iron spike driven into bars and sills to steady the head or foot of a prop. *Stauffer.*

brocade. A type of bronze powder consisting of coarse metal flakes prepared from the waste of metal-leaf factories. *Camm.*

Brocatelle marble. A variety of marble from the French Pyrenees. The body of the stone is fine, compact, and of light yellow color traversed by veins and dull red blotches. The name is that of a coarse kind of tapestry, which the marble somewhat resembles. *Fay.*

brochantite. A mineral, $Cu_4(OH)_6SO_4$ common in the oxidation zone of copper sulfide deposits; monoclinic; emerald-green to dark green color; formed by the decomposition of chalcopyrite. *A.G.I.; Dana 17.*

brockite. A mineral, (Ca,Th,Ce) Po_4. H_2O, of the rhabdophane group. From the Wet Mountains, Colo. *Hey, M.M., 1964; Fleischer.*

brockram. Eng. Miners' term for breccia, Cumberland. *Arkell.*

B rod. A former standard diamond drill rod having an outside diameter of $1\frac{29}{32}$ inches.

Superseded in 1954 by a new standard drill rod designated by the letter name BW. *Long.*

B rod bit. A Canadian standard noncoring bit having a set diameter of 2.315 inches. More commonly called $2\frac{5}{16}$B drill-rod bit. *Long.*

broggerite. A thorium-bearing variety of uraninite, $(U,Th)O_2$, occurring in octahedral crystals; specific gravity, 9.03. *Webster 3d.* Same as thorian uraninite. *Crosby, p. 53.*

broggite. a. A variety of asphalt from Peru. *Tomkeieff, 1954.* b. A variety of anthraxolite. *Crosby, p. 66.*

broil. Corn. A collection of loose rock fragments usually discolored by oxidation, and indicating the presence of a mineral vein beneath; outcrop; gossan. Also spelled bryle; broyl. *Fay.*

broken. a. Eng. That part of a mine where the mineral has already been partly worked away, and where the remainder in course of being extracted. *Fay.* b. The dislocation of a vein by faulting. *Weed, 1922.* c. Term used to describe a mixed sequence of deposits; a broken sand usually has shaly layers in it. *Wheeler.* c. *See* broken coal.

broken ashlar. Ashlar in which the stones are rectangular, but of different sizes and shapes. *Webster 3d.*

broken charge. A charge of explosive in a drill hole divided into two or more parts that are separated by stemming. *Fay.*

broken coal. In anthracite only; coal that is small enough to pass through a 3⅜ to 4 inch (square) aperture, but too large to pass through a 2¾ or 2½ inch mesh. Smaller than steamboat, and larger than egg coal. *Fay. See also* anthracite coal sizes.

broken ground. a. Eng. Faulty or unproductive measures. *Fay.* b. A shattered rock formation, or a formation crisscrossed with numerous, closely spaced, uncemented joints and cracks. *Compare* loose ground, b; breccia, b. *Long.* c. Rock or mineral formations fragmented by blasting with explosives, such as the broken material in a shrinkage stope. *Long.*

broken in. a. A newly set bit, which has been rotated slowly under a light load for a short period of time for the purpose of gradually removing the excess matrix and forcing the diamonds to seat themselves. *See also* break-in, b. *Long.* b. A carbon, the sharp points and edges of which have been rounded through use and repeated resetting in a bit. *See also* break-in, c. *Long.*

broken in stone. *See* broken in, b. *Long.*

broken-joint tile. A single-lap roofing tile of a size such that the edge of one tile, when laid, is over the center of the head of a tile in the course next below. *Dodd.*

broken jud. N. of Eng. A large block of coal in course of being worked loose from the bed. *Hess.*

broken line. One which changes its direction one or more times in its entire length, or it is a line made up of two or more straight lines. *Jones, 2, p. 81.*

broken rangework. Masonry work made of squared stones in courses of uneven heights. *Standard, 1964.*

broken rock. *See* broken ground. *Long.*

brokens; robbery; robbing pillars. Eng. The removal or extraction of pillars previously formed in bord and pillar working. In Durham and Northumberland the terms robbery and robbing pillars imply incomplete extraction of the pillars. *SMRB, Paper No. 61.*

broken seed. *See* seed. *Dodd.*

broken skip. Aust. A skip (car) from which some of the coal has fallen off in transit leaving only part of a skip load. *Fay.*

broken stone. a. A diamond that has been shattered in use. *Long.* b. A diamond that, in use, has lost a portion of its mass by cleaving action. *Long.* c. A diamond, the size and shape of which have been changed by deliberate cleaving. *Long.* d. *See* crushed stone. *BuMines Bull. 630, 1965, p. 885.*

broken working. The working away or removal of blocks or pillars of coal formed by whole workings. *Peel.*

broken workings. *See* working the broken. *Nelson.*

brokes. Term used in the English ball-clay mines for clay that will not cut into balls; such clay is generally of low plasticity and poor fired color. *Dodd.*

bromargyrite. A bromyrite resembling horn silver and is associated with it. *E.C.T., v. 12, p. 428.*

bromellite. A white, beryllium oxide, BeO. Hexagonal; dihexagonal-pyramidal crystals. From Langban, Sweden. *English.*

bromine. A nonmetallic element in group VII of the periodic system, one of the halogens. At ordinary temperature, it is a deep reddish-brown liquid; gives off a poisonous diatomic vapor (Br_2) and has an irritating smell. It is derived in large quantities from sea water and underground brines. Used extensively in synthetic organic chemistry. Symbol, Br; atomic number, 35; atomic weight, 79.909; valences, 1, 3, 5, and 7; orthorhombic; specific gravity, 3.12; melting point, −7.2° C; and boiling point, 58.78° C. *C.T.D.; Fay; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-103.*

bromine compounds. Used chiefly in the production of antiknock gasolines. Derived from sea water at Wilmington, N.C., and from natural brine in Michigan. *Barger.*

bromite. Same as bromyrite. *Fay.*

bromlite. A mineral, $BaCa(CO_3)_2$, midway between witherite and strontianite. Also called alstonite. *Webster 3d.*

bromocyanide process. Recovering values from refractory or special gold ores, in which cyanogen bromide (CNBr), or a chemical mixture forming it, is used for treating the ore. *Bennett 2d, 1962.*

bromoform; tribromomethane; methenyl tribromide. A colorless, heavy liquid; $CHBr_3$; odor and taste similar to those of chloroform; and specific gravity, 2.8887. Used in mineralogic analysis and in assaying. *CCD 6d, 1961.*

bromyrite. A silver bromide, AgBr, containing 57 percent silver. Sectile; isometric. *Sanford; Dana 17.*

bronchitis. An inflammation of the bronchial tubes due, among other causes, to the inhalation of irritants, such as dusts. Common among miners. *I.C. 7146, 1941, p. 1.*

brongniardite. A lead-silver sulfantimonide, $PbAg_2Sb_2S_5$. It contains 26.2 percent silver. *Sanford.*

Brongniart's formula. A formula relating the weight (w, oz) of solid material in 1 pint of slip (or slop glaze), the weight (P, oz) of 1 pint of the slip, and the specific gravity (S) of the dry solid material:

$$W = (P - 20) \times S / (S - 1)$$

The formula was established for slop glazes by A. Brongniart. *Dodd.*

bronquear. Mex. To hammer or to pry with a hammer or a gad in rock that is loose and liable to fall. *Fay.*

brontolith. A meteoric stone; a thunderstone. *Standard, 1964.*

bronze. a. Any of the many copper-base alloys in which tin is the principal alloying element, with or without other alloying elements. Also called tin bronze. *Henderson.* b. Any of the many copper-base alloys having as its principal alloying element any element other than zinc. The term usually is preceded by its principal alloying element as, for example, aluminum bronze, silicon bronze, tin bronze, etc. *Henderson.* c. All copper-base alloys containing alloying elements other than zinc and in sufficient amounts to be predominant over the zinc in the alloy. *Henderson.* d. An alloy composed mainly of copper and tin. Various other elements may be added in small amounts for certain specific purposes. A number of copper alloys are referred to as bronzes although they contain no tin. The American Society for Testing Materials has classified all copper-base alloys on a basis of composition ranges of the principal alloying elements. *Henderson.*

bronze gold. Any bronze resembling gold in color. *Standard, 1964.*

bronze mica. Synonym for phlogopite. *Fay.*

bronze pearls. The variety of so-called black pearls with a bronzelike color and sheen. *Shipley.*

bronze steel. An alloy of copper, tin, and iron; used as gunmetal. *Standard, 1964.*

bronze tubes. Tubes of bronze or copper embedded in the lining of the bosh (principally) for the circulation of water to counteract the intense heat. *Mersereau, 4th, p. 398.*

bronze welding. Gas welding of copper, steel, or other metals using a filler rod of silicon brass alloy. This process is easier than fusion welding because the temperature is lower, yet it generally exceeds 850° C, and the joint is therefore usually made under carefully controlled conditions in a factory. *Ham.*

bronzite. a. A mineral consisting of a ferriferous variety of enstatite often having a luster like that of bronze, $(Mg,Fe)SiO_3$; orthorhombic. *Webster 3d; Dana 17.* b. It is often used as a prefix to the names of rocks containing the mineral. Rocks of the gabbro family are the most common ones having the prefix. *Fay.*

bronzite cat's-eye. Bronzite with a chatoyant effect. *Shipley.*

bronzitite. An igneous rock composed entirely of bronzite. *Standard, 1964.*

brooch. a. Corn. A mixture of various ores. *Fay.* b. Synonym for broach. *Long.*

brooching. *See* broaching, a. *Fay.*

brood. a. Impurities as extracted with the ore. *Nelson.* b. Corn. The heavier kinds of waste in tin and copper ores. A mixture of tin and copper ore. *Fay.*

Brookfield viscometer. An electrically operated rotating cylinder viscometer in which the drag is recorded directly on a dial; it has been used in the testing of vitreous-enamel slips. *Dodd.*

Brookhill waffler. A coal cutter with the ordinary horizontal jib and also a shearing or mushroom jib. In some cases, a flight loader follows it along the face to load the cut coal onto the face conveyor (named after Brookhill colliery). *Nelson.*

brookite. Titanium dioxide, TiO_2. Identical in composition with rutile, but occurs in brown translucent orthorhombic crystals. *Fay.*

brooming. The crushing and spreading of the head of a timber pile not fitted with a driving band when driven into hard ground. *Ham.*

brora. Eng. In Sutherland, the imperfect coal in the lower part of the oolite formation. *Fay.*

Broseley tile. An old name for a plain clay roofing tile; such tiles were made in the Brosley area of Shropshire, England. *Dodd.*

brosing; brosing time. Scot. Mealtime. *Fay.*

brothers. A rope or chain sling, the term applying to both two- or four-leg types. *Ham.*

brouse. Derb. A sort of coarse stopping, made of small boughs of trees, and placed in back of shaft timbers to prevent rock from falling. *Fay.*

brow. a. Lanc. An underground roadway leading to a working place, driven either to the rise or to the dip. *Fay.* b. A low place in the roof of a mine, giving insufficient headroom. *Fay.* c. The highest margin of a height as viewed in profile. *Webster 3d.* d. A fault plane. *Arkell.* e. A term used in Wales for landing, d. *Nelson.* f. A hill or bank. *Mason.* g. Top of a mine shaft. Also called pit brow. *Pryor, 3.* h. Eng. A road going to the rise. *SMRB, Paper No. 61.* i. Eng. In Durham and Northumberland, the edge of a canch. *SMRB, Paper No. 61.* j. Eng. *See* gate, b. *SMRB, Paper No. 61.*

brow bar. Mid. A massive curb or beam of timber fixed in the wall of the shaft across the top of an inset or station. Also called browpiece. *Fay.*

brow bin. An ore bin made by cutting away the floor of the station close to the shaft. *Higham, p. 163.*

Brown agitator. *See* Pachuca tank. *Pryor, 3.*

brown cannel. Another name for torbanite. *Tomkeieff, 1954.*

brown clay. a. York. Hessle boulder clay. *Arkell.* b. *See* red clay. *H&G.*

brown clay ironstone. Compact, often nodular masses of limonite with clay impurities. *Fay.*

brown coal. a. A low-rank coal which is brown, brownish-black, but rarely black. It commonly retains the structures of the original wood. It is high in moisture, low in heat value, and checks badly upon drying. *A.G.I.* b. A light brown to seal-brown substance intermediate between peat and bituminous coal; usually regarded as a variety of lignite, other varieties being darker or black. It may be distinguished from peat: (1) many tissues and fibers can be recognized in peat, but only a few fibers or none in brown coal; (2) water can be squeezed out of fresh peat by manual pressure, but not from brown coal; and (3) peat can be cut but brown coal cannot. These are rough distinctions. Actually, there is no sharp distinction between peat and coal. Some have attempted to assign it a higher rank by defining lignite as containing 20 or more percent water, brown coal between 10 and 20 percent water, and bituminous coal less than 10 percent water. *Hess.* c. A type of low-rank coal intermediate between bituminous coal and peat, and comparatively high in water content. In English-speaking countries, the terms brown coal and lignite are synonymous; whereas in Germany and other parts of Europe, brown coal is restricted to megascopically compact structural varieties, and lignite is restricted to individual pieces of wood enclosed in brown coal. Brown coal may be subdivided into low-grade coal consisting of visible vegetable remains, and high-grade brown coal, a compact, homogeneous, and tough rock. *Tomkeieff, 1954.* d. Coal of the lowest rank, soft and friable, and having a high, inherent moisture content. *B.S. 3323, 1960.* e. Unconsolidated lignitic coal having less than 8,300 British thermal units, (moist, mineral-matter-free). *ASTM D388-38.*

brown face. Gossan from the tin lodes of Tasmania. *Fay.*

brown hematite. A misnomer; the mineral bearing this name is limonite, a hydrous iron oxide, whereas true hematite is anhydrous. *C.M.D. See also* brown iron ore.

brown henns. Eng. Base metal mixed with lead ore in a mineral vein, Derbyshire. *Arkell, p. 59.*

Brown horseshoe furnace. A furnace of the annular turret type for calcining sulfide ores. *Fay.*

brown hyacinth. Vesuvianite. *Shipley.*

Brownian movement; pedesis. A continuous agitation of particles in a colloidal solution caused by unbalanced impacts with molecules of the surrounding medium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-33.*

brownies. *See* copperheads. *Hansen.*

brown iron ore; limonite; brown hematite; bog iron ore. Its approximate formula is $2Fe_2O_3 \cdot 3H_2O$, equivalent to about 59.8 percent iron. Probably a mixture of hydrous oxides. *Sanford.*

brown ironstone clay. Clayey limonite. *Hess.*

brown lead ore. An early name for brown pyromorphite. *Fay.*

brown lignite. a. Lignite lower in rank than black lignite. It has a fixed carbon content ranging from 30 to 55 percent and a total carbon content ranging from 65 to 73.6 percent. *A.G.I.* b. Same as brown coal. *Tomkeieff, 1954.*

brown matter. Brown matter is found in varying amounts in the attrital matter of all splint and semisplint coals; it is occasionally present in the attritus of bright coals. Cell-wall degradation matter and the contents of cells which in thin section are brown and semitranslucent. The term has no exact equivalent in the Stopes-Heerlen nomenclature. Constituents with a reflectance between that of vitrinite and fusinite may correspond in part to brown matter. Some brown matter is identical with semifusinite and massive micrinite. Synonym for semiopaque matter; semitranslucent matter; brown cell-wall degradation matter. *IHCP, 1963, pt. 1.*

brown metal coal. Eng. Term used among Yorkshire miners for bituminous coal which when broken gives much brown or red dust. *Tomkeieff, 1954.*

brownmillerite. A tetracalcium aluminoferrite, $4CaO \cdot Al_2O_3 \cdot Fe_2O_3$, first prepared by Hansen, Brownmiller, and Bogue, and afterwards detected in portland cement, and later in dolomite-silica firebricks. *Spencer 16, M.M., 1943.*

Brown-Mills apparatus. A liquid-air breathing apparatus that weighs about 40 pounds when fully charged with 5½ pounds of liquid air and 2 pounds of carbon dioxide absorbent. It consists of a liquid-air container or pack in a leather case enclosing three concentric cases of cupronickel. Can be used for a period of 2 hours. *McAdam, pp. 37-38; Sinclair, I, pp. 319-321.*

Brown muffle furnace. A mechanically raked roasting furnace of the straight-line type with a series of longitudinal combustion flues placed under the hearth. *Fay.*

Brown-O'Hara furnace. A long, horizontal, double-hearth furnace for the treatment of lead ores. *Fay.*

Brown panel system. a. Same as pillar-and-breast. *Fay.* b. Coal mining by long rooms opened on the upper side of the gangway. The breasts are usually from 5 to 12 yards wide and are separated by pillars (solid walls of coal broken by crossheadings for ventilation) 5 to 12 yards thick. The pillars are robbed by mining from them until the roof comes down and prevents further working. *Hess.*

brown petroleum. A natural solid or semisolid product produced by the action of air upon fluid bitumens. *Fay.*

brown rock. A type of phosphate rock resulting from the weathering of phosphatic limestones. Found in Tennessee, and used as raw material for fertilizer. *CCD 6d, 1961.*

brown sienna. *See* sienna. *CCD 6d, 1961.*

brown soil. A zonal group of soils having a brown surface horizon which grades downwards into lighter colored soil and finally into a layer of carbonate accumulation. It is developed under short grasses, bunch grasses, and shrubs in a temperate to cool, semiarid climate. *A.G.I.*

brown spar. Any light carbonate that is colored brown by the presence of iron carbonate, as ankerite, dolomite, magnesite, or siderite. *Standard, 1964.*

brownstone. A ferruginous sandstone, the grains of which are generally coated with iron oxide. Applied almost exclusively to a dark brown sandstone derived from the Triassic formations of the Connecticut River Valley. *A.G.I.* Used as a building stone. *See also* sandstone. *Fay.* b. Eng. Toadstone. *Arkell.*

Brown tank. A cylindrical tank or vat, tall in proportion to its diameter, with the bottom ending in a 60° cone. Within the tank is a hollow column extending from the bottom to within about 8 inches from the top. The apparatus works on the air-lift principle, the aerated pulp in the tube flowing upward, and discharging at the top while more pulp flows in at the bottom to take its place. It is in reality a pulp agitator. Also called Pachuca tank. *Liddell 2d, p. 390.*

brown tongs. A long-handled, plierlike device similar to a certain type of blacksmith tongs used to handle wash or drill rods in place of a safety clamp in shallow borehole drilling. Also called adjustable pipe tongs; extension tongs; lowering tongs. *Long.*

brown turf. An Irish name for the layer of turf (peat) situated betwen the white turf and the black turf and in composition intermediate between these two. *Tomkeieff, 1954.*

brown umber. A brown earthy variety of limonite. *Fay.*

browpiece. A heavy upright timber used for underpinning in opening a station for a level in a mine. *Webster 3d. See also* brow bar. *Fay.*

browse. Ore imperfectly smelted, mixed with cinder and clay. *Fay.*

brow-up. Lanc. An inclined roadway driven to the rise. Also called brow; up-brow. *Fay.*

Broxburn oil shale. A Scottish shale that yields 23 to 35 gallons of crude oil and

35 to 40 pounds of ammonium sulfate per ton. *Fay.*

broyl. Corn. *See* broil. *Fay.*

brucite. A hydrous magnesia;$MgO \cdot H_2O$ or $Mg(OH)_2$; which is one of many sources of dead-burned magnesite. Used in the production of basic refractories and in welding-rod coatings. *Lee.*

brucite marble. A product of dedolomitization; a crystalline metamorphic rock formed by the action of intense heat on dolomite or magnesian limestone. *C.M.D.*

Bruckner cylinder. Pac. A form of revolving roasting furnace. *See also* Bruckner furnace. *Fay.*

Bruckner furnace. Horizontal cylindrical furnace revolving on end trunnions. *Pryor, 3.*

brugnatellite. A flesh-pink basic hydrous carbonate of magnesium and iron, $MgCO_3 \cdot 5Mg(OH)_2 \cdot Fe(OH)_3 \cdot 4H_2O$. Micaceous, lamellar. From Van Malenco, Lombardy, Italy; Iron Hill, Colo. *English.*

bruise. A concentration of cracks in the surface of glassware caused by localized impact. *Dodd.*

Brulax system. An impulse system of oil firing, particularly for the top-firing of annular kilns, developed by A. A. Niesper in Switzerland, in 1955. *Dodd.*

brulee. Can. Windfall of daed trees and brush. Also called slash. *Hoffman.*

Brunauer, Emmett and Teller method. A procedure for the determination of the total surface area of a powder or of a porous solid by measurement of the volume of gas (usually N_2) adsorbed on the surface of a known weight of the sample. The mathematical basis of the method was developed by S. Brunauer, P. H. Emmett and E. Teller—therefore, the usual name B.E.T. method. *Dodd.*

brunnerite. A blue to violet variety of calcite that is found both as cuboid crystals and massive. *Standard, 1964.*

Brunner's yellow. An antimony yellow recipe given by K. Brunner in 1837; 1 part tartar emetic, 2 parts lead nitrate, 4 parts NcCL. The mixture is calcined and then washed free from soluble salts prior to its use as a ceramic color. *Dodd.*

bruno hand. *See* bruno man. *D.O.T. 1.*

brunoing. A term used in Arkansas and Missouri for pulling fine ore down from the working place, especially with the hands. From its similarity to the action of a bear. *Fay.*

bruno man. a. A term used in Arkansas and Missouri for one who removes fine ore from a working place, especially when the work is done with the hands. *See also* brunoing. *Fay.* b. In metal mining, one who loosens ore, blasted from the working face, with a pick or bar and pushes it down from a pile into contact with the scoop of a mechanical shovel or within reach of other muckers, to assist in loading cars. Also called bruno hand. *D.O.T. 1.*

brunstone. A Scotch form of brimstone. *Fay.*

brunsvigite. An olive-green to yellowish-green hydrous silicate of aluminum, iron, and magnesium, $9(Fe,Mg)O \cdot 2Al_2O_3 \cdot 6SiO_2 \cdot 8H_2O$. A chlorite near the metachlorite of the Buchenberg. Cryptocrystalline. Fine scaly masses. From Radauthal, Harz, Germany. *English.*

Brunton. A small pocket compass with sights and a reflector attached, used in sketching mine workings, as in mine examinations, or in preliminarly surveys. *Fay.*

Brunton compass. Synonym for Brunton. *Long.*

Brunton oscillating sampler. Consists of an oscillating divider swinging back and forth in a vertical plane beneath the feed spout. This cutter or divider is suspended on a horizontal shaft and swings through a 120° arc. The size of the cut made by a Brunton sampler can be changed by changing the speed of the cutter. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 467.*

Brunton sampler. a. A mechanical sampling device which automatically selects 1/625 part of the ore passing through the sampler. *Fay.* b. An oscillating deflector which cuts through a falling stream of ore and separates a fraction of it. *Pryor, 3.*

brush. a. N.S.W. To remove rock from the roof or floor of an opening to increase the height of working (coal mines) N.S.W. b. In a coal mine, a road through the goaf, gob, or worked-out areas packed with waste. *C.T.D.* c. To clean up fine coal from the floor. *C.T.D.* d. Mid. To mix gas with air in a mine by buffeting it with a jacket. *Fay.* e. Forest of Dean. A rich brown hematite. *Fay.* f. Mixed load into colliery tub of large and small coal. *Pryor, 3.* g. To rip; to enlarge. *Mason.* h. To remove bisque in a definite pattern by means of a brush. *ASTM C286-65.* i. A conductor arranged to make electrical contact between a stationary and a moving surface. *C.T.D.*

brush, bolthole. *See* bolthole brush. *ASTM C286-65.*

brush cast. *See* brush mark, b. *Pettijohn.*

brush cleaner. A device consisting of bristles set in a suitable backing used for cleaning a conveyor belt. It is usually of the rotary type. *See also* rotary belt cleaner. *ASA MH4.1-1958.*

brush coating. Layer or refractory mortar applied to a brick wall with a brush. *Bureau of Mines Staff.*

brush discharge. In high-intensity electrical fields, discharge from sharp points along a conductor. Electricity concentrates at these points and charges ambient molecules of air which are then repelled, carrying away charge. Phenomenon exploited in mineral processing in high-tension separation. *Pryor, 3.*

brusher. In mining, one who pries down rock or slate from the roof of an underground passageway to increase its height by using a bar, or if easier, may dig up clay, rock, or earth to lower the tracks the required amount. Also called dirt scratcher; ripper; rockman; stoneman. *D.O.T. 1.*

brushes. a. A small round brush used to remove bisque enamel from around boltholes prior to firing operation. *ACSB, 3.* b. In edging or margin, a stiff-bristle brush with metal guide used for the removal of bisque enamel along edges of ware before firing operation. *ACSB, 3.* c. In graining, a brush used for the application of graining paste to an enameled surface to produce a natural-wood grain effect. *ASCB, 3.* d. In stenciling, a flat hard-bristle brush used to remove bisque enamel from the stencil openings prior to firing operation. *ACSB, 3.* e. A power-driven circular brush. The article, from which the bisque enamel is to be removed, is guided across the front of the revolving brush. *ACSB, 3.*

brush hook. A short, heavy hook with an ax handle, used by surveyors for cutting brush. *Fay.*

brushing. a. Scot. That part of the roof or floor of a seam removed to form roadways. *Fay.* b. Digging up the bottom or taking down the top of an entry or room for the purpose of admitting cars where the seam of coal is too thin or shallow for the admission of cars. *See also* brush, a. *Fay.* c. Cutting or blasting down the roof of a coal seam. *Arkell.* d. Ripping; normally enlarging a road by taking down the roof, but extended to sides and floor as well. *Mason.* e. Eng. *See* canch, b. *SMRB, Paper No. 61.* f. Removal of dry enamel by brushing through a stencil or along an edge to produce a design or edging. *Bryant.* g. *See* brush, h. *ASTM C286-65.*

brushing bed. Scot. The stratum brushed or rippled. *See also* brush, a. *Fay.*

brushing shot. a. A charge fired in the air of a mine to blow out obnoxious gases or to start an air current. *Fay.* b. A shot so placed as to remove a portion of the roof to increase the height of a haulageway. *See also* brush, a. *Fay.*

brushite. A nearly colorless mineral, $CaHPO_4 \cdot 2H_2O$, concisting of calcium hydrogen phosphate in slender crystals or massive. *Webster 3d.*

brush mark. a. A surface imperfection found on the exterior of some bottles; the marks resemble a series of fine vertical laps and are also known as scrub marks. *Dodd.* b. Essentially a bounce cast with a crescentic depression on the downcurrent end. The depression is interpreted as the cast of a small ridge of mud pushed up by the impinging object. Also called brush cast. *Pettijohn.*

brush ore. An iron ore in stalactitic forms resembling a brush. *Webster 3d. See also* brush, e. *Fay.*

brush plating. Plating with a concentrated solution or gel held in or fed to an absorbing medium, pad, or brush carrying the anode (usually insoluble). The brush is moved back and forth over the area of the cathode to be plated. *ASM Gloss.*

brush rake. A rake blade having a high top and light construction. *Nichols.*

brush treatment. A method of treating mine timber in which the timber is painted with a preservative or merely dipped into a tank of preservative. Preservatives used are creosote, zinc chloride, sodium fluoride, and other chemicals. *Lewis, p. 71.*

bruskins. Mid. Lumps of coal weighing about 1 pound each. *Fay.*

brute. A rough or unpolished gem. Rarely used. *Hess.*

bruting. A method of roughly shaping diamonds by rubbing one against another. *Hess.*

Bruxellian. Lower middle Eocene. *A.G.I. Supp.*

Bryanizing. A process in which 99.99 percent pure zinc is electrochemically deposited as a coating on wire. *Sinclair, V. p. 9.*

Bryan mill. A three-roll (edge-roller) mill of the Chilean type. *Liddell 2d, p. 355.*

bryle. a. Traces of a vein of ore in loose earth on or near the surface. *Nelson.* b. Corn. *See* broil. *Fay.*

bryozoan. One of the Bryozoa or moss animals. An exclusively colonial animal that secretes a calcareous, horny, or membranous covering in a multitudinous variety of forms and structures. *A.G.I.*

BS Abbreviation for blowing snow. *Zimmerman, p. 17.*

BS; BSI Abbreviations for British Standard and British Standards Institution. The Institution is responsible for the preparation (through industry committees on which interested parties are represented) of national standards for Great Britain; copies of these standards, and of any foreign standard, can be obtained from the Institution at 2 Park Street, London, W. 1. *Dodd.*

B-scope. A cathode ray oscilloscope indicator having a rectangular plot of (target) range versus bearing. Spot brightness indicates echo intensity. *Hy.*

b. s. gang. The production crew, which, by maintaining pumping equipment, etc., in repair, keeps producing wells in operation. *Hess.*

BSI *See* BS. *Dodd.*

bte Abbreviation for brake thermal efficiency. *BuMin Style Guide, p. 58.*

B to B Abbreviation for back to back. *Zimmerman, p. 14.*

Btu Abbreviation for British thermal unit. *BuMin Style Guide, p. 58.*

bu Abbrevation for bushel. *BuMin Style Guide, p. 58.*

bubble. a. Air bubble in spirit level mounted on theodolite or level. *Pryor, 3.* b. A globule of air or other gas in a liquid; also, a vesicle of water or other liquid inflated with air or other gas. A term used in flotation. *Fay.*

bubble brick. A lightweight brick developed by the U.S. Bureau of Mines that is useful for nonload-bearing applications in all-basic furnaces. This refractory is made by pressing and baking into bricks millions of tiny bubbles formed when molten refractory materials are poured through an air-blast. They are lighter than standard refractory bricks and more resistant to the sudden, violent temperature changes known as thermal shock. *Bureau of Mines Staff.*

bubble cap. A small, hollow, chemical stoneware hemisphere with serrations around the bottom edge; used on stoneware trays in deacidifying towers in the chemical industry. *Dodd*

bubble chamber. A device that marks the paths of charged particles by photographing the train of bubbles they produce as they move through certain superheated liquids. *See also* cloud chamber; spark chamber. *L&L.*

bubble glass. Glassware containing gas bubbles sized and arranged to produce a decorative effect. *See also* foam glass. *Dodd.*

bubble hearth process. A process in which powdered iron ore is reduced with hydrogen to sponge iron in a bubble hearth furnace. The furnace has a flat, circular, hollow hearth made of alloy steel which is supplied with hot hydrogen gas under pressure through small inlets that dot the hearth. Ore is placed on the hearth and hot hydrogen is bubbled through it. *R.I. 4092, June 1947, p. 3.*

bubble impressions. Small depressions, not marked by raised rim, formed by gas bubbles; superficially resembling raindrop impressions. *Pettijohn.*

bubble pickup. Method of testing small grains of minerals to ascertain their response to flotation collector agents. A bubble of air is pressed down on particles under water, and then raised and examined to find whether it has lifted any grains. *Pryor, 3.*

bubble pipe. Tube inserted in pulp at regulated depth, through which compressed air is gently bubbled. The air pressure indicates the pulp density and provides a means of control. *Pryor, 4.*

bubble-pressure method. A technique for the determination of the maximum size of pore in a ceramic product; this size is calculated from the pressure needed to force the first bubble of air through the ceramic when it is wetted with a liquid of known surface tension. The method is used, for example, in the testing of ceramic filters. *Dodd.*

bubble pulse. A pulsation attributable to the bubble produced by a seismic charge fired produces an identical unwanted seismic times with a period proportional to the cube root of the charge; each oscillation produces an identical unwanted seismic effect. *A.G.I.*

bubbles. Air introduced near bottom of flotation cell containing pulped ore forms coursing bubbles, which rise through the liquid and emerge as mineralized bubbles forming a semistable froth column. This depends for its continuity partly on the surface-active reagents borne by the mineral in the air/water interphase of each bubble and partly on the aid of frothing reagents. *Pryor, 3.*

bubble structure. Size and spatial distribution of voids within the fired porcelain enamel. *ASTM C286-65.*

bubble tower. A closed cylindrical tower arranged with shelves on which is absorbing oil through which distilled gas is caused to bubble, and the heavier fractions of gas are absorbed. *Porter.*

bubbly clay. A clay which, because it contains small amounts of organic matter, causes bubbles if used in vitreous enamels. *Dodd.*

bubbly rock. Cavernous breccia with cavities between the fragments, Millstone grit, Bwlchgwyn quarries, Denbigh, Wales. *Arkell.*

bucaramangite. A resin resembling amber but insoluble in alcohol and yielding no succinic acid. *Fay.*

buchite. A glassy rock resulting from the fusion of a clay or shale block engulfed in a magma. *C.T.D.*

Buchner funnel. A porcelain filter shaped to support filter paper on a flat perforated disk. Much used for vacuum filtration of ore pulps. The residue on the filter is conveniently displayed for nine-point sampling. *Pryor, 3.*

buchnerite. A peridotite containing monoclinic and orthorhombic pyroxenes and for which the name lherzolite has been used. *Holmes, 1928.*

buchonite. An extrusive rock composed of labradorite, titanaugite, and titaniferous hornblende, with nepheline and sodic sanidine, and accessory biotite, apatite, and opaque oxides. The nepheline is commonly altered to analcite. The mafic constituents compose about 50 percent of the rock. A variety of tephrite. *A.G.I.*

buck. a. To break up or pulverize, as to buck ore samples. *Webster 3d.* b. To bring or carry, as to buck water. *Webster 3d.* c. A name given to large quartz reefs in which there is little or no gold. *Gordon.* d. In anthracite coal regions, to push coal down a chute toward a mine car. *Zern.* e. A dead plate. *ASTM C162–66.* f. A special support for ware during the firing of porcelain enamel on heavy ware. *ASTM C286–65.*

bucker. a. Derb. A flat piece of iron with a wooden handle, used for breaking ore. *Fay.* b. One who bucks or breaks ore. *Fay.* c. A laborer who pushes coal down a chute in pitching or inclined coal seams. *Fay.*

bucker helper. One who breaks ore. *Bureau of Mines Staff.*

bucket. a. A typically round and wooden vessel for drawing up water from a well. *Webster 3d.* b. A vessel (as a tub or scoop) for hoisting and conveying material (as coal, ore, grain, gravel, mud, or concrete). *Webster 3d.* c. The dipper or scoop at the end of the arm of a bucket dredge. *Webster 3d.* d. One of the receptacles on the rim of a water wheel into which the water rushes causing the wheel to revolve. *Webster 3d.* e. A float or paddle of a water wheel or of a boat's side wheel or stern wheel. *Webster 3d.* f. One of the containers of an endless-belt type of conveyor. *Webster 3d.* g. The piston of a well pump. It always contains a valve. It is connected to and operated by the sucker rods. *Fay.* h. Synonym for bailer, a; calyx, a. *Long.* i. Tubular containers equipped with auger- or other-type cutting edges used to make borings in earthy or soft formation by rotary methods. *Long.* j. An open-top can, equipped with a bail, used to hoist broken rock or water and to lower supplies and equipment to men working in a mine shaft or other underground opening. *Long.* k. The top valve or clack of a pump. *Zern.* l. One of the conveying units on a bucket conveyor that lifts the material from a boot or bin when passing over the lower sprocket and is dumped on passing over the upper sprocket. The bucket is often made of perforated metal so that water entrapped will pass through the perforations and back to the boot. *Zern.* m. A part of an excavator that digs, lifts, and carries dirt. *Nichols.*

bucket auger. A short helical auger incorporating a steel tube to help hold the cuttings on the auger during withdrawal from the drill hole. *See also* auger, a. *Long.*

bucket conveyor. A conveyor consisting of a continuous line of buckets attached by pivots to two endless roller chains running on tracks and driven by sprockets. The buckets are so pivoted that they remain in an upright position at all times except when tilted into a dumping position by a cam or other device placed at any required position on the track. *B.S. 3552, 1962. See also* bucket elevator; gravity discharge conveyor elevator; pivoted bucket conveyor. *ASA MH4.1-1958.*

bucket dredge. A dredge having two pontoons, between which passes a chain of digging buckets. These buckets excavate material at the bottom of the pond (paddock) in which the dredge floats, and deposit it in concentrating devices on the decks. *Pryor, 3.*

bucket drill; bucket drilling. Originally developed as an aid in making excavations for cesspools and septic tanks; now used mostly in drilling holes for concrete piers on construction jobs. The U.S. Bureau of Mines has found the bucket drill useful in obtaining samples of clay deposits and contends that this type of equipment excels in recovering fairly undisturbed samples of unconsolidated material and can be used for drilling holes up to 200 feet deep. *Bureau of Mines Staff.*

bucket dumper. *See* lander. *D.O.T. 1.*

bucket elevator. An appliance for elevating material, consisting of steel buckets fastened to an endless belt or chain. It is usually set at steep angles, around 70°. The load is picked up by discharge from a chute or by a dredging action in a boot. Its best application is in a plant where space is restricted and the material is minus

2 inches in size. *Nelson.*

bucket elevator belt. A belt fabricated for bucket elevator use, to which elevator bucket are attached. *ASA MH4.1-1958.*

bucket elevator, centrifugal discharge. *See* centrifugal discharge bucket elevator. *ASA MH4.1-1958.*

bucket elevator, continuous. *See* continuous bucket elevator. *ASA MH4.1-1958.*

bucket elevator, double leg. *See* double leg bucket elevator. *ASA MH4.1-1958.*

bucket elevator, gravity discharge. *See* gravity discharge conveyor-elevator. *ASA MH-4.1-1958.*

bucket elevator, internal discharge. *See* internal discharge bucket elevator. *ASA MH4.1-1958.*

bucket elevator, perfect discharge. *See* positive discharge bucket elevator. *ASA MH-4.1-1958.*

bucket elevator, pivoted. *See* pivoted bucket conveyor. *ASA MH4.1-1958.*

bucket elevator, positive discharge. *See* positive discharge bucket elevator. *ASA MH-4.1-1958.*

bucket elevator, super-capacity. *See* super-capacity bucket elevator. *ASA MH4.1–1958.*

bucket factor. *See* fill factor. *Woodruff, v. 3, p. 499.*

bucket gate. *See* bin gate.*ASA MH4.1-1958.*

bucket hooker. *See* can hooker. *D.O.T. 1.*

bucketing. Eng. The operation of removing a wornout pump bucket or clack, and replacing it with a new one. *Fay.*

bucket-ladder dredge; bucket-line dredge; ladder-bucket dredge. A dredge whose digging mechanism consists of a ladderlike truss on the periphery of which is attached an endless chain which rides on sprocket wheels and on which buckets are attached. *Bureau of Mines Staff.*

bucket-ladder excavator. A mechanical excavator working on the same principle as a bucket-ladder dredge, but adapted for use on land. *C.T.D. See also* trench excavator.

bucket lid. Scot. The flap of a bucket valve. *Fay.*

bucket lift. The discharge pipe of a lifting pump in a mine. *Standard, 1964.*

bucket line. An endless line of digging buckets on a dredger, or on a bucket elevator. *Pryor, 3.*

bucket-line dredge. *See* bucket-ladder dredge. *Bureau of Mines Staff.*

bucket loader. a. A form of portable, self-feeding, inclined bucket elevator for loading bulk materials into cars, trucks, or other conveyors. *See also* bucket elevator; portable conveyor, b. *ASA MH4.1–1958.* b. A machine having a digging and gathering rotor, and a set of chain-mounted buckets to elevate the material to a dumping point. *Nichols.*

bucket machine. *See* elevator pump. *Fay.*

bucket mounting. Scot. Leather or gutta percha packing of a pump bucket. *Fay.*

bucket piece. Scot. The pipe carrying the bucket door of a pump. *Fay.*

bucket pump. a. An iron or wooden receptacle for hoisting ore, or for raising rock in shaft sinking. *Fay.* b. A reciprocating lift pump formerly much used in shafts and sinkings. *Nelson.*

bucket rig. Synonym for rotary bucket drill. *Long.*

bucket rods. Eng. Wooden rods to which a pump piston is attached. *Fay.*

bucket sheave. A pulley attached to a shovel bucket, through which the hoist or drag cable is reeved. *Nichols, 2.*

bucket shell. Scot. The cast-iron or brass frame of a pump bucket. *Fay.*

bucket sword. Eng. A wrought-iron rod to which a pump bucket is attached, having at its upper end a knocking-off joint. *Fay.*

bucket temperature. The surface temperature of the sea as measured by a bucket thermometer or by immersing a surface thermometer in a freshly drawn bucket of water. *H&G.*

bucket thermometer. A water-temperature thermometer provided with an insulated container around the bulb. It is lowered into the sea on a line until it has had time to reach the temperature of the surface water, then withdrawn and read. The insulated water surrounding the bulb preserves the temperature reading and is available as a salinity sample. *H&G.*

bucket tree. Eng. The pipe between the working barrel and the windbore of a pump. *Fay.*

bucket tripper. A device that tilts or turns the buckets of a pivoted bucket conveyor causing them to discharge. It may be fixed or movable. *ASA MH4.1-1958.*

bucket wheel excavator; BWE. A continuous digging machine originally designed and used in large-scale stripping and mining of East German brown coal deposits. Its digging mechanism is essentially a boom on which is mounted a rotating vertical wheel having buckets on its periphery. As the rotating wheel is pressed into the material to be dug, the buckets cut, gather, and discharge the material onto a conveyor belt where it is moved to the mined materials transport system. *Bureau of Mines Staff.*

bucking. a. Derb. The act of breaking or pulverizing ore. The bucking hammer or bucking iron is a broadheaded hammer used for this purpose, and the ore is broken on a flat piece of iron (bucking plate). *Fay.* b. Sawing a long log into shorter pieces. *Nichols.*

bucking hammer. A rectangular piece of cast iron 5 or 6 inches across, usually rounded fore and aft with an eye on the back and with a wooden handle; used for grinding ore on a cast-iron bupcking board. *Hess.*

bucking iron; bucking plate. An iron plate on which ore is ground by hand by means of a bucking hammer. Used extensively for the final reduction of ore samples for assaying. *Barger.*

bucking plate. *See* bucking iron.

bucking ore. A hand process of crushing ore. *Fay.*

bucking tool. A dolly for supporting a rivet. *Ham.*

bucklandite. a. A black variety of epidote having a tinge of green, and differing from ordinary epidote in having the crystals nearly symmetrical and not, like other epidote, lengthened in the direction of the orthodiagonal; from Achmatovsk, Ural Mountains. *Fay.* b. Anhydrous allanite in small black crystals; from Arendal, Norway. *Fay.*

buckle. *a.* The bend in a piece of drill-stem equipment induced by excessive feed pressure. *Long.* b. The deformation of component members of a drill derrick, tripod, or mast, caused by attempting to hoist too heavy a load or by applying excessive strain when pulling on stuck casing, etc. *Long.* c. A defect in a metal bar or sheet characterized by a waviness which is usually transverse to the direction of rolling. *ASM Gloss.* d. An indentation in a casting resulting from expansion of the sand. *ASM Gloss.*

bucklers; tacklers. Derb. Small chains put around the coal when loaded in corves, to prevent it falling off. *Fay.*

buckling. Producing a bulge, bend, bow, kink, or other wavy condition in sheets or plates by compressive stresses. *ASM Gloss.*

buckling length. The length of drill rod that will withstand flexure or bending when subjected to a specific feed pressure or compressional load. *Long.*

buckling load. The maximum load expressed in pounds or tons that can be imposed on a string of drill rods, casing, or pipe, or on a drill tripod, derrick, or mast without the string; also, a part being bent or buckled. *Long.*

Buckman table. Mechanized form of Cornish ragging (racking) frame. Ore pulp is fed gently over a number of parallel and superimposed sluices or tables. At short-timed intervals the feed is switched to a parallel group, while the original tables are tilted sharply back and washed clean of settled mineral. *Pryor 3.*

buck plates. Steel plates at ends of tie rods used to strengthen brickwork of furnace. *Pryor, 3.*

buck quartz. Barren quartz veins. Also called bull quartz. *Bureau of Mines Staff.*

buck reef. A barren vein; bull quartz. *Hess.*

buckshot. a. Aust. Small concretionary nodules of iron oxide or manganese oxide in soil. *A.G.I. Supp.* b. Synonym for shot. *See also* shot, h. *Long.*

buckshot cinder. Cinder from the iron blast furnace, containing grains of iron. *Fay.*

buckshot gravel. Natural accumulation of small, accretionary limonite nodules developed in soil. *A.G.I. Supp.*

buckshot land; buckshot soil. a. Land or soil filled with rounded lumps of the size of buckshot, or which, by weathering, breaks up into such lumps. *Standard, 1964.* b. Land or soil containing many limonitic nodules. *Standard, 1964.*

buckshots. Early nickname of Molly Maguires. *Korson.*

buckstay. An upright iron or steel brace resting upon or built into a boiler setting or furnace wall to support the brickwork. *Zern.*

buckstone. Rock not producing gold. *Compare* buck quartz. *Fay.*

buck up. a. To screw two threaded members, such as drill rods, together tightly. *Long.* b. To shore up with lagging; to brace. *Long.*

buckwheat; buckwheat coal. In anthracite only. Buckwheat is divided into four sizes: No. 1, or buckwheat; No. 2, or rice; No. 3, or barley; No. 4, or barley No. 2, or silt (sometimes also called culm or slush). Buckwheat No. 1 passes through a ½-inch woven wire screen and over a 5/16-inch woven wire screen, through a 9/16-inch round punched plate and over a ⅜-inch round punched plate. The American Institute of Mechanical Engineers has recommended that buckwheat No. 1 shall pass through 9/16-inch holes and over 5/16-inch holes, a screen with circular holes being used. *Fay. See also* anthracite coal sizes.

buckwheat slate. A friable slate (shale) that requires careful timbering in headings driven through it. It crumbles badly at or near the surface of the ground. *Fay.*

Bucky diaphragm. An X-ray scatter-reducing device originally intended for medical radiography but also applicable to industrial radiography in some circumstances. Thin strips of lead, with their width held parallel to the primary radiation, are used to absorb scattered radiation preferentially; the array of strips is in motion during exposure, to prevent formation of a pattern on the film. *ASM Gloss.*

buddagh. Ir. A highly carbonaceous, soft, muddy looking fire clay, from Leinster. *Fay.*

buddle. a. Circular arrangement in which finely divided ore, in water, is delivered from a central point and flows gently to the perimeter. The heaviest and coarsest particles bed down while the lightest overflow. Several variants include concave buddle with peripheral feed and central discharge, and continuous buddles as differentiated from those which are periodically stopped and cleaned up. *Pryor, 3.* b. To separate (ore) from slime or stamp work by means of a buddle. *Standard, 1964.*

buddler. A workman who works an inclined trough or plane for washing out the light particles of a crushed ore. *Sandstrom.*

buddling. Washing. *Zern.*

buddles. Pans, with rapidly revolving agitators, into which tailings or water from ore dressing passes before being finally run away. *Gordon.*

buddle work. a. Eng. Dressed and partly dressed ore obtained from the buddle. *Fay.* b. Upgrading of tin slimes by gentle sluicing in which a bed of retained material is built up (buddled), while a lighter (tailing) fraction overflows. *See also* buddle, a. *Pryor, 3.*

buddy. A partner; each of two men who work in the same working place of a mine. Sometimes spelled buddy. *Fay.*

Buddy. A shortwall coal cutter designed for light duty such as stabling on longwall power-loaded faces and for subsidiary developments. *Mason, v. 2, p. 576.*

buddy system. In scuba diving, divers with few exceptions should work in pairs. This is probably the greatest single aid toward scuba safety, especially under unfavorable conditions. The divers should remain in sight of each other. In poor visibility, they should use a buddy line 6 to 10 feet long. *H&G.*

budgetary control. Economic factor in process control, in which agreed costs are established for a period concerning the quantities and qualities involved in a defined technical operation. The operation must then be controlled within these agreed terms of reference. *Pryor, 3.*

buetschliite. A hydrous potassium and calcium carbonate, $3K_2CO_3.2CaCO_3.6H_2O$. Probably hexagonal; formed by the hydration of fairchildite in the fused wood ash of burnt trees. (Not the butschliite of R. Lang, 1914). *Spencer 18, M.M., 1949.*

buff brick. A light-colored brick usually light cream to light tan. *Bureau of Mines Staff.*

buffed top. A term used for any stone which is faceted below the girdle, with a slightly convex surface above the girdle produced by polishing on a buff instead of a metal lap. *Shipley.*

buffer. a. Any of various devices, apparatus, or pieces of material designed primarily to reduce shock due to contact as: (1) an apparatus on the end of a railway car to close the space between adjoining cars and to absorb shocks incident to car coupling and movement; and (2) a bumper-type shock absorber usually installed in pairs on the ends of railway cars in Europe. *Webster 3d.* b. A rotating head covered with felt or other soft material. It is supplied with a fine polishing powder and is employed to polish the surface of stone. *Fay.* c. A pile of blasted rock left against or near a face to improve fragmentation and reduce scattering from the next blast. *Nichols.* d. A movable metal plate used in tunnels to limit scattering of blasted rock. *Nichols.* e. In the stonework industry, one who uses a portable electric motor with a felt buffing head and putty (polishing) powder to produce a lustrous finish on marble and granite *D.O.T.1.* f. A substance whose purpose is to maintain a constant hydrogen-ion concentration in water solutions, even where acid or alkalies are added. *ASM Gloss.* g. The act of buffering. *Bureau of Mines Staff.* h. A workman who finishes ceramic ware by grinding with small grinders or buffers to remove sharp edges and other surface defects. *See also* ware dresser. *Bureau of Mines Staff.* i. *See* marble polisher. *D.O.T.1.*

buffer bar. The heavy iron bar of a railroad car buffer. *Webster 2d.*

buffer beam. Scot. Beams fired in a shaft to prevent pump rods from traveling too far. *Fay.*

buffer block. A block serving as a buffer. *Webster 2d.*

buffer rope. Aust. A rope suspended between the cages in a shaft where rope guides are employed, so as to prevent the cages from colliding. *Fay.*

buffer shooting. Same as blanket shooting. *Fay.*

buffer solution. One which maintains a nearly constant pH despite the addition of considerable quantities of acid or alkali. Reagents which produce this buffering effect consist of a strong base and a weak acid, or vice versa. Salts are of such acids as acetic, carbonic, and phosphoric, which have low dissociation. *Pryor, 3.*

buffer stop. A heavy sleeper or bar set across the track rails to stop cars at terminal points on sidings. *Nelson.*

buffer thimble. A cast-iron bushing on the end timber of the platform of a car. *Standard, 1964.*

buffing. a. Developing a lustrous surface by contacting the work with a rotating buffing wheel. *ASM Gloss.* b. The final stage in stone polishing that consists of polishing the surface with revolving pads of paper-mill felt supplied with putty powder—fine-grained tin oxide. *Compare* ironing, a; emerying. *AIME, p. 328.*

buffing machine. A machine used for buffing or polishing. *Fay.*

buffing oil. A viscous oil used with polishing or buffing wheels. *Hess.*

buffing wheel (buff). Buff sections assembled to the required face width for use on a rotating shaft between flanges. *ASM Gloss.*

buff section. A number of fabric, paper, or leather disks with concentric center holes held together by various types of sewing to provide degrees of flexibility or hardness. These sections are assembled to make wheels for polishing. *ASM Gloss.*

buff stick. A piece of stick covered with leather or velvet and charged with emery or other powder. Used in polishing. *Fay.*

buff stone. *See* Cornish stone. *Hess.*

buff ware. A stoneware made from clay and other ingredients; it is not decorated. *Fay.*

buff wheel. A buffing wheel. *Webster 2d.*

bug. a. A bullet or go-devil. *See also* bullet, b. *Long.* b. Synonym for vug. *Long.*

bug dust. a. The fine coal or other material resulting from a boring or cutting of a drill, a mining machine, or even a pick. *Fay.* b. Fine, dry, dustlike particles of rock ejected from a borehole by a current of pressurized air when compressed air, instead of a liquid, is used as a cuttings removal agent. *Long.* c. Fine coal or rock material resulting from dry boring, drilling, or the use of other cutting machines in underground work places. *Long.*

bug duster. An attachment used on shortwall mining machines to remove cuttings (bug dust) from back of the cutter and to pile them at a point which will not interfere with operation. *ASA C42.85:1956.*

bug dusting. Removing bug dust from the undercut. *B.C.I.*

bugger. *See* machine scraper. *D.O.T. 1.*

buggeroo. N. Wales. A dolomite bed in the Carboniferous limestone, Hunts quarry, Porthywaen. *Arkell.*

buggied. Penna. Said of coal moved underground in a small car. *Hess.*

buggy. a. A small wagon or truck used for short transportation of heavy materials (as coal in a mine or ingots in a steel mill). *Webster 3d.* b. A four-wheeled steel car used for hauling coal to and from chutes. *Fay.* c. A mine car of small dimensions, sometimes used in thin beds. *Hudson.* d. Slang for a shuttle car. *B.C.I.* e. Bug dust. *Mason.*

buggyman. *See* barrowman. *D.O.T. 1.*

bug hole. a. A small cavity, in a rock, usually lined with crystals. *Fay.* b. Synonym for vug. *Long.*

bug light. Slang for a miner's electric cap lamp. *B.C.I.*

bugor. An elevation of ground or succession of hillocks separating creeks or ravines, as on the shore of the Black Sea. *Standard, 1964.*

bugre. Braz. Pockets of yellow clay, rich in gold, found especially in contact with the itabirites and quartzites. *Fay.*

Buhrer kiln. The zigzag kiln invented by J. Buhrer. *See also* zigzag kiln. *Dodd.*

buhrmill. a. A stone disk mill, with an upper horizontal disk rotating above a fixed lower one. Grist is fed centrally and discharged peripherally. Stones are dressed periodically, channels being cut to facilitate passage. Also applied to other rubbing mills, for example, conical porcelain or steel ones in which a grooved cone rotates in a close fit in a fixed casing. Also spelled burrmill. *Pryor, 3.* b. A stone mill, consisting of one stationary stone and one revolving stone, for grinding pigment pastes. *Bennett 2d, 1962.*

buhrstone; burrstone; burstone. a. Certain varieties of porous open-textured calcareous-cemented sandstone which, because of the angular character of the sand grains, are suitable for millstones. *Holmes, 1928.* b. A silicified fossiliferous limestone, with abundant cavities which were formerly occupied by fossil shells. Its cellular character and its toughness occasioned extensive use of it as a millstone formerly. *Fay.*

buhrstone mill. A grinding mill with two horizontal circular stones, one revolving upon the other as in an old-fashioned grain mill. *Mersereau, 4th, p. 234.*

builder. a, A fire clay brick cull used for bottom construction in kilns, or for boxing brick during burning. *Bureau of Mines Staff.* b. A material, such as an alkali, a buffer, or a water softener added to soap or a synthetic surface-active agent to produce a mixture having enhanced detergency. Examples: (1) Alkalies—caustic soda, soda ash, and trisodium phosphate; (2) buffers—sodium metasilicate and borax; and (3) water softeners—sodium tripolyphosphate, sodium tetraphosphate, sodium hexametaphosphate, and ethylene tape, b. *Crispin*.

builders' tape. A long measuring tape of steel or fabric contained in a circular case, usually 50 or 100 feet in length. *See also* tape, b. *Crispin*

builders up. Eng. Men who make packs and set timber, in ironstone mines. *Fay*.

buildhouse. *See* bildas. *Fay*.

building. Som. A built-up block, or pillar of stone or coal, to carry the roof. *See also* cog. *Fay*.

building brick. A block of clay material usually fired to form a stable mass; used for general building purposes. *ACSG, 1963*.

building clay. *See* brick clay. *Dodd*.

building lime. May be quicklime or hydrated lime (but usually connotes the latter), whose physical characteristics make it suitable for ordinary or special structural purposes. *Boynton*.

building sand. Sand used in erecting buildings, particularly for making mortar and wall plaster. *Hess*.

building stone. a. Any stone used in masonry construction, generally stone of superior quality that is quarried and trimmed or cut into regular blocks. *A.G.I. Supp*. b. Includes all stones for ordinary masonry construction, ornamentation, roofing, and flagging. Countless different kinds of rocks are used. Practically all varieties of igneous, sedimentary, and metamorphic rocks are included, but a few varieties stand out prominently because of their durability and widespread occurrence. In its broader sense, the term includes stone in any form that constitutes a part of a structure; however, cut or rough-hewn blocks for exterior walls are most widely used. *Stokes and Varnes, 1955*.

building unit. As applied to structural clay products, a unit, the specifications for which include measures of durability, strength, and other structural properties, but not requirements affecting appearance. *ASTM C43-65T*.

build up. To increase the thickness ot a metal part by welding additional metal to the surface of the part. *Long*.

buildup sequence. The order in which weld beads are deposited, generally designated in cross section. *ASM Gloss*.

built-in. *See* fixed. *Ro*.

built platform. *See* wave-built platform. *Schieferdecker*.

built-up. a. *See* chunked-up. *Fay*. b. *See* build up. *Long*.

built-up edge. Chip material adhering to the tool face adjacent to the cutting edge during cutting. *ASM Gloss*.

built-up mica. A composite material built to any desired thickness by alternating layers of overlapped splittings and a suitable binder, usually organic, and them formed into sheets, plates, or special configurations by heating, pressing, and trimming. *Skow*.

built-up work. Terra-cotta articles formed of plastic clay in pieces or sections, generally by hand. *Mersereau, 4th, p 269*.

bulb. The glass container holding the filament of an electric filament lamp or the electrodes of an electric discharge lamp. *C.T.D*.

bulb angle. A steel angle section which has been enlarged to a bulb at one end. *See also* beaded section. *Ham*.

bulb edge. The heavy rounded edge or bead of sheet-drawn glass. *ASTM C162-66*.

bulb of pressure. a. The area of compressed soil beneath a loaded foundation; the lines of equal vertical stress, of bulb shape, below a footing, obtained from the Boussinesq equation. *Ham*. b. *See* pressure bulb. *ASCE P1826*.

bulb opal. Menilite opal. *Shipley*.

bulb trailer. A slip trailer made with a rubber bulb. *See also* slip trailer. *ACSG*.

bule. a. Eng. A bit of iron put around pistons. *Fay*. b. Derb. The handle or bail of an ore bucket. *Fay*.

bulget finish. *See* finish. *Dodd*.

bulging. Expanding the walls of a cup, shell, or tube with an internally expanded segmented punch or a punch composed of air, liquids, or semiliquids such as waxes, rubber, and other elastomers. *ASM Gloss*.

bulgram. Eng. Term used in Cumberland for a parting shale in a coal seam. *Tomkeieff, 1954*. Same as tom.

bulk. Brist. Run-of-mine coal in large quantities. *Fay*.

bulk beds. The main coal seams, South Ireland. *Campare* post, h. *Arkell*.

bulk density. a. The weight of an object or material divided by its material volume less the volume of its open pores. *ACSG, 1963*. b. The ratio of the weight of a collection of discrete particles to the volume which it occupies. *B.S. 3552, 1962*. c. The weight of a material, on being compacted in a defined way, per unit volume (including voids). *Taylor*. d. The weight per unit volume of any material including water; the weight in pounds per cubic foot. *Nelson*. e. Synonymous with apparent density; loading weight. *ASTM B243-65*.

bulk flotation. The intentional raising as a mineralized froth of more than one mineral in one operation. *Pryor, 4*.

bulkhead. a. A tight partition of wood, rock, and mud or concrete in mines for protection against gas, fire, and water. *Fay*. b. A masonry diaphragm built across a subaqueous tunnel where compressed air is used, as a precaution and to prevent the flooding of an entire tunnel in case of an accident. It is usually kept some distance in the rear of the working face, and is provided with two air locks; one of them is an emergency lock near the roof. *Stauffer*. c. A wall or partition erected to resist ground or water pressure. *Nichols*. d. A timber chock in metal mines. *Nelson*. e. A watertight dam containing some form of door or removable plate. *B.S. 3618, 1963, sec. 4*. f. The end of a flume, whence water is carried in iron pipes to hydraulic workings. *Fay*. g. A solid crib used to support a very heavy roof. *See also* cog; chock. *Fay*. h. A panel of brick of lesser cross-sectional thickness built into a wall for ease of replacement or for entrance to the walled chamber. *AISI No. 24*.

bulking. a. The increase in volume of a material due to manipulation. Rock bulks upon being excavated; damp sand bulks if loosely deposited, as by dumping, because the apparent cohesion prevents movement of the soil particles to form a reduced volume. *ASCE P1826*. b. The difference in volume of a given mass of sand or other fine material in moist and dry conditions; it is expressed as a percentage of the volume in a dry condition. *Taylor*.

bulking agent. Chemically inert materials for increasing the volume of a composition, for example, clay. *Bennett 2d, 1962*. Also called a filler. *See also* filler. *Bureau of Mines Staff*.

bulk mining. A method of mining in which large quantities of low-grade ore are mined without attempt to segregate the high-grade portions. *Newton, p. 6. Compare* selective mining, a.

bulk modulus. a. The number that expresses a material's resistance to elastic changes in volume; for example, the number of pounds per square inch necessary to cause a specified change in volume. *Leet*. b. Under increasing force per unit area a body will decrease in size but increase in density. *A.G.I*.

bulk modulus of elasticity. The ratio of a tensile or compressive stress, triaxial and equal in all directions (for example, hydrostatic pressure), to the relative change it produces in volume. *Ro*.

bulk oil flotation. a. A flotation process in which large amounts of oil are used. *Fay*. b. In this process the separation of mineral from gangue is accomplished by virtue of the fact that minerals of metallic luster, such as sulfides, or hydrocarbons, as coal and graphite, are wetted preferentially by oil in the presence of water and consequently pass into the interface between oil and water; while gangue or rock is wetted by water and remains in the medium. *Mitchell, p. 570*.

bulk oil separation. A concentration process based on selective wetting of minerals by oil in the presence of water and in the absence of air. *E.C.T., v. 8, p. 935*.

bulk pit excavation. Primarily excavation of considerable length as well as of substantial volume or bulk that must be hauled from the site of operations. Also called embankment digging. *Carson, pp. 28, 36*.

bulk samples. Large samples of a few hundredweight or more taken at regular though widely spaced intervals. In the case of coal, a car load may be taken at intervals for size analysis and dirt content. *See also* grab sample. *Nelson*.

bulk specific gravity (**specific mass gravity**). Ratio of the weight in air of a given volume of permeable material (including both permeable and impermeable voids normal to the material) at a stated temperature to the weight in air of an equal volume of distilled water at a stated temperature. *ASCE P1826*.

bulk spreader. A machine for carrying and spreading cement or other material in soil stabilization. *Nelson*.

bulk strength. The strength per unit volume of an explosive and depends upon the weight strength and density. *Nelson*. It is obtained by multiplying the weight strength of an explosive by its density and dividing by the density of the blasting gelatin, which is 1.55 *McAdam II, p. 17*.

bulk volume. A term used relative to the density and volume of a porous solid, for example, a refractory brick. It is defined as the volume of the solid material plus the volume of the sealed and open pores present. *Dodd*.

bulk wide-area excavation. In this kind of excavation, there is complete access to the site from many directions, and the excavation banks can be sloped flatly on two or more sides. Usually shallower in depth than bulk pit excavations but larger in area. *Compare* bulk pit excavation. *Car-*

son, p. 28.

bull. a. An iron rod used in ramming clay to line a shothole. *Stauffer.* b. Aust. *See* drag, a and b; backstay. *Fay.* c. N.S.W. To enlarge the bottom of a drilled hole to increase the explosive charge. *New South Wales.* d. One who purchases shares in the hope that their price will rise. *Hoov, p. 285.*

Bullard Dunn Process. Electrolytic method of descaling iron and steel and coating surface with protective layer of tin. *Pryor, 3.*

bull bit. A flat drill bit. *Fay.*

bull block. A machine with a power-driven revolving drum for cold drawing wire through a drawing die as the wire winds around the drum. *ASM Gloss.*

bull clam. A bulldozer fitted with a curved bowl hinged to the top of the front of the blade. *Nichols.*

bulldog. a. A type of drill-rod-foot safety clamp built somewhat like a spider and slips, but differing by having the slips or movable jaws attached to, and actuated by, a foot-operated lever. *Long.* b. A general term applied to rod and/or casing safety clamps having both fixed and movable serrated jaws that contact and securely grip the rods or casing. *Long.* c. A fishing tool consisting of a steel body, tapered at the top, on which slide two or more wedge-shaped, serrated face segments. Lowered into a tubular piece of lost equipment, such as casing, the serrated segments are pushed upward toward the narrow part of the body, and when the tool is raised, the segments are forced outward, securely gripping the lost equipment. Also called bulldog spear; casing dog; casing spear. *Long.* d. To pull or move a drill machine or auxiliary equipment by means of a block and tackle or by power derived from a rope used on the drill cathead or hoist drum. Also called cat; snake. *Long.* e. Roasted tap cinder consisting of ferric oxide and silica, derived from the puddling furnace. It is a refractory material and is used for fettling the puddling furnace. *Osborne.*

buldog clamp. *See* bulldog, a. *Long.*

bulldog grip. A V-bolt threaded at both ends, often used as a rope clamp. *Ham.*

bulldog spear. *See* bulldog, c. *Long.*

bulldoze. a. To level or excavate earth surface by means cf a heavy, adjustable steel blade attached to the front end of a tractor or a wheeled vehicle. *Long.* b. To reduce broken rock by the use of explosives to a size handy for raising to the surface. *See also* mudcap; secondary blasting. *Fay.*

bulldozer. a. A tractor on the front end of which is mounted a vertically curved steel blade held at a fixed distance by arms secured on a pivot or shaft near the horizontal center of the tractor. The blade can be lowered or tilted vertical by cables or hydraulic rams. It is a highly versatile piece of earth excavating and moving equipment especially useful in land clearing and leveling work, in stripping topsoil, in roadbuilding and ramp building, and in floor or bench cleanup and gathering operations. Also called dozer. *Bureau of Mines Staff.* b. In nonmetal mining, a laborer who breaks up large stones with a sledge hammer or pneumatic drill so they will pass through grizzly (grating) in limestone mine. *D.O.T. Supp.* c. A horizontal machine, usually mechanical, having two bull gears with eccentric pins, two connecting links to a ram, and dies to perform bending, forming, and punching of narrow plate and bars. Railroad car sills are formed with a bulldozer. *ASM Gloss.* d. A cleaning blade that follows the wheel or ladder of a ditching machine. *Nichols.* e. In a machine shop, a horizontal press. *Nichols.*

bulldozing. a. The blasting of large boulders or pieces of broken ore on the surface or underground to reduce them to a size suitable for handling and feeding to crushers. Short holes are ordinarily drilled in the blocks of stone or ore and are loaded with a small charge of explosive. Sometimes a stick of dynamite is laid on the rock and covered with a double handful of mud and then exploded, this is known as mudding. In large mines this is done in special chambers. *Hess.* b. The movement of ground or ore by means of a curved plate or pusher in front of a heavy gasoline-driven machine. *Hess.*

bulle. A gas bubble in a mineral-enclosed cavity nearly filled by a liquid. *Hess.*

bulled hole. A quarry blasting hole, the bottom of which has been enlarged or chambered to receive a heavy explosive charge. *See also* chambering. *Nelson.*

bull engine. A single, direct-acting pumping engine, the pump rods forming a continuation of the pistol rod. *Zern.*

buller shot. a. Som. A second shot put in close to and to do the work not done by a blown-out shot, loose powder being used. *Fay.* b. Scot. a blown-out shot. Also called buller. *Fay.*

Buller's rings. Buller's firing trial rings indicate the work done by heat by their contraction. *Rosenthal.*

bullet. a. A small, lustrous, nearly spherical industrial diamond. *Long.* b. A conical-nosed, cylindrical weight, attached to a wire rope or line, either notched or seated to engage and attach itself to the upper end of the inner tube of a wire-line core barrel or other retrievable or retractable device placed in a borehole. Also called bug; go-devil; overshot. *Long.* c. A scraper with self-adjusting spring blades, inserted in a pipeline and carried forward by the fluid pressure, clearing away accumulations and/or debris from the walls of the pipe. Also called go-devil. *Long.* d. A bullet-shaped weight or small explosive charge dropped to explode a charge of nitroglycerin placed in a borehole. Also called go-devil. *Long.*

bulletin. a. A large tabulation sheet on which the weight of each carload of coal each miner sends out is entered. Also called coal bulletin. *Fay.* b A brief or condensed public notice or announcement usually concerning a matter of marked current interest and issuing from a source that might reasonably be considered authoritative. *Webster 3d.* c. A class of publications issued by the U. S. Bureau of Mines; U. S. Geological Survey; etc. *Fay.*

bullets. Eng. Masses of marl full of fibrous gypsum, as much as 15 feet thick, Derbyshire and Staffordshire. Also called balls; pillars. *Arkell.*

bullfrog. *See* barney. *Fay.*

bull gear. a. A toothed driving wheel which is the largest or strongest in the mechanism. *Nichols. b.* A gear or sprocket that is much larger than the others in the same power train. *Nichols.*

Bullgrader. Trade name for an international (formerly Bucyrus-Erie) angling dozer. *Nichols.*

bullhead. *See* key brick. *Dodd.*

bullheader. A bull-nosed brick used as a rowlock. *ACSG, 1963.*

bullhead rail. A track rail developed in Great Britain, rounded at the top and bottom, and supported by a cast-iron chair. *Ham.*

bullies. Fragments of country rock enclosed in a mineral vein. *Compare* bulls. *Arkell.*

bulling. a. The firing of explosive charges in the cracks of loosened rock. The clay stemming is forced around the charge by a bulling bar. *See also* bulled hole. *Nelson.* b. Lining a shothole with clay. *Stauffer.*

bulling bar. An iron bar used to pound clay into the crevices crossing a borehole, which is thus rendered gastight. *Compare* bull, a. *Fay.*

bulling shovel. A triangular, sharp-pointed shovel used in ore dressing. Also called vanning shovel. *Fay.*

bullion. a. Uncoined gold or silver in the shape of bars, ingots, or comparable masses. *Webster 3d.* b. Concretion found in some types of coal; composed of carbonate or silica stained by brown humic derivatives; often well-preserved plant structures form the nuclei. *A.G.I.* c. Lanc. Nodules of clay ironstone, pyrite, shale, etc., which generally enclose a fossil. *Fay.* d. A semirefined alloy containing sufficient precious metal to make recovery profitable. *ASM Gloss.* e. Refined gold or silver, uncoined. *ASM Gloss.* f. Flat glass of uneven thickness made by handspinning of a gob of glass at the end of an iron rod. *Bureau of Mines Staff.*

bullion balance. A sensitive beam balance of heavy construction that is used for weighing bullion and specie. *Webster 3d.*

bullion bar. a. Refined gold or silver in the form of bars of convenient sizes and weights for handling and storage. *Henderson.* b. A bar upon which the molten glass at the end of a blowing tube is rested to assist in bringing it into special shape *Fay.*

bullion content. Bullion (gold or silver) weight in a parcel of mineral or metal changing hands. The major value is that of the carrier (for example argentiferous lead), but payment is made both for this and for the precious metal. *Pryor, 3.*

bullion point. The centerpiece of a sheet of glass made by the old method of spinning a hot glass vessel in a furnace until it opened out under centrifugal action to a circular sheet. The centerpiece bears the mark of attachment to the rod used to spin the sheet. The method is obsolete now, but is revived for antique effects. *C.T.D.*

bullions. a. Eng. Usually calcareous concretions; occasionally ironstone nodules or quartzite boulders, Lancashire. *Nelson.* b. Eng. Coal balls. Spherical concretionary cement stones in the coal seams and shales, Lancashire. *Arkell.*

bull ladle. Usually the largest ladle in the foundry. *Bureau of Mines Staff.*

bull mica. Large clusters of diversely oriented and partially intergrown crystals of muscovite with a little interstitial albite and quartz. *Skow.*

bullnose; jamb brick. A building brick or refractory brick having one end face rounded to join one side face. Such bricks built above one another can be used to form a rounded jamb, hence the alternative name jamb brick. *Dodd.*

bullnose bit. A noncoring bit having a convex, helf-hemispherical-shaped crown or face. Also called wedge bit; wedge reaming bit; wedging bit. *Long. See also* plug bit, b.

bullock gear. *See* horse gear. *Pryor, 3.*

bull plugs. Plugs that are screwed into the end of an unfinished pipeline to keep out dirt and small animals; made of a short pipe nipple having one end closed by welding or pressed in oval form and the other end threaded. *Porter.*

bull point. a. Synonym for boulder buster, a. *Long.* b. A sharp-pointed steel bar. *Long.* c. A large steel point driven with a sledge. *Fay.*

bull pump. Corn. A direct single-acting pump, the steam cylinder of which is placed over the top of a shaft or slope, and the piston rod attached to the pump rods. The steam lifts the piston end pump rods and the weight of these produces the downstroke. *Fay.*

bull pup. A worthless mining claim. *Fay.*

bull quartz. A miner's or prospector's term for white, coarse-grained barren quartz. *A.G.I.*

bull reel. The churn drill winch that lifts and lowers the drill string. Also called spudding reel. *Nichols.*

bull rope. A heavy rope or cable from which a cable drill and stem are suspended and by means of which they are lifted and dropped, or churned up and down, in drilling a borehole. *Long.*

bulls. Eng. Ragged bulls, two or three layers of shelly limestone, which pass into hard calcareous sandstone, in the Purbeck bed of Sussex. *Arkell.*

bull's-eye. Labradorite with a dark sheen. *Shipley.*

bull's-eyes. Nodules of pyrite in roofing slate. *Fay.*

bull's-eye tuyere. A tuyere discharging in the center of a hemispherical plate. *Standard, 1964.*

bull shaker. A shaking chute where large coal from the dump is cleaned by hand. *Zern.*

Bull's kiln. A clamp of a type designed by W. Bull in which the bricks to be fired are set in a trench below ground level; this type of kiln finds some use in India. Also known as bock kiln. *See also* clamp. *Dodd.*

bull wheel. a. The large winding drum on which the drill cable or bull rope of a churn or cable-tool drill is wound. *Long.* b. Large sheave at the top of the mine-shaft headframe over which the cage- or skip-hoist rope passes. *Long.* c. An underground sheave wheel; particularly, the wheel around which the tail rope is passed beyond each terminal of a tail-rope haulage system. *Fay.* d. A reel used in rope drilling to accommodate the boring rope by which the bit is suspended in the hole. *B.S. 3618, 1963, sec. 3.* e. A large driving wheel or sprocket. *Nichols.* f. A driving sprocket for a crawler track. *Nichols.* g. The pulley which rotates the camshaft of a stamp battery. *Nelson.* h. A large rope-driven pulley from the main shaft of a rig used to raise and lower the bit or fishing tool and sometimes the casing. *Shell Oil Co.*

bully. a. A pattern of miners' hammer, varying from broad bully to narrow bully. *Fay.* b. A slang term for a laborer employed to help a drill runner operate a drill; also used for an oilfield laborer. *Long.* c. A developing heading driven to the dip, usually the full dip of the coal seam and worked by rope haulage. *Nelson.*

bullying. *See* springing, c. *Fay.*

bullymong. Eng. Soft, white marly limestone, containing numerous fossils, Lincolnshire limestone, Essendine, near Stamford. *Arkell.*

bultfonteinite. A basic hydrous calcium silicate and fluoride, $2Ca(OH.F)_2{\cdot}SiO_2$. Triclinic. Pink spherules of nearly colorless needles, radiating. Closely related to custerite. From Bultfontein mine, Republic of South Africa. *English.*

bumboat. A small boat equipped with a hoist and used for handling dredge lines and anchors. *Nichols.*

bumicky. A stonemason's term for a combination of powdered stone and cement used to fill crevices made by accidental chipping, as of building stones. *Standard, 1964.*

bumming. a. Scot. Heaving or rising of the pavement or floor. *Fay.* b. Emitting a hollow sound when struck. *Fay.*

bump. a. Any dull, hollow sound produced in a coal seam or associated strata as a result of mining operations. *See also* rock bump; rock burst. *Nelson.* b. Rebound caused by a sudden release of tension on the drill stem when the core breaks or snaps free of the bottom of the borehole. *Long.* c. A sharp, upward blow applied to the drivepipe, casing, or drill stem with a drive hammer. *Long.* d. Sudden failure of the floor or walls of a mine opening, generally accompanied by a loud report and a sharp shock or jar. *Long.* e. The earth tremor occasioned by a rock failure, when that failure causes no damage to the workings. *Spalding.* f. A noise caused by a break in the roof underground. The actual movement due to the break. A sudden floor uplift due to a break in the floor. *Mason.* g. In coal mining, shock due to the movement of coal, floor, or roof strata, with sufficient violence to be heard and to shake the workings. *Pryor, 3.*

bumped heads. Convex or concave heads used with boilers or tanks; dished heads. *Hess.*

bumper. a. A man who pushes loaded cars or cans into the station for the hooker and takes the empties away. *Hess.* b. A device used to loosen the tools when drilling is carried on without jars. *Porter.* c. A fender for lessening the jar caused by the collision of cars or other moving equipment. *Jones.* d. *See* catches, c. *Fay.* e. A machine used for packing molding sand in a flask by repeated jarring or jolting. *ASM Gloss.*

bumper post. Barriers of heavy steel construction anchored at track endings. The barriers effectively stop rolling railroad cars and prevent their being thrown off center or derailed. Also available are wheel stops which engage the wheels of rolling cars. The stops are secured directly to the tracks and can be used singly or in pairs. *Bests, p. 371.*

bumper-up. A skilled man who assists a riveting squad by means of a holding-up hammer. *See also* holder-up; rivet catcher. *Ham.*

bumping. a. Forming a dish in metal by means of many repeated blows. *ASM Gloss.* b. Forming a head. *ASM Gloss.* c. Setting the seams on sheet metal parts. *ASM Gloss.* d. Ramming sand in a flask by repeating jarring and jolting. *ASM Gloss.*

bumping down. The consolidation of a mass of metal powder by vibration before the pressing operation. *ASTM B243-65.*

bumping post. A post placed as a buffer at the end of a spur of railroad track. *Webster 3d.*

bumping table; jerking table. Old name for shaking table. *Pryor, 3.*

bumping trough. a. A sheet-iron trough hung from plugs so that it may be swung backward and forward and used for handling ore in stopes where the dip is such that the ore will not "run." *Fay.* b. An appliance for handling broken rock in flat mine stopes. A sheet-steel trough is hung from chains, and arrested at one end of its swing by a bump stop, so that the ore slides forward. *Pryor, 3.*

bump knocker. Ark. Local term used at Spadra for a person who picks down portions of machine-mined coal which have not been shot down by blasting. *Fay.*

bumps. Sudden, violent expulsion of coal from one or more pillars, accompanied by loud reports and earth tremors. They occur in coal mines where a strong, thick, massive sandstone roof rests directly on the coal with no cushioning layer of shale between. The breaking of this strong roof as the seam is mined causes violent bumps and the crushing and bursting of pillars left for support. There are two distinctive types of bumps: (1) pressure bumps, which appear to be due to the unit loading of a pillar being too great for its bearing strength and where the coal roof and floor are strong, the pillar is ruptured suddenly and with violence; and (2) shock bumps, which are thought to be due to the breaking of thick, massive, rigid strata somewhere above the coalbed which causes a great hammerlike blow to be given to the immediate roof which it transmits as a shock wave to the coal pillar or pillars. *Kentucky, pp. 24, 237; Lewis, pp. 37-38.*

buna. A synthetic rubber based on butadiene and acrylonitrile; butadiene and styrene. *Pryor, 3.*

bunch. a. A small quantity of ore in a compact mass in a vein. *Fay.* b. A portion of a pipe vein of greater thickness than the rest of the pipe vein. *Standard, 1964.* c. A small rich patch in a lode. *Gordon.*

bunched seismometers; multiple seismometers. Group of seismometers located at short intervals at the same seismometer station and electrically interconnected. *Schieferdecker.*

bunch of ore. Corn. An ore body, usually a small one. *Fay.*

bunch of veins. A group of parallel or almost parallel veins. *Schieferdecker.*

bunchy. a. An ore body containing small scattered masses or bunches of ore. *Weed, 1922.* b. A mine that is sometimes rich and at other times poor. *Hess.*

bunchy reef. S. Afr. A succession of blows, or outcrops, following a certain course. *See also* blow, a and c. *Fay.*

bund. An earth retaining wall. *Austin.*

bunding. A staging of boards on stulls or stemples, to carry deads. *See also* stull covering, a. *Fay.*

bung. A stack or column of saggers, one placed on another. The bung rests on set-out bricks. *Hess.*

bung arch, 9-inch. A special bung brick with only ⅛-inch taper. *Bureau of Mines Staff.*

bung brick. A special type (quality, size, and shape) of fire clay brick, used in roofs of air furnaces. *Bureau of Mines Staff.*

bunk. A built-in frame that usually has low sides and a canvas, mesh, or spring bottom, and that serves as a bed or sleeping place. *Webster 3d.* Common in mining and lumber camps. *Fay.*

bunker. a. A vessel for the storage of materials; the lowermost portion is usually constructed in the form of a hopper. Also called bin. *B.S. 3552, 1962.* b. A large bin or compartment for the storage of bulk materials. *See also* bin. *ASA MH4.1-1958*

bunker coal. Applied to coal consumed by ocean steamers, tugs, ferryboats, or other steam watercraft. Also called bunkers. *Fay.*

bunker conveyor. A high-capacity conveyor which takes peaks of production from another conveyor and discharges the material when production drops. Such a conveyor may be laid under or alongside a trunk belt near its discharge end. The floor of the bunker comprises a slow-moving steel plate conveyor operated by hydraulic or other power. A movable plough plate situated over the trunk belt diverts the material sideways into the bunker conveyor. *Nelson.*

bunker gate. *See* bin gate. *ASA MH4.1-1958.*

Bunker Hill screen. Funnel-shaped rotating screen set at an angle. Oversize works down to neck of funnel for discharge and intersize passes through. Obsolescent. *Pryor, 3.*

bunkering capacity. The capacity of any ing. It may be expressed as a tonnage or ore during interruptions to normal working. It may be expressed as a tonnage or as so many hours of normal production. Bunkering capacity may be provided at the surface and at critical points underground. *Nelson.*

bunker oil. A heavy fuel oil formed by stabilization of the residual oil remaining after the cracking of crude petroleum. *HW.*

bunker plate. An iron plate covering a hole in a ship's deck leading to the coal bunker. *Fay.*

bunkers. A Wales term for bunker coal. *Fay.*

bunker, surface. A large capacity hopper or standage room to store coal or mineral coming from the winding shaft. The provision tends to equalize the run of mine going to the preparation plant and smooth out any minor breakdowns in the plant. *Nelson.*

bunker, underground. Arrangements, such as high capacity supplementary conveyors, staple pits, hoppers, or standage room for cars, positioned at key points between the faces and pit bottom. The object is to enable costly power-loading machines to operate continuously when there are surface or shaft delays. At one colliery a 250-ton underground bunker was provided between the main belt system and the skip winding in the shaft. *See also* bunker conveyor; gate-end bunker. *Nelson.*

bunky. Ill.; Wis. In metal mines, a partner; called a buddy in coal mines. *Fay.*

bunney. a. A mass of ore not lying in a regular vein. *Nelson.* b. *See* bonny. *Fay.*

bunning. Eng. In lead mining, a floor or staging of wood built across the lode over the miners' heads, and on which the refuse was thrown, so that the mine, originally begun as an open work, became covered over for its whole length except the windlass opening. Also spelled bunding. *Fay.*

bunny. Corn. An isolated body of ore. *Hess. See also* bonny.

buns. Eng. Geodes of chalcedony and quartz in basalt, near Tortworth, Gloucestershire. *Arkell.*

Bunsen burner. A gas burner consisting of a tube with a small gas jet at the lower end, and an adjustable air inlet by means of which the heat of the flame can be controlled. Used as a source of heat for laboratory work and, in conjunction with an incandescent mantle, as the usual form of gas burner for illuminating purposes. *C.T.D.*

bunsenite. Native vitreous pistachio green nickel oxide, NiO; forms minute octahedrons. *Dana 6d, p. 208.*

Bunsen photometer. a. A visual photometer in which a simple mirror system enables both sides of teh test plate, consisting of a screen of opaque white paper on which is a grease spot, to be viewed at the same time. That portion of the screen on which the grease lies is translucent to light, so that there is a difference in brightness between the grease spot and its surrounding ungreased paper. When comparing sources, one on either side of the photometric bench, the point of balance is such that, as seen in the mirror, both sides of the screen show equality of contrast between the grease spot and its white surround. *Roberts, II, p. 24.* b. *See* grease-spot photometer. *C.T.D.*

Bunsen's extinction coefficient. The reciprocal of the thickness that a layer of glass, or other transparent material, must have for the intensity of transmitted light to be decreased to one-tenth of its intensity as it falls on the layer. *Dodd.*

Bunter sandstone. Eng. A sandstone at the base of the Triassic system in Western Europe. *Fay.*

Bunter series. The lowest of the three series into which the rocks of the Triassic system of Western Europe are divided. In the English Midlands, where it is well exposed, it consists of pebble beds with sandstone above and below. *C.T.D.*

buntknochig bernstein. The German name for mottled osseous amber. *Tomkeieff, 1954*

bunton. a. A steel or timber element in the lining of a rectangular shaft. Buntons may be 6 by 5 or 6 inches square and extend across the shaft at intervals of 4 to 8 feet. They serve to reinforce the barring and also carry the cage guides. Rolled steel joists are now generally used as buntons. *See also* dividers; wallplates. *Nelson.* b. A timber placed horizontally across a shaft. It serves to brace the wallplates of the shaftlining and also, by means of plank nailed to them, to form separate compartments for hoisting or ladderways. *Fay.*

bunton racking. Timber pieces used in the support of rectangular shafts. *See also* wallplate. *Nelson.*

buoy. To keep from sinking; to keep afloat in a liquid. A term used in flotation. *Fay.*

buoyancy. The reduction in weight of a body when immersed in a fluid, equal to the weight of fluid displaced by the body. If the latter floats, its weight equals the weight of the fluid displaced; this is Archimedes' principle. *Ham.*

buoyant foundation. A reinforced concrete foundation adopted when erecting structures on fluid silt or mud. It is so designed that the sum total of its own weight and of the loads to be carried is approximately equal to the weight of soil or water which it displaces. *Ham.*

buoyant unit weight. *See* submerged unit weight. *ASCE P1826.*

buoyant weight. The apparent weight of a string of drill tools suspended in a liquid-filled borehole. The apparent weight is the weight of the drill string in air less the weight of the liquid displaced by the drill string when suspended in a liquid-filled borehole. *Long.*

Buoyoucos hydrometer. A variable-immersion hydrometer. The original instrument was graduated empirically to indicate the weight of solids per unit volume of suspension; it was subsequently developed for particle-size analysis. *Dodd.*

bur; burr. a. A nodule or mass of flint rock in a softer rock. *Standard, 1964.* b. A burrstone or buhr. *Standard, 1964.*

buratite. An aurichalcite containing calcium monoxide, probably as a mechanical admixture. *Weed, 1918.*

burbankite. A mineral, $(Ca,Sr,Ba,Ce,Na)_6(CO_3)_5$, as pale yellow hexagonal crystals with other rare-earth carbonates from Montana. *Spencer 20, M.M., 1955.*

burden. a. All types of rock or earthy materials overlying bedrock. *See also* cover, d; mantle; overburden. *Long.* b. Valueless material overlying the ore, especially such as is removed by stripping. Frequently called overburden. *Webster 2d.* c. The resistance that an explosive charge must overcome in breaking the rock adjacent to a drill hole in mining. *Webster 3d.* d. The tonnage or cubic yards of rock, ore, or coal which an explosive charge is expected to break. *Nelson.* e. The distance between the charge and the free face of the material to be blasted. *Fay.* f. Corn. The tops or head of stream work, which lie over the stream of tin. *Fay.* g. *See* line of least resistance. *Fraenkel.* h. Barren or nonore material that overlies and must be removed to gain access to minable grade material. Frequently called overburden; cover. *Bureau of Mines Staff.* i. The charge of a blast furnace exclusive of the fuel; also, the ratio of the ore to the total charge. *Bureau of Mines Staff.* j. Heavy burden is a high ratio of ore to coke; light burden is a low ore-to-coke ratio. *Bennett 2d, 1962.*

burden gage. *See* hole director. *Higham, p. 79.*

burdening the furnace. Determining the proper proportions of ore, coke, and limestone for the blast furnace charge. *Mersereau, 4th, p. 398.*

Burdigalian. Upper Lower Miocene. *A.G.I. Supp.*

bureau. A specialized administrative unit; especially, a subdivision of an executive department of a goverenment. *Webster 3d.* An example is the Bureau of Mines. *Fay.*

Bureau of Mines. A government agency in the U.S. Department of Interior concerned with conservation and utilization of Mineral Resources and with Health and Safety regulations in the Mining Industry. *Bureau of Mines Staff.*

Bureau of Mines brick. *See* dolomite brick.

Bureau of Standards; United States Bureau of Standards. Official laboratories for defining and checking standards of quality, performance, etc., of chemicals and apparatus. *Pryor, 3.*

burette. A laboratory apparatus, consisting typically of a graduated glass tube with a small aperture and stopcock, that is used for delivering measured quantities of liquid or for measuring volumetrically the liquid or gas received or discharged. *Webster 3d.*

burfs. Shrop. The basalts on Clee Hill. *Arkell.*

burgee. a. Eng. Term used in Lancashire for friable coal which breaks into smalls on extraction. *Tomkeieff, 1954.* b. Small coal suitable for furnaces or engines. *Arkell.* c. Contaminated sand resulting from the grinding of plate glass. *Dodd.*

Burgers vector. Dislocation displacement. The Burgers vector is parallel to a screw-dislocation line and perpendicular to an edge-dislocation. *VV.*

burgie. *See* burgee, a; burgy. *Tomkeieff, 1954.*

burgy. Lanc. Slack, or small coal. *Fay. See also* burgee, a.

Burgos luster. A red luster for porcelain made by suitably diluting a gold luster with a bismuth luster; some tin may also be present. Word comes from Burgos, Spain.

Dodd.

burial ground. A place for burying unwanted radioactive objects to prevent escape of their radiations, the earth acting as a shield. Such objects must be placed in watertight, noncorrodible containers so that the radioactive materials cannot be leached out and get into an underground water supply. Also called graveyard. *NRC-ASA N1.1-1957.*

buried channel. An old channel filled and concealed by glacial or other superficial deposits. *B.S. 3618, 1964, sec. 5.*

buried hill. A hill of resistant older rock over which later sediments were deposited. The overlying sedimentary beds have the form of an anticline as the result of original dip, unequal compaction, and other causes. The term was first applied to the underlying beds of the Healdton field, Okla. *A.G.I.*

buried outcrop. Blind apex. *Pryor, 3.*

buried placers. a. Old placer deposits which have been buried beneath lava flows or other strata. *Fay.* b. Deep lead. *Pryor, 3.*

buried rivers. Riverbeds which have been buried below lava flows, glacial drifts, or alluvial deposits. *Fay.*

burk. A hard knot or lump in a vein. Possibly a corruption of burl which means a knot, lump, or an excrescence. *Fay.*

burkeite. A white, buff, grayish sulfatocarbonate of sodium, $2Na_2SO_4 \cdot Na_2CO_3$. Orthorhombic. Small flat crystals, and twins; nodules. From Searles Lake, Calif. *English.*

burlap. A coarse-woven material of jute. Used for wrappings, hangings, decorations, etc. *Crispin.*

Burleigh; Burley. A miner's term for any heavy two-man drill. The Burleigh was the first successful machine rock drill. *Hess.*

burler. Forest of Dean. Hand-picked lump iron ore. *Arkell.*

burley clay. A clay containing burls, oölites, or nodules, which may be high in alumina or iron oxide. As used in Missouri it refers to a diaspore-bearing clay usually averaging 45 percent to 65 percent Al_2O_3. *ACSB, 1.*

Burma jade. Same as Burmese jade. *Shipley.*

Burma moonstone. Moonstone (feldspar) from Burma, which during recent years has included fine blue moonstone. *Shipley.*

Burma ruby. Trade term for the finest colored rubies whether or not from Burma, where most of them are mined. Also called Burmese ruby. *Shipley.*

Burma sapphire. A term often used for fine royal blue sapphire whether or not from Burma. Same as oriental sapphire. *Shipley.*

Burmese jade. Finest known jadeite, from mines in Mogaung, a subdivision of the Myitkyina district in upper Burma. The term Burma jade is commonly used in the Orient to distinguish it from any and all varieties of nephrite (jade). Same as soda jadeite. Also called Burmese jadeite. *Shipley.*

Burmese spinel. Red spinel and flame spinel found in perfect octahedra and fine gem quality in alluvial deposits near Mogok in upper Burma, in association with rubies which are usually waterworn. *Shipley.*

burmite. Amber found in Burma. It is generally pale yellow, but reddish and dark brown specimens are also known. Slightly harder than Baltic amber. *See also* Chinese amber. *Shipley.*

burn. a. To permit a bit to become overheated in use. *Long.* b. To calcine. *Long.* c. To cut with a torch. *Nichols.* d. To pulverize with very heavy explosive charges. *Nichols.* e. To heat or fire ceramic products to obtain the desired degrees of vitrification. *Bureau of Mines Staff.* f. To heat ceramic wares to a point at which they take a hard stony or glassy texture. *Hess.*

burnable poison. A neutron absorber (or poison), such as boron, which, when incorporated in the fuel or fuel cladding of a nuclear reactor, gradually burns up (is changed into nonabsorbing material) under neutron irradiation. This process compensates for the loss of reactivity in a reactor which occurs as fuel is consumed and poisonous fission products accumulate. *L&L.*

burn cut; shatter cut. a. A type of cut employed in underground blasting in which the cut holes are drilled parallel to each other and straight into the face, one or more holes being left unloaded for the others to break to. The cut is a comparatively simple one to drill, but the holes must be parallel or the cut does not break well. *Lewis, p. 1966.* b. A drill hole pattern widely used in fast-moving tunnels. Holes are drilled in the center of the face and left uncharged and void, and serve as a relief zone when the round is fired. The void holes are drilled parallel and may be either of normal or of larger diameter up to 8 inches. There may be five or six of these void holes used, compared with one or two of the larger holes. In large tunnels, a burn cut round may have up to 60 holes with a pull of up to 9 feet. All holes in the round are drilled parallel and in line with the tunnel. *Nelson.*

burned. a. Said of slate or other impurity that adheres tightly to the coal. Similarly, coal is said to be "burned to the roof" when it is hard to separate the roof rock from the coal. *Fay.* b. *See* burn. *Long.*

burned bit. As a result of high speed, excessive pressure, and poor water circulation, sufficient heat may be generated at the bottom of a borehole to cause a diamond crown to soften, resulting in displacement of diamonds and a ruined bit. *Nelson.*

burned cut. A cut made in the face of a heading for which three or four holes are drilled normal to the face and in a triangle or square, 12 to 18 inches on a side, with another hole in the center. One, two, or three holes are loaded and shot, the others relieve the pressure and induce breaking. A cavity is formed to which other shots in the face readily break. Used for especially tough ground. Also called Michigan cut; woodchuck cut. *Hess.*

burned in. *See* burn in. *Long.*

burned-in grain bottom. One composed of refractory grain, sintered into place to form a monolithic hearth. *Bureau of Mines Staff.*

burned lime; burnt lime. Calcium oxide (quicklime) formed from limestone, or other forms of calcium carbonate, which has been calcined at high temperature to drive off the carbon dioxide. *Shell Oil Co.*

burner. a. A device that admits fuel and air to control combustion. *ACSG, 1963.* b. A person whose duty it is to tend a ceramic kiln. *ASCG, 1963.*

burner block. A refractory block with one or more orifices through which fuel is admitted to a furnace. *ASTM C162-66.*

burner reactor. *See* converter reactor. *L&L.*

burn in. a. To run a bit with too little coolant until the heat generated by the bit fuses the cuttings, core, bit, and the bottom of the borehole. *Long.* b. To deliberately run a bit with reduced amount of coolant until core is jammed inside the bit. *See also* dry block. *Long.*

burning. a. In the processing of metals, the heating of a metal sufficiently close to the melting point to cause permanent injury. Such injury may be caused by the melting of the more fusible constituents, by the penetration of gases, such as oxygen, into the metal with subsequent reactions, or perhaps by the segregation of elements already present in the metal. *Henderson.* b. In the processing of abrasive shapes, refractories, and other ceramic materials, the final heat treatment to which the material is subjected in the process of manufacture for the purpose of developing bond and other necessary chemical and physical properties. Also called firing. *Henderson.* c. In grinding, a change in the work being ground, caused by the heat of grinding, usually accompanied by surface discoloration, and frequently producing etch cracks. *Henderson.* d. The welding of lead; a term commonly used by lead welders. *Henderson.* e. Oxidation which takes place so rapidly that heat and light are released. *Crispin.* f. Derb. An old method of working veins by softening them with fire. *See also* firing, b. *Fay.*

burning bars; burning points; burning tools. Equipment used to suspend or support ware during the firing operations. *ASTM C286-65.*

burning gravel. Eng. Farmers' name for cobble gravel having so little interstitial soil that the crops dry up in summer. *Arkell.*

burning house. The furnace in which sulfide ores are calcined to form gaseous SO_2 and leave the metal oxide, or in the case of noble metals, the metal itself. *Bureau of Mines Staff.*

burning-in kiln. A kiln in which stain or enamel color painted on glassware or sheet glass is fired to cause it to adhere more or less permanently; usually of muffle type. *C.T.D.*

burning marks. *See* pin mark; point mark.

burning mountain. A volcano. *Webster 3d.*

burning-off. A fault in vitreous enameling resulting from the apparent burning-away of the ground coat; in reality, the fault is due to the enamel having become saturated with iron oxide. To prevent this, the fusion temperature of the ground coat should be raised by altering its composition. *Dodd.*

burning oil. A common name for kerosine. *Fay.*

burning out. A loose term, usually used to describe the action of furnace linings in wearing away without a known reason. *Bureau of Mines Staff.*

burning point. The temperature at which a volatile oil in an open vessel will ignite from a match held close to its surface. Formerly used to determine the safety of kerosine or other illuminants. *Standard, 1964.*

burning points. *See* burning bars. *ASTM C286-65.*

burning rate. The rate at which a liquid fuel is burned in a pool. *I.C. 8137, 1963, p. 76.*

burning scale. *See* scale, e. *Arkell.*

burning tool mark. A defect in the porcelain enamel appearing on the surface opposite to the point of contact with the supporting burning tool. *ASTM C286-65.*

burning tools. *See* burning bars. *ASTM C286-65.*

burning zone. *See* hot zone. *Bryant.*

burnishing. a. The operation of polishing gilding, with bloodstone or agate, after the ware comes out of the enamel kiln. *C.T.D.* b. The smoothing of surfaces by means of a hard tool or object, especially by rubbing. *Lowenheim. See also* ball burnishing.

burnishing sand. A fine, rounded-grain silica sand of uniform size between 65 and 100 mesh. Used in rolling down and burnishing gold decorations on porcelain. *AIME, p. 15*

burn-off. The process of severing an unwanted portion of a glass article by fusing the glass. *ASTM C162-66.*

burn-off rate. *See* melting rate. *ASM Gloss.*

burno man. A laborer who gets ore ready for a mechanical shovel or a hand shoveler. *Hess.*

burn out. To salvage diamonds from a used bit by dissolving the matrix alloy with an acid or by use of an electrolytic process. *Long.*

burnover. An underfired stock brick from the outside of a clamp, such bricks are usually retired. *See also* stock brick. *Dodd.*

Burnside apparatus. An apparatus for boring towards old workings or water-bearing strata, providing for control of water or gas, which may issue therefrom. *B.S. 3618, 1963, sec. 4.*

Burnside boring machine. This machine has been specially developed for boring in all types of ground, and incorporates a very important feature, that of controlling the water immediately if it is tapped. In boring, the hole is first prepared for the reception of a special rubber ring, two iron plates, and two wedges. When these are properly adjusted the rubber washer is compressed and powerfully gripped on the sides of the borehole to effect a sound and reliable joint. If during boring operations water should rush out and the borerods cannot be withdrawn, the two handwheels are screwed in; this presses india-rubber plugs on to the borerods and effects a watertight joint. *Mason, v. 1, p. 317.*

burnt alum; dried alum; exsiccated alum. Alum that has been dried at 200° C, and powdered; $AlNH_4(SO_4)_2$ or $AlK(SO_4)_2$. A caustic. *Webster 3d.*

burnt amethyst. A term applied to artificially colored yellow transparent quartz (topaz quartz) which, unlike poorly colored yellowish quartz (citrine), is largely produced by heating natural amethyst of brownish hue. *See also* burnt stone. *Shipley.*

burnt bearing. A bearing which has become overheated and melted owing to lack of lubrication, improper lubricant, improper fitting, or overloading. *Hess.*

burnt bit. A bit that has been overheated and sometimes partially fused. *See also* burn in. *Long.*

burnt borax; calcined borax; dehydrated borax. A spongy mass; $Na_2B_4O_7$; obtained by calcining hydrated sodium borate. *Bennett 2d, 1962.* Used in glass, enamels, and other ceramics. *CCD 6d, 1961.*

burnt brass. Synonym for copper sulfate. *Webster 3d.*

burnt cairngorm. A term applied to that topaz quartz which has been changed from the color of cairngorm (smoky quartz) to topaz color. *See also* burnt amethyst; burnt stone. *Shipley.*

burnt coal. a. Coal altered by heat from an igneous intrusion within or near the seam. *B.S. 3618, 1964, sec. 5.* b. Sooty or cindery material arising from metamorphic action of intrusive rock on a coal seam. *Pryor, 3.*

burnt copper. Copper oxide formed by the excessive heating of copper in air. *Bennett 2d, 1962.*

burnt coral. A dark brown or blackish coral discolored by having lain at the bottom of the sea. *Shipley.*

burnt crown. Synonym for burnt bit. *Long.*

burnt deposit. A dull, nodular electrodeposit resulting from excessive current density. *ASM Gloss.*

burnt-in. In ceramics, said of colors that have been applied under the glaze, and are fired with it. *Fay.*

burnt-in sand. A defect consisting of a mixture of sand and metal cohering to the surface of a casting. *ASM Gloss.*

burnt iron. a. Iron which by long exposure to heat has suffered a change of structure and become brittle. It can be restored by careful forging at welding heat. *Fay.* b. In the Bessemer and open-hearth processes, iron which has been exposed to oxidation until all of its carbon is gone, and oxide of iron has been formed in the mass. *Fay.*

burnt lime. Calcined limestone, [$CaO{\cdot}MgO$ (dolomitic), or CaO (calcitic), or a mixture of these]. *ASTM C162-66.*

burnt metal. Metal which has become oxidized by overheating, and is so rendered useless for engineering purposes. *C.T.D.*

burnt ocher. Ferric oxide. *Bennett 2d, 1962.*

burnt ore. a. Roasted ore. *Fay.* b. Ferric oxide. *Bennett 2d, 1962.*

burnt shale; oxidized shale. Carbonaceous shale which has remained for a long period in a colliery tip and undergone spontaneous combustion and converted into a coppery slag material. It is sometimes used for road and construction work. *Nelson.* Also known in coal-bearing areas of Kentucky and Alabama as "red dog" and sometimes used in place of stone as road metal. *Bureau of Mines Staff.*

burnt stone. An antique carnelian, such as is sometimes found in ancient ruins and has apparently been acted on by fire. *Fay.*

burnt stuff. Aust. An intensely hard, rocky stratum underlying the surface soil. *Standard, 1964.*

burnt topaz. Genuine topaz which has been altered in color to pink topaz. *Shipley.*

burnt umber. A reddish-brown, manganese-bearing, hydrated iron oxide; used as a pigment. *Hess.*

burnup. A measure of nuclear reactor fuel consumption. It can be expressed as either the percentage of fuel atoms that have undergone fission or the amount of energy produced per unit weight of fuel fissioned. In the latter case, it is usually expressed as megawatt days per metric ton of fuel exposed. *L&L.*

burr. a. Eng. Generally, a compact sandstone with siliceous matrix, but may be used to describe any rock especially hard to drill. Lancashire. *Nelson.* b. Derb. A hard knot or lump in a vein. A lump of ore that is harder than the vein itself. Also spelled bur; burk. *Fay.* c. The rough edge left on sheet steel after punching or stamping is called the burr. This burr must be completely removed from the article before the application of porcelain enamel and may be spun off on a lathe, crimped to a roll edge or ground off with a grinding wheel. Also spelled buhr. *Hansen.* d. A rotary tool having teeth similar to those on hand files. *ASM Gloss.*

Burrell apparatus. A portable gas analysis apparatus consisting of five pipettes, used for the complete analysis of gases. The combustion pipette is for determining hydrogen, methane, or other explosive gas by slow combustion. The next two pipettes are Francis autobubbler pipettes for absorbing carbon monoxide and the heavy hydrocarbons or illuminating gases. The last two pipettes are used to absorb carbon dioxide and oxygen. Gas is transferred from the sample tube to fill the 100-cubic-centimeter burette, and its volume is checked. By opening the proper connections and raising and lowering the leveling bottle, the gas is passed through each pipette in turn a sufficient number of times to insure the complete absorption of the respective constituents that are absorbable; the remaining constituents being then determined by slow combustion. *Lewis, pp. 731-732.*

Burrell gas detector. A device to obtain a safe, rapid, and accurate determination for low percentages of methane inside the mine. Complete combustion of the methane takes place within the apparatus, and the percentage is measured volumetrically. *Fay.*

Burrell indicator. An instrument for use in a mine which takes a sample of air and measures its contraction after the methane in it has been burned. This contraction is read on a scale and shows the percentage of methane present. *Zern.*

burring. a. Passing over the face of a pulpstone with a special tool to develop a pattern for providing a freer cutting surface. *ACSG, 1963.* b. *See* deburring. *ACSG, 1963.*

burrow. a. A refuse heap at a coal mine. *Zern.* b. Tubular openings made by worms and other animals. Usually preserved as fillings; may be vertical, horizontal, or inclined, and straight or sinuous. *Pettijohn.*

burrows. Dev. Sand with layers of concretionary stone used for building. *Arkell.*

burr rock. A term sometimes used to designate an aggregate of muscovite books and quartz. *Skow.*

burrstone. *See* buhrstone.

burst. An explosive breaking of coal or rock in a mine due to pressure. In coal mines they may or may not be accompanied by a copious discharge of methane, carbon dioxide, or coal dust. Also called outburst; bounce; bump; rock burst. *BuMines Bull. 309, 1929, pp. 1, 13.*

burster. a. A hydraulic mechanism which, when inserted into a large diameter shothole, breaks down the strata by means of pistons operating transversely. *B.S. 3618, 1964, sec. 6.* b. Scot. A shot in a coal seam which has not been sheared or undercut. Equivalent to "shot off the solid." Also called bursting shot. *Fay.* c. *See* buster, a. *Fay.*

bursting. The phenomenon sometimes exhibited by refractories containing chrome ore, when exeposed to iron oxide at high temperature, of having the exposed face swell and grow until it breaks away from the brick mass. *A.R.I.*

bursting charge. A small charge of fine powder, placed in contact with a charge of coarse powder to insure the ignition of the latter. *Fay.*

bursting expansion. In the refractories industry this term has the specific meaning of surface disintegration of basic refractories caused by the absorption of iron oxide. The expansion that leads to this form of failure results from solid solution of magnetite (Fe_3O_4) in the chrome spinel that forms a major constituent of chrome and chrome-magnesite refractories. A laboratory test submits a test-piece cut to the size of a 2-inch cube, to the action of 40 gram of mill-scale (crushed to pass a 30 B.S. sieve) for 1 hour at 1,600° C; the expansion is expressed as a linear percentage. *Dodd.*

bursting off. The breaking of the blow-over. *ASTM C162–66. See also* blow-over.

bursting time. The time between the application of an electric current and the setting off of the explosive charge. In seismic prospecting, it may be necessary to take into account the maximum difference in timelag between the bursting of the earliest and latest detonators in a series. In a series firing current of over 1 ampere direct current, the maximum difference with submarine seismic detonators is always less than 1 millisecond. *Nelson.*

burst of whinstone. Scot. A bed or mass of igneous rock at the surface of the ground. *Fay.*

burstone. *See* buhrstone.

bursztyn. Polish name for amber. *Tomkeieff, 1954.*

Burt filter. A stationary, intermittent filter in which the leaves are suspended vertically in a cylindrical vessel set on a considerable incline. The leaves are therefore ellipses. The slime cake is discharged by introducing air and water into the interior of the leaf. There is also a newer Burt filter of the continuous rotating drum type. *Liddell 2d, p. 390.*

burthen. Scot. The load of coal which the bearers carry on their backs. *Fay.*

burton. a. Any of several arrangements of hoisting tackle; usually one with a single and a double block. *Webster 3d.* b. Stowage (as of casks) athwartships in the hold of a ship. *Webster 3d.*

Burton A. Nongelatinous permissible explosive. Used in mining. *Bennett 2d, 1962.*

bury. Ir. Soft shale or clay; flucan. *Fay.*

bus bar. A heavy metal conductor, usually copper, for high-amperage electricity. *ASM Gloss.*

bush. a. Wooded or bush-covered, uncultivated, and unpopulated or sparsely populated areas, generally far removed from cities. *Long.* b. To insert or attach a bushing. *Long.* c. To line a circular hole with a ring of metal, commonly to take up wear or to make the hole fit more closely an axle or pinion. *Hess.* d. A cylindrical stationary bearing on which a relatively hard rotating part is carried, wear of the latter thus being minimized. *Pryor, 3.*

bushed. Can. Mental state brought on by a protracted stay in the woods. *Hoffman.*

bushel. A measure of capacity. The imperial bushel equals 2,218.192 cubic inches and the Winchester bushel equals 2,150.42 cubic inches, which is divided into 4 pecks. The bushel used in measuring charcoal and coal contains 5 pecks, or 2.688 cubic inches, being 20 pounds or less of charcoal, and, in various localities, 80, 76, or 72 pounds of coal. The Winchester bushel is the standard for the United States. *Fay.*

bushhammer. A hammer having a serrated face, as of rows of pyramidal points, for dressing stone. *Fay.*

bushhammered surface. Term used to describe the surface finishing of building limestone that is rough and pitted. *AIME, p. 330.*

bushing. a. Synonym for sub, c. *Long.* b. Cylindrical sleeve to fill in the space between a small-size drill rod and the inside of a swivel-head drive rod designed to take a larger drill rod. *Long.* c. A fitting for the purpose of connecting dissimilar-size pipes. A sleeve-shaped plug having inside and outside threads to suit the different pipe diameters. *Long.* d. A metal cylinder between a shaft and a support or a wheel, that serves to reduce rotating friction and to protect the parts. *Nichols.* e. A liner in the orifice of any feeder for molten glass, for example, the orifice ring of a gob feeder or the unit through which molten glass is drawn in making glass fibers. *ASTM C162-66.* f. A bearing or guide. *ASM Gloss.*

bush metal. An alloy used for journals, bearings of shafts, etc. *Fay.*

bushveld complex. A great intrusive igneous body in the Transvaal that has undergone remarkable magmatic differentiation. *Bateman.*

basqueda de criaderos minerales. Sp. Localization of mineral fields. *Hess.*

Buss table; Ferraris table. Shaking table for treatment of ore sands, or deck supported by Ferraris truss moved by eccentric. *Pryor, 3.*

bustamente furnace. Cylindrical shaft furnace used to distill mercury from its ores. *Pryor, 3.*

bustamite. A grayish-red variety of rhodonite containing lime. *Fay.*

buster. a. An expanding wedge used to break down coal or rock. *Pryor, 3.* b. A pair of dies, usually flat or with a simple-shaped impression, used in press forging, for barreling or flattening a hot metal billet, and also for loosening scale on hot, ferrous forging billets. *ASM Gloss.*

buster shot. Same as breaking-in shot, a *Fay.*

bustite. An achondritic meteorite composed esssentially of enstatite, small amounts of diopside and oligoclase, and a little nickel iron. *Compare* aubrite. *Holmes, 1920.*

bustle. a. York. Hurry in mining or working coal, or in performing other colliery work. *Fay.* b. A board put on the end of a car to keep coal when going up or down a steep slope. *Fay.*

bustle pipe; hot-blasting circulating duct. A metal tube of large diameter which surrounds a blast furnace at a level a little above the tuyères; it is lined with refractory material and distributes the hot air from the hot-blast stoves to the pipes known as goosenecks which in turn carry the air to the tuyeres. *Dodd.*

but. Scot. Outwards; toward hte shaft; outbye. *Fay.*

butane. a. Synonym for bottle gas. *Long.* b. C_4H_{10}; a hydrocarbon of the paraffin series. *Nelson.*

butane flame methanometer; sigma recording methanometer. An instrument giving a continuous record of the methan concentration in mine air. It uses a small flame burning butane in a gauze-protected enclosure. Instead of observing the cap, thermocouples are used to show the increased temperature above the flame and the resulting signal is displayed on a recording milliammeter. The instrument runs for at least a week and is accurate to about 0.05 percent methane. *See also* methane tester type S.3. *Nelson.*

Butchart table. A shaking table, toggle-actuated, with its deck supported in slipper bearings, and carrying curved riffles. *Pryor, 3.*

butler finish. A semilustrous metal finish produced with a soft abrasive wheel, similar in appearance to the traditional hand-rubbed finish on silver. *ASM Gloss.*

butlerite. A monoclinic mineral occurring as as oriented intergrowths with parabutlerite; from Argentina. A hydrous sulfate of iron. *American Mineralogist, v. 27, No. 2, February 1942, p. 144.*

butt. a. Opposite of face, coal exposed at right angles to the face, and in contrast to the face, generally having a rough surface. Also called end in Scotland. *B.C.I.; Fay.* b. The butt of a slate quarry is where the overlying rock comes in contact with an inclined stratum of slate rock. *Fay.* c. Eng. A pack built on a longwall face between the gate-side packs. *SMRB, Paper No. 61.* d. Eng. A softwood chock filled with dirt. *SMRB, Paper No. 61.* e. Eng. A pillar of stone erected to form a gateway. *SMRB, Paper No. 61.* f. A flat surface at right angles to, and projecting outward at the base of a thread. *Long.* g. To screw threaded members together until butts are firmly seated against each other. *Long.* h. To bring two flat surfaces together. *Long.*

butt and collar joint. In sewer pipes and drainpipe, a joint between two butt ends covered by a collar. *Hess.*

butt and strapped joint. a. A joint having the ends of two pieces of pipe united by and riveted to a sleeve. The strap may be inside or outside, and may be single or double riveted. *Hess.* b. In boiler and tank construction, the butt joint of two sheets is covered by a narrow sheet called a strap which is riveted to both sheets. *Hess.*

butt cable. *See* hand cable.

butt cleat. a. A short, poorly defined cleavage plane in a coal seam usually at right angles with the face cleat. *Compare* face cleat, a. *Fay.* b. *See* end joint. *Pryor, 3.* c. In mining, a lesser plane approximately at right angles. *Lewis, p. 542. See also* cleat. f. *Kentucky, p. 23.*

butte. An isolated hill or small mountain with steep or precipitous sides and a top that is flat, rounded, or pointed. Usually has a smaller summit area than a mesa. *Webster 3d.*

butt entry. a. An entry driven at right angles to the butt. *B.C.I.* b. The gallery driven at right angles with the butt cleat. An end-on entry. *Fay.* c. A gallery driven parallel with the main cleat of the coal seam. *See also* entry, c. *Nelson.*

butterball. Rounded segregation of pure carnotite, of clear yellow color found in the soft sandstone of Temple Rock, San Rafael swell, Utah. *Hess.*

buttered joint. A thin mortar joint made by aplying a small quantity of mortar with a trowel along the edges of the face of a brick and laying it without a complete mortar bond. *A.R.I.*

butterfly. a. Name applied to valves, the inside of which is designed like a damper in a stovepipe. *Long.* b. In pumps, a double check valve with flaps that work on a common diametral hinge. *Long.*

butterfly valve. a. A disk turning a diametral axis inside a pipe. Used as a throttle valve in petroleum and gas engines. *C.T.D.* b. A valve consisting of a pair of semicircular plates hinged to a common diametral spindle in a pipe; by hinging axially, the plates permit flow in one direction only. *C.T.D.*

buttering. a. Depositing weld metal on the face of a joint to increase weldability. *ASM Gloss.* b. Placing mortar on the brick or other masonry unit with a trowel before laying. *ACSG.*

buttering trowel. Used for spreading mortar on the brick before it is laid. *Crispin.*

butter rock. *See* haltrichite. *C.M.D.*

Butters and Mein distributor. A turbo distributor which spreads sand evenly around a circular leaching tank in gold cyanidation. *Pryor, 3.*

Butters' filter. Plate-and-frame vacuum filter into which ore pulp is drawn. Solids are retained on canvas leaves while filtrate is removed through channels in the plates. Works intermittentiy and has largely been superseded by continuous drum filtration. *Pryor, 3.*

buttgenbachite. A sky-blue, hydrous chloronitrate of copper, $16CuO,2CuCl_2Cu(NO_3)_2 \cdot 19H_2O$; hexagonal. A felt of minute needles. From Likasi, Katanga, Republic of the Congo. An end member of the connellite-buttgenbachite series. *See also* connellite. *English; Dana 7, v. 2, p. 572.*

butt heading. *See* butt entry. *Fay.*

butt joint. a. *See* butt cleat, a. *Fay.* b. A joint between two abutting members lying approximately in the same plane. A welded butt joint may contain a variety of grooves. *See also* groove weld. *ASM Gloss.* c. In a pipe, flat ends that meet but do not overlap. *Nichols.*

buttock. a. A corner formed by two coal faces more or less at right angles, such as the end of a working face; the fast side; any short piece of coal approximately at right angles to the face; a rib, the rib side. *Mason.* b. Eng. That portion of a working face of coal, next to be taken down. *Fay.* c. The rib of coal exposed at one or both ends of a longwall face, to enable a cutter loader to commence its run; the coal removed by a cutter loader. *See also* stable, b; web, a. *Nelson.* d. Coal which has been undercut, and is ready to be broken. *Pryor, 3.*

buttocker. Eng. One who breaks down the coal that has been undercut by the holers; a getter. *Fay.*

buttock getters. N. of Eng. Preparation getting machines which take the coal at right angles to the face line on a buttock. *Trist.*

button. a. A globule of metal remaining in an assaying crucible or cupel after fusion has been completed. *ASM Gloss.* b. That part of a weld which tears out in the destructive testing of spot, seam, or projection welded specimens. *ASM Gloss.* c. Globule of lead formed during fire assay of gold or silver ore. *Pryor, 3.*

button balance. A small, very delicate balance used for weighing assay buttons. *Fay.*

button metal. A composition, one-fifth copper and four-fifths zinc, used for brass buttons. White button metal contains 60 percent copper, 30 percent zinc, and 7 to 10 percent tin. *Standard, 1964.*

button onyx. A name for an opel agate with alternating bands of black chalcedony and common opal. Also called button opal. *Shipley.*

button pearl. A dome-shaped pearl with one surface almost plane. *Shipley.*

button rope conveyor. *See* rope and button conveyor. *ASA MH4.1-1958.*

button test. A test designed to determine relative fusibility of frit or powder. So called because the completed specimens resemble buttons. *ASTM C286-65.*

buttress. A pier or projection built out from a wall to increase its strength and add to its resistance to thrust, which may arise from earth or water pressure or from an arch. *Ham.*

Buttress thread. Screw profile in which front face is normal to screw axis, and back face is at angle of 45°. *Pryor, 3.*

butts. The unconsumed or waste portions of finished electrodes. *Chemical and Metallurgical Engineering, v. 17, No. 4, July 26, 1922, p. 163.*

butt seam welding. *See* seam welding. *ASM Gloss.*

but shot. In coal mining, a charge placed so that the face or burden is nearly parallel with the borehole. *Fay.*

butt side. The side of the working face of a coalbed in which the joints or cleats are least pronounced as distinguished from the face side in which the joints are most pronounced. *Hess.*

butt strap. A steel plate covering a butt joint, connecting two members by either riveting or welding. *Ham.*

Butts Well No. 1. The first gushing oil well ever struck; sunk in 1874 by the Foster Oil Company on the Archy Buchanan farm, Bradford oilfield, Pa.; yielded 70 barrels per day. *Porter.*

butt weld. A weld made between two abutting unscarfed ends or edges without overlapping. Both the pin- and box-thread portions of petroleum drill pipe generally are butt-welded electrically to upset end tubing to form a complete section of drill pipe or rod. *Long.*

butt-welded tube. A tube made by drawing mild steel strip through a bell, so that the strip is coiled into a tube, the edges being then pressed together and welded. *C.T.D.*

butt welding. Welding a butt joint. *ASM Gloss.*

butty. a. A fellow miner, especially one who works a breast in partnership with another miner. A term in English mining for 200 years. *Korson.* b. A comrade; a chum or partner. *Fay.* c. Eng. In coal mining, one who takes a contract, or is a partner in a contract for working out a certain area of coal. Also spelled buddy. *Fay.* d. Mid. A man who sorts and loads the coal, for which he is paid by the ton; a butty banksman. *Fay.*

butty collier. Eng. The foreman of a butty gang. *Standard, 1964.*

butty gang. Eng. A company of men who undertake work by contract, and divide the profits among themselves. *Standard, 1964.*

buttyman. a. A man in charge of others who is paid for the whole job and himself pays those under him. *Mason.* b. York. A contractor who mines coal. *See also* butty, c. *Fay.*

buttyship. S. Staff. The prevailing mode of working the "10-yard" coal seam. The contractor mines, loads, and delivers coal to place of sale, finding all tools, horses, skips, corn, candles, powder, pit beer, etc. The masters find timber, engine power, and loaders at the boats. *Fay.*

butty system. In certain British coalfields, during the early part of the 19th century, the coal miners were not directly employed by the owners, but by a contractor, called a butty, who engaged with the mine owner to deliver coal or ironstone at so much per ton. He employed the laborers required, using his own horses, and supplying all the tools. Almost invariably the butty invested in a public house or general store where he paid his men—the major portion of the wages coming back to him across his own counter. *See also* truck system. *Nelson.*

butyl rubber. Synthetic material, copolymer of butadiene and isobutane. *Pryor, 3.*

butyrellite. Same as bog butter. *Tomkeieff, 1954.*

butyrite. Same as bog butter. *Tomkeieff, 1954.*

Buxton tests. Tests carried out in a gallery at the Safety in Mines Research Station at Buxton, England. The tests are made to determine the liability of an explosive to ignite gas or coal dust, before it can be placed on the official permitted list. *See also* permitted explosives, a. *Nelson.*

buying on margin. A purchase of shares in which the purchaser supplies cash or collateral for a certain margin or percentage of the cost, and the broker lends, or undertakes to borrow, the balance, charging his client interest. *Hoov, p. 285.*

buying on option. Often prospectors devote themselves solely to finding minerals, and afterwards companies with sufficient capital take over the partially exposed deposits in order to open them up. Sometimes the deposit is taken over for exploitation for a trial period during which time the prospector is paid a fee, with the final decision to buy being left till later. This is known as buying on option. *Stoces, v. 1, pp. 656-657.*

buzzard. Eng. A small layer of inferior coal, Lancashire. *Tomkeieff, 1954.*

buzz saw. A name often applied to a circular saw. *Crispin.*

bw d^{-1} Abbreviation for barrels of water per day. *BuMin Style Guide, p. 58.*

BWE Abbreviation for bucket wheel excavator. *Bureau of Mines Staff.*

BWG Abbreviation for Birmingham wire gage. *Zimmerman, p. 17.*

Bwlchgwyn quartzite. A quartzite from Bwlchgwyn, Nort Wales, used as a raw material for silica brick manufacture. *Dodd.*

bwpd Abbreviation for barrels of water per day. Also abbreviated BWPD. *BuMin Style Guide, p. 58.*

byard. A leather breast strap used by miners in drawing carloads of ore or coal. *Standard, 1964.*

byat. *See* biat. *Fay.*

bye chains. In Wales, hauling ropes, or chains for dip inclined planes. *Fay.*

bye channel. A spillway leading water around a reservoir when the latter is filled to capacity. *Ham.*

byerite. Applied by Mallett to a so-called mineral coal, somewhat resembling torbanite but differing from it in not crackling in fire, in being heavier, and in melting and in intumescing when heated. It yields a large amount of gas and tarry oils. *A.G.I.*

byerlite. An artificial asphalt made from petroleum by driving off the volatile products. *Webster 2d.*

bye water. *See* bank water. *Hess.*

byework; bywork. Back work; datalwork; day work; day-wage work. *Mason.*

byeworker; byworker. Dataller, repairer; day-wage repair work. *Mason.*

by heads. Term used when a well flows intermittently. *Porter.*

by-lead. *See* by-wash. *Fay.*

by-level. A side level driven for some unusual but necessary purpose. *Zern.*

byon. Gem-bearing gravel, particularly that with brownish-yellow clay in which corundum, rubies, sapphires, etc., occur. *Bureau of Mines Staff.*

bypass; byepass. a. A short passage used to get by or around a place it is not advisable to cross, for example, a mine shaft *Fay.* b. A small passage to permit equalization of the pressure on the two sides of a large valve so that it may be readily opened or closed. *Fay.* c. An extra gas pipe passing around a valve or gas chamber used to prevent a complete stoppage of the flow of gas when the valve or chamber is closed. *Fay.* d. To pass to the side of an obstruction in a borehole by deflecting the hole. Also called drill by. *Long.* e. An alternative path, in a duct or pipe, for a fluid to flow from one point to another, with the direction determined by the opening or closing of valves or dampers in the main line as well as in the bypass. *Strock, 10.* f. An arrangement of screens and chutes, or of piping, allowing material to be passed around a given part of a flow line. Much used to avoid feeding fine ore through a relatively coarse crusher, thus reducing load, wear, and chance of blockage. *Pryor, 3.*

bypassing. Irregular fluid flow wherein gas or water flows past a body of oil in a reservoir instead of displacing it. *Hess.*

bypass valve. An auxiliary valve to relieve the pressure on a sluice valve or to supply priming water to a pump. *B.S. 3618, 1963, sec. 4.*

bypit. Scot. A pit nearer the outcrop than the engine pit; an air pit. *Fay.*

byproduct. A secondary or additional product; for example, the more common byproducts of coal ovens are gas, tar, benzol, and ammonium sulfate. *Webster 3d; Fay.*

byproduct coke. Coke manufactured with attendant recovery of byproducts, in ovens that are heated externally. *ASTM D121-62.*

byproduct material. In atomic energy law, any radioactive material (except source or fissionable material) obtained in the process of producing or using source or fissionable material. Includes fission products and many other radioisotopes produced in nuclear reactors. *L&L.*

byproduct oven. A coke oven consisting of a series of long, narrow chambers arranged in rows, and heated by flues in which are burned a portion of the combustible gases generated by the coking of the coal. All of the volatile products are saved and collected as ammonia, tar, and gas, etc. *Fay.*

byproducts of coal. The products obtained from coal by destructive distillation and other processes. *Cooper.*

byroad. Scot. A subsidiary road. *Fay.*

bysmalith. A more or less vertical cylindrical body of igneous rock that transects the adjacent sedimentary rocks and has been injected by pushing up the overlying strata along steep faults. *A.G.I.*

byssolite. A name unnecessarily coined for a variety of quartz containing inclusions of greenish fibers of, probably, actinolite or asbestos. Differs from bysolite, a mineral of no gemmological interest. *See also* sagenitic quartz. *Shipley.*

bystromite. a. Monoclinic magnetic pyrites as distinct from hexagonal pyrrhotine. *Spencer 19, M.M., 1952.* b. Magnesium antimonate, $MgSb_2(O,OH)_6$, tetragonal; massive; pale blue-gray; from El Antimonio, Sonora, Mexico. *Spencer 19, M.M., 1952.*

bytownite. A plagioclase feldspar having a composition between labradorite and anorthite, $Ab_{30}An_{70}$—$Ab_{10}An_{90}$; triclinic. *Dana 17.*

bytownitite. An anorthosite in which the feldspart is essentially bytownite. *Hess.*

bytownorthite. A contraction of bytownite-anorthite. Feldspars of the plagioclase series, ranging in composition from $Ab_{20}An_{80}$ to $Ab_{10}An_{90}$. *English.*

by-wash. A channel cut to convey the surplus water from a reservoir or an aqueduct, and prevent overflow. Also called by-lead. *Fay.*

by-waters. Yellow-tinted diamonds. *Bureau of Mines Staff.*

bywork. Mid. Odd work, or that which is paid for by the day, in connection with the underground roads. The men who perform it are called byworkmen. *Fay.*

C

c a. Abbreviation for the prefix centi-, which indicates that the basic unit that follows is multiplied by one-hundredth or by 10^{-2}. *Zimmerman, p. 172.* b. Abbreviation for centimeter, although cm is preferred. *Webster 3d.* c. Symbol for velocity; speed of light; velocity of light; velocity of sound. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F–95; Zimmerman, pp. 63, 115.* d. Abbreviation for concentration; symbol for percentage concentration; volumetric concentration. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C–74; Zimmerman, p. 28.* e. Abbreviation for calorie, but cal is generally used. *BuMin Style Guide, p. 58; Webster 3d.* f. Symbol for specific heat; with subscript p, as c_p, the symbol for specific heat at constant pressure and with subscript v, as c_v, the symbol for specific heat at constant volume. *Zimmerman, p. 100.* g. Abbreviation for carat. *Zimmerman, p. 21.* h. Abbreviation for coefficient; symbol for coefficient of induction; partial capacitance coefficient. *Zimmerman, pp. 25, 158.* i. Abbreviation for capacity; capacitance. *Webster 3d.* j. Abbreviation for curie. *BuMin Style Guide, p. 59.* k. Symbol for one of the three crystallographic axes, (a, b, c). Conventionally the vertical axis is the c axis. *Bureau of Mines Staff.* l. Abbreviation for cathode, circuit, conductor, coulomb, current. *Webster 3d.* n. Abbreviation for cycle. *BuMin Style Guide, p. 59.* o. Abbreviation for candle. *BuMin Style Guide, p. 58.* p. Abbreviation for cold. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F–97.* q. Abbreviation for core. *Zimmerman, p. 30.* r. Abbreviation for continental air mass. *Zimmerman, p. 29.* s. Abbreviation for clockwise, cognate, color, contact. *Webster 3d.* t. Abbreviation for clearance. *Zimmerman, p. 25.* u. Abbreviation for calm. *Zimmerman, p. 20.* v. Abbreviation for circa, meaning about or approximately. Also abbreviated ca; *ca. Webster 3d.* w. Symbol in hydraulics for the height of a wave after reflection. *Zimmerman, p. 118.* x. With subscript 1, as c_1, and with subscript 2 as c_2, the symbols for Planck's first (c_1) and second (c_2) radiation constants. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-95.*

c a. Symbol for velocity; velocity of light in a vacuum; speed of light; speed of light in a vacuum; velocity of sound or of other waves; speed of sound. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F–98; Zimmerman, pp. 159, 165, 166, 169, 170.* b. Symbol for concentration of solution; volumetric concentration. Also enclosed in brackets as [*c*], the symbol for concentration of solution. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F–98.* c. Symbol for heat capacity per atom; heat capacity per molecule; heat capacity per mole; heat capacity per unit mass or specific heat capacity; specific heat. Also with subscript *m*, as c_m, the symbol for heat capacity per atom and for heat capacity per molecule. With subscript *p*, as c_p, the symbol for specific heat at constant pressure and with subscript *v*, as c_v, the symbol for specific heat at constant volume. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98; Zimmerman, pp. 146, 157.* d. As a subscript, the symbol for critical; critical state; critical value; critical properties; for example, p_c for critical pressure and t_c for critical temperature. *Zimmerman, pp. 168, 172.* e. Symbol for one of the three crystallographic axes, (*a*, *b*, *c*). Conventionally the vertical axis is the *c* axis. *Bureau of Mines Staff.* f. With subscript 0, as c_0, the symbol for one of the unit-cell parameters, a_0, b_0, c_0. *Bureau of Mines Staff.* g. As a subscript, the symbol for cathode. *Zimmerman, p. 168.* h. Symbol for induction coefficient; partial capacitance coefficient; and with suitable subscript, the symbol for partial capacitance or partial permittance. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F–98; Zimmerman, p. 151.* i. Symbol in hydraulics for the height of a wave after reflection. *Zimmerman, p. 188.* j. With subscript 1, as c_1, and with subscript 2, as c_2, the symbols for Plancks' first (c_1) and second (c_2) radiation constants. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98.*

C a. Chemical symbol for carbon. *Handbook of Chemistry and Physics, 45th ed., p. B-1.* b. Abbreviation for centigrade; Celsius. *BuMin Style Guide, p. 58.* c. Abbreviation for 100. Also the Roman numeral for 100, and when overscored as $\bar{C}$, the Roman numeral for 100,000. *Zimmerman, pp. 55, 128.* d. Abbreviation for hundredweight, but cwt is generally used. Also abbreviation for cental or short hundredweight. *BuMin Style Guide, p. 59; Webster 3d; Zimmerman, p. 55.* e. When crossed by a central dash, as Є, the symbol for Cambrian. When the Cambrian symbol Є is preceded by lowercase p, as pЄ, it is the symbol for Precambian. *USGS Sugg., p. 86.* f. Abbreviation for concentration. *Zimmerman, p. 28.* g. With the subscript p, as C_p, the symbol for molecular specific heat at constant pressure and with subscript v, as C_v, the symbol for molecular specific heat at constant volume. *Zimmerman, p. 100.* h. Symbol for thermal conductance. *Zimmerman, p. 108.* i. Abbreviation for coefficient, and the symbol for coefficient of flow in hydraulics; coefficient of discharge; coefficient of resistance. *Zimmerman, pp. 25, 26, 46.* j. Abbreviation for capacitance; capacitor, and the symbol for electrostatic capacity. *Zimmerman, pp. 21, 41.* k. Abbreviation for corundum (Al_2O_3) in normative rock calculations made from quantitative chemical analyses of rocks. *A.G.I. Supp.* l. Abbreviation for concrete. *Zimmerman, p. 359.* m. Abbreviation for circle; circumference. *Zimmerman, p. 129.* n. Abbreviation for cylinder; cylindrical lens. *Zimmerman, p. 33.* o. Abbreviation for Cape in topography. Also abbreviated c. *Webster 3d; Zimmerman, p. 21.* p. Abbreviation for calm. *Zimmerman. p. 440.* q. Abbreviation for cloudy; type of significant cloud. *Webster 3d;*

Zimmerman, p. 440. r. Abbreviation for contact flight in meteorology. *Zimmerman, p. 29.* s. Symbol for grid-voltage source for a vacuum tube. *Zimmerman, p. 51.*

C a. Symbol for concenration; normality of a solution. *Zimmerman, pp. 160, 173.* b. Symbol for total value of heat capacity; heat capacity per mole, which is also indicated by using subscript *M*, as C_M. With subscript *p*, as C_p, the symbol for heat capacity at constant pressure and for molecular specific heat at constant pressure and with subscript *v*, as C_v, the symbol for heat capacity at constant volume and for molecular specific heat at constant volume. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98; Zimmerman, pp. 157, 170.* c. Symbol for thermal conductance. *Zimmerman, p. 147.* d. Symbol for coefficient; general coefficient; coefficient of discharge; coefficient of resistance. *Zimmerman, pp. 146, 148, 185.* e. Symbol for capacitance or permittance; electrostatic capacity. *Zimmerman, pp. 151, 171.* f. Symbol for compliance. *Zimmerman, p. 152.*

°C. Degrees Celsius (formerly, and still more commonly, known as degrees centigrade). *Dodd.*

ca Abbreviation for circa, meaning about or approximately. *GPO Style Manual, p. 156.*

Ca a. Chemical symbol for calcium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.* b. Abbreviation for cathode. *Zimmerman, p. 22.*

CA Abbreviation for cold air. Also abbreviated ca. *Webster 3d.*

cab. a. A compartment for the driver in a mine locomotive. All coal mine locomotives in excess of 10 tons weight must have a cab at each end or an adequate center cab. *Nelson.* b. Eng. A hard ferruginous gouge or casing between the unaltered country rock and the ore. *See also* casing, a. *Fay.* c. Corn. A quartz vein poor in tin ore. *Arkell.*

cabal glass. A special glass consisting solely of calcium oxide, boric oxide, and alumina, hence its name. *Dodd.*

caballa balls. Eng. Ironstone nodules worked for iron in the Weald. Also called bulls. *Arkell.*

caballing. If two water pipes of different temperature and salinity characteristics but having the same density are mixed the resulting mixture will be slightly more dense than either of the two types and the mixture will tend to sink. This increase in density is called caballing. *Hy.*

cabbage leaf marking. *See* frondescent cast. *Pettijohn.*

cabble. To break up into pieces (as charcoal iron) preparatory to the processes of fagoting, fusing, and rolling into bars. *Fay.*

cab guard. On a dump truck, a heavy metal shield extending up from the front wall of the body and forward over the cab. *Nichols.*

cabin. a. A small roughhouse usually of one room, such as a prospector's cabin. *Hess.* b. A fireman's station underground in a coal mine. *C.T.D.* c. A small room, either on the surface or underground, for example, a lamp cabin or a deputy's cabin. *Fay.* d. A room or recess at the pit bottom or inby and used by underground officials for consultation and for writing reports. *See also* lamp station, a. *Nelson.*

cabinet projection. A method of representation of solid objects on a drawing. The object is drawn in plan or elevation; faces perpendicular to this plane are drawn at an angle of 45°, the lengths drawn at this angle being half-scale. *Ham.*

cable. a. Same as cable-laid rope; a fiber cable consists of three hawsers laid up left-handed. *Zern.* b. A ropelike usually stranded assembly of electrical conductors or of groups of two or more conductors insulated from each other but laid up together usually by being twisted around a central core, the whole usually heavily insulated by outside wrappings; specifically, a submarine cable. *Webster 3d.* c. A steel rope for hoisting or for aerial trams. *Fay.* d. A stranded conductor (single-conductor cable) or a combination of conductors insulated from one another (multiple-conductor cable). *U.S. BuMines Fed. Mine Safety Code–Bituminous Coal and Lignite Mines, Pt. I Underground Mines, October 8, 1953.* e. A flexible rope composed of many steel wires or hemp fibers in groups, first twisted to form strands, several of which are again twisted together to form a rope. Also called wire cable; wire line; wire rope; steel cable. *Long.* f. *See* cable-laid rope, c. *Long.* g. *See* armored cable; electric cable. *Nelson.* h. A single concentration of steel wires intended for prestressing. *Taylor.* i. A nautical unit of horizontal distance, equal to 600 feet (100 fathoms) and approximately one-tenth of a nautical mile. *H&G.*

cable belt conveyor. A conveyor using steel wire ropes to take the tensile pull, which in the conventional conveyor is taken by the belt. Two-stranded steel ropes, one on either side of the conveyor, are used for this purpose. The belt sits on and is supported across the two ropes by means of rubber shoe forms along the belt edges. These belts can be of long lengths, high capacities, and of higher lifts. *Nelson.*

cable clamp. A U-shaped steel rod with threaded ends and a bar with nuts, provided to clamp over two or more cylindrical pieces to bind them together, as the overlapped ends of two wire ropes. Also called cable clip; clamp; clip. *Long.*

cable clip. Synonym for cable clamp. *Long.*

cable control unit. A high-speed tractor winch having one to three drums under separate control. Used to operate dozers and towed equipment. *Nichols.*

cable coupler adaptor; flit plug adaptor. Used to connect a cable coupling unit to apparatus. It may either be separate from or integral with the enclosure of the apparatus to which the cable coupling unit is to be connected. *B.S. 3618, 1965, sec. 7.*

cable coupling box. A cable-connecting box to which the rubber sheath and/or armoring of the cable is attached. Inside the box the ends of the conductors are connected to the terminals of the apparatus or to those of the adjoining cable by means of mechanical clamps or soldered thimble connectors. The box is filled with insulating compound poured in hot, which sets into a solid mass, thus sealing the end of the cable and so preventing moisture from damaging the insulation. The body of the box may be of cast iron, cast steel, or a suitable nonferrous metal. *Mason, v. 2, p. 435.*

cable coupling unit; flit plug. A form of detachable cable sealing box utilizing contact tubes and pins to facilitate ready connection to, or disconnection from, a similar unit or other apparatus. *B.S. 3618, 1965, sec. 7.*

cable cover. A fired clay—in this context generally (but erroneously) known as earthenware, or concrete conduit for covering underground electric cables; the principal objects of these covers are to give warning of the cable's presence and to protect it from excavating tools. *Dodd.*

cable drill. a. A heavy drilling rig in which a rope is used for suspending the tools in the borehole. *See also* churn drill, b. *Nelson.* b. A churn or percussion drill rig, consisting of a tower (derrick), wire rope for moving tools vertically, a power unit, and a reciprocating device. It drills holes of up to 10 inch diameter vertically to considerable depths. Can be light and mobile. *Pryor, 3.*

cable driller. In petroleum production, one who supervises setup and drilling operations, and operates the controls of a cable drilling rig which is used to drill oil and gas wells; controls flow of well when it is brought in (first begins flowing) by capping it or regulating control valves; keeps record of nature and location of strata encountered, number of feet drilled per shift, and materials used. Also called cable tool driller; driller; well driller. *D.O.T. 1.*

cable drilling. *See* rope drilling.

cable duct. A protective earthenware or concrete pipe through which electric cable or prestressing wires are pulled. The latter are generally grouted into the ducts with cement grout. *Ham.*

cable excavator. A long range, cable-operated machine which works between a head mast and an anchor. *Nichols.*

cable, flame-resistant. See flame-resistant cable.

cable hook. A round hook with a wide beveled face. *Nichols.*

cable hooker. One who couples hoist cable to loaded cars in a clay pit and signals to have cars drawn up inclined rails to mouth of pit. Also called hookup man. *D.O.T. 1.*

cable-laid rope. a. An ordinary lay rope. *Nelson.* b. A compound-laid rope consisting of several ropes or several layers of strands laid together into one rope, as, for instance, 6 by 6 by 7. *H&G, p. 129.* c. A rope in which both the fibers forming the strands and the strands themselves are twisted to the left. *Long.* d. Wire cable made of several ropes twisted together, strands of hawser-laid rope, twisted right-ed together without limitation as to the number of strands or direction of twist. A fiber cable-laid rope is composed of three strands of hawser-laid rope, twisted right-handed. *Zern.*

cable lay. Of wire cable, several wire ropes each composed of strands not limited in number or direction of twist. Of fiber cable, strands of hawser-laid rope twisted right-handed. *Pryor, 3.*

cable length. A maritime unit of length based on the length of a ship's cable and variously reckoned as equal to 100 fathoms; one-tenth of the nautical mile of 6,080 feet; or 120 fathoms. *Webster 3d.*

cable loader. One who sets up and loads brick and tile onto a conveyor used for transporting dried clay products to kilns for burning. Also called deracker. *D.O.T. 1.*

cable railway. An inclined track up and down which travel wagons fixed at equal intervals to an endless steel wire rope, either above or below the wagons. *Ham.*

cable reel. A drum on which conductor cable is wound, including one or more collector rings and associated brushes, by means of which the electric circuit is made between the stationary winding on the locomotive or other mining device and the trailing cable which is wound on the drum. The drum may be driven by an electric motor, a hydraulic motor, or mechanically from an axle on the machine. *ASA C42.85: 1956.*

cable reel locomotive. A face or gathering locomotive driven by a power cable connected to trolley wires. The cable winds on a reel attached to the locomotive. *Nelson.*

cable-screw conveyor. A one-way or closed circuit conveyor of which the propelling medium is a flexible, torque transmitting cable of which helical (screw) threads are an integral part. Loads or load carriers engage the thread and advance a distance equal to one pitch each revolution of the cable screw. *ASA MH4.1-1958.*

cable sealing box. A closed box to which a cable can be attached and which is designed to be filled with insulating compound to protect the insulation of the cable from air or moisture. *B.S. 3618, 1965, sec. 7.*

cable selvage belt. A conveyor belt in which the carrying section is composed of rubber and fabric with attached intermittent transverse metal supports having both ends supported by cables. The cables transmit the driving force and the center portion functions as the load-supporting medium. *ASA MH4.1-1958.*

cable sheathing. A seamless lead tube formed around telephone or telegraph cables in order to protect them from dampness or injury. The lead is ordinarily hardened by antimony, but tellurium (about 0.1 percent) and calcium (about 0.04 percent) are also said to have been used. *Hess.*

cable sheath, nonmetallic. A covering consisting of composition tapes, compound jackets of natural or synthetic rubber, thermoplastic, or fiber braids applied over the conductor assembly and insulation of multiple conductor cables. *I.C. 7962, 1960, p. 21.*

cable shield. A metallic shield consisting of nonmagnetic material applied over the insulation of the individual conductors or conductor assembly. *I.C. 7962, 1960, p. 21.*

cable speed. Rate at which a cable, under load, may be wound on a hoist drum. Commonly measured in feet per minute. Also called hoist speed; line speed; rope speed. *Long.*

cable splicer. a. A short piece of tubing or a specially formed band of metal generally used without solder in joining ends of portable cables for mining equipment. *ASA C42.85: 1956.* b. A man who splices cable. *Bureau of Mines Staff.*

cable system. One of the well-known drilling systems, sometimes designated as the American or rope system. The drilling is performed by a heavy string of tools suspended from a flexible manila or steel cable to which a reciprocating motion is imparted by an oscillating "walking beam" through the suspension rope or cable. *See also* churn drill. *Fay.*

cable-system drill. Synonym for churn drill, a. *Long.*

cable-tool bit. A heavy, blunt-edge chisel bit made from a cylinder of solid steel flattened and grooved longitudinally on two sides and used as the cutting tool or bit in drilling a borehole with a churn drill. Also called spud; spud bit. *Long.*

cable-tool cuttings. The rock fragments and sludge produced in drilling a borehole with a churn drill. *Long.*

cable-tool dresser. *See* tooldresser. *D.O.T. 1.*

cable-tool drill. Synonym for churn drill, a. *Long.*

cable-tool driller. Synonym for churn driller, b. *Long.*

cable-tool drilling. Procedure of drilling with a solid steel chisel-faced bit working vertically at the end of a string of solid steel tools suspended in the hole at the end of a steel line or rope and activated by a walking beam. *Wheeler; Bureau of Mines Staff.* Synonym for churn drilling. *Long.*

cable-tool men. Men experienced in drilling holes with churn-drill equipment. *See also* churn drill. *Long.*

cable-tool operator. In petroleum production, one who removes obstructions from boreholes or from producing oil or gas wells, using a special string of tools attached to the cable. *D.O.T. 1. See also* churn driller.

cable-tool outfit. Synonym for churn-drill rig. *Long.*

cable-tool rig. Synonym for churn-drill rig. *Long.*

cable tools. The bits and other bottom-hole tools and equipment used to drill boreholes by percussive action, using a rope, instead of rods, to connect the drilling bit with the machine on the surface. *See also* churn drill. *Long.*

cableway. A system in which the carriers are supported by a cable and are not detached from the operating span. The travel of the carriers is wholly within the span. *ASA MH4.1–1958. See also* aerial cableway.

cableway excavator. A slackline cableway used for excavating a restricted area. *Ham.*

cableway transporter. A transporter crane on which the track for the carrier is a steel wire rope. *Ham.*

cabochon. *A* style of cutting in which the top of the stone forms a curved convex surface. The base may be convex, concave, or flat. *Anderson.*

cabocle. A compact rolled pebble resembling red jasper, supposed to be hydrous aluminum-calcium phosphate; found in the diamond-producing sands of Bahia, Brazil. *Standard, 1964.*

cabra stone. Fluorite. *Shipley.*

cabrerite. A hydrous arsenate of nickel, cobalt, and magnesium found in green crystals and in masses. *Fay.*

ca'canny; go slow. To work unreasonably slow due to a dispute or grievance; to set a limit to the quantity of work performed and below what might be reasonably expected. *See also* stint. *Nelson.*

cache. Fr. The place where provisions, ammunition, etc., are cached or hidden by trappers, or prospectors, in unsettled regions. *Fay.*

cacheutaite. A lead, copper, and silver selenide carrying 7 to 36 percent copper. It is closely related to zorgite. *Weed, 1918.*

cacholong. An opaque bluish-white or pale-yellow opal, containing a little alumina. *Fay.*

cacoxenite. A hydrous phosphate of iron, $FePO_4Fe(OH)_3 + 4\frac{1}{2}H_2O$, occurring in yellow or brownish radiated tufts. *Fay.*

cactus grab. A digging and unloading attachment hung from a crane or excavator. It consists of a split and hinged bucket fitted with curved jaws or teeth which dig into the loose rock while the bucket is being dropped and contract to lift the load while it is being raised. It is used increasingly for mechanical mucking in shaft sinkings. A standard cactus double rope grab for shaft sinking has a capacity of about 20 cubic feet, weighs about 5,500 pounds, and can fill a 5-ton capacity hoppit in about 4 minutes. *Nelson.*

cadacryst. Synonym for chadacryst; xenocryst. *A.G.I. Supp.*

cadastral control. A system of established monuments whose positions are accurately determined and are used in all correlated cadastral surveys. *Seelye, 2.*

cadastral map. A map showing the extent, ownership, value, etc., of land. In the United States, cadastral maps usually show individual tracts of land, with corners, length and bearing of boundaries, acreage, ownership, and sometimes cultural and drainage features. *Stokes and Varnes, 1955.*

cadastral surveys. Surveys relating to land boundaries and subdivisions, made to create or to define the limitations of titles, and to determine units suitable for transfer. The term includes surveys involving retracements for the indentification, and resurveys for the restoration, of property lines. (The term cadastral is practically obsolete; use land survey or property survey.) *Seelye, 2.*

cadge. Derb. To attach the hoisting rope to an ore bucket; also, to fasten tools in the bucket with a rope to prevent them falling out. *Fay.*

cadger. A little pocket oilcan for miners. *Fay.*

cadmia. a. An impure zinc oxide that forms on the walls of furnaces in the smelting of ores containing zinc. *Standard, 1964.* b. Cadmium yellow. *Standard, 1964.* c. A Greek name for calamine, of which calamine may be a corruption. *Hess.*

cadmium. Tin-white; malleable; ductile; toxic; bivalent metallic element; capable of taking a high polish; and it emits a crackling sound when bent. Occurs in the mineral greenockite (CdS) and also in small amounts in ores of zinc from which it is separated as a byproduct. Used chiefly in the protective electroplating of iron and steel and in the manufacture of bearing metals. Symbol, Cd; hexagonal; atomic number, 48; atomic weight, 112.40; specific gravity, 8.642; melting point, 320.9° C; and boiling point, 767° C. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-104.*

cadmium acetate. $[Cd(C_2H_3O_2)_2{\cdot}3H_2O]$, molecular weight, 284.55; specific gravity, 2.01; forms colorless, deliquescent, monoclinic crystals that are highly soluble in water and alcohol. It becomes anhydrous when heated to 130° C and attains a specific gravity of 2.34 and a melting point of 256° C; the salt decomposes at higher temperatures. *I.C. 7881, 1958, p. 22.*

cadmium acetate hydrate. Colorless or white; monoclinic; $Cd(CH_3COO)_2{\cdot}3H_2O$. Used in ceramics in iridescent glazes. *CCD 6d, 1961.*

cadmium antimonide. CdSb is a hard, brittle alloy. Of interest as a semiconductor and it also has some promise for thermoelectric applications. *Lee.*

cadmium blend. Greenockite, CdS. *Hey 2d, 1955.*

cadmium borotungstate. Yellow; triclinic; $2CdO{\cdot}B_2O_3{\cdot}9WO_3{\cdot}18H_2O$. Used as Klein's reagent for separating minerals. *CCD 6d, 1961.*

cadmium bromide. $(CdBr_2)$; a yellow crystalline powder with a molecular weight of 272.24; specific gravity, 5.20; melting point, 580° C; and boiling point, 963° C. *I.C. 7881, 1958, p. 23.*

cadmium carbonate. ($CdCO_3$); a white, crystalline powder, soluble in acids, potassium cyanide, and ammonium salts but insoluble in water. It decomposes below 500° C. The salt can be made by adding an alkali carbonate to a solution of another cadmium salt. Molecular weight, 172.42; specific gravity, 4.26. *I.C. 7881, 1958, p. 23.*

cadmium chloride. ($CdCl_2$); composed of colorless hexagonal crystals that are soluble in water and in methyl and ethyl alcohol. It forms hydrates with 1, 2, 4, and 5 molecules of water. Molecular weight, 183.32; melting point, 568° C; boiling point, 960° C; and specific gravity, 4.05. *I.C. 7881, 1958, p. 23.*

cadmium columbate; cadmium niobate. $Cd_2Cb_2O_7$ ($Cd_2Nb_2O_7$) is an antiferroelectric and has low losses at high frequency. *Lee.*

cadmium copper. A variety of copper containing 0.7 to 1.0 percent cadmium. Used for trolley, telephone, and telegraph wires because it gives high strength in cold-drawn condition, combined with good conductivity. *C.T.D.*

cadmium cyanide. [$Cd(CN)_2$]; obtained as a white precipitate when potassium or sodium cyanide is added to a fairly concentrated solution of a cadmium salt. It dissolves in an excess of the precipitating reagent owing to formation of the complex ion. The salt is slightly soluble in water and easily soluble in acids, and decomposes when heated above 200° C in air. *I.C. 7881, 1958, p. 23.*

cadmium fluoride. CdF_2; molecular weight, 150.40; white; isometric; specific gravity, 6.64; melting point, 1,100° C; boiling point, 1.758° C; and soluble in water and in acids. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-159.*

cadmium iodide. A dimorphic material, (CdI_2), with a molecular weight of 366.25. The alpha form has a melting point of 385° C, boiling point of 713° C, and a specific gravity of 5.67. The beta form has a specific gravity of 5.30. It is composed of lustrous white, hexagonal scales that are stable in air. *I.C. 7881, 1958.*

cadmium minerals. Natural compounds containing cadmium. *Bureau of Mines Staff.*

cadmium niobate. $Cd_2Nb_2O_7$; a ferroelectric compound of potential value as a special electroceramic; the Curie temperature is −103° C. *Dodd.*

cadmium nitrate. [$Cd(NO_3)_2$]; forms white hygroscopic crystals that are soluble in water, alcohol, and liquid ammonia. It can be made by dissolving cadmium metal, oxide, or carbonate in nitric acid and evaporating to incipient crystallization. Molecular weight, 308.49; melting point, 59.4° C; specific gravity, 2.46. *I.C. 7881, 1958, p. 23.*

cadmium nitrate tetrahydrate. White; needles; hygroscopic; $Cd(NO_3)_2 \cdot 4H_2O$; and soluble in water and in alcohol. Used in ceramics for coloring glass and porcelain. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-159.*

cadmium ocher. The mineral greenockite; used as a pigment. *Standard, 1964.*

cadmium orthophosphate. $Cd_3(PO_4)_2$; molecular weight, 527.14; colorless; amorphous; melting point, 1,500° C; insoluble in water; and soluble in acids. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-159.*

cadmium oxide. Yellowish-red or brownish-red to brownish-black; isometric; CdO. Used as an addition agent for cadmium-plating baths; a pigment in ceramics; a chemical catalyst; and for making cadmium salts. *CCD 6d, 1961.*

cadmium ratio. The ratio of the neutron-induced saturated activity in an unshielded foil to the saturated activity of the same foil when it is covered with cadmium. *NRC-ASA N1.1-1957.*

cadmium selenide. CdSe; molecular weight, 191.36; gray to brown or red; hexagonal; specific gravity, 5.81 (at 15° C, referred to water at 4° C); melting point, above 1,350° C; and insoluble in water. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-160.*

cadmium silicate; cadmium metasilicate. $CdSiO_3$; molecular weight, 188.48; colorless; orthorhombic; specific gravity, 4.93; melting point, 1,242° C; and practically insoluble in water. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-160.*

cadmium sulfide; cadmium yellow; greenockite. a. A light yellow to orange powder; hexagonal; CdS. Used in ceramic glazes. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–160.* b. Used with selenium in the production of ruby glass and as a yellow colorant in enamels. Specific gravity, 3.9 to 4.8; melting point, 1,750° C (at 100 atmospheres); practically insoluble in water; and soluble in ammonium hydroxide and in acids. Occurs as the mineral greenockite, which is recovered as a byproduct in the refining of zinc ores. Used with selenium and sulfur as the red coloring material for porcelain sign enamels. *Lee; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–160.* c. A bright yellow pigment. *Bennett 2d, 1962.* d. Source of cadmium. *Bureau of Mines Staff.*

cadmium sulfoselenide. A pigment prepared by adding selenium to a solution of barium sulfide or nitrate, reacting the solution with cadmium sulfate, and calcining with excess sulfur to remove unreacted selenium, which tends to darken and dull the product. *BuMines I.C. 7881, 1958, p. 22.*

cadmium telluride. CdTe; molecular weight, 240.00; black; isometric; specific gravity, 6.20 (at 15° C, referred to water at 4° C); melting point, 1,041° C; and insoluble in water and in acids. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-160.*

cadmium titanate. $CdTiO_3$; a special ferroelectric ceramic having the ilmenite structure at room temperature; the Curie temperature is approximately −220° C. *Dodd.*

cadmium tungstate. $CdWO_4$; molecular weight, 360.25; yellow crystals; slightly soluble in water and soluble in ammonium hydroxide. Used in fluorescent paint. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-160.*

cadmium yellow. *See* cadmium sulfide.

cadmium zirconate. Used as an additive to barium-titanate-type ceramics because it acts as a depressant to the dielectric constant in the Curie temperature. *Lee.*

cadmosellite; kadmoselite. A black, hexagonal mineral, approximately $Cd(Se_{0.85}S_{0.15})$, with a resinous to adamantine luster; perfect cleavage; has the wurtzite structure; found as fine xenomorphic disseminations cementing sandstone. *American Mineralogist, v. 43, No. 5-6, May-June 1958, p. 623.*

cadwaladerite. Hydrous basic aluminum chloride, $Al(OH)_2Cl \cdot 4H_2O$, as amorphous grains in halite from Cerro Pintados, Chile. *Spencer 16, M.M., 1943.*

Caen stone. A light cream-colored Jurassic limestone, chiefly from Caen, Normandy, largely used for building purposes, as in various English churches. *Standard, 1964.*

caeruleofibrite. Synonym for ceruleofibrite. *English. See* connellite.

caesium. A variant of cesium. *Webster 3d.*

cafemic. A mnemonic term used collectively for the calcium, ferrous-ferric, and magnesium constituents of rocks or magmas. *A.G.I. Supp.*

cafetite. Orthorhombic radiating crystals in a pyroxenite from Africanda, Kola Peninsula, U.S.S.R.; approximating $(Ca,Mg)(Fe,Al)_2Ti_4O_{12} \cdot 4H_2O$. Named from the composition, Ca-Fe-Ti. *Hey, M.M., 1961.*

cage. a. Mining term for elevator. *Kentucky, p. 329.* b. The structure used in a mine shaft for the conveyance of men and materials. Cages are usually designed to take one or two cars per deck and may be single or multidecked. Where multidecked cages are used, simultaneous or consecutive discharge of decks can be employed. The modern trend is towards consecutive decking with power-operated cage unloading equipment. Cages can be either steel, composite, or all-alloy construction. An all-alloy cage is about half the weight of its all-steel equivalent. The cage is suspended from bridle chains which in turn are attached to the cappel of the winding rope. Normally there are two cages in simultaneous operation in the separate compartments of the shaft and traveling in opposite directions. *Nelson.* c. A structure of elastic iron rods slipped into a borehole around the drill rods to stabilize and reduce tendency of rods to vibrate. *Long.* d. The container for the ball in a ball valve. *Long.* e. Synonym for friction head, e. *Long.* f. A wire guard or screen in pipes to prevent passage of solids. *Long.* g. A circular frame that limits the motion of balls or rollers in a bearing. *Nichols.* h. The barrel or drum of a whim on which the rope is wound. *Fay.*

cage bar. Safety device which holds doors shut or keeps trams in position. *Pryor, 3, p. 65.*

cage chains. *See* bridle chains. *Nelson.*

cage cover. Scot. The iron sheets fixed above a cage to protect its occupants; a hood. *See also* bonnet, a. *Fay.*

cage guides. a. Conductors made of wood, iron or steel, or wire rope, used for the purpose of guiding the cages in the shaft and to prevent them from swinging and colliding with each other while in motion. *See also* fixed guides; rope guides. *Nelson.* b. Scot. Shoes, usually cast-iron, clasping the guides (*see* cage guides, a) in a shaft and guiding the cage in its movements in the shaft. *Fay. See also* cage shoes.

cage iron. A cagelike core iron. *Standard, 1964.*

cageman. *See* cager, a; hoistman. *D.O.T. 1.*

cageman helper. *See* cager helper. *D.O.T. 1.*

cage mills. Cage mills, also known as disintegrators, are used extensively for secondary crushing of stone and gravel, and for reduction of slag, fertilizers, and the like. Materials of high moisture content, such as limestone chips from stockpiles, are pulverized without plugging. The machines are of simple design and easily maintained. The cages, which are the only moving parts, are removed readily for repair of hardfacing. *Pit and Quarry, 53rd, Sec. B, p. 35.*

cage of a whim. Corn. The barrel on which the rope is wound; a drum. *Fay.*

cager. a. In mining, one who directs station operations and movement of cage used to raise and lower men, mine cars, and supplies between various levels and surface, working at top of shaft or at an intermediate level inside mine. May be designated as top cager; headman I when working only at top of shaft. Also called banksman; cageman; cage tender; on-setter; shaft headman; skip tender. *D.O.T. 1.* b. A power-operated ram for pushing mine cars into or out of cages at pit top or pit bottom. *Nelson.* c. One who supervises weighing, and the sequence of sending up components of a furnace charge, keeps tally of the number of charges and signals to the top filler when it is time to hoist. *Fay.*

cager coupler. In bituminous coal mining, one who works with a cager, coupling and uncoupling cars at a shaft station. *D.O.T. 1.*

cager helper. A laborer who assists the cager in operation of the cage used to raise and lower men and supplies between various levels and surface. Also called cageman helper; cage-tender helper. *D.O.T. 1.*

cage runner. *See* hoistman. *D.O.T. 1.*

cage seat. Scaffolding, sometimes fitted with strong springs, to take the shock, and on which the cage rests when reaching the pit bottom or other landing. *See also* cage shuts. *Fay.*

cage sheets. Short props or catches on which cages stand during caging or changing cars. *Zern.*

cage shoes. Fittings bolted to the side of a cage to engage the rigid guides in the shaft. Usually there are two for each guide, one at the top and one at the bottom of the cage. The shoes are usually about one foot long and shaped to fit closely round about three-quarters of the guide, with sufficient clearance for free movement but not sufficient to allow the shoe to come off the guide. *Nelson.*

cage shuts. Som. Short props or catches upon which cages stand during caging. Called fallers in Lancashire. *See also* chairs; dogs; cage seat. *Fay.*

cage stops. Equipment fitted on the cage floor to hold the car in position while traveling in the shaft. Spring- or rubber-mounted stops are more commonly used. *See also* keps. *Nelson.*

cage tail chain. Scot. A chain fastened to the bottom of the shaft cage to haul a car out of a short dip road. *Fay.*

cage tender. *See* cager, a. *Fay.*

cage-tender helper. *See* cager helper. *D.O.T. 1.*

cageway. A cage guide, or part of a shaft containing the guides. *Standard, 1964.*

caging. N. Staff. The operation of changing the tubs or cars on a cage. *Fay.*

cagutte. A baguette; an oblong cut diamond. *Hess.*

cahnite. A white hydrous boroarsenate of calcium, $4CaO.B_2O_3.As_2O_5.4H_2O$. Penetration twins of tetrahedronlike sphenoids. Tetragonal. From Franklin, N.J. *English.*

caicos salt. Solar salt of various sizes produced on the Caicos Islands, British West Indies. *Kaufmann.*

Cainozoic. Synonym for Cenozoic. *A.G.I. Supp.*

cairn; carn. A mound or heap of stones erected for a memorial or mark, such as a sepulchral monument or a landmark, or to indicate the site of a cache. *Standard, 1964.*

cairngorm. Smoky-yellow or brown varieties of quartz, the coloring matter probably due to some organic compound; named from Cairngorm in the Scottish Grampians, the more attractively colored varieties being used as semiprecious gem stones. Also called smoky quartz. *C.T.D.*

caisson. a. A cylindrical steel section of shaft, used for sinking through running or waterlogged ground. A horizontal caisson is used for tunneling through similar ground, perhaps with pressure locks to aid in keeping out water. *Pryor, 3.* b. A chamber, usually sunk by excavating within it, for the purpose of gaining access to the bed of a stream or other body of water. If the chamber is closed on top and the water excluded by air pressure, it is called a pneumatic caisson. *Seelye, 1.* c. A watertight chamber used in construction work under water (as in a harbor or river) or as a foundation. *Webster 3d.* Also, used in excavating for foundations in the presence of great quantities of water. *Fay.*

caisson disease. Pains in the joints and paralysis affecting workers in compressed air who are subjected too suddenly to normal atmospheric pressure. The trouble is caused by bubbles of nitrogen accumulating in the nervous system. The only satisfactory treatment is to put the sufferer into a medical lock to be recompressed to the pressure under which he was working, and then gradually to reduce the pressure. This disease is also known as the bends, diver's paralysis, air embolism, and compressed-air sickness. *Ham.*

caisson sinking; drum shaft; drop shaft. A method of sinking a shaft through wet clay, sand or mud down to firm strata. The cast-iron tubbing, attached ring by ring on the surface, is gradually lowered as the shaft is excavated. There is a special airtight working chamber at the bottom of the lining. A cutting shoe at the lower end of the tubbing helps it to penetrate the soft ground. The caisson method is obsolescent, being replaced by the freezing method, etc. *See also* concrete caisson sinking. *Nelson.*

cajon. Sp. In the Southwestern United States, a cañon or narrow gorge with steep sides; a box gorge. *Standard, 1964.*

cake. a. Solidified drill sludge. *Long.* b. That portion of a drilling mud adhering to the walls of a borehole. *Long.* c. The solid residue left in a filter press after the solution has been drawn off. *Fay.* d. *See* cake of gold. *Fay.* e. To form in a mass as when ore sinters together in roasting, or coal cakes together in coking. *Fay.* f. In powder metallurgy, a coalesced mass of unpressed metal powder. *ASM Gloss.*

cake bed. Som. A 5-foot bed of limestone; used for inside work. *Arkell.*

cake copper. Copper cast in a round, cake-shaped mass. *See also* tough cake. *Hess.*

caked dust. Compaction or adherence of dust particles to the extent that a light stroke with a brush or a light airblast, as from the mouth, will not cause the dust to be dispersed. *I.C. 8001, 1960, p. 2.*

cake of gold. Gold formed into a compact mass (though not melted) by distillation of mercury from amalgam. Also called sponge gold. *Fay.*

cakes of ore. Flattish masses of ore. *Nelson.*

cake silver. Name formerly given in England to pure silver. *Hess.*

cake thickness. The measure of the thickness of the filter cake deposited by a drilling fluid against a porous medium. Cake thickness and water loss constitute the determining factors of filtration qualities. *Brantly, 1.*

caking coal. Coal which softens and agglomerates on heating and after volatile matter has been driven off at high temperatures, produces a hard gray cellular mass of coke; all caking coals are not good coking coals. *Tomkeieff, 1954. See also* coking coal.

caking index; agglutinating power. A laboratory method of indicating the degree of caking, coking or binding together of a coal when a sample is heated in a prescribed manner. *Nelson.*

cal. a. Corn. Wolframite; tungstate or iron and manganese. Frequently associated with tin ore. *Fay.* b. Abbreviation for calorie. Also abbreviated C and c. *BuMin Style Guide, p. 58; Webster 3d.*

cala. A short and narrow ria formed in a limestone coast. *Schieferdecker.*

calabashing. Panning tin gravels in a half-calabash gourd. Used in prospecting and alluvial mining in primitive conditions. *Pryor, 3.*

Calabrian. Lower pleistocene. *A.G.I. Supp.*

calaite. The mineral turquoise. *Fay.*

calamaco. Mex. Large piece of rock, difficult to break up. *Fay.*

calamanco; calaminker. N. of Eng. Red or mottled Paleozoic marls and shales. *Arkell.*

calamin. To apply to (pottery) a wash made from the pigment calamine. *Standard, 1964.*

calamine. a. A commercial, mining, and metallurgical term comprising the oxidized ores of zinc, as distinguished from the sulfide ores (blendes). Used by mineralogists as the name of mineral species; American mineralogists commonly call the hydrous silicate of zinc, $H_2O{\cdot}2ZnO{\cdot}SiO_2$, by this name, but inasmuch as British mineralogists call the anhydrous carbonate, $ZnCO_3$, by the same name, some authorities advocate discontinuance of the use of the name for distinct mineral species and the confinement of its use to a class of ores, which was the original use and still is the commercial and technical use. *Fay.* b. A special kind of so-called galvanized iron. Also spelled kalamin. *Standard, 1964.* c. Sometimes used in Europe as a synonym for smithsonite. *A.G.I.* d. Synonym for hemimorphite. *Dana 17.*

calamine stone. Eng. A carbonate of zinc; smithsonite. *Fay.*

calamine violet. An indicator plant which grows only on zinc-rich soils in the zinc districts of Central and Western Europe. *Hawkes, 2, p. 4.*

calamite. An asparagus-green variety of tremolite. *Standard, 1964.*

calas coast. Coast, mostly of the longitudinal type, formed by the submergence of small valleys which have a rather steep grade, so that, also under the influence of the breakers, small, hemicircular bays are formed. *Schieferdecker.*

calaverite. One of the gold telluride group of minerals, $AuTe_2$. Corresponds to the same general formula as sylvanite and krennerite. Pale bronze-yellow color or tin-white, tarnishing to bronze-yellow on exposure; metallic luster; contains 40 to 43 percent gold, 1 to 3 percent silver. Found in the United States (California, Colorado); Australia; Canada. An important source of gold. *CCD 6d, 1961.*

calc. Prefix meaning containing calcium carbonate. *A.G.I.*

calc-alkalic series. An igneous rock series having an alkali-lime index of 55 to 61. *A.G.I.*

calc-alkali rock. An igneous rock in which the proportion of lime and alkalies (in relation to the other constituents) is such that the dominant minerals are feldspars, hornblende, and/or augite, specifically, the alkali minerals, such as feldspahtoids and soda pyroxenes and soda amphiboles, are absent. The term includes granodiorite, syenite, diorite, and gabbro, and their volcanic analogs and excludes alkali and apilithic rocks and most peridotites. The term is used rather loosely to contrast a rock that is not alkaline with one that is, and it cannot be strictly limited by definition. *Holmes, 1928.*

calcaphanite. A variety of diabase showing patches of secondary calcium carbonate embedded in a green groundmass. *Webster 2d.*

calcar. a. An oven, or reverberatory furnace used in early glassmaking processes for calcination of the batch into frit. *Webster 3d.* b. An annealing arch or oven. *Webster 3d.*

calcarenite. Suggested by Grabau for a limestone or dolomite composed of coral sand, shell sand, or calcic sand derived from the erosion of limestones. *Fay.*

calcareous. a. Like calcite or calcium carbonate, especially in hardness. *Webster 3d.* b. Consisting of or containing calcium carbonate. *Webster 3d.* c. Containing calcium or any calcium compound. *Webster 3d.* d. Relating to rocks containing calcium carbonate. *Webster 3d.* e. Growing on limestone or in soil impregnated with lime. *Webster 3d.*

calcareous algae. Algae that forms deposits of calcium carbonate. Fossil calcareous algae are found in the United States. *MacCracken.*

calcareous clay. A clay containing the minerals calcite and/or dolomite in amounts sufficient to cause obvious effervescence with dilute HCl. If the carbonates are in sufficient excess over Fe_2O_2, the clay fires to a cream color and has a short vitrification range. *ACSB-1.*

calcareous crust; caliche. An indurated horizon cemented with calcium carbonate. *Schieferdecker.*

calcareous deposit. A limestone, formed by the accumulation of varied fossil (or recent) shell fragments, corals, micro-organisms, etc., in a matrix partly of organic and partly of inorganic origin. Distinctive types are determined either by characteristic fossils, peculiar structures, or by the presence of particular compounds or impurities. Some degree of consolidation is common to all calcareous deposits except the abyssal oozes. *Stokes and Varnes, 1955.*

calcareous dust. Limestone, quicklime, hydrated lime, and cement dusts fall in this class. These dusts are more or less soluble in the body fluids, and are eventually absorbed. They cause no chronic irritation of the respiratory tract. *Pit and Quarry, 53rd, Sec. B, p. 252.*

calcareous glazes. Glazes in which lime or other calcium compounds are the main fluxing agents. *Rosenthal.*

calcareous grits. Sandy beds, intermixed with or cemented by calcium carbonate. *Fay.*

calcareous iron ore. Siderite, $FeCo_3$, containing some calcium. *Hess.*

calcareous marl. Unconsolidated material that is mainly a mixture of calcium carbonate and clay. *AIME, p. 132.*

calcareous oozes. a. Sediment consisting mostly of the shells of one-celled animals and which become chalk when hardened. *MacCracken.* b. These contain more than 30 percent calcium carbonate, which represents the skeletal material of various plankton animals and plants. The calcareous oozes may be further divided into three types, depending upon a characteristic type of organism present in the sediment, namely: (1) globigerina ooze, in which the calcium carbonate is in the tests of pelagic foraminifera; (2) pteropod ooze, containing conspicuous shells of pelagic molluscs; and (3) coccolith ooze, containing large numbers of coccoliths and rhabdoliths that form the protective structures of the minute Coccolithophoridae. *H&G, p. 73.*

calcareous ores. Iron ores in which the gangue consists mainly of carbonate of lime. *Osborne.*

calcareous peat. Same as eutrophic peat. *Tomkeieff, 1954.*

calcareous rocks. Rocks which are wholly or largely calcium (lime) carbonate. *Mason, v. 1, p. 13.*

calcareous sandstone. A sandstone containing a considerable proportion of calcium carbonate. *Fay.*

calcareous sinter. *See* travertine. *Stokes and Varnes, 1955.*

calcareous spar. Crystalline calcium carbonate. *See also* calcite. *Fay.*

calcareous tufa. A spongy, porous or vesicular deposit or calcium carbonate. When the carbonate of calcium is deposited in a solid form it is called travertine or calcsinter. Stalactites and stalagmites are of this nature. *Fay.*

calcarinate. Cemented with calcium carbonate. *A.G.I. Supp.*

calc-dolomite. Rock consisting of both calcite and dolomite crystals. *A.G.I. Supp.*

calce. Native calcium oxide, CaO, found on Mount Vesuvius, Italy. It formed from limestone enveloped in lava and altered by the heat of the lava. *Hess.*

calcedony. *See* chalcedony. *Fay.*

calc-flinta. A very fine-grained metamorphic rock of flinty aspect derived from a calcareous mudstone. The new minerals are in part due to pneumatolytic processes, and include feldspars and lime-silicate minerals, the latter being less abundant than in a calc-silicate hornfels. *Holmes, 1928.*

calcia. The chemical compound, calcium oxide (CaO). *Boynton.*

calciborite. Calcium borate, $Ca_5B_8O_{17}$, monoclinic. White radial aggregates in drill cores from limestone skarn, from the Urals, U.S.S.R. Named from the composition. *See also* frolovite. *Spencer 21, M.M., 1958.*

calcic. a. Of, peratining to, or containing calcium. Said especially of minerals, particularly feldspars, in which calcium is an important constituent. *Fay.* b. Refers to igneous rocks having an alkali-lime index of 61 or higher. *A.G.I. Supp.*

calciclase. Proposed by Johannsen for the calcic plagioclases from An_{90} to An_{100}, commonly called anorthite. The term anorthite would be reserved for the pure end-member. Obsolete. *A.G.I.*

calcic series. Those igneous rock series having an alkali-lime index of 61 or higher. *A.G.I.*

calciferous. Bearing, producing, or containing calcium, calcium carbonate, or calcite. *Webster 3d.*

calcify. To make or to become hard or stony by the deposit of calcium salts. *Standard, 1964.*

calcigenous. Forming a calx; said of certain metals. *Standard, 1964.*

calcilutite. a. Suggested by Grabau for a limestone or dolomite composed of calcareous rock flour, the composition of which is typically nonsiliceous, though many calcilutites contain an intermixture of clay. *Fay.* b. A consolidated lime mud. *Webster 3d.*

calcinable. Capable of being calcined or reduced to a friable state by the action of fire. *Fay.*

calcination. a. Heating ores, concentrates, precipitates, or residues to decompose carbonates, hydrates, or other compounds. *ASM Gloss.* The process differs from roasting because air is not supplied to the charge during heating. The essential difference between calcining and roasting is that roasting involves a chemical reaction between the gas and the solids, but in calcination the surrounding hot gas serves merely to provide the necessary heat. *Newton, pp. 284–285.* b. A heat treatment to which many ceramic raw materials are subjected preparatory to further processing or use, for the purpose of driving off volatile chemically combined components and effecting physical changes. *HW.* c. To heat metals at high temperatures to convert them into their oxides. *See also* roasting. *Nelson.*

calcinatory. *See* calciner. *Fay.*

calcine. a. Ore or concentrate after treatment by calcination or roasting and ready for smelting. *C.T.D.* b. To expel volatile matter by heat, as carbon dioxide, water of sulfur, with or without oxidation; to roast; to burn (said of limestone in making lime). *Fay.* c. To disintegrate or make friable, as with flint. *Hess.* d. A ceramic material or mixture fired to less than fusion for use as a constituent in a ceramic composition. *ASTM C242–60.* e. A refractory material, often fire clay, that has been heated to eliminate volatile constituents and to produce desired physical changes. *ASTM C71-64.*

calcined aluminas. These are avaiable in several grades based on the degree of heat treatment received. Traces of residual water remain and they are more easily broken down by milling than other types of alumina. They are fluffier, less pure, and usually contain less alpha phase than the tabular grades. They are normally produced in 100 mesh and finer sizes. *Lee.*

calcined bauxite. Bauxite from which the water has been driven off by heating. *Mersereau, 4th, p. 285.*

calcined clay. Ball clay or china clay that has been heated until combined water is removed and plastic character of the clay is destroyed. *CCD 6d, 1961.*

calcined gypsum. Gypsum partially dehydrated by means of heat, having the approximate chemical formula, $CaSO_4 \cdot \frac{1}{2}H_2O$. *ASTM C11-60.*

calcined kaolin. A claylike, mealy, white, grayish or reddish aluminum silicate, used in making porcelain. *Crispin.*

calcined refractory dolomite. Raw refractory dolomite that has been heated to a temperature sufficiently high and for a long enough time to decompose the carbonate structure and remove volatile constituents. *ASTM C71-64.*

calciner. A furnace or kiln for roasting. *Fay.*

calcining. a. Roasting of ore in oxidizing atmosphere, usually to expel sulfur or carbon dioxide. If sulfur removel is carried to practical completion, the operation is termed sweet roasting; if CO_2 is virtually removed, dead roasting. *Pryor, 3.* b. Reducing to powder by heating. *Mersereau, 4th, p. 234.*

calcining furnace. A furnace in which ores or metallurgical products are calcined. *C.T.D.* Also called calciner. *Fay.*

calcining of refractory materials. The heat treatment to which raw refractory materials are subjected, preparatory to further processing or use, for the purpose of eliminating volatile chemically combined constituents and producing volume changes. *ASTM C71-64.*

calcinite. A silicon-carbide preparation. Used as an abrasive. *Bennett 2d, 1962 Add.*

calcioancylite. A brownish-yellow variety of ancylite with the formula, $(Sr,Ca)_3Ce_4(CO_3)_7(OH)_4 \cdot 3H_2O$. The strontium is partly replaced by calcium and some barium; from the pegmatites of the Khibine Peninsula, northern Russia. Also called calcium ancylite and incorrectly calciumcylit. *Hay 2d, 1955; Hess; Crosby, p. 94.*

calciocelestite. A variety of celestite containing calcium. *Standard, 1964.*

calciocopiapite. The calcium member of the copiapite family, $CaFe_4(SO_4)_6(OH)_2 \cdot 19H_2O$, occurring at Dashkesan, Middle Caucasus, U.S.S.R. *See also* tusiite. *Hey, MM, 1964; Fleischer.*

calcioferrite. A yellow-green calcium-iron hydrous phosphate, $6CaO.3Fe_2O_3.4P_2O_5.19H_2O$; Mohs' hardness, 2.5; specific gravity, 2.53; in scales (monoclinic ?) or as nodules. *Larsen, p. 81.*

calciornotite. *See* tyuyamunite.

calciostrontianite. A strontianite, $(Sr,Ca)CO_3$, containing 13.14 percent $CaCO_3$; from Brixlegg, Tirol. *Dana 6d, p. 288.*

calciovolborthite. A moderately radioactive mineral, $CuCa(VO_4)(OH)$; possibly orthorhombic; occurs either in flat, thin, green or greenish-yellow crystals or in a form that is gray and granular; found in the Colorado plateau area in sandstone, associated with carnotite and tyuyamunite; also found in the oxidized zone of deposits containing vanadium minerals. *Crosby, pp. 67-68; Hess.*

calciphyre. A marble with conspicuous calcium and/or magnesium silicate minerals. *See also* calc-silicate marble; limurite; magnesium marble; marble; skarn; tactite. *A.G.I.*

calcirudite. Suggested by Grabau for a limestone or dolomite composed of broken or worn fragments of coral or shells or of limestone fragments, the interstices filled with calcite, sand, or clay. The cement is calcareous. *Fay.*

calcisiltite. Limestone composed of calcite grains of silt size. *A.G.I. Supp.*

calcite. A mineral having the composition, $CaCO_3$, which correseponds to a composition or 56.0 percent CaO and 44.0 percent CO_2. Specific gravity 2.71 for pure calcite crystals. Calcite is the essential constituent of limestone, chalk, and marble, and a minor constituent of many other rocks. *HW.* More commonly known as limestone. Used as a flux in the manufacture of pig iron and steel. Principal sources in the United States are Pennsylvania, Michigan, West Virginia, and Illinois. *Crispin.*

calcite bubble. A hollow sphere of calcite formed by the deposition of calcite around a gas bubble. *Schieferdecker.*

calcite ledge. A ledge of calcite projecting horizontally into a pool at its water level. *Schieferdecker.*

calcite limestone. A limestone containing not more than 5 percent of magnesium carbonate. *ASTM C119-50.*

calcite marble. A crystalline variety of limestone containing not more than 5 percent of magnesium carbonate. *ASTM C119-50.*

calcite satin spar. *See* satin spar. *Shipley.*

calcite skin. A thin coating of calcite on clay walls, formed by ascending solutions. *Schieferdecker.*

calcitic dolomite. A carbonate rock composed of between 10 and 50 percent calcite and between 50 and 90 percent dolomite. *A.G.I.*

calcitite. A rock composed of calcite, for example, limestone. *A.G.I. Supp.*

calcitization. Alteration of aragonite to calcite. *A.G.I. Supp.*

calcitrant. a. Refractory. *Fay.* b. Said of certain ores. *Fay.*

calcium. Silvery-white; rather soft; bivalent metallic element of the alkaline-earth group; quickly tarnishes in air; and when heated burns with a brilliant light. Used chiefly in alloys and in various metallurgical processes, often as a scavenger. It never occurs uncombined in nature but is very common in combination in certain minerals and rocks, especially as a carbonate (as in limestone), a sulfate, or a phosphate; in practically all natural waters; and in most animals and plants as an essential constituent. *Webster 3d.* Symbol, Ca; isometric; atomic number, 20; atomic weight, 40.08; specific gravity, 1.55 (at 20° C); melting point, 851° C; boiling point, 1,487° C; decomposes water to form hydrogen and calcium hvdroxide; and specific electrical resistivity, 4.6 microhms per cubic centimeter. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-104.*

calcium acetate. $Ca(C_2H_3O_2)_2$; molecular weight, 158.17; colorless; crystalline; soluble in water; and slightly soluble in ethyl alcohol. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-160.*

calcium acrylate. A free-flowing white powder; $(H_2C{:}CHCOO)_2Ca$; and forms a dihydrate which is also a free-flowing powder. Used as a binder for clay products and foundry molds. *CCD 6d, 1961.*

calcium-aluminum garnet. Same as grossularite. *Shipley.*

calcium-aluminum silicate. This material, known as calumite, is used to make amber and green glasses. *Lee.*

calcium antimonate. $CaO \cdot Sb_2O_5$. Limited use as an opacifier in enamels and glazes. *Lee.*

calcium autunite. Artificially prepared autunite in which calcium can be replaced by Na, K, Ba, Mn, Cu, Ni, Co, Mg. Synonym for autunite. *Spencer 19, M.M., 1962.*

calcium bicarbonate. A compound, $Ca(HCO_3)_2$; molecular weight, 162; cannot be isolated as a solid since it decomposes easily, thus all its reactions are carried out in solution. One of the chief causes of temporary hardness of water. *Cooper, p. 286.*

calcium boride. CaB_6. Used in deoxidizing copper. *Hess.*

calcium carbide. Tetragonal; CaC_2; colorless when pure; usually ranging from dark gray to brown; and decomposes in water. Produced commercially by heating quicklime and carbon together in an electric furnace. Used for the generation of acetylene and for making calcium cyanamide. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-161.*

calcium carbonate; chalk; calcite; aragonite. a. White powder or colorless crystals; $CaCO_3$. One of the most stable, common, and widely dispersed of materials. It occurs in nature as aragonite, calcite, chalk, limestone, lithographic stone, marble, marl, and travertine. *CCD 6d, 1961.* Referred to as whiting, it has many uses in ceramics to introduce calcia. *Lee.* Also used as a separator in glass firing. *Kinney.* b. Calcium carbonate (molecular weight, 100.09) crystallizes in two crystal systems: Hexagonal rhombohedral or hexagonal as calcite and orthorhombic as aragonite. Hexagonal calcium carbonate (calcite) is colorless, white, yellowish, or rarely pale gray, red, green, blue, or violet; specific gravity, 2.710 (at 18° C); Mohs' hardness, 3; melting point, 1,339° C (at 1,025 atmospheres); decomposes at 898.6° C; and soluble in water, in acids, and in ammonium chloride solution. Orthorhombic calcium carbonate (aragonite) is colorless, white, yellow, reddish, bluish, or black; specific gravity, 2.930, ranging from 2.85 to 2.94; Mohs' hardness, 3.5 to 4.0; transforms to calcite at 520° C; decomposes at 825° C; and soluble in water, in acids, and in ammonium chloride solution. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-161, B-242.* c. Source of quicklime and of calcium metal. *Bureau of Mines Staff.*

calcium carbonate, precipitated. *See* chalk, precipitated. *CCD 6d, 1961.*

calcium carbonate, prepared. *See* chalk, prepared. *CCD 6d, 1961.*

calcium chloride; anhydrous calcium chloride. A deliquescent salt; $CaCl_2$. Obtained from brine wells, dry lake beds, and as a byproduct for making soda ash and other chemicals. In the anhydrous state, it is a white porous solid. Used as a drying and dehumidifying agent. In a more or less hydrated state, it is in solid, colorless flakes or in a water solution. Used for controlling dust; for melting snow and ice on roads; for freezeproofing; in freezing mixtures; in refrigeration brine; and in concrete as an accelerator or an aid in curing. *Webster 3d.* Molecular weight, 110.99; colorless; isometric; deliquescent; specific gravity, 2.15 (at 25° C, referred to water at 4° C); melting point, 772° C; boiling point, above 1,600° C; very soluble in water; and soluble in alcohol, in acetone, and in acetic acid. The common hydrates of calcium chloride are calcium chloride monohydrate ($CaCl_2 \cdot H_2O$); calcium chloride dihydrate ($CaCl_2 \cdot 2H_2O$); and calcium chloride hexahydrate ($CaCl_2.6H_2O$). *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-161.* Anhydrous calcium chloride is the source of calcium metal produced by electrolysis. *Bureau of Mines Staff.*

calcium-chloride process. A method used to consolidate floor dust in mine roadways in which calcium chloride is applied with a wetting agent. This wet calcium-chloride process is widely used in Europe. *Roberts,* *I, p. 109.*

calcium-chromium garnet. Same as uvarovite. *Shipley.*

calcium cyanamide. $CaCN_2$; molecular weight, 80.10; colorless; hexagonal rhombohedral; and melting point, about 1,190° C. Used as fertilizer. *Bennett 2d, 1962.*

calcium cyanide. Colorless crystals or white powder; gray-black (technical grade); $Ca(CN)_2$. Used for leaching gold and silver ores. *CCD 6d, 1961.*

calcium dialuminate. $CaO\cdot 2Al_2O_3$; melting point, 1,705° C; thermal expansion, 5.0 x 10^{6}. Present in high-alumina cement but does not itself have cementing properties. *Dodd.*

calcium ferrite. In the binary system, two ferrites are formed—$CaO\cdot Fe_2O_3$; and $2CaO\cdot Fe_2O_3$; the former may occur in some high-alumina cement. *Dodd.*

calcium fluoride; fluorite; fluorspar. CaF_2; colorless when pure and it is found in nature as the mineral fluorite (fluorspar). *Webster 3d.* Molecular weight, 78.08; isometric; specific gravity, 3.180, ranging from 2.97 to 3.25; Mohs' hardness, 4; melting point, 1,360° C; boiling point, about 2,500° C; slightly soluble in water and in acids; soluble in ammonium salt solutions; and insoluble in acetone. The mineral fluorite (fluorspar) is colorless, often yellow, blue, green, and violet, and rarely red. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-161, B-243.* An important constituent of opal glass. *C.T.D.*

calcium fluosilicate; calcium silicofluoride. Colorless or white powder; tetragonal; $CaSiF_6$ or $CaSiF_6.2H_2O$ (calcium fluosilicate dihydrate). Used in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-161.*

calcium 45. Radioactive calcium; mass number, 45; half-life, 165 days; and radiation, beta. Used to study calcium exchange in clays; ion exchange; and diffusion of calcium in glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-12.*

calcium glass. *See* crown glass. *Shipley.*

calcium hafnate. $CaHfO_3$; melting point 2,470 ± 20° C; specific gravity, 5.73; thermal expansion (10—1,300° C), 7 × 10^{-6}. *Dodd.*

calcium hexaluminate. $CaO.6Al_2O_3$; melts incongruently at 1,850° C to form corundum and a liquid. *Dodd.*

calcium hydrate. *See* calcium hydroxide; hydrated lime. *CCD 6d, 1961.*

calcium hydroxide; calcium hydrate; hydrated lime; lime hydrate; caustic lime; slaked lime. Soft; white; crystalline powder; alkaline, slightly bitter taste; $Ca(OH)_2$. Used in metallurgy. *CCD 6d, 1961.* Molecular weight, 74.09; colorless; hexagonal; specific gravity, 2.230; no melting point because it loses H_2O at 580° C; slightly soluble in water; and soluble in ammonium-chloride solution. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-161.* Commonly sold as a white powder or in a water suspension (milk of lime). *Webster 3d.*

calcium hypochlorite; calcium oxychloride; chlorinated lime; hypochlorite of lime; bleaching powder; bleach. $Ca(C10)_2.4H_2O$; molecular weight, 215.06; colorless crystals or white powder; deliquescent; and soluble in water. Used as a bleaching agent and as a disinfectant. *Bennett 2d, 1962.*

calcium-iron garnet. Same as andradite. *Shipley.*

calcium-lead. Lead hardened by a fractional percent of calcium. *Hess.*

calcium lignosulfonate. Used as a binder for nonmagnetic ores. *See also* lignosulfonates. *CCD 6d, 1961.*

calcium-magnesium pyrophosphate. $Ca_2Mg_2(P_2O_7)_2$; molecular weight, 476.88; a green powder; insoluble in water; and soluble in acid. Used in porcelains and enamels. *Bennett 2d, 1962.*

calcium metasilicate; wollastonite. $CaSiO_3$; monoclinic; a brilliant white nonmetallic mineral. Used as a filler for ceramics and as mineral filler. *CCD 6d, 1961.*

calcium mica. *See* margarite. *Bennett 2d, 1962.*

calcium minerals. Naturally abundant and widely exploited in industry. Main useful ores are calcite, dolomite, anhydrite, gypsum. Apatite is mined for phosphorus, fluorite for fluorides, colemanite, and ulexite for boron. *Pryor, 3.*

calcium molybdate. Colorless; tetragonal; $CaMoO_4$; specific gravity, 4.38 to 4.53; and melting point, above 1,500° C. A small addition promotes good adherence on certain enamels when used in conjunction with antimony oxide. *Lee; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-162.*

calcium monoaluminate. $CaO.Al_2O_3$; melting point 1,605° C. A principal constituent of high-alumina cement. *Dodd.*

calcium montmorillonite. An artificially prepared clay mineral with calcium in place of magnesium. *Spencer 16, M.M., 1943.*

calcium nitrate; lime nitrate; nitrocalcite; lime saltpeter. Colorless or white; isometric; hygroscopic; $Ca(NO_3)_2$. Used in explosives; in incandescent gas mantles; and in fertilizers. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-162.*

calcium orthosilicate; dicalcium silicate. $2CaO.SiO_2$; melting point, 2,130° C. Occurs in four crystalline forms: α, stable above 1,447° C; σ, bredigite, stable from about 800° to 1,447° C on heating; 1,447° to 670° C on cooling. β larnite, stable or metastable from 520° to 670° C; γ, stable below 780° to 830° C. Material in which a considerable amount of $2CaO.SiO_2$ has been formed by high temperature reactions, falls to a powder—dusts—on cooling because of the inversion (accompanied by a 10 percent increase in volume) to the γ-form at 520° C. The inversion can be prevented by the addition of a stabilizer, for example, B_2O_3 or P_2O_5. Calcium orthosilicate is a constituent of Portland Cement and may be found in dolomite refractories. *Dodd.*

calcium oxide; calcia; quicklime; burnt lime; lime; fluxing lime; pebble lime. a. CaO; molecular weight, 56.08; colorless; isometric; specific gravity, 3.40; melting point, 2,572° C; boiling point, 2,850° C; and soluble in ethyl alcohol. Used in metallurgy. *Bennett 2d, 1962.* b. Source of calcium metal. *Bureau of Mines Staff*

calcium phosphate. *See* apatite. *Fay.*

calcium phosphate, dibasic; dicalcium orthophosphate; secondary calcium phosphate. White; tasteless; triclinic; $CaHPO_4.2H_2O$ and $CaHPO_4$. Used in glass manufacture. *CCD 6d, 1961.*

calcium phosphate, monobasic; calcium biphosphate; monocalcium orthophosphate; acid calcium phosphate. Colorless; pearly; triclinic; scales or powder; deliquescent in air; $CaH_4(PO_4)_2.H_2O$. Used in glass manufacture. *CCD 6d, 1961.*

calcium phosphate, tribasic; calcium orthophosphate; tricalcium orthophosphate; tricalcium phosphate. White; odorless; tasteless; amorphous powder; $Ca_3(PO_4)_2$. Occurs abundantly in nature as phosphate rock, apatite, and phosphorite. Used in ceramics in porcelains, potteries, enamels, and milk glass. *CCD 6d, 1961.*

calcium phosphide. Ca_3P_2; molecular weight, 182.19; red crystals; gray lumps; specific gravity, 2.51 (at 15° C); and melting point, about 1,600° C. Used for signal fires. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-162.*

calcium plumbate; calcium orthoplumbate. Orange to brown; crystalline; Ca_2PbO_4; and decomposed by hot water or carbon dioxide. Used in glass and as an oxidizing agent. *CCD 6d, 1961.*

calcium potassium sulfate; kaluszite; syngenite. $CaK_2(SO_4)_2\cdot H_2O$; monoclinic; specific gravity, 2.60. *Bennett 2d, 1962.*

calcium resinate. Yellowish-white; amorphous powder or lumps. Used in manufacturing porcelains and enamels. *CCD 6d, 1961.*

calcium silicates. The four compounds are: wollastonite ($CaO.SiO_2$); rankinite ($3CaO.2SiO_2$); calcium orthosilicate ($2CaO.SiO_2$); and tricalcium silicate ($3CaO\cdot SiO_2$). *Dodd.*

calcium silicide; calcium-silicon. $CaSi_2$; molecular weight, 96.25; specific gravity, 2.5; and insoluble in water. Used in metallurgy and in explosives. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-163.*

calcium silicofluoride. *See* calcium fluosilicate. *CCD 6d, 1961.*

calcium stannate. White; crystalline; $CaSnO_3\cdot 3H_2O$. Used as an additive in ceramic capacitors and in the production of ceramic colors. *CCD 6d, 1961.* Melting point, above 1,200° C. *Lee.*

calcium stearate. White powder; $Ca(C_{18}H_{35}O_2)_2$. *CCD 6d, 1961.* Molecular weight, 607.04; crystalline; insoluble in water; and insoluble in ethyl alcohol and in ether. Used in waterproofing; in plastics; and in concrete. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-163.*

calcium sulfate; anhydrous calcium sulfate; anhydrite. The natural anhydrous form is the mineral anhydrite; $CaSO_4$. Molecular weight, 136.14; colorless; orthorhombic becoming monoclinic at 1,193° C; specific gravity, 2.960, ranging from 2.899 to 2.985; Mohs' hardness, 3.0 to 3.5; melting point, 1,450° C; slightly soluble in water; soluble in acids, in ammonium salt solutions, and in glycerol. The mineral anhydrite is colorless, white, gray, black, brown, or reddish. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-163, B-242.*

calcium sulfate dihydrate; gypsum. The natural hydrated form of calcium sulfate is the mineral gypsum; $CaSO_4\cdot 2H_2O$. Molecular weight, 172.17; colorless; monoclinic; specific gravity, 2.32; Mohs' hardness, 1.5 to 2.0; loses $2H_2O$ at 163° C; slightly soluble in water; soluble in acids, in ammonium salt solutions, and in glycerol. The mineral gypsum is colorless, white, and often yellow, red, brown, or black. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-163, B-243.*

calcium sulfo-aluminates. Two compounds exist: the high form, $3CaO.Al_2O_3.3CaSO_4.$-30-$32H_2O$; and the low form, $3CaO.Al_2O_3.$-$CaSO_4.12H_2O$. Both forms may be produced by reaction between $3CaO.Al_2O_3$ and gypsum during the hydration of portland cement. The high form is also produced when cement and concrete are attacked by sulfate solutions. *Dodd.*

calcium titanate; calcium metatitanate; perovskite. $CaTiO_3$; melting point, 1,975° C. Used in high-potassium bodies either alone or blended with barium titanate and other alkali-earth zirconates and/or stannates. Also used in conjunction with some barium titanate-lead titanate piezoelectric compositions. *Lee; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-163.*

calcium tungstate; scheelite. $CaWO_4$; molecular weight, 287.93; colorless or white; tetragonal; and specific gravity, 6.06 (at 20° C). *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-163.*

calcium zirconate; calcium metazirconate. $CaZrO_3$; soluble in nitric and in other acids. Used as a chemical raw material. *CCD 6d, 1961.* Melting point, 2,550° C. Has favorable refractory characteristics; low firing shrinkage; and is stable under highly reducing conditions up to 1,750° C. Used primarily in dielectric bodies. *Lee; Handbook of Chemistry and Physics, 45th ed, 1964, p. B-163.*

calcium-zirconium silicate. White solid; $CaZrSiO_5$. Used in electrical resistor ceramics and as a glaze opacifier. *CCD 6d, 1961.*

calclacite. Hydrous chloride and acetate of calcium, $CaCl_2.Ca(C_2H_3O_2)_2.10H_2O$, formed as a fibrous efflorescence on certain limestones stored in wooden drawers. Named from the composition, Ca,Cl,Ac. *Spencer 18, M.M., 1949.*

calclithite. Limestone containing 50 or more percent of fragments of older limestone eroded from the land and redeposited. *A.G.I. Supp.*

calcomalachite. A mixture of malachite and calcite, and also, often, gypsum. An ornamental stone often sold as malachite. *Shipley.*

calcouranite. Synonym for autunite. *Crosby, p. 7.*

calcrete. Suggested by Lamplug for conglomerates formed by the cementation of surficial gravels by calcium carbonate. Calcicrete was suggested by Bonney as preferable. *Holmes, 1928.*

calc-sapropel. A deposit composed of sapropel (dominant) and remains of calcareous algae. *Tomkeieff, 1954.*

calc-schist. A metamorphosed limestone in which calcite has recrystallized into elongated or platy forms, instead of the commoner granular form, thus creating a schistose structure in the rock. *Hess.*

calc-silicate hornfels. A fine-grained metamorphic rock containing a high percentage of calc-silicate minerals. *See also* calc-flinta; hornfels; limurite; pneumatolytic hornfels; skarn; tactite. *A.G.I.*

calc-silicate marble. A marble with conspicuous calcium and/or magnesium silicate minerals. *See also* calciphyre; limurite; magnesian marble; marble; skarn; tactite. *A.G.I.*

calc-sinter. Limestone deposited from springs and waters containing dissolved calcium carbonate; travertine. Also called calcareous tufa. *Fay.*

calcspar. Synonym for calcite. A.G.I. *Supp.*

calc tufa. Where evaporation goes on steadily at the surface while water is being brought up from below by capillary action, calcium carbonate may become a cement to the soil, or to the crumbling rock near the surface, and a solid, porous, or spongy deposit of calcium carbonate (calc tufa) may arise by continued precipitation of calcium carbonate in solution from lower levels. *A.G.I.*

calculiform. Pebble-shaped. *Webster 3d.*

calculus. Branch of mathematics which deals with rates of change by infinitesimal increments. Calculations from these of the corresponding change over finite increments. *Pryor, 3.*

calcurmolite. The unnamed mineral, $Ca(UO_2)_3(MoO_4)_3(OH)_2.11H_2O$, is named from its composition. *Hey, MM, 1964; Fleischer.*

caldasite. A mixture of fibrous baddeleyite, zircon, altered zircon, and other minerals. A massive, light brownish-gray to dark blue zirconium-bearing rock containing usually 65 to 80 percent ZrO_2. *Crosby, p. 118; Heinrich, p. 125.*

Caldecott cone. A conical tank used to settle and discharge as a continuous underflow the relatively coarse sand from an overflowing stream of mineral pulp. Another similar arrangement is the Callow cone. These, and others, are developed from spitzkasten. *Pryor, 3.*

caldera. a. A large basin-shaped volcanic depression, more or less circular or cirquelike in form, the diameter is many times longer than that of the included volcanic vent or vents, no matter what the steepness of the walls or the form of the floor may be. There are three major types according to origin: Explosion caldera, collapse caldera, and erosion caldera. *A.G.I.* b. A very large crater produced by a violent explosion. *Webster 3d.*

calderite. A variety of garnet containing the manganous-ferric molecule, $3MnO.Fe_2O_3.$-$3SiO_2$. From Nagpur, India. *English.*

caldron. a. S. Wales. The fossil remains of the cast of the trunk of a sigillaria that remained vertical above or below the coal seam. *See also* bell mold. Also called caldron bottom. *Fay.* b. A small depression more or less circular, elliptical, or oval in plan. *Schieferdecker.*

caldron bottom. a. Mud-filled prostrate trunk of sigillaria in the roof of certain coal seams. The trunk is a separate mass of rock, with a film of coal around it. It is liable to collapse without any warning sound. Also called horseback. *See also* pot, c; bell mold; caldron. *Nelson.* b. Eng. A cone-shaped mass with slippery surfaces found in the roof of some seams. It sometimes comprises a ring of coal around a core of material differing slightly from the oridinary roof. Also called pothole; kettle bottom. *SMRB, Paper No. 61.*

caldron process. Recovery of silver, in which a slurry of the ore in a copper vessel is agitated with salt. *Bennett 2d, 1962.*

caldron subsidence. The sinking of part of the roof of an intrusion within a closed system of peripherial faults up which magmas have penetrated. *Holmes, 1928.*

cale. Mid. A specified number of tubs taken into a working surface during the shift. *Fay.*

Caledonian orogeny. a. Post-Silurian diastrophism. *A.G.I. Supp.* b. In a broad sense, a series of diastrophic movements beginning perhaps in the early Ordovician period and continuing through the Silurian period, as recorded in the rocks in Scotland and in Scandinavia. *A.G.I. Supp.*

Caledonides. A mountain system raised during the late Silurian to the early Devonian time, particularly in Scandinavia and in Scotland. *A.G.I. Supp.*

caledonite. A green basic sulfate of lead and copper of uncertain composition. *Sanford.*

calerer. Eng. Diluvian earth, Suffolk. *Arkell.*

calfdozer. A smaller version of the bulldozer. *Ham.*

calf line. A wire rope or cable wound on the calf wheel of a churn- or rotary-drill machine and used in handling casing. Also called casing line. *See also* calf wheel. *Long.*

calf reel. The churn-drill winch used for handling casing and for odd jobs. Also called casing reel. *Nichols.*

calf wheel. a. A short hoising drum with a large-diameter driving sprocket, used to wind up the casing line or calf line which is multiple-reeved through the sheaves of the crown and traveling blocks by means of which casing and/or drill pipe is handled. *Long.* b. A reel used in rope drilling to accommodate the rope by which the casing is raised or lowered. *B.S. 3618, 1963, sec. 3.*

caliber. The inside diameter or bore of a tube, pipe, or cylinder. *Long.*

calibrate. a. To ascertain the caliber of, as a thermometer tube. *Webster 3d.* b. To determine or to mark the capacity or the graduations of, or to rectify the graduations of, as a graduated measuring instrument. *Webster 3d.* c. To standardize, as a measuring instrument, by determining the deviation from standard, especially as to ascertain the proper correction factors. *Webster 3d.*

calibrated block. *See* split block. *Skow.*

calichal. Mex. Second-class silver ore carrying from 150 to 1,000 ounces per ton). At Pachuca, Hidalgo, the best or first-class ore separated in the mine, the second-class being known as azogues. *Fay*

caliche. a. In Mexico and southwestern United States, gravel, sand, or desert debris cemented by porous calcium carbonate; also, the calcium carbonate itself. *Fay.* b. Surface or near-surface deposits of soluble salts precipitated by evaporation. *Bateman.* c. Natural Chilean saltpeter. *Bennett 2d, 1962.*

calico marble. A local name for a Triassic conglomerate from Frederick County, Md., used in the columns of the old Chamber of Representatives in the Capitol at Washington, D.C. *Fay.*

calientes. Mex. Silver ores, generally colorados, with some iron sulfate, the result of weathering. *Hess.*

California-bearing ratio. The ratio of the force per unit area required to penetrate a soil mass with a 3-square-inch circular piston (having a 2 inch diameter approximately) at the rate of 0.05 inch per minute to that required for corresponding penetration of a standard material. The ratio is usually determined at 0.1-inch penetration, although other penetrations are sometimes used. *ASCE P1826.*

California cat's-eye. Compact fibrous serpentine, exhibiting an indistinct light line or chatoyant effect, and occasionally a fine cat's-eye. *Shipley.*

California hyacinth. Hessonite. *Shipley.*

California iris. Kunzite (spodumene). *Shipley.*

California lapis. A misnomer for blue dumortierite quartz. *Shipley.*

California moonston. White or whitish chalcedony. A misnomer. *Shipley.*

California morganite. Morganite from California; some of fine color but more often a salmon pink color. *Shipley.*

Californian jade. *See* californite.

Californian onyx. A dark, amber-colored and brown aragonite used in ornamentation. *Standard, 1964.*

Californian stamp. Crushing device operating on drop-weight principle. Five heads operate in one mortar box, each stamp falling 90 times a minute on its die. Moving parts are head, shoe, stem, tappet. Last name lifted by cam. Once very important, today obsolete. *Pryor, 3.*

California poppy. A local indicator plant for copper in Arizona, observed over the outcrop of the San Manuel copper deposit. Here the distribution of this species is confined to copper-rich soil, and its population density is closely proportional to the copper content of the soil. *Hawkes, 2, p. 313.*

California pump. a. A rude pump made of a wooden box through which an endless belt with floats is operated; used for pumping water from shallow ground. *Zern.* b. *See* China pump. *Hess.*

California ruby. Garnet. *Shipley.*

California sampler. A drive sampler equipped with a piston that can be retracted mechanically to any desired point within the barrel of the sampler. *Long.*

California tigereye. Same as California cat's-eye. *Shipley.*

California topaz. Topaz from the Mesa Grande and Ramona districts of southern California. Usually pale blue to almost colorless, but occasionally as fine in color as any blue topaz. *Shipley.*

California turquoise. Variscite. *Shipley.*

California-type dredge. A single-lift dredge with stacker. Buckets, which are closely spaced, deliver to a trommel. The oversize is piled behind the dredge by a conveyor (stacker). Undersize is washed on gold-saving tables on the deck; tailings discharge astern through sluices. *Bureau of Mines Staff.*

californite. A compact, massive vesuvianite. Used as an ornamental stone. *Sanford. See* idocrase. *Dana 17.*

californium. A transuranic element not occurring in nature. Atomic number, 98 and the mass number of the most stable known isotope, 251. Produced by Seaborg, Thompson, Street, and Ghiorso in 1950 by the cyclotronic bombardment of curium 242 with high-energy (35 mev) alpha particles. Symbol, Cf. *Gaynor; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-91.*

caling. Mid. Conveying tubs into the stalls out of turn, irregularly, so that each miner is not supplied with an equal number during the day. *Fay.*

caliper. a. An instrument used to measure precisely the thickness or diameter of objects or the distance between two surfaces, etc. *Long.* b. An instrument used in conjunction with a microlog which, when lowered down a borehole, measures and records the internal diameter throughout its depth. *B.S. 3618, 1963, sec. 3.* c. An instrument consisting of a graduated beam and at right angles to it a fixed arm and a movable arm which slides along the beam to measure the diameter of logs and trees. *Webster 3d.* d. A device for measuring the dimensions of an object, usually with movable jaws which hold or contact an object. When equipped with means for accurate measurement of small units, it is called a micrometer caliper or simply a micrometer. *Shipley.*

caliper brakes. Brakes in which two brake-shoes are curved to the brake path and anchored near the centerline of the drum. This gives an increased arc of contact but does not increase uniformity of pressure. This causes the brake linings to wear unevenly. *Sinclair, V, p. 197.*

caliper diameter. The distance measured across the bottoms of two opposite tooth gaps on a roller chain sprocket having an even number of teeth, and measured between one tooth gap and the nearest opposite gap for a sprocket with an odd number of teeth. *J&M.*

caliper log. Continuous record of the variations in mean diameter or in cross-sectional area of a borehole with depth. *Institute of Petroluem, 1961.*

calist. Eng. Hard sand intermixed with gravel, which will stand without lining tubes during boring operations, until water from below rises up, which will cause it to fall away. *Arkell.*

calite. a. A heat-resisting alloy of aluminum, nickel, and iron. *Hess.* b. Iron or steel treated by calorizing. *Hess.*

calk. a. To drive tarred oakum into the seams between planks and fill with pitch. *Fay.* b. A tapered wedge or cone-shaped piece of iron or steel projecting downward on the shoe of a draft animal to prevent slipping. *Webster 3d.* c. Limestone or chalk. *Arkell.* d. To peen and draw metal toward and around a diamond being handset in a malleable-steel bit blank. Also called peen. *Long.* e. To wick. *Long.* f. A variety of baryte. *Hey 2d, 1955.* g. In metalworking, to close a joint or seam by battering the edge of a plate or fitting. *Hess.* h. To close joints in pipe with lead, either as lead wool or as metal which has been poured into the joint while melted, and which is made watertight and gastight by battering with a hammer and calking iron. *Hess.*

calking. a. The process of peening and drawing metal toward and around a diamond being handset in a malleable-steel bit blank, or the material used as backing around the diamond. Also called peening. *See also* backing d. *Long.* b. Wicking. *Long.* c. The process of driving oakum or other spongy material into rock crevices or into the seams between planks with blunt-edge chisels; also, the material so driven. *Long.*

calking iron. Synonym for calking tool. *Long.*

calking lead. Lead 99.73 percent pure; impurities: 0.015 percent arsenic, antimony, and tin, together, 0.08 percent copper, 0.02 percent zinc, 0.25 percent bismuth, 0.02 percent silver. *Bennett 2d, 1962.*

calking tool. A bunt chisel or punch used in calking. *Long.*

calkinsite. A hydrous carbonate of rare earths, $(La,Ce,Nd,Pr)_2(CO_3)_2 \cdot 4H_2O$, as minute pale-yellow orthorhombic plates from Montana. An alteration product of burbankite. *Spencer 20, M.M., 1955.*

calkstone. Eng. Alternative name for hassock. *Arkell.*

call. a. Yield expected, or called for, as result of treating a given tonnage of ore, for a defined period. *Pryor, 3.* b. Notification to holders of incompletely paid-up shares requiring further payment. *Pryor, 3.* c. Corn. Mock iron or call. *Arkell.*

callaghanite. A mineral, $Cu_4Mg_4Ca(OH)_{14}(CO_3)_2 \cdot 2H_2O$, blue monoclinic crystals in dolomite rock from Gabba, Nev. *Spencer 20, M.M., 1955.*

callainite. An apple- to emerald-green, massive, waxlike aluminum phosphate, $AlPO_4 + 2\frac{1}{2}H_2O$. *Fay.* Possibly a mixture of wavellite and turquoise. *American Mineralogist, v. 28, No. 1, Jan. 1943, p. 64.*

callais. A precious stone of greenish-blue color, probably turquoise, referred to by Pliny in 77 A.D. Dana uses this as a synonym for callainite, an emerald-green hydrated aluminum phosphate. *Fay.*

callen; kallen. Irony; especially used when a lode is rich in soft iron ocher. *Fay.*

caller. N. of Eng. A miner who goes round the villages about 2 hours before work commences, to call the men who examine the mine in the morning before the miners enter. *Fay.*

calley stone. York. In coal mining, a kind of hard sandstone, more or less argillaceous. *See also* ganister, d. *Fay.*

calliard; galliard. N. of Eng. A hard smooth, flinty gritstone. *Fay.*

callimus. Loose, stony matter found in the cavities of eaglestone. *Standard, 1964.*

calling course. Eng. The time for the men to go to work. *See also* caller. *Fay.*

callis. Eng. A shaly coal, Lancashire. *Nelson.*

Callon's rule. A rule stating that when a pillar has to be left in an inclined seam for the support of a shaft or of a surface structure, a greater width should be left on the rise side of the shaft or structure than on the dip side. *Briggs, p. 76.*

Callovian. Uppermost Middle or lowermost Upper Jurassic. *A.G.I. Supp.*

callow. a. The baring or cover of open workings. *Fay.* b. The stratum of soil above the subsoil; the top or rubble bed of a quarry. *Webster 3d.* c. A low-lying or marshy meadow. *Webster 3d.*

Callow cone. A conical free-settling tank. Pulp is fed centrally; the finer solid fraction overflows peripherally and the coarser is withdrawn at controlled rate via the apex at the bottom of the cone. *Pryor, 3.*

Callow flotation cell. An early form of pneumatic flotation cell, still in limited use. Air is blown in at the bottom of the tank at low pressure, through a porous septum such as a blanket, and mineralized froth overflows along the sides while the tailings progress to the discharge end. *Pryor, 3.*

Callow process. A flotation process embodying the usual principles but in which agitation is secured by air forced into the pulp through the canvas-covered bottom of the cell. *Fay.*

callows. Som. A name given to a thick coal seam. *Tomkeieff, 1954.*

Callow screen. A continuous belt formed of fine screen wire travels horizontally between two drums. Pulp is fed from above and flows through together with the finer solids, while coarser material is discharged as screen passes over the end drum. *Pryor, 3.*

callys. Corn. *See* Killas, a. *Fay.*

calm. Scot. A light-colored shale or mudstone. *Nelson.*

calmstone; caumstone. Scot. Argillaceous limestone or white clay used for whitening hearths and doorsteps. *Arkell.*

calocar. A white earth or clay. *Fay.*

calomel. A mineral, $2[Hg_2Cl_2]$ colorless, white, grayish- and yellowish-white, yellowish-gray to ash-gray, brown color. Occurs as a secondary mineral, and originally found at Moschellandsberg, Bavaria, Germany. Synonym for calomelite; calomelano; horn quicksilver; mercurial horn ore. *Dana 7, v. 2, pp. 26–27; Hey 2d, 1955; A.G.I.*

calomelano. Synonym for calomel. *Hey 2d, 1955.*

calomel electrode. Half-cell used to measure electromotive force; potential being that of mercury and mercurous chloride in contact with saturated solution of potassium chloride. Used in pH measurement. *Pryor, 3.*

calomelite. Synonym for calomel. *Spencer 19, M.M., 1952.*

calorescence. The phenomenon of glowing when a substance is stimulated by the heat rays which lie beyond the red end of the visible spectrum. Same as thermoluminescence. *Shipley.*

calorie. The gram calorie (or small calorie) is the quantity of heat required to raise the temperature of 1 gram of water from 15° to 16° C. The mean calorie is one-hundredth part of the heat required to raise 1 gram of water from 0° to 100° C. Owing to slight variations of the specific heat of water, these are not exactly equal. The kilogram calorie (or large calorie) equals 1,000 gram calories. *C.T.D.*

calorific intensity. The temperature of a fuel attained by its combustion. *Newton, p. 130.*

calorific power. The quantity of heat liberated when a unit weight or a unit volume of a fuel is completely burned. *Newton, p. 128.*

calorifics. a. The science of heating. *Standard, 1964.* b. That branch of physics that treats of heat, especially of the discarded caloric theory. *Standard, 1964.*

calorific value. *See* gross calorific value; net calorific value. *A.G.I.*

calorimeter. Any apparatus for measuring the quantity of heat generated in a body or emitted by it, as by observing the quantity of a solid liquefied or of a liquid vaporized under given conditions. Used in determining specific heat; latent heat; the heat of chemical combinations; etc. *Standard, 1964.*

calorimeter room. A place at the surface of the mine where drained firedamp is monitored or its heat content ascertained. *B.S. 3618, 1963, sec. 2.*

Calorite. Trade name. A pyroscope similar to a pyrometric cone but cylindrical; they are made for use between 500° and 1,470° C. *Dodd.*

calorizing. A process of rendering the surface of steel or iron resistant to oxidation by spraying the surface with aluminum and heating to a temperature of 800° to 1,000° C. *C.T.D.*

caltonite. An extremely compact, bluish-black igneous rock related to olivine basalt, consisting of microphenocrysts of olivine and augite in a trachytic groundmass of feldspar laths, augite, iron ore, and isolated spots of analcite. *Johannsen, v. 4, 1938, p. 242.*

calumetite. Azure-blue spherules and sheaves of orthorhombic scales with good basal cleavage, $Cu(OH,Cl)_2 \cdot 2H_2O$; from the Centennial mine, Calumet, Mich. Named from the locality. *Compare* anthonyite. *Hey, MM, 1964; Fleischer.*

calving. As applied to glacier ice, the process by which a glacier that terminates in a body of water breaks away in large blocks. Such blocks form the icebergs of polar seas. *Leet.*

calx. a. Powder produced by calcining a mineral; lime. *Webster 3d.* b. The friable residue (as a metal oxide) left when a mineral or metal has been subjected to calcination or roasting. *Webster 3d.* c. Broken and refuse glass. *Webster 2d.*

calyou; caildo; kaylowe; kaildo. Eng. Pebbles for rubble walling. *Arkell.*

calyx. a. A steel tube attached to the upper end of a core barrel having the same outside daimeter as the core barrel. The upper end is open except for two web members running from the inside of the tube to a ring encircling the drill rod. The calyx serves as a guide rod and also as a bucket to catch cuttings that are too heavy to be flushed out of the borehole by the circulation fluid. Also called bucket; sludge barrel; sludge bucket. *Long.* b. Synonym for shot drill. *Long.* c. A pipe or tube equipped with a sawtooth cutting edge, sometimes used to obtain a core sample of a formation being drilled. *Compare* basket, a. *Long.* d. In well drilling, a long cylindrical vessel which guides an annular toothed bit. Its action is like that of a diamond drill. A toothed cutter takes the place of a diamond crown, and is rotated by hollow flushing rods with a strong constant flow of water. A core is cut, preserved in a core barrel and brought to the surface. The drills are made large enough so that the holes are used as shafts. *Hess.* e. *See* sediment tube. *B.S. 3618, 1963, sec. 3.*

calyx boring. The process of drilling, and/or the hole or core produced with a shot drill. *Long.*

calyx drill; shot drill. A rotary core drill which uses hardened steel shot for cutting rock, and will drill holes from diamond drill size up to 6 feet or more in diameter. Drilling is slow and expensive, and holes cannot be drilled more than 35° off the vertical, as the shot tends to collect on the lower side of the hole. *Lewis, p. 84.*

calyx drilling. A method of rotary drilling using a toothed cutting bit or chilled shot. *B.S. 3618, 1963, sec. 3.*

calyx rod. A round drill rod used on a shot drill, usually outside coupled and of larger diameter than diamond drill rods. *Long.*

calzirtite. A mineral, $CaZr_3TiO_9$; tetragonal; from the East Siberian massif, U.S.S.R. Named from the composition, calcium-zirconium-titanium. *Hey, M.M., 1961.*

cam. a. A rotating piece, either noncircular or eccentric, used to convert rotary into reciprocating motion, often of irregular outline, and giving motion that is irregular in direction, rate, or time. *Standard, 1964.* In stamp mills, the cam projects from a revolving horizontal shaft and raises the stamp by catching the lower surface of the tappet or collar surrounding the rod on which the stamphead is hung. The upper side of the cam has an easy curve, such as a parabola, so that when it strikes the tappet it may not jar it when the lifting movement begins. Sometimes called lifter or wiper. *Fay.* b. A device mounted on a revolving shaft used for transposing rotary motion into an alternating, reciprocating, or back an forth motion. *Crispin.*

Cambay stone. A variety of carnelian from Cambay, India. *Fay.*

camber. a. A beam, bar, or girder bent like a bow, hump towards the strata. *Mason.* b. Deviation from edge straightness usually referring to the greatest deviation of side edge from a straight line. *ASM Gloss.* c. Sometimes used to denote crown in rolls where the center diameter has been increased to compensate for deflection caused by the rolling pressure. *ASM Gloss.* d. A vertical convex curve in a culvert barrel. *Nichols.* e. Outward lean of the front wheels of a motor vehicle. *Nichols.*

camber girder. A normal H-section girder which has been slightly bent. They are used as roadway supports where the sides are strong enough to support them. They may also be set on stone, concrete, or brick walls built along the sides of the roadway. *See also* steel support. *Nelson.*

camber of rolls. *See* camber. *ASM Gloss.*

camber of sheet. *See* camber. *ASM Gloss.*

camber rod. The tensioning rod inserted below a trussed beam. *Ham.*

Cambrian. The oldest of the systems into which the Paleozoic stratified rocks are divided; also, the corresponding oldest period of the Paleozoic era. *Fay.*

camel back. A miner's term sometimes applied to such structures as bells, pots, kettle bottoms, or other rock masses that tend to fall easily from the mine roof. *See also* tortoise. *A.G.I.*

Camelia metal. A high copper alloy used for bearings containing 70.4 percent copper, 4.2 percent tin, 10.2 percent zinc, 14.7 percent lead, and 0.5 percent iron. *Campbell; Camm.*

cameo. A layered stone (onyx, agate, opal, etc.) or shell carved in relief to show the design in a layer of one color or colors and the background in another color or colors. *Hess.*

cameo ware. Fine pottery with figures in relief of a different color from the ground as Wedgwood ware and jasper ware. *Standard, 1964.*

camera lucida. Mirror or prism attached to eyepiece of microscope, enabling observer to sketch the object displayed. *Pryor, 3.*

Cammett table. A side-jerk concentrating table similar to the Wilfley table. *Hess.*

camouflage. The substitution for a common element in a crystal lattice by a trace element of the same valence. *A.G.I.*

camouflet. a. A cavity formed in a borehole by the dentonation of an explosive charge placed in the borehole. Also called chamber. *Long.* b. A quarry blasting hole enlarged by chambering. *Nelson.* c. In military mining, an explosive charge designed to shatter adjacent ground without disturbing the surface. *Pryor, 3.* d. In civil mining, a small explosive charge used to enlarge an excavation, to spring or chamber out a hole so that a bigger explosive load can then be charged. *Pryor, 3.*

camp. A mining town. *Weed, 1922.*

campaign. a. The working life of a tank or other melting unit between major cold repairs. *ASTM C162–66.* b. The period during which a furnace is continuously in operation. *Fay.*

Campanian. Upper Middle Senonian. *A.G.I. Supp.*

campanite. A sodic-potassic variety of leucite tephrite sometimes containing large phenocrysts of leucite; from Monte Somma, Italy. *Holmes, 1928.*

campan marble. A pale, yellowish-green marble mottled with white. A dark green variety of marble containing red blotches is known as campan rouge. *Fay.*

Campbell process. Open-hearth process of steel manufacture in which ore and pig iron are used as raw materials in a tilting furnace. *Bennett 2d, 1962.*

camper. Scot. Coal slightly altered by whin; dirty coal. *Fay.*

camphor. A translucent, volatile, white resin made from an oriental evergreen. Extensively used in the manufacture of explosives; celluloid; and disinfectants. *Crispin.*

camphor jade. A variety of white translucent jadeite resembling crystallized camphor in appearance. *Shipley.*

cam press. A mechanical press in which one or more of the slides are operated by cams; usually a double-action press in which the blank-holder slide is operated by cams through which the dwell is obtained. *ASM Gloss.*

camp sheathing. A retaining wall to support a river bank, formed by timber piles and walings, the piles being 6 to 10 feet apart. *Ham.*

camp sheeting. A sheetpiling used in foundation work to hold back granular soils or sand. *Ham.*

camptonite. A lamprophyre containing pyroxene, sodic hornblende, and olivine as dark constituents, and labradorite as the light constituent. Sodic orthoclase may be present also. *A.G.I.*

camptospessartite. An igneous dike rock composed of a basic spessartite and titanaugite. *Johannsen, v. 1, 2d, 1939, p. 246.*

campylite. A yellowish to brown variety of mimetite crystallizing in barrel-shaped forms. *Fay.* A source of lead.

cam shaft. In stamp battery, horizontal shaft on which rotate the cams which lift the five individual stamps in a battery. *Pryor, 3.*

camshaft. a. In stamp milling, a strong horizontal revolving shaft to which a number of cams are attached in such a manner that no two of them shall strike the tappets at the same instant, distributing the weight to be lifted. *Fay.* b. The shaft upon which are located cams or lobes that open and close the valves at the correct time. *Shell Oil Co.*

camshaft bearings. The bearings that support the camshaft in the engine block. *Shell Oil Co.*

cam stick. In stamp battery crushing, a square-sectioned wooden stick greased on underside and leather-lined above, inserted between cam and tappet as a stamp rises, to facilitate jacking-up on finger bar. *Pryor, 3.*

camstone. a. Scot. A compact whitish limestone. *Standard, 1964.* b. Scot. A bluish-white clay used for whitening purposes. *Standard, 1964.*

can. a. A term used in the tristate zinc and lead district for a bucket used in hoisting. A "can" ranges from 1,200 to 1,400 pounds capacity. *BuMines Bull. 419, 1939, p. 203.* b. In a nuclear reactor, the container in which fuel rods are sealed to protect the fuel from corrosion and prevent gaseous diffusion products from escaping into the coolant. *Ham.*

Canada balsam; balsam of fir; Canada turpentine. Yellowish liquid; pinelike odor; and soluble in ether, in chloroform, or in benzene. Obtained from Abies balsamica. Used for lacquers and varnishes and as an adhesive for lenses; instruments; etc. Its refractive index (1.530) is approximately the same as that of most optical glasses. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, p. E-104.* Used as an adhesive for mounting small fragments and thin sections of rocks, minerals, and fossils on glass slides for microscopic examination. *Bureau of Mines Staff.*

Canadian asbestos. *See* chrysotile. *C.M.D.*

Canadian pole system. A system of oil-well drilling differing from the American cable system, in that wooden rods screwed together are used instead of a rope. The Canadian pole is a useful all-round prospecting rig, and it is particularly suitable for regions where excessive caving makes it necessary to have some positive method of rotating the bit. *Fay.*

Canadian shield. The vast area of Precambrian rocks having an areal extent of 2 million square miles in eastern Canada. *C.T.D.*

Canadian testing machine. *See* Quebec standard asbestos testing machine. *Sinclair, W. E., p. 508.*

canadite. A nepheline syenite containing albite, or a sodic plagioclase, as the principal feldspar and abundant mafic minerals which contain lime and alumina, that is, normative anorthite; the rock type is intermediate between albite-nepheline syenite and shonkinite. *Holmes, 1928.*

canal. a. An artificial watercourse cut through a land area for use in navigation, irrigation, etc. *H&G.* b. That part of a tank leading from the relatively wide fining area to the machine. *ASTM C162-66.* c. *See* chute, f; ditch, j. *Long.*

Canamin clay. A colloidal clay from British Columbia, Canada. Particle size is very small and therefore has great adsorption capacity. Consists mainly of colloidal aluminum silicate. *CCD 6d, 1961.*

canary. a. Sometimes used by rescue teams to give early indication of the presence of carbon monoxide in mine air. At least three birds should be taken by exploring parties and the distress of any one bird is taken as an indication of carbon monoxide danger. A small cylinder of oxygen may be carried for the resuscitation of an affected bird. A good type of carbon monoxide detector is the most convenient and reliable indicator. *See also* P.S. detector tube. *Nelson.* b. Yellow diamond. *Schaller.*

canary beryl. Greenish-yellow beryl. *Shipley.*

canary ore. A yellow, earthy argentiferous lead ore, generally pyromorphite, bindheimite, or massicot, more or less impure. *Fay.*

canary stone. A somewhat rare yellow variety of carnelian. *Fay.*

canasite. A silicate and fluoride of calcium and sodium, monoclinic; occurs associated with fenalsite at Khibina, Kola Peninsula, U.S.S.R. Named from the composition, Ca-Na-Si. *Hey, M.M., 1961.*

Canastotan. Lower Upper Silurian. *A.G.I. Supp.*

cancelling device. A device, operated by movement of the winder drum, which cancels signals shown on the shaft signal indicator and enables fresh signals to be received. *B.S. 3618, 1965, sec. 7.*

canch. a. A part of a bed of stone worked by quarrying. *Fay.* b. Eng. Roof or floor removed to make height and side removed to make width. If above the seam it is called a top canch; if below the seam, a bottom canch. A canch on a roadway close to the face is called a face canch; a canch on a roadway outbye is called a back canch. Also called brushing; ripping. *SMRB, Paper No. 61.* c. The face of the roof ripping in a roadway. It follows that the canch is continually being excavated and advanced. *See also* ripping face support. Also called ripping lip. *Nelson.*

canche. A trench with sloping sides and very narrow bottom. *Zern.*

cancrinite. A hexagonal mineral, $[(Na_2Ca)_4(CO_3H_2O)_{0-3}(AlSiO_4)_6]$, occurring in nepheline syenites. *A.G.I.*

cancrinite syenite. A feldspathoidal syenite containing cancrinite as the dominant feldspathoid. *Holmes, 1928.*

cand. Corn. Fluorspar, or fluorite occurring as a veinstone; called by the Derbyshire miners, blue john. Also spelled cann; kann. *Fay.*

C & D hot top. A hot top designed by W. A. Charman and H. J. Darlington (thus the name C&D) at the time, about 1925, when they were both employed by Youngstown Sheet & Tube Company, United States. The hot top, which is fully floating, consists of a cast-iron casing lined with fire clay or insulating refractories; a refractory bottom ring is attached to the lower end of the casing to protect the latter from the hot metal. *Dodd.*

candelite. Another name for cannel coal. *Tomkeieff, 1954.*

candite. Ceylonite, (pleonaste) the iron-magnesium spinel, $(Mg,Fe)O\cdot(Al,Fe)_2O_3$. *Dana 6d, p. 220.*

candle. a. The unit of light intensity defined as the light given out in a horizontal direction by the flame of a sperm candle weighing one-sixth of a pound and burning at the rate of 120 grains per hour. *Mason, v. 1, p. 244.* b. *See* ceramic fllter. *Dodd.*

candle coal. *See* cannel coal. *Fay.*

candle-foot. A unit of illumination. The light given by a British standard candle at a distance of 1 foot. *Crispin.*

candlepower. a. The illuminating power of a standard sperm candle. Used as a measure for other illuminants. *Crispin.* b. The British standard candle is defined as a sperm candle, that burns at the rate of 120 grains of sperm per hour. *Fay.* c. The Hefner candle now used in the United States as a standard is about 0.88 part of the British standard. *Hess.* d. The luminous flux emitted by a source of light per unit solid angle in a given direction. It is expressed in terms of the international candle and new candle. *C.T.D.*

candle quartz. A faced quartz crystal having a long prismatic and often tapering shape. *AM, 1.*

candle turf. A dirty, yellowish-white variety of peat which has the consistency of soap, and when dried is very flammable and burns with a clear, bright, steady flame. Also called gas turf. *Tomkeieff, 1954.*

cane. Solid glass rods. *ASTM C162-66.*

canel. *See* cannel coal. *Tomkeieff, 1954.*

cane marl. Local name for one of the low quality fire clays associated with the Bassey Mine, Littlerow and Peacock coal seams of North Staffordshire, England. *Dodd.*

caneware. Eighteenth century English stoneware of a light brown color; it was a considerable advance on the coarse pottery that preceded it but, for use as tableware, caneware was soon displaced by white earthenware. During the 19th and the earlier part of the present century, however, caneware continued to be made in South Derbyshire and the Burton-on-Trent area as kitchenware and sanitary ware; it has a fine textured cane-colored body with a white engobe on the inner surface, often referred to as cane-and-white. *Dodd.*

canfieldite. a. This name was first given to an isometric silver sulfogermanate, believed to be a new species, but later it proved to be identical with argyrodite. The name was then withdrawn and transferred to (b). *English*. b. A black, silver sulfostannate, $4Ag_2S \cdot SnS_2$. In octahedrons. Isometric. From Aullagas, Colquechaca, Bolivia. *English*.

Canfield's reagent. An etchant containing 1.5 grams cupric chloride, 5 grams nickel nitrate, 6 grams ferric chloride, in 12 milliliters of hot water. It is used for revealing phosphorus segregation in iron and steel. *Osborne*.

canga. a. Braz. Canga consists essentially of hard blocks and fragments of the rocks of the iron formation, cemented with limonite. Where these fragments are plentiful and are derived from the hard ore outcrops, canga forms a valuable ore, which may run as high as 68 percent iron. Generally it is phosphoric, but there are considerable areas in which the phosphorus is below the Bessemer limit. *Hess*. b. Braz. A kind of auriferous glacial rock; in reality an iron breccia. Also applied to a brown porous conglomerate. *Fay*.

can hoisting system. A method of hoisting in shallow lead zinc mines in areas of the United States. Instead of the conventional enginehouse, operation is controlled at the top of the shaft. Onsetter below hooks the can on, then signals by a lamp attached to his wrist to the hoistman sitting above. Can is hoisted, swinging free. At the surface a tail rope is snapped to underside, a deflection plate is swung into place, and the can is lowered. It capsizes and discharges its load to the surge bin, is again hoisted, freed of its tail rope and wound down the shaft, where it is replaced by a full can. *Pryor, 3*.

can hooker. In metal mining, a laborer who passes hook of hoisting cable through bail (handle) of large can-shaped container or bucket filled with ore or rock to be hoisted from shaft bottom to surface. Also called bucket hooker. *D.O.T. 1*.

canister. a. Aust. A tin for holding blasting powder. *Fay*. b. A hopper-shaped truck, from which coal is discharged into coke ovens. *Fay*

calp. Ir. A bluish-black to grayish-blue limestone. *Standard, 1964*.

cank; kank. a. Eng. A compact, fine-grained sandstone with a calcareous or siliceous cement, Midland Counties. *Nelson*. b. Eng. Similar to burr, often an ironstone, Lancashire. *Nelson*. c. York. A completely cemented, compact, and fine-grained sandstone, or any fine-grained rock hard to drill. *Nelson*. d. A hard, dark gray massive rock consisting largely of ankerite, found in some Coal Measures marine beds. *B.S. 3618, 1964, sec. 5*.

cank balls. York. Nodular masses of cemented sandstone; sometimes also ironstone nodules. *Arkell*.

canker. a. Eng. The ocherous sediment in mine waters, being bicarbonate of iron precipitated by the action of the air. *Fay*. b. Rust; verdigris, or copper rust. *Webster 2d*. c. To rust; to corrode; to tarnish. *Webster 2d*.

cann. Corn. *See* cand. *Fay*.

cannel. *See* cannel coal. *B.S. 3618, 1964, sec. 5*.

cannel bass. Staff. Carbonaceous shale in character approaching an oil shale. *Tomkeieff, 1954*.

cannel coal. a. This is an old term for a coal burning with a steady luminous flame. The sapropelic origin of cannel coal was recognized at the beginning of the present century. The term cannel coal is now used for sapropelic coal containing spores, in contrast to sapropelic coal containing algae, which is termed boghead coal. Viewed microscopically, cannel coal shows no stratification. It is generally dull and has a more or less pronounced waxy luster. It is very compact and fractures conchoidally. There are transitions between cannel coal and boghead coal and it is not possible always to distinguish macroscopically between cannel coal and boghead coal. Such a distinction can, however, be easily made with microscope except in high rank coals. In American nomenclature, cannel coal must contain less than 5 percent anthraxylon. Cannel coal occurs in layers or lenses up to several centimeters in thickness. Thin seams consisting entirely of cannel coal are known. It occurs widely but in limited amounts. Synonym for gayet; analogous term is parrot coal. *See also* sapropelic coal; boghead coal. *IHCP, 1963, part I*. b. A variety of bituminous or subbituminous coal of uniform and compact fine-grained texture with a general absence of banded structure. It is dark gray to black in color, has a greasy luster, and is noticeably of conchoidal or shelllike fracture. It is noncaking, yields a high percentage of volatile matter, ignites easily, and burns with a luminous smoky flame. *ASTM D493-39*.

cannelite. Another name for cannel coal. *Tomkeieff, 1954*.

canneloid. a. Coal that resembles cannel coal. *Tomkeieff, 1954*. b. Coal that is intermediate between cannel coal and bituminous coal. *Tomkeieff, 1954*. c. Durain laminae in banded coal. *Tomkeieff, 1954*. d. Cannel coal of semianthracitic or anthracitic rank. *Tomkeieff, 1954*.

cannel shale; cannel slate. a. A shale in which the mineral and the organic matter are approximately in equal proportions. *Tomkeieff, 1954*. b. A black shale formed by the accumulation of sapropels accompanied by a considerable quantity of inorganic material, chiefly silt and clay. *A.G.I.*

cannes marble. Same as griotte marble, a reddish marble with white spots formed by fossil shells (goniatites). *Hess*.

canning. a. A dished distortion in a flat or nearly flat surface, sometimes referred to as oil canning. *ASM Gloss*. b. Enclosing a highly reactive metal within one relatively inert for the purpose of hot working without undue oxidation of the active metal. *ASM Gloss*.

cannizzarite. A lead, bismuth sulfosalt; monoclinic crystals as thin leafy blades; from Vulcano, Lipari Island, Italy. *American Mineralogist, v. 38, No. 5–6, May-June 1953, p. 536*.

cannock. S. Staff. A ferruginous nodule occurring in a fire clay; the name derives from the town of Cannock in that area. *Dodd*.

cannonball mill. A mill for grinding tough materials by attrition with cannonballs in a rotating drum or chamber. *See also* ball mill. *Fay*.

cannonier. Fr. *See* fireman. *Fay*.

cannon pot. A small pot for glass melting. *Dodd*.

cannon shot. *See* blown-out shot. *Fay*.

cannon-shot gravels. Eng. Quaternary boulder gravels in Norfolk, so named on account of the size and roundness of the cobbles. *Arkell*.

canny. Corn. Applied to lodes containing calcium carbonate and fluorspar. *See also* cand. *Fay*.

canon. *See* canyon. *Webster 3d*.

cansa; chapinha. Hydrated Brazilian hematite ore resulting from the weathering of itabirite. *Osborne*.

cant. a. To slip or turn over to one side. *Fay*. b. An inclination from a horizontal, a vertical, or another given line; a slope or a bevel; a tilt. *Webster 3d*. c. To roll and move logs or heavy sill timbers with a cant hook. *Long*.

cantalite. A rhyolite pitchstone from Cantal, France. *Holmes, 1928*.

cant dog. Eng. A handspike with a hook. A cant hook. *Fay*.

cantharid luster. A ceramic luster having green and blue iridescence like that of a Spanish fly. *Fay*.

cant hook. A wooden lever with a movable iron hook at the end, used for turning or rolling logs or heavy sill timbers. *Long*.

cantilever. a. A support system in which one end of a beam is fixed and the other is free. Construction sometimes used to give grizzly vibrating freedom. *Pryor, 3*. b. A lever-type beam that is held down at one end, supported near the middle, and supports a load on the other end. *Nichols*.

cantilever crane. A transporter crane with one or both ends overhanging. *Ham*.

cantilever grizzlies. Grizzlies fixed at one end only, the discharge end being overhung and free to vibrate. This vibration of the bars is caused by the impact of the material. The disadvantage of the ordinary bar grizzly is clogging due to the retarding effect of the cross rods. This has been overcome in the cantilever grizzly by eliminating the tie rods except at the head end where they are essential. The absence of these rods below the point of support also aids in preventing clogging as it permits the bars to vibrate in a horizontal plane which keeps the material from wedging. *Pit and Quarry, 53rd, Sec. B, pp. 118-119*.

cantilever wall. A retaining wall, whose stability is provided by the weight of material resting upon its heel. *Ham*.

cantle piece. A cant or side piece in the head of a cask. *Standard, 1964*. *See also* cants. *Fay*.

canton blue. A violet-blue ceramic color made by the addition of barium carbonate to cobalt blue. A quoted recipe is: 40 percent cobalt oxide; 30 percent feldspar; 20 percent flint; 10 percent $BaCO_3$. *Dodd*.

cantonite. A covellite that occurs in cubes with cubic cleavage and it is probably pseudomorphous after chalcopyrite which had replaced galena; from the Canton mine, Ga. *Hess*.

cants. Eng. The pieces forming the ends of buckets of a waterwheel. *See also* cantle piece. *Fay*.

canutillos. Synonym for emerald. *Hey 2d, 1955*.

canvas. Usually applied to brattice cloth, which is a heavy canvas of cotton, hemp, or flax, frequently fireproofed. *Jones*.

canvas door. A simple square frame of about 2- by 2-inch pieces tied with diagonal strips and covered with brattice; used for deflecting air currents at inby points where the pressure is low. *Nelson*.

canvasman. *See* brattice man. *D.O.T. 1*.

canvas tables. Inclined rectangular tables covered with canvas. The pulp, to which clear water is added if necessary, is evenly distributed across the upper margin. As it flows down, the concentrates settle in the corrugations of the canvas. After the meshes are filled, the pulp feed is stopped, the remaining quartz is washed off with clear water, and finally the concentrates removed (by hose or brooms). *Liddell 2d, p. 386.*

canvas tube. *See* flexible ventilation ducting. *Nelson.*

canyon. a. A precipitous valley; a gorge. Also spelled canon. *Fay.* b. Mex. A mine-level drift or gallery. C. de guia, a drift along the vein. *Fay.* c. A deep valley with steep sides located as a part of the ocean floor. The deep floors of ocean canyons contain sand and deep-sea mud. The Hudson Canyon is an example. It cuts the continental shelf to a depth almost as great as that of the Grand Canyon in northwest Arizona. *MacCracken.*

caolad flint. A form of cryptocrystalline silica occurring at Cloyne, County Cork, Eire. It has a specific gravity of 2.26 and is readily ground, without the need for precalcination, for use in pottery bodies. *Dodd.*

cap. a. A piece of plank or timber placed on top of a prop, stull, or post. *Long.* b. A flat piece of wood inserted between the top of the prop and the roof. *Hudson.* c. The horizontal member of a set of timber used as a roadway support. *Nelson.* d. The roof or top piece in a three-piece timber set used for tunnel support. *Nichols.* e. The blue halo of ignited firedamp which shows above the yellow flame of a safety lamp when in air containing small quantities of firedamp. The percentage of firedamp can be roughly measured by the height of the cap. Also called gas cap. *Fay.* f. A detonator or blasting cap. *Nelson.* g. The top of a saddle reef; sometimes used synonymously with gossan to describe an outcrop. *Nelson.* h. Decomposed veinstuff at the outcrop of a lode. *Gordon.* i. S. Afr. A mine when the vein matter is barren or when the vein is pinched, or contracted, is said to "in cap". *Fay.* j. Rock above coal or ore. *See also* cap rock. *Fay.* k. Barren rock and/or soil covering an ore deposit. *Long.* l. Overburden consisting of unconsolidated material overlying or covering bedrock. Also called cover; mantle. *Long.* m. To seal, plug, or cover a borehole. *Long.* n. An attachment riveted on the end of a rope to which a chain may be fastened. *Fay.* o. A fitting that goes over the end of a pipe in order to close it and thus producing a dead end. *Fay.* p. A fitted or threaded piece to protect the top of a pile from damage while being driven. *Nichols.* q. A pipe plug with female threads. *Nichols.* r. In diamond cutting, the sawed off apex of an octahedron. *Hess.* s. *See* headtree, d. *SMRB, Paper No. 61.* t. Another name for crown. *ASTM C162–66.* u. A type of bottle closure. *ASTM C162–66.* v. To cut off the ends of a glass cylinder. *ASTM C162-66.*

capacitance. a. The ability to store electrical energy, measured in farads, microfarads, or micro-microfarads. *H&G.* b. In flotation, a property expressible by the ratio of the time integral of the flow rate of material or electric charge to or from a storage, divided by the related potential change. *Fuerstenau, p. 545.*

capacitive control. An alternative to inductive control is to employ a capacitor in series with the choke and therefore to obtain a leading power factor for the circuit. The current in a capacitive circuit is less affected by changes in voltage than that in an inductive circuit. Therefore, should there be a sudden drop in mains voltage, the capacitively controlled lamp is less likely to be extinguished than the inductively controlled lamp. *Roberts, II, p. 197.*

capacitor. a. Electrical appliance working on the condenser principle. Two conducting plates are separated by an insulating layer. When alternating current is applied the capacitor is adjusted so that its leading current balances the lag of the circuit giving a high-power factor. *Pryor, 3.* The principal use for capacitors in mines has been in improving the average power factor of the mine system in order to qualify for a favorable power rate. The selection of a suitable capacity is made by dividing the number of reactive kilovolt-ampere hours registered by the number of hours (730) in the average month. The selected capacitor is then connected on the high-voltage lines, usually paralleling transformers to provide a discharge path. Occasionally capacitors will be used at individual motors, usually conveyor motors, to relieve the powerline of excess amperes and thereby provide voltage improvement. *Kentucky, pp. 261–262.* b. An adjustable electric appliance used in circuit with a motor to adjust the power factor. Also called capacitor. *Pryor, 4.*

capacity. a. As applied to diamond and rotary drills, the load that the hoisting and braking mechanism of a drill are capable of handling on a single line, expressed in footage as the depth to which the drill can operate with different size bits. *Long.* b. As applied to air compressors, the actual amount of air compressed and delivered, expressed in cubic feet per minute (cfm) of free air intake at sea level pressure. *Long.* c. As applied to pumps, the volume of a liquid the pump will deliver, expressed in gallons per minute (gpm). *Long.* d. In ore dressing, the capacity of a screen is the measure of the amount of material that can be screened in a given time, and is measured in tons per square foot per hour per millimeter of aperture. *Newton, p. 74.* e. The amount of material that a transporting agency such as a stream, a glacier, or the wind can carry under a particular set of conditions. *Leet.*

capacity curve. A graph showing the volume of a reservoir at any given water level. *Ham.*

capacity factor. a. Introduced by Vaughan, and is the ratio between the breaking strength of a winding rope and the load suspended on it (excluding the weight of the rope itself). He recommended that this capacity factor should be 12 for all depths down to about 5,000 feet. *See also* factor of safety, a. *Nelson. b.* A method of assessing the size of rope. The capacity factor of the rope is the static factor of safety of the rope at the capping, that is, the breaking strength of the rope divided by the weight of the loaded cage or skip and the suspension gear, comprising the chains, or equivalent equipment, and a detaching hook. *Sinclair, V, p. 15.*

capacity-flow conveyor. *See* en masse conveyor. *ASA MH4.1-1958.*

capacity insulation. The ability of masonry to store heat as a result of its mass, density, and specific heat. *ACSG, 1963.*

capacity load. The maximum load which can be carried safely. *Crispin.*

capacity of air compressor. The actual amount of air compressed and delivered, expressed in terms of free air at intake temperature and at the pressure of dry air at the suction. The capacity of an air compressor should be expressed in cubic feet per minute. *Fay.*

capacity of car or tub. Cubic yard of solid rock per car or tub. *Fraenkel.*

capacity of the market. As applied to mining, the ability of the market to buy, especially with regard to the quantity which can be placed in the market, and to the prices which can be obtained. *Stoces, v. 1, p. 66.*

capacity of the wind. The total amount of detrital material of a given kind that can be sustained (per unit volume of air) by a wind of a given velocity. In the aggregate, wind transports more material than water, although water at the same speed of flow is capable of transporting much larger particles. During a dust storm, the wind may carry from 160 short tons up to 126,000 short tons per cubic mile of air. *A.G.I.*

cap board. Same as cap. *Fay.*

cap crimper. A plierslike tool for pressing the open end of a blasting cap on the safety fuse before placing in the primer. *See also* capped fuse. *Nelson.*

cape. a. A diamond having a yellowish tinge. *Schaller.* b. A point or extension of land jutting out into the sea, either in the form of a peninsula or merely as an angle or projecting point on a coast. *Schieferdecker.*

Cape blue. Crocidolite asbestos found near Prieska, Republic of South Africa. *Pryor, 3.*

Cape chrysolite. Green prehnite from the Republic of South Africa. *Shipley.*

Cape diamond. One with yellowish tinge. *Pryor, 3.*

Cape garnet. A bright red-yellow almandite (garnet). *Schaller.*

capel; kapel. a. Corn. A rock containing quartz, schorl, and hornblende. *See also* caple. *Fay* b. A wall of a lode; so called by Cornish miners, and primarily when the country rock adjacent to the lode itself has been more or less altered by the same mineralizing agencies through which the lode was formed. Also called cab. In the United States, casing is sometimes used synonymously. *Fay* c. A steel socket used to cap a steel rope. For a hoisting cage, molten white metal is poured in around the wires. In Great Britain, winding rope must be recapped biannually, 6 feet of the old being removed each time. *Pryor, 3.*

Capell fan. A centrifugal type of mine fan in use from about 1860 to the early part of the present century. It consists essentially of two concentric cylindrical chambers, each provided with six curved blades, the convex sides of which faced the direction of rotation. The shell between the two sets of blades contained openings to allow the air to pass from the inner to the outer chamber. It produced up to 400,000 cubic feet per minute. *Nelson.*

capel lode. Corn. A lode composed of hard unpromising feldspar containing minute particles of chlorite. *See also* capel. *Fay.*

Cape May diamond. A colorless and clear quartz crystal from Cape May, N.J. *Schaller.*

Cape ruby. Brilliantly red garnet, gem stone. Other varieties are carbuncle and Bohemian garnet. *Pryor, 3.*

capes. Scot. Movable sides and ends put on a hutch, wagon, or car to increase its capacity. *Compare* bustle, b. *Fay.*

cap head. Eng. A top for an air box used in shaft sinking. *Fay.*

capillarity. a. The quality or state of being capillary. *Webster 3d* b. The action by which the surface of a liquid, where it is in contact with a solid, is elevated or depressed depending upon the relative attraction of the molecules of the liquid for each other and for those of the solid. Especially observable in capillary tubes where it determines the elevation or depression of the liquid above or below the level of the liquid in which the tube is dipped. *Webster 3d.* c. The ability of a brick or other fired clay products to conduct liquids through its pore structure by the force of surface tension. *ACSG, 1963.* d. A phenomenon observable when making borehole inclination surveys by the acid-etch method, wherein the upper surface of the dilute hydrofluoric acid is seen to curve upward, forming a concave surface. When the acid bottle is in a true vertical or horizontal position, the concave surface is symmetrical, and the resultant etch plane is horizontal. When the acid bottle is tilted, the concave surface is asymmetric in shape; the resultant etch plane is not horizontal, and the angle so indicated is always greater than the true inclination of the borehole. *See also* etch angle; capillarity correction. *Long.*

capillarity correction. The deduction of a specific angular value from the apparent angle, as indicated by the plane of the etch line in an acid-survey bottle, to correct for capillarity effects and thereby determine the true inclination angle of a borehole. Proper values to be deducted from the apparent angles read on acid bottles differing in size may be determined by referring to charts, graphs, or tables prepared for that purpose. *See also* capillarity-correction chart. *Long.*

capillarity-correction chart. A chart, graph, or table from which the amount of capillarity correction may be ascertained and applied to an angle reading taken from an acid-etch line in an acid bottle of specific size to determine the true angle of inclination of a borehole surveyed by the acid-etch method. Also called correction chart; test-correction chart. *See also* capillarity correction. *Long.*

capillarity-correction graph. A capillarity-correction chart. *Long.*

capillarity-correction table. A capillarity-correction chart. *Long.*

capillary. a. The action by which the surface of a liquid is elevated at the point at which it is in contact with a solid (as in a lamp wick). *Shell Oil Co.* b. Resembling a hair; fine, minute, slender; especially, having a very small or thin bore usually permitting capillary. *Webster 3d.* c. A mineral exhibiting a fine hairlike structure, for example, millerite. *Nelson.*

capillary action; capillarity. The rise or movement of water in the interstices of a soil or a rock, as the result of capillary forces. *ASCE P1826.*

capillary attraction. The combination force, adhesion and cohesion, which causes liquids, including molten metals, to flow between very closely spaced solid surfaces even against gravity. *ASM Gloss.*

capillary flow. *See* capillary migration. *ASCE P1826.*

capillary fringe zone. The zone above the free-water elevation in which water is held by capillary action. *ASCE P1826.*

capillary head. The potential expressed as head of water that causes the water to flow by capillary action. *ASCE P1826.*

capillary migration; capillary flow. The movement of water by capillary action. *ASCE P1826.*

capillary movement. a. The rise of subsoil water above the water table through the channels connecting the pores in the soil. *Nelson.* b. Movement of underground water in response to capillary attraction. *Nichols.*

capillary pyrites. Same as millerite. *Standard, 1964.*

capillary red oxide of copper. A common name for chalcotrichite, a form of cuprite. *Weed, 1918.*

capillary rise; height of capillary rise. The height above a free-water elevation to which water will rise by capillary action. *ASCE P1826.*

capillary tube. A tube with so fine a bore that the rise or fall of a liquid in it by capillary attraction is perceptible to the eye. *Standard, 1964.*

capillary water. a. Water held above the water table in soil by capillary force. *Seelye, 1. See also* held water. *Nelson.* b. Water that has been subjected to the influence of capillary action. *ASCE P1826.*

capillary waves. Small waves, less than 1.73 centimeter in length, having rounded crests and V-shaped troughs whose characteristics are governed primarily by the forces of surface tension. It is believed that these waves increase friction between wind and the sea surface and contribute more to sea clutter on radar than other waves. *Hy.*

capital expenditure. The amount of money required for the purchase of the right to mine a deposit, for its preliminary development, for the purchase of adequate equipment and plant to operate it, and for working capital. *Hoov, p. 154.*

capital project. A development scheme which is not financed by the revenue of a mine. *See also* project. *Nelson.*

capital scrap. Scrap from redundant manufactured goods and equipment. This scrap is collected and processed by merchants. *See also* process scrap. *Nelson.*

capitan; capataz. Mex. A mine captain; de patio, a surface boss. *Fay.*

Capitan limestone. Massive white limestone in the Guadalupe Mountains. It extends into the eastern Glass Mountains and includes the Tessey, Gilliam, and Vidrio deposits; however, the U. S. Geological Survey considers Tessey limestone as a distinct formation. Found in New Mexico and Texas. *Hess.*

cap lamp. That term generally applied to the lamp which a miner wears on his safety hat or cap. For illumination only. *B.C.I. See also* miner's electric cap lamp.

caple. Corn. A hard rock lining tin lodes. *See also* capel. *Fay.*

cap light, dry cell. A self-contained light which permits free use of the hands and may be suitable for gaseous or explosive atmospheres. The headlamp, with focusing lens and bulb, is strapped to the head or hat, and the dry cell battery unit can be clipped to the belt. To prevent explosion, the bulb-socket ejects the bulb automatically in case of breakage. Bureau of Mines bulletins of permissible equipment should be consulted for headlamps that are approved for mine operations. *Bests, p. 142.*

cap light, wet cell. These rechargeable, wet cell cap lights are designed for workers who need a self-contained light that will not interfere with free use of the hands. The battery is worn on the belt, and the light unit, which is attached to the cap or head, contains bulbs filled with krypton gas. The head light either contains two separate bulbs or a single bulb with two filaments in parallel, thus assuring the wearer of a constant source of light in the event that one bulb or one filament burns out. Used by miners, repairmen, tank workers, etc. *Bests, p. 412.*

caporcianite. *See* laumontite.

Cappeau furnace. A modification of the Ropp furnace for calcining sulfide ore. *Fay.*

capped fuse. A length of safety fuse with the cap or detonator crimped on before it is taken to the place of use. *Nelson. See also* plain detonator.

capped quartz. A variety of quartz containing thin layers of clay. *Fay.*

capped steel. Semikilled steel cast in a bottle-top mold and covered with a cap fitting into the neck of the mold. The cap causes the top metal to solidify. Pressure is built up in the sealed-in molten metal and results in a surface condition much like that of rimmed steel. *ASM Gloss.*

cappel; capping. A fitting at the end of the winding rope to enable the bridle chains of the cage to be connected by a pin through the clevis. In Great Britain, satisfactory results have been obtained from white metal and wedge-type cappels. Normally, wedge cappels are manufactured either in 1.5 percent manganese steel to B. S. 2772, Pt. 2, 1956, or in 26/32 tons tensile mild steel and are tested to a proof load of 250 percent of the static load for which they are required. *See also* G.H.H. cappel; white-metal cappel. *Nelson.*

cappelenite. A very rare, weakly radioactive, greenish-brown, hexagonal mineral, $(Ba,Y)_2SiBO_6$; found in veins in syenite associated with wohlerite, rosenbuschite, catapleiite, orangite, lavenite, elaeolite, and sodalite. *Crosby, p. 68.*

Cappelin-Smith process. *See* Guggenheim process. *Hess.*

capper. a. One who separates the cylinder of machine-blown curved window glass from the blowing attachment, cracking it into proper lengths by the use of an electric cutting wire or by alternately applying heat and cold. Also called corker; sealer. *D.O.T. 1.* b. In brickmaking, the man who receives the filled molds as they come from a brick machine; a molder. *Standard, 1964.*

cappice. Aust. A horizontal stick of timber or bar of steel used for supporting a weak roof. A variation of cap or cap piece. *Fay.*

cap piece. a. A piece of wood usually 24 to 36 inches long, 6 to 8 inches wide, and 2 to 6 inches thick, and is fitted over a straight post or timber to afford more bearing surface for the support. All single posts, or timbers including safety posts, should be covered with a cap piece to provide additional bearing surface. *Kentucky, p. 140.* b. Ark. Usually a piece of wood split from a log. *Fay.*

capping. a. The overburden or rock deposit overlying a body of mineral or ore. *Nelson.* b. The attachment at the end of a winding rope. *See also* continental gland-type capping; interlocking wedge-type capping; white metal cappel. *Sinclair, V, pp. 24-28.* c. The preparation of capped fuses. *Nel-*

son. *See also* safety fuse capping. *Lewis, p. 119.* d. The fixing of a shackle or a swivel to the end of a hoisting rope. *C.T.D.* e. The operation of fastening steel rope to a winding cage. *Pryor, 3.* f. The process of sealing or covering a borehole and/or the material or device used to seal or cover a borehole. *Long.* g. The name given to a method by which the spouting flow of a liquid or gas from a borehole may be stopped or restricted; also, the mechanism attached to borehole collar piping and so used. *Long.* h. The separation of a block of stone along the bedding plane. *Fay.* i. Sometimes a synonym for overburden. *Fay.* j. In powder metallurgy, the partial or complete separation of a compact into two or more portions by cracks which originate near the edges of the punch faces and which proceed diagonally into the compact. *ASM Gloss.* k. *See* cap, a. *Fay.*

capping station. A special room or building used solely for the preparation of capped fuses. *Nelson.*

cap pot. In glassmaking, a crucible having a lid or cap. *Fay.*

cap rock. a. Barren vein matter, or a pinch in a vein, supposed to overlie ore. *Fay.* b. A hard layer of rock, usually sandstone, a short distance above a coal seam. *Fay.* c. The layer of rock adjacent to overlying ore, generally a barren vein material. *Webster 3d.* d. A disklike plate over part of or all of the top of most salt domes in the Gulf Coast States and in Germany. It is composed of anhydride, gypsum, limestone, and sometimes sulfur. *A.G.I.* e. A comparatively impervious stratum immediately overlying an oil- or gas-bearing rock. *A.G.I.* f. *See* caliche, a. *A.G.I.* g. Eng. The cap rock of the alum shale, Estuarine sandstones on the Yorkshire coast. *Arkell.*

caprylic acid; octanoic acid; octoic acid. Colorless; oily liquid; $CH_3(CH_2)_6COOH$; and a slight unpleasant odor. Used in ore separations and as a chemical raw material. *CCD 6d, 1961.*

capsal. A capstan. *Standard, 1964.*

cap seat. The ledge inside the mouth of a milk bottle. *ASTM C162-66.*

cap set. A term used in square-set mining methods to designate a set of timber using caps as posts, resulting in a set of timber shorter than the normal set. *Bureau of Mines Staff.*

cap sheet. Smooth or mineral surfaced roll roofing for use as the top layer on a built-up roof. *ASTM D1079-54.*

cap shot. A light shot of explosive placed on the top of a piece of shale that is too large to handle, in order to break it. *B.C.I.*

cap sill. The upper horizontal beam in the timber framing of a bridge, viaduct, etc. *Fay.*

capstan. a. A spoollike drum mounted on a vertical axis used for heave hoisting or pulling. It is operated by steam, electric power, or hand pushes or pulls against bars inserted in sockets provided in the upper flange or head. *Long.* b. Sometimes used as a synonym for cathead. *Long.*

capstan bar. One of the levers by which the capstan is worked. *Webster 2d.*

capstone. In masonry, the uppermost or finishing stone of a structure. *Fay.*

capsule metal. A high lead alloy containing 92 percent lead and 8 percent tin. *Campbell.*

captain dresser. Eng. A manager of an ore-dressing plant. *Fay.*

captive mine. Aust. A mine which produces coal or mineral for use by the same company. *Nelson.*

captive tonnage. The quantity of mineral product from a mine produced solely for use by the parent company or subsidiary. *Bureau of Mines Staff.*

capture. a. Synonym for piracy. *A.G.I.* b. The substitution in a crystal lattice of a trace element for a common element having a lower valence. *A.G.I.*

car Abbreviation for carat. *Zimmerman, p. 21.*

car. a. A vehicle for use on a railroad, usually mounted on trucks, and often provided with mechanism for coupling, so as to form part of a train. *Standard, 1964.* b. A vehicle moving on wheels. *Webster 3d.* c. A wheeled vehicle used for the conveyance of coal or ore along the gangways or haulage roads of a mine. *Zern.* Also called mine car; tramcar; tub; wagon; mine wagon. *Fay.* d. A wheeled carrier that receives and supports the load to be conveyed. Generally attached to chain, belt, cable, linkage, or other propelling medium. *See also* tray. *ASA MH4.1-1958.*

caracolite. A colorless, hydrous, lead-sodium chlorosulfate, perhaps $Pb(OH)Cl.Na_2SO_4$. Occurs as crystalline incrustations. *Fay.*

caracoly. An alloy of gold, silver, and copper used first by the Caribs in making ornaments. *Standard, 1964.*

Caradocian. Lower Upper Ordovician. *A.G.I. Supp.*

Carapella's reagent. An etchant consisting of 5 grams ferric chloride dissolved in 96 milliliters ethyl alcohol to which has been added 2 milliliters of hydrochloric acid. It is used in etching nonferrous metals and manganese steels. *Osborne.*

carat. a. A unit employed in weighing diamonds, and formerly equal to 3-1/6 troy grains (205 milligrams). The international metric carat (abbreviated M.C.) of 200 milligrams was made the standard in the United States in 1913, as it was the standard in Belgium, Denmark, Great Britain, France, Germany, Japan, the Netherlands, and Sweden. A carat grain is one-fourth carat. *Webster 3d.* b. Employed to distinguish the fineness of a gold alloy, and meaning one-twenty-fourth part. Pure gold is 24-carat gold. Goldsmiths' standard is 22 carats fine, that is, it contains 22 parts of gold, 1 part of copper, and 1 part of silver. *Fay.* c. *See* karat. *ASM Gloss.*

caratage. Synonym for carat weight. *Long.*

carat count. The number of near-equal-size diamonds having a total weight of 1 carat or 200 milligrams; hence, 40 small diamonds weighing 1 carat would be called 40-count diamonds, or 8 diamonds weighing 1 carat would be called 8-count diamonds. *Long.*

carat-goods. Diamonds averaging about 1 carat each in weight. *Long.*

carat loss. Amount of diamond material lost or worn away by use in a drill bit expressed in carats. *Long.*

carat weight. Total weight of diamonds set in a drill bit expressed in carats. Also called caratage. *Long.*

carbamate. Salt of carbamic acid (NH_2COOH). *Pryor, 3.*

carbankerite. This term was introduced by V. Hevia in 1960 to designate a microlithotype containing 20 to 60 percent by volume of carbonate minerals (calcite, siderite, dolomite and ankerite), and was adopted in 1962 by the Nomenclature Subcommittee of the International Committee for Coal Petrology. In coal preparation practice carbankerite, like carbopyrite and carbargilite falls into the category of true intergrown coal in as much as the mineral carbonate is so intimately associated with the coal that it is not possible to free it by crushing. It appears therefore in middlings. It is usually possible to free the mineral carbonate deposits occurring in cleat partings and fissures by crushing. When carbankerite occurs in appreciable proportions in cleaned coal it has its effect as an inert material on coking and swelling properties, hydrogenation and gasification, but without giving rise to any special trouble or difficulty. Carbankerite shows no tendency to spontaneous combustion or to produce dust. *IHCP, 1963, part I.*

carbapatite. Same as carbonate apatite. *English.*

carbargilite. In 1955 the Nomenclature Subcommittee of the International Committee for Coal Petrology resolved to use this term for the microlithotype containing 20 to 60 percent by volume of clay minerals, mica, and in lesser proportions, quartz. In coal preparation practice, carbargilite corresponds to true intergrown coal. The mineral is so intimately associated with the coal that it is impossible to free it by crushing. Carbargilite therefore appears in middlings and may be a common constituent of steam-raising coals. If the proportion of carbargilite in a coal is too high, it will prove troublesome in carbonization, hydrogenation and gasification. It has no special tendency to form dust or to spontaneous combustion. *IHCP, 1963, part I.*

carbenes. The components of the bitumen in petroleums, petroleum products, malthas, asphalt cements, and solid native bitumens, which are soluble in carbon disulfide but insoluble in carbon tetrachloride. *Urquhart, Sec. 2, p. 81.*

carbide. a. A commercial term for calcium carbide used in miners' lamps. *Fay* b. Either the carbide compound of tungsten or the bit-crown matrice and shaped pieces formed by the pressure molding and sintering of a mixture of powdered tungsten carbide and other binder metals, such as cobalt, copper, iron, and nickel. *See also* cemented carbides; sintered carbides. *Long* c. A compound of carbon with one or more metallic elements. *ASM Gloss.*

carbide bit. A steel bit which contains inserts of tungsten carbide. *Nichols, 2.*

carbide inserts. Shaped pieces of a hard metal compound, sometimes inset with diamonds, formed by the pressure molding and sintering of a mixture of powdered tungsten carbide and other binder metals, such as iron, copper, cobalt, or nickel. Inset into holes, slots or grooves in bits, reaming shells, or core barrels, the hard metal pieces become cutting points or wear-resistant surfaces. Also called carbide slugs. *Long.*

carbide lamp. A lamp that is charged with calcium carbide and water and burns the acetylene generated. *Hess.*

carbide lime. A waste lime hydrate byproduct from the generation of acetylene from calcium carbide and may occur as a wet sludge or dry powder of widely varying degrees of purity and particle size. It is gray and possesses the pungent odor of acetylene. *Boynton.*

carbide miner. A pushbutton mining machine with a potential range of 1,000 feet into the seam from the highwall, a maximum production of some 600 tons per shift, and a recovery of 65 to 75 percent of the coal within the reach of the machine. This unit is a continuous miner working from a control stand outside of the seam of coal. The operator can control both the vertical and horizontal direction of the cutting heads as shown on an oscilloscope screen. As the cutting head advances into the coal seam, it drags a series of conveyor sections behind it, which in turn deposit the coal into a truck on the outside of the coal seam. *Krumlauf, p. 8.*

carbide of silicon. An artificial abrasive made by fusing coke, sand, salt, and sawdust in electric furnaces. Discovered in an attempt to make artificial diamonds. *See also* Carborundum. *Fay.*

carbides. Compounds of carbon with iron and other elements in steel; for example, Fe_3C (cementite), Fe_4W_2C, and Cr_4C_2. *C.T.D.*

carbide slugs. Synonym for carbide inserts. *Long.*

carbide tools. Cutting tools, made of tungsten carbide, titanium carbide, tantalum carbide, or combinations of them, in a matrix of cobalt or nickel, having sufficient wear resistance and heat resistance to permit high machining speed. *ASM Gloss.*

carbinol. a. Monovalent radical of primary alcohol, CH_2OH. *Pryor, 3* b. Primary alcohol of the formula $R.CH_2OH$. *Pryor, 3.*

carbite. A contraction of the word carbon with the mineral termination ite, applied to both diamond and graphite; not in current usage. *Hess.*

Carbite. Trade name ofr an exlposive. *Hess.*

carble. Shrop. Thin-bedded shivery sandstone. *Arkell.*

carbo. A Latin name for charcoal, later transferred to fossil coal. *Tomkeieff, 1954.*

Carbo. Clay-bonded silicon carbide; used as refractory. *Bennett 2d, 1962.*

Carboalumina. Trade name for fused aluminum oxide. *See also* alumina. *Hess.*

carboanimalis. Animal charcoal. *Hass.*

carbocernaite. A carbonate of calcium, strontium, sodium, and lanthanons (mainly lanthanum and cerium), $(Na,Ca,Sr,Ln)Co_3$; orthorhombic. From Vuori-Yarvi, Kola Peninsula. Named from the composition, carbon-cerium-natrium. The name is uncomfortably near carbocer. *Hey, M.M., 1961.*

carbocher. A variety of hydrocarbon containing about 8 percent of rare earths and found enclosed in a mineral kondrikite. From the Khibine Peninsula, Russia. *Tomkeieff, 1954.*

Carbocoal. Trade name for coke made by the low-temperature distillation of high-volatile coal. The coke produced is granular and is made into briquettes which ignite more easily than ordinary coke supposedly as a result of occluded oxygen. *Hess.*

carbodynamite. A form of dynamite in which fine charcoal is used as the absorbent. *Webster 2d.*

carbofossilis. An old Latin name for fossil coal. *Tomkeieff, 1954.*

Carbofrax. Silicon carbide; product used for highly refractory installations. *Bennett 2d, 1962.*

carbohumin. a. An amorphous carbonaceous substance, a product of decomposition of plants and impregnating plant remains which undergo transformation into coal. It is assumed to be present in coal in the form of structureless jelly. Synonym for fundamental jelly; fundamental substance; gélose; jelly; vegetable jelly. *Tomkeieff, 1954* b. Same as ulmins. *A.G.I.*

carbohydrate. Any of a group of neutral compounds composed of carbon, hydrogen. and oxygen including the sugars, starches dextrans, glycogens, celluloses, and pentosans, some of which are formed by all green plants and used immediately for growth or stored for future use and which as a whole constitute a major class of animal foods characterized chemically as hydroxy aldehydes or ketones and classified into monosaccharides, disaccharides, trisaccharides, and polysaccharides on the basis of the number of aldehyde or ketone groups present in one molecule. *Webster 3d.*

carboid. A name applied to the group of pyrobitumens insoluble in carbon disulfide. *Tomkeieff, 1954.*

carbolic. a. Of, pertaining to, or derived from carbon and oil; of or pertaining to coal-tar oil. *Standard, 1964.* b. Of or pertaining to carbolic acid. *Hess.*

carbolic acid. White; crystalline; deliquescent; $C_6H_5.OH$; a burning taste; and an odor resembling that of creosote. Contained in the heavy oil of coal tar, from which it is distilled at between 165° and 190° C. It is a caustic poison. Antidotes are epsom salts, alcohol, and heat. *Standard, 1964.*

carbolite. A byproduct in iron smelting, consisting of calcium-aluminum silicon carbide, and used as a substitute for calcium carbide. *Standard, 1964.*

Carbolon. *See* carbolite.

Carboloy. A trademark for a hard metallic substance. Used especially for making cutting tools. Produced by sintering a cemented carbide, usually of tungsten, with cobalt or nickel. *Webster 3d.*

carboloy-set. Diamonds inset in pressure-molded and sintered matrix metal composed of a cobalt-bonded, powdered tungsten carbide mixed with varying amounts of other powdered metals, such as iron, nickel, copper, or zinc. *See also* Carboloy. *Long.*

Carbolux. Trade name for a free-burning coke made at medium temperatures, 680° to 720° C. *Ind. & Eng. Chem., v. 11, News Ed. Dec. 10, 1933, p. 342.*

carboman. *See* stone molder. *D.O.T. 1.*

carbon. a. A nonmetallic, chiefly tetravalent element, occurring native in two crystal systems, as diamond (isometric) and as graphite (hexagonal); also occurring as a constituent of coal, petroleum, and asphalt, of limestone and other carbonates, and of all organic compounds; and also obtained artificially in varying degrees of purity. Symbol, C; valences, 2, 3, and 4; atomic number, 6; atomic weight, 12.011; sublimes, above 3,500° C; and boiling point, 4,827° C. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-105.* Its low neutron-capture cross section and low atomic weight make it valuable as a moderator. The artificially produced isotope, carbon 14, is radioactive and is used as a tracer in biological and organic chemical research. *NRC-ASA N1.1-1957. See also* radiocarbon; radioactive dating. b. Rand term for thucolite in banket ore. *Pryor, 3.* c. A gray-to-black, opaque, tough, hard cryptocrystalline aggregate of diamond crystals occurring in irregular shapes and sizes. It is classed as an industrial diamond and formerly was used extensively as a cutting-medium inset in diamond-drill bits. More recently, only occasionally used in diamond bits and other tools. Also called black diamond; carbonado. *See also* diamond. *Long.*

carbona. a. Corn. An irregular deposit or impregnation of tin ore found in connection with a tin lode. *Arkell.* b. Corn. A large mass of rich ore sometimes called a house. *Arkell.*

carbonaceous. a. Coaly, containing carbon or coal, especially shale or other rock containing small particles of carbon distributed throughout the whole mass. *Fay* b. Carbonaceous sediments include original organic tissues and subsequently produced derivatives of which the composition is organic chemically. *A.G.I.*

carbonaceous coal. Coal in composition intermediate between a metabituminous coal and anthracite. *Tomkeieff, 1954.*

carbonaceous rock. A sedimentary rock that contains plant and animal residues and products regardless of whether they were original constituents or were subsequently introduced. The carbon may be contained in chemical derivatives greatly altered from the original organic form. As thus defined, carbonaceous sedimentary rocks include the coal series, sapropel, black shale, oil shale, oil and asphalt, and mixtures and intergradations of these together with rocks containing these materials in appreciable quantities. *Stokes and Varnes, 1955.*

carbonaceous shale. A dark-colored shale containing carbonaceous matter. *Tomkeieff, 1954 See also* bat; clod.

carbonado. Cryptocrystalline material composed of diamond. It is compact, opaque, dark gray to black, lacking cleavage planes and very tough. Usually occurs in rounded masses, but is also found in angular broken pieces. Principal source is the State of Bahia, Brazil, but it occurs occasionally elsewhere in South America and in Africa. It was formerly in demand for diamond-drill bits. *I.C. 8200, 1964, p. 149.*

carbonado bit. Synonym for carbon bit. *Long.*

carbon arc cutting. Metal cutting by melting with the heat of an arc between a carbon electrode and the base metal. *ASM Gloss.*

carbon arc welding. Welding in which an arc is maintained between a nonconsumable carbon electrode and the work. *ASM Gloss.*

carbonate. a. A compound containing the acid radical (CO_3) of carbonic acid. Bases react with carbonic acid to form carbonates. *C.T.D.* Sometimes used as a synonym for calcareous; also, rarely, as a synonym for carbon. *Long.* d. Can. Rocks high in carbon dioxide, such as limestone, dolomite, etc. *Hoffman.*

carbonate apatite. A carbonate and phosphate of calcium, $3Ca_3P_20_8.CaCO_3$. A member of the apatite group containing the carbonate radical. Same as carbapatite; both names are best withdrawn in favor of dahllite or podolite. From Laacher district, Rhineland, Germany. *English.*

carbonate cyanotrichite. Pale blue fibrous aggregates, from northwest Kara-Tau, U.S.S.R., $Cu_4Al_2[(CO_3), (SO_4)] (OH)_{13}.2H_2O$, give x-ray powder data corresponding to cyanotrichite, but contain carbonate replacing a large proportion of the sulface. *Hey, M.M., 1964; Fleischer.*

carbonated spring. A spring of water containing dissolved carbon dioxide gas. They are very common especially in volcanic countries, and sometimes contain so much gas that if a little sugar is thrown into the water, it effervesces like soda water. *Fay.*

carbonated stone. An artificial stone in the manufacture of which steam and carbon dioxide are used to hasten hardening. *Standard, 1964.*

carbonate hardness. Hardness in a water caused by bicarbonates and carbonates of calcium and magnesium. *ASTM STP No. 148-D.*

carbonate leach. a. Metallurgical process for dissolution of uranium values by means of a sodium carbonate solution. Used on Todilto limestone and other high-lime ores. *Ballard.* b. Dissolution of uranium with an aqueous solution of sodium carbonate in the presence of sufficient oxygen to render uranium hexavalent and satisfy the equation $2U_3O_8+O_2+18Na_2CO_3+6H_2O6Na_4UO_2(CO_3)_3+12NaOH$. *Pryor, 3.*

carbonate mineral. A mineral formed by the combination of the complex ion $(CO_3)^{2-}$ with a positive ion. Common example: calcite, $CaCO_3$. *Leet.*

carbonate of barium. *See* witherite. *Fay.*

carbonate of calcium. *See* calcium carbonate; calcite. *Fay.*

carbonate of strontium. *See* strontianite. *Fay.*

carbonate rock. Limestone, magnesian limestone, dolomite, or magnesite. *Bateman.*

carbonates. a. Ores containing a considerable proportion of lead carbonate, often rich in silver. *Fay.* b. Salts of carbonic acid, H_2CO_3. *Henderson.* c. Eng. Carbonado. *Hess.*

carbonation. a. The process of introducing carbon dioxide into a fluid. *A.G.I.* b. A process of chemical weathering by which minerals that contain lime, soda, potash, or other basic oxides are converted to carbonates by the action of carbonic acid in water or air. *A.G.I.*

carbonatite. a. A high-carbonate rock derived from hot magmatic fluids. *A.G.I. Supp.* b. A sedimentary carbonate rock; synonym for limestone; dolomite. *A.G.I. Supp.*

carbon bit. A diamond bit in which the cutting medium is inset carbon. *Long.*

carbon black. A trade name for the finely divided carbon produced from burning hydrocarbons, such as mineral oils, in conditions where combustion is incomplete. *See also* gas black; lampblack. *C.T.D.*

carbon brick. Brick usually made from crushed coke, bonded with pitch or tar. *Bureau of Mines Staff.*

carbon-ceramic refractory. A manufactured refractory comprised of carbon (including graphite) and one or more ceramic materials such as fire clay and silicon carbide. *HW.*

carbon deposition. The deposition of amorphous carbon, resulting from the decomposition of carbon monoxide gas into carbon dioxide and carbon within a critical temperature range. When deposited within the pores of a refractory brick, the carbon may build up such pressure that it destroys the bond and causes the brick to disintegrate. *HW.*

carbon dioxide; carbonic-acid gas; dry ice. a. Heavy, colorless; irrespirable gas; CO_2; it extinguishes a flame. It is formed in mine explosions and in mine fires and forms part of the afterdamp. *Fay.* b. Product of complete combustion of carbon fuels. Transported in liquid form in steel cylinders. Used in gaseous form as a fire extinguisher and in solid form as dry ice. *Crispin.*

carbon dioxide blasting. A method of blasting coal that has been undercut, topcut, or sheared. Into one end of a seamless high-grade Mo-steel cylinder 2 to 3 inches in diameter and from 36 inches to 60 inches long is put a cartridge containing a mixture of potassium perchlorate and charcoal with an electric match. The other end is sealed by a metal disc weaker than the shell and held in place by a cap which has holes at about 45° to the axis of the cylinder. The cylinder is filled with liquid carbon dioxide at a pressure of 1,000 pounds per square inch and inserted in the borehole with the cap holes pointing outward. The heating mixture is lit and raises the gas pressure so that the disc is sheared; the carbon dioxide escaping through the angular holes tends to hold the cylinder in place, break and push the coal forward. If the gas pressure is not enough to break the coal, the cylinder, if not properly set, will be blown from the borehole. The cylinder can be used over and over. It is claimed that a greater portion of lump coal is obtained than with ordinary explosives. Some smelters loosen slag in the same way. *Hess.*

carbon dioxide gas fire extinguisher. A portable appliance for putting out mine fires. A charge of 2 to 15 pounds of carbon dioxide is stored under pressure in a steel container with a wheel or lever valve on top. Carbon dioxide is released as a mixture of gas and snow. This appliance must be recharged by the makers. *See also* fire extinguisher. *Nelson.*

carbon dioxide indicator. These indicators can determine the amount of carbon dioxide in the atmosphere of an enclosed place. The instrument is portable for use in possible field operations. Models vary in size depending on the operational range demanded. An aspirator bulb draws a test sample of air or flue gas into an absorption column. Carbon dioxide is absorbed by potassium hydroxide, and the reduction of air pressure is recorded on a manometer scale. *Bests, p. 584.*

carbon dioxide process. A method of bonding refractory grains by mixing them with a solution of sodium silicate, molding to the required shape and then exposing the shape to CO_2. The process was first mentioned in British Patent 15 619 (1898), but did not come into general use until about 1955, when it began to be employed in the bonding of foundry sands and cores. The process has been tried for bonding rammed linings in small ladles. *Dodd.*

carbon dioxide test. Same as dry ice test. *Shipley.*

carbon dioxide water fire extinguisher. A portable appliance for putting out mine fires. It consists of a copper-lined vessel containing water and a small copper cylinder of carbon dioxide, compressed to a pressure of 60 atmospheres. When the copper seal of the cylinder is broken, the pressure of the gas released expels a jet of water a distance of about 40 feet. This appliance is now preferred to the soda acid type. *See also* fire extinguisher. *Nelson.*

carbon disulfide; carbon bisulfide. CS_2; when pure, a colorless, volatile liquid; an unpleasant garlicky odor. Used as a solvent for sulfur, phosphorus, iodine, bromide, camphor, gums, resins, waxes, and fats. *Crispin.*

carbon electrode. A nonfiller-metal electrode, used in arc welding, consisting of a carbon or graphite rod. *Coal Age, v. 66, No. 3, Mar. 1961, p. 91.*

carbonet. *See* briquette, a. *Fay.*

carbon flame. The white flame produced by burning carbon. *Webster 3d.*

carbon fleck. *See* carbon spot. *Long.*

carbon 14. a. A radioactive isotope of carbon having the atomic weight of 14 and that is produced by collisions between neutrons and atmospheric nitrogen. Useful in determining the age of carbonaceous matrial younger than 30,000 years old. The half-life is 5,700 years. *A.G.I.; A.G.I. Supp.* b. The half-life of carbon 14 has also been determined to be 5,400 years and 5,568 years. *Bureau of Mines Staff.*

carbon-14 dating. A method of determining the age of an artifact by means of measuring the rate of radiation of the carbon isotope carbon 14 present in all organic matter. The so-called half-life of carbon 14 has been determined at 5,568 years. If, for example, a piece of charcoal gives off radiation at half the rate of a modern piece of charcoal, it is 5,568 years old. An object giving off a different rate can be dated by interpolation on the radiation scale. *Sandstrom.*

carbon-free. Refers to metals and alloys which are practically free from carbon. *Hess.*

carbon-hydrogen ratio; C/H ratio. A method of classifying coals by determining the ratio which exists between the carbon and hydrogen present in them. Thus, if a given coal contains 80 percent carbon and 5 percent hydrogen, the carbon-hydrogen ratio would be 80 to 5 or 16. Bituminous coals have a carbon-hydrogen ratio between 14 and 17 and most antharcites between 24 and 29. *See also* anthracite. *Nelson.*

carbonic-acid gas. *See* carbon dioxide. *Webster 3d.*

carbonicola. A Coal Measures' freshwater Shell in which the umbones are positioned at some distance from the anterior end of the shell. A fossil used for the correlation of coal seams. *See also* Mollusca. *Nelson.*

carbonic-oxide gas. *See* carbon monoxide. *Fay.*

Carboniferous. a. Period or system of the Paleozoic era, younger than Devonian and older than Permian; equivalent to the combined Mississippian and Pennsylvanian periods. *A.G.I. Supp.* b. Formerly considered by the U.S. Geological Survey to be the youngest Paleozoic division consisting of Mississippian, Pennsylvanian, and Permian. Obsolete. *A.G.I. Supp.*

Carboniferous limestone. The earliest or oldest rocks of the Carboniferous system and usually form the base of the coalfields. In most areas, these rocks consist of limestone, often crowded with marine fossils (corals, brachiopods, and molluscs), but in some areas the rocks include shales and sandstones, and in Scotland and Northumberland, England, workable coal seams. *Nelson.*

carbonification; coalification. Carbonification is the process by which the vegetable substances of peat were transformed in the partial absence of air, and under the influence of temperature and pressure throughout geological time into lignite and subsequently into coal. *IHCP, 1963, part I.*

carbonite. a. A native coke, occurring at the Edgehill mines, near Richmond, Va.; it is more compact than artificial coke and some varieties afford bitumen. *Fay.* b. Coal altered by an igneous intrustion. *Tomkeieff 1954.* c. Fossil coal. *Tomkeieff, 1954.* d. Very brittle, black variety of bitumen, infusible and insoluble in organic solvents, containing about 85 percent carbon and 6 percent hydrogen. *Tomkeieff, 1954.* e. A permissible explosive. *Fay.*

carbonitriding. Introducing carbon and nitrogen into a solid ferrous alloy by holding above Ac_1 in an atmosphere that contains suitable gases such as hydrocarbons, carbon monoxide, and ammonia. The carbonitrided alloy is usually quench-hardened. *ASM Gloss.*

carbonization. a. In the coalification process, carbonization characterizes the progressive changes undergone by the preserved organic matter and the biochemical decomposition products between the death of the plant or animal and the stage of essentially complete reduction to residual carbon, in situ. *A.G.I.* b. The slow decay under water of organic material, plant or animal, resulting in a concentration of carbon as a film of carbon showing more or less distinctly the form and structure of the original tissue. *A.G.I.* c. The process of decomposing a nonvolatile carbonaceous substance, usually coal, into solid, liquid, and gaseous products, by heating in a reducing atmosphere. *B.S. 3323, 1960.*

carbonization of coal. There are two principal means of carbonizing coal. The first, carbonization at low temperatures, has been defined as the heat treatment of coal in the absence of air at temperatures of 450° to 700° C., while the second, high-temperature carbonization, is the heat treatment of coal at temperatures of 900° to 1,200° C. *Mitchell, p. 49.*

carbonized. Converted into carbon. *Fay.*

carbonizing. The reduction of a substance to carbon by subjecting it to intense heat in a closed vessel. *Crispin.*

Carbon J. Coal tar pitch. *Bennett 2d, 1962 Add.*

carbon knock. A knock or pounding in a gage or gasoline engine by carbon deposits in the cylinders. The heated carbon causes the fuel to detonate or explode and also causes "preignition", that is, it ignites the fuel before the end of the compression stroke. *Porter.*

carbon man. A laborer who replaces carbon anodes, and adjusts electrical conductors during electrolytic refining of magnesium. *D.O.T Supp.*

carbon minerals. Carbon forms with oxygen and hydrogen many series of compounds, which occur naturally as bitumens and petroleums. Amorphous carbon enters largely into the composition of coals. In their approximate order of age, the carbon minerals are petroleum, asphalts, peats, brown coals, bituminous coals, anthracites, graphite, and the diamonds (the oldest). *Nelson.*

carbon monoxide; carbonic-acid gas. Colorless; odorless; very toxic gas; CO; that burns to carbon dioxide with a blue flame. Formed as a product of the incomplete combustion of carbon (as in water gas and producer gas; in the exhaust gases from internal-combustion engines; and in the gases from the detonation of explosives). Used chiefly in the synthesis of carbonyls (as nickel carbonyl in the refining of nickel), phosgene, and many organic compounds (as hydrocarbons for fuels, methanal and higher alcohols, aldehydes, and formates). *Webster 3d.* Four parts of carbon monoxide in 10,000 parts of air is about the limit a man can stand for 1 hour. This gas is formed during mine fires and after explosions; in automobile exhaust; and in gas stoves. *von Bernewitz.*

carbon monoxide asphyxia. Underground workers who survive the initial effects of a mine fire or explosion are usually affected in some degree, by carbon monoxide asphyxia. Carbon monoxide causes asphyxia because it combines with the hemoglobin of the blood much more readily than oxygen does, and the hemoglobin therefore carry less and less oxygen from the lungs to the body. The correct treatment of carbon monoxide asphyxia is to remove the carbon monoxide from the blood by inducing deep breathing of pure oxygen. *McAdam, p. 98.*

carbon monoxide detectors. A very satisfactory means of indicating carbon monoxide content is afforded by the colorimetric detector. Grab samples are taken as an aspirator bulb is squeezed. It is replacing the older and similar, but less sensitive, Hoolamite type. A direct-reading scale and greater accuracy are provided by the Hopcalite instrument, a continuous-type sampler employing an air pump. The development of satisfactory detectors has been a major factor in reducing deaths due to carbon monoxide poisoning in mines. *Hartman, p. 30. See also* P.S. carbon monoxide detector; M.S.A. carbon monoxide detector. *McAdam, pp. 153-156.*

carbon monoxide disintegration. The breakdown of refractory materials that sometimes occurs (particularly with fireclay refractories) when they are exposed, within the temperature range 400° to 600° C, to an atmosphere rich in carbon monoxide. The disintegration is due to the deposition of carbon around iron spots in the brick, following the well-known dissociation reaction: $2CO \approx CO_2 + C$. *Dodd.*

carbon monoxide filter. Any filter designed to remove poisonous carbon monoxide gas from the air to be breathed before it enters the lungs. If sufficient oxygen is present to keep an oil safety lamp alight, the filter will give adequate protection against carbon monoxide or other poisonous gases produced by colliery explosions, mine fires, or other means. Two main types are available: (1) mining gas masks, and (2) self-rescuers. *McAdam, p. 59.*

carbon monoxide monitor. An automatic system for detecting and controlling concentrations of carbon monoxide. A typical installation includes automatic air intake tubes that feed air samples through a filter to an analyzer cell, where the carbon monoxide concentration is indicated on a permanent graph. Available with alarm attachments. *Bests, p. 584.*

carbon monoxide poisoning. In diving this type of accident usually occurs as a result of contamination of the diver's air supply by exhaust gases from an internal-combustion engine. *H&G. See also* carbon monoxide asphyxia. *McAdam, p. 152.*

Carbon oil. Trade name for kerosine. *Fay.*

carbonolite. Proposed by Wadsworth for carbonaceous rocks. *Fay.*

carbon ratio. a. The fixed carbon percentage in pure coal. *Tomkeieff, 1954.* b. The ratio of the fixed carbon in any coal to the fixed carbon plus the volatile hydrocarbons; expressed in percentage. *A.G.I.* c. The ratio of the most common carbon isotope (C^{12}) to either of the less common carbon isotopes (C^{13} or C^{14}), or the reciprocal of one of these ratios. If unspecified, the term generally refers to the ratio C^{12} to C^{13} *A.G.I.*

carbon refractory. A manufactured refractory comprised substantially or entirely of carbon (including graphite). *HW.*

carbon-set bit. Synonym for carbon bit. *Long.*

carbon silicide. *See* silicon carbide.

carbon spot. Black fleck or flakelike nondiamond form of carbon inclusion in a diamond crystal. *Long.*

carbon steel. Steel containing carbon up to about 2 percent and only residual quantities of other elements except those added for deoxidation, with silicon usually limited to 0.60 percent and manganese to about 1.65 percent. Also called plain carbon steel; ordinary steel; straight carbon steel. *ASM Gloss.*

carbon test, color. An approximate determination of carbon by comparing the color of a fluid with the color of a standard solution. It is more rapid than the combustion method. *Porter.*

carbon tetrachloride. Liquid; CCl_4; strong pungent odor; and is nonflammable. Used for fire extinguishers; as a solvent for oils and fats; and can be used to test activated charcoal. *Hess.*

carbon trash. Carbon remains of plant life found in sedimentary strata and often associated with uranium mineralization. *Ballard.*

carbon tube. A cylindrical glass vessel used in the calorimetric determination of carbon in steel. *Webster 2d. See also* combustion tube. *Fay.*

carbonyl powder. In powder metallurgy, a metal powder prepared by the thermal decomposition of a metal carbonyl. *ASM Gloss.* Usually referred to by the name of the metal, for instance, carbonyl iron. *Bureau of Mines Staff.*

Carbopermian. Permocarboniferous. *A.G.I. Supp.*

carbopyrite. This term was introduced by V. Hevia in 1960 to designate a microlithotype containing 5 to 20 percent by volume of iron disulfide (pyrite, marcasite and melnikovite) and was adopted in 1962 by the Nomenclature Subcommittee of the International Committee for Coal Petrology. Carbopyrite is widely distributed in quantities which vary considerably. It is generally particularly abundant in seam having a marine roof and such occurrences are sometimes useful in seam identification and correlation. In coal preparation practice carbopyrite, like carbargilite and carbankerite, falls into the category of true intergrown coal, the pyrites being so intimately associated with the coal that it is generally impossible to free it by crushing. As an exception to this, pyrite occurring in fine hair cracks is freed to some extent by crushing and appears in the prepared coal as minute spangles. In the normal course of coal preparation carbopyrite remains in middlings, and, as a result, is a common constituent of steam raising coals. High sulfur in such coals furthers both the format of deposits on, as well as corrosion of, the heating surfaces. In addition it raises the SO_2 and SO_3 content of the flue gases. *IHCP, 1963, part I.*

Carborundum. Trade name for green, often iridescent, artificial carbon silicide, CSi. Hexagonal-rhomohedral plates. It is produced in an electric furnace and used as an abrasive and as a refractory material. Is useful for sharpening tools. Identical with moissanite. *Webster 2d; English.*

carborundum machine. A machine provided with carborundum wheels designed to cut moldings, cornices, balusters, etc., from stone. *Fay.*

carbosand. Fine sand that has been treated with an organic solution and roasted in order to produce a material that can be sprayed onto oil slicks and aid in sinking such slicks, thereby destroying the fire hazard occasioned by the presence of oil on water. *CCD 6d, 1961.*

carboxy; carboxyl. a. Monovalent, COOH acetic group. *Pryor, 3.* b. Carboxylic acid has general formula $R-(COOH)_n$. *Pryor, 3.*

carboxyl. *See* carboxy. *Pryor, 3.*

carboxylic acid method. In flotation, a method for treatment of various oxygen ores using carboxylic acids as collectors with gangue depressants to float base-metal minerals from associated impurities. The process is suitable for the carbonates or oxides of lead, copper, or zinc, somewhat less useful with other lead minerals and with hemimorphite, and unsuitable for chrysocolla. *Gaudin, 2, pp. 462, 464.*

carboxymethylcellulose; CMC. An organic compound that finds use in the ceramic industry as an additive to glazes and engobes to prevent friability before the coating is fired; carboxymethylcellulose (CMC) has been added to vitreous-enamel slips to prevent settling. *Dodd.*

carboy. a. A wax bottle in which hydrofluoric acid is stored and transported. *Long.* b. A large glass bottle enclosed in a box or in wickerwork, used mainly as a container in which corrosive acids are transported and/or stored. *Long.*

carbozite. A black liquid, made from a bituminous ore, used for the protection of steel surfaces during transport and storage. This fluid dries rapidly to a hard gloss, which is resistant to acids, alkalies, moisture, sea air, and temeperatures up to 200° C. *Osborne.*

car builder. In bituminous coal mining, one who shapes and welds together angle iron to make the body framework and undercarriages of mine cars. *D.O.T. 1.*

carbuncle. A gem of a deep-red color, inclining to scarlet, found chiefly in the East Indies. When held up to the sun it loses its deep tinge and becomes the color of burning coal. Formerly believed to be capable of shining in darkness. A variety of garnet, though the name includes also the ruby and the spinel. *Fay.*

carburan. a. A hydrocarbon related to, or identical with, thucholite, the ash of which contains uranium, lead, and iron. *Tomkeieff, 1954.* b. A variety of anthraxolite, from pegmatites of Karelia, Karelo-Finnish S.S.R. *Crosby, p. 66.*

carburet. a. Carbide. *Webster 3d.* b. To combine chemically with carbon. *Webster 3d.* c. To enrich (a gas) by mixing with volatile carbon compounds (as hydrocarbons). *See also* carbureted water gas. *Webster 3d.*

carbureted hydrogen. An odorless, flammable gas, CH_4. Known in coal mines as firedamp or gas. *See also* methane. *Nelson.*

carbureted water gas. A fuel gas formed by decomposing steam with hot coke, and mixing this gas with oil vapor. *Bureau of Mines Staff.*

carburetor. a. A device used on gasoline engines, and some kerosine engines, for carbureting air with gasoline or kerosine vapor. *Porter.* b. The chamber of a water-gas plant, lined with refractory material and often filled with checkers on which oil is sprayed to enrich the gas. *Compare* superheater, b. *Dodd.*

carburization. The process of imparting carbon, as in making cement steel. *Fay.*

carburizing; casehardening. Hard-surfacing of steel by heating above critical temperature in inert atmosphere with source of carbon (for example, cyanide salts), thus forming a cementite casing above a tough core (which has already been machined). *Pryor, 3.*

carburizing flame. A gas flame which will introduce carbon into some heated metals as during a gas welding operation. A carburizing flame is a reducing flame, but a reducing flame is not necessarily a carburizing flame. *ASM Gloss.*

carcass. The tension-carrying portion of the conveyor belt. It may be comprised of multiple plies of fabric or cord, simple layers of cord or steel cable, bonded together with rubber friction. *See also* rubber conveyor belt. *ASA MH4.1-1958.*

car chalker. In bituminous coal mining, a laborer who chalks on car number of room or working place from which coal is obtained in order that a production record of all parts of mine can be maintained. *D.O.T. 1.*

car-changing system. The arrangement in a tunnel for changing cars at the face. It may consist of a hand-operated traverser or some form of portable crossing from the full to the empty rail track. In high-speed tunneling, a small locomotive is often used to link the tunnel haulage with the main or outbye haulage. *See also* cherry picker; double-track portable switch. *Nelson.*

car cleaner. In anthracite and bituminous coal mining, a laborer who cleans mine (pit) cars, in which coal is transported, by shoveling out the fine coal and dust left in the bottom and scraping the dirt and dust from the outside of the cars. May be designated as railroad-car cleaner at bituminous mines. Also called pit-car cleaner. *D.O.T. 1.*

car coupler. *See* coupler. *D.O.T. 1.*

car cutter. In metal and nonmetal mining, one who uncouples one or more loaded mine cars from a train and pushes them onto a rotary dumper on which cars are turned over to dump ore into storage bins underground or at the surface. *D.O.T. 1.*

card concentrator. A table made of two planes having a flexible joint between them dividing the table into two nearly equal triangles, forming a diagonal line along which concentrates separate from the tailings. *Liddell, 2d, p. 386.*

cardenite. A trioctahedral montmorillonoid derived from biotite in soil-clay at Carden Wood, Aberdeenshire, Scotland. A mixed alteration product previously described without name by G. F. Walker. *Spencer 20, M.M., 1955.*

Carder tunnel kiln. A tunnel-kiln designed in about 1928 by Carder and Sons, Brierley Hill, England, for the firing of stoneware at 1,200° C. *Dodd.*

cardiglio marble. It. A gray, clouded marble obtained for ornamental purposes from Corsica. *Fay.*

cardinal point. a. One of the four points spaced at 90° intervals around the face or wall of a bit. *Long.* b. Any one of the four principal compass points, such as North, South, East, and West. *Long.* c. Depending on the type of winding drum employed, a change in the speed of the winding ropes occurs at certain definite intervals during the winding cycle. These change-of-speed points are known as the cardinal points of the winding cycle. *Sinclair, V, p. 151.*

car dispatcher. *See* motor boss. *D.O.T. 1.*

car distributor. *See* motor boss. *D.O.T. 1.*

Cardox. Trade name for an explosive device used principally in coal mining. *See also* carbon dioxide blasting. *Bureau of Mines Staff.*

Cardox-Hardsocg auger. Trade name for a track-mounted coal auger capable of drilling and extracting coal up to about 30 inches in diameter and about 100 feet in length. The frame is located to one side of the auger section to reduce height and the direction of drilling can be reversed without moving. The auger is extended in 6-foot section. *Nelson.*

cardoxide. A baked mixtures of caustic soda and lime, used in the container or regenerator of self-contained mine-rescue or oxygen-breathing apparatus to absorb the exhaled carbon dioxide. It has the advantage over straight caustic soda in that it does not cake, liquefy, or solidify when used. *Lewis, p. 760.*

Cardox-plant operator. In bituminous coal mining, one who recharges steel shells (tubes) known by the trade name Cardox with metal shearing disks, electrical firing elements, and liquid carbon dioxide to prepare them for blasting coal. *D.O.T. 1.*

Cardox shell. Steel shell used to contain carbon dioxide in the Cardox blasting method. *See also* carbon dioxide blasting. *Bureau of Mines Staff.*

car drier. A drier in which ware is transported on cars. *ACSG, 1963.*

car dropper. a. A mine employee who controls the movement of cars to the dump. *Grove.* b. In metal and nonmetal mining, a laborer who runs cars down inclined haulageways, either pushing the cars down the incline one at a time, or hooking a cable to the cars and lowering them down the incline. Also called dropper; load dropper. *D.O.T. 1.*

card table. A shaking table with a grooved deck instead of nailed-on riffles. Used in gravity concentration of sands. *Pryor, 3.*

card tender. In the asbestos products industry, one who tends carding machine that cleans asbestos, cotton, or other fibers; arranges fibers parallel, and transforms them from a roll or lap into a ropelike untwisted strand of cotton (sliver). Also called allye tender; card feeder; card hand; card operator; winder. *D.O.T. 1.*

car dump. A tipple. *Nelson.*

car dumper. a. A mechanical device for tilting a railroad hopper or gondola car over sidewise and emptying its contents. *Fay.* b. A person who unloads cars by upending or overturning them. *Bureau of Mines Staff.*

card weight pipe. A term used to designate standard or full weight pipe, which is the Briggs standard thickness of pipe. *Strock, 3.*

car feeder. *See* car-haul man. *D.O.T. 1.*

car filler. *See* mucker, g. *D.O.T. 1.*

cargo inspector. In petroleum production and refining, one who inspects and gages crude and refined petroleum for presence of foreign substances before and after transfer from terminal tanks to ship tanks. *D.O.T. 1.*

car handler. *See* carman. *D.O.T. 1.*

car haul. A pusher chain conveyor used for moving small cars, such as mine cars, along a track. A form of tow conveyor. *See also* pusher chain conveyor. *ASA MH4.1-1958.*

car-haul man. In bituminous coal mining, one who operates the motor that drives a car haul (endless chain or cable) to which mine cars are clipped to convey them over the weighbridge on the approach to the tipple or onto the cage at the shaft bottom. Also called car feeder; feeder; feeder chainman. *D.O.T. 1.*

car hooker. *See* coupler. *D.O.T. 1.*

caries texture. A texture in ores where the contact has alternating embayments. *A.G.I.*

carinate fold. In geology, an isoclinal fold. *Standard, 1964. See also* isoclinal. *Fay.*

car inspector. In bituminous coal mining, one who examines mine cars for defective bodies, framework, undercarriages, or wheels. *D.O.T. 1.*

Carinthian furnace. a. A small reverberatory furnace with an inclined hearth, in which lead ore is treated by roasting and reaction, wood being the usual fuel. *Fay.* b. A zinc distillation furnace with small, vertical retorts. *Fay.*

Carinthian process. A metallurgical method for treating lead ore, the characteristics of which are the smallness of the charge, the slow roasting, so that for every part of lead sulfide 1 part of sulfate and at least 2 parts of oxide are formed, the low temperature at which all of the operations are carried on, and the aim to extract all the lead in the reverberatory. The hearth is inclined toward the flue and the lead is collected outside the furnace. *Fay.*

carious. Decayed, irregularly weathered. *Challinor.*

car loader. a. *See* loader, c; chute loader, b. *D.O.T. 1.* b. *See* boxcar loader; loading conveyor. *ASA MH4.1-1958.*

Carlsbad twin; Karlsbad twin. a. A twin in the monoclinic system with the vertical axis as the twinning axis. *Fay.* b. A twinned crystal in which the twinning axis is the c axis, the operation is a rotation of 180 degrees, and the contact surface is parallel to the side pinacoid; common in the alkali feldspars. *A.G.I.*

Carlson compass. A borehole-surveying device consisting of a gimbal-mounted open frame, rigidly enclosing a graduated circle inside of which is a gimbal-mounted compass. This assemblage, inserted in a glass tube filled with a melted gelatin mixture, is placed inside a tightly sealed brass tube or clinometer. When the tube is lowered into, and suspended at a point in a borehole for a suffiicent length of time to allow the gelatin to set or jell, the position of the gimbal parts becomes fixed in the solidified gelatin, thereby providing a means whereby the compass course and inclination of the borehole at a specific point may be determined. *Compare* Maas borehole compass. *Long.*

carlton shape. A teacup, the top half of which is cylindrical, the bottom half being approximately hemispherical but termination in a broad, shallow foot. *Dodd.*

carman. a. In anthracite and bituminous coal mining, a worker who handles mine or railroad cars underground or at the surface of a mine. May be designated according to job, as brakeman; car cleaner; car pincher; car runner; pusher. Also called car handler. *D.O.T. 1.* b. In the quarry industry, a laborer who hooks chain couplings together to form trains of cars loaded with rock, that are hauled up an incline and automatically dumped. *D.O.T. 1.*

Carman equation. A relationship, derived from Kozeny's equation, permitting determination of the specific surface, S, of a powder from permeability measurements:

$$S = 14\sqrt{[p^3/KV(1-p^2)]}$$

where p is the porosity of the bed of powder, V is the kinematic viscosity of the flowing fluid, and K is a constant. In his original application of this equation, P. C. Carman used a simple apparatus in which liquids were used as permeating fluids. *Dodd.*

carmazul. Oxidized copper ore composed of jasper, vein quartz, hematite, chryscolla, and malachite, and showing red, brown, blue, and green colors. *Hess.*

carmeloite. Proposed by Lawson for a group of alkalic andesites at Carmelo Bay, Calif. The rocks have an unusually high content of soda and contain ubiquitous iddingsite. *A.G.I.*

carmentite. A variety of digenite. *Weed, 1918.*

Carmichel-Bradford process. *See* blast roasting. *Fay.*

carminite. A carmine to tile-red lead-iron-arsenate, perhaps $Pb_3As_2O_8{\cdot}10FeAsO_4$. Found in clusters of fine needles; also in spheroidal forms. *Fay.*

carn. Corn. Pile of stones acting as beacon. Also known as cairn; karn. *Pryor, 3.*

carnallite. A massive, granular, greasy, milk-white, soluble, hydrous, magnesium-potassium chloride, $KMgCl_3{\cdot}6H_2O$, crystallizing in the orthorhombic system; deliquescent. *Dana 17.*

carnallite plant operator. In ore dressing, smelting, and refining, one who makes carnallite flux used in magnesium refining, by weighing carnallite ingredients according to formula, and mixing them thoroughly, using a shovel. The mixture is then melted in a furnace crucible and poured into cooling pans. *D.O.T. 1.*

carnegieite. A feldspar sometimes known only as an artificial mineral, found in a cinder cone on the Island of Linosa, east of Tunis, north Africa; a polymer of nephelite, $Na_2O{\cdot}Al_2O_3{\cdot}2SiO_2$; triclinic at low temperatures; isometric at high temperatures. *English; Larsen, p. 154; Hey 2d, 1955.*

carnelian. Orange-red or red, brownish-orange, brownish-red, or brownish-yellow, translucent to semitranslucent variety of chalcedony. Less often yellow. It grades into the more brownish-red or brownish-yellow which is called sard. *See also* carnelian onyx. *Shipley.*

carnelian agate. Banded agate similar to carnelian onyx in coloring except bands are not straight and parallel. *Shipley.*

carnelian onyx. Onyx with alternating bands of white chalcedony and carnelian. Also, in a broader sense, any true onyx, one or more of the alternating bands of which are carnelian colors. Differs from sardonyx. *See also* carnelian agate. *Shipley.*

Carnian. Lower Upper Triassic. *A.G.I. Supp.*

car nipper. *See* car runner. *D.O.T. 1.*

Carnot cycle. An ideal heat engine cycle in which the working substance goes through the four successive operations of isothermal expansion to a desired point, adiabatic expansion to a desired point, isothermal compression, and adiabatic compression back to its initial state. *Webster 3d.*

carnotite. An orthorhombic mineral, $K_2(UO_2)_2(VO_4)_2{\cdot}3H_2O$; bright yellow to lemon- and greenish-yellow; strongly radioactive; ordinarily occurs in a mixture of carnotite and tyuyamunite; it is widespread in Colorado, Utah, New Mexico, and Arizona, where it occurs chiefly in cross-bedded sandstones of Triassic or Jurassic age, either disseminated or as relatively pure masses around petrified or carbonized vegetal matter. It is of a secondary origin, having been formed from the action of meteoric waters on preexisting uranium minerals. Used as a source of radium. Not to be confused with carnotite (silicocarnotite). *Crosby, pp. 11-12; Sanford.*

Carnotite region. The area in western Colorado, southeastern Utah, and the Carrizo Mountains of New Mexico and Arizona in which carnotite is found. *Hess.*

Carnot's function. A function of a temperature of a source of heat which occurs in the mathematical development of Carnot's principle. It is numerically equal to the reciprocal of this temperature on the absolute scale. *Webster 2d.*

carobbiite. Potassium fluoride, KF, with some NaCl, etc., NaCl structure. *Spencer 21, M.M., 1958.*

car oil. Black lubricating oils designated low cold test, black oil, etc. Car oils are usually black lubricating oils of the same general character as summer black oil. *Porter.*

Carolina stone. A China stone used to some extent in the United States pottery industry. *Dodd.*

carpenter, bank. In bituminous coal mining, one who works at the surface of a mine repairing mine car bodies, structures, bins, and other equipment. *D.O.T. 1.*

carpenter, car. In bituminous coal mining, one who builds and repairs the wooden bodies of mine cars. *D.O.T. 1.*

carpet. A bituminous surface of appreciable thickness, generally formed on top of a roadway by the application of one or more coats of bituminous material with gravel, sand, or stone chips added. Also called blanket. *Fay.*

carpholite. A yellow mineral crystallizing in orthorhombic laths elongated in direction of C, with prismatic cleavage at 68.5°; $MnO.Al_2O_3.2SiO_2.2H_2O$. *Larsen, p. 171.*

carphosiderite. A discredited term equal either to jarosite or natrojarosite. *American Mineralogist, v. 42, No. 7–8, July-August 1957, p. 586.*

car pincher. In anthracite, bituminous, and metal mining, a laborer who moves railroad cars into position directly under loading chutes at breaker or tipple, inserting pinch bar under car wheels and bearing down or pulling up on it to force car forward. Also called car shifter; car spotter; railroad-car shifter; spotter. *D.O.T. 1.*

car puller. *See* pusher. *D.O.T. 1.*

car pusher. *See* cars-to-drier man. *D.O.T. 1.*

carkquaise. An annealing arch for plate glass. *Standard, 1964.*

carr. Forest peat; wood peat. *Tomkeieff, 1954.*

carrack. Eng. *See* capel. *Fay.*

Carrara marble. Any of the marbles quarried near Carrara, Italy. The prevailing colors are white to bluish, or white with blue veins; a fine grade of statuary marble is included. *Fay.*

car retarder. a. An appliance for reducing or controlling the speed of mine cars. It may take the form of a creeper with horns which retract when the car may run freely and again tripped into the operating position at the beginning of a run. *See also* hydrabrake retarder. *Nelson.* b. A car retarder consists of a brakeshoe located along the track. On an electrical impulse, it is forced against both sides of the car wheels by compressed air. Control can be manual or automatic. Used to control the speed of railroad cars in industrial yards. *Bests,* *p. 371.*

carriage. a. A term used with shaker conveyor supports. Carriages may be designated as ball-frame, wheel, or roller carriages, depending on their construction. The carriage may or may not be attached solidly to the conveyor troughs. *Jones. See also* slope cage; carrigal. b. Same as cage. *Korson.* c. A sliding or rolling base or supporting frame. *Nichols.*

carriage bolt. An oval or buttonhead black bolt with square neck which prevents the bolt from turning while the nut is being tightened. *Crispin.*

carriage mounting. One or more rock drills mounted on a wheeled frame, used in tunneling. *Pryor, 3.*

carriageway. That part of a road which is designed for vehicular traffic. *Ham.*

Carribel explosive. A new permitted explosive of medium strength, and can be used in wet boreholes provided its immersion time does not exceed 2 to 3 hours. The maximum charge weight in British coal mines is 24 ounces and can be used for coal and ripping shots in conjunction with short-delay detonators. *Nelson.*

car rider. A brakeman or laborer employed to ride on a car to the dumper, or on cars pushed from cradle, to apply brake, and prevent hard bumping. A blast furnace term. *Fay.*

carried interest; revisionary interest. A working interest participation in producing property whereby the operator is reimbursed his investment out of oil before the recipient receives a percentage share of net income. *Wheeler.*

carrier. a. A rotating or sliding mounting or case. *Nichols.* b. Containers traveling on aerial ropeway. *Pryor, 3.* c. A substance, such as a catalyst, by means of which some element or group is transferred from one compound to another. *Webster 3d.* d. Electrons, electron holes, or positive and negative ions which are mobile under a potential gradient. *VV.*

carrier solvent. In uranium leaching, an inert organic liquid (for example, kerosine) in which the organic chemical used to extract uranium from aqueous liquor is dissolved. *Pryor, 3.*

carrier wave. The wave which is to be modulated. *NCB.*

carrigal. Scot. A wheeled bogie or platform for the conveyance of coal cars or tubs, in a level position, on a highly inclined roadway. *Fay.*

carrollite. A sulfide of cobalt, CO_2CuS_4, with small amounts of copper, iron, and nickel; crystallizes in the cubic system. *C.M.D.*

carrot. a. A misspelling of carat. *Long.* b. Sometimes used as a synonym for core, especially in England. *Long.*

carrousel. A four-wheeled bogie fitted with a rotating framework which carries two sets of stillages for the handling of bricks from a dryer to a Hoffman type of kiln. (Word is derived from the French word for merry-go-round.) *Dodd.*

carrousel conveyor. A continuous platform or series of spaced platforms which move in a circular horizontal path. The term carrousel has been applied to other forms of conveyors, such as car type and pallet type. *ASA MH4.1-1958.*

car runner. In anthracite and bituminous coal mining, a laborer who runs cars down inclined haulageways from working places to switches or sidings at the shaft or along main haulageways. He may be designated according to material hauled, as culm runner; rock car runner. Also called car dropper; car nipper; dropper; load dropper; mine-car dropper; runner. *D.O.T. 1.*

carry. a. Scot. The thickness of roof rock taken down in working a seam. *Fay.* b. The thickness of seam which can be conveniently taken down at one working. *Fay.*

carryall; carryall scraper; scraper. A self-loading carrier device with a scraperlike, retractable bottom usually self-propelled and used especially for excavating and hauling unconsolidated or crushed rock and earthy materials. *Bureau of Mines Staff.*

Carryall. Trade name for LeTourneau-Westinghouse scrapers. *Bureau of Mines Staff.*

carryall scraper. *See* carryall. *Bureau of Mines Staff.*

carry-in. Manual lehr loading. *ASTM C162-66.*

carrying bar. Eng. *See* carrying girder. *SMRB, Paper No. 61.*

carrying belt. a. The belt on which the coal or ore is transported to the discharge point. The carrying belt is the upper strand except in the case of a bottom belt conveyor. *Nelson.* b. The belt on the run which carries the load. *See also* carrying run. *ASA MH4.1-1958.*

carrying capacity. The greatest amount of electrical current that a conductor can safely carry, expressed in amperes. The various size wires, with their carrying capacities, are arranged in a table in the National Electrical Code. *Crispin.*

carrying gate. Derb. The main haulage road in a mine. *Fay.*

carrying girder; carrying bar. Eng. *See* crossing balk. Also called carrying set. *SMRB, Paper No. 61.*

carrying idler. a. In belt conveyors, the belt idlers upon which the load-carrying portion of belting is supported. *ASA MH4.1-1958.* b. In live roller conveyors, the rolls upon which the load is supported while being conveyed. *ASA MH4.1-1958.*

carrying-in boy. One who carries finished glassware in the lehr (oven). *D.O.T. 1.*

carrying roller. The conveyor roll upon which the conveyor belt or the object being transported is supported. *ASA MH4.1-1958.*

carrying run. That portion of the conveyor in or on which material is conveyed. *ASA MH4.1-1958.*

carry-off man. In the iron and steel industry, a laborer who unloads steel sheets from the pickling cradle machine carrier in which they are submerged in an acid bath for removal of scale and other impurities. Also called pickling unloader. *D.O.T. 1.*

carry-over. The unfused batch dust, blown into the exit passages and regenerators of a glass tank. *Bureau of Mines Staff.*

carse. A Scottish term applied to the flatlands in valleys. *Fay.*

car shifter. In the coke products industry, a laborer who shifts railroad cars in a cokeyard by inserting a pinchbar between the car wheel and the rail and depressing the pinchbar. *See also* car pincher; pusher, a. *D.O.T. 1.*

car slide. The ramped loading platform for a scraper loader. *Nelson.*

car spotter. A term used for the small hoist employed to haul a trip of empty cars under the loading end of a gathering conveyor or elevator. Also called tugger. *Jones. See also* car pincher.

cars-to-drier man. One who transports green clay products, stacked on handcars, to and from drying tunnel. Also called car pusher; drier man. *D.O.T. 1.*

carstone. Eng. Hard ferruginous sandstones of Lower Cretaceous age. *Arkell.*

car stop. A contrivance to arrest the movement of a mine car. At the top of incline haulages, wheel stopes, axle stops, or stop blocks may be used. At the top and bottom of shafts, automatic stops are often installed, the cars being released when the cage is in position to receive them. *Nelson.*

cart. a. Scot. A measure of 12 hundredweight of screened coal (but in practice varying from 12 to 15 hundredweight) by which miners were formerly paid. *Fay.* b. Som.; S. Wales. A tram with or without wheels for conveying coal underground in thin seams. *Fay.* c. In the United States, a two-wheeled vehicle for carrying heavy materials, or a lighter form for passenger use; in the British Isles and in parts of New England, it may have either two wheels or four wheels. *Hess.*

cart hand. *See* blunger loader. *D.O.T. 1.*

carting. Som. Hauling coal underground in thin seams. *Fay.*

carting boy. Eng. A boy who pushes or pulls carts of coal from the working face in thin coal seams. *C.T.D.*

cartographer. One who prepares maps from information supplied by a land surveyor. *Ham.*

cartographic. Of or pertaining to a map. A cartographic unit in geology is a rock or a group of rocks that is shown on a geologic map by a single color or pattern. *Fay.*

cartography. a. The science and art of expressing graphically, by means of maps and charts, the visible physical features of the earth's surface, both the natural and the manmade features. *A.G.I.* b. The science and art of map construction. *A.G.I.*

cartology. The mapping and drawing of longitudinal sections, measuring intervals, and plotting vertical sections of strata; used widely by mine surveyors for correlating coal seams. *See also* correlation. *Nelson.*

carton. A pasteboard box containing high explosives, blasting cap, or electric blasting caps, a number of which are packed in a wooden case for shipment. *Fay.*

cartop. The refractory surface of a tunnel kiln car. *ACSG, 1963.*

cartouche. An ornamental framework used in decoration sometimes enclosing an inscription or pictorial subject. *Haggar.*

cartridge. a. A cylindrical, waterproof, paper shell, filled with high explosive and closed at both ends. Used in blasting. *Fay.* b. Short cylinders (about 4 inches long and 2½ inches in diameter) of highly compressed caustic lime made with a groove along the side, used in breaking down coal. *See also* lime cartridge. *Fay.* c. A cylindrical, waterproof, paper shell filled with cement or other material used in plugging or sealing cavities or cavey ground encountered in drilling a borehole. *Long.* d. A small metal container about the size of a 12-gage shotgun shell, fitted with a screwcap. Formerly much used by a hand bit setter as a pocket-size diamond container. *Long.* e. A single pellet of explosive, which may be 4 or 8 ounces. The majority of shotholes require a number of cartridges to make up the exlosive charge. It is safer and more efficient to use the larger cartridges to reduce possible dirt gaps. Also called plug. *Nelson.*

cartridge brass. A copper-zinc alloy containing about 30 percent zinc, highly ductile. *Pryor, 3.*

cartridge fuse. A fuse enclosed in an insulating tube in order to confine the arc when the fuse blows. *Crispin.*

cartridge pin. A round stick of wood on which the paper tube for the blasting cartridge is formed. *Fay.*

cart trade. Som. *See* land sale, c. *Fay.*

car trimmer. A person who adjusts the load in a railroad car or mine car. *Fay.*

car-type conveyor. A series of cars attached to and propelled by an endless chain or other linkage running on a horizontal or slight incline. *ASA MH4.1-1958.*

car unloader. A form of portable drag-chain, belt, or flight conveyor which can be placed either beneath or over the railroad tracks for the purpose of handling bulk materials from hopper bottom cars. *See also* portable conveyor. *ASA MH4.1-1958.*

carver, machine. In the stonework industry, one who uses only pneumatic hammers and no handtools in the carving of designs and figures on the surface of granite or marble blocks and slabs. *D.O.T. 1.*

carving. a. Leic. A wedge-shaped vertical cut or cutting at the side of a stall. *Fay.* b. Leic. An airway between the solid and a pack wall. *Fay.*

carvoeira. A secondary igneous rock consisting of tourmaline and quartz. *Johannsen, v. 1, 2d, 1939, p. 246.*

car whacker. *See* mine-car repairman. *D.O.T. 1.*

Casagrande liquid limit apparatus. An appliance to determine the liquid limit of a soil. It consists of a brass dish, handle, and cam mounted on a hard rubber base. The dish falls through a distance of 1 centimeter per rotation. A sample of soil 1 centimeter thick is placed in the dish with a groove 11 millimeters wide at the top and 2 millimeters at the bottom. The number of jars required to cause the 2-millimeter gap to close along one-half of an inch is recorded. *Nelson.*

cascade. A process or apparatus, usually in separation or purification, in which materials are passed through a multiplicity of identical or similar relatively simple operations, in order to multiply the separation or other effect that is achieved in a single simple operation. An outstanding example is the Oak Ridge diffusion plant for separating uranium isotopes by passing uranium fluoride mixtures through an extended series of diffusion cells, each of which causes a slight enrichment of the desired isotope. An ordinary bubble plate distillation tower is a much more frequently encountered example. *CCD 6d, 1961.*

cascade coal dryer. A thermal process for drying fine coal. An example of this type is the Conreur dryer. Coal entering the top of the drying tower is carried down by a series of rollers, being permeated by an ascending stream of hot air. Fixed baffles direct the air to facilitate mingling The very finest particles may have to be recovered by dry filters or wet scrubbers. It treats coal with a top size ranging from one-fourth inch to 2 inches. *See also* fluidized bed dryer. *Nelson.*

cascade control. Externally impressed signal series which connects several controllers or resetting devices in series. *Pryor, 3, p. 31.*

cascade flotation cell. Elementary type of flotation cell, in which air is entrained by plunging cascade of pulp, mineralized bubbles being removed further downstream. *Pryor, 3.*

cascade sequence. A combined longitudinal and buildup sequence in which weld beads are deposited in overlapping layers, usually laid in a backstep sequence. *ASM Gloss.*

cascade upgrading. *See* countercurrent decantation. *Pryor, 3.*

Cascadian orogeny. Post-Tertiary diastrophism that uplifted the Cascade mountains of the Pacific Northwest. *A.G.I. Supp.*

cascading. Movement of crop load in ball mill rotating at such a speed that the balls breaking free at top of rising load roll quietly down to the toe of the charge. With increased peripheral speed, motion changes to turbulent cataracting and, still faster, to avalanching when upper layer of crushing bodies breaks clear and falls freely to top of crop load. *Pryor, 3.*

cascadite. A dark, biotite-olivine-augite dike rock with abundant phenocrysts of biotite and fewer phenocrysts of olivine and augite in a groundmass composed principally of alkali feldspar. *Holmes, 1928.*

case. a. A small fissure, admitting water into the mine workings. *Fay.* b. One of the frames, of four pieces of plank each, placed side by side to form a continuous lining in galleries run in loose earth. *Webster 2d.* c. To line a borehole with steel tubing, such as casing or pipe. *Long.* d. A wooden or pasteboard box in which dynamite, cartons, or boxes of blasting caps, or coils of fuse are transported and/or stored *Long.* e. In a ferrous alloy, the outer portion that has been made harder than the inner portion, or core, by casehardening *ASM Gloss.*

cased. a. A borehole lined with some form of steel tubing, such as casing or pipe. *See also* case in; case off. *Long.* b. Dynamite, cartons of blasting caps, or coils or fuse packed in wooden or pasteboard boxes. *Long.*

cased glass. Glassware with a superimposed layer of another glass having a different composition and usually colored. The thermal expansions of the two glasses must be carefully matched. *Compare* ply glass. *Dodd.*

cased off. *See* case off. *Long.*

cased tin. Eng. Fine tin ore that is retreated by a gentle current of water flowing over the frame or table. *Fay.*

casehardened. A term sometimes used for tempered glass. *See also* tempered glass. *ASTM C162-66.*

casehardening. a. The geological process by which the surface of a porous rock, especially a sandstone or a tuff, is coated by a cement or a desert varnish, formed by the evaporation of a mineral-bearing solution. *A.G.I.* b. Hardening a ferrous alloy so that the outer portion, or case, is made substantially harder than the inner portion, or core. Typical processes used for casehardening are carburizing, cyaniding, carbonitriding, nitriding, induction hardening, and flame hardening. *ASM Gloss.*

case in. Synonym for case, c. *Long.*

casein. An amorphous plastic made from the albumen of milk by treating milk with acid. Sometimes colored to imitate amber, agate, malachite, tortoise shell, ivory, and other decorative materials. Specific gravity, 1.3 to 1.4; refractive index, 1.55 to 1.56. *Shipley.*

casement wall. *See* breast wall. *Dodd.*

case mold. *See* mold. *Dodd.*

case off. To line a borehole with some form of steel tubing to prevent entry of broken rock materials, gas, or liquids into the borehole. Also called blank off; block off; case. *Long.*

caser. In petroleum production, a member of a crew of workers who run casing (pipes which prevent walls of the well from caving) into oil or gas wells or pull it from wells with a pulling machine, which is essentially a hydraulic jack. Casing crews work especially on cable drilling rigs where the regular drilling crew consists of only the cable driller and tooldresser. On rotary rigs the casing is usually run by the rotary driller and other crew members. Also called casing crew man; casing gang man; casing man. *D.O.T. 1.*

cases of spar. Eng. Intersecting veins of quartz. *Fay.*

cash. Som. Soft shale or bind in coal mines. *Fay.*

casher box. A metal box used to catch a glass bottle after it has been severed from the blowpipe in the old hand blown process. *Dodd.*

cashy blaes. Scot. Soft coaly blaes with little coherence. *Fay.*

casing. a. Pac. A zone of material altered by vein action and lying between the unaltered country rock and the vein. *Fay.* b. A local Ohio term applied to thin slabs of sandstone that split out between closely spaced joints. *Fay.* c. Special steel tubing welded or screwed together and lowered into a borehole to prevent entry of loose rock, gas, or liquid into the borehole or to prevent loss of circulation liquid into porous, cavernous, or crevassed ground. *Long.* d. Process of inserting casing in a borehole. *Long.* e. Piping used to support the sides of a borehole. Flush-coupled casing is joined with a coupling which has the same outside diameter as the casing, but has two male threaded ends. Flush-joint casing has a male thread at one end and a female thread at the other; no coupling is used. *B.S. 3618, sec. 3, 1963.* f. Corn. A partition of brattice, made of casing plank, in a shaft. *Fay.* g. A structure of wood, metal, or other material which completely encloses the elevating or conveying machinery elements to support them, to afford safety protection, to protect from the weather, or to confine dust, gases, or fumes arising from the material being conveyed; or to form a part of the conveyor in the same manner as a trough. *ASA MH4.1-1958.* h. Formwork for setting concrete. *Nelson.* i. Can. Steel pipe enclosing diamond drill rods. *Hoffman.* j. The steel lining of a circular shaft. *C.T.D.* k. The larger diameter pipe cemented in the hole, such as surface casing, protective casing, and production casing. *Wheeler.* l. A surface layer of glass of another color; also called flashing. *Haggar.* m. Those stationary parts of a fan which guide air to and from the impeller. *B.S. 3618, sec. 2, 1963.*

casing anchor packer. A type of packer that can be anchored within the casing. *Long.*

casing barrel. A joint of casing to which a casing bit and shell is attached and used like a core barrel. *Long.*

casing-barrel reaming shell. Synonym for casing reaming shell. *Long.*

casing bit. A diamond-set rotary bit designed to bore out an annulus slightly larger than the casing. It is withdrawn before the casing is inserted. *B.S. 3618, 1963, sec. 3.*

casing bowl and slips. Synonym for casing spider. *Long.*

casing catcher. A safety device equipped with slips or dogs to catch and grip casing if it is dropped while being lowered into or lifted from a borehole. Also miscalled tubing catcher; tubing hanger. *Long.*

casing clamp. A mechanical device designed to facilitate the hoisting or suspension of casing in a borehole. Made by forming a half circle in a heavy steel bar. When bolted together, in pairs, the bars fit around the outside and tightly grip the casing. Size of clamp is determined by outside diameter of the casing to be handled. *Long.*

casing collar kick. Magnetically induced signal produced during drilling as locator passes the collar, thus monitoring depth of drilling. *Pryor, 3.*

casing coupling. A short, threaded connector, usually pin threaded on both ends, by means of which two pieces of casings may be joined. *Long.*

casing crew man. *See* caser. *D.O.T. 1.*

casing cutter. A tool used to cut off a length of casing in a borehole at any desired point below the collar of the borehole. *Long.*

casing dog. a. A lifting device consisting of one or more serrated sliding wedges working inside a cone-shaped collar. Used to grip and hold casing while it is being raised or lowered into a borehole. *See also* bulldog, b. *Long.* b. A fishing tool. *See also* bulldog, c. *Long.*

casing drive hammer; drive hammer. A weight used to drive casing down a borehole. Also called monkey. *B.S. 3618, 1963, sec. 3.*

casing drivehead. A heavy steel bushing or swelled coupling screwed into the top of a string of casing. The device serves to protect the threads and acts as an anvil for the hammer when driving the casing. Also called casing head. *Long.*

casing drive shoe; drive shoe. A hardened steel shoe screwed to the lower end of the casing to protect the casing when it is driven down a hole by percussive means. *B.S. 3618, 1963, sec. 3.*

casing elevator. A circular clamp made in halves hinged at one end and closed fast with a latch at the other end. It is equipped with two long heavy chain links that furnish a means of hanging it on the hoist-line hook. Used to raise and lower collared casing or pipe. *Long.*

casing fitting. An accessory threaded to fit casing. *Compare* casing coupling. *Long.*

casing float. A rubber-ball-type check valve, generally placed near the bottom of a long string of casing. Its use reduces the load imposed on the hoisting mechanism in lowering casing into a wet borehole. Also called casing valve; float valve. *Long.*

casing, flush coupled. *See* flush-coupled casing. *Long.*

casing, flush joint. *See* flush-joint casing. *Long.*

casing head. a. Synonym for casing drivehead. *Long.* b. A fitting attached to top of casing on an oil well to separate oil from gas, to allow pumping and the cleaning of the borehole, etc. Also called Christmas tree. *Long.*

casing-head gas. Natural gas rich in oil vapors. So named as it is usually collected, or separated from the oil, at the casing head. Frequently called combination gas or wet gas. *Fay.*

casing-head gasoline. The liquid hydrocarbon recovered from casing-head gas by absorption, compression, or refrigeration. Also known as natural gasoline. *A.G.I.*

casing-head stuffing box. *See* stuffing box. *Long.*

casing hook. A hook connecting the hoisting block and line to the links of the casing elevator. *Long.*

casing, inserted-joint. *See* inserted-joint casing. *Long.*

casing, inside coupled. Synonym for flush-coupled casing. *Long.*

casing jar hammer; jar hammer. A drive hammer used to extract casing. *B.S. 3618, 1963, sec. 3.*

casing knife. Device similar to and used in same manner as a casing cutter. *See also* casing cutter. *Long.*

casing line. Cable or wire rope wound on a hoisting drum and used only to raise or lower casing in a borehole. Also called calf line. *Long.*

casing of a reef. Aust. The abnormal veinstuff abutting on the solid reef. *See also* casing, a. *Fay.*

casing off. Process of inserting a line of casing in a borehole. *See also* case, c; case off. *Long.*

casing pipe. Synonym for casing. *Long.*

casing point. In borehole drilling, casing point is the depth to which the casing is entered. *Pryor, 3, p. 72.*

casing pressure. The pressure built up in the casing when closed at the top of the well. It is usually measured by placing a pressure gage on one of the side outlets on the casing head. *Porter.*

casing puller. A screw or hydraulic jack used to pull casing or drill rods stuck in a borehole. *Long.*

casing reaming shell. A sleeve designed to serve as a reaming coupling between a casing bit or set casing shoe and a joint of corresponding-size casing, which is being used as a core barrel. Also called casing-barrel reaming shell. *Long.*

casing ripper. An expanding-type cutting device, which can be lowered into a cased hole on drill rods or a line. Cutter is designed to rip longitudinal slits to free the casing at a coupling or to perforate the casing. *Long.*

casing shoe. A steel sleeve threaded to fit and be coupled to the bottom end of diamond-drill casing as a cutting head and protector when the casing is driven through overburden. The inside diameter of a specific letter-name-range casing shoe (whether plain or inset with diamonds or other cutting media) is always large enough to permit other downhole drill fittings having the same letter-name-range designation to be run inside and through the casing shoe. When a casing shoe is set with diamonds or other cutting media it is called a set casing shoe, which should not be confused with casing bit. Also called casing drive shoe. *Compare* casing bit; set casing shoe. *Long.*

casing-shoe bit. a. Synonym for set casing shoe. *Long.* b. Sometimes incorrectly used as a synonym for casing bit. *See also* casing bit. *Long.*

casing spear. An instrument used for recovering casing which has accidenatlly fallen into the well. The "bulldog," which is the most simple form of casing spear, consists of a steel body tapered at the top, on which slide two steel segments with serrated edges. When lowered inside the casing to be recovered the steel segments are pushed upward along the narrow part of the body, but when raised, the segments remain stationary, and the weight of the casing forces the thicker part to exercise a pressure on the segments forcing them outward. The greater the pull, the greater is the correseponding lateral pressure. Also called casing dog. *Fay.*

casing spider. A holding device resting on the drilling floor, consisting of two or more serrated sliding wedges working inside a heavy cone-shaped bowl or collar, used to suspend casing in a drill hole during makeup or breakout. Also called casing bowl and slips. *Long.*

casing string. The total amount of any given size of casing inserted in a borehole. *Long.*

casing sub. a. A coupling threaded to fit casing at one end and drill rods or other downhole drill equipment at the other end. *Long.* b. A connection used in fishing with a petroleum-type rotary drill. *Long.*

casing substitute. Synonym for casing sub. *Long.*

casing tester. In the petroleum industry, a closely fitting, rubber-flanged bucket or a similar tool let down in a well to determine the location of a leak in the casing. *Hess.*

casing valve. Synonym for casing float. *Long.*

casing wall. *See* breast wall. *Dodd.*

casing water swivel. A special swivel designed to fit on casing at the collar of a borehole around the drill rods. Allows casing to be rotated slowly while maintaining a flow of water between drill rods and inside of casing in addition to the flow of water down the inside of the drill rods. Primarily used with Morissette expansion reamer. *Long.*

Cassadagan. Middle Upper Devonian above Chemungian. *A.G.I. Supp.*

Cassel brown; Cassel earth. A brown earthy substance found in peat and lignite beds and used as a pigment; originally found near Cassel, Germany. Cologne brown or Cologne earth is a similar substance originally found near Cologne, Germany. *Hess.*

Casselian. Synonym for Chattian. *A.G.I. Supp.*

Cassel kiln. *See* Kassel kiln. *Dodd.*

Cassel's green. Barium manganate. *Bennett 2d, 1962.*

casserole. A deep, round, usually porcelain dish with a handle used for heating substances in the laboratory. *Webster 3d.*

cassette. A lightproof holder, used to contain radiographic films during exposure to X-rays or gamma rays, that may or may not contain intensifying screens or filter screens, or both. A distinction is often made between a cassette, which has positive means for insuring contact between screens and film and is usually rigid, and an exposure holder, which is rather flexible. *ASM Gloss.*

cassianite. Variant spelling of kassianite. *Tomkeieff, 1954.*

cassinite. A feldspar from Delaware County, Pa., containing several percent of baryta. *Fay.*

cassiterite; tin stone. SnO_2; tetragonal; usually black in color; Mohs' hardness, 6 to 7; streak pink-white; specific gravity, 6.9. When pure contains 78.6 percent tin, but is usually adulterated by other metals. *Pryor, 3.*

cast. a. The mineral or other substance that fills a hole which has been formed in a rock by the solution of the original hard material of which the shell or skeleton was composed. *A.G.I.* b. A natural mold which has been filled naturally with some mineral substance. *A.G.I.* c. To form in a desired shape by pouring molten metal into a mold, as a bit mold, and allowing it to harden. *Long.*

castable. A refractory mix containing heat resisting hydraulic setting cement. A refractory concrete. *A.I.S.I. No. 24.*

castable refractory. a. A refractory aggregate which will develop structural strength by hydraulic set after having been tempered with water and compacted. *A.R.I.* b. A mixture of a heat-resistant aggregate and a heat-resistant hydraulic cement; for use, it is mixed with water and rammed or poured into place. *HW.*

cast-after-cast. Corn. The throwing up of ore from one platform to another successively. *See also* shambles. *Fay.*

cast-alloy tool. A cutting tool made by casting a cobalt-base alloy and used at machining speeds between those for high-speed steels and sintered carbides. *ASM Gloss.*

castanite. A chestnut-brown hydrous ferric sulfate, $Fe_2O_32SO_3.10H_2O$. *Fay.*

castaways. Sterile veinstone. *Fay.*

cast bit. A bit in which the diamond-set crown is formed on a bit blank by pouring molten metal into a prepared mold. Also called cast-set bit; cast-metal bit. *Long.*

cast brick. *See* electrocast brick. *Bureau of Mines Staff.*

Castellanos powder. A kind of blasting powder containing nitroglycerin and either nitrobenzene or a picrate, mixed with other materials. *Webster 2d.*

castellated. Formed like a castle, as a castellated nut which has a portion of its length turned and slotted for the reception of cotter pins. *Crispin.*

Castellated beam. Trade name for a steel beam formed by cutting a rolled steel joist along the web in the form of a zig-zag. After this cutting operation the two halves are arranged so that the crests of the cuts meet; these are then joined by butt welding. As a result, the depth and moment of the beam are increased by 50 percent. *Ham.*

castellated bit. a. A long-tooth, sawtooth bit. *Long.* b. Diamond-set coring bit with a few large diamonds or hard-metal cutting points set in the face of each of several upstanding prongs separated from each other by deep waterways. Also called padded bit. *Long.*

caster. a. A wheel mounted in a swivel frame so that it is steered automatically by movements of its load. *Nichols.* b. In an automotive vehicle, the toe-in of the front wheels. *Nichols.*

casteth. Derb. Said of a shaft when the air issuing from it on a cool or frosty morning contains visible vapor. *Fay.*

cast gate. In founding, the channel through which the metal is poured into a mold. *Fay.*

casthole. Derb. A prospect hole not exceeding about 9 feet deep, the depth from which waste material may be thrown by hand. *Fay.*

casthouse. The building in which pigs or ingots are cast. *Fay.*

castillite. An impure variety of bornite, containing zinc, lead, and silver sulfides. *Fay.*

casting. a. An object at or near finished shape obtained by solidification of a substance in a mold. *ASM Gloss.* b. Pouring molten metal into a mold to produce an object of desired shape. *ASM Gloss.* c. A process of shaping glass by pouring hot glass into molds or onto tables, or rolls. *ASTM C162-66.* d. Forming ceramic ware by introducing a body slip into a porous mold which absorbs sufficient water from the slip to produce a semirigid article *ASTM C242-60T.* e. N. of Eng. Payment made to fillers when coal has to be shoveled more than an agreed distance to the conveyor belt or tubs. *Trist.*

casting alloy. Any alloy commonly melted and used to produce bit crowns by the casting process. Usually used in referring to copper- and nickel-base alloys. *Long.*

casting bort. Synonym for castings. *Long.*

casting bronze. A copper-base alloy used primarily to produce bit crowns by the casting method. *Long.*

casting copper. Inferior to electrolytic and lake copper. It is obtained from a variety of copper ores and from by-products of brass foundries. *Crispin.*

casting cracks. An obvious cracking tendency in the enameled surface due to cracks in the metal. *Hansen.*

casting floor. *See* sand floor. *Mersereau, 4th, p. 399.*

casting machine. A series of iron molds on an endless-belt conveyor to receive and cast the molten pig iron into form as it comes from the furnace. *Mersereau, 4th, p. 399.*

casting metal. Synonym for casting alloy. *Long.*

casting over. a. A quarryman's term for an operation consisting of making a cut with a steam shovel, which, instead of loading the material on cars, moves it to one side, forming a long ridge. *Fay.* b. The operation of reestablishing benches that have been covered or caved, and also cutting up a high bank into one or more smaller banks. *Lewis, p. 399.*

casting pit. The space in a foundry in which the molds are placed and the castings made. In the Bessemer and open-hearth steelworks, it is the space utilized for casting the molten steel into cast-iron ingot molds. *Fay.*

casting-pit refractories. Specially shaped refractories (usually fireclay) for use in the casting of molten steel. *Dodd.*

casting plate; casting table. A flat iron table upon which molten glass is poured to flatten out. *Mersereau, 4th, p. 328.*

castings. One of several terms (and/or letter symbols) commonly used to designate low quality drill diamonds. *Long.*

casting shrinkage. a. Liquid shrinkage, the reduction in volume of liquid metal as it cools to the liquidus. *ASM Gloss.* b. Solidification shrinkage, the reduction in volume of metal from the beginning to ending of solidification. *ASM Gloss.* c. Solid shrinkage, the reduction in volume of metal from the solidus to room temperature. *ASM Gloss.* d. Total shrinkage, the sum of the shrinkage in definitions a, b, and c above. *ASM Gloss.*

casting spot. A fault that sometimes appears on the cast pottery as a vitrified and often discolored spot on the bottom of the ware or as a semielliptical mark on the side. It occurs where the stream of slip first strikes the plaster mold and is attributable to local orientation of platy particles of clay and mica in the body. The fault can be largely eliminated by adjusting the degree of deflocculation of the slip so that it has a fairly low fluidity. The fault is also known as a flashing. *Dodd.*

casting strains. Strains in a casting caused by casting stresses that develop as the casting cools. *ASM Gloss.*

casting stresses. Stresses setup in a casting because of geometry and casting shrinkage. *ASM Gloss.*

casting table. *See* casting plate. *Mersereau, 4th, p. 328.*

casting wheel. A large turntable with molds mounted on the outer edge. Used primarily in the base metal industries for cast ingots, anodes, etc. *Bureau of Mines Staff.*

casting-wheel operator. In ore dressing, smelting, and refining, one who operates a large rotating casting wheel to pour molten, nonferrous metal, such as copper or lead, into molds mounted on the edge of the wheel. *D.O.T. 1.*

cast in situ. Concrete which is cast in position in a structure as distinct from precast concrete, which refers to elements made independently on a construction site, or in a factory and transported from there for erection on a site. *Ham.*

cast iron. An iron containing carbon in excess of the solubility in the austenite that exists in the alloy at the eutectic temperature. For the various forms gray cast iron, white cast iron, malleable cast iron, and nodular cast iron, the word cast is often left out, resulting in gray iron, white iron, malleable iron, and nodular iron, respectively. *ASM Gloss.*

cast iron enamel. A porcelain enamel specifically designed for application to cast iron. *ASTM C286-65.*

cast-iron fittings. Elbows, couplings, and other small or irregular pieces for use in a pipe system or for some other subsidiary use, which have been molded from cast iron. *Hess.*

cast-iron pipes. Cylindrical iron tubes made from iron containing so much carbon that, as cast, it is not usefully malleable at any temperature. They may be cast in fixed molds or in whirling molds that compact the iron centrifugally. *Hess.*

castle; castling. Local term for the setting of bricks on a dryer car, two-on-two in alternate directions. *Dodd.*

castle nut. Hexagonal nut, slotted at top to permit insertion of split pin in hole in bolt on which nut is screwed. *Pryor, 3.*

castling. *See* castle. *Dodd.*

cast matrix. Bit-crown matrix material formed by pouring molten metal into a bit mold and allowing it to harden. *Long.*

cast-metal bit. Synonym for cast bit. *Long.*

cast-metal matrix. Synonym for cast matrix. *Long.*

castor. Same as castorite. *Fay.*

castor amine. An oil. Used in ore flotation as a selective collector; and in rustproofing metal surfaces. *Bennett 2d, 1962.*

castorite. A natural, colorless silicate of lithium and aluminum. *Bennett 2d, 1962.*

castor machine oil. A lubricating oil used for moderately heavy machinery. *Hess.*

cast set. a. A bit produced by a casting process. *See also* cast bit. *Compare* **hand set;** sinter bit. *Long.* b. A surface-set diamond bit produced by a casting process. *Long.*

cast-set bit. Synonym for cast bit. *Long.*

cast setting. The actual process of producing a cast bit. *See also* cast bit; cast set. *Long.*

cast-setting material. South African term for very low quality drill diamonds (usually Congos) used in diamond bits. *Long.*

cast steel. Steel as cast, that is, not shaped by mechanical working. Originally applied to steel made by the crucible process as distinguished from that made by cementation of wrought iron. *C.T.D.*

cast structure. The internal physical structure of a casting evidenced by shape and orientation of crystals and segregation of impurities. *ASM Gloss.*

cast-weld. To join (parts) by placing together in a mold and pouring molten metal between or around. *Webster 3d.*

cast-welded rail joint. A welded joint between the ends of two adjacent rails, generally formed by the thermit process. *Ham.*

caswellite. A copper-red, altered biotite, resembling clintonite. *English.*

cat. a. S. Staff. A hard fire clay. Also called catch earth. *Fay.* b. Any heavy-duty tracklaying tractor, equipped either with or without a dozer blade. *Long.* c. To move a heavy piece of drilling equipment utilizing power derived from the cathead. *See also* bulldog. *Long.*

cata-. A prefix to indicate that the rock belongs to the deepest zone of metamorphism, which is characterized by very high temperature, hydrostatic pressure, and relatively low shearing stress. *Compare* apo-; kata-; epi-; meta-; meso-. *A.G.I.*

cataclasis. Rock deformation accomplished by fracture and rotation of mineral grains or aggregates. The same as granulation. *A.G.I. Supp.*

cataclasite. A cataclistic rock that has been formed by shattering (or cataclasis) which has been less extreme than in the case of a mylonite. *See also* augen gneiss; autoclastic schist; augen schist; crush breccia; crush conglomerate; flaser gabbro; flaser gneiss; flaser granite; mylonite; protoclastic; protomylonite; stronalite. *A.G.I.; A.G.I. Supp.*

cataclasm. A breaking or rending asunder; a violent disruption. *Standard, 1964.*

cataclastic. a. Of or pertaining to a texture found in metamorphic rocks in which brittle minerals have been broken and flattened in a direction perpendicular to the pressure stress. *Compare* autoclastic. *A.G.I.* b. Refers to a coarse fragmentation of a rock in transit; for example, glacial action. *A.G.I. Supp.*

cataclinal. Of or pertaining to streams or valleys that descend in the same direction toward which the underlying rock layers dip. Opposite of anaclinal. *Stokes and Varnes, 1955.*

cataclysm. Any violent and extensive subversion of the ordinary phenomena of nature; an extensive stratigraphic catastrophe. *Standard, 1964.*

cataclysmal. *See* cataclysmic. *Fay.*

cataclysmic. a. Accompanied with violent disruption. *Fay.* b. Of or pertaining to the nature of cataclysm; characterized by a cataclysm or by cataclysms. *Standard, 1964.*

catalin. An amorphous plastic similar to baklite. *Shipley.*

Catalina sardonyx. Catalinite. *Shipley.*

catalinite. Beach pebbles from Santa Catalina Island, Calif. *Shipley.*

catalog of abandoned mines. A record of plans of abandoned mines which gives the location of the workings, the minerals worked, the custodian of the plans, and references as to the approximate extent of the workings within specified 6-inch ordnance sheets. *B.S. 3618, 1963, sec. 1.*

catalysis. Acceleration or deceleration of a reaction produced by a substance which may be recovered practically unchanged after the reaction. *Webster 3d.*

catalyst. A substance capable of changing the rate of a reaction without itself undergoing any net change. *ASM Gloss.*

catalytic. a. Causing, involving, or relating to catalysis. *Webster 3d.* b. Of or pertaining to a catalyst. *Webster 3d.*

catalytic deposition. Deposition induced by a catalyst, which is a substance that promotes a chemical action without taking part in it itself. *Bateman.*

catalytic methanometer. A firedamp detector depending upon the combustion or oxidation of methane at heated filaments. Usually the gas is drawn through the apparatus by a rubber suction bulb, and the filaments are heated by a battery in the instrument. A new version of this principle is the resistance methanometer. *See also* acoustic methanometer. *Nelson.*

catalytic oxidation. A process used by the U.S. Bureau of Mines that converts the incompletely burned hydrocarbons present in automobile exhaust into harmless gases. It involves burning up the fuel remnants with the aid of catalysts—chemical agents that speed up reactions without being consumed themselves. *Bureau of Mines Staff.*

cat and clay. Straw and clay worked together to form a building or chinking material. *Webster 3d.*

catanorm. The theoretical calculation of minerals in rocks of the catazone as indicated by chemical analyses. It is approximately equivalent to the CIPW norm. *A.G.I. Supp.*

cataphoresis. Movement of charged particles in a fluid medium in response to an electric field. Metallic hydroxides and other positive sols migrate to cathode and negatives ones to anode. *See also* electrophoresis. *Pryor, 3.*

cataphorite; catophorite; kataforite; kataphorite; katophorite. A soda-iron amphibole between barkevikite and arfvedsonite, $NaCaFe_4''Fe'''(Si_7Al)O_{22}(OH)_2$; found in southern Norway. *American Mineralogist, v. 43, No. 7-8, July-August, 1958, pp. 797-798; English.*

catapleiite. A hydrous silicate, $H_4(Na_2Ca)$-$ZrSi_3O_{11}$, light yellow to yellowish-brown color, crystallizing in thin tabular hexagonal prisms. *Fay.*

catapleiite syenite. A porphyritic rock of tinguaite habit containing phenocrysts of catapleiite, and occasionally of eudialyte, in an aphanitic but holocrystalline groundmass composed of those minerals with alkali feldspars, nepheline, and aegirine. *Holmes, 1928.*

cataract. A waterfall, usually of a great volume of water; a cascade in which the vertical fall has been concentrated in one sheer drop or overflow. *A.G.I.*

cataracting. Motion of crushing bodies in a ball mill in which some fall freely after breaking away from the top of the crop load and fall with impact to the toe of the load. *Pryor, 4. See also* cascading.

catarinite. A native alloy of iron and nickel, Fe_2Ni. *Standard, 1964.*

catastrophe. a. In mining, a disaster in which many lives are lost or much property damaged, as by a mine fire, explosion, inrush of water, etc. *Fay.* b. In geology, a sudden, violent change in the physical conditions of the earth's surface; a cataclysm. *Standard, 1964.*

catawbrite. Proposed by Lieber for a rock in South Carolina that is an intimate mixture of talc and magnetite. *Fay.*

cat bank. Eng. An iron loop placed on the underside of the center of a flat corf bow (bucket handle), in which to insert the hook. *Fay.*

cat block. a. A pulley block equipped with a hook instead of an eye. *Long.* b. Synonym for cathead. *Long.*

catbrain. Eng. Soil consisting of rough clay mixed with stones. A common field name and minor locality name widely distributed in England. *Arkell.*

catch; keps; chairs; wings. a. Projections in a mine shaft which arrest cage, skip, or other reciprocating systems in the event of fracture or overwind. *Pryor, 3.* b. In coal work, refers to a device for holding trams in a cage when hoisting. *Pryor, 3. See also* jack catch.

catchall. A tool for extracting broken implements or junk from boreholes or wells; a fishing tool. *Long.*

catch basin. A cistern, basin, or depression, at the point where a gutter discharges into a sewer, to catch matters which would not readily pass through the sewers. A reservoir to catch and retain surface drainage. *Crispin.*

catch drain. *See* grip. *Ham.*

catch earth. *See* cat, a. *Fay.*

catcher. a. Eng. A safety or disengaging hook for prevention of overwinding. *Fay.* b. Leic. *See* cage shuts. *Fay.* c. Strong beams in mine shafts to catch the rods of pumps in case of a breakdown. *Fay.* d. Synonym for core lifter. *Long.*

catches. a. Catches or rests placed on shaft timbers, to hold the cage when it is brought to rest at the top, bottom, or any intermediate landing. Also called latches; chairs; keeps; dogs. *Fay.* b. Stops fitted on a cage to prevent cars from running off. *Fay.* c. Mid. Projecting blocks of wood attached to pump spears to prevent damage in case of a breakdown. *Fay.*

catch feeder. An irrigating ditch. *Ham.*

catch gear. An appliance fixed in the headgear to limit the drop of the cage after an overwind. The upward speed and momentum of the loaded cage (after its release from the rope) may be such that its subsequent drop may be so severe as to fracture the suspension gear, resulting in the cage falling down the shaft. The amount of drop is limited by catch gear consisting of a series of catches suspended from beams supported on hydropneumatic buffers to reduce the impact shock. The cage is released by raising slightly and retracting the catches. *See also* detaching hook; overwind. *Nelson.*

catchment area. An intake area and all parts of the drainage basin which drain into it. *Fay.*

catchment basin. The entire area from which drainage is received by a reservoir or a river. *Webster 3d.*

catch pin. Eng. A strong oak or iron pin fixed over and to the ends of the beam of a pumping engine, which, in the event of a broken spear, prevents damage to the top or bottom of the cylinder. *See also* spring beams. *Fay.*

catch pit. a. In mineral processing, sump in a mill to which the floor slopes gently, and into which all spillage gravitates or is hosed for either return by pumping to its place in the flowline, or for periodical removal. Also called catch sump. *Pryor, 3.* b. Synonym for sump, n. *Long.*

catch points. Set of spring-loaded points in upgrade railway line which close behind a rising train. If any rolling stock breaks away it is then automatically diverted to a siding. *Pryor, 3.*

catch props. Props erected in the face to act as temporary supports until the permanent supports are brought forward. *Nelson.* Also called watch props; safety props. *C.T.D.*

catch scaffold. Eng. A platform in a shaft a few feet beneath a working scaffold to be used in case of accident. *Fay.*

catchwater. *See* grip. *Ham.*

catchwater drain. A surface drain to intercept and collect the flow of water from adjoining land, so as to prevent it from reaching a road or mine sidings. *See also* subsurface drainage. *Nelson.*

catch wings. Substantial wooden blocks placed in mine shaft just below point reached by reciprocating rod of Cornish pump at bottom of its stroke. *Pryor, 3.*

cat claw. A miner's term applied locally in Illinois to a bed of marcasite from 2 to 6 inches thick which sometimes occurs between the "clod" roof of a coal seam and the more stratified shale above. The lower surface of the marcasite bed is characterized by very irregular protuberances extending downward 1 to 3 inches into the clod. Also called cat. *A.G.I.*

cat clay. Mid. Surface clay. *Arkell.*

cat coal. York. Coal with pyrites. *Nelson.*

cat dirt. a. Derb. A hard fire clay. *Fay.* b. Derb. Coal mixed with pyrite. *Fay.* c. Derb. A kind of earthy scoria not unlike lava. *Fay.*

cat-dirt clay. Eng. A kind of clay that is short in cutting, and mixed with joints that are whiter than the clay, Derbyshire lead mines. *Arkell.*

catear. Sp. To search for new mines; to prospect. *Hess.*

catenary. That curve into which a uniformly loaded cable will fall when suspended from its two ends; such curves are seen in suspension bridges, cableways, and ropeways. *Ham.*

caternary arch. A sprung arch having the shape of an inverted catenary (the shape assumed by a string suspended from two points that are at an equal height from the ground). The stress pattern in such an arch is such, that there is no tendency for any bricks to slip relative to one another. *Dodd.*

catenary suspension. The overhead suspension of contact wire for electric traction by vertical links of different lengths connected to a catenary wire above it. The contact wire will thus be maintained at a constant height. *Ham.*

Caterpillar. A tractor made for use on rough or soft ground and moved on two endless metal belts consisting of series of flat treads, one belt on each side of the machine, the belts being kept in motion by toothed driving wheels so that the tractor moves forward or backward with the revolution of the belts; a trademark. Also called caterpillar tractor. *Webster 3d.*

caterpillar chain. A short endless chain on which dogs or teeth are spaced to mesh with and move or be moved by a conveyor chain. *ASA MH4.1-1958.*

caterpillar chain dog. A dog or tooth attached to a caterpillar drive chain to provide the driving contact with the conveyor chain. *ASA MH4.1-1958.*

caterpillar drive. A drive equipped with a caterpillar chain which engages and propels the conveyor chain. *ASA MH4.1-1958.*

caterpillars. An endless chain of plates which function as wheels for heavy vehicles. *See also* crawler tracks. *Nelson.*

caterpillar tread. An attachment like an apron conveyor, placed around and connecting the front and back wheels of self-propelled machines, furnishing a broad track that allows the machine to traverse rough, uneven, soft, or sandy country. If the distance between the wheels is considerable, idlers help to aline the track. *Hess.*

cat eye. An imperfection; an elongated bubble containing a piece of foreign matter. *ASTM C162-66.*

catface. a. Small discontinuous veinlets of pyrite, a number of which sometimes appear to radiate from a common center that may be a small sulfur ball. In some mining districts, this name is applied to lenticular deposits of pyrite. *Mitchell, p. 67.* b. A miner's term for glistening balls or nodules of pyrite in the face of coal. *Fay.*

catfaced block. In New York and Pennsylvania, a bluestone quarryman's term for a mass of waste situated between two closely spaced open joints. *Fay.*

cat gold. An early name for gold-colored mica. *Fay.*

cathead. a. A small, deep-flanged, spool-like winch or capstan mounted on the countershaft of the draw works or hoisting drum near the front and generally to one side of the swivel head of a diamond drill. It is used to wind a line when breaking or making up rod, casing, or pipe joints, or to operate a driver hammer. Also called niggerhead. *Long.* b. Colloquial synonym for drum, of the drill hoist. *Long.* c. A small capstan. *Long.* d. A broad bully hammer. *See also* bully, a. *Fay.* e. Eng. A nodule of ironstone containing fossil remains. *Standard, 1964.* f. A winch used primarily to raise or lower casing. *B.S. 3618, 1963, sec. 3.*

cathead man. A member of a drill crew who manipulates the rope or chain wound and snubbed around a cathead. *See also* cathead, a. *Long.*

cathead sheave. A sheave set on the topmost part of a pile frame. *Ham.*

cathedral glass. Rolled flat glass textured on one side to resemble old window glass. *Compare* antique glass. *Dodd.*

cathode. The electrode where electrons enter (current leaves) an operating system, such as a battery, an electrolytic cell, an X-ray tube, or a vacuum tube. In the first of these, it is positive; in the other three, negative. In a battery or electrolytic cell, it is the electrode where reduction occurs. Opposite of anode. *ASM Gloss.*

cathode compartment. In an electrolytic cell, the enclosure formed by a diaphragm around the cathode. *ASM Gloss.*

cathode copper. Electrolytically refined copper which has been deposited on the cathode of the electrolytic bath of acidified copper sulfate solution. Such copper is usually melted again in a furnace before being marketed as electrolytic copper. *Camm.*

cathode deposit. Metal precipitated on cathode by electrolysis. *Pryor, 3.*

cathode efficiency. Current efficiency at the cathode. *ASM Gloss.*

cathode fall. A very thin space-charge region in front of a cathode surface, characterized by a steep potential gradient through the region. *BuMines Bull. 625, 1965, p. VII.*

cathode film. The portion of solution in immediate contact with the cathode during electrolysis. *ASM Gloss.*

cathode pickling. *See* electrolytic pickling. *Dodd.*

cathode protection. Use of sacrificial anodes to divert electrolytic corrosion from iron structure with which they are placed in contact so as to form a positive electrode. *Pryor, 3.*

cathode rays. Streams of electrons emitted from the filament (called the cathode) of a vacuum tube under the influence of high voltage and which, by suitable means, can be brought outside the tube. *Crispin.*

cathode-ray tube. A special form of vacuum tube in which a focused beam of electrons is caused to strike a surface coated with a phosphor. This beam is deflected so that it traces an orthogonal presentation of two separate signals; a third independent signal may be presented as a variation of the intensity of the electron beam, and in turn, the fluorescent intensity. *ASM Gloss.*

cathode spot. A bright candescent spot on the surface on a cathode, apparently an active area through which current flows from the plasma. *BuMines Bull. 625, 1965, p. VII.*

cathode-spot mode. A particular mode of arc operation as observed in laboratories of the Linde Co. The cathode spot is unusually bright and the arc is abnormally constricted at the cathode terminus. The same behavior has been called the "contracted mode." *BuMines Bull. 625, 1965, p. VII.*

cathodic cleaning. Electrolytic cleaning where the work is the cathode. *ASM Gloss.*

cathodic corrosion. Corrosion of the cathodic member of a galvanic couple resulting from the flow of current. *BuMines Bull. 619, 1964, p. 206.*

cathodic pickling. Electrolytic pickling where the work is the cathode. *ASM Gloss.*

cathodic protection. Partial or complete protection of a metal from corrosion by making it a cathode, using either a galvanic or impressed current. *ASM Gloss.*

cathole. A small hole dug in the surface of the ground in which the base of a drill-tripod leg is set. *Long.*

catholyte. The electrolyte adjacent to the cathode in an electrolytic cell. *ASM Gloss.*

cation. a. The element or the positive ion which appears at the cathode or negative terminal in an electrolytic cell. *Crispin.* b. An ion having a positive charge. *Hurlbut.*

cation clay adsorption. *See* clay adsorption, cation. *ACSG, 1963.*

cation exchange. *See* base exchange. *ACSG, 1963.*

cation exchange capacity. A measure of the ability of a clay to adsorb or exchange cations; usually expressed in milliequivalents of cations per 100 grams of dry clay. *ACSG, 1963.*

cationic collectors. In flotation, amines and related organic compounds capable of producing positively charged hydrocarbon-bearing ions (hence the name cationic collectors) for the purpose of floating miscellaneous minerals, including silicates. *Gaudin, 2, p. 5.*

cationic detergent. A detergent in which the cation is the active part. *ASM Gloss.*

cationic reagents. In flotation, surface-active substances which have the active constituent in the positive ion. Used to flocculate and to collect minerals that are not flocculated by the reagents, such as oleic acid or soaps, in which the surface-active ingredient is the negative ion. Reagents used are chiefly the quaternary ammonium compounds; for example, cetyl trimethyl ammonium bromide. *CCD 6d, 1961.*

catline. A rope or cable wrapped around a cathead and used to spin up or spin out drill rods, casing, or pipe. *Compare* spinning chain; spinning cable; spinning rope. *Long.*

catlinite; pipestone. A red clay found in southwestern Minnesota and formerly used by the Indians for making pipes. *Sanford.*

catoctin. A monadnock or a residual mountain or a ridge which preserves a remnant of an old peneplain on its summit. *Fay.*

catogene. A general term for sedimentary rocks because they were formed by deposition from above, as of suspended material. *Compare* anogene; hypogene. *Fay.*

catonic exchange. *See* ionic exchange. *Dodd.*

catoptrite; katoprit. A black, red in thin flakes, silicoantimonate of manganese, iron, and aluminum, $14(Mn,Fe)O.2(Al,Fe)_2O_3$.-$2SiO_2 \cdot Sb_2O_5$; monoclinic; minute tabular crystals. From Nordmark, Sweden. *English.*

cat rake. A hydraulic brake or controller of a Cornish pumping engine, first introduced by Boulton and Watt. *Fay.*

cat run. A low passage that requires crawling to traverse it. Synonym for crawlway. *A.G.I.*

cats. Scot. Burnt clay used for tamping in wet strata. *Fay.*

cat salt. A granulated salt formed from the bittern or leach brine used for making hard soap. *Fay.*

cat sapphire. A blackish or greenish-blue Oriental sapphire (that is, true sapphire) of some value as a cut gem stone, but not of characteristic color. *C.M.D.*

cat's brain. A sandstone traversed in every direction by little branching veins of calcite. *Fay.*

cat scaups; cat scopes. Eng. Catheads; nodules, Whitehaven, Cumberland. *Arkell.*

cat scratch. An imperfection; surface irregularities on glassware resembling the marks of a cat's claws. *ASTM C162-66.*

cat's-eye. a. A greenish, chatoyant variety of chrysoberyl and quartz. *Dana 17.* The oriental cat's-eye is the more highly prized. *Hess.* b. Alternate term for tiger's-eye, the silicified form of crocidolite asbestos sometimes polished and used as ornaments. *Sinclair, W .E., p. 483.*

cat's-eye enstatite. Enstatite with a chatoyant effect. *Shipley.*

cat's-head. Ire. A nodule of hard gritstone in shale. *Compare* cathead, e. *Fay.*

Catskill beds. An Old Red Sandstone phase in the Upper Devonian of North America, typically exposed in the Catskill Mountains of New York, and reaching a thickness of 5,000 feet of nonmarine red sandstones capped by white sandstones in Pennsylvania. *C.T.D.*

catskinner. Operator of a crawler tractor. *Nichols.*

cat's quartz. a. Same as cat's-eye. *Fay.* b. A variety of quartz containing fibers of asbestos. *Fay.*

catstane. a. Scot. A conical cairn or monolith supposed to mark the locality of a battle. *Fay.* b. One of the upright stones which supports the grate in a fireplace. *Fay.*

Cattermole Process. An early flotation process (1903) based on adhesion of sulfide minerals to oil. Mineral oil or fatty acid agglomerated heavy minerals into floccules which were separated by classification from overflowing gangue. *Pryor, 3.*

cattierite. Cobalt disulfide, CoS_2, cubic with pyrite structure; from Shinkolobwe, Republic of the Congo. *Spencer 17, M.M., 1946.*

catty. a. Any of various units of weight used in China and southeast Asia varying around 1⅓ pounds or 600 grams; also, a Chinese unit according to a standard set up in 1929 equal to 1.1023 pounds or 500 grams. *Webster 3d.* b. A gold weight which equals 2.9818 troy pounds. *Fay.*

catwalk. A pathway, usually of wood or metal, that gives access to parts of large machines. *Nichols.*

cauf. N. of Eng. A bucket or large basket used in hoisting coal. *Hess.*

cauk. a. Eng.; Scot. Chalk; limestone. *Fay.* b. An English miner's term for barite, or heavy spar. *See also* cawk, a and b. *Fay.*

cauld. Scot. A dam in a river; a weir. *Fay.*

cauliflowering. The tendency of a coal to swell and open out when heated, thus exposing a surface out of all proportion to the size of the original coal. *See also* swelling number. *Nelson.*

caulk. Synonym for calk. *Long.*

caulking. a. Setting the edges of plates in a riveted joint with hammer and caulking tool to insure a tight joint. *Crispin.* b. In general, making a joint tight or leakproof by forcing plastic material between parts that are not tightly fitted. *Crispin.* c. Synonym for calking. *Long.*

caunche; canch. In coal mining, removal of part of roof or floor to increase height of roadway. *Pryor, 3.*

causeway. a. A raised road, across wet or marshy ground or across water. *H&G.* b. Eng. Rough causeway; calciferous sandstone, surface deeply undulated, Wealden beds. *Arkell.*

caustic. Capable of destroying the texture of anything or eating away its substance by chemical action; burning; corrosive. *Webster 3d.*

caustic ammonia. Gaseous or dissolved ammonia. *Standard, 1964.*

caustic dip. A strongly alkaline solution into which metal is immersed for etching, neutralizing acid, or removing organic materials, such as grease or paints. *ASM Gloss.*

caustic embrittlement. Effect on metal of immersion in caustic alkaline solutions. *Pryor, 3.*

causticity. a. The property of burning or corroding flesh chemically, as by sodium or potassium hydroxide. *Porter.* b. An excess of lime in boiler feedwater compounds. *Porter.*

causticized ash. Combinations of soda ash (Na_2CO_3) and caustic soda (NaOH) in definite proportions marketed for purposes where an alkali is needed ranging in causticity between the two materials. Causticized ash is usually designated by its caustic soda content and the range of standard marketed products embraces 7, 10, 15, 25, 36, 45, and 67 percent of caustic soda. *CCD 6d, 1961.*

caustic lime. *See* calcium hydroxide. *CCD 6d, 1961.*

caustic potash. Potassium hydroxide, KOH. *Osborne.*

caustic silver. *See* silver nitrate. *Bennett 2d, 1962.*

caustic soda. Sodium hydroxide; NaOH; deliquescent; a soapy feel; and its solution in water is strongly alkaline. A common reagent in the laboratory. Manufactured by treating quicklime with a hot sodium carbonate solution. *C.T.D.* Very useful as a de-enameling agent. The molten caustic dissolves such materials as enamels, sand, or glass which contain a high percentage of silica. Part goes into solution and part forms sodium silicate which is precipitated. After the solution has removed enamel equal to approximately 10 percent of the weight of the NaOH charge, the reaction begins to slow down. The solution, which becomes rich in Na_2O, is rejuvenated by introducing dry steam, which combines with the Na_2O to form NaOH; this is accomplished without danger. NaOH is a primary ingredient in cleaning compounds used in the preparation of metal for enameling. *Lee.*

caustic soda method. A water softening treatment usually carried out where the water contains a fairly high proportion of temporary hardness and a quite small proportion of permanent hardness. In it, sodium carbonate reacts with the permanent hardness and the insolubles are either filtered or allowed to settle. *Cooper, p. 371.*

caustobiolites. A general name for fossil combustible substances. *Tomkeieff, 1954.*

caustobiolith. This term designates a rock with a fairly high content of organic carbon compounds or even pure carbon where the latter is, like the carbon compounds, of organic origin. *IHCP, 1963, part I.*

caustoliths. Same as caustobiolites. *Tomkeieff, 1954.*

caustophytolith. Suggested by Grabau to replace caustobiolith. Not to be confused with acaustophytolith. *A.G.I.*

causul metal. A cast iron containing nickel, copper, and chromium; similar to nickel resist. *Camm.*

cautionary zone. A zone in which any unworked mineral lies within a specified distance from unconsolidated deposits or other sources of danger, particularly gas and water. *B.S. 3618, 1963, sec. 4.*

cavalorite. A plutonic igneous rock composed essentially of oligoclase or andesine and practically no other constituents. *Compare* anorthosite; aplite. *Johannsen, v. 3, 1937, p. 145.*

cave. a. Fragmented rock materials, derived from the sidewalls of a borehole, that obstruct the hole or hinder drilling progress. *Long.* b .The partial or complete failure of borehole sidewalls or mine workings. *Long.* c. Synonym for cellar. *Long.* d. To allow the roof to fall without any retarding supports or waste packs. *Mason.* e. A falling in of the roof strata, sometimes extending to the surface and causing a depression therein. Also called cave-in. *Hudson.* f. Collapse of an unstable bank. *Nichols, 2.* g. A natural cavity, recess, chamber, or series of chambers and galleries beneath the surface of the earth, within a mountain, a ledge or rocks, etc.; sometimes a similar cavity artificially excavated. *Standard, 1964.* h. Any hollow or cavity. *Standard, 1964.* i. The ashpit in a glass furnace. *Standard, 1964.*

cave coral. A small, stalked formation of calcium carbonate on the floor, the wall, or the ceiling of a cave. Synonym for coral formation. *Schieferdecker.*

cave deposit. An irregular deposit of material in caves generally found in limestone. *Fay.*

caved stopes. There are two distinct types of caved stopes. In the first, the ore is broken by caving induced by undercutting a block of ore. In the second, the ore itself is removed by excavating a series of horizontal or inclined slices, while the overlying capping is allowed to cave and fill the space occupied previously by the ore. The first type comprises the caving methods of mining, while the second comprises the top-slicing method. *BuMines Bull. 390, 1936, p. 12.*

cave hole. A depression at the surface, caused by a fall of roof in the mine. *Fay.*

cave-in. Collapse of walls or roof of mine excavation. *Pryor, 3.*

cave-in-heave. The partial or complete collapse of the walls of a borehole. *Brantly, 1.*

cavel. A stonemason's ax. *Fay.*

caveman. An odd job man around (frequently under) a glass furnace. *Dodd.*

cave marble. A cryptocrystalline banded deposit of calcite or of aragonite that can be highly polished. Synonym for cave onyx. *A.G.I.*

cave onyx. *See* cave marble. *A.G.I.*

cave pearl. A smooth, rounded concretion of calcite or aragonite formed by concentric precipitation around a nucleus. It is usually found in caves. Synonym for pisolite. *A.G.I.*

caver. a. Eng. A thief who steals ore or coal at a mine or the officer appointed to guard a mine. *Standard, 1964.* b. A person whose hobby is exploring caves. Also called a spelunker. *Schieferdecker.*

cavern. A large, natural underground cavity or cave; a den; any cavity. *Standard, 1964.*

cavern limestone. Any limestone occurring in caverns, especially the Mississippian limestone of Kentucky. *Webster 3d.*

cavernous. Containing cavities or caverns, sometimes very large. Most frequently applied to limestones and dolomites. *Fay.*

caverns. Eng. Wide fissures in the Inferior Oolite. *Arkell.*

cavil. a. N. of Eng. A lot, drawn quarterly by a miner for his working place in the mine. *Fay.* b. To draw lots at stated periods, by miners to determine the places in which they will work for the following period. *Fay.* c. A type of heavy sledge with one blunt and one pointed end. Used for rough shaping stone at the quarry. *Crispin.*

caviling. The drawing of lots for working places (usually for 3 months) in the coal mine. *C.T.D.*

caviling rules. N. of Eng. Rules or bylaws in reference to cavils and wages. *Fay.*

cavils. Eng. Lots drawn quarterly or half-yearly by piece workers to determine the position of their working places. *SMRB, Paper No. 61.*

caving. a. A stoping method in which the ore is broken by induced caving. This may be achieved by (1) block caving, including caving to main levels and caving to chutes or branched raises; or (2) sublevel caving. *BuMines Bull. 390, 1936, p. 4.* b. In coal mining, the practice of encouraging the roof over the waste to collapse freely so that it fills the waste area and thereby avoiding the need to pack. Caving in coal mines is on the increase. In metal mining, caving implies the dropping of the overburden as part of the system of mining. *See also* block caving; sublevel caving; top slicing. *Nelson.* c. The failure and sloughing in of sidewalls of boreholes, mine workings, or excavations. *Long.* d. Fall of rock underground. *Statistical Research Bureau.*

caving by raising. *See* chute caving. *Fay.*

caving ground. Rock formations that will not stand in the walls of an underground opening without support such as that offered by cementation, casing, or timber. *Long.*

caving hole. A borehole in which fragments of the material making up the walls of the hole slough so much that the borehole cannot be kept open without the use of casing or cementation. *Long.*

cavings. Fragments of borehole wall-rock material that fall into a borehole, sometimes blocking the hole, and which must be washed or drilled out before the borehole can be deepened. *Long.*

caving system. a. A method of mining in which the ore, the support of a great block being removed, is allowed to cave or fall, and in falling is broken sufficiently to be handled; the overlying strata subsides as the ore is withdrawn. There are several varieties of the system. *See also* block caving; top slicing and cover caving; top slicing combined with ore caving. *Fay.* b. Longwall coal mining in which excavated space (gob) is left to collapse. *Pryor, 3.*

caving the back. *See* block caving.

cavitation. The formation and instantaneous collapse of innumerable tiny voids or cavities within a liquid subjected to rapid and intense pressure changes. Cavitation produced by ultrasonic radiation is sometimes used to give violent localized agitation. That caused by severe turbulent flow often leads to cavitation damage. *ASM Gloss.*

cavitation damage. Wearing away of metal through the formation and collapse of cavities in a liquid. *ASM Gloss.*

cavitation erosion. *See* cavitation damage. *ASM Gloss.*

cavitation noise. The noise produced in a liquid by the collapse of bubbles which have been created by cavitation. *Hy.*

cavity. a. A natural underground opening or void which may be small or large. *Compare* cave; cavern; vug. *Long.* b. A void in a bit caused by a bubble of gas entrapped in the matrix material during the manufacturing process. Also called vug. *Long.* c. The bubble formed by a projectile at water entry. *Hy.*

cavity-filling deposit. A deposition of minerals in cavities or rock openings. *Bateman.*

cavity wall. A wall built of masonry units so arranged as to provide a continuous air space at least 2 inches wide and not more than 3 inches wide within the wall. The facing and backing are tied together with rigid metal ties. *ACSG.*

CAVU Abbreviation for ceiling and visibility unlimited. *Zimmerman, pp. 22, 383.*

cawk. a. Eng. Sulfate of barium heavy spar. *Fay.* b. Scot. Chalk; limestone. Also spelled cauk. *Fay.*

caxas. Walls of a vein; chest. *Hess.*

c axis. a. The vertical axis of crystals in all systems except the isometric or cubic system. *Bureau of Mines Staff.* b. In structural petrology, the reference axis that is at right angles to the plane of movement; that is, in a pack of sliding cards, it is the direction perpendicular to the cards. *A.G.I.*

cay sandstone. Friable to firmly cemented coral sand formed near the base of a coral reef cay. Cay sandstone is horizontally stratified and reaches above high-tide level. It is cemented by calcium carbonate deposited from fresh water. *A.G.I.*

Cayugan. Upper Silurian. *A.G.I. Supp.*

cayuse. In the Western United States, a native range horse; especially, an Indian pony. *Webster 3d.*

Cazenovian. Lower Middle Devonian. *A.G.I. Supp.*

cazin. A brass containing 82.6 percent copper and 17.4 percent zinc that is used to braze steel. *Campbell.*

Cb Chemical symbol for columbium (niobium). *Zimmerman, p. 144.*

Cbr Abbreviation for California bearing ratio. *Nelson.*

C/B ratio. A measure of the resistance to freezing and thawing of a brick. It is the ratio of the weight of water absorbed by cold immersion (24 hours) to the weight absorbed by immersion in boiling water (5 hours); also known as the saturation coefficient. *ACSG.*

cc Cubic centimeter. Also abbreviated cu cm and cm^3. *Webster 3d.*

Cd Chemical symbol for cadmium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

C-D principle. The convergence-divergence principle used in the Frenkel mixer. *Dodd.*

Ce Chemical symbol for cerium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Ceag Montlucon gas detector. This nonautomatic detector has the appearance of a mine official's electric hand lamp. It indicated on an illuminated scale percentages of methane from 0-3 in steps of 0.1. When a test for firedamp is to be made the projecting front piece is turned part of a revolution and this extinguishes the main light and lights up the illuminated scale. A sample of air is flushed into the detector by means of a small aspirator (or hand pump); the button switch at the side is operated and the percentage of firedamp, if any, is indicated on the illuminated scale. *Cooper, p. 224.*

cecilite. A leucitite characterized by an abundance of melilite. *Holmes, 1928.*

cedarite. A fossil resin resembling amber. Identical with chemawinite. Obtained from Cedar Lake, Saskatchewan River, Canada. *English. See also* succinite.

cedricite. A leucitite composed of leucite, diopside, and phlogopite, and commonly containing pseudomorphs of serpentine after olivine. *A.G.I.*

C_{50}. *See* contrast ratio. *Dodd.*

ceiling cavity. A concave solution opening in a cave ceiling, a half-round or segmental trace of a tube remaining in the roof or in the wall. Synonym for half tube. *Schieferdecker.*

ceiling channel. A sinuous channel developed in a cavern ceiling, a half-round or segmental trace of a tube remaining in the roof or in the wall. Synonym for half tube. *Schieferdecker.*

ceiling pocket. A downward facing solution cavity in a cave ceiling unrelated to the joints. *Schieferdecker.*

ceiling tube. A half tube developed in a cave ceiling and elongated along a joint. *Schieferdecker.*

ceja. a. The cliff at the edge of a mesa; an escarpment. *A.G.I.* b. The steeper slope of the two slopes of a wold, if it is a cliff, or that part of this slope that is a cliff. *See also* wold. *A.G.I.* c. Mex. In vanning with a horn spoon or miner's pan, the heaviest streak or concentrate that appears at the edge. *Fay.*

celadon. a. A sea-green color. Celadon fleuré has raised decoration of this color. *C.T.D.* b. Porcelain of pale or grayish-green color. *C.T.D.*

celadon green. *See* celadonite.

celadonite. A green mineral of the mica group, high in iron content and generally occurring in cavities in basaltic rocks. *A.G.I.*

celandine green. *See* celadonite.

celedonite. Error for celadonite. *Hey 2d, 1955.*

celeste blue. A ceramic color made by softening the normal cobalt blue by the addition of zinc oxide. *Dodd.*

celestialite. A variety of sulfohydrocarbon which has been found in iron meteorites. *Tomkeieff, 1954.*

celestial precious stone. Olivine from a meteorite. *Schaller.*

celestial stone. Turquoise. *Shipley.*

celestine. *See* celestite. *C.M.D.*

celestite; celestine. A strontium sulfate, $SrSO_4$; orthorhombic. *Dana 17.* $SrSO_4$, decomposes at 1,580° C. The mineral source of strontium and its compounds. Both the mineral and the chemical are sometimes used to impart iridescence to glasses and glazes. They have also been used as fining agents in crystal glass. *Lee.*

celite; celith. A constituent of portland cement clinkers. *English.*

cell. a. A compartment in a flotation machine. *Hess.* b. One of the spaces in a hollow clay building block. According to the American Society for Testing and Materials, a cell must have a minimum dimension of at least ½ inch and a cross-sectional area of at least 1 square inch. *Dodd.* c. A single element of an electric battery, either primary or secondary. *Crispin.* d. Battery unit consisting of two electrodes separately contacting an electrolyte so that there is a potential difference between them. *Bennett 2d, 1962.* e. *See* galvanic cell; local cell. *ASM Gloss.*

cellar. Excavated area under drill-derrick floor to provide headroom for casing and pipe connections required at the collar of a borehole, or to serve as a covered sump. *Long.*

cellar coal. Eng. Term used among Lancashire miners for any coal seam lying a short distance below a main seam in which sumps or cellars are made. *Tomkeieff, 1954.*

cellar stone. A small, irregular rock fragment. *Fay.*

cell feed. The material supplied to the cell in the electrolytic production of metals. *ASM Gloss.*

cell-feed department foreman. In ore dressing, smelting, and refining, a foreman who supervises workers engaged in concentrating, flaking, and drying magnesium chloride preparatory to obtaining magnesium by electrolysis. *D.O.T. Supp.*

cell furnace. A glass tank furnace in which glass in the melting end and auxiliary chambers is heated electrically. *Dodd.*

cellon. A nonflammable celluloid; specific gravity, 1.26; refractive index, 1.48. An amber imitation. *Shipley.*

cell plasterer. A laborer who seals an opening around a carbon anode, where it protrudes through the cover of a magnesium refining cell to prevent leakage of chlorine gas and to secure anode in position. *D.O.T. Supp.*

cells. Hollow spaces enclosed within the perimeter of the exterior shells and having a minimum dimension of not less than one-half inch and a cross-sectional area of not less than 1 square inch. *ACSG, 1963.*

cells in parallel. When cells are connected so that all the positive terminals are joined together and all the negative poles joined together a battery is so formed, and the cells are said to be joined in parallel. *Morris and Cooper, p. 248.*

cells in series. When cells are connected so that the positive terminal of one cell is joined to the negative terminal of another cell a battery is formed, and the cells are said to be joined in series. *Morris and Cooper, p. 247.*

cell texture. A texture, showing a network along grain boundaries, that may originate by segregation on exsolution. A similar texture may form by the replacement of organic forms, especially cell walls, by ore minerals. *Schieferdecker.*

cellular. Applied to igneous rocks, especially lavas containing numerous gas cavities. Synonym for vesicular; scoriaceous. *A.G.I.*

cellular cofferdam. A cofferdam, with a double wall, consisting of steel sheet piling arranged in intercepting rings about 50 feet in diameter. The space between the lines of piling is filled with sand. *Ham.*

cellular concrete. A lightweight concrete foam which may be made in several ways: (1) by the addition of aluminum powder to the concrete mix and applying heat which sets hydrogen free to make the concrete cellular; (2) by whipping air into the mix containing an entraining agent; and (3) by adding performed foam to the mix. Such foams are made from a foaming agent such as dried blood, a stabilizer such as ferrous or aluminum sulfates, organic solvents, and a germicide, such as chlorinated phenol or mercury salts. *CCD 6d, 1961.*

cellular glass. Foam glass; used as thermal insulation. *Bennett 2d, 1962 Add.*

cellular pyrite. Marcasite. *Fay.*

cellular structure. *See* network structure. *C.T.D.*

celluloid. A plastic produced from a cellulose base of two varieties, sometimes used for imitations of amber, ivory, tortoise shell, etc. The newer nonflammable cellulose acetate variety, or safety celluloid, has specific gravity, 1.3 to 1.8; refractive index, 1.49 to 1.50. The old flammable cellulose nitrate variety has approximately the same properties. *Shipley.*

cellulose. a. Woody fiber of plants, sometimes coarsely ground and added to a drill-circulation medium or to cement slurries as a plugging agent. *Long.* b. The most abundant carbohydrate, $C_6H_{10}O_5$, with a chain structure like that of the paraffin hydrocarbons. With lignin, an important constituent of plant materials, from which coal is formed. *Leet.*

cellulose nitrates. *See* nitrocelluloses. *CCD 6d, 1961.*

celsian. A colorless silicate of barium and aluminum, $Ba(Al_2Si_2O_8)$; monoclinic. Crystals and twins of many forms; usually cleavable massive. From Jacobsberg, Sweden; and Mariposa County, Calif. A feldspar. *English; Dana 17.*

Celsius. a. The centigrade thermometer or scale; a common but an erroneous use. *Standard, 1964.* b. A thermometric scale divided like the centigrade, except that the numeration runs downward; invented by Anders Celsius (1701-1744). Symbol, C. *Standard, 1964; BuMin Style Guide, p. 58.*

celyphitic. An incorrect spelling of kelyphitic; of, or pertaining to, the rims or borders of pyroxene or amphibole surrounding olivine or garnet in some rocks, as observed in thin section. *Hess.*

cement. a. The compact groundmass which surrounds and binds together the larger fragments or particles in sedimentary rocks. *HW.* b. Chemically precipitated material occurring in the interstices between allogenic particles of clastic rocks. Silica, carbonates, iron oxides, iron hydroxides, gypsum, and barite are the most common cements. Clay minerals and other fine clastic particles should not be considered cement. *A.G.I.* c. A finely divided metal obtained by precipitation. The word in this sense is generally used in combination; as, cement copper, cement gold, or cement silver. *Standard, 1964.* d. The substance in which iron is packed in the process of cementation. *Standard, 1964.* e. A material or a mixture of materials (without aggregate) which, when in a plastic state, possesses adhesive and cohesive properties, and which will harden in place. *ASTM C11–60.* f. A finely ground powder which, in the presence of an appropriate quantity of water, hardens and adheres to suitable aggregate, thus binding it into a hard agglomeration that is known as concrete or mortar. *Taylor.* g. To place cement in a borehole to seal off caves or fissures or to fill cavities or caverns encountered in the process of drilling boreholes. *Long.* h. Used in gold-mining regions to describe various consolidated, fragmental aggregates, such as breccia, conglomerate, and the like, that are auriferous. *Fay.* i. A hard alluvial deposit, often a conglomerate. *Gordon.*

cementation. a. To fill cavities or plug a drill hole with cement or other material to stop loss of water or entrance of unwanted liquids, gas, or fragmented rock materials into a borehole. Also called dental work. *Long.* b. The process by which loose sediments or sands are consolidated into hard rock by injection of chemical solutions, thin cement slurries, or self-hardening plastic. *Long.* Also called cementing. c. The introduction of one or more elements into the outer portion of a metal object by means of diffusion at high temperature. *ASM Gloss.* d. Usually, the process of raising the carbon content of steel by heating in a carbonaceous medium. Generally, any process in which the surface of a metal is impregnated by another substance. Also called casehardening; carburization; carbonization. *C.T.D.*

cementation box. The box of wrought iron in which casehardening is effected. *Fay.*

cementation sinking. A method of shaft sinking through water-bearing strata by injecting chemicals or liquid cement into the ground. A number of small-diameter boreholes are put down around the shaft (and about 80 feet ahead of the shaft bottom), through which cement is forced by means of pumps. The cement, when set, seals the fissures and thus prevents water inflows during sinking. The method is most successful in strong fissured strata, and least successful in loose alluvial deposits. *See also* grouting. *Nelson.*

cementation steel. Steel made by a process in which bars of wrought iron are packed into a sealed furnace together with charcoal. The resulting material is blister steel. *Camm.*

cementation water. Water containing dissolved copper or iron sulfates or other metal compounds. *Stoces, v. 1, p. 478.*

cement bacillus. This name has been applied to the compound $3CaO \cdot Al_2O_3 \cdot 3CaSO_4 \cdot 31H_2O$, which is formed by the action of sulfate solutions on Portland Cement and concrete. *Dodd.*

cement barrel. Synonym for cement injector. *Long.*

cement bond log. The problem of determining whether casing is properly cemented in place has long been a thorny one. A device, which is in all esesentials merely an adaption of a continuous velocity logging tool, has been developed to throw light on the quality of a cement job. If a single-detector continuous velocity log is run in a cased or cemented hole, the path of minimum acoustic travel time between transmitter and detector is generally via the steel pipe. This path is generally quickest because the travel time through steel is about 17,300 feet per second. This travel time is less than that through sandstone (unless their porosity is less than 5 percent) or through carbonate rocks (unless their porosity is less than about 10 percent). Thus when drilling through most sand-shale sequences a velocity log run after casing was set would be expected to show a shorter and more uniform travel time than if run through the same interval uncased. *Wyllie, p. 162.*

cement bricks. Bricks made from a mixture of Portland cement and sand or cinders. *Mersereau, 4th, p. 260.*

cement, chemical resisting. Portland cement that is somewhat more resistant to chemical action than the regular grade because of high tetracalcium aluminoferrate and low tricalcium aluminate content, and also because of additives such as water glass, calcium soaps, or other materials. *CCD 6d, 1961.*

cement clay. A clay rock containing a varying amount of calcium carbonate, and used for the manufacture of cement. *Nelson.*

cement clinker. Portland cement as it comes from the kiln. *Bureau of Mines Staff.*

cement contractor. A company or person available for hire by contract, using trained men and special equipment to place large quantities of cement in a borehole. *Long.*

cement copper. Copper precipitated by iron from copper sulfate solutions. *Bateman.*

cement deposit. The Cambrian conglomerate occupying supposed old beaches or channels. It is gold-bearing in the Black Hills, S. Dak. *Fay.*

cement dust. Byproduct of cement manufacture; contains 6 to 9 percent K_2O; used in fertilizers. *Bennett 2d, 1962.*

cemented carbide. Generally, a mixture of powdered tungsten carbide and cobalt, subjected to pressure and heat to produce bit crowns, small plates, cubes, or cylinders of material having a much greater hardness than steel. Mixtures also may contain small amounts of titanium, columbium, or tantalum carbide. Cobalt may be replaced by powdered nickel. *See also* carbide inserts. Also called sintered carbide. *Long.*

cemented carbide tools. Tools made from pulverized carbides fused into hard tips for heavy-duty or high-speed cutting of metals. *Crispin.*

cemented shale. Hardened shale, the mineral particles of which are bound by siliceous, calcareous, or ferruginous cement. *Compare* compaction shale. *A.G.I. Supp.*

cementer, oil-well. In petroleum production, one who directs and assists workers engaged in cementing annular space between gas- or oil-well sidewalls and steel casings, to provide protection and control for underground operations; recommends type of cementing job for specific formations and conditions. Also called oil-well cementer. *D.O.T. 1.*

cement factor. The weight of cement per cubic yard of hardened concrete. *Taylor.*

cement gold. Gold precipitated in fine particles from solution. *Fay.*

cement grout. A pumpable thin slurry consisting primarily of a mixture of cement, sand, and water injected into rock formations through boreholes as a sealant. Also called grout. *Long.*

cement grouting. The material used in and/or the process of applying or injecting, under pressure, a thin slurry of cement and fine sand into rock formations to seal the joints, cracks, or fissures, or to stabilize and increase the strength of brecciated or unconsolidated material. Also called grouting. *Long.*

cement gun. a. Machine for mixing, wetting, and applying refractory mortars to hot furnace walls. *Bureau of Mines Staff.* b. Synonym for cement injector. *Long.* c. A mechanical device for the application of cement, in the form of gunite, to the walls or roofs of mine openings or building walls. Also called gunite gun. *Long.*

cement, H.E.S. *See* high early strength cement. *CCD 6d, 1961.*

cementing. The operation of cementing the casing into a hole to shut off water and caving strata and to prevent the oil and gas from migrating or blowing out. *Shell Oil Co. See also* cementation. *Long.*

cementing furnace. A furnace or oven used in the process of cementation. *Fay.*

cementing material. *See* cement. *Fay.*

cementing oven. *See* cementing furnace.

cementing tool operator. In petroleum production, one who uses special tools and techniques in performing more difficult cementing jobs on oil- or gas-well boreholes or producing wells, such as sealing permeable formations, or shutting off gas or water flow by driving cement at high pressures through perforated casings or well liners to specified points (squeeze cementing). Also called special tool operator. *D.O.T. 1.*

cementing trowel. A tool similar to the plasterer's trowel but often of heavier gage stock. *Crispin.*

cement injection. The process of injecting cement into a borehole by use of a cement injector or by grouting. *Long.*

cement injector. a. A device consisting of a long piece of steel tubing having a rupture plate in the bottom and a piston in the upper end. Cement placed in the tube between the rupture plate and the piston is ejected into the borehole by bursting the rupture plate when water pressure, delivered through the drill rods, is applied to the piston. Also called cement barrel; cement gun. *Long.* b. Mechanical device connected to a high-pressure pump capable of injecting cement under high pressure into rock formations through a borehole. *Compare* grout injector, b; grout machine. *Long.*

cementite. a. A compound of iron and carbon, known chemically as iron carbide and having the approximate chemical formula Fe_3C. It is characterized by an orthorhombic crystal structure. When it occurs as a phase in steel, the chemical composition will be altered by the presence of manganese and other carbide-forming elements. *ASM Gloss.* b. Identical with cohenite, the natural meteoritic material. *Hey 2d, 1955.*

cementitious. Having the property of or acting like cement, as certain limestones and tuffs when used in the surfacing of roads. *A.G.I. Supp.*

cement joggle. An indentation left in one concrete block to correspond with a notch in the adjoining block. When the blocks have set, the cavity between them is filled with concerete, thus forming a key and preventing relative movements. *Ham.*

cement kiln. A rotating, refractory-line, horizontal, steel shell, for burning Portland cement. *Bureau of Mines Staff.*

cement kiln hood. The head, which may be mobile or fixed, of a rotary cement kiln; through the hood the burner passes and within the hood the clinker discharges from the kiln to the cooler. *Dodd.*

cement, low heat. A variety of portland cement having higher tetracalcium aluminoferrate and dicalcium silicate content and less of tricalcium silicate and tricalcium aluminate than usual. The cement sets with the evolution of much less heat. *CCD 6d, 1961.*

cement mill. a. A mill for crushing and grinding cement stone; also, a mill for grinding the cinder after it comes from the kiln *Fay.* b. A mill for grinding limestone and shale to be fused into clinker for cement. *Hess.*

cement mixer operator. *See* concrete mixer operator. *D.O.T. 1.*

cement-modified soil. The addition of small quantities of cement (1 to 2 percent) to fine-grained soils to reduce the liquid limit, plasticity index, and water-absorption tendency. The effect of the cement is to bring individual soil particles into aggregations, thus artificially adjusting the grading of the soil. *See also* soil stabilization. *Nelson.*

cement mortar. Made from 4 (or less) parts of sand, 1 of cement, and adequate water. *Nelson.*

cement paint. Paint based on portland cement with pigment, filler, accelerator, and water repellant. *Bennett 2d, 1962 Add.*

cement pipe; concrete pipe. A hollow cylinder, with fitted ends formed by molding a mixture of portland cement, water, sand, stone or other hard material, and permitting it to harden by natural process prior to handling and use. *Hess.*

cement plug. Hardened cement material filling a portion of a borehole. *Long.*

cement, quicksetting. *See* quicksetting cement. *Long.*

cement rock. A natural limestone rock containing the proper amount of clay for cement manufacture. *Mersereau, 4th, p. 235.*

cement silver. Silver precipitated from solution, usually by copper. *Fay.*

cement slurry. A pourable or pumpable mixture of water, cement, and the fine sand having the consistency of a thick liquid-like heavy cream. *Long.*

cement stabilization. The addition of cement to a soil, which acts as a binding agent and produces a weak form of concrete called soil cement. The quantity of cement to be added depends upon the type of soil. Cement can be used with most types of soil, providing the clay fraction is reasonably small and other specified impurities are not present. A small percentage of lime is usually added. With very poor soils, cement stabilization may be uneconomical or impracticable. *See also* soil stabilization. *Nelson.*

cement steel. Same as cementation steel. *Standard, 1964.*

cement stone; cement rock. a. Any rock which is capable of furnishing cement when properly treated *Fay.* b. *Scot.* Argillaceous limestone-magnesian. *Nelson.*

cement texture. A texture produced by cementation or replacement of cement in a sandstone or conglomerate by ore minerals. *Schieferdecker.*

cement valve. A ball, flapper, or clack-type valve placed at the bottom of a string of casing, through which cement is pumped. When pumping ceases, the valve closes and prevents return of cement into the casing. *Long.*

cenology. The branch of geology treating of the terrestrial, fluviatile, and lacustrine deposits. Synonym for surface geology. *A.G.I.*

Cenomanian. Lower Upper Cretaceous. *A.G.I. Supp.*

cenosite; kainosite. A very rare, weakly, radioactive, yellowish-brown, orthorhombic mineral, $2CaO.(Ce,Y)_2O_3CO_2.4SiO_2.H_2O$; found in limy rocks metamorphosed by pegmatitic solutions. *Crosby, pp. 97-98; Hess.*

cenotypal. Applied to aphanitic and porphyritic igneous rocks having the habit or suite of characteristics typical of fresh or nearly fresh volcanic rocks, such as those of Recent and Tertiary age. Crystals are lustrous, and glass, where present, has not lost its brilliancy by devitrification; whereas in the older rocks, feldspars and glass have become dull and lusterless by decomposition and devitrification. Rocks having the older-looking, dense, and compact habit are described as paleotypal. The two terms constitute an attempt to express the essential differences between the two groups of aphanitic rocks variously distinguished as Tertiary and pre-Tertiary, fresh and altered, hypabyssal and volcanic; differences that are recognized in the nomenclature of rocks by two groups of terms, such as rhyolite and quartz porphyry, andesite and porphyrite, basalt and diabase. *Holmes, 1928.*

Cenozoic. The latest of the five eras into which geologic time, as recorded by the stratified rocks of the earth's crust, is divided; it extends from the end of the Mesozoic era to and including the present. Also, the entire group of stratified rocks deposited during the Cenozoic era. The Cenozoic era includes the periods called Tertiary and Quaternary in the nomenclature of the U.S Geological Survey. Some European authorities divide it, on a different basis, into the Paleogene and the Neogene periods, and still others extend the Tertiary period to include the whole. *Fay.*

cental. An English weight of 100 avoirdupois pounds, the same as the hundredweight in the United States. *Standard, 1964.*

center. a. A temporary timber framework upon which the masonry of an arch of reinforced masonry lintel is supported until it becomes self-supporting. *ACSG.* b. To force a ball of clay into a centered position on a potter's wheel. *ACSG, 1963.*

center adjustment. In surveying, a system which allows accurate final centering of the theodolite above (or below) its station by sliding the whole instrument on its stand (tribrach). Important with short sights where small centering errors could introduce serious inaccuracy. *Pryor, 3.*

center bore; centre bore. Synonym for set inside diameter. *Long.*

center brick. A special, hollow, refractory shape used at the base of the guide tubes in the bottom pouring of molten steel. The center brick has a hole in its upper face and this is connected via the hollow center of the brick to holes in the side faces (often six in number). The center brick distributes molten steel from the trumpet assembly to the lines of runner bricks. It is also sometimes known as a crown brick or spider. *Dodd.*

center constant. In air velocity determination, the ratio of the mean velocity to the velocity measured at the center. This ratio is found to be dependent upon the Reynolds number. *Roberts, I, p. 44.*

center constant method. If a pitot-static tube is to be used as a permanent installation for air velocity determination it is usual to find the relationship between the mean velocity and the velocity at the position chosen, usually the center. For this, two tubes are used. One is placed in the required position while the other tube is used to determine the velocity distribution across the conduit. The fixed-position tube serves to monitor the variation, if any, in the flow velocity. Once the relationship between the mean velocity of the airstream and that indicated by the fixed tube is established then the latter tube is used to meter the flow. This is known as the center constant method. *Roberts, I, p. 44.*

center core method. A method of tunneling whereby the center is left to the last for excavation. *Sandstrom.*

center country. Aust. The rock between the limbs of a saddle reef. *Fay.*

center cut. a. The boreholes, drilled to include a wedge-shaped piece of rock and which are fired first in a heading, tunnel, drift, or other working place. *See also* center shot. *Fay.* b. A vertical cut or groove made in coal at or near the center of a working face to facilitate blasting. *Grove.*

center distance. The distance between the centers of the shafts of a chain drive. *J&M.*

center drilling. Drilling a conical hole (pit) in one end of a workpiece. *ASM Gloss.*

center head. A device attached to a scale or blade for use in locating the center of some round object; as the center point on the end of a shaft preliminary to centering. *Crispin.*

center-hole lapping. The cleaning or lapping of center holes. *See also* lapping. *ACSG, 1963.*

centering; centreing. a. A timber falsework used to support the parts of a masonry arch during construction. *Webster 3d.* b. The operation on lens elements wherein the element is optically lined up with the axis of rotation and the edges ground concentric with the optical axis. *ASTM C162-66.*

centering adjustment. In surveying, sliding plate used for final close adjustment of vertical axis of theodolite above its station. May incorporate clamp and fine-adjustment screws. *Pryor, 3.*

centering of shaft. The fixing of the center spot of the proposed shaft at the site selected and the maintenance of the shaft sinking along this plumb line during its entire depth. *Nelson.*

centering plug. A plug fitting both spindle and cutter to insure concentricity of the cutter mounting. *ASM Gloss.*

center-latch elevator and links. Synonym for elevator, i. *Long.*

centerless grinding. Grinding the outside or inside of workpiece mounted on rollers rather than on centers. The workpiece may be in the form of a cylinder or the frustum of a cone. *ASM Gloss.*

centerline. a. A line marked on the roof of a roadway to indicate the direction of the central axis of the roadway. *B.S. 3618. 1963, sec. 1.* b. The plumbline, hung from the roof of a mine roadway, used for controlling the direction in which the roadway is driven. *B.S. 3618, 1963, sec. 1.* c. In U.S. public land surveys, the line connecting opposite quarter-section or sixteenth-section corners. *A.G.I.*

centerman. In anthracite and bituminous coal mining one who locates the centerline of underground openings in a mine, such as entries, rooms, and haulageways, so that the miners can drive the openings in a straight line without calling the mine surveyor. *D.O.T. 1.*

center of gravity. a. Center of mass. *Webster 3d.* b. The single point in a body (as a homogeneous sphere toward which every particle of matter external to the body is gravitationally attracted. *Webster 3d.* c. The point or area of greatest concentration, significance, or interest; a predominating or controlling situation; a focal point. *Webster 3d.* d. The center of mass of a cut or a fill. *Nichols.*

center of gravity of an area. *See* centroid of an area. *Ro.*

center of mass; center of inertia. a. The point that represents the mean position of the matter in a body. *Webster 3d.* b. The point in a body through which acts the resultant resisting force due to the body's inertia when it is accelerated. Coincident with the center of gravity. *C.T.D.* c. In a cut or a fill, a cross section line that divides its bulk into halves. *Nichols.*

center of pressure. A point on an area under equal overall pressure at which such pressure can be calculated as in balance. *Pryor, 3.*

center of shear. *See* torsional center. *Ro.*

center of symmetry. In crystallography, the point in which the axes and planes of symmetry intersect; in the normal group of the triclinic system, which has neither planes nor axes of symmetry, the point with respect to which equivalent opposite faces are symmetrical. *Fay.*

center of torsion. *See* torsional center. *Ro.*

center of transit. a. Manufacturer's term for either of the two vertical spindles (axes) of the transit. The outer (hollow) center revolves in a socket and is attached to the graduated horizontal circle. The inner center revolves in a socket in the outer center and is attached to the alidade or upper portion of the instrument. *Seelye, 2.* b. The common point of intersection of the vertical axis, the horizontal (cross) axis, and the axis of the telescope tube. *Seelye, 2.*

center of twist. *See* torsional center. *Ro.*

center pin; center pintle. In a revolving shovel, a fixed vertical shaft around which the shovel deck turns. *Nichols.*

center plug. a. A small diamond-set circular plug, designed to be inserted into the annular opening in a core bit, thus converting it to a noncoring bit. *Long.* b. A detachable, diamond-set pilot portion of a pilot-type noncoring bit. *Long.*

center prop; middle prop. a. Eng. A prop set temporarily under the center of a plank to support it before props are set at the ends of the plank. *SMRB, Paper No. 61*. b. Eng. *See* temporary prop, b. *SMRB, Paper No. 61*.

center, reduction to. In triangulation, the computation of the necessary corrections to allow for an eccentric setup (that is, a setup in which the instrument does not occupy the point under signal). *Seelye, 2*.

center roll. A horizontal roll at the center of a troughing idler that has three or more rolls. *NEMA MB1—1956*.

centers. a. Framed supports, usually arch-shaped, upon which are placed the lagging boards used, in building an arch, for supporting the roof of a tunnel. *Stauffer*. b. Conical steel pins of a grinding machine upon which the work is centered and rotates during grinding. *ACSG, 1963*.

center shot. A shot in the center of the face of a room or entry. Also called center cut. *Fay*.

center spinning. A method of casting molten metal, in which the molds are spun and centrifugal force helps to fill them. *Pryor, 3*.

center-trace time. One of two approaches used in plotting seismic reflection data on time cross sections. Center-trace times are the times picked on the two traces from the respective detector groups nearest the shot and on opposite sides. The average of the two times for each reflection is plotted at the shot-point position. The points thus plotted for adjacent shot points are connected by straight lines. *Compare* trace-by-trace plotting. *Dobrin, pp. 129, 132*.

centigrade. Symbol, C. Graduated to a scale of 100; of or pertaining to such a scale. On the centigrade thermometer the freezing point of water is 0° (C) and its boiling point is 100° (C). If any degree on the centigrade scale, either above or below 0° C, is multiplied by 1.8, the result will be, in either case, the number of degrees above or below 32° F, or the freezing point of Fahrenheit. *Standard, 1964*.

centigrade heat unit. The quantity of heat required to increase the temperature of 1 pound of water 1° C at atmospheric pressure. Approximately 454 gram calories. Abbreviation, chu. *NRC-ASA N1.1-1957*.

centigram. A unit of mass and weight equal to one-hundreth of a gram; abbreviation, cg. *Webster 3d*.

centimeter. A measure of length in the metric system equal to one-hundreth of a meter; 0.3937 inch; abbreviation, cm. *Crispin*.

centimeter, gram, second system. Removed.

centipoise. The one-hundredth part of a poise, an absolute unit of fluid viscosity. Viscosity of drill-mud fluid is sometimes expressed in centipoise units. *See also* poise. *Long*.

central axis; centroidal axis. A central axis of an area is one that passes through the centroid; it is understod to lie in the plane of the area unless the contrary is stated. When taken normal to the plane of the area, It is called the central polar axis. *Ro*.

central breaker. A breaker where the coal from a number of mines in a district is prepared. Central breakers, representing the last word in mining technology, make it economical for operators to abandon many local breakers. *Korson*.

central depression. *See* inner depression. *Schieferdecker*.

Central Engineering Establishment. An establishment set up in 1954 by the National Coal Board at Stanhope Bretby, near Burton-on-Trent, England, to undertake the design and devlopment of mining equipment. The establishment costs the National Coal Board less than 0.1 percent of its annual turnover. *Nelson*.

central eruption. Volcanic eruption at a center as distinct from along a fissure; the usual type of eruption at the present day. Continued eruption at one center builds volcanoes of the central type. *Challinor*

central fan system. An indirect system of heating in which the air is heated by steam or hot water at a central location and carried to or from the rooms to be heated by a fan and a system of ducts. Also called hot blast system. *Strock, 10*.

central heating plant. a. A heating plant in a building serving all or most of the rooms in the building, as distinguished from individual room heaters. *Strock, 10*. b. A heating plant serving two or more buildings. Also called district heating. *Strock, 10*.

centralized control. *See* remote control. *Nelson*.

centralizer. A device that lines up a drill steel or string between the mast and the hole *Nichols*.

central polar axis. *See* central axis. *Ro*.

central rescue station. A central building equipped for rescue work. It may serve all National Coal Board collieries within a radius of 15 miles, or by special regulation within a greater radius not exceeding 20 miles. The station contains, ready for immediate use, breathing apparatus, ancillary equipment, and vehicles. It is also the training center for the colliery rescue workers. A scheme A station has a permanent resident corps of trained men. *See also* rescue apparatus. *Nelson*.

central vent. An opening in the earth's crust, roughly circular, from which magnetic products are extruded. A volcano is an accumulation of material around a central vent. *Leet*.

centric. Having the material more or less arranged either radially or concentrically around centers, a crystal often forming the center; said of rock texture. *Standard, 1964*.

centrifugal blower. *See* blowing fan. *Nelson*.

centrifugal brake. A safety device on a mine hoist drum that applies brake if the drum speed exceeds the set limit. *Pryor, 3*.

centrifugal casting. Casting molten metals in a rapidly revolving mold. *Bureau of Mines Staff*.

centrifugal clutches. Consists of a driving hub having one or more weighted sections fitted with friction lining on the outer radial surfaces that contact a driven hub having a flange covering that portion of the driving hub containing the radial elements. Upon starting, the radial elements of the driving hub have no appreciable drag, but upon accelerating to the operating speed the force produced by the centrifugal action increases rapidly as the square of the speed and they grip the driven element, thereby causing it to speed up to the required speed of the driving hub. *Pit and Quarry, 53rd, Sec. D, p. 72*.

centrifugal coefficient. Separation coefficient, C^o of a machine separating minerals by use of centrifugal force F acting on a particle of weight W. Ratio F/G. $F = WV^2_p/gr$ where V_p is the tangential velocity, g the gravitational acceleration, r the radius of the rotation. In feet per pound per second units $C^o = -(V^2_p/gr)$. *Pryor, 3*.

centrifugal compressor. Series of low-pressure but high volume fans which build up steady higher pressure between entry and discharge. *Pryor, 3*.

centrifugal discharge bucket elevator. A type of bucket elevator using centrifugal discharge elevator buckets suitably spaced to permit the free discharge of bulk materials. *See also* bucket elevator; centrifugal discharge elevator bucket. *ASA MH4.1-1958*.

centrifugal discharge elevator bucket. A bucket designed to scoop material from the boot of an elevator and discharge by reason of the combined effect of centrifugal force and gravity. *ASA MH4.1-1958*.

centrifugal fan. a. An earlier type of mine fan ranging up to 40 feet in diameter. It had up to eight blades attached to the fan wheel and revolved inside a spiral casing. When revolving it set up a region of low pressure, thus producing a difference in absolute pressure between its inlet and outlet which caused a flow of air through the fan and therefore through the mine. The modern counterpart of the centrifugal fan is the radial-flow fan. *Nelson* b. *See* radial-flow fan. *B.S. 3618, 1963, sec. 2*.

centrifugal filter. *See* filter, b.

centrifugal force. The force exerted as a material particle moving along a curve reacts to the body that constrains the motion and is impelled by inertia to move away from the center of curvature, the force being directed outwardly along the radius of curvature (as a speeding automobile skidding off the outer edge of a curved highway. *Compare* centripetal force. *Webster 3d*.

centrifugal governor. A speed regulating device used on engines by which the speed of rotation affects the altitude of two rotating balls or weights, any variation in speed causes the balls to assume a new plane of rotation and at the same time to cut off or increase the flow of steam, gas, or oil. *Porter*.

centrifugal pump. a. A form of pump in which water is drawn through the eye of a rotating impeller and discharged from its periphery into a chamber of series of passages of gradually increasing cross section. The kinetic energy given to the water by its cenetrifugal discharge is thus largely converted to pressure energy. *B.S. 3618, 1963, sec. 4*. b. A centrifugal pump with one impeller is called a single-stage pump. For high heads several stages are used, one impeller delivering water to the next one, thus building up the head generated in the pump. Stage pumps, fitted with guide vanes to direct the water, are called turbine pumps. The volute pump, without guide vanes, is gaining favor. Six- and eight-stage centrifugal pumps are in operation at a number of mines. A stage pump is limited to a maximum head of about 300 feet per stage, but a head ranging from 150 to 225 feet is more commonly used. *Lewis, pp. 637–638*. c. *See* turbine pump. *B.S. 3618, 1963, sec. 4*.

centrifugal replacement. The replacement of a mineral by another mineral that begins in the center of the host mineral and proceeds outwards. *A.G.I.*

centrifugal separation. a. The separation of particles of different kinds by centrifugal action as used in cyclone separators and centrifuges. *See also* coal-preparation plant.

Nelson. b. The use of centrifugal force to increase apparent density of finely divided particles so as to accelerate their movement with respect to ambient fluid. *Pryor, 3.* c. Accelerated settlement of finely divided particles from pulp, removal of moisture, or classification into relatively coarse and fine fractions by centrifuging. Performed on a laboratory scale in small batches, and commercially in a hydrocyclone or centrifugal classifier. *Pryor, 3.*

centrifugal ventilation. A mine ventilation system in which the air is led through a shaft in the middle of the field into the mine and out again at the periphery of the mining field. *Stoces, v. 1, p. 529.*

centrifuge. A rotating device for separating liquids of different specific gravities or for separating suspended colloidal particles, such as clay particles in an aqueous suspension, according to particle-size fractions, by centrifugal force. Colloidal particles that cannot be deposited from suspension by gravity can be deposited by centrifugal force in a supercentrifuge. *Bureau of Mines Staff.*

centrifuge moisture equivalent. *See* moisture equivalent. *ASCE P1826.*

centrifuging. a. Dewatering with the aid of centrifugal force. *B.S. 3552, 1962.* b. Application of centrifugal force to mineral treatment. *Pryor, 4.*

centripetal drainage. Drainage more or less radially inward toward a center. *Stokes and Varnes, 1955.*

centripetal force. The force that constrains a material particle to follow a curved path and that acts inwardly toward the center of curvature of the path causing centripetal acceleration, as a railroad train is prevented from leaving the track on a curve by the force exerted on the flanges of the outer wheels by the outer rail. *Compare* centrifugal force. *Webster 3d.*

centripetal pump. A pump with a rotating mechanism that gathers a fluid at or near the circumference of radial tubes and discharges it at the axis. *Standard, 1964.*

centripetal replacement. The replacement of a mineral by another mineral from the periphery of the host mineral inward. *1964.*

centroclinal. An uplift of strata which gives them a partial quaquaversal dip. *Standard, 1964*

centrocline. An area of stratified rocks which dipse toward a center. *Hess.*

centroid. The center of area of a section; that point about which the static moment of all the elements of area equals zero. *See also* center of gravity. *Ham.*

centroidal axis. *See* central axis. *Ro.*

centroid of an area; center of gravity of an area. That point in the plane of the area about any axis through which the moment of the area is zero; it coincides with the center of gravity of the area materialized as an infinitely thin homogeneous and uniform plate. *Ro.*

centrosphere. The central core of the earth, composed of heavy material and accounting for most of the mass of the earth. Synonym for barysphere. *Stokes and Varnes, 1955.*

centrosymmetrical. In crystallography, having symmetry around a center but lacking a plane of symmetry or an axis of symmetry. *Fay.*

centrum. The point, line, or place within the earth from which earthquake waves are propagated. *Stokes and Varnes, 1955.*

cephalopods. These have a head, mouth, and tentacles as in a cuttlefish. The shell was at one time a straight, hornlike trumpet or dagger sheath, as in the extinct belemnites, but living species are coiled, like most cephalopods, into a spiral shell like the nautilus. Cephalopods are always marine. *Mason, v. 1, p. 28.*

cer-agate. Yellow chalcedony. *See also* carnelian. *Shipley.*

ceramals; cermets; metamics. Materials produced by combining a ceramic, such as an oxide, carbide, nitride, boride, silicate or silicide, with a metal or alloy. The combination is effected at high temperatures under controlled atmospheres using methods similar to powder metallurgy techniques; the product has properties that differ from those of the components. Ceramals have good high-temperature strength together with resistance to oxidation and intergranular corrosion. Applications include gas turbine blades, and electrical components. *Osborne.*

ceramet. Substance formed of a mixture of metal and ceramic, to give the requisite conductivity to the latter. *C.T.D. Supp.*

ceramic. a. As a singular or plural noun, any of a class of inorganic, nonmetallic products which are subjected to a high temperature during manufacture or use. *ACSG, 1963.* b. As an adjective, of or pertaining to ceramics, that is, inorganic, nonmetallic as opposed to organic or metallic, or pertaining to products manufactured from inorganic nonmetallic substances, which are subjected to a high temperature during manufacture or use, or pertaining to the manufacture or use of such articles or materials, such as ceramic process or ceramic science. *ACSG, 1963.*

ceramic beading. Applying enamel slip to edge or trim of hollow ceramic articles. *Bennett 2d, 1962 Add.*

ceramic bond. a. The cohesion and adhesion that develops between the particles in a ceramic body by heat treatment through the formation of glassy materials providing inner growth of new crystalline forms. *Bureau of Mines Staff.* b. In a ceramic body, the mechanical strength developed by a heat treatment which causes the cohesion of adjacent particles. *HW.*

ceramic coating. a. A coating applied to ceramic ware which is primarily composed of nonmetallic materials. It may contain small amounts of metallic oxides for coloring purposes (that is, glazes, oxide coatings, etc.). *Bureau of Mines Staff.* b. An inorganic, essentially nonmetallic, protective coating on metal, suitable for use at or above red heat. *ASTM C286-65.*

ceramic colorant. *See* color oxide. *ASTM C286-65.*

ceramic color glaze. An opaque-colored glass of satin or gloss finish obtained by spraying the clay body with a compound of metallic oxides, chemicals, and clays and firing at high temperatures, fusing the glaze to the body, making them inseparable. *ACSG, 1963.*

ceramic cones. *See* pyrometric cone. *Hess.*

ceramic engineer. One who conducts research and directs the technical work in the manufacture of ceramic products, such as bricks, pottery, and glassware; tests physical, chemical, and heat resisting properties of various materials used in manufacture; selects combinations of materials for use in manufacture of ceramics according to the conditions under which the product is to be used; designs equipment and apparatus to improve methods of producing ceramic products; determines the temperature at which the shaped ceramic is to be baked and the manner in which it is to be glazed. *D.O.T. 1.*

ceramic engineering. The application of the fundamental sciences to the development of ceramic products. *Enam. Dict.*

ceramic filter. A ceramic characterized by an interconnected pore system, the pores being of substantially uniform size. Such ceramics are made from a batch consisting of prefired ceramic, quartz, or alumina together with a bond, that, during firing, will vitrify and bind the surfaces of the grains together. The pore size of different grades varies from about 10μ to 500μ. The filters are commonly available as tiles or tubes, the latter sometimes being known as candles; special shapes can be made as required. Uses include filtration, aeration, electrolytic diaphragms and airslides. *Compare* filter block; sintered filter. *Dodd.*

ceramic industries. Industries which manufacture products from nonmetallic materials by heat treatment. These products include brick, tile, terra-cotta, sewer pipe, drain tile, lightweight aggregate, china, pottery, porcelain, cement, plaster, glass, enamel, refractories, electrical insulants, thermoinsulants, abrasives, ceramic coatings, etc. Some of the nonmetallic material utilized are clays, shales, silica, bauxite, diaspore, kyanite, limestone, magnesia, gypsum, talc, asbestos, mica, zirconia, etc. *Bureau of Mines Staff.*

ceramic ink. An ink containing a ceramic pigment that develops its color on firing. Also known as stamping, screening, or printing ink. *ASTM C286-65.*

ceramicite. A porcelainlike, pyrometamorphic rock consisting of basic plagioclase and cordierite with accessory hypersthene and a groundmass of glass. *Webster 3d.*

ceramic materials. Materials which contain compounds of metallic and nonmetallic elements. Examples: MgO, $BaTiO_3$, SiO_2, SiC, clays, spinels, mullite, glasses, etc. *VV.*

ceramic mosaic tile. An unglazed tile formed by either the dust-pressed or plastic method, usually ¼ to ⅜ of an inch thick, and having a facial area of less than 6 square inches and which is usually mounted on sheets approximately 2 feet x 1 foot to facilitate setting. Ceramic mosaic tile may be of either porcelain or natural clay composition and may be either plain or with an abrasive mixture throughout. *ASTM C242-60T.*

ceramic paste. A French term synonymous with ceramic body. *ASTM C242-60T.*

ceramic pebbles. Grinding media made from very dense, tough porcelain, alumina, and sillimanite. *AIME, p. 14.*

ceramic reactor. A reactor constructed of fuel and moderator assemblies of high-temperature-resistant ceramic materials, such as metal oxides, carbides, or nitrides. *NRC-ASA N1.1-1957.*

ceramics. a. The art and science of making and using solid particles which have as their essential components, and are composed in large part of, inorganic nonmetallic materials. *Bureau of Mines Staff.* b. Originally, referred only to ware formed from clay and hardened by the action of heat, and to the art of making such ware. However, its significance has gradually been extended by usage, and it is now understood to include all refractory materials, cement, lime, plaster, pottery, glass, enamels, glazes, abrasives, electrical insulating products, and thermal insulating products made from clay or from other inorganic nonmetallic mineral substances. *HW*. c. Fictile art, relating to the manufacture of any type of pottery or porcelain. *Dodd.*

ceramic sizing. Varnish. *Bennett 2d, 1962 Add.*

ceramic sponge. Calcined clay or diatomaceous earth foamed by gas and fired. *Bennett 2d, 1962 Add.*

ceramic-to-metal seal. The joining of a metal to a ceramic is generally accomplished by metallizing the ceramic surface and then brazing-on the metal component. Ceramic-to-metal seals are used in electrically insulated and vacuum-tight lead-throughs, especially for high power, high frequency devices; components so made are more rugged and resist higher temperatures than those having a glass-to-metal seal, therefore, permitting a higher bake out temperature and use in a nuclear environment. *Dodd*

ceramic tools. Cutting tools made from fused, sintered, or cemented metallic oxides. *ASM Gloss.*

ceramic veneer. A type of architectural terracotta, characterized by larger face dimensions and thinner sections, ranging from 1⅛ to 2½ inches in thickness, with adhesion and anchored types. *ACSG.*

ceramic whiteware. A fired ware consisting of a glazed or unglazed ceramic body which is commonly white and of fine texture. This term designates such products as china, porcelain, semivitreous ware and earthenware. *ASTM C242-60.*

ceramist. A person devoted to the ceramic art, whether as a manufacturer, a designer and decorator, or as a student or connoisseur. *Fay.*

ceramites. A term used by M. E. Wadsworth including all fictile ceramic minerals. *Fay.*

cerargyrite; horn silver. Silver chloride, $AgCl$, contains 75 percent silver. Perfectly sectile; isometric. *Sanford; Dana 17.*

ceratite. A type of ammonoid with sutures in which the lobes are subdivided into subordinate crenulations although the saddles remain smoothly rounded and undivided. *A.G.I.*

cetratophyre. *See* keratophyre. *Fay.*

cereal. An organic binder, usually corn flour. *ASM Gloss.*

cerhomilite. Borosilicate of calcium, beryllium, iron, thorium, and rare earths. *Hey 2d, 1955.*

ceria. *See* cerium oxide. *CCD 6d, 1961.*

cerianite. Minute, greenish-yellow octahedra in carbonate rock. Cubic CeO_2 with some ThO_2. Obtained from Lachner, Sudbury, Ontario, Canada. Named from its relation to thorianite and uraninite. *Spencer 21, M.M., 1958.*

cerian uraninite. Uraninite containing $(Ce,La)_2O_3$ in excess. *Crosby, p. 53.*

ceric. Of, pertaining to, or containing cerium in the tetravalent state; for example, ceric oxide (CeO_2). *Webster 3d.*

ceric hydroxide; ceric oxide, hydrated; cerium hydrate. A whitish powder when pure. The dry powder is a hydrated oxide containing from 85 to 90 percent ceric oxide; $CeO_2.xH_2O$. Used as an opacifier in glasses and enamels (imparts yellow color) and in the production of shielding glass. *CCD 6d, 1961.*

ceric oxide, hydrated. *See* ceric hydroxide. *CCD 6d, 1961.*

cerite. A mineral consisting of a hydrous silicate of cerium and allied metals occurring generally in brownish masses; Mohs' hardness, 5.5; specific gravity, 4.86. *Webster 3d.*

cerium. A steel-gray-metallic element, one of the rare earth metals. Symbol, Ce; valences, 3 and 4; isometric or hexagonal: atomic number, 58; atomic weight, 140.12; specific gravity, 6.67 to 8.23, depending on allotropic form; melting point, 795° C; and specific electrical resistivity, 78 microhms per cubic centimeter. An alloy with iron and several rare elements is used as the sparking component in automatic lighters and other ignition devices. It is also a constituent (0.15 weight-percent) in the aluminum-base alloy ceralumin. Compounds of cerium, particularly the oxide and fluoride, are being applied with success to increasing the luminosity of high-current-density arc carbons. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-105.*

cerium chloride. *See* cerous chloride. *CCD 6d, 1961.*

cerium copper. An alloy of copper and misch metal, an alloy of rare-earth metals containing 85 to 90 percent misch metal. *Hess.*

cerium dioxide. *See* cerium oxide. *CCD 6d, 1961.*

cerium hydrate. *See* ceric hydroxide; cerous hydroxide. *CCD 6d, 1961.*

cerium metals. Any of a group of rare-earth metals separable as a group from other metals occurring with them and in addition to cerium including lanthanum, praseodymium, neodymium, promethium, samarium, and sometimes europium. *Webster 3d.*

cerium minerals. Rare earths; the important one is monazite. *Pryor, 3.*

cerium nitride. CeN; produced by the action of N_2 on Ce at 800° C or NH_3 on Ce at 500° C. *Dodd.*

cerium oxide; cerium dioxide; ceric oxide; ceria. a. CeO_2; melting point, 2,800° C. Used in porcelain enamel as an opacifier and is introduced with titania to produce a yellow color in glass. Alone it is one of the best glass decolorizers and is also employed to make glass more stable to light and other radiations. The oxides, CeO_2 and Ce_2O_3, are derived from monazite sand. *Lee.* b. Pale yellow, heavy powder; white when pure and the commercial oxide is brown. Used in ceramics; in polishing glass; and as an opacifier in enamels. *CCD 6d, 1961.*

cerium sulfides. There are three sulfides: CeS; melting point, 2,450° C ± 100° C; Ce_3S_4; melting point, 2,050° C ± 75° C; and Ce_2S_3; melting point, 1,890° C ± 50° C. Special ceramic crucibles have been made of these sulfides, but they can be used only in vacuo or in an inert atmosphere; such crucibles are suitable as containers for molten sodium, potassium, calcium and other highly electropositive metals. The thermal shock resistance of CeS is good, that of Ce_2S_3 poor, and that of Ce_3S_4 intermediate. *Dodd.*

Cermak-Spirek furnace. An automatic reverberatory furnace of rectangular form divided into two sections by a longitudinal wall. Used for roasting zinc and quicksilver ores. *Fay.*

cermal. *See* cermet. *H&G.*

cermet; cermal. A material or body consisting of ceramic particles bonded with a metal. According to the American Society for Testing and Materials, the ceramic phase must be present in 15 percent or more of the body. A ceramic foam or porous ceramic is not a cermet because the bonding of the ceramic structure is not dependent on or due to the metal. *H&G.*

cerolite. A member of the serpentine group with the formula $MgSiO_3 \cdot 1\frac{1}{2}H_2O$ to $Mg_6Si_7O_{20} \cdot 10H_2O$. Also spelled kerolite; kerolith. *Hey 2d, 1955.*

cerous. Of, pertaining to, or containing cerium in the trivalent state; for example, cerous hydroxide $[Ce(OH)_3]$. *Webster 3d.*

cerous chloride; cerium chloride. White crystals; $CeCl_3 \cdot xH_2O$; deliquescent; specific gravity, (anhydrous), 3.88. Used in incandescent gas mantles and in the preparation of cerium metal. *CCD 6d, 1961.*

cerous fluoride. An off-white powder; insoluble in water and in acids; $CeF_3 \cdot xH_2O$. Used in arc carbons to increase their brilliance and in the preparation of cerium metal. *CCD 6d, 1961.*

cerous hydroxide; cerium hydrate. A white gelatinous precipitate; approximate formula, $Ce(OH)_3$; yellow, brown, or pink when impurities are present; soluble in acids; and insoluble in water and in alkalies. Chief source is monazite sand. Used in pure form to produce cerium salts; to impart yellow color to glass; and as an opacifying agent in glazes and enamels; and in crude form in the flaming arc lamp. *CCD 6d, 1961.*

cerous oxalate; cerium oxalate. Yellowish-white; odorless; tasteless, crystalline; $Ce_2(C_2O_4)_3 \cdot 9H_2O$; decomposes upon heating; soluble in dilute sulfuric acid and in hydrochloric acid; very slightly soluble in water; and insoluble in oxalic acid solution, in alkalies, in alcohol, and in ether. Used in isolating the metals of the cerium group. *CCD 6d, 1961.*

cerro. a. Sp. A hill or mountain. *Fay.* b. Colom. Mina de cerro, a placer mine near mountain tops or on high tablelands where water is scarce. *Fay.*

certain rent. Same as dead rent. *Fay.*

certificate. A written declaration or testimonial, for example, a fire-boss certificate. Miners frequently use the term in referring to certificates issued to fire bosses, mine foremen, etc. *Jones.*

certificated manager. Eng. A superintendent of a coal mine who has a certificate of competency or of service from the government. *Hess.*

certified. A certified employee is one who has been granted a state certificate of competency for a given job. *B.C.I.*

certified apparatus. That which has been certified by the Ministry of Power as complying with the requirements for flameproof enclosure or for intrinsic safety. *B.S. 3618, 1965, sec. 7.*

ceruleite; coeruleite. A turquoise-blue hydrous arsenate of aluminum and copper, $CuO \cdot 2Al_2O_3 \cdot As_2O_5 \cdot 8H_2O$; compact. Clayey masses made up of excessively minute crystals. From Huanaco, Chile. *English.*

Cerulene. A trade name for a form of calcium carbonate colored green and blue by malachite and azurite, and used as a gemstone. From Bimbowrie, south Australia. *English.*

ceruleofibrite; caeruleofibrite. Synonym for Connellite. *Hey 2d, 1955.*

cerussite. A lead carbonate, $PbCO_3$. Orthorhombic; color white to grayish adamantine; Mohs' hardness, 3 to 3.5; specific gravity, 6.55. *Pryor, 3.*

cervantite. A discredited term equal to stibiconite. *American Mineralogist, v. 39, No.*

3-4, March-April 1954, p. 406.

cesarolite. A steel-gray hydrous manganate of lead, $H_2PbMn_3O_8$. Spongy masses. From Sidi-Amor-ben-Salem, Tunisia. *English.*

cesium. A silvery-white metallic element in group I of the periodic system, one of the alkali metals. Symbol, Cs; valence, 1; hexagonal; atomic number, 55; atomic weight, 132.905. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-106.*

cesium ion. An atom of cesium that has lost some electrons. *MacCracken.*

cesium 137. A radioisotope recovered as a fission product from nuclear reactors, with a half-life of 33 years and a dominant characteristic gamma radiation of 0.66 million electron volt. It is suitable as a gamma-radiation source in radiography. *ASM Gloss.*

cesium silicate. Cs_2SiO_3; molecular weight, 341.88; yellow; crystalline; and insoluble in water. Used in ceramics. *Bennet 2d, 1962.*

cess. A drain, usually formed of porous pipe along the foot of a cutting. *Ham.*

cesspit. An underground tank lined with brickwork or concrete for collecting sewage where no main drainage system exists, and requiring periodical pumping out. The more usual name for it is cesspool. This method of sewage collection is no longer considered good practice, and has been superseded by the septic tank. *Ham.*

cesspool. A pit for the reception or detention of sewage. *Crispin.*

cetane number. An indication of diesel fuel ignition quality. The cetane number of a fuel is the percentage by volume of cetane in a mixture of cetane and alpha methylnaphthalene which matches the unknown fuel in ignition quality. American diesel oil usually varies from 30 to 60 cetane. *Nichols.*

cetolith. A stony body, sometimes obtained during dredging in deep ocean water, that is the fused otic bones of whales. *C.T.D.*

ceylanite. Original spelling of ceylonite. *Hey 2d, 1955.*

Ceylon alexandrite. The unusually transparent alexandrite which occurs in Ceylon in large sizes, often of 20 or more carats in weight, after cutting. *Shipley.*

Ceylon cat's-eye. Chrysoberyl cat's-eye. Also called Ceyonese cat's-eye. *Shipley.*

Ceylon chrysoberyl. Chrysoberyl from Ceylon, the principal source of that gem stone. Most of it yields cat's eye or stones with a chatoyant effect, and if dark green, exhibits more or less the changeable color quality of alexandrite. *Shipley.*

Ceylon diamond. Colorless zircon. *Shipley.*

Ceylonese chrysolite. Trade name for fine, golden-yellow chrysoberyl. *C.M.D.*

Ceylonese peridot. The trade name for a yellowish-green variety of tourmaline, approaching olivine in color; used as a semiprecious gem stone. *C.M.D.*

Ceylonese ruby. True ruby does occur, rather rarely, in Ceylon, together with much commoner ruby spinel. Much of the gem stone material sold under this name is spinel. *C.M.D.*

Ceylonese zircon. True zircon occurs in Ceylon, but frequently this is not differentiated from tourmaline of the same color. Ceylonian (sic) zircon is the name given by jewelers to the fire-red, yellowish-green, and grey zircons. *C.M.D.*

Ceylon garnet. Almandite from Ceylon. *Shipley.*

Ceylon hyacinth. Hessonite garnet. *Shipley.*

ceylonite; ceylanite. A dark variety of spinel in which iron is present. From Ceylon. *Fay.*

Ceylon moonstone. Moonstone from Ceylon, which is the principal source of the orthoclase variety. Usually with whitish adulaerescence; less often bluish. *See also* blue moonstone. *Shipley.*

Ceylon opal. Misnomer for moonstone (feldspar). *Shipley.*

Ceylon sapphire. A pale-blue sapphire (corundum). *Schaller.*

ceyssatite. *See* infusorial earth. *Bennett 2d, 1962.*

Cf Chemical symbol for californium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

cfm Abbreviation for cubic feet per minute. A standard capacity or performance measurement for compressors. *Nichols.*

CFR Abbreviation for Cooperative Fuel Research. *Shell Oil Co.*

C-frame. An angling dozer lift and push frame. *Nichols.*

C-framepress. Same as gap-framepress. *ASM Gloss.*

cfs Abbreviation for cubic feet per second. *Pit and Quarry, 53rd, sec. E, p. 82.*

cg Abbreviation for centigram. *BuMin Style Guide, p. 58.*

cgs Abbreviation for centimeter-gram-second (system). *BuMin Style Guide, p. 58.*

chabazite. A hydrous silicate, $(Ca,Na)_2(Al_2Si_4O_{12})\cdot 6H_2O$, essentially of calcium and aluminum; cubelike crystals; rhombohedral. *Dana 17.*

chad. Eng. Gravel; small stones which form the bed of a river. *Fay.*

chadacryst. One of the relatively small crystals scattered as inclusions through a host crystal (oikocryst) of another mineral. *Holmes, 1928.*

chadger. Derb. Anything made fast to a hoisting rope by a noose, as a large rock or piece of ore that cannot be placed in a bucket. *Fay.*

chaf. A piece of coal or ore with rock adhering to it. *Mersereau, 4th, p. 352.*

chafe. To wear away as by friction. *Crispin.*

chafery. A forge fire for reheating. *Fay.*

chaffee work. A local term used in Colorado for annual labor on a mining claim. *Fay.*

chaff holes. Eng. Horizontal or gently inclined holes, 5 to 6 feet long and 2 to 8 inches in diameter, in the gristle bed, a tufaceous limestone in the basal Purbeck beds. The holes are branching and filled with fossil wood. *Arkell.*

chaff peat. Peat formed from shreds and fragments of vegetable material. *Tomkeieff, 1954.*

chafing fatigue. Fatigue initiated in a surface damaged by rubbing against another body. *See also* fretting. *ASM Gloss.*

chain. a. The portion of the machine that does the cutting in the work of undercutting coal at the face of an entry. *Fay.* b. A measuring instrument that consists of 100 links joined together by rings and is used in surveying; a unit of length equal to 66 feet. *See also* Gunter's chain. *Webster 3d.* c. A mechanical combination consisting of two or more links; specifically, a closed chain. *Webster 2d.* d. A circuit, as of a galvanic battery. *Webster 2d.* e. A series of links pivotally joined together to form a medium for conveying or transmitting motion or power. General classes of chains common to the conveyor art are: detachable, pintle, combination, roller, rivetless, coil, inverted tooth, and bar link chains. *ASA MH4.1-1958.* f. A towline or drive belt made of inetrlocked links. *Nichols.* g. A surveyor's steel tape measure. *Nichols.* h. A series of atoms linked together, generally in an organic molecule. Chains may consist of one kind of atoms only (for example, carbon chains) or of several kinds of atoms (for example, carbon-nitrogen chains). There are open-chain and closed-chain compounds (ring or cyclic compounds). *C.T.D.*

chain balance; chainomatic. Has a chain in place of the smaller weights, which can be added link by link to complete weighing, a recording device showing the weight thus added. *Pryor, 3, p. 35.*

chain belt. A belt made up of flat links and used for the transmission of power. *Hess.*

chain block. a. A combination of sheaves over which chains are arranged in the same manner as the rope in a block and tackle. Also called chain hoist. *Long.* b. *See* differential pulley block. *Ham.*

chain book. *See* fieldbook. *C.T.D.*

chain breat machine. A coal-cutting machine, so constructed that a series of cutting points attached to a circulating chain work their way for a certain distance under a seam; when the limit is reached, the machine is withdrawn and shifted to one side, where another cut is put in. *Fay.*

chain brow way. An undereground inclined plane worked by an endless chain. *Fay.*

chain bucket dredger. A dredger with a bucket ladder. *Ham.*

chain bucket loader; bucket loader. A mobile loader that uses a series of small buckets on a roller chain to elevate spoil to the dumping point. *Nichols.*

chain casing. An oil retaining sheet metal enclosure, around a chain drive. *J&M.*

chain coal cutter. A coal cutter which cuts a groove in the coal by an endless chain traveling round a flat plate called a jib. The chain consists of a number of pick boxes. Each box holds a cutter pick fastened into the box by a set screw or similar device. The coal cutter pulls itself along the face by means of a rope at a speed varying from 7 inches to 5 feet or more per minute. The chain travels around the jib at a speed varying from 320 to 650 feet per minute. The cut in the coal varies from 3½ to 7½ inches high and up to 8½ feet in length. *See also* coal-cutter picks. *Nelson.*

chain compound. A hydrocarbon compound in which hydrogen and carbon atoms are linked in a straight line; for example, methane, ethane, and propane. *Hess.*

chain conveyor; scraper chain conveyor. a. A conveyor comprising one or two endless linked chains with crossbars or flights at intervals to move the coal or mineral. The loaded side of the conveyor runs in a metal trough while the empty side returns along guides underneath. The material is transported on the conveyor partly by riding on the chain and flights and partly by being scraped along in the trough. The chain conveyor is widely used in coal mines and capacities range up to 100 tons per hour with lengths of about 100 yards. *See also* armored flexible conveyor. *Nelson.* b. *See* drag chain conveyor; rolling chain conveyor. *ASA MH4.1-1958.*

chain couplings. Consists of two hubs each equipped with teeth upon which a ring of chain is joined to form the driving member. The chains may be of the roller or silent type and should be inclosed in a housing which will retain the lubricant.

Pit and Quarry, 53rd, Sec. D, p. 66.

chain driller. *See* chain-machine operator. *D.O.T. 1.*

chain-driven belt. A conveyor similar in design to those driven by ropes, the essential difference being that the tension is taken by chains, either under or alongside the carrying belt. *Nelson.*

chain-drive rotary. Synonym for chain-drive table. *Long.*

chain-drive table. Rotary drill table turned by means of a sprocket chain running between table and drill-motor drive shaft. Also called chain-drive rotary. *Long.*

chain elevator. *See* bucket elevator. *ASA MH4.1-1958.*

chainer. *See* clipper. *D.O.T. 1.*

chain feed. Feeding mechanism by which the up-and-down movements of the drill stem are controlled by a link chain running on sprocket gears. *Long.*

chain feeder. *See* conveyor-type feeder. *ASA MH4.1-1958.*

chain-feeder operator. *See* mill feeder. *D.O.-T. Supp.*

chain grate. *See* chain grate stoker. *Bureau of Mines Staff.*

chain grate stoker; chain grate. A wide, endless, traveling chain which supports the burning fuel in a broiler furnace. *Bureau of Mines Staff.*

chain guard. An open guard of sheet metal, expanded metal, or similar construction around a chain drive. *J&M.*

chain hoist. a. A block and tackle in which chain is used instead of rope. *Crispin.* b. Synonym for chain block. *Long.*

chain-hoist engineer. In anthracite coal mining, one who operates a chain hoist, used to pull mine cars up a haulage slope (incline). *D.O.T. 1.*

chain hydrometer. A type of hydrometer that is operated at constant depth by a chain loading device similar to that used on some analytical balances. It has been used for the determination of the particle size distribution of clays. *Dodd.*

chain lacing. The arrangement of block positions in a cutter chain so that bits inserted in these blocks will occupy certain positions while cutting. *Jones.*

chain-machine helper. *See* machine helper. *D.O.T. 1.*

chain-machine operator. In bituminous coal mining, one who operates a chain-driven machine to undercut coal preparatory to blasting it loose from the working face with explosives. Also called chain driller. *D.O.T. 1.*

chain machines. Coal-cutting machines which cut the coal with a series of steel bits set in an endless chain moved continuously in one direction either by an electric motor or a compressed-air motor. These machines may be divided into four classes, known as breast machines, shortwall machines, longwall machines, and overcutting machines. *Kiser, k, p. 2.*

chainman. a. One who measures distances with a tape. The head chainman is the lead man and normally reads and records the distances while the end or rear chainman merely holds the end of the tape at a mark left by the head chainman. *A.G.I.* b. Leading man in chaining or survey of boundary. In the United States, called an axman. *Pryor, 3.* c. In mining, one who assists a mine surveyor in making underground and surface surveys. Also called lineman; rodman. *D.O.T. 1.* d. *See* gaffer. *Dodd.*

chain marks. Marks made on the bottoms of glass articles as they ride through a lehr on a chain belt slightly overheated. *ASTM C162-66.*

chain of locks. A system of connected locks in which the intercommunicating gate is the headgate of each lower lock and the tailgate for the lock above it. *Ham.*

chain pillar. A pillar left to protect the gangway and airway, and extending parallel to these passages. *Fay.*

chain pipe vise. A portable vise utilizing a heavy chain to fasten the pipe in the jaw *Crispin.*

chain pitch. For a roller chain, the distance in inches between the centers of adjacent joint members. For a silent chain, the distance in inches between the centers of the holes in a link plate. *J&M.*

chain pulley. A sheave wheel or pulley with depressions to engage the links of a chain. *Crispin.*

chain reaction. A reaction that stimulates its own repetition. In a fission chain reaction, a fissionable nucleus absorbs a neutron and fissions, releasing more than one additional neutron. These in turn can be absorbed by other fissionable nuclei, releasing more neutrons. A fission chain reaction is self-sustaining when the number of neutrons released in a given time interval equals or exceeds the number of neutrons absorbed. *L&L.*

chain road. Main underground haulage road through which tubs are hauled by an endless chain. *Pryor, 3.*

chain runner; chain boy; chainman. Scot. A person in charge of, and who accompanies, cars, trips or trains in mechanical haulage. *Fay.*

chain screen. A screen made up of lengths of chain hanging close together from a bar; used for protection against furnace heat while bars and other tools are pushed through and manipulated during working on the inside of a furnace for pot setting or repairs. *C.T.D.*

chain-selvage belt. A belt in which the carrying section may be made up of rubber or fabric, woven metal, or other material and along each edge of which is fastened an endless chain with a suitable attachment. The chains carry the driving tension. The center part functions only as a loading supporting medium. *ASA MH-4.1-1958.*

chain sling. A sling made of links of wrought iron or 1½ percent manganese steel. *Ham.*

chain structure. A structure or texture found in a number of chromite occurrences, consisting of a series of connected chromite crystals somewhat resembling a chain. *Schieferdecker.*

chain survey. A survey in which lengths only are measured, no angular measurements being taken. It is plotted by triangulation. *Ham.*

chain surveying. The simplest method of surveying, and has the advantage that the equipment required is inexpensive and hard wearing. It is the ideal method for small areas and has been employed successfully for large surveys. Nevertheless it has definite limitations when applied to surveys of enclosed or builtup areas. *Mason, v. 2, p. 715.*

chain, surveyor's. In measurement, 100 steel links, with total length of 100 feet (engineers chain) or 66 feet (Gunter's chain). Distance measured by chain or steel tape is chainage. *Pryor, 3.*

chain takeup. An idler sprocket, or similar device, mounted on an adjustable bracket to adjust the slack in a chain drive. *J&M.*

chain tension. The actual force existing at any point in a conveyor chain. *ASA MH-4-1-1958.*

chain tongs. A steel bar fitted with a serrated end provided with a sprocket chain to embrace the pipe used by drillers to couple and uncouple drivepipe or casing. Also called chain wrench; pipe tongs. *Long.*

chain transmission. A means of transmitting power, useful when the distance between driver and driven shafts is too great for gearing and not sufficient for belting. *Crispin.*

chain-type conveyor. *See* conveyor, chain-type.

chainwall. a. A method of mining coal in which the roof is supported by pillars of coal between which the coal is mined away. *Standard, 1964.* b. Scot. A system of working by means of wide rooms and long, narrow pillars, sometimes called room and rance. *Fay.* c. Scot. A long, narrow strip of mineral left unworked, for example, along the low side of a level. *Fay.*

chain width. For a roller chain, the distance between the link plates of a roller link. This is not the overall width of the chain. For a silent chain, the width over the working link plates of the chain, exclusive of pinheads, washers, or other fastening devices. *J&M.*

chain wrench. Synonym for chain tongs. *Long.*

chair. a. A cast-iron support bolted to a timber or concrete railway sleeper, used to hold a bullhead rail in position. *Ham.* b. A wooden chair of traditional design used by a glassblower. *Dodd.* c. A team of workmen producing handmade glassware. *Dodd.*

chairs. a. Movable supports for the cage arranged to hold it at the landing when desired. Also called catches; dogs; keeps. *Fay.* b. Projections which can be set into guides so that the skip or cage descending in the mine shaft is brought to rest at the correct level. *Pryor, 3.*

chalazoidite. An ellipsoidal body composed of fragments of pumice ranging in size from small grains to one-half-inch in diameter, most of them have a nucleus of looser texture, around which are concentric layers of alternating density and an outside layer of greater strength; a pisolite. Also called mud ball; drop of mud. *Hess.*

chalcanthite. A hydrous copper sulfate, $CuSO_4.5H_2O$. Blue vitriol. Soluble in water; triclinic. *Dana 17.*

chalcedonite; chalcedony. Fibrous quartz with a negative elongation. *Hess.*

chalcedony. Broadly, a mixture of cryptocrystalline and hydrated silica, often with radiating fibrous or botryoidal structure. Forms include carnelian, sard, prase, plasma, bloodstone, chrysoprase (when colored as with nickel), agate, moss agate, onyx, and sardonyx. *Pryor, 3.*

chalcedony moonstone. The white, or almost colorless, chalcedony. Gathered from beaches in various parts of the world, especially in California, it has been widely sold as moonstone. It lacks adularescence of genuine moonstone. Same as California moonstone. *Shipley.*

chalcedony onyx. Chalcedony with alternating stripes of gray and white. Also called chalcedonyx. *Shipley.*

chalcedony patch. A milklike, semitransparent patch which sometimes occurs as a flaw in a ruby. *Hess.*

chalchihuitl. Mex. Any green precious stone. According to G. F. Kunz, the precious chalchihuitl is jadeite. Also spelled chalchiguite; chalchihuite. *Fay.*

chalchuite. Green turquoise. *Schaller.*

chalcite. a. A decomposition product of either pyrite or chalcopyrite; hence described as iron sulfate (green vitriol); copper sulfate (blue vitriol); or iron oxide (colcothar). *Standard, 1964. b. Plural* form chalcites was a collective term used by Wadsworth to include lime, mortar, cement, etc. Used as building materials. *Fay.*

chalcoalumite. A turquoise-green to Nile-blue hydrous sulfate of copper and aluminum, $CuSO_4.4Al(OH)_3.3H_2O$. Probably triclinic. Botryoidal, fibrous crusts. From Bisbee, Ariz. *English.*

chalcocite; glance; redruthite. Copper sulfide, Cu_2S; orthorhombic. Color lead-gray; Mohs' hardness, 2.5 to 3; streak lead-gray; metallic luster; specific gravity, 5.5 to 5.8. Contains 79.8 percent copper. *Pryor, 3.*

chalcocyanite. Anhydrous cupric sulfate, $CuSO_4$. It replaces the name hydrocyanite because the pure mineral contains no water (but is then white, not blue). *Spencer 19, M.M., 1952.*

chalcodite. A scaly micalike bronze-colored variety of stilpnomelane. *Fay.*

chalcogene. The association of ore deposits connected with a phase of mountain building and plutonism. *Schieferdecker.*

chalcomenite. A hydrous cupric selenite, $CuSeO_3+2H_2O$. Occurs in small blue monoclinic crystals. *Fay.*

chalcomiklite. Bornite. *Weed, 1918.*

chalcomorphite. A vitreous hydrous calcium-aluminum silicate. *Standard, 1964.*

chalconatronite. A mineral, $Na_2Cu(CO_3)_2.3H_2O$, probably monoclinic, as a greenish-blue incrustation on ancient bronze objects from Egypt. Named from copper, natron, and soda. *Spencer 21, M.M., 1958.*

chalcophacite. Liroconite. *Weed, 1918.*

chalcophanite; hydrofranklinite. A hydrous manganese-zinc oxide, $(Mn,Zn)O.2MnO_2.2H_2O$. *Sanford.*

chalcophile element. Any element which has a strong affinity for sulfur, and which is readily soluble in molten iron monosulfide; an element commonly found in sulfide ores. *A.G.I.*

chalcophyllite. A highly basic arsenate of copper, $7CuO.As_2O_5.14H_2O$, of various shades of green, occurring in tabular crystals of foliated masses. *Fay.*

chalcopyrite; copper pyrites. A sulfide of copper and iron, $CuFeS_2$ or $Cu_mFe_nS_{(m+n)}$; brass-yellow color; tetragonal; Mohs' hardness, 3.5 to 4; streak black; specific gravity, 4.1 to 4.3; contains 34.5 percent copper. *Pryor, 3.*

chalcopyrrhotite. A brownish, brass-yellow, iron-copper sulfide, Fe_4CuS_6 that is found massive. *Standard, 1964.*

chalcosiderite. A light, siskin-green, hydrous, copper-iron phosphate $CuO.3Fe_2O_3.2P_2O_5.8H_2O$. Occurs in sheaflike crystalline groups as in crustations. *Fay.*

chalcosine. Chalcocite. *Weed, 1918.*

chalcostibite. A lead-gray copper-antimony sulfide, $Cu_2S.Sb_2S_3$. Also called wolfsbergite. *Fay.*

chalcotrichite. A variety of cuprite in which the crystals are slender and hairlilke. *Fay.*

chalder. Scot. A measure of weight. The Perth chalder was 5 tons; the River Forth chalder, 30 hundredweights; and the Hurlet chalder, 2 tons. *Fay.*

chalder wagon. N. of Eng. *See* chaldron, b. *Fay.*

chaldron. a. A standard measure of coal in England during the 14th century, and weighed about 2,000 pounds but increased with time. The keels or boats into which the coal was loaded held about 20 chaldrons, and thus for some time the keel was regarded as a standard measure in the Tyne coal trade. *See also* wain. *Nelson.* b. Thirty-six bushels, or 53 hundredweight avoirdupois. Chaldron wagons, containing this quantity, convey the coal from the mine to the place of shipment. *Fay.*

chalicosis. A pulmonary affliction occurring among stonecutters that is caused by inhalation of stone dust. *Webster 3d.*

chalk. a. Soft earthy sandstone of marine origin, composed chiefly of minute shells. It is white, gray, or buff in color. Part of the ocean bed and some shores are composed of chalk, notably the White cliffs of Dover, England. *H&G.* b. Natural calcium carbonate. *Bennett 2d, 1962.* c. Synonym for chalk rock. *Long.* d. To record in writing or to mark with chalk or keel. *Long.*

chalkboard enamel. A special type of mat porcelain enamel used to provide a writing surface for chalk. *ASTM C286-65.*

chalk, drop. *See* chalk, prepared. *CCD 6d, 1961.*

chalking. Removed.

chalking deal. Eng. A flat board upon which is kept an account of the work done by the miners in a certain district. A bulletin board. *Fay.*

chalking on. N. of Eng. Keeping an account of the number of tubs (cars) sent out of a stall or room. *Fay.*

chalk line. Used frequently for making a straight line on a floor for placement of shafting, machinery, etc. A piece of string coated with chalk is drawn taut between two points along the floor. When raised at a midpoint and allowed to snap back, a straight chalk line is made on the floor. Also called snap line. *Crispin.*

chalk, precipitated; calcium carbonate, precipitated. Fine; white; microcrystalline powder; odorless; tasteless; stable in air; and specific gravity, about 2.7. For industrial uses, *see whiting. CCD 6d, 1961.*

chalk, prepared; drop chalk; calcium carbonate, prepared. Very fine; white to grayish-white; powder; often formed in conical drops; odorless; tasteless; and stable in air. Used in calcimine; polishing powders; and silicate cements. For other uses, *see* whiting; chalk, precipitated. *CCD 6d, 1961.*

chalk rock. A soft, milky-colored rock, such as soft limestone, calcareous tufa, diatomaceous shale, or volcanic tuff. *Long.*

chalkstone. Eng. A soft, generally whitish, clayey parting in a coal seam. *Arkell.*

chalk up. a. To write up the daily (or shift) drilling record. *Long.* b. To establish an outstanding performance record. *Long.*

chalky; chalked. The condition of a porcelain-enameled surface that has lost its natural gloss and become powdery. *ASTM C286-65.*

chalky chert. An uneven or rough fracture surface, commonly dull or earthy, soft to hard, may be finely porous, essentially uniform composition, resembles chalk or tripoli. Formerly referred to as cotton chert. Includes porcelaneous unglazed material which grades into glazed porcelaneous chert. Same as dead chert. *A.G.I.*

challenge feeder. Ore feeder used with stamp batteries to regulate rate of entry to mortar box. A horizontal plate is turned by linkages operated when the central stamp falls below a prefixed point, it then draws ore from feeding bin. *Pryor, 3.*

chalmersite. Identical with cubanite. *English.*

chalybeate. Impregnated with salts of iron; having a taste due to iron. *Webster 3d.*

chalybite. *See* siderite. *Fay.*

chamber. a. The miner's working place sometimes referred to as a room or breast. *Hudson.* b. A stall. *Fay.* c. A body of ore with definite boundaries apparently filling a preexisting cavern. *Fay.* d. A powder room in a mine. *Fay.* e. A cavity formed, to contain an explosive charge, at a point in a mine shaft or gallery. *Webster 2d.* f. A body of ore of considerable width and irregular or rotund form occurring as an expansion of a vein or as an isolated mass. *Webster 2d.* g. In blasting, to enlarge the bottom of (a drill hole) by one or more light preliminary shots so that a sufficient blasting charge may be loaded for the final shot. *Webster 3d.* h. A space or gallery excavated in a quarry to receive a large explosive charge. *See also* heading blast. The term is also applied to underground passages or galleries. *Nelson.* i. An excavation to accommodate an explostive charge. *B.S. 3618, 1964, sec. 6.* j. A camouflet. *Long.* k. To enlarge a portion of a borehole by the use of explosives. Also called spring. *Long.* l. Corrupted form of the word chamfer. *Long.*

chamber-and-pillar. Penna. *See* breast-and-pillar. *Fay.*

chamber-and-pillar system. A modification of sublevel stoping by which a series of sublevels are successively caved. *Hess. See also* sublevel stoping, b.

chamber blast. A large-scale blast in which explosives in bulk are placed in excavated subterranean chambers. Also called coyote blast; gopher-hole blast. *Webster 2d.*

chamber blasting. Used in very heavy blasting, where a great quantity of rock is to be thrown down at one time by a correspondingly large charge. A tunnel or drift is usually run to the site of the chamber, and the latter is excavated and charged. The drift is well packed with earth and sand before firing. In such a chamber, or series of chambers, as much as 7,000 pounds of dynamite may be placed, throwing down 350,000 tons of rock at one blast. *Stauffer.*

chamber deposit. A cave filled with mineral. *See also* chamber, c. *Fay.*

chamber dryer. A type of dryer in which shaped clayware is placed in chambers in which the temperature, humidity, and air flow can be controlled; the ware remains stationary during the drying process. The Keller dryer is of this type, its distinctive feature being the system of handling the bricks to be dried by means of stillages and finger-cars. *Dodd.*

chamber dust. *See* flue dust. *Fay.*

chambered lode. So called when a portion of the wall of a lode is fissured and filled with ore. *See also* chamber, c. *Fay.*

chambered vein. a. A vein, the walls of which are irregular and brecciated, particularly the hanging wall, owing to the formation of the vein under low pressure at shallow depth. *Schieferdecker.* b. A mineral vein filling large areas of space in ruptured rocks. *Standard, 1964.* Synonym for stockwork. *See also* chambered lode. *Fay.*

chamber girder. A normal H section girder which has been slightly bent. They are used as roadway supports where the sides are strong enough to support them. They may also be set on stone, concrete, or brick walls built along the sides of the roadway. *See also* steel support. *Nelson.*

chambering. a. The enlarging of the bottom of a quarry blasting hole by the repeated firing of small explosive charges. The enlarged hole or chamber is then loaded with the proper explosive charge, stemmed, and fired to break down the quarry face. A free-running explosive, such as Monograin, is used. The method gives poor fragmentation, and better methods, such as multiple row blasting, are now used. *Nelson.* b. A borehole in which portions of the sidewalls are breaking away and forming cavities or small chambers *Long.* c. The enlargement of a portion of a borehole by the use of explosive charges. Also called springing. *Long. See also* camouflet.

chamber kiln. A kiln consisting of one or more separate rooms for setting the ware. *ACSG, 1963.*

chamberman. One who controls process by which sulfuric acid is made from sulfur dioxide gas resulting from the roasting of zinc sulfide ore preparatory to recovery of the zinc. *D.O.T. 1.*

chamber oven. A refractory-lined gas-making unit; the capacity of such an oven may vary from about 1 to 5 tons of coal. *Dodd.*

chambersite. The manganese analogue of boracite, $Mn_3B_7O_{18}$ Cl, occurring in tetrahedra in brines from Barber's Hill salt dome, Chambers County, Texas. Named from the locality. *Hey, M.M. 1964; Fleischer.*

chambers without filling. *See* sublevel stoping.

chameleonite. A name proposed for a rare variety of tourmaline, olive green in daylight, changing to brownish-red in most artificial light. *Shipley.*

chameleon mineral. *See* potassium permanganate. *Bennett 2d, 1962.*

chameleon stone. Hydrophane. *Shipley.*

chamfer. a. The beveled or rounded surfaces formed by removing material from sharp edges or corners. *Brantly, 2.* b. A relieved angular cutting edge at a tooth corner *ASM Gloss.* c. A small groove or furrow *Webster 3d.*

chamfer angle. a. The angle between a reference surface and the bevel *ASM Gloss.* b. On a milling cutter, the angle between a beveled surface and the axis of the cutter. *ASM Gloss.*

chamfering. Making a sloping surface on the edge of a member. Also called beveling. *See also* bevel angle. *ASM Gloss.*

chamois. a. A soft pliant leather prepared from the skin of the chamois. *Webster 3d.* b. An oil-tanned suede-finished leather prepared from the flesher of sheepskins *Webster 3d.* c. Used for separating excess mercury from gold amalgam. *Fay.*

chamoisite. *See* chamosite.

chamosite; chamoisite. A mineral member of the chlorite group, approximately $(Fe'',Mg,Al,Fe''')_6(AlSi_3)O_{10}(OH)_8$; monoclinic. An important constituent of many oolitic iron ores. *A.G.I.*

chamotte. a. Fr. Burned clay used by zinc smelters. *Fay.* b. The refractory portion of a mixture used in the manufacture of firebrick, composed of calcined clay or of reground bricks. *Standard, 1964.*

champion lode. The main vein as distinguished from branches. The term is of Cornish origin, and is little used in the United States. Also called mother lode; master lode. *Fay.*

Champlain forge; American forge. A forge for the direct production of wrought iron, generally used in the United States instead of the Catalan forge, from which it differs in using only finely crushed ore and in working continuously. *Fay.*

Champlevé enamelware. One type of vitreous-enamel artware; a pattern is first cut into the base metal but, where the pattern requires that enamels of different colors should meet, a vertical fin of metal is left so that the color boundary will remain sharp, the two enamels not running into one another when they are fused. Champlevé is a French word meaning raised field. *Dodd.*

chance. a. In coal mining, the opportunity a shot has to break the coal. *Fay.* b. The opportunity to put in a shot in a good position. *Fay.*

Chance-Claus process. An industrial process for recovering sulfur from waste-containing sulfides. It comprises two steps: (1) treatment of sulfide with carbon dioxide, forming H_2S, and (2) oxidation of H_2S to water and sulfur by air in the presence of a catalyst, such as ferric oxide. *Webster 2d.*

chance coal. Staff. A name given to a 9-inch coal seam. *Tomkeieff, 1954.*

Chance cone. *See* cone classifier, b. *Hess.*

Chance glass. Dark blue glass that transmits ultra-violet light only. *Bennett 2d, 1962.*

chance measure. Eng. Any seam or bed of coal or other rock occupying an unusual or foreign position in the strata. *Fay.*

chance measures. Eng. Measures containing balls of ironstone, Derbyshire. *Arkell.*

Chance process. A method of cleaning coal by using a fluid mixture of sand and water which floats off a clean coal product but allows slate and other impurities to sink. Named after Thomas M. Chance, American Mining Engineer. *Webster 3d.*

Chance sand-flotation process. A dense-media process in which coal is separated from refuse in an artificial dense medium of sand suspended in water. The specific gravity of this medium is such that the merchantable coal floats while the refuse sinks to the bottom, the separation being analogous to that of a float-and-sink separation with a heavy liquid like zinc chloride. *Mitchell, p. 480.*

Chance washer. A large, cone-shaped, wet separator designed to produce three products, namely clean coal, middlings, and refuse from raw coal which varies in size down to about one-sixteenth of an inch. A mixture of water and well-graded sand is used and kept at a density of about 1.75. The agitation water enters at the base and keeps the sand in suspension. The heavy shale sinks to the bottom and the clean coal floats and passes over the side. The Chance washer is used in many new washery plants in Great Britain. It can handle up to about 360 tons per hour of raw coal. *See also* coal-preparation plant; cyclone washer. *Nelson.*

chanfer; chamfer. To bevel or slope an edge or corner. *Nichols.*

change day. The day when drill crewmen or a gang of miners are transferred from one work shift to another. Also called swing day. *Long.*

change face. In angular measurement with theodolite, transit of instrument, that is, turning of telescope 180° horizontally and vertically so that the reading originally taken face right is repeated face left and any error due to inaccurate centering of horizontal axis of the reading circle is neutralized. *Pryor, 3.*

changehouse. a. *Compare* doghouse, c; drill shack. *Long.* b. A special building at mines or other works where laborers may wash themselves or change from street to work clothes and vice versa. Also called changing house; dry; dryhouse. *Long.*

changehouse man. In mining, one who cleans, heats, and ventilates locker rooms, shower rooms, and washrooms in which workmen change clothes. Also called dry boss; dryhouse man; dry janitor; dryman; washhouse man. *D.O.T. 1.*

change point; turning point. In leveling survey, a point at which the leveler's staff is first held while foresight is taken. The staff is then swiveled to face a new position of the leveling instrument, which now takes a backsight, thus showing the amount by which its level has changed. *Pryor, 3.*

changer and grather. N. of Eng. A man whose duty it is to keep the pump buckets and clacks in working order about a mine *Fay.*

changing bronze. The process of changing tuyeres, plates, monkey, etc., at blast furnaces. *Fay.*

changing house. Synonym for changehouse. *Long.*

changkol. Malay. A heavy Chinese hoe with an eye in which the handle fits; used in cutting soft rock and earth and for stirring gravel in sluice boxes, etc. *Hess.*

channel. a. S. Afr. In sampling, a channel approximately 6 inches wide and 1 inch deep is cut at right angles to the formation. The chips of rock recovered by this cutting are taken as the sample for that particular specimen of ground. *Beerman.* b. S. Afr. Formations associated with gold-bearing conglomerate in the Witwatersrand system which are thought to represent ancient stream courses in which gold-bearing gravels accumulated. *Beerman.* c. Groove cut across an ore exposure for sampling purposes. *Pryor.* d. A groove cut along the line where rock or stone is to be split. *Webster 3d.* e. Scot. & N. of Eng. Gravel. *Arkell.* f. Eng. Altered toadstone, Derbyshire. *Arkell.* g. A stream bed eroded in sedimentary formations and subsequently filled with later sediments—favorable for uranium mineralization in some formations. *Ballard.* h. An elongated open depression in which water may, or does, flow. *Seelye, 1.* i. Cavity behind casing in a faulty cement job. *Wheeler.* j. A communication path from a transmitter to a receiver. *NCB.* k. In metallurgy, a sow or runner. *Webster 2d.* l. An erosional feature that may be meandering and branching and is part of an integrated transport system. *See also* washout, b. *Pettijohn.* m. A linear erosional feaure similar to but larger than a groove. Best developed in turbidite sequences. *See also* channel cast. *Pettijohn.* n. The deeper part of a moving body of water (as a river, harbor, or strait) where the main current flows or which affords the best passage. *Webster 3d.* o. An especially tubular enclosed passage, as a conduit, pipe, or duct. *Webster 3d.* p. Gravel, being the material of which the riverbed is composed. *Webster 2d.* q. That part of a forehearth which carries the glass from the tank to the flow spout and in which temperature adjustments are made. *ASTM C162-66.*

channel bed. Scot. A bed of gravel. *Fay.*

channel blocks. Large, trough-shaped, refractory blocks used for the channel in glass tanks. *Bureau of Mines Staff.*

channel cast; gouge channel; washout; channel fill. Cast of small groove-like channel or very large groove, generally sand-filled and cuti n shale. *Pettijohn.*

channeler; channeller. a. A powerful quarrying machine capable of cutting slots in stone at any angle. It is used for cutting dimension stone off the quarry face without explosives. *See also* broaching, b. *Nelson.* b. A channeling machine. *Fay.* c. A machine that cuts a deep groove in rock, ordinarily to free dimension stone from the mass, or to make a smooth side for a canal or other excavation in rock. Cutting is accomplished by a group of reciprocating chisel-pointed bars, operated by steam or compressed air while the machine carrying them travels back and forth on a track. Ordinarily used only in the softer rocks, such as limestone, soapstone, or slate. Also called track channeler; bar channeler. *Hess.*

channel fill. *See* channel cast. *Pettijohn.*

channel-fill deposit. The deposit which has accumulated in a stream channel because the transporting capacity of the stream has been insufficient to remove the sand and other sediments as rapidly as they have been delivered. *A.G.I.*

channeling. a. The action of the charge in a blast furnace in opening up irregular openings for the blast. *Bureau of Mines Staff.* b. In ion-exchange fixed bed work, development of passages in a resin column through which the liquors flow preferentially so that the resin is efficiently loaded. *Pryor, 3.* c. In cyanide sand leaching, cracks in the sand bed through which cyanide solution runs without proper percolating contact with mass of particles. *Pryor, 3.*

channeling machine. *See* channler. *Fay.*

channeling-machine operator. a. In bituminous coal mining, one who operates a coal-cutting machine to cut channels (a few inches wide) in coal, after the overlying ground has been removed, to partly detach coal in blocks so that it may be broken loose more easily by blasting. Also called channeler-machine operator; channel-machine operator. *D.O.T. 1.* b. In the quarry industry, one who sets up and operates a track-mounted machine that cuts (drills) vertical channels (a few inches wide) in quarrystone in which wedges are driven to crack off a block from the mass. Also called channeler-machine operator; channeler runner; channel-machine operator; channel-machine runner. *D.O.T. 1.*

channel man. In ore dressing, smelting, and refining, one who installs new channel irons to form a supporting framework for a continuous anode. *D.O.T. 1.*

channel sample. Material from a level groove cut across an ore exposure in order to obtain true cross section of mineral exposed. *Pryor, 3. See also* groove sample.

channel sampling. *See* trench sampling.

channel sand. A sand or a sandstone deposited in a stream bed or some other channel eroded into the underlying bed; it frequently contains oil, gas, gold, or other valuable minerals. *A.G.I.*

channel slide rails. A method of temporary rail track advance at tunnel faces. They comprise a pair of specially made channels with ramp ends. They fit over the rail section in use and are pushed forward periodically as the power loader clears the rock ahead. The permanent track is extended as space becomes available. *Nelson.*

channel terrace. A contour ridge built of soil moved from its uphill side, which serves to divert surface water from a field. *Nichols.*

channelway. The channel along which mineralizing solutions rise from depth. Synonym for feeder. *Schieferdecker:*

channel width. S. Africa. The width or thickness between the outer edges of the lowest layer and the highest layer of conglomerate composing the reef, perhaps with some waste conglomerate included. *Hess.*

channer. Scot. Gravel. Arkell.

chap. a. Scot. A customary and rough mode of judging, by sound, of the thickness of coal between two working places, by knocking with a hammer on the solid coal. *Fay.* b. To examine the face of the coal, etc., for the sake of safety, by knocking on it lightly. *Fay.* c. Scot. A blow, rap, knock, or stroke. *Webster 3d. See also* sounding, c.

chapapate. A Cuban term for a kind of asphalt or bitumen. Also called Mexican asphalt. *Fay.*

chaparral. Sp. A thicket of dwarf evergreen oaks; a dense impenetrable thicket of stiff or thorny shrubs or dwarf trees. *Webster 3d.* Characteristic of Mexico and Eouthwestern United States. *Fay.*

chapeau de fer. A French term for an oxidized iron outcrop; gossan or iron hat. *Fay.*

chapeiro. Peculiar variety of coral reef, on the Brazilian coast, growing in small scattered patches, often rising to the height of 40 to 50 feet sometimes attaining the level of low water, at the top usually very irregular and sometimes spread like mushrooms. *Schieferdecker.*

chapelet. a. A machine for raising water, or for dredging, by buckets of an endless chain passing between two rotating sprocket wheels. *Standard, 1964.* b. A chain pump having buttons or disks at intervals along its chain; paternoster pump. *Standard, 1964.* c. A device for holding the end of heavy work, as a cannon, in a turning lathe. *Standard, 1964.*

chapinha. *See* cansa. *Osborne.*

chaplet. Metal support for holding cores in place within sand molds. *ASM Gloss.*

Chapman process. A method of gold recovery, in which cyanidation dissolves the metal from an ore pulp, and the aurocyanide is simultaneously sorbed by activated carbon. This last is then retrieved by froth flotation. *Pryor, 3.*

Chapman shield. A pair of vertical plates of sheet iron or steel arranged with a ladle between them, which can be moved longitudinally along the front of the furnace. Its main purpose is to protect the laborer from hte furnace heat. *Fay.*

chapping. Rough guess of distance separating two approaching drives underground made by knocking with a heavy hammer. *Pryor, 3.*

chapra. A term used in Bihar, India for a kind of hoe used in mines for scraping waste debris into pans for carrying or loading cars. *Hess.*

char. a. To reduce to charcoal or carbon by exposure to heat. *Webster 3d.* b. Eng. In Cornwall, to work by the day. *See also* chare. *Fay.* c. Scot. Coke; usually calcined ironstone. *Fay.* d. To oxidize a diamond by excessive heating in the presence of oxygen or air. *Long.* e. Coke made by the low-temperature carbonization of lignite; usually brittle, often powdery. A low-temperature coke. *Hess.*

character. Typical wavelet shape by which under favorable conditions a reflection from a particular boundary plane may be recognized. *Schieferdecker.*

characteristic ash curve. The curve obtained from the results of a float and sink analysis showing, for any yield of floats (sinks), the ash content of the highest density (lowest density) fraction passing into these floats (sinks), the yield being plotted on the ordinate and the ash content on the abscissa. *B.S. 3552, 1962.*

characteristic curve. *See* fan characteristics. *Roberts, I, p. 187.*

characteristic impedance. a. Of an explosive. the amount of energy transferred to a given rock is a linear function of the product of density and rate of detonation. *Leet, 2, p. 64.* b. For rock, density times velocity of longitudinal waves in the rock. *Leet, 2, p. 64.*

characteristic radiation. High-intensity. single wavelength X-rays, characteristic of the element emitting the rays that appear in addition to the continuous white radiation whenever the voltage of the X-ray tube is increased beyond a critical value. *ASM Gloss.*

characterizing accessory mineral. Synonym for varietal mineral. *A.G.I.*

charbon â gas. Fr. Gas coal. *Tomkeieff, 1954.*

charbon clair. Fr. Term for lenticular bands of solid coal interbedded with a powdery coal (charbon sourd). *Tomkeieff, 1954.*

charbon demi-gras. Fr. Steam coal. *Tomkeieff, 1954.*

charbon de terre. Fr. Fossil coal. *Tomkeieff, 1954.*

charbon flambant. Fr. Flame coal. *Tomkeieff, 1954.*

charbon flambant â gas. Fr. Gas flame coal. *Tomkeieff, 1954.*

charbon gras. Fr. Bituminous coal. *Tomkeieff, 1954.*

charbon maigre. Fr. Semianthracite. *Tomkeieff, 1954.*

charbon roux. Fr. Brown charcoal, produced by an incomplete carbonization of wood. *Fay.*

charbon sourd. Fr. Term for powdery coal enclosing solid coal bands (charbon clair). *Tomkeieff, 1954.*

charcoal. A dark-colored or black porous form of carbon made from vegetable or animal substances (as from wood by charring in a kiln or retort from which air is excluded) and used for fuel and in various mechanical, artistic, and chemical processes. *Webster 3d.*

charcoal blacking. Charcoal used in the pulverized form as dry blacking or in suspension with clay as a black wash and either dusted or coated on the surface of molds tim prove the surface. *Osborne.*

charcoal furnace. A furnace in which wood or any other substance is reduced to charcoal by dry distillation. *Standard, 1964.*

charcoal iron. Sulfur-free pig iron made in a charcoal furnace; has higher quality, higher density and closer structure than other iron. *Bennett 2d, 1962.*

charcoal pig iron. *See* charcoal iron. *Bennett 2d, 1962.*

charcoal pit. A charcoal furnace in the form of a pit, usually conical in shape. Charcoal is made by piling wood in the pit, covering it with earth and sod, and then burning it with a minimum of air. In some places where a bank is of proper height and structure, it is burrowed into and a beehive-shaped chamber is excavated with a small opening at the top, so that the flow of air is easily regulated. *Hess.*

charcoal plate. A tinplate of superior quality made with charcoal iron. *Standard, 1964. See also* tinplate. *Fay.*

charcoal tinplate. Tinplate with a relatively heavy coating of tin (higher than the coke tinplate grades). *Bennett 2d, 1962.*

chare; char. To work by the day without being hired regularly; to do odd jobs or chores. *Webster 2d.*

charge. *a.* The liquid and solid materials fed into a furnace for its operation. *ASM Gloss.* b. Weights of various liquid and solid materials put into a furnace during one feeding cycle. *ASM Gloss.* c. The glassforming mixture for melting. *ASTM C162–66.* d. Nonmetallic raw materials which have ben mixed for further processing, (that is, sintering, melting, forming, etc.). *Bureau of Mines Staff.* e. A kiln load of unfired ceramic ware. *Bureau of Mines Staff.* f. The fissionable material or fuel placed in a reactor to produce a chain reaction. *NRC–ASA N1.1–1957.* g. As a verb, to assemble the charge in a reactor. *NRC–ASA N1.1–1957.* h. The explosive loaded into a borehole for blasting; also, any unit of an explosive, as a charge of nitroglycerin or a charge of detonating composition in the blasting cap. *Fay.* i. To put the explosive into the hole, to arrange the fuse, or squib, and to tamp it. *Fay.*

charge hand. Senior workman responsible for small group. *Pryor, 3.*

charge hoist. In a reactor with horizontal fuel channels, the lift which is used to raise the loading and unloading machinery to charge holes at any particular level of fuel elements. *Ham.*

charge limit. For an explosion, the maximum weight of charge which can be fired without causing an ignition in gallery tests. *McAdam II, p. 42.*

chargeman. a. A stallman. *Nelson.* b. Mid. A man specially appointed by the manager to fire shots and to look after the men who drill the holes. A shot firer. *Fay.* c. A laborer who moves a mixture of copper concentrate, high-grade crushed ore, slag, and fluxing ingredients, through a hopper into charge pipes opening into a reverberatory furnace where smelting takes place, using an air-pressure hose. Also called feeder. *D.O.T. Supp.* d. Eng. The person in charge of the stonemen and shifters in a district on the repairing shift. *SMRB, Paper No. 61.*

charger. a. A remotely controlled device for moving single wagons over a short distance at a mine surface. It runs on a narrow-gage track alongside the main rails and uses a pair of roller arms which extend to engage on either side of a wagon wheel. Propelled by a guided chain engaging a power-drive chain wheel, the charger can position a wagon exactly where required. *Nelson.* b. Ih Iowa, a powder container holding 1 pound. *Hess.* c. Corn. An augerlike implement for charging horizontal boreholes for blasting. *Fay.* d. In the iron and steel industry, one who loads steel ingots into a furnace for heating, withdraws white-hot ingots from the furnace, and positions them on bed of a mill for rolling, using a traveling electric charging machine. *D.O.T. 1.* e. *See* lidman. *D.O.T. Supp.*

charger-car operator. *See* larryman. *D.O.T. Supp.*

charge weigher. In ore dressing, smelting and refining, one who weighs out specified amounts of coke, limestone, and copper-bearing scrap materials to make furnace charges for recovery of copper from plant refuse. *D.O.T. 1.*

charging. a. The loading of a borehole with explosives. *Fay.* b. The arranging of the fuse or squib, and the tamping of the hole with stemming material. *Jones.* c. For a lap, impregnating the surface with fine abrasive. *ASM Gloss.* d. Feeding raw material into an apparatus, for example, into a furnace, for treatment or conversion. *Bennett 2d, 1962.* e. Packing pottery in a kiln. *ACSG.*

charging box. A box in which ore, scrap, pig iron, fluxes, etc., are conveyed to the furnace by means of a charging machine. *Fay.*

charging-car operator. *See* larryman. *D.O.T. Supp.*

charging door. The door through which a smelter or furnace is loaded. *Enam. Dict.*

charging fork. The mechanical arrangement for inserting the load of ware into a box-type enameling furnace. *Enam. Dict.*

charging hopper. That part of a concrete mixer which rests on the ground, and which is filled with the required quantities of cement, sand, and gravel before they are loaded into the mixing drum. *Ham.*

charging machine. A machine for delivering coal, ore, or metals to a furnace, gas retort, or coke oven. *Fay.*

charging-machine operator. a. In the iron & steel industry, one who loads metal and flux into open-hearth furnace with an electric powered traveling charging machine. Also called charger, furnace charging-machine operator, poker in, and pusher runner. *D.O.T. 1.* b. In ore dressing, smelting, and refining, one who loads copper or copper scrap in a reverberatory furnace. *D.O.T. 1.*

charging man. A laborer who charges an electric-arc furnace with metals, alloys, and other materials. Also called furnace charger; furnace feeder. *D.O.T. Supp.*

charging pan. The iron pan adjusted on the end of the charging peel for holding the scrap and carrying it into the furnace. *Mersereau, 4th, p. 413.*

charging peel. A long arm or extension attached to a charging machine for conveying and dumping the scrap in the open hearth furnace. *Mersereau, 4th, p. 413.*

charging rack. A device used for holding batteries for mining lamps and for connecting them to a power supply while the batteries are being recharged. *ASA C42.-85:1956.*

charging scale. A scale for weighing the various materials used in a blast furnace. *Fay.*

charging station. A room underground or on the surface equipped for charging and exchanging locomotive batteries. It may also provide facilities for repairs. *See also* locomotive garage. *Nelson.*

chark. a. To burn to charcoal or coke. *Webster 3d.* b. Charcoal; coke; cinder. *Webster 3d.*

Charles' law. If the pressure of a given mass of gas be kept constant, the volume varies directly as the absolute temperature: $\frac{V}{T}$ = Constant, if P is constant. *Cooper.*

Charlton photoceramic process. A positive print is formed on ceramic ware by a process involving the application of emulsion to the ware, exposure in contact with the negative, and development. *Dodd.*

Charmouthian. Middle Lower Jurassic. *A.G.I. Supp.*

charnockite. a. A quartzofeldspathic gneiss or granulite with hypersthene; regarded by some petrographers as being igneous. *A.G.I.* b. A granitic rock with hypersthene as its chief mafic constituent. Originally applied to the granitic member of a series of hypersthene-bearing rocks ranging in composition from granite through norite to hypersthene pyroxenite. Some petrographers regard charnockites as the products of deep-seated metamorphism. *A.G.I.* c. Granulites characterized by the mineral assemblage quartz, orthoclase, and hypersthene, with or without garnet and plagioclase. *A.G.I.*

charnockite series. A series of rocks that resemble the pyroxene granulites of Saxony, Germany, ranging from the charnockite through noritic types to pyroxenite and characterized throughout by the presence of hypersthene. *Holmes, 1928.*

char oven. A furnace for charring turf. *Fay.*

Charp. Trade name for calcined high-alumina refractory powder; it is made from Ayrshire beauxitic clay. *Dodd.*

Charpy test. A pendulum-type, single-blow impact test in which the specimen, usually notched, is supported at both ends as a simple beam and broken by a falling pendulum. The energy absorbed, as determined by the subsequent rise of the pendulum, is a measure of impact strength or notch toughness. *ASM Gloss.*

charred peat. Peat artificially dried at a temperature that causes partial decomposition. *Bennett 2d, 1962 Add.*

charring. The expulsion by heat of the volatile constituents of wood, etc., leaving more or less pure vegetal carbon. *Fay.*

chart datum. The plane to which soundings on a chart are referred, usually low water. *Hy.*

charter. Mid. The tonnage price paid to contract miners. *Fay.*

chartered civil engineer. A civil engineer who has been admitted to Corporate Membership of the Institution of Civil Engineers, generally by examination. *Ham.*

charter master. Staff. A contractor who engages to work a steam, or sometimes a small mine at a tonnage price for the owner, or owners, the charter master finding and paying the underground labor. *See also* butty, c. *Fay.*

charter price. Price per ton of coal paid to face workers for hewing, and perhaps loading and moving. *Pryor, 3.*

char value. The amount of charred oil obtained from kerosine after burning in a standard wick and lamp at a standard rate for 24 hours. The weight of char is estimated from that present in the upper portion of the wick after washing with light petroleum spirit and drying at 100° to 110° C. Char value should be less than 30 milligrams per kilogram of kerosine.

Francis, 1965, v. 1, p. 270.

chase. a. To make a series of cuts each, except the first, following in path of the cut preceding it, as in chasing a thread. *ASM Gloss.* b. A continuous vertical recess built into a wall to receive pipes and ducts. *ACSG.* c. Eng. To run the cages up and down the shaft after the winding engine has been standing for some time, to see that all is right before men are allowed to get into the cage. Also called chess the ropes. *Fay.*

chaser. An edge wheel revolving in a trough to crush asbestos mineral without destroying the fiber. Used in the pottery industry and for fine crushing of ore. Also called edge runner. *Fay.*

chaser mill. a. This type mill usually consists of a cylinder steel tank which is lined with wooden blocks laid with the end grain up. The rollers are usually wooden, with a revolving speed of 15 to 30 revolutions per minute. Wet-ground mica is produced in mills of this type. *BuMines Bull. 630, 1965, p. 588.* b. Name occasionally used for an edge-runner mill. *Dodd.*

chaser, tar. In the coke products industry, a laborer who works as a member of a crew concerned with keeping collecting mains free of tar, pitch, and carbon accumulations. Also called tar chaser; tarman; tar runner. *D.O.T. Supp.*

chasha. Russ. A disintegrater for gold-bearing gravelly clays; similar to an arrastre except that it disintegrates instead of crushes. *Fay.*

chasing. a. The art of ornamenting metal by cutting it with a graver, or the product of this art. *Standard, 1964.* b. The process of finishing the surface of castings by polishing and removing small imperfections. *Webster 3d.* c. Following a vein by its range or direction. *Fay.*

chasing the vein. Derb. Following the vein along the surface by means of cast holes or prospect pits. *Fay.*

chasm. A yawning hollow or rent as in the earth's surface; any wide and deep gap; a cleft; fissure. *Standard, 1964.*

chasovrite. A variety of clay mineral (glinite) from the Chasovyar deposit in the Ukraine, U.S.S.R. *Spencer 21, M.M., 1958.*

chassingite. An achondrite (meteoritic stone) that is mainly olivine. *Hess.*

chat. a. Applied to a chert conglomerate at the base of the Pennsylvanian system in parts of Kansas. Also applied to the upper and cherty part of the underlying Mississippian limestone. *A.G.I.* b. The finely crushed gangue remaining after the extraction of lead and zinc minerals. From Joplin, Mo. *A.G.I.*

Chateauagy iron. A low-phosphorus, copper-free pig iron produced from New York State magnetite ore. *Brady, 4th ed., 1940, p. 114.*

Chatelier. *See* Le Chatelier. *Dodd.*

chatoyancy. The characteristic optical effect shown by cat's eye and some other minerals. It is caused by the reflection of light from numerous, alined, microscopic tubular channels, perhaps as many as 25,000 per square centimeter. When cut en cabochon, such a stone exhibits a narrow silvery band of light that changes its position as the gem is turned. *C.M.D.*

chatoyant. Having a luster resembling the changing luster of the eye of a cat as seen at night. *See also* cat's eye. *Fay.*

chatroller. An ore-crushing machine, consisting of a pair of cast-iron rollers, for grinding roasted ore. *Fay.*

chats. a. Northumb. Small pieces of stone with ore. *Fay.* b. Eng. A low grade of lead ore. Also, middlings which are to be crushed and subjected to further treatment. The mineral and rocks mixed together which must be crushed and cleaned before sold as mineral. Chats are not the same as tailings, as the latter are not thrown aside to keep for future milling. *Fay.* c. Loosely used in Missouri, Kansas, and Oklahoma, for tailings or waste product from the concentration of lead and zinc ore. *Fay.* d. Eng. Bowse when broken up on the knockstone ready for the hotchin tubs, Yorkshire lead mines. *Arkell.* e. A quarrying tarm for cherty rock used as an abrasive. *AIME, p. 329.*

chat-sawed. Term used to describe the surface finish of building limestone that is somewhat smoother than shot-sawed. *AIME, p. 330.*

chatter. a. Rapid vibrations caused by overfeeding the bit and/or by drill rods rubbing against the sidewalls of a borehole. *Long.* b. In machining of grinding, a vibration of the tool, wheel, or workpiece producing a wavy surface on the work, and the finish produced by such vibrations. *ASM Gloss.*

chattermark. a. A spiral or flutelike, round-topped ridge, sometimes seen on outside surface of core. Some drillers claim that such spiral ridges are formed when bit and drill stem chatter or vibrate or when the bit has been overfed. *Long.* b. One of a series of short curved cracks on a glaciated rock surface roughly transverse to the glacial striae. *Webster 3d.* c. Surface imperfections on the work being ground, usually caused by vibrations transferred from the wheel work interface during grinding. *ACSG, 1963.*

chatterpye. Eng. A kind of ironstone, being of the color of a magpie. *Compare* throstler; culver; quoiceneck. *Arkell.*

Chattian. Upper Oligocene. *A.G.I. Supp.*

Chattock-Fry tilting micromanometer. The standard form of this instrument uses the interface between two liquids as its fixed datum, like the two-liquid differential manometer. The two vertical limbs of the U-tube are two cylindrical vessels which are usually of 2 inches in diameter and spaced either 13 or 26 inches apart. These two end vessels are connected to a central vessel. The end vessels are filled with distilled water and a quantity of oil (Nujol) is introduced into the top of the central vessel from the oil filler so that two surfaces of separation are formed with water. The oil-water interface above the tube in the central vessel is in the form of a bubble. When a differential pressure is applied between the two end vessels, the bubble changes in size, the image of which may be observed either with a microscope with cross wires or by optical projection of the image onto a ground-glass screen. *Roberts, I, pp. 31-32.*

Chautauquan. The Upper Upper Devonian, below Bradfordian. *A.G.I. Supp.*

chaux de Theil. French hydraulic lime containing about 20 percent clay. *Bennett 2d, 1962.*

Chazyan. Lower Ordovician. *A.G.I. Supp.*

check. a. The stamped metal tag placed on each loaded car to identify the loader; also called ticket or tag. This term is also applied to slit canvas or brattice cloth, called a check curtain or fly, placed across a passage to prevent the flow of air while still permitting the passage of men and equipment. To check also means to verify some statement. *Jones.* b. A wall. A variation of cheek. *Fay.* c. Token, tally, motty. *Mason.* d. A brass disk with a miner's lamp number punched on it. He exchanges the check for his lamp at the lamp room every time he enters or leaves the mine. *Nelson.* e. Separation of wood across the growth rings. *Lewis, p. 39.* f. To stop or slow down. *Long.* g. To inspect for structural or dimensional imperfections; to examine. *Long.* h. Sometimes used as a synonym for check valve. *Long.* i. An almost imperceptible crack in steel caused by uneven quenching in hardening. *Webster 3d.* j. Eng. A fault. *Fay.* k. An imperfection; a surface crack in a glass article. *ASTM C162-66.*

check ball. The ball part of ball-and-socket type check valve used in the heads of core barrels and in drill-rod-and-casing strings to allow liquids to flow unhindered in one direction only. *Long.*

check battery. A battery to close the lower part of a chute acting as a check to the flow of coal, and as a stopping to keep the air in the breasts. *Fay.*

check board. A board usually posted at the entrance to a mine or to a section of a mine on which miners hand their identification checks to show whether they are in or out; or on which their loading checks are hung. *Bureau of Mines Staff.*

checkboarding. a. *See* checkerboarded, a. *Long.* b. To divide property in a manner so that two parties acquire title to alternating and equal-size square sections of land. *Long.*

check brakes. Aust. An arrangement for automatically checking the speed of skip running down an incline when unattached to a rope. *Fay.*

check clack. Scot. A fixed valve in a rising main other than a delivery valve. *See also* check valve. *Fay.*

check curtain. *See* curtain. *Kentucky, p. 93.*

check dam. A dam that divides a drainageway into two sections with reduced slopes. *Nichols.*

check-docking boss. *See* checkweigher. *D.O.T. 1.*

checker arches. Firebrick supports built of arch brick or keys to support the checkerwork on the second, third, or fourth pass of hot-blast stoves. *Fay.*

checkerboard. A loose pattern of lease purchases that seeks a protective position in a general trend or area of possible production. *Wheeler.*

checkerboard drilling. *See* checkerboarded, a. *Long.*

checkerboarded. a. An area in which boreholes have been placed at the intersections of equally spaced parallel lines laid out on a square grid or checkerboard pattern. *Long.* b. An area divided into squares of equal size by two groups of equally spaced parallel lines placed at right angles to each other. *Long.*

checkerboard system. *See* bord-and-pillar method. *Fay.*

checker bricks. *See* checkers. *Dodd.*

checker chamber. Common term for a regenerator. *Bureau of Mines Staff.*

checker coal. Anthracite coal that occurs as rectangular grains. *Zern.*

checkers; checker bricks. Refractory bricks or special shapes set in a regenerator in such a way as to leave passages for the movement of hot gases; waste gases passing from a furnace through the checkers give up heat which, on reversal of the direction of gas flow in the furnace, is subsequently transferred to the combustion air and fuel. *Dodd.*

checkerwork. a. A structure of firebrick (as in a regenerative furnace) built so that the bricks alternate with open spaces permitting the passage of gases which give heat to or receive heat from the firebrick. *Webster 3d.* b. *See* checkerboarded. *Long.*

check grieve. Scot. A person who checks the weight of mineral on behalf of the landlord. *Compare* checkweigher. *Fay.*

checking. a. Fine cracks on a fired ceramic surface. Also called surface checking. *Bureau of Mines Staff.* b. Term applied to raised lines on cast-iron enamels caused by cracking of the ground coat underneath. *Enam. Dict.* c. Temporarily reducing the temperature or the volume of the air blast on a blast furnace. *Fay.*

check man. A man who keeps a record of miners' tokens sent out on their loaded coal tubs. With modern conveyor systems, this duty is obsolescent. *Nelson.*

check measurer. *See* checkweigher. *D.O.T. 1.*

check number. A number assigned to each miner by which his coal is identified, and under which its weight is entered on the coal bulletin. *See also* check, a. *Fay.*

checknut. A nut screwed down upon another nut causing a binding on the threads. Commonly called locknut. *Crispin.*

checkoff. A method of collecting union dues. fees, and fines by withholding them from the miner's wages. *Fay.*

checkout. Scot. The meeting of the roof and floor, the coal seam being thereby cut off; to pinch out. *Fay.*

check puller. In mining, one who pulls out the checks or tickets (metal identification tabs) from loaded mine cars as they are weighed or dumped, and calls the number on them to a weightmaster I so that the miner who loaded the car can be identified for pay purposes. Also called ticket boy. *D.O.T. 1.*

check rail. A third rail fixed close outside the inner rail on curves in a railway track in order to reduce wear on the outer rail caused by centrifugal force; this rail also helps to keep the inner wheel on the rail. *Ham.*

checks; checkmarks. Numerous, very small cracks in metal or other material caused in processing. *ASM Gloss.*

checksheet. A sheet on which are printed illustrations of various drilling equipment assemblies with the component items shown in their relative operating positions and used as a guide in making up a list of the units necessary to do various routine drilling jobs. *Long.*

check surpey. A survey made to confirm the positions of established survey stations in the mine. *B.S. 3618, 1963, sec. 1.*

check valve. a. Generally, a ball-type valve device placed in core barrels, soil samplers, or drill rods to control the directional flow of liquids. When used on a core barrel, the check blocks the downward flow of the circulation liquid through the inner tube. When used on a rod string, it blocks the upward flow of the circulation liquid through the rods. *Long.* b. Any device that permits a liquid or gas to pass in one direction but automatically closes when *also* clack valve; reflux valve.

check viewer. In bituminous coal mining, one the flow is stopped or reversed. *Long. See* who inspects and checks portions of mine which have been leased to workers to see that terms of lease, such as mining within specified limits, safety precautions, and production rate, are duly observed. *D.O.T. 1.*

checkweigher. In mining, one who checks, in interest of miners, the weighing of coal in mine cars or other containers by the company weighmaster. He estimates the amount of slate, dirt, rock, and other foreign matter in the coal and sees that only authorized deductions are made. Also called check-docking boss; check measurer; checkweighman; justiceman. *D.O.T. 1. Compare* check grieve. *Fay.*

checkweighman. *See* checkweigher. *D.O.T. 1.*

checquer bricks. *See* chequers. *Dodd.*

Cheddite. High explosive; 70 to 90 percent potassium chlorate, 0 to 20 percent aromatic nitro compounds, 0 to 15 percent paraffin. *Bennett 2d, 1962.*

cheek. The intermediate section of a flask that is used between the cope and the drag when molding a shape which requires more than one parting plane. *ASM Gloss.*

cheekakoo. Alaskan term for a tenderfoot, that is, a newcomer in a rough mining camp. *von Bernewitz.*

cheeking. The removal of the side or sides of a roadway to increase the width. *TIME.*

cheeks. a. The sides or walls of a vein. *Fay.* b. Extensions of the sides of the eye of a hammer or pick. *Fay.* c. Eng. Projecting masses of coal. *Fay.* d. The refractory sidewalls of the ports of a fuel-fired furnace. *Dodd.*

cheesebox. A name given to a cylindrical still, used in the distillation of kerosine in the United States. *Fay.*

cheesecakes. Shrop. Clay in very thin flakes, alternating with sand; Wealden beds of Whitchurch. *Arkell.*

cheese clack. Scot. A temporary clack (valve) inserted between two pipes. *Fay.*

cheese doggers. York. Lenticular sulfurous doggers, 4 to 5 feet in diameter, like thin-edged millstones, in the Jet rock series. *Arkell.*

cheese pitch. At Trinidad Lake, a variety of asphalt which has been pushed out on the land and contains gas cavities like the asphalt from the lake. *Abraham, 6th, 1960, v. 1, p. 177.*

cheeses. Derb. Clay ironstone in cheese-shaped nodules. *Fay.*

cheese stick; two-minute lighter. A fuse lighter consisting of cardboard tubes blocked at one end by a wooden plug and filled with a combustible material. *South Australia, p. 40.*

cheese weights. Aust. The circular cheese-shaped weights used to keep guide ropes taut. *Fay.*

cheestone. Derb. A stone that by reason of a joint breaks further into the wall than usual. *Fay.*

chelate compound. The compound formed by the combination of a chelating agent and a metal ion. *ASM Gloss.*

chelating agent. A substance which contains two or more electron donor groups and which will combine with a metal ion so that one or more rings are formed. In metal finishing, a chelating agent is used to control or eliminate certain metallic ions present in undesirable quantities. *ASM Gloss.*

chelation. Decomposition or disintegration of rocks or minerals resulting from the action of organisms or organic substances. *A.G.I. Supp.*

cheleutite. A ferruginous, nickeliferous, and slightly supriferous smaltite. *Weed, 1918.*

Chelsea color filter. An effective dichromatic color filter transmitting light of only two wavelength regions; one in the deep red, the other in the yellow green. Useful for discriminating between emerald and its imitations and for detecting synthetic spinels and pastes colored blue with cobalt. *Anderson.*

Chelsea filter. *See* color filter. *Shipley.*

chemawinite. A pale yellow to dark brown resin related to succinite, occurring on a beach on Cedar Lake, near the mouth of the North Saskatchewan River, Canada; specific gravity, 1.055; soluble to the extent of 21 percent in absolute alcohol. *Fay.*

chemechol. A method of breaking down coal rather similar to Hydrox and applied on the same lines as air shooting. *Nelson.*

chemical. As a noun, substance obtained by a chemical process. *Crispin.*

chemical adsorption. Surface adherence; accompanied by the formation of primary bonds. *VV.*

chemical affinity. a. The force which binds atoms together in molecules. The affinity of a chemical reaction is measured by the maximum external work (change of free energy) obtainable from the reaction. *C.T.D.* b. The tendency of one substance to form a chemical compound with another. *Hess.*

chemical analysis. a. A method of obtaining the chemical composition of a refractory, which usually involves taking it into solution, followed by a process of separation to obtain quantitatively the elements present, after which calculations are made to show the percentage of the various constituents as they occur in the material. *A.R.I.* b. A method of determining the composition of a material employing chemical techniques by which the various elements are separated quantitatively. *Bureau of Mines Staff.*

chemical bonds. *See* covalent bonds; ionic bonds; metallic bonds; primary bonds; secondary bonds; van der Waals bonds. *VV.*

chemical-cartridge respirator. An air-purifying device which removes small quantities of gases or vapors from the inspired air. They are recommended only for atmospheres not immediately dangerous to life. At present the U. S. Bureau of Mines has approved them for protection against organic vapors such as those encountered in handling solvents. *Bests, p. 101.*

chemical change. A change by which the identity of a substance is changed; for example, burning a piece of coal. *Crispin.*

chemical-clay grout. A typical grout of this class used in Great Britain is bentonite-sodium silicate, in which the silicate is used to render irreversible the thixotropic nature of the bentonite suspension. The gel is stronger than pure bentonite and permanent in that local vibration cannot cause it to reliquefy. Setting time can be controlled by adjustment of the chemical content. *See also* Benphosil grout. *Nelson.*

chemical combination. Change in which permanent alteration of properties occurs, accompanied by intake or release of energy. Reaction is governed by laws of mass conservation, definite and multiple proportions, equivalence, and volumetric reaction. *Pryor, 3.*

chemical composition. The weight percentages of the component elements of a material. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24. Glossary of terms used in the aluminum-extrusion industry.*

chemical constitution of coal. The elements or component parts of coal. These are determined by chemical analyses which may be performed in different ways. An ultimate analysis provides exact information as to the percentages of the various elements (such as carbon, oxygen, and hydrogen) present in the coal. Another method is by proximate analysis which determines the relative percentages of carbon, moisture, volatile matter (such as gas and tar), sulfur, and ash. It requires a fuel technologist to appreciate the importance of the data given in a coal analysis. *Nelson.*

chemical denudation. The processes in which the salts or the soluble minerals in the earth are dissolved by water and carried to the sea. *Bennett 2d, 1962.*

chemical deposition. The precipitation or plating-out of a metal from solutions of its salts through the introduction of another metal or a reagent into the solution. *ASM Gloss.*

chemical durability. The lasting quality (both physical and chemical) of a glass, or ceramic, surface. It is frequently evaluated, after prolonged weathering or storing, in terms of chemical and physical changes in the glass, or ceramic, surface, or in terms of changes in the contents of a vessel. *ASTM C162-66.*

chemical element. Matter composed of atoms of only one chemical type and which thus cannot be decomposed into simpler substances by chemical means. There are about a hundred elements known. *Anderson.*

chemical energy. Energy released or absorbed when atoms form compounds. Generally becomes available when atoms have lost or gained electrons, and often appears in the form of heat. *Leet.*

chemical engineer. A chemist whose activities include the design and erection of chemical plants as well as research and general work in industrial chemistry. *Crispin.*

chemical engineering. Developing, building, and operation of plants in which materials are chemically worked up to desired end products. *Pryor, 3.*

chemical equilibrium. Reaction in which state is reached where reaction is reversible and is occurring at equal rate in both directions. *Pryor, 3.*

chemical equivalents. Combining weights relative to that of hydrogen. Number of grams of an element which combine with or replace 1 gram of hydrogen or 8 grams of oxygen. *Pryor, 3.*

chemical erosion. *See* corrosion. *Schieferdecker.*

chemical extraction. Term taking the place of hydrometallurgy. It embraces leaching (acid, alkaline, and pressure), ion exchange, solvation precipitation, and calcination. *Pryor, 3.*

chemical flask. A glass vessel usually having a round or a conical body and a neck which can be grasped by a clamp. Used to heat liquids. *Bennette 2d, 1962.*

chemical foam extinguisher. A fire extinguisher containing a chemical foam that is formed by mixing a suitable acid solution with an alkali solution to form gas bubbles containing carbon dioxide. The foam is spread over the surface of the blaze and the blanket of carbon dioxide smothers the flames. It can be used freely on burning materials, such as wood or coal, as well as against highly flammable liquids; it should not be used where there is danger of electric shock. *McAdam, pp. 115-117.*

chemical gaging. A method of measuring flow of water by determining the dilution of a chemical solution introduced upstream at a known rate and concentration. *Ham.*

chemical glass. A chemically durable glass suitable for use in making laboratory apparatus. *ASTM C162-66.*

chemical heat pad. A small canvas bag kept inside a specifically prepared rubber or neoprene protective case. Heat is produced by the chemical action of cold water on the mixture of finely divided iron and salts of multivalent metals, such as manganese, stored in the bag. Used in place of the hot-water bottle for underground first-aid and rescue work. *McAdam, pp. 102, 104.*

chemical lead. Lead of more than 99.9 percent purity, with low fractional percentages of copper and silver, as originally obtained from the ore; used for manufacturing storage battery plates, chemical piping. *Bennett 2d, 1962.*

chemical lime. A quicklime or hydrated lime that is used for one or more of the many chemical and industrial applications. Usually it possesses relatively high chemical purity. *Boynton.*

chemical limestone. A rock, composed predominantly of calcite, formed by direct chemical precipitation. *A.G.I.*

chemically bonded brick. Brick manufactured by process in which mechanical strength is imparted by chemical bonding agents instead of by firing. *HW.*

chemically bonded refractory cement. A jointing cement for furnace brickwork that may be one of two types: (1) air-setting refractory cement, finely ground refractory material containing chemical agents, such as sodium silicate which ensure that the cement will harden at room temperature, and (2) air-hardening refractory cement, finely ground refractory material containing chemical agents that cause hardening at a temperature below that at which vitrification begins but above room temperature. *Dodd.*

chemically combined water. That combined chemically as part of the molecule. *Bureau of Mines Staff.*

chemically precipitated metal powder. Powder produced by the reduction of a metal from a solution of its salts either by the addition of another metal higher in the electromotive series, or by other reducing agent. *ASTM B243-65.*

chemically precipitated powder. In powder metallurgy, powder produced as a precipitate by chemical displacement. *ASM Gloss.*

chemical metallurgy. Science of the composition and methods of isolation of metals from their ores. *Bennett 2d, 1962.*

chemical milling. Removing metal stock by controlled selective chemical etching. *ASM Gloss.*

chemical mineralogy. The investigation of the chemical composition of minerals; the processes of their formation; and the changes they undergo when acted upon chemically. *Fay.*

chemical polishing. Improving the surface luster of a metal by chemical treatment. *ASM Gloss.*

chemical porcelain. Vitreous ceramic whitewares used for containing, transporting, or reaction of chemicals. *ASTM C242-60.*

chemical precipitation. In the leaching process, displacement of a metal from solution by a less noble metal. Usually less costly than electrolytic precipitation, but the latter produces a purer metal and regenerates the solvent. Also called cementation. *E.C.T., v. 8, p. 939.*

chemical properties. Those reactions in which the element or compound will take part with other elements or compounds. *Cooper.*

chemical reaction. When a chemical reaction takes place the molecules of the reaction substances come together and the atoms rearrange themselves in different combinations to form molecules different from the original ones. *Cooper.*

chemical rock. In the terminology of sedimentary rocks, a chemical rock is composed chiefly of material deposited by chemical precipitation, either organic or inorganic. Chemical sedimentary rocks may have either a clastic or nonclastic (usually crystalline) texture. *Compare* edtrital sedimentary rock. *Leet.*

chemical sediment. Any accumulation of sediments that formed directly by precipitation from solution, that is, by evaporation or occasionally by the formation of insoluble precipitates on mixing solutions of two soluble salts. The most important natural substances deposited in these ways are the salts contained in sea water (chiefly calcium carbonate and various chlorides and sulfates) and the naturally occurring nitrates, borates, and alkali carbonates. *Stokes and Varnes, 1955.*

chemical soil consolidation. A new process for sinking through loose heavily watered ground. A gel-forming chemical is injected into the loose material which is eventually consolidated. The time delay in the gel formation can be controlled by chemical means and the rate of injection at waterlike viscosity is rapid. Promising results have been obtained with a proprietary process using A.M.9. This method is an improvement on former processes where it was necessary to inject two separate chemicals (calcium chloride and sodium silicate) and the reaction between them took place in the ground to be treated. *See also* bentonite; silicatization process. *Nelson.*

chemical solution. A term often used to indicate the apparent solution of a solute in a solvent, together with chemical action; for example, acids, bases, and salts. *Cooper.*

chemical stoneware; brick, chemical. A clay pottery product which is widely employed to resist acids and alkalies. It is used for utensils, pipes, stopcocks, pumps, etc. Specific gravity 2.2; hardness, scleroscope 100. Stoneware is made from special clays free from lime and iron, low in sand content, with low temperatures, and having sufficient plasticity to permit turning in a potter's wheel. *CCD 6d, 1961.*

chemical symbol. A single capital letter, or a combination of a capital letter and a lowercase letter, which is used to represent either an atom or a gram atom of an element; for example, the symbol for sodium is Na (from the Latin natrium). *C.T.D.*

chemical water treatment. A method of treating hard water by adding selected chemical substances which break down the offending impurities, the residue being either passed on in solution in harmless or less harmful form, or driven off as a gas, or precipitated for subsequent retention in the incorporated filter. The general reagents are lime or soda or a combination of both with or without the addition of zeolites or colloids. *See also* colloidal water treatment. *Nelson.*

chemical weathering. The weathering of rock material by chemical processes that transform the original material into new chemical combinations. Thus chemical weathering of orthoclase produces clay, some silica, and a soluble salt of potassium. *Leet.*

chemihydrometry. Determination of flow rate and channel taken by water by introduction of suitable chemical upstream and measurement of dilution. (Radiotracers and fluorescin also used for tracing flow direction.) *Pryor, 3.*

chemiluminescence. Luminosity connected with chemical changes in a luminous substance. *Standard, 1964.*

chemise. A wall built as a lining to an earth bank. *See also* revet. *Ham.*

chemism. Chemical affinity or attraction, especially considered as a manifestation of energy; chemical properties or activities collectively. *Standard, 1964.*

chemisorption. Irreversible sorption, an adsorbate being held as product of chemical reaction with absorbent. Activation energy is relatively high. *Pryor, 3.*

chemist. A person versed in chemistry. One whose buisness is to make chemical examinations or investigations, or one who is engaged in the operations of applied chemistry. *Fay.*

chemist, geochemical prospecting. In petroleum production, one who analyzes soils, water, rock core materials, and other samples obtained from oil and gas prospecting or well drilling operations to detect presence of petroleum or gas deposits. *D.O.T. 1.*

chemist, glass. One who conducts research in the chemistry of glass, and develops and controls processes involved in the manufacture of glass products. Also called glass technologist. *D.O.T. 1.*

chemistry. The study of the composition of substances and of the changes in composition which they undergo. The main branches are inorganic chemistry, organic chemistry, and physical chemistry. *C.T.D.*

chemist's coal. An old name given to a particular kind of hard splint coal in Scotland. According to Gresley, this name is a corruption of chemises coal because in the old days good quality coal used to be carried out of the mine by women in their shifts or chemises. On the other hand in the old Scottish tongue chemis, chemy, or chemise (an abbreviation of the Old French chef més or chief mansion) means the mansion or the principal dwelling of an estate, and so this particular coal may have acquired its name for being allocated to the mansion. *Tomkeieff, 1954.*

chemites. A word employed by M. E. Wadsworth to embrace all mineral chemical materials. *Fay.*

Chemox apparatus. A self-contained, breathing escape apparatus that weighs 13½ pounds, and that uses, in place of the conventional cylinder of oxygen, a canister of chemicals which generate oxygen when activated by the moisture in exhaled air. It gives the wearer complete protection in toxic or in oxygen-deficient atmospheres for a period of at least 45 minutes. The apparatus was approved by the U.S. Bureau of Mines and is accepted for use in British mines under the following conditions: (1) It can be used for emergency purposes provided that the apparatus is used under the supervision of trained rescue men; and (2) It can be used by trained rescue men to enable them to become familiar with it's use provided that hard work is not undertaken. *McAdam, pp. 51-53.*

chempure tin. Purest commercially available tin, 99.9 percent tin. *Bennett 2d, 1962.*

Chemungian. Middle Upper Devonian, below Cassadagan. *A.G.I. Supp.*

chenevixite. A massive to compact dark-green to greenish-yellow hydrous arsenate, perhaps $Cu_2(FeO)_2As_2O_8+3H_2O$. *Fay.*

Chenhall furnace. A gas-fired furnace for the distillation of zinc from zinc-le aodres. *Fay.*

chenier. A perched beach ridge on a chenier plain. *Schieferdecker.*

chenier plain. A plain of tidal marshes or swamps along an open seashore, which is zoned by cheniers. *Schieferdecker.*

Chenot process. The process of making iron sponge from ore mixed with coal dust and heated in vertical cylindrical retorts. *Fay.*

Chequer plate. A plate of steel or cast iron which is perforated or patterned to provide a nonslip surface. *Ham.*

chequers; chequer bricks. *See* checkers; checker bricks. *Dodd.*

cheralite. A member of the monazite group rich in thorium ($ThO_2$31.50 percent), $(Ce,La,Th,U,Ca)(P,Si)O_4$, as green monoclinic crystals in pegmatite from Travancore. Named from Chera (Kerala), an ancient kingdom in southwest India. *Spencer 20, M.M., 1955.*

cheremchite; tscheremchite. A variety of sapropelic coal composed of a mixture of structureless humic sapropel and algal remains. *Tomkeieff, 1954.*

cherkers. Forest of Dean. Ironstone nodules. *Arkell.*

chernozem. Synonym for tchornozem; tschernosem. *A.G.I.*

cherry coal. a. A soft noncaking coal which burns readily. *Webster 3d.* b. A deep black, dull, or lustrous bituminous coal, with a somewhat conchoidal fracture, readily breaking up into cuboidal fragments. It ignites easily with a yellowish flame, making a hot, quick fire, and retains its shape until thoroughly consumed. Its specific gravity is much less than anthracite, about 1.30. *Fay.*

cherry opal. A reddish translucent opal from Mexico. *Shipley.*

cherry picker. a. A fishing tool in the modified form of a horn socket. The lower end or mouth is cut away on one side and resembles a scoop; hence, because of its shape, the device, as it is turned, works around and behind an object that has become partly embedded in the wall of the borehole, thus engaging it where a regular horn socket would fail. *Long* b. A small hoist to facilitate car changing near the loader in a tunnel. The empty car is either lifted above the track (to allow a loaded car to pass out beneath) or swung to one side free of the track. The equipment is fairly common particularly for handling large cars. *See also* double-track portable switch. *Nelson* c. In tunneling, a small traveling crane spanning tracks which transfers an empty car to a parallel track so that a loaded one can be drawn from the advancing end. *Pryor, 3* d. A small derrick made up of a sheave on an A-fram, a winch and winch line, and a hook. Usually mounted on a truck. *Nichols, 2.*

cherry red. Applied to iron heated so that the color is red like a ripe cherry. *Mersereau, 4th, p. 458.*

cherry-red heat. A common term used on the color scale, generally given as about 750°C (1,382° F). *Bureau of Mines Staff.*

chert. a. Cryptocrystalline silica, distinguished from flint by flat fracture, as opposed to conchoidal. *Pryor, 3.* b. Ofter referred to as chat; a very hard glassy mineral, chiefly silica (SiO_2). *Wheeler.*

chertification. Silicification, especially by chalcedony or by fine-grained quartz. *A.G.I.*

chervetite. A mineral, $Pb_2V_2O_7$; in small monoclinic crystals at the Mounana uranium mine, Republic of Gabon. *Hey, MM, 1964; Fleischer.*

chesil. Eng. Shingle; gravel. *Arkell.*

Chesney process. A method for producing magnesium metal and other magnesium products from sea water by precipitation with dolomitic lime as the means of separating the relatively small quantity of magnesium from the large volume of sea water. *CCD 6d, 1961.*

chessy copper. *See* azurite. *CCD 6d, 1961.*

chessylite. *See* azurite.

chest. a. A tight receptacle or box for holding gas, steam, liquids, as the steam chest of an engine. *Webster 2d.* b. Scot. A tank or barrel in which water is drawn from the sump. *Fay.*

Chesterian. Upper Mississippian. *A.G.I. Supp.*

chesterlite. Microcline feldspar from Chester County, Pa. *Schaller.*

chesting. Scot. Drawing water by means of a chest. *See also* chest, b. *Fay.*

chest knife. A tool used in hand-blown glassmaking for removing the moil from the blowing iron; the moils are allowed to crack off while the blowing irons are in a receptacle called a chest. *Dodd.*

chestnut coal. a. In anthracite only, coal small enough to pass through a square mesh of 1 inch to 1⅛ inch, but too large to pass through a mesh of five-eighths or one-half of an inch. Known as No. 5 coal. *Fay.* b. Ark. Coal that passes through a 2-inch round hole and over a 1-inch round hole. *Fay. See also* anthracite coal sizes.

chevaliers. Eng. Ironstone nodules in the Weald. *Arkell.*

chevee. A flat gem with a polished concave depression. *Bureau of Mines Staff.*

Chevenard dilatometer. An apparatus for the measurement of thermal expansion; it depends on the recording, by means of an optical lever, of the differential expansion of the test piece and that of a standard. It finds use in Western Europe for the testing of ceramic products. *Dodd.*

chevick. Eng. Gravel consisting of fragments of Wealden shale, more or less cemented with ferruginous matter, occurring on the surface round Horley, Surrey, to a depth of 2 to 3 feet, occasionally 8 feet. The same as shrave. *Arkell.*

chevron crossbedding. Crossbedding that dips in different directions in superimposed beds forming a chevron pattern. Also called herringbone crossbedding or zigzag crossbedding. *Pettijohn.*

chevron drain. A rubble-filled trench system in the slope of a railway cutting, laid out in herringbone fashion and leading the surface water into buttress drains arranged along the line of steepest slope. *Ham.*

chevron fold. A very sharp fold that is usually small. *A.G.I.*

chevron mark. Linear row of chevrons, presumably pointing upstream. *See also* vibration mark; ruffled groove cast; herringbone marking. *Pettijohn.*

chew. a. To grind into small fragments. *Long.* b. To tear through material in a borehole with a sawtooth or serrated bit. *Long.* c. To gouge or deeply erode an article, such as the surface of a bit, by hard, sharp-cornered rock fragments. *Long.*

chews; chows. Scot. Coal loaded with a screening shovel; middling-sized pieces of coal. *Fay.*

chew up. *See* chew. *Fay.*

Chezy formula. A formula expressing the relation between velocity of water, hydraulic radius, and friction slope; thus, $V = C\ RS_f$, in which V equals velocity, R equals hydraulic radius, S_f equals sine of the slope angle due to friction, and C equals a coefficient. *See also* Kutter's formula; Manning's formula. *Seelye, 1.*

CH_4. Marsh gas; an explosive gas consisting of 4 atoms of hydrogen and 1 atom of carbon. *Bureau of Mines Staff.*

chiastolite; macle. A variety of andalusite, aluminum silicate, $Al_2O_3.SiO_2$, in which carbonaceous impurities are arranged in a regular manner along the longer axis of the crystal, in some varieties like the X (Greek chi), hence the name. *Sanford.*

chiastolite slate. A fine-grained, metamorphosed, carbonaceous shale without any prominent cleavage or schistosity and containing conspicuous crystals of chiastolite. *Hess.*

chibinite. A coarse-grained eudialyte syenite in which soda amphiboles are more abundant than soda pyroxenes. It differs from lujaurite in having a more granular texture and in containing less nepheline. *Holmes, 1928.*

chicharra sampling. A sampling technique in which the ore bodies are sampled with a dry stoper drill. *Lewis, p. 343.*

chickenfeed. An Alaskan term for fine gravel one-half inch more or less in diameter. *Bureau of Mines Staff.*

chicken grit. Commonly composed of oyster shell, limestone, and marble, although other materials, such as granite and feldspar, are sometimes used. *BuMines Bull. 630, 1965, p. 886.*

chicken ladder. A notched log or pole used as a ladder. *Bureau of Mines Staff.*

chicot pearl. Same as blister pearl. *Shipley.*

chidder. Aust. Slate and pyrite mixed. *Fay.*

Chiddy's test. Cupellation assay, for gold content of barren cyanide solution. The gold (and silver) is precipitated together with metallic lead as sponge on aluminum. This metal is cupeled and gold prill is weighed. *Pryor, 3.*

Chideruan. Uppermost Permian. *A.G.I. Supp.*

chief of party. A civil engineer who is in charge of the surveying party in the field. He is responsible to the chief engineer. *Crispin.*

chigura. A timber used in making a cribe. *Bureau of Mines Staff.*

chihlimbar. Romanian name for amber. *Tomkeieff, 1954.*

childrenite. A hydrous phosphate of aluminum, $(Fe'',Mn'')Al(PO_4)(OH)_2.H_2O$; brown to yellowish-brown color; isomorphous with eosphorite. *Hey 2d, 1955; Dana 7, v. 2, pp. 936-938.*

Chilean lapis. Pale to light blue lapis lazuli containing veins of white matrix; often tinged or spotted green and prominently veined with white or gray. *Shipley.*

Chilean mill; edge runner. A mill having vertical rollers running in a circular enclosure with a stone or iron base or die. There are two classes: (1) those in which the rollers gyrate around a central axis, rolling upon the die as they go (the true Chile mill), and (2) those in which the enclosure or pan revolves, and the rollers, placed on a fixed axis, are in turn revolved by the pan. It was formerly used as a coarse grinder, but is now used for fine grinding. *Liddell 2d, p. 356.*

Chilean mill operator. In ore dressing, smelting, and refining, one who operates a battery of Chilean mills in which a lead, zinc, copper, or gold ore is ground to a size suitable for separation and concentration of the valuable mineral by being crushed between heavy rollers and the surface of a metal grinding ring. Becoming obsolete. *D.O.T. 1.*

Chile bars. Bars of impure copper, weighing about 200 pounds, that are imported from Chile. They correspond to the Welsh blister copper, containing 98 percent copper. *Fay.*

chileite. A hydrous lead and copper vanadate containing 11.7 to 13.6 percent copper. It is related to psittacinite. Structure, earthy. Formula, uncertain. From Chile. *Weed, 1918.*

chilenite. A soft silver-white amorphous silver bismuthid, Ag_6Bi. *Standard, 1964.* Bismuth silver. *Fay.*

Chile niter; Chile saltpeter. A commercial name for sodium nitrate; $NaNO_3$. *See also* sodium nitrate. *C.T.D.*

Chile saltpeter. *See* Chile niter.

chill. a. Derb. To test the roof with a tool or bar to determine its safety. *Fay.* b. A metal insert imbedded in the surface of a sand mold or core or placed in a mold cavity to increase the cooling rate at that point. *ASM Gloss.* c. White iron occurring on a gray iron casting, such as the chill in the wedge test. *ASM Gloss.* d. To harden by suddenly cooling. *Gordon.*

chill casting. Pouring molten metal into molds so made that it comes into contact at desired places with metal; cooling, therefore, being accelerated and special hardness imparted. *Pryor, 3.*

chill crystals. Small crystals formed by the rapid freezing of molten metal when it comes into contact with the surface of a cold metal mold. *C.T.D.*

chilled casting. A casting which has been chilled, either by casting in contact with something which will rapidly conduct the heat from it, as a cool iron mold, or by sudden cooling by exposure to air or water. *Fay.*

chilled cast iron. Castings of iron made in molds or parts of molds that are faced with iron or steel. The castings cool rapidly in these parts and so retain a larger percentage of carbon. *Mersereau, 4th, p. 426.*

chilled contact; chilled zone. a. That part of an igneous body that is finer grained and nearer the contact than the rest of the igneous body. It is believed to have cooled more rapidly than the main body of igneous rock and hence is finer grained. *A.G.I* b. The border of an intrusive that was suddenly cooled by contact with the country rock, and consequently of finer grain than the interior of the intrusive which had a longer time to crystallize. *Hess.*

chilled dynamite. The condition of the dynamite when subjected to a low temperature not sufficient to congeal it, but which seriously affects the strength of the dynamite. *Fay.*

chilled iron. Cast iron cast in molds constructed wholly or partly of metal, so that the surface of the casting is white and hard while the interior is gray. *C.T.D.*

chilled shot. In hard-rock boring with adamantine or Calyx drill, chilled iron or steel pellets which are driven by the drill bit and do the actual abrasive cutting. *Pryor, 3.*

chilled-shot bit. A flat-surfaced bit used with hardened steel shot to drill rock by a milling action. *B.S. 3618, 1963, sec. 3.*

chiled-shot drill. *See* shot drill. *Neelson.*

chilled-shot drilling. A method of rotary drilling in which chilled steel shot is used as the cutting medium. *B.S. 3618, 1963, sec. 3.*

chillers. A piping system through which a wax distillate is run to chill the wax and thus make it separate from the oil. *Bureau of Mines Staff.*

chill hardening. *See* chill. *Fay.*

chill mark. A wrinkled surface condition on glassware resulting from uneven cooling in the forming process. *ASTM C162-66.*

chill point. a. The temperature at which a melted gelatin (used in a Maas compass) starts to congeal. *Long.* b. The temperature at which a molten metal, lubricating oil, or grease starts to congeal. *Long.*

chill time. Same as quench time. *ASM Gloss.*

chimming. Corn. Jarring a keeve to settle concentrates; tozing. *Hess.*

chimney. a. An ore shoot. *Compare* chute, e. *Fay.* b. A steep and very narrow cleft or gully in the face of a cliff or mountain. *Fay.* c. A pipelike more or less vertical natural vent or opening in the earth. *Webster 3d.* d. Eng. A spout or pit in the goaf of vertical coal seams. *Fay.* e. A term used in Virginia for limestone pinnacles bounding zinc ore deposits. *Fay.* f. A long, steep, dipping or vertical, tubular-shaped subterranean solution cavity or natural vent sometimes encountered in rock formations. It may or may not be filled with rocks, rock materials, or minerals. *Long.* g. A miner's term for a vertical or nearly vertical staple shaft between two coal seams. *Nelson.* h. An ore body which is roughly circular or elliptical in horizontal cross section, but may have great vertical extent. *Nelson.* i. Usually, a restricted section in a lode; rising steeply and unusually rich. *Pryor, 3. See also* pipe. j. Any extended and continuous rich streak of ore in a vein, especially if vertical. *Standard, 1964.* k. A pit, canal, or crevice of decomposition in strata, or its filling. *Standard, 1964.* l. A cylindrial vent for volcanic rock. *Standard, 1964.* m. The column of igneous rock filling a pipe-shaped vent. *Standard, 1964.* n. A vertical column of rock rising above its surroundings. *Bureau of Mines Staff.* o. A flute or channel on a vertical sliff or between vertical walls. *See also* chimney rock, a. *Bureau of Mines Staff.* p. A vertical shaft in the roof of a cave. *A.G.I.*

chimney arch. An arch in the base of a chimney used to admit a flue. *ACSG, 1963.*

chimney draught. The natural draught resulting from a difference in weight of the hot gases leaving the appliance and the outside air at atmospheric temperature coupled with any suction created by wind sweeping past the chimney outlet. *See also* working difficulty, a true channel sample cannot be taken. Often used in preliminary prospecting. *Pryor, 3.*

chiral twin. *See* Brazil twin. *Bureau of Mines Staff.*

chirls; churrels. Scot. Coal that passes through a screening shovel; small coal free from dross or dirt. *Fay.*

chiropterite. Bat guano. *A.G.I. Supp.*

chirt; chirtt. Derb. *See* chert. *Fay.*

chisel. a. A tool of great variety whose cutting principle is that of the wedge. *Crispin.* b. A sharp, straight-edged drill bit. *Bureau of Mines Staff. See also* bit. c. The steel cutting tool used in percussive boring. It ranges from 6 to 12 inches in length with variously shaped bits to suit the nature of the ground. The chisel is made to strike a series of blows at the bottom of the borehole. Water or mud is circulated to convert the chippings into sludge and to keep the chisel cool. *Nelson.* d. *See* chesil. *Arkell.*

chisel bit. a. Synonym for chopping bit. *Long.* b. A percussive-type, rock-cutting bit having a single, chisel-shaped cutting edge extending across the diameter and through the center point of the bit face. Also called chisel-edge bit; chisel-point; Swedish bit. *Long.*

chisel draft. The dressed edge of a stone, which serves as a guide in cutting the rest. *Fay.*

chisel-edge bit. Synonym for chopping bit. *Long.*

chisel-point bit. Synonym for chopping bit. *Long.*

chisel steel. A carbon steel containing 1 percent carbon. It is readily forged and used for chisel making, large punches, miner's drills, etc. *Camm.*

chisel worker. *See* stonecutter, hand. *D.O.T. 1.*

chi than. Chinese name for coal. *Tomkeieff, 1954.*

chitter. a. Lanc. A seam of coal overlying another one at a short distance. *Fay.* b. Derb. A thin band of clay ironstone. *Fay.*

chittering. A fault that may appear as a series of small ruptures along the edge or rim of pottery ware. True chittering is caused by incorrect fettling. *Dodd.*

chiver. *See* shiver. *Arkell.*

chkalovite. Sodium and beryllium silicate, $Na_2Be(SiO_3)_2$, orthorhombic, from the Kola Peninsula, U.S.S.R. *Spencer 15, M.M., 1940.*

chladnite. The group of achondritic meteorites composed essentially of enstatite. Brezina extended the term to include bronzite stones of the diogenite group. To avoid confusion, Prior proposed the term aubrite to replace chladnite as used by Rose and Tschermak. *Holmes, 1928.*

chloanthite; cloanthite. An arsenide of nickel, $NiAs_2$, occurring in the cubic system; tin-white to steel-gray color. This is a valuable nickel ore, often associated with smaltite and skutterudite. *C.M.D.; Dana 17.*

chloraluminite. A hydrous aluminum chloride, $AlCl_3+xH_2O$, that occurs as a volcanic product. *Standard, 1964.*

chloramine. A tasteless disinfectant, NH_2Cl, produced by the reaction of ammonia and chlorine in water. *Cooper, p. 363.*

chlorapatite. *See* apatite. *Fay.*

chlorargyrite. A chloride of silver occurring in cubic crystals; usually associated with native silver. *C.M.D. See also* cerargyrite.

chlorastrolite. A translucent mottled green prehnite, or related mineral, with a chatoyant effect. From the Lake Superior region, especially on Isle Royale. *Shipley.*

chlorate explosives. Explosives with a potassium chlorate base, such as the French cheddite which contains about 80 percent potassium chlorate and 5 percent castor oil with dinitrotoluene constituting nearly all the remainder of the explosive. Potassium chlorate is also a constituent of the Sprengal-type explosive. Chlorate explosives are characterized by a hot flame on detnation. *Lewis, p. 112.*

chlorate ion. Monovalent ClO_3— ex chloric acid $HClO_3$. *Pryor, 3.*

chlorate powder. A substitute for blackpowder in which potassium chlorate is used in place of potassium nitrate. This class of explosive has received little attention because of greater sensitiveness to shock and friction. *Fay.*

chloride. a. To follow a thin vein or discontinuous ore deposit by irregular workings, intent only on extracting the profitable parts and with no regard for development; usually said of a lessee, sometimes of one who works another's mine without permission. The term is said to have originated at Silver Reef in southwestern Utah when the rich silver-chloride ores were being worked. The thin seams were followed by lessees with the least possible handling of barren rock, hence the miner became a chlorider, and his operations chloriding. The words were later extended to similar workers and their operations in other fields. *Fay.* b. A compound of chlorine with another element or radical. A salt or ester of hydrochloric acid. *Crispin.*

chloride of lime. Bleaching powder or bleaching lime; $CaOCl_2$. Obtained by treating lime with chlorine gas. Used as a bleach and a disinfectant. *Crispin.*

chlorider. *See* chloride, a. *Fay.*

chlorides. Pac. A common term for ores containing chloride of silver. *Fay.*

chloride stick. A steel bar, usually octagonal, about seven-eighths of an inch thick and 4 feet long, with each end sharpened, and 5 to 6 inches bent outward at 45°. Used for digging out bits of rich ore. A picky poke bar. *Hess.*

chloriding. Mining thin veins. *Statistical Research Bureau.*

chloridization; chlorination. An ore treatment using chlorine to produce a metal chloride; also Platner's process (obsolete) in which gold was extracted as soluble chloride after roasting and chemical attack. *Pryor, 3.*

chloridize. To convert into chloride; applied to the roasting of silver ores with salt, preparatory to amalgamation. *Fay.*

chloridizing roasting. The roasting of sulfide ores and concentrates, mixed with sodium chloride, to convert the sulfides to chlorides. *C.T.D.*

chlorinated lime. *See* calcium hypochlorite. *Bennette 2d, 1962.*

chlorination. a. Removing dissolved gases and entrapped oxides by passing chlorine gas through molten metal, such as aluminum and magnesium. *ASM Gloss.* b. S. Afr. Exposure of pulverized ore to chlorine. *Beerman.*

chlorination process. The process first introduced by Plattner, in which auriferous ores are first roasted to oxidize the base metals, then saturated with chlorine gas, and finally treated with water, which removes the soluble chloride of gold, to be subsequently precipitated and melted into bars. *Fay.*

chlorinator. A machine for feeding either liquid or gaseous chlorine to a stream of water. *ASTM STP No. 148-D.*

chlorine. A common nonmetallic univalent and polyvalent element belonging to the halogens. A heavy greenish-yellow, irritating, toxic gas of disagreeable odor. Usually made by the electrolysis of aqueous solutions of sodium chloride. Used chiefly as a powerful bleaching, oxidizing, and disinfecting agent in water purification and in making numerous products (as bleaching powder, chlorinated solvents, military gases, and synthetic resins and plastics). Symbol, Cl; valences, 1, 3, 5, and 7; atomic number, 17; and atomic weight, 35.453. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-106.*

chlorine log. In effect, a simplified version of a gamma-ray spectrometer log. It is designed to respond to the chlorine content of the formations surrounding a borehole. Since almost all chlorine exists as soluble chlorides in pore water, the log offers a method of estimating the salinity of formation waters. This log has several different trade names such as Saltilog; Chlorinilog; Salinity log. *Wyllie, p. 164.*

chlorine minerals. Minerals containing chlorine, such as atacamite, boracite, apatite, carnallite, cerargyrite, halite, mimetite, pyromorphite, salammoniac, sylvite, sodalite, vanadinite, wernerite, etc. *Fay.*

Chlorinilog. *See* chlorine log. *Wyllie, p. 164.*

chlorinity. a. The total amount in grams of chlorine, iodine, and bromine contained in 1 kilogram of seawater, assuming that the bromine and iodine have been replaced by chlorine. *Hy.* b. The number giving the chlorinity in grams per kilogram of seawater sample is identical with the number giving the mass in grams of atomic weight silver just necessary to precipitate the halogens in 0.3285233 kilogram of the seawater sample. *Hy.*

chlorite. a. In chemistry, anion ClO_2^-; chlorous acid is $HClO_2$. *Pryor 3.* b. In geology, the general term for hydrated silicates of aluminum, iron, and magnesium, general formula, $(MgFe)_5Al(AlSi_3)O_{10}.(OH)_8$; monoclinic; green color; Mohs' hardness, 1.5 to 2.5; specific gravity, 2.65 to 2.94. *Pryor, 3.*

chlorite schist. A schist containing prominent chlorite, the foliation being due to the parallel disposition of the flakes. Other minerals are generally present, such as quartz, epidote, magnetite, and garnet, the two latter being often in conspicuous well-formed crystals (porphyroblastic texture). *Holmes, 1928.*

chlorite slate. A schistose or slaty rock composed largely of chlorite. *Fay.*

chloritic sand. A sand colored green by sand-size chlorite grains as one of the constituents. *Fay.*

chloritic schist. A schist containing chlorite. *Fay.*

chloritization. a. The replacement by, conversion into, or introduction of chlorite. *A.G.I.* b. The replacement by alteration of ferromagnesian minerals to chlorite. *C.T.D.*

chloritoid. A dark green brittle mica, $(Fe'',Mg)_2(Al_4Si_2O_{10})(OH)_4$; monoclinic. Found in metamorphic rocks. *Dana 17; A.G.I.*

chlormanganokalite. A yellow chloride of potassium and manganese, $4KCl.MnCl_2$. Rhombohedral. Flat rhombohedrons. Eruption of April 1906, Vesuvius, Italy. *Eng-*

induced draught. *Nelson.*

chimney effect. *See* stack effect. *Strock, 10.*

chimney-flue checkerwork. *See* basket weave checkerwork. *Bureau of Mines Staff.*

chimney rock. a. A column of rock rising above its surroundings or isolated on the face of a slope. *Webster 3d. See also* chimney. *Fay.* b. Gulf States. A local name for any rock soft enough when quarried to be cut or sawn readily, refractory enough for domestic chimneys, and which may or may not harden on exposure to the air, as some limestone, siliceous bauxite clay, or soapstone. *Hess.*

chimney shot. A local term in New York applied to the effect of an overcharge of explosive in a line of drill holes, the effect being to throw the rock to some distance, forming a deep trench. *Fay.*

chimney tile. Special tile for chimney flues around which bricks or other masonry are laid. *Mersereau, 4th, p. 260.*

chimney work. Mid. A system of working beds of clay ironstone in patches 10 to 30 yards square, and 18 or 20 feet in thickness. The bottom beds are first worked out, and then the higher ones, by miners standing upon the fallen debris; and so on upward in lifts. *See also* rake. *Compare* overhand stoping. *Fay.*

china. a. A glazed or unglazed vitreous ceramic whiteware used for nontechnical purposes. This term designates such products as dinnerware, sanitary ware, and artware, when they are vitreous. *See also* bone china; American hotel china. *ASTM C242–60.* b. The ceramic imitative of porcelain. Fine pottery having a hard, sonorous, semitranslucent body, made chiefly from kaoline, china stone, and bone (bone ash). *C.T.D.*

china clay. ($Al_2O_3.2SiO_2.2H_2O$), kaolin; a white, low plastic clay. A primary clay, the product of decomposition of an igneous rock high in feldspar. Kaolin is used extensively in the manufacture of paper, china, and refractories, and often as a raw material to supply alumina and silica in enamel frit compositions. *Enam. Dict.* Also called kaolin; porcelain clay. *C.T.D.*

china-clay rock. a. Same as Cornwall stone. *Hess.* b. Granite in its most kaolinized form in which all the feldspar is transformed into kaolinite and the rock is so soft that it is readily broken in the fingers. *Arkell.*

chinaman. A colloquial term for a loading ramp. *Nelson.*

chinaman chute. Mine opening over haulage level through which ore from the stope above is drawn to the waiting trucks as planking is removed. Usually opening between stulls below shrinkage stope. *Pryor, 3.*

Chinaman pabble. N.Z. A pebble or boulder made from a conglomerate of quartz pebbles cemented by chalcedony. Jaspilite, quartz, and Chinaman pebbles resembling those of King Solomon are found in many places. *Hess.*

china metal. a. Porcelain. *Fay.* b. York. Shale baked to a hard, white, coarse, porcellaneous substance. *Arkell.*

China opal. Common opal resembling white porcelain. *Shipley* .

china process. The method of producing glazed ware by which the ceramic body is fired to maturity, following which the glaze is applied and matured by firing at a lower temperature. *ASTM C242-60T.*

China pump; Chinese pump. A slanting wooden trough with the lower end in the water and through which an endless chain of boards that just fit the trough is moved upward, usually by a treadmill. *Bureau of Mines Staff.*

Chinarump. Petrified wood from Arizona. *Schaller.*

china sanitary ware (sanitary plumbing fixtures). Glazed, vitrified whiteware fixtures having a sanitary service function. *ASTM C242-60T.*

china stone. a. Eng. White, cherty limestone of Carboniferous age, Derbyshire. *Arkell.* b. In Wales, a compact, finegrained, calcitic mudstone of Carboniferous age. *Arkell.* c. Partly decomposed granite, consisting of feldspathic minerals and quartz; it is used as a flux in pottery bodies. Examples in the United Kingdom are Cornish stone and Manx stone. The Cornish stone is available in various grades, for example, hard purple, mild purple, hard white, and soft white; the feldspars are least altered in the hard purple, alteration to secondary mica and kaolinite being progressively greater in the mild purple, hard white, and soft white; the purple stones are so colored by the small amount of fluorspar present. Manx stone (from Foxdale, Isle of Man) is virtually free from fluorine. *Dodd.*

chinaware. An expression describing porcelain, particularly porcelain tableware. *Rosenthal.*

Chinese amber. Sometimes correctly applied to amber mined in Burma and marketed in China, but more often applied incorrectly to pressed Baltic amber and often to bakelite or other amber-colored plastics. *Shipley.*

Chinese blue; Mohammedan blue. The mellow blue, ranging in tint from sky-blue to grayish-blue, obtained by the early Chinese and Persian potters by the use of impure cobalt compounds as colorants. *Dodd.*

Chinese jade. A term correctly applied to jadeite. *Shipley.*

Chinese script. The angular microstructural form suggestive of Chinese writing and characteristic of the constituents $^{\alpha}$(Al-Fe-Si) and $^{\alpha}$(Al-Fe-Mn-Si) in cast aluminum alloys. A similar microstructure is found in cast magnesium alloys containing silicon as Mg_2Si. *ASM Gloss.*

Chinese silver. An alloy used as an imitation of silver containing 58 percent copper, 17.5 percent zinc, 11.5 percent nickel, 11 percent cobalt, and 2 percent silver. *Camm.*

Chinese speculum metal. A reddish mirror alloy containing 80.83 percent copper and 5.50 percent antimony. *Camm.*

Chinese wall. A calcite wall furled like corrugated iron. *Schieferdecker.*

chingle. a. Scot. A gravel free from dirt. *See also* shingle. *Fay.* b. That portion of the coal seam stowed away in the goaves to help support the mine roof. *Fay.*

chink. a. An opening, space, break, or hole typically of greater length than breadth (as between planks in a wall); a crack, crevice, cranny, or interstice. *Webster 3d.* b. A short, sharp sound (as of metal or small sonorous bodies struck with a slight tap). *Webster 3d.*

chink-faceted pebble. A pebble that has been subjected to a limited recurrent surface rubbing against a limited surface area of another rock fragment or ledge of bedrock, so as to produce a smooth, distinct, and often sharply limited facet. *J. Geol., v. 51, No. 5, July-Aug. 1943, pp. 353-358.*

chinley coal. Eng. Lump coal which passes over a screen; usually the best coal. *Fay.*

chiolite. A snow-white fluoride of sodium and aluminum, $5NaF.3AlF_3$, crystallizing in the tetragonal system and also occurring in massive granular form. *Fay.*

chip. a. Small fragment of a diamond, usually thin and tabular in shape. *Long.* b. To break small fragments from the surface of a diamond or other material. *Long.* c. Small, angular, and generally flat pieces of rock or other materials. *Long.* d. An imperfection due to breakage of a small fragment out of an otherwise regular surface. *ASTM C162-66.*

chip bit. A bit in which the major portion of the inset diamonds are either diamond chips or thin, tabular-shaped, low-grade drill diamonds. *Long.*

chip blasting. Shallow blasting of ledge rock. *Nichols.*

chip breaker. a. A notch or groove in the face of a tool parallel to the cutting edge, to break the continuity of the chips. *ASM Gloss.* b. A step formed by an adjustable component clamped to the face of the cutting tool. *ASM Gloss.*

chip-crusher operator. In metallurgy, a laborer who shovels scrap metal shearings into a machine that automatically crushes scrap to reduce its bulk. *D.O.T. Supp.*

chip diamond. *See* chip, a. *Long.*

chipped. a. When referring to character of diamond wear, it denotes loss of diamond due to chips and fragments having been broken away from the body of the diamond. *Long.* b. A surface pitted by loss of material in the form of chips. *Long.*

chipped glass. A glass article with a chipped surface produced intentionally. *ASTM C162-66.*

chipper. Derb. One who chips the gangue from the ore. An ore dresser. *Fay.*

chipping. a. The process of handsetting diamond fragments in a bit. *Long.* b. To reduce in size by breaking away small fragments from the parent mass. *Long.* c. Loosening of shallow rock by light blasting or airhammers. *Nichols.* d. Removing seams and other surface defects in metals manually with chisel or gouge, or by a continuous machine, before further processing. *ASM Gloss.* e. Similarly, removing excessive though not defective metal. *ASM Gloss.* f. Fracturing and breaking away of fragments of a porcelain enameled surface. *ASTM C286–65.* g. The process of removing thin extra glass prior to grinding. *ASTM C162-66.*

chippings. Crushed angular stone fragments ranging from ⅛ to 1 inch in size. *See also* aggregate. *Nelson.*

chippy. a. A miner's slang term for a small piston. *Bureau of Mines Staff.* b. *See* rock drill, b. *Fay.*

chips. Pieces of material removed from a workpiece by cutting tools or an abrasive medium. *ASM Gloss.*

chip sample. A regular series of ore chips or rock chips taken either in a continuous line across an exposure or at uniformly spaced intervals. *A.G.I.*

chip sampling. a. The taking of small pieces of ore or coal, with a small pick, along a line or at random, across the width of a face exposure. The samples are usually taken daily and often confined to exploration. Reasonable care is taken to chip a weight of material which corresponds to the length of sample line. *See also* bulk samples. *Nelson.* b. A variant of channel sampling, in which, owing to extreme hardness of rock, shape of deposit, or other *lish.*

chlorocalcite. *See* hydrophilite; baeumlerite.

chlorocyanic. Consisting of chlorine and cyanogen combined. *Fay.*

chloromelanite. A dark green, nearly black variety of jadeite. *Fay.*

chloropal. A green, opallike hydrous silicate of iron, $Fe_2O_3.3SiO_25H_2O$. *Fay.*

chlorophaeite. A mineral closely related to chlorite in composition and found in the groundmass of tholeiitic basalts where it occupies interstices between feldspar laths, forms pseudomorphs after olivine, or occurs in veinlets and amygdules. The fresh mineral is pale green, but when weathered, it may be dark green, brown, or red. *A.G.I.*

chlorophane. A variety of fluorspar which exhibits a bright green phosphorescent light when heated. *Fay.*

chlorophoenicite. A gray-green basic hydrous arsenate of zinc and manganese, $10(Zn,Mn)O.As_2O_5.7H_2O$. Monoclinic. Elongated crystals. From Franklin, N.J. *English.*

chlorophyll coal. A variety of dysodile from which chlorophyll can be extracted by alcohol. *Tomkeieff, 1954.*

chlorophyr. Proposed by Dumont for certain porphyritic quartz diorites near Quenast, Belgium. *Fay.*

chlorosis. The yellowing of the leaves of plants sometimes caused by a deficiency of iron necessary in the formation of chlorophyll. Has been useful as a guide to ore since nickel, copper, cobalt, chromium, zinc, and manganese are all antagonistic to iron in the plant metabolism. *Hawkes, 2, p. 313.*

chlorosity. The number expressing chlorinity as grams per 20° C liter. Obtained by multiplying the chlorinity of a sample by its density at 20° C. *Hy.*

chlorospinel. A variety of spinel, grass-green in color, due to the presence of copper. Contains iron replacing the aluminum, $MgO(Al,Fe)_2O_3$. Also called magnesium-iron spinel. *Fay.*

chlorothionite. A copper and potassium chlorosulfate, $CuCl_2K_2SO_4$. Occurs in bright blue crystalline crusts on lava. An alteration product from Mt. Vesuvius, Italy. *Weed, 1918.*

chlorotile. A green, hydrated copper arsenate, $Cu_3(AsO_4)_2.6H_2O$, that crystallizes in the orthorhombic system. *Standard, 1964.*

chloroxiphite. A dull-olive or pistachio-green oxychloride of lead and copper, $2PbO.Pb(OH)_2.CuCl_2$. Monoclinic. From Mendip Hills, Somersetshire, England. *English.*

chlorutahlite. Same as utahlite, the prefix being added, no doubt, because of the characteristic green color of the stone. *English.*

chock. a. A square pillar for supporting the roof, constructed of prop timber laid up in alternate cross-layers, in log-cabin style, the center being filled with waste. Commonly called crib in Arkansas. *See also* cog; nog; hydraulic chock. *Fay.* b. A square pillar constructed of short rectangular blocks of hardwood, for supporting the roof. *Fay.* c. Two blocks of hardwood placed across the rail or between rails to prevent tubs, cars, or wagons, from running down the incline. *Fay.* d. A block of wood, sometimes wedge-shaped, placed under the ends of the runners on a drill base to prevent movement of a drill or under a mine-car wheel to prevent movement of the car. *Long.* e. To wedge drill-machine runners or drill-truck wheels in place by using chock blocks or wedges. *Long.* f. A block used under and against an object to prevent it from rolling or sliding. *Nichols, 2.*

chock and block. Newc. Tightly filled up. *Fay.*

chock blocks; chock lumps. Pieces of wood, square or rectangular in cross section, usually made of oak, ash, or other hard wood. Also used to denote a shaped piece of wood provided with a handle and designed for placing between the rails to hold back a tub or set of tubs. *TIME.*

chock hole. A small depression dug in the earth in which a wheel of a truck-mounted drill rig is set to prevent the drill from moving. *Long.*

chocking. The supporting of undercut coal with short wedges or chocks. *C.T.D.*

chocolate. a. A very fine-grained mica schist found in New Hampshire and used in the manufacture of scythe stones, axestones, and knife stones. *Fay.* b. A brown or chocolate-colored drilling mud or rock. *Long.*

chog. a. An English term for chocks, or blocks spiked into the corner of a shaft to form a bearing for the side-waling piece, or the blocks used in headings to separate the cap and poling board. *Stauffer.* b. A block of wood for keeping pump trees or other vertical pipes plumb. *See also* collar, i; collaring, c. *Fay.*

choke. a. In crushing practice, a stoppage of the downward flow in the crushing chamber. *See also* choke point. *South Australia, p. 101.* b. Choking coil. *Nelson.* c. Aperture for controlling oil and gas volume. *Wheeler.* d. A point in a cave or at the base of a pitch blocked by the influx of clay, sand, gravel, or similar material. *A.G.I.* e. An imperfection consisting of an insufficient opening in the finish and neck of a container. *ASTM C162-66.*

choke crushing. A recrushing of fine ore due to the fact that the broken material cannot find its way from the machine before it is again crushed. *See also* free crushing. *Fay.*

chokedamp. a. A mine atmosphere that causes choking, or suffocation, due to insufficient oxygen. As applied to "air" that causes choking, does not mean any single gas or combination of gases. *Fay.* b. A name sometimes given in England to carbon dioxide. *Fay. See also* blackdamp.

choked crushing. a. In ore comminution, operating at so high a rate of feed that the crushing zone is choked, that is, it contains waiting material above the zone of maximum comminution. *Pryor, 3.* b. Comminution in which the discharge arrangements can restrict departure of ore even when it has been broken to the release size of the machine. *Pryor, 4.*

choke fed. In comminution, rolls are choke fed when fed all of the material that they will take. The product of choke fed rolls is never so uniform as when free feeding is used. Choke feeding is used only on feed of about one-fourth inch diameter or less. *Compare* free fed. *Newton, p. 62.* or less. *Compare* free fed. *Newton, p. 62*

choke feed. A feeding arrangement in which the potential rate of supplying material at the feed point exceeds the rate at which the conveyor will remove material. *ASA MH4.1-1958.*

choke feeding. As deliberately used in roll crushing of ore, feed at a rate greater than can be discharged at the set of the machine, so that the rolls are sprung apart, the angle of nip is increased and the product contains oversize. *Pryor, 3.*

choke point. Bottleneck of any crusher. *Pryor, 3, p. 81.*

choker. A chain or cable so fastened that it tightens on its load as it is pulled. *Nichols, 2.*

choker hook; round hook. A hook that can slide along a chain. *Nichols.*

choke valve. A valve to regulate flow of fluid from an oil well. Different choke sizes are used for different producing rates. The choke is generally referred to as bean. The size of opening is measured in sixty-fourths of an inch. *Nelson.*

choking. Stoppage of flow, due to obstructed discharge, sticky material, packed and compacted fines, or bad control. *Pryor, 3, p. 81.*

chondri. The rounded and ellipsoidal grains of silicates which are characteristic of meteorites. In section, they suggest grains of wheat or of barley packed together, a face which suggested the Greek name. *Fay.*

chondrite. A general term for stony meteorites which contain chondrules embedded in a finely crystalline matrix consisting essentially of pyroxenes (mainly enstatite or bronzite), olivine, and nickel-iron with accessory troilite, chromite, and oligoclase. Glass is sometimes present and it may be abundant in the chondrules. *Holmes, 1928.*

chondrodite. A yellow-red mineral of the humite group, $Mg_5(SiO_4)_2(OH,F)_2$; monoclinic. Commonly occurs in contact-metamorphosed dolomites. *A.G.I.; Dana 17.*

chondronite. A deep red, garnetlike stone found in the United States. *Hess.*

chondrule. A spheroidal aggregate, often radiated in texture, ranging from microscopic size to that of a walnut, and which occurs in many stony meteorites. The chief minerals are orthorhombic pyroxene, olivine, nickel-iron, troilite, and oligoclase; in some cases, glass (maskelynite) of feldspathic composition is an important constituent. *Holmes, 1928.*

chonkole. A Malayan spade. *Fay.*

chonolith. An intrusive mass that is so irregular in form and its relationship to the invaded formations is so obscure that it cannot be designated a dike, a sill, or a laccolith. *Fay.*

chop. a. To break up and drill through boulders or other rock and earthy material encountered in sinking a drivepipe or casing through overburden by impact produced by lifting and dropping a chopping-bit-tipped string of drill rods in a borehole. Also to break lost core or other obstruction in a borehole in the manner described above. *Long.* b. Som. A local term for fault. *Fay.*

chop ahead. To break up boulders and other rock material below the bottom of the casing or drivepipe by using a chopping bit attached to drill rods. *See also* chop, a. *Long.*

chop feeder. A feeder in which a power-operated, swinging quadrant gate delivers material at a predetermined rate. The action is similar to the reciprocating plate feeder. *ASA MH4.1-1958.*

chopper. A device, that is, a toothed disk, used to interrupt a beam of light at regular intervals, or a similar device for interrupting signals. *NCB.*

chopping; chopping down. A term used to describe the digging action of a dragline when excavation takes place with the bucket heel above the line of the cutting lip. This term is usually used when referring to an operating method where the dragline bucket excavates above the line of the fairlead and fills above tub level. *Austin.*

chopping bit. A steel, chisel-shaped cutting-edged bit designed to be coupled to a string of drill rods and used to fragment, by impact, boulders, hardpan, and lost core in a borehole. Also called chisel bit; chisel-edge bit; chisel-point bit; long-shank chopping bit. A straight chopping bit. *Compare* cross chopping bit. *Long.*

choppy cross-lamination. Small-scale trough cross-lamination. *Pettijohn.*

chord. a. In public land surveys the line of a great circle connecting any two selected corners on a base line, standard parallel, or latitudinal township boundary. *Seelye, 2.* b. Any straight line joining any two points on the circumference of a circle. *Jones, 2, p. 102.*

chordal effect; chordal action. The effect produced by the chain joint centers being forced to follow arcs instead of chords of the sprocket pitch circle. *J&M.*

chordal pitch. The length of one side of the polygon formed by the lines between the joint centers as the chain is wrapped on the sprocket. It is a chord of the sprocket pitch circle, and is equal to the chain pitch. *J&M.*

chorismite. A general term for a group of mixed rocks, the fabric of which is described as macropolyschematic. They are the result of the injection of the crystallization products of intruding magmas into, and/or the mixture of such material with, the enclosing rocks, sedimentary or metamorphic. According to Sederholm, they are a type of migmatite, but Niggli would restrict migmatite to the mixed rocks which have originated by a process of partial or incipient palingenesis or anatexis. Varieties of the chorismites include the phlebites, ophthalmites, stromatites, merismites, miarolithites, and nebulites. *A.G.I.*

C-horizon. A layer of unconsolidated material, relatively little affected by the influence of organisms and presumed to be similar in chemical, physical, and mineralogical composition to the material from which at least a portion of the overlying solum developed. The C-horizon is not strictly a soil, because it is little modified by biological processes in soil formation, nor is it a horizon, because it often has an indefinite lower limit. It includes that part of the parent material of the soil which is represented by weathered and disaggregated, but otherwise little altered, parent rock. *Stokes and Varnes, 1955.*

chorometry. Land surveying. *Standard, 1964.*

C/H ratio. *See* carbon-hydrogen ratio.

chrismatine. *See* chrismatite. *Tomkeieff, 1954.*

chrismatite. A butyraceous, greenish-yellow to wax-yellow hydrocarbon from Wettin, Saxony, Germany. It has a specific gravity of less than 1 and is soft at 55° to 60° C. *Fay.*

christiansen effect. A dispersion phenomenon observed in mineral grains under the microscope. The grain boundary appears bluish on one side and reddish or orange on the other when immersed in a liquid of the same refractive index as the mineral for certain colors or wave lengths of light. *Hess.*

Christmas tree. The assembly of pipes and valves at the top of the casing of an oil well that controls the flow of oil from the well. *Shell Oil Co. See also* casing head.

christobalite. Same as cristobalite. *Standard, 1964.*

Christy's equation. In reprecipitation of gold by zinc from aurocyanide (cyanide process): $2KAu(CN)_2 + 3Zn + 4KCN + 2H_2O = 2Au + 2K_2Zn(CN)_4 + K_2ZnO_3 + 2H_2$. *Pryor, 3.*

chromadizing; chromodizing; chromatizing. Forming an acid surface to improve paint adhesion on aluminum or aluminum alloys, mainly aircraft skins, by treatment with a solution of chromic acid. *ASM Gloss.*

chromate. A salt or ester of chromic acid; a compound containing the radical, CrO_4^{--} *A.G.I.*

chromate treatment. A treatment of metal in a solution of a hexavalent chromium compound to produce a conversion coating consisting of trivalent and hexavalent chromium compounds. *ASM Gloss.*

chromatic aberration. *See* aberration. *Shipley.*

chromatic color. A hue, as distinguished from white, black, or any tone of gray. Opposite of achromatic color. *Shipley.*

chromating. Performing a chromate treatment. *ASM Gloss.*

chromatite. A mineral, $CaCrO_4$; finely crystalline citron-yellow crusts from clefts in limestones. Named from the composition. *Hey, MM, 1964; Fleischer.*

chromatites. Used by M. E. Wadsworth to include mineral coloring matter, paints, pigments, etc. *Fay.*

chromatograph. An instrument for analyzing gases and vapors from liquids with boiling points up to 300° C. The gas chromatograph arranges the molecules of the gas in increasing size, and as each group emerges from the column, a detector measures the quantity of each. Since all the molecules of one type emerge after the same time interval, it is possible to identify quickly the constituents present. Sensitive detectors can determine concentrations as low as 1 part in 1,000,000. Used in by-product plants and in the B.O.S. process. *Nelson.*

chromatographic analysis. Separation of components of mixture into zones, one or more of which can be identified by color, etc. (1) by adsorption column, adsorbing from solute in tube packed with cellulose, alumina, lime, etc., (2) by electrochromatography, passage of electricity across column or paper strip down which solvent mixture is flowing, causing migration to side of flow-line; (3) by electrophoresis, use of electric current to aid migration and, (4) by paper partition, separation into bands as suitable solvent flows past drop of solution which contains compounds (qualitative and quantitative analysis. *Pryor, 3.*

chromaventurine. Green glass containing chromic oxide. *Bennett 2d, 1962.*

chrome. a. Same as chromium. *Fay.* b. Commonly used to indicate ore of chromium consisting of the mineral chromite. *Bateman.* c. Sometimes loosely used to mean to plate with chromium. *Lowenheim.*

chrome, alumina-pink. A ceramic color consisting principally of Cr_2O_3, Al_2O_3, and ZnO; when used as a glaze stain, the glaze should contain ZnO and little, if any, CaO. It is recommended that, for use under glaze, the glaze should be leadless. The color depends on diffusion of chromium into the insoluble Al_2O_3 lattice and is normally stable up to 1,300° C. *Dodd.*

chrome-aluminum steel. A steel sometimes used in Europe to resist the accumulation of scale in the tubes of locomotive superheaters, etc. It contains about 6.0 percent chromium and 1.0 to 1.5 percent aluminum. *Camm.*

chrome antigorite. Antigorite containing some csromium. *Spencer 18, M.M., 1949.*

chrome brick. *A* refractory brick manufactured substantially or entirely of chrome ore. *ASTM C71-64.*

chrome chert. A variety of chert which has replaced the silicate minerals of a chromite peridotite, the more resistant chromite grains remain unaltered in the secondary siliceous matrix. *Holmese, 1928.*

chrome diopside. A variety of diopside. Dark green specimens are seldom either transparent or cut as gems. *Shipley.*

chrome garnet. Synonym for uvarovite. *Fay.*

chrome greens. Pigments which are a mixed precipitate of chrome yellow and iron blue. By varying the proportions of yellow and blue, a wide range of hues is produced. Chrome greens have excellent lightfastness and good opacity. Used extensively for almost all types of paints and enamels. Iron blue is a highly oxidized iron ferrocyanide and in the presence of an oil that dries by oxidation the blue is partially deoxidized, which means that it loses some of its color or strength because of this chemical reaction. Chrome greens are widely used because of their brightness, opacity, lightfastness, excellent strength, and relatively low cost. *CCD 6d, 1961.*

chrome idocrase. An emerald-green variety of vesuvianite, containing chromium. Found in Black Lake, Quebec, Canada, and Ekaterinburg, Ural Mountains, U.S.S.R. *English.*

chrome iron ore. Synonym for chromite. *Fay.*

chrome ironstone. *See chromite.*

chromel. A heat resistant nickel chromium alloy used for burning bars. *Hansen.*

chrome-magnesite brick. A refractory brick that may be either fired or chemically bonded, manufactured substantially of a mixture of chrome ore and dead-burned magnesite, in which the chrome ore predominates by weight. *HW.*

chrome ocher. A bright green clay material, containing 2 to 10.5 percent Cr_2O_3. *Hess.*

chrome ore. A rock having as its essential constituent the mineral chromite or chrome spinel, which is a combination of FeO and MgO with Cr_2O_3, Al_2O_3, and usually a small proportion of Fe_2O_3. The composition, which is represented by the formula, $(Fe,Mg)O.(Cr,Al,Fe)_2O_3$, is extremely variable. Refractory grade chrome ore has only minor amounts of accessory minerals, and has physical properties that are suitable for the manufacture of refractory products. *HW.* The steel industry consumes more than three-fourths of the supply either in refractories or in the production of chrome alloys, and especially stainless steel; the mineral is used also for tanning leather and for chemical manufacture. Small amounts are mined in California, but 99 percent of our supply is imported, chiefly from the Republic of South Africa, Cuba, and the Philippines. *Barger.*

chrome pickle. a. Producing a chromate conversion coating on magnesium for temporary protection or for a paint base. *ASM Gloss.* b. The solution that produces the conversion coating. *ASM Gloss.*

chrome refractories. Refractories consisting essentially of refractory grade chrome ore bonded chemically or by burning. Chrome refractories are nearly chemically neutral, but may react with strong acids or bases. *Henderson, p. 264.*

chrome spinel. Another name for the mineral picotite, a member of the spinel group. *C.M.D.*

Chrome Stainless. A trade name for a steel containing 17 percent chromium, remainder iron with low carbon. *Hess.*

chrome-tin pink. A color for ceramic glazes. The color is probably produced by the precipitation of fine particles of chromic oxide on the surface of tin oxide in an opaque glaze. Lime must also be present. *Dodd.*

chrome tourmaline. A variety of tourmaline obtained from the Ural Mountains, U.S.S.R. (10.86 percent Cr_2O_3); and Maryland (4.32 percent Cr_2O_3). *Spencer 18, M.M., 1949.*

chrome vesuvian. Same as chrome idocrase. *English.*

chrome yellows. Yellow pigments of lead chromate; $PbCrO_4$. A very light greenish-yellow to the lemon shade to a medium yellow. Medium yellow is about a normal lead chromate, containing 95 percent or more lead chromate, $PbCrO_4$. The light hues contain varying amounts of coprecipitated lead chromate and lead sulfate. Chrome yellows are used in paints and enamels, also calcimine, but not in casein paints or finishes that are to be applied to surfaces that are alkaline, such as cement or stucco. *CCD 6d, 1961.*

chrome, zircon-pink. About 70 percent of the SnO_2 used in chrome-tin pink can be replaced by zircon without impairing the color or stability. *See also* chrome-tin pink. *Dodd.*

chromia. *See* chromium oxide. *Bennett 2d, 1962.*

chromic. Of, pertaining to, or containing chromium in the trivalent state; for example, chromic oxide (Cr_2O_3). *Webster 3d.*

chromic anhydride. *See* chromium trioxide. *Bennett 2d, 1962.*

chromic iron. Chromite. *Schaller.*

chromic phosphate; chromium orthophosphate; chromium phospate. Violet triclinic crystals; $CrPO_4.6H_2O$; soluble in acids; and insoluble in water. Used in pigments. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-168.*

chromic sulfate, hydrated. a. Violet; amorphous scales; $Cr_2(SO_4)_3.15H_2O$; specific gravity, 1.867 (at 17° C); and soluble in water. Used in ceramics (glazes and green effects). *CCD 6d, 1961.* b. Violet; isometric; $Cr_2(SO_4)_3.18H_2O$; specific gravity, 1.70; and soluble in water and alcohol. Used in ceramics (glazes and green effects). *CCD 6d, 1961.*

chromite. Chrome iron ore, $FeCr_2O_4$; cubic; iron-black color. Mohs' hardness, 5.5; brown streak; specific gravity, 4.6. A commercial source of chromium. Chemical grade has high purity. Metallurgical grade (lumpy) is sufficiently coarse to be usable in a blast furnace. When pure, 68 percent Cr_2O_3 but rarely exceeds 50 percent. *Pryor, 3.*

chromitite. a. Chromite mixed with magnetite or hematite. *Bureau of Mines Staff.* b. An igneous rock composed essentially of chromite. If over 5 percent of biotite or pyribole are present, the rock is known as a biotite-chromitite, bronzite-chromitite, etc. *Hess.*

chromium. A steel-gray metallic element obtained from chromite ($FeO.Cr_2O_3$). Alloyed with nickel in heat-resisting alloys and with iron or with iron and nickel in stainless and heat-resisting steels. Also used as a corrosion-resisting plating. Symbol, Cr; valences, 2, 3, and 6; isometric and hexagonal; atomic number, 24; atomic weight, 51.996; specific gravity, 7.138 (at 20° C); melting point, 1,890° C; boiling point, 2,482° C; and specific electrical resistivity, 13.1 microhms per cubic centimeter (at 20° C. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-106.*

chromium aluminide. CrAl; melting point, 2,160° C; and has good oxidation resistance. *Lee.*

chromium borides. At least three have been described: CrB, CrB_2, and Cr_3B_2. They have high melting points; are very hard and corrosion-resistant; and may be suitable for use in jet and rocket engines. CrB; orthorhombic; specific gravity, 6.2; and Mohs' hardness, 8.5. CrB_2; hexagonal; specific gravity, 5.15; hardness, 2010 Knoop. Cr_3B_2; may be crystalline; specific gravity, 6.1; and Mohs' hardness, 9+. Used as metallurgical additives; high-temperature electrical conductors; cermets; refractories; and coatings resistant to attack by molten metals. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-167.*

chromium carbides. These carbides, $Cr_{23}C_6$, Cr_7C_6 and Cr_3C_2, have melting points of 1250, 1665, and 1890° C respectively. Extreme hardness and excellent surface finish make these materials suitable as precision gauge blocks and they are also of interest for a number of mechanical and chemical uses. *Lee.*

chromium garnet. Uvarovite. *Shipley.*

chromium minerals. The only ore commercially exploited is chromite. Metal is used in steel alloys, plating, photograph, dyeing. Ore is used for refractory furnace bricks in steel furnaces. *Pryor, 3.*

chromium nitride; chromium mononitride. CrN; molecular weight, 66.00; isometric or amorphous; decomposes at 1,700° C; and insoluble in water. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-167.*

chromium oxide; chromium sesquioxide; chromic oxide; chromia; chrome green; chrome oxide green. a. Cr_2O_3; melting point, 2,435° C. Chromium compounds are used in glasses, glazes, and enamels mainly to impart a green color. It is most often introduced as chromium oxide or potassium dichromate, but the dichromates of sodium and ammonium and the chromates of potassium, sodium, and iron are used occasionally. Chromium oxide may be used in glazes to produce chrome-tin pinks or chrome greens. *Lee; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–167.* b. Bright green; hexagonal; and insoluble in water, in acids, and in alkalies. Used in metallurgy; as pigments; and in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–167.* c. A pigment that consists of chromic oxide and it should not be confused with chrome green. It is made by burning sodium dichromate with a reducing agent. The pure grade consists of 99 percent Cr_2O_3; specific gravity, 5.20. Used in limeproof paints and finishes that are to be applied to cement surfaces. One of the most permanent and indestructible pigments available and is fast to strong alkalies and acids. *CCD 6d, 1961.* d. A green pigment used to some extent in green stains or oxides and also a raw material in the manufacture of vitreous enamels. *Hansen.*

chromium plating. The production of a thin layer of chromium on the surface of another metal by electrode position to protect it against corrosion. Thicker coatings are used to resist wear and abrasion. *See also* hard plating. *C.T.D.*

chromium sesquioxide. *See* chromium oxide. *CCD 6d, 1961.*

chromium silicides. CrSi, Cr_3Si, Cr_2Si, and $CrSi_2$; melting points up to 1,710° C; excellent resistance to oxidation in air at elevated temperatures; and great hardness. Used as wear-resistant components at high temperatures. *Lee.*

chromium steel. Steel containing varying amounts of chromium; very hard and tenacious. *See also* stainless steels. *Nelson.*

chromium sulfate; chromic sulfate. Violet or red powder; $Cr_2(SO_4)_3$; specific gravity, 3.012; and insoluble in water and in acids. Used in ceramics (glazes and green effects). *CCD 6d, 1961.*

chromium trioxide; chromic anhydride. a. CrO_3; molecular weight, 99.99; red; orthorhombic; deliquescent; specific gravity, 2.70; melting point, 196° C; and soluble in water and in ethyl alcohol. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–167.* b. Dark purplish-red crystals and soluble in ether. Used in ceramic glazes and in colored glass; in chromium plating; and in metal cleaning. *CCD 6d, 1961.*

chromized iron; chromized steel. Iron or steel that has been subjected to burial in a mixture of pure powdered chromium and aluminum in an atmosphere of pure hydrogen at a temperature of 1,400° F. A high chromium alloy that withstands high temperatures and is highly noncorrosive in air is thus formed on the outside of the iron or steel. *Hess.*

chromizing. A surface treatment at elevated temperature, generally carried out in pack, vapor, or salt bath, in which an alloy is formed by the inward diffusion of chromium into the base metal. *ASM Gloss.*

chromography. Method of identification of minerals. Polished section is placed in contact with photographic paper, a current is passed, and ions migrating to the paper are developed so as to produce a color print suitable for microscrutiny. Resembles sudfur printing. *Pryor, 3.*

chromometer. An instrument for determining the color of petroleum and other oils. *Standard, 1964.*

chromotography. A chemical process of separating closely related compounds by permitting a solution of them to filter through an absorbent so that the different compounds become absorbed in separate colored layers comprising a chromatogram. *H&G.*

chromus. Of, pertaining to, or containing chromium in the bivalent state; for example, chromous chloride ($CrCl_2$). *Webster 3d.*

chromowulfenite. A red variety of wulfenite, containing some chromium. *Fay.*

chron. Originally introduced to designate an indefinite division of geologic time. More recently, it has been proposed as the time unit equivalent to the stratigraphic unit, subseries, and the geologic name; for example, Mohawkian. *Hess.*

chronic exposure. Irradiation over a long period of time, either continuous or made up of several shorter periods. *NCB.*

chronograph. An apparatus for electrically recording explosion phenomena simultaneously with a continuous time record. *Rice, George S.*

chronolithologic unit. Time-rock unit. *A.G.I. Supp.*

chronostratigraphic unit. Geologic time unit; in order of decreasing magnitude: Era, period, stage, epoch, and age. *A.G.I. Supp.*

Chrustiov's hardness scale. A scale it is claimed completes Mohs' scale in the region of high hardness. *Osborne.*

chrysoberyl. Beryllium aluminate, $BeAl_2O_4$; orthorhombic; color green; Mohs' hardness, 8.5; streak, vitreous; specific gravity, 3.7. Gem varieties transparent. *Pryor, 3.* Known as cat's-eye when it has a chatoyant luster. *Fay.*

chrysoberyl cat's eye. *See* cymophane; cat's-eye. *C.M.D.*

chrysoberyllus. A confusing name, rarely applied to greenish-yellow beryl. *Shipley.*

chrysocarmen. A red or brown copper-bearing ornamental stone from Mexico containing light and dark blue as well as numerous green spots of, perhaps, azurite and malachite. *Shipley.*

chrysocolla. Hydrated copper silicate, $CuSiO_3.2H_2O$; usually encrusted rather than crystalline; color, green to blue; Mohs' hardness, 2 to 4; white streak; specific gravity, 2.1. *Pryor, 3.*

chrysocolla quartz. A translucent chalcedony colored by chrysocolla. Same as azurlite. *Shipley.*

Chrysodor. Trade name for a green and white stone with markings like marble. *Shipley.*

chrysojasper. Jasper colored with chrysocolla. *Shipley.*

chrysolite. A yellowish-green, sometimes brownish or reddish, iron-magnesium silicate. A common mineral in basalt and diorite. When used as a gem, it is called peridot. The name has at various times been applied to topaz, prehnite, and apatite but is now used only to mean olivine. *Fay; Hess.*

chrysolite aquamarine. Same as chrysolite beryl. *Shipley.*

chrysolite beryl. A light yellowish-green to light yellow-green beryl. *Shipley.*

chrysolite cat's eye. Chrysoberyl cat's eye. *Shipley.*

chrysolite chrysoberyl. A light greenish-yellow to light yellow-green chrysoberyl. *Shipley.*

chrysolite sapphire. A light yellow-green sapphire. *Shipley.*

chrysolite spinel. A light greenish-yellow to light yellowish-green spinel. *Shipley.* ish-green topaz. *Shipley.*

chrysolithus. A pale yellowish-green beryl. *Schaller.*

chrysopal. A translucent apple-green common opal colored by nickel. From Silesia. *See also* prasopal. *Shipley.*

chrysophyric. Applied to a basalt containing phenocrysts of olivine. *Hess.*

chrysoprase. An apple-green chalcedony, the color of which is due to nickel. *Sanford.* Used as a gem. *A.G.I.*

chrysoprase colored onyx. Same as green onyx. *Shipley.*

chrysoprase matrix. Chrysoprase with noticeable white or brown inclusions. *Shipley.*

chrysoquartz. Green aventurine quartz. *Shiplay.*

chrysotile. A metamorphic mineral, an asbestos, the fibrous variety of serpentine. A silicate of magnesium, with tetrahedra arranged in sheets. *Leet.* Also called Canadian asbestos.

chrysotile asbestos. The fibrous variety of serpentine. *A.G.I.*

Chrystolon. Silicon carbide. *Bennett 2d, 1962.*

chu Abbreviation for centigrade heat unit. *NRC—ASA N1.1-1957.*

chuck. a. The part of a diamond or rotary drill that grips and holds the drill rods or kelly and by means of which longitudinal and/or rotational movements are transmitted to the drill rods or kelly. *Compare* automatic chuck. *Long.* b. The part of a rock-drill machine that grips or holds the drill rod or steel. *Long.* c. To throw away or discard. *Long.* d. A device for holding work or tools on a machine so that the part can be held or rotated during machining or grinding. *ASM Gloss.*

chuck block; chock block. The wooden block or board which is attached to the bottom of the screen so as to raise the depth of the issue and act as a false lip to the mortar in stamp milling. *Fay.*

chuck bolt. Synonym for chuck screw. *Long.*

chucker-on; chuck-on. A device for automatic rerailing of tubs or cars; ramp; rerailer. *Mason.*

chucking lug. A projection forged or cast onto a part to act as a positive means of driving or locating when the part is being machined. *ASM Gloss.*

chuck nut. Synonym for chuck screw. *Long.*

chuck screw. A set screw in the periphery of a diamond-drill chuck body by means of which a serrated jaw within the body of the chuck may be made to grip and hold the drill rod. Also called chuck bolt; chuck nut. *Long.*

chuck up. A command indicating that drill rods are to be inserted in the drive rod of a diamond drill and that they are to be clamped in the chuck preparatory to resuming drilling. *Long.*

chuckie stone. One of the pebbles or cobbles of sedimentary rock or of igneous rock occurring as an inclusion in a coalbed. One explanation for their occurrence is that they were attached to roots of floating trees rafted into the swamp during periods of high water. *A.G.I.*

chuco. Caliche deposit in Chile composed mainly of sodium sulfate. *A.G.I. Supp.*

chudobaite. A mineral, $(Na,K)\ (Mg,Zn)_2H(AsO_4)_2.4H_2O$, in anorthic crystals from the second oxidation zone at Tsumeb, southwest Africa. *Hey, M.M., 1961.*

chuff brick. *See* salmon brick. *ACSG.*

chukhrovite. A cubic mineral occuring in the Kara-Oba molybdenum deposit, Central Kazakhstan, approximates to $Ca_6Al_3(Y,Ln)_2(SO_4)_2F_{23}.20H_2O$. Perhaps the same as an unnamed cubic mineral from Greenland described by O. B. Boggild. *Hey, M.M., 1961.*

chump. Eng. To drill a shothole by hand. *Fay. See also* churn.

chun. a. Derb. A clay or soft gouge between two hard walls. *Fay.* b. Eng. An open chasm in a vein. *Arkell.*

chungkol. Malay. Heavy hoe used to stir and loosen bed when sluicing alluvial tin gravels. *Pryor, 3.*

chunked-up. Built-up with large lumps of coal to increase the capacity of the car. Also called built-up. *Fay.*

chunker I. In bituminous coal mining, a laborer who loads large lumps of coal into cars at working places in a mine by hand. *D.O.T. 1.*

chunker II. In bituminous coal mining, a laborer who arranges large lumps of coal uniformly on flatcars as they are loaded at the mine surface. *D.O.T. 1.*

chunk glass. Rough pieces of optical glass obtained when a pot of glass is broken open. *Dodd.*

chunk mineral. In Wisconsin, applied to masses of galena as broken out of the mine. *Fay.*

chunks. Random sizes of glass sheets which are smaller than standard sizes of stock-sheets. *ASTM C162-66.*

churchillite. Same as mendipite. From Churchill, Mendip Hills, England. *English.*

churchite. A very rare, weakly radioactive mineral, $(Ce,Ca)(PO_4).2H_2O$; smoke-gray, tinged with flesh-red; possibly monoclinic; occurs as coatings on siliceous rock from a copper lode; from Cornwall, England. *Crosby, p. 98; Larsen, p. 72.*

churn; chump. A long iron rod used to hand-bore shotholes in soft material, such as coal. *Proyr, 3.*

churn drill; churn drilling. a. Portable drilling equipment, usually mounted on four wheels and driven by steam-, diesel-, electric-, or gasoline-powered engines or motors. The drilling is performed by a heavy string of tools tipped with a blunt-edge chisel bit suspended from a flexible manila or steel cable, to which a reciprocating motion is imparted by its suspension from an oscillating beam or sheave, causing the bit to be raised and dropped, thus striking successive blows by means of which the rock is chipped and pulverized and the borehole deepened; also, the act or process of drilling a hole with a churn drill. Extensively used by the diamond-drilling industry to drive pipe vertically through difficult and deep overburden or fractured barren ground before coring operations with a diamond drill. Also called American system drill; blasthole drill; cable drill; cable-system drill; cable-tool drill; rope-system drill; shothole drill; spudder; spud drill; well drill. *Long.* b. A drilling rig for putting down vertical holes in exploration and quarry blasting. The rig consists of a derrick, a steel wire rope hung from the top of the derrick which raises and lowers the tools into the borehole, and the walking beam which imparts the up-an-down movement to the chisel. *See also* percussive drill. *Nelson.* c. A long iron bar with a cutting end of steel, used in quarrying, and worked by raising and letting it fall. When worked by blows of a hammer or sledge, it is called a jumper or jump drill. *Fay.*

churn driller. a. In bituminous coal mining, a term applied to a miner, hand driller, or other worker when using a heavy, chisel-edged, percussion drill for drilling holes vertically in rock during shaft-sinking operations, by lifting, rotating, and dropping the drill repeatedly to sink the holes by shattering the rock. Almost obsolete. *D.O.T. 1.* b. A person experienced in the use and operation of a churn drill and equipment. Also called cable-tool driller. *Long.*

churn-drill operator. In mining and in the quarry industry, one who drills holes with a churn (cable) drill in rock and overlying ground of open-pit mines or quarries to obtain samples, or to provide holes in which explosives are charged and set off to break up the solid mass. Also called blasthole driller; blasting hole well driller; clipper blast-drill operator; well driller operator. *D.O.T. 1.*

churn-drill outfit. Synonym for churn-drill rig. *Long.*

churn-drill rig. A churn-drill machine, complete with accessory tools and equipment required for specific drilling operations. *Long.*

churning. Agitating the fluid metal in a mold by moving a small, heated iron rod up and down in the feeder in order to insure solid castings. *Crispin.*

churns. Forest of Dean. Ironstone workings in cavern-shaped excavations. A rough chamber-and-pillar system of working. *Fay.*

churn shot drill. A boring rig which combines both churn and shot drillings. The churn drill is used for rapid penetration in barren ground where no core is required. The shot drill is used for taking cores along important rock formations. *Nelson.*

chute. a. A channel or shaft underground, or an inclined trough above ground, through which ore falls or is shot by gravity from a higher to a lower level. Also spelled shoot. *Fay.* b. In Pennsylvania, a crosscut connecting a gangway with a heading. *Fay.* c. An inclined watercourse, natural or artificial, especially one through which boats or timber are carried, as in a dam. *Standard, 1964.* d. A narrow channel with a free current, especially on the lower Mississippi River. *Standard, 1964.* e. A body of ore, usually of elongated form, extending downward within a vein (ore shoot). The two forms of orthography of this word are of French and English origin respectively. Under chute, the original idea is that of falling; under shoot, that of shooting or branching. Both are appropriate to the technical significations of the word. An ore shoot may be considered as a branch of the general mass of the ore in a deposit, or as a pitch or fall of ore. In England, the orthography shoots is exclusively employed and is the best as applied to ore deposits, the other being unnecessarily foreign. *Fay.* f. A ditch or inclined timber trough through which the overflow water or mud from a borehole is conducted from the collar of the hole to the sump. The chute may be fitted with baffles and screens to cause the cuttings to settle in the chute before reaching the sump. Also called canal; ditch. *Long.* g. A trough operated mechanically in loading coal underground. *Hudson.* h. A metal trough in a breaker, along which the coal slides by gravity. *Hudson.* i. A steep, three sided steel tray for the passage of coal or ore from a conveyor into mine cars. It is designed to minimize degradation and spillage of materials. *Nelson.* j. A string of rich ore in a lode (used instead of shoot). *Nelson.* k. Ore pass connecting stope with haulage level. *Pryor, 3.* l. Stockpile with withdrawing system such as belt conveyor. *Pryor, 3.* m. An open trough through which bulk materials or objects are directed and lowered by gravity. The trough may be straight or curved. *ASA MH4.1–1958.* n. An inclined trough or tube to guide sliding objects from a higher to a lower level. *Crispin.* o. A high-velocity conduit for conveying to a lower level. *Seelye, 1.* p. An inclined drop or fall. *Seelye, 1. See also* gate. q. As applied to stream flow, refers to a new route taken by a stream when its main flow is diverted to the inside of a bend, along a trough between low ridges formed by deposition on the inside of the bend where water velocities were reduced. Also called chute cutoff. *Compare* neck cutoff. *Leet.*

chute attendant. *See* chute tender. *D.O.T. 1.*

chute blaster. *See* pluggerman. *D.O.T. 1.*

chute boss. In coal mining, a foreman who supervises the loading and drawing of coal into and out of chutes, especially where coal is mined from inclined beds. *D.O.T. 1.*

chute caving. The method involves both overhand stoping and ore caving. The chamber is started as an overhand stope from the head of a chute and is extended up until the back weakens sufficiently to cave. The ore body is worked from the top down in thick slices, each slice being, however, attacked from the bottom and the working extending from the floor of the slice up to an intermediate point. The cover follows down upon the caved ore. Also called caving by raising; block caving in chutes. *Fay.*

chute checker. In metal mining, one who keeps record of amount of ore drawn from each raise or chute in an ore body being mined by the caving method (lower part of ore body is mined and developed with a system of chutes so that the remaining ore which sloughs, or caves, from lack of support can be drawn off). Also called tallyman. *D.O.T. 1.*

chute drawer. *See* chute loader, a. *D.O.T. 1.*

chute, grizzly. *See* grizzly chute. *ASA MH4.1-1958.*

chute loader. a. In metal and nonmetal mining, a laborer who loads ore or rock into mine cars underground by opening and closing chute gates. Also called chute drawer; chute man; chute trammer. *D.O.T. 1.* b. In the quarry industry, one who loads crushed rock from bins into trucks or railroad cars by opening and closing the chute or bin gates by hand or by means of a lever. Also called car loader. *D.O.T. 1.*

chute man. *See* chute loader; chute tender.

chute operator. In the quarry industry, a laborer who loads barges with crushed rock by operating a hand winch to lower a chute through which crushed rock flows from a bin. *D.O.T. 1.*

chute puller. In anthracite and bituminous coal mining, a laborer who loads coal or rock from chutes or bins into mine cars, railroad cars, trucks, or onto screens, rolls, or picking tables, opening and closing the gate or door by hand or by means of a lever. He may be designated according to type of work, as railroad-car loader; screen feeder; or slate-gate attendant. Also called basket man; gateman. *D.O.T. 1.*

chute, screen loading. *See* screen loading chute. *ASA MH4.1-1958.*

chute system. A method of mining by which ore is broken from the surface downward into chutes and is removed through passageways below. *Hess. See also* glory-hole system. *Bureau of Mines Staff.*

chute tapper. In metal mining, one who opens gates of finger raises (steeply sloping openings) when ore is being drawn from a body mined by the caving method, to allow caved ore to flow down raises through grizzlies (gratings made of heavy metal beams) or heavy timbers to the chutes on the haulage level. *D.O.T. 1.*

chute tender. In bituminous coal mining, one who tends chutes which convey coal from tipple down a slope to a point where it is loaded into railroad cars (gondolas), loosening clogged or blocked coal with a crowbar or some other tool to start it moving. Also called chute attendant; chute man. *D.O.T. 1. See also* battery starter.

chute trammer. *See* chute loader, a. *D.O.T. 1.*

CI Abbreviation for cast iron. *Zimmerman, p. 200.*

cienaga. In southwestern United States, a moist or springy spot where there is a natural seepage of water in an arid region. *Hess.*

CIE system. The name derives from the initials of the Commission Internationale de l'Eclairage. It is a trichromatic system of color notation that is being used, for example, in the glass industry. *Dodd.*

Cimarron series. Red beds occuring above the salt deposits in the Permian of Kansas. *C.T.D.*

ciment fondu. A slow-setting, rapid-hardening cement containing 40 percent lime, 40 percent alumina, 10 percent silica, and 10 percent impurities; specific gravity. *Bennett 2d, 1962.* Sometimes called bauxite cement.

ciminite. A volcanic rock composed essentially of sanidine and pyroxene with subordinate calcic plagioclase and olivine. An olivine trachyte. *A.G.I.*

cimita. A natural mixture of clay and feldspar occurring in parts of Chile. The composition is not uniform but a typical analysis is: 58 percent SiO_2; 33 percent Al_2O_3; 1 percent Fe_2O_3; 4 percent alkali, and 4 percent H_2O. *Dodd.*

CIMM Canadian Institute of Mining and Metallurgy. *Statistical Research Bureau.*

cimolite. A white, grayish, or reddish hydrosilicate of aluminum, soft and claylike or chilklike in appearance. *Fay.*

cinch; cinch work. In Nevada, the annual assessment work required to hold title to an unpatented mining claim. *Bureau of Mines Staff.*

Cincinnatian. Upper Ordovician. *A.G.I. Supp.*

cinder. a. One of the small commonly vesicular fragments of lava that are projected from an erupting volcano, are about ¼ to 1½ inches in diameter, and are coarser than volcanic ash and smaller than volcanic bombs. *Webster 3d.* b. An uncemented volcanic fragment that may range from 4 to 32 millimeters in diameter. Such fragments are usually glassy or vesicular. *Stokes and Varnes, 1955.* c. Eng. Inferior ironstone, North Staffordshire. *Nelson.* d. A derogatory synonym for carbon. *Long.* e. Slag, particularly from iron blast furnaces. *Fay.* f. A scale thrown off in forging metal. *Webster 3d.*

cinder bank. Same as cinder dump. Also indicates an old dump as distinguished from one in use. *Fay.*

cinder bed. a. Eng. A stratum of the Upper Purpeck series, almost wholly composed of oyster shells; so named by the quarrymen from its loose incoherent composition. *Fay.* b. A layer of cinders beneath a mold to permit the escape of gas. *Crispin.*

cinder block. A block closing the front of a blast furnace and containing the cinder notch. *Webster 3d.*

cinder breakout. The slag within the furnace escaping through the brickwork; caused by erosion, corrosion, or softening of brick by heat. *Fay.*

cinder coal. a. Coal which has been cindered by heat from an igneous intrusion. Many coal seams have been affected in this way in Scotland and in Durham, England. *See also* metamorphism. *Nelson.* b. Aust. A very inferior natural coke, little better than ash. *Fay.*

cinder cone. A volcanic cone composed of cinders and scoria. *Fay.*

cinder cooler. In a blast furnace, a water-cooled casting, usually of copper, that is pressed into the cinder notch. *Henderson.*

cinder crusher operator. In concrete products industry, one who crushes coal cinders for use in the production of concrete products, using conveying equipment and corrugated steel crushing rollers. *D.O.T. 1.*

cinder dock. A bed containing molds into which, in former practice, cinder was run, chilled, and then thrown into cars with forks. *Fay.*

cinder dump. A place where cinder ladles are emptied. *Fay.*

cinder fall. The dam over which the slag from the cinder notch of a furnace flows. *Fay.*

cinder notch. The hole, about 5 or 6 feet above the iron notch, and 3 feet below the tuyères, through which slag is flushed two to three times between casts. *See also* cinder tap. ***Fay.***

cinder pig. Pig iron made from a charge containing a considerable proportion of slag from puddling or reheating furnaces. *C.T.D.*

cinder pit. Large pit filled with water into which molten cinder is run and granulated at cast or flush. *Fay.*

cinder plate. *See* bloomery. *Fay.*

cinder runner. A trough carrying slag from skimmer or cinder notch to pit or ladle, *See also* cinder notch. *Fay.*

cinder snapper. A man who removes cinder skulls frfom cinder runners. *Fay.*

cinder tap; cinder notch. The hole through which cinder is tapped from a furnace. Also called Lurmann front. *Fay.*

cinder tub. A shallow iron truck with movable sides into which the slag of a furnace flows from the cinder runner. *Fay.*

cinder, volcanic. A fragment of lava, generally less than one inch in diameter, ejected from a volcanic vent. *Mather.*

cinder wool. A fibrous glass obtained by the action of a jet of air or steam upon molten slag as it flows from a blast furnace. Commonly called mineral wool. *Fay.*

cinerite. Sedimentary material consisting of volcanic cinders. *A.G.I. Supp.*

cinnabar. Mercury sulfide, HgS; hexagonal; color red; Mohs' hardness, 2 to 2.5; streak red; specific gravity, 8.1; 86.2 percent mercury. *Pryor, 3.*

cinnabar matrix. A term applicable to various varieties of minerals containing numerous inclusions of cinnabar but especially to a Mexican variety of jasper. *Shipley.*

cinnamite. Same as cinnamon stone. *Fay.*

cinnamon stone. Grossularite, a lime garnet. *See also* essonite; hessonite; hyacinth. *Hess; Dana 17.*

CIP. Abbreviation for cast iron pipe. *Zimmerman, p. 21.*

cipolino. A marble rich in silicate minerals and characterized more particularly by laters rich in micaceous minerals. *Holmes, 1920.*

Cipolletti weir. A measuring weir in which the notch plate has a trapezoidal opening tapering from the top, the side slopes being 1 horizontal to 4 vertical. *Ham.*

C.I.P.W. classification. From the initial letters of the last names of the men who originated it, Cross, Iddings, Pirsson, and Washington. Synonym for norm system. *A.G.I.*

circle. a. In the central United States, a nearly circular lead and zinc deposit developed in clayey chert breccias in old sinkholes in Paleozoic limestone or in dolomite (broken ground). *Schieferdecker.* b. In a grader, the rotary table which supports the blade and regulates its angle. *Nichols.* c. A plane figure bounded by a curved line called the circumference, and every point of the circumference is equally distant from a point within the figure, called a center. *Jones, 2, p. 91.*

circle agate. Agate with circular markings *Shipley.*

circle brick. A brick with two opposite larger faces curved to form parts of concentric cylinders. *Compare* radial brick. *Dodd.*

circle cutting drill. a. A pneumatic drill carried on rotating arms. Used to cut grindstones and pulpstones from the quarry. *AIME, p. 333.* b. Same as ditcher, b. *Fay.*

circle grinding. Either cylindrical or internal grinding. *ASM Gloss.*

circle haul. In strip mining, a haulage system in which the empty units enter the mine over one lateral and leave, loaded, over the lateral nearest the tipple. This system is utilized where laterals are built into the mine from the main road, whether outside the outcrop or on the high-wall side of the mine workings. This system reduces the haul on the coal surface to a minimum, except where there are only two laterals, one at each end of the workings. *R.I. 3416, 1938, p. 9.*

circle mica. Thumb-trimmed block mica larger than punch and of sufficient area to yield a disk 2 inches in diameter free of cracks and open areas. Now included in general term punch mica. *Skow.*

circle reverse. The mechanism that changes the angle of a grader blade. *Nichols.*

circles Ches. Wavy, undulating streaks of various colors frequently seen in the sides of shafts, on the pillars, faces, and roof of rock salt mines. *Fay.*

circle shear. A shearing machine with two rotary disk cutters mounted on parallel shafts driven in unison and equipped with an attachment for cutting circles where the desired piece of material is inside the circle. It cannot be employed to cut circles where the desired material is outside the circle. *ASM Gloss.*

circle shear operator. In the iron and steel industry, one who cuts boiler plates and other heavy metal sheets, rods, and plates into prescribed sizes and shapes for assembly into objects, such as boilers and tanks using a shear equipped with rotary blades. Also called rotary shearman; rotary shear operator. *D.O.T. 1.*

circle spout. Eng. A trough or gutter around the inside of a shaft to cacth the water running down the sides; a garland. *Fay, p. 295.*

circle system of firing. *See* rotary-hearth kiln. *Dodd.*

circuit. a. A conducting part or a system of conducting parts through which an electric current is intended to flow. *U.S. Bu-Mines Federal Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. I Underground Mines, October 8, 1953.* Synonym for round trip. b. The course followed by an electric current passing from its source through a succession of conductors and back to its starting point. *Crispin.*

circuit breaker. a. An overload protective device installed in the positive circuit to interrupt the flow of electric current when it becomes excessive or merely exceeds a predetermined value. Circuit breakers are provided at the substations to protect the generating equipment between substations to isolate a faulted section, so that a distance station cannot feed through to a fault; and in the circuit to each mining section to further isolate local faults. The circuit breaker feeding such a mining section is called a sectionalizing circuit breaker. *Kentucky, p. 255.* b. A switch that automatically interrupts an electric circuit under an infrequent abnormal condition (as overload). *Webster 3d. See also* cutoff, g. *Fay.*

circuits; roundabouts. Circular galleries made at the different levels in a mine which enable empty trucks to be pushed out of the cage on one side and simultaneously for the full ones to be pushed in on the other side, thus ensuring a more rapid journey of the cage. Circuits also aid the circulation of the air. *Stoces, v. 1, p. 237.*

circuit tester. A galvanometer used for testing blasting circuits before firing by touching the terminals of the circuit to the posts of the instrument. It is provided with a silver chloride cell which generates such a small current that a single cap may be tested. *Lewis, p. 124.*

circuit voltage. Voltage is the greatest root-mean-square difference of potential between any two conductors of the circuit concerned. *ASA M2.1-1963.*

circular arch. A roadway support consisting of an H-section girder of circular form and usually made in three parts. The joints are secured by fishplates and bolts. This type of steel arch is useful for withstanding pressures from roof, sides, and floor. With close lagging between the rings, the finished roadway resembles a tube. *See also* steel arches. *Nelson.*

circular-arc method. *See* slip surface of failure. *Nelson.*

circular bin discharger. A revolving cone with feeder fingers around the base periphery connected at the apex through a universal joint to a revolving arch breaker arm. *ASA MH4.1-1958.*

circular coal. Another name for eye coal. *Tomkeieff, 1954.*

circular cutting dril. *See* ditcher, b. *Fay.*

circular field. The magnetic field which surrounds a nonmagnetic conductor of electricity or which exists and is completely contained within or also surrounds a magnetic conductor of electricity. Generally applied to the magnetic field within any magnetic conductor resulting from a current being passed through the part or through a section of the part. *ASM Gloss.*

circular grading table. *See* rotary sorting table. *Nelson.*

circular kiln. A tunnel kiln in the shape of a circle. *ACSG, 1963.*

circular mil. A unit used for the measurement of the area of the cross section of wires, tubes, and rods, being the area of a circle whose diameter is 1 mil; 0.000000785 of a square inch. It is equal to 0.7854 of a square mil. One square millimeter equals 1,974 circular mills. *Standard, 1964.*

circular saw. A saw whose teeth are spaced around the edge of a circular disk running upon a central arbor. *Crispin.*

circular sawyer, stone. In the stonework industry, one who saws large, rough blocks of building or monumental limestone, marble, granite, sandstone, or soapstone into slabs or smaller blocks with a diamond toothed or abrasive circular saw. Also called circular saw operator; stone saw operator; stone sawyer. *D.O.T. 1.*

circular shaft. A shaft excavated to the round shape. The circular shaft is equally strong at all points, is convenient for concrete lining and tubbing and both can be made relatively watertight, and offers the least resistance to airflow. In Great Britain, circular shafts tend to be standardized at diameters of 16, 18, 20, or 24 feet with, in special cases, shafts of 22 and 26 feet. *Nelson.*

circular slip. A type of landslide which may occur in embankments or cuttings in clay or homogeneous earth. *See also* slip surface of failure. *Nelson.*

circular tunnel kiln. The same as a straight tunnel kiln, except that it has a movable, circular platform instead of cars. *Bureau of Mines Staff.*

circulated gas-oil ratio. The number of cubic feet of gas introduced into a well for gas-lift operations, per barrel of oil lifted. *Porter.*

circulating fluid. a. A fluid pumped into a borehole through the drill stem, the flow of which cools the bit, washes away the cuttings from the bit, and transports the cuttings out of the borehole. *Compare* reverse circulation. Also called circulation fluid; circulation medium; drill fluid; drilling fluid. *Long.* b. The process of causing a fluid to circulate in a borehole. *Long.*

circulating head. A casing to drill-rod coupling. When attached to the top of casing, it is used during the process of pumping cement slurries or circulating water through the casing, forcing the fluid to fllow out of the casing into the drill hole between the outside of the casing and the walls of the borehole. Also called stuffing box; tight head. *Long.*

circulating load. a. In mineral processing, use of closed circuit to check mineral issuing from a specific treatment, and to return to the head of the treatment those particles which do not satisfy the maintained conditions for release to the next stage of treatment. A 5/1 circulation load in a ball mill, classifier means that five units are returned to the ball mill by the classifier for each unit released to the following stage. Use of such an arrangement allows the material in circulation to be reduced more gradually to the desired state than if it passed through once only and had to be finished in that pass (open circuit). The ratio between new feed and circulating load is an important factor in grinding control in ball mills. *Pryor, 3.* b. In ore dressing, oversize material returned to a ball mill for further grinding. *Newton, p. 70.*

circulating medium. a. Any type of liquid or gas used as a drill cuttings-removal and bit-coolant agent. Also called circulation medium; coolant. *Compare* circulating fluid. *Long.* b. Medium in circulation in or outside the separating bath, at or about the specific gravity of that in the separating bath. *B.S. 3552, 1962.*

circulating pump. a. A pump (usually centrifugal) used to circulate water through the condenser of a steamplant; a pump used to circulate water in a coal washer or ore concentration plant. *Nelson.* b. The pump used to circulate mud or water through the drilling column. Also called mud pump; slush pump. *B.S. 3618, 1963, sec. 3.*

circulating scrap. Scrap arising at steelworks and foundries during the manufacture of finished iron and steel or of castings. It consists of the sheared-off ends of rolled and other worked products, rejected material, etc. *See also* capital scrap. *Nelson.*

circulating water. a. The water in the water circuit. *B.S. 3552, 1962.* b. Synonym for circulating fluid. *Long.*

circulation. a. The passing of any liquid or gas to the end of the drill string and back to the surface in the process of drilling a borehole. *Long.* b. The movement of air currents through mine openings. *Long.* c. In rotary drilling, the process of pumping mud-laden or other fluid down the drill pipe, through the drilling bit, and upward to the surface through the annulus between the drill-hole walls and the drill pipe. *A.G.I.* d. The act of moving in a course, not a circle, which brings the moving thing, fluid, etc., to the place where its motion began. *Webster 2d.*

circulation fluid. The fluid pumped through and to the end of the drill string and back to the surface in the process of drilling a borehole. *Long.*

circulation loss. The result of drilling fluid escaping into the formation by way of crevices or porous media. *Brantly, 1.*

circulation medium. Synonym for circulating medium. *Long.*

circulation of air; dadding. The controlled flow of air to and from the faces to secure adequate ventilation of all workings and traveling roads. *Nelson.*

circulation velocity. The speed, generally expressed in lineal feet per second, at which a fluid or gas travels upward in a borehole after passing the face of the bit. *Long.*

circulation volume. The amount of liquid or gas circulated through the drill-string equipment in drilling a borehole. The amount of liquid circulated is expressed in gallons per minute (gpm), and the amount of a gas, as air, is expressed in cubic feet per minute (cfm). *Long.*

circulator. In ore dressing, smelting, and refining, a laborer who fills electrolysis tanks with electrolyte preparatory to copper refining and maintains adequate circulation during the process. *D.O.T. 1.*

circumdenudation. Erosion (denudation) that, in dissecting a land mass, has left a part of the ground upstanding (a residual 'hill of circumdenudation') by having worked round it apparently fortuitously, such a hill not being obviously due to the outcrop of a resistant rock, though it may very likely be capped by a hard stratum. *Challinor.*

circumference. A circle which includes all points of a round object on or within the plane of the circle. For example, the circumference of a cylinder or tube is the shortest line or belt around the object. *Brantly, 2.*

circumferentor. A surveyor's compass with diametral projecting arms each carrying vertical slit sight. *Webster 3d.*

cire perdue. A process used in metal casting that consists of making a wax model (as of a statuette), coating it with a refractory (as clay) to form a mold, heating until the wax melts and runs out of small holes left in the mold, and then pouring metal into the space left vacant. *Webster 3d.*

cir mil Abbreviation for circular mil (wire measure). *BuMin Style Guide, p. 58.*

cirque. A deep steep-walled basin high on a mountain, usually shaped like half a bowl and often containing a small lake, caused especially by glacial erosion, and usually forming the blunt head of a valley. *Webster 3d. See also* corrie.

cistern. a. In metallurgy, a settling tank for liquid slag, pulp, etc. *Fay.* b. An artificial reservoir or tank for holding or storing water or other liquids. *Webster 3d.* c. The receptacle into which glass is ladled from the pots to be poured over the table in making plate glass or in casting glass; a cuvette. *Fay.*

Citadur. Trade name; a high-alumina cement made in Czechoslovakia. *Dodd.*

citrate. A salt or ester of citric acid. *Webster 3d.*

citric acid. $C_6H_8O_7$ occurs in a variety of fruit, especially lemons. When extracted and purified, it forms whitish crystals. A 10-percent solution of citric acid is used to test the acid-resisting qualities of a porcelain-enameled surface. *Hansen.*

citrine; citrine quartz. Not the true topaz of mineralogists, but a yellow variety of quartz, which closely resembles it in color though not in other physical characters; it is of much less value than true topaz. Known under a variety of geographical names such as, Bohemian topaz, Indian topaz, Madagascar topaz, Madeira topaz, and Spanish topaz. Brazilian topaz is the true mineral. Also called quartz topaz. *See also* false topaz; smoky quartz. *C.M.D.*

citrine quartz. *See* citrine.

civil engineer. One whose work includes design, construction, and maintenance of public works, highways, railroads, bridges, steel framework of buildings, etc. *Crispin.*

civil mean time. Averaged time, as indicated by a clock which shows the mean solar day. It differs from that of apparent day. *Pryor, 3.*

C-J detonation. A detonation characterized by the equivalence of the detonation velocity to the velocity of sound in the burned gas plus the velocity of flow of the burned gases. *I.C. 8137, 1963, p. 76.*

Cl Chemical symbol for chlorine. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

cl Abbreviation for centiliter. *BuMin Style Guide, p. 58.*

clach. Term used among Scottish miners for an impure cannel coal. *Tomkeieff, 1954.*

clack. a. The hinged, lidlike part of a check, clack, or pump valve. Also called check; flap; flapper. *Long.* b. A clack or pump valve. *Long.*

clack door. Eng. The opening into the valve chamber to facilitate repairs and renewals without unseating the pump or breaking the connections. Also, an iron plate bolted to the pipe to close the opening. *Fay.*

clack-door piece. Eng. A cast-iron pipe having an opening in the side for access to the clack or valve. *Fay.*

clack guard. Scot. A ring to prevent undue opening of the clack. *Fay.*

clack lid. Scot. The flap of a clack or stationary valve. *Fay.*

clack piece. The casting forming the valve chamber. *Fay.*

clack seat. The rim or seat on which the hinged lid or flapper of a clack valve closes. *Long.*

clack valve. A valve having a lidlike piece hinged on one side within a chamber that permits the flow of a fluid or gas to proceed in one direction only. Usually, the check valve on the pickup end of a drill-pump suction hose is a clack-type valve. Also called check valve; flap valve; flapper valve; foot valve. *Long.*

cladding. a. Covering of one metal with another so as to utilize their joint qualities or to cheapen cost. The metals are usually rolled together under high pressure and temperature. *Pryor, 3.* b. The outer jacket of nuclear fuel elements. It prevents corrosion of the fuel and the release of fission products into the coolant. Aluminum, stainless steel, and zirconium are typical cladding materials. *L&L.*

cladgy. A variation of claggy. *Fay.*

clad metal. A composite metal containing two or three layers that have been bonded together. The bonding may have been accomplished by corolling, welding, casting, heavy chemical deposition, or heavy electroplating. *ASM Gloss.*

clad steel. Carbon or low alloy steel having a layer of another metal or alloy firmly bonded to it. *Ham.*

claggy. Newc. a. Adhesive. When the coal is tightly joined to the roof, the mine is said to have a claggy top. Also spelled cladgy. *Fay.* b. Muddy or clayey dirt. *Pryor, 3.*

Claibornian. Middle Eocene. *A.G.I. Supp.*

claim. a. The portion of mining ground held under the Federal and local laws by one claimant or association, by virtue of one location and record. Lode claims, maximum size 600 by 1,500 feet. Placer claims 600 by 1,320 feet. A claim is sometimes called a "location." *See also* mining claim. *Fay.* b. S. Afr. Land on a mining field to which a miner is legally entitled. A Transvaal claim has an area of 64,025 English square feet (or 60,000 Cape square feet). It is about 155 feet along the strike of the reef, and 413 feet across the line, or along the dip of the reef. An area of 1.44 claims is equal to a South African morgen. (In Cape feet, the claim is 150 by 400 feet.) Mining maps are often designed in squares of 1,000 by 1,000 feet, which, therefore, contain about 16 claims measured horizontally. *Beerman.* c. In Australia, a claim is defined as the portion of Crown land which any person or number of persons shall lawfully have taken possession of and be entitled to occupy for mining purposes. No land comprised in any mining lease can be considered to be a claim. A claim is marked out by fixing in the ground posts at each angle of the claim, and it need not be surveyed. A miner is required to hold a miner's right before he can legally mark out or work a claim. *Nelson.*

claimant. In the federal mining law, means locator. *Ricketts, I.*

claim jumping. The location of a mining claim on supposedly excess ground within the staked boundaries of an existing location on the theory that the law governing the manner of making the original location has not been complied with. *Ricketts, I.*

claims held in common. The phrase held in common means a claim whereof there are more owners of a claim than one, while the use of the words claims held in common, on which work done upon one of such claims shall be sufficient, means that there must be more than one claim so held, in order to make a case where work upon one of them shall answer the statutory requirements as to all of them. *Ricketts, I.*

claim system. A system used mainly in the United States that grew up in the early days of mining in Western United States, following the gold rush of 1849, as an outgrowth of the desire of the prospector to develop a mineral deposit discovered on the public lands and to have his claim confirmed by law. The mining laws of the United States are based on this system, whereas most other mining countries follow the concession system. *Compare* concession system. *Hoov, pp. 365-366.*

clam. a. A clip; a haulage clip; an appliance for attaching mine cars to a rope. *Mason.* b. Eng. A bracket or support for a pump; a clamp. *Fay.*. c. A clamshell bucket. *Nichols.* d. To mud-in the door of a kiln. *ACSG, 1963.*

clammer. A haulage hand who attaches tubs to a rope by means of clams. *Mason.*

clamming. Local name for the brick and fireclay filling of the wickets of an old-type pottery kiln; sometimes spelled clamin. *See also* wicket. *Dodd.*

clammings. Entrance to oven. *Noke.*

clamp. a. A device to grip and hold in position a piece or part or hold or bind together two or more parts, usually with jaws or cheeks, at least one of which is movable. Also incorrectly called clip. *Compare* cable clamp. *Long.* b. Eng. A pile of cut and dried peat. *Standard, 1964.* c. Two pieces of wood or steel bolted around a pipe to stop a leak. Also called cleat. *B.S. 3618, 1963, sec. 4.* d. A pile of ore for roasting or of coal for coking. *Fay.* e. A device for holding two pieces or parts of rope together by pressure. *Zern.* f. *See* slips, d. *B.S. 3618, 1963, sec. 3.* g. A number of bricks piled up in a particular form for burning. *Webster 3d.*

clamped. *See* fixed. *Ro.*

clamped roof layer. Roof layers in which the edges are clamped, so that the deflection and deflection gradient at the edges are zero. *BuMines Bull. 587, 1960, p. 2.*

clamping. The process of burning bricks in clamp. *See also* clamp, g. *Fay.*

clamping screw. A screw fitted on a theodolite. It is used to clamp the vernier so that the tangent screw can be used. *Ham.*

clamp kiln. A periodic, updraft, open-top kiln of semipermanent construction, similar to a scove kiln except that it has walls containing fire arches which are laid up with scove brick. *ACSG, 1963.*

clamp man. *See* carbon man. *D.O.T. Supp.*

clamp, rail. *See* rail clamp.

clamps. Split castings with recessed or spiral grooves which serve as gripping surfaces. *Lewis, p. 254.*

clamp screw. A screw that clamps the vernier of a calibrated circle on a theodolite, so that the fine adjustment (tangent screw) can be used to complete alinement of the telescope. Usually, in addition to the two which clamp vertical and horizontal circle, there is a third which clamps together the two horizontal plates. *Pryor, 3.*

clamshell. A twin-jawed bucket without teeth usually hung from the boom of a crane that can be either crawler or wheel mounted. The bucket is dropped in the open position onto the material to be excavated or handled. It is then closed, encompassing material between the hinged two halves. *Bureau of Mines Staff.*

clamshell loader. A grab-type loader activated by cables. Used in mucking operations. *Lewis, p. 186.*

clamshell snapper. There are several sizes of clamshell snappers for taking small disturbed sediment samples. The largest of those presently in use aboard Navy survey ships is about 30 inches long and weighs about 60 pounds. It is ruggedly constructed of stainless steel. The cast stainless steel snapper jaws are closed by a heavy arm actuated by a strong spring and lead weight. In the open position a foot device extends below the jaws so that it strikes the bottom first. The impact moves the arms up releasing the jaws which snap shut trapping about a pint of bottom material. The snapper is equipped with a tailfin and may be lowered from the oceanographic winch. *H&G.*

clan. a. A clan of rocks is bound together by similarities in composition. *A.G.I.* b. A larger compositional category for classifying igneous rocks; for example, the rhyolite-granite clan. A clan may be defined either by mineralogical or by chemical compositional limitations. Also used (Tyrell, 1926) to indicate consanguinity in rocks. *A.G.I.*

clanger. Eng. *See* clauncher, a. *Fay.*

Clanny lamp. The safety lamp invented by Dr. Clanny and first exhibited in 1813. He improved the lighting power of the lamp by substituting for the lower portion of the gauze cover a glass cylinder to surround the flame, and a shield or bonnet to protect the flame from air currents. *Nelson.*

clap-me-down. In inclined shaft timbering, a joint in which the end pieces are checked into the cap and sill for a distance of approximately 1 inch, with a bevel on the inner side. *Higham, p. 148.*

clapotis. The wave pattern established when waves are reflected by a barrier so that the crests and troughs occur alternately in the same places with water particle motion limited to vertical movement, while a quarter wavelength away the particle motion is horizontal, back and forth. This is a standing wave phenomenon. *Hy.*

clap sill. In hydraulic engineering, a miter sill; the bottom part of the frame on which lock gates shut; a lock sill. *Fay.*

clarain. This term was introduced by M. C. Stopes in 1919 to designate the macroscopically recognizable bright lustrous constituent of coal, which in contrast to vitrain, is intrinsically striated by dull intercalations. Nowadays the term is used to describe all finely striated bands of coal which have an appearance intermediate between vitrain and durain. As a general rule, clarain is the most widely distributed and common macroscopic constituent of all humic coals. *IHCP, 1963, part I.*

Clarendonian. Lower Pliocene or upper Miocene. *A.G.I. Supp.*

clarificant. A substance used for clarifying a liquid; for example, isinglass or alum. *Bennett 2d, 1962.*

clarification. a. The cleaning of dirty or turbid liquids by the removal of suspended and colloidal matter. *See also* recirculation of water. *Nelson.* b. The concentration and removal of solids from circulating water in order to reduce the suspended solids to a minimum. *B.S. 3552, 1962.* c. In leaching process, removal of the last traces of solid matter, usually from pregnant solution, for example, gold-rich cyanide prior to precipitation. Near-colloids are sometimes adsorbed by diatomaceous earth, the resulting liquid being described as limpid, sparkling, gin-clear, and polished. *Pryor, 3.*

clarified amber. More or less cloudy amber which has been clarified by heating in rapeseed oil. *Shipley.*

clarifier. A centrifuge, settling tank, or other device, for separating suspended solid matter from a liquid. *Hess.*

clarifying tank. A tank for clarifying cyanide or other solutions and frequently provided with a filtering layer of sand, cotton waste, matting, etc. *Fay.*

clarinite. a. The major maceral or micropetrological constituent of clarain. It is a heterogeneous material that is generally translucent in thin section, and in which there may be intercalated lenticels of such other ingredients, as xylinite, fusinite, resinite, suberinite, periblinite, collinite, and ulminite. *A.G.I.* b. Strictly, not a maceral, but may be used for repetitive description. *Tomkeieff, 1954.*

clarite. In 1955 the Nomenclature Sub-committee of the International Committee for Coal Petrology resolved to use this term for the microlithotype consisting principally of vitrinite and exinite. It contains at least 95 percent of vitrinite and exinite. The proportions of these two macerals may vary widely but each must be greater than the proportion of inertinite, and neither must exceed 95 percent. Distinction may be made between spore clarite, cuticular clarite, and resinous clarite. It is widely distributed and very common, particularly in clarain type coals and occurs in fairly thick bands. *IHCP, 1963, part I.*

Clark circle system. *See* rotary-hearth kiln. *Dodd.*

clarkeite. A massive, dense, strongly radioactive mineral, occurring as an alteration product of uraninite, $(Na,K)_{2-2x}(CaPb)_x$-$U_2O_7.yH_2O$; dark brown to reddish-brown. *Crosby, pp. 12-13.* Brown gummite; Mitchell County, N.C. *English*

Clark process. A process for softening water by the addition of hydrated lime, which precipitates calcium and magnesium bicarbonates. *Webster 2d*

Clark riffler. A sample reducing device which splits a batch sample of ground ore into two equal streams as it falls across an assembly of deflecting chutes. *Pryor, 3, p. 329.*

clarocollain. A rock-type coal consisting of the maceral collinite and lesser quantities of other macerals. *Compare* colloclarain. *A.G.I.*

clarocolite. A type of coal intermediate between clarite (predominant) and collite. *Tomkeieff, 1954.*

clarodurain. A rock-type coal consisting of the maceral vitrinite (tellenite or collinite) and large quantities of other macerals, mainly micrinite and exinite. Micrinite and exinite are present in larger quantities than vitrinite. *Compare* duroclarain. *A.G.I.*

clarodurite. The term clarodurain was introduced by G. H. Cady in 1942, and in the modified form clarodurite was adopted by the Nomenclature Sub-committee of the International Committee for Coal Petrology in 1956 to designate the microlithotype with maceral composition between that of clarite and durite but closer to durite than to clarite. It occurs in fairly thick bands, is widely distributed and, like duroclarite, is a common constituent of most humic coal. *ISCP, 1963, part I.*

clarofusain. A rock-type coal consisting of the macerals fusinite and vitrinite and may contain all other macerals. Fusinite is present in a larger quantity than in fusoclarain. *Compare* fusoclarain. *A.G.I.*

clarofusite. A type of coal intermediate between clarite (predominant) and fusite. *Tomkeieff, 1954.*

clarotelain. A rock-type coal consisting of the maceral telinite and smaller quantities of other macerals. *Compare* teloclarain. *A.G.I.*

clarotelite. A type of coal intermediate between clarite (predominant) and telite. *Tomkeieff, 1954.*

clarovitrain. A rock-type coal consisting of the maceral vitrinite (collinite or telinite) with smaller amounts of other macerals. *Compare* vitroclarain. *A.G.I.*

clarovitrite. A type of coal intermediate between clarite (predominant) and vitrite. *Tomkeieff, 1954.*

clash. Scot. A thin slurry of clay and water. *Dodd.*

clasolite. A rock composed of the fragments of other rocks. *See also* clastic. *Fay.*

clasp. a. A snugly fitting ferrule for connecting pump rods. *Fay.* b. Any of various forms of releasable catch, for holding together two or more objects or complementary parts of anything. *Webster 2d.*

class. A division of igneous rocks based on the relative proportions of the salic (siliceous and aluminous minerals, quartz, feldspars, and feldspathoids) and femic (ferromagnesian minerals, pyroxene, amphibole, etc.) standard normative minerals as calculated from chemical analyses. The descriptive terms—persalic, dosalic, salfemic, dofemic, and perfemic, corresepond to the terms—perfelsic, dofelsic, mafelsic, domafic, and permafic, which are based on the relative proportions of the felsic and mafic minerals actually present. The division of igneous rocks into classes is analogous to the less rigid division into hololeucocratic, leucocratic, mesocratic, melanocratic, and holomelanocratic types. *Holmes, 1928.*

classical washout. A belt of barren ground or thin coal produced by the erosion of the seam by rivers which flowed during or soon after the deposition of the coal. These erosion channels are now filled with sandy sediment. *See also* rock riders; rock rolls. *Nelson.*

classification. a. As applied to coal washing, the process of separating particles of various sizes, densities, and shapes by allowing them to settle in a fluid. *Mitchell, p. 257.* b. The evaluation and segregation of trimmed sheet mica according to grades and qualities. *Skow.* c. In powder metallurgy, separation of a powder into fractions according to particle size. *ASM Gloss.* d. Grading of particles too small to be screened in accordance with their size, shape, and density by control of their settling rate through a flued medium (water, slurry, or air). Under free settling conditions (though a relatively quiet medium), this is sedimentation when practiced discontinuously on small quantities of material. With hindered settlement the particles gravitate against a rising current of medium, the flow rate of which is so adjusted that the desired heavy or coarse particles can fail to a bottom discharge, while the lighter ones are upswept at a higher speed than is compensated by their falling rate and overflow. In continuous free settlement, withdrawal of the settled fraction is made through a spigot, or by means of mechanically operated rakes or spirals, while the light fraction overflows at the upper discharge level of the sorting pool. Classification is a sizing operation to some extent for homogeneous particles of roughly similar shape and a sorting operation when particles of different sizes, shapes, and densities are treated. *Pryor, 3.*

classification of crystals. Of 32 possible types of symmetry, only eleven are found in common minerals. Each type can be referred to its set of axes. Classification begins with symmetry classes, and continues by referring all crystals conforming to a given set of axes into a crystal system. The latter are cubic, tetragonal, hexagonal, orthorhombic, monoclinic, and triclinic. *See also* crystal. *Pryor, 3.*

classification of minerals. Chemically, following Dana, eight types are (1) native elements; (2) sulfides, selenides, tellurides, arsenides, antimonides; (3) sulfo-salts; sulfarsenites, sulfantimonites, sulfobismuthites; (4) haloids; (5) oxides; (6) oxygen salts, carbonates, silicates, etc.; (7) salts of organic acids; and (8) hydrocarbon compounds. Rutley classifies according to group in accordance with the periodic table as regards dominant economic constituents. Silicates are classified by structural arrangement of their SiO_4 group. *Pryor, 3.*

classification of soils. Soils are classified into certain well-defined types dependent on the size, shape, and nature of the particles For a preliminary classification at the site, it is generally sufficient to recognize the main types, such as gravels, sands, silts, clays, and peat. Later the gravels, sands, and silts are subdivided into coarse, medium, or fine, according to particle size. *See also* soil classification, for dominant grain size, etc. *Nelson.*

classifier. a. A machine or device for separating the constituents of a material (as ore, coal, sand) according to relative sizes and densities thus facilitating concentration and treatment. *Webster 3d.* Classifiers may be hydraulic or surface-current box classifiers (spitzkasten). Classifiers are also used to separate sand from slime, water from sand, and water from slime. *Fay.* b. The term classifier is used in particular where an upward current of water is used to remove fine particles from coarser material. *See also* centrifugal separation. *Nelson.* c. In mineral dressing, the classifier is a device that takes the ball-mill discharge and separates it into two portions—the finished product, which is ground as fine as desired, and oversize material. *Newton, p. 70.*

classifier dredge. A dredge in which the gravel goes from the trommel to a classifier and then to jigs. This type dredge has become a strong competitor of the sluice dredge. *Lewis, p. 396.*

classifier man. One who separates crushed ore into sands (coarse particles) and slimes (fine particles) preparatory to further concentration of metal. *D.O.T. Supp.*

classifier operator. One who separates coarse and fine precipitated alumina particles from rich liquor, using hydroseparators, thickeners, and classifiers, as a step in the alumina-extraction process. Also called hydrate-thickener operator. *D.O.T. 1.*

classify. The separation of fragments of different dimensions into classes of different size limits as effected in screens and classifiers. *Nelson.*

classing. Sorting ore according to its quality. *Gordon.*

clastic. Consisting of fragments of rocks or of organic structures that have been moved individually from their places of origin. *Compare* detrital; fragmental. *A.G.I. Supp.*

clastic deformation. One of the processes of metamorphism that involves the actual fracture, rupture, and rolling out of rock and mineral particles. In some instances, the crystal structure may be preserved but the orientation of the fragments becomes confused. In other instances, the rock may be thoroughly pulverized. *Stokes and Varnes, 1955.*

clastic dike. A tabular body of clastic material transecting the bedding of a sedimentary formation, representing extraneous material that has invaded the containing formation along a crack, either from below or from above. Synonym for sandstone dike. *A.G.I.*

clastic dispersion pattern. A pattern where the dispersion is mainly caused by movement of solid particles. *Hawkes, 2, p. 144.*

clasticity index. A measure of the maximum apparent grain size of a sediment. *A.G.I.*

clastic rock. Any deposit which is composed of fragments of pre-existing rocks, or of solid products formed during the chemical weathering of such older rocks. Examples of sediments belonging to this group are gravel, sand, mud, and clay, and their consolidated sedimentary-rock equivalents, conglomerate, sandstone, and shale. The clastic rocks are subdivided according to the grain size or diameter of their constituent particles, and many schemes of nomenclature have been based upon this principle. *Stokes and Varnes, 1955.*

clastic texture. Texture shown by sedimentary rocks formed from deposits of mineral and rock fragments. *Leet.*

clastomorphic. Applied to deuteromorphic rock constituents, the shapes of which have been modified by exogenetic processes, for example, the rounded or angular grains of a detrital sediment. *Schieferdecker.*

clatersal. Small diamond splints from which diamond powder is produced by crushing. *Bureau of Mines Staff.*

clathrate. A texture found chiefly in leucite rocks, in which the leucite crystals are surrounded by tangential augite crystals in such a way that it suggests a net or a section of a sponge, the felted mass of augite prismoids representing the threads or walls, and the clear, round leucite crystals, hte holes. *Schieferdecker.*

claudetite. The monoclinic phase of arsenic oxide, As_2O_3. *Hey 2d, 1955*

clauncher. a. Eng. A tool for cleaning blast holes. Also called clanger. *Fay.* b. Derb. A piece of stone, that has a joint back of it, which becomes loose and falls when the heading has been driven past it. *Fay.*

Clausius unit. Unit of entropy (caloric per degree). *Pryor, 3.*

clausthalite. Lead selenide., PbSe. *Fay.*

claut. a. Scot. A scraper with a long handle. *Fay.* b. Mud or rubbish heaped together. *Standard, 1964.*

clavalite. A belonite with a globular enlargement at each end. *A.G.I. Supp.*

clay. a. A fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It may be a mixture of clay minerals and small amounts of nonclay materials or it may be predominantly one clay mineral. The type clay is determined by the predominant clay mineral present (that is, kaolin, montmorillonite, illite, halloysite, etc.). *Bureau of Mines Staff.* It is plastic when sufficiently wetted, rigid when dried en masse, and vitrified when fired to a sufficiently high temperature. *ASTM C242–60T. See also* fire clay; clay mineral; bentonite. b. It has three aspects: (1) a natural material with plastic properties; (2) an essential composition of particles of very fine size; and (3) an essential composition of crystalline fragments of minerals that are essentially hydrous aluminum silicates or occasionally hydrous magnesium silicates. The term implies nothing regarding origin but is based on properties, texture, and composition, that are interrelated, for example, the plastic properties are the result of the constituent minerals and their small grain size. *A.G.I.* c. Soil consisting of inorganic material, the grains of which have diameters smaller than 0.005 millimeter. *A.G.I.* d. According to international classification, it has a grain size less than 0.002 millimeter. *C.T.D.* e. A general term applied to the material added to water to prepare a drilling mud. *Long.*

clay adsorption, anion. The adsorption of anions either on basal OH surfaces, i.e., structural hydroxyis are replaced by other anions, or on edges where unsatisfied positive bonds occur. Exchange of edge hydroxyis may also occur. *ACSG, 1963.*

clay adsorption, cation. The adsorption of cations either on basal surfaces where negative charges occur, possibly as a result of isomorphous replacements within the lattice, and/or adsorption on prism surfaces where unsatisfied negative bonds may occur. Basal surface adsorption predominates in three-layer clays while edge adsorption predominates in kaolin clays. *ACSG, 1963.*

clay-and-shale feeder. *See* shale-and-clay feeder, *D.O.T. 1.*

clay back. A back slip in a coal seam containing a clayey deposit. *Nelson.*

clay bals. *See* armored mud balls. *Pettijohn.*

clay band. Scot. A clay ironstone. *Nelson.*

clay band ironstone. Impure argillaceous carbonate of iron occurring in sandstones and shales, either as definite layers or as nodules. *B.S. 3618, 1964, sec. 5.*

clay bank. a. A bank of clay. *Webster 2d.* b. A brownish orange that is yellower and paler than leather or spice and yellower and light than gold pheasant. *Webster 3d.*

clay barrel. *See* triple-tube core barrel. *Long.*

clay bit. A mud auger; a mud bit; also, a bit designed for use on a clay barrel. *See also* clay-boring bit. *Long.*

clay book tile. Structural clay tile with tongue and groove edges resembling a book in shape. *Hess.*

clay-boring bit. A special coring bit used on split-inner-tube core barrels. Thickness of bit face is reduced and inside shoulder is not inset with diamonds, to allow a sharp-edged extension of the inner barrel to extend through and project a short distance beyond the face of the bit. Also called clay bit; mud bit. *Long.*

clay building brick. Brick for normal constructional purposes; such brick can be made from a variety of brick clays. Relevant British Standards are B.S.-657 (Dimensions) and B.S.-1257 (Testing). The United States Standards are—ASTM-C62 (Building Brick); ASTM-C216 (Facing Brick), and ASTM-C67 (Sampling and Testing). *Dodd.*

clay carman. One who drives a small dump car used for transporting clay, shale, and rock from an open pit to a tipple or to crushing machine. *D.O.T. 1.*

clay carrier. One who carries clay and molds to ware former or to batter-out for molding. Picks up scrap clay and returns it to mill for reuse. Prepares and carries slip for casting, putting clay, water, and other materials into blunger (mixer), and starting machine. Also called scrapman. *D.O.T. 1.*

clay, clear. A natural, hydrous, aluminum silicate which, when used as a mill addition in enamel millings, imparts very little opacity to the fired enamel. Consequently, this type of clay is used in enamels where brilliance and depth of color are of prime importance. *Enam. Dict.*

clay content. *See* shrinkage test. *Nelson.*

clay course. A clay seam or clay gouge found along the sides of some veins. *Fay.*

claycrete. The weathered argillaceous layer immediately overlying bedrock. *A.G.I. Supp.*

clay cutter. Cutting ring at entry to pipe feeding into suction cutter dredge. Set of cutting blades in dredge trommel, used to break clay brought up by dredge buckets. *Pryor, 3.*

clay dam. a. Mid. A stopping made of puddled and well-beaten clay, from 12 to 36 inches thick, and rammed into the roof, floor, and sides of the excavation made to receive it. *Fay.* b. A stopping or dam, wherein the seal against water is provided by puddled clay inserted between brick walls or wooden planks. *B.S. 3618, 1963, sec. 4.*

clay dauber. One who seals kiln doors before burning and kiln fireboxes after burning and assists other workers in knocking out doors and in unsealing fireboxes after cooling. Also called dauber; plaster man. *D.O.T. 1.*

clay digger. *See* clay-mine loader. *D.O.T. 1.*

clay, domestic. Any clay mined in the United States for domestic use. *Bureau of Mines Staff.*

claydune. A dune composed of clay particles heaped up by the wind. *A.G.I.*

clayer. Scot. A rod for forcing clay into joints of strata in wet shotholes. *See also* cliay iron. *Fay.*

clayey breccia. A breccia in which rubble and silt each composes over 10 percent and other material less than 10 percent of the aggregate. *A.G.I.*

clayey soil. A soil in which clay is the basic constituent. The clay contributes to strength by cohesion, but detracts from stability by volume change and by plastic flow under load. *Nelson.*

clay feeder. *See* shale-and-clay feeder. *D.O.T. 1.*

clay galls. a. Mud curls or cylinders formed by drying and cracking of thin layers of coherent mud; commonly rolled or blown into sand and buried; flattened upon wetting forming a lenticular bleb of clay or shale. *Pettijohn.* b. Eng. Clay gall pellets of clay or mudstone, often ocherous, sometimes hollow, found especially in false-bedded oolitic limestones such as forest marble. *Compare* cricks. *Arkell.*

clay gouge. a. A thin seam of clay separating ore, or ore and rock. *Weed, 1922.* b. A claylike material found in the brecciated or gouge zone of a fault; also, sometimes found in the walls or within ore veins. *Long.*

clay grinder. *See* grinder. *D.O.T. 1.*

clay-grog mortar. *See* grog fire clay mortar. *A.R.I.*

clay gun. Equipment used to fire a ball of fire clay into the taphole of a blast furnace. *Pryor, 3. See also* mud gun.

clay handler. A laborer who mixes fire clay with water and heat-resisting materials to form a plastc mixture suitable for making condensers and retorts used in smelting zinc ore to recover the zinc. *D.O.T. 1.*

clay, hi-set. The term applied to clays which impart characteristic stiffness to enamel slips. *Enam. Dict.*

clay hog. a. In a coalbed, a pinched place filled with clay. *Bureau of Mines Staff.* b. Mid. *See* wash fault. *Fay.*

clay hoister. One who transfers damp clay from storage cellar to clay shop where it is formed into ware. *D.O.T. 1.*

clay hole. A cavity, in a rock, filled with clayer material. *See also* clay pocket. *Fay.*

claying. Lining a borehole with clay, to keep the powder dry. *Fay.*

claying bar. A rod or tool for lining a newly made coal shot hole with clay to seal up any breaks in the walls of the hole. The hole is filled with clay to about one-third of its length. The claying bar is driven in by hammer to the limit and rotated by a tommy bar in the eyelet at the outer end of the bar. *See also* scraper and break detector. *Nelson.*

clay iron. An iron rod used for ramming clay into wet drill holes. *Webster 2d. See also* bull, a; claying bar. *Fay.*

claying-up man. *See* bedder. *D.O.T. 1.*

clay ironstone. a. A clayey rock heavily charged with iron oxide, usually limonite; commonly in concretionary form. *A.G.I.* b. Clayey iron carbonate. A heavy compact or fine-grained clayey-looking rock, occurring in nodules and uneven beds among carboniferous and other rocks. It contains only 20 to 30 percent iron, and yet much of the iron produced by the United Kingdom is produced from it. *Fay.* c. Applied to sheetlike deposits of concretionary masses consisting of argillaceous siderite, as occur with carbonaceous strata. *Schieferdecker.*

clayite. A hydrous silicate of aluminum, $Al_2O_3.2SiO_2.2H_2O$. This name has been suggested for "colloidal kaolinite." A number of English fire clays are found to consist chiefly of clayite. *English.*

clay kiln. A kiln or stove for burning clay. *Fay.*

clay lath. British Standards 2705 describes this as copper-finished steel wire mesh at the intersections of which suitably shaped unglazed clay nodules have been bonded by a firing process. Clay lath provides a stable, well-keyed base to cover the whole of a surface with the minimum number of joints; it is supplied to rolls or mats. *Dodd.*

clay loader. A machine used for loading clay transportation to the plant or a workman responsible for operating a clay-loading machine. *Bureau of Mines Staff.*

clay loam. A fine-textured soil that breaks into clods or lumps which are hard when dry. When the moist soil is pinched between the thumb and finger, it will form a thin ribbon which will break readily, barely sustaining its own weight. The moist soil is plastic and will form a cast that will bear much handling. When kneaded in the hand, it does not crumble readily but tends to work into a heavy compact mass. *Stokes and Varnes, 1955.*

clay, low-set. The term applied to those clays which, when used in enamel millings, produce thin or runny slips, as compared to normal consistency. *Enam. Dict.*

clay maker. On who blends and mixes the various clays, as shipped from the mine, into a thin, semiliquid form by operating blunger (mixing machine). Also called blunger machine operator; clay mixer; clay washer; slip maker; slip mixer; wet mixer. *D.O.T. 1.*

clay marl. A whitish, smooth, chalky clay; a marl in which clay largely predominates. *Webster 3d.*

clay micronized. A term applied to clay that has been processed through a micronizer. *Enam. Dict.*

clay mill. A mill for mixing and tempering clay; a pug mill. *Fay.*

clay mineral. A colloidal size, crystalline, hydrous silicate with a crystal structure of the two-layer type, kaolinite, or of the three-layer type, montmorillonite, in which silicon and aluminum ions have tetrahedral coordination with repsect to oxygen, while aluminum, ferrous and ferric iron, magnesium, chromium, lithium, manganese, and other ions have octahedral coordination with respect to oxygen or to hydroxyl groups. Exchangeable cations may be on the surfaces of the silicate layers, in an amount determined by the excess negative charge within the composite layer. These cations usually are calcium and sodium, but may also be potassium, magnesium, hydrogen, aluminum, etc. The most common clay minerals belong to the kaolinite, montmorillonite, attapulgite, and illite (or hydromica) groups. Mixed-layer clay minerals are either randomly or regularly interstratified intergrowths of two or more clay minerals. *A.G.I.*

clay mortar-mix. Finely ground clay used as a plasticizer for masonry mortars. *ACSG, 1963.*

claypan. a. Aust. A shallow silted depression in which water collects after it rains. *Webster 3d.* b. A stratum of stiff, compact, relatively impervious clay which is not cemented and, if immersed in water, may be worked into a soft plastic mass. It differs from hardpan. *Stokes and Varnes, 1955.*

clay parting. a. Clayey material bound between a vein and its wall. Also called casing; parting. *Fay.* b. Seams of hardened carbonaceous clay between or in beds of coal. *Hess.*

claypit. a. A sump in which a drilling mud is mixed and stored. *Long.* b. A pit or sump in which the return fluid from the borehole is collected and stored for recirculation. *Long.* c. A pit where clay is dug. *Fay.*

clay plug. A sediment with much organic muck deposited in a cutoff river meander. *A.G.I. Supp.*

clay pocket. A clay-filled cavity in rock; a mass of clay in rock or gravel. *See also* clay hole. *Hess.*

clay press. A press used to squeeze water out of slip, which is then dried and ground. *C.T.D.*

clay products glazer. One who dips shaped or molded clay products into a glaze solution that makes a hard shiny surface when subjected to high temperatures in a kiln. *D.O.T. 1.*

clay puddle. A plastic material produced by mixing clay with about one-fifth of its weight of water used to provide a watertight blanket, employed for lining canals or in the cutoff walls of dams. *Ham.*

clay puddler. *See* batch mixer. *D.O.T. 1.*

clay pugger. *See* pug-mill operator. *D.O.T. 1.*

clay, purified. Dry, powdered clay from which natural impurities have been removed by any of the various clay beneficiation methods. *Enam. Dict.*

clay rag. Glouc. Stone found in claypits. *Arkell.*

clay rock. A rock composed of fine, argillaceous, detrital material and chiefly that derived from the decompoistion of feldspars; indurated clay, sufficiently hardened to be incapable of using as a clay without grinding, but not chemically altered or metamorphosed. Also called clay stone. *Fay.*

clay sampler. A special tool for obtaining laboratory samples of clay. *Ham.*

clay sapropel. Clay deposit containing sapropel. *Tomkeieff, 1954.*

clay seam. A seam of clay in rocks; also, may be a fault gouge. *Bureau of Mines Staff.*

clay shale. Shale composed wholly or chiefly of argillaceous material. *Fay.*

clay shredder. A unit for the preliminary preparation of plastic clay. The machine consists of a hopper with a flat or conical base; adjustable knives operate from a vertical, central, rotating shaft. The clay falls from the shredder through slots in the casing. *Dodd.*

clay size. That portion of the soil or of sediments that is finer than 0.002 millimeter or finer than 0.005 millimeter in some instances. *ASCE P1826.*

clay slate. a. Slate derived from shale. *A.G.I. Supp.* b. Very hard consolidated shale. *A.G.I. Supp.* c. A variety of slate, the cleavage planes of which lack the luster found in slates, and thus approach phyllite. The term also distinguishes argillaceous slates from slates derived from volcanic ash. *Holmes, 1928.*

clay soil. A fine-textured soil that forms very hard lumps or clods when dry. When dry clay soil is pinched out between the thumb and fingers, it will form a long flexible ribbon. *Stokes and Varnes, 1955.*

clay soils. *See* sedimentation test. *Ham.*

Clayspar. Trade name for a siliceous raw material occurring in Scandinavia and containing approximately 95 percent SiO_2, 2.5 percent Al_2O_3, 1.5 percent K_2O, and 0.5 percent Na_2O. *Dodd.*

clay sponge. *See* ceramic sponge. *Bennett 2d, 1962 Add.*

clay-spray cutter. One who trims colored bands painted on surface of green ware to specified thickness by rotating ware on wheel and cutting away excess band, using carbide cutting tool. *D.O.T. Supp.*

clay stains. Yellowish-brown or rust-colored films from deposits of clay minerals. *Skow.*

clay state. A pottery article is in the clay state when it is shaped but not yet fired. *Rosenthal.*

clay stone. a. Aust. A soft, earthy, feldspathic rock occurring in veins and having the appearance of indurated clay. *Fay.* b. One of the concretionary masses of clay frequently found in alluvial deposits, in the form of flat rounded disks either simple or variously united so as to give rise to curious shapes. They are sometimes almost as regular as if turned in a lathe. *Fay.* c. In spite of the several meanings, the term is a good one and should be retained as applicable to indurated clay in the same sense as sandstone is applicable to indurated or cemented sand. The application of the term to concretionary bodies should be abandoned and these things given the correct name. The application to a partially weathered feldspathic igneous rock should also be given up. *A.G.I.*

clay stone porphyry. An old and somewhat indefinite name for those porphyries whose naturally fine groundmass is more or less kaolinized, so as to be soft and earthy, suggesting hardened clay. *Fay.*

clay substance. Does not exist in nature and is a term used by ceramists for ceramic calculations, designating theoretically pure clay. *Rosenthal.*

clay temperer. *See* millman; wet-pan operator. *D.O.T. 1.*

clay thrower. *See* thrower. *D.O.T. 1.*

clay vein. a. Structural features occurring most frequently in areas where the coal is folded to the extent that there are well-developed fractures and face cleats. A clay underlying the seam where there is considerable overburden is squeezed into these voids. Where there features assume any considerable linear extent, they resemble veins. Also called dirt slips. *Kentucky, p. 24.* b. Clay filling of a fracture in a coalbed, usually from the roof but may be from the floor. Ranges from a filmlike trace to many feet in thickness and may extend laterally for several hundred feet. May act as a barrier to migration of water and gases, such as methane. The source material of the clay filling is sedimentary in origin. *Bureau of Mines Staff.* c. A body of clay, usually roughly tabular in form like an ore vein, that fills a crevice in a coal seam. It is believed to have originated where the pressure was high enough to force clay from the roof or floor into small fissures and in many instances, to alter and to enlarge them. Also called horseback. *A.G.I.*

clay ware. a. Potter's term for shaped pottery before firing. *Rosenthal.* b. Everything made of clay. *Rosenthal.*

clay wash. a. A deposit of clay transported and deposited by water. *Bureau of Mines Staff.* b. The agitation of an oil with fuller's earth or some other clay to improve the color or odor of the oil. *Porter.* c. A thin emulsion of clay and water, sometimes used to strengthen the face of the mold. *Freeman.* d. Clay thinned with water and used for coating gaggers and flasks. *Crispin.*

clay washer. *See* clay maker. *D.O.T. 1.*

clay-water pastes, yield point. *See* yield point. *ACSG, 1963.*

clay winning. The mining and processing of clay raw materials. *ACSG, 1963.*

clay with flints. A deposit of mixed chalk flints and clay in England that lies directly on the Chalk in many areas and is often seen in potholes or in pipes. It is usually ascribed to the effect of solution-weathering on the Chalk, but in many instances, there may be an additional admixture of Tertiary materials. The clay is reddish or brown, very tenacious, and often nearly black at the base of the deposit, becoming lighter and more sandy higher. Unfortunately, the term has been loosely applied to almost all the clay-flint drift deposits that rest on the Chalk. *Holmes, 1928.*

clay worker. *See* blunger loader. *D.O.T. 1.*

clead. Eng. To cover with planks. *Fay.*

cleading. A lining or covering of boards, planks, battens, or nonconducting material (as for lining a ship's cabin or a mine shaft or for insulating a boiler or engine cylinder); lagging. *Webster 3d.*

clean. a. N. of Eng. Free from firedamp or other noxious gases. *Fay.* b. A coal seam free from dirt partings. *Fay.* c. A diamond or other gem stone free from interior flaws. *Hess.* d. A borehole free of cave or other obstructing material. *Long.* e. To remove cave or other obstructing material from a borehole. *Long.* f. A mineral virtually free of undesirable nonore or waste-rock material. *Long.* g. Empty. *Long.* h. Free of foreign material. In reference to sand or gravel, means lack of binder. *Nichols.* i. To undergo or perform the process of cleaning; to clean up; to make a cleanup. *Webster 3d.*

Clean Air Act. An Act which became part of Great Birtain's national legislation in July 1956, although its main provisions did not become effective until June 1, 1958. Its objective is to reduce atmospheric pollution to acceptable limits. Inter alia, it empowers local authorities to declare smoke control areas in which the emission of any smoke from chimneys will constitute an offense. *See also* chimney; coal smoke; grit; smoke. *Nelson.*

clean bomb. A nuclear bomb that produces relatively little radioactive fallout. *L&L.*

clean cutting. A rock formation, the cuttings of which do not tend to mud up on the face of a diamond- or other-type bit. *Long.*

clean cuttings. Rock cuttings that do not ball or adhere to the walls of the borehole; also, rock cuttings not contaminated by cave material or drill-mud ingredients *Long.*

cleaned coal. Coal produced by a cleaning process (wet or dry). *B.S. 3552, 1962.*

cleaner. a. Scot. A scraper for cleaning out a shothole. *Fay.* b. One who selects best grades of asbestos filter that have been separated from rock, and picks out all foreign matter. *D.O.T. 1.* c. A solution, usually alkaline, used to remove oil, grease, drawing compounds, and loose dirt from metal as a step in preparing the surface for porcelain enameling. *ASTM C286-65.* d. A substance used to remove soil from metal parts prior to pickling. *ACSB-3.*

cleaner cells; recleaner cells. Secondary cells for the retreatment of the concentrate from primary cells. *B.S. 3552, 1962.*

cleaning plant. *See* coal washer, b; preparation plant. *Pryor, 3.*

cleaner man. One who operates a battery of cleaner jigs that separate the coarser grains of ore from the finer particles by agitation and screening in water. *D.O.T. 1.*

cleaners. Materials that are used in the porcelain enameling industry to clean the metal are usually alkaline and can be divided into groups as follows: (1) cleaning by chemical action, as with caustic soda; (2) cleaning by emulsification, as with soaps; and (3) cleaning by mechanical action, as with insoluble abrasive materials. *Lee.*

cleaners-up. The men employed in removing the debris from the cut made by a longwall coal-cutting machine. Synonymous with gummer. *TIME.*

clean hole. A borehole free of cave or other obstructing material. *Long.*

cleaning. a. The retreatment of the rough concentrate to improve its quality. *Pryor, 4, p. 816.* b. The process of removing oil, shop dirt, and drawing compounds from sheet iron parts prior to pickling. This is usually accomplished by submerging the ware in a boiling solution of alkalies compounded under various trade names. Oil and grease solvents are sometimes used, but must be followed by a boiling alkaline bath treatment. *Hansen.* c. The removal of grease or other foreign material from a surface. *Lowenheim.* d. A general term for the methods and processes of separating dirt from coal, or gangue from mineral. *See also* coal-preparation plant; roughing. *Nelson.*

cleaning, coal. The treatment of coal to lower the mineral matter (ash) content. *B.S. 3552, 1962.*

cleaning, dry. The mechanical separation of impurities from coal by methods which avoid the use of a liquid. *B.S. 3552, 1962.*

cleaning of coal at the face. Means the removal of a visible impurity. *Mitchell, p. 221.*

cleaning solution. For laboratory glassware, mixed sulfuric acid (concentrated) and saturated sodium dichromate solution in ratio 100/1. *Prpor, 3.*

cleaning, wet. The mechanical separation of impurities from coal by methods involving the use of a liquid. *B.S. 3552, 1962.*

cleanout. a. To remove cave or other obstructing material from a borehole. *Long.* b. A port or opening provided in the body or base of a machine or other mechanism through which accumulated debris may be removed. *Long.*

cleanout auger. *See* cleanout jet auger. *Long.*

cleanout driller. In petroleum production, one who cleans out cave-ins of old wells, using a special string of tools attached to cable. He removes, cleans, and resets screens or liners, used to exclude sand and rock and prevent caving of oil- or gas-bearing strata at the bottom of the well. Also called cleanout man; fisherman; well cleaner. *D.O.T. 1.*

cleanout jet auger. An auger equipped with water-jet orfices designed to clean out collected material inside a driven pipe or casing before taking soil samples from strata below the bottom of the casing. Also called cleanout auger; M.P.F.M. jet auger. *Long.*

cleanout man. *See* cleanout driller. *D.O.T. 1.*

cleanout tooldresser. In petroleum production, one who sharpens, tempers, and repairs the tools used in cleaning out oil or gas wells. *D.O.T. 1.*

cleanser; clanser. Eng. An iron tube or shell, with which a borehole is cleaned. *Fay.*

cleansing. S. Staff. Clearing and making fit for traversing old gate roads; carrying out cuttings from the mine; clearing the sumps at bottom of shafts. *Fay.*

clean toe. A sufficient shattering of the material that constitutes the toe to make its entire removal possible without excessive secondary blasting. *Compare* toe, c and d. *Fay.*

cleanup. a. The operation of collecting all the valuable product of a given period of operation in a stamp mill, or in a hydraulic or placer mine. *Fay.* b. The valuable material resulting from a cleanup. *Fay.* c. To load out all the coal a miner has broken. *Fay.* d. An opportunity to clean up. *Fay.* e. The cleanup of sluices in placer mining is a similar process which occurs daily or more often. The gold, tin, or other concentrate is shoveled out for further treatment. *Nelson.* f. To police and tidy up drill and premises around a drill rig. *Long.*

cleanup barrel. One used to batch grind and then amalagamate gold-bearing concentrates and hesidues. *Pryor, 3, p. 87.*

cleanup man. a. The man who performs the operation described under cleanup, a *Fay.* b. *See* wasteman. *D.O.T. 1.*

cleap. A cleaving crosswise of the bedding in a coal seam: a cleat. *Standard, 1964.*

clear. a. Translucent diamonds with few visible spots or flaws. *Long.* b. Water that has not been recirculated in drilling and hence is free of drill cuttings and sludge. Also applied to return water when it contains little or no entrained cuttings or sludge. *Long.* c. A safe working place. *Long. See also* clean, a and b.

clearance. a. The space between the top or side of a car and the roof or wall. *Fay.* b. Technically, the annular space between downhole drill-string equipment, such as bits, core barrels, casing, etc., and the walls of the borehole with the downhole equipment centered in the hole. Loosely, the term is commonly and incorrectly used as a synonym for exposure. *See also* exposure, a. *Long.* c. The amount of open space around a drill or piece of mining equipment in an underground workplace. *Long.* d. The gap or space between two mating parts. *ASM Gloss.* e. Space provided between the relief of a cutting tool and the surface cut. *ASM Gloss.*

clearance angle. The angle between a plane containing the flank of the tool and a plane passing through the cutting edge in the direction of relative motion between the cutting edge and work. *ASM Gloss.*

clearance space. A space in pumps of the piston and ram types, usually quite small, between the cylinder end and the piston at the end of its stroke. The height to which water can be raised on the suction side is influenced by the volume of this space. *Mason, V. 2, p. 164.*

clear ceramic glaze. The same as ceramic color glaze except that it is translucent or slightly tinted with a gloss finish. *ACSG, 1963.*

clear ceramic glazed tile. Facing tile whose surface faces are covered by an inseparable, fire-bonded, translucent, or tinted ceramic glaze of lustrous finish. *ASTM C43-65T.*

clear clay. A clay such as kaolin that is free from organic matter and so does not give rise to bubbles if used in a vitreous enamel; such clays are used in enamels when good gloss and clear colors are required. *Dodd.*

clearer. a. Eng. Miners who undercut the coal, working at distances of 3 or 4 yards apart along the face. *Fay.* b. A reservoir (in saltmaking) into which bring is conveyed. *Fay.*

clear frit. A frit that remains essentially transparent or nonopaque when processed into a porcelain enamel. *ASTM C286-65.*

clear glaze. A colorless or colored transparent ceramic glaze. *ASTM C242-60.*

clearing. The removal of all standing growths, whether of bushes or of trees. *Carson, p. 88.*

clearing and grubbing. Removal of tree stumps before excavation starts on a construction site. *Ham.*

clearing hole. A hole drilled to a slightly larger diameter than the bolt passing through it. The clearance for black bolts is normally one-sixteenth of an inch. *Ham.*

clear melting. The process of keeping the glass in a molten condition for a time sufficient to permit the impurities or uncombined substances to settle. *Fay.*

clear mica. Transparent muscovite without stains and with a smooth surface in reflected light. *Bureau of Mines Staff.*

clear span. The clear unobstructed distance between the inner extremities of the two supports of a beam. This dimension is always less than the effective span. *Ham.*

clear water reservoir. *See* service reservoir. *Ham.*

cleat. a. Main joint in a coal seam along which it breaks most easily. Runs in two directions, along and across the seam. *Pryor, 3.* b. A small piece of wood nailed to two planks to keep them together, or nailed to any structure to make a support for something else. *Fay.* c. Eng. A wooden wedge four or five inches square placed between the top of a post and the underside of a bar or cap. *Fay.* d. Eng. A piece (or pieces) of wood fastened to pump spears for the purpose of steadying them, and preventing them from wearing where they pass through the collaring, and to prevent the edges of the spear plates and bolts from injuring the pumps. *Fay.* e. An attachment fastened to the conveying medium to act as a pusher, support, check or trip, etc., to help propel material, parts or packages along the normal path of conveyor travel. May be of various sizes and shapes to suit the application. *ASA MH4.1-1958.* f. Systems of joints, cleavage planes or planes of weakness found in coal seams. The more pronounced points are called face cleats and are normally parallel to the line or direction of regional folding. It is common for a set of joints, which are approximately parallel cracks or fissures a few inches apart, to occur though not as well developed and usually nearly at right angles to the face cleats. These are known as butt cleats. *Kentucky, p. 23.* g. Coal seams are usually intersected by a series of inclined joints which are often well developed. These joints have received distinctive names, such as cleat or slips though bord is sometimes employed. Usually there are two distinct systems of joints coursing at roughly right angles to each other. The term cleat or face cleat is applied to the major joints and end cleats to the minor joints. *Nelson.* h. Joints in coal more or less normal to the bedding planes. *B.S. 3618, 1964, sec. 5.* i. *See* clamp. *B.S. 3618, 1963, sec. 4.*

cleat spar. York. Crystalline mineral matter, often ankerite, occurring in the cleat cracks of coal. *Arkell.*

cleavage. a. In mineralogy, the property possessed by many minerals of being rather easily split parallel to one or more of the crystallographic planes characteristic of the mineral. *Fay.* b. A tendency in rocks to cleave or to split along definite, parallel, closely spaced planes which may be highly inclined to the bedding planes. It is a secondary structure, commonly confined to bedded rocks, developed by pressure, and ordinarily accompanied by at least some recrystallization of the rocks. Cleavage should not be confused with the fracturing of rocks, which is jointing. *See also* joint, a. *Fay.* c. In quarrying, the cleavage of rocks is often called the rift. *Nelson.* d. A fragment of a crystalline substance, such as a diamond produced by cleaving. *Long.* e. Severance of glass; usually the final separation resulting from scoring with a glasscutter. *Kinney.*

cleavage banding. A compositional banding that is parallel to the cleavage rather than to the bedding. It results from the mechanical movement of incompetent material, such as argillaceous rocks, into the cleavage planes in a more competent rock as sandstone. Ordinarily, the argillaceous bands are only a few millimeters thick. *See also* segregation banding. *A.G.I.*

cleavage fracture. A fracture, usually of a polycrystalline metal, in which most of the grains have failed by cleavage, resulting in bright reflecting facets. It is one type of crystalline fracture. Contrast with shear fracture. *ASM Gloss.*

cleavage plane. a. The crystallographic plane, which can be likened to the grain in wood, along which a crystalline substance, such as diamond, may be split easily. *See also* cleavage, d. *Long.* b. Any uniform joint, crack, or change in quality of formation along which rock will break easily when dug or blasted. *Nichols.* c. The plane along which the cleavage takes place. *Fay.*

cleavages. As used by the diamond-cutting and diamond-bit-setting industries, the more or less flat diamond fragments produced by splitting a crystalline diamond along the octahedral plane. Such fragments are used primarily as a material from which special-shaped, diamond-pointed cutting tools are produced. *Long.*

cleavage stepping. Small, sharp, subparallel monoclinal flexures that distort the cleavage face into a series of broad low steps. *Skow.*

cleavage structure. A structure, within a single grain or crystal, resulting from mineral cleavage. *Schieferdecker.*

cleavage way. Rift; first way; reed. *Arkell.*

cleave. a. Scot. One of two or more divisions of a seam, usually ironstone. *Fay.* b. To split a crystalline substance, such as a diamond, along a cleavage plane. *Long.*

cleavelandite. A white, lamellar, variety of albite. *Dana 17.*

cleaves. Eng. Soft red sandstone of the New Red Sandstone formation, Radstock district. *Arkell.*

cleaving. Splitting a crystal along a cleavage plane. *Hess.*

cleavings. Eng. Divisions of beds of coal, in the direction of the laminae, either horizontal or inclined. *Fay. See also* composite seam.

cleaving way. Corn. A direction parallel to the bedding planes of a rock. *Compare* quartering way. *Fay.*

cledge. Eng. A clay or stiff loam; also, the upper stratum of certain beds of fuller's earth. *Webster 2d.*

cleek. a. Scot. To load cages at the shaft bottom or at midworkings. *Fay.* b. Scot. A haulage clip. *Fay.*

cleek coal. Scot. Coal as it comes from the mine. *See also* run-of-mine. *Fay.*

cleeksman; cleekie. Scot. An early term for the person who unhooked the baskets of coal at the shaft mouth. *Fay.*

cleet. Derb. *See* cleat, c. *Fay.*

Clerici solution. A molecular mixture of thallium malonate and thallium formate. Used as a heavy solution for the separation of minerals. The solution has a maximum density of 4.25 at 20°C. It is prepared by adding to one of two equal quantities of thallium carbonate, formic acid and to the other malonic acid until each is neutralized. The two solutions are then mixed, filtered and evaporated until almandite floats. *Hess.*

cleve. Eng. A steep hillside; a cliff. *Standard,* *1964.*

cleveite. A variety of uraninite containing a large percentage of UO_3, and also rich in helium. Contains about 10 percent of the yttrium earths. *Fay.*

Cleveland iron ore. Same as Cleveland ironstone. *Bureau of Mines Staff.*

Cleveland ironstone. A sandy oölitic siderite bed of Lias age, mined for iron in the Cleveland district of Yorkshire, England. The ore is said to have averaged about 30 percent iron. *Hess.*

clevis. a. In coal mining, a spring hook or snap hook used to attach the hoisting rope to the bucket. Also called clivvy. *Pryor, 3.* b. A U-shaped iron used with an iron pin for connecting ropes to the drawbars of cars or, when used with iron links, for coupling cars together. *Jones.* Also used as a connecting link between chains or lines or to hang a sheave in a drill tripod or derrick. *Long.*

cliachite. a. A ferruginous bauxite from Cliache, Dalmatia, Yugoslavia. *English.* b. Colloidal aluminum hydroxide occurring as one of the constituents of bauxite. *See also* sporogelite. *English.*

cliff. a. Wales. Shale which is laminated, splitting easily along the planes of deposition. *See also* bind, a. *Fay.* Also called clift. *Fay.* b. A very steep, perpendicular, or overhanging face of rock, earth, or glacial ice of considerable height. *Webster 3d.* c. The strata of rocks above or between coal seams. *Standard, 1964.* d. A high, steep face of rock, formed at the seacoast. Also called seacliff. *Schieferdecker.*

cliff corniche. *See* cliff overhang. *Schieferdecker.*

cliffed coast. A coast formed by cliffs. *Schieferdecker.*

cliff glacier. A glacier which occupies a relatively small depression in the side of a mountain or in the escarpment of a plateau. *Fay.*

cliff overhang; cliff corniche. The sapped part of a cliff above the wavecut notch. *Schieferdecker.*

cliffstone. A hard chalk found in England and used in paint, as a filler for wood, and in the manufacture of rubber. *Bureau of Mines Staff.*

cliffstone Paris white. A special grade of whiting made from a hard grade of English chalk. *CCD 6d, 1961.*

clift. a. A cliff. *Standard, 1964 See* also cliff, b. *Fay.* b. S. Wales. A general term used to describe many types of shale. *Nelson.* c. A strong, usually silty mudstone. Obsolete. *B.S. 3618, 1964, sec. 5.*

clift quar. a. S. Wales. A hard, sandy shale. *Nelson.* b. A banded or nonbanded siltstone. *Nelson.*

climate. a. The average course or condition of the weather at a particular place over a period of many years as exhibited in absolute extremes, means, and frequencies of given departures from these means, of temperature, wind velocity and direction, precipitation, and other weather elements. *Bureau of Mines Staff.* b. The prevailing set of conidtions (as of temperature, humidity, or freshness of atmosphere) in any place. *Webster 3d.* c. Climate has a profound effect on such geological processes as weathering, stream erosion and deposition, eolian erosian and deposition, glaciation, soil formation and removal, coal formation, and some ore deposition and concentration. *Bureau of Mines Staff.* d. Of pulp undergoing froth flotation, the prevailing balance of chemical energy reached by the reacting electrical, physical, and chemical forces. *Pryor, 4.*

climatic peat. Peat produced through the action of climate in a definite zone of the earth. Climatic peat deposits are subdivided into blanket moss and hill (sub-Alpine) peat. *Tomkeieff, 1954.*

climb. The tendency of an inclined diamond-drill hole to follow an upward-curving, increasingly flat course; also, the tendency of a diamond or other rotary-type bit to drill a hole curved in the updip direction when holes are drilled in alternating hard- and soft-layer rock having bedding planes that cross the borehole at an angle other than 90° to the face of the bit. *Long.*

climb cutting. Analogous to climb milling *ASM Gloss.*

climbing forms. A type of formwork used for the construction of reinforced concrete walls for buildings. The formwork is jacked up from bars anchored in the concrete, which is poured continuously until completion of the work. *See also* moving forms. *Ham.*

climbing ripples. Cross-lamination produced by superimposed migrating ripples. *Pettijohn.*

climb milling. Milling in which the cutter moves in the direction of feed at the point of contact. *ASM Gloss.*

clinch; clink bolts. Eng. Crossbolts under spear bolts to prevent the pump rods from stripping. *Fay.*

clink basalt. Ire. Porphyry. *Arkell.*

clinker. a. Term used among British miners for coal altered by an igneous intrusion. *Tomkeieff, 1954.* b. Eng. A compact, marly, whitish stone, very good for lime burning; has a glistening fracture. *Arkell.* c. Eng. Ferruginous concretions in the Lower Greensand, often so compact as to ring under the hammer, and then called clinkers by the quarrymen. *Compare* sun bed. *Arkell.* d. Generally a fused or partly fused byproduct of the combustion of coal, but also including lava and portland cement clinker and partly vitrified slag and brick. *ACSG, 1963.* e. Rough, jagged, scoriaceous, spinose fragments of lava, usually of basic composition and typically found on the surface of a lava flow. *A.G.I.* f. Vitrified or burnt matter thrown up by a volcano. *Fay. g.* The agglomerated semivitrified and mainly inorganic residue of the combustion of solid fuel. *B.S. 3323, 1960.* h. A scale of black oxide of iron formed when iron is heated to redness in open air. *Fay.* i. A hard, burnt paving brick used in Holland. *Arkell.*

clinker bar. A bar fixed across the top of an ashpit for supporting the rods used for clearing the fire bars. *Fay.*

clinker brick. A very hard-fired brick, fired nearly to the point of complete vitrification and whose shape is somewhat distorted or bloated. *ACSG.*

clinkered dolomite. *See* double-burned dolomite *A.R.I.*

clinkering zone. That part of a cement kiln which is in the temperature range (1,350° to 1,600° C) in which the constituents react to form the clinker. *Dodd.*

clinkertill. Proposed for boulder clay baked by the burning of lignite beds. *Hess.*

clinks. Internal cracks formed in steel by differential expansion of surface and interior during heating. The tendency for these to occur increases with the hardness and mass of the metal, and with the rate of heating. *C.T.D.*

clinkstone. A feldspathic rock of the trap family, usually fissile, and is sonorous when stuck with a hammer. *See also* phonolite. *A.G.I.*

clinoamphibole. A group name for the monoclinic amphiboles. *English.*

clinoaugite. A collective name for the monoclinic pyroxenes. *English.*

clinoaxis. The inclined lateral axis in the monoclinic system, designated *a. A.G.I.*

clinochlore. A mineral member of the chlorite group, composition approximately $(Mg,Fe'')_4A1_2(A1_2Si_2)0_{10}(OH)_8$; monoclinic. *A.G.I.*

clinochrysotile; orthochrysotile. Monoclinic and orthorhombic forms of chrysotile, as determined by X-rays. *Spencer 20, M.M., 1955.*

clinoclase. A basic copper arsenate, $4[Cu_3AsO_4(OH)_3]$. *See also* clinoclasite. *Fay; Hey 2d, 1955.*

clinoclasite. A hydrous copper arsenate, $Cu_3As_2O_8.3Cu(OH)_2$ or $6CuO.As_2O_5 3H_2O$. Color, internally, a dark verdigris green; externally, a blackish blue-green; it crystallizes in the monoclinic system. *Fay.*

clinoenstatite. A monoclinic variety of pyroxene. Crystals elongated, parallel to C axis. Typically magnesium metasilicate, $MgSiO_3$, that is, with the composition of enstatite, but grading, by substitution of increasing quantities of iron, into clinohypersthene, $MgFe(SiO_3)_2$. *English.*

clinoenstenite. Winchell's name for the isomorphous series, $MgSiO_3FeSiO_3$, of monoclinic pyroxenes, comprising clinoenstatite and clinohypersthene. *Compare* enstenite. Occurs in meteoric stones. *English.*

clinoferrosilite. a. The colorless or faintly yellow iron metasilicate, $FeSiO_3$, end member of the monoclinic pyroxene series, containing up to 15 percent of the molecule $MgSiO_3$. Occurs as minute needles in obsidian. From Africa; Wyoming; California; Iceland. *English.* b. A dimorph of ferrosilite. *Dana 17.*

clinograph. An instrument for making a borehole survey, that is, to determine if, and in what direction, a borehole has deviated off the true vertical plane. *See also* crooked hole. *Nelson.*

clinoguarinite. Cesaro's name for a monoclinic form of guarinite. *See also* orthoguarinite. *English.*

clinohedrite. a. Breithaupt's name for tetrahedrite. *English.* b. A colorless to white, amethystine basic silicate of zinc and calcium, $H_2ZnCaSiO_5$; monoclinic; clinohedral crystals. From Franklin, N.J. *English.*

clinohumite. A member of the chondrodite group, $Mg_9(SiO_4)_4(F,OH)_2$; monoclinic. *Dana 17.*

clinohypersthene. A monoclinic dimorphous form of hypersthene. Typically, magnesium-iron metasilicate, $MgFe(SiO_3)_2$. *English.*

clinometer. An apparatus for measuring vertical angles. It consists of a pendulum or spirit level and a circular scale, and is to be used with a steel chain or rope by which it can be suspended between points of different elevation. *Jones.* b. A borehole-surveying device consisting of a rubber-stoppered, glass culture tube partially filled with a dilute solution of hydrofluoric acid enclosed in a watertight brass or steel container, the upper end of which is equipped with box threads fitting the pin thread of a drill-rod coupling. When attached to the lower end of a line of drill rods and suspended at a point in a borehole approximately 1 hour, the acid etches the inside of the glass tube, forming what appears to be a line where the upper surface of the acid is in contact with the tube. The inclination of that line is measured and with necessary connections for capillarity indicates the dip of the borehole at the point where the clinometer was suspended. In addition to the above end or plain type, there is the line clinometer and a special type used with the Hall-Rowe wedging device. *Long.*

clinometer case. The watertight brass or steel tube encasing an acid bottle used in determining inclination of a borehole by an acid-dip survey. *See also* clinometer, b. Also called body; clinometer shell. *Long.*

clinometer rule. A simple angle-measeuring device consisting of a folding rule, the two arms of which are attached to either side of a graduated hinge member and one arm of which is equipped with a small spirit level. Also called angle rule; degree rule. *Long.*

clinometer shell. Synonym for clinometer case. *Long.*

clinophone. An exceptionally accurate instrument for borehole surveying, designed particularly for use with the freezing and cementation methods of shaft sinking, capable of giving the slope of a borehole to within one minute of arc. *Ham.*

clinoptilolite. A hydrous silicate of aluminum, calcium, sodium, and potassium, $(Ca,Na_2,K_2)O.Al_2O_3.10SiO_2.7H_2O$; tabular crystals; monoclinic. A dimorphous form of ptilolite. Identical with crystallized mordenite from Hodoo Peak, Wyo. *English.*

clinopyroxene. A collective name for the monoclinic pyroxenes. *English.*

clinosklodowskite; klinosklodowskit. A mineral, $Mg(H_3O)_2[UO_2SiO_4]_2.3H_2O$, monoclinic; as distinct from sklodowskite, $Mg[UO_2SiO_3OH]_2.5H_2O$, orthorhombic (?). *Spencer 21, M.M., 1958.*

clinostrengite. A mineral, $Fe'''Po_4.2H_2O$, monoclinic, dimorphous with orthorhombic strengite. Synonym for phosphosiderite; metastrengite. *Spencer 19, M.M., 1952.*

clinoungemachite. A mineral, monoclinic; pseudorhombohedral. Visibly indistinguishable from ungemachite, but material insufficient for chemical analysis. From Chuquicamata, Chile. *English.*

clinovariscite. A mineral, $AlPo_4.2H_2O$; monoclinic. Dimorphous with orthorhombic variscite. Synonym for metavariscite. *Spencer 19, M.M., 1952.*

clinozoisite. An epidote having the composition of zoisite, $Ca_2Al_3(SiO_4)(Si_2O_7)(OH)$; monoclinic; crystals striated. *Dana 17.*

clint. a. A bare, level surface developed on horizontal beds of limestone. *A.G.I.* b. A hard or flinty rock; a rocky cliff; a projecting rock or ledge. *Webster 3d.*

Clintonian. Lower Middle Silurian. *A.G.I. Supp.*

clintonite. Synonym for seybertite; also used as a group name for the brittle micas. *Hey 2d, 1955.*

Clinton limestones; Clinton shales. The Middle Niagara series, well-exposed in the Niagara gorge section and locally including a bedded iron ore at the base, which supplies the ironworks at Birmingham, Ala. *C.T.D.*

Clinton ore. A red, fossiliferous iron ore of the Clinton formation of the East-Central United States, with lenticular grains. Also called flaxseed ore and fossil ore. *Standard, 1964.*

clip. a. A device similar to a clamp but smaller and for the same purpose. *Zern.* b. A hook for attaching a bucket to a cable. *Hess.* c. Connector between underground tub, car, truck, tram, and endless rope haulage; operated by clipper. A clip pulley has a broad rim into which studs are set, to grip links of haulage chain. *Pryor, 3.* d. Synonym for cable clamp; clamp. *Long. See also* haulage clip; automatic clip; coupling; clam. e. The portion of a brick cut to length. *ACSG, 1963.*

clip and shave. In forging, a dual operation in which one cutting surface in the clipping die removes the flash and then another shaves and sizes the piece. *ASM Gloss.*

clip method. The clip method of making wire rope attachments is widely used. Drop forged clips of either the U-bolt or the double-saddle type are recommended. When clips of the correct size are properly applied, the method develops about 80 percent of the rope strength. *ASA M11.1-1960, p. 24.*

clipper. a. Eng. A hook for attaching the bucket to the cable. Used in shaft sinking. *Fay.* b. In anthracite and bituminous coal mining, a laborer who engages and disengages the clips, grips, or links by which mine cars are attached to a hoisting cable or endless rope and hauled along inclines or flat grades. Also called chainer; grabman; gripman; gripper. *D.O.T. 1.*

clipper blast-drill operator. *See* churn-drill operator. *D.O.T. 1.*

clipper man. In the iron and steel industry, one who cuts end of skelp sheets (sheet steel for making pipe) to a tapered point and bends it into a cup shape by machine. *D.O.T. 1.*

clipper-off. Aust. A workman who unfastens the clip connecting a skip to a haulage rope. *Fay.*

clipper-on. Aust. A workman who fastens skips to a haulage rope with a clip. *Fay.*

clipping edge. That portion of a forging where the flash is trimmed off. *ASM Gloss.*

clip pulley. Eng. A wheel containing clips in the groove for gripping a wire rope. *Fay.*

clip screws. *See* antagonizing screws. *Pryor, 3.*

clip tile. Tile designed as a base for steel I-beams. The unit fits around the flanges of the beam. *ACSG, 1963.*

clits. *See* lagging; lid; wedge. *Nelson.*

clive. Derb. *See* cliviss. *Fay.*

clives. Som. Fissile slate clay, that is, shale. shale. Also called cliff; coal clives. So called because of its easy cleavage. *Arkell.*

cliviss. Eng. A bit of turned iron, with a spring, for fastening a bucket to a rope. Also called clive, clivvy. A variation of clevis. *Fay.*

clivvy. Eng. *See* cliviss. A variation of clevis. *Fay.*

clo. A unit of clothing insulation defined as the insulation necessary to keep a sitting man comfortable in a normally ventilated room at 70° F and 60 percent relative humidity. In physical terms, it is equal to 42.7 British thermal units per square foot per hour. *Strock, 10.*

cloam; cloom. Old English clam; earth; clay. It survives in dialects as cloam, cloom, earthenware, and pottery. *Arkell.*

cloanthite. *See* chloanthite. *C.M.D.*

clob. a. Eng. Peaty earth, Berkshire. *Tomkeieff, 1954.* b. Corn. Clod or lump of earth. *Tomkeieff, 1954.*

clobbering. A term applied to the decoration of Chinese blue and white china with flowers, etc., painted in enamel and fired. *C.T.D.*

clock interval timer. A special timepiece designed to ring or give an alarm at specified intervals. Used widely in burning operations in enamel shops. *Enam. Dict.*

clod. a. Soft shale or slate, in coal mines, usually applied to a layer forming a bad roof. Also called clot. *Fay.* b. A "clod of dirt" of greater or less diameter; thin at the edges and increasing in thickness to the middle. *See also* kettle bottom. *Fay.* c. Applied by miners to loosely consolidated shale commonly found in close conjunction with a coalbed. *A.G.I.* d. Eng. Deposits interstratified with the coal, Yorkshire and Midland Counties. *See also* bat, g. *Nelson* e. A hard earthy clay on the roof of a working place in a coal seam, often a fire clay. *C.T.D.*

clod buster. A drag that follows a grading machine to break up lumps. *Nichols.*

clod coal. Scot. Strong homogeneous coal. *Fay.*

clod tops. Forest of Dean. Clay or shale beds overlying seams of coal. *Fay.*

cloisonné. A method of surface decoration in which differently-colored enamels or glazes are separated by fillets applied to the design outline. For porcelain enamel, the fillets are wire secured to the metal body, while for pottery and tile the fillets are made of ceramic paste, squeezed through a small diameter orifice. *ACSG, 1963.*

cloissone enamel. Porcelain enamel inlaid between partitions of bent copper or gold wire fillets attached to the base. Subsequent polishing of surface brings out the design of the enamel artist. In effect, the colors are separated by delicate filigrees of gold or copper. *Enam. Dict.*

clog. a. Mid. A short piece of timber about 3 by 6 by 24 inches fixed between the roof and a prop. *Fay.* b. A flat wedge over a post. *See also* lid, a. *Nelson.* c. To obstruct, hinder, or choke up; for example, the stoppage of flow through a pipe by an accumulation of foreign matter, or the filling up of the grooves in a file when operating on a soft metal. *Crispin.* d. Eng. Rock filling a fault. *Arkell.*

clog pack. York. *See* chock, a; nog, a. *Fay.*

close annealing. *See* box annealing.

close-burning coal. Coal which kindles quickly and melts and runs together like bitumen. *Tomkeieff, 1954.*

close-connected. Applied to dredges in which the buckets are each connected to the one in front without any intermediate link. *Fay.*

close couple. An expression used to indicate a very close integration between all phases which have an effect on an operation; this provides for maximum efficiency. *Austin.*

closed basin. A district draining into some depression or lake within its area, from which water escapes only by evaporation. *Webster 2d.*

closed circuit. a. A water circuit designed so that the only water added is that necessary to replace the loss in the washery products. *B.S. 3552, 1962.* b. In mineral dressing, a system in which ore passes from comminution to a sorting device which returns oversize for further treatment and releases undersize from the closed circuit. *Pryor, 4.*

closed-circuit grinding. A size reduction process in which the ground material is removed either by screening or by a classifier, the oversize being returned to the grinding unit. Typical examples are, a dry pan with screens, dry-milling in an air swept ball mill, and wet milling in a ball mill with a classifier. *Dodd. See also* circulating load.

closed-circuit operation. Retention and retreatment of ore in part of flow-line until it satisfies criteria for release. Used in comminution to reduce over-grinding by passing intermediate particles repeatedly through grinding systems, classifying the product and returning oversize. Used in concentration (for example. rougher-scavenger-cleaner flotation) to retain a selected fraction of ore in circuit for retreatment (a middling), until it is either upgraded to rank as concentrate or sufficiently denuded of value to be rejected as tailing. *Pryor, 3.*

closed-circuit television. System in which television cameras relay pictures of conditions at important points in the plant, thereby aiding shiftsmen to watch inaccessible places and exercise extended control. *Pryor, 3.*

closed contour. A contour line that is continuous on a map and does not intersect the edge of the arbitrary map area on which it is drawn. *Stokes and Varnes, 1955.*

closed cycle. Cycle of operation of a heat engine in which the same power fluid is used repeatedly, as a steam engine that condenses the steam for reuse, instead of being used once and then discarded, as in a rocket or jet motor. Also applicable to a cooling system in which the coolant is cycled repeatedly through the source of heat, itself being cooled in another part of the cycle. *Compare* open cycle. *NRC-ASA N1.1-1957.*

closed-cycle reactor system. A system in which the primary coolant flows to a heat exchanger and then recirculates through the core in a completely closed circuit. *L&L.*

closed dies. Forging or forming dies designed to restrict the flow of metal to the cavity within the die set, as opposed to open dies, in which there is little or no restriction to lateral flow. *ASM Gloss.*

closed fault. A fault in which the two walls are in contact. *A.G.I. Compare* open fault.

closed fold. A fold in which compressive stress was sufficient to bring the opposite sides in contact. *A.G.I.*

closed foliation. The foliae appear megascopically as a continuous felt of flakes or rods. *Schieferdecker.*

closed form. a. A crystal form that encloses a finite volume of space. *A.G.I.* b. A crystal form in which all the faces, having a like position relative to the planes of symmetry or the axes of symmetry, yield an enclosed solid. *Fay.*

closed frame. A mine support frame used especially in inclined shafts where protection is needed on all sides from rock pressure. This completely closed set is provided at the bottom with a sill. The joint is usually effected by tenons, so that when the pressure is exerted in a downward direction the timbers interlock. *Stoces, v. 1, pp. 150-151.*

closed front. An arrangement of the blast furnace without a forehearth. *Fay.*

closed joint; incipient joint. A joint found in rocks that causes a plane of weakness known variously as a rift or gain. This largely determines the shape of the blocks which may be extracted from a quarry. *BuMines Bull. 630, 1965, p. 877.*

closed-loop control. A system to control the speed of a winding engine. The principle makes use of two or more control quantities, utilizing their amplified difference as a feedback to the winder motor. The system can be applied equally well to alternating or direct current driven winders and is a step towards semiautomatic or fully automatic control. *See also* automatic cyclic winding. *Nelson.*

closed pass. A pass of metal through rolls where the bottom roll has a groove deeper than the bar being rolled and the top roll has a collar fitting into the groove, thus producing the desired shape free from flash or fin. *ASM Gloss.*

closed porosity. *See* porosity. *Nelson.*

closed pots. Fire-clay pots for melting glass with the top nearly closed to keep out the products of combustion and other impurities. *Mersereau, 4th, p. 328.*

closed pressure. The pressure on a gas well that has been closed long enough to attain a maximum. The time is usually about 24 hours, but is sometimes several days. The well must stay closed until the pressure does not increase more rapidly than 1 percent in 10 minutes. *Porter.*

closed season. That portion of the year when placers cannot be worked by reason of shortage of water, due to drought or cold. *Fay.*

closed-spiral auger. A soil-sampling auger made by spirally twisting a flat steel ribbon to form a tubelike, hollow-center, corkscrewlike device. *Long.*

closed system. *See* isochemical. *Challinor.*

closed top. *See* cup and cone. *Fay.*

closed traverse. A traverse whose accuracy can be checked by the fact that, when it is closed, the angles should add up to 360°, and which ends at its starting point. *Ham.*

closed-water circuit. The separation of solids from a washery slurry so that the water can be returned to the plant and used continuously. *Nelson.*

close goods. Pure stones, of desirable shapes; highest class of South African diamonds, as assorted at Kimberly. *Bureau of Mines Staff.*

close-grained. Having fine and closely arranged fibers, crystals, or particles. *Webster 3d.*

close in. a. To wall-in and roof-over the drill platform for protection of workers from rain and cold. *Long.* b. To shut off the flow, as from an oil, gas, or artesian well. *Long.*

close-jointed. Applied to rocks in which the joints are very close together. *Fay.*

close-joints cleavage. Synonym for strainslip cleavage. *A.G.I.*

close mold. A two-part flask filled by pouring through ingates. *Standard, 1964.*

close nipple. A nipple, the length of which is about twice the length of a standard pipe thread and is without any shoulder. *Strock, 3.*

close-packed hexagonal structure. An arrangement of atoms in crystals which may be imitated by packing spheres; characteristic of a number of metals. The disposition of the atomic centers in space can be related to a system of hexagonal cells. *C.T.D.*

close place. Scot. A narrow drift without a separate air return. *Fay.*

close-poling. The placing of poles or plank close together. *See also* poling, a. *Fay.*

close prospecting. Prospecting undertaken after the existence of payable ground is disclosed and localized by preliminary prospecting. It is undertaken for valuation purposes to determine (1) the cubic measurements of both overburden and gravel, (2) the estimation of the gold or other mineral contents, (3) the average value of the area in pence, cents, carats, or other unit, per cubic yard, and (4) all possible information regarding the nature of the overburden and gravel, that is, whether it is clayey, free wash, etc., as well as of the bedrock. *Griffith, S. V., pp. 2-3.*

close return bend. A short, cast or malleable iron, U-shaped fitting for uniting two parallel pipes. It differs from the open return bend in having the arms joined. *Porter.*

closer. The last brick or tile laid in a course; may be a whole unit or one that is shorter and usually appears in the field of the wall. *ACSG.*

close-ranged. Screened or classified between close maximum and minimum limits of size or settlement. *Pryor, 4.*

close sand. A sand so closely packed that it has low porosity and makes a poor oil reservoir. *Hess.*

close sheathing. Consists of planks placed side by side along a continuous frame. Its use is to prevent local crumbling of less compacted soils. Since crevices can exist between planks, it should not be used with fine silts or liquid soils, which can seep out through these cracks. *Compare* skeleton sheathing; tight sheathing. *Carson, p. 244.*

close sizing. a. In screening, choice of a series of sieve sizes which closing restricts the size range of each fraction of the material separated between its limiting and retaining mesh. *Pryor, 3.* b. Sizing with screens fairly close in size of aperture (mesh). *Pryor, 4.*

close work. a. Driving a tunnel or drifting between two coal seams. *Fay.* b. *Scot. See* narrow work, e. *Fay.*

closet suite. A suite of ceramic sanitary ware including the closet and the flushing cistern. *Dodd.*

close timbering. The setting of timber sets and lagging bark to bark or very close together when shaft sinking or tunneling through very loose ground or crushed coal in thick seams. *See also* cribbing; forepoling. *Nelson.*

closing apparatus. Eng. Sliding doors or other mechanical arrangement at the top of an upcast shaft for allowing the cages to pass up and down without disturbing the ventilation of the mine. *Fay.*

closing error. When calculating or plotting the distances, angles or coordinates of a closed traverse or one connecting two accurately located points, the discrepancy between starting and finishing point. This error is adjusted in proportion to the magnitude of angles and distances involved, if it is below a tolerable limit. *Pryor, 3.*

closing line; digging line. The cable which closes the jaws of a clamshell or orange-peel bucket. *Nichols, 2.*

closing rope. Operating rope for opening and closing a grab. *Ham.*

closing stock. Quantity on hand at end of an accounting period. Opening stock should be the closing stock of the previous period. Used in mine storekeeping and audit of concentrates on hand. *Pryor, 3.*

closing the horizon. Measuring, at a triangulation station, the horizontal angles between successive stations around the horizon so as to return to the starting point (the sum of the angles should equal 360°); measuring the last angle of the series, closing on the starting point. *Seelye, 2.*

closterite. Dense, laminated, brownish-red algal coal found in Irkutsk, U.S.S.R. It consists of an accumulation of spheroidal algal colonies of different sizes, among which are disseminated great numbers of desmid algae, belonging to the living genus, Closterium. *Tomkeieff, 1954.*

closure meter. An instrument for indicating the amount of closure that has taken place. *Spalding.* Wall closure in mines is measured by this instrument. *Also called* sag meter. *Spalding, p. 76.*

closure. a. In a dome or anticline, the vertical distance between the lowest point on the fold through which a closing contour would pass and the highest point on the fold. *USGS Bull. 686, 1922, p. xiii.* b. Used in structural geology, especially in connection with potential oil structures, to designate the vertical distance between the highest point of a fold and the lowest contour that closes around the structure. It is an approximate measure of the capacity of a structural trap for oil and/or gas. *Stokes and Varnes, 1955.* c. A closed anticlinal structure. *A.G.I. Supp.* d. Vertical distance between the top of an anticlinal structure and the lowest level at which a continuous encricling contour can be drawn. *A.G.I. Supp.* e. Vertical distance between the bottom of a depression and the lowest point in its rim. *A.G.I. Supp.* f. A portion of brick to close when required, the end of a course as distinguished from a half brick. *A.I.S.I. No. 24.* g. The relative inward movement of the two walls of a stope. The commonly used terms "sag," settlement of the roof, and drop of the hanging wall, are deceptive and in the case of vertically dipping lodes are meaningless. *Spalding, p. 159.* h. The difference in the relative position of the bottom and the collar of a borehole expressed in horizontal distance in a specific compass direction. *Long.*

closure, error of. a. Of a traverse, the amount by which the computed position of the last point of the traverse fails to coincide with the initial point; that is, the length of line necessary to close the traverse. Frequently, also, the ratio of the linear error of closure to the perimeter (also known as the error of the survey). *Seelye, 2.* b. Of angles, the amount by which the sum of the measured angles fails to equal the true sum. *Seelye, 2.* c. of azimuths, the amount by which the measurement of the azimuth of the first line of a traverse, made after completing the circuit, fails to equal the initial measurement. *Seelye, 2.* d. Of a level circuit, the amount by which the last computed elevation fails to equal the initial elevation; or the amount by which the differences of elevation in a circuit fail to add up (algebraically) to zero. *Seelye, 2.* e. Of a horizon, the amount by which the sum of the angles measured around the horizon differs from 360°. *Seelye, 2.* f. Of a triangle, the amount by which the sum of the three angles of a triangle differs from the true sum; that is, 180° plus the spherical excess. *Seelye, 2.*

clot. a. A group of ferromagnesian minerals in an igneous rock, from a few inches to a foot or more in size, commonly drawn out longitudinally, that may be an altered foreign inclusion or a segregation. *Compare* autolith; xenolith. *A.G.I. Supp.* b. A cutoff section of a column of clay from an auger machine to be used in a repress. *A.I.S.I. No. 24.* c. Same as clod. *Fay.*

clothing. Eng. Brattice constructed of a coarse, specially prepared canvas. *Fay.*

cloth oil. A name given to one of the distillates of crude petroleum (specific gravity, 0.875) that is used for oiling wood. *Fay.*

clot mold. The mold, in some types of stiff plastic brickmaking machines, into which a clot of clay is extruded and from which it is then ejected prior to the final repressing. *Dodd.*

clotting. The sintering or semifusion of ores during roasting. *Fay.*

cloud. *See* fog. *Pryor, 3.*

cloud agate. Applied especially to light gray, transparent to semitransparent chalcedony with more or less rounded spots of darker gray which resemble dark clouds. *Shipley.*

cloudburst treatment. A form of shot peening. *ASM Gloss.*

cloud chamber. A device that displays the tracks of charged atomic particles. It is a glass-walled chamber filled with a supersaturated vapor. When charged particles pass through the chamber, they leave a cloudlike track much like the condensation trail of a plane. This track permits scientists to see the paths of these particles and study their motion and interaction. *See also* bubble chamber; spark chamber. *L&L.*

clouded agate. Chalcedony with irregular or indistinct patches of color. *Hess.*

clouded ware. Pottery colored with, for example, manganese, cobalt, etc., put on with a sponge. *C.T.D.*

cloudy agate. A term loosely used for white to gray chalcedony containing any cloudy effect. *Shipley.*

cloudy amber. A trade classification which includes translucent to opaque amber. Its comparative opacity is due to inclusions of small bubbles. *Shipley.*

cloudy chalcedony. Chalcedony with dark cloudy spots in a light-gray transparent base. *Schaller.*

cloudy stains. In mica, cloudlike effects in various colors. *Skow.*

clough. A sluice gate in a culvert. *Ham.*

clour. Eng. A small depression of roof extending into the coal. *Fay.*

cloustonite. Scot. A mineral related to asphalt, occurring in patches in blue limestone and in blue flags at Inganess, Orkney. It is soluble in benzol and at a red heat gives off a large amount of illuminating gas. *Fay.*

clouts. Eng. Ironstone nodules in the Weald. *Arkell.*

cloy. A plastic cement mixture: applied to any claylike preparation. *Standard, 1964.*

clucking. The breaking of a rock by curved fractures that pass beyond the limit of the desired plane of separation. *Fay.*

clump; clunch. a. A bend in a roadway or passage in a coal seam. *C.T.D.* b. A large fall of roof. *C.T.D.* c. A tough fire clay. *C.T.D.*

clumper. Heavy fall of roof in mine. *Pryor, 3.*

clunch. a. A clay or mudstone, with rootlets, forming the floor of a coal seam. Synonymous with fire clay; spavin. Also called stone clunch. *Nelson.* b. A fine-grained, often clayey rock which breaks readily into irregular lumps. *B.S. 3618, 1964, sec. 5.* c. A bluish hard clay. *B.S. 3618, 1964, sec. 5.* d. In coal mining, seat earth, for example, that underlying the seam of coal. Indurated chalk marl or fine shale; tough fire clay. *Pryor, 3.*

clunch clay. a. A provincial term for indurated chalk marl. *A.G.I.* b. A provincial term for a sort of indurated clay which is found dividing the coal seams. *A.G.I.* c. A fine shale sometimes overlying a coalbed. It is soft and subject to deformation by squeezing during mining, and therefore, does not make a good roof. *A.G.I.*

cluster, gear. Two or more gears of different sizes made in one solid piece. *Nichols.*

clustered carbide. Synonym for interspersed carbide. *Long.*

clusterite. A round or semiround, smooth nodular growth of calcite usually occurring in clusters. Synonym for botryoid; grape formation. *A.G.I.*

cluster mill. A rolling mill where each of the two working rolls of small diameter is supported by two or more backup rolls. *ASM Gloss.*

cluster of veins. An aggregation of a number of irregularly striking veins. *Schieferdecker.*

clutch. a. A device by which a haulage drum can either be connected to the driving axle or allowed to run freely and independently of it. *Nelson.* b. A device which connects and disconnects two shafts which revolve in line with each other. *Nichols.*

clutch brake. A device to slow the jackshaft when a clutch is released, to permit more rapid gearshifting. *Nichols, 2.*

clutch, engine; flywheel clutch. A friction clutch in an engine flywheel. *Nichols, 2.*

clutch room. Aust. A chamber, generally underground, in which there are friction clutches that control the different haulage ropes on the various districts. *Fay.*

clutch-shifted transmission. A constant-mesh transmission in which power is directed through gear trains by engagement of friction clutches. *Nichols.*

Cm Chemical symbol for curium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

cm a. Abbreviation for centimeter. *BuMin Style Guide, p. 58.* b. Abbreviation for metric carat. *Zimmerman, p. 68.*

cm^2 Abbreviation for square centimeter. *BuMin Style Guide, p. 62.*

CM Abbreviation for Coal Measures as developed in Great Britain. *Nelson.*

CMC *See* carboxymethylcellulose. *Dodd.*

CMI centrifuge. A fine-coal dewatering machine consisting of two rotating elements, an outside conical screen frame and an inside solid cone, which carries spiral hindrance flights. By a slight difference in the number of teeth in the gears the screen element moves slightly faster, in the same direction, than the solid cone. Material enters the machine from the top, falls on the solid cone where the centrifugal force throws it against the screen. It slides down the screen until it meets the upper end of the hindrance flights, and, in doing so, the water begins to pass through the screen. The flights spiral downward, and as the screen moves slowly around them in the direction of the downward pitch, the solids gradually find their way to the bottom of the screen basket and the zone of maximum centrifugal force, tending to remove all of the water. *Kentucky, pp. 316-318.*

Co Chemical symbol for cobalt. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Coade stone. A vitreous ware, used for architectural ornament, made in London by Mrs. Coade from 1771 until her death in 1796; manufacture finally discontinued in about 1840. The body consisted of a kaolintic clay, finely ground quartz and flint, and a flux (possibly ground glass). *Dodd.*

coagulation. a. The binding of individual particles to form flocs or agglomerates and thus increase their rate of settlement in water or other liquid. *See also* flocculation. *Nelson.* b. The state of solute in a solvent, or of a colloidal gel, resulting from clotting or curdling; the act of changing to a curdlike condition. *Fay.* c. The coalescence of fine particles to form larger particles. *ASTM STP No. 148-D.*

coagulator. A soluble substance, such as lime, which when added to a suspension of very fine solid particles in water causes these particles to adhere in clusters which will settle easily. Used to assist in reclaiming water used in flotation. *Hess.*

coak. Same as coke; calk. *Standard, 1964.*

coal. a. A solid, brittle, more or less distinctly stratified, combustible carbonaceous rock, formed by partial to complete decomposition of vegetation; varies in color from dark brown to black; not fusible without decomposition and very insoluble. The boundary line between peat and coal is hazy (*see* brown coal) as is the boundary line between coal and graphite and the boundary line between carbonaceous rock and coal. In the formation of coal, the vegetal matter appears to have been very largely moss and other low forms of plants, but in places, coal contains much wood; the vegetal matter seems to have first taken the form of peat, then lignite, and then bituminous coal. The latter by the loss of its bitumen has in some places been converted into anthracite (hard coal) and finally into graphite. Coal deposits are usually termed beds and range from a fraction of an inch to several hundred feet in thickness. Colloquially, they are called seams and veins. The differences in coals are due to age, pressure (folding and/or depth of burial), and heat, which may have been supplied by transecting dikes or by movement in the rocks. It has been suggested that coal when dried at 100° C should contain at least 50 percent combustible material. Many schemes have been offered for the classification of coals, but all have difficulties as there are numerous important variables including fixed carbon, volatile carbon compounds, water, oxygen, sulfur, ash, and coking properties. The ash depends on the type of material from which the coal was made, on the sediment carried into the coal when being formed, and on the dissolved matter brought in at that time or later. Campbell divides coals into the following ranks or classes, in which the fuel ratio quoted is the quotient of the fixed carbon divided by the volatile matter as shown by the proximate analysis: (1) *lignite*—coals which are distinctly brown and either markedly woody or claylike in appearance. As it comes from the mine, lignite generally carries 30 to 40 percent water and its heating value is low. When exposed to the weather, much of the water is lost and the coal slacks more readily than higher rank coal and is more likely to ignite spontaneously. Lignite gives a brown powder and coal (except for cannel coals) gives a black powder. Lignites contain a large percentage of water and ash. *Compare* peat; brown coal; pitch coal; (2) *subbituminous*—distinguished from lignite by its black color and its lack of distinctly woody structure and texture, and from bituminous coal by its loss of moisture and consequent slacking in the weather so that it must be shipped in boxcars and must be carefully watched to prevent spontaneous combustion; (3) *bituminous*—a group containing many types of coals only slightly affected by weathering unless it is extended over years, in which case they break into fine prismatic pieces; not in platy pieces like most lignite. The group has a maximum fuel ratio of about 3; fixed carbon and volatile matter are about equal. Many of the better bituminous coals and coke, though they are not alone in this as some semibituminous coals make excellent coke. Cannel, block, and splint coals are varieties of bituminous coal. Bituminous coals have been subdivided by the U.S. Geological Survey into those having a calorific value less than 12,500 Btu in air-dried samples and those having a calorific value higher than 12,500 Btu; (4) *semibituminous*—a poor name for a coal of higher rank than bituminous, although the name seems to imply the opposite meaning. It produces almost no smoke when burned properly, and it is called smokeless on the market. It breaks into fine particles if handled much, and it is especially suitable for mechanical stokers. Its fuel ratio, 3 to 6, is high and its heat efficiency is the highest of the coals; (5) *semianthracite*—a coal harder than semibituminous but not as hard as anthracite; its fixed-carbon content also falls between the two and it has a fuel ratio between 6 and 10. A small quantity of this coal is mined in the United States, and it is usually sold as anthracite; (6) *anthracite*—this is a hard coal having a fuel ratio of not less than 10 and not more than 50 to 60. It is a smokeless coal of high fuel efficiency, though lower than semianthracite and semibituminous. Above a fuel ratio of 60, the carbon in coal is difficult to burn and approaches graphite. Coals are referred to according to use as steam, gas, coking, smokeless, or bunker coal. Lump coal is coal in large pieces. *See also* high volatile coal; medium volatile coal; low volatile coal; bituminous coal. *Fay; Hess.* b. Coal is a combustible sedimentary rock formed from plant remains in various stages of preservation by processes which involved the compaction of the material buried in basins, initially of moderate depth. These basins are broadly divided into limnic (or intracontinental) basins, and paralic basins which were open to marine incursions. As the underlying strata subsided progressively, and more or less regularly but sometimes to great depths, the vegetable debris was subjected to the classical factors of general metamorphism, in particular those of temperature and pressure. Coals are characterized by their type, determined by the nature of the plant remains, and the conditions of deposition and by their rank. The variations in rank are of greatest importance in the classification of coals. Increasing metamorphism results in important changes in all the properties of coal. Under the microscope, almost all coal appears heterogeneous. The various constituents, called macerals, occur in characteristic associations, microlithotypes, which may include in more or less intimate mixture 0.20 percent by volume of mineral matter. The amount of mineral matter which coal can contain and still retain its name depends on commercial considerations which vary from one country to another. The different bands recognized by the unaided eye in humic coals are called lithotypes. The physiochemical properties of the maceral vitrinite are commonly used to characterize and classify scientifically coals of the higher levels of rank, that is, the hard coals. *IHCP, 1963, part I.*

coal analysis. The determination, by chemical methods, of the proportionate amounts of various constituents of coal. Two kinds of coal analyses are ordinarily made: (1) proximate analysis, which divides the coal into moisture (water), volatile matter, fixed carbon, and ash. Percentage of sulfur and heat value in British thermal units per pound, each obtained by separate determination, are usually reported with the real proximate analysis; and (2) ultimate analysis, which determines the percentages of the chemical elements carbon, hydrogen, oxygen, nitrogen, and sulfur. Other elements which may be present are considered impurities and are reoprted as ash. *Bureau of Mines Staff.*

coal apple. a. Aust. A spheroidal form of coal found occasionally in certain coalbeds. Synonymous with coal ball. *Fay; A.G.I.* b. A spherical mass of coal up to 8 inches in diameter found in coal seams. Apples of large diameter have several concentric skins and some show cone-in-cone structure. According to Smith and Masterson, coal apples are found in coal seams affected by igneous metamorphism. *Tomkeieff, 1954.*

coal ash. Noncombustible matter in coal. *Bureau of Mines Staff.*

coal auger. A special type of continuous miner. It consists essentially of a large diameter screw drill which cuts, transports, and loads the coal onto vehicles or conveyors. The coal auger is used for (1) winning opencast coal without stripping overburden; (2) in pillar-and-stall mining; and (3) extraction of pillars or percentage of pillars, which would otherwise be uneconomic to work. *See also* Cardox-Hardsocg auger. *Nelson.*

coal backer. Eng. A man who is engaged in carrying coal on his back from a ship to wagons. *Fay.*

coalbagger. A laborer who fills bags with coal for sale to customers. *D.O.T. 1.*

coal ball. Coal balls are nodules of spheroidal, lenticular or irregular shape containing petrified plant remains and in some cases animal remains. They vary in size from about 1 centimeter to 40 centimeters or more; occasional specimens weight more than 1 ton. Infrequently an entire seam in a restricted area consists largely of coal balls. Coal balls consist mainly of calcareous, dolomitic, sideritic, pyritic, or siliceous material surrounding or impregnating plant and animal remains. They occur in brown coals (mainly sideritic balls) as well as in coals of higher rank generally lying within the coal seam but occasionally in the roof. Calcareous, dolomitic and pyritic coal balls are commonly found in seams having marine strata in the roof. The distribution in seams is variable. They may occur in a broad zone running through the coalbed or be distributed irregularly in nests. Synonym for torf dolomite. *IHCP, 1963, part I.*

coal bank. An exposed seam of coal. *Craigie, v. 1, p. 537.*

coal barge. A flatboat used to carry coal. *Craigie, v. 1, p. 537.*

coal barrier. A protective pillar of coal. *See also* barrier pillar. *Nelson.*

coal baron. The owner of a rich coal mine or mines. *Craigie, v. 1, p. 537.*

coal basin. Depressions in older rock formations in which coal-bearing strata have been deposited. *Fay. See also* concealed coalfield; exposed coalfield.

coal bearer. Scot. *See* bearers, a. *Fay.*

coal bearing. Scot. The ancient custom of employing women to carry coal out of the mine. *Fay.*

coalbed. A bed or stratum of coal. Coal seam is more commonly used in the United States and Canada. *Fay.*

coalbin. A boxlike receptacle or space for coal. *Craigie, v. 1, p. 537.*

coal bit. *See* rotary bit. *B.S. 3618, 1964, sec. 6.*

coal blacking. Iron founders' blacking made from powdered coal. *Webster 3d.*

coal blasting. There are two methods of breaking coal with explosives, namely, blasting cut coal, which is the method most commonly used, and blasting off the solid, or grunching. *McAdam II, p. 95.*

coal blossom. An outcrop of much weathered coal. *A.G.I. Supp. See also* coal smut.

coal boat. A coal barge. *Craigie, v. 1, p. 537.*

coalbox. Aust. Large bins for storing coal. *Fay.*

coal brass. Iron pyrite in coal seams. Commonly used in the plural. *Fay.*

coalbreaker. a. A building containing the machinery for breaking coal with toothed rolls, sizing it with sieves, and cleaning it for market. *Fay.* b. A machine for breaking coal. *Fay.* c. A person employed at breaking coal. *Standard, 1964.*

coal breccia. Coal broken into angular fragments by natural processes occurring within the coal bed. Polished and slickensided surfaces may be common. *Stutzer and Noe, 1940, p. 248.*

coal briquettes. Coal made more suitable for burning by a process which forms it into regular square- or oval-shaped pieces. *Bennett 2d, 1962.*

coal briquetting. *See* briquette. *Nelson.*

coal bump. Sudden outbursts of coal and rock that occur when stresses in a coal pillar, left for support in underground workings, cause the pillar to rupture without warning, sending coal and rock flying with explosive force. *Bureau of Mines Staff.*

coal bunker. A place for storing coal, especially in steamships for furnace use. *Fay.*

coal burned to top or bottom. A condition encountered in some mines in which there is no parting between the coal and the surrounding strata. The coal sticks to the strata thereby creating one of the most difficult coal blasting problems of dislodging the coal that is burned to the top or bottom. *Kentucky, p. 179.*

coal burster; hydraulic cartridge. An appliance for loosening coal by means of high-pressure water and oil. It consists of a round, stainless steel bar with small telescopic rams acting on a steel liner in a shot hole. The bar is connected to a hand- or power-operated pump placed near the face. The high-pressure liquid from the pump causes the rams and liner to exert a pressure sufficient to loosen or break down the coal. It is a safe method of coal breaking without the use of explosives. It has not, however, made the progress originally anticipated. *See also* water infusion. *Nelson.*

coal, caking test. a. In Roga's method, a mixture of coal (at —0.21 millimeter) with 5 grams of specified anthracite (—0.4 millimeter) is located with 6 kilogram weight for one-half minute in a filled crucible fitted with a disk and lid. This is then heated to 850° C, for 15 minutes, screened on 1 millimeter and reweighed. Abrasion tests and further screenings and weighing follow. *Pryor, 3.* b. In Gray and King's method, coal is slowly heated in a tube and examined. If caking strongly, further crushed samples are mixed in ratio to electrode carbon until a hard and nonshrinking coke is obtained. *Pryor, 3.*

coal car. A car used in hauling coal in or from a mine. *Craigie, v. 1, p. 538.*

coal carbonization. *See* carbonization of coal.

coal carbon ratio. Ratio of fixed carbon to volatile matter. *Bennett 2d, 1962.*

coal carrier. One who or that which is employed to carry coal. A railroad is a coal carrier. *Fay.*

coal cart. A cart for carrying coal. *Craigie, v. 1, p. 538.*

coal chute. A trough or spout down which coal slides from a bin or pocket to a locomotive tender, or to vessels, carts, or cars. *Fay.*

coal claim. A piece of land having, or thought to have, valuable coal deposits on it, and legally claimed by one seeking to own it. *Mathews, v. 1, p. 347.*

coal classification. The grouping of coals according to certain qualities or properties, such as coal type, rank, carbon-hydrogen ratio, volatile matter, etc. *Nelson.*

coal classification systems. In all countries the basis is content of volatile matter. With 10 percent volatile, anthracite; between 10 percent and 13 percent lean coal, semianthracite or dry-steam coal; 14 percent to 20 percent, variously designated; 20 percent to 30 percent, fat or coking coal. A second parameter is calorific value, and a third caking and/or coking property. After World War II, an international working party chose three parameters, (1) volatile matter; (2) caking properties on rapid heating and, (3) coking properties. *Pryor, 3. See also* ASTM coal classification; Fuel Research Board/National Coal Board Classification; ECE coal classification.

coal clay. Clay found under a coalbed, usually a fire clay. *Bureau of Mines Staff.*

coal cleaner. In bituminous coal mining, a a laborer who stands in a railroad car as it is being loaded from tipple chutes with run-of-mine coal and picks out slate, rock, and other impurities. Also called flat trimmer; slate picker. *D.O.T. 1.*

coal cleaning; coal preparation; coal refining. These terms, used in the order given, refer to the sorting, picking, screening, washing, pneumatic separation, and mixing of coal sizes to the best advantage for (and requirements of) the market. Coal cleaning is commonly used because it defines the operation of preparing coal for the market. In coal cleaning, only those impurities that are mechanically mixed with the coal are removed by wet or pneumatic (air) cleaning. Coal refining is incorrect; refining refers to purifying metals. *Bureau of Mines Staff.*

coal cleaning equipment. Coal cleaning equipment used to remove impurities from the coal is mined, such as slate, sulfur, pyrite, shale, fire clay, gravel, and bone. *ASA C42.85-1956.*

coal cleaning plant; washery. A plant where raw or run-of-mine coal is washed, graded, treated to remove impurities, and reduce ash content. *Pryor, 3.*

coal clearing. The loading of broken coal at the face into conveyors or mine cars. The clearing shift is the coal-loading shift or stint. *Nelson.* Usually the miner has a measured task or stint (stent). *Pryor, 3.*

coal company. A company engaged in coal mining; a business firm that deals in coal. *Craigie, v. 1, p. 538.*

coal conglomerate. A conglomerate made of fragments of coal. *Tomkeieff, 1954.*

coal constituent classification; Spackman System. In the United States it is generally agreed that the maceral concept of the nomenclature Stopes-Heerlen System, fails to comprehend the effect of the stage of coalification on the nature of coal constituents. W. Spackman's interpretation of the maceral concept incorporates the ideas of variable coalification in suggesting a skeletal framework upon which a systematic classification can be built. The maceral concept, as interpreted by Spackman, implements the classification of the products of coalification. In this scheme, macerals possessing similar chemical and physical properties are assembled into maceral groups which can, in turn, be characterized by a comparatively restricted set of properties. Maceral groups possessing similar characteristics can be classified into maceral suites. *IHCP, 1963, part I.*

coal county. A county in which the chief industry is mining coal. *Mathews, v. 1, p. 347.*

coal cutter. a. The longwall coal cutter is a power-operated machine which draws itself by rope haulage along the face, usually cutting out from the bottom of the seam a thin strip of coal, in preparation for shot firing and loading or a cutter loader. The bar and disk machines are obsolescent and the chain coal cutter is now almost universal. *Nelson.* b. See machineman, b. *D.O.T. 1.*

coal-cutter design. Most longwall chain coal cutters consist of three self-contained units, namely (1) haulage; (2) motor; and (3) jib-end section. This three-unit design makes assembly and handling relatively easy as the units can be taken apart, which is an advantage where shafts are small and roadways restricted. In a major breakdown, it is easier to replace one unit rather than send the entire machine to the surface for repairs. *Nelson*.

coal-cutter picks. The cutting points attached to a cutter chain for making a groove in a coal seam. The picks are made from quality carbon steel or a hard alloy steel and tipped with fused tungsten carbide or sintered tungsten carbide or other hard-wearing material. The advent of the coal-cutter pick tipped with tungsten carbide on a heat-treated alloy steel shank has resulted in marked improvements in drilling and a reduction in cutting delays. *See also* chain coal cutter; double-ended pick; duckbill pick; tungsten-carbide bits. *Nelson*.

coal-cutter team. The men in charge of a coal cutter. A cutting team varies from two to five with two to three about average. The leading man is normally stationed in front of the machine and is in charge of the controls and his assistant follows behind. *See also* back-end man. *Nelson*.

coal-cutting machine. A machine powered by compressed air or electricity which drives a cutting chain or other device so as to undercut or overcut the seam, or to remove a layer of shale. Precussive cutters are used to bore holes or to make vertical cuts (nicking, shearing); disk, bar, and chain cutters carry small picks which undercut the seam as the machine travels. *Pryor, 3*.

coal-cutting machine operator. *See* machineman, b. *D.O.T. 1*.

coal digger *See* coal miner; miner, h. *Fay*.

coal digging. A place where coal is dug. *Craigie, v. 1, p. 538*.

coal dish. A receptacle for holding burning charcoal. *Craigie, v. 1, p. 538*.

coal distributor. A person or thing that distributes coal. An agent of the coal company that distributes coal to consumers. *Bureau of Mines Staff*.

coal drawing. The extraction, haulage, and hoisting of coal from the face to the pithead. *Nelson*.

coal drill. Usually an electric rotary drill of a light, compact design. Aluminum and its alloys usually are used to reduce the weight. Where dust is a hazard, wet drilling is employed. With a 1 horsepower electric drill, speeds up to 6 feet per minute are possible. Light percussive drills, operated by compressed air, and hand-operated drills are also employed. *Nelson*.

coal drill, electric. *See* electric coal drill.

coal driller. In coal mining, a worker who uses a hand or power drill to drill holes into the working face of the coal into which explosives are charged and set off to blast down the coal. *D.O.T. 1*.

coal drop. A broad, shallow inclined trough down which coal is discharged from a wharf into the hold of a vessel. A coal chute. *Fay*.

coal dryer. A plant or vessel in which water or moisture is removed from fine coal. The artificial drying of fine coal is not often employed. Fine coal is removed from washwater by dewatering classifiers, or by vacuum filtration. *See also* dryer; thermal drying, b. *Nelson*.

coal dump. A place where coal is dumped for future use. *Mathews, v. 1, p. 347*.

coal duns (Forest of Dean). Coal measure shales. *Fay*.

coal dust. a. A finely divided coal. There is a diversity of opinion as to what the term coal dust means; that is, how finely must coal be divided to be termed dust. Some writers base the distinction on the point whether it can be carried to considerable distance by air currents. Coal that will pass through 100-mesh screens (100 wires to the linear inch) is frequently accepted as representing mine dust. For testing explosives at the Pittsburgh station coal passed through 100 mesh is taken as standard. In the foreign galleries the practice varies between this size and coal that passes through 200 mesh. *Fay*. b. The general name for coal particles of small size. In experimental mine testing, particles which will not pass through a 20-mesh screen (1/32-inch-square openings) are not considered as coal dust. *Rice, George S*. c. The Bureau of Mines has arbitrarily defined coal dust as being that which will pass through a 20-mesh screen, based upon the fact that particles coarser than 20-mesh have little influence on the development of an explosion of Pittsburgh coalbed dust on which many experiments have been made. The mean diameter of some coal dust particles is less than 1/2 micron. Finely divided dust in bulk flows and acts in some respects like a liquid. *R.I. 3631, April 1942, pp. 2–3*. d. The dust produced by the breakage and crushing of coal underground and at coal preparation plants. It is usually intermixed with a varying proportion of stone dust. Coal dust in mines presents two main dangers; (1) explosion hazard, and (2) pneumoconiosis hazard. The explosibility of a coal dust cloud depends upon its fineness, purity, and volatile content. The dust particles believed to be harmful from the pneumoconiosis aspect are those of 5 microns and under. *See also* dust-free conditions. *Nelson*. In mines, the most common explosive dust encountered is bituminous coal dust. The U.S. Bureau of Mines has established that coal dust in the absence of gas can explode and that explosions can occur in any shape of mine opening. *Hartman, p. 49*. e. A material frequently used in sand molding. For all classes of work, the coal should be of fine grain and the volatile material should not be less than 28 percent. A correct proportion of coal dust mixed with the sand is stated to improve the skin of the casting and promote clean stripping by imposing a carbon film between the molten metal and mold face. It assists in preventing sand scabs, and produces a more refractory sand by coating the grains with a carbon deposit. *Osborne*.

coal elevator. A building in which coal is raised and stored preparatory to loading on cars, ships, etc. *Mathews, v. 1, p. 347*.

coal-dust explosion. A mine explosion caused by the ignition of fine coal dust. It is considered that an explosion involving coal dust alone is relatively rare. It demands the simultaneous formation of a flammable dust cloud and the means of ignition within it. The flame and force of a firedamp explosion are the commonest basic causes of a coal-dust explosion. The advancing wave of the explosion stirs up the dust on the roadways and thus feeds the flame with the fuel for propagation. *See also* colliery explosion; stone-dust barrier. *Nelson*.

coal-dust index. Percentage of fines and dust passing the 0.0117-inch (48-mesh sieve). *Bennett 2d, 1962*.

coaler. a. Something (as a railroad or ship) wholly or chiefly employed in transporting or supplying coal. *Webster 3d*. b. A laborer employed in coaling. *Webster 2d*. c. A share of stock in coal-carrying railroads. *Mathews, v. 1, p. 347*.

coalesced copper. Massive copper made from ground, brittle, cathode copper by briquetting and sintering in a reducing atmosphere at high temperatures with pressure. *ASM Gloss*.

coalescence. The union of particles of a dispersed phase into larger units, usually effected at temperatures below the fusion point. *ASM Gloss*.

coalescent. Joined together or running together. *Fay*.

coalette. Synonym for briquette. *Fay*.

coal exchange. A market for the sale of coal; especially, a place for transactions in coal on a large scale. *Fay*.

coal face. a. The mining face from which coal is extracted by longwall, room, or narrow stall system. *Nelson*. b. A working place in a colliery where coal is hewn, won, got, gotten from the exposed face of a seam by face workers. *Pryor, 3*.

coal factor. *See* factor. *Fay*.

coal fauld. Scot. A storage place for coal. *Fay*.

coalfield. An area of country, the underlying rocks of which contain workable coal seams. The distribution of coalfields was largely determined by folding movements and the subsequent denudation. The original coal areas were clearly larger than the present coalfields. *See also* coal basin. *Nelson*.

coal fitter. Eng. A coal factor. *Standard, 1964. See also* factor. *Fay*.

coal flat. A coal barge. *Craigie, v. 1, p. 538*.

coal flotation. *See* flotation process; froth flotation. *Nelson*.

coal formation. a. A stratigraphic coal-bearing unit in the coal measures. *Fay*. b. A stratum in which coal predominates. *Craigie, v. 1, p. 538*.

coal fuel ratio. The content of fixed carbon divided by the content of volatile matter is called the fuel ratio. According to their fuel ratios coals have been classed: anthracite, not less than 10; semianthracite, 6 to 10; semibituminous, 3 to 6; and bituminous, 3 or less. *Bureau of Mines Staff*.

coal gas. Flammable gas derived from coal either naturally in place, or by induced methods of industrial plants and underground gasification. *Bureau of Mines Staff*.

coal gasification, underground. *See* underground gasification.

coal getter. Eng. One who cuts, holes, hews, or mines coal in a mine. A coal miner. *Fay*.

coal gravel. A secondary deposit of coal consisting of coal fragments of varying size that have been removed from the place of formation and redeposited. *A.G.I.*

coal hagger. N. of Eng. One who is employed in cutting or hewing coal in a mine. A coal miner. *Fay*.

coal handler. a. One who loads or unloads coal. *Craigie, v. 1, p. 538*. b. One who supplies coal to the gas-producing ovens in which coal gas is generated for use as a fuel in furnaces in which ore is smelted to recover the metal. *D.O.T. 1*.

coal-handling foreman. One who supervises workers engaged in unloading coal from barges into coal hoppers. He reads a scale indicating the weight of the coal as it enters the bunkers on a conveyor from coal tower hoppers, and records the amounts in a logbook for comparison with bills of lading. *D.O.T. 1.*

coal heaver. One employed in the moving or shoveling of coal, in loading or discharging coalships, in shoveling coal from ships' bunkers to the furnaces; a coal passer. *Fay.*

coalheugh. a. Scot. A mound of refuse about old mines. *Fay.* b. Scot. A place where coal is dug; a coal mine. *Fay.*

coal hewer. Eng. A person who digs coal; a collier; a miner. *Fay.*

coal hiker. A laborer who carries coal, usually in a basket or bucket, from the delivery truck to the customer's storage place. *D.O.T. 1.*

coal hill. a. A hill composed of or containing coal. *Craigie, v. 1, p. 538.* b. Scot. Ground occupied at a pithead or mine mouth for colliery purposes. *Fay.*

coal hod. A coal scuttle. *Craigie, v. 1, p. 538.*

coal-hoisting engineer. In coal mining, one who operates a hoist for raising coal to the surface where separate shafts or compartments are used for handling coal and men. *D.O.T. 1.*

coalhole. a. A hole for coal (as a trap or opening in a sidewalk leading to a coalbin). *Webster 3d.* b. Gr. Brit. A compartment for storing coal. *Webster 3d.*

coal hulk. A vessel kept, usually at foreign stations, for supplying steamers with coal. *Fay.*

coal hydrogenation. *See* coal liquefaction. *CCD 6d, 1961.*

coalification. Those processes involved in the genetic and metamorphic history of coalbeds. The plant materials that form coal may be present in vitrinized or fusinized form. Materials contributing to coal differ in their response to diagenetic and metamorphic agencies, and the three essential processes of coalification are called incorporation, vitrinization, and fusinization. *See also* carbonification. *A.G.I.*

coalify. To change vegetal matter into coal. *Hess.*

coaling. a. The making of charcoal. *Craigie, v. 1, p. 538.* b. The action of loading with coal. *Craigie, v. 1, p. 538.* c. A place where charcoal is burned. *Craigie, v. 1, p. 538.* d. The process of supplying or taking coal for use, as in coaling a steamer, etc. *Fay.* e. Mid. Engaged in mining coal. *Fay.*

coaling shift. The shift on which coal is produced. *See also* preparation shift. *Nelson.*

coaling station. A place where boats or trains may get coal. *Craigie, v. 1, p. 538.*

coaling-station dumper. In bituminous coal mining, a laborer who coals by opening the chute door of a coalbin or by dumping loaded mine cars from a trestle into tenders. *D.O.T. 1.*

coal inspector. In bituminous coal mining, one who inspects coal at the surface of a coal mine, in coal cars, and at the tipple to maintain uniform standards in quality of mined coal; visually inspects coal samples removed from loadings to determine amounts of impurities, such as rock and slate, mixed with the coal; and grades coal according to percentage of impurities found in coal samples. Also called tipple inspector. *D.O.T. 1.*

Coalite; semicoke. A trade name for a smokeless fuel produced by carbonizing coal at a temperature of about 600° C. It has a calorific value per pound of about 13,000 British thermal units, and is used for domestic purposes. *See also* coking coal; smokeless coal. *Nelson.*

Coalite process. *See* Parker process.

coalition. A voluntary joining of persons or parties, for the purpose of combining their resources, as in the support of some plan or policy relating to mining operations; a combination. *Fay.*

coal jigger. *See* Baum washer; jig washer; plunger jig washer. *Nelson.*

coal kiln. A kiln for making charcoal. *Craigie, v. 1, p. 538.*

coal king. A coal baron. *Mathews, v. 1, p. 347.*

coal land. Land of the public domain which contains coalbeds. *Fay.*

coal lateral. A railroad that parallels a coal road. *Mathews, v. 1, p. 347.*

coal leads. The thin veins of coal in a fault zone. The evidence provided by the coal leads may indicate the direction of the displaced seam. *See also* drag. *Nelson.*

coal liquefaction; coal hydrogenation. The conversion of coal into liquid hydrocarbons and related compounds by hydrogenation at elevated temperatures and pressures. *CCD 6d, 1961.* In essence, this involves putting pulverized bituminous coal into an oily paste, which is treated with hydrogen gas under appropriate conditions of temperature and pressure to form the liquid molecules of carbon and hydrogen which constitute oil. *Kentucky, p. 45.*

coal man. One who sells or delivers coal. *Craigie, v. 1, p. 538.* b. One who owns coal property. *Craigie, v. 1, p. 538.*

coal master. Eng. The owner or lessee of a coalfield or colliery. *Fay.*

coal measures. Strata containing coalbeds, particularly those of the Pennsylvanian period. *A.G.I. Supp.*

Coal Measures. Used as a proper name for a stratigraphic unit more or less equivalent to the Pennsylvanian period. *A.G.I. Supp.*

Coal Measure unit. The Coal Measure strata disclose a rough repetition or cycle of different kinds of rock in the same regular manner. Broadly, the cycle of strata upwards is coal, shale, sandstone, and coal. This sequence is sometimes referred to as a unit. *Nelson.*

coal measures plant. *See* coal plant.

coal merchant. One who sells coal. *Craigie, v. 1, p. 538.*

coal metals. Scot. Strata in which coal seams occur. *Fay.*

coal meter. Eng. One appointed to superintend the measuring of coal. *Fay.*

coal microbiology. The study of micro-organisms whose activities are associated with the formation and degradation of coal. *I.C. 8075, 1962, p. 2.*

coal mine. Any and all parts of the property of a mining plant, on the surface or underground, which contributes, directly or indirectly under one management to the mining or handling of coal. *Fay.* In addition to the underground roadways, staple shafts, and workings, a coal mine incudes all surface land in use, buildings, structures and works, preparation plants, etc. *Nelson.* A colliery. *See also* mine. *Fay.*

coal mine explosion. The burning of gas and/or dust with evidence of violence from rapid expansion of gases. *Bureau of Mines. Instructions for Disaster, Fatal-Accident, and Miscellaneous Health and Safety Reports, April 1966, Chapter 5.1, p. 45.*

coal mine ignition. The burning of gas and/or dust without evidence of violence from expansion of gases. *Bureau of Mines. Instructions for Disaster, Fatal-Accident, and Miscellaneous Health and Safety Report, April 1966, Chapter 5.1, p. 45.*

coal mine inspector. In mining, one who examines the safety conditions of a mine in regard to pit slope or underground roof, timbering, haulage, ventilation, electricity, and machines, and makes tests with a safety lamp to detect gas and dust hazards. Also called examiner; gas inspector; mine inspector; safety inspector. *D.O.T. 1.*

coal miner. One who digs coal. *Fay.*

coal mine regulations. National, state, and local laws, or enforceable rules that govern coal mining. *Bureau of Mines Staff.*

coal mining. The industry that supplies coal and its various byproducts. *Nelson.*

coal mining examinations. The examinations held in Great Britain which must be passed by every person who wishes to hold a colliery manager's (or undermanager's) certificate. A candidate for a certificate may submit himself for the *old-style* six-paper examination, or the *new-style* three-stage examination of the Mining Qualifications Board or the joint examinations of the Board and the Institution of Mining Engineers. Holders of approved degrees or diplomas, or certain other qualifications, who apply for a first-class certificate, are required to qualify only in the subject of mining law. *See also* colliery manager. *Nelson.*

coal mining explosives. The statutory requirements regarding the use of explosives in coal mines are very stringent. In gaseous mines only permitted explosives are allowed. *See also* explosive, b; blasting, a. *Nelson.*

coal mining methods. The methods of working coal seams have been gradually evolved and progressively improved or modified as knowledge and experience were gained and power machines became available. Over the years, a very large number of methods of mining coal have been developed to suit the seam and local conditions, and they may be divided, broadly, into (1) long-wall, and (2) pillar methods of working. *See also* method of working. *Nelson.*

coal oil. a. The crude oil obtained by the destructive distillation of bituminous coal. *Fay.* b. That distillate obtained from such a crude oil which is used for illuminating purposes—kerosene. *Fay.* c. Crude petroleum. *Fay.*

coal passer. A laborer who transports coal or coke from storage bins or piles to place of use. *D.O.T. 1.*

coal pebble. Highly polished, spherical or elliptical mass of bituminous or anthracite coal, may consist of concentric shells, easily separated from the surrounding bed, the laminations of which may continue through the pebble. Some pebbles are striated and slickensided. Coal pebbles are only found where coalbeds have been intruded by dikes. *Hess.*

coal picker. a. A laborer who picks over dump or rubbish heap to salvage any good coal. *D.O.T. 1.* b. A laborer who removes foreign material or "bone" from coal passing over a picking table. *Bureau of Mines Staff.*

coal pile. A heap of coal. *Craigie, v. 1, p. 539.*

coal pipe. Eng. a. The carbonized annular coating or bark of a fossil plant. *Fay.* b. A very thin seam of coal. *Fay.* c. A fossil tree stump reaching from a coalbed up into the overlying rock strata indicating rapid subsidence and burial of the standing tree. The inner casts of these stumps usually consist of material differing from the surrounding rock. *Stutzer and Noe, 1940, p. 168. See also* erratics.

coalpit. a. A place where charcoal is made. *Fay.* b. Eng. A place where coal is dug. A coal mine. *Fay.*

coal planer. A type of continuous coal mining machine developed in Germany especially for longwall mining. It consists of a heavy steel plow with cutting knives, with power equipment to drag it back and forth across a coal face. A parallel conveyor receives and carries away the coal as the planer digs it from the face. *Bureau of Mines Staff.*

coal plant. A fossil plant found in coalbeds or contributing its substance to the formation of coalbeds. Any plant species, the residue of which has entered into the composition of coal under natural geological conditions. *Fay.*

coal plough. a. This device carries steel blades which shear or plane off the coal to a limited depth and ploughs it onto the face conveyor. The plough is hauled backward and forward along the coal face by steel ropes or chains operated by winches in the gate roads and planes off a thickness of 11.8 inches to a height one-third to one-half the seam thickness each time. The coal is conveyed along the face by a double chain conveyor with double-ended drive; the conveyor sections are articulated to allow for bends in its tracks and are moved bodily forward at each passage of the plough, either by compressed-air jacks or by means of a torpedo or trailer attached by rope to the plough and an auxiliary drum on the winches. Its uses are limited to softer coal seams, or to suitably prepared coal. Also called kohlenhobel. *Mason, v. 1, p. 123.* b. A cutter loader with knives to slice the coal off the face. *See also* plough. *Nelson.*

coal pocket. a. A structure, bunker, or bin for the storage of coal. *Fay.* b. An arrangement of bins to load trucks or rail cars by gravity. *ASA MH4.1-1958.*

coal preparation. a. A collective term for physical and mechanical processes applied to coal to make it suitable for a particular use. *B.S. 3323, 1960.* b. The undercutting, shot-firing, or water infusion operations at the face to prepare the coal for loading by hand or machine. *See also* preparation shift. *Nelson.* c. The various processes where raw coal is dedusted, graded, and treated by dry methods (rarely) or water methods, using dense-media separation (sink-float), jigs, tables, flotation; objective being the removal of free dirt, sulfur, and other undesired constituents. *Pryor, 3.*

coal-preparation department. Gr. Brit. An area department of the National Coal Board which is responsible for the installation of new plants and tests and investigations. Its aim is to produce a clean-graded coal and it functions in close touch with the marketing department. *Nelson.*

coal-preparation plant. A plant for the cleaning and sizing of the raw coal before it is loaded into railway cars or trucks. In the case of large plants the trend is to combine dense-medium washing for the large coal with washing in baums or troughs for the smaller sizes and froth flotation or simple flocculation for the fines. The average capacity of coal-preparation plants now being built in Great Britain ranges from 500 to 600 tons per hour. In the United States, plant capacities vary from 500-2,000 tons per hour. *See also* gravity concentration; screen, a; washery. *Nelson.*

coal-preparation process. The process adopted for cleaning and sizing coal for the market. The selection of the best process for any particular run-of-mine coal is a specialist study. Many conflicting factors must be weighed. The cost of a detailed investigation is well repaid in higher recoveries, in flexibility, and in ease of operation and maintenance. *Nelson.*

coal-preparation shift. On mechanized longwall faces, the shift during which coal-cutting, boring, and shot-firing operations are performed. *Mason, v. 1, p. 119.*

coal prints. N. of Eng. Thin films, or patches, of coallike matter interbedded with shale. *Fay.*

coal prospector. One who prospects or seeks for evidence of coal. *Mathews, v. 1, p. 347.*

coal pulverizer operator. One who operates by means of electrical switches, mechanical levers and valves, a coal pulverizing plant consisting of several interrelated machines. The plant crushes, dries, and pulverizes coal, and delivers the pulverized coal either to a storage bin or to a blower that supplies the fuel to a boiler or furnace. *D.O.T. 1.*

coal puncher. a. A coal cutter of the reciprocating type, used for undercutting and nicking coal. Also called pick machine. *Fay.* b. *See* pneumatic pick. *Nelson.*

coalrake. Derb. A seam or bed of coal. *Fay.*

coal rank. a. Classification according to degree of metamorphism or progressive alteration, in the natural series from lignite to anthracite; higher rank is classified according to fixed carbon on dry basis; lower rank according to British thermal units on moist basis. *Bennett 2d, 1962 Add.* b. The degree of maturity of the coal substance. *See also* rank, f. *Nelson.*

coal rash. Very impure coal containing much argillaceous material, fusain, etc. *A.G.I. Supp.*

coal region. An area in which coal is mined extensively. *Craigie, v. 1, p. 539.*

coal rith; coal ree; coal fauld. Scot. A sale place for coal other than at a colliery. *Fay.*

coal road. a. An underground roadway or heading in coal. *Zern.* b. A railroad whose principal business is the haulage of coal, as from mine to industrial centers. *Fay.*

coal room. a. Scot. A working face in stoop-and-room workings. *Fay.* b. The open area between pillars where the coal has been removed. *Bureau of Mines Staff.*

coal royalties. Fees paid for coal leased to the proprietors of the mine by the owners of the minerals below the surface. *Peel.*

coal salad. In Wales, a mixture of various sorts of coal. *Fay.*

coal sampler. In the light, heat, and power industry, a laborer who collects coal samples from cars in the yard or from pulverized coal bunkers for testing by a fuels analyst to ascertain such properties as heat value, moisture, sulfur, or ash content. *D.O.T. 1.*

coal sampling. The standard method used by the U.S. Bureau of Mines samplers is as follows: A space of 5 feet in width should be cleared of dirt and powder from top to bottom of the seam being sampled. Down the center of this cleared space, a zone 1 foot wide is cut to a depth of at least 1 inch in order to get perfectly clean coal. A cut is then made up the center of this zone to a depth of 2 inches and a width of 6 inches; or, if the coal is soft, to a depth of 3 inches and a width of 4 inches. Approximately 5 to 6 pounds of coal will be obtained for each foot of thickness of the seam. This should include all bony coal included in the mining operation and exclude all slate or partings which are thrown out during the operation. The sample obtained should be collected on a waterproof cloth 6 by 7 feet and then screened, the lumps being broken in a mortar, and all passed through a ½-inch screen. Any impurities, such as slate or pyrite, are crushed to one-fourth inch or finer and thoroughly mixed with the coal. The coarser materials should be evenly distributed, the sample being then quartered, remixed, and requartered. When the mixing is complete, the sample should be placed in a can of 3 pounds capacity and the top screwed on and sealed with adhesive tape. The can should be labeled with the name of the collector, the location, the date, and any other information necessary for the analysis. *Kentucky, p. 408. See also* groove sample; sampling.

coal sampling, laboratory methods. There are two methods, the choice depending on whether the coal appears wet or dry: (1) when coal appears dry, the first procedure is to reduce the coal in the jaw crusher to pass a 4-mesh sieve and reduce the sample to 10 pounds weight, on the larger riffle sampler. The 10-pound 4-mesh sample is ground in a rollcrusher or coffee mill to 20 mesh. From various parts of this sample, take with a spoon, without sieving, a composite 50-gram total moisture sample which should be placed directly in a rubber-stoppered bottle. Thoroughly mix the main portion of the sample, reduce on the small riffle sampler to about 200 grams, and pulverize to 60 mesh by suitable grinder, disregarding loss of moisture. After passing 60 mesh, the sample is mixed and reduced to 50 grams on the small riffle sampler. This final sample is transferred to a 4-ounce rubber-stoppered bottle. Moisture is determined on both the 60-mesh and the 20-mesh samples. The following computation is made: (1) the analysis of the 60-mesh coal which has become partly air-dried during sampling is computed to the dry-coal basis by dividing each result by 1, minus its contents of moisture. The analysis of the coal "as received" is computed from the dry-coal analysis by multiplying by 1, minus the total moisture found in the 20-mesh sample; and (2) when coal appears wet, the sample is spread on tarred pans, weighed, and air-dried at room temperature or in a special drying oven at 10° to 15° C above room temperature. After it is weighed again, this drying is continued until the loss of weight is not more than 0.1 percent per hour. The sampling is then completed as under (1) for dry coal. *Kentucky, pp. 409-410.*

coal saw. A coal cutter employing a very thin chain and bits, or saw, which cuts a kerf 2 inches wide, in comparison with normal chain and bit kerfs which are 5 to 7 inches wide. The coal saw is for use where hydraulic devices could be employed to break down the coal and thus eliminate most or all of the shooting ordinarily required. *Jones.*

coal scares. Thin laminae of pyrite in coal. *Bureau of Mines Staff.*

coal screener. In the iron and steel industry, a laborer who operates sifters to grade coal. *D.O.T. 1.*

coal scuttle. A strong metal pail or bucket, or scooplike container, in which coal for domestic use is carried. *Craigie, v. 1, p. 539.*

coal seam. A bed or stratum of coal. *Craigie, v. 1, p. 539. See also* coalbed.

coal-seam correlation. The identification of a coal seam; the linking up or matching of a seam exposed in different parts of a mine or coalfield. A coal seam may be correlated by lithology, by fossils, by chemical composition, or by its spore content. Coal-seam correlation is very imoprtant in exploration and in penetrating faults. *See also* correlation, e. *Nelson.*

coal seat. Clay beneath coal. *Bureau of Mines Staff.*

coal-sensing probe. A nucleonic coal-sensing instrument which can measure the thickness of coal left on the floor of a seam when a cutter loader operates on a longwall face. The principle used is the measurement of the density of the strata underlying the machine by a gamma-ray backscattering unit. Gamma rays from the radioactive source are scattered in all directions by the atomic particles in the coal and rock. The amount of scattered radiation eventually reaching the Geiger counter is, approximately, inversely proportional to the density of the scattering medium, that is, more will come back from coal than from rock. Thus, as the amount of coal between the source and the underlying rock changes, so the amount reaching the Geiger counter and the counting unit (the ratemeter) will change and consequently the output of the meter can be calibrated in terms of the thickness of the floor coal. *Nelson.*

coal separator. A machine which separates the coal from dirt in the run-of-mine material. *See also* coal-preparation plant. *Nelson.*

coalshed. Eng. A coalbed of only a few inches in thickness and therefore unworkable. *Fay.*

coal sheugh. Scot. A coal mine. *Hess.*

coal sill. Cumb. A soft clay from coal measures used for slate pencils. *Arkell.*

coal sizes. The sizes by which anthracite coal is marketed are as follows, diameter of opening through which or over which coal will pass. *Crispin.*

	Through	*Over*
Broken	4-1/2 in.	3-1/4 in.
Egg	3-1/4 in.	2-5/16 in.
Stove	2-5/16 in.	1-5/8 in.
Chestnut	1-5/8 in.	7/8 in.
Pea	7/8 in.	9/16 in.
No. 1 Buckwheat	9/16 in.	5/16 in.

coal slime. A slurry containing particles of such size range that 50 percent or more (by weight) will pass a 200-mesh sieve. *Mitchell, p. 610.*

coal sludge. A slurry that has been partly dewatered by sedimentation, usually to a dilution that will permit further dewatering by filtration. *Mitchell, p. 610.*

coal slurry. Finely crushed coal mixed with sufficient water to form a fluid. To use coal slurry pumped through a pipeline as fuel, expensive drying and dewatering pretreatment has been necessary. Recent tests indicate that coal slurry can be fired in a cyclone furnace as it is received from a pipeline, that is, a coal and water mixture. *See also* slurry. *Nelson.*

coal smits. York. Worthless, earthy coal. *See also* coal smut. *Fay.*

coal smoke. A suspension of very fine particles in air. A coal which breaks down easily when heated gives off its volatile matter very easily and perhaps more quickly than the available draught can supply the air for combustion with the result that dark smoke containing much unburnt or partly burnt material is given off—a loss of fuel energy. *See also* smoke. *Nelson.*

coal smut. Eng. An earthy coal stratum at or near the surface. The outcrop of a coal seam. Also called blossom of coal; coal blossom.

Coal special. Explosive; used in mines. *Bennett 2d, 1966.*

coal split. *See* split seam. *Nelson.*

coal spragger. a. In bituminous coal mining, one who sets short wooden props in a slanting position (sprags) under the upper or overhead section of a bed of coal to hold that section up while the lower section is being mined, or wedges heavy slanting props (sprags) against the coal to prevent it from flying when broken down by blasting. *D.O.T. 1.* b. One who places short pointed wooden sprags between the spokes of a mine car wheel to stop the car. *Bureau of Mines Staff.*

coal stone. a. Eng. A kind of cannel coal. *Fay.* b. A local name for the Kimmeridge oil shale. *Tomkeieff, 1954.*

coal stove. A stove designed for burning coal rather than wood. *Craigie, v. 1, p. 539.*

coal stripper. In bituminous coal mining, a general term applied to a worker who is engaged in mining coal in a strip mine, one in which the coal is close enough to the earth's surface to permit the use of power shovels in stripping back the ground and loading the coal into large cars or trucks. Usually designated according to particular jobs, as fireman, steam shovel; groundman; power-shovel operator. *D.O.T. 1.*

coal substance. Coal excluding its mineral matter and moisture. *B.S. 3323, 1960.*

coal tar. Tar obtained by the destructive distillation of bituminous coal, usually in coke ovens or in retorts and consisting of numerous constituents (as benzene, xylenes, naphthalene, pyridine, quinoline, phenol, cresols, light oil, and creosote) that may be obtained by distillation. *Webster 3d.*

coal-tar color. Color composed of or containing any substance derived from coal tar, or any substance so related in its chemical structure to a constituent of coal tar as to be capable of derivation from such constituent. *Bennett 2d, 1962.*

coal-tar creosote; creosote oil; liquid pitch oil. Dark, yellow to greenish oil obtained from coal-tar distillation; specific gravity 1.030 to 1.080; boiling point 200 to 300° C.; used as disinfectant, wood preservative. *Bennett 2d, 1962.*

coal-tar oils. Oils obtained by the distillation of coal tar; classified into light and heavy oils. A light oil is one having a specific gravity less than 1.000 and contains the coal-tar napthas. The heavy oils sink in water and contain such compounds as creosote, anthracene, anthracene oil, etc. *Porter.*

coal-tar pitch. A dark brown to black residuum from the distillation of coal tar, ranging from a sticky mass to a brittle solid, depending on the degree of distillation. Most coal-tar pitch made melts between 60° and 70° C. Used for waterproofing; roofing; paving compounds and fillers; insulation; fuel briqueting; core compounds; electrodes; pitch-coke; and fuel. *Hess.*

coal tar, viscous. Amorphous, resinous phenolic residue from the manufacture of gas from coal; specific gravity, 1.08 to 1.25; and soluble in ethyl alcohol. Used in roofing compositions and in roadmaking. *Bennett 2d, 1962.*

coal testing. Evaluating coals by methods other than chemical, such as determining the relative values of different coals as fuels by burning them under controlled conditions in furnaces, or to determine their gas and coke producing properties by testing in a retort. Coal testing is frequently erroneously used, especiallyl in coal marketing, for coal analysis. *Bureau of Mines Staff.*

coal tipple. A tipple. *Mathews, v. 1, p. 347.*

coal tower operator. In the light, heat, and power industry, one who unloads coal from barges into coal tower hoppers, using an electric hoist to actuate the scoop bucket traveling on a beam suspended from the coal tower over the barge. *D.O.T. 1.*

coal trade. a. The mining and distribution of coal. *Craigie, v. 1, p. 539.* b. Coal merchants. *Craigie, v. 1, p. 539.*

coal train. A train loaded with coal. *Craigie, v. 1, p. 539.*

coal trimmer. In ore dressing, smelting, and refining, one who operates a small, electric-powered tram (car) to transoprt coal from storage bins to roasting furnaces where it is used as a fuel in roasting ore to eliminate undesirable elements. *D.O.T. 1.*

coal trimmer. One who is employed to stow and trim or shift coal on board vessels, either as cargo or supply for furnaces. *Fay.*

coal type. a. A variety of coal, such as common banded coal, cannel coal, algal coal, and splint coal. The distinguishing characteristics of each type of coal arise from the differences in the kind of plant material that produced it. *A.G.I.* b. A coal, particularly a bituminous coal, contains bands or layers which are dissimilar and which are believed to have been formed mainly from selected portions of the plant material forming the seam. These bands, which have been given the terms vitrain, clarain, durain, and fusain, are the dieffrent types of coal in that seam. *Nelson.*

coal vend. a. Eng. The general sale of coal. *Fay.* b. The limited quantity of coal to which each colliery was restricted by a former combination of coal operators on the Tyne river. *Fay.*

coal wall. Scot. The coal face. *Fay.*

coal warrant. In Wales, a kind of fire clay forming the floor of a coalbed. *Fay.*

coal washer. a. In the coal mining and coke products industry, one who washes coal, using equipment, such as launders, shakers, screens, and conveyors to separate coal from slate, rock, and other impurities, usually by gravity separation. May be designated according to equipment tended, as free-discharge washer operator; seal-discharge washer operator; washer table man. Also called coal-washer tender; wash-coal conveyorman; washerman; washer operator. *D.O.T. Supp.* b. A place where mined coal is jigged, sized, and treated by sink-float methods, or by froth-flotation to remove ash, shale, sulfur and other unwanted products. The resulting vend product is graded to size and regulated for maximum ash content. Also called cleaning plant; preparation plant. *Pryor, 3.*

coal-washer tender. *See* coal washer, a. *D.O.T. 1.*

coal washing. *See* washing apparatus. *Fay.*

coal wheeler. In the iron and steel industry, a laborer who shovels coal into a wheelbarrow and pushes it to the furnaces. *D.O.T. 1.*

coal-whipper. Gr. Brit. One (as a laborer or a machine) that raises coal out of the hold of a ship. *Webster 3d.*

coal wood. Wood to be burned for charcoal. *Craigie, v. 1, p. 539.*

coal work. a. N. of Eng. Headings driven in coal. *Fay.* b. Scot. A colliery. *Fay.*

coal workings. A coal mine with its appurtenances; a colliery. *Standard, 1964.* Coal works. *Fay.*

coalyard. A place where coal is stored. *Creigie, v. 1, p. 539.*

coaly rashings. Soft dark shale, in small pieces, containing much carbonaceous matter. *Zern.*

coarse; coose. A vein or the material that comes from it when it is not rich, the mineral being thinly disseminated through it. Inferior; faulty. *Fay.*

coarse aggregate. Aggregate predominantly retained on the No. 4 (4.76 millimeters) sieve; or that portion of an aggregate retained on the No. 4 (4.76 millimeters) sieve. *ASTM C125-66.*

coarse gold. Gold in large grains as distinguished from gold dust. Also called coarse quartz gold. *Mathews, v. 1, p. 348.*

coarse-grained. Applied to rocks composed of large grains; used mainly in a relative sense, but an average size greater than 5 millimeters in diameter has been suggested. *Stokes and Varnes, 1955.*

coarse-grained soil. A soil in which gravel and sand predominate. Coarse-grained soils are those least affected by moisture-content changes and most surface rain, etc., becomes gravitational water. *Nelson.*

coarse jigs. The jigs used to handle the larger sizes and heavier grades of ore or metal. *Weed, 1922.*

coarse lode. A lode not rich. *See also* coarse. *Fay.*

coarse metal. An iron-and-copper matte containing sulfur; a product of copper smelting in a reverberatory furnace. *Standard, 1964.*

coarsening. *See* grain growth. *ASM Gloss.*

coarse roll. A large roll for the preliminary crushing of large pieces of ore, rock, or coal. Used in stage crushing. *Fay.*

coarse sand. Sand with a diameter between 0.5 millimeter and 1 millimeter. *A.G.I.*

coast. A strip of land of indefinite width extending along the seashore. *Schieferdecker.*

coastal plane. A low, level plain composed of horizontal or of gently sloping strata of clastic material. One of its margins is the coast. It represents a portion of the sea floor that recently emerged, and it borders the pre-existing land which was uplifted with it. *Bureau of Mines Staff.*

coastal terrace. *See* marine terrace. *Schieferdecker.*

Coast and Geodetic Survey. A Bureau of the U.S. Government charged with the topographic and hydrographic survey of the coast and the execution of belts of primary triangulation and lines of precise leveling in the interior. *Fay.*

coaster. Corn. One who picks ore from the dump or abandoned mines. *Fay.*

coastline. a. Technically, the line that forms the boundary between the coast and the shore. *A.G.I.* b. Commonly, the line that forms the boundary between the land and the water. *A.G.I.*

coast of transverse deformation; composite coast. A coast consisting of alternating zones of submergence and emergence, connected with zones of downwarping and upwarping which are transverse to the coast. *Schieferdecker.*

coast plain. A plain of denudation or a base level. It makes a sea level, to which the land has been reduced by subaerial forces. The coast plain, not to be confused with the ordinary coastal plain of uplifted marine sediments, is wave cut. *A.G.I.*

coast with tidal flats. A coast in front of which a shallow sea with numerous tidal flats is situated, usually protected against the open sea by an offshore bar. *Schieferdecker.*

coated abrasive. An abrasive product, sandpaper for example, in which a layer of abrasive particles is firmly attached to a paper, cloth, or fiber backing by means of glue or synthetic-resin adhesive *ASM Gloss.* The principal abrasives used for this purpose are crushed quartz, garnet, aluminum oxide, and silicon carbide. *AIME, p. 4.*

coated chippings. Chippings of stone which have been thinly coated with bituminous substance for spreading over the wearing surface of a road. *Ham.*

coated diamond. A diamond having a dull coating, usually very thin. *Bureau of Mines Staff.*

coated electrode. A filler-metal electrode, used in arc welding, consisting of a metal wire with a light coating, usually of metal oxides and silicates, applied subsequent to the drawing operation primarily for stabilizing the arc. Contrast with covered electrode. *ASM Gloss.*

coated macadam. Coarse road stone which has been coated with tar or bitumen. *See also* tarmacadam. *Ham.*

coated ore. Cumb. Lead ore in lumps, covered over with a crust of white spar and fibrous lead ore, called by the miners coated ore. *Arkell.*

coated products. Flexible abrasive products where the paper cloth or fiber sheets are coated on one side with abrasive bond mixture. *See also* abrasive disk. *ACSG, 1963.*

coated stone. A stone entirely covered by some transparent material to improve its color. *See also* altered stone. *Shipley.*

coat hanger. Term applied to alloy crosspieces in a continuous furnace on which ware is hung. *Enam. Dict.*

coating clay. A high-grade, smooth, grit-free, white china clay for coating paper and textiles. *CCD 6d, 1961.*

coatings. *See* ceramic coating and slip coating. *ACSG, 1963.*

coaxial cable. Electrical cable with inner conducting wire covered by alternating layers of insulating and conducting material. *Pryor, 3.*

coaxing. Improvement of the fatigue strength of a specimen by the application of a gradually increasing stress amplitude, usually starting below the fatigue limit. *ASM Gloss.*

cob. a. Corn. To break ore with hammers so as to sort out the valuable portion. *Fay.* b. Derb. A small solid pillar of coal left as a support for the roof. *Fay.*

coba. Uncemented sand and gravel underlying nitrate deposits in Chile. *A.G.I. B-107.*

cobalt. A tough, lustrous, nickel-white or silvery-gray, metallic element in group VIII of the periodic system. Similar in properties to iron, but harder. It is magnetic below 1,075° C and can take a high polish. Symbol, Co; isometric; atomic number, 27; atomic weight, 58.933; valences, 2 and 3; sepcific gravity, 8.9 (at 20° C); melting point, 1,495° C; electric resistivity, 6.35×10^{-6} ohm per cubic centimeter (at 20° C); and tensile strength (commercial cobalt containing carbon), 29 tons per square inch. Used extensively in alloys. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-107.*

cobalt aluminate; cobaltous aluminate; Thenards blue. $Co(AlO_2)_2$; molecular weight, 176.89; blue; isometric; and insoluble in water. *Bennett 2d, 1962.*

cobalt-ammonium sulfate. *See* cobaltous-ammonium sulfate. *CCD 6d, 1961.*

cobalt arsenate. *See* cobaltous arsenate. *CCD 6d, 1961.*

cobalt bloom. Hydrated arsenate, $Co_3As_2O_8 . 8H_2O$. *Pryor, 3. See also* erythrite.

cobalt-bonded. Particles of a refractory material, as powdered tungsten carbide, cemented together with cobalt to form a metallike mixture. *Long.*

cobalt carbonate. *See* cobaltous carbonate, basic. *CCD 6d, 1961.*

cobalt-cemented. Synonym for cobalt-bonded. *Long.*

cobalt chloride. *See* cobaltous chloride. *CCD 6d, 1961.*

cobalt-chromium steel. A steel said to resist pitting and high-temperature deformation; has been used for valves of internal-combustion engines; contains 80 percent iron, 13.3 percent chromium, 3.7 percent cobalt, 1.5 percent carbon, 0.7 percent molybdenum, 0.4 percent silicon, and 0.4 percent manganese. *Camm.*

Cobalt fluosilicate; cobaltous silicofluoride. Pale red; hexagonal trigonal; $CoSiF_6 . 6H_2O$; specific gravity, 2.113 (at 19° C); and soluble in water. Used in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-169.*

cobalt glance. *See* cobaltite. *Fay.*

cobalt glass. Blue paste (glass) colored with cobalt *Shipley.*

cobaltic. Of, pertaining to, or containing cobalt in the trivalent state; for example, cobaltic oxide (Co_2O_3). *Webster 3d.*

cobaltic boride; cobalt monoboride. Crystalline prisms; CoB; specific gravity, 7.25 (at

18° C); soluble in nitric acid; decomposes in water; and melting point, above 1,400° C. Used in ceramics. *CCD 6d, 1961.*

cobaltic oxide; cobalt oxide. Steel-gray or black; hexagonal or orthorhombic; Co_2O_3; soluble in concentrated acids; insoluble in water; and specific gravity, 4.81 to 5.60. Used in coloring enamels, glazing pottery, and as a pigment. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-169.*

cobaltiferous lollingite. *See* cobalt lollingite.

cobaltiferous wad. An impure hydrated oxide of manganese containing up to 30 percent of cobalt. *C.M.D.*

cobaltite; cobalt glance. A silver-white to gray mineral, CoAsS; metallic luster; contains 35.5 percent cobalt; Mohs' hardness, 5.5; specific gravity, 6 to 6.3; found in Canada, Republic of the Congo, and Sweden. Used in ceramics. An important cobalt ore. *CCD 6d, 1961.*

cobalt lollingite; cobaltiferous lollingite. Synonym of safflorite, which always contains iron, $(Co,Fe)As_2$, and gives the same X-ray pattern as lollingite. *Spencer 16, M.M., 1943.*

cobalt melanterite. Same as bieberite. *English*

cobalt minerals. Minerals containing cobalt, such as linneite, cobaltite, erythrite, and smaltite. *Fay.*

cobalt molybdate. A molybdenum catalyst (a gray-green powder). Used in petroleum technology, in reforming and desulfurization. *CCD 6d, 1961.*

cobalt monoxide. *See* cobaltous oxide. *CCD 6d, 1961.*

cobalt-nickel compound. A product of the refining of certain ores which contain cobalt and nickel. The compound is a mixture of the oxides of cobalt and nickel and is used in smelting dark colored enamels which require both oxides. *Enam. Dict.*

cobaltnickelpyrite. a. A name applied by Vernadsky to a steel-gray member of the pyrite group containing 11.7 to 17.5 percent nickel and 6.6 to 10.6 percent $(Fe,-Ni, Co)S_2$; small, pyritohedral crystals; isometric. Probably a mixture of siegenite and pyrite. From Musen, Westphalia, Germany. *English.* b. As applied by Henglein, a synonym for hengleinite. *Hey 2d, 1955.*

cobaltoadamite. A pale rose-red to carmine variety of adamite in which cobalt replaces some of the zinc. *English.*

cobaltocalcite. Replaces the generally accepted name sphaerocobaltite for rhombohedral $CoCO_3$. Not the cobaltocalcite of F. Millosevich, 1910, a red cobaltiferous variety of calcite. *Spencer 19, M.M., 1952.*

cobalt ocher. Synonym for asbolane; erythrite, a. *Hey 2d, 1955.*

cobaltocobaltic oxide; tricobalt tetroxide. Steel-gray to black; isometric; molecular weight, 240.80; Co_3O_4; insoluble in water, in hydrochloric acid, and in nitric acid; soluble in sulfuric acid and in fused sodium hydroxide; and specific gravity, 6.07. Used in ceramics; pigments; catalysts; and as a source of cobalt metal. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-169.*

cobaltosphaerosiderite. A peachblossom red carbonate of iron, manganese, magnesium, cobalt, and calcium; rhombohedral. Also spelled cobaltospharosiderite. *English.*

cobaltous. Of, pertaining to, or containing cobalt in the bivalent state; for example, cobaltous oxide (CoO). *Webster 3d.*

cobaltous-ammonium sulfate; cobalt-ammonium sulfate. Ruby-red; crystalline; $CoSo_4$-$(NH_4)_2So_4.6H_2O$; soluble in water; insoluble in alcohol; and specific gravity, 1.902. Used in ceramics; in cobalt plating; and as a catalyst. *CCD 6d, 1961.*

cobaltous arsenate; cobalt arsenate; cobaltous orthoarsenate; cobalt orthoarsenate; erythrite; cobalt bloom. Violet-red; monoclinic; $Co_3(AsO_4)_2.8H_2O$; soluble in acids; insoluble in water; and specific gravity, 3.178 (at 15° C). Used for painting on glass and porcelain in light blue colors and for coloring glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-168.*

cobaltous carbonate; cobalt carbonate; spherocobaltite. Red; hexagonal trigonal; $CoCO_3$; insoluble in water and in ammonia; soluble in acids; and specific gravity, 4.13. Used in ceramics. The cobalt carbonate of commerce is usually the basic salt. *See also* cobaltous carbonate, basic. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-168.*

cobaltous carbonate, basic; cobalt carbonate, basic. Red-violet; crystalline; $2CoCO_3$.-$3Co(OH)_2.H_2O$; soluble in acids; and insoluble in cold water. The cobalt carbonate of commerce. Used in manufacturing cobaltous oxide; cobalt pigments; and cobalt salts. *CCD 6d, 1961.*

cobaltous chloride; cobalt chloride. Blue; hexagonal; $CoCl_2$; hygroscopic; soluble in water and in alcohol; and specific gravity, 3.348. Used as an absorbent for ammonia; in gas masks; in electroplating; as a flux for magnesium refining; as a solid lubricant; as catalysts; and in barometers. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. 1964, p. B-168.*

cobaltous chloride hexahydrate; cobalt chloride hexahydrate. Ruby-red; monoclinic; $CoCl_2.6H_2O$; loses $6H_2O$ at 110° C; soluble in water and in alcohol; and specific gravity, 1.924 (at 25° C, referred to water at 25° C). Used as an absorbent for ammonia; in gas masks; in electroplating; as a flux for magnesium refining; as a solid lubricant; as catalysts; and in barometers. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-169.*

cobaltous chromate; cobalt chromate. $CoCrO_4$; gray-black crystals; soluble in acids, in ammonium hydroxide, and in solution of chromium trioxide; insoluble in water. Used in ceramics in tinting. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–169.* Also used with aluminum oxide and zinc oxide to produce light stains in vitreous enamel and, with the same oxides, to prepare light green stains. *Lee.*

cobaltous nitrate; cobalt nitrate. Red; monoclinic; $Co(NO_3)_2.6H_2O$; deliquescent; loses $3H_2O$ at 55° C; soluble in water and in acids; and specific gravity, 1.88. Used in porcelain decoration; in cobalt pigments; and in the preparation of cobalt catalysts. *CCD 6d, 1961.* Appears to be desirable for light-colored, first-coat enamels for sheet iron. *Lee.*

cobaltous orthophosphate octahydrate; cobalt orthophosphate octahydrate. A reddish powder; $Co_3(PO_4)_2.8H_2O$; specific gravity, 2.769 (at 25° C); loses $8H_2O$ at 200° C; slightly soluble in cold water; soluble in mineral acids; and insoluble in alcohol. Used in manufacturing cobalt pigments; in coloring glass; and in painting on porcelain in light blue colors. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-169.*

cobaltous oxide; cobalt oxide; cobalt monoxide. A grayish powder; green-brown isometric crystals; CoO; soluble in acids; insoluble in water; specific gravity, 6.45, ranging from 5.7 to 6.7; and melting point, 1,935° C. Used as a pigment in ceramics; as a catalyst; for the preparation of cobalt salts; in porcelain enamels; and in coloring glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–169.* Also used as a coloring medium in glass, glazes, and enamel; as a decolorizer in glass and enamel; in combination with either manganese or selenium, usually the latter, for the purpose of masking excess yellow color; and in ground coat enamel to give it a tight grip on the metal base. *Lee.*

cobaltous sulfate; cobalt sulfate. A red powder; hexagonal; $CoSO_4$; soluble in water; and specific gravity, 3.71 (at 25° C). Used in ceramics; pigments; and glazes; and in plating baths for cobalt. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-170.*

cobaltous sulfate heptahydrate; cobalt sulfate heptahydrate; bieberite. Red to pink; monoclinic; $CoSO_4.7H_2O$; molecular weight, 281.10; specific gravity, 1.948 (at 25° C, referred to water at 25° C); melting point, 96.8° C; loses $7H_2O$ at 420° C; and soluble in water, in ethyl alcohol, and in methyl alcohol. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B–170.* Used in ceramics; pigments; and glazes; and in plating baths for cobalt. *CCD 6d, 1961.* Also used in whiteware bodies to impart a blue or blue-white color, and sometimes used in decorative work where a soluble compound is needed to make solutions for spray work, as on art pottery. *Lee.*

cobalt pentlandite. The cobalt analogue of pentlandite, Co_9S_8, from northern Karelia. *Hey, M.M.I, 1961.*

cobalt-potassium nitrite; potassium cabaltinitrite; Fischer's salt; cobalt yellow. Yellow; isometric; $K_3Co(NO_2)_6$; molecular weight, 452.27; specific gravity, 5.18; slightly soluble in water; and insoluble in alcohol Used as a yellow pigment and in painting on glass or porcelain. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-206.*

cobalt praseochloride; cis-chloroaquotetrammine cobalt (III) chloride. $Co(NH_3)_4Cl_3$-H_2O; molecular weight, 251.42; violet; orthorhombic; specific gravity, 1.847; soluble in water and in acids; and insoluble in alcohol. *Bennett 2d, 1962 Add.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-170.*

cobalt pyrites. *See* linncite. *Fay.*

cobalt sesquisulfide; cobaltic sesquisulfide. Co_2S_3; molecular weight, 214.06; black crystals; specific gravity, 4.8; and insoluble in water. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-170.*

cobalt 60. Radioactive cobalt of mass number 60. One of the most common radioisotopes. Half-life, 5.3 years; radiation, beta and gamma. Cobalt 60 emits gamma rays which have about the same penetrating power as those from radium. Used for radiographic testing of welds and castings; and as a research aid in studying the permeability of porous media to the flow of oil, and the oil consumption in internal-combustion engines. *CCD 6d, 1961.*

cobalt skutterudite. The pure end member, $CoAs_3$, of the skutterudite series. *Hey, MM, 1964.*

cobalt steel. Alloy characterized by great hardness and brittleness. Used in high-speed steel to improve cutting power. *Pryor, 3.*

cobalt vitriol. *See* red vitriol; rose vitriol. *Fay.*

cobalt zincate. Green powder; insoluble in water; and soluble in acid. Used as a pigment. *Bennett 2d, 1962.*

cobbed ore. a. Eng. Ore broken from veinstone by means of a small hammer. *Fay.* b. Ore from which as much barren rock as practicable has been broken off with hand hammers. *Bureau of Mines Staff.*

cobbe pan. Grinding pan. *Pryor, 3.*

cobber. a. In the asbestos products industry, a laborer who stands before a bench and breaks asbestos fibers away from asbestos-bearing rock with a light hammer. *D.O.T. 1* b. In metal mining, a laborer who chips gangue (waste rock) from lumps of ore with a hammer, thus increasing the percentage of valuable minerals and reducing the amount of gangue to be handled in treating the ore at the mill or smelter. Also called cobber man. *D.O.T. 1.*

cobber man. *See* cobber. *D.O.T. 1.*

cobbing. a. Rubble, as from furnace bottoms, impregnated with copper. *Standard, 1964* b. Refers to a crude separation at coarse sizes, usually by magnetite methods. *Bureau of Mines Staff* c. Hand concentration in which lumps of concentrate are detached from waste, using a 3-pound chisel-edged hammer. Term also used for whole sorting operation. *Pryor, 3.*

cobbing board. A flat piece of wood used in cobbing. *Fay.*

cobbing hammer. A special chisel type of hammer to separate the mineral in a lump from the gangue in the hand picking of ores. *Nelson.*

cobble. a. Eng. Small lump coal. *See also* cob coal. *Fay* b. A waterworn rounded stone, especially of the size suitable for paving. Also called cobblestone. *Arkell.* c. A rock fragment between 64 and 256 millimeters in diameter; larger than a pebble and smaller than a boulder, rounded or otherwise abraded in the course of aqueous, eolian, or glacial transport. Synonym for boulderet; cobblestone. *A.G.I.* d. A usually rounded or semirounded rock fragment having an average dimension ranging from 3 to 12 inches. *Long* e. Penna: In metallurgy of iron, an imperfectly puddled ball which goes to pieces in the squeezer. *Fay.*

cobble gravel. Deposit of uncemented cobbles or cobblestones. *A.G.I. Supp.*

cobble riffle. A sluice with a cobble-paved bottom used in placer mining. It lasts considerably longer than wood or cobblestone but a steeper slope is necessary for the flow of material. *Nelson.*

cobbles. a. A graded size of anthracite below large coal—about 5 inches. *Nelson.* b. Coke tinplates so poor as to require complete scrapping. *Bennett 2d, 1962.*

cobblestone. a. Synonym for cobble. *A.G.I. Supp.* b. A rounded rock suitable for paving a street or road. *A.G.I. Supp.*

cobbling. Eng. Cleaning the haulage road of coal that has fallen off the trams. *Fay.*

cob coal. A large round piece of coal. *Fay.*

Coblentzian. Upper Lower Devonian. *A.G.I. Supp.*

Coblenzian. Synonym for Coblentzian. *A.G.I. Supp.*

cob mill. A type of grinder used to crush large lumps of caked raw materials in the enamel mixing room. *Enam. Dict.*

cobra stone. Chlorophane. *Bureau of Mines Staff*

cob wall. A wall built of unburned clay, sometimes mixed with straw, or of straw, lime, and earth. *Fay.*

cocarde ore. Fragments of rock encrusted with metallic minerals. Also called sphere ore. *Hess.*

coccolith. A minute calcareous body found in chalk and deep-sea ooze and constituting the skeletal remains of a coccolithophore. *Webster 3d.*

cocinerite. A silver-gray sulfide of copper and silver, Cu_4AgS. Massive. Perhaps a variety of stromeyerite. From Ramos, Mex. *English.*

cocite. A dark, fine-grained, yellowish-green dike rock with prominent crystals of olivine and diopside in a dense groundmass of leucite, orthoclase, biotite, and magnetite. *Johannsen, v. 4, 1938, p. 279.*

cock. A device for regulating or stopping the flow in a pipe, made by a taper plug that may be rotated in a body having ports corresponding to those in the plug. *Porter. See also* drain valve.

cockade ore. a. Cockscomb pyrite; a form of marcasite. *Fay* b. Crusts of different minerals deposited successively around rock fragments. *Bateman.*

cockade structure. a. Concentric rings of different sulfides (and gangue ?) surrounding inclusions. *A.G.I.* b. Applied to successive crusts of unlike minerals deposited upon breccia fragments in a vein. Fragments of rock or ore are enclosed by successive crusts of other minerals. *Stokes and Varnes, 1955; Schieferdecker.*

cocker. To set supports herringbone fashion. *Mason.*

cockering. Herringbone supports. A method of support by which a center suport of beams or bars running longitudinally along the roof of a road is supported systematically by slanted struts or props with their feet spragged in the side of the road, the whole looking like a herringbone. *Mason.*

cockermegs; cockers; cockersprags. Temporary supports for the coal face. A short crosspiece is held to it by two slanting props, one hitched in the floor and the other in the roof. *Pryor, 3.*

cockerpole. A piece of timber placed horizontally between two inclined pieces which abut against the roof and floor. *Fay.*

cockers. *See* cockermegs. *Pryor, 3.*

cocker sands. Eng. Quicksands, Lancashire and Kent. *Arkell.*

cockersprags. *See* cockermegs. *Pryor, 3.*

cockhead. Derb. A pack to support the roof. It consists of slack or waste and is about 12 feet in width, surmounted by a few lumps of coal. *Fay.*

cockle. a. Corn. Schorl or black tourmaline. *Fay.* b. Any mineral occurring in dark, long crystals, especially schorl. *Webster 2d.* c. Eng. A black, thready mineral, seeming to be a fibrous talc, Cornish tin mines. *Arkell.* d. Eng. An ironstone nodule. *Arkell.* e. Cornish name for hard siliceous rocks. *Arkell.* f. Dev. Schorl rocks. *Arkell.*

cockles. Eng. Flat and broad blue stone, containing shells, used for building, Lower Lias, Axminster. *Arkell.*

cockleshell. York. Black shale full of carbonicola shells in Adwalton stone coal. *Arkell.*

cockloft. Aust. A raise or crosscut in deep lead operations to connect two sets of workingsc at different horizons. *Nelson.*

cock metal. A soft alloy composed of 2 parts copper and 1 part lead; used for making taps and cocks. *Fay.*

cocko. A piece of slate or bony. *Korson.*

cockpit. That part of a tractor or grader containing the operator's seat and controls. *Nichols.*

cockscomb pyrites. A crestlike variety of marcasite. *Webster 3d.*

cocoa mat. A fabric of wood fibers used to distribute water evenly over a smooth surface. *Nichols.*

coconut amine. Amine of coconut fatty acids; an oil. Used in ore flotation as a selective collector and used for rustproofing metal surfaces. *Bennett 2d, 1962.*

coconut piece. A special shape of ceramic wall tile. *Dodd.*

cocopan. Term used in South Africa for the rocker-dumping type of tipping truck. *Higham, p. 313.*

cod. Newc. The bearing of an axle. *Fay.*

code a. A unified and coordinated body of law; especially, re-enactment, in improved and systematic form, of previously existing law, whether derived from statute, prescription, or judicial decisions. *Standard, 1964.* b. A system of signals or of characters used to represent letters or words, or in any way to communicate intelligence, as a cipher code, naval code, or telegraphic code. *Standard, 1964.* c. A system of rules and regulations generally approved and formally applied for conduct in particular cases; as in the mining code. *Standard, 1964.*

codorous ore. A highly siliceous hematite containing only a trace of phosphorus, but high in potash. *Osborne.*

cod piece. Aust. A wooden fishplate used for connecting the segments of a curb in shafts. *Fay.*

cod placer. *See* placer. *Dodd.*

coe. Eng. a. A small cabin built over the shaft. *Fay.* b. Derb. A small ore house. *Bureau of Mines Staff.*

coefficient. a. Something that unites in action to produce an effect; a joint agent. *Webster 3d.* b. Any of the factors (as constants) of a product considered in relation to another factor (as a variable). *Webster 3d.* c. A number that serves as a measure of some property (as of a substance or body) or characteristic (as of a device or process) and that is commonly used as a factor in computations. *Webster 3d.* d. Measure; degree. *Webster 3d.* e. A prefixed number to be used as a multiplier. *Crispin.* f. A number indicating the degree of a quality of a substance or material. *Crispin.*

cofficient of absolute viscosity. *See* coefficient of viscosity. *ASCE P1826.*

coefficient of acidity. The figure expressing the following ratio, calculated from the molecular proportions of the constituents of a rock or slag:

$$\frac{\text{Number of atoms of oxygen in } SiO_2}{\text{Number of atoms of oxygen in the basic oxides}}$$

Holmes, 1928.

coefficient of active earth pressure. *See* coefficient of earth pressure. *ASCE P1826.*

coefficient of compressibility. a. A measure of the deviation of a gas from Boyle's law.

See also Boyle's law. *C.T.D.* b. Change in void ratio per unit of pressure change. *Pryor, 3.*

coefficient of consolidation. In the consolidation of soils, we obtain a value for the coefficient expressed in square centimeters per minute, where the permeability is in centimeters per minute. *See also* consolidation press. *Ham.*

coefficient of contraction. This is related to the vena contracta, and is the ratio between the minimum cross-sectional area of a jet of water flowing through an orifice under pressure, and the cross-sectional area of the orifice itself. *Ham.*

coefficient of discharge. Ratio of observed to theoretical discharge. For a siphon this coefficient should be based on the area of the outlet. *Seelye, 1.*

coefficient of earth pressure. The principal stress ratio at a point in a soil mass. *See also* active coefficient of earth pressure; passive coefficient of earth pressure; at rest (coefficient of earth pressure). *ASCE P1826.*

coefficient of elasticity. Same as modulus of elasticity. *ASM Gloss.*

coefficient of equivalence. *See* equivalence, coefficient of. *C.T.D.*

coefficient of expansion. The factor which expresses the change per unit length of any material for each degree of temperature. *Crispin.*

coefficient of friction. a. The frictional resistance of each square foot of rubbing surface when the velocity of the air current is 1,000 feet per minute. *Nelson* b. A numerical expression of the relationship between pressure and the resistance force of friction. This relationship is subject to many variables such as whether it is applied to holding friction, sliding friction, rolling friction, or internal friction of a bulk material; whether the surfaces in contact are smooth or rough, the kind of material composing those surfaces, if they are wet or dry, lubricated or nonlubricated. The coefficient of friction is used in determining the power necessary to drive a machine, to determine the slope angles used in hoppers, bins, chutes, and bunkers; or to determine the maximum angle of inclination for a conveyor. *ASA MH4.1-1958.*

coefficient of heat transmission. The quantity of heat (in the United States, usually Btu) transmitted from fluid to fluid per unit of time (usually 1 hour) per unit of surface (usually 1 square foot) through a material or arrangement of materials under a unit temperature differential (usually 1° F) between fluids. Commonly used for building maetrials. *Strock, 10.*

coefficient of internal friction. The tangent of the angle of internal friction. *ASCE P1826.*

coefficient of linear expansion. The expansion per ° C or ° F per unit of length. *Bureau of Mines Staff.*

coefficient of permeability; permeability. The rate of flow of water under laminar flow conditions through a unit cross-sectional area of a porous medium under a unit hydraulic gradient and a standard temperature, usually 20° C. *ASCE P1826.*

coefficient of roughness. A factor in the Kutter, Manning, Bazin, and other formulas expressing the character of a channel as affecting the friction slope of water or air flowing therein. *Seelye, 1.*

coefficient of scatter. The rate of increase of reflectance with thickness at infinitesimal thickness of porcelain enamel over an ideally black backing. *ASTM C286-65.*

coefficient of subgrade reaction; modulus of subgrade reaction. The ratio of load per unit area of horizontal surface of a mass of soil to corresponding settlement of the surface. It is determined as the slope of the secant, drawn between the point corresponding to zero settlement and the point of 0.05-inch settlement, of a load-settlement curve obtained from a plate load test on a soil using a 30-inch, or larger diameter, loading plate. It is used in the design of concrete pavements by the Westergaard Method. *ASCE P1826.*

coefficient of thermal diffusion; thermal diffusivity. A thermal property of matter with the dimensions of area per unit time. *A.G.I.*

coefficient of thermal expansion (linear). The fractional change in length of a body per degree of temperature change. *ACSG, 1963.*

coefficient of traction. Represents the percentage of the total engine power that can be converted into forward motion by means of the friction between tire or track. *Carson, p. 68.*

coefficient of transmissibility. *See* transmissibility coefficient.

coefficient of uniformity. The ratio of the particle size for 60 percent finer by weight to the effective diameter, the latter being the particle size for 10 percent finer by weight. *Ham.*

coefficient of utilization method. *See* Lumen method of design. *Roberts, II, p. 63.*

coefficient of variation. A statistical term which measures the relative variation of a series of values from the mean or average value:

$$C = \frac{S}{\bar{X}},$$

where C equals coefficient of variation, S equals standard deviation, and $\bar{X}$ equals mean, average. Also called relative standard deviation. *Bureau of Mines Staff.*

coefficient of velocity. The rate of transformation of a unit mass during chemical reaction. *Pryor, 3.*

coefficient of viscosity. a. The shearing force per unit area required to maintain a unit difference in velocity between two parallel layers of fluid a unit distance apart. Also called coefficient of absolute viscosity. *ASCE P1826.* b. The value of the tangential force per unit area required to maintain unit relative velocity between two parallel planes unit distance apart. Values of viscosity in centimeter-gram-second units are: air, 0.00018; water, 0.01; and glycerin, 11. *See also* viscosity. *Nelson.*

Coelenterates. The group of animals which includes the jellyfishes, corals, and Hydroids. *Hy.*

coercimeter. An instrument for measuring the magnetic intensity of a natural or artificial magnet. *Bureau of Mines Staff.*

coercive force; coercive field. The opposing magnetic intensity that must be applied to a magnetized substance to reduce the magnetic induction in the material to 0. *Compare* coercivity. *Webster 3d.*

coercivity. The property of a material determined by the value of the coercive force when the material has been magnetized to saturation. *Webster 3d.*

coeruleolactite. A milky-white to light blue hydrous phosphate of aluminum; occurs in fibrous crusts. A member of the turquoise group. *Dana 6d, p. 846; American Mineralogist, v. 43, No. 11–12, November-December 1958, p. 1224.*

coesite. Named from L. Coes who first obtained this form of silica; produced at 500° to 800° C and a pressure of 35 kilobars with specific gravity, 3.01; insoluble in HF. *Dodd.*

coestead. Eng. A small building. *See also* coe, a. *Fay.*

Coeur D'Alene lagging. *See* lagging. *Lewis p. 48.*

coffeepot lamp. Aust. An ordinary coal miner's open oil lamp, similar in shape to a coffeepot. *Fay.*

coffee shale. Drillers' term in the Appalachian basin for well cuttings of dark colored shale chips mixed wih light-colored mud. *A.G.I.*

coffer, cofer. a. Derb. To secure a shaft from leaking by ramming in clay behind the masonry or timbering. *Fay.* b. Corn. *See* mortar, b. *Fay.* c. A rectangular plank frame, used in timbering levels. *Fay.* d. A floating dock; a caisson. *Standard, 1964.*

cofferdam. a. A temporary watertight enclosure (as of piles packed with clay or of metal plates) from which the water is pumped to expose the bottom of a body of water and permit construction (as of foundations or piers). *Webster 3d.* b. A method of shaft sinking through saturated sand or mud near the surface. A cofferdam is an enclosure, open to the air, which keeps water out of the shaft area to allow excavation to proceed. The enclosing wall is constructed by driving down strips of steel with interlocking edges or concrete piles, reinforced with steel. In general, cofferdams are only used for short lengths and where piles can be driven into an impervious deposit, so that normal pumping will keep the shaft sufficiently dry for working. *See also* drop shaft; drum, j; iron and steel sheet piling; piling, a. *Nelson.* c. A set of temporary walls designed to keep soil and/or water from entering an excavation. *Nichols.*

coffering. a. The operation involved in the construction of dams for impounding water. *C.T.D.* b. A method of shaft sinking through loose, watery, or running ground. It consists in lining the shaft with a thick wall, made of brick and cement or brick and hydraulic lime with puddled clay in all cavities. Used for keeping back surface water but the method is now somewhat obsolescent. *Nelson.*

coffin. a. Corn. An old, open-mine working, in which the ore is cast up from platform to platform. *Standard, 1964.* b. A heavily shielded shipping cask for spent fuel elements. Some coffins weigh as much as 75 tons. *L&L.*

coffinite. A naturally occurring uranium mineral, $U(SiO_4)_{1-x}(OH)_{4x}$ (or $USiO_4$ with appreciable $(OH)_4$ in place of some SiO_4). Specific gravity, 5.1; luster adamantine; color black; commonly fine-grained and mixed with organic matter and other minerals. Found in Colorado, Utah, Wyoming, and Arizona. An important ore of uranium in some mines on the Colorado plateau. *CCD 6d, 1961.*

coffin lid. *See* coal pipe, c.

cog. a. Straight timbers set in a large bunch. They should be firmly set and as close together as possible. Sometimes 12 to 20 are set at one location. Under conditions where single straight posts will not suffice to control the top, and yet cribs are not needed, the use of cogs may be advantageous. May also be called a battery. *Kentucky, p. 142.* b. A crib made of notched timbers built up like a log house. A chock. cob, corncob, or crib. If the timbers are squared instead of notched, the structure is called a nog. It is ordinarily filled with waste, and rocks are put between the timbers. *Hess.* c. A rock intrusion. *Fay.* d. To consolidate ingots or shape them by hammering or rolling. *Hess.* e. An inserted tooth as in a cogwheel. Gears are often improperly referred to as cogwheels. *Crispin.*

cog-and-rung gin. One of the earliest appliances for hoisting the coal and water from the mine. It was a windlass fitted with a cogwheel and pinion arrangement, and worked by a horse in much the same way as horse gins are worked. *Fay.*

cogger. Eng. One who builds cogs. *See also* cog. *Fay.*

cogging. a. The operation of rolling or forging an ingot to reduce it to a bloom or billet. *C.T.D.* b. The propping of the roof in longwall stalls. *See also* cog; nog. Also spelled coggin. *Fay.*

cogging mill. a. A blooming mill. *ASM Gloss.* b. Usually a two-high reversing mill consisting of two rolls, 2 to 4 feet in diameter, between which the hot ingot is reduced to blooms or slabs. *Osborne, p. 357.*

coggle. A rounded, waterworn stone, especially of the size suitable for paving; a cobble. Also called cogglestone. Same as cobblestone. *Arkell.*

cognate fissure. One fissure of a system of fissures that originated at the same time from the same causes as other fissures in the same system. Cognate may similarly apply to fractures and joints. *Stokes and Varnes, 1955.*

cognate inclusion. A xenocryst or xenolith occuring in an igneous rock to which it is genetically related. Synonym for cognate xenolith; autolith. *Holmes, 1920.*

cognate xenolith. Synonym for cognate inclusion; autolith. *A.G.I.*

cogwheel ore. A miners' name for bournonite. $PbCuSbS_3$. Same as wheel ore. *Dana 17.*

cohenite. The natural, meteoritic material, Fe_3C, the artificial being cementite. *Hey 2d, 1955.*

coherency. The continuity of lattice of precipitate and parent phase (solvent) maintained by mutual strain and not separated by a phase boundary. *ASM Gloss.*

coherent precipitate. A precipitate in a stage intermediate between a solute and a distinct phase, formed from a supersaturated solvent even though the lattice may be distorted. Such a precipitate has no phase boundary. *ASM Gloss.*

cohesion. a. That property of like mineral grains which enables them to cling together in opposition to forces tending to separate them. *Hess.* b. Part of the shear strength of a soil indicated by the term c in Coulomb's equation, $s = c + p \tan \phi$. *See also* apparent cohesion. *ASCE P1826.* c. Force of attraction between the molecules (or atoms) within a single phase. *Compare* adhesion. *ASM Gloss.* d. The soil quality of sticking together. *Nichols.*

cohesional soil. A frictional soil, such as sand, gravel, or clean silt. *Nelson.*

cohesionless soil. a. A soil which when unconfined has little or no strength when air-dried, and which has little or no cohesion when submerged. *ASCE P1826.* b. A frictional soil, such as sand, gravel, or clean silt. *Nelson.*

cohesion of soil. Strength of soil caused by electrostatic attraction of particles and interstitial moisture. Shear strength of soil in excess of that computed from angle of internal friction. *See also* Mohr's diagram; Coulomb's equation. *Bureau of Mines Staff.*

cohesive soil. a. A soil which when unconfined has considerable strength when air-dried, and which has significant cohesion when submerged. *ASCE P1826.* b. A sticky clay or clayey silt as opposed to sand. *Nelson.*

cohesive strength. a. The hypothetical stress in an unnotched bar causing tensile fracture without plastic deformation. *ASM Gloss.* b. The stress corresponding to the forces between atoms. *ASM Gloss.* c. Same as technical cohesive strength; disruptive strength. *ASM Gloss.*

coil. The process of making clay objects by building with ropes or coils of clay. *ACSG, 1963.*

coil breaks. Creases or ridges across a metal sheet transverse to the direction of coiling, occasionally occuring when the metal has been coiled hot and uncoiled cold. *ASM Gloss.*

coil building. A primitive method of shaping clay vessels by rolling clay into a rope which is then coiled to form the wall of the vessel; the inner and outer surfaces of the roughly shaped ware are finally smoothed. *Dodd.*

coil drag. A tool to pick up pebbles, bits of iron, etc., from the bottom of a drill hole. *Fay.*

coiler. In metallurgy, one who winds nonferrous strips and sheets into coils as they emerge from a rolling mill or slitting machine. Also called coiler operator. *D.O.T. Supp.*

coil load. The total amount of heat, in British thermal units per hour, which must be removed from the air by the cooling coils. *Hartman, p. 327.*

coil weld. A butt weld joining the ends of two metal sheets to make a continuous strip for coiling. *ASM Gloss.*

coinage bronze. A copper-base alloy of from 2 to 4 percent tin and 1 to 2 percent zinc. Used for copper coins. *Bennett 2d, 1962.*

coinage copper. *See* coinage bronze. *Bennett 2d, 1962.*

coinage metal. Alloy of 10 percent copper, about 4 percent tin, 1 percent zinc, gold, silver or nickel; used for minting coins. *Bennett 2d, 1962.*

coin gold. In the United States, an alloy of 90 percent gold and 10 percent copper. In Great Britain, an alloy of 91.67 percent gold and 8.33 percent copper. *Bennett 2d, 1962.*

coining. a. A closed-die squeezing operation, usually performed cold, in which all surfaces of the work are confined or restrained, resulting in a well-defined imprint of the die upon the work. *ASM Gloss.* b. A restriking operation used to sharpen or change an existing radius or profile. *ASM Gloss.* c. In powder metallurgy, the final pressing of a sintered compact to obtain a definite surface configuration. (Not to be confused with repressing or sizing.) *ASM Gloss.*

coin silver. Coin silver is 900 fine silver and the balance copper. *BuMines Bull. 630, 1965, p. 811.*

coinstone bed. Cement stone band. Stone suitable for coinstones, quoinstones, and cornerstones, used in building. *Arkell.*

coir. Coconut husk fiber. *Zern.* Used in certain metallurgical processes. *Fay.*

coke. a. Bituminous coal from which the volatile constituents have been driven off by heat, so that the fixed carbon and the ash are fused together. Commonly artificial, but natural coke is also known, for example, where a dike has intersected a bituminous coalbed and has converted the bordering coal to natural coke. *Sanford.* b. A derogatory synonym for carbon; carbonado; black diamond. *Long.*

coke breeze. The fine screenings from crushed coke or from coke as taken from the ovens, of a size varied in local practice but usually passing a $\frac{1}{2}$-inch or $\frac{3}{4}$-inch screen opening. *ASTM D121-62.*

coke bubbles; coke globules. Isolated particles of coke, more or less sperical and usually hollow, cooled while still in suspension, retaining their own shape without aggregation. They are usually found on the floor after explosions. *Rice, George S.*

coke burner. In coke products industry, one who controls the formation (burning) of coke in beehive coke ovens, being responsible for the quality of coke produced; periodically observes the burning coal in each oven, slowing down the process as required by sealing cracks in the bricked doors with loam; and decides when coke is ready for drawing from the color and length of flame in the oven. *D.O.T. 1.*

coke coal. a. N. of Eng. Carbonized or partially burnt coal found on the sides of dikes. *See also* natural coke, a. *Fay.* b. Coal altered by an igneous intrusion. *Arkell.*

coke crusher operator. In the coke products industry, one who tends a mill (crusher) through which coke is run to be crushed to desired size. *D.O.T. 1.*

coke crust. A thin layer of coke of considerable area compared with its thickness, deposited, while plastic, on some surface to which it sticks. *Rice, George S.*

coke drawer. A mechanical device for drawing coke from an oven. *Fay.*

coke drawer, hand. In the coke products industry, a laborer who removes coke from beehive ovens by hand. *D.O.T. 1.*

coke drawing machine helper. *See* scraper out man. *D.O.T. 1.*

coke dust; coked dust. Coal dust which has been coked by the heat of an explosion and has assumed different forms under different conditions usually found near the origin of the explosion, and also where the velocity of the explosion is low, as in a room or wide place, always provided there is at that point an excess of coal dust over that needed for combination with oxygen. The volatile matter of coal dust seems to burn first and, if the coal is a coking coal, coke is formed of one kind or another, depending on the position, temperature, size of dust, and velocity of explosion. *Rice, George S.*

coke iron. Iron made in a furnace using coke as fuel. *Webster 3d.*

cokeite. a. Coal altered by an igneous intrusion. Synonym for carbonite, a. *Tomkeieff, 1954.* b. Natural coke formed by the action of magma on coal, or by natural combustion of coal. *Holmes, 1920.*

coke man. In the foundry industry, a laborer who unloads, stores, and conveys coke within the foundry. *D.O.T. 1.*

coke mill. A mill used in the foundry for the grinding of coke for the production of blacking. *Osborne.*

coke oven. A chamber of brick or other heat-resistant material in which coal is destructively distilled. Coke ovens are of two principal types: (1) beehive ovens, which were originally built round with a spherical top like an old-fashioned beehive. They had an opening in the top and various small openings for draft at the base. The ovens were developed into banks (rows) of joining cubicles, but the coke in long columnar pieces is characteristic and is still known as beehive coke. Tar, gas, and other byproducts are lost; and (2) byproduct ovens, which were built in rectangular form with the front and back removable but so arranged that it may be luted to practical gastightness and all byproducts gaseous at the high temperatures are pumped out. *Hess.*

coke-oven mason. In the coke products industry, one who builds and repairs brick and stone beehive coke ovens; also constructs hearths, straight and arched side walls, arched roof, door frames, leveling bar brackets, and charging hole frames, cutting the stone or brick to size and shape with tools, such as chisels and hammers. *D.O.T. 1.*

coke-oven repairman. In coke products industry, one who makes repairs on metal parts of coke ovens to keep them in operating condition, dismantling and replacing parts with wrenches, hammers, and screw jacks. Also called industrial furnace repairman. *D.O.T. 1.*

coke oven tar. Coal tar produced in byproduct coke ovens in the manufacture of coke from bituminous coal. *Urquhart, Sec. 2, p. 81.*

coke, petroleum. The solid residue remaining after destructive distillation of petroleum materials. The fixed or solid carbon content is 90 to 95 percent. Because of its purity, petroleum coke is used extensively in metallurgical processes; also, for the Hall electrolytic process for aluminum. *CCD 6d, 1961.*

coke picker. In the coke products industry, a laborer who picks out foreign material, such as slag and slate, from coke before and after it has been loaded in the railroad cars. *D.O.T. 1.*

coke pig iron. Most common type of pig iron made with coke as the reducing agent. *Bennett 2d, 1962.*

coke pitch. A black amorphous solid obtained from the distillation of tar. Used in the manufacturing of water gas, as fuel. *Bennett 2d, 1962.*

coke plate. a. Tinplate made from coke iron. b. Tinplate having lighter coating than charcoal plate. *Webster 3d. **See also*** tinplate. *Fay.*

coke scrubber. An apparatus filled with coke moistened with oil, used to purify street gas, which is forced through it. *Fay.*

coke tinplate. Standard tinplate with the lightest commercial tin coat; used for food containers, oil canning. *Bennett 2d, 1962.*

coke tower. A high tower or condenser filled with coke. Used in the manufacture of hydrochloric acid to give a large surface for the union of a falling spray of water with the rising hydrochloric-acid gas. *Fay.*

coke wave. Plot of swelling numbers against volatile content. *Bennett 2d, 1962.*

coke wharf. Aust. A platform onto which coke is pushed when discharged from an oven. *Fay.*

cokey. In Joplin, Mo., a shoveler; a mucker. *Fay.*

cokey herder. In Joplin, Mo., a foreman of a shovel gang. *Fay.*

cokey pitch. At Lake Trinidad, asphalt that has flowed over the land and has been coked by brush fires. *Abraham, 6th, 1960, v. 1, p. 177.*

coking. Distillation to dryness of a product containing complex hydrocarbons, which break down in structure during distillation, such as tar or crude petroleum; the residue of the process is coke. *Bennett 2d, 1962.*

coking coal. a. The most important of the bituminous coals, which burns with a long yellow flame, giving off more or less smoke, and creates an intense heat when properly attended. It is usually quite soft, and does not bear handling well. In the fire, it swells, fuses, and finally runs together in large masses, which are rendered more or less porous by the evolution of the contained gaseous hydrocarbons. *Fay.* b. Coal which can be converted into useful coke that must be strong enough to withstand handling. There is no direct relation between the elementary composition of coal and coking quality, but generally coals with 80 to 90 percent carbon on a dry, ash-free basis are most satisfactory *A.G.I. Supp.*

coking plate. A plate at the door of a furnace which uses bituminous coal, on which fresh coal is placed and allowed to coke before being spread on the fire. *Fay.*

coking stoker. A mechanical stoker or device for firing a furnace which permits the coal to coke before feeding it to the grate, thus burning the fuel with little or no smoke. *Fay.*

col. Fr. A saddle or gap across a ridge or between two mountain peaks; also, in a valley in which streams flow both ways from a divide, that part of the valley at the divide, especially if the valley slopes rather steeply away from the divide. *Fay.*

colander shovel. An open wirework shovel used for taking salt crystals from an evaporating brine. *Fay.*

Colburn process. The production of sheet glass by vertical drawing for about 4 feet and then bending over a driven roller so that the cooling sheet then travels horizontally. The process was invented by I. W. Colburn in 1905 and subsequently perfected by the Libbey-Owens Company. *Dodd.*

colch. Eng. A piece of earth falling from the roof or side, in soft works, Derbyshire. *Arkell.*

colcather. A redish-brown iron oxide left as a residue when ferrous sulfate is highly heated. Used formerly in polishing glass and as a pigment. *Webster 3d.*

Colcrete. Trade name for a method of concrete placing whereby cement and sand grout from a special mixer are poured or pumped over coarse aggregate already in position. It is suitable for mass concreting and especially for work below water. *Ham.*

cold bed. A platform in a rolling mill on which cold bars are stored. *Fay.*

cold blast. Air forced into a furnace without being previously heated. ***See also*** Gayley process. *Fay.*

cold-cathode arc. An indefinite term descriptive of any arc with a cathode that is not candescent. *BuMines Bull. 625, 1965, p. VII.*

cold chamber machine. A die-casting machine where the metal chamber and plunger are not heated. *ASM Gloss.*

cold chisel. A chisel of tempered steel, used in cutting cold metal. *Standard, 1964.*

cold-cracking. Cracks in cold, or nearly cold, metal, due to excessive internal stress caused by contraction. Such cracks may be caused by the mold being too hard or the design of a casting being unsuitable. *Ham.*

cold crushing strength. ***See*** crushing strength. *Dodd.*

cold-draw. To draw (as metal) while cold or without the application of heat. *Webster 3d.*

cold-drawing. The process of reducing the cross-sectional diameter of tubes or wire by drawing through successively smaller dies without previously heating the material, thereby increasing its tensile strength. Steel wire for prestressing is made by this process. *Ham.*

cold-drawn steel. Steel rods finished by drawing them through a die to reduce their size and to give them better quality. *Mersereau, 4th, p. 426.*

cold-drawn wire. Wire that has been drawn through a die at normal temperature. *Taylor.*

cold-extractable metal. ***See*** readily extractable metal. *Hawkes, 2, p. 151.*

cold extrusion. ***See*** extrusion. *ASM Gloss.*

cold furnace. N. of Eng. A drift driven into an upcast shaft to convey the return air into it instead of passing it over the furnace fire. This is done to prevent the ignition of the gas in the return air. *Fay.*

cold galvanizing. Application of powdered zinc, in suspension in an organic solvent, to iron articles. On evaporation of the solvent an adherent coating of zinc remains. *Pryor, 3.*

cold head. York. Quarryman's term for the coral bed in the Hambleton Oolite. *Arkell.*

cold nose. A mining exeprt who underrates the value of mineral properties. *Standard, 1964.*

cold noser. ***See*** wildcatter. *Long.*

cold-nosing. a. Running an unhoused drill in cold weather. *Long.* b. Synonym for wildcatting. *Long.*

cold pit. Leic. A downcast shaft. Called cold because the fresh or cold air comes down it. *Fay.*

cold-press. The act or process of subjecting bit-matrix-powder metal mixtures in a mold to high pressure before sintering *Long.*

cold pressing. The process of compressing metal or other powders in a die at room temperature to form a compact. Cold pressing is usually followed by sintering at elevated temperatures. *NRC-ASA N1.1-1957.*

cold-process cement. Another name for slag cement. ***See also*** slag cement. *Dodd.*

cold-roll. To roll (metal) without applying heat. *Webster 3d.*

cold-rolled. Said of metal that has been rolled at a temperature close to atmospheric. The cold rolling of metal sheets results in a smooth surface finish. *C.T.D.*

cold-rolled steel. A low-carbon, cold-reduced sheet steel. *ASTM C286-65.*

cold saw. A saw for cutting cold metal. *Mersereau, 4th, p. 426.*

cold-short. A condition of brittleness existing in some metals at temperatures below the recrystallization temperature. *ASM Gloss.*

cold shot. A portion of the surface of an ingot or casting showing premature solidification caused by a splash of metal during pouring. *ASM Gloss.*

cold shut. a. A discontinuity that appears on the surface of cast metal as a result of two streams of liquid meeting and failing to unite. *ASM Gloss.* b. A portion of the surface of a forging that is separated, in part, from the main body of metal by oxide. *ASM Gloss.*

cold soldering. Soldering in which two pieces are joined without heat (as by means of a copper amalgam). *Webster 3d.*

cold stoking. In glassmaking, the operation of lowering the temperature of the oven until the glass attains the proper consistency for blowing. This operation follows that of clearing. *Fay.*

cold treatment. Cooling to a low temperature, often near —100°F., for the purpose of obtaining desired conditions or properties, such as dimensional or structural stability. *ASM Gloss.*

cold-twisted bars. Rolled mild steel bars which have been twisted when cold to increases their strength. *Taylor.*

cold type. A bituminous pavement which may be mixed hot and laid cold or, as is the usual case, mixed and laid cold. *Pit and Quarry, 53rd, Sec. E, p. 70.*

cold welding. Solid-phase welding in which pressure, without added heat, is used to cause interface movements which bring the atoms of the faying surfaces close enough together that a weld ensues. *ASM Gloss.*

cold work. Permanent strain produced by an external force in a metal below its recrystallization temperature. *ASM Gloss.*

cold-worked steel reinforcement. Steel bars or wires which have been rolled or drawn at normal temperatures. *Taylor.*

cold working. Shaping of metals at ordinary temperatures; cold drawing, rolling, stamping. Within limits, in treatment of iron, copper, aluminum, induces work hardening, thus increasing strength. If carried too far, brittleness results. Metal which is brittle when cold is termed cold-short. *Pryor, 3.*

cold zone. The preheating zone of a rotary cement kiln. *Bureau of Mines Staff.*

colemanite. A natural hydrated calcium borate, $Ca_2B_6O_{11}.5H_2O$; white or colorless; white streak; vitreous to dull luster; Mohs' hardness, 4 to 4.5; specific gravity, 2.26 to 2.48; found in California. One of the raw materials in the United States for boric acid, sodium borate, etc. *CCD 6d, 1961.*

Cole reagent. Solution of 10 gram stannous chloride, 95 milliliter water, 5 milliliter HCl and 10 gram pyrogallol. Viscose silk impregnated with this turns red to violet in solution containing gold. *Pryor, 3.*

colgrout. Special cement-sand grout used in Colcrete. It is poured or pumped through 3-inch-diameter pipes to consolidate aggregate previously placed in situ. *Ham.*

collain. a. A subvariety of euvitrain. It consists of redeposited ulmin compounds precipitated from solution and observable microscopically. *A.G.I.* b. Approved by the Heerlen Congress of 1935 as applicable to vitrain in which plant structure is not visible. Adopted as collite, spelled collit in German but retaining the ain ending in English and French usage. *Compare* ulmain. *A.G.I.*

collapse. a. The failure of a tripod or derrick caused by overloading or improper structural design resulting in tripod breaking or falling. *Long.* b. Complete cave-in of walls of a borehole or mine workings. *Long.*

collapse breccia. a. Breccia formed by the collapse of the roof of a cave. *Bateman.* b. Breccia formed by the collapse of the roof of country rock above an intrusive. *Bureau of Mines Staff.*

collapse caldera. A caldera resulting primarily from the collapse of the volcanic cone occasioned by the withdrawal of magmatic support at depth, or, more rarely, by the internal solution of the volcanic cone. *See also* caldera. *A.G.I.*

collapse sinks. Caverns may become so enlarged by solution and erosion that they may locally collapse, thus giving rise to another class of sinkholes which may be called collapse sinks. *A.G.I.*

collapse structures. Structures resulting from the downhill sliding of rocks under the influence of gravity to produce small klippe or folds. *A.G.I.*

collapsing strength. The load expressed in pounds or tons, which, if exceeded, results in the collapse of a structure, such as a drill tripod, derrick, or A-frame. *Long.*

collar. a. In a mine shaft, the first wood frame of the shaft; sometimes used in reference to the mouth or portal of the tunnel. *B.C.I.* b. Supporting framework at top of shaft from which linings may be hung. *Pryor.* c. The term applied to the timbering or concrete around the mouth or top of a shaft. *Lewis, p. 21.* d. The bar, or crosspiece, in a framed timber set. *Stauffer.* e. The junction of a mine shaft and the surface. *Nelson.* f. The beginning point of a shaft or drill hole, the surface. *Ballard.* g. The mouth of a mine shaft. *Fay.* h. A flat ring surrounding anything closely. *Fay.* i. Scot. A frame to guide pump rods; the fastening of pipes in a shaft. *Fay.* j. *See* cap. *Fay.* k. The mouth or opening of a borehole or the process of starting to drill a borehole. *Long.* l. A pipe coupling or sleeve. *Long.* m. Synonym for friction head. *Long.* n. A sliding ring mounted on a shaft so that it does not revolve with it. Used in clutches and transmissions. *Nichols.* o. A short fire-clay section used to join the main (silica) part of a horizontal gas retort to the metal mouthpiece. *Dodd.*

collar beams. *See* square-set stopes. *Nelson.*

collarbound. Pipe held in a borehole by sediments or drill cuttings packed tightly above and around the couplings of an outside-coupled pipe or casing. *Long.*

collar buster. A cutting tool used to sever casing above the point at which it is collarbound or frozen in the borehole. *Long.*

collar clamp. A split clamp that can be attached to a pipe collar for the purpose of stopping a leak. *Porter.*

collar crib. N. of Eng. A strong, polygonal, wooden frame fixed in a shaft, upon which the crib or wood tubbing is bedded. *Fay.*

collared. a. A started hole drilled sufficiently deep to confine the drill bit and prevent slippage of the bit from normal position. *Bureau of Mines Staff.* b. A borehole just begun, in which a length of pipe has been placed. *Long.* c. Pipe or drill rods coupled together by means of threaded couplings, the outside diameter of which is larger than the outside diameter of the pipe or rods. *Long.*

collared and heeled prop. Eng. A prop with the top chamfered on the driving side and hollowed out to receive a round bar. *SMRB, Paper No. 61.*

collared casing. Ordinary pipe joined with pipe collars or couplings. *Long.*

collar in. a. The act or process of beginning a borehole. *Long.* b. To make a pot smaller in diameter by pressure from the outside while it is turning on the wheel. *ACSG, 1963.*

collaring. a. The process of beginning the drilling of a borehole. *Long.* b. The process of beginning the excavation of a mine shaft or the drilling of rock-drill holes. *Long.* c. Eng. Timber framing for supporting pump trees in a shaft. *See also* chog. *Fay.* d. The term used to indicate that metal passing through a rolling mill follows one of the rolls so as to encircle it. *C.T.D.*

collaring a hole. The formation of the front end of a drill hole, or the collar, which is the preliminary step in drilling to cause the drill bit to engage in the rock. *Fraenkel.*

collaring bit. A fishtail-, spudding-, or other-type bit used exclusively for beginning a borehole. *Long.*

collar joint. The interior longitudinal vertical joint in a multiunit masonry wall. *ACSG.*

collar launder. Eng. The pipe at the top of a lift of pumps for carrying water to a cistern. *Fay.*

collar of shaft. a. S. Afr. Structure from timber or other material keeping the top of a shaft from falling in. *Beerman.* b. Aust. The first wooden frame around the top of a shaft. *See also* collar, c and g. *Fay.*

collars. In rolling mills, the sections of larger diameter separating the grooves in rolls used for the production of rectangular sections. *C.T.D.*

collar set. a. The main structure of timber, steel, or concrete, to support and secure the mouth of a shaft. *Nelson.* b. That at the top of a shaft from which linings (shaft sets) are hung by means of hanging bolts. *Pryor, 3, p. 94.*

collar socket. A fishing tool designed to slip over and grip a casing or pipe coupling. *Long.*

collar structure. A heavy wooden frame erected at the mouth of a rectangular shaft to provide a solid support for the timber sets. A more permanent structure consists of a concrete wall extending from two to eight sets in depth. On this concrete mass is bolted the bearer timbers which support the top heavy set or collar set. The term also applies to the heavy concrete ring at the mouth of a circular concrete-lined shaft. *Nelson.*

collar stud. A stud threaded at one end and having a short shaft or spindle at the other, the two separated by a collar which is an integral part of the stud, used for carrying gears, levers, etc. *Crispin.*

collateral series. A radioactive decay series intiated by transmutation, which eventually joins into one of the four radioactive decay series; for example, americium 242 and its immediate decay products in relation to the uranium disintegration series. *NRC-ASA N1.1-1957.*

collecting agent; collector. A reagent added to a pulp to bring about adherence between solid particles and air bubbles. *B.S. 3552, 1962.*

collecting rope. Aust. An endless rope used for bringing skips from where they are left by the main haulage system to the bottom of the shaft. *Fay.*

collecting system. Every drain or sewer in a sewerage system between the buildings from which the sewage originates and the sewage disposal works where it is treated. *See also* sewerage. *Ham.*

collective flotation. Flotation in which all metals are collected in one concentrate. *Gaudin, 2, p. 5.*

collectively screened trailing cable. A trailing cable with a metallic screen surrounding all conductors. This type has now been discarded in British coal mines and all trailing cables used will be of the individually screened type. *Nelson.*

collective subsidence. That condition in sedimentation in which the particles and flocs are sufficiently close together to retard the coarse fast-settling particles while the slow-settling ones are entrapped and carried down with the mass. *Mitchell, p. 611.*

collector. A heteropolar compound containing a hydrogen-carbon group and an ionized group, chosen for ability to adsorb selectively in froth flotation process and render adsorbing surface relatively hydrophobic. A promoter. *Pryor, 4.*

collet. a. The small horizontal plane, or face at the bottom of the brilliant-cut gem stone. *Hess.* b. A split sleeve used to hold work or tools during machining or grinding. *ASM Gloss.* c. Same as culet. *Shipley.* d. A flange on which a gem stone is set. *Shipley.*

collier. a. Eng. Strictly speaking, a man who mines coal with a pick though commonly applied to anyone who works in or about a colliery. *Fay.* b. Eng. A steam or sailing vessel carrying a cargo of coal. *Fay.* c. Eng. A coal merchant or dealer in coal. *Fay.* d. A miner responsible for working the coal from his stall, or stint, on a longwall face and for setting supports adequate for safety. A person must have had some years experience at the coal face as an assistant before he is entitled to become a collier. Colliers are usually paid in accordance with a pricelist in force at the mine. Also called hewer; stallman. *Nelson.*

Collier. Explosive; used in mines. *Bennett 2d, 1962.*

collier's coal; house coal. A certain weight of coal or a load of 1 ton, which is supplied at agreed periods and either free or at a cheap rate, to colliery workers who are householders. *Nelson.*

collier's lung. *See* anthracosis. *Fay.*

collier's ton. Eng. A weight of often several hundredweight in addition to the standard ton of 2,240 pounds. In former times as much as 28 hundredweight was reckoned as 1 ton. *Fay.*

colliery. a. A whole coal mining plant, generally used in connection with anthracite mining but sometimes used to designate the mine, shops, and preparation plant of a bituminous operation. *B.C.I.* b. A coal mine. *Pryor, 3.* c. A ship, or ships, used in the coal trade. *Standard, 1964.*

colliery agent. Gr. Brit. A colliery chief official with a status between the manager and owner. Under private enterprise, the colliery agent may or may not be a qualified mining engineer. *See also* agent, c. *Nelson.*

colliery bailiff. Derb. The superintendent of the colliery. *Fay.*

colliery boss. *See* superintendent, colliery. *D.O.T. 1.*

colliery carpenter. A full-time carpenter employed at a colliery who prepares the timber for ventilation doors and ventilation regulators and may go underground to erect them. He does all work involving timber frames, formwork, etc. *Nelson.*

colliery clerk. In coal mining, one who keeps all the records pertaining to the operation of a coal mine. *D.O.T. 1.*

colliery consumption. That part of the coal output at a colliery which is used for steam generation and other purposes connected with the working of the colliery itself. *Nelson.*

colliery explosion. An explosion in the workings or roadways of a colliery as a result of the ignition of firedamp or coal dust or a mixture of both. *See also* coal-dust explosion; methane; stone-dust barrier. *Nelson.*

colliery official. The term, in ordinary usage, refers to an overman or deputy and also officials on special duties. *See also* superior official; underofficial. *Nelson.*

colliery plans. Gr. Brit. The maps of the mine workings, and sections of the shafts and seams being worked, which the colliery manager must keep at the pithead office in accordance with the Surveyors and Plans Regulations, 1956, of the Act. *Nelson.*

colliery surveyor. A surveyor appointed to carry out surveying work and to prepare plans and sections of a mine, but who is not the surveyor for the mine. *B.S. 3618, 1963, sec. 1.*

colliery warnings. Eng. Telegraphic messages sent from signal service stations to the principal colliery centers to warn managers of mines when sudden falls of the barometer occur. *Zern.*

colligative properties. These are properties only of solutions and include vapor pressure, freezing point, boiling point, and osmotic pressure changes which occur with changes in the characteristics of the solution. Seawater does not follow the general rules of solutions, but departures are proportional. *Hy.*

collimate. a. To bring into line, as the axes of two lenses or of two telescopes; also, to make parallel, as refracted or reflected rays. *Standard, 1964.* b. To determine or to correct the direction of the line of sight (of a telescope) by the use of a collimator, or by vertical reflection from the surface of a basin of mercury. *Standard, 1964.*

collimating marks. In photographic mapping, index marks to define the x and y coordinate axes and the principal point of the photograph. These marks are registered on the negative either by metal points in the frame of the camera or by marks engraved on the pressure plate. *Seelye, 2.*

collimation. a. Alinement axially of parts of optical system. Collimation error is one due to line of sight of survey instrument not coinciding with traversing gear, scales, or leveling devices. Collimation line is line of sight, passing through intersection of crosshairs of reticule. Collimation method is height-of-instrument method of leveling whereby fore-and-aft readings are made on leveling staff by instrument placed intermediately so that rise or fall between fore station and back station is shown by change in staff reading. *Pryor, 3.* b. Conversion of a divergent beam of energy or particles into a parallel beam. *ASM Gloss.*

collimation axis. The straight line passing through the optical center of the object glass and the horizontal rotation axis perpendicular to the latter. *Webster 2d.*

collimation error. An error produced in surveying instruments when the line of sight is out of alinement either horizontally or vertically. *Ham.*

collimation line. The line of sight of a surveying instrument which passes through the intersection of the cross hairs in the erticule. *Ham.*

collimation method. In leveling, the height of the instrument is always known by taking the first sight on a point of known level, generally a bench mark. The level of any other point can then be worked out by subtracting the staff reading from the height of the instrument. This method is convenient for obtaining the levels of several points from one setup of the instrument. *Ham.*

collimation plane. The plane described by the collimation axis during the revolution of a transit. *Webster 2d.*

collimation position. The ideal position of the line of sight of a telescope; that is, the optical axis. *See also* line of sight. *Seelye, 2.*

collimator. a. A fixed telescope with spider lines in its focus, used to adjust a second telescope by looking through it in a reverse direction with the latter, so that images of the spider lines are formed in the focus of the second telescope, as if they originated in a distant point. *Standard, 1964.* b. A device for confining the elements of a beam within an assigned solid angle. *NRC-ASA N1.1-1957.*

collinite. a. A variety of euvitrinite. The micropetrological constituent, or maceral, of collain. It consists of completely jellified plant material precipitated from solution and subsequently hardened. *Compare* ulminite. *A.G.I.* b. A variety of the major maceral vitrinite. The micropetrological constituent, or maceral, of structureless vitrain. Preserved plant structure is not discernible. Term recommended by the Heerlen Committee of 1935 as being perferable to the term euvitrinite. *Compare* telinite. *A.G.I.*

collinsite. A light brown hydrous phosphate of calcium, magnesium, and iron. $2CaO.(Mg,Fe)O.P_2O_5.2\frac{1}{2}H_2O$. Fibrous nodules. Triclinic. From Francois Lake, British Columbia, Canada. *English.*

Collins miner. A type of remote-controlled continuous miner for thin seam extraction. The coal seam is extracted in a series of parallel stalls 6 to 7 feet wide and 100 yards long. Full extraction of the seam is the objective. The extraction is controlled entirely from the roadway at the entrance of each stall, and the cutting unit carries with it an automatically extending belt conveyor, ventilation ducting and cables for power and control. The equipment is largely contained in a train of nine, rail-mounted bogies, sited in the central roadway from which the stalls are to be driven. One bogey is the launching platform on which the cutting unit is carried from one stall to the next. The cutting unit, which enters the stalls, consists essentially of three trepan heads feeding a short conveyor passing through the center of the machine and discharging onto the belt extending to the angle station outby. The miner is controlled by one man in the control cabin and there are special instruments, such as methanometers, coal-sensing device, etc. The machine was conceived by H. E. Collins of the National Coal Board of Great Britain, and its production is the result of teamwork which was coordinated by the Central Engineering Establishment. It is now undergoing trials. It is anticipated that the machine will eventually produce in the region of 1,000 tons per day working three shifts, and the manpower should not exceed 20 men. *Nelson.*

collision blasting. Blasting in which different sections of the rocks are blasted out against each other. *Langefors, p. 51.*

collision waves. Two waves that are propagated in opposite directions through the burned gases, and originating at the point where two explosion waves meet. *Fay.*

collite. Another name for euvitrain. *See also* collain. *Tomkeieff, 1954.*

collobrierite. Proposed by Lacroix (in 1917) for a metamorphic rock composed of grunerite, fayalite, red garnet, magnetite, and some feldspar. *A.G.I.*

colloclarain. A type of coal consisting of the maceral collinite and other macerals, and in which the quantity of other macerals, mainly exinite, exceeds collinite. *Compare* clarocollain. *A.G.I.*

colloclarite. A type of coal intermediate between collite (predominant) and clarite. *Tomkeieff, 1954.*

collodion. A solution of guncotton in ether and alcohol. It is deposited as a film on the evaporation of ether. *Standard, 1964.*

colloform. a. Rounded reniform masses of mineral which result from colloidal precipitation. *A.G.I.* b. A texture in minerals that originated through solidification of colloidal matter and consisting of a series of concentrically curved or scalloped layers. *Schieferdecker.*

colloid. a. A substance composed of extremely small particles, ranging from 0.2 micron to 0.005 micron which when mixed with a liquid will not settle, but remain permanently suspended; and the colloidal suspension thus formed has properties that are quite different from the simple, solid-liquid mixture or a solution, (that is, salt in water). Typical colloids are glue, starch, gelatin, swelling bentonite. Many other clays may be practically colloidal. *Bureau of Mines Staff.* b. A jellylike or gelatinous substance, as the celloid formed when ground bentonite is mixed with water. *Long.* c. Extremely small particles of material so finely ground that when mixed in a fluid, the particles remain permanently suspended. *Long.* d. A state of subdivision of matter which consists either of single large molecules or of aggregations of smaller molecules. These particles of ultramicroscopic size may be solid, liquid, or gaseous and are surrounded by different matter which may also be solid, liquid, or gaseous. Colloidal particles are subject to flocculation and deflocculation depending on their nature and the electrolyte added to colloidal suspensions. Colloidal properties of an enamel frit, color pigment, clay, and opacifier all work together in bringing about the set-up of a liquid enamel so important to good enamel workability, etc. The clay addition is, of course, the most colloidal of these materials but it is understood that each other material, to the minute extent at least, acts advantageously in forming the proper liquid enamel set-up. *Hansen.* e. A substance (as gelatin, albumin, or starch) that, when apparently dissolved in water or other liquid, diffuses not at all or very slowly through a membrane and shows other special properties (as lack of pronounced effect on the freezing point or vapor pressure of the liquid). *Webster 3d.*

colloidal. a. Designating matter of very small particle size, usually in the range of 10^{-5} to 10^{-7} centimeter in diameter. *ASTM STP No. 148-D.* b. A state of subdivision of suspended matter in which the particle size ranges between 5 and 200 millionths of a millimeter. *Bateman.*

colloidal clay. A clay, such as bentonite, which, when mixed with water, forms a gelatinous-like liquid. *Long.*

colloidal concrete. Concrete of which the aggregate is bound by colloidal grout. *Taylor.*

colloidal fuel. A mixture of finely pulverized coal and fuel oil, which remains homogeneous in storage. It has a high calorific value and is used in oil-fired boilers as substitute for fuel oil alone. *Nelson.*

colloidal gold; collaurin; collaurum. Colloidal gold particles dispersed in an aqueous suspension, ranging in color from blue to red to yellow, depending on the particle size. *Bennett 2d, 1962; CCD 6d, 1961.*

colloidal graphite. Graphite ground in oil or water to produce a colloidal suspension. *Bennett 2d, 1962.*

colloidal grout. A grout which has artificially induced cohesiveness or ability to remain in suspension. *Taylor.*

colloidal metal. A colloidal dispersion of a metal; for example, colloidal gold. *Bennett 2d, 1962.*

colloidal mud. A drilling mud in which the gelatinous constituents, such as bentonite, will remain in suspension in water for a long time. *Long.*

colloidal particles. Particles so small that their surface activity has an appreciable influence on the properties of their aggregate. *ASCE P1826.*

colloidal solution. a. Consists of a liquid medium containing dispersed solid particles larger than simple molecules, but too small to be resolved by the ordinary microscope. *Hawkes, p. 260.* b. A solution somewhere between a suspension and a true solution. Very minute particles are suspended in the liquid; for example, glue in water. *Cooper.*

colloidal state. One in which, following grouping of the molecules of solute, these cannot pass through a semipermeable membrane. *Pryor, 3.*

colloidal sulfur. Amorphous sulfur in a finely divided condition. Prepared by the action of dilute sulfuric acid on sodium thiosulfate or by the reaction of hydrogen sulfide and sulfurous acid. Also prepared by mixing equivalent solutions of hydrogen sulfide and sulfur dioxide. Forms a clear yellow solution containing very minute suspended particles of sulfur; the addition of a little alum immediately precipitates the sulfur. Also called milk of sulfur. *Cooper, pp. 277, 279.*

colloidal water treatment. A method of treating hard water, involving the use of colloids, usually proprietary substances. They are either added to the feed water or introduced into the boiler. The colloid forms an envelope around the solid particles, thus preventing their adherence to pipework or the boiler shell. *See also* chemical water treatment; zeolite process. *Nelson.*

colloid chemistry. Study of dispersed phase in dispersion medium at colloid sizes. *Pryor, 3, p. 80.*

colloid mill. Grinding appliance such as two discs set close and rotating rapidly in opposite directions, so as to shear or emulsify material passed between them. *Pryor, 4.*

colloid minerals. Minerals deposited as gradually hardening gelatinous or flocculent masses instead of assuming crystalline form. *Schieferdecker.*

Collum washer. Mineral jig with quick downstroke of plunger and retarded return. *Pryor, 3.*

collophane. The massive, cryptocrystalline types of apatite that constitute the bulk of phosphate rock and fossil bone. *Dana, 17, pp. 373-374.*

collophanite. Synonym for collophane. *Hey 2d, 1955.*

colluvial. Consisting of alluvium in part and containing angular fragments of the original rocks. Contrasted with alluvial and diluvial; also, consists of talus and cliff debris, the material of avalanches. *Fay.*

colluvial clay. A clay transported down a slope, either by gravity or wash, and deposited at or near the base of the slope. *ACSB, 1.*

colluvium. Applied to loose and incoherent deposits, usually at the foot of a slope or cliff and brought there chiefly by gravity. Talus and cliff debris are included in such deposits. *A.G.I.*

Colmol miner. A continuous miner for operation in coal headings. The coal is completely augered by two banks of cutting arms fitted with picks and rotating at 52 revolutions per minute. The arms rotate in opposite directions to assist in gathering up the cuttings for the central conveyor. The cutting height is between 38 and 48 inches. The crawler tracks provide a continuous thrust on the picks and a cutting rate of about 4 inches per minute is possible. *Nelson.*

Colmol mining machine. A machine in which the coal is hewed from the solid by ten rotating chipping heads in two rows of five, each with the lower row in advance of the upper. Each head consists of a bit supplemented by widely spaced teeth, each tooth being stepped back to the outside of the head. The circular kerfs made by the heads overlap, and as the machine moves forward, the effect is to break the coal ahead of the teeth into the free spaces, thereby minimizing the production of fines. *Mason, V. 2, p. 547.*

colog. Abbreviation for cologarithm. *BuMin Style Guide, p. 58.*

Cologne earth; Cologne umber. An earthy black or brown lignite used as a pigment. *Tomkeieff, 1954.*

Cologne umber. *See* Cologne earth. *Tomkeieff, 1954.*

cololite. A substance appearing to be the petrified intestines of fishes or their contents, but more probably formed of worm casts. Frequently found in the lithographic slates of the oölite. *Fay.*

colophonite. A cloudy yellow-brown common variety of andradite garnet, rarely, if ever, cut as a gem. Also a nongem variety of vesuvianite. *Shipley.*

color. a. The shade or tint of the soil or rock that indicates ore, for example, gossan coloration. *Fay.* b. A partticle of metallic gold found in a prospector's pan after a sample of soil or of crushed rock has been panned out. Prospectors say, for example, the dirt gave so many colors to the panful. *Fay.* c. Color is one of the most important properties used in megascopic and microscopic determination of minerals. It depends upon the selective absorption of certain wavelengths of light by the mineral during transmission or reflection. The color of metallic (or metal-bearing) minerals is a fairly constant porperty; whereas that of nonmetallic minerals is generally less so owing to the pigmentation effect of impurities. The color of a massive mineral is sometimes different from the color of its powder or streak. *Stokes and Varnes, 1955.* d. The Munsell notation has come into wide use for the designation of colors of rocks and soils. In this system, a color is specified by the three variables of hue (dominant spectral color), value (brilliance), and chroma (saturation or purity), and written in the order and form: hue value/chroma. *Stokes and Varnes, 1955.*

Coloradoan. Middle Upper Cretaceous. *A.G.I. Supp.*

Colorado aquamarine. Aquamarine from Mount Antero, Colo. It is usually pale blue to pale blue-green, but occasionally of the most valued color, pale light blue. *Shipley.*

Colorado diamond. Transparent smoky quartz. *Shipley.*

coloradoite. Natural mercury telluride; Mohs' hardness, 3; specific gravity, 8.6. *Bennett 2d, 1962.*

Colorado jet. Jet from Colorado; of good quality. *Shipley.*

Colorado lapis lazuli. Dark blue lapis lazuli from the Sawach Range, Colo. *Shipley.*

Colorado ruby. An incorrect name for the fiery-red garnet (pyrope) crystals obtained from Colorado. *C.M.D.*

Colorado silver; Colorado metal. A misleading name for a German silver containing 57 percent copper, 25 percent nickel, and 18 perecnt zinc. *Camm.*

Colorado topaz. True topaz of a brownish-yellow color obtained in Colorado, but quartz similarly colored is sometimes sold under the same name. *C.T.D.*

Colorado tourmaline. Pink, lilac, green, and colorless tourmaline which, for a while after 1906, was found near Royal Gorge, Colo. *Shipley.*

color-aging. Term applied to slates whose color may change somewhat in a relatively short time. Sometimes this improves the appearance of the slate. In general, color-aging is not a weathering process that is deleterious to the endurance of the slate. *AIME, p. 792.*

color black. Finely divided carbon black. Used as a pigment. *Bennett 2d, 1962.*

color buffing. Producing a final high luster by buffing; sometimes called coloring. *ASM Gloss.*

color centers. Color absorption within a crystal as a result of a point defect (vacancy, interstitialcy, or substitution) which produces an electronic transition. *VV.*

color code. A system of standard colors for identifying conductors for polarity, etc., and for identifying external terminals of motors and starters to facilitate making power connections between them. *ASA M2.1-1963.*

colored frit. A frit containing a colorant in order to produce a strong color in the porcelain enamel. *ASTM C286-65.*

colored silica brick. Mottled silica brick. *Bureau of Mines Staff.*

colored slates. The so-called colored slates are quarried in slate belts extending from Rutland County, Vt., into Washington County, N.Y. They are of two geologic ages, those of Ordovician age including the red, bright green, and black slates, and those of Cambrian age including green, purple, and variegated slates. One type, the sea-green slate, is gray or greenish gray when first quarried, but after a few years of exposure the color changes to a buff or brownish gray. Another type, unfading green slate, maintains its greenish-gray color indefinitely. The so-called purple slate is a purplish brown. A variegated type is greenish brown with irregular purple patches giving a mottled effect. Red slates associated with bright green varieties of Ordovician age occur near Granville, Washington County, N.Y. The red color is due to abundant finely divided hematite. *AIME, pp. 793-794.*

colorer. One who applies glazes of various colors to spaces marked on tile, using bulb pen. *D.O.T. 1.*

color grade. The grade or classification into which a gem is placed by examination of its color in comparison to the color of other gems of the same variety. *Shipley.*

colorimeter. a. Instrument or device for the chemical analysis of liquids by comparison of the color of the given liquid with standard colors. *Webster 3d.* Two major types are used in the U.S. oil industry: The ASTM colorimeter for analyzing lubricating oils, and the Saybolt colorimeter for analyzing light oils. *Shell Oil Co.* b. An instrument for measuring absorption characteristics of substances, gases, liquids, or solids at selected electromagnetic spectral frequencies, generally in the ultraviolet, visible, and infra-red region. *Bureau of Mines Staff.*

colorimeter test. A method of estimating the composition of mine-road dusts by comparing their color with a standard sample of 80 percent incombustible dust. *Nelson.*

colorimetric analysis. Method of chemical analysis in which filtered solutions are compared for color with known concentrations of compound imparting that color to the solution or with specially tinted transparent films which have been suitably calibrated. A colorimeter either compares the colored test solution with a known standard or measures the amount of monochromatic light transmitted through a colored liquid. *Pryor, 3.*

colorimetric determination. An analytical procedure based on measurement, or comparison with standards, or color naturally present in samples or developed therein by the addition of reagents. *ASTM STP No. 148-D.*

colorimetric method. This method, for the determination of incombustible matter, may only be used in relation to mine roads which have been stone-dusted with white limestone dust (or other dust of white or nearly white color), because it depends on the contrast in color between the white, or nearly white, stone dust and the black coal dust. The samples which are lighter in color are presumed to contain more incombustible matter than the standard dust and are not analyzed further; on the other hand those that are darker than the standard dust are analyzed by one of the approved chemical methods. At present, the standard sample must contain 80 percent incombustible matter, or some suitably chosen higher percentage. *Cooper, p. 419.*

colorimetric value. An indication of the amount of organic compounds present in fine aggregate. *Taylor.*

color index. In petrology, the sum of the dark or colored minerals in a rock expressed in percentages; especially applied in the classification of igneous rocks. According to the index, rocks may be divided into leucocratic (color index, 0 to 30), mesotype or mesocratic (color index, 30 to 60), and melanocratic (color index, 60 to 100). Shand recognized a fourth subdivision, hypermelanic (color index, 90 to 100). *A.G.I.*

coloring. Producing desired colors on metal by a chemical or electrochemical reaction. *See also* color buffing. *ASM Gloss.*

colorless. Devoid of any color, as is pure water, a pane of ordinary window glass, or a fine diamond; therefore, distinctly different from white, as is milk, or white jade. As only transparent objects can be colorless, and no opaque object can be colorless, such terms as white sapphire and white topaz are misnomers. Rock crystal is a colorless variety of quartz; milky quartz is a white variety. *Shipley.*

color measurement. There are two basic methods of measurement: (1) spectrophotometer, typified by the Beckman and the Hardy instruments; (2) Tristimulus filter method, typified by the colormaster, Hilger, and Hunter instruments. The subject of color measurement is important in the ceramic industry, particularly for glazed tiles, sanitary ware and vitreous enamelware, which may have to match. *Dodd.*

color oxide. A nonmetallic or metallic oxide (or a mixture) which is used to impart color to ceramic ware, enamels, glasses, and glazes. *Bureau of Mines Staff.*

color play; play of colors. Prismatic colors produced by the dispersion of light. *Bureau of Mines Staff.*

color range. All colors shown by various specimens of a mineral, an oil, or a rock. *Hess.*

color ratio. The ratio of light (felsic) to dark (mafic and heavy) minerals in an igneous rock. *Stokes and Varnes, 1955.* Synonym for color index. *A.G.I.*

colors. a. The specks of gold seen after the successful operation of a gold pan, when finely crushed ore has been panned to remove bulk of light minerals. The residual heavy fraction is then scanned for visual evidence of gold by the prospector. *Pryor, 3.* b. In optical mineralogy, the colors of doubly refracting substances as seen in doubly polarized light (crossed nicols). *Fay; Hess.* c. *See* metallic colors. *ACSG, 1963.*

color twist. Twisted colored glass rods as a form of decoration within a wine glass stem. *Dodd.*

colrake. A shovel used to stir lead ores during washing. *Fay.*

Columbia-Gel. Gelatinous permissible explosive; used in mining. *Bennett 2d, 1962.*

Columbia group. A series of fluvioglacial marine and estuarial deposits of sand and gravel, overlying the Lafayette formation along the Atlantic Coast of the United States, south of New York, formed in the Pleistocene during the final glacial retreat. *Fay.*

columbite; tantalite; niobite. A natural oxide of niobium, tantalum, ferrous iron, and manganese, found in granites and pegmatites, $(Fe,Mn)(Nb,Ta)_2O_6$. Some tin or tungsten may be present in the mineral. Iron black to brownish-black color; streak, dark red to black; luster, submetallic; Mohs' hardness, 6; specific gravity, 5.2 to 7.9. Found in Maine, North Carolina; Greenland; U.S.S.R.; Germany. A source of niobium and tantalum. *CCD 6d, 1961.*

columbium; niobium. A white to steel-gray metallic element in group V of the periodic system, occurring between arsenic and antimony. Symbol, Cb (columbium) or Nb (niobium); valences, 2, 3, 4?, and 5; isometric; atomic number, 41; atomic weight, 92.906; specific gravity, 8.57 (at 20° C); melting point, 2,468°±10° C; boiling point, 4,927° C; specific electrical resistivity, 20 microhms per cubic centimeter; and insoluble in water and in acids. Occurs in a number of rare minerals. Used in austenitic stainless steel to diminish susceptibility to intercrystalline corrosion. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–123.* The name niobium was adopted by the International Union of Pure and Applied Chemistry in 1950 after 100 years of controversy. Many leading chemical societies and Government organizations refer to it as niobium. Most metallurgists, leading metals societies, and all but one of the leading U.S. commercial producers still refer to the metal as columbium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-123.*

columbium carbide; nobium carbide. Black crystals; lavender-gray powder; isometric; CbC (NbC); molecular weight, 104.92; insoluble in water and in all acids except in nitric acid and hydrofluoric acid; melting point, about 3,500° C; hardness, 2,400 kilograms per square millimeter; and specific gravity, 7.6 or 7.82. Used in cemented carbide tipped tools, certain special steels, and in the preparation of columbium (niobium) metal. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-198.*

columbium chloride; columbium pentachloride; niobium chloride; niobium pentachloride. Yellow to white; crystalline; $CbCl_5$ ($NbCl_5$); molecular weight, 270.17; soluble in alcohol, in ether, in carbon tetrachloride, in hydrochloric acid, and in concentrated sulfuric acid; melting point, 194° C or 204.7° C; boiling point, 241° C or 254° C; specific gravity, 2.75; deliquescent; and decomposes in water and in moist air with the evolution of hydrogen chloride fumes. Used in the preparation of pure columbium (niobium) and as an intermediate. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-198.*

columbium pentachloride; niobium pentachloride. *See* columbium chloride. *CCD 6d, 1961.*

columbium-potassium oxyfluoride; potassium-columbium oxyfluoride; potassium pentafluocolumbate; potassium oxycolumbate; niobium-potassium oxyfluoride; potassium-niobium oxyfluoride; potassium pentafluoniobate; potassium oxyniobate. Colorless or white; monoclinic; lustrous plates or leaflets; $K_2CbOF_5.H_2O$ ($K_2NbOF_5.H_2O$); greasy to touch; and soluble in water and in concentrated hydrofluoric acid. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–199.* Used in the separation of columbium (niobium) from tantalum and in the electrolytic preparation of columbium metal (niobium metal). *CCD 6d, 1961.*

columbotantalite. A noncommittal term for members of the columbite-tantalite series. *Hey, M.M., 1961.*

columbretite. An ash-gray lava, a variety of feldspathoidal latite porphyry, composed of phenocrysts of sanidine, and of augite and magnetite after hornblende. The compact groundmass contains microlites of oligoclase having corroded outlines filled with analcite. *Johannsen, v. 4, 1938, p. 168.*

column. a. A round column set vertically or horizontally in a heading and to it the machine drill is clamped. This column is provided with a head at one end, and a shoe at the other end provided with a screw for setting it up against the rock walls. A column gives a firmer support, as a rule, than the tripod also used for holding the drill. Blocks of tough wood are placed between the column end and the rock. *Stauffer.* b. The rising main or length of pipe conveying the water from the mine to the surface. *Fay.* c. *See* motive column. *Fay.* d. A solid core cut from a borehole. *Fay.* e. A supporting pillar. *Webster 3d.* f. The water above the valve in a set of pumps. *Fay.* g. Synonym for drill column. *Long.* h. The drill-circulation liquid confined within a borehole. *Long.* i. A long section of drill core. *Long.* j. The water confined within a pipe above a pump. *Long.* k. In borehole casing, a row of casing sections screwed together and forming a whole. *Stoces, v. 1, p. 85.* l. A member, such as a steel prop, primarily carrying axial loads by means of compression stresses. *See also* beam. *Nelson.* m. In ion exchange, a rubber-lined or noncorrodable cylinder filled to half its height with resin beads which rest on a bed of sand. Arranged usually in a series of two, three, or four with pipes and valves permitting feed, discharge, flush, and circulation of solutions, according to whether the column is stripping (loading) a pregnant solution or being eluted. *Pryor, 3.* n. A cave formation caused by the union of a stalactite with a stalagmite. Synonym for stalacto-stalagmite. *Schieferdecker.* o. A mass of plastic material, such as clay, shaped by forcing it continuously through a die. *Bureau of Mines Staff.*

column analogy. An analogy used in structural design as described by Professor Hardy Cross. It is applied to equations for slope and deflection of a beam subjected to bending and those for load and moment in a short column, loaded eccentrically. *See also* Hardy Cross method. *Ham.*

columnar. a. A mineral with a structure obscurely resembling prisms, for example, hornblende. *Nelson.* b. Composed of columnlike individuals. *Schieferdecker.*

columnar coal. Coal with a columnar structure, usually due to thermal metamorphism. *Tomkeieff, 1954.*

columnar crystals. Elongated crystals that grew at right angles to a surface. *C.M.D.*

columnar jointing. Jointing that breaks the rock into columns. The joints usually form a fairly well defined prism that is hexagonal in cross section. It is most characteristic of diabase and basalt. Generally considered to be shrinkage cracks resulting from the cooling of the igneous mass in which they occur. *A.G.I. See also* columnar structure, b.

columnar section. A geologic illustration that shows in a graphic manner, and by use of conventional symbols for different rock types, the successive rock units that occur throughout a given area or at a specific locality. It may be accompanied by a very brief description of lithology and by appropriate brief notations indicating the thickness, age, and classification of the rocks. *Stokes and Varnes, 1955.*

columnar structure. a. A mineral possesses a columnar structure when it is composed of slender crystals of prismatic cross section, as some amphiboles are. When the columns are flattened, the structure is said to be bladed. *Hess.* b. A structure common in diabase and basalt dikes, sills, and lava sheets. It consists of parallel, more or less regular prismatic columns generally transverse to the rock mass and generally considered to be shrinkage cracks caused by cooling. *Fay. See also* columnar jointing. c. Columns, 9 to 14 centimeters in diameter and 1 to 1.4 meters in length, found in some calcareoeus shales or argillaceous limestones; oval to polygonal in section. Columns are perpendicular to bedding. Possibly a desiccation structure. *Pettijohn.* d. A coarse structure of parallel columns of grains, having the long axis perpendicular to the casting surface. *ASM Gloss.*

columnar charge. a. A continuous charge in a quarry borehole. *Compare* deck charge. *B.S. 3618, 1964, sec. 6.* b. Charge uniformly distributed in the principal part of a straight drill hole. The degree of packing is smaller than for the bottom charge. *Fraenkel.*

column drill. A tunnel rock drill supported by a vertical steel column jacked tightly between the roof and floor. It is being replaced by various types of drill mounting and air-leg supports. *Nelson.*

column head. In the mushroom type of reinforced concrete construction, the enlargement of the column where it meets the slab. *Ham.*

column load. A single continuous charge. *Carson, p. 320.*

column of mud. Synonym for mud column. *Long.*

column pipe. The large cast-iron (or wooden) pipe through which the water is conveyed from the mine pumps to the surface. A mounting pipe; a rising main. *Fay.*

columns of ore. Deposits of ore in lodes having a small lateral but considerable vertical extent. An ore shoot. *Fay.*

colusite. a. Possibly a sulfide, arsenide, telluride, and antimonide of copper, iron, molybdenum, tin, and zinc, $(Cu,Fe,Mo,Sn,Zn)_4$-$(S,As,Te,Sb)_{3-4}$. Isometeric; bronze-gray color; granular. Said to be a member of the sphalerite group. From Butte, Mont. *English.* b. A variety of tetrahedrite containing 3.21 percent tin; from Japan. *Spencer 19, M.M., 1952.*

comagmatic. a. Applied to igneous rocks, or to the region in which they occur, having a common set of chemical, mineralogical, and textural features, and hence regarded as having been derived from a common parent magma. Essentially synonymous with consanguineous. *A.G.I.* b. Igneous rocks having certain chemical or mineralogical characteristics in common and hence, regarded as derived from a common parent magma; consanguineous; may be applied to igneous rocks in a district or region, but not necessarily to all the igneous rocks in the district. *Fay.*

comagmatic region. An area in which the igneous rocks are of the same general geologic age, have certain distinguishing characteristics in common, and are regarded as comagmatic; a petrographic province. *Fay.*

Comanche series. The Lower Cretaceous series of rocks in the western Gulf region of North America. *Standard, 1964.*

Comanchian. Lower Cretaceous. *A.G.I. Supp.*

comb. The place, in a fissure which has been filled by successive deposits of minerals on the walls, where two sets of layers thus deposited approach most nearly or meet, closing the fissure and exhibiting either a drusy central cavity or an interlocking of crystals. *Fay.*

combed. A surface texture of narrowly spaced lines produced on clay facing bricks by fixing wires or plates above the extruding column of clay so that they comb its surface. *Dodd.*

combed finish tile. Tile whose face surfaces are altered by more or less parallel scratches or scarfs in manufacture to give increased bond for mortar, plaster, or stucco. *ASTM C43-65T.*

combed structure. In its simplest form this structure consists of a fissure lined with crystals on each side, having their bases on the walls and their apexes directed toward the center. In some cases the fissure is thus altogether filled up with two sets of crystals meeting in the center. *Bureau of Mines Staff.*

combed veins. *See* banded vein; comb. *Fay.*

combed ware. Decoration effected by means of a toothed tool drawn across slip, over a body of a different color. *C.T.D.*

combeite. A rhombohedral mineral, $Na_4Ca_3Si_6O_{16}(OH,F)_2$. In nephelinite from Kivu, Republic of the Congo. *Spencer 21, M.M., 1958.*

combination. A union of two or more elements. *Crispin.*

combination die. In die casting, a die having two or more different cavities for different castings. *ASM Gloss.*

combination drill. A drill equipped for cable-tool and/or diamond-drilling operations, or for a cable-tool and/or rotary drilling operations. *Long.*

combination driller. A driller versed in cable-tool and diamond- or rotary-drilling techniques. *Long.*

combination electric locomotive. A mine locomotive which can operate as a trolley locomotive or as a battery locomotive. While operating on the battery, it can be used, under certain conditions, at the coal face. Also it may be used on the main haulage trolley system where, due to higher voltage, higher speeds are possible. *Nelson.*

combination gas. Natural gas rich in oil vapors. Wet gas. Also called casing-head gas. *Fay.*

combination longwall. *See* longwall, b. *Fay.*

combination mill. An arrangement of a continuous mill for roughing, and a guide or looping mill for shaping. *ASM Gloss.*

combination of subslicing and stoping. *See* sublevel stoping, b. *Fay.*

combination rig. a. A rig comprising a complete cable-tool outfit and a complete rotary outfit. *Porter.* b. Synonym for combination drill. *Long.*

combination sampler. A universal-type soil-sampling device in which some of the constructional features of two or more special-use samplers are combined. *Long.*

combination shot. A blast made by dynamite and permissibles, or permissible explosives and blasting powder in the same hole. It is bad practice and in many States is prohibited by law. *Fay.*

combination socket. A finishing tool. *Long.*

combination stoping. *See* combined overhand and underhand stoping. *Fay.*

combination-type electric mine locomotive. *See* electric mine locomotive.

combined carbon. The part of the total carbon in steel or cast iron that is present as other than free carbon. *ASM Gloss.*

combined cyanide. The cyanide of a metal-cyanide complex ion. *ASM Gloss.*

combined moisture. Moisture in coal that cannot be removed by ordinary drying. *Compare* free moisture, a. *Cooper, p. 397.*

combined overhand and underhand stoping. This term signifies the workings of a block simultaneously from the bottom to its top and from the top to the bottom. The modifications are distinguished by the support used, as open stopes, stull-supported stopes, or pillar-supported stopes. Also known as combined stopes; combination stoping; overhand stoping and milling system; back and underhand stoping milling system. *Fay.*

combined shrinkage stoping and block caving. In this method the ore body is worked from the top down in successive layers of much greater thickness than in top slicing. The mass of ore is weakened by a series of shrinkage stopes, which are extended up between the ribs, pillars, or blocks, which are subsequently caved. The intervening blocks are under cut and caved as in block caving. The cover follows the caved ore. Also called overhand stoping with shrinkage and simultaneous caving. *Fay.*

combined side and longwall stoping. *See* overhand stoping, b. *Fay.*

combined stopes. *See* combined overhand and underhand stoping. *Fay.*

combined stresses. Any state of stress that cannot be represented by a single component of stress; that is, one that is more complicated than simple tension, compression, or shear. *ASM Gloss.*

combined system. A system of drainage in which a set of drains and sewers carries both soil and surface water. *See also* separate system. *Ham.*

combined top slicing and shrinkage stoping. In this method the ore body is worked from the top down in successive slices. In the working of each slice the unit is worked as a shrinkage stope. The broken ore serves to give lateral support to the sides of the unit and also serves as a working platform from which the back is reached. After working a unit the cover is caved. No timber mat is used. Also known as the Kimberley method. *Fay.*

combined twinning. A rare type of twinning in which the twin operation can be described as composing a rotation of 180° around the c axis with reflection over 1120. *AM, 1.*

combined water. *See* chemically combined water. *Bureau of Mines Staff.*

combining weight. a. The relative weight of an element that has the same combining capacity as a given weight of another element, the standard now usually being 8 for oxygen but it was formerly 1 for hydrogen: The atomic weight divided by the valence. *Webster 3rd.* b. The relative weight of a radical or compound that combines with a given weight of an element, radical, or compound; especially, the weight of a compound that reacts with one equivalent of an element. *Webster 3d.*

comb rack. a. Refers to a bar of acid-resistant metal used to space and separate ware in a pickling basket. *Enam. Dict.* b. A burning tool shaped like a comb. *ASTM C286-65.*

comb ridge. a. Spires, most of which are more than 2,000 feet above the adjacent valley, surmount a narrow comb ridge, which is a thin partition of rock, or a gigantic arete. *A.G.I.* b. The coalescence of cirques has produced a comblike palisade of sharp rock needles which constitutes the aiguille type of mountain ridge. Such a ridge has, perhaps, most frequently been designated by the term arete (fishbone), though in the Alps, the term grat (edge) has been applied especially to the smaller and lateral ridges of this type. Comb ridge was proposed for all such palisades of needles derived by this process. *A.G.I.*

comb texture. A texture in which individual crystals have their long axes perpendicular to the walls of a vein. *Schieferdecker.*

combustibility. An assessment of the speed of combustion of a coal under specified conditions. *B.S. 3323, 1960.*

combustible. Capable of undergoing combustion or of burning. Used especially of materials that catch fire and burn when subjected to fire. *Compare* flammable. *Webster 3d.*

combustible carbon (in coal). The total carbon in the coal less that which is present as mineral carbonates. *B.S. 1016, 1961, Pt. 16.*

combustible gas indicator. The most common type of unit uses a heated platinum wire to ignite combustible gases in the sample. Heat of combustion changes the electrical resistance of the wire, which in turn affects the meter. Calibration is usually in terms of percentages of the Lower Explosive Limit of a particular gas, conversion for other gases being made by table. Although flame arrestors are built into the combustion chamber orifices, hazardous locations normally require use of tubes to carry the sample to a safe area for measurement. *Bests, p. 581.*

combustible schist. Another name for carbonaceous or bituminous shale. *Tomkeieff, 1954.*

combustible shale. Synonym for tasmanite. *Fay.*

combustion. The action or operation of burning; the continuous combination of a substance with certain elements, such as oxygen or chlorine, for example, accompanied by the generation of light and heat. *Standard, 1964. See also* ignition temperature.

combustion arch. A flat or curved refractory roof over a furnace to promote combustion by reflection of heat. *AISI, No. 24.*

combustion chamber. a. The enclosure in which fuel is burned. *ACSG, 1963.* b. Part of a furnace or kiln. *ASCG, 1963.*

combustion engineer. An engineer with practical training and knowledge of all kinds of fuels and their combustion characteristics. In general, he has not the technical qualifications of the fuel technologist. *Nelson.*

combustion furnace. A long, narrow, portable furnace used in the combustion method. *Fay.*

combustion method. A method for the quantitative determination of certain elements (such as carbon, hydrogen, and nitrogen) in organic compounds by combustion. *Webster 3d.*

combustion rate. The weight of fuel burnt per square foot of grate area per hour. *Nelson.*

combustion tube. A glass tube especially designed to withstand great heat as produced by the combustion method. *Standard, 1964.*

come-along. a. An open, fixed-jaw spanner used to grip, hold, and lift rods, casing, or piping. *Compare* lowering iron. *Long.* b. A device consisting of two serrated jaws so attached to a ring that a pull on the ring causes the opposing jaws to close and grip a wire, cable, or any cylindrical piece of drill equipment. *Long.*

comeback. In enameling, comeback refers to the length of time necessary for a furnace to return to its peak temperature after the introduction of a load of ware. *Enam. Dict.*

comedown; comb dung. Softish stone occurring in the roof of a coal seam and easily falling down when coal is removed. *Arkell.*

comendite. A sodic rhyolite containing alkalic amphibole and/or pyroxene. *A.G.I.*

come out. To withdraw or hoist the drill string or tools from a borehole. *Long.*

comet. In Wales, a hand lamp with a long, torchlike flame. *Fay.*

come-to-nature. The charge settling down into a pasty mass after boiling. *Mersereau, 4th, p. 443.*

come water. The constant or regular flow of water in a mine proceeding from old workings or from water-bearing rocks. *Fay.*

comfort air conditioning. Air conditioning that controls the atmosphere which human beings breathe. *Hartman, p. 4.*

comfort zone. Used to describe the effective temperature in British mines that normally falls in the range of 54° to 68° F on the basic scale. *Roberts, I, p. 136.*

coming out. The process of withdrawing or hoisting the drill string or tools from a borehole. *Long.*

coming up to grass; coming up to day. Eng. Common terms used by miners for the word basset, or outcrop. *Fay.*

Comleyan. Lower Cambrian. *A.G.I. Supp.*

command. Group of signals which initiates a step in execution of a program. *Pryor, 3, p. 31.*

commencing operations. The performance of some act which has a tendency to produce an intended result. *Ricketts, II.*

commercial deposit. A deposit of oil, gas, or other minerals in sufficient quantity for production in paying quantities. *Williams.*

commercial dust. Impure gold dust. *Bennett 2d, 1962.*

commercial flux. A flux sold under a trade name; prepared for use in soldering, brazing, and welding. *Crispin.*

commercial granite. This term includes granite, gneiss, gneissic granite, granite gneiss, and the rock species known to petrologists as syenite, monzonite, and granodiorite, species intermediate between them, the gneissic varieties and gneisses of corresponding mineralogic compositions and the corresponding varieties of porphyritic textures. The term commercial granite shall also include other feldspathic crystalline rocks of similar textures, containing minor amounts of accessory minerals, used for special decorative purposes, and known to petrologists as anorthosite and laurvikite. *ASTM C119-50.*

commercial idler bearing. A bearing having either ground or unground races and in which the bore and outside diameter tolerances are held to thousandths of an inch and the width tolerance to hundredths of an inch. *NEMA MB1-1961.*

commercially disposable coal. A statistical term referring to saleable coal, less colliery consumption and coal supplied to employees. *B.S. 3323, 1960.*

commercial marble. A crystalline rock composed predominantly of one or more of the following minerals: calcite, dolomite, or serpentine, and capable of taking a polish. *ASTM C119-50.*

commercial mine. A coal mine operated to supply purchasers in general as contrasted with a captive mine. *Zern.*

commercial ore. Can. Mineralized material currently profitable at prevailing metal prices. *Hoffman.*

commercial quantity. A quantity of oil, gas, or other minerals sufficient for production in paying quantities. *Williams.*

commercial quarry. a. Term that includes quarries for aggregate and quarries for the production of limestone for industrial and agricultural purposes. *Streefkerk, p. 16.* b. Not owned or controlled by consumer. Contrasted with a captive quarry. *Bureau of Mines Staff.*

commercial sampling. The American Society for Testing and Materials divides coal sampling into commercial sampling and special purpose sampling. Commercial sampling procedures are intended to produce an accuracy such that if a large number of samples are taken from a single lot of coal, 95 out of 100 test results will be within plus or minus 10 percent of the average of these samples. *Compare* special purpose sampling. *Mitchell, p. 81.*

commercial zinc. *See* spelter. *Nelson.*

comminute. To reduce solids to minute particles by crushing, grinding, or pulverizing. *Crispin.*

comminution. a. The act or action of comminuting or the fact of being comminuted; pulverization; trituration. *Webster 3d.* b. The breaking, crushing, or grinding of coal, ore, or rock. *Nelson.* c. In powder metallurgy, the same as pulverization. *ASM Gloss.*

commission broker. A broker who buys and sells on order for customers, who may be scattered throughout the country, and who are reached by a network of branch commission houses in various cities. *Hoov, p. 280.*

commission ore. Uranium-bearing material of 0.10 percent U_3O_8 or higher, for which the Atomic Energy Commission has an established price. *Ballard.*

common banded coal. The common variety of bituminous and subbituminous coal. It consists of a sequence of irregularly alternating layers or lenses of (1) homogeneous black material having a brilliant vitreous luster; (2) grayish-black, less brilliant, striated material usually of silky luster; and (3) generally thinner bands or lenses of soft, powdery, and fibrous particles of mineral charcoal. The difference in luster of the bands is greater in bituminous than in subbituminous coal. *ASTM D493-39. See* banded coal.

common bond. *See* American bond. *A.R.I.*

common brick. Brick such as is used for rough work or for filling in or backing. *Crispin. See also* building brick.

common-brick clay. A red-to-brown burning clay which usually has a high percentage of fluxing impurities, is plastic enough for shaping, and fires to a very hard and strong solid with little warping or cracking at a relatively low temperature. *Bureau of Mines Staff.*

common goods; rejections; rubbish. Terms applied to the less desirable diamond material used for abrasive purposes. *I.C. 8200, 1964, p. 3.*

common ion effect. Change in concentration of an ion in a saturated solution through addition of another electrolyte which yields an ion in common with the solid substance present in excess. The ion product remains constant, but with the increase of concentration of one ion that of the other diminishes correspondingly. Since the solution is already saturated, precipitation occurs, the effect being a reversal of the process of ionization. *Pryor, 3.*

common iron. The poorest quality of commercial iron. *Standard, 1964.*

common lead (pronounced like the verb led). Lead having four isotopes (mass numbers 204, 206, 207, and 208) in the proportions generally obtained by analyzing lead from rocks and lead minerals which are associated with little or no radioactive material; commonly considered to be the lead present at the time of the earth's formation, as distinguished from lead produced later by radioactive decay. *A.G.I.*

common opal. Opal without play of color. Most varieties are of no gemmological interest or importance, others because of their color or markings are set in jewelry. *See also* precious opal. *Shipley.*

commons. Clay building bricks that are made without attention to appearance and intended for use in the inner leaf of cavity walls or for internal walls. The crushing strength of such bricks varies from about 1,500 to 6,000 per square inch, the water absorption from about 10 to 30 wt., percent. *Dodd.*

common salt. *See* halite; sodium chloride. *Bennett 2d, 1962.*

common solder. Soft solder of about 60 percent lead, 40 percent tin, optional antimony to about 1.5 percent. *Bennett 2d, 1962.*

communication road. Scot. An underground road between two coal mine shafts. *Fay.*

commutated current. Electric current of constant strength of which the direction of flow is reversed at constant intervals of time. *Schieferdecker.*

commutator. a. A contrivance for reversing the direction of electric current in any circuit. *Crispin.* b. Apparatus to convert direct current into commutated current. *Schieferdecker.* c. A cylindrical ring or disk assembly of conducting members, individually insulated in a supporting structure with an exposed surface for contact with current-collecting brushes and ready for mounting on an armature shaft. *Lowenheim.*

commutator compound. Generally a mixture of paraffin and beeswax, used to lubricate the brushes and commutator of a dynamo or motor, and to reduce sparking. *Porter.*

commutator-controlled welding. Spot or projection welding in which several electrodes, in simultaneous contact with the work, function progressively under the control of an electrical commutating device. *ASM Gloss.*

commuting transformer. A transformer resembling a dynamo, but with a revolving commutator. *Webster 2d.*

Como beds. In geology, a thin series of beds extending from Wyoming along the east base of the Rocky mountains into Colorado, containing a rich land fauna of mammals and reptiles. The beds are referred either to the Upper Jurassic or the Lower Cretaceous. *Standard, 1964.*

compact. a. In powder metallurgy, an object produced by the compression of metal powder, generally while confined in a die, with or without the inclusion of nonmetallic constituents. Synonymous with briquette. *See also* compound compact; composite compact. *ASM Gloss.* b. To treat glass in a manner, such as by heat-treatment, to approach maximum density. *ASTM C162-66.* c. Marked by an arrangement of parts or units closely pressed, packed, grouped, or knit together with very slight intervals or intervening space.

Webster 3d.

compacted yards. Measurement of soil or rock after it has been placed and compacted in a fill. *Nichols.*

compacting factor. The ratio obtained by dividing the observed weight of concrete which fills a container of standard size and shape when allowed to fall into it under standard conditions of test, by the weight of fully compacted concrete which fills the same container. *Taylor.*

compacting factor test. For freshly prepared concrete made by weighing a container filled under standardized conditions, therefore obtaining the specific gravity of the mix. *Pryor, 3.*

compaction. a. Decrease in volume of sediments, as a result of compressive stress, usually resulting from continued deposition above them, but also from drying and other causes. *See also* differential compaction. *A.G.I.* b. In soil mechanics, the densification of a soil by means of a mechanical manipulation. *ASCE P1826.* c. Reduction in bulk of fill by rolling, tamping, or soaking. *Nichols, 2.* d. The expulsion of air from a soil mass and so achieve a high density. This results in (1) increased bearing capacity; (2) reduced tendency to settlement or deformation under load; and (3) reduced liability to moisture changes, that is, increased all-round stability. Compaction is normally specified as a soil density (pound per cubic foot) to be achieved. Density measurement is necessary to assess progress and completion. *See also* relative compaction. *Nelson.* e. One stage in the process by which sediments are converted into rocks. *Wheeler.* f. The process of inducing a closer packing of the aggregate particles in concrete by the reduction of voids. *Taylor.*

compaction curve; Proctor curve. The curve showing the relationship between dry unit weight (density) and the water content of a soil for a given compactive effort. *ASCE P1826.*

compaction plant. Machines, such as rollers, to expel air from a soil mass and so achieve a high density. Smooth-wheel rollers are best for gravels, sands, and gravel-sand-clay soils with reasonably high moisture contents. Pneumatic-tired rollers are best for clays with reasonably high moisture contents and sheepsfoot rollers are the best for clays with low moisture contents. The economical limit beyond which further rolling gives only slight increase in density is: pneumatic-tired rollers, 4 to 8 passes; smooth-wheel rollers, 8 to 16 passes; sheepsfoot rollers, 32 to 64 passes. *Nelson.*

compaction shale. Shale that owes its strength to compaction rather than to cementation. *Compare* cemented shale. *A.G.I. Supp.*

compaction test; moisture-density test. A laboratory compacting procedure whereby a soil at a known water content is placed in a specified manner into a mold of given dimensions, subjected to a compactive effort of controlled magnitude, and the resulting unit weight determined. The procedure is repeated for various water contents sufficient to establish a relationship between water content and unit weight. *ASCE P1826.*

compact material. Material which can be excavated with a pick, generally a granular soil with a relative compaction of 90 percent or more. *Ham.*

compact rock. A rock so closely grained that no component particles or crystals can be recognized by the eye. *Nelson.*

companion heading. A subsidiary heading driven alongside a main heading to act as a return airway and sometimes for bringing in supplies. *Nelson.*

company. a. Eng. A number of butty colliers, or partners who work in a stall or room. *Fay.* An association of persons for carrying on a commercial or industrial enterprise or business. *Webster 3d.*

company account. Drilling done by a company on its property using its own equipment operated by personnel working for the company. *Long.*

company driller. *See* company miner.

company drilling machine operator. *See* company miner.

company hand. *See* company man. *D.O.T. 1.*

company house. A house in which a mineworker lives and pays rent to the coal company he works for. *Korson.*

company man. A man who works for the company by the hour or by the day, such as tracklayers, timbermen, drivers, and cagers, as distinguished from miners who work under contract, as by the ton, yard, etc. He also brushes down the walls and roofs when apparently dangerous and loads the loose rock and debris into cars and pushes them out to the haulageway. *Fay.*

company miner. In mining, one who drills, blasts, and loads rock or ore into cars in a mine. He is usually enagaged in development work, that is, driving underground passages, to open up a vein for actual mining, and prospecting for new deposits; and is paid on a day basis and may receive a bonus based on footage of advance. Also called company driller; company drilling-machine operator. *See also* miner, j. *D.O.T. 1.*

company store. A retail store associated with and usually owned and operated by an industrial company. *Webster 3d.* This type of store is common in mining and lumber camps. *Fay.*

company weighman. *See* master's weighman. *Nelson.*

company work. Work for which miners are paid a fixed rate of wages per shift. *See also* day wage. *Nelson.*

company worker. *See* company man. *D.O.T. 1.*

comparator. a. In photographic mapping, a device for measuring accurately the two rectangular coordinates of the image of a point on a photograph. *Seelye, 2.* b. An apparatus facilitating comparison of test material with known standard, or with other substances. A comparator microscope has a duplicate optical system, so that the observer sees two fields simultaneously (one with each eye). The Lovibond comparator has colored disks which can be matched against colored liquids to give approximate pH value, etc., using the same principle as with a set of pH color tubes in a more permanent and compact style. *Pryor, 3.*

comparator base. A carefully measured horizontal distance, usually one tape-length long, used as a means of checking and comparing the tapes used in the field. *Seelye, 2.*

comparison prism. A small, right-angled prism placed in a front of a portion of the slit of a spectroscope or a spectrograph for the purpose of reflecting light from a second source of light into the collimator, so that two spectra may be viewed simultaneously. *See also* comparison spectrum. *C.T.D.*

comparison spectrum. A spectrum which contains a number of sharply defined, well-identified lines of standard wavelength that is used as a standard of comparison in studying other spectra. Usually photographed on the same plate above and below the photograph of the spectrum being studied. *Gaynor.*

compartment. a. A separate division or section of anything. *Webster 2d.* Mining shafts usually are divided into two or more compartments or sections, separated by framed timbers and planking. *Fay.* b. A space or division in a shaft formed by cross buntons. The main compartments in a winding shaft are two for cages or skips. *See also* rectangular shaft, a. *Nelson.* c. One section or unit in a coal- or mineral-treatment plant. *Nelson.*

compass. a. An instrument for determining directions, usually by the pointing of a magnetic needle free to turn in a horizontal plane, as, for example, the ordinary surveyor's compass. Also, a dip compass, for tracing magnetic iron ore, having a needle hung to move in a vertical plane. *Fay.* b. An instrument for describing circles, transferring measurements, and similar operations consisting in its simple form of two pointed branches joined at the top by a pivot, one of the branches generaly have a pen or pencil point. *Webster 3d.* c. A Maas or other compass device used in borehole-survey work. *Long.*

compass and wedge. Term sometimes used for a brick that has a taper both on the side and on the face, for example a 9-inch brick tapered 4½/3½ inches and 2½/2 inches. *Dodd.*

compass deflection. a. The difference, expressed in degrees, between the direction a magnetic compass needle points and true or astronomical north. This is termed magnetic declination. *Long.* b. Differences, expressed in degrees, between magnetic-north directions and the direction a magnetic compass points, owing to local magnetic interferences. This is termed magnetic deviation. *Long.*

compass direction. Direction as indicated by a compass without any allowances for compass error. The direction indicated by a magnetic compass may differ by a considerable amount from the true direction referred to a meridian of the earth. *H&G.*

compass error. The amount by which a compass direction differs from the true direction. The error is usually expressed in degrees and is marked (+) or minus (−) according to whether the compass direction as read in degrees of azimuth is less or greater than the true azimuth. The error is to be applied according to sign to the compass reading to obtain the true azimuth direction. The compass error combines the effects of the deviation and variation of the compass. *H&G.* The error is also expressed as number of degrees east or west of true azimuth north. *Bureau of Mines Staff.*

compass points. The four principal points of the compass—north, east, south, and west, are called the cardinal points. Midway between the cardinal points are the intercardinal points — northeast, southeast, southwest, and northwest. Midway between each cardinal and intercardinal point is a point with a name formed by combining that of the cardinal and intercardinal point, the former being placed first, as north-northeast, east-northeast, and so forth. Midway between the points already indicated are points bearing the name of the nearest cardinal or intercardinal point followed by the word by and the name of the cardinal point in the direction in which it lies, as north by east, northeast by north, and so forth. In all, there are 32 points separated by intervals of 11¼°. Each of these intervals is subdivided into quarter points. *H&G.*

compass rule. The compass rule is most generally used for balancing a traverse. This rule states that correction in latitude or departure equals:

$$\frac{\text{closure in latitude or departure}}{\text{perimeter (the length of traverse)}}\text{ X the side}$$

Corrections found by this formlua are algebraically applied to the respective latitudes or departures. *Staley, p. 65.*

compass traverse. The framework for a survey in which a number of straight lines are accurately measured by tape or pace, their bearings being taken by a compass, which should be of the prismatic type. The latitude and departure of each line is calculated and the necessary corrections are made to provide a closed traverse. *Ham.*

compatibility triangle. Subsystem of compatible phases in a ternary system. *VV.*

compeb mill. A closed, horizontal, rotating, steel cylinder containing compartments, each having different-sized balls for grinding and pulverizing raw cement materials. *Mersereau, 4th, p. 235.*

compensated grades. Grades which have been reduced to keep total resistance the same on curves and tangents. *Urquhart, Sec. 2, p. 26.*

compensating diaphragm. Fitting added to the telescope of a theodolite in stadia work which varies the interval between the stadia hairs when a sloping sight is taken, in order that the horizontal distance from the instrument to the staff can be calculated. *See also* stadia hairs. *Ham.*

compensating drive. In a four-wheel drive truck, a freewheeling unit in the front propeller shaft that allows the front wheels to go farther than the rear on curves. *Nichols.*

compensating error. Random error equally liable to be plus or minus, and if of small dimensions, reasonably likely to be compensated by further errors. In contrast, systematic or biased errors all fall on same side of correct measurement and may therefore accumulate and produce serious discrepancies. *Pryor, 3.*

compensating rope. Balance weight ropes having direct connection with hoisting ropes. *Ham.*

compensation. An amount paid, per week or as a lump sum, in respect of incapacity or death caused as the result of an injury by accident arising out of, or in the course of, a workman's employment. *Nelson.*

compensation, isostatic. A theory of equillibrium of the earth's crust assuming that columns of rock and water standing on bases of equal area have equal weights irrespective of the elevation and configuration of their upper surfaces. *A.G.I.*

compensation method. Procedure for determining the voltage difference between two points in the ground by compensating this voltage difference with a known and adjustable voltage difference. *Schieferdecker.*

compensation water. The quantity of water which must be allowed to pass through a dam in order to meet the needs of those who used the water before the dam was built. *Ham.*

compensator. Instrument to determine the voltage difference between two points in the ground by the compensation method. *Schieferdecker.*

competence. In hydraulics, the measure of the ability of a stream to carry a piece of rock. This is a guide in prospecting work, when tracing alluvial deposits to their source. *Pryor, 3.*

competence of a stream. Relates to the largest fragment or boulder which a stream can carry. A term used in tracing placers or outcrops along streams. *Nelson.*

competent. a. Strata or rock structure combining sufficient firmness and flexibility to transmit pressure, and, by flexure under thrust, to lift a superincumbent load. *Standard, 1964.* b. Streams able to transport debris of a given size. *Standard, 1964.* c. Rock formations in which no artificial support is needed to maintain a cavefree borehole. *Long.* d. Rock capable of withstanding an applied load under given conditions without falling or collapsing. *Long.*

competent bed. a. A rock formation which, because of massiveness or inherent strength, is able to lift not only its own weight but also that of the overlying rock. *A.G.I.* b. A bed that has a physical characteristic such that it responds to tectonic forces by folding and faulting, rather than by crushing and flowing. A competent bed is relatively strong; an incompetent bed, relatively weak. *B.S. 3618, 1964, sec. 5.*

competent rock. Rock which, because of its physical and geological characteristics, is capable of sustaining openings without any structural support except pillars and walls left during mining (stulls, light props, and roof bolts are not considered as structural support). *BuMines Bull. 587, 1960, p. 5.*

complement. a. The complement of an arc is 90° minus the arc. *Zern, p. 54.* b. *See* rock fracture. *Roberts, I, p. 111.*

complementary dikes. Associated dikes (or other minor intrusions) composed of different but related rocks, regarded respectively as the leaucocratic and the melanocratic differentiation products from a common magma; for example, aplite and lamprophyre; bostonite and camptonite. *Holmes, 1928.*

complementary forms. In crystallography, two forms which, when combined geometrically, produce a form having higher symmetry. *Fay.*

complementary rocks. Suggested by Brögger for the basic rocks, which, usually in the form of dikes, accompany larger intrusions of more acidic types and complement them in a chemical sense. *Compare* lamprophyre; oxyphyre; radial dikes. *Fay.*

complete analysis. One complete within requirement of a specific investigation, as regards identification of each mineral species in a sample of ore, the establishment of its formula and possibly stereostructure and the correct quantification of all elements likely to enter the problem of devising a suitable method of treatment. *Pryor, 3.*

complete combustion. Occurs when the products of combustion leaving the furnace or appliance do not contain any gaseous combustible matter. *See also* perfect combustion. *Nelson.*

complete fusion. Fusion which has occurred over the entire base-metal surfaces exposed for welding. *ASM Gloss.*

complex. a. An ore is complex when it carries several metals difficult to extract. *von Bernewitz.* b. Combination of two or more compounds or ions (example, $K_4Fe(Cn)_6$, ex 4KCN and $Fe(CN)_2$). A complex ion is an electrically charged group of atoms. *Pryor, 3.* c. An assemblage of rocks of any age or origin that has been folded together, intricately mixed, involved, or otherwise complicated. *Stokes and Varnes, 1955.*

complex crystals. Those having many crystal forms and faces. *Shipley.*

complex fold. A fold which is cross-folded; that is, a fold, the axial line of which is folded. *Fay.*

complex gravitational crystallization differentiation. A complicated process of magmatic differentiation accomplished by the combined effects of crystal settling, transport by convection currents, and gaseous transfer. *Schieferdecker.*

complex ore. a. An ore containing several metals. *Bateman.* b. Ores named for two or more valuable metals such as lead-zinc ores, gold-silver ores, etc. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 205.* c. This term has no precise meaning. It generally signifies an ore that is difficult or costly to treat because of the presence of unusual minerals, for example, a gold ore with arsenic and antimony minerals, or an ore containing two or more metals, or ore composed almost wholly of several sulfide minerals. *Nelson.*

complex steel. An alloy steel containing more than two alloying elements, such as high-speed tool steel. It contains more elements than quaternary steel. *Fay.*

complexing agent. A substance that is an electron donor and that will combine with a metal ion to form a soluble complex ion. *ASM Gloss.*

complex ion. An ion that may be formed by the addition reaction of two or more other ions. *ASM Gloss.*

complex pegmatite. A pegmatite body characterized by pneumatolytic-hydrothermal replacement and rare minerals. *Schieferdecker.*

complicated pneumoconiosis. A condition superimposed on simple pneumoconiosis by the effect of tubercle. *Nelson.*

compo. Eng. Fine-grained, loamy sand, streaked with silty partings. *Arkell.*

component. a. A constituent part, for example, a mineral is a component of a rock. *Webster 3d.* b. An ingredient of a chemical system, the concentration of which in the different phases is capable of independent variation. *Webster 3d.* c. Any one of the vector terms added to form a given vector sum or resultant. *Webster 3d.* d. One of the independent substances present in each phase of a heterogeneous equilibrium. The number of components in a system is the minimum number of chemical constituents which must be specified in order to describe the composition of each phase present. *A.G.I.*

component of coal. The term component was introduced in 1920 by R. Thiessen. In discussing the various petrographic layers or bands of banded bituminous coal, he refers to these layers or bands as components of coal, which are petrographic entities, recognizable visually as bands or layers of coal that have distinctive physical appearance and characteristic microstructural features from coal to coal. Therefore, the component anthraxylon is described as representing bright, glossy bands of coal that under the microscope always show traces of more or less well-preserved cellular tissues indicating its derivation from woody plant material. Thiessen recognized three components of banded bituminous coals—anthraxylon, attritus, and fusain. The term component is somewhat comparable with the term microlithotype of the Stopes-Heerlen Nomenclature. *IHCP, 1963, part I.*

composite. Made up of separate parts or elements; combined or compounded; not simple. *Standard, 1964.*

composite compact. In powder metallurgy, a compact consisting of two or more adhering layers of different metals or alloys with each layer retaining its original identity. *ASM Gloss.*

composite cone. A volcanic cone, usually of large dimensions, built of alternating layers of lava and pyroclastic material. Essentially, synonymous with stratified cone and stratovolcano. *See also* volcanic cone. *A.G.I.*

composite construction. A type of construction made up of different materials, for example, concrete and structural steel, or of members produced under different conditions, for example, in situ concrete and precast concrete. *Taylor.*

composite dike. A dike formed by two or more intrusions of different ages into the same fissure. The adjective composite is similarly applied to sills, laccoliths, and other intrusions. *Fay; Hess.*

composite electrode. a. Filler-metal electrode, used in arc welding, consisting of more than one metal component combined mechanically. It may or may not include materials which protect the molten metal from the atmosphere, improve the properties of the weld, or stabilize the arc. *Coal Age, v. 66, No. 3, Mar. 1961, p. 91.* b. A tubular electrode having a flux-filled core. *ASM Gloss.*

composite explosives. Explosives of this type contain a mechanical mixture of substances which consume and give off oxygen with one or several simple explosives. Nobel's extra dynamite (1879) is a good example of this type. They can be regarded as mixed explosives with an addition of one or more simple explosives as sensitizers, which makes for easier initiation of the mixture and gives greater assurance of complete transformation. The great majority of commercial explosives belong to this category. *Fraenkel, v. 3, Art. 16:0, p 31.*

composite fold. A fold having smaller folds on its limbs, regardless of dimensions. *A.G.I.*

composite gneiss. A banded rock resulting from intimate penetration of magma (usually granite) into the country rocks. *See also* injection gneiss; migmatite. *A.G.I.*

composite intrusion. An intrusion composed of two or more kinds of rock intruded at different times but making use of the same channel of injection. *Stokes and Varnes, 1955.*

composite joint. A joint in which welding is used in conjunction with mechanical joining. *ASM Gloss.*

composite map. A map on which several levels of a mine are shown on a single sheet. Horizontal projection of data from different elevations. *McKinstry.*

composite materials. Structural materials of metal alloys or plastics with built-in strengthening agents which may be in the form of filaments, foils, or flakes of a strong material. *H&G.*

composite plate. An electrodeposit consisting of layers of at least two different compositions. *ASM Gloss.*

composite sampling scheme. One in which different parts, or stages, of the sample are reached by differing methods. *Pryor, 3.*

composite seam. A coal bed consisting of two or more parts that are in contact where intervening strata have wedged out. *A.G.I. Supp.*

composite section. Projection of data from various locations to a single vertical (or inclined) section. *McKinstry.*

composite sill. A sill composed of two or more intrusions having different chemical and mineralogical compositions. *Billings, 1954, p. 295.*

composite stone. Same as assembled stone. *Shipley.*

composite stones. A comprehensive term which includes doublets, triplets, etc., in which a stone consists of two or more parts either of the same or of different materials cemented or otherwise joined together. *Anderson.*

composite vein. A large fracture zone, up to many tens of feet in width, consisting of several parallel ore-filled fissures and converging diagonals, the walls of which and the intervening country rock have undergone some replacement. *Bateman, 1950, p. 112.*

composite wheel. A bonded product where two or more specifications are bonded together in one wheel. *ACSG, 1963.*

composite working. N. of Eng. A system of organization in which all members of a team undertake all face tasks and share in the common paynote. *Trist.*

composition. a. An aggregate, mixture, mass, or body formed by combining two or more elements or ingredients. *Webster 3d.* b. The mineralogical or chemical constitution of a rock. *A.G.I.* c. The elements present in a substance and the proportions in which they occur. *C.T.D.* d. An alloying ingredient for hardening gold, used in the jewelry trade, consisting of 2 parts copper to 1 part zinc. *Hess.*

composition brick. Scot. A common building brick made by the stiff plastic process from clay and colliery waste; characteristically, it has a black core. *Dodd.*

composition face; composition plane. The face or plane by which the parts of a twin crystal are united. *Standard, 1964.*

composition of forces. If two or more forces acting on a body can be replaced by a single force the forces are said to have been compounded. This is known as composition of forces. *Morris and Cooper, p. 175.*

composition plane. See composition face. *Standard, 1964.*

compound. a. A lubricant applied to the inside and outside of ropes, preventing corrosion and lessening abrasion of the rope when in contact with hard surfaces. *Zern.* b. The walled or fenced enclosure of a European residence or factory in India, China, the Malayan settlements, or the Republic of South Africa; also, a similar enclosure containing a group of native houses. *Standard, 1964.* Also used in the Transvaal, Republic of South Africa, for the living quarters of the Kaffir miners. *Fay.* c. Composed or produced by the union of two or more elements, ingredients, or parts; a composite. *Standard, 1964.* d. A combination of the atoms or ions of different elements. The mechanisms by which they are combined is called a bond. *Leet.*

compound air lift. More than one air-lift pump in series. *Pryor, 3.*

compound compact. In powder metallurgy, a compact consisting of mixed metals, the particles of which are joined by pressing or sintering, or both, with each metal particle retaining substantially its original composition. *ASM Gloss.*

compound compression; stage compression. In compound compression, the work of compression is divided into two or more stages or cylinders. In two-stage compression, air is compressed in the first or low-pressure cylinder to a certain point, then forced into an intercooler where it is cooled to approximately its original temperature, then passes into the second or high-pressure cylinder, in which it is compressed to the final or delivery pressure. The ratio of compression in each cylinder of a two-stage compressor is equal to the square root of the overall ratio of compression, that is, the square root of the final absolute pressure divided by the absolute atmospheric pressure. In three-stage work, the ratio of compression, in each cylinder is the cube root of the overall ratio of compression. *Lewis, p. 666.*

compound cradle. An apparatus composed of three tiers of blanket tables, a shaking table, and a quicksilver riffle for catching gold. *Fay.*

compound curve. A continuous curve composed of two or more arcs of different radii. *Zern, p. 455.*

compound die. Any die so designed that it performs more than one operation on a part with one stroke of the press, such as blanking and piercing where all functions are performed simultaneously within the confines of the particular blank size being worked. *ASM Gloss.*

compound dredger. A type of dredger combining the suction or suction cutter apparatus with a bucket ladder. *C.T.D.*

compound dynamo; compound motor. A direct-current electric machine in which shunt and field winding are in a series. *Pryor, 3.*

compound engine. An engine in which the steam does useful work in two stages, that is, first in a small high-pressure cylinder and then in a larger low-pressure cylinder. This compound arrangement gives higher efficiencies than a single-cylinder engine. *Nelson.*

compound fault. A series of closely spaced parallel or nearly parallel faults. *C.T.D.*

compound foreset bedding. A cross-bedded unit with tangential foresets and a concave base. *Pettijohn.*

compound girder. A rolled steel joist strengthened by plates attached to the flanges by riveting or welding. *Ham.*

compounding. Expanding the steam in two or more engine cylinders, in order to prevent the lowering of the efficiency of the engine by condensation. *Mason, V. 2, pp. 368-369.*

compound lode. Veins seldom occur alone. There are often a number of parallel deposits, or a series of intersecting veins. Such a system is called a compound lode.

Higham, p. 5.

compound motor. *See* compound dynamo. *Pryor, 3.*

compound oils. Mineral oils which are mixed with animal or vegetable oils to increase viscosity or adhesion. *Porter.*

compound oxides. Behave like a compound of two oxides, though they may not actually be so. Thus, triferric tetroxide (Fe_3O_4) behaves like a compound of ferrous and ferric oxides—FeO and Fe_2O_3—and forms ferrous and ferric salts with acids. *Cooper.*

compound proportion. A proportion between two ratios, either or both having more than one condition which affects the problem. In problems of this type, all of the terms appear in pairs, with the exception of one term, and this is always expressed in the same units as the required term. *Jones, 2, p. 65.*

compound ripple marks. Two or more sets of ripple marks, one superimposed on the other. *Pettijohn.*

compound ripples. Type of ripple marks resulting from simultaneous interference of wave-oscillation with current action. *Pettijohn.*

compound rolls. Two or more pairs of crushing rolls arranged above one another, the upper pair acting as a primary crusher and the lower pair as a secondary crusher. Compound rolls find use in the size-reduction of brick clays. *Dodd.*

compound shaft. A shaft in which the upper stage is often a vertical shaft, while the lower stage, or stages, may be inclined and driven in the deposit. In this type shaft, the wind is divided into two or more stages, and underground winding engines are installed to deal with the lower stages, with transfer points and ore bins at the junction of two stages. *Sinclair, V, p. 2.*

compound shoreline. Shoreline, the features of which combine elements of submerged and emerged coasts as a result of submergence followed by emergence. *Schieferdecker.*

compound spherulite. A spherulite which appears to have been formed by the rapid growth of rays of plumose spherulitic aggregates outwards from a central core and the final radial growth of a denser layer forming an outer spherical shell. Compound spherulites are known with a diameter of more than 10 feet. *Schieferdecker.*

compound transmission. A gear set in which power can be transmitted through two sets of reduction gears in succession. *Nichols.*

compound twins. In crystallography, individual crystals of one group united according to different laws. *Standard, 1964.*

compound vein. a. A vein or lode consisting of a number of parallel fissures united by cross fissures, usually diagonally. *Fay.* b. A vein composed of several minerals. *Fay.*

compound ventilation. a. An arrangement of a number of major ventilation systems serving various large working areas and served by more than two shafts and their associated fans, but integrated to form one ventilation system. Usually adopted in large combined mines. *See also* radial ventilation. *B. S. 3618, 1963, sec. 2.* b. Ventilation by means of a number of splits, which is now normal practice. *See also* ventilation, c. *Nelson.*

compound-wound motor. A direct-current motor which has two separate field windings—one connected in parallel and the other in series with the armamature circuit. *Lowenheim.*

comprehensive mechanization. N. of Eng. Preparation-getting machines in conjunction with flexible armored (snaking) face conveyors and power-assisted stonework. The advancing of the conveyor and of walking chocks are triggered by the passage of the cutter loader in recent experiments in the introduction of automation. Comprehensive mechanization is still rare in low seams. *Trist.*

compressed. Pressed together; compacted; or reduced in volume by pressure. *Webster 3d.*

compressed air. Air compressed in volume and transmitted through pipes for use as motive power for underground machines. Compressed air is costly to transmit long distances but has certain advantages, namely, it cools the air at the working face and is relatively safe in gassy mines. *Nelson.*

compressed-air blasting; air shooting. A method originated in the United States for breaking down coal by compressed air. Air at a pressure of 10,000 to 12,000 pounds per square inch is conveyed in a steel pipe to a tube or shell inserted in a shothole. The air is admitted by opening a shooting valve and is released in the hole by the rupture of a shear pin or disc. The sudden expansion of the air in the confined hole breaks down the coal. Advantages: (1) a high proportion of large coal; (2) no danger of methane ignition; and (3) no toxic or disagreeable fumes. *Nelson.*

compressed-air disease. *See* caisson disease. *Nelson.*

compressed-air-driven lamps. These lamps are self-contained units and comprise a strong alloy casing within which are a compressed-air turbine and a small alternating-current generator with stationary windings and revolving field magnets. The air enters the casing at one side, passes through a filter and then through a reducing valve which maintains a constant pressure of 40 pounds per square inch on the turbine blades. The air escaping from the turbine is used to scavenge the inside of the lamp and remove any firedamp that might have entered when the lamp was not in use. It is finally discharged through a series of holes of such a size that the pressure inside the lamp casing is 2 to 3 pounds per square inch above atmospheric. Should this pressure be lost due to the lamp glass being broken, the light is extinguished automatically by a spring-loaded diaphragm, which short-circuits the generator unless held open by the excess pressure. Also called air turbolamp. *Mason, v. 1, p. 259.*

compressed-air intoxication. *See* nitrogen narcosis. *H&G.*

compressed-air locomotive. A mine locomotive driven by compressed air. It is very safe and much used in gassy mines in Europe. The air is brought down by pipeline from the surface to a charging station near the pit bottom. *See also* locomotive haulage. *Nelson.*

compressed-air measurement. Compressed air may be measured by two methods: (1) full pressure, a method in which the volume of air delivered by a compressor is measured by noting the entire volume of the compressed-air system or of the main parts of the system, such as the receiver at the compressor, the main pipelines, and a receiver at the other end of the pipeline. The volumes of the receivers and pipeline are calculated, and the system is assumed to be free from any leakage. Without discharging into the pipeline, the compressor is run for 1 hour or more until the metal parts have attained normal operating temperature. The discharge from the compressor is now switched to deliver air to the pipe system, and the number of revolutions required to bring the pressure in the pipeline up to normal operating pressure should be noted by a revolution counter. The pressure and temperature in each part of the system are recorded, that is, in the first receiver, in the pipeline, and in the second receiver, each being provided with a thermometer and pressure gauge. The volume of compressed air in each part of the system is reduced to cubic feet of free air and these volumes are totaled to give the total free air in the system; and (2) low pressure, a method in which the Compressed Air Society recommends that the output from a compressor be measured under low pressure as it flows from a smooth nozzle. *Lewis, pp. 679-680.*

compressed-air plan. A plan showing the position and details of certain compressed-air equipment in the mine. *B.S. 3618, 1963, sec. 1.*

compressed-air turbines. Turbines used for driving coal cutters, belt conveyors, and similar duties. They are not so efficient in their use of the air as piston engines, but possess the merits of extreme simplicity and robustness, and therefore are preferred for coal face use. *Mason, V.2, p. 382.*

compressed pellets. Blasting powders manufactured in cartridge form for use in small diameter shotholes. These pellets are particularly useful for horizontal shotholes. *McAdam II, p. 13.*

compressibility. a. Property of a soil pertaining to its susceptibility to decrease in volume when subjected to load. *ASCE P1826.* b. The compressibility of a substance is usually defined as the relative change in volume per unit change in pressure referred to an arbitrary initial pressure. *Lewis, p. 580.* c. In powder metallurgy, the reciprocal of the compression ratio where the compact is made following a procedure, in which the die, the pressure, and the pressing speed are specified. *ASM Gloss.* d. A density ratio determined under definite testing conditions. *ASTM B243-65.* e. The reciprocal of the bulk modulus. *See also* coefficient of compressibility. *C.T.D.*

compression. a. In steam practice, the action of the piston in compressing the steam remaining in the cylinder, after the closure of exhaust valves into the clearance space. *Fay.* b. The point in the cycle of operations, or on the corresponding indicator diagram, at which this act occurs; also, the period over which compression takes place. *Webster 2d.* c. For steel wheel rollers, the compacting effect of the weight at the bottom of the roll, measured in pounds per linear inch of roll width *Nichols.* d. A system of forces or stresses that tends to decrease the volume or to shorten a substance, or the change of volume produced by such a system of forces. *A.G.I.*

compressional wave; longitudinal wave. a. A traveling disturbance in an elastic medium characterized by volume changes (and hence density changes) and by particle motion in line with the direction of travel of the wave. *A.G.I.* b. A longitudinal wave (as a sound wave) propagated by the elastic compression of the medium. *Webster 3d.*

compression curve. *See* pressure-void ratio curve.

compression efficiency. The ratio of the theoretical power required to compress air to the actual power required in the cylinder. The theoretical power may be computed as either isothermal or adiabatic power, and the compression efficiency is expressed on the corresponding basis. *Lewis, p. 663.*

compression fault. A fault resulting from compressive forces in the earth's crust. *Schieferdecker.*

compression flange. That part of a beam which is compressed; it is the upper part at midspan of a simply supported beam, and the lower part at the support of a continuous beam. *Ham.*

compression gasoline. Natural or casing-head gasoline made by compressing natural gas. *Hess.*

compression-ignition engine. An internal-combustion engine in which ignition of the liquid fuel injected into the cylinder is performed by the heat of compression of the air charge. *C.T.D.*

compression index. The slope of the linear portion of the pressure-void ratio curve on a semilog plot. *ASCE P1826.*

compression of air. *See* isothermal compression; isothermal expansion; adiabatic compression; adiabatic expansion; compound compression.

compression ratio. a. In powder metallurgy, the ratio of the volume of the loose powder to the volume of the compact made from it. *ASM Gloss.* b. The ratio of the volume of space above a piston at the bottom of its stroke to the volume above the piston at the top of its stroke. *Nichols.* c. The ratio of absolute pressure after and before compression. *Strock, 10.*

compression roll. The drive wheel of a steel wheel roller. Also called drive roll. *Nichols.*

compression strength. Resistance of material to rupture under compression, expressed as force per unit area. *Pryor, 3.*

compression subsidence. That condition in sedimentation in which the flocs or particles are conceived to be in close contact, further subsidence occurring as a direct effect of compression resulting in the elimination of water from the flocs and interstitial spaces. The settling velocity decreases with time of settling. *Mitchell, p. 611.*

compression tests. Tests performed during site investigations to determine soil strength and particularly applicable to clay deposits. *See also* unconfined compression appliance. *Nelson.*

compression zone. The surface area affected by compressive strain. *See also* neutral zone; tension zone. *Nelson.*

compressive force. A type of force such as the heavy weight of a building on its foundation or the weight of a mine roof on a prop, chock, or pack. *Morris and Cooper, p. 141.*

compressive strength. a. The load per unit of area under which a block fails by shear or splitting. *A.G.I.* b. The load per unit area at which an unconfined prismatic or cylindrical specimen of soil will fail in a simple compression test. Also called unconfined compressive strength. *ASCE P1826.* c. The maximum compressive stress that a material is capable of developing, based on original area of cross section. In the case of a material which fails in compression by a shattering fracture, the compressive strength has a very definite value. In the case of materials which do not fail in compression by a shattering fracture, the value obtained for compressive strength is an arbitrary value depending upon the degree of distortion that is regarded as indicating complete failure of the material. *ASM Gloss.*

compressive stress. A stress that tends to push together the material on opposite sides of a real or imaginary plane. *Billings, 1954, p. 14.*

compressor. a. A machine, steam or electrically driven, for compressing air for power purposes. Small air compressors may be compound steam and double-stage air. Large compressors may be triple-expansion steam and three-stage air and always used with condensers. Underground rock drills require an effective air pressure of about 100 pounds per square inch. *Nelson. See also* air compressor. b. Any kind of reciprocating, rotary, or centrifugal pump for raising the pressure of a gas. *C.T.D.* c. A machine which compresses air. *Nichols.*

compressor station repairman. A maintenance man in a factory or a mill who maintains and repairs compressor station structures and operating equipment, such as steam and internal-combustion engines, compressors, water pumps, generators, and boilers. *D.O.T. 1.*

Compton absorption. The absorption of a photon in the Compton effect. *NCB.*

Compton effect. When short homogeneous X-rays are scattered by light elements their wavelength is slightly increased, the scattered radiation containing usually both the original and the modified wavelengths. For an angle of scattering of 90°, the increase in wavelength is always 0.024 angstrom unit, whatever the scattering element. The effect is due to the collision of a photon with an electron and the consequent decrease in the energy of the photon. *C.T.D.*

comptonite. An opaque variety of thomsonite from the Lake Superior region; often cut cabochon as a curio stone. *Shipley.*

computed ultimate bending strength. *See* modulus of rupture in bending. *Ro.*

computed ultimate twisting strength. *See* modulus of rupture in torsion. *Ro.*

computer. a. A generic term for machines which can be used to solve mathematical problems. The two principal classes of computers are: (1) analog computers which use physical magnitudes to solve the problems, and (2) digital computers which perform the calculations using numbers that represent the various quantities and are composed of digits represented according to a predetermined code. *Gaynor.* An analog computer acts on internally stored information to solve complex mathematical problems; and a digital computer computes information in digital form. It is more accurate than the analog computer. *Crispin.* b. In seismic prospecting, one who with one or two assistants, carries on the routine work of transforming the "wiggly lines" on the reflection records into the form in which they are finally used. Where corrected record sections are prepared he must compute the corrections and must assemble the other information to be fed into the playback so that it will turn out properly corrected records. In addition to handling corrections, the computer must mark the records, read and plot times, and otherwise maintain the flow of data. *Dobrin, p. 56.*

computer, gravity prospecting. In petroleum production, one who computes and interprets variations in gravity pull of different earth formations, from the readings of a gravity meter, torsion balance, or other gravity measuring instruments recorded by a gravity prospecting party, to disclose indications of subsurface strata likely to contain petroleum deposits. *D.O.T. 1.*

computer helper. In metal mining, one who performs routine calculations from the measurements recorded at various field locations by a prospecting party searching for petroleum or ore reserves, using an integrator, a planimeter, mathematical formulas, charts, or other computational devices. May be designated according to kind of prospecting done, as computer helper, gravity prospecting. Also called chart clerk. *D.O.T. Supp.*

computing time. In computing time, when notice is given in land office proceedings, the first day is excluded and the last day included. *Ricketts, I.*

computor helper, gravity prospecting. In petroleum production, one who performs routine calculations from the measurements of gravity pull recorded at various field locations by a gravity prospecting party searching for petroleum reserves, using an integrator, a planimeter, mathematical formulas, charts, or other computational devices. *D.O.T. 1.*

computer, magnetic prospecting. In petroleum production, one who computes and interprets variations in magnetic attraction of earth formations, from the readings of a magnetometer taken at different locations by a magnetic prospecting party, to disclose indications of subsurface strata favorable to further petroleum exploration activities. *D.O.T. 1.*

computer, seismograph. In petroleum production, one who computes depths of subsurface rock strata from seismograph recordings, obtained by one or more seismic prospecting parties, to provide data for delineating contours of subsurface stratigraphy which may reveal earth formations favorable to petroleum deposition. Also called seismic coordinator. *D.O.T. 1.*

comstockite. A mineral, $(Mg,Cu,Zn)SO_4 \cdot 5H_2O$, containing 5.60 percent ZnO, 9.40 percent MgO, 9.00 percent CuO, 39.07 percent H_2O; from the Comstock Lode, Nev. Synonym for zinc-magnesia chalcanthite. *Spencer 19, M.M., 1952.*

concave. Hollowed or rounded inward like the inside of a bowl; having a shape that curves inward; a curved recess. Opposite of convex. *Webster 3d.*

concave bit. a. A new design of tungsten carbide drill bit for percussive boring. The cutting edge is concave, while in the conventional type the edge is convex. The new bit remains sharper for a longer period before regrinding becomes necessary and gives a higher penetration speed. Also called saddleback tip. *Nelson.* b. *See* plug bit, b. *B.S. 3618, 1963, sec. 3.*

concave crossbedding. Crossbedding deposited on a lower concave surface. Also used to describe crossbedding with tangential or concave foresets. *Pettijohn.*

concave crown. Synonym for concave bit. *Long.*

concave fillet weld. A fillet weld having a concave face. *ASM Gloss.*

concave inclined bedding. Crossbedding with concave, generally tangential, foresets. *Pettijohn.*

concavity. A concave condition applicable to the width of any flat surface. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

concealed coalfield. A coalfield which is totally buried beneath newer deposits, usually Permian and Trias strata, which repose unconformably on the Coal Measures in the basin. A good example of a concealed coalfield is that of Kent, in southeast England. *See also* exposed coalfield. *Nelson.*

concentrate. a. In mining, the product of concentration. Used in plural form as "arrangements for treating the concentrates were complete." Concentrates are called ore at Joplin, Mo.; mineral at Michigan copper mines; and tailings at Black Hawk, Colo. *Fay.* b. In mining, to separate ore or metal from its containing rock or earth. The concentration of ores always proceeds by steps or stages. Thus the ore must be crushed before the mineral can be separated, and certain preliminary steps, such as sizing and classifying, must precede the final operations, which produce the finished concentrates. *Ricketts, I.* c. Can. Enriched ore after removal of waste in beneficiation mill. *Hoffman.* d. The clean product recovered in froth flotation. *B.S. 3552, 1962.* e. To intensify in strength or to purify by the removal of valueless or unneeded constituents; condense; intensify. *Standard, 1964.*

concentrated charge. a. The heavy explosive charge loaded into the enlarged chamber at the bottom of a quarry blasthole. *See also* chambering, a. *Nelson.* b. Means that the height of the charge is small compared with the burden which can be given quantitatively. *Langefors, p. 61.*

concentrate filter operator. One who separates mineral concentrates from water or chemical solutions prior of the smelting of the concentrate to recover the mineral. *D.O.T. 1.*

concentrated load. A load that is confined to a very small area, a knife-edge load being a particular type of concentrated load. *Ham.*

concentrating plant. *See* concentrator. *Fay.*

concentrating table. A device consisting of a riffled deck, usually inclined in two directions to the horizontal, to which a differential reciprocating motion in a substantially horizontal direction is imparted; the material to be separated is fed in a stream of water, the heavy particles collect between the riffles and are there conveyed in the direction of the reciprocating motion while the lighter particles are borne by the current of water over the riffles to be discharged laterally from the table. *B.S. 3552, 1962.*

concentration. a. Separation and accumulation of economic minerals from gangue. *See also* ore dressing. *Bateman; Fay.* b. A placer deposit is a natural concentration of economic minerals. *Bureau of Mines Staff.* c. Increasing the strength of aqueous solutions by evaporating part of their water. *Fay.* d. The area covered by the diamonds as compared with the total area of the cutting surface of a surface-set bit. *Long.* e. The volume of diamonds, expressed in percent, compared to the total volume of the crown of an impregnated bit. *Long.* f. The percentage of acid compared with the volume of water added to produce a dilute solution. *Long.* g. The ratio of the dry weight of sediment to the weight of water sediment mixture of which it is part. Sediment concentration is commonly expressed in parts per million (ppm). *USGS Prof. Paper 462-F.* h. The process of increasing the dissolved solids per unit volume of solution, usually by evaporation of the liquid; the quantity of solute dissolved in a unit volume of solution. *ASTM STP No. 148-D.*

concentration cell. An electrolytic cell, the electromotive force of which is due to a difference in concentration of the electrolyte or active metal at the anode and the cathode. *Osborne.*

concentration, chemical. Strength of solution, expressed as a percentage (grams per 100 millimeters); molarity (moles per liter); molality (moles per kilogram); Normality (equivalent grams per liter). A mole is one gram molecule, the molecular weight of the compound in grams. *Pryor, 3.*

concentration criterion. The ratio between the density in a liquid of two minerals which are to be separated (M_h and M_l being the heavy and light one respectively) $C = \frac{M_h - 1}{M_l - 1}$, where water (S.G.1) is the liquid. This ratio indicates the grain size above which separation by gravity methods should be commercially practicable. Above 2.5 fine sands (down to below 200-mesh) can be tabled. At 1.75 the lower limit is 100-mesh; at 1.5 about 10 mesh, and 1.25 only gravel sizes can be treated. *Pryor, 3.*

concentration effect, law of. The rate of a simple chemical reaction is directly proportional to the concentration of each reactant, raised to a power equal to the number of molecules of the reactant in the equation for the actual reaction. *See also* mass action, law of. *Pryor, 3.*

concentration factor. A parameter used in modifying the Boussinesq equations to describe various distributions of vertical stress. *ASCE P1826.*

concentration of output. Essentially, to secure the maximum output of coal from the minimum length of face with due regard to safety and development. To measure the degree of concentration at a colliery, the following data are collected: (1) the total length of coalface; (2) the total length of main haulage roads; and (3) the total output. In general, the greater the dispersion of the workings, the greater the unproductive manpower employed and the higher the costs of production. *See also* face concentration; geographical concentration; overall concentration. *Nelson.*

concentration plant. Equipment for the recovering of valuable minerals from ores by physical means, that is, by washing or flotation. *C.T.D.*

concentration ratio. a. Weight or tonnage ratio (K) of the weight of feed (F) to the weight of concentrate (C) produced: $K = \frac{F}{C}$, for a two-product treatment. *Pryor, 3.* b. Grade, ratio (K) of grade of valuable constituent in feed to grade of valuable constituent in concentrate. *Bureau of Mines Staff.*

concentration, stage. In ore treatment series reduction of size, with removal of a finished product at each such reduction stage *Pryor, 3.*

concentration table. A table on which a stream of finely-crushed ore and water flows downward, and the heavier metallic minerals lag behind and flow off in a separate compartment. *Weed, 1922.*

concentration units, solutions. Two types of expression are used, which involve the quantity of solute, solvent, and/or solution: (1) group A, solute per solution in grams per liter. Moles of solute per liter of solution, or molarity. Gram equivalents per liter, or normality; and (2) group B, percent solute per solvent. Grams per 100 or gram percent. Weight of solute in solvent grams per liter. Moles of solute per liter solvent, or molality. *Pryor, 3.*

concentrator. a. A plant where ore is separated into values (concentrates) and rejects (tails). An appliance in such a plant, for example, flotation cell, jig, electromagnet, shaking table. Also called mill; reduction works; cleaning plant. *Pryor, 3. Compare* separator. b. An apparatus in which, by the aid of water or air and specific gravity, mechanical concentration of ores is performed. A concentration plant. *Fay.* c. A general term for a worker who tends concentrating tables, vanners, and other types of equipment used to separate valuable minerals from waste material. *D.O.T. 1.*

concentric. That which has a common center with something else. *Webster 3d.*

concentric fold. *See* parallel fold. *A.G.I.*

concentric fractures. A system of fractures more or less concentrically disposed about a center. *A.G.I.*

concentricity. Adherence to a common center, as in the inner and outer walls of a tube or hollow shape. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

concentric pattern. Diamonds set in bit face in concentric circles so that a slight uncut ridge of rock is left between stones set in adjacent circles. *Compare* eccentric pattern. *Long.*

concentric weathering. *See* spheroidal weathering.

concentric wheel. A bonded product containing two or more concentric sections of different (abrasive) specifications. *ACSG, 1963.*

concertina structure. A sheet formed by the repeated folding of a bed on itself, after the manner of the bellows of a concertina when shut up. The sheet is formed enitrely of the one bed and thus the structure differs from ordinary isoclinal folding, where distinct beds are involved. *Challinor.*

concessionary coal. *See* collier's coal. *Nelson.*

concessions. *See* concession system.

concession system. Under this system the state or the private owner has the right to grant concessions or leases to mine operators at discretion and subject to certain general restrictions. It had its origin in the ancient regalian doctrine that all mineral wealth was the prerogative of the crown or the feudatory lord and applies in almost every mining country in the world except the United States. *Compare* claim system. *Hoov, p. 365.*

conchilite. A bowl-shaped rock with a smooth or an irregular and scalloped outline. It has growth lines parallel to the margin. It ranges from 1 inch to 3 feet in diameter, and from less than 1 inch to more than 3 inches in height. Composed of limonite and goethite, and sometimes contains magnetite or manganite. It formed through the activity of a hemispherical colloid cell.

A.G.I.

conchoidal. Shell-shaped; the more compact rocks, such as flint, argillite, felsite, etc., break with concave and convex surfaces and are said to have a conchoidal fracture. *Fay.*

conchoidal fracture. A fracture with smooth, curved surfaces showing concentric undulations resembling the lines of growth on a shell. Conchoidal fracture is well displayed in quartz and flint, and to a lesser extent in anthracite. *See also* even fracture. *Nelson.*

concluded angle. Triangulation: The third angle of a triangle, not measured, but calculated from the other two angles. *Seelye, 2.*

concordant. Intrusive igneous bodies, the contacts of which are parallel to the bedding (or foliation) of the country rock. *Billings, 1954, p. 290.*

concordant injection. An igneous mass injected along bedding planes. *Fay.*

concrete. a. An intimate mixture of stone, sand, water, and a binder (usually portland cement) which hardens to a stonelike mass. *See also* breeze concrete; cement; reinforced concrete; standard mix. *Nelson.* b. A similar mass made with tar or asphalt (rare). *Hess.*

concrete aggregate. Normal (as opposed to lightweight) concrete aggregate includes sand and gravel, crushed rock of various types and slag. The nomenclature is given in British Standards 812; the mineralogical composition is dealt with in American Society for Testing and Materials, C294 and C295. *Dodd.*

concrete blocks. a. Solid or hollow precast blocks of concrete used in mines for lining roadways and building construction, etc. *Nelson.* b. The properties required of concrete blocks, both dense and lightweight, are specified in the United Kingdom in British Standard 2028. In the United States, the properties required of a solid concrete building block are specified in the American Society for Testing and Materials, C145; the properties of hollow concrete blocks are specified in American Society for Testing and Materials, C90 and C129; for methods of sampling and testing see American Society for Testing and Materials, C140 and C426. *Dodd.*

concrete breaker. A compressed-air tool, specially designed and constructed to break up concrete. *See also* compressed air. *Ham.*

concrete brick. A building brick made from portland cement and a suitable aggregate *Dodd.*

concrete caisson sinking. A shaft-sinking method sometimes used through soft ground down to bedrock. It is similar to caisson sinking except that reinforced concrete rings are used and an airtight working chamber is not adopted. *Nelson.*

concrete finishing machine. A machine used in the construction of roads or airfield runways. It is generally mounted on rails and runs on flanged wheels, smoothing and compacting the concrete to the required shape. *Ham.*

concrete mixer. A machine with a rotating drum in which the constituents of concrete are thoroughly mixed. Mixer sizes are distinguished by two figures, as follows: 5/3½, 7/5, 10/7, and 14/10. The first, always the larger, is the capacity of the mixer in cubic feet of damp aggregate and dry cement; the second figure is the volume of aggregate and cement after water has been added. *Ham.*

concrete mixer operator. In the concrete products industry, one who operates a small, portable concrete mixing machine to mix sand, gravel, cement, and water to make concrete. Also called cement mixer operator; concrete mixer; mixer; mixer man; mixer operator; mixer runner; mixing machine operator; mixing man. *D.O.T. 1.*

concrete paver. A concrete mixer for road making which moves either along rails or on crawler tracks, carrying a concreting boom used to place the concrete. *Ham.*

concrete pile. A precast reinforced or prestressed concrete pile driven into the ground by a pile driver. This term also applies to a cast in situ pile which is cast in a hole bored in the ground. *See also* in situ concrete piles. *Ham.*

concrete plug. A thick layer of reinforced concrete placed in the bottom of a shaft after it has been sunk to the desired depth and permanently lined. The plug resists floor lifting and provides a clean, smooth sump. *Nelson.*

concrete precision index. Coefficient of variation of concrete. *Bennett 2d, 1962.*

concrete pump. An apparatus which drives concrete to the placing position through a pipeline of 6-inch diameter or more, using a special type of reciprocating pump. The latter can force concrete through such a pipe to a distance of 1,000 feet and lift it to a height of 100 feet. The rate of placing is about 20 cubic yards per hour for one pump. *Ham.*

concrete roofs. There are many different types of applications of concrete roofs, the simplest being solid reinforced in situ slabs for a maximum span of 20 feet. Hollow precast reinforced or prestressed units are suitable for spans between 15 and 35 feet, being both lighter and thinner than solid units. For large spans of about 100 feet reinforced or prestressed beams can be used with in situ or precast units as infilling. Where such beams are undesirable an elliptical dome or shell design is suitable. *See also* precast concrete; prestressed concrete. *Ham.*

concrete shaft lining. *See* permanent shaft support; shaft wall. *Nelson.*

concrete sprayer. A compressed air machine for spraying liquid concrete on mine roadways. *See also* Aliva concrete sprayer. *Nelson.*

concrete spreader. A road-making machine supported by the concrete forms, or running on rails set parallel to them. It spreads the concrete evenly. *Ham.*

concrete vibrating machine. A machine which travels with the work, similar to a spreader or concrete finisher, vibrating up to 40 cubic yards per hour of concrete. *See also* vibrated concrete. *Ham.*

concrete vibrator. Machine which helps the aggregate to consolidate with minimum interstitial porosity. Gives greater strength as less water is incorporated in the mix, and as consolidation is better than with punning. *Pryor, 3.*

concreting boom. A light steel truss supported on frames at one end close to a concrete mixer, and at the other end on wheels. A concrete bucket travels along its lower member, running on a pair of overhead wheels. A bucket of 7 cubic feet capacity can be carried on a boom 40 feet long, weighing 400 pounds. *Ham.*

concretion. An accumulation of mineral matter that forms around a center or axis of deposition after a sedimentary deposit has been laid down. Cementation consolidates the deposit as a whole, but the concretion is a body within the host rock that represents a local concentration of cementing material. The enclosing rock is less firmly cemented than the concretion. Commonly spheroidal or disk-shaped, and composed of such cementing agents as calcite, dolomite, iron oxide, or silica. *Leet.*

concretionary. Tending to grow together. Particles of like chemical composition when free to move, combine, and form nodules of various sizes and shapes that are called concretions. Clay and ironstone nodules, pyrite balls, turtle stones, etc., are examples. Some greenstones also exhibit concretionary structure. *Fay.*

concretionary and nodular. Minerals, usually monomineralic aggregates, which are found in detached masses, the forms being sometimes spherical, sometimes irregular, for example flint. *Nelson.*

concretionary structure. a. A nodular or irregular concentration of siliceous, calcareous, or other materials formed by localized deposition from solution in sedimentary rocks. *C.T.D.* b. A zonal texture characterized by concentric shells of slightly varying composition and properties; normally the result of variation during growth; closely related to banded, gel, and colloform textures. *Schieferdecker.*

concretor. A skilled worker who spreads and levels concrete with or without formwork, shaping it to cambers or falls if required. *Ham.*

concurrent heating. Using a second source of heat to supplement the primary heat in cutting or welding. *ASM Gloss.*

concussion. Shock or sharp airwaves caused by an explosion or heavy blow. *Nichols.*

concussion table. An inclined table, agitated by a series of shocks, and operating at the same time like a buddle. It may be made self-discharging and continuous by substituting for the table an endless rubber cloth, slowly moving against the current of water, as in the Frue vanner. *Fay.* Also called percussion table.

cond Abbreviation for conductivity. *BuMin Style Guide, p. 58.*

condensate. A product of condensation; especially, a liquid obtained by the condensation of a vapor or gas. *Webster 3d.*

condensation. a. In hydrology, the process by which water changes from the gaseous state into the liquid state or solid state. It is the reverse of evaporation. *A.G.I.* b. The change of a substance from a vapor into a liquid state due to cooling. *Crispin.*

condensation point. The temperature at which the vapor changes into its liquid state, for instance, steam into water. *Morris and Cooper, p. 107.*

condenser. a. An apparatus for removing heat from a gas (steam) so as to cause the gas to revert to the liquid state (water). *ASTM STP No. 148-D.* b. An apparatus used for condensing vapors obtained during distillation; it consists of a condenser tube, either freely exposed to air or contained in a jacket in which water circulates. *C.T.D.* c. An accumulator of electrical energy. *Crispin.*

condenser maker. In ore dressing, smelting, and refining, one who operates an automatic machine in which fire clay condensers, used in smelting zinc ores, are made. *D.O.T. 1.*

condenser operator. In ore dressing, smelting, and refining, one who recovers magnesium particles from dust-bearing gas, using shock-chilling condensers and other dust-collecting apparatus. Also called dust operator. *D.O.T. 1.*

condenser setter. In ore dressing, smelting, and refining, one who sets up condensers in which zinc vapor is collected and condensed after being driven off by the application of intense heat to the ore in retorts in a zinc furnace. *D.O.T. 1.*

condensing lens. A lens for producing convergent light. *Fay.*

condensoid. The atmospheric contaminants commonly called "fume," when consisting of solids, and "fog" when composed of liquid dispersoids. *I. C. 7210, May 1942, p. 2.*.

condie. *See* waste, d.

conditioned sinter. A name given to sinter with lime additions. The lime addition (8 percent in some plants) has led to improvements in blast furnace performance and economy. *See also* sintering. *Nelson.*

conditioner. An apparatus in which conditioning takes place. *B.S. 3552, 1962.*

conditioners. Those substances added to the pulp to maintain the proper pH (measure of acidity or alkalinity of the pulp) to protect such salts as NaCN, which would decompose in an acid circuit, etc. Na_2CO_3 and CaO are the most common conditioners, since most flotation pulps should be alkaline. *Newton, p. 101.*

conditioning. Stage of froth-flotation process in which the surfaces of the mineral species present in a pulp are treated with appropriate chemicals to influence their reaction when the pulp is aerated. *Pryor, 4.*

conditioning period, drilling. Time spent in circulating a higher-than-normal volume of fluid through the drilling string while slowly rotating and lowering the string from the last few feet above to the bottom of a borehole to wash away any obstructing material before resuming coring operations. *Long.*

conditioning time, flotation. The period during which the pulp is agitated with a given chemical, or combination of chemicals, in the series of conditioning operations which precede separation of various minerals in the ore by froth flotation. *Pryor, 3.*

conditioning zone. a. The part of a tank furnace for flat glass where the temperature of the glass is adjusted before it flows into the forehearth or drawing chamber. *Dodd.* b. That part of the feeder, away from the wall of a glass-tank furnace, in which the temperature of the molten glass is adjusted to that required for working. *Dodd.*

condition line. The infinite number of combinations of wet- and dry-bulb temperatures which will satisfy the requirements of an air supply for a given room condition from what is known as the condition line on the psychometric chart. *Strock, 10.*

condition the hole. To circulate a higher-than-normal volume of drill fluid while slowly rotating and lowering the drill string from a point a few feet above the bottom to the bottom of the borehole to wash away obstructing materials before resuming coring operations. *Long.*

conduct. Aust. *See* cundy, b. *Fay.*

conductance. a. The quantity of heat (usually Btu) transmitted per unit time (usually 1 hour) from a unit of surface (usually 1 square foot) to an opposite unit of surface of material under a unit temperature differential (usually 1°F) between the surfaces. *Strock, 10.* b. Conductance is the reciprocal of resistance, and is measured by the ratio of the current flowing through a conductor to the difference of potential between its ends. *Lowenheim.*

conducting materials, electrical. Materials which allow a current to flow easily; such as metals, the conductivity ranging from silver, which is 1.06 times as effective as copper, to steel, which has only about 0.1 times the conductivity of copper. In addition, there are many special alloys which have a resistance of more than 50 times that of a copper conductor of the same size. *Mason, v. 2, p. 393.*

conduction. a. The transfer of heat through matter by the communication of kinetic energy from particle to particle rather than by a flow of heated material. *Compare* convection. *Webster 3d.* b. The maintenance of an electric current through metals by a general movement of conduction electrons; through electrolytes by a movement of both positive and negative ions; or through gases by the passage of cathode rays, ionized molecules, or anode rays. *Webster 3d.* c. The flow of heat through a body by the transfer of kinetic energy from molecule to molecule without gross mixing. *NRC-ASA N1.1-1957.*

Conductive Silver Preparation. Specially compounded materials containing silver powder in a suitable vehicle, with or without ceramic flux; can be coated on base materials such as titanate bodies, mica, glass, porcelain, steatite, plastics, wood, cloth and paper by stencil screenings (squeegee), spraying, dipping, brushing, roller coating, banding wheel, or other suitable method. Fixed by air-drying, baking at low temperatures, or firing at elevated temperatures. Used to produce capacitor electrodes, ceramic-to-metal solder seals, electrical shields, surfaces of high conductivity on nonconductive materials; as a base for electroplating on ceramic and nonceramic surfaces. *CCD 6d, 1961.*

conductivity. a. The quality or power of conducting or transmitting, as heat or electricity. The reciprocal of resistivity. *Webster 3d.* b. The relative ability of materials to carry an electrical current. *Crispin.*

conductor. a. Guides of rope or of rigid construction to guide the cages or skips in the shaft. *Mason.* b. A wooden cylinder, 12 to 13 feet long, used in the United States when sinking a new oil well. The conductor, which has a slightly greater diameter than that of the first string of casing, is inserted in the drill hole, and extends from the bottom of the first casing to the floor of the derrick. The object of the conductor is to guide the casing, great care being taken to secure its absolute vertically in the first place. *Fay.* c. A relatively short length of pipe driven through the unconsolidated zone of top soil as the first step in collaring a borehole. Also called conductor pipe; standpipe. *Long.* d. In petroleum drilling, the piping carried through overburden to bedrock or the first string of casing placed in a borehole. *Long.* e. *See* brakeman, c. *D.O.T. 1.* f. A substance or a body capable of readily transmitting electricity, heat, or sound. *Webster 3d.* g. A material which offers a low resistance to the passage of an electric current. *C.T.D.* h. That part of an electric transmission, distribution, or wiring system which actually carries the current. *C.T.D.* i. One of the wires forming the windings of an electric machine. *C.T.D.* j. The metallic conductor in a cable; it is invariably of copper surrounded by an insulating dielectric material. *C.T.D.*

conductor-cable locomotive. An electric locomotive having a cable on a reel and connected both with the locomotive motor and the trolley wire in the entry, so that the locomotive may be driven into an unwired room. *Zern.*

conductor casing. *See* standpipe, c. *B.S. 3618, 1963, sec. 3.*

conductor pipe. Synonym for conductor, c. *Long.*

conductor string. *See* conductor, d. *Long.*

conduit. a. An airway. *Zern.* b. A natural or artificial channel through which water or other fluid passes or is conveyed; an aqueduct, a pipe. *Webster 3d.* c. A pipe, tube, or tile for receiving and protecting electric wires or cables (as for telephones or powerlines). *Webster 3d.* d. Pipe or casing placed in a borehole. *See also* casing, c; drivepipe, a. *Long.* e. A pipe or tile carrying water, wire, or pipes. *Nichols.*

conduit for electric cable. *See* cable cover. *Dodd.*

conduit hole. A flat or nearly horizontal hole drilled for blasting up a thin piece in the bottom of a level. *Zern.*

conduit pipe. Wrought-iron pipe used as armor for electric wires. A tubular conduit. *Fay.*

cone. a. A device used on top of blast furnaces to enable charge to be put in without permitting gas to escape. Also called bell. *C.T.D.* b. The conical part of a gas flame next to the orifice of the tip. *ASM Gloss.* c. The conical hill or conical mountain built by an active volcano. Explosive volcanoes build their cones from debris, ranging in size from dust to huge blocks, thrown out from the vent and have steep slopes approaching or exceding the angle of repose. Quieter volcanoes that pour out lava have much gentler slopes. *Hess.* d. A three-sided pyramid made of unfired ceramic materials whose composition is such that when heated at a controlled rate will deform and fuse at a known temperature. It is placed inside a kiln or furnace with ceramic ware to indicate the temperature of the kiln and the fired condition of the ware. *See also* pyrometric cone. *Bureau of Mines Staff.* e. A solid with a circle for a base and with a convex surface that tapers uniformly to a vertex. *Jones 2, p. 119.* f. Geometric pattern formed by the recessed portion of the face of a concave bit. *Long.* g. Geometric pattern of the rock plug or stickup left in the bottom of a borehole drilled by a concave bit. *Long.* h. Beveled copling device on a small diamond drill or percussion rock drill by means of which it may be attached to a drill column. *Long.*

C-one; C-1. A symbol commonly used to designate the best quality drill-diamond-grade congos. *See also* congos; C-two. *Long.*

cone angle. a. The angle included between the opposite sides of the cone in a concave bit, measured in degrees. *Long.* b. The angle that the cutter axis makes with the direction along which the blades are moved for adjustment, as in adjustable blade reamers where the base of the blade slides on a conical surface. *ASM Gloss.*

cone bit. a. Synonym for roller bit. *Long.* b. A cone-shaped noncoring bit, which may be set with diamonds or other cutting media. *Long.* c. Colloquial term, improperly applied to bullnose bit. *Long.*

cone classifier. a. A hydraulic or free-settling classifier of conical shape. *Pryor, 3.* b. A conical sheet-steel vessel usually a 60° cone, with the point at the bottom, through which water, clear or weighted, flows upward. Ore, coal, or other mineral matter is fed in at the top. The current carries the smaller particles or those of lowest gravity over the rim and others settle. *Hess. See also* Callow cone; Caldecott cone; Allen cone; Chance cone; Menzies cone separator; Jeffrey-Robinson cone.

cone crusher; gyratory crusher. A machine for reducing the size of materials by means of a truncated cone revolving on its vertical axis within an outer chamber, the anular space between the outer chamber and cone being tapered. *B.S. 3552, 1962. See also* gyratory breaker.

cone cut. A cut in which a number of central holes are drilled towards a focal point and, when fired, break out a conical section of strata. *B.S. 3618, 1964, sec. 6.*

cone equivalent pyrometric. The number of that standard cone whose tip would touch the supporting plaque simultaneously with a cone of the material being investigated when tested under standard conditions. *Hess.*

cone-face bit. A cone or concave-face bit. *Long.*

cone gear. A belt driven between two similar cones. As the belt is moved by its striker gear parallel with the axes of rotation, the gear ratio is changed. *Pryor, 3.*

cone hip. *See* hip tile. *Dodd.*

cone-in-cone coal. Coal showing a structure known as cone-in-cone which consists of a set of reentrant cones closely packed together. *Tomkeieff, 1954.*

cone-in-cone structure. a. A secondary structure occurring in marls, limestones, ironstones, coals, etc. It is a succession of small cones of approximately the same size one within another and sharing a common axis. *Holmes, 1928.* b. Coal exhibiting a peculiar fibrous structure passing into a singular toothed arrangement of the particles is called cone-in-cone coal or crystallized coal. *Fay.*

cone man. One who tends cones in which fine materials (slimes) are separated from coarser materials (sands) by the lifting effect of a current of water. *D.O.T. 1.*

Conemaughian. Upper Middle Pennsylvanian. *A.G.I. Supp.*

cone of depression. a. The depression, which is approximately conical in shape, that is produced in a water table or in the piezometric surface by pumping or artesian flow. *A.G.I.* b. The funnel-shaped depression produced in the water-level surface around a pumped well. *Legrand.* c. The dried up area of soil around a single underground suction point. *Nichols.* d. The space enclosed between the water table, at which water would stand naturally in the ground, and the position at which it in fact stands owing to drainage or pumping at some point in the vicinity. *B.S. 3618, 1963, sec. 4.*

cone of influence. *See* cone of depression, a.

cone penetration test. An in situ soil-testing procedure whereby, through the use of a cone penetrator, information may be obtained to allow an engineer to calculate some of the load-bearing characteristics of silty or fine to medium-coarse sand materials. *Long.*

cone penetrator. A 30° to 60° cone having a basal diameter approximately the same size as an a-size diamond-drill rod used to determine the force required to thrust the cone downward into silty or fine to medium-coarse sands, and hence to obtain information that a foundation or soils engineer may use to calculate some of the load-bearing capabilities of such formations. Also called cone penetrometer. *Long.*

cone penetrometer. A cone penetrator equipped with a device that will register the pressure required to drive the cone downward into the formation being tested. *See also* cone penetrator; penetrometer. *Long.*

cone pulley. Stepped pulley, worked in conjunction with similar one to which it is connected by belt drive. To change gearing the belt is moved to the next larger step on one pulley and the next smaller on the other. *Pryor, 3.*

cone rock bit. a. A rotary drill, with two hardened knurled cones which cut the rock as they roll. *Porter.* b. Synonym for roller bit. *Long.*

cone runner. In coal mining, one who operates gravity separation device, known as cone, in which coal is separated from slate, rock, or other impurities by action of rising current of water, regulating flow of coal and impurities into top of cone and flow of water into the bottom so that pressure will prevent coal from sinking and carrying it off in overflow while rock or slate sinks through opening at bottom. Also called cone tender. *D.O.T. 1.*

cone sampling. Another name for quartering. *Pearl, p. 78.*

cone screen test. A method for testing fineness of milled enamels. A given quantity of liquid enamel is washed through a brass screen in the form of a cone and graduated along the side. The degree of fineness is reported as the depth of residue in the bottom of the screen. This method has been found considerably less accurate than the present 50 cubic centimeter through 200 mesh method and has been almost universally replaced by the latter. *Enam. Dict. See also* screen test.

cone settler. Conical vessel fed centrally with fine ore pulp. Undersize is discharged through a flexible pipe (gooseneck), which permits variation of hydrostatic pressure. This apex discharge is thick and carries the larger sized particles. The peripheral top overflow is thin and carries the finer fraction of the solids. *Pryor, 3.*

cone sheet. A curved dike or sheet that is part of a concentric set of curved dikes or sheets that dip inward. *Billings, 1954, p. 311.*

cone structure; corrugated structure. Form taken by asbestos seams, and especially amosite and crocidolite, resulting in varying fiber lengths. *Sinclair, W. E., p. 483.*

cone system. The method of preparation whereby impurities are separated from anthracite in a metallic cone containing a mixture of sand and water with a specific gravity higher than that of anthracite and lower than the impurities. The anthracite floats. The impurities sink. *Hudson.*

cone tender. *See* cone runner. *D.O.T. 1.*

Conewangoan. Upper Upper Devonian. *A.G.I. Supp.*

cone wheel. A relatively small wheel in the shape of a cone or cylinder where length is greater than diameter and containing a threaded bushing for mounting on a grinder. *ACSG, 1963.*

Conferva peat. Peat derived from freshwater algae (Conferva) and other water plants. *Tomkeieff, 1954.*

confidence interval. Term used in statistical methodology. Limits of error of quantity which is calculable from given data when allowance has been made for known chance variance in collection of such data, are confidence limits. Space between is confidence interval, within which lies the true value, shown with sufficient precision for the required purpose of the work in hand. *Pryor, 3.*

configuration. In electrical prospecting, the relative position of the electrodes. *Porter.*

confined groundwater. Synonym for artesian water. *A.G.I.*

confining bed. a. A watertight bed above or below a stratum containing artesian water. *Fay.* b. An impervious stratum above and/or below an aquifier. *B.S. 3618, 1963, sec. 4.*

confluence. A junction or flowing together of streams; the place where streams meet. *Standard, 1964.*

confluent. a. A stream that unites with another; a fork or branch of a river: especially applied to streams nearly equal in size, and distinguished from affluent. *Standard, 1964.* b. Flowing together to form one stream. *Standard, 1964.*

conformability; conformity. The mutual relationship of comfortable beds. *Fay.*

conformable. Successive beds or strata are conformable when they lie one upon another in unbroken and parallel order and no disturbance or denudation took place at the locality while they were being deposited. If one set of beds rests upon the eroded or the upturned edges of another, showing a change of conditions or a break between the formations of the two sets of rocks, they are unconformable. *Fay.*

conformable coast. *See* longitudinal coast. *Schieferdecker.*

conformal map projection. A map projection on which the shape of any small area of the surface mapped is preserved unchanged. Sometimes termed orthomorphic map projections, orthomorphic meaning right-shape. This is misleading because, if the area mapped is large, its shape will not be preserved, but only the shape of each small section of it. The exact condition for a conformal map projection is that the scale at any point be the same in all directions. The scale may change from point to point, but at each point it will be independent of the azimuth. Among the more important conformal map projections are the Mercator, the stereographic, the transverse Mercator, and the Lambert conformal map projections; the last two are used in the State coordinate systems. *A.G.I.*

congela. Coba with a high salt content. *A.G.I. Supp.*

congelation temperature. a. The freezing point. *Bureau of Mines Staff.* b. The temperature at which an oil becomes a solid or is reduced to a standard pasty state. Tests on the congelation temperature give different results as they do not agree on the final consistency of the material. *Bureau of Mines Staff.*

congenial. Applied to rocks in which lodes became ore bearing. *Fay.*

conglomerate. a. A cemented clastic rock containing rounded fragments of gravel or pebble size. Monogenetic and polygenetic types are recognized, according to the uniformity or the variability of the composition and the source of the pebbles. *Holmes, 1928.* b. Also referred to as pudding stone; millstone grit. *Hudson.*

conglomerate ore. Usually refers to uranium ore mine from the Shinarump conglomerate formation. *Ballard.*

conglomeration. The heaping together of diverse materials into one mass. *Challinor.*

conglomerite. A conglomerate that has reached the same state of induration as a quartzite. *A.G.I.*

congo bort. Congos used industrially as bort. *See also* bort, congos. *Long.*

congo diamond. *See* congos. *Long.*

Congo emerald. Dioptase. *Shipley.*

Congo gum; Congo copal. Yellowish; amorphous solid; specific gravity, 1.06 to 1.07. Used as a substitute for amber. One of the hardest fossil resins. *Bennett 2d, 1962.*

congo rounds. Spherical- or near-spherical-shaped congos. *See also* congos. *Long.*

congos. a. Originally and commonly used as a name for a variety of diamonds found in the Republic of the Congo diamond district in Africa and more recently as a descriptive term applied to all diamonds having the appearance and characteristics of those produced in the Republic of the Congo. Congos are white to gray green and yellow, drusy-surfaced, opaque to somewhat translucent diamonds, having shapes corresponding to the many forms characteristic of the isometric (cubic) crystal system. At one time, congos were considered fit only for use in fragmented form, but a considerable number are now used as tool stone and drill diamonds. *See also* diamond. *Long.* b. Sometimes designates drill diamonds ranging from 1 to 8 stones per carat in size. *Long.*

congressite. A very light-colored, coarsely granular igneous rock composed mainly of nepheline with small amounts of sodalite, plagioclase, mica, calcite, and ilmenite. *Holmes, 1928.*

congruent forms. In crystallography, two forms which may each be derived from the other by rotation about an axis of symmetry. *Fay.*

congruent melting. A geologic or metallurgical process in which a binary compound melts at a certain concentration to a liquid of its own composition. *Bureau of Mines Staff.*

congruent transformation. An isothermal or isobaric phase change in which both of the phases concerned have the same composition throughout the process. *ASM Gloss.*

Coniacian. Lower Senonian. *A.G.I. Supp.*

conical. Cone-shaped. In mineralogy, usually an elongated cone as are most icicles. *Shipley.*

conical drum. A winding drum cone-shaped at each end, for balancing the load upon the engine during winding operations. The heavily loaded upgoing rope winds on the small diameter while the lightly loaded downgoing rope winds off the large diameter of the cone. *See also* winding drum. *Nelson.*

conical flute casts. Plain, conical flute casts. *Pettijohn.*

conical head gyratory crusher. This crusher is of the gyratory type for secondary reduction and is identified by the characteristic shape of its breaking head. The included angle of the breaking head surfaces is large and this larger angle greatly increases the ratio of discharge to feed area. The large ratio permits crushed materials to relocate themselves far enough apart to prevent power-consuming clogging and packing. Also, its higher gyrating speed and the large discharge area make it eminently suitable for the task of fine crushing at a high capacity. *Pit and Quarry, 53rd, sec. B, p. 29.*

conical mill. Hardinge ball mill. *Pryor, 3.*

conical refraction. The refraction of a ray of light at certain points of double-refracting crystals, so that on emerging from the crystal it widens from an apex into a hollow cone (external conical refraction), or on entering diverges into a cone and issues as a hollow cylinder (internal conical refraction). *Standard, 1964.*

conical roll. A crusher in which clay material passes between a moving set of rolls, conical in shape. *ACSG, 1963.*

conichalcite. A pistachio-green to emerald-green basic arsenate of calcium and copper, $CaCu(AsO_4)(OH)$, occurring reniform and massive, and resembling malachite. *Dana 7, v. 2, pp. 806-807.*

conic map projection. A map projection produced by projecting the geographic meridians and parallels onto a cone which is tangent to, or intersects, the surface of a sphere, and then developing the cone into a plane. *A.G.I.*

coning. a. Important method of obtaining a true sample from a pile of ore. Material is shoveled onto center of heap, so that it forms a cone. The shoveler works around and drops each load as vertically as possible. Still working steadily around, he next flattens the cones, and removes shovelfuls successively onto four separate heaps, of which two are rejected. If the material permits, he thus rejects two opposite quadrants and proceeds to recone and requarter the remainder. For good work, there must be a relation between the maximum individual particle size and the weight (or volume) of the sample pile. As the latter shrinks it must be crushed to a smaller size to permit accurate blending of the various sized particles during mixing. *See also* quartering. *Pryor, 3.* b. The upward intrusion of bottom water sometimes resulting when an oil well or a gas well is overproduced, or insufficient back pressure is maintained on the well. Also, applied in a different sense to underground gas storage reservoirs, referring to the coned pressure gradient surrounding a well during or shortly after input. *A.G.I.*

coning and quartering. A method of sample reduction. *See also* quartering. *Nelson.*

conjugate center. In aerial photography, the image point on a photograph of the principal point of an adjacent overlapping photograph. *Seelye, 2.*

conjugated joints. Two sets of related joints that dip in different directions, such as those resulting from compressional stresses. *Bureau of Mines Staff.*

conjugated veins. a. Two sets of related veins that dip in different directions. *Bureau of Mines Staff.* b. Originally conjugated joints that were filled with vein material. *Bureau of Mines Staff.*

conjugate fault system. A system of two intersecting sets of parallel faults. *Schieferdecker.*

conjugate impedance. Two impedances having resistive components which are equal and reactive components which are equal in magnitude but opposite in sign are known as conjugate impedances. *H&G.*

conjugate joint systems. Sets of intersecting joints which are sometimes perpendicular or rectilinear, and often mineralized to form vein systems. Joint patterns, such as these, are believed to be the result of compressive stresses which were relieved by joint formation rather than the formation of a single fissure. *Lewis, pp. 411, 593.*

conjugate layers. In solvent extraction, the two immiscible solutions in equilibrium with each other. *NRC-ASA N1.1-1957.*

Conkling magnetic separator. A conveying belt which passes under magnets, below which belts run at right angles to the line of travel of the main belt. The magnetic particles are lifted up against these cross-belts and are thus removed. *Liddell 2d, p. 386.*

Conklin process. A dense-media coal cleaning process in which the separating medium consists of minus 200-mesh magnetite (5.2 specific gravity) in water in the proportions of 4.4 parts of water to 1 part of magnetite, to get an effective specific gravity of about 1.9. An advantage claimed for this process is that the medium requires little agitation to keep it in suspension and that the medium is easily removed from the clean coal and refuse. *Mitchell, pp. 494-495.*

connate. a. Born, produced, or originated together. *Webster 3d.* b. Applied to waters (and extended to include CO_2 in limestone and other volatile materials) buried with fragmental and volcanic rocks and remaining stagnant except as they are incorporated in new minerals found in the rock. *Holmes, 1928.*

connate water. Water that was deposited simultaneously with the solid sediments, and which has not, since its deposition, existed as surface water or as atmospheric moisture. *Fay.*

connecting. The operation of joining adjacent electric blasting cap wires to each other, to connecting and leading wires, in such a way than an electric current will flow through with the least possible resistance. *Fay.*

connecting curve. A curve introduced to connect a turnout with a side track. *Zern, p. 476.*

connecting frame. A device similar to a guide frame for shaker conveyors but with provision for insertion of the puller rod. A connecting frame can be inserted between any two standard trough sections to serve as a substitute for a connecting trough on single-arm electric or air devices. *Jones.*

connecting link. For a roller chain, a pin link made with one link plate easily detachable to facilitate connecting or disconnecting the two ends of a chain. *J&M.*

connecting rod. A rigid rod that transmits power from one rotating part of a machine to another in reciprocating motion (as from a crankpin to a piston). *Webster 3d.*

connecting section. That part of a mining belt conveyor which consists of a framing and the belt idlers supported by the framing, both of which carry the belt from the intermediate section to the head section and return the belt to the intermediate section. The connecting section may or may not be interchangeable with the intermediate section increments or parts.

1939, pp. 10-12. The Irwin consistomer and the Bingham mobilometer are instruments used in the determination of mobility and yield values (consistency) of enamel slips. *Enam. Dict.*

consolidated drained test. A soil test in which essentially, complete consolidation under the confining pressure is followed by additional axial (or shearing) stress applied in such a manner that even a fully saturated soil of low permeability can adapt itself completely (fully consolidate) to the changes in stress due to the additional axial (or shearing) stress. *ASCE P1826.*

consolidated immediate shear test. This is a method of measuring the variation in shear strength with the variation in a load placed normal to the plane of failure. It is applied to a soil which has been first consolidated under the normal load. *See also* drained shear test; quick test. *Ham.*

consolidated sediments. Sediments which have been converted into rocks by compaction, deposition of cement in pore spaces and/or by physical and chemical changes in the constituents. *Hy.*

consolidated undrained test. A soil test in which essentially, complete consolidation under the vertical load (in a direct shear test) or under the confining pressure (in a triaxial test) is followed by a shear at constant water content. Also called consolidated quick test. *ASCE P1826.*

consolidation. a. In geology, any or all of the processes whereby loose, soft, or liquid earth materials become firm and coherent. *Stokes and Varnes, 1955.* b. In soil mechanics, it refers to the adjustment of a saturated soil in response to increased load and involves the squeezing of water from the pores and decrease in void ratio. *Stokes and Varnes, 1955.* c. The gradual reduction in volume of a soil mass resulting from an increase in compressive stress. *See also* initial consolidation; primary consolidation; secondary consolidation. *ASCE P1826.*

consolidation curve. *See* consolidation time curve. *ASCE P1826.*

consolidation hole. Borehole into which chemical solutions or grout are injected to cement or consolidate fragmental rock material. *Compare* grout hole. *Long.*

consolidation press. Laboratory equipment for obtaining data on the voids ratio of a clay sample, from which the coefficient of consolidation can be determined. *Ham.*

consolidation ratio. The ratio of the amount of consolidation at a given distance from a drainage surface and at a given time to the total amount of consolidation obtainable at that point under a given stress increment. *ASCE P1826.*

consolidation settlement. The gradual settlement of loaded clay. *Nelson.*

consolidation test. a. A test in which the specimen is laterally confined in a ring and is compressed between porous plates. *ASCE P1826.* b. The test may be made in an odometer. An undisturbed sample of clay measuring 6 centimeters in diameter and 2 centimeters thick is confined laterally in a metal ring and compressed between two porous plates which are kept saturated with water. A load is applied and the clay consolidates, the excess pore water escaping through the porous stones. After each increment of load is applied, it is allowed to remain on the sample until equilibrium is established, and a consolidation curve showing the deformation with time is obtained for each increment. *Nelson.*

consolidation time curve. A curve that shows the relation between the degree of consolidation and the elapsed time after the application of a given increment of load. Also called time curve, consolidation curve, and theoretical time curve. *ASCE P1826.*

consolidation trickling. During closing of bed or particles in the suction half of jigging cycle, interstitial burrowing down of fastest moving small particles before the mass of particles becomes too compact for movement. *Pryor, 3.*

consolute. Mutually soluble or miscible in all proportions. *Webster 3d.*

conspicuous place. Open to view; catching the eye; easy to be seen; manifest; obvious to the sight; seen at a distance; exposed to view; clearly visible; prominent and distinct; prominently; openly and convenient to the public. *Ricketts, I.*

constant. Any property of a substance, numerically determined, that remains always the same under the same conditions, as the specific gravity; the melting point; the freezing point; or the electrical conductivity. *Standard, 1964.*

constantan. A group of copper-nickel alloys 45 to 60 percent copper with minor amounts of iron and manganese, and characterized by relatively constant electrical resistivity irrespective of temperature; used in resistors and thermocouples. *ASM Gloss.*

constant composition law. *See* definite proportions law.

constant error. *See* biased error. *Pryor, 3, p. 159.*

constant-weight feeder. a. An automatic device which maintains a constant rate of feed of ore from the bin or stockpile to the grinding circuit. It is controlled by tilt due to the weight of ore on a balanced length of the belt conveyor; by electrically vibrated chute; by pusher gear; by timed delivery from automatically loaded hoppers. *Pryor, 3.* b. A feeder intended to deliver a certain weight per unit of time. *ASCG, 1963.*

constituent. a. One of the ingredients which make up a chemical system. *ASM Gloss.* b. A phase or combination of phases which occur in a characteristic configuration in an alloy microstructure. *ASM Gloss.*

constituent of attritus. This term, although it has its prevailing general usage, has been commonly, and more or less consistently, used by the U.S. Bureau of Mines since this conventional usage was adopted by R. Thiessen in 1931. Constituents are the petrographic entities of the attritus which are recognizable in thin sections only by the microscope. The following constituents may be distinguished in coals: translucent humic degradation matter; brown or semitranslucent matter; opaque matter (granular; massive); resins and resinous matter; spores and pollen; cuticles and cuticular matter; algae and algae matter. The term constituent, which applies mainly to the microscopic entities composing the attritus in the U. S. Bureau of Mines terminology, is equally applicable to the macerals of the Stopes-Heerlen system although its use has not been so definitely restricted. *IHCP, 1963, Part I.*

constitution. a. Structural arrangement of linkage of elements in a substance. *Pryor, 3.* b. This term refers to the type of constituent or constituents present in a solid metal or alloy and the proportions of each type concerned. *C.T.D.*

constitutional ash; constitution coal. Ash resulting from complete combustion of clean coal. Fixed ash, originating in the vegetation from which the coal was formed, as distinct from free ash, the entrained shale trapped into the coal seam at time of deposition. *Pryor, 3. See also* inherent ash, a.

constitutional change. Transformation of a constituent in an alloy (for example, austenite into pearlite. *Pryor, 3.*

constitutional formula. One which shows how the atoms in a molecule are arranged. *Pryor, 3.*

constitutional water. Water definitely bound into a hydrated crystal (for example, $CuSO_4.5H_2O$). *Pryor, 3.*

constitution diagram. A graphical representation of the temperature and composition limits of phase fields in an alloy system as they actually exist under the specific conditions of heating or cooling (synonymous with phase diagram). A constitution diagram may be an equilibrium diagram, an approximation to an equilibrium diagram, or a representation of metastable conditions or phases. *Compare* equilibrium diagram. *ASM Gloss.*

constraint. Any restriction that occurs to the transverse contraction normally associated with a longitudinal tension, and that hence causes a secondary tension in the transverse direction. *ASM Gloss.*

constringence. *See* Abbe number. *Dodd.*

construction. The number of strands in a rope and the number of wires in the strand. These numbers should be separated by a multiplication sign, thus 6 x 19 signifies a 6-stranded rope having 19 wires per strand. The division (or over) sign should be used to denote the separate layers of wires in the strand (thus, a 6 x 19 (12/6/1) rope indicates that its strands have 12 wires laid over 6 wires laid over 1). *Ham.*

construction account. An account in mining finance to which all construction expenses are charged. Many of the Lake Superior copper mines summarize their finances so that the cost of operation is divided into two classes, one being for general working expenses and the other for construction, sometimes classed as capital account. It includes new buildings and machinery on the surface and frequently new mine openings. *Weed, 1922.*

constructional. In geology, owing its form, position, direction, or general character to building processes, such as accumulation by deposition or by volcanic extrusion. *Fay.*

constructional land form. A land form created by the accumulation of material; examples are volcanic cones, deltas, and floodplains. The term also applies to forms created by diastrophism, such as fault blocks or folds. *Stokes and Varnes, 1955.*

constructional plain. Constructional plains owe their origin and present surface features principally to the distribution and deposition of earth material in sublevel sheets along the streamways or at the margin of the ocean, or to the distribution of lava sheets or other volcanic ejecta over the surface. *A.G.I.*

construction joint. The vertical or horizontal face in a concrete structure where concreting has been stopped and continued later. The concrete on each side of the vertical (or sloping) faces forming the

NEMA MB1-1961.

connecting trough. A shaker conveyor trough of standard length to which special lugs or plates have been attached to provide a means of connecting the trough to the driving arms of the conveyor drive unit. All motion of the conveyor is transmitted through the connecting trough. The term drive trough is frequently used for this special type of trough. *Jones.*

connecting trough support. The means of supporting connecting troughs where they pass over the drive unit. The support is attached to the drive unit frame and is designed to allow the connecting trough freedom of movement in the direction of the panline. Supports may be of the ball frame, wheel, rolled, or rocker arm types. *Jones.*

connecting wire, blasting. a. A wire generally of smaller gage than the shot-firing cord and used for connecting the electric blasting cap wires from one drill hole to those of an adjoining one in mines, quarries, and tunnels. *ASA C42.85:1956.* b. A wire of smaller gage than the leading wire used for connecting the electric blasting cap wires from one borehole to those of an adjoining one. *Fay.*

connection. a. Adding a length of drill pipe to the drilling shaft as drilling progresses. *Brantly, 2.* b. A connecting rod to transmit motion and force from the revolving crank or eccentric to the slide of a press. *ASM Gloss.*

connection box, electrical. A boxlike enclosure with removable face or plate within which electric connections between sections of cable can be made. *ASA C42.85:1956.*

connection man. *See* parting and connection man. *D.O.T. 1.*

connector, electrical. Any device for holding in electrical contact the ends of conducting wires in such a manner that they may be readily released when it is desired to disconnect them. *Crispin.*

connellite. A blue hydrated copper chlorite, possibly $Cu_{19}(SO_4)Cl_4(OH)_{32}.3H_2O$, hexagonal; from Cornwall, England. An end-member of the connellite buttgenbachite series. Synonym for caeruleofibrite; ceruleofibrite. *Dana 7, v. 2, pp. 572-573.*

Connemara marble. Dark green to grayish gem quality serpentine. *Shipley.*

conny. Eng. The same as coombe coal, Nottinghamshire. *Tomkeieff, 1954.*

conode. Isothermal construction line between two equilibrated phases. *VV.*

conoplain. A gentle, conical plain that has been partly built and partly cut and that slopes outward in all directions. This form is considered to be the normal one in a mountainous arid region, differences of topographic age being marked by differences in slope. *A.G.I.*

conoscope. a. A palariscope for examining the interference figures produced by crystals in convergent polarized light. *Webster 3d.* b. In optical mineralogy, the instrument or polarizing microscope used for the study and observation of interference figures and related phenomena, particularly for measuring the axial angle (2E). *A.G.I.*

conoscopic. The arrangement of a polarizing microscope for obtaining the interference figures of minerals. *Hess.*

Conrad counterflush coring system. A system, the notable feature of which, is the provision of a reversed mud flush circulation which permits uninterrupted core recovery in the rotary system of drilling. *Sinclair, II, p. 216.*

Conrad machine. Mechanized pit digger used in checking of alluvial boring. 5 foot long sections of tubing 24 inches in internal diameter are worked into the ground from their mounting on a tractor, the spoil being at the same time removed by means of a bucket or grab. In suitable ground 50 feet or more depth has been reached. *Pryor, 3.*

consanguineous. Synonym for comagmatic. *Schieferdecker.*

consanguineous association. Natural group of sediments or of rocks of related origin. *A.G.I. Supp.*

consanguinity. The genetic relationship of igneous rocks that were presumably derived from a common parent magma. *Fay.*

consequent. a. Pertaining to or characterizing the earth movements which result from the external transfer of material in the process of gradation; opposite of antecedent. *Standard, 1964.* b. Streams or drainage patterns having a course or direction dependent on or controlled by the geologic structure, or by the form and slope of the surface. *Fay.*

consequent drainage. A river system directly related to the geologic structure of the area in which it occurs. *C.T.D.*

consequent lake. a. A constructional lake decreases in size by filling at the inlet and cutting down at the outlet; while thus dwindling away, it is a consequent lake. *A.G.I.* b. Those lakes which occupy original depressions in a land surface. They may be irregularities of the ocean bottom which were preserved when it was lifted above sea level. Other examples of this type are lakes occupying depressions on the surface of lava flows, depressions in sand dunes, and depressions in the glacial till or modified glacial drift. *A.G.I.*

consequent stream. a. If considered on a basis of relationship to the rocks in which they originated, the streams described by Powell as superimposed would be called consequent. Synonym for superimposed (or superposed) stream; inherited stream; epigenetic stream. *A.G.I.* b. A stream which follows a course that is a direct consequence of the original slope of the surface on which it developed. *A.G.I.*

consertal. A textural arrangement in which irregularly shaped crystals in juxtaposition are closely fitted together, interlocked, or consterted. *Fay.*

conservation. Conserving, preserving, guarding, or protecting; keeping in a safe or entire state; using in an effective manner or holding for necessary uses, as mineral resources. *Hess.*

conservation of energy. a. The total energy of an isolated system remains constant irrespective of whatever internal changes may take place, energy disappearing in one form and reappearing in another. *Webster 3d.* b. The sum total of the energy of the universe neither diminishes nor increases, though it may assume different forms successively. *Standard, 1964.*

conservation of matter; indestructibility of matter. When a chemical action takes place the sum of the weights of the reacting substances equals the sum of the weights of the products; for example, 4 grams of hydrogen plus 32 grams of oxygen form 36 grams of water. Also called conservation of mass. *Cooper.*

conservative properties. Those properties of the ocean, such as salinity, the concentrations of which are not affected by the presence or activity of living organisms but which are affected only by diffusion and advection. *Hy.*

conserving agent. A reagent added to an ore pulp to protect other flotation agents from attack by substances present in the pulp. *Taggart, p. 846.*

conset jig. Jig developed for Mesabi iron ores in which vertical movement of water is produced by low-pressure inflation and deflation of rubber tubes just below screens. *Pryor, 3.*

consey. Scot. An underground branch road in stoop-and-room workings. *Fay.*

consideration. a. Something given as recompense; as, a payment or a reward. *Webster 3d.* b. Price, motive, etc., of a contract. *Pryor, 3.* c. A money allowance agreed to be paid in addition to the usual pricelist, when miners are working in abnormal places or conditions. *See also* allowance. *Nelson.* d. N. of Eng. Payment made to a man or a team to make up earnings which are below an equitable level or as compensation for extra work or abnormal conditions. *Trist.*

consideration miner. A miner who, because of abnormal working conditions is not paid on a regular scale, but on a consideration rate. *Zern.*

consignment sampling. The sampling of a single consignment of coal or coke to a specified accuracy. *B.S. 1017, 1960, Pt. 1.*

consistence. a. The capacity of fresh concrete, mortar, or cement paste to resist deformation or flow. *Taylor.* b. Before the workability and volume yield of a lime putty can be determined under the conditions laid down in British Standard 890, Building Limes, the consistency of the putty must be adjusted to a specified standard value. This value is known as Standard Plastering Consistence, and is achieved by addition or removal of water. *Stowell.*

consistency. a. The degree of solidity or fluidity of bituminous materials. *Fay.* b. The relative ease with which a soil can be deformed. *ASCE P1826.* c. A property of a material determined by the complete flow-force relation. *ASTM C 11-60.* d. The properties of a slip that control its draining, flowing, and spraying behavior. *ASTM C 286-65.* e. Percentage of solids in pulp. *Pryor, 3.* f. Fluidity. *Pryor, 3.* g. In concrete testing, the behavior with the slump test or the weight with the compacting test. *Pryor, 3.* h. The condition (as of a material) of standing together or remaining fixed in union; firmness. *Webster 3d.* i. A degree of density, viscosity, or resistance to movement or to separation of constituent particles. *Webster 3d.*

consistency index. *See* relative consistency. *ASCE P1826.*

consistency limits. The liquid limit, plastic limit, and shrinkage limit. These all apply to the water content of a clay, each in a certain state as defined by British Standard 1377. *Nelson.*

Consistodyne. Trade name; a device for attachment to the barrel of a pug for controlling the workability of the clay. *Dodd.*

consistometer. An instrument for the measurement of relative consistency of mineral suspensions and other materials. It is calibrated in terms of viscosity with water-sugar solutions. *R.I. 3469, September,* joint is generally united by continuous reinforcement crossing the joint. When stopping on a horizontal plane adhesion is usually attained by well-roughening the set concrete surface before pouring new. *Ham.*

construction way. The temporary works employed for transport of men and materials during construction of the finished or permanent way. *C.T.D.*

constructive possession. That possession which the law annexes to the legal title or ownership of property, when there is a right to the immediate actual possession of such property but no actual possession. *Ricketts, I.*

constructive waves. Waves that build a shoreline feature, such as a beach, a bar, or a spit. Opposite of destructive waves. *Schieferdecker.*

consulting engineer. A specialist employed in an advisory capacity. Normally, does not manage or direct any operation, and is at the service of the board rather than of the company's administrative and executive staff. *Pryor, 3.*

consulting mining engineer. A highly qualified mining engineer with a wide background of experience in his particular field. He may be asked by a client or company to examine a property and prepare a report and valuation, or to give advice or expert evidence in cases of alleged subsidence damage. *Nelson.*

consumable electrode-arc melting. A method of arc melting in which the electrode itself serves to supply the metal; this method is commonly employed for melting titanium and zirconium. *Newton, p. 510.*

consume. To use up; to expend; to waste; as in the chemical and mechanical loss of mercury in amalgamation. *Fay.*

consumption charge. That portion of a utility charge based on energy actually consumed, as distinguished from the demand charge. *Strock, 10.*

contact. a. The place or surface where two different kinds of rocks meet. Applies to sedimentary rocks, as the contact between a limestone and a sandstone, for example, and to metamorphic rocks; and it is especially applicable between igneous intrusions and their walls. *Fay.* b. S. Afr. A lode of considerable length and between two kinds of rocks, one of which is generally an igneous intrusive. *Fay.* c. The line of delimitation between a metalliferous vein and its wall, or country rock. *Standard, 1964.* d. As used by drillers in the Midwestern United States, the upper surface of the basement of igneous rocks underlying the sedimentary rocks. *Long.* e. The coming together (touching) of two or more specially arranged ends of electrical conductors to complete an electrical circuit or circuits. *Crispin.*

contact aerator. A tank in which sewage is treated by aeration with compressed air. *Ham.*

contact angle. a. The angle across the water phase of an air-water-mineral system, used to measure effect of surface conditioning. *Pryor, 4.* The angle between the tangent to the interface and the tangent to the solid surface at any point along the line of contact of the interface between two fluids and a solid; usually measured inside the water phase where water is involved. Maximum and minimum values, measured under static conditions, termed advancing and receding contact angles respectively, are usually qualified by stating the phase in which the angle is measured (for example, oil-advancing contact angle). *B.S. 3552, 1962.*

contact bed. In geology, a bed lying next to or in contact with a formation of different character. *Fay.*

contact breaker. A device for quickly and automatically breaking or making an electric circuit. *Crispin.*

contact breccia. A breccia resulting from the shattering of wall rocks around laccolithic and other igneous instrusive masses. The breccia may consist of fragments of both the wall rock and the intrusive. In some instances, the outside of an igneous mass may crystallize and later be brecciated before the entire mass solidifies, the fragments subsequently becoming welded together or cemented by the still fluid parts of the same magma. *A.G.I.*

contact deposit. A mineral deposit between two unlike rocks, usually applied to an ore body at the contact between a sedimentary rock and an igneous rock. *Weed, 1922.* A contact lode or contact vein. *Fay.*

contact erosion valley. A valley that has been eroded along the contact between two different kinds of rock, as between two different sedimentary formations, between igneous and sedimentary rocks, along a fault, or along an upturned unconformity. *Stokes and Varnes, 1955.*

contact goniometer. A protractor for measuring the angles between adjacent crystal faces. *Fay.*

contact line. The line of intersection of a contact surface with the surface of an exposure or with the surface of bedrock covered by mantle rock; a contact line may be exposed or concealed. *Stokes and Varnes, 1955.*

contact lode. *See* contact, b; contact deposit; contact vein. *Fay.*

contact logging. In this type log, provision is made for electrodes to be pressed firmly against the borehole wall. By doing this, current flowing from the electrodes to the wall of the borehole no longer has to traverse the mud. The path from the electrodes through the mud filter cake which sheaths permeable beds is also reduced to a minimum. The electrode spacing of contact logging devices is very small by comparison with the spacings used in conventional logging devices. Consequently, contact logging devices see very much more detail in the beds they pass through. *Wyllie, pp. 98-99.*

contact logging device. A contact logging device consists of a spring bow very analgous to a section gage. On one arm of the bow is a rubber pad shaped to fit the curvature of the hole. In this pad, slightly recessed, are three electrodes about one-half inch in diameter and located at 1-inch intervals. These three electrodes are used to record two resistivity curves. One curve is a three-electrode type with a spacing of 1½ inches and the second is a two-electrode type with a spacing of 2 inches. *Wyllie, p. 99.*

contact metamorphic. Applied to rocks and/or minerals that have originated through the process of contact metamorphism. *A.G.I.*

contact-metamorphic deposit. An ore body that formed along the contact of a mass of igneous, country, or invaded rock, the ore having been derived wholly, or in part, from the intrusive mass. If the term contact-metamorphic deposit is used for this type, it would not necessarily conflict with the term contact deposit applied to any ore body occurring along the boundary between two formations or two kinds of rock. *Stokes and Varnes, 1955.*

contact metamorphism. a. Metamorphism genetically related to the intrusion (or extrusion) of magmas and taking place in rocks at or near their contact with a body of igneous rock. *See also* thermal metamorphism. *A.G.I.* b. The changes that take place along the contact of an igneous rock and the enclosing rocks into which it has been intruded, or the underlying rocks over which it has been extruded. Some of the contact-metamorphic changes are the recrystallization of limestone and the formation of the typical lime-silicate minerals of the contact zone. Metamorphism produced by the heat of an igneous intrusion. Also called thermal metamorphism; thermometamorphism; local metamorphism. *Fay. See also* metamorphic aureole.

contact-metasomatic deposit. A deposit formed by high-temperature magmatic emanations along an igneous contact. *Bateman.*

contact metasomatism. a. A mass change in the composition of the rock other than the elimination of gases involved in simple metamorphism. *USGS Prof. Paper 57, 1907, p. 117.* b. Replacement of the contact rocks adjacent to an intrusive resulting from high-temperature emanations, from a deep-seated magma, from which constituents are carried out that combine with some of the rock constituents to form a suite of high-temperature minerals. Much material is added. *Bateman.*

contact mineral. A mineral formed by contact metamorphism. *Fay.*

contactor. A device for making and breaking an electric power circuit repeatedly. *ASM Gloss.*

contact plating. Deposition of a metal, without the use of an outside source of current, by immersion of the work in a solution in contact with another metal. *Lowenheim.*

contact pressure. The unit of pressure that acts at the surface of contact between a structure and the underlying soil mass. *ASCE P1826.*

contact print. A print on paper sensitive to light, such as ferroprussiate paper, made by placing a drawing or tracing in contact with this paper, exposing it to light for the required period. *See also* blueprint; photostat printing. *Ham.*

contact process. A process for making sulfuric acid. Sulfur dioxide gas (obtained by burning pyrite) is purified by electrical precipitation, and is passed over a catalytic agent to form sulfur trioxide which combined with water produces sulfuric acid. *C.T.D.*

contact reef. S. Afr. The term generally denotes the Ventersdorp contact reef, that is, a gold-bearing conglomerate occurring beneath the Ventersdorp lavas and frequently overlying mineralized horizons of the Witwatersrand system. *Beerman.*

contact resistance. Transition resistance between an electrode and the ground. *Schieferdecker.*

contact rocks. Rocks produced by igneous intrusions along their contacts or walls. They include both the border rocks of the intrusion and the metamorphosed or recrystallized portions of the intruded rocks, such as products from shales, slates, or limestones; sandstones are less influenced by intrusions. *Lewis, p. 603.* Also called skarm; tactite.

contact scanning. In ultrasonics, a planned systematic movement of the beam relative to the object being inspected, the search unit being in contact with and coupled to this object by a thin film of coupling material. *ASM Gloss.*

contact shoe. Collector shoe, which maintains contact between the conducting wire or rail and the electric vehicle being powered. *Pryor, 3.*

contact twin. The simplest type of twin, in which two portions of a crystal appear to have been united along a common plane after one portion has been rotated 180° relative to the other portion. The plane of contact (plane of union or the composition face) may or may not be the twinning plane. *See also* juxtaposition twin. *Fay.*

contact vein. A variety of fissure vein, between different kinds of rock occupying a typical fracture from faulting, or it may be a replacement vein formed by mineralized solutions percolating along the contact where the rock is usually more permeable and there replacing one or both of the walls by a metasomatic process. Also called contact deposit. *Fay.*

contact zone. See aureole. *A.G.I.*

container winding. This winding system makes use of a coal receptacle on small rollers which fits closely in the cage. During the previous wind it is filled near the shaft, and similarly it is emptied very quickly at the surface and returned to the pit bottim on the next wind. *Sinclair III, pp. 199-200.*

containment. The provision of a gastight shell or other enclosure around a reactor to confine fission products that otherwise would be released to the atmosphere as a result of a major accident. *L&L.*

contaminant. *See* impurity. *Herman, p. 15.*

contaminate. The admixture or introduction of undesired substances to a medium, thereby reducing the value of the medium or making it unfit for its intended use. Example: cave material from nonore zones admixed with sludge sample from an ore zone. *Long.*

contaminated. Made radioactive by the addition of (sometimes) minute quantites of radioactive material. *NRC-ASA N1.1-1957.*

contamination. a. The presence of any foreign material in a drilling fluid which may tend to change the properties of the drilling fluid, such as cement, anhydrite, salt, shale cuttings, etc. *Brantly, 1.* b. Applied to magmas and denoting the addition of foreign rock material, as by assimilation of wall rock. *A.G.I.* c. The accidental introduction of foreign, deleterious matter at any stage in the enameling process. This may be caused by unclean mills, dirt, furnace scale, etc. *Hansen.* d. The presence of unwanted radioactive matter, or the soiling of objects or materials with radioactive dirt. *L&L.* e. The act or process of a substance being diluted or admixed with another material, which may render the original substance unfit for use. *See also* contaminate. *Long.*

contamination engineer. One who inspects oil line systems, and analyses oil samples extracted from piping, tanks, and pumping units to ascertain and correct conditions causing oil contamination, and to facilitate flow of oil through system; makes chemical and physical analyses of oil, using portable laboratory equipment, to determine factors, such as excessive oil viscosities hindering free passage of oil through pipes, or presence of oil contamination. *D.O.T. 1.*

contemporaneous. Originating, arising, or being formed or made at the same time. Examples include interbedded volcanic rocks and sedimentary rocks (in contrast with sills that are later than the enclosing sedimentary rocks); segregation veins and patches (*compare* schlieren) in igneous rocks; and dolomites produced from limestones soon after the deposition of the limestones. Generally, all rocks and facies of them that were developed while the processes of formation of the enclosing rocks were still operating. *Webster 3d; Holmes, 1928.*

contemporaneous deformation. Deformation, especially folding and faulting, that takes place while the rocks are being deposited. In contrast to the folding and faulting that take place long after the sedimentation. *A.G.I.*

contemporaneous erosion. Erosion of local character that occurs while sedimentation is taking place generally elsewhere. *Stokes and Varnes, 1955.*

contemporaneous filling. Methods of mining where the stopes are filled as in filled stopes. *Nelson.*

contemporary carbon. The average carbon of living matter. It contains the maximum natural proportion of carbon 14 and has a radioactivity of about 16 disintegrations per gram-minute. *A.G.I.*

content. Something that is contained; the thing, things, or substance in a receptable or an enclosed space. *Webster 3d.* Often used in mining, as ore content, mineral content, copper content, etc. *Fay.*

cont hp Abbreviation for continental horsepower. *BuMin Style Guide, p. 58.*

contiguous. a. Touching without fusion; applicable whether the parts are like or unlike. *A.G.I.* b. Touching along boundaries, often for considerable distances. Next to or adjoining with nothing similar intervening. Synonym for nearby; close; not distant. Touching or connected throughout. Synonym for continuous; unbroken; uninterrupted. *Webster 3d.* c. Immediate preceding or following in time or in sequence. Without an intervening interval or item; also, involving items so occurring or so arranged. Near in time or sequence. Synonym for adjacent. *Webster 3d.*

contiguous claims. Mining claims which have a side or end line in common. *Lewis, p. 31.*

contiguous limonite. Limonite in the gangue around and adjoining a cavity or a group of cavities formerly occupied by iron-bearing sulfide. *A.G.I.*

continent. a. A large landmass rising more or less abruptly above the deep ocean floor. It includes marginal areas that are shallowly submerged. At present continents constitute about one-third of the earth's surface. *A.G.I. Supp.* b. A continuous extent or mass of land. One of the great divisions of land on the globe. Specifically, a large body of land differing from an island or a peninsula in its size and in its structure, which is that of a large basin bordered by mountain chains. *Webster 3d.* c. A large segment of the earth's outer shell including a terrestrial continent and the adjacent continental shelf. *Webster 3d.*

continental alluvium. Alluvium produced by the erosion of a highland area and deposited by a network of rivers to form an extensive plain. *A.G.I. Supp.*

continental basin. A region in the interior of a continent that may comprise one or several closed basins. *Webster 2d.*

continental borderland. a. This term is appropriate when the zone below the low-water line is highly irregular and includes depths well in excess of those typical for continental shelves. *Schieferdecker.* b. A zone bordering a continent, below sea level, that is highly irregular and includes depths well in excess of those typical of a continental shelf. *A.G.I. Supp.* c. A terraced area or a submerged plateau adjacent to a continental shelf but at greater depth. *A.G.I. Supp.* d. Synonym for borderland. *A.G.I. Supp.*

continental deposit. A sedimentary deposit laid down within a general land area in lakes or streams or by the wind, as contrasted with marine deposits, laid down in the sea. *Fay.*

continental drift. The hypothesis that the continents can drift on the surface of the earth because of the presumed viscosity of the substratum, much as ice drifts through water. For example, the supposed movement of North America and South America away from Europe and Africa to which they were once joined according to the hypothesis. *A.G.I.; Hess.*

continental drift theory. A theory that all continents were at one time a single land mass that broke up and drifted apart. *MacCracken.*

continental geosyncline. A geosyncline filled with nonmarine sediments. *A.G.I. Supp.*

continental glacier. A glacier or ice sheet covering a large portion of a continent, as the ice cap of Greenland; specifically, the ice cap which covered the northern third of the globe at the height of the glacial epoch. *Standard, 1964.*

continental gland-type capping. A wire rope capping method in which a rope-clamping device is used instead of a capping. The end of the rope is turned back upon itself over a suitably radiused and grooved block, and the short end of the rope is clamped on to the main rope above the block. *Sinclair, V, p. 28.*

continental island. a. An island that is near and geologically related to a continent, as Great Britain. *Webster 3d.* b. A continental island is merely a detached remnant of the continent near which it lies and from which it is separated, in almost all instances, by shallow water. The boundary between deep and shallow water is the 100-fathom (600-foot) line, and nearly all continental islands rest upon submarine platforms which are less than 100 fathoms (600 feet) deep and run into the submerged continental shelf. *A.G.I.*

continental margin. The zone separating the emergent continents from the deep sea bottom. It generally consists of the continental shelf, the continental slope, and the continental rise. *A.G.I. Supp.*

continental ocean. That part of the deep ocean overlying a layer of sial, as contrasted with true ocean floored by sima. *A.G.I. Supp.*

continental plate. Thick crust underlying a continent. *A.G.I. Supp.*

continental plateau. A broad protuberance of the surface of the lithosphere, coinciding approximately with a continent but including also the continental shelf. Synonym for continental platform. Contrasted with ocean basin. *Webster 3d; Fay.*

continental platform. The platformlike mass of a continent that stands above the surrounding oceanic basins. Synonym for continental shelf. *A.G.I. Supp.*

continental process. In copper smelting, the reduction of copper ores in a shaft furnace, after roasting, if necessary. Also called Swedish process; German process. *Fay; Hess.*

continental rise. The submarine surface beyond the base of the continental slope, generally having a gradient of less than 1 to 1,000, occurring at depths from 4,500 to 17,000 feet, and leading down to abyssal plains. *A.G.I. Supp.*

continental rock. A rock unit deposited on land as opposed to one deposited in sea water which would be a marine rock. It may be eolian, fluvial, lacustrine, palustrine, or volcanic. *A.G.I.*

continental sediment. A sediment deposited upon a continent (in the nonmarine environment). It may be of aqueous origin (river, lake, or swamp) or of terrestrial origin, (desert or glacial). *Stokes and Varnes, 1955.*

continental shelf. a. The gently sloping tread around a continent, extending from the low-water line to the depth of approximately 100 fathoms, at which depth there is a marked increase of slope toward the great depths. *Shhieferdecker.* b. The gently sloping, shallowly submerged marginal zone of the continents extending from the shore to an abrupt increase in bottom inclination. The greatest average depth is less than 60 feet, and the width ranges from very narrow to more than 200 miles. *A.G.I. Supp.* c. A component of the continental terrace. *Bureau of Mines Staff.*

continental slope. a. The declivity from the offshore border of the continental shelf at depths of approximately 100 fathoms (600 feet) to oceanic depths. It is characterized by a marked increase in gradient. *A.G.I.* b. Continuously sloping portion of the continental margin with gradient of more than 1 to 40, beginning at the outer edge of the continental shelf and bounded on the outside by a rather abrupt decrease in slope where the continental rise begins at depths ranging from about 4,500 to 10,000 feet. Formerly considered to extend to the abyssal plains. *A.G.I. Supp.* c. A component of the continental terrace. *Bureau of Mines Staff.*

continental talus. *See* insular talus. *H&G.*

continental terrace. The zone around the continents, extending from low water line to the base of the continental slope. *H&G.*

continuity. a. The manner of joining floors to beams, and of beams to beams and to columns, so that they bend together when loaded and thereby strengthen each other. This objective is readily achieved with welded steel or reinforced concrete but is more difficult with other materials. *Ham.* b. The concept that where there is no change of state, seawater is incompressible and the liquid matter is neither created nor destroyed. If there is any vertical contraction in a volume of fluid therefore, there must be a horizontal expansion, so that the original voluume is maintained. This is accomplished by motion resulting in changes of the shape of the original parcel of water. *Hy.*

continuous azimuth method. A method of traversing by which the azimuth of the survey lines is obtained from the instrument. *B.S. 3618, 1963, sec. 1.*

continuous beam. A beam covering several spans in one straight line, constructed so that a given load on one span will produce on the others an effect which can be calculated. Such continuity is both safe and economical where the supports are not likely to settle. *Ham.*

continuous-bucket elevator. This type elevator has the buckets so shaped and attached to the chain or belt that the back of each serves as a discharge chute for the one immediately succeeding it. They are so close together as to be nearly in contact, so that but little spill occurs between them. By locating the discharge spout some distance down from the top, this elevator will handle material that has a tendency to pack in the buckets and requires time to leave them so that it is not easily discharged centrifugally. This type elevator should be loaded directly into the buckets by means of a loading "leg" or chute which fits closely around the buckets on the uprun. *Pit and Quarry, 53rd, Sec. C, p. 34. See also* bucket elevator; continuous elevator bucket.

continuous-bucket excavator. An excavator consisting of a series of buckets attached to a continuous chain, guided by two or more ladders. The buckets are drawn against the bank face, taking a cut of constant depth, while simultaneously the machine moves slowly along the ground on a bench above or below the bank; often used in opencast mining in soft deposits. *Nelson.*

continuous casting. A casting technique in which an ingot, billet, tube, or other shape is continuously solidified while it is being poured, so that its length is not determined by mold dimensions. *ASM Gloss.*

continuous chamber kiln. *See* transverse arch kiln. *Dodd.*

continuous charge. A charge of explosive that occupies the entire drill hole except for the space at the top required for stemming. *Fay.*

continuous clarifier. *See* continuous thickener. *Nelson.*

continuous coal cutter. A coal mining machine of the type that cuts the face of the coal without being withdrawn from the cut. *Fay.*

continuous coring. A borehole-drilling technique whereby, the cuttings-removal agent is countercirculated through an inside flush-coupled-type drill string to deliver both the cuttings and core produced to a tray or container at the surface. *Long.*

continuous-countercurrent decantation (CCD) process. A thickening process in which the ore flows in one direction through the line of thickeners, and the wash water flows in the opposite direction. The spigot product from the last thickener is discarded if it has been washed sufficiently; if not, it is sent to a filter. *Newton, p. 420.*

continuous cutters. Coal cutting machines such as the shortwall cutter, longwall cutter, and overcutting machines. They are known as continuous cutters because a continuous cut can be made the full width of the face without stopping these machines, while machines of the intermittent variety must be frequently reset. *Kiser, 1, p. 2.*

continuous deformation. Deformation accomplished by flowage of rocks rather than by rupture. *G.S.A. Memoir 6, 1938, p. 33.*

continuous drier. A drier in which the ware moves through the drying cycle in an uninterrupted flow pattern in contrast to a batch drier. *ASCG, 1963.*

continuous driving. In this operation the same personnel do the drilling, blasting, and mucking while working continuously round after round. They can in this way—except for the time for ventilation—be at work during the whole shift. Continuous driving is used when the advance per round is low and the mucking or the drilling and blasting do not need more than a part of the shift. *Langefors, p. 206.*

continuous elevator bucket. A bucket having sides projecting beyond the front and which when spaced continuously with other buckets forms a chute for the material discharged by the following bucket as they pass over the elevator head wheel. High front, medium front and low front are terms used to designate continuous buckets having a relatively small or large included angle between the front and back. *ASA MH4.1-1958.*

continuous extraction. Extraction (leaching) of solids by liquid which cycles continuously countercurrent to the material it is depleting of the sought value (for example, gold in cyanide process), the pregnant liquid at a certain stage being stripped of value and returned as barren solution. *Pryor, 3.*

continuous filament. *See* fiber. *ASTM C162-66.*

continuous filters. *See* Oliver filter; American disk filter.

continuous-flight auger. A drill rod with continuous helical fluting, which acts as a screw conveyor to remove cuttings produced by an auger drill head. Also called auger. *Long.*

continuous furnace. A furnace in which the charge enters at one end, moves through continuously, and is discharged at the other. Many methods are used for moving the charge; they vary according to the weight, shape, and nature of the stock being treated. *C.T.D.*

continuous grading. A particle-size distribution in which all intermediate size fractions are present, as opposed to gap grading. *Taylor.*

continuous kiln. a. A kiln which is loaded and fired continuously, (that is, tunnel kiln). *Bureau of Mines Staff.* b. A kiln in which the waste heat from the hot brick chambers is used to heat the wares in other compartments still to be burned. *Fay.* c. A lime kiln that is fed from above and delivers continuously below; a running kiln; a draw kiln. *Fay.*

continuous mill. A rolling mill consisting of a number of stands of synchronized rolls (in tandem) in which metal undergoes successive reductions as it passes through the various stands. *ASM Gloss.*

continuous miner. A mining machine designed to remove coal from the face and to load that coal into cars or conveyors without the use of cutting machines, drills, or explosives. *Jones. See also* Colmol miner; Crawley-Wilcox continuous miner; Goodman miner; Joy miner; Marietta miner.

continuous mining. a. Mining in which the continuous mining machine cuts or rips coal from the face and loads it onto conveyors or into shuttle cars in a continuous operation. Thus, the drilling and shooting operations are eliminated, along with the necessity for working several headings in order to have available a heading in which loading can be in progress at all times. *Woodruff, v. 3, p. 35.* b. Methods of coal mining using ploughs or similar machines, have become known, broadly, as continuous mining. The longwall machine and conveyor are in the same track which is situated between the last row of props and the face. The conveyor is moved forward progressively as the coal is cut and loaded by the machine. There are no separate or cyclic operations as in conventional machine mining and the aim is to make each shift a continuation of the previous shift. Where the conditions are favorable, faces up to 250 yards in length may be so worked. *See also* cyclic mining. *Nelson.*

continuous mixer. A concrete mixer into which the water, cement, and aggregate are fed without stopping, and from which the mixed concrete pours in a continuous stream. *Ham.*

continuous permafrast zone. A regional zone predominantly underlain by permafrost. There is no permafrost at widely scattered sites. *A.G.I.*

continuous phase. In an alloy or portion of an alloy containing more than one phase, the phase that forms the background or matrix in which the other phase or phases are present as isolated units. *ASM Gloss.*

continuous precipitation. Precipitation from a supersaturated solid solution accompanied by a gradual change of lattice parameter of the matrix with aging time. It is characteristic of the alloys which produce uniform precipitate throughout the grains. *See also* discontinuous precipitation. *ASM Gloss.*

continuous process of distillation. A petroleum distillation process in which the crude oil flows slowly by gravitation through a series of stills or retorts each placed slightly lower than the preceding one. Each still has a carefully maintained temperature, and yields, therefore, continuously a product of given volatility. *Fay.*

continuous profiling. A seismic method of shooting in which seismometer stations are placed uniformly along the length of a line and shot from holes also spaced along the line so that each hole records seismic-ray paths identical geometrically with those from immediately adjacent holes, so that events may be carried continuously by equal-time comparisons. *A.G.I.*

continuous rating. An electrical machine, or other piece of apparatus, is said to be continuously rated when it gives its rated output continuously without exceeding a certain specified temperature rise or suffering any ill effects. *Compare* intermittent rating. *C.T.D.*

continuous reaction series. That branch of Bowen's reaction series comprising the plagioclase group, in which reaction of early-formed crystals with later liquids takes place continuously, that is, without abrupt phase changes. *A.G.I.*

continuous recording. In geophysics, the process of making uninterrupted records of observations over selected periods of time. *A.G.I.*

continuous ropeway. An aerial ropeway which operates on the same principle as the endless rope haulage. The loaded buckets are hauled by an endless rope in one direction and the empty buckets travel back on the return rope alongside. *Nelson.*

continuous sampling. Taking a sample from each unit so that increments are taken at regular intervals whenever the coal or coke is handled at the point of sampling. *B.S 1017, 1960, Pt. 1.*

continuous sintering. Presintering, or sintering, in such manner that the objects are advanced through the furnace at a fixed rate by manual or mechanical means. Synonymous with stoking. *ASTM B243-65.*

continuous smelter. Any smelter which is fed constantly and which discharges frit in a continuous stream. The passage of the material through the smelter is generally effected by gravitational flow. *Enam. Dict.*

continuous spectrum. a. The band of all the rainbow colors, red, orange, yellow, green, blue, and violet, merging one into the other, produced by all incandescent solids. *Anderson, p. 354.* b. The spectrum of a wave, the components of which are continuously distributed over a frequency region. *H&G.*

continuous stream. A stream that does not have interruptions along its course. It may be perennial, intermittent, or ephemeral, but it does not habitually have wet and dry stretches. *A.G.I.*

continuous stream conveyor. *See* en masse conveyor. *ASA MH4.1-1958.*

continuous tank furnace. A glass furnace in which the level of glass remains constant because the feeding of batch continuously replaces the glass withdrawn. *ASTM C162-66.*

continuous thickener; continuous clarifier. A large cylindrical tank with a conical base. Rakes rotate on a shaft and move the settled sludge towards the central discharge to be drained or pumped away. *Nelson.*

continuous velocity log. A seismic log made by instruments which record the velocity of sound or of seismic waves continuously over small intervals as the logging device traverses a borehole and emtis sound which traverses the walls of the hole. *A.G.I.*

continuous vertical retort. A type of gas retort, built of silica or siliceous refractories. Coal is charged into the top of the retort, coke is extracted from the bottom, and town gas is drawn off, the whole operation being continuous. Continuous vertical retorts are also used in the zinc industry, in which case they are built of silicon carbide refractories. *Compare* horizontal retort, a. *Dodd.*

continuous weld. A weld extending continuously from one end of a joint to the other; where the joint is essentially circular, completely around the joint. Contrast with intermittent weld. *ASM Gloss.*

contorted. Bent or twisted together; used where strata are folded or crumpled on a large scale. If on a small scale, the strata are corrugated. *Fay.*

contortion. The folding and bending to which rock strata have been subjected. *Fay.*

contour. a. The outline of an object. *A.G.I. Supp.* b. A line connecting points of equal value on a map or diagram, most commonly points of equal elevation on a map. *A.G.I. Supp.* c. A line drawn through points of equal elevation on any surface. It is the intersection of a horizontal plane with the surface. *Rice.* d. An imaginary line on the surface of the ground, every point of which is at the same altitude. *Fay.* e. A line or a surface at all points of which a certain quantity, otherwise variable, has the same value (as lines of equal elevation on the ground or isothermal surfaces in a heat-conducting solid). Synonym for contour line. *Webster 3d.* f. Topographic maps have contours and are very useful in showing the relief of a particular area. *Bureau of Mines Staff.* g. As a verb, to construct (as a road) in conformity to a contour. To provide (as a map) with contours (contour lines). To draw or to plot a contour. *Webster 3d.* h. The profile or cross-sectional outline of a bit face *Long.*

contour diagram. A type of petrofabric diagram prepared by the contouring of a point diagram. Its purpose is to obtain easier visualization of the results of the petrofabric study. *A.G.I.*

contour forming. *See* stretch forming; tangent bending; wiper forming. *ASM Gloss.*

contour gradient. A line marked on the ground surface at a given constant slope. *Ham.*

contouring. There are two general methods in use: (1) the direct method, when the actual points of equal level are located on the ground and surveyed, and (2) the indirect method, when the levels of the corners of a grid system are obtained and the contour lines interpolated. The control being the nature and the steepness of the area to be contoured. *Mason, V. 2, p. 730.*

contour interval. a. The difference in elevation between two adjacent contour lines. *A.G.I.* b. The vertical distance between the elevations represented by adjacent contour lines on a map. *Webster 3d.*

contour line. a. line on a map representing a contour. *A.G.I.* b. Contour line and contour are synonoymous according to present usage. *A.G.I.* c. A line connecting points of equal elevation above or below a datum plane such as sea level. It may be topographic or structural. *A.G.I.* d. Topographic maps have contour lines and are very useful in showing the relief of a particular area. *Bureau of Mines Staff.* e. A line on a map connecting points of equal thickness of sedimentary units. Synonym for isopach line. *A.G.I.* f. The recording of quantified properties of sediments by contour lines has been advocated. *A.G.I.*

contour machining. Machining of irregular surfaces, such as those generated in tracer turning, tracer boring, and tracer milling. *ASM Gloss.*

contour map. a. A map showing the configuration of a surface by means of contour lines drawn at regular intervals of elevation, as one for every 20 feet. A crowding of the contour lines indicates steepness. *Webster 3d; Fay.* b. A map showing by contours (or contour lines) topographic, or structural, or thickness, or facies differences in the area mapped. *A.G.I.*

contour milling. Milling of irregular surfaces. *See also* tracer milling. *ASM Gloss.*

contour plan. A plan drawn to a suitable scale showing surface contours or calculated contours of coal seams to be developed. These plans are important during the planning stage of a project. *Nelson.*

contour race. A watercourse following the contour of the country. *Fay.*

contour, structural. An imaginary line of equal elevation on a selected stratigraphic horizon, called the structural datum. *A.G.I.*

contour, topographic. An imaginary line on the ground, all points of which are at the same elevation above (or below) a specified datum surface. *A.G.I.*

contraband. In coal mining, a term meaning cigars, cigarettes, pipes and other contrivances for smoking, matches, and mechanical lighters. In Great Britain, at safety lamp mines, it is an offence to take contraband below ground or to have contraband in one's possession below ground. Workmen are searched periodically before they enter the cage or spake at the beginning of the shift. *Nelson.*

contraclinal valley. A valley, the longitudinal slope of which is counter to the dip of the underlying strata. *Bureau of Mines Staff.*

contract. a. A bargain or agreement voluntarily made upon good consideration, between two or more persons capable of contracting to do, or forbearing to do, some lawful act. *Hoov. p. 359.* b. In mining, applies to an agreement between operator and workman to pay the latter so much per foot for excavating drift or stope. These men are known as contract miners and are usually skilled workmen. They work harder than men on wages due to the incentive of higher earnings. *Weed, 1922.* c. Agreement between contractor and employing company to construct, erect, install and operate specified works under agreed conditions. A cost-plus contract is one in which the contractor undertakes a comprehensive activity, part of which he may subcontract (or let out). A unit contract is one in which company awards a restricted part of job to the contractor. *Pryor, 3*

contract driller. *See* contract miner, a. *D.O.T. 1.*

contract drilling. Drilling work done for a company or person by a person or company furnishing the drilling equipment and labor for a specified cost, which is based on the amount and type of work. *Compare* company account. *Long.*

contract drilling-machine operator. *See* contract miner, a. *D.O.T. 1.*

contract weir. A notch set in a dam narrower than the width of a channel along which water is flowing, and which is used to measure the rate of flow. Such a weir has end contractions. *Ham.*

contraction. a. The action or process of becoming smaller, shorter, or pressed together. For example, the contraction of a gas on cooling. A decrease of size. The quality or state of being contracted. *Webster 3d.* b. Shrinking. In changing from a vitreous to a crystalline character, rocks shrink. Contraction may account for subsidence in certain areas. The whole globe of the earth is believed by many to have shrunk by cooling, an example of contraction. *Fay.*

contraction cavities. The bulk of the contraction that accompanies the solidification of metals is concentrated in the feeder heads and risers, from which molten metal flows to compensate for contraction in the casting of ingot proper. When, however, the supply of molten metal fails at certain points, contraction cavities are formed. *C.T.D.*

contraction hypothesis. The theory that compression causing folding and thrusting is a result of the shrinking of the earth. The crust must decrease in size to accommodate itself to the shrinking interior of the earth. *A.G.I.*

contraction in area. The difference between the original cross-sectional area of a tensile test piece and the area at the point of fracture. Usually stated as a percentage of the original area. *C.T.D.*

contraction joint. The designed break in a structure to allow for the drying and temperature shrinkage of concrete, brickwork, or similar material, thereby preventing the formation of harmful cracks *Ham.*

contraction vein. A vein formed by the filling of a fissure caused by contraction resulting from the drying or cooling of the surrounding rock. *Fay.*

contract loader. In bituminous coal mining, one who is paid a certain rate per ton or car of coal mined, and employs one or more loaders whom he pays out of his earnings. *D.O.T. 1.*

contract man. *See* contract miner, a. *D.O.T. 1.*

contract manager. An experienced man employed by the contractor responsible for carrying out a building or civil engineering contract. *Ham.*

contract miner. a. In anthracite and bituminous coal mining, one who operates electric or compressed-air machines to drill holes into the working face of coal or rock for blasting, and shovels coal into cars after blasting. A contract miner is usually engaged in production work, that is, the mining of coal only, and is paid on a tonnage basis. In anthracite regions, he is paid the wage rate of a consideration miner when encountering obstructions of rock or slate that prevent his earning an amount in excess of a fixed or specified rate per day. Also called contract driller; contract drilling-machine operator; contract man; contractor. *D.O.T. 1.* b. In metal mining, one who drills, blasts, and loads ore or rock into cars in a mine. Is usually engaged in production work, that is, the mining of ore only, and is paid on a contract basis (so much per ton, cubic yard, or cars of ore produced. *D.O.T. 1.*

contractor. a. The person who signs a contract to do certain specified work at a certain rate of payment. In mining, the contractor is an experienced miner or a hard-heading man. He employs other men and the work may proceed on a three-shift basis. *Nelson.* b. S. Afr. Mine worker undertaking special tasks on a contractual basis, such as shaft sinking, development blasting, etc. *Beerman.*

contract ration. The ration of the reflectance of a coating over black backing to its reflectance over a backing of reflectance of 0.80 (80 percent). *ASTM C286-65.*

contract work. Work which is outside the scope of the mine price list and is performed on the basis of an agreement between a miner and the mine manager. The agreement may be only verbal and renewable weekly or monthly. Payment is made according to performance. In development work the contract rate is usually per yard advance. There may be bonus payments for good work or for extra performance. *See also* piecework *Nelson.*

contraflexure. A change in the direction of bending of a structural member. It is the point at which there is zero bending moment. *Ham.*

contragradation. Stream aggradation caused by an obstruction. Synonym for dam gradation. *A.G.I.*

contralode. a. Counterlode. *Hess.* b. *See* cross course. *Fay.*

contraposed shoreline. A shoreline on which, in the course of time, the surface of the resistant undermass has been resurrected from beneath a loose marine cover; the result is a rejuvenation of the coastal forms. *Schieferdecker.*

contra-rotating axial fan. A modification of the axial-flow fan. It consists of two impellers with aerofoil shaped blades which rotate in opposite directions. The drive is by means of a single motor through differential gears, or two separate motors, one for each impeller. They are placed in the airstream and act as streamlined hubs. These fans are available for auxiliary ventilation in mines. *See also* axial-flow auxiliary fan. *Nelson.*

contrast. A ratio expressing the geochemical relief, computed as the ratio either of maximum value to threshold, of maximum to background, or of threshold to background values. *Hawkes.*

contrasted differentiation. Introduced by Nockolds who recognizes that, although progressive fractionation is an important mechanism of magmatic differentiation, there is evidence that differentiation in intercrustal magma basins yields two contrasted magmas, acidic and basic; hence contrasted differentiation. He points out that varying degrees of reaction between these contrasted magmas may produce intermediate rock types which resemble in every way the intermediate types normally regarded as a result of progressive fractionation. *A.G.I.*

Contravec. Trade name; a system for the blowing in of air at the exit end of a tunnel kiln to counteract the normal convection currents. *Dodd.*

contributory negligence. In mining, means that the law imposes upon every person the duty of using ordinary care for his own protection against injury. It is not synonymous with assumption of risk. *Ricketts, I.*

control. a. Something that affords a standard of comparison or a means of verification, such as a control experiment. *Webster 3d.* b. A system of relatively precise field measurements (as a traverse or a triangulation system) with which local secondary surveys may be tied in to insure their essential accuracy. *Webster 3d.* c. Any of the factors determining the nature of geologic formations at a given place. *Webster 3d.* d. In geology, the background and the quantity of data which are responsible for the interpretation placed on a map or a cross section. *A.G.I.* e. As a verb, to check, to test, or to verify by counter or parallel evidence or experiments. To verify by comparison or by research. *Webster 3d.* f. An attempt to guide a borehole to follow a predetermined course through the use of wedges or by manipulation of the drill string. *Long.* g. A mechanism by which the speed or rate of an operation may be regulated. *Long.* h. Points on the ground, accurately fixed in position horizontally or vertically (or both), which are used as accurate starting and closing points for traverses, planetable surveys, terrestrial or aerial photographic surveys, etc. A system of control points is usually established by triangulation or traverses, and by leveling. *Seelye, 2.* i. That part of a conduit where the water level gives a good indication of the rate of flow. *See also* Venturi flume. *Ham.*

control assay. An assay made by an umpire to determine the basis on which a purchaser shall pay the seller for ore. *See also* umpire, b. *Fay.*

control, automatic volume. A device incorporated in seismic instruments to control the amplitude of responses before their recording, including the rapid recovery of response levels after an onset of energy and the increase of sensitivity with the decay of amplitudes received with time. *A.G.I.*

control chart. Graph showing, horizontally, the operating norm and also the upper and lower limits within which deviations must be held. Should these exceed the permitted variance, special steps must be taken to locate and correct the upsetting factor or factors. *Pryor, 3.*

control factor. The ratio between the minimum compressive strength and the average compressive strength. *Taylor.*

control head. A large gate valve designed to provide a clear opening for the passage of drilling tools into a borehole and to act as a head or cap on the casing at the collar of the borehole. *Long.*

control joints. Provision for the dimensional change of different parts of a structure due to shrinkage, expansion, temperature variation or other causes, so as to avoid the development of high stresses. *See also* expansion joint, b. *Taylor.*

controlled atmosphere. An atmosphere circulated through, or contained in, a muffle furnace or other heating unit, the oxygen content of which is regulated or adjusted to a level low enough to prevent oxidation of diamonds during the sintering stage of producing a diamond bit by a powder metal process. *Long.*

controlled caving. A mining method utilizing the advantages of longwalls but at the same time without filling. In this method, the working room in front of the working face is protected by close lines of props and cribs, which are portable and easily taken to pieces. As the face proceeds the cribs are shifted as well as the props with the face, leaving the mined-out room to cave. This method is also called mining with self-filling. *Stoces, v. 1, p. 315.*

controlled cooling. Cooling from an elevated temperature in a predetermined manner to avoid hardening, cracking, or internal damage, or to produce a desired microstructure. This cooling usually follows a hot-forming operation. *ASM Gloss.*

controlled footage. The specified maximum number of feet of borehole a single diamond- or other-type bit may be allowed to drill in a specific-type rock, as predetermined by the drill foreman. *Long.*

controlled gravity conveyor. *See* controlled velocity roller conveyor *ASA MH4.1-1958.*

controlled mosaic. A mosaic fitted to a control plot by rephotographing the component vertical photographs to compensate for scale variations resulting from tilt and for variations in flight altitude. *A.G.I.*

controlled-pressure cycle. A forming cycle during which the hydraulic pressure in the forming cavity is controlled by an adjustable cam that is coordinated with the punch travel. *ASM Gloss.*

controlled pressure pouring. A process for bypassing the ingot phase in iron and steelmaking. *Encyclopaedia Britannica. Britannica Book of the Year, 1965. p. 457.*

controlled production. Production of oil by the manipulation of gas pressures so as to produce a maximum quantity of oil and a minimum of gas. *Porter.*

controlled rectifier. A rectifier in which means for controlling the current flow through the rectifying devices is provided. *Coal Age, 1.*

controlled splitting. When airways are arranged in parallel and a prescribed quantity of air is made to flow through each branch. *Hartman, p. 131.*

controlled strain test. A test in which the load is so applied that a controlled rate of strain results. *ASCE P1826.*

controlled stress test. A test in which the stress to which a specimen is subjected is applied at a controlled rate. *ASCE P1826.*

controlled thermonuclear reaction. *See* thermonuclear reaction. *L&L.*

controlled velocity roller conveyor. A roller conveyor having means to control the velocity of the objects being conveyed. *See also* roller conveyor. *ASA MH4.1-1958.*

controller. Any mechanical or electrical device which is part of or added to a machine or device for automatic regulation or control. *Bureau of Mines Staff.*

controlling rate. That at which the key mamachine in a series arranged for continuous ore processing is set to work. The control function may be for quantity passing per time, ratio of size reduction from feed to discharge, or for a necessary physical or chemical change of state of solid or liquid phase of the process *Pryor, 3.*

controlling system. In flotation, that portion of an automatic feedback control system which compares functions of a controlled variable and a command and adjusts a manipulated variable as a function of the difference. It includes the reference input elements, summing point, forward and final controlling elements, and feedback elements. *Fuerstenau, pp. 542-543.*

control man. One who maintains depth and composition of cryolite bath in aluminum reduction pots within limits favorable to efficient aluminum production. *D.O.T. 1.*

control managerial. Definition of function, development of methods, statistical fact-finding, correction of variations. *Pryor, 3.*

control on fracture. In quarrying, control on fracture is based on the experimental determination of the type and the grade of explosive, the loading ratio, and the pattern of boreholes. *Streefkerk, p. 64.*

control pipe. A pipe of sufficient diameter and length to contain a core barrel. The upper end of the pipe is equipped with a rod-stuffing box and relief valve, and the lower end is coupled to the exposed side of a control-head gate valve. Used to enable a driller to remove core barrel from borehole when a high-pressure flow of water is encountered in drilling. *Long.*

control point. Accurately located station (as regards latitude, longitude and elevation) to which survey can be tied. Essential in air survey connection to ground. *Pryor, 3.*

control production. Design, loading and regulating flow, improving productivity. *Pryor, 3.*

control rod. A rod, plate, or tube containing a strong neutron-absorbing material (hafnium, boron, etc.). Used to control the power of a nuclear reactor. A control rod absorbs neutrons, preventing them from causing further fissions. *See also* regulating rod; safety rod; shim rod (which are types of control rods). *L&L.*

control samples. In any continuous process, samples taken often enough (whether by hand or mechanically) so that the operation process may be guided by the samples and weights of the materials involved. *Newton, Joseph. Introduction to Metallurgy, 1938, p 476.*

control signal. A signal passed to the equipment governed by the control system, in order to apply a change or correction. *NCB.*

control size; checking size; testing size. A single size chosen to test the accuracy of a sizing operation; may be the same as the designated size. *B.S. 3552, 1962.*

control system. A system composed of a number of elements of any kind to control any operation or equipment. *NCB.*

control unit. A section which handles information transfers and arithmetic. *Pryor, 3, p. 31.*

control valve. A valve for controlling constant flow in a pipeline irrespective of pressure; also modifications of such a valve for dividing flows, or introducing other flows to make up a given quantity of fluid. *Ham.*

convection. a. The transfer of heat by means of the upward motion of the particles of a liquid or a gas which is heated from beneath. *Shell Oil Co.* b. The circulatory motion that occurs in a fluid at a nonuniform temperature owing to the variation of its density and the action of gravity. The transfer of heat by this automatic circulation of a fluid. *Webster 3d.* c. A process of mass movement of portions of any fluid medium (liquid or gas) in a gravitational field as a consequence of different temperatures in the medium and hence different densities. The process thus moves both the medium and the heat, and the term convection is used to signify either or both. *A.G.I.* d. The flow of electricity by the motion of charged particles of air passing off currents from a pointed electrical conductor. *Crispin.*

convectional rain. Rain caused by convection in the atmosphere. When surface layers of the latter are heated, air laden with moisture will rise in a convection current. In rising, the air is cooled down to dewpoint temperature when its water vapor will condense to form a cloud. A convection current may be so strong that a cloud will be very high, when the proportion of water will become so great that heavy rain results. Thundery rain in a temperate region is typical of convectional rain. *Ham.*

convection current. a. A stream of fluid propelled by thermal convection. Thermally produced vertical air flow. *Webster 3d.* b. A transfer of material due to differences in density, generally brought about by heating. Characteristic of the atmosphere and of bodies of water. Drag along the base of the crust by convection currents generated within the interior of the earth has been suggested to be a cause of orogeny. *A.G.I.* c. A closed circulation of material sometimes developed during convection. Convection currents normally develop in pairs; each pair is called a convection cell. *Leet.*

conventional checkerwork. *See* pigeonhole checkerwork. *Bureau of Mines Staff.*

conventional coring. a. Cutting and recovering core by generally accepted methods and standard diamond-drilling equipment. *Long.* b. As used by individuals associated with petroleum well-drilling operations, to cut and recover core using any type of annular-shape cutting head other than a diamond bit *See also* calyx, c. *Long.*

conventional machine mining. A system of mining established for many years in British coal mines. The longwall face is undercut, blasted and loaded by hand on to a face conveyor. The conveyor is then moved forward ready for the next day, the packs are built and the back props withdrawn. Such faces still produce about 60 percent of the total output and is known as conventional machine mining. It has the disadvantage that there are limits to production because it is cyclic mining, that is, it involves separate operations as enumerated above. *See also* continuouse mining. *Nelson.*

conventional milling. Milling in which the cutter moves in the direction opposite to the feed at the point of contact. *ASM Gloss.*

conventional mining. The cycle of operations which includes cutting the coal, drilling the shot holes, charging and shooting the holes, loading the broken coal, and installing roof support. Also known as cyclic mining. *Woodruff, v. 3, pp. 34-35.*

conventional mud. A drilling fluid containing essentially clay and water. *Brantly, 1.*

conventional strain. *See* strain. *ASM Gloss.*

conventional stress. *See* stress *ASM Gloss.*

convergence. a. Applied to the diminishing interval between geologic horizons. In some instances, this is due to an unconformable relationship and in other instances to variable rates of deposition. *See also* isopach. *A.G.I.* b. The line of demarcation between turbid river water and clear lake water, which denotes a downstream movement of water on the lake bottom and an upstream movement of water at the surface. *A.G.I.* c. In refraction phenomena, the decreasing of the distance between orthogonals in the direction of wave travel. This denotes an area of increasing wave height and energy concentration. *A.G.I.* d. In paleontology, resemblance which cannot be attributed to a direct relationship or to genetic affinity. *See also* convergent evolution. *A.G.I.* e. In oceanography, an area or zone in which the water sinks slowly downward from the ocean surface. *Schieferdecker.* f. When a coal seam is extracted on a longwall face, the roof lowers and the floor lifts causing a convergence of roof and floor, with consequent loss of height. Convergence is an important factor in thin seam mining. *Nelson.*

convergence map. *See* isochore map. *A.G.I.*

convergence recorder. An appliance for measuring changes in vertical height usually at the coalface. It consists of a telescopic strut set between roof and floor and carrying a pen which records the movement on a clockwork-driven chart. *See also* romometer. *Nelson.*

convergent evolution. a. The process in which phylogenetic stocks that are not closely related produce forms that are similar in appearance. Such forms are not as closely related genetically as they appear to be. Synonym for adaptive convergence. *A.G.I.* b. The evolution toward a common adaptation when it occurs in forms which independently have developed similar adaptations and are far removed from each other in the scale of relationship. *A.G.I.*

convergent light. Light tending to one point or focus. *Fay.*

converse lock joint. A joint, for wrought pipe, that is made up with a cast-iron hub. *Fay.*

conversion. A short conduit for uniting two others having different hydraulic elements; a transition. *Seelye, 1.*

conversion burners. Fuel-burning devices (usually oil or gas) intended for installation in a wide variety of boilers or furnaces. *Strock, 10.*

conversion coating. A coating consisting of a compound of the surface metal, produced by chemical or electrochemical treatments of the metal. *ASM Gloss.*

conversion factor. A number facilitating statement of units of one system in corresponding values in another system. *Pryor, 3.*

conversion ratio. The ratio of the number of atoms of fissionable fuel generated to the number of atoms of fissionable fuel consumed in a conveyor reactor *L&L.*

convertal process. A German process which cleans the coal and also reduces the moisture content to about 10 percent. Heavy oil is added to a coal slurry containing 50 to 60 percent of water. On mixing, the coal particles become coated with oil and hence resistant to water, whereas the shale particles remain uncoated and easily wetted. By high-speed centrifuging the coal/oil mixture is retained in the centrifuge while the shale particles pass out with the water. The process is not as efficient as froth flotation. *Nelson.*

converter. a. An apparatus for transforming the quality or quantity of electrical energy; a term formerly applied to the transformer, but now restricted to a machine utilizing mechanical rotation. *Standard, 1964.* b. A furnace in which air is blown through a bath of molten metal or matte, oxidizing the impurities and maintaining the temperature through the heat produced by the oxidation reaction. *ASM Gloss.* Also used in converting copper matte. *Fay.* c. A heat exchanger for transferring heat from steam to water. *Strock, 10.*

converter air. *See* primary air, a. *Newton, p. 259.*

converter foreman. A foreman who supervises workers engaged in converting copper matte to blister copper; and directs activities concerned with charging converter, blowing charge, pouring of slag and copper, casting of blister copper, and removal of castings. *D.O.T. Supp.*

converter plant. A plant that takes up an insoluble element from the soil, builds it into its living structure, and at death returns it to the soil in soluble form. *Hawkes.*

converter reactor. A nuclear reactor that produces some fissionable fuel, but less than it consumes. In some usages, a reactor that produces a fissionable material different from the fuel burned, regardless of the ratio. The process is known as conversion in both usages. *See also* breeder reactor. *L&L.*

converter skimmer. In ore dressing, smelting, and refining, one who makes blister copper (high-grade crude copper) by oxidizing iron and sulfur impurities in copper matte, using a converter. *D.O.T. Supp.*

converting. a. The process of removing impurities from molten metal or metallic compounds by blowing air through the liquid. The impurities are changed either to gaseous compounds, which are removed by volatization, or to liquids which are removed as slags. *E.C.T., v. 8, p. 937.* b. The process was applied to the metallurgy of copper by Pierre Manhes. Air is blown through molten copper matte in the presence of free silica. The iron is oxidized to FeO which forms a slag with the silica; the sulfur is oxidized and goes off as SO_2. *Liddell 2d, p. 493.*

converting coal. Mid. A local name given to coal suitable for steelmaking purposes at Sheffield. *Fay.*

Convertol process. A process for flocculating the coal particles in a pulp by means of oil so that they are retained on a suitable screening surface and thereby separated from unflocculated material and the bulk of the water. *B.S. 3552, 1962.*

convex. Curving like the surface of a sphere. *Crispin.*

convex cutting. Cabochon cutting. *Shipley.*

convex fillet weld. A fillet weld having a convex face. *ASM Gloss.*

convex incline bedding. Crossbedding with convex (upward) foresets. *Petetijohn.*

convey. To impart; to communicate; to transport. *Crispin.*

conveyer. One who or that which conveys, transports, transmits, imparts, or transfers, or specifically; any mechanical contrivance for conveying material in the working of mills, elevators, etc., such as endless chains, etc. *Standard, 1964. See* conveyor.

conveying, hydraulic. Use of flowing water or slow settling fluids based on water mixed with suitable heavy minerals to convey rock, coal, etc., in pipes. *Pryor, 3.*

conveying, pneumatic. Use of compressed air to move fairly fine aggregates laterally and/or vertically, as with small coal, cement, etc. *Pryor, 3.*

conveyor. a. A mechanical contrivance generally electrically driven, which extends from a receiving point to a discharge point and conveys, transports, or transfers material between those points. *ASA C42.85: 1956.* b. The apparatus, belt, chain, or shaker, which, in conveyor mining, moves coal from the rooms and entries to a discharge point or to the surface. "Mother conveyors" are the conveyors which receive the coal from several unit conveyors in rooms or entries. *B.C.I. See also* armored flexible conveyor; gate conveyor; shaker conveyor, a; trunk conveyor. c. Included are skip hoists and vertical reciprocating conveyors; typical exceptions are those devices known as industrial trucks, tractors, and trailers, tiering machines (truck-type), cranes, hoists, monorails, power and hand shovels, power scoops, bucket draglines, platform elevators designed to carry passengers or the elevator operator, and highway or rail vehicles. *ASA MH4.1-1958.*

conveyor air-lock. A ventilation stopping or separation door through which a conveyor has to run. It consists of at least two well-built partitions, each with some form of air-lock designed to pass the belt and yet to reduce to a minimum the leakage of air and the raising of dust. An air-lock chute is sometimes used. *Nelson.*

conveyor belt. A belt used to carry materials and transmit the power required to move the load being conveyed. *See also* cord conveyor belt; interwoven conveyor belt; rubber conveyor belt; solid woven conveyor belt; steel band belt; steel cable conveyor belt; stitched canvas conveyor belt; wire mesh conveyor belt. *ASA MH4.1-1958.*

conveyor belt friction. *See* friction, a. *ASA MH4.1-1958.*

conveyor belt joint. The joining of two ends of a belt conveyor to make a continuous band without gaps or exposed ends. The vulcanized joint is the best type and some authorities give its strength as about 80 percent or more of that of the belt. *Nelson.*

conveyor beltman. *See* conveyor man. *D.O.T. 1.*

conveyor belt sag. *See* sag, d. *ASA MH4.1-1958.*

conveyor, belt-type. A conveyor consisting of an endless belt used to transport material from one place to another. *ASA C42.85: 1956.*

conveyor chain. A chain used in the conveying medium of conveyors. *ASA MH4.1-1958.*

conveyor, chain-type. A conveyor using a driven endless chain or chains, equipped with flights which operate in a trough and move material along the trough. *ASA C42.85: 1956.*

conveyor creep. The downward slippage of a conveyor on an inclined face. With powered supports, this movement is liable to cause ram damage. Anchor stations are necessary to arrest conveyor creep. *See also* stell prop. *Nelson.*

conveyor dryer. An appliance in which the coal or ore is moved through a chamber containing hot gases on a perforated plate or a heavy mesh, stainless-steel continuous belt. *Nelson.*

conveyor elevator. A conveyor which follows a path part of which is substantially horizontal or on a slope less than the angle of slide of the material and part of which is substantially vertical or on a slope steeper than the angle of slide. *ASA MH4.1-1958.*

conveyor face. A longwall face on which the coal is loaded direct onto a face conveyor. The coal may be loaded by hand or mechanically. The face conveyor delivers its load of coal into tubs or cars or onto a gate conveyor. *Nelson.*

conveyor-feeder operator. *See* mill feeder. *D.O.T. Supp.*

conveyor loader. a. conveyor that at its extremity has a digging head that moves with the conveyor and works its way under the coal, which, by the unequal shaking of the conveyor, is carried back to the car. Also called shaking-conveyor loader. *Zern.* b. One who loads on a conveyor. *Zern. See also* loader.

conveyor man. a. One who sets up and tends chain, belt, or shaker (reciprocating) conveyors to transport coal or metal ore about a tipple at surface or from working face in mine. Also called beltman; loading-boom operator. *D.O.T. 1.* b. In the quarry industry, one who tends an endless conveyor belt used to transport rock from the crusher to storage bins. Also called conveyor beltman. *D.O.T. 1.*

conveyor-operator tripper. *See* tripper man. *D.O.T. Supp.*

conveyor, shaker-type. A conveyor designed to transport material along a line of troughs by means of a reciprocating or shaking motion. *ASA C42.85:1956.*

conveyor shifter; flitter; pan shifter. A member of a team responsible for advancing the face conveyor as the coal is worked away. In many modern layouts, the armored conveyor is pushed forward by hydraulic rams. *Nelson.*

conveyor speed. *See* speed, b. *ASA MH4.1-1958.*

conveyor track. The path, parallel to the face, occupied by a longwall conveyor. The track is advanced everey turnover. *Nelson.*

conveyor-tripper operator. *See* tripper man. *D.O.T. Supp.*

conveyor-type feeder. Any conveyor, such as apron, belt, chain, flight, pan, oscillating, screw, or vibrating, adapted for feeder service. *ASA MH4.1-1958.*

conveyor, vibrating-type. A conveyor consisting of a movable bed mounted at an angle to the horizontal, which vibrates in such a way that the material advances. *ASA C42.85:1956.*

convolute bedding; convolute lamination; curly bedding; slip bedding. Wavy or contorted laminations that die out both upward and downward within a given sedimentation unit. *Pettijohn.*

convolute current-ripple lamination. Deformed current-ripple cross-lamination. *Pettijohn.*

convolute lamination. *See* convolute bedding. *Pettijohn.*

convolutional balls; roll up structure. A comparatively small, concentric ball formed in association with convolute bedding. *Pettijohn.*

convoy. Eng. A wooden brake formerly applied to one of the wheels of a coal wagon. *Fay.*

convulsion. A sudden and violent disturbance of the order of the rocks; a terrestrial catastrophe; cataclysm. *Standard, 1964.*

Cooke elutriator. A short column hydraulic elutriator for sub-sieve sizes designed by S. R. B. Cooke. *Dodd.*

cookeite. An aluminosilicate of lithium with the formula, $4[LiAl_4(Si,Al)_4O_{10}(OH)_8]$, with about 3 percent silicon. *Hey 2d, 1955.*

coolant. a. Any medium, such as air, water, gas, oil, mud, etc., used as a circulation medium in drilling operation. *Long.* b. A liquid used to dissipate the heat generated by a cutting tool. Coolants most frequently used are soda water, lard oil, kerosine, and turpentine, or combinations of these. *Crispin.* c. In metal cutting, the preferred term is cutting fluid. *ASM Gloss.* d. The liquid used to cool the work during grinding and to prevent it from rusting. It also lubricates, washes away chips and grits, and aids in obtaining a finer finish. *ACSG, 1963.* e. Any fluid that is circulated through a nuclear reactor to remove heat. Common coolants are water, air, carbon dioxide, and liquid sodium. *L&L.*

coolant fluid. Synonym for coolant. *Long.*

cooler. When used in the Portland Cement industry, the term refers to the ancillary unit of a cement kiln into which hot clinker is discharged to cool before it is conveyed to the grinding plant. *Dodd.*

cooler arch. An opening of truncated-cone shape in tuyère breast of furnace. The tuyère cooler is placed in it. *Fay.*

coolers. Coolers in which atmospheric air is blown by a fan, through a nest of pipes, into a tower or chamber in which it comes into intimate contact with fine particles of water from atomizing nozzles. By the evaporation of some of this water the air rapidly becomes saturated at the wet-bulb temperature, the remaining water running off at the same temperature. This water is collected and pumped back through the nest of pipes, thereby cooling the air before it enters the spray chamber. The entering air then has a lower dry-bulb temperature than the atmosphere and, since its moisture content is unaltered, the wet-bulb is lower also. *Spalding, p. 268.*

cooling. Applied to minerals which, like saltpeter, give a sense of cooling when touched by the tongue. *Hess.*

cooling agent. A chemical added to an explosive during manufacture to suppress or inhibit the flame produced in blasting. *B.S. 3618, 1964, sec. 6.*

cooling arch. A furnace for the annealing of glassware, which is placed in the furnace and remains stationary throughout the annealing. *Compare* lehr. *Dodd.*

cooling curve. A curve showing the relation between time and temperature during the cooling of a material. *ASM Gloss.*

cooling-down period. a. The time elapsing after a covered pot is opened before the glass is cool enough to work. *ASTM C162–66.* b. The period between fining stage and the removal of the glass from the furnace. *ASTM C162-66.*

cooling floor. A floor upon which hot ore is placed for the purpose of cooling. *Fay.*

cooling load. The total amount of heat to be removed from a space to maintain desired designed conditions. For mines in operation, it is possible to meaesure the actual amount of heat generated in underground openings by observing temperature changes in a known weight flow rate of mine air. For projected mines and extensions of operating mines, the amount of heat produced must be calculated, knowing which of the sources of underground heat is operative. *Hartman, p. 346.*

cooling power. The rate at which air will remove heat from a body and may be measured dry or wet. The cooling power of air, as determined by the kata thermometer, is one of the basic environmental standards. *Hartman, p. 302.*

cooling-power thermometer. *See* katathermometer. *Nelson.*

cooling rate. *See* setting rate. *ASTM C162-66.*

cooling stresses. Residual stresses resulting from nonuniform distribution of temperature during cooling. *ASM Gloss.*

cooling striae. Whorls of parallel lines seen in most glass imitations of gems. *Shipley.*

cooling system of a rectifier. The cooling system of a rectifier is the equipment, that is, parts and their interconnections, used for cooling a rectifier. It includes all or some of the following: rectifier water jacket, cooling coils or fins, heat exchanger, blower, water pump, expansion tank, insulating pipes, etc. *Coal Age, 1.*

cooling tower. A device in which hot water from a steam condenser or refrigerating plant, is pumped to the top of a tower and cooled by allowing it to flow downward in thin streams from one container to another. *Hess.*

cooling zone. That part of the continuous furnace in which the ware is allowed to cool after firing. *ASTM C286-65.*

cool time. In multiple-impulse and seam welding, the time interval between successive heat times. *ASM Gloss.*

coolth. Absence of heat. *Spalding.*

coom. a. Scot. Wooden centering for an arch; hence, the roof of a mine or roadway is said to be coomed when it is arch-shaped. *Fay.* b. Scot. Soot; the dust of coal. *Fay.* c. *See* calm. *Arkell.*

coombe coal. Term used among British miners for crushed coal or coal slack. Also used in Nottinghamshire as a name of a bright coal seam situated on the top of Hard seam. *Tomkeieff, 1954.*

Coombs' criterion. An empirical statistical criterion for stopping extraction of factors in factor analysis. Applicable only to analyses in which the table of correlations contains only positive or zero values. *Bureau of Mines Staff.*

coontail ore. Banded ore consisting mainly of fluorite and sphalerite in alternate light- and dark-colored layers; occurs in the Cave-in-Rock district of southern Illinois. *A.G.I. Supp.*

Cooper-Hewitt lamp. An efficient lamp usually operated on 110-volt direct-current circuits. It consists of a glass tube, several feet long, containing mercury vapor at low vapor tension. *Crispin*.

cooperite. a. A steel-gray platinum sulfide, PtS; tetragonal; minute crystal grains. This mineral was earlier classified as orthorhombic and isometric. In platiniferous norite of the Bushveld, Transvaal, Republic of South Africa. Not to be confused with cooperite of Adam, 1869, nor with the trade name for an alloy of nickel, zirconium, tungsten, etc. *English*. b. Synonym for marmolite. *Hey 2d, 1955*.

Cooper's lines. An anastomosing meshwork of minute curved and branching lines produced in rock by shearing under pressure. *G.S.A. Memoir 50, 1952, p. 31*.

coor. Eng. A period of 6 or 8 hours' work by miners, making four or three periods to the day of 24 hours; a shift. *See also* core, t. *Fay*.

coordinate. a. Any one of a set of variables or parameters used in specifying the state of a substance (as temperature, pressure, or entropy) or the motion of a particle (as position, velocity, or momentum). *Webster 3d*. b. Any one of a set of numbers used in specifying the location of a point on a line, in space, or on a given plane or other surface; for example, latitude and longitude are coordinates of a point on the earth's surface. *Webster 3d*. c. One of the linear or angular quantities (usually two-dimensional) which designate the position which a point occupies in a given reference plane or system. *A.G.I.* d. Graphic or Cartesian are two measurements plotted at right angles. One, the Y-axis is vertical (the ordinate). The other is horizontal (the X-axis or abscissa). They are used to locate a point in a plane. A series of such points, plotted with one or both of the measured quantities changing is a graph. Geometrical coordinates are used in surveying to locate a point with reference to a north-south ordinate and east-west abscissa. *Pryor, 3*.

coordinate bond. A convalent bond, typical of coordination complexes, that is held to consist of a pair of electrons donated by only one of the two atoms it joins. Also called dative bond; semipolar bond. *Webster 3d*.

coordinate valence. A special form of covalent bond, in which the shared electrons are contributed by one atom, for example, hydrogen ion H_3O+. *Pryor, 3*.

coordination complex. A compound or an ion that contains a central, usually metallic atom or ion combined by coordinate bonds with a definite number of surrounding ions, groups, or molecules, that retains its identity, more or less, even in solution, and that may be nonionic, cationic, or anionic. *Webster 3d*.

coordination number. a. The number of attachments being usually four or six to the central atom in a coordination complex. *Webster 3d*. b. A number used in classifying various arrangements in space of constituent groups of crystals, the number being a function of the relative sizes and polarization properties of oppositely charged ions forming the solid crystal lattice. *Webster 3d*. c. The number of atoms, ions, groups, or molecules that can be directly attached to a central atom. It refers commonly to the number of oxygen atoms that can surround a central cation. *A.G.I.*

coordinator, geophysical. An interpreter who coordinates geophysical data with geological data in order to assemble more accurate maps of the areas explored. *A.G.I.*

coorongite. a. Elastic, bituminous substances derived from algae. *Schieferdecker*. b. A boghead coal in the peat stage. Named from the Coorong River in southern Australia. *Stutzer and Noe, 1940, p. 118*.

coose. a. Lean; said of ores. *Hess*. b. *See* coarse lode. *Fay*.

Copacite. Trade name; a Canadian sulfite lye. *Dodd*.

copaiba balsam. An oleoresin from various leguminous trees of tropical America. Used in many graining pastes. *Enam. Dict.*

copal. A class of natural resins, both recent and fossil. The principal recent, or soft, copals are Philippine, Manila, and pontianak. The principal fossil, or hard, copals are Congo and kauri. Yellow to red; semitransparent; brittle lumps; conchoidal fracture; and vitreous luster. In general, the copals have higher acid numbers than the dammar resins. The soft copals are partly soluble in alcohol, chloroform, and turpentine. The hard copals are nearly insoluble in the usual solvents but, on strong heating, the resins lose 10 to 25 percent of their weight and become soluble in turpentine and linseed oil. Found in the East Indies, the Philippines, Australia, and Africa. *CCD 6d, 1961*.

copaline. Same as copalite. *Fay*.

copalite. An oxygenated hydrocarbon resembling copal, from the blue clay of Highgate, near London, England. *Fay*.

Copaux-Kawecki fluoride process. A process for converting beryl to beryllium oxide. In this process, beryl containing 10 to 12 percent BeO is crushed, ground in a wet ball mill to minus 200 mesh, and filtered. It is then mixed in batches with soda ash, sodium silicofluoride, and sodium ferric fluoride and made into briquets. The briquets are dried, sintered, cooled, crushed, and ground in a wet pebble mill to which hot water is added, and the slurry is pumped to a tank for leaching. More water is added and the mixture is agitated, leached, and allowed to settle. The liquid, containing soluble sodium beryllium fluoride, is decanted to separate it from the solids, which contain aluminum and iron oxides and silica. Caustic soda is added to the heated solution to precipitate beryllium hydroxide, which is filtered and calcined to convert it into beryllia. *BuMines Bull. 630, 1965, pp. 103-104*.

cope. a. *Derb*. To contract to mine lead ore by the dish, load, or other measure. *Fay*. b. An exchange of working places between miners. Also spelled coup. *Zern*. c. *Derb*. A duty or royalty paid to the lord or owner of a mine. *Fay*. d. *Eng*. A superficial deposit covering or coating the substrata. A cold, stiff, and wet clay. *Arkell*. e. The upper or topmost section of a flask, mold, or pattern. *ASM Gloss.*

copel. An alloy containing 55 percent copper and 45 percent nickel, used for thermocouples. *Newton, Joseph. Introduction to Metallurgy, 1938, pp. 183, 349*.

Copenhagen water. *See* normal water. *Hy*.

coper. Derb. One who contracts to mine lead ore at a fixed rate; a miner. *Fay*.

coper, hand. In the stonework industry, one who cuts large, irregular, rough-sawed slabs of marble into two or more pieces and shapes them to approximate specified dimensions. Also called marble coper. *D.O.T. 1*.

coper, machine. In the stonework industry, one who cuts large marble slabs into blocks or smaller slabs of specified dimensions on a coping machine which is especially adapted to the accurate and smooth cutting of stone, also called coper machine operator, coping machine cutter; coping machine man; coping machine operator; coping saw operator; stone trimmer. *D.O.T. 1*.

coper machine operator. *See* coper, machine *D.O.T. 1*.

copi. Gypsum, generally weathered. *Fay*.

copiapite. A basic, ferric sulfate, perhaps, $2Fe_2O_35SO_318H_2O$. Also called yellow copperas; misy. *Fay*.

coping. a. The top or cover of a wall usually made sloping to shed water. b. In marble works, the process of trimming the edges of slabs of stone. *See also* coping machine. *Fay*. c. In quarrying, the process of cutting one slab into two without regard to the finish of the edges. *AIME, p. 332*. d. Cutting or slotting stone with a thin abrasive wheel. *ASM Gloss*. e. The material or units used to form a cap or finish on top of a wall, pier, or pilaster to protect the masonry below from the penetration of water from above. *ACSG*. f. Shaping stone or other hard nonmetallic material by use of a grinding wheel. *ACSG, 1963*.

coping and sawing foreman. In the stonework industry, a foreman who supervises the cutting of large blocks and slabs of stone into smaller blocks and slabs preparatory to milling and finishing the stone for building or monumental purposes. *D.O.T. 1*.

coping machine. A machine, consisting of a gearing and a carborundum wheel for cutting and trimming marble slabs, as for baseboards, tile, etc. *Fay*.

coping machine cutter. *See* coper, machine *D.O.T. 1*.

coping machine man. *See* coper, machine *D.O.T. 1*.

coping machine operator. *See* coper, machine *D.O.T. 1*.

coping out. The cutting away of the sand face in the drag half of the mold to bring it to the proper parting line. For any depression thus made, there is a corresponding projection of sand from the face of the cope. *Crispin*.

coping saw operator. *See* coper, machine *D.O.T. 1*.

coping tile. Special tile used for the top course of a soaking pit. *Bureau of Mines Staff*.

coplaning. a. The process of moving the head of a theodolite laterally until its vertical axis lies in the produced vertical plane common to two plumblines. Also called alinement. *B.S. 3618, 1963, sec. 1*. b. Slang for coplaning is "jiggling in". *Bureau of Mines Staff*.

coppaelite. A porphyritic volcanic rock composed of phenocrysts of augite in a holocrystalline groundmass of pyroxene, melilite, phlogopite, minor perovskite, and minor apatite; from Coppaeli di Sotto, Umbria, Italy. *Holmes, 1928*.

coppel. The same as cupel. *Standard, 1964*.

copper. A reddish metallic element in group I of the periodic system. Symbol, Cu; valences, 1 and 2; atomic number, 29; atomic weight, 63.54; specific electrical resistivity, 1.682 microhms per cubic centimeter (at 20° C). Copper and native copper crystallize in the isometric system. Native copper frequently occurs in dendritic clusters or in sheets or in plates filling narrow cracks or fissures. Malleable; ductile; high electrical and thermal conductivity; good resistance to corrosion; specific gravity, 8.96 (at 20° C); melting point, 1,083° C; boiling point, 2,595° C; insoluble in water; soluble in nitric acid and in hot sulfuric acid; and very slightly soluble in hydrochloric acid and in ammonium hydroxide. It has many uses, notably as an electrical conductor and it is the basis of brass, bronze, aluminum-bronze, and other alloys. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–107.* Found sometimes native and also in the following minerals: azurite, atacamite, azurmalachite, bornite, brochantite, chalcanthite, chalcocite, chalcopyrite (copper pyrites), chrysocolla, covellite, cuprite, enargite, malachite, stromeyerite, tennantite, tenorite, tetrahedrite. Leading producers are United States, Chile, Peru, Canada, Africa, and the U.S.S.R. *CCD 6d, 1961.*

copper acetoarsenite; cupric acetoarsenite; copper acetate metaarsenate; Paris green. An emerald-green powder; $(CuO)_3As_2O_3.Cu(C_2H_3O_2)_2$; soluble in acids; and insoluble in water and in alcohol. *CCD 6d, 1961.* Molecular weight, 1,013.77. Used in pigments. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-171.*

copper amalgam. *See* amalgam. *Hess.*

copper arsenite; cupric arsenite; copper orthoarsenite; Scheele's green. $CuHAsO_3$ (?); molecular weight, 187.47; yellowish-green powder; insoluble in water; and poisonous. Used as a pigment. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-171.*

copperas. Hydrated iron sulfate; $FeSO_4.7H_2O$; color, green; Mohs' hardness 2; specific gravity 1.9. Copper sulfate (blue); ferrous sulfate (green to yellow), and zinc sulfate are sometimes incorrectly called copperas. *Pryor, 3.*

copperasine. A sulfate of iron and copper resulting from the docomposition of copper pyrites. *Standard, 1964.*

copperas stone. Synonym for pyrite, from which copperas is often made. *Fay.*

copperas, white. *See* goslarite. *C.M.D.*

copper barilla. Bol. Native copper in granular form mixed with sand. *See also* corocoro; barilla. *Fay.*

copper bath. A solution of copper salt, as the sulfate, used in electroplating. *Standard, 1964.*

copper-bearing steel. A steel which is highly resistant to corrosion. It contains up to 0.6 percent copper. *Nelson.*

copper bit. A soldering iron. *Hess.*

copper bottoms. A metallic product of very indefinite composition, made (usually) in reverberatory furnaces by smelting rich cupriferous substances without sufficient sulfur to quite satisfy the copper present. *Fay.*

copper brazing. Brazing with copper as the filler metal. *ASM Gloss.*

copper calcine. Copper-bearing sulfide ore which has been crushed, ground, and mechanically concentrated with or without a part separation of pyrite from the copper sulfides by flotation. The concentrates are then roasted. *Hess.*

copper carbonate; basic copper carbonate; azurite; blue carbonate of copper; azure copper; chessylite. $2CuCO_3.Cu(OH)_2$; molecular weight, 344.65; blue; monoclinic; specific gravity, 3.88; Mohs' hardness, 3.5 to 4; and insoluble in water. Used as a source of copper; a pigment; and in jewelry. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–171.* Also added to glazes where, instead of getting the blues and greens of copper oxide, it is desirable to get the lavenders, reds, and purples obtainable under reducing conditions. *Lee.*

copper cement. *See* amalgam. *Hess.*

copper chalcanthite. Synonym for chalcanthite, $CuSO_4.5H_2O$, which with siderotil, $FeSO_4.5H_2O$, and cobalt chalcanthite = bierberite, $CoSO_4.5H_2O$, is classed as subspecies under a species, chalcanthite. *Spencer 18, M.M., 1949.*

copper chloride; cupric chloride. A brown or yellow powder; $CuCl_2$; hygroscopic; and specific gravity, 3.054. Used in refining copper, gold, and silver; in recovering mercury from its ores by the wet process; and in electroplating copper on aluminum. *CCD 6d, 1961.*

copper chloride dihydrate; cupric chloride dihydrate. Green; deliquescent; orthorhombic; $CuCl_2.2H_2O$; and specific gravity, 2.39. Used in refining copper, gold, and silver; in recovering mercury from its ores by the wet process; and in electroplating copper on aluminum. *CCD 6d, 1961.*

copper compress operator. A laborer who compresses copper scrap into bales for use in charging refining furnaces, by operating a hydraulic ram. *D.O.T. 1.*

copper concentrate. The product of any one of a number of forms of concentration processes. *Ricketts, I.*

copper dipper. A metal dipper used in the sampling of pickling solutions. *ACSB, 3.*

copper direct-firing process. An ingenious metallurgical process developed by the U.S. Bureau of Mines for recovering copper from low-grade complex ores. Lean ores—usually 95 percent or more quartzite, limestone, sandstone, or limonite rock—are crushed and mixed with a small quantity of salt and coke. When the mixture is heid at the reaction temperature of 830° C for half an hour, the oxides or sulfides reduce to metal that migrates or segregates in the form of thin films or flakes. These are later recovered by conventional flotation procedures. *Bureau of Mines Staff.*

copper emerald. Dioptase. *Shipley.*

copper enamel. An enamel designed for application to prepared copper surfaces. *Enam. Dict.*

copper flower. Any one of several indicator plants that serve as guides when prospecting for copper ores. *See also* Ocimum homblei; Acrocephalus robertii; Gypsophila patrini; California poppy. *Hawkes, 2, p. 312.*

copper fluoride dihydrate; cupric fluoride dihydrate. Blue; monoclinic; $CuF_2.2H_2O$; slightly soluble in water; and soluble in acids. Used in ceramics and enamels. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-172.*

copper fulminate. $Cu(ONC)_2$; molecular weight, 147.61. Used as a detonator in coal mines. *Bennett 2d, 1962.*

copper glance. *See* chalcocite. *Fay.*

copperheads. Copper-colored spots, generally in first coat on iron, and not easily covered with second coat. Copperheads are spots of excessive oxidation with red iron oxide producing the color. *Bryant.*

copper ingots. Notched bars of commercial copper used for casting purposes. The notches are left for convenience in breaking up the bars. *Mersereau, 4th, p. 505.*

copperization. Impregnation with copper, or with some compound containing copper. *Fay.*

copper lapis. Azurite. *Shipley.*

copper lead. An alloy bearing metal; more effective than babbitt in withstanding high load pressures and high temperatures. *Crispin.*

copperlight. A glass window pane, ¼ inch thick and up to 16 square inch size, fitted in a special copper frame and used as a fire stop. *Dodd.*

copper loss. Electrical energy wasted as heat in a copper conductor. *Webster 3d.*

copper malachite. Chrysocolla. *Shipley.*

copper metaborate; copper borate; cupric borate. Bluish-green; crystalline; $Cu(BO_2)_2$; specific gravity, 3.859; soluble in water and in acids. Used in pigments and in painting on porcelain. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-171.*

copper mica. A miner's name for chalcophyllite. *Weed, 1918.*

copper minerals. Those of the oxidized zone of copper deposits (zone of oxidized enrichment) include azurite, chrysocolla, copper metal, cuprite, and malachite. Those of the underlying zone (that of secondary sulfide enrichment) include bornite, chalcocite, chalcopyrite, covellite. The zone of primary sulfides (relatively low in grade) includes the unaltered minerals bornite and chalcopyrite. Striking advances in percolation-leaching techniques now make it practicable to extract copper from extremely low-grade deposits more-or-less in situ, values of less than 1 pound per ton being reported as economic in some of the disseminated ores (the so-called porphyrys. *Pryor, 3.*

copper monoxide. *See* copper oxide. *CCD 6d, 1961.*

copper, native. Like those of gold and silver, crystals of copper are of the cubic system, but well-shaped cubes are quite exceptional, and even complex crystals are rare. The metal usually has the form of thin plates filling narrow crevices in igneous rocks, slate, or sandstone; these are often dendritic. Mossy aggregates are also common, particularly in the upper parts of veins of copper ore. Native copper is usually dull and tarnished. It is seldom in sufficient quantity to be worked. *C.M.D.*

copper nickel. *See* niccolite. *Fay.*

copper nitride. Dark green powder; Cu_3N; molecular weight, 204.63; specific gravity, 5.84 (at 25° C, referred to water at 4° C); decomposes at 300° C; decomposes in cold water and in acids. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-173.*

copper oleate; cupric oleate. A brown powder or greenish-blue mass; $Cu(C_{18}H_{33}O_2)_2$; soluble in ether; and insoluble in water. Used as an ore-flotation agent. *CCD 6d, 1961.*

copper ore. Rock carrying copper mineral or minerals. *Weed, 1922. See also* chalcopyrite, atacamite; azurite; torbernite, linarite; malachite; tetrahedrite.

copper-ore germ. A mixture of various copper minerals, such as green malachite, green or blue chrysocolla, blue azurite, and red cuprite. *Schaller.*

copper ore, plush. *See* cuprite.

copper ore, ruby. *See* cuprite.

copper oxide; cupric oxide; copper monoxide; tenorite; melaconite; black copper oxide; paramelaconite. CuO; molecular weight, 79.54; black; monoclinic; specific gravity, 6.40; and insoluble in water. *Bennett 2d,* *1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–173.* Soluble in acids and melting point, 1,326° C. Used for producing green or blue colors on glass, faience, porcelain, and stoneware; as a source of copper; in electroplating; and as a solvent for chromic iron ores. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-173.*

copper oxide, red; cuprous oxide; cuprite. Reddish-brown; isometric; Cu_2O; loses oxygen at 1,800° C; soluble in acids; insoluble in water; and specific gravity, 5.75 to 6.09. Used in ceramics; porcelain red glaze; red glass; in electroplating; and as a source of copper. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-173.*

copper phosphate. Libethenite. *Weed, 1918.*

copper picker. In metal mining, one who picks out copper, which occurs in a native state, from the lower grade ore. *D.O.T. 1.*

copper pipe. Size rated by either inside or outside diameters; thickness of wall is measured by Stub's wire gage. Much used in plumbing and in the industries. *Crispin.*

copper pitch. A jet black to brownish pitchlike material carrying from 12.12 to 84.22 percent CuO and found in the oxidized zone. It has a conchoidal fracture, and where it occurs in large enough pieces may resemble obsidian or anthracite coal. It apparently may be a mixture of the hydrous oxides of copper and iron, oxide and carbonate of copper, oxide and silicate of copper, or more or less hydrated oxides of copper and manganese. All the varieties may have more or less chalcedony mixed with them. *Hess.*

copper pitch ore. A jet-black to brown mixture of several hydrous oxides (of copper, iron, and manganese), often with silicates and carbonates, in a more or less colloidal state. The mixture imbraces chiefly the minerals tenorite, chrysocolla, limonite, malachite and a manganese oxide. Amorphous. *English.*

copper plates. Aust.; Pac. Sheets laid down in front of a stamp mill cleaned and amalgamated with quicksilver, so that when the crushed ore and water flow over them, the gold is arrested and amalgamated. *von Bernewitz.*

copper powder. A bronzing powder made by saturating nitrous acid with copper, and precipitating the latter by the addition of iron. The precipitate is then thoroughly washed. *Fay.*

copper precipitate. More or less impure copper which has been precipitated from copper-bearing solutions; it may contain iron and arsenic; cement copper. *Camm.*

copper-precipitation drum operator. In ore dressing, smelting, and refining, one who precipitates copper from mine water by tumbling mine water and shredded tin cans in a revolving drum. *D.O.T. Supp.*

copper pyrite. Chalcopyrite. *Pryor, 3.*

copper rain. Minute globules thrown up from the surface of molten copper, when it contains but little suboxide. *Fay.*

copper ruby glass. *See* ruby glass. *Dodd.*

copper segregation process. This process was discovered in 1923 during experimental work in which oxide copper ores were being treated with coal to reduce the copper to the metallic state before leaching with an ammoniacal ammonium carbonate solution. The process involves heating the oxidized ore with a reducing agent and a halide salt at about 700 degrees C to produce metallic copper, which may then be recovered by ammonia leaching or by flotation with conventional copper sulfide collectors. *R.I. 5501, 1959, p. 3.*

copper slate. Slate impregnated with copper minerals. *Fay.*

coppersmiths' copper. Hot-rolled copper sheet in soft temper and relatively heavy thickness. *Bennett 2d, 1962.*

copper smoke. The gases from the calcination of copper sulfide ore. *Fay.* The gases contain sulfur dioxide, SO_2. *Hess.*

copper suboxide. Cuprous oxide in chemistry; cuprite in mineralogy. *Weed, 1918.*

copper sulfate. *See* chalcanthite. *Fay.*

copper sulfate pentahydrate; cupric sulfate pentahydrate; blue vitriol; blue copperas; chalcanthite. a. $CuSO_4.5H_2O$; blue; triclinic; loses $5H_2O$ at 150° C; white when dehydrated; slowly effloresces in air; soluble in water and slowly soluble in glycerol; and specific gravity, 2.284. Used in ore flotation and as a source of copper. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–173.* Sometimes used in the production of copper-ruby glass. *Lee.* b. Blue, poisonous crystals obtained by the action of dilute sulfuric acid on copper oxide in large quantities, with evaporation and crystallization. *Crispin.*

copper sulfide; cupric sulfide; covellite; indigo copper. a. CuS; molecular weight, 95.60; black: hexagonal or monoclinic; specific gravity, 4.6; and Mohs' hardness, 1.5 to 2. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–173.* b. A source of copper. *Bureau of Mines Staff.*

copper titanate. $CuTiO_3$. Sometimes added in quantities up to 2 percent to $BaTiO_3$ to increase the fired density. *Dodd.*

copper uranite. *See* uranite; torbenite. *Fay.*

copper vitriol. *See* chalcanthite. *Fay.*

copper xanthate; copper ethylxanthogenate. $Cu(C_3H_5OS_2)_2$; molecular weight, 305.94; yellow precipitate; insoluble in water and in carbon disulfide; slightly soluble in ethyl alcohol; and soluble in ammonium hydroxide. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-174.*

coppite. a. A niobium-containing mineral used as raw material in the production of ferroniobium. *Osborne.* b. A variety of tetrahedrite. *Hey 2d, 1955.*

copraloy. A special alloy steel containing copper as one of its elements. *Mersereau, 4th, p. 469.*

coprecipitation. a. The process of precipitating together. *Webster 3d.* b. The carrying down by a precipitate of substances that are normally soluble under the conditions of precipitation. *A.G.I.*

coprolite. a. The fossilized excrement of fishes, reptiles, and mammals. Coprolites are composed largely of calcium phosphate. *Holmes, 1928.* b. The fossilized undigestible residue that has been eaten and passed through the alimentary canal of some animal. *A.G.I.* c. Petrified excrement. *A.G.I.* d. Synonym for fecal pellet; castings. *A.G.I.* e. Workmen's name, adopted from geologists, for phosphatic nodules worked for fertilizer. *Arkell.*

copropel. Dark-brown or gray coprogenic ooze, containing chitinous exoskeletons of benthonic arthropods in addition to reworked organic matter. *A.G.I.*

copt. Eng. Irregular smooth surface of a vein side, with rounded knobs, Yorkshire lead mines. *Arkell.*

coquille. Derived from the French word meaning shell, a thin glass with a radius of curvature of 3½ inches used in the production of sun glasses. *See also* micoquille. *Dodd.*

coquimbite. A granular, massive, hydrated sulfate of ferric iron, $Fe_2(SO_4)_3.9H_2O$. Color pale violet to deep amethystine; also yellowish to green. *Dana, 7, v. 2, pp. 532–533.*

coquina. a. Soft porous limestone composed of broken shells, corals, and other organic debris. *A.G.I. Supp.* b. A porous, friable variety of limestone made up chiefly of fragments of shells and of coral cemented together as rock. *Fay.* c. A detrital limestone consisting wholly, or nearly so, of sorted debris of shell and/or coral of extinct or living species. It is more or less cemented coarse shell debris. *Pettijohn, 2d, 1957, pp. 401-402.*

coquinoid. a. As a noun, an autochthonous deposit of limestone consisting mainly of more or less entire shells in situ. *Pettijohn, 2d, 1957, p. 402.* b. A lithified coquina. *A.G.I.* c. As an adjective, referring to coquina, which is a deposit of shells or shell fragments. *A.G.I.*

coquinoid limestone. Limestone consisting of, and built mainly by, sedentary organisms (for example, shell beds, crinoid beds, etc.) and not swelling into moundlike or lenslike forms. Synonym for biostromal limestone. The bedded character distinguishes it from the moundlike or lenslike bioherm. *See also* biostrome. *Compare* bioherm. The fossils in coquinoid limestones are predominantly unbroken. *A.G.I.*

coracite. a. An alteration product of uraninite partly changed to gummite. *Standard, 1964.* b. Synonym for uraninite. *Crosby, p. 53.*

coral. a. A bottom-dwelling marine coelenterate, either solitary or, more commonly, growing in large colonies of countless individuals. *Bureau of Mines Staff.* b. The solid secretion and external skeleton of coral polyps that is composed of calcium carbonate, as calcite or aragonite. The polyps have formed large fringing and offshore coral reefs, such as the Great Barrier Reef of Australia, for example, and structureless, resistant masses of limestone. Corals have been important rock builders during all geologic times since the early Ordovician period. *Bureau of Mines Staff.* c. The calcareous skeleton of a coral or of a group of corals. *A.G.I. Supp.*

coral agate. Any agate resembling fossilized coral. More specifically, agatized or silicified coral, in which white coral skeletons appear against flesh-red background. A variety of beekite. *Shipley.*

coral cap. A thick section of reef coral overlying materials of noncoral origin. *A.G.I.*

coral, colonial. A coral in which the individuals are attached together as a unit, and do not exist as separate animals. *A.G.I.*

coral, compound. The skeleton of a colonial coral. *A.G.I.*

coral formation. A formation, generally developed on cave walls, nodular in form with a rough or granular surface resembling coral. Synonym for cave coral. *A.G.I.*

coralgal. Refers to carbonate sediment derived from corals and algae. *A.G.I. Supp.*

coral head. A massive mushroom or pillar-shaped coral growth. *Hy.*

Corallian. Synonym for Lusitanian. *A.G.I. Supp.*

coral limestone. a. A limestone composed of coral fragments. *Fay.* b. A rock consisting of the calcareous skeletons of corals often cemented by calcium carbonate. Synonym for coralline limestone. *Webster 3d.*

coralline. a. Pertaining to, composed of, or having the form of corals; as, coralline limestone. *Fay.* b. Like coral in color or in form. Composed of coral. *Webster 3d.*

coralline limestone. Synonym for coral limestone. *Webster 3d.*

coralloid; coralloidal. a. Having the form or the appearance of coral. Branching like coral. *Webster 3d.* b. Like coral, or consisting of interlaced flexuous branchings. *Fay.*

coral mud and sand. Marine deposits formed around coral islands and coasts bordered by coral reefs, containing abundant fragments of corals. Near the reefs the particle sizes are relatively coarse and the deposit is described as coral sand; farther out, the particles become gradually smaller until the material is a coral mud. *Holmes, 1928.*

coral ore. A curved, lamellar variety of liver-colored cinnabar from Idria, Austria. *Standard, 1964.*

Coralox. Trade name for fused aluminum oxide. *Bureau of Mines Staff.*

coral rag. Eng. The upper member of the Middle Oölite (Jurassic), so called because it consists, in part, of continuous beds of corals, for the most part retaining the position in which they grew and sometimes forming masses 15 feet thick. *Fay.*

coral red. A ceramic color. One form of coral red consists of basic lead chromate; this compound is unstable and the decorating fire must be at a low temperature. *Dodd.*

coral reef. a. A structure formed by reef-building coral polyps, which precipitate calcium carbonate from the sea water to form their internal skeletons. *A.G.I.* b. A mass of coral detritus which attains, or nearly attains, the surface of the sea. *A.G.I.* c. A ridge or mound of coral limestone, the top of which lies or, at the time of its formation, lay near the surface of the ocean. It is composed primarily of calcium carbonate secreted by marine organisms, the most important of which are corals. *A.G.I.* d. A complex of skeletal and shell growths and accumulations. The framework is coral in place but a large part of the reef may be the calcium-carbonate debris of marine species other than coral. Less than one-half of a reef may be composed of coral. The existence and the growth of the reef depend on the successful growth of corals constantly resisting wave erosion. *A.G.I.*

coral-reef coast. A coast having deposits of coral and algae origin fringing the shore and partly exposed at low tide. *Shepard, p. 76.*

coral-reef lagoon. A shallow body of water forming the center of an atoll or separating a barrier reef from the shore. *A.G.I.*

coral-reef shoreline. A shoreline formed by coral polyps building reefs upward from a submarine floor or outward from the margins of any land area. Whatever the influence which past subsidence of the sea bottom or elevation of the water surface may have exerted upon the particular forms assumed by coral reefs, does not affect the fact that the present shorelines of the reefs owe their existence to agencies which operate independently of such changes of level. *A.G.I.*

coral rock. Reef limestone differs from most fragmental and organic rock deposits because it is largely built up in a solid coherent form from the outset, and therefore, constitutes a rock mass without any cementation process. *A.G.I.*

coral sand. Sand-size particles formed from coral fragments. *Hess. See also* coral mud.

coral zone. The depth of the sea at which corals thrive. *Fay.*

corbel. A supporting projection of the face of a wall; an arrangement of brick in a wall in which each course projects beyond the one immediately below it to form a support, shelf, or baffle. *HW.*

corbel out. To lay one or more courses of brick, each projecting beyond the one below it to form a support. *A.R.I.*

corbond. An irregular mass or "dropper" from a lode. *Fay.*

cord. a. Any of various units of quantity for wood cut for fuel or pulp; especially, a unit equal to a stack 4 by 4 by 8 foot or 128 cubic feet. *Webster 3d.* b. An attenuated glassy inclusion possessing optical and other properties differing from those of the surrounding glass. *ASTM C162-66.*

Cordaites. A plant group, which is now extinct, includes the Coniferales (pines and firs) and the Cycadales (cycads). The Cordaites were tall, slender trees which often attained heights of 100 feet. For a considerable height above the ground, the trunk was devoid of branches. The long, straplike leaves now form matted masses among the Coal Measure fossil plants. *Nelson.*

cord-belt conveyor. A rubber belt consisting of spaced cotton duck cords embedded in the rubber and protected at the top by a breaker strip with thick rubber cover. The bottom of the belt contains one or two plies of heavy duct, to give transverse strength. *See also* nylon belt. *Nelson.*

cord conveyor belt. A rubber conveyor belt in which the carcass is composed of a single ply, or multiple plies of cotton or synthetic cords acting as longitudinal tension-carrying members in combination with plies of fabric to provide transverse strength and to hold the cords together. *ASA MH-4.1-1958.*

Coreau detonnant. Cordtex. Detonating fuse used in blasting. *Pryor, 3.*

corded pahoehoe. A type of pahoehoe, the surface of which is marked by a series of small cordlike ridges, commonly alined parallel to the direction of flow. The cords are usually an inch or less in diameter and may be superimposed on still larger ropelike convolutions of the crust. The term ropy lava is essentially synonymous. *USGS Bull. 994, 1953, p. 35.*

corder. Eng. The man who makes and repairs corves (small cars). *Fay.*

codierite. A silicate of magnesium and aluminum, $Mg_2Al_3(AlSi_5O_{18})$, found as an accessory mineral in granite, gneiss (cordierite gneiss), schists, and in contact metamorphic zones. Orthorhombic; color is different shades of blue; Mohs' hardness, 7 to 7½; transparent to translucent; luster, vitreous; specific gravity, 2.60 to 2.66. In the United States it is found chiefly in Connecticut and New Hampshire. Also found in Finland, Greenland, Malagasy Republic, and Bavaria. Sometimes used as a gem. Also called iolite; dichroite; water sapphire. *Dana 17, p. 426.*

cordierite-anthophyllite rock. A pneumatolytic metamorphic rock consisting essentially of anthophyllite (as radiating aggregates or irregularly distributed prisms) and cordierite. Biotite, garnet, quartz, plagioclase and magnetite may be present in varying amounts, and by increasing the quantity of plagioclase, the rock becomes plagioclase gneiss. *Holmes, 1928.*

cordierite ceramic. Any ceramic whiteware in which cordierite, $(2MgO.2Al_2O_3.5SiO_2)$, is the essential crystalline phase. *ACSB-4.*

cordierite norite. Metamorphosed norite containing cordierite. Muscovadite is a related rock containing a notable quantity of biotite. *Holmes, 1928.*

cordierite porcelain. A vitreous ceramic whiteware for technical application in which cordierite, $(2MgO.2AlO_2O_3.5SiO_2)$, is the essential crystalline phase. *ASTM C242-60.*

cordierite whiteware. Any ceramic whiteware in which cordierite, $(2MgO.2Al_2O_3.5SiO_2)$, is the essential crystalline phase. *ASTM C242-60.*

cordillera. Sp. A continuous chain or range of mountains. Generally, a whole mountain province, including all the subordinate mountain ranges and groups and the interior plateaus and basins. Specifically, when it is capitalized as a proper name, the great mountainous region of western North America, lying between the Great Plains and the Pacific Ocean, and extending from central Mexico into Alaska; the Cordilleran province. *Fay.* b. A group of mountain ranges forming a mountain system of great linear extent, often consisting of a number of more or less parallel chains. For example, the North American cordillera includes all the mountains from the eastern face of the Rocky mountains to the Pacific Ocean. *Webster 3d.* c. A group of mountain ranges including the valleys, plains, rivers, lakes, etc. The component ranges may have various trends but the cordillera will have one general direction. A mountain range, or a mountain system, and, in some instances, the main mountain axis of a continent. *A.G.I.*

Cordirie process. The refining of lead by conducting steam through it, while molten, to oxidize certain metallic impurities. *Fay.*

cordite. An explosive compound consisting of cellulose nitrate and a restrainer, such as vaseline, used chiefly as a propellant. *Standard, 1964.*

cord of ore. About 7 tons, but measured by wagonloads, and not by weight. The expression "cord" is a term used in some parts of Colorado and applied only to low-grade ore; the smelting ore is reckoned by the ton. *Fay.*

Cordtex. A detonating fuse suitable for opencast and quarry mining. It consists of an explosive core of pentaerythritol tetranitrate (PETN) contained within plastic covering. It has an average velocity of detonation of 6,500 meters per second (21,350 feet). This is practically instantaneous. Cordtex detonating fuse is initiated by electric or a No. 6 plain detonator attached to its side with an adhesive tape. *Nelson.*

Cordtex relay. A new device to achieve short-interval delay firing with Cordtex. A relay is an aluminum tube with a delay device, and is inserted in a line of Cordtex where required. The relays are made with two delays, 15 and 20 milliseconds respectively. *Nelson.*

corduroy. a. A ribbed and napped textile material used for recovering coarse gold or other heavy metal or mineral from a stream detonation through the entire explosives column. Gelatin cored ammonia dynamites also are very useful when an operator wishes to practice alternate velocity loading to attain a more effective one-two punch in conjunction with the use of short period or millisecond delay, electric blasting caps. *Pit and Quarry, 53rd, Sec. A, p. 79.*

cored bar. In powder metallurgy, a compact of bar shape, the interior of which has been melted by passage of electricity. *ASM Gloss.*

cored bomb. A volcanic bomb consisting of a xenolithic nucleus coated with an outer shell of congealed lava. The nucleus may consist of an accidental fragment of basement rock, an accessory fragment picked up from the walls of a conduit, or an essential fragment produced during an eruption. *USGS Bull. 994, 1953, p. 83.*

cored brick. A brick that is at least 75 percent solid in any plane parallel to the bearing surface. *ACSG, 1963.*

cored hole. a. A borehole put down by a core drill. *Nelson.* b. A cast hole cored with a dry-sand core instead of delivering as a hole directly from the pattern. In general, the term is applied to any hole in a casting which is not bored or drilled in the shop. *Crispin.*

core dressing. Solution, such as ethyl silicate, used to form clear skin at surface of core. *Pryor, 3.*

core drill. a. A mechanism designed to rotate and cause an annular-shaped rock-cutting bit to penetrate rock formations, produce cylindrical cores of the formations penetrated, and lift such cores to the surface, where they may be collected and examined. *See also* adamantine drill; calyx drill; diamond drill; rotary drill; shot drill. *Long.* b. The act or process of producing a cylindrical core of rock, using a core-drilling machine and equipment. *Long.* c. A drilling machine equipped with a hollow bit (core bit) and a core barrel which by rotation cuts out and recovers a rock core sample. *A.G.I. Supp.* d. A drill that removes a cylindrical core from the drill hole. *Compare* diamond drill; short drill. *Webster 3d.*

core driller. *See* diamond driller. *D.O.T. 1.*

core-drill fittings. All pieces of equipment used in drilling a borehole for the purpose of collecting cores of the rock formation penetrated, such as bits, core barrels, drill rods, casing, drivepipe, other related or accessory tools, and equipment. *Long.*

core drilling. a. Process of obtaining cylindrical rock samples by means of annular-shaped rock-cutting bits rotated by a borehole-drilling machine. *Long.* b. The process of obtaining natural or undisturbed samples of soil or rock by drilling. Three general types of drills are in use for deep holes, the calyx shot drills, diamond drills, and rotary drills. *Stokes and Varnes, 1955.* b. Drilling with a hollow bit and a core barrel in order to obtain a rock core. *A.G.I.*

core-drill operator. *See* diamond driller. *D.O.T. 1.*

core-drill sampling. The act or process of obtaining cylindrical samples of rock in the form of a core. *Long.*

core-dryer. A form in foundry work which serves to retain the shape of a core while it is being baked. *Crispin.*

cored solid solution. *See* coring. *C.T.D.*

core equipment. Bits, core barrel, and other bottom-hole and drill-string equipment used when core samples are being recovered from rock formations through which a borehole is drilled. *Long.*

core exposure. Length of core that is subjected to washing action of circulation medium when exposed between the bit face and lower end of the inner tube of a core barrel or core-barrel extension. *Long.*

core extractor. a. A special tool that works like screw or hydraulic jack, used to push core out of a core barrel. Also called core plunger; core pusher. *Long.* b. A fishing tool designed to recover core dropped from a core barrel and resting on the bottom of a borehole. Also called basket; core basket; core fisher; core grabber; core picker. *Long.*

core fisher. Synonym for core picker. *Long.*

core grabber. a. A term used by drillers for the engineer, geologist, or fieldman who supervises the drilling and the collection of core and sludge; keeps records of progress, extras, time, etc.; and does preliminary logging of core, core splitting, preparation and shipment of samples and all other supervisory work within his experience and capacity on a diamond-drilling job. Also called core snatch; sample grabber. *Long.* b. Synonym for core picker. *Long.*

core gripper. Synonym for core lifter. *Long.*

core-gripper case. Synonym for lifter case. *Long.*

core grouting. Material used in and/or the act or process of injecting small fragments of rock or coarse sand into a core barrel to wedge the core inside the barrel when no core lifter is used, as when using straight-wall bits or drilling with a shot drill. *Long.*

core head. Obsolete synonym for core bit. *Long.*

core hole. A boring by a diamond drill or another machine that is made for the purpose of obtaining core samples. *A.G.I. Supp.*

core hole driller. In petroleum production, one who drills shallow boreholes and extracts core samples of earth formations, using a coring bit and barrel, to determine stratigraphy and locate petroleum deposits. *D.O.T. 1.*

core house. Synonym for core shack. *Long.*

core intersection. The point in a borehole where an ore vein or body is encountered, as shown by the core; also, the width or thickness of the ore body, as shown by the core. Also called core interval. *Long.*

core interval. Synonym for core intersection. *Long.*

core iron. In founding, a strengthening iron grate in a core. *Webster 2d.*

core jam. Synonym for core block. *Long.*

core library. A structure in which boxed cores from numerous recorded localities are stored and kept available for inspection and study. *Compare* core house; core shack; core shanty. *Long.*

core lifter; core spring. A spring clip at the base of the core barrel which grips the core, enabling it to be broken off and brought out of the hole. *Also called* core catcher; core clip; core grabber; core gripper; core spring; ring lifter; spring lifter; split-ring lifter. *See also* core cutter. *B.S. 3618, 1963, Sec. 3.*

core-lifter adapter. A device used in Canada between a straight-wall bit and core barrel in which a core spring may be placed. Usually used only to recover core when dry blocking is inadvisable. *Long.*

core-lifter case. Synonym for lifter case. *Long.*

core-lifter wedges. The tapered sliding wedges that grip and hold the core inside a wedge core lifter. *Long.*

core loss. The portion of rock cored but not recovered. *Compare* core recovery. *Long.*

core machine. In foundry work, a hand- or power-driven machine having a hopper with a horizontal worm at the bottom. Used for making round and square cores. *Crispin.*

core of the earth. a. The dense central part of the earth, below a depth of about 1,800 miles (2,900 kilometers). Synonym for centrosphere. *Schieferdecker.* b. The earth is believed to consist of the following: inner core, solid, 860 mile radius; outer core, liquid, 1,300 miles thick; mantle, solid, 1,800 miles thick; and crust, solid, 622 miles thick. *H&G.*

core oils. Those oils used as binders in making sand cores in foundry work. Linseed oil or linseed oil mixed with less expensive vegetable oil is frequently used. *Crispin.*

core orientation. The act or process of using information obtained from magnetic polarity or other measurements of a piece of core in an attempt to determine the downhole bearing of the structural features of the rock formation as displayed in the core. *Long.*

core oven. The oven in which foundry cores are baked. *Crispin.*

core petroleum. Petroleum plus core gas in core as brought to surface in drilling wells. *Bennett 2d, 1962 Add.*

core picker. a. A core-fishing device consisting of a tube fitted internally at its lower end with flat, flexible spring fingers that permit core to enter the tube but close when the device is hoisted from the borehole, preventing its escape. Also called basket; core basket; core extractor; core fisher; core grabber. *Long.* b. Synonym for core lifter. *Long.*

core plug. A cylinder containing chemically treated sand and used for stemming shotholes in coal mines. *Nelson.*

core plunger. a. The flat pistonlike head on the end of a bar or rod of a core-extractor device. *Long.* b. Synonym for core extractor. *Long.*

core print. A projection on a pattern which forms an impression in the sand and locates and holds the core in position while the mold is being poured. *Crispin.*

core pusher. a. A plunger used for extracting a core from the core barrel. *Bureau of Mines Staff.* b. Synonym for core extractor. *See also* core extractor, a. *Long.*

core rack. a. A framework built to support several tiers of core boxes. *Long.* b. Grooved or partitioned tray, supported on legs or sawhorses, on which core is placed when removed from a core barrel for inspection or temporary storage before being placed in boxes. *Long.*

core recovery. The proportion of the drilled rock column recovered as core in core drilling. *A.G.I. Supp.* The amount withdrawn generally is expressed as a percentage of the theoretical total obtainable or in general terms, as excellent, good, fair, or poor. *Compare* core loss. *Long.*

core rod. In powder metallurgy, the part of a die used to produce a hole in a compact. *ASM Gloss.*

core run. Technically, the distance cored per round trip, which is expressed in number of feet or in relative terms, as short or long. Core blocks may occur before the core barrel is filled; the barrel then is short of being full, resulting in a short core run. Loosely, the amount of core recovered per round trip. *Long.*

core sample. One or several pieces of whole or split parts of core selected as a sample for analysis or assay. *Long.*

core sampler. A weighted tube for obtaining of sand passing over it. The corduroy blanket is replaced every 4 hours or so for washing to remove the gold. *Nelson*. b. A road made of logs laid crosswise on the ground or on other logs. *Nichols*.

corduroy spar; graphic granite. An intergrowth of potash feldspar (orthoclase or microcline) and quartz. *AIME, pp. 340–341*.

corduroy texture. Bands of coarse-grained qupartz and albite or microcline. *Hess*.

cordwood. Wood cut in 4-foot or shorter lengths to be used as fuel. *Nichols*.

cordylite. A very rare, weakly radioactive, hexagonal mineral, $(Ce,La)_2Ba(CO_3)_3F_2$, found in pegmatitic veins in nepheline-syenite associated with aegirite, ancylite, synchisite, and neptunite; colorless to wax yellow when fresh, but commonly ocher-yellow in the surface because of alteration. *Crosby, pp. 69-70*.

core. a. A cylindrical sample of rock obtained in core drilling. *A.G.I. Supp*. The sample of rock obtained through the use of a hollow drilling bit, which cuts and retains a section of the rock penetrated. *A.G.I*. b. A portion removed from the interior of a mass usually to determine the interior composition or the hidden condition. For example, a core taken from the well drilling for geologic and chemical analysis. *Webster 3d*. c. The central part of the earth below a depth of about 1,800 miles (2,900 kilometers), probably consisting of iron-nickel alloy. It is divisible into an outer core that may be liquid and an inner core, about 800 miles (1,300 kilometers) in radius, that may be solid. *A.G.I. Supp*. d. The central part of the earth having a radius of about 2,100 miles (3,400 kilometers) and displaying notably different physical properties from the surrounding mantle and crust. *Webster 3d*. e. The central part of something, especially, the filling of a hollow object. *A.G.I. Supp*. f. The shield of a continent. *Webster 3d*. g. The plug or neck of a volcano. *Webster 3d*. h. The central part of an anticlinal structure, or of a domal structure, or of mountains having a folded or a completely crumpled structure. *Webster 3d*. i. A hard, unburned central part of a piece of coal or limestone. Also, an unburned or an overburned piece of limestone in hydrated lime. *Webster 3d*. j. A nodule of obsidian, flint, or other stone from which flakes have been struck for making implements. *Webster 3d*. k. As a verb, to take a core from, as a sample of interior composition. For example, to core an oil well; or to core a salt formation. *Webster 3d*. l. A specially formed material inserted in a mold to shape the interior or another part of a casting which cannot be shaped as easily by the pattern. *ASM Gloss*. m. In a ferrous alloy, the inner portion that is softer than the outer portion, or case. *ASM Gloss*. n. A body of green or dry sand placed in the mold to form a corresponding cavity in the casting. *Freeman*. o. The central part of a plaster mold of the type used in solid casting. *Dodd*. p. The central part of a sand mold as used in foundries. *Dodd*. q. A one piece refractory or heat-insulating shape for use at the top of an ingot mold and serving the same purpose as a hot-top; this type of core is also sometimes called a dozzle. *See also* hot-top. *Dodd*. r. One or more members supported within an extrusion die to form holes in extruded brick or tile. *ACSG, 1963*. s. The center of a nuclear reactor containing the fuel elements and usually the moderator, but not the reflector. *L&L*. t. Corn. A miner's underground working time or shift. Also spelled coor. *Fay*. u. The central part of a rope forming a cushion for the strands. In wire ropes, it is sometimes made of wire, but usually it is of hemp, jute, or some like material. See also independent wire rope core; wire strand core. *Zern*. v. A cone or V-shaped mass of rock that is first blasted out in driving a tunnel. *Fay*. w. In several European methods of tunneling, the sidewalls are built first in special drifts, and the arch area is then excavated and the arch built, leaving the central mass to be removed last. This center of rock or earth is called the core. *Stauffer*. x. The central portion of a bit mold that forms the inside diameter of the bit. *Long*. y. A cone or inverted V-shaped stub of rock left in the bottom of a drill hole by a cone noncoring bit. *Compare* standoff. *Long*. z. Short for drill core. *Bureau of Mines Staff*. aa. Device placed in a mold to make a cavity in a casting. *Bureau of Mines Staff*.

core analysis. a. The characteristics of the minerals contained in a specific section of a core sample as determined petrographically, by metallurgical treatments and/or by chemical or cupelling methods. Also called core assay; core values. *Long*. b. As used by the petroleum industry, a study of a core sample to determine its water and oil content, porosity, permeability, etc. *Long*.

core assay. Sometimes used as a synonym for core analysis, but more commonly it infers that the mineral content of a core sample has been determined by fire methods. *Long*.

core balance protection. A system of protection applied to circuits in an alternating-current system having its neutral point earthed and utilizing a core balance transformer to measure the earth leakage current. *See also* earth fault protection. *B.S. 3618, 1965, sec. 7*.

core balance system. See earth fault protection. *Nelson*.

core balance transformer. A form of current transformer, the primary windings of which are connected in each phase (and neutral if any) of a circuit and are wound on a common core. The flux resulting from an out-of-balance current in the primary windings induces a voltage in a secondary winding. *B.S. 3618, 1965, Sec. 7*.

core barrel. a. A hollow cylinder attached to a specially designed bit and which is used to obtain and to preserve a continuous section, or core, of the rocks penetrated in drilling. *A.G.I*. b. A tube inside a drill pipe and which is supported by a bit to receive the core in core boring. *Webster 3d*.

core-barrel bit. Obsolete name for a core bit that could be coupled directly to the bottom end of a core barrel. *Long*.

core-barrel head. The coupling unit between the single- or dual-tube, tubular body of a core barrel and the drill-rod string. For the swivel-type double-tube core barrel, the core-barrel head also contains the bearing mechanism to which the inner of the two body tubes is attached. *Long*.

core-barrel rod. Synonym for guide rod. *Long*.

core basket. Synonym for core picker. *Long*.

core binder. Organic material added to foundry sand to aid in formation of a strong core for casting. Flour, linseed oil, starch and resins are among materials used. *Pryor, 3*.

core bit. A hollow, cylindrical boring bit for cutting a core in rock drilling or in boring unconsolidated earth material. It is the cutting end of a core drill. *Bureau of Mines Staff*.

core-bit tap. A tapered, tap-threaded fishing tool designed to recover a core bit lost in a borehole. *Long*.

core block. An obstruction inside a bit, reaming shell, or core barrel consisting of impacted core fragments or drill cuttings, which prevents entry of core into the core barrel. *Long*.

core blower. A machine for making foundry cores using compressed air to blow and pack the sand into the corebox. *ASM Gloss*.

core boring. As used by soil- and foundation-testing engineers, a synonym for core; core drilling. *Long*.

core borings. As used by soil- and foundation-testing engineers, a synonym for core; cuttings; drill sludge. *Long*.

core box. a. The box in which the core, or mass of sand producing any hollow part of a casting is made. *Fay*. b. A lidded wood, metal, or cardboard container designed to hold core in parallel grooves. *Long*.

core-box plane. A plane for making circular core boxes. When the right-angle sides of the plane rest on the edges of the cut, the point of the plane will cut on the circumference of the circle. *Crispin*.

core breaker. a. Synonym for core lifter. *Long*. b. A sharp-cornered pluglike device inside an annular-shaped bit, which breaks up any core produced into pieces small enough to be washed out of the borehole as cuttings. *Long*.

core catcher. a. Sievelike tray or device on or in which the core is ejected continuously from the upper end of a drill string, and is caught and held when core is recovered by counterflow or reverse-flow continuous core-drilling techniques. *Long*. b. Synonym for core lifter. *Long*. c. A steel spring fitted at the lower end of a soil sampler to keep the sample from dropping out. *Nelson*. d. In deep boring, a ring of steel of wedge form cut into vertical stripes which encircles and rides on the core when drilling, but wedges the core in the core barrel when drilling ceases and the rods are lifted. *Nelson*. e. A valvelike device which permits a sediment sample to enter the core barrel as it is driven into the sea bottom and which closes from the weight of the sample within the tube to prevent loss of sample while coring device is being brought to the surface. *Hy*.

core-catcher case. Synonym for lifter case. *Long*.

core clip. *See* core lifter. *B.S. 3618, 1963, sec. 3*.

core cutter; core lifter. An attachment at the base of the core barrel which grips and breaks the core at the bottom when the rods are extracted. *Nelson*.

cored ammonium nitrate dynamite. The dynamites of this class come in cartridges 4 inches and up in diameter and in weight strengths from 20 to 70 percent. Their water resistance is considered good (the gelatin core being responsible for this), but their fume characteristics are rated as poor. Besides providing increased water-resistance, these explosives tend to exhibit the higher velocities characteristic of gelatin explosives (10,500, 15,000 and 17,000 feet per second), rather than the low and medium velocities characteristic of other straight ammonia dynamite. In addition, the gelatin core assures propagation of stratified samples of seabed deposits. *C.T.D. Supp.*

core sand. Silica sand to which a binding material has been added in order to obtain good cohesion and porosity after drying for the purpose of making cores. *Osborne.*

core saw. A machine capable of rotating at high speed, equipped with a thin metal disk having diamonds inset in its edge. Used somewhat like a bench saw to cut core longitudinally into sections. *Compare* core splitter. *Long.*

core shack. A roofed and enclosed structure in which core-filled boxes are stored. Also called core house; core shanty. *Long.*

core shanty. Synonym for core shack. *Long.*

core shell. a. A special coupling between the diamond bit and the core barrel; it contains a spring that prevents the core from slipping out of the barrel. *Bureau of Mines Staff.* b. Synonym for reaming shell. *Long.*

core sludge. The slurry produced during abrasion by the cutting bit, or through fracture and grinding of part of the sample during this process. *Pryor, 3, p. 109.*

core snatcher. a. A company man who collects and takes care of drill cores when the drilling is being done by contract. *Fay.* b. *See* core grabber, a. *Long.* c. Synonym for core lifter. *Long.*

core splitter. Tool employing a chisel to split core longitudinally in half, rarely in quarter, sections. One-half usually is assayed, and the other half is retained and stored. Term also may be applied to a diamond saw used for the same purpose. *Long.*

core spring. Synonym for core spring. *Long.*

core-spring adapter. Synonym for core-lifter adapter. *Long.*

core-spring case. Synonym for lifter case. *Long.*

core storage. See core library. *Long.*

core table. a. Table on which core in boxes or trays is placed while being examined or logged. *Long.* b. *See* core rack, b. *Long.*

core test. A hole drilled with a core drill, usually for the purpose of securing geologic information and sometimes with the purpose of investigating geologic structure. *See also* strat test. *A.G.I.*

core texture. In this texture, a second mineral occurs on the inside of an area of another mineral. Where the residual rim is at the same time enclosed in a mass of the invading mineral, the term atoll texture is more appropriate. Synonym for atoll texture. *Schieferdecker.*

core tongs. A come-along-type open-end wrench used to grip and handle core as it is being removed from a large diameter or extra-long core barrel suspended in a vertical position above the drill platform. *Long.*

core tray. An open or lidless core box. *See also* core box; core rack, b. *Long.*

core tube. Synonym for inner tube, of a core barrel. *Long.*

core-type spiral chute. A spiral chute having a center core or column about which it is fabricated, with the core serving as the inside guard. *ASA MH4.1-1958.*

core values. Used in a general sense as a synonym for core analysis; core assay. In a strict sense, the term should not be used to designate the mineral content of the core sample unless the valuable mineral is gold, silver, platinum, etc. *Long.*

core velocity. The zone of maximum air velocity in a mine roadway, usually at or near the center of the road. *Nelson.*

core wall. In a battery wall those courses of brick, none of which are directely exposed on either side. *AISI No. 24.*

core wash. a. The portion of the core lost through erosive action of the drill circulation fluid. *Long.* b. The act or process of erosion of core by washing action of the drill circulation fluid. *Long.* c. A mixture used for painting foundry cores. *Crispin.*

Corex glass. One of the glasses that is transparent to ultraviolet light. *Bureau of Mines Staff.*

corf; corfe; corve; cauf. a. Newc. A large basket used in hoisting coal; from the German korb. *Fay.* b. A wooden frame to carry coal. *Fay.* c. A sled or low wagon for the same purpose. When used for bringing up the rock from a sinking shaft the cores are made without wheels, and are more like a basket. In early days corves were wicker baskets, having wooden bows or handles; they held about 4¼ hundredweight of coal. *See also* hutch. a. *Fay.*

corf bater; corf bitter. N. of Eng. A boy who cleans the dirt or mud off corves. *See also* corf, a. *Fay.*

corf bow. Eng. The handle of a corf. *Fay.*

Corindite. Trade name for an artificial product consisting mainly of corundum and used as an abrasive. *English.*

coring. A variable composition between the center and surface of a unit of structure (such as a dendrite, grain, or carbide particle) resulting from nonequilibrium growth which occurs over a range of temperature. *ASM Gloss.*

coring bit. Synonym for core bit. *Long.*

coring devices. Coring devices are essentially steel tubes that are driven into the ocean floor bottom for the purpose of obtaining and investigating a sediment sample or core from a particular topography. Phleger, Kullenberg, Ewing, Moore, Emery-Dietz are some of the coring devices used for this purpose. *H&G.*

coring equipment. *See* core equipment. *Long.*

coring out. Forming of the interior portions of foundry castings with cores. *Crispin.*

coring tool; corer. A tool which is used when a core is required. In drilling, where speed is the aim, cores are not made. When, however, an important bed or horizon is approached, and detailed geological information is required, the coring bit is inserted and core drilling commenced. *Nelson.*

coring up. The placing of the cores in their position in a foundry mold ready for casting. *Crispin.*

coring weight. The amount of feed pressure that should be applied to a core bit to obtain optimum results in the way of core recovery and bit performance while drilling a specific rock. *Long.*

Corinthian process. *See* Carinthian process. *Fay.*

Coriolis force. Named after the French civil engineer and mathematician, G. G. Coriolis. It is the apparent force, corresponding to the Coriolis acceleration of a body, equal to the product of the mass by the Coriolis acceleration. It is caused by the earth's rotation which deflects a moving body on the surface of the earth to the right (clockwise) in the northern hemisphere and to the left (counterclockwise) in the southern hemisphere. As a result of the earth's rotation, it is responsible for the deflection of projectiles to the right, the motion of the winds to the right, and the spinning of water in a vortex to the right in the northern hemisphere, and all these motions to the left in the southern hemisphere. Because the first complete explanation of this apparent force was by American meteorologist, W. Ferrel, it is also called Ferrel's law. *See also* Ferrel's law. *Bureau of Mines Staff; Webster 3d; A.G.I.*

corker. *See* capper. *D.O.T. 1.*

cork fossil. A variety of amphibole or hornblende, resembling cork; the lightest of all minerals. *Fay.*

corkscrew. a. A device resembling a corkscrew, used as a fishing tool. *Compare* Jamaica open-spiral auger. *Long.* b. A borehole following a spiraled course. *Long.* c. A cylindrical surface, such as the outer surface of a piece of spirally grooved core. Also called fluted core. *Long.*

corkscrew core. *See* fluted core. *Long.*

corkscrew flute casts. Flute cast with corkscrew form; with twisted beak. *Pettijohn.*

cork stone. Stone made by mixing ground cork and a mineral substance which also acts as the binder. *Bennetet 2d, 1962.*

corncob. Synonym for taper bit. *Long.*

corncob bit. Obsolete synonym for taper bit. *See also* taper bit. *Long.*

cornean. Eng. An igneous rock, so called from its tough, compact, and hornlike texture. Also known as asphanite. *Fay.*

corneite. A biotite hornfels formed during the folding of a shale. *See also* hornfels. *A.G.I.*

cornelian. A translucent red variety of chalcedony. *C.M.D.* Synonym for carnelian.

Cornelius furnace. A type of glass-melting furnace in which the glass is heated by direct electrical resistance. *Dodd.*

corneous manganese. Synonym for photicite. *Hey 2d, 1955.*

corner. A point on a land boundary at which two or more boundary lines meet. It is not the same as a monument, which is the physical evidence of the location of the corner on the ground. *A.G.I.*

corner angle. On face milling cutters, the angle between an angular cutting edge of a cutter tooth and the axis of the cutter, measured by rotation into an axial plane. *ASM Gloss.*

corner break. The separation of a block of stone from a solid ledge by breaking it simultaneously along two faces meeting at a corner. *Fay.*

corner-fastened tray conveyor. *See* suspended tray conveyor. *ASA MH4.1-1958.*

corner-hung tray conveyor. *See* suspended tray conveyor. *ASA MH4.1-1958.*

corner joint. A joint between two members located approximately at right angles to each other in the form of an L. *ASM Gloss.*

corner racking. Square or triangular strips of pinewood fixed vertically down each corner of a rectangular shaft to secure and stiffen the timber sets. *Nelson.*

corners. In Wales, bands of clay ironstone. *Fay.*

corner wear. The tendency of a grinding wheel to wear on a corner so that it does not grind up to a shoulder without leaving a fillet. *ACSG, i963.*

cornetite. A peacock-blue, basic copper phosphate, $Cu_3(PO_4)_2.3Cu(OH)_2$; orthorhombic minute crystals and crusts. From Katanga, Republic of the Congo; Bwana M'Kubwa, Northern Rhodesia. *English.*

cornice glacier. One of various shapes of glaciers on ledges on the face of a cliff. Also called cliff glacier. *A.G.I.*

corning. Scot. Mealtime. *Fay.*

Corning. Trademark for glass and glassware of various compositions and physical properties, and accessories used therewith. *CCD*

6d, 1961.

Corning table. *See* Bilharz table. *Fay.*

cornish. Term in use among Welsh miners for cannel coal or anthracitized cannel coal. *Tomkeieff, 1954.*

Cornish. a. Of, relating to, or characteristic of Cornwall, England. *Webster, 3d.* b. Of, relating to, or characteristic of Cornishmen. *Webster 3d.*

Cornish boiler. A steam boiler which resembles the Lancashire boiler except that there is only one furnace tube. The diameter of the boiler shell is commonly about 5 to 6 feet. The furnace tube contains cross tubes to increase the evaporative power of the boiler. *Nelson.*

Cornish clay. Same as Cornish stone, a. *CCD 6d, 1961.*

Cornish diamond. Eng. A quartz crystal from Cornwall. *Webster 3d.*

Cornish engine. *See* Cornish pump.

Cornish mining ton. The weight equal to 21 hundredweight of 112 pounds each, or 2,352 pounds (1,066.87 kilograms). *Webster 2d.*

Cornish pump; Cornish engine. A single-acting engine in which the power for pumping operations was transmitted through the action of a cumbersome beam. These pumps began to be introduced early in the 19th century and held the field for practically 100 years. *Nelson.*

Cornish rolls. A geared pair of horizontal cylinders, one fixed in a frame and the other held by strong springs. The distance apart is adjusted by distance pieces of shims. *Pryor, 3.* Used for grinding. *Bureau of Mines Staff.*

Cornish stone. a. A partially weathered feldspar, used as a flux and fusible ingredient in porcelain and tiles. Sometimes called china stone. *CCD 6d, 1961.* b. Eng. A quartz crystal from Cornwall. *CCD, 6d, 1961.*

cornubianite. a. Proposed by Boase from the classic name for Cornwall, England, for a contact hornfels, consisting of andalusite, mica, and quartz. Bonney suggested restricting cornubianite to tourmaline hornfels. *Fay.* b. A very fine-grained nonfissile metamorphic rock composed of quartz, feldspar, and mica. *See also* hornfels; leptynolite; proteolite; seebenite. *A.G.I.*

cornubite. A basic copper arsenate, $Cu_5(AsO_4)_2(OH)_4$, dimorphous and associated with cornwallite. The name was provisionally given as cornubianite, earlier applied to a metamorphic rock, hornfels. *Spencer 21, M.M., 1958.*

cornuite. a. A yellow, gelatinous substance, apparently in albumen with 97 percent water; found in fissures in diatomite deposit of Luneburger Heide, Hanover, Germany. It may be an organic matter derived from the diatoms or a fungus. *Tomkeieff, 1954.* b. A blue, green, hydrous copper silicate, $CuSiO_3.2H_2O$; glassy. The colloidal phase of chrysocolla. *English.*

Cornwall. A county in England forming a peninsula at the southwestern extremity of Great Britain renouned for its copper and tin mines which have been worked for centuries. *Encyclopaedia Americana.*

cornwallite. An emerald-green, massive, hydrous copper arsenate, $Cu_3As_2O_8.2Cu(OH)_2 + H_2O$. *Fay.*

Cornwall stone. a. A highly weathered and partly kaolinized feldspathic rock used to replace feldspar and kaolin in some ceramic applications. *BuMines Bull. 585, 1960, p. 284.* b. A feldspar-quartz-kaolinite product obtained from weathered alaskite-type granite in Cornwall, England. *A.G.I.*

coro-coro. A dressed product of copper works in South America, consisting of grains of native copper mixed with pyrite, chalcopyrite, mispickel, and earthy minerals. *See also* copper barrilla; barrilla. *Fay.*

Coromant cut. A new drill hole pattern in which two overlapping holes of about 2¼ inches in diameter are drilled in the tunnel center and left uncharged. These holes form a slot roughly 4 by 2 inches to which the easers can break. All the holes in the round are parallel and in-line with the tunnel. Short-delay detonators are used for the easer holes and ½-second delays for the rest of the round. A pull of 10 feet per round has been obtained in strong rock with 10-foot 6-inch holes. Explosive consumption for the easer holes is about 0.2 pounds per foot of hole. *Nelson.*

corona. a. A Spanish term meaning crown. Sometimes used in the Southwestern United States as a synonym for diamond bit. *Long.* b. A zone of minerals, usually radial around another mineral, or at the contact between two minerals. The term has been applied to reaction rims, corrosion rims, and originally, crystallized minerals. Also called kelyphite. *A.G.I.* c. A luminous discharge from the surface of a conducting wire when voltage causes breakdown of surrounding air. Observed with Cottrells, high-tension separators. *Pryor, 3.* d. In spot welding, an area sometimes surrounding the nugget at the faying surfaces, contributing slightly to overall bond strength. *ASM Gloss.*

coronadite. A black manganate of lead and manganese, $(Mn,Pb)Mn_3O_7$, massive; fibrous. Probably a mixture of hollandite and an unknown lead mineral. From the Coronado vein, Clifton-Morenci district, Ariz. *English.* Resembles psilomelane in general aspect. *Fay.*

coronite. Corona-bearing rock. *A.G.I. Supp.*

corporal. Mid. A district foreman in charge of the underground haulageways. *Fay.*

corporation. A legal entity and can have no greater rights than an individual in acquiring public lands. Hence a corporation, regardless of the number of its stockholders, may lawfully locate no greater area than is allowable in the case of an individual. A corporation is a citizen of the state within which it is incorporated and it is conclusively presumed that all of its stockholders are citizens. *Ricketts, I.*

corpse light. A blue flame (due to methane) made in a miner's safety lamp when concentration of dangerous gas is high. *Pryor, 3.*

corrading stream. When the debris supplied to a stream is less than its capacity for carrying load, the stream abrades its bed and is a corrading, downcutting, or degrading stream. *A.G.I.*

corrasion. a. The wearing away of the surface of the earth through the friction of solid material transported by water or air. It is one form of erosion. *Fay.* b. Mechanical erosion performed by moving agents such as wear by glacial ice, by wind, by running water, etc. *A.G.I.* c. The wearing away of rocks and soil by the abrasive action of material moved along by wind, waves, streams, or glaciers. One of the several processes of erosion. *Webster 3d.*

corrected effective temperature. The scales of effective temperature take into consideration the temperature, humidity and speed of the air. The effects of radiant heat can be included in an assessment of effective temperature by using the globe thermometer temperature instead of the dry-bulb temperature in those cases when the reading of the globe thermometer is higher than the dry-bulb temperature. In such cases the result is described as the corrected effective temperature. *Roberts, I, p. 343.*

corrected loupe. *See* loupe, corrected. *Shipley.*

corrected width. S. Afr. The same as estimated true width of a reef or vein after allowing for the angle at which a drill has intersected the reef or vein. The length of the intersection is the borehole width of the reef or vein and may be considerably larger. *Beerman.*

correcting wedge. A deflection wedge used to deflect a crooked borehole back into its intended course. *See also* deflecting wedge. *Long.*

correction chart. A chart, graph, or table giving the true angle of the inclination of a borehole for specific apparent angles as read from the etch line in a specific-size acid bottle. *See also* capillarity-correction chart. *Long.*

correction factor. *See* assay plan factor. *Truscott, p. 99.*

correction table. *See* correction chart. *Long.*

correctly placed material. a. Material correctly included in the products of a sizing or density separation. *B.S. 3552, 1962.* b. In cleaning, the material of specific gravity lower than the separation density which has been included in the low density product, or material of specific gravity higher than the separation density which has been included in the high density products. *B.S. 3552, 1962.* c. In sizing, the undersize contained in the underflow, or oversize contained in the overflow, of a sizing operation. *B.S. 3552, 1962.*

correlate. a. To find horizons of the same age in the strata at different places that are either distant or are separated by geologic disturbances; to find which coalbeds in one coalfield or part of a coalfield correspond with (or are the same as) those of another coalfield. *Mason.* b. To plot or to arrange two different surveys, the surveys of two different mines, or the underground and the surface on the same base line or to a common meridian. *Mason.* c. To establish a definite stratigraphic relationship between. For example, to correlate the fossil faunas or the formations of two areas. *Webster 3d.*

correlated. Belonging to the same stratigraphic horizon. Correlated strata, for example. *Webster 3d.*

correlation. a. The determination of the equivalence in geologic age and in stratigraphic position of two formations or other stratigraphic units in separated areas; or, more broadly, the determination of the contemporaneity of events in the geologic histories of two areas. The same fossils constitute the chief evidence in problems of correlation. *Fay.* b. Determination of synchrony of homotaxis, or of relation to the scale of geologic time; usually used in the comparison of geologic formations or of fossil faunas or fossil floras belonging to different districts. *Webster 3d.* c. Correlations may be based on paleontologic or physical evidence. *A.G.I.* d. In seismic interpretation, the picking of corresponding phases, obtained at two or more separated seismometer spreads, of those seismic events which appear to originate at the same geologic formation boundary. *A.G.I.* e. Commonly, in coal mining, correlation signifies the recognition of identical seams in different exposures. *See also* coal-seam correlation; lithologic correlation. *Nelson.* f. The process of orientating underground survey lines or of coordinating underground survey stations to the National Grid. *B.S. 3618, 1963, sec. 1.* g. Procedure of finding peaks and troughs on the seismograms that correspond to the same phase of reflections against the same boundary plane. *Schieferdecker.*

correlation shooting. A seismic shooting method in which isolated profiles are shot and correlated to obtain relative structural positions of the horizons mapped. Opposite of continuous profile shooting. *A.G.I.*

corrensite. It is suggested that the name corrensite be restricted to a 1:1 regularly interstratified chlorite—swelling chlorite. *American Mineralogist, v. 46, No. 5–6, May-June 1961, p. 769.*

corridor dryer. Term sometimes used for a chamber dryer. *See also* chamber dryer. *Dodd.*

corridor system. *See* methane drainage. *Roberts, I, p. 81.*

corrie. Scot. A circular hollow on the side of a hill or a mountain; a cirque. Also spelled corry. *See also* cirque. *A.G.I.; A.G.I. Supp.*

corrity. York. Applied to crossbedded rocks. *Arkell.*

corrode. a. To eat away by degrees as if by gnawing. *Webster 3d.* b. To wear away or to diminish by gradually separating or destroying small particles or converting into an easily distintegrated substance; especially, to eat away or to diminish by acid or alkali reaction or by chemical alteration. *Webster 3d.*

corroded. a. A diamond surface that has the appearance of having been etched by acid. *Long.* b. Eaten away, or with the surface pitted by a corrosion liquid or gas. *Long.*

corroded crystal. A phenocryst that after crystallization is more or less reabsorbed or attacked by the magma, or a crystal in a vein or a pegmatite that is partly dissolved by later solutions. The process is probably much the same in all three instances. *Hess.*

corroding lead. Lead of purity exceeding 99.94 percent, suitable for the production of white lead. *C.T.D.*

corrosion. a. Erosion of land or rock; specifically, the removal of soil or rock by the solvent or chemical action of running water. *Compare* corrasion. *Webster 3d.* b. It is necessary to distinguish between the wearing or denuding action of a river on its bed and on its banks. The cutting away and deepening of the bed is known as corrosion, and the wearing away of its banks is known as erosion. *A.G.I.* c. The eating away of rock due to chemical solution. Corrosion is frequently used to denote chemical denudation. *A.G.I.* d. Chemical erosion, whether accomplished by motionless or moving agents. *A.G.I.* e. Gradual destruction of a material usually by solution, oxidation, or other means attributable to a chemical process. *Lowenheim.*

corrosion and gumming test. The complete evaporation of gasoline under standard laboratory conditions to determine the quantity of tarry residue and the amount of discoloration of the copper cup in which the test is made. *Porter.*

corrosion border; corrosion rim; corrosion zone. a. A modification of the outlines of phenocrysts caused by the corrosive action of a magma upon minerals which were previously stable under different conditions. It is a special case of the reaction rim. *See also* corona; reaction rim. *Johannsen, v. 1, 2d, 1939, p. 171.* b. Synonymous with resorption border. *Webster 3d.*

corrosion embrittlement. The severe loss of ductility of a metal resulting from corrosive attack, usually intergranular and often not visually apparent. *ASM Gloss.*

corrosion fatigue. Effect of the application of repeated or fluctuating stresses in a corrosive environment characterized by shorter life than would be encountered as a result of either the repeated or fluctuating stresses alone or the corrosive environment alone. *ASM Gloss.*

corrosion, magmatic. A process of resolution in which an early formed phase, such as quartz phenocrysts, later becomes corroded or embayed as the result of some change in the conditions affecting the solubility of the phase; sometimes corrosion rims result. *A.G.I.*

corrosion of refractories. Deterioration or wearing away of refractory bodies largely at their surfaces through chemical action of external agencies. *HW.*

corrosion potential. The steady-state irreversible potential of a metal or alloy in a constant corrosive environment. *BuMines Bull. 619, 1964, p. 206.*

corrosion rate. The rate which a metal or alloy is removed because of corrosion. This may be expressed in terms of loss in weight or loss of thickness in a given period of time. (Corrosion rates in terms of thickness change refer to the loss of metal from one side only.) *H&G.*

corrosion spring swamp. Corrosion spring swamps include a very small group of deposits formed in a peculiar manner. Where springs, such as that of the Big Bone Lick in Kentucky, carry to the surface a considerable quantity of dissolved rock materials, such as salt, calcium carbonate, etc., the leaching of the soluble minerals from the underground rocks may be so much that the surface gradually sinks, forming a swampy area. Generally, the rate of ablation of the district is so rapid that the local downsinking, produced by the process of solution, results in a widespread lowering of the surface. In rare instances, as at the Big Bone Lick and at other saline springs in Kentucky, a small area of marsh land is produced. *A.G.I.*

corrosion surface; corrosion zone. Blackened, pitted, irregular bedding surface found in some limestones; attributed to submarine solution or resorption. *Pettijohn.*

corrosion zone. *See* corrosion surface. *Pettijohn.*

corrosive. Anything that corrodes, especially a chemical agent, such as an acid; anything that wears away or disintegrates. *Fay.*

corrosive water. Aggressive water, such as water containing free CO_2, capable of dissolving calcium carbonate. *Bennett 2d, 1962 Add.*

corrugated. When on a small scale beds are much wrinkled, folded, or crumpled, they are said to be corrugated. On a larger scale, they are said to be contorted. *Fay.*

corrugated friction socket. A fishing tool. *Long.*

corrugated ripple mark. A longitudinal ripple mark with a symmetrical rounded crest and trough. Such ripple marks are rarely branched. *A.G.I. Supp.*

corrugated trough. A trough with corrugations formed into the bottom to assist coal travel on steep grades or under wet conditions. *Jones.*

corrugating. Forming sheet metal into a series of straight, parallel, alternate ridges and grooves by using a rolling mill equipped with matched roller dies or by using a press brake equipped with special-shaped punch and die. *ASM Gloss.*

corrugator. *See* pipe finisher. *D.O.T. 1.*

Corsican green. A mineral similar to bastite; used as a substitute for it in ornamental objects. *Shipley.*

corsilite; corsilyte. A rock from Corsica composed of smaragdite replacing diallage, more or less of the original diallage, and saussurite (feldspars altered to a mixture of albite, zoisite, epidote, quartz, muscovite, calcite, etc. *Hess.*

corsite. An orbicular variety of gabbro. *A.G.I.*

cortex. In coal, that part of the axis of a vascular plant which surrounds the central cylinder and is separated from the cylinder by the endodermis, and limited on the outside by the epidermis. *Bureau of Mines Staff.*

cortlandtite. A peridotite composed of large hornblende crystals with poikilitically included olivine crystals. *A.G.I.; A.G.I. Supp.*

corundolite. A rock consisting of corundum and iron oxides. *See also* emery rock. *A.G.I.*

corundophilite. A chlorite, $(Mg,Fe)_3(Al,Fe)_3(Si,Al)_4O_{10}(OH)_8$, consisting of magnesium, iron, aluminum hydroxyl silicate. *Webster 3d.*

corundum. An aluminum oxide, Al_2O_3, occurring commonly as an accessory mineral in the metamorphic rocks, such as crystalline limestone, mica-schist, gneiss. Rhombohedral. Color various; usually some shade of brown, pink, or blue. May be white, gray, green, ruby-red, or sapphire-blue. Luster adamantine to vitreous. Transparent to translucent. Mohs' hardness, 9; specific gravity, 4.02. The colored and clear varieties form the gems sapphire, ruby, oriental emerald, and oriental topaz. The granular impure variety is known as emery. Artificial corundum is manufactured from bauxite on a large scale. This synthetic material together with other manufactured abrasives, has largely taken the place of natural corundum as an abrasive. The main use of natural corundum is for gem stones such as ruby, and sapphire. *Dana 17, pp. 290-292.*

corundum cat's eye. Corundum with a bluish, reddish, or yellowish reflection of light of a lighter shade than the stone itself. *Schaller.*

corundum syenite. A medium-grained, light yellow or place rose rock containing large crystals of corunudm in a groundmass of microperthite. Accessory minerals are quartz and biotite. *Stokes and Varnes, 1955.*

corve. A small tub or tram. The original corve or corf was a wooden basket for carrying coal from the face to the shaft bottom and up the shaft. *Nelson.*

corvers. N. of Eng. Carpenters who make corves (baskets). Also, formerly, one who brought corves out of the mine, and kept them in repair. *Fay.*

corvusite. A very rare, purplish, blue-black to brown, weakly radioactive vanadium mineral, $V_2O_4.6V_2O_5.nH_2O$; from the carnotite region of Colorado and Utah. *Crosby, pp. 119-120; Hess; E.C.T., v. 14, p. 436.*

cos Abbreviation for cosine. *BuMin Style Guide, p. 58.*

cosalite. A sulfide of lead and bismuth, $Pb_2Bi_2S_5$, containing 42 percent bismuth. *Sanford.*

cosecant. The cosecant of an arc is the secant of the complement of the arc. *Zern, p. 55.*

cosedimentation. Contemporaneous deposition. *A.G.I. Supp.*

coseismic line. A diagrammatic line drawn through those places which suffer earthquake shocks simultaneously. These lines are generally elliptical, the center point of the ellipse being known as the epicenter. *Ham.*

cosh Abbreviation for hyperbolic cosine. *BuMin Style Guide, p. 59.*

cosine. The cosine of an arc is the sine of its complement; or it is the distance from the foot of the sine to the center of the circle. *Zern, p. 54.*

coslettized iron. Iron which has been immersed in a dilute solution of iron phosphate and phosphoric acid, near its boiling point. A very thin hard and tenacious coating of gray iron phosphate is formed on the surface of the iron, which it protects from rust. *Camm.*

Coslett treatment. Use of hot phosphoric acid bath to form an anticorrosion surface film on steel. When grain of surface is modified by addition of manganese salts, process is Parkerizing. *Pryor, 3.*

cosmic. Of, from, or relating to the cosmos, the extraterrestrial vastness, or the universe in contrast to the earth alone. *Webster 3d.*

cosmic dust. a. Fine particles of cosmic or meteoric origin, or the remains of small meteorites which have been decomposed on passing through the earth's atmosphere. *A.G.I.* b. Very fine particles of solid matter in any part of the universe, including meteoric dust and zodiacal light particles in the solar system. *Webster 3d.*

cosmic radiation. Radiation made up of cosmic rays. *Webster 3.*

cosmic ray. a. A stream of atomic nuclei of heterogeneous, extremely penetrating character that enter the earth's atmosphere from outer space at speeds approaching that of light and with energies ranging from a few billion to at least 10^7 billion electron volts and that bombard atmospheric atoms to produce mesons as well as secondary particles possessing some of the original energy. *Webster 3d* b. Radiation incident on the earth from outer space. *A.G.I.*

cosmic sediment. Particles of extraterrestrial origin reaching the surface of the earth. These particles are found chiefly in deep-sea sediments, in the form of black magnetic spherules. *A.G.I.*

cosmites. Used by M. E. Wadsworth to designate mineral decorative materials, ornamental stones, and gems. *Fay.*

cosmochemistry. a. The study of the distribution of elements in the universe. *Schieferdecker* b. The study of the chemical composition of and changes in the universe. *Webster 3d.*

cosmogony. a. A part of the science of astronomy that deals with the origin and the development of the universe and its components. *Webster 3d.* b. The creation, the origination, or the manner of coming into being of the world or the universe. A theory of the origination of the universe. Also spelled cosmogeny. *Webster 3d.* c. Speculation regarding the origin of the universe, including the origin of the earth. *A.G.I. Supp.*

cosmology. The science of the universe. *A.G.I. Supp.*

cossacks. Nickname for coal and iron police. *Korson.*

cost account. Detailed statement of items of cost in each major section of the overall expenditure, suitably related to product made. Can be valuable instrument in technical process control in mineral industry. *Pryor, 3.*

cost book. Corn. A book used to keep accounts of mining enterprises carried on under the cost-book system, peculiar to Cornwall and Devonshire, and differing from both partnership and incorporation. It resembles the mining partnership system of the Pacific States. *Fay.*

cost-book system. This form of organization consisted of a system whereby a mine was divided into shares, which were purchased by a limited number of part-owners, usually living in the mining community. The joint owners, or adventurers as they were called, supplied all the capital and shared all profits. The cost-book system cannot be called a partnership, because it is something more; nor can it be termed a joint-stock company, since it is something less than the modern company, of which it was the forerunner. *Hoov. p. 232.*

cost controller. An engineer/accountant based at a large colliery, responsible for analyzing costs, pinpointing wastage, and framing procedures to reduce costs. He works closely with his production colleagues on the preparation of estimates and forecasts, and in inculcating a cost consciousness in all departments. *Nelson.*

costean. a. A trench cut across the conjectured line of outcrop of a seam or ore body to expose the full width. *Nelson* b. The channel eroded by a flow of water to expose mineral deposits during prospecting work. *See also* trenching, b. *Nelson* c. Corn. Fallen or dropped tin. From the Cornish, cothas, meaning dropped, and stean, meaning tin. *Fay.*

costeaning. a. The removal of soil and subsoil by a rushing of water, in order to expose rock formations in prospecting for reefs or lodes *C.T.D.* b. Proving an ore deposit or vein by trenching across its outcrop at approximately right angles. *Weed, 1922* c. Tracing a lode by pits sunk through overburden to underlying rock. *Pryor, 3.*

costean pit. Corn. A pit sunk to bedrock in prospecting. *Standard, 1964.*

cost, fixed; overhead. That part of the outgoing which is constant, whatever tonnage is mined. Includes administrative management, amortization, rentals, and fixed interest. *Pryor, 3.*

costing. For technical and financial control of mining operations, special developments from cost accountancy are used. They include budgetary control, standard costing and responsibility control and work by examining variances either of details in comparable accounting periods, or by comparing estimated with actual costs. *Pryor, 3.*

cost, insurance and freight. Term showing that these items have been paid by the shipper of concentrates, metal, etc. *Pryor, 3.*

costra. Low-grade Chilean soduim nitrate. *Bennett 2d, 1962.*

cot. Abbreviation for cotangent. *BuMin Style Guide, p. 58.*

cotangent. The cotangent of an arc is equal to the tangent of the complement of the arc. *Zern, p. 54.*

coteau. A French term signifying a small hill or hillock. In the northern United States it was generally applied by the early French travelers to a range of hills or to an escarpment forming the edge of a plateau. Such an escarpment is usually dissected, so that it resembles a range of hills, at a distance. The Coteau des Prairies and the Coteau du Missouri are escarpments of this character. *USGS Bull. 611, 1915, p. 45.*

cotectic line. A special case of the boundary line, in ternary systems, along which one of the two crystalline phases present reacts with the liquid, upon decreasing the temperature, to form the other crystalline phase. Synonym for reaction curve; reaction line. *A.G.I.*

cotectic surface. A curved surface in a quaternary system, representing the intersection of two primary phase volumes, one or both of which are solid solution series. It is the bivariant equivalent of the univariant cotectic line in ternary systems. *A.G.I.*

coth. Abbreviation for hyperbolic cotangent. *BuMin Style Guide, p. 59.*

Cotham marble. A member of the Rhaetic rocks of England. It is an impure limestone characterized by arborescent or moss-like markings; a type of landscape marble. *C.T.D.*

coticule. A fine-grained honestone from Belgium. It is compact, yellow in color, and contains minute crystals of yellow manganese garnet with potash mica and tourmaline. It may be prepared for marketing by cutting to include a blue-gray phyllite for additional strength or support. *Brady, p. 824.*

cotidal lines. Lines on a map or chart passing through all points at which high waters occur at the same time. The lines show the lapse of time, usually in lunar-hour intervals, between the moon's transit of the Greenwich meridian and the occurrence of high water for any point lying along the line. *Hy.*

cotter. a. Eng. To mat together; to entangle. Frequently applied to a hard, cross-grained, tough stone or coal, as cottered coal. *Fay* b. A tapered rod or pin, generally flat in section, used for wedging the ends of rods or of strap ends over their rods. *Crispin.*

cotterite. A variety of quartz having a peculiar metallic pearly luster. *Standard, 1964.*

cotter pin. Usually a form of split pin which is inserted into a hole near the end of a bolt to prevent a nut from working loose. *Crispin.*

cottle. A retaining wall placed around a model to hold poured plaster until it sets to form a mold. *ACSG, 1963.*

cottles. Leather strips of various widths. *Noke.*

cotton ball. *See* ulexite. *Fay.*

cotton chert. Synonym for chalky chert. Obsolete. *A.G.I.*

cotton fabric multiply belt. A rubber belt consisting of a rubber cover and impregnation and the cotton duct fabric. The rubber cover protects the fabric from abrasion and prevents the penetration of moisture or oil. The rubber cover ranges up to three-eighths of an inch or more in thickness, depending on the material carried. The belt contains about 40 percent rubber and 60 percent fabric. The strength of the belt lies in the fabric. *See also* solid-woven fabric belt. *Nelson.*

cotton miner. Can. In Quebec, a miner employed in an asbestos mine. *Fay.*

cotton rock. a. A variety of chert with a black, dense interior and a white or light-colored exterior. *A.G.I.* b. A white to slightly gray or buff variety of limestone which has a soft, somewhat chalky, and porous appearance suggestive of cotton. Missouri cotton rock isusually dolomitic, siliceous, and fine-grained *Lower Silurian.* The term is colloquial. *A.G.I.*

cotton stone. A variety of mesolite. *Fay See also* cotton rock.

Cottrell meter. This instrument applies the veiling brightness method of producing threshold conditions. When in use the sighting telescope is directed towards some critical detail of the visual task and the veiling brightness is adjusted until it matches the background. The gradient filter is then turned until the target detail is at threshold visibility. *Roberts, II, p. 102.*

Cottrell operator. In ore dressing, smelting, and refining, one who recovers magnesium dust particles remaining in magnesium gas after processing, using a battery of Cottrell electrical precipitators. Also called agglomerator operator; dust operator. *D.O.T. 1.*

Cottrell precipitator. An electrostatic device whereby negatively charged dust or fume particles are attracted to a wire electrode positively charged enclosed in a flue, the walls of which act as the other electrode. Widely used for treating sulfuric acid mist, cement mill dust, power-plant fly ash, metallurgical fumes, etc. *CCD 6d, 1961.*

cotunnite. A soft white to yellowish lead chloride, $PbCl_2$. Occurs in acicular crystals of the orthorhombic system and in semicrystalline masses. *Fay.*

CO_2 process. See carbon dioxide process. *Dodd.*

coulch. Derb. A piece of earth falling from the roof or side in soft workings. *Fay.*

coulee; coulie. a. A solidified stream or sheet of lava extanding down the side of a volcano, and often forming a ridge or spur. *Fay.* b. A short, blocky, steep-sided lava flow, generally of glassy rhyolite or obsidian, issuing from the flank of a volcanic dome or from the summit crater of a volcano. *A.G.I.* c. Generally applied throughout the northern tier of States to any steep-sided gulch or water channel and at times even to a stream valley of considerable length. *USGS Bull. 611, 1915, p. 42* d. A small often intermittent stream. A dry creek bed sometimes running with water in a wet season. *Webster 3d* e. A steep-walled valley or ravine varying widely in size and often having a stream at the bottom. *Webster 3d* f. A small valley or low-lying area. *Webster 3d.*

coulee lake. Sometimes lava is deposited across a valley, and the river channel is dammed. Volcanic dams are common, and some important lakes were formed by them. Geologists call a sheet of lava a coulee and, therefore, a lava-dammed lake is called a coulee lake. *A.G.I.*

coulomb. The practical meter-kilogram-second (mks) unit of electric charge equal to the quantity of electricity transferred by a current of 1 ampere in 1 second; the standard in the United States. *Webster 3d* Also called an ampere-second. *Newton, p. 453.*

coulomb attraction. The attraction between ions of opposite electric charges. *A.G.I. Supp.*

coulomb damping. a. The dissipation of energy that occurs when a particle in a vibrating system is resisted by a force whose magnitude is a constant independent of displacement and velocity, and whose direction is opposite to the direction of the velocity of the particle. Also called dry friction damping. *H&G* b. *See* specific damping capacity. *Lewis, p. 569.*

Coulombs law. a. In electromagnetics, the force between two poles is directly as the product of their pole strengths and inversely as the square of the distance between them. *Pryor, 3.* b. In electrostatics, the force between two charges in vacuo is directly as the product of their magnitudes, and inversely as the square of the distance between them. *Pryor, 3.*

coulometer. An electrolytic cell arranged to measure the quantity of electricity by the chemical action produced in accordance with Faraday's laws. *Lowenheim.*

coulsonite. A vanadiferous iron ore assumed to have the composition $FeO.(Fe,V)_2O_3$. Patches in magnetite. First named vanadomagnetite. From northeastern India. *English.*

coulter. A knife or wheel on a plow to cut the sod when plowing. *Mersereau, 4th, p. 285.*

Coulter counter. A high speed device for particle size analysis designed by W. H. Coulter and now made by Coulter Electronics, Inc., Chicago. A suspension of the particles flows through a small aperture having an immersed electrode on either side with particle concentration such that the particles traverse the aperture substantially one at a time. Each particle, as it passes, displaces electrolyte within the aperture, momentarily changing the resistance between the electrodes and producing a voltage plus of magnitude proportional to practical volume. The resultant series of pulses is electronically amplified, scaled, and counted. *Dodd.*

counter. a. A gangway driven obliquely upwards on a coal seam from the main gangway until it cuts off the faces of the workings, and then continues parallel with the main gangway. The oblique portion is called run. *Fay.* b. An apparatus for recording the number of strokes made by a pump, an engine, or other machinery. *Fay.* c. A crossvein. *Fay.* d. An instrument for the detection of uranium and thorium. *Nelson* e. A contraction used for any device which registers radioactive events, that is, alpha counter, beta counter, Gieger-Mueller counter, scintillation counter. The term is correctly used only for devices which actually register number of events, but is often erroneously applied to count rate meters which register events per unit time. *Bureau of Mines Staff.*

counter-arched revetment. A revetment to a cutting in brickwork having arches turned between counterforts in a similar manner to a multiple-arch dam. *Ham.*

counterbalance; counterpoise. A weight used to balance another weight or the vibrating parts of machinery. *Fay.*

counter blow. In the blow-and-blow process of shaping glassware, the operation during which the parison is blown out. *Dodd.*

counterblow hammer. A forging hammer in which both the ram and anvil are driven simultaneously toward each another by air or steam pistons. *ASM Gloss.*

counterbored coupling. A drill-rod coupling in which the opening at each end is counterbored or tapered to an included angle of 20°; hence drilling fluid can flow through the coupling with less turbulence and loss of head than when pumped through a standard drill-rod coupling. Also called steamflow-rod coupling. *Long.*

counterboring. Drilling or boring a flat-bottomed hole, often concentric with other holes. *ASM Gloss.*

counterbracing. Two diagonal cross braces provided in the panels of steel trusses and frames to withstand wind pressure and to stabilize the structure. *Ham.*

counter chute. A chute through which the coal from counter-gangway workings is lowered to the gangway below. *Fay.*

counter coal. Coal worked from breasts or bords to the rise of a counter gangway. *Fay.*

countercurrent. a. Arrangement in which ore, or pulp, proceeds in one direction and is progressively stripped of part of its contained mineral, while the enriched fraction thus produced moves in the opposite direction, the results being central feed, with discharge of high-grade concentrate at one end of the process and low-grade or barren tailing at the other. In countercurrent decantation (C.C.D.) the sand, slime, or slurry moves through a series of washing and settling operations while the wash water or solvating liquid moves in the opposite direction until it is sufficiently rich (pregnant) to be discharged for stripping of its value and return to the sand discharge end of the semicontinuous process. *Pryor,* 3. b. A current that flows in a direction opposite to the normal flow. The subsurface cold stream is an example. *MacCracken.*

countercurrent braking. Braking accomplished by reversing the motor connections, at the same time inserting appropriate resistance in the rotor circuit to adjust the negative torque to the desired value. With this method complete control of deceleration is obtained, even to a dead stop. Its greatest disadvantage is that it is expensive in current consumption. It is unsuitable for winders sited at depth, owing to the heat given out. *Spalding, pp. 350-351.*

countercurrent circulation. Synonym for counterflush. *Long.*

countercurrent decantation. The clarification of washery water and the concentration of tailings by the use of several thickeners in series. The water flows in the opposite direction from the solids. The final products are slurry which is removed as fluid mud and clear water which is reused in the circuit. *Nelson.*

countercurrent pipe exchange. A heat exchanger, constructed of pipe, in which the direction of the cold oil is opposite to that of the hot oil. *Porter.*

countercurrent principle. A means of maintaining the chemical potential at a uniform level during a reaction. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 302.*

counter drain. The drain formed along the foot of a canal bank or dam to both carry away leakage and to strengthen the bank. *Ham*

counterflow. In a heat exchanger, where the fluid absorbing heat and the fluid losing heat are so directed that lower and higher temperature of the one is adjacent to the lower and higher temperature of the other, respectively. Ordinarily, the one fluid is flowing in the opposite direction from the other, hence the term. *Strock, 10.*

counterflush. Synonym for reverse circulation. *Long.*

counterflush boring; reversed flush boring. A method of core drilling in which the circulating fluid passes down the borehole and returns up the inside of the rods, providing continuous recovery of the core. *B.S. 3618, 1963, sec. 3.*

counterfort. A strengthening pier bonded and perpendicular to the inner side of a retaining wall, thereby stabilizing it against overturning, and increasing its strength. *Ham.*

counter gangway. A gangway driven obliquely across the workings to a higher level, or a gangway driven between two lifts and sending its coal down to the gangway below through a chute. *Fay.*

counterhead. Mid. An underground heading driven parallel to another, and used as the return air course. *Fay.*

counter ions. Those able to neutralize anchored ions of opposite polarity. *Pryor, 3.*

counterlode. A smaller vein running across the main lode. *See also* countervein. *Fay.*

counterpoise. *See* counterbalance. *Fay.*

countershaft. a. A shaft which receives power from a parallel main shaft, and transmits it to another part of the main shaft or to working parts. *Nichols.* b. A shaft that allows one end of a main shaft to drive the other through reduction gears. *Nichols.*

countersink. In a twist drill, the tapered and relieved cutting portion situated between the pilot drill and the body. *Osborne.*

countersinking. Forming a flaring depression around the top of a hole for deburring, for receiving the head of a fastener, or for receiving a center. *ASM Gloss.*

countervein. A crossvein running at approximately right angles to the main ore body. *Weed, 1922. See also* counterlode. *Fay.*

counterweight. a. A weight used with a cylindrical drum to reduce the hoisting moment of a single load. May be shaped like the hammer of a piledriver, being made of cast-iron sections or composed of a series of round cast-iron disks contained within a pipe in the manway side of the shaft. *Lewis, p. 243.* b. A dead or nonworking load attached to one end or side of a machine to balance the weight carried on the opposite end. *Nichols.* c. A working part attached or positioned partly for the purpose of improving machine balance. *Nichols.*

countess. Slate, size 20 by 10 inches; a duchess is 24 by 12 inches, and a princess is 24 by 14 inches. Terms descriptive of those trimmed for roofing. *Pryor, 3.*

counting assay. Approximate method of analysis, where particles of value and gangue are similar in shape and size, and their proportions can be assessed by inspection, probably under a low-powered microscope. *Pryor, 3.*

count rate; counting rate. Number of counts per unit time. *NCB.*

count-rate meter; counting-rate meter. An instrument which gives a continuous indication of the average rate of arrival of pulses from a counter. *NCB.*

country. The name given by miners to the rock in which the lode, vein, or reef is situated. *Gordon. See also* country rock.

country bank. Ark. A small mine supplying coal for local use only. *Fay.*

country rock. a. The rock traversed by or adjacent to an ore deposit. *Fay.* b. Applied to the rocks surrounding and penetrated by mineral veins or invaded by and surrounding an igneous intrusion. *Holmes, 1920.* c. The rock in which a mineral deposit or an intrusion is enclosed. Synonym for country. *Webster 3d.* d. The common rock of a region. *Webster 3d.* e. The valueless rock surrounding a lode. *Pryor, 4.*

country sale. Scot. Sale of coal at the mine; sale by cart, as distinguished from disposal by rail or sea. *Fay.*

County of Durham system. A combination of the panel and room-and-pillar method of mining. *See also* room-and-pillar. *Fay.*

coup. a. N. of Eng. To exchange cavils (lots) with the consent of the foreman. *Fay.* b. Scot. A bank, or face of a heap where debris is dumped. *Fay.* c. To overturn. *Fay.* d. N. of Eng. An informal exchange of workplace, task, or shift time. *Trist.*

couple. a. Mid. To conduct water down the sides of shafts into water curbs or garlands. *Fay.* b. To connect or screw together. *Long.* c. Synonym for double. *See also* double. *Long.* d. Common term for thermocouple. *See also* thermocouple. *Bureau of Mines Staff.* e. Two equal and opposite forces that act along parallel lines. *Webster 3d.*

coupled. Connected together. *Long.*

coupled wave. A surface seismic wave of complex motion in an elastic medium. It is described only by mathematical explanation. Also called C-wave. *A.G.I.*

coupler. a. In mining, a laborer who connects drawbar, hook, chain, or automatic coupling of mine cars underground and at the mine surface to make up trips (trains) for haulage. When coupling empty cars, he is known as empty coupler. Also called car coupler; car hooker; hooker; locomotive coupler; main-line coupler; minecar coupler; motorman coupler; snapper. *D.O.T. 1.* b. *See* shackle, c. *Nelson.* c. *See* shakler. *Nelson.*

couplet. *Synonym* for double. *See also* double. *Long.*

couple up. Synonym for couple. *See also* couple, b. *Long.*

coupling. a. A device for connecting tubs or mine cars to form a set or journey. *See also* automatic clip; shackle, c. *Nelson.* b. A connector for drill rods, casing, or pipe with identical box or pin threads at either end. *Compare* sub, c. *Long.* c. A threaded sleeve used to connect two pipes. *Fay.* d. A device for joining two rope ends without splicing. *Zern.* e. York. An attachment for joining a chain to the end of a rope. *Fay.* f. The degree of mutual interaction between two or more elements resulting from mechanical, acoustical, or electrical linkage. *ASM Gloss.* g. Occasionally used to mean any jointing device and may be applied to either straight or reducing sizes. *Strock, 3.* h. An arrangement for transferring electrical energy from one circuit to another, in one or both directions. *C.T.D.* i. A device for connecting two vehicles, as railway coaches. *C.T.D.* j. A connection between two coaxial shafts, conveying a drive from one to the other. *C.T.D.*

coupling chains. Scot. Short chains connecting the cage with the winding rope. *See also* bridle chains. *Fay.*

coupling tongs. Scot. A tool used in joining flanged pipes. *Fay.*

coupon. A piece of metal from which a test specimen is to be prepared—often an extra piece as on a casting or forging. *ASM Gloss.*

coup-over. Aust. A small chamber, into which an empty skip can be upset so as to allow a full skip to pass when there is only a single line. Called coup-up in Scotland. *Fay.*

coup plate. In coal mining, steel plate on which tubs are turned from one set of rails to another. *Pryor, 3.*

course. a. To conduct the ventilation backward and forward through the workings, by means of properly arranged stoppings and regulators. *Fay.* b. Som. A seam of coal. *Fay.* c. A progressing or proceeding along a straight line without change of direction. *Webster 3d.* d. To ventilate a number of faces in series. *B.S. 3618, 1963, sec. 2.* e. Corn. An unproductive vein as opposed to be a lode. *See also* crosscourse. f. The horizontal direction of a geologic structure. Synonym for strike. *Webster 3d.* g. A channel through which water flows. Synonym for watercourse. *Webster 3d.* h. An influx of water from one direction. *Standard, 1964.* i. A horizontal layer or row of brick in a structure. *HW.*

coursed blockwork. When concrete blocks weighing from 10 to 50 tons are used in breakwater construction, the blockwork is laid in horizontal, bonded layers or courses. *Ham.*

coursed rubble. Rubble in courses of differing breadths. *Standard, 1964.*

coursed ventilation. Mine ventilation by the same air current, that is, without splitting of air. *Nelson.*

course of employment. In mining, means where a miner is working within the period of the employment at a place he may reasonably be and while he is reasonably fulfilling the duties of his employment or is engaged in doing something incidental thereto. *Ricketts, I.*

course of ore. a. A horizontal shoot. *Nelson.* b. *See* chute, b; course, f. *Fay.*

course of vein. Its strike. The horizontal line on which it cuts the country rock. *Fay.*

course stacking. The method of shovel operation in which no ground is hauled away. The shovel simply stacks the ground on the opposite side from the working cut, or it may turn entirely around, dumping the spoil on a bank behind. *Lewis, p. 399.*

coursing. The system of ventilation in mines, as by doors, brattices, and stoppings. *Standard, 1964.*

coursing bubble. One rising freely through cell during froth flotation. *Pryor, 4.*

coursing joint. The mortar joint between two courses of bricks or stones. *Bureau of Mines Staff.*

coursing pole. Rod used to keep courses straight in bricklaying. *Bureau of Mines Staff.*

coursing the air. *See* course, a. *Fay.*

coursing the waste. *See* course, a. *Fay.*

courthouse. A method used by companies for checking the amount of refuse in coal. The refuse is picked from a few cars of run-of-mine coal daily, and when the amount of refuse is considered unreasonable, it is shown to the miner and his laborers. They may be suspended from work if the amount and size of refuse is too high. *Mitchell, p. 216.*

courthouse inspector. In bituminous coal mining, one who examines mine cars of coal for impurities, such as slate, rock, and dirt, by the courthouse system (selecting cars at random for examination). Rejects, on basis of inspection, any group or lot of cars containing too much impurity. *D.O.T. 1.*

courtzilite. A form of asphaltum allied to gilsonite. *Fay.*

cousie. Scot. A self-acting plane. *Fay.*

cousie wheel. Scot. The drum or pulley on a self-acting plane. *Fay.*

cousin Jack. Cornish miner, usually far from home. *Pryor, 3.*

Couvinian. Lower Middle Devonian. *A.G.I. Supp.*

covalent bond. a. A nonionic chemical bond formed by shared electrons, usually a pair belonging originally each to a different atom or both to one atom. Distinguished from electrovalent bond. *See also* coordinate bond. *Webster 3d.* b. A linkage between two atoms in a molecule, with no difference in electric charge on the two atoms. A linkage formed by the sharing of electron pairs. *A.G.I.*

cove. a. A small sheltered inlet or bay. For example, an irregular shoreline broken by many coves. *Webster 3d.* b. A shallow tidal stream or arm of the sea. A backwater near the mouth of a tidal stream. *Webster 3d.* c. A deep recess or a small valley in the side of a mountain. A level area sheltered by hills or mountains. *Webster 3d.* d. A small bay or an open harbor. Also applied to small areas of a plain or a valley that extend into a mountain or a plateau. A precipitously walled, cirque-like opening at the head of a small steep valley produced by erosion of shale below a thick massive sandstone. In Arizona and New Mexico, a re-entrant in the border of a mesa or a plateau is also called a rincon (from the Spanish meaning an inner corner). *See also* rincon. *USGS Bull. 730, 1923, p. 87.* e. A basin or a hollow where the surface of the land has caved in, as from the dissolving away of the underlying rock by aqueous solution. *Webster 3d.* f. Scot. A hollow in a rock formation. Synonym for cavern. *Webster 3d.*

covelline. *See* covellite. *Pryor, 3.*

covellite; covelline. A copper sulfide; CuS; hexagonal; color indigo-blue; Mohs' hardness, 1.5 to 2; specific gravity, 4.6. Copper 66.4 percent. *Pryor, 3.* Also known as indigo copper.

cover. a. The thickness of rock, solid or incoherent, between the workings and the surface (or seabed). *Nelson.* b. The pattern or number of drill holes (pilot holes) deemed adequate to detect water-bearing fissures or structures in advance of mine workings. *Compare* area cover. *Long* c. Shelter over and around a drill rig. *Long.* d. Total thickness of material overlying mine workings or an ore body. Also called burden; mantle. *Long.* e. A loose term for overburden. *B.C.I.* f. Chiefly stratified rocks overylying the basement, which deform by folding under the proper conditions. *Hess.* g. Eng. In Somerset, thick cover and thin cover, two limestone beds used for paving. *Arkell.* h. The vertical distance between any position in the strata and the surface or any other position used as reference. *B.S. 3618, 1964, sec. 5.* i. In underground installations, the depth below the surface that is reached by an opening. The thickness of rock and soil that forms the roof of an opening. *Compare* rock cover. *A.G.I.*

cover binding. Corn. *See* plank timbering. *Fay.*

cover blocks; spacers. Small precast mortar blocks used inside formwork or shuttering to ensure the correct cover to reinforcement. *Taylor.*

cover brick. Common term for arch brick used to line soaking pit covers. *Bureau of Mines Staff.*

cover coat. The top or last coat of porcelain enamel, as distinguished from the first or ground coats. Some modern enamels are one coal enamels, thus serving as ground and cover coats simultaneously. *Enam. Dict.*

covered electrode. Filler-metal electrode, used in arc welding, consisting of a metal core wire with a relative thick covering which provides protection for the molten metal from the atmosphere, improves the properties of the weld metal and stabilizes the arc. *Coal Age, v. 66, No. 3, Mar. 1961, p. 91.*

covered pot. *See* pot, k. *Dodd.*

cover gap. The area in advance of mine workings not adequately probed by pilot holes to detect the presence of water-bearing fissures or structures. *Long.*

cover half. In die casting, the stationary half of a die. *ASM Gloss.*

cover hole. One of a group boreholes drilled in advance of mine workings to probe for and detect water-bearing fissures or structures. *Long.*

covering bords. York. A series of bords (rooms) formed on the side of a shaft pillar, from which longwall working is commenced. *Fay.*

covering formation. Very often beds containing economic deposits of minerals are faulted, folded, and in part eroded. If later they are covered with other younger layers which do not include economic minerals or contain deposits of a different kind from those found in the deeper sequence, then this layer is spoken of as the covering formation. *Stoces, v. 1, p. 44.*

covering power. a. The degree to which a porcelain enamel coating obscures the underlying surface. *ASTM C 286-65.* b. The degree to which a glaze hides or obscures a ceramic surface. *Bureau of Mines Staff.* c. The ability of a solution to give a satisfactory plate at very low current densities, a condition which would exist in recesses and pits. This term suggests ability to cover but not necessarily with a uniform coating, while throwing power suggests ability to get a uniform thickness on an irregularly shaped object. *ASM Gloss.*

cover line. The point at which the overburden meets the coal. *B.C.I.*

cover load. The load due to the weight of the superincumbent rock. *Isaacson, pp. 73-74.*

cover mass. The material overlying the plane of an angular unconformity. *A.G.I. Supp.*

cover rock. *See* cover, a.

coversed sine. The versed sine of the complement of the arc. *Zern, p. 55.*

cover stress. The stress induced by the cover load only and which is uninfluenced by the propinquity of any excavations. *Isaacson, p 74.*

cover wood. Eng. *See* lofting. *SMRB, Paper No. 61.*

cover work. Lumps of copper too large to pass the screen and which accumulate in the bottom of the mortar of the stamp. *Fay.*

cove skirting. A special shape of ceramic wall tile. *Dodd.*

covite. A plutonic rock composed of sodic orthoclase, abundant hornblende and sodic pyroxene, nepheline, and accessory sphene, apatite, and opaque oxides. A relatively dark variety of nepheline syenite. *A.G.I.*

cow. a. A kind of self-acting brake for inclined planes; a trailer. *Compare* cousie. *Fay.* b. York. The finest crushed lead ore. Also called coe. *Arkell.*

coward diagram. A chart which gives an indication of the explosive potential of any gaseous mixture, such as methane/air or hydrogen/air. *Nelson.*

cowl. N. of Eng. A wrought-iron water barrel, or tank for hoisting water. *Fay.*

Cowles process. Direct manufacture of aluminum alloys, such as copper aluminum, from aluminum ores by reacting with carbon in an electric furnace in the presence of the alloying metal. *Bennett 2d, 1962.*

cowp. Newc. To overturn; to exchange working places. *See also* coup. *Fay.*

Cowper-Siemens stove. A hot-blast stove of firebrick on the regenerative principle. *Fay.*

Cowper stove. *See* hot-blast stove. *Dodd.*

cowshut; cushat marl. Gray marl. *Arkell.*

cow stone. Eng. A local term for greensand boulders. *Fay.*

cow sucker. A cylindrical heavy piece of iron attached to a cable or wire line, making it descend rapidly into a borehole when the cable or line is not attached to a string of drilling tools or equipment. Also called bug; bullet; go-devil. *Long.*

coyote blasting; coyote-hole blasting; gopher-hole blasting. A term applied to the method of blasting in which large charges are fired in small adits or tunnels driven, at the level of the floor, in the face of a quarry or slope of an open-pit mine. *Bureau of Mines Staff.*

coyote hole. A small tunnel driven horizontally into the rock at right angles to the face of the quarry. It has two or more crosscuts driven from it parallel to the face. It is in the ends of these crosscuts that the explosive charge is generally placed, and the remaining space in the tunnel is filled up with rock, sand, timbers, or concrete, to act as stemming or tamping. Same as gopher hole. *Fay.*

coyote-hole blasting. *See* coyote blasting. *Bureau of Mines Staff.*

coyoting. Pac. Mining in irregular openings or burrows, comparable to the holes of coyotes or prairie foxes; gophering. *Fay.*

cp a. Abbreviation for candlepower; centipoise. *BuMin Style Guide, p. 58.* b. Abbreviation for chemically pure. *Bureau of Mines Staff.*

C.P. Hemborn dust extractor. A dust trap in which the clean air flows inwards around the outside of the drill rods, and the dust and chippings are extracted in the airstream passing through the hollow rods. It includes a drum-type dust container with filter units. The appliance requires special rods and bits. *Nelson.*

cps Abbreviation for cycles per second. *BuMin Style Guide, p. 59.*

Cr. Chemical symbol for chromium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

crab. a. Any of various machines or apparatus especially for raising or hauling heavy weights: as (1) a winch mounted (as on skids) so that it can be moved; (2) the part of an overhead traveling crane that rolls along the track and carries the load; and (3) a claw for anchoring a portable machine. *Webster 3d.* b. A machine for moving heavy weights. Especially, the engines employed for lowering into place the pumps, rods, pipes, etc., of Cornish pitwork. *See also* crab winch. c. An iron rod forked at one end, attached to loaded coal cars coming up out of a slope. *Fay.*

d. A hoisting winch used to pull ladles, cars, or iron plate in a boilershop. Also called mule; car dumper. *Fay.* e. In photogrammetry the angle between the edge of a photograph and the flight line. *A.G.I.*

crabhole. Aust. A hole, apparently waterworn, found in the bedrock under the drift. *Fay.*

crab locomotive. A trolley locomotive fitted with a crab or winch for hauling mine cars from workings where a trolley wire is not installed. *Nelson.*

crab operator. In bituminous coal mining, one who maintains and operates a crab (electric motor equipped with a drum and haulage cable mounted on a small truck) to pull loaded mine cars from working places to haulageways in the mine. *D.O.T. 1.*

crab rock. Eng. Breccia or brockram, near base of New Red series, Barrow in Furness district. *Compare* rabbit eye; toad's-eye. *Arkell.*

crab winch. An iron machine consisting of two triangular uprights between which are two axles, one above the other. These machines are frequently used in connection with pumping gear where mine shafts are not deep. *See also* crab, b. *Fay.*

cracker. a. A coalbreaker. *Fay.* b. A manila cable, usually 100 feet long, placed between a string of tools and a wire cable to give the desired elasticity. *Porter.* c. Used jocularly for miner. *Korson.* d. A machine for the coarse crushing of pitch used as binder. Also called fixed beater. *B.S. 3552, 1962.*

cracker boss. An official in charge of the screen room in a breaker. *Korson.*

crackers. a. Eng. The so-called Portland crackers, huge spheroidal doggers of calciferous sandstone, blue-hearted, on Shotover Hill. Also applied to big mudstone septaria in the Oxford and Kimmeridge clays. *Arkell.* b. Eng. A subdivision of the Lower Greensand in the Isle of Wight containing large calcareous sandstone crackers or doggers. *Arkell.*

cracket. N. of Eng. A tool used by miners in mining coal. *Fay.*

cracking. a. A process in which relatively heavy hydrocarbons (such as fuel oils and naphthas from petroleum) are broken up into lighter products (such as gasoline and ethylene) by means of heat, and usually pressure, and sometimes catalysts. *Webster 3d.* b. A process of breaking down organic compounds of high molecular weight into compounds of lower molecular weight. *Shell Oil Co.* c. Breaking of bisque enamels which usually results in tearing in the fired enamel. Rough handling of sprayed ware and low dry film strength of the bisque enamel combine to promote cracking of the dried surface. *Enam. Dict.* d. Cracks that occur in ceramic ware during drying, firing, or cooling. *Bureau of Mines Staff.*

cracking off. The severing of shaped glassware from the moil. *See also* moil. *Dodd.*

cracking of oil. A name given to the method by which hydrocarbons of one composition are reduced to lower members of the same series, or converted into other hydrocarbons during distillation. It originated about 50 years ago by the stillmen in the old Pennsylvania refineries and means just what its connotation conveys, namely a part alteration, as distinguished from the more complete decomposition which would disrupt the molecule largely into carbon and permanent gas. Cracking simply alter the molecules to an extent that produces an amount of low-boiling fractions that cannot be obtained by simple distillation. It may not be accomplished by any considerable production of permanent gas, the product being largely a liquid condensate, but of different character from that obtained by simple distillation. *Fay.*

crackle. a. A crazed or cracked surface on art pottery or glass. To produce the effect on pottery the glaze is compounded so as to have a higher thermal expansion than the body; the craze pattern is sometimes emphasized by rubbing coloring matter, such as umber, into the fine cracks. With glass, the ware is cracked by quenching in water; it is then reheated and shaped. *Dodd.* b. A cracked vitreous enamel, the surface appearing to be wrinkled due to its mottled texture, can be produced by the wet process of application. *Dodd.*

crackle breccia. A breccia, the fragments of which are parted by planes of fission and which have undergone little or no relative displacement. *A.G.I.*

crackled. a. Glassware, the surface of which has been intentionally cracked by water immersion and partially heated by reheating before final shaping. *ASTM C162-66.* b. A mottled textural effect in a wet process porcelain enamel resembling a wrinkled surface. *ASTM C286-65.* c. Enamel characterized by a novel pattern-work of surface resulting from special application and handling. *Enam. Dict.*

crackled quartz. *See* crackled stones. *Shipley.*

crackled stones. Stones in the structure of which numerous small cracks or fissures have been produced by heating and sudden cooling in water, at which time dyes may be forced into the cracks producing stones of various colors. *See also* Indian emerald. *Shipley.*

crackled texture. A concentric texture in which minute cracks have developed by shrinkage during crystallization. *Schieferdecker.*

crackle ware. A term applied to glazed ware in which the glaze shows extensive crazing. *ACSG, 1963.*

crack off. The process of severing a glass article by breaking, as by scratching and then heating. *ASTM C162-66.*

crack off man. *See* breaker, sprues. *D.O.T. 1.*

cracks. a. Scot. Vertical planes of cleavage in coal. Planes at right angles to the bedding. *Fay.* b. Irregular fractures within the crystal that may be natural or may arise from blasting, rough handling, or other causes. *Skow.*

cracks of gas. Puffs or explosions of gas in blast furnaces. *Fay.*

crack wax. A dark-colored variety of ozokerite showing a granular fracture. *Tomkeieff, 1954.*

cradle. a. Eng. A movable platform or scaffold suspended by a rope from the surface, upon which repairs or other work is performed in a shaft. *Fay.* b. Eng. In the Midland coalfield, a loop made of a chain in which a man is lowered and raised in a shaft not fitted with a cage. *Fay.* c. A wooden box, longer than wide, provided with a movable slide and hopper, and mounted on two rockers. It is used for washing gold-bearing earths. *See also* rocker. *Fay.* d. The part of a car dumper in which the car rests when it is dumped. *Fay.* e. To wash, as gold-bearing gravel, in a mining-cradle. *Standard, 1964.* f. The balance platform for the cage in some shafts at the bottom. *Mason.* g. Device by means of which a small diamond or percussive-type drill may be attached to a drill column or arm. Also called saddle. *Long.* h. Mounting for rock drill. *Pryor, 3.* i. The trough-shaped metal support for a mounted pneumatic drill. *C.T.D.* j. A support bracket with a hinged connection to its load. *Nichols.* k. A carriage. *Nichols.*

cradle dump. A tipple which dumps cars with a rocking motion. *Fay.*

cradling. Scot. Stone walling in a mine shaft. *Fay.*

Craelius drilling machine. A small, fairly light boring machine constructed by the Swedish engineer Craelius for shallow exploratory borings underground. It drills in any direction (downwards, upwards, horizontally, or obliquely) to depths of from 200 to 1,000 meters, but usually only 50 meters. It uses coring or solid bits, with or without flushing and can be driven either by hand, any oil engine, compressed air, or electricity. *Stoces, v. 1, p. 83.*

crag. a. A steep, rugged rocky eminence; a rough broken cliff or projecting point of rock. *Webster 3d.* b. A sharp, detached fragment of rock. *Webster 3d.*

craigmontite. A light-colored variety of nepheline syenite, containing in descending order of abundance, nepheline, oligosclase, and muscovite, with small amounts of calcite, corundum, biotite, and magnetite; from Craigmont Hill, Ontario, Canada. *Holmes, 1928.*

craignurite. A glassy variety of rhyodacite. *A.G.I.*

cramp. a. Rail bender; Jim Crow. *Mason.* b. A short bar of metal having its two ends bent downwards at right angles for insertion into two adjoining pieces of stone, wood, etc., to hold them together. *Fay.* c. A pillar of rock or mineral left for support. *Fay.* d. Derb. A fastening used to keep pumps in place. *See also* clamp, a. *Fay.* e. A contrivance for holding parts of a frame in place during construction. It usually consists of a steel bar along which slide two brackets between which the work is fixed, one of the brackets being pegged into a hole in the bar while the other is adjustable for position by means of a screw. *C.T.D.* f. A locking bar of incorrodible metal used to bind together adjacent stones in a course, and having bent ends, one of which is fastened into each stone. Also called a cramp iron. *C.T.D.*

crampet. Eng. A bracket. *See also* cramp, d. *Fay.*

crampon; crampoon. An appliance for holding stones or other heavy objects that are to be hoisted by crane. It consists of a pair of bars hinged together like scissors, the points of which are bent inwards for gripping the load, while the handles are connected by short lengths of chain to a common hoist ring. *C.T.D.*

cranch. a. Derb. A pillar of ore left to support the roof or hanging wall. *See also* cramp, c. *Fay.* b. Part of a vein left unworked during previous mining operations. *Nelson.*

crandall. a. A stonecutter's hammer for dressing ashlar. Its head is made up of pointed steel bars of square section wedged in a slot in the end of the iron handle. *Standard, 1964.* b. To dress stone with a crandall. *Standard, 1964.*

crandallite. A hydrous phosphate of calcium and aluminum, $CaO.2Al_2O_3.P_2O_5.6H_2O$; probably orthorhombic; white to light gray; compact to cleavable masses, or fibrous. Formerly called kalkwavellite. From Tintic district, Utah; Dehrn, Nassau, Germany. *English.*

crane. A machine for lifting and transporting heavy weights, generally from above. *Mersereau, 4th, p. 414.*

crane bed. Eng. A pale, earthy limestone with imperfectly formed oolitic particles. *Arkell.*

crane board. N. of Eng. A return air course connected directly with the furnace. *Fay.*

crane boom. A long, light boom, usually of lattice construction. *Nichols.*

crane brae. Scot. A short incline in steep working. *Fay.*

crane ladle. A pot or ladle supported by a chain from a crane; used for pouring molten metals into molds. *Fay.*

craneman. a. Eng. One whose business it is to hoist coal with the crane. *Fay.* b. A man who operates any type of a crane. *Fay.*

craneman, kiln setting. One who operates an overhead crane equipped with a setting machine that grabs piles of brick and sets them in kiln for burning. *D.O.T.1.*

crane post. The vertical member of a jib crane, to the top of which the jib is connected by a tie rod. *C.T.D.*

crane rope. Wire rope consisting of 6 strands of 37 wires around a hemp center. *H & G, p. 129.*

crane tower. That tower of a derrick crane which carries the jib and crane machinery. The two other towers are known as anchor towers. *Ham.*

crank. a. Small coal, Wales. *Fay.* b. Term used in the pottery industry in two related senses: (1) a thin refractory bat used as an item of kiln furniture in the glost firing of wall tiles. A number of cranks, each supporting one or more tiles, are built-up to form a stack; the cranks are kept apart by refractory distance pieces known as dots; and (2) a composite refractory structure for the support of flatware during glost firing and decorating firing; the crank is designed to prevent the glazed surfaces of the ware from coming into contact with other ware or kiln furniture. *Dodd.*

crank angle. In the petroleum industry, (1) the angle made by the centerline of the crank with the centerline of the cylinders or the centerline of the attached slider; and (2) the angle through which the crank turns in a unit time. *Porter.*

crank press. A mechanical press, the slides of which are actuated by a crankshaft. *ASM Gloss.*

crankshaft. The engine shaft that converts the reciprocating motion and force of pistons and connecting rods to rotary motion and torque. *Nichols.*

cranny. Any small opening, fissure, or crevice, as in a wall or rock. *Fay.*

crapply. York. A term applied to friable rocks. *Arkell.*

craquelé. *See* crackle, a. *Dodd.*

crate dam. A dam built of crates filled with stone. *Fay.*

crater. a. In general, a bowl-shaped topographic depression with steep slopes and generally of considerable size. *A.G.I. Supp.* b. The depression above or around the orifice of a volcano that often appears as a funnel-shaped pit maintained by successive explosions at the top of a built-up cone. *Webster 3d.* c. The flaring or bowl-shaped opening of a geyser. *Webster 3d.* d. A depression formed by the impact of a meteorite. *Webster 3d.* e. Any one of thousands of formations on the surface of the moon that range in size from small pocks less than 1 mile in diameter to walled plains nearly 150 miles across and thought by many investigators to have been caused by the impact of huge meteorites and by others to be of igneous origin. *Webster 3d.* f. In blasting, the funnel of rupture, which in bad rock may have very steep sides and a relatively small volume of broken rock. *Stauffer.* g. The formation of a large funnel-shaped cavity at the top of a well, resulting from a blowout or occasionally from caving. *Brantly, 1.* h. In machining, a depression in a cutting tool face eroded by chip contact. *ASM Gloss.* i. In arc welding, a depression at the termination of a bead or in the weld pool beneath the electrode. *ASM Gloss.*

crateral; craterine; craterous. Of or belonging to a crater. *Webster 3d.*

crater cone. A cone built up around a volcanic vent by lava which reached the surface through that vent, either in a molten state or in fragmental condition. *A.G.I.*

crater cuts. These cuts consist of one or several fully charged holes in which blasting is carried out towards the face of the tunnel, that is, towards a free surface at right angles to the holes. *Langefors, p. 230.* These represent in principle a completely new type of cut and make use of the crater effect which is obtained in blasting a single hole at a free rock surface. The possibility of a uniform enlargement can be counted on. This means that if the scale is enlarged so that the diameter and depth of hole and length of the charge are all doubled, for example, a crater of double the depth will be obtained. The number of holes can be increased instead of increasing the diameter of the holes. *Langefors, p. 251.*

cratered. Having a crater or craters. Full of craters, as the cratered moon. *Webster 3d.*

crater fill. A mass of congealed lava in the bottom of a volcanic crater. It is generally of lenticular form and has pronounced columnar jointing. Usually it is bordered by cinders, talus, or weathered rock that has fallen down from the crater wall. *A.G.I.*

crater lake. A lake, generally of freshwater, formed by the accumulation of rain and ground water in a volcanic crater or caldera having a relatively impermeable floor and impermeable walls. Crater Lake, Ore., is an example. *A.G.I.*

craterlet. A little crater. *Webster 3d.*

crater lip. In explosion-formed crater nomenclature, the elevation increase at the crater edge formed by (1) uplifting of strata and (2) deposition of ejecta from the crater. About 25 percent of the apparent crater volume is deposited on the lip. *Mining and Minerals Engineering, v. 2, No. 2, February 1966, p. 65.*

crater, volcanic. A steep-walled depression at the top of a volcanic cone or on the flanks of a volcano. It is directly above a pipe or vent that feeds the volcano, and out of which volcanic materials are ejected. In its simplest form, it is usually a flat-bottomed or pointed, inverted cone more or less circular in plan. The diameter of the floor is seldom over 1,000 feet; the depth may be as much as several hundred feet. It is primarily the result of explosions or of collapse at the top of a volcanic conduit. *See also* crater; explosion crater; lateral crater; pit crater. *A.G.I.*

crater well. A gas or oil well which blows its pipe out or leaks alongside the pipe and washes the soil away from the well until, around the well, a pond or small lake is formed. *Bureau of Mines Staff.*

cratogenic. a. Of or pertaining to a craton. *A.G.I. Supp.* b. Formed in or in relation to a craton. *A.G.I. Supp.*

craton. A relatively immobile part of the earth and generally of large size. Also spelled kraton but craton is preferred in the United States. *A.G.I.*

cratonic shelf. The zone lying between the more positive and negative areas of a craton. *A.G.I. Supp.*

craunch. A piece of a vein left uncut as a support. *Arkell.*

Craven Sunflower method. A method of mine roadway area measurement utilizing the Sunflower apparatus. This instrument consists essentially of a graduated brass rod, of adjustable length, which can be rotated through 360° in a vertical plane. Radial measurements are made from a central point in the airway, and at observed angles, and these are taken to the periphery of the road. From the data so obtained, either a scale diagram of the roadway section is prepared, or else the area is calculated. *Roberts, I, pp. 59-60.*

craw coal. *See* crow coal. *Fay.*

crawl. a. A defect of glazes in which the glaze draws up into droplets or globules, leaving parts of the surface with insufficient glaze. *ACSG.* b. Synonym for crawlway; cat run. *Schieferdecker.*

crawler. a. One of a pair of an endless chain of plates driven by sprockets and used instead of wheels, by certain power shovels, tractors, bulldozers, drilling machines, etc., as a means of propulsion. Also any machine mounted on such tracks. *Bureau of Mines Staff.* b. Local term for an apron feeder to a pan mill used in brickmaking. *Dodd.*

crawler tracks; caterpillars. An endless chain of plates used instead of wheels by certain power shovels, continuous miners, etc. A crawler-track machine is more stable and can travel over softer ground. *Nelson.*

Crawley midget miner. A longwall cutter loader taking a 4-foot 3-inch web in seams 22 to 28 inches in thickness and traveling at 3 feet per minute. The machine is single-ended and has four boring arms spaced at about a 72-degree lag to each other. These operate ahead of the periphery chain which clears any uncut and unloaded coal. The chain cludes flight pick boxes for loading the coal. The machine can be fitted with a sensing device which automatically adjusts the vertical height of the machine. *See also* coal-sensing probe. *Nelson.*

Crawley-Wilcox miner. A continuous miner for use in narrow headings in seams 22 to 46 inches thick. It has two augers, the diameters of which can be varied to suit seam thickness, with picks on front cutting edges and auger scrolls. The augers rotate in opposite directions and the coal is discharged onto a bridge conveyor and then onto a chain conveyor. It can operate on gradients up to 1 in 3 dipping and 1 in 2½ rising. *Nelson.*

crawling. A condition very similar to tearing which occurs when firing a sprayed enamel coating over another coating already fired. The characteristic of crawling is the aggregating of the top-coat into balls of irregular-shaped islands during firing, thus exposing the first coat between these islands.

May be caused by too heavy application, improper drying conditions or too finely ground enamel. *Hansen*.

crawlway. A low passageway that only permits the passage of a man by crawling. *A.G.I.*

craw picker. Scot. One who picks stones from coal or shale. *Fay*.

craze. a. Corn. The tin ore which collects in the middle part of the buddle; middlings. Also called creaze. *Fay*. b. Hairlike cracks appearing in a glaze. Also called crazing. *C.T.D.*

crazeproof enamel. An enamel which will not craze when given a severe thermal shock test. *Hansen*.

crazing. a. The cracking of a surface layer into small irregularly shaped contiguous areas. *Taylor*. b. Almost invisible cracking in a finished enamel surface, extending down to the base metal. This condition should not be confused with "hairlines". *Enam. Dict.*

crazing pot. Popular name in the pottery industry for an autoclave. *Dodd*.

cream. A rusty impure meerschaum. *Fay*.

cream bed. Som. Fine-grained, grayish limestone. *Arkell*.

creams. Sometimes designates a very high quality drill diamond. *Long*.

crease. a. A limestone quarry in the side of a mountain. *Nelson*. b. An old stream channel. *Fay*.

crease limestone. Forest of Dean. Division of the Carboniferous limestone containing iron ore. *Arkell*.

creashy peat. Term used in Scotland for a variety a highly bituminous peat. *Tomkeieff, 1954*.

creasote. *See* creoesote. *Bennett 2d, 1962*.

creaze. Corn. Low-grade middling which collects in middle zone in buddling. *Pryor, 3*.

crednerite. An iron-black to steel-gray metallic mineral with a black to brownish streak and perfect cleavage, $CuMn_2O_4$. *Dana 7d, v. 1, p. 723*.

creedite. A colorless, purple hydrous sulfate and fluoride of calcium and aluminum, $2CaF_2 . 2Al(F,OH)_3 . CaSO_4 . 2H_2O$; monoclinic; prismatic crystals, grains, and radiating masses. From Wagon Wheel Gap, Colo.; Tonopah, Nev. *English*.

creek. a. In maritime districts, a small tidal inlet. *Fay*. b. In inland districts, a small stream or branch of a river; a brook. *Fay*. c. A stream of less volume than a river. A small tidal channel through a coastal marsh. Local in Maryland and Virginia, a wide arm of a river or bay. A long shallow stream flowing intermittently or an arroyo; local in the southwestern United States. *A.G.I.*

creek claim. A claim which includes the bed of a creek. Under the statute of Oregon, a tract of land 100 yards square, one side of which abuts on a creek or rather extends to the middle of the stream. *Fay*.

creekology. a. An ironical term for unscientific methods of choosing drilling sites or prospective oil or gas acreage and particularly applied to selection based on the general appearance of outcrops, topography, drainage, etc. *A.G.I.* b. The term was derived from the primitive, unscientific practice of locating drilling sites for oil wells along creeks in Pennsylvania in the 1860's and 1870's. *Bureau of Mines Staff*.

creek placers. Placers in, adjacent to, and at the level of small streams. *Fay*.

creek right. The privilege of diverting water for the purpose of working a creek claim. *Fay*.

creel. Scot. A kind of basket in which coal and rock are conveyed from the mine. *Fay*.

creep. a. A slow movement of rock debris or soil due to gravity, down a slope for instance. It is usually imperceptible except to observations over a long period. *ASCE P1826*. b. The slow and imperceptible movement of finely broken up rock material from higher to lower levels. Also the material itself that has moved. *A.G.I.* c. An imperceptibly slow, more or less continuous downward and outward movement of slope-forming soil or rock. The movement is essentially viscous, under shear stresses that are large enough to produce permanent deformation but are too small to produce shear failure, as occurs in a landslide. *Stokes and Varnes, 1955*. d. Slow deformation that results from long application of a stress. By many investigators, it is limited to stresses below the elastic limit. Part of the creep is a permanent deformation. Part of the deformation is elastic and from this part of the specimen recovers. *A.G.I.* e. Eng. A squeeze or crush forcing the pillars down into the floor which often give the miner the impression that the floor is rising, due to its being softer than the roof. Any slow movement of mining ground. Also called squeeze; pull. *Compare* thrust. *Fay*. f. A gradual movement of loose rock material such as clay, due to alternate freezing and thawing, wetting and drying, or other causes. *Fay*. g. To rise above the surface of a solution upon the walls of a vessel, as salt crystals in a voltaic cell. *Webster 2d*. h. A very slow movement of a winding engine, when the brake is not sufficiently applied to hold it. *Fay*. i. A very slow gradual movement of the drill-hoist drum when the brake is worn or not securely set. *Long*. j. *See* drag, q. *Higham, p. 104*. k. The action of a belt in alternately losing speed on the driving pulley because of contraction in length due to lowered tension when leaving, and gaining speed on the driven pulley because of stretching caused by the tight side tension. *ASA MH4.1-1958*. l. Very slow travel of a machine or a part. *Nichols*. m. Unwanted turning of a shaft due to drag in a fluid coupling or other disconnect device. *Nichols*. n. Time-dependent strain occurring under stress. The creep strain occurring at a diminishing rate is called primary creep; that occurring at a minimum and almost constant rate, secondary creep; that occurring at an accelerating rate, tertiary creep. *ASM Gloss.* o. A slow inelastic or plastic deformation of concrete or steel under continued stress. *Taylor*. p. The rise of a precipitate on the wet walls of a vessel. *C.T.D.* q. The formation of crystals on the sides of a vessel above the surface of an evaporating liquid. *C.T.D.*

creeper. An endless chain, with projecting bars at intervals which catch the car axles and haul them up an inclined plane. They are used on the surface and around the pit bottom. Creepers are also used on relatively flat roadways to retard or propel the cars as required. *See also* retarder. *Nelson*.

creeper crane. A crane of high lifting capacity for building steel arch and cantilever bridges. It generally travels along the top chord of such a bridge during construction. *Ham*.

creeping. Eng. The settling or natural subsidence of the surface caused by extensive underground mining. *Fay*.

creep limit. a. The maximum stress that will cause less than a specified quantity of creep in a given time. *ASM Gloss.* b. The maximum nominal stress under which the creep strain rate decreases continuously with time under constant load and at constant temperature. Sometimes used synonymously with creep strength. *ASM Gloss.*

creep recovery. Time-dependent strain after release of load in a creep test. *ASM Gloss.*

creep-rupture test. Same as stress-rupture test. *ASM Gloss.*

creep strength. a. The constant nominal stress that will cause a specified quantity of creep in a given time at constant temperature. *ASM Gloss.* b. The constant nominal stress that will cause a specified creep rate at constant temperature. *ASM Gloss.*

creep tests. Methods for measuring the resistance of metals to creep. Time-extension curves under constant loads are determined. The methods used vary with respect to the duration of the tests and the procedure adopted in estimating behavior during long periods of time. *C.T.D.*

creep wrinkles. Small microfolds or corrugations on the bedding plane, perpendicular to the direction of movement (slumping or creep). *See also* crinkle marks; pseudoripple marks. *Pettijohn*.

creeshy; greasp blaes. Scot. Smooth-faced nodules of shale or bind occasionally found in the roof of some coal seams. *Nelson*.

creeshy clods. Peat which on drying breaks into irregular clods which burn with a clear bright flame like a lump of tallow or grease. *Tomkeieff, 1954*.

Cremer kiln. A German design of tunnel kiln that can be divided into compartments by a series of metal slides to permit better control of temperature and atmosphere. The fired ware is cooled by air currents through permeable refractory brickwork in the kiln roof or by water-cooling coils. *Dodd*.

Cremnitz white. White pigment consisting of lead carbonate and hydrated lead oxide. *Bennett 2d, 1962*.

crenitic. Derived from the Greek for spring. Used by Crosby to describe mineral veins which have been deposited by uprising springs. *Fay*.

crenulate shoreline; indented shoreline. Ungraded shoreline, showing many sharp headlands; typical of a shoreline in an early stage of shoreline development. *Schieferdecker*.

crenulation. A small fold with a wavelength of a few millimeters that occurs chiefly in metamorphic rocks. Synonym for wrinkle. *A.G.I.*

creoline. A purplish epidotized basalt in Massachusetts. *Hess*.

creolite. Banded jasper from Shasta County, California. *Schaller*.

creosote. a. A colorless to yellowish oily liquid compound consisting of a mixture of phenols distilled from wood, and having a smoky odor and burning taste. *Standard, 1964*. b. To impregnate (wood) with creosote oil. *Webster 3d*. c. As used in wood preservation, a distillate of coal tar produced by high-temperature carbonization of bituminous coal; it consists principally of liquid and solid aromatic hydrocarbons, and contains appreciable quantities of tar acids and tar bases; it is heavier than water; and has a continuous boiling range of at least 125° C beginning at about 200°

c. Also called creosote oil; creosote distillate. *ASTM D324-41.*

creosote, beechwood. *See* creosote, wood-tar. *CCD 6d, 1961.*

creosote coal-tar solution. A solution of coal tar in creosote in various proportions. Usually contains 20 to 40 percent of coal tar. *ASTM D324-41.*

creosote, wood-tar; creosote, beechwood. A colorless or faintly yellow, oily liquid; characteristic smoky odor; miscible with alcohol, ether, and fixed or volatile oils; and specific gravity, 1.080. Used as an ore-flotation agent. *CCD 6d, 1961.*

creosoting. The injecting of creosote into timber which is to be exposed to the weather, in order to increase its durability. *Crispin.*

creosoting cylinder. Strong wrought-iron cylinder in which railroad ties, etc., are exhausted of their moisture and filled with creosote pumped in under pressure. *Crispin.*

crept bord. Eng. A bord or room more or less filled up from the effects of creep. *Fay.*

crept pillars. Eng. Pillars of coal which have passed through the various stages of creep. *Fay.*

crescent cast. *See* current crescent. *Pettijohn.*

crescentic. Resembling or suggesting a crescent, which is the shape or figure defined by a convex and concave edge. Like a crescent moon. *Webster 3d.*

crescentic dune. Synonym for barchan. *A.G.I.*

crescentic fracture. A curved fracture made by glacial ice that is convex upcurrent. *Pettijohn.*

crescentic gouge. *See* gouge marks. *Pettijohn.*

crescentic lake. Synonym for oxbow. *A.G.I.*

crescentic scour mark. *See* current crescent. *Pettijohn.*

crescent-type cross-bedding. Same as trough cross-stratification. *Pettijohn.*

cresol; methyl phenol; cresyl alcohol. CH_3-C_6H_4OH. Used as a flotation agent. *CCD 6d, 1961.*

Crespi hearth. A type of open-hearth steel furnace bottom characterized by the fineness of the particles of dolomite used for ramming; after it has been burned-in, the hearth is very dense and resistant to metal penetration. *Dodd.*

cressed. Reduced about one-eighth inch in diameter for a short distance at ends. A foreign term, used on artesian well casing. *Fay.*

crest. a. The summit of any eminence; the highest natural projection which crowns a hill or mountain, from which the surface dips downward in all directions, or in opposite directions. *A.G.I.* b. The highest point on an anticline. *See also* crestline. *A.G.I.* c. The line connecting the highest points on the same bed in an infinite number of cross sections across a fold. *Billings, 1954, p. 36.* d. In oceanography, a narrow rise having an irregular longitudinal profile and constituting the top of a sea-bottom elevation. *Schieferdecker.*

crestal plane. The plane formed by joining the crests of all beds in an anticline. *See also* crest. *A.G.I.*

crested. Consisting of groups of tabular crystals forming ridges. *Shipley.*

crest gate. A gate for maintaining or lowering water level, erected at the crest of a dam. *See also* roller gate; sliding gate. *Ham.*

cresting. Trimming used on the ridge of tiled roofs. Same as hip roll. *Fay.*

crestline. In an anticline, the line connecting the highest points on the same bed in an infinite number of cross sections. Not necessarily the same as the axis of a fold. *See also* crest, b. *A.G.I.*

crest of berm. The seaward margin of the berm. *See also* berm. *Hy.*

cresyl alcohol. *See* cresol. *CCD 6d, 1961.*

cresylic. Mixture of cresol isomers. Frother and froth stabilizing agent in flotation process. Emulsion stabilizer. *Pryor, 3.*

cresylic acid. The trade designation for commercial mixtures of phenolic materials boiling above the cresol range. Consists of phenols, cresols, and xylenols and higher phenols in various proportions, according to its source and boiling range. Used as a flotation agent. *CCD 6d, 1961.*

Cretaceous. a. From the Latin creta, meaning chalk. Applied to the third and final period of the Mesozoic era. Extensive marine chalk beds were deposited during this period. *Bureau of Mines Staff.* b. Of the nature of chalk or relating to chalk. *Fay.* c. Also the system of strata deposited in the Cretaceous period. *Fay.*

crevasse; crevass. a. A break, opening, or chasm of some width and considerable depth. *Webster 3d.* b. A split or cleavage through massed ice, a glacier, a snow field, or through earth after earthquakes. *Webster 3d.* c. A breach in the levee of a river. *Webster 3d.*

crevasse filling. An elongate kame believed to have been deposited in a crevasse. *A.G.I.*

crevasse ridge. Fluvial material deposited in a glacial crevasse and now occurring as a more or less straight ridge rising above the general land surface and extending parallel to the direction of ice movement. *A.G.I. Supp.*

crevet. A goldsmith's crucible. *Hess.*

crevice. a. Pac. A shallow fissure in the bedrock under a gold placer, in which small but highly concentrated deposits of gold are found. *Fay.* b. The fissure containing a vein. As employed in the Colorado statute relative to a discovery shaft, a crevice is a mineral-bearing vein. *Fay.*

crevice corrosion. A type of concentration-cell corrosion; corrosion of a metal that is caused by the concentration of dissolved salts, metal ions, oxygen, or other gases, and such, in crevices or pockets remote from the principal fluid stream, with a resultant building up of differential cells that ultimately cause deep pitting. *ASM Gloss.*

crevice oil. Oil occurring in the cracks in shale, as in the Florence, Colo., oilfield. *Porter.*

crevicing. Collecting gold that is in the crevices of a rock. *Fay.*

crew loader. In bituminous coal mining, one of a crew of loaders who shovels coal, blasting from working face, onto a conveyor that transports it from the underground working place to a point where it is loaded into mine cars. *D.O.T. 1.*

crib. a. A shaft-sinking curb. Also used for a timber chock. *Nelson.* b. A structure composed of frames of timber laid horizontally upon one another, or of timbers built-up as in the walls of a log cabin. *Fay.* c. A miner's luncheon. *Fay.* d. Eng. A cast-iron ring in a shaft upon which tubbing is built up. *See also* wedging curb. *Fay.* e. Eng. A wooden foundation upon which the brick lining or walling of a shaft is built. *Fay.* f. An interval from work underground for croust, bait, snack, downer, piece, chop, snap, bit, or tiffin. *C.T.D.* g. A job. *C.T.D.* h. A drill base made of timber stacked log-cabin fashion. *Long.* i. To support walls of an excavation by lining the opening with timbers and boards. *Long.* *See also* cog; curb, a; nog; chock; pack.

cribadura. Sp. Screening. *Hess.*

cribbe. Mex. Cribbing, including rock-filled cribs to support the roof. *Bureau of Mines Staff.*

cribbing. a. The construction of cribs, or timbers laid at right angles to each other, sometimes filled with earth, as a roof support or as a support for machinery. *B.C.I.* b. The close setting of timber supports when shaft sinking through loose ground. The timber is usually square or rectangular and practically no ground is exposed. The method is also used for constructing ore chutes. *See also* barring; close timbering. *Nelson.* c. A method of timbering used primarily to rectify a mistake of removing too great a percentage of the coal on the advance, and has the effect of replacing part of the coal. Some are made by using timbers in pigpen style; first laying timbers one way then placing other timbers across the first. This is continued until the area between the bottom and the roof is filled and wedged tight. Others are made by laying a layer of timbers first in one direction, then another layer across at right angles to the bottom layer. Space between the timbers in a layer varies according to requirements. The hollow type are generally filled with gob. *Kentucky, p. 142.*

cribble. A sieve. *Fay.*

crib dam. A dam constructed of interlocking rectangular sections of timber or precast concrete, laid to a batter, and forming cells which are filled with earth or broken rock. *See also* gravity retaining wall. *Ham.*

crib kettle. A dinner pail. *Zern.*

cribs. Segments of oak to encircle the shaft. *Peel.*

cribwork. A construction of timbering made by piling logs or beams horizontally one above another, and spiking or chaining them together, each layer being at right angles to those above and below it. *See also* crib, b. *Fay.*

crichtonite. A variety of ilmenite in which the proportion of titanic oxide is less than normal. *Standard, 1964.*

cricks. a. Som. Clay galls. *Arkell.* b. Vertical joints affecting only the lower strata in a quarry. *Arkell.* c. Joints in slate with an inclination opposite to the dip of the rock. *Arkell.*

criggling. Term used in South Wales for a carbonaceous shale or clay associated with coal. *Tomkeieff, 1954.*

Crilley and Everson process. A flotation process in which the ore is crushed to 50 mesh and mixed with a thick black oil. Boiling water containing enough acid to give it a tart taste is then added. This process was tried at Baker City, Ore. and at Denver, Colo., in 1889. *Liddell 2d, p. 406.*

crimp. a. The flattening made by a crimper near the mouth of a blasting cap for holding the fuse in place. *Fay.* b. To fix detonator on blasting fuse by squeezing it with special pliers. *Pryor, 3.* c. A tight bend in metal made under pressure. *Nichols.*

Crimp and Bruges' formula. A formula connecting the rate of flow in a sewer with its hydraulic mean depth and slope:

$$v = 124m^{0.67}\sqrt{i},$$

where v is the velocity of flow, m is the hydraulic mean depth, and i is the hydraulic gradient. The units are in feet per second and feet. *See also* Barnes' formula. *Ham.*

crimper. A tool specially made for fastening a cap to a fuse. *Stauffer. See also* cap crimper.

crimping. a. The action of squeezing the open end of a plain detonator, or detonating relay, over a length of fuse. *B.S. 3618, 1964, sec. 6.* b. Forming relatively small corrugations in order to: (1) set down and lock in a seam, (2) create an arc in a strip of metal, and (3) reduce an existing arc or diameter. *ASM Gloss.* c. An operation wherein the metal around or along the edge of the piece is shaped into the form of a roll or curl. *Hansen.*

crimson night stone. Purple fluorite from Idaho. *Schaller.*

crinanite. A rock composed of sodic plagioclase, much titanaugite and olivine, with minor analcite, apatite, and opaque oxides. The texture is ophitic. A variety of theralite. *A.G.I.*

crinkle. A small fold, usually a fraction of an inch in wavelength. *A.G.I.*

crinkled. A textural effect on a porcelain enamel surface having the appearance of fine wrinkles or ridges. *ASTM C286-65.*

crinkled bedding. Bedding or laminations displaying minute wrinkles; in carbonate rocks crinkled bedding is believed related to algal mats. Term also used for convolute bedding. *Petetijohn.*

crinkled stone. A diamond with a shallowish, wavy, or rough surface. *Bureau of Mines Staff.*

crinkle marks. A series of sub-parallel corrugations of the bedding surface related to very small-scale crumpled internal laminations ascribed to subaqueous solifluction. *See also* creep wrinkles. *Pettijohn.*

crinkling. Drawing up of the enamel surface into ridges. *ACSB, 3.*

crinoid. A marine invertebrate animal belonging to the phylum Echinodermata. Fossil crinoids are found in rocks of Upper Cambrian and all subsequent ages. Typically, they are attached by a jointed stem and have a shape resembling a lilylike plant; hence the name sea lily is commonly applied. Crinoids were especially abundant in the Devonian and Mississippian periods, declined at the end of the Paleozoic era, and achieved a secondary maximum in the middle of the Mesozoic era. About 650 species still exist. *See also* Crinoidea. *Stokes and Varnes, 1955.*

crinoidal limestone. A marine limestone composed largely of fossil crinoid remains, such as plates, disks, and stems or columns. *Bureau of Mines Staff.*

Crinoidea. a. A large class of chiefly tropical or fossil echinoderms that have a more or less cup-shaped body provided with five or more feathery arms that are commonly bifurcated or many-branched and bearing pinnules, a mouth lying between the arms on the concave upper surface, and opposite the mouth usually a long jointed stalk fixed to the base of the body and having its opposite end divided into rhizoid processes that anchor the animal to the sea bottom. *Webster 3d.* b. A class of stemmed or secondarily free echinoderms with regularly arranged body plates and arms that continue the structures of the lateral body plates. Range from the Ordovician period to the Recent. *See also* crinoid. *A.G.I. Supp.*

cripple. (Dialect) A swampy or low wet ground usually covered with brush or thickets. *Webster 3d.*

crippling load. The load under which a long column starts to bend. Hooke's law ceases to apply at such a load, so that a very slight increase of load causes a very large increase of deflection. *Ham.*

crisis. An old and not much used term denoting the stage of melting when the firing could be reduced to allow the glass to cool off and the last traces of bubble to disappear. *C.T.D.*

crispite. Sagenite. *Schaller.*

cristobalite. A mineral, like quartz, SiO_2, and is present in many siliceous volcanic rocks, both as the lining of cavities and as an important constituent in the fine-grained groundmass. Tetragonal (?); pseudoisometric; colorless; luster, vitreous; translucent; stable only above 1,470° C; Mohs' hardness, 7; specific gravity, 2.30. High-temperature cristobalite is isometric and frequently forms in small octahedral crystals. In the United States, it is found associated with tridymite in the lavas of the San Juan district, Colo. It is an important constituent of silica brick. *Dana 17, p. 485.*

cristograhamite. Grahamite from the Cristo mine, Huasteca, Mex. *Fay.*

critch. Lime in its strong state; the stratum above a stone bed; critchy (stony). *Arkell.*

critical. *See* criticality. *L&L.*

critical angle. a. The angle at which a ray of light in passing from a dense medium, such as a gem stone, into a rarer medium, such as air, is refracted at 90° to the normal. Any rays reaching the intersurface at angles greater than the critical angle are unable to pass into the rarer medium, and are totally reflected. *Anderson.* b. The angle of incidence at which refracted light just grazes the surface of contact between two different media. *A.G.I. Supp.* c. *See* stalling angle. *Sinclair, I, p. 102.*

critical area. In prospecting work, an area found to be favorable, from geological age and structural considerations. *See also* favorable locality. *Nelson.*

critical area of extraction. The area of coal required to be worked to cause a surface point to suffer all the subsidence possible from the extraction of a given seam. *Nelson.*

critical assembly. An assembly of sufficient fissionable material and moderator material to sustain a fission chain reaction at a low-power level. This permits the study of the behavior of all the components of the assembly for various types of fissionable material and for many different geometric arrangements. *L&L.*

critical circle; critical surface. The sliding surface assumed in a theoretical analysis of a soil mass for which the factor of safety is a minimum. *ASCE P1826.*

critical coefficient. The ratio of the critical temperature to the critical pressure. *Webster 3d.*

critical cooling rate. The minimum rate of continuous cooling just sufficient to prevent undesired transformations. *ASM Gloss.*

critical current. As applied to electric blasting caps, the minimum current that can be employed to fire detonators connected in series so that the chance of a misfire will be less than 1 in 100,000. *Fraenkel, v. 3, Art. 16:10, p. 3.*

critical current density. In an electrolytic process, a current density at which an abrupt change occurs in an operating variable or in the nature of an electrodeposit or electrode film. *ASM Gloss.*

critical damping. The point at which the damping constant and the undamped frequency of a seismometer or seismograph are equal. After deflection, the moving mass approaches rest position without overswing and the motion is said to be aperiodic. *A.G.I.*

critical density. a. The density of a substance at its critical temperature and under its critical pressure. *A.G.I.* b. The unit weight of a saturated granular material below which it will lose strength and above which it will gain strength when subjected to rapid deformation. The critical density of a given material is dependent on many factors. *ASCE P1826.* c. In particle classification under approximately free conditions of fall through water, the minimum ratio of solid to liquid at which the hindering effect conferred by the solid-liquid mixture is effective. *Pryor, 3.*

critical depth. A given quantity of water in an open conduit may flow at two depths having the same energy head. When these depths coincide, the energy head is a minimum and the corresponding depth is Belanger's critical depth. *Seelye, 1.*

critical distance. In refraction seismic work, that distance at which the direct wave in an upper medium is matched in arrival time by that of the refracted wave from the medium below having greater velocity. *A.G.I.*

critical experiment. An experiment conducted to verify the results of calculations relative to the critical size and other physical data affecting a reactor design. The power is kept so low that equipment to remove heat is not reequired. *L&L.*

critical facility. A facility where critical experiments are conducted. *L&L.*

critical flow. A condition of flow for which the mean velocity is at one of the critical values. *See also* critical velocity; subcritical flow; supercritical flow. *Seelye, 1.*

critical height. The heights of vertical cuts in a cohesive soil (for example, clay) at which they will stand without supports. *Nelson.*

critical hydraulic gradient. The hydraulic gradient at which the intergranular pressure in a mass of cohesionless soil is reduced to zero by the upward flow of water. *ASCE P1826.*

criticality. The state of a nuclear reactor when it is sustaining a chain reaction. *See also* dry criticality; wet criticality. *L&L.*

critical mass. The smallest mass of fissionable, material that will support a self-sustaining chain reaction under stated conditions. *L&L.*

critical material. A material that is vital to the national defense, the main source of which is within the continental limits of the United States, and which may not be produced in quality and in quantity sufficient to meet requirements. *A.G.I.*

critical minerals. a. Minerals essential to the national defense, the procurement of which in war, while difficult, is less serious than those of strategic minerals because they can be either domestically produced or obtained in more adequate quantities or have a lesser degree of essentiality, and for which some degree of conservation and distribution control is necessary. *See also* strategic minerals; essential mineral. *Hess.* b. Minerals or mineral associations that are stable only under the conditions of one given metamorphic facies and will change upon change of facies. For example, in Eskola's greenschist facies, sericite and chlorite, albite and epidote are critical mineral associations because these combinations cannot persist out of the field of the greenschist facies, although any one of the individual minerals may be found in more than one facies. *Schieferdecker.*

critical path schedule. A methodical and graphical means of programming work with the aid of a line diagram, on which are shown by one line per activity the duration, cost and inter-relationships of all activities comprising a project. *Taylor.*

critical point. a. The point at which the properties of a liquid and its vapor become indistinguishable. It is generally synonymous with critical temperature. *A.G.I.* b. The temperature or pressure at which a change in crystal structure, phase, or physical properties occurs. The same as transformation temperature. *ASM Gloss.* c. In an equilibrium diagram, that specific value of composition, temperature, and pressure, or combinations thereof, at which the phases of a heterogeneous system are in equilibrium. *ASM Gloss.*

critical potential. A potential which produces a sudden change in magnitude of the current. *ASM Gloss.*

critical pressure. a. The maximum feed pressure that can be applied to a diamond bit without damaging the bit or core barrel. *Long.* b. The minimum load, in pounds per effective diamond cutting point in a bit face, at which the diamonds cut the rock. Below this load, the diamonds slide on the rock surface without penetrating the rock, and the diamonds polish, become dull, and are rendered unfit for further use in that particular ground unless reset. *Long.* c. The pressure exerted by a substance in its critical stage. *Webster 3d.* d. The pressure at which a gas may just be liquefied at its critical temperature. *C.T.D.*

critical range. The range of temperature in which the reversible change from austenite (stable at high temperature) to ferrite, pearlite, and cementite (stable at low temperature) occurs. The upper limit varies with carbon content; the lower limit for slow heating and cooling is about 700° C. *C.T.D.*

critical rate. The rate of cooling required to prevent the formation of pearlite and to secure the formation of martensite in steel. With carbon steel this means cooling in cold water, but it is reduced by the addition of other elements, hence oil- and air-hardening steels. *C.T.D.*

critical slope. a. The maximum angle with the horizontal at which a sloped bank of soil or given height of soil will stand unsupported. *ASCE P1826.* b. Synonym for angle of repose. *A.G.I.*

critical speed. a. The speed at which a rotating drill stem begins to vibrate excessively; hence by either decreasing or increasing the rotational speed of the drill stem the vibration may be reduced or alleviated. *Long.* b. The theoretical speed at which a ball is held to the inner surface of the smooth ball mill liners by centrifugal force

$$n = \left[\frac{76.6}{\sqrt{d}}\right]$$ where n equals revolutions per minute, and d the mill diameter in feet. *Pryor, 4.* c. A rotational speed that corresponds to a natural frequency of the rotating member. *ASM Gloss.*

critical state. An unstable condition of a substance when on the point of changing from a liquid to a vapor, or vice versa, defined by its critical temperature and its critical pressure. The former is the highest temperature at which that particular substance can exist in the liquid state at any pressure. The latter is the vapor pressure at the critical temperature. For example, the critical temperature for carbon dioxide is 31° C and its critical pressure is 73 atmospheres. *Standard, 1964.*

critical strain. The strain just sufficient to cause the growth of very large grains during heating where no phase transformations take place. *ASM Gloss.*

critical stress. Maximum compressive and tensile stress on boundary of opening. *Bu-Mines Bull. 587, 1960, p. 2.*

critical surface. *See* critical circle. *ASCE P1826.*

critical temperature. a. That temperature above which a substance can exist only in the gaseous state, no matter what pressure is exerted. *A.G.I.* b. The temperature of a substance in its critical state. The highest temperature at which it is possible to separate substances into two fluid phases (the vapor phase and the liquid phase). *Webster 3d.* c. The transition temperature of a solid from one allotropic form to another (as the Curie point of a metal, for example; or the temperature (573° C) at which alpha quartz changes to beta quartz). Synonym for transformation temperature. *Bureau of Mines Staff.* d. The temperature at which a change takes place in the physical form of a substance; for example, the change of diamond to the amorphous form of carbon begins at a temperature of 1,800° F in presence of oxygen. *Long.* e. Synonymous with critical point if the pressure is constant. *ASM Gloss.* f. The temperature above which the vapor phase cannot be condensed to liquid by an increase in pressure. *ASM Gloss.*

critical velocity. a. Reynolds' critical velocity is that at which the flow changes from laminar to turbulent, and where friction ceases to be proportional to the first power of the velocity and becomes proportional to a higher power—practically the square. *Seelye, 1.* b. Kennedy's critical velocity is that in open channels which will neither deposit nor pick up silt. *Seelye, 1.* c. Belanger's critical velocity is that condition in open channels for which the velocity head equals one-half the mean depth. *See also* critical depth. *Seelye, 1.*

critical void ratio. The void ratio corresponding to the critical density. *ASCE P1826.*

critical volume. The specific volume of a substance in its critical state. *Webster 3d.*

crizzle. A roughness on the surface of glass, clouding its transparency. *Standard, 1964.*

crizzling. Fine cracks in the surface of the glass, occasioned by local chilling during manufacture. *C.T.D.*

crocidolite; blue asbestos; cape blue. Variety of asbestos; $(OH)_2Na_2Fe_5Si_8O_{22}$; lavender-blue in color; suited for spinning and weaving. *Bennett 2d, 1962.*

corcidolite opal. A common opal containing inclusions of crocidolite. *See also* opal cat's-eye. *Shipley.*

corcidolite quartz. Tiger eye. *Shipley.*

crockery. A term covering all kinds of domestic pottery. *C.T.D.*

Crockett magnetic separator. Series of flat magnets of alternate polarity, with pole pieces pointed down and forming a continuous arc, below which is a continuous belt. This assembly is submerged in a tank with several hoppers through which pulp flows. Magnetic solids adhere to underside of belt and are dragged clear. *Pryor, 3.*

crocoisite. *See* crocoite.

crocoite. An orange Siberian mineral consisting of lead chromate, $PbCrO_4$; monoclinic. Also spelled crocoisite. *A.G.I.* Also called red lead ore. *Webster 3d.*

crocus. A term used in the Milford, N.H., quarries to denote gneiss or any other rock in contact with granite. *Fay.*

crocus cloth. Cloth to which pulverized oxide of iron is glued; used for polishing. *Crispin.*

crocus martis. A name used for impure red ferric oxide pigments and polishing powders, usually produced by heating iron sulfate containing calcium sulfate, lime, or other inert filler. Also sometimes applied more generally to other impure oxides of red or yellow color. *CCD 6d, 1961.*

crocus of antimony. Brownish-yellow; mainly sodium or potassium thioantimonite; Na_3SbS_3 or K_3SbS_3. Obtained as a slag in refining antimony. *Webster 3d.*

crocus of Venus. An old name for cuprous oxide. Used in making red glass and glazes. *Hess.*

crocus, red. A red pigment based on ferric oxide but containing a large proportion of calcium sulfate or similar material. Similar to Venetian red. *CCD 6d, 1961.*

crog balls; crogs. Eng. Large to immense concretionary masses of limestone. *Arkell.*

croha. Belg. A local name in Liege for a coal closely resembling English cannel coal. *Bureau of Mines Staff.*

Croixan. The rocks of the Upper Cambrian age in the Pacific province in North America, so named from St. Croix, Minn., the type locality. *C.T.D.*

cromaltite. An alkali pyroxenite, containing aegirine-augite, melanite, and biotite; from the Cromalt Hills, Assynt, Scotland. *Holmes, 1928.*

Croning process (C process). A shell-molding process. *ASM Gloss.*

Cronite #1. Explosive; used in mines. *Bennett 2d, 1962.*

cronstedtite. A coal-black to brownish-black hydrous iron silicate, $6[Fe''_2Fe'''_2SiO_5(OH)_4]$, with some replacement of Fe'''_2 by Fe'' Si (?); sometimes contains magnesium; structurally related to kaolinite; not a chlorite. *Fay; Hey 2d, 1955.*

crook. A self-acting apparatus for running the hudges (boxes on runners) on inclines in step coalbeds. *Bureau of Mines Staff.*

crooked hole. A borehole which has deviated from the vertical or from the direction along which it was started. Horizontal and inclined diamond drill holes over 300 feet in length are liable to deviate badly. Holes which are drilled vertically may also deviate but not usually to the same degree. A borehole may become crooked due to (1) dipping strata of different hardness; (2) fault planes or shear zones; or (3) drilling defects or inefficiency. *See also* borehole surveying. *Nelson.*

Crookes glass. Glass made with rare earths having low transmission for ultraviolet light. *Bennett 2d, 1962 Add.*

crookesite. a. A massive, compact, metallic, lead-gray selenide of copper, thallium, and silver, $(Cu,Tl,Ag)_2Se$. *Fay.* b. Synonym of tammite. *Hey 2d, 1955.*

croot; crutch. Som. A mealy white stone, marted with ore, and soft, associated with the lead ore, Mendips. *Compare* critch; crouch clay. *Arkell.*

crop. a. The outcrop of a lode; or the coal of poor quality at the outcropping of a seam. *Standard, 1964.* b. As a verb, to appear at the surface; to outcrop. *Webster 3d.* c. The roof coal or stone which has to be taken down in order to secure a safe roof in the workings. *Fay.* d. Corn. *See* crop tin. *Fay.* e. To leave coal at the bottom of a bed. *See also* cropping coal. *Fay.* f. To fine when the coal in a tub contains too much refuse; it is done by deducting a percentage of the weight. *Standard, 1964.* g. A defective end portion of an ingot which is cut off as scrap. *ASM Gloss.*

crop coal. a. Coal of inferior quality near the surface. *Fay.* b. N. of Eng. Coal remaining on the floor after face has been undercut, caused by the cutterjib rising from the floor. Has to be taken up by picks. In higher, wet seams may be deliberately left to allow water to drain from the face into the goaf. *Trist.* c. The coal next to the roof in a seam. *Nelson.*

crop fall. A caving in of the surface at the outcrop of the bed caused by mining operations. Applied also to falls occurring at points not on the outcrop of the bed. Synonymous with day fall. *Fay.*

cropline. A line following the outcrop. *Austin.*

crop load. The mixture of crushing bodies, ore particles, and water being tumbled in the ball mill. *Pryor, 4.*

crop ore. Eng. First-quality tin ore, cleaned for smelting. *Standard, 1964.*

crop out. a. Synonym for outcrop. *Long.* b. To be exposed at the surface; referring to bedrock surface exposures. *See also* outcrop. *Fay.*

cropper. Eng. A shot placed at the highest side or edge of a shaft bottom. *Fay.*

cropping. a. Coal cutting beyond the normal cutting plane. *Mason.* b. Portions of a vein or other rock formation exposed at the surface. *Fay.* c. An outcrop. *Standard, 1964.* d. The operation of cutting off the end or ends of an ingot to remove the pipe and other defects. *C.T.D.*

cropping coal. The leaving of a small thickness of coal at the bottom of the seam in a working place, usually in back water. The coal so left is termed "cropper coal." *Zern.*

cropping out. The natural exposure of bedrock at the surface. That part of a vein that appears at the surface is called the cropping or outcrop. *Fay.*

crop tin. The chief portion of tin ore separated from waste in the principal dressing operation. *Fay.*

crop upwards. Eng. In miners' parlance, to rise. *Fay.*

cross. a. A pipe fitting with four branches arranged in pairs, each pair on one axis, and the axes at right angles. When the outlets are otherwise arranged, the fittings are branch pipes or specials. *Strock, 3.* b. *See* crosscut, from Wales. *Fay.* c. *See* andre. *Mason.*

crossarm. a. The top member of a drill derrick of H-frame from which the sheave wheel is suspended. *Long.* b. Horizontal bar fitted between two drill columns on which a small diamond or other type rock drill can be mounted. *Compare* sidearm. *Long.*

cross assimilation. The simultaneous exchange of material from the magma to the wall rock and from the wall rock to the magma, tending to develop the same phases in both. *A.G.I.*

crossbar; collar; cap; roof bar. The horizontal roof member of a timber set on mine roadways, or a flat supported by props on the face. *See also* beam. *Nelson.*

cross-bearing. A check bearing on a survey point not in the immediate sequence of stations being located. *Pryor, 3.*

crossbedded. Having minor beds or laminae lying oblique to the main beds of stratified rock. For example, crossbedded sandstone. *Webster 3d.*

crossbedding. a. The quality or state of being crossbedded. A crossbedded structure. *Webster 3d.* b. Lamination, in sedimentary rocks, confined to single beds and inclined to the general stratification. Caused by swift local currents, deltas, or swirling wind gusts, and especially characteristic of standstones, both aqueous and eolian. *Fay.* c. Crossbedding is generally truncated by the overlying stratum. However, at the base of the crossbedded formation, the crossbedding is not truncated but it approaches the contact with the underlying stratum in a broad tangential curve. *Forrester, p. 68.* d. The arrangement of laminations of strata transverse or oblique to the main planes of stratification of the strata concerned. Inclined, often lenticular, beds between the main bedding planes. It is found only in granular sediments. *A.G.I.* e. Should be applied to inclined bedding found only in profiles at right angles to the current direction. *A.G.I.*

crossbedding, torrential. Fine, horizontally laminated strata alternating with uniformly crossbedded strata composed of coarser materials. It is believed to have originated under desert conditions of concentrated rainfall, abundant wind action, and playa lake deposition. *A.G.I.*

crossbelt. A belt changed to run from the top of one pulley to the bottom of another to produce a reversal of direction. *Crispin.*

crossbend test. A test in which fired or bisque porcelain enamel panels are progressively distorted by bending to determine the resistance of the coating to cracking. *ASTM C286-65.*

cross-bladed chisel bit. Synonym for cross chopping bit. *Long.*

crossbond. a. A bond connected from the rail on one side of the track to the rail on the opposite side. It should be provided about 200 feet apart along the entire track, as well as at every switch latch and just beyond every switch frog, to localize the adverse effect of an open rail or defective rail joint. *See also* bonding. *Kentucky, p. 246.* b. The bond in the wall, obtained by the use of header brick, to bond the stretchers of adjacent courses. *See also* English crossbond. *Bureau of Mines Staff.*

cross-breaking strength. *See* modulus of rupture. *ACSG, 1963.*

cross channel. A channel connecting two successive lows, running transverse to the beach. *Schieferdecker.*

cross chopping bit. Bit with cutting edges made by two chisel edges crossing at right angles with the intersection of chisel edges at the center of the bit face. Used to chop (by impact) lost core or other obstructions in a borehole. Also called cross bit; cross-braded chisel bit; cruciform bit. *Long.*

cross conveyor. Any conveyor used for transporting ore or waste from one room or working place through a crosscut to an adjacent room or working place. Used principally where the cross conveyor receives ore or waste from a conveyor and delivers it to another conveyor or a car. *Jones.*

cross-country mill. A rolling mill in which the mill stands are so arranged that their tables are parallel with a transfer (or crossover) table connecting them. They are used for rolling structural shapes, rails, and any special form of bar stock not rolled in the ordinary bar mill. *ASM Gloss.*

cross course. a. A vein or lode, which intersects the main productive veins or lodes. Sometimes known as crossvein or cross lode. *B.S. 3618, 1964, sec. 5.* b. A contralode. *Fay. See also* crossvein.

cross-course spar. Corn. Radiated quartz. *Fay.*

crosscut. a. A small pasageway driven at right angles to the main entry to connect it with a parallel entry or air course. In Arkansas, also used instead of breakthrough. *Fay.* b. A tunnel driven at an angle to the dip of the strata, to connect different seams or workings. *Nelson.* c. A crosscut may be a coal drivage. *See also* pillar-and-stall. *Nelson.* d. An underground passage directed across an ore body to test its width and value or from a shaft to reach the ore body. *See also* level crosscut. *Nelson.* e. A horizontal opening driven across the course of a vein or in general across the direction of the main workings. A connection from a shaft to a vein. *Lewis, p. 21.* f. In room and pillar mining, the piercing of the pillars at more or less regular intervals for the purpose of haulage and ventilation. Synonym for breakthrough. *Kentucky, p. 332.* g. In general, any drift driven across between any two openings for any mining purpose. *Bureau of Mines Staff.* h. A level or tunnel driven through the country rock, generally from a shaft, to intersect a vein or lode. *C.T.D.* i. A borehole directed so as to cut through a rock strata or ore vein essentially at right angles to the dip and strike of the rock strata, a vein, or a related structure. *Long.* j. *See* stenton. *B.S. 3618, 1963, Sec. 2.* k. A road connecting two other more important roads. *Mason.* l. A double-handled saw. *Mason.*

crosscut method (combined with removal of pillars). *See* top slicing and cover caving. *Fay.*

crosscut method of working. *See* overhand stoping. *Fay.*

crosscut tunnel. A tunnel driven at approximately right angles to a main tunnel, or from the bottom of a shaft or other opening, across the formation to an objective point. The term "crosscut" would seem more appropriate as the term tunnel implies being open to the surface at both ends, as a railroad tunnel. *Fay.*

crossed belt. A driving belt which has a twist between the driving and the driven pulleys causing a reversal of direction. *Crispin.*

crossed dispersion. In optical mineralogy, the dispersion that produces an interference figure with color distribution symmetrical to the center of the figure. *Fay.*

crossed nicols. a. Two nicol prisms so arranged that their vibration planes are mutually at right angles. *Fay.* b. In optical mineralogy, an anisotropic crystal is interposed between the nicol prisms to observe its optical interference effects. The petrographic microscope is normally used with nicol prisms (or equivalent polarizing devices) in the crossed position. *A.G.I.* c. Nicols is often capitalized (crossed Nicols). Two nicol prisms placed one in front of the other, or one below the other, and so oriented that their transmission planes for plane-polarized light are at right angles with the result that light transmitted by one is stopped by the other unless modified by some intervening body. *Webster 3d.*

crossed off. A road or working place at the entrance to which fencing or crossbars have been erected to warn workmen not to enter these places because of danger. *Nelson.*

crossed twinning. a. Repeated twinning after two twinning laws, as in microcline. *Fay.* b. Polysynthetic twinning, according to two twin laws, and in which the composition planes of one type of twinning intersect the composition planes of the other type of twinning at right angles, or nearly at right angles. Also called quadrille twinning. It is characteristic of microcline and pseudoleucite. *Bureau of Mines Staff.*

crossel; crossil. Mid. Breccia or conglomerate. *Arkell.*

cross entry. a. An entry or set of entries, turned from main entries, from which room entries are turned. *U.S. BuMines Federal Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. I Underground Mines, October 8, 1953.* b. A horizontal gallery driven at an angle or at right angles to a main entry. The meanings of double cross entry and triple cross entry are as given for main entry. *Nelson.*

crosses and holes. Eng. In Derbyshire, the discoverer of a lode secures it temporarily by making "crosses and holes" in the ground. *Fay.*

cross face. A coal face having a general direction between end and bord line. *TIME.*

cross facets. Same as break facets. *See also* girdle facets. *Shipley.*

cross fault. A fault that strikes diagonally or perpendicularly to the strike of the faulted strata. *A.G.I.*

crossfed grinding (surface). The amount of horizontal feed of the wheel across the table. *ACSG, 1963.*

cross fiber. a. In a vein, fibrous minerals formed or occurring at right angles to the vein walls; applied mainly to asbestos veins. *A.G.I.* b. One of the three recognized forms in which asbestos fiber is found in rock deposits. In this, the most common form of deposition, the fibers, closely packed together, are set at right angles to the rock faces of the seam or vein in which they occur. *Sinclair, W. E., p. 35.*

crossfired furnace. *See* side-fired furnace. *ASTM C162-66.*

cross flucan. A name given by Cornish miners to clay seams crossing a vein. *Bureau of Mines Staff.*

cross fold. A fold, the axis of which intersects the axis of another fold, generally the lesser or younger of two folds. (In structural petrology, efforts have been made to distinguish different types of cross folds by writing crossfold, cross-fold, and (cross-)fold; but the usage is not standardized. *A.G.I. Supp.*

cross-folding. A system of folding in which there are two fold trends, more or less at right angles. Usually one trend is dominant, the folds following the other trend being then termed cross-folds, so that cross-folding might apply in a restricted sense to these cross-folds only. *Challinor.*

cross frog. A frog adapted for railroad tracks that cross at right angles. *Webster 2d.*

crossgate. a. A gate road driven at an angle off the main gate in longwall mining, to form new intermediate gates or new faces inside a disturbance. Well-sited cross gates result in reduction of inby conveyors and in roadway maintenance. *Nelson.* b. Eng. *See* crossheading, d. *SMRB, Paper No. 61.* c. York. Short headings driven on the strike end at right angles to the main gates or roads. *Fay.*

cross gateway. Aust. A road, through the goaf, that branches from the main gateway. *Fay.*

cross-grained rock. A local term in Ohio for certain sandstone beds that exhibit cross bedding. *Fay.*

cross-grains. In mica, lines, striations, crenulations, or sharp folds that lie in the plane of cleavage. They may result in tears or breaks during splitting. *Skow.*

cross-grooves. Two or more intersecting sets of groove casts. *Pettijohn.*

crosshair. a. In microscopes and surveying instruments, the wire or hair crossing at right angles in the exact line of the optic center of the instrument. Also called cross wire. *Porter.* b. Spider's thread mounted in eyepiece of telescope of theodolite for use in sighting. *Pryor, 3.*

crosshead. a. A runner or framework that runs on guides, placed a few feet above the sinking bucket in order to prevent it from swinging too violently. *Fay.* b. A beam or rod stretching across the top of something; specifically, the bar at the end of a piston rod of a steam engine, which slides on the ways or guides fixed to the engine frame and connects the piston rod with the connecting rod. *Fay.* c. *See* squaring shear. *ASM Gloss.*

crosshead guide. A guide for making the crosshead of an engine move in a line parallel with the cylinder axis. *Standard, 1964.*

crossheading. a. A passage driven for ventilation from the airway to the gangway, or from one breast through the pillar to the adjoining working. Also called cross hole; cross gateway; headway. *Fay.* b. One driven from one drift or level across to another to improve ventilation. *Pryor, 3.* c. A heading driven at an angle off the main level to cut off stalls or intermediate headings, and form new ones on the face side of the heading. Also called oblique heading; cutting-off road. *Nelson.* d. Eng. A road in longwall working to cut off the gateways. Synonym for crossgate; slope. Also called crossbow; crossend. *SMRB, Paper No. 61.*

cross hole. a. A term used in Wales for a short cut-through communicating with two headings for ventilation purposes. *Fay.* b. *See* stenton. *B.S. 3618, 1963, sec. 2.*

crossing. a. The place where two or more lines of rails extending in different directions cross each other. *Fay.* b. Eng. *See* air crossing. *Fay.* c. A crosscut, Wales. *Fay.*

crossing balk; carrying bar; carrying girder. Eng. The plank, balk, or girder set across the entrance to a road to support one end of the planks, balks, or girders set to the roof of a roadway junction. Also called crossing girder. *SMRB, Paper No. 61.*

crossite. A blue soda-amphibole intermediate between glaucophane and riebeckite. Lath-shaped crystals and grains. From Berkeley, Calif.; Venzolasca, Corsica Island, France. *English.*

cross joint. a. A joint in an igneous rock oriented more or less perpendicular to the flow lines. Synonym for tension joint. *A.G.I. Supp.* b. A joint in sedimentary rocks that crosses more prominent joints at approximate right angles. *A.G.I. Supp.* c. *See* head joint. *ACSG.*

cross-joint fan. A system of cross joints in igneous rock, the joints diverging in a fanlike manner because of the arching of the flow lines which are more or less perpendicular to the joints. *G.S.A. Memoir 5, 1937, p. 97.*

cross lamination. a. The structure commonly present in granular sedimentary rocks that consists of tabular, irregularly lenticular, or wedge-shaped bodies lying essentially parallel to the general stratification and which themselves show a pronounced laminated structure in which the laminae are steeply inclined to the general bedding. Synonym for crossbedding; false bedding. *A.G.I.* b. An arrangement of laminations, transverse to the planes of stratification of the strata concerned. They generally end abruptly at the top but in general tend to become more or less parallel to the bedding planes below. *A.G.I.* c. Cross-stratification with foresets less than 1 centimeter thick. *Pettijohn.*

cross latches. A cross switch. *Hess.*

cross lode. Synonym for crossvein. *A.G.I.*

cross measure. A heading driven horizontally or nearly so, through or across inclined strata. *Fay.*

cross-measure borehole. A borehole drilled at an angle through the rock strata generally for the purpose of firedamp drainage. *B.S. 3618, 1963, sec. 2.*

cross-measure borehole system. *See* methane drainage. *Roberts, I, p. 77.*

cross-measure drift. a. A development drift driven across the strata from the surface to intersect and work coal seams. *Nelson.* b. A development heading driven from a level in one coal seam to intersect and work upper or lower seams. *Nelson.*

cross measure tunnel. A roadway or airway driven across pitching measures on, or nearly on, a level to reach a bed of coal or other objective, or to drain off water. *Zern.*

cross-off. Clev. To stack out; to wall off the entrance to a goaf. *Bureau of Mines Staff.*

crossover. a. A stretch of track which connects two parallel tracks, and enables a train to pass from one track to the other. *Zern, p. 476.* b. A pipe fitting with a double offset, or shaped like the letter U with the ends turned out. Used to pass the flow of one pipe past another when the pipes are in the same plane. *Strock, 3.*

crossover tee. A fitting made along lines similar to the crossover, but having at one end two openings in a tee-head, the plane of which is at right angles to the plane of the crossover bend. *Strock, 3.*

crosspiece. a. The short piece of timber in a wooden pillar or crib. *See also* edger. *Fay.* b. Synonym for crossarm. *Long.*

cross poling. Short poling boards placed horizontally to cover the gap between runners in excavation trench timbering. *Ham.*

cross-ripple mark. An interference ripple mark consisting of roughly rectangular cells. *A.G.I. Supp.*

cross-ripples. A type of interference ripples.

Pettijohn.

crossroad. Scot. A main road driven at a more moderate inclination than directly to the rise of the strata. *Fay.*

cross rolling. The rolling of sheet so that the direction of rolling is changed about 90° from the direction of the previous rolling. *ASM Gloss.*

cross-roll straightener. A machine having paired rolls of special design for straightening round bars or tubes, the pass being made with the work parallel to the axes of the rolls. *ASM Gloss.*

cross section. a. A profile portraying an interpretation of a vertical section of the earth explored by geophysical and/or geological methods. *A.G.I.* b. A cutting or a section across. A section at right angles to, especially the longer axis of anything. For example, the cross section of a fold drawn at right angles to the fold axis. *Webster 3d; Bureau of Mines Staff.* c. A piece of something cut off in a direction at right angles to an axis. *Webster 3d.* d. A view, a diagram, or a drawing representing such a cutting. *Webster 3d.* e. A horizontal grid system laid out on the ground for determining contours, quantities of earthwork, etc., by means of elevations of the grid points. *Seelye, 2.* f. A measure of the probability that a nuclear reaction will occur. Usually measured in barns. It is the apparent area presented by a target nucleus (or particle) to an oncoming particle. *L&L.*

cross-section. a. The verb is hyphenated but the noun is two words not hyphenated. *Webster 3d.* b. To represent in cross section. To make a cross section of. *Webster 3d.* c. To cut or to divide into cross sections. *Webster 3d.*

cross-sectional area. The area of a surface cut by a plane passing through the body and perpendicular to the long axis of the body if one exists. If not, any such area cut by a plane. *Bureau of Mines Staff.*

cross-sectional method. An ore reserve estimation method in which assay and other data are projected to predetermined planes and the areas of influence of the assay data are determined mainly by judgment. This method is helpful not only for ore reserve computations, but also to mine planning. *Krumlauf, p. 81.*

cross-section paper. Paper ruled in squares for convenience in drawing and measuring. *Nichols.*

cross spread. Seismometer spread perpendicular to the shooting line. *Schieferdecker.*

cross-spur. A vein of quartz that crosses a lode. *Fay.*

cross staff. Box mounted on light staff, with cross sighting slits, giving user two sighting lines at right angles. *Pryor, 3.*

cross-stone. Synonym for andalusite and staurolite. *Hey 2d, 1955.*

cross stoping. *See* overhand stoping. *Fay.*

cross strata. Minor laminations oblique to the plane of the main stratum which they help to compose. *Ballard.*

cross-stratification. a. The minor laminations are oblique to the plane of the main stratum which they help to compose. *See also* crossbedding. *Standard, 1964; Fay.* b. The arrangement of layers at one or more angles to the dip of the formation. A cross-stratified unit is one with layers deposited at an angle to the original dip of the formation. Many investigators have used crossbedding and cross lamination as synonymous with cross-stratification, but it is proposed to restrict the terms crossbedding and cross lamination to a quantitative meaning depending on the thickness of the individual layers or cross strata. *Stokes and Varnes, 1955.*

cross stratum. A single layer of homogeneous or gradational lithology deposited at an angle to the original dip of the formation and separated from adjacent layers by surfaces of erosion, surfaces of nondeposition, or by abrupt changes in character. Cross bed and cross lamina have been used as synonyms for cross stratum, but it is proposed that they be restricted to a quantitative meaning. A cross bed is more than 1 centimeter thick and a cross lamina is 1 centimeter or less in thickness. *Stokes and Varnes, 1955.*

crosstie. A timber or metal sill placed transversely under the rails of a railroad, tramway, or mine-car track. *Fay.*

cross valve. a. A valve fitted on a transverse pipe so as to open communication at will between two parallel lines of piping. Much used in connection with oil and water pumping arrangements, especially on ship board. *Strock, 3.* b. Usually considered as an angle valve with a back outlet in the same plane as the other two openings. *Strock, 3.*

crossvein. a. A vein that crosses or intersects an older, a larger, or a more productive vein. *Webster 3d.* b. An intersecting vein. Synonym for cross lode. *Fay.* c. It has also been applied to a vein which crosses the bedding planes of strata. This usage appears to be unnecessary and conflicts with the same term applied to instances where two veins actually cross each other. *Fay.*

cross wall. Eng. A wall built to a face pack parallel to the general line of advance of the face. *SMRB, Paper No. 61.*

cross-wire weld. A projection weld made between crossed wires or bars. *ASM Gloss.*

crotch. A fitting that has the general shape of the letter Y. Caution should be exercised not to confuse the crotch and wye. *Strock, 3.*

crotch height. For a silent chain, the height of the link crotch above the pitch line of the link. *J&M.*

crouan. Corn. Granite, especially if soft and decomposed. *See also* grouan; growan. *Fay.*

crouch clay. Eng. White pottery clay. *Compare* croot; crutch; critch. *Arkell.*

crouch ware. a. A kind of fine pottery made in the 17th century. *Fay.* b. A salt-glazed stoneware made at Burslem, England. *Fay.*

crowbar. A heavy pinch bar of iron or steel flattened to a chisellike point at one end, used as a lever. *Crispin.*

crow coal. Certain earthy coal which contains very little bitumen and a large percentage of ash. Also called craw coal. *Fay.*

crowd. a. The process of forcing a bucket into the digging, or the mechanism which does the forcing. Used chiefly in reference to machines which dig by pushing away from themselves. *Nichols, 2.* b. Used by some drillers as a synonym for overfeed. *Long.* c. As used by handsetters, the uneven calking of a diamond resulting in its being pinched or forced out of its intended position in a bit. *Long.* d. To place or set diamonds too closely together in the crown of a bit. *Long.*

crowding. In power shovel nomenclature, crowding is the thrusting of the dipper stick forward over the shipper shaft; retracting is the reverse of crowding. *Carson, p. 38.*

crowding baffle. In froth flotation, a slanted board used to direct the rising mineralized froth toward the overflow lip of the cell. *Pryor, 3.*

crowding barrow. A handbarrow for bricks; it has a base and front, but no sides. *Dodd.*

Crowe process. The treatment of pregnant cyanide solution to remove air before the gold is precipitated. *Nelson.*

crowfoot. a. A V-shaped notch in an arch block; sometimes made in the bottom block where this rests upon the wallplate. *Stauffer.* b. A tool with a sideclaw, for grasping and recovering broken rods in deep boreholes. *Fay.* c. An iron claw or fork, to which a rope is attached, and by which the rods are lowered and raised when changing the tools in deep boreholes. *Fay.* d. Irregular or zigzag markings found in Tennessee marble. Also called stylolite. *AIME, p. 331.*

crown. a. A timber crossbar up to 16 feet long, supported by two heavy legs, or uprights, one at each end. Crowns may be set at 3-foot intervals and sometimes a roof bolt is put up through the center of the crown. *Nelson.* b. The elevation of a road center above its sides. *Nichols.* c. The curved roof of a tunnel. *Nichols.* d. As used by the drilling and bit-setting industries in the United States, the portion of the bit inset or impregnated with diamonds formed by casting or pressure-molding and sintering processes; hence the steel bit blank to which the crown is attached is not considered part of the crown. *Long.* e. The topmost part of a drill tripod, derrick, or mast. *Long.* f. Used in some countries other than the United States as a synonym for bit. *Long.* g. The part of a furnace forming the top or roof. *ASTM C162-66.* h. A contour on a sheet or roll where the thickness or diameter increases from edge to center. *ASM Gloss.* i. The top section of a press structure where the cylinders and other working parts may be mounted. Also called dome; head; top platen. *ASM Gloss.*

crown arch. The arched plate which supports the crown sheet of the firebox of a boiler. *Fay.*

crown bar. a. One of the bars on which the crown sheet of a locomotive rests. *Fay.* b. Strong timber, usually round, used in supporting the roof of a tunnel in the English method of driving. *Stauffer.*

crown blast. The procedure of blowing air at roof level into the exit end of a tunnel kiln to counteract the natural flow of gases in this part of the kiln. *Dodd.*

crown block. A pulley, set of pulleys, or sheaves at the top of a drill derrick on and over which the hoist and/or other lines run. Also called crown pulley; crown wheel. *Long.*

crown brick. *See* key brick; center brick. *Dodd.*

crown die. Synonym for bit mold. *Long.*

crowned pulley. In power transmission, one with convex curve of driving rim, aiding flat belt to remain centered. *Pryor, 3.*

crown fire. A fire burning in tree tops. *Nichols.*

crown flint glass. An optical crown glass bordering on optical flint glass because of the addition of a substantial content of lead oxide and with somewhat higher dispersion than optical crown glass. *ASTM C162-66. See also* lead crown glass.

crown formation. Aust. Used in Bendigo for the outcrop of saddle reefs crowning the hills, from which points the reefs dip in opposite directions. *Fay.*

crown glass. a. Glass of the alkali-lime-silica type, as opposed to lead glass (flint glass); used for electric lamp bulbs. Also called soda-lime glass. *C.T.D.* b. Glass of uneven thickness and slightly convex (therefore, producing some optical distortion), handmade by blowing and spinning. *Compare* optical crown glass. *Dodd.*

crown gold. Gold that is eleven-twelfths fine (91.67 percent pure gold). Used in the minting of the crown of the rose from 1526 and adopted in 1634 as the standard for other English gold coins. *Webster 3d.*

crown-in. The pressure of the overlying strata causing falls of roof or creep in the floor of a rock salt mine. *Nelson.*

crowning. The heaving or lifting of the floor beds along a roadway to form a ridge or crown along the center line. *Nelson.*

crownings-in. S. Staff. The strata forming the roof or cover. *Fay.*

crown life. Synonym for bit life. *Long.*

crown metal. Synonym for diamond matrix. *See also* diamond matrix, a. *Long.*

crown mold. Synonym for bit mold. *Long.*

crown optical glass. A low-dispersion relatively low-index glass. Commonly used in the converging elements of lenses. Any glass with a Nu-value of more than 55.0 (or between 50.0 and 55.0 if the index is more than 1.60). *VV. See also* optical crown glass. *ASTM C162-66.*

crown pulley. A pulley whose diameter is greater at the middle than at the edges of its face. This crown tends to prevent the belt from running off the pulley provided the belt is not slipping. *Crispin.*

crown sheet. The plate that forms the top of the furnace or firebox of an internally fired steam boiler. *Webster 3d.*

crownstone. A hard, smooth, flinty gritstone. *See also* ganister. *Fay.*

crown tree; crown. A piece of timber set on props to support the mine roof. *Zern.*

crown wheel. a. A cogwheel having the teeth on the plane of the wheel's circle instead of upon its circumference. *Fay.* b. One driven by pinion, notably in drive of ball mill. Largest wheel of any reduction gear. *Pryor, 3.* c. Synonym for crown block. *Long.*

crow's-foot. A clawlike tool used to withdraw broken rods from a borehole. *See also* screw bell; spiral worm. *Nelson.*

crowst. Corn. Miners' lunch; (elevenses). *Pryor, 3.*

crowstones. a. Black cherts in the Carboniferous limestone. *Arkell.* b. Eng. Hard, siliceous sandstone beds in the Yoredale series of the Yorkshire and Derbyshire coalfields, and in the Jurassic of Yorkshire. In mining, crow is used to denote any poor or impure bed, as of coal or limestone. *Arkell.*

Croxdale stretcher tram. A stretcher used as an ambulance trolley in transporting casualties from underground workings. It is similar to the Briggs stretcher carriage in design, except for the adjustable handles at each end of the tram and the rubber-tired wheels, which can be replaced by pneumatic tires for roadways not equipped with tub track. *McAdam, pp. 106-107.*

croyl. Eng. Indurated clay with shells, Carboniferous of Grassington. *Arkell.*

croylstone. A variety of finely crystallized barite. *Standard, 1964.*

crozling coal. Eng. Term used in Derbyshire for caking coal. *Tomkeieff, 1954.*

crozzle. a. To shrivel or cake with heat; to burn to a cinder. Also spelled crozle. *Webster 2d.* Said of coal. *Fay.* b. Eng. Contorted noncarbonaceous shale, Coal Measures of Staffordshire and Derbyshire. A cinder. Crozzling of coal, means caking. *Arkell.*

crozzling. The fusing of burning coal. *Bureau of Mines Staff.*

crucible; crucible furnace. The hearth of a blast furnace, cupola, or open hearth; a refractory vessel for melting or calcining metals, ores, etc. *Bureau of Mines Staff.*

crucible assay. *See* assay; lead button. *Nelson.*

crucible clays. Ball clays that are relatively refractory, for use in producing crucibles that will withstand high temperatures. *CCD 6d, 1961.*

crucible furnace. *See* crucible. *Bureau of Mines Staff.*

crucibles, clay. A pot made of fired refractory clay, used to smelt small batches of enamel or glaze mixes. *Enam. Dict.*

crucible steel. Steel made by melting blister bar, wrought iron, charcoal, and ferroalloys in crucibles which hold about 100 pounds. This was the first process to produce steel in a molten condition, hence the product called cast steel. Mainly used for the manufacture of tool steels, but now largely replaced by the electric-furnace process. *C.T.D.*

crucible swelling number. The number which defines, by reference to a series of standard profiles, the size and shape of the residue produced when a standard weight of coal is heated under standard conditions. *B.S. 1016, 1961, Pt. 16.*

crucible tongs. Tongs used for handling crucibles. *C.T.D.*

cruciform bit. a. Synonym for cross chopping bit. *Long.* b. Percussive rock drill bit having four chisel-shaped cutting edges in the form of a cross on the face of the bit. Also called cross bit. *Long.*

crucite. Same as andalusite. *Fay.*

crude. A substance in its natural unprocessed state. Crude ore or crude oil, for example. In a natural state; not cooked or prepared by fire or heat; not altered or prepared for use by any process; not refined. Synonym for raw; crude oil. *Webster 3d.*

crude anthracene. Solid product containing anthracene. Obtained on cooling the coal-tar distillate collected above about 270° C. *Bennett 2d, 1962.*

crude antimony. Antimony sulfide ore. *Bennett 2d, 1962.*

crude asbestos. Hand selected cross-vein material of longest fibres in native or unfiberized form. It comes in chunks and must be mechanically processed to develop the usefulness of the fibre. *Arbiter, pp. 66-67.*

crude asphalt; crude pitch. Raw asphalt as it comes from the lake. *Mersereau, 4th, p. 206.*

crude benzol. Recovered from coke-oven gas and from other coal gases produced at high temperatures, by scrubbing the gas with gas oil, or creosote oil, or by absorption on active carbon, after tar vapors, water, and ammonia have been removed. A small percentage of benzol is also present in coal tar, from which it may be recovered by distillation. Crude benzol may contain as impurities sulfur compounds (for example, carbon disulfide and thiophene), phenols, pyridine, indene, coumarone, naphthalene, and traces of scrubbing oil. *Francis, 1965, v. 1, p. 302.*

crude iron ore. The material, as mined, prior to any processing for removing waste constituents, though it may be crushed and screened. *BuMines Bull. 630, 1965, p. 458.*

crude mica. The crude crystals or books as extracted from the mine. *Skow.*

crude mineral oil. Crude petroleum. *Fay.*

crude naphtha. Unrefined petroleum naphtha. *Standard, 1964.*

crude naphthalene. Solid product, consisting essentially of naphthalene, obtained on cooling crude intermediate fractions from the distillation of coal tar and during purification of coal gas. *Bennett 2d, 1962.*

crude oil. a. Raw petroleum as it comes from the earth. *Mersereau, 4th, p. 198.* b. A bitumen of liquid consistency, comparatively volatile, and composed principally of hydrocarbons, usually with traces of sulfur, nitrogen, or oxygen compounds. *A.G.I.*

crude oil treater. In petroleum production, one who treats crude oil from wells in chemical, electrical, or centrifugal units to remove sediment and water. Also called dehydrator operator, dehydrator plant operator, pumper, treater. *D.O.T. 1.*

crude ore. The unconcentrated ore as it leaves the mine. *Schieferdecker.*

crude-ore bin. A bin in which ore is dumped as it comes from the mine. *Fay.*

crude petroleum. A naturally occurring mixture, consisting predominantly of hydrocarbons, and/or sulfur, nitrogen, and/or oxygen derivatives of hydrocarbons, which is removed from the earth in liquid state or capable of being so removed. *ASTM D288-57.*

crude pitch. *See* crude asphalt. *Mersereau, 4th, p. 206.*

crude shale oil. The oil obtained as a distillate by the destructive distillation of oil shale. *ASTM D288-57.*

crude sulfur; brimstone. Elemental sulfur that is 99.0 to 99.9 percent pure and is free from arsenic, selenium, and tellurium. *BuMines Bull. 630, 1965, p. 903.*

crude tar. Bituminous product, viscous or liquid, resulting from the destructive distillation of organic materials. *Bennett 2d, 1962.*

crude tar bases. Mixtures of those constituents of coal tar which can be extracted from the lower boiling distillates by dilute mineral acid. Consists essentially of basic compounds of the pyridine series. *Bennett 2d, 1962.*

crudy asbestos. Refers to asbestos which has been only partially milled, so that the fiber has not been fluffed but only separated from the rock. Most of the asbestos is still in the form of bundles of fibers like spicules. *AIME, p. 45.*

crudey state. Fiber strands not fully opened up or only partly fiberized. *Sinclair, W. E., p. 483.*

crumber. A bulldozer blade that follows the wheel or ladder of a ditching machine to clean and shape the bottom. *Nichols.*

crumble coal. English translation of German formkohle. *Tomkeieff, 1954.*

crumble peat. Friable earthy peat or peaty earth. *Tomkeieff, 1954.*

crump; bump. Ground movement, perhaps violent, due to failure under stress of ground surrounding underground workings usually in coal, so named because of sound produced. *See also* bump. *Pryor, 3.*

crumpled ball. Highly irregular, crumpled-up masses of laminated sandstone, 5 to 25 centimeters across, flattened parallel to the bedding as opposed to slump balls which have smooth surfaces. *Pettijohn.*

crumpled mud-crack casts. Sand fillings (of mud cracks) that display ptygmatic deformation or crumpling produced by adjustment of fillings to compaction of enclosing mud matrix. *Pettijohn.*

crup. A gradual settling of the measures overlying a mine caused by the weight crushing the pillars, or forcing them down into the floor. A variation of creep. *Fay.*

crush. a. A general settlement of the strata above a coal mine due to failure of pillars; generally accompanied by numerous local falls of roof in mine workings. *Fay.* b. A species of fault in coal. *Fay.* c. Breakage of supports of underground workings under roof pressure. *Pryor, 3.* d. A casting defect caused by a partial destruction of the mold before the metal was poured. *ASM Gloss.*

crushability. The relative ease of crushing a sample under standard conditions. *B.S. 3552, 1962.*

crush belt. A belt of intensely crushed rock. *Challinor.*

crush border. A microscopic granular texture sometimes characterizing adjacent feldspar particles in consequence of their having been crushed together during or subsequent to their crystallization. *Fay.*

crush breccia. a. A breccia produced by the shattering of rocks along a fault. *Fay.* b. A breccia formed essentially in situ by cataclasis. *See also* cataclasite; crush conglomerate. *A.G.I.*

crush bursts. Rockbursts in which there is actual failure at the face, accompanied by movement of the walls. *Higham, p. 208.*

crush conglomerate. a. A conglomerate produced by the crushing of rock strata in the shearing often accompanying folding. *Standard, 1964.* b. Similar to a fault breccia except the fragments are more rounded in a crush conglomerate. *A.G.I.* c. Synonymous with tectonic conglomerate. *See also* pseudoconglomerate; crush breccia. *A.G.I.*

crush dressing. The process of using steel rolls to form or dress the face of grinding wheels to any desired contour. *ACSG, 1963.*

crushed gravel. The product resulting from the artificial crushing of gravel with substantially all fragments having at least one face resulting from fracture. *ASTM C125-66.*

crushed gypsum. Gypsum subjected to a primary crushing operation. *ASTM C11-60.*

crushed steel. A metallic abrasive made from high carbon and crucible sheet steel specifically treated to impart brittleness. It is then crushed to sizes ranging from 2 to 200 mesh. After screening, each batch is heattreated and separated into 25 sizes ranging from 20 to 200 mesh. *AIME, p. 19.*

crushed stone. a. The product resulting from the artificial crushing of rocks, boulders, or large cobblestones, substantially all faces of which have resulted from the crushing operation. *ASTM C125-66.* b. Term applied to irregular fragments of rock crushed or ground to smaller sizes after quarrying. Also called broken stone. *BuMines Bull. 630, 1965, p. 885.*

crushed vein. A mineralized zone or belt of crushed material. The crushing was caused by folding, faulting, or shearing. *Fay.*

crusher. A machine for crushing rock or other materials. Among the various types of crushers are the ball-mill, gyratory crusher, Hadsel mill, hammer mill, jaw crusher, rod mill, rolls, stamp mill, and tube mille. *Fay; Hess.*

crusher-and-blender operator. In the coke products industry, one who prepares coal for coking by mixing coal of various compositions and pulverizing it in mechanical blending and crushing plant. *D.O.T. Supp.*

crusher feeder. In quarry industry, one who feeds broken rock into crusher after it is dumped from trucks or cars, by pushing it down a chute with a shovel or bar, or by pushing it directly into crusher from a platform. Also called crusher loader; laborer, crusher; stone breaker; trap man. *D.O.T. 1.*

crusher foreman. A foreman who supervises workers engaged in unloading, transporting, crushing, and storing ore. Oversees activities, such as unloading of ore from cars into bins, discharging of ore from bins onto conveyor belts leading to crushers, crushing of ore to designated size, selection of ore by mechanical samplers, and transportation of ore by elevators and belts to various bins or storage areas. *D.O.T. Supp.*

crusher laborer. A general term used to designate workers performing any one or a combination of unskilled tasks, concerned with crushing and grinding ore preparatory to concentration of metal. *D.O.T. Supp.*

crusher loader. One who feeds crusher. *Bureau of Mines Staff.*

crusher man. a. In anthracite and bituminous coal mining, one who operates a crusher through which large coal is run to break it into smaller sizes. *D.O.T. 1.* b. In quarrying, one who operates a crusher through which broken quarry rock is run to break it into crushed stone for construction work. *D.O.T. 1.*

crusher operator. In the concrete products and construction industry, one who operates an electric, gasoline, or steam-powered rock-crushing machine that may be provided with screens to sift the material and with a hose system to wash it. *D.O.T. 1.*

crusher rolls. Steel or chilled iron rollers with parallel horizontal axes and peripheries at a fixed distance apart so that rocks, coal, or other substances of greater thickness cannot pass between without crushing. Rolls may be toothed or ribbed, but for rock, including ores, the surfaces are usually smooth. *Hess.*

crusher rock. a. Term used in quarrying to describe the weathered overlying rock that occurs at most quarry operations and which is sold for use as road base. *BuMines Bull. 630, 1965, p. 888.* b. The total unscreened product of a stone crusher. *Shell Oil Co.*

crusher-run stone. Rock that has been broken in a mechanical crusher and which has not been subjected to any subsequent screening process. *Taylor.*

crusher setting; set. The distance between roll faces or plates in a crusher. In the case of jaw and roll crushers, the setting controls the maximum size, and to some extent the grading of the product produced. The best setting is usually that which produces 10 to 15 percent of oversize pieces, which are fed back for recrushing. Gyratory breakers do not permit any marked variation in the setting or in the size of the product. *Nelson.*

crusher stower. A machine which crushes ripping stone in headings and projects it through a pipe into gate side packs. It may also be used for filling old roadways or roof cavities. *See also* pneumatic stowing. *Nelson.*

crush forming. Shaping a grinding wheel by forcing a rotating metal roll into its face so as to reproduce the desired contour. *ASM Gloss.*

crush gate. A gate in a development face designed to be abandoned with a view to localizing the crush effect consequent on the winning of the coal immediately above or immediately below the development face. *TIME.*

crushing. a. Reducing ore or quartz by stamps, crushers, or rolls. *Fay.* b. The quantity of ore so pulverized or crushed at a single operation. *Fay.* c. Aust. The equivalent of millrun. *Fay.* d. *See* comminution. e. Size reduction into relatively coarse particles. *B.S. 3552, 1962.*

crushing bort. Diamond material with radial or confused crystal structure lacking distinct cleavage forms. Color is faintly milky to grayish or dark and is suitable only for crushing into grit powder or dust. Diamond fragments from cutting establishments or recovered from waste are frequently classed as crushing bort. The Bakwanga mine, Republic of the Congo, is the principal source of this material. *I.C. 200, 1964, p. 149.*

crushing bortz. Synonym for bort. *Long.*

crushing cycle. The sequence of operations in crushing a material, including, for example, the screening of the primary product and the recirculation of the screen overflow. *B.S. 3552, 1962.*

crushing drilling. A rotary drilling method in which drilling is performed by the crushing or grinding action of a roller bit which rotates while being pressed against the rock. *Fraenkel, v. 1, Art. 8 : 30, p. 21.* Also called roller-bit drilling.

crushing machine. A machine constructed to pulverize or crush stone and other hard and brittle materials; a stone crusher. *Fay.*

crushing mill. Same as stamp mill. *See also* crusher. *Fay.*

crushing rolls. A machine consisting of two heavy rolls between which ore, coal, or other mineral is crushed. Sometimes the rolls are toothed or ribbed, but for ore their surface is generally smooth. *Fay.*

crushing strain. The strain which causes the failure of a material by compression. *Crispin.*

crushing strength. a. The resistance which a rock offers to vertical pressure placed upon it. It is measured by applying graduated pressure to a cube, one inch square, of the rock tested. A crushing strength of 4,000 pounds means that a cubic inch of the rock withstands pressure to 4,000 pounds before crushing. The crushing strength is greater with shorter prisms and less with longer prisms. *Fay.* b. The pressure or load at which a material fails in compression; used for comparing the strength of walling and lining materials, such as concrete, masonry, stone, packs, etc. *Nelson.* c. The maximum load per unit area, applied at a specified rate, that a material will withstand before it fails.

Typical ranges of value for some ceramic materials are:
fireclay and silica refractories
2,000 to 5,000 pounds per square inch
common building bricks
2,000 to 6,000 pounds per square inch
engineering bricks, Class A
above 10,000 pounds per square inch
sintered alumina
above 50,000 pounds per square inch.
Dodd.

crushing test. a. A test of the suitability of stone to be used for roads or building purposes; a cylindrical specimen of the stone, 1 inch in diameter and 1 inch long, is subjected to axial compression in a testing machine. *C.T.D.* b. A radial compressive test applied to tubing, sintered-metal bearings, or other similar products for determining radial crushing strength (maximum load in compression). *ASM Gloss.* c. An axial compressive test for determining quality of tubing, such as soundness of weld in welded tubing. *ASM Gloss.*

crush line. A line along which rocks, under great compression, yield, usually with the production of schistosity. *Fay.*

crush movement. Compression, thrust, or lateral movement tending to develop shattered zones in rocks. *Fay.*

crush plane. A plane defining zones of shattering which result from lateral thrust. *Fay.*

crush zone. A zone of faulting and brecciation in rocks. *Fay.*

crust. a. A hard layer on the surface of softer material. *A.G.I. Supp.* b. The outer layer of the earth, originally considered to overlie a molten interior, now named in various ways: Lithosphere, sial, material above the Mohorovicic discontinuity, tectonosphere, etc. Commonly used in a figurative and an imprecise sense. *A.G.I. Supp.* c. The outer shell of the solid earth, the lower limit of which may be defined in various ways. According to one definition, the crust would be considered to be of the order of 19 miles (30 kilometers) to 31 miles (50 kilometers) thick. Sometimes the term crust is used synonymously with sial, in which case the crust is about 19 miles (30 kilometers) thick under those portions of the continents near sea level, about 31 miles (50 kilometers) thick under the higher mountain ranges, and absent under the Pacific Basin. The term was originally based on the idea of an outer solid crust resting on a liquid substratum. *A.G.I.* d. Shrop. A fine-grained white sandstone. *Fay.*

crustal instability. Synonym for tectonism. *A.G.I.*

crustal plate. A portion of the earth's crust beneath an oceanic or continental region. *A.G.I. Supp.*

crustation. A thin mineral deposit coating rock or forming a film on pools of standing water. A crustation is often composed of calcite. *A.G.I.*

crust fracture. An extended fracture in the earth's crust. *Fay.*

crustification. a. The layering of crusts of different minerals deposited successively on the walls of a cavity. *Bateman.* b. Suggested for those deposits of minerals and ores that are in layers or crusts and which, therefore, have been deposited from solution. *Fay.*

crustified banding. A structure of certain vein fillings resulting from a succession and often times a rhythmic deposition of crusts of unlike minerals upon the walls of the open space. *Schieferdecker.*

crustified vein. A vein which has been filled with a succession of crusts of ore and gangue material. *Schieferdecker.*

crust movement. An extensive movement of the earth's crust. *Fay.*

crust of the earth. a. The exterior shell of the earth. Synonym for earth's crust. *Schieferdecker.* b. That part of the earth lying above the Mohorovicic disconformity. *A.G.I.*

crust stone. A fragile, flaky crust of calcite, or of other minerals, covering portions of cave walls. *A.G.I.*

crust stress. Pressure within the rocks of the earth's crust. *Fay.*

crust torsion. A twisting stress in the earth's crust. *Fay.*

crut. A short heading excavated into the face of a coal seam; a heading or drift across the strata, or from one deposit to another. *Nelson.*

crutch. *See* croot. *Arkell.*

crutt. N. Staff.; Som. A road or heading driven in coal measures, turned from a level, etc. *Bureau of Mines Staff.*

cry. Sound made by rod of metallic tin when bent. *Pryor, 3.*

cry-; cryo-; kryo-. Combining form from the Greek kryos meaning icy cold. It is used to indicate cold or freezing. *Webster 3d.*

Cryderman loader. A clamshell-type loader activated by hydraulic cylinders operated from a traveling base suspended on the stage. Used in shaft sinking operations. *Lewis, p. 186.*

cryocarbide. *See* pearlite.

cryoconite. a. A fine-grained, almost powder-like substance found on the surface of glaciers. Absorption of radiation by the cryoconite causes ablation and the formation of cryoconite holes or dust wells. *A.G.I.* b. It is formed as a result of the differential melting of the ice. *Bureau of Mines Staff.*

cry of tin. The peculiar crackling noise produced in bending a piece of metallic tin. *Fay.*

cryogenic switching elements. In information processing, logical switching information processing elements which utilize the variability of the transition to superconductivity as a function of magnetic field strength. *H&G.*

cryogenic period. An informal designation for a time interval in geologic history during which large bodies of ice occurred at or near the poles and the climate of the earth was generally suitable for the growth of continental glaciers. *A.G.I.*

cryohydrate. a. A salt that contains water of crystallization only at a low temperature; for example, a eutectic mixture of salt and ice. *Hackh's Chem. Dict.* b. The solid that separates as a result of the freezing of a saturated solution. It is composed of the solvent and the solute in the same proportions as they were in the saturated solution. *Henderson.*

cryolite. Sodium-aluminum fluoride, $Na_3Al.F_6$; compact, granular. Colorless to red-brown. Mohs' hardness, 2.5; white streak; specific gravity, 2.97. Contains 54.3 percent fluorine and 12.9 percent aluminum. Of outstanding value in fusion of bauxite, melting at low temperature. *Pryor, 3.*

cryolite glass. A semitransparent or milky-white glass, made of silica and cryolite with oxide of zinc, melted together. Also called milk glass; fusible porcelain. *Fay.*

cryolite; synthetic; sodium fluoaluminate. Colorless; monoclinic; Na_3AlF_6; specific gravity, 2.90; melting point, 1,000° C; soluble in solutions of aluminum and ferric salts; slightly soluble in water; and refractive index, 1.338. Used in ceramics and in the production and refining of aluminum from bauxite. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-222.*

cryolithionite. A colorless fluoride of lithium, sodium, and aluminum, $Li_3Na_3Al_2F_{12}$. Isometric. Rhombic dodecahedrons, large. From Ivigtut, Greenland; Ural Mountains, U.S.S.R. *English.*

cryology. a. In the United States, the study of refrigeration. *A.G.I.* b. In Europe, a synonym for glaciology. *A.G.I.* c. The study of ice and snow. *A.G.I.* d. The study of sea ice. *A.G.I.*

cryoluminescence. The low-temperature increase of weak luminescence, or its development in normally nonfluorescent material. *A.G.I. Supp.*

cryopedology. The science of intensive frost action and of permanently frozen ground, including studies of the processes and their occurrence and also the engineering devices which may be invented to avoid or to overcome the difficulties induced by them. *A.G.I.*

cryosphere. All of the earth's surface that is permanently frozen. *A.G.I.*

cryoturbation. Frost action including frost heaving. *A. G. I. Supp.*

crypt-; crypto-; krypt-; krypto-. Combining form from the Greek kryptos, meaning hidden, covered, secret, invisible, latent. Cryptocrystalline, for example, means invisibly crystalline. *Webster 3d.*

crypthydrous. Refers to vegetable accumulations laid down on a wet substratum in contrast to those deposited under water. *Compare* phenhydrous. *A.G.I. Supp.*

crytobatholithic. Refers to the first of six stages in the erosion of a batholith. The batholith is not exposed but its presence is indicated by dikes, sills, and mineral veins in the roof, or by areas of alteration in the overlying rock. *A.G.I.*

cryptobatholithic deposit. A mineral deposit in the roof of a batholith which has not yet been exposed by erosion. *Schieferdecker.*

cryptobatholithic stage. A stage in the erosion of a batholith. The batholith is not yet exposed by erosion, and its presence is only indicated by dikes, sills, and veins occurring in what seems to be the roof of a batholith. *Bureau of Mines Staff.*

cryptoclastic. a. Compact; composed of extremely small, broken, or fragmental particles that are barely visible under a microscope. *Stokes and Varnes, 1955.* b. Composed of microscopic fragmental particles. *Webster 3d.*

cryptocrystalline. a. Crystalline, but so fine grained that the individual components cannot be seen under a microscope. Formed of crystals of an almost unresolvable small size, but not glassy; same as microcryptocrystalline. *A.G.I.; Hess.* b. Indistinctly crystalline. Having a structure that, though crystalline, is so fine that no distinct particles are recognizable even under the microscope. *Webster 3d.*

cryptoexplosion structure. This structure may be the result of meteoric impact. Synonym for cryptovolcanic structure. *A.G.I. Supp.*

cryptoflorescene. Term for soluble salts that have crystallized in the interior of a clay building product and are therefore hidden. *Dodd.*

cryptographic. a. Having a graphic structure of intergrowths that is so small that it cannot be resolved by a microscope. *Standard, 1964.* b. Denoting a texture of rocks that is so fine that the individual constituents cannot be distinguished under a microscope. Usually the result of a crypto-crystalline intergrowth of quartz and feldspar. *A.G.I.*

cryptohalite. A gray ammonium fluosilicate, $(NH_4)_2.SiF_6$, that crystalizes in the isometric system. *Standard, 1964*

cryptohydrous. The conditions under which coal was formed. Decay under water in swamps. *Tomkeieff, 1954.*

cryptomagmatic deposit. A mineral deposit of supposed magmatic origin developed in surroundings which do not reveal in any way its relationship to a body of eruptive parent rock. *Schieferdecker.*

cryptomelane. Potassium-manganese (barium-manganate) giving an X-ray pattern distinct from psilomelane (barium-manganese manganate). *Spencer 16, M.M., 1943.*

cryptomere. A fine-grained rock, the constituents of which are not determinable megascopically. Synonym for kryptomere; aphanite. *Johannsen, v. 1, 2d, 1939, p. 182.*

cryptomerous. a. A very fine crystalline texture. *Stokes and Varnes, 1955.* b. Of or pertaining to cryptomere. *Johannsen, v. 1, 2d, 1939, p. 182.*

cryptoperthite. A submicroscopic lamellar intergrowth of potassic and sodic feldspar. The lamellae are detectable only by means of X-ray diffraction or an electron microscope. *See also* perthite. *A.G.I.; Webster 3d.*

Crypto system. Trade name for an impulse system of oil firing, more particularly for the top firing of annular kilns. *Dodd.*

cryptovolcanic. Produced by completely concealed volcanic activity. *Webster 3d.*

cryptovolcanic structure. A small, nearly circular area of highly disturbed strata in which there is no trace of volcanic materials to confirm a volcanic origin. Hence, the combining form crypto meaning hidden. *A.G.I.*

Cryptozoic. Eon of hidden life. Synonym for Precambrian. *A.G.I. Supp.*

Cryptozoic eon. Time of little or no visible fossil remains. *Bureau of Mines Staff.*

crys ground. Limestone strata with occasional beds or bands of iron ore. *Nelson.*

crystal. a. A regular polyhedral form, bounded by planes, which is assumed by a chemical element or compound, under the action of its intermolecular forces, which passing, under suitable conditions, from the state of a liquid or gas to that of a solid. A crystal is characterized first by its definite internal molecular structure and second, by its external form. *Fay.* b. The regular polyhedral form, bounded by plane surfaces, which is the outward expression of a periodic or regularly repeating internal arrangement of atoms. *A.G.I.* c. A body formed by the solidification under favorable conditions of a chemical element, a compound, or an isomorphous mixture and having a regularly repeating internal arrangement of its atoms; especially such a body that has natural external plane faces as a result of the internal structure. *Webster 3d.* d. Quartz that is transparent or nearly so and that is either colorless or only slightly tinged. Also a piece of this material. Also called rock crystal. *Webster 3d.* e. A colorless transparent diamond. *Webster 3d.* f. Glass of superior quality and often with ornamental cutting. Synonym for flint glass. Also a piece of this material. *Webster 3d.* g. As an adjective, consisting of or resembling crystal. Synonym for crystalline; clear; transparent. Relating to or using a crystal. *Webster 3d.*

crystal aggregate. A number of crystals grown together so that each crystal in the group is large enough to be seen by the unaided eye and each crystal is more or less perfect. In gemmology it differs from a crystalline aggregate, as a homogenous gem stone can be cut only from an individual crystal of a crystal aggregate. Same as crystal group. *Shipley.*

crystal analysis. The study of the arrangement of atoms, ions, or molecules in crystals, chiefly by X-ray methods aided by the theory of their possible grouping in space. *Hess.*

crystal axes. Imaginary lines passing through a crystal in important symmetry directions, intersecting in the origin at the center of the crystal. The axes are usually three in number, and they are chosen to act as a frame of reference by means of which the relative positions of the crystal faces can be described. *Anderson.*

crystal axis. A reference axis used for the description of the vectorial properties of a crystal. There are generally three noncoplanar axes, chosen parallel to the edges of the unit cell of the crystal structure so as to be parallel to symmetry directions if possible. *A.G.I.*

crystal bar. Hafnium produced by the van Arkel and de Boer process. *Thomas.*

crystal bar process. *See* iodide process. *Thomas.*

crystal boundaries. The surfaces of contact between adjacent crystals in a metal. Anything not soluble in the crystals tends to be situated at the crystal boundaries, but in the absence of this, the boundary between two similar crystals is simply the region where the orientation changes. *C.T.D.*

crystal casts; crystal imprints. Fillings of cavities left by solution or sublimation of crystals embedded in fine-grained sediment. *See also* ice crystal marks; ice crystal casts. *Pettijohn.*

crystal chemistry. The study of the factors that determine the forms in which solids crystallize, and the relations between the properties of solids and their structures. *A.G.I.*

crystal class. One of the 32 crystallographically possible combinations or groups of symmetry operations that leave one point, or origin, fixed. *A.G.I.*

crystal defects. Irregularities in a lattice structure that affect resistance to crushing. Microdefects are due to irregular distribution of ions. Macrodefects are incipient strain areas or discontinuities in an otherwise regular lattice. Mosaic defects are orderly blocks of regular lattice that are packed together to form a larger and imperfect particle. *Pryor, 3.*

crystal detector. A detector that depends for its operation on the rectifying action of the surface of contact between certain crystals (as of galena) and a metallic electrode. *Webster 3d.*

crystal diamagnetism. The abnormal ratio of magnetization to the magnetizing force responsible for it, as observed in some crystals, such as those of bismuth. *Hess.*

crystal face. One of the several flat or plane exterior surfaces of a crystal. *See also* crystal. *Long.*

crystal flotation. The act or process of floating of lightweight crystals in a body of magma. Opposite of crystal settling. *A.G.I.*

crystal form. The form or shape in which crystals occur; the cube, the octahedron, and others. *Shipley.*

crystal form, ideal. One in which the like faces are of the same size and shape. *Shipley.*

crystal fractionation. Migmatic differentiation resulting from the settling out of crystals from a melt. *A.G.I. Supp.*

crystal glass. A colorless glass, highly transparent, frequently used for art or tableware. *ASTM C162-66.*

crystal glazes. Devitrified glazes in which crystallization has taken place. *Rosenthal.*

crystal grating. A diffraction grating for X-rays or gamma rays utilizing the natural spacing of a crystal lattice as the grating space. *Webster 3d.*

crystal group. Same as crystal aggregate. *Shipley.*

crystal habit. The habit of crystalline mineral is described as prismatic (long to needle-shaped); tabular to platy and scaly (micaceous). Intergrowths are given by specific description. *Pryor, 3.*

crystal imprints. *See* crystal casts. *Pettijohn.*

crystal indices. Numbers or other representations which indicate the inclination of a crystal face to the crystal axes. *Shipley.*

crystall-; crystallo-. Combining form meaning crystal. *Webster 3d.*

crystal lattice. a. The regular and repeated three-dimensional arrangement of atoms that distinguishes crystalline solids from all other states of matter. Essentially the regularity displayed by a crystal lattice is that of a three-dimensional mesh which divides space into identical parallelepipeds. Imagine a number of identical atoms placed at the intersections of such a mesh; then we have what is known as a simple lattice (synonymous with Bravais lattice). *A.G.I.*

crystallic. Relating to crystals or crystallization. *Webster 3d.*

crystalliferous. Producing or bearing crystals. *Webster 3d.*

crystalliform. Having a crystalline form. *Standard, 1964.*

crystalline. a. Made of crystal. *Webster 3d.* b. Resembling crystal. *Webster 3d.* c. Of the nature of or relating to a crystal. Formed by crystallization. Having a regular arrangement of the atoms in a space lattice. Opposite of amorphous. Having the internal structure, though not necessarily the external form, of a crystal; for example, granite is only crystalline, but a quartz crystal is perfectly crystallized. *Webster 3d.* d. Crystalline rock is composed of crystals or fragments of crystals. *Webster 3d.* e. Transparent, clear, or pure. *Long.*

crystalline aggregate. An aggregate of crystalline grains or fragments, such as granite, not showing well-defined crystal forms. *Fay.*

crystalline chondrite. A hard, crystalline stony meteorite of bronzite and olivine with firm chondri breaking with the mass. *Hess.*

crystalline enstatite-anorthite chondrite. A hard, crystalline stony meteorite of enstatite, anorthite, and nickel-iron with firm, round, radial chondri that break with the matrix. *Hess.*

crystalline form. The external geometrical shape of a crystal. *C.M.D.*

crystalline fracture. A fracture of a polycrystalline metal characterized by a grainy appearance. Contrast with fibrous fracture. *ASM Gloss.*

crystalline glaze. A glaze containing macroscopic crystals. *ASTM C242-60.*

crystalline grains. Minute crystals or crystalline particles which compose a granular crystalline aggregate. Distinguished from minute fiberlike crystals which compose fibrous crystalline aggregates. *Shipley.*

crystalline granular texture. A primary texture due to crystallization from a fluid (aqueous) medium. Examples are rock salt (halite), gypsum, and anhydrite. *A.G.I.*

crystalline limestone. A marble formed by the recrystallization of sedimentary limestone strata. As the result of recrystallization, the calcite grains composing the limestone increased in size and the enlarged calcite crystals became mutually interlocking. Crystalline limestone or marble is either the product of metamorphism or of diagenesis of sedimentary limestone strata in most instances. *See also* marble. *Bureau of Mines Staff.*

crystalline material. Same as crystal material. *Shipley.*

crystalline quartz. A term used to distinguish all the varieties of quartz which are not cryptocrystalline, such as rock crystal, amethyst, citrine, cairngorm, rose quartz, tiger eye, etc. *Shipley.*

crystalline rock. a. A rock composed of minerals plainly in the crystalline state. *A.G.I. Supp.* b. An inexact general term for igneous and metamorphic rocks as opposed to sedimentary rocks. *A.G.I. Supp.*

crystalline schist. A rock that has been entirely or partly recrystallized by metamorphism. It is named after its predominate mineral, for example, chlorite schist, hornblende schist, mica schist, etc. *Standard, 1964.*

crystalline solution. Synonym for solid solution. *Webster 3d.*

crystalline tonstein. This type tonstein contains vermicular, prismatic or tabular kaolinite crystals and may be either light or dark in color according to the proportion of contained carbonaceous matter. Occasionally granular kaolinite may also be recognized. The crystals lie embedded in either a finely crystalline or cryptocrystalline kaolinite groundmass. *IHCP, 1963, part I.*

crystallinic metamorphism. A molecular change which renders an amorphous mineral body crystalline; as, limestone converted to marble. *Fay.*

crystallinity. a. The degree of crystallization exhibited by an igneous rock; expressed by such terms as holocrystalline, hypocrystalline, holohyaline, etc. *Holmes, 1928.* b. The quality or the state of being crystalline; the degree of crystallization. *Webster 3d.*

crystallite. a. A general term for a minute body that does not react to polarized light and that occurs in glassy igneous rocks; for example, globulite, longulite, margarite, trichite, and other forms of incipient crystallization that cannot be referred to a definite mineral species. *Holmes, 1928.* b. A small, rudimentary or embryonic crystal that is not referable to a definite mineral species. *Fay.* c. A minute mineral form like those common in glassy volcanic rocks. It is usually not referable to any mineral species but it marks the first step in the crystallization process. *Webster 3d.* d. A single grain in a polycrystalline medium. Also a crystallographically homogeneous domain within such a grain. *Webster 3d.*

crystallitic. Of, pertaining to, or formed of, crystallites. *A.G.I.*

crystallizable. Capable of forming or of being formed into crystals. *Webster 3d.*

crystallization. a. The formation of mineral crystals during the cooling of a magma or by precipitation from a solution. *Bateman.* b. The process through which crystalline phases separate from a fluid, a viscous, or a dispersed state (gas, liquid solution, or rigid solution). *Holmes, 1920.* c. The process of crystallizing. A form of body resulting from crystallizing. *Webster 3d.*

crystallization differentiation. a. Magmatic differentiation by the separation of crystals from the magma. *Bateman.* b. A process of fractional crystallization in which an originally, theoretically homogeneous melt, such as a magma, splits up into constrasting parts which may eventually constitute separate bodies of different kinds of rocks (magma differentiates). *Bureau of Mines Staff.*

crystallization interval. a. The interval of temperature (or less frequently, pressure) between the formation of the first crystal and the disappearance of the last drop of liquid from a magma on cooling. It usually excludes the late-stage aqueous fluids. *A.G.I.* b. More specifically, when referring to a given mineral, the range or the ranges of temperatures over which that particular phase is in equilibrium with liquid. In the case of equilibria along reaction lines or reaction surfaces, crystallization intervals, as thus defined, include temperature ranges in which certain solid phases are actually decreasing in amount with decrease in temperature. *A.G.I.*

crystallization magnetization. Chemical magnetization. *A.G.I. Supp.*

crystallization nucleus. A small particle of any kind around which crystals begin to form when a substance crystallizes. *Bureau of Mines Staff.*

crystallization schistosity. Fissility resulting from the preferred orientation of crystals that grew in the easiest direction. *G.S.A. Memoir 6, 1938, p. 68.*

crystallization systems. The 32 possible crystal groups, distinguished from one another by their symmetry, are classified under 6 systems, each characterized by the relative lengths and inclinations of the assumed crystallographic axes. These are isometric, tetragonal, hexagonal, orthorhombic, monoclinic, and triclinic. *Fay.*

crystallize; crystalize. To cause to form crystals or to assume crystalline form; especially to cause to assume perfect or large crystals. To cause to take a fixed and definite form. To become converted into crystals. To assume crystalline form. To solidify by crystallizing. To deposit crystals. To become fixed and definite in form. *Webster 3d.*

crystallized. a. Erroneously used to describe drill-string equipment or machine parts that have failed by fatigue fractures caused by prolonged subjugation to vibration, bending, or twisting. *Long.* b. Converted from an amorphous or molten state to a crystalline form. *Long.* c. Formed into crystals. Definite in form. *Webster 3d.*

crystallized coal. *See* cone-in-cone structure. *A.G.I.*

crystallized tinplate. Tinplate having crystals formed by the action of diluted nitric and hydrochloric acids. *Standard, 1964.* A rather low grade of tinplate. *See also* tinplate. *Fay.*

crystallizing force. The potentiality, or the expansive force, by which a mineral tends to develop its own crystal form against the resistance of the surrounding solid mass. This may be a differential force that causes the crystal to grow preferentially and more rapidly in one crystallographic direction than in another. *Bureau of Mines Staff.*

crystalloblast. One of the mineral components of a crystalloblastic rock or crystalloblastic rock mass. *Webster 3d.*

crystalloblastesis. Deformation accomplished by metamorphic recrystallization. *G.S.A. Memoir 6, 1938, p. 34.*

crystalloblastic. a. In a rock, of or relating to any crystalline texture resulting from metamorphism. *Webster 3d.* b. Denoting a structure produced by crystals growing in a solid solution. *Webster 3d.* c. A crystalline texture due to metamorphic recrystallization. A characteristic of this texture is that the essential constituents are simultaneous crystallizations and are not formed in sequence, so that each may be found as inclusions in all the others. *Johannsen, v. 1, 2d, 1939, p. 207.*

crystalloblastic series. An arrangement of metamorphic minerals in an order of decreasing crystallization force so that crystals of any of the listed minerals tend to assume idioblastic outlines at surfaces of contact with simultaneously developed crystals of all minerals occupying lower positions in the series. This crystalloblastic series corresponds closely to an arrangement in order of decreasing specific gravity. *See also* idioblastic. *Bureau of Mines Staff; A.G.I.*

crystalloblastic texture. *a.* The texture of metamorphic rocks which have recrystallized under conditions of directed pressure, elevated temperature, and high viscosity in contrast to igneous rocks in which successive crystallization of minerals occurs under conditions of relatively low viscosity and nearly uniform pressure. *C.T.D.; Holmes, 1920.* b. This texture is correlated with a mode of origin in which every individual crystal exerted its own force of crystallization against a resistance offered by the enclosing medium and its constituent competing crystals. *Bureau of Mines Staff.*

crystalloceramie. Name under which Apsley Pellatt patented his cameo encrustations or porcelain reliefs and cameos enclosed in glass. *Haggar.*

crystallochemical element. An element essential to the composition and the structure of a mineral. *A.G.I. Supp.*

crystallogenesis. The production or formation of crystals. *Webster 3d.*

crysatllogenic. Crystal-producing. *Webster 3d.*

crystallogeny. a. The science and the theory of the production of crystals. *Standard, 1964.* b. That branch of crystallography that deals with the formation of crystals.

Webster 3d.

crystallogram. A photographic record of crystal structure obtained through the use of X-rays. *Webster 3d.*

crystallographic. Relating to or dealing with crystallography or crystals. For example, crystallographic textures and crystallographic axes. *Webster 3d.*

crystallographic axes. Three axes intersecting at right angles, the vertical one being the X-axis and the two horizontal ones the Y and Z. The position of a crystal face is defined by the ratio of its intercepts with these axes. *Pryor, 3.*

crystallographic direction. Refers to directions in the various crystal systems which correspond with the growth of the mineral and often with the direction of one of the faces of the original crystal itself. *Shipley.*

crystallographic discolorations. Bands of lighter or darker shades of the basic color of the block of mica. Such bands generally are parallel to the crystallographic faces of the crystal from which the block was separated. *Skow.*

crystallographic notation. A concise method of expressing the relationship of any crystal face to the axes of reference in the crystal. *C.T.D.*

crystallographic planes. Any set of parallel and equally spaced planes that may be supposed to pass through the centers of atoms in crystals. As every plane must pass through atomic centers and no centers must be situated between planes, the distance between successive planes in a set depends on their direction in relation to the arrangement of atomic centers. *C.T.D.*

crystallographic system. Any of the major units of crystal classification, embracing one or more symmetry classes. *C.T.D.*

crystallographic texture. Any texture in which the crystallographic properties of the host mineral control the distribution of mineral inclusions or veinlets. This texture may be the result of replacement as well as exsolution. Many types are included, such as lamellar, triangular, etc. *Schieferdecker.*

crystallography. a. The science of the interatomic arrangement of (solid) matter, its causes, its nature, and its consequences. *A.G.I.* b. The science of crystals and of crystallization dealing with the system of forms among crystals, their structure, and their forms of aggregation. *Webster 3d.*

crystalloid. a. A substance (as a salt, for example) that forms a true solution, in solution diffuses readily through a membrane, and is capable of being crystallized. *Compare* colloid. *Webster 3d.* b. Formerly, it was considered to be the antonym for colloid. Now it is known that many colloids can be crystallized and many crystalloids can be prepared in the colloidal state. *A.G.I.* c. As an adjective, having some or all of the properties of crystal. *Webster 3d.*

crystalloidal. Having the properties of or relating to a crystalloid. *Webster 3d.*

crystallology. The science of the structure of crystals. It embraces crystallography and crystallogeny. *Standard, 1964.*

crystalloluminescence. The emission of light by a substance during its crystallization. *A.G.I. Supp.*

crystallomagnetic. Relating to the magnetic properties of crystals and crystal structures. *Webster 3d.*

crystallothrausmatic. Designating a type of orbicular rock in which early phenocrysts form the nuclei of the orbicules. *Schieferdecker.*

crystallurgy. The process of crystallization. *Fay.*

crystal material. Any substance possessing crystal structure but no definite geometric form visible to the unaided eye. Also known as crystalline material. *Shipley.*

crystal mush. Partially crystallized magma. *A.G.I. Supp.*

Crystalon; Crystolon. Silicon carbide product; used for refractory and abrasive purposes. *Bennett 2d, 1962.*

crystal optics. The science which treats of the transmission of light in crystals. *Fay.*

crystal pattern. A space lattice of a crystal structure. *Hackh's Chem. Dict.*

crystal properties. Optical include color, streak, luster (submetallic, vitreous, resinous), diaphaneity transparence, (translucence, opacity), isotropy, refractive index, polarizing quality. Physical include hardness, measured on Mohs' scale; cleavage, characterized by appearance of cleavage plane along which crystal breaks most readily and smoothly; fracture (even, conchoidal); tenacity (brittleness, elasticity, flexibility); specific gravity; paramagnetism; ferromagnetism; dielectric constant, etched patterns or figures on corrosion. *Pryor, 3.*

crystal recovery. The recovery of the original properties in a crystal that has been distorted by stress resulting from continued relief from stress, heating, or decrease in the speed of deformation. *G.S.A. Memoir 6, 1938, p. 106.*

crystal rectifier. A point contact between a metal and a crystal (such as copper and galena), or between two crystals (such as zincite and bornite). It has marked unidirectional conductivity. *C.T.D.*

crystals. a. Geometrical forms, with plane faces, of infinite variety, assumed by the majority of minerals. *Weed, 1922.* b. Trade term for fourth grade diamonds; colorless diamonds. *Hess.* c. Australian synonym for drill diamonds. *Long.* d. Atomic structures with long-range order. (Euhedral surfaces are not required.) *VV.*

crystal sandstone. In siliceous sandstone it may be that the deposited silica is precipitated upon the rounded or angular quartz grains in crystalline position, thus converting them outwardly into crystals. Examination with a lens shows the crystal forms and faces of the little regenerated quartz grains. The sandstone is known as crystal sandstone. *A.G.I.*

crystal sedimentation. The settling of crystals in a liquid magma. *Compare* crystal settling. *A.G.I. Supp.*

crystal settling. Gravitational sinking of crystals from the liquid magma in which they formed, by virtue of their higher density. The settling may be aided by convection currents carrying the crystal-laden magma downward. *A.G.I.*

crystal soldered emerald. Same as soldered emerald, but with rock crystal substituted for beryl. *Shipley.*

crystal sorting. The separation by various unspecified processes, of crystals from a magma, or of one crystal phase from another, during the crystallization of a magma. *A.G.I.*

crystal spectrometer. An X-ray spectrometer employing a crystal grating. *Webster 3d.*

crystal structure. a. The periodic or repeated arrangement of atoms in a crystal. *A.G.I.* b. The arrangement in most pure metals may be imitated by packing spheres, and the same applies to many of the constituents of alloys. *See also* face-centered cubic; close-packed hexagonal structure. *C.T.D.*

crystal systems. a. A classification of crystals based on the intercepts made on the crystallographic axes by certain crystal faces (or bounding planes). *C.M.D. See also* crystallization systems. b. The six main symmetry groups into which all crystals, whether natural or artificial, can be classified. *Anderson.*

crystal texture. The size and arrangement of the individual crystals in a crystalline mass. *C.M.D.*

crystal tuff. a. An indurated deposit of volcanic ash dominantly composed of intratelluric crystals blown out during a volcanic eruption. The term should be restricted to tuffs containing more than 75 percent by volume of crystals. *See also* tuff. *A.G.I.* b. The crystals usually are broken euhedra of the common phenocrysts of the lava, and they may be sheathed in an envelope of glass. *A.G.I.*

crystal-vitric tuff. Tuff consisting of 50 to 75 percent of crystal fragments and 25 to 50 percent of glass fragments. *A.G.I. Supp.*

crystobalite. Crystal modification of quartz which is formed by heating the clay silica bodies at temperatures above 1,100° C.; it increases the thermal expansion and decreases the danger of crazing. *Rosenthal*

Crystolon. A trade name for silicon carbide, SiC. *AIME, p. 18.*

Cs Chemical symbol for cesium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

csc Abbreviation for cosecant. *BuMin Style Guide, p. 58.*

csch Abbreviation for hyperbolic cosecant. *BuMin Style Guide, p. 59.*

C.S. jar collar. A thick-wall steel collar, the inside surface of which is tapered to fit two serrated-face taper sleeves. The assembly may be fitted at any point over a casing or pipe and serves as a drive collar in sinking casing or pipe by driving and choping. Also called self-tightening jar collar; self-tightening jar coupling; Simmons jar block, Simmons jar collar. *Long.*

CST Abbreviation for central standard time. Also abbreviated C, Ct, c s t. *Zimmerman, pp. 23, 383.*

ct Abbreviation for carat. *Zimmerman, p. 21.*

ctenoid cast. Cast with form of an obliquely-cut, longitudinally ribbed cylinder. Probably bounce casts made by equisetiform plant steams. Very rare. *Pettijohn.*

C. T. Nozzle. Trade name; a refractory nozzle for steel pouring designed to give a constant teeming rate (therefore, the name). The nozzle consists of an outer fireclay shell and a refractory insert of different composition. Strictly speaking, the term refers to a particular type of insert developed for the teeming of free cutting steels. *Dodd.*

C to C Abbreviation for center to center. *Zimmerman, p. 200.*

C-two; C-2. Commonly designates the lowest of two qualities of congo diamonds normally used as drill-grade diamonds *Long.*

cu Abbreviation for cubic. *BuMin Style Guide, p. 58.*

Cu Chemical symbol for copper. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

cubanite. In Cuba, a bronze-yellow sulfide of copper and iron mineral, perhaps $CuFe_2S_4$ or $CuS.Fe_2S_3$. *Fay.*

cubbling. Breaking up pieces of flatiron to be piled or fagoted, heated, and rolled *Fay.*

cubbyhole. A niche cut in the rib or wall for the storage of explosive or detonators. *Bureau of Mines Staff.*

cube. a. Scot. A ventilating furnace in a mine. *Fay.* b. The crystal form in the isometric system that consists of six like, mutually perpendicular faces and differs from the geometric cube in that the six faces need not be square but must bear like relations to the internal structure of the crystal. *Webster 3d.* c. A relatively rare crystal form of diamond having six equal-area faces at right angles to each other. *Long.* d. A rectangular prism having squares for its ends and faces. *Jones, 2, p. 116.*

cube coal. a. A layer of hard greenish clay found at the top of a coal seam in parts of Pennsylvania and West Virginia. It breaks readily into cubes of nearly perfect shape. Sometimes called rooster coal. *Fay.* b. Eng. Coal broken into cubes, of about 1 foot on each side, to suit certain trade. *Fay.*

cubek. The oil content of sedimentary rock in terms of barrels per cubic kilometer of sediments. *A.G.I.*

cubem. The oil content of sedimentary rock in terms of barrels per cubic mile of sediments. *A.G.I.*

cube ore. Eng. An arsenate of iron, $6FeASO_4.2Fe(OH)_3+12H_2O$, of an olive-green to yellowish-brown color, and occurring commonly in cubes with the copper ores of Cornwall. Pharmacosiderite. *Fay.*

cube powder. Gunpowder made in large cubical grains and burning more slowly than the small or irregular grains. *Fay.*

cue spar. Same as anhydrite. *Standard, 1964.*

cube test. Determining the strength of a Portland cement by testing to destruction a cube of mortar made under standard conditions, using a mix of 1 part cement, 3 parts by weight of standard sand, and 10 percent by weight of water. Test cubes are of 6-inch sides and are generally sent to a laboratory for test at 7 and 28 days. Such test cubes are normally supplemented by small concrete beams, cast and tested on site. *Ham.*

cubic. Having the form of a cube, as a cubic crystal; or referring to directions parallel to the faces of a cube, as cubic cleavage. *See also* cubic system. *Shipley.*

cubic centimeter. A measure of volume in the metric system. One cubic centimeter is equal to 0.061 cubic inch. Abbreviation, cc. *Enam. Dict.*

cubic cleavage. Equally good cleavage in three mutually perpendicular directions. *Fay.*

cubic foot. A volume of a size equal to that of a cube 1 foot on a side. Equal to 28.316 liters, or 6.2288 imperial gallons, or 0.028317 cubic meter. *Beerman.*

cubic inch. A volume of a size equal to that of a cube 1 inch on a side. Equal to 16.387 cubic centimeters. *Beerman.*

cubicite; cubizite. Cubic zeolite; analcime. *Fay.*

cubic meter. A volume equal to that of a cube 1 meter on a side. Equal to 35.315 cubic feet, or 219.97 imperial gallons. *Beerman.*

cubic packing. The manner of arrangement of solid units in a sediment in which the unit cell is a cube, the eight corners of which are the centers of the spheres or solids involved. This is the loosest or most open type of systematic packing. *A.G.I.*

cubic plane. A plane perpendicular to any one of the three crystallographic axes of the cubic (isometric) system; the Miller indices are {100}. *ASM Gloss.*

cubic stock. Blocks of stone approximatelv cubical in form as contrasted with thin stock or slabs. *Fay.*

cubic system. The crystal system which has the highest degree of symmetry; it embraces such forms as the cube and the octahedron. *C.M.D.*

cubing rolls. Crushing rolls having projections and used for breaking down hard slabby clays into a cubelike product that is more suitable for feeding to a secondary grinding unit. *See also* crushing rolls. *Dodd.*

cubo-octahedron. A crystal form which has faces of both the cube and the dodecahedron. *Shipley.*

cucalite. A chloritic diabase passing locally into chlorite schist. *See also* basic schist; epidiorite; greenstone; greenschist; lavialite; metabasite; ophite; ophiolite; prasinite; timazite. *A.G.I.; Holmes, 1920.*

cuckhold. An iron tool for cutting off lumps of prepared clay, from a pug, ready for the hand molding of building bricks. *Dodd.*

cuckoo shots. Subsidiary shots in the roof of a longwall working, between the coal face and the waste, or in any waste. *Nelson.*

cu cm Abbreviation for cubic centimeter. Also, cc and cm^3. *BuMin Style Guide, p. 58.*

cuddy. a. Scot. A donkey. *Fay.* b. A lever mounted on a tripod for lifting stones, leveling up railroad ties, etc. *Fay.* c. A weight mounted on wheels; a loaded bogie, used to counterbalance the tub or car on an inclined roadway. Also spelled cuddie. *Fay.*

cuddy brae. Scot. An inclined roadway, worked in the same manner as a self-acting incline. *Fay.*

cuesta. Sp. a. A sloping plain, especially one with the upper end at the crest of a cliff. A hill or a ridge with a steep face on one side and a gentle slope on the other. Common in the southwestern United States. *Webster 3d.* b. A landform commonly found in regions of gently tilted sedimentary rocks and consisting of an inclined upland, the slope of which conforms with the dip of a resistant bed or series of beds and a relatively steep escarpment descending abruptly from its crest. *Webster 3d.* c. *See* hogback; wold. *A.G.I.*

cueva. Sp. A cave or grotto. *Fay.*

Cuisian. Synonym for Bruxellian. *A.G.I. Supp.*

culasse. The part of a brillant-cut stone below the girdle. *Bureau of Mines Staff.*

culbuteur. Belg. A dumping apparatus which turns completely over, or around, when emptying cars. *Fay.*

culet; collet. The small lower terminus of a brilliant-cut gem. It is parallel to the table. *Standard, 1964.*

cull. Equivalent of the English waster. *Dodd.*

cullet. a. Broken glass that can be recharged to the glass furnace. The word is derived from the French collet, the little neck left on the blowing iron when bottles were handblown; these collects were returned to the glass pot and remelted. Factory cullet or domestic cullet is from the same glassworks at which it is to be used; foreign cullet is from a different glassworks. *Dodd.* b. The portion of a glass article which will later be cutoff and discarded or remelted. *ASTM C162-66.* c. Waste glass used with the batch to improve the rate of melting and to save waste of materials. *C.T.D.*

cullet cut. Synonym for block reek. *ASTM C162-66.*

culls. Brick rejected because of imperfection in size, shape, or quality. *AISI No. 24.*

culm. a. A vernacular term variously applied, according to the locality, to carbonaceous shale, or to fissile varieties of anthracite coal. *Rice.* b. Small coal, particularly anthracite smalls. *B.S. 3323, 1960.* c. Eng. Anthracite; a kind of coal, of indifferent quality, burning with a small flame, and emitting a disagreeable odor. *Fay.* d. Penna. The waste or slack of the Pennsylvania anthracite mines, consisting of fine coal, more or less pure, and coal dust and dirt. *Fay.* e. Anthracite fines which will pass through a screen with ⅛-inch holes. *Nelson.* f. Rocks of the Carboniferous age in the southwest of England, consisting of shales and sandstones with occasional thin layers of crushed coal or culm. *Nelson.* g. All coal refuse finer than rice. Before a market was developed for fine coal, it used to be piled in banks and left for waste; culm banks are now being reclaimed. *Korson.* h. In anthracite terminology, the waste accumulation of coal, bone, and rock from old dry breakers. *Mitchell, p. 610.* i. In bituminous coal preparation, culm corresponds to slurry or slime, depending upon the size distribution of the suspended solids. *Mitchell, p. 610.*

culm bank; culm dump. The deposit on the surface of culm usually kept separate from deposits of larger pieces of slate and rock. *Hudson.*

culm bar. A peculiar bar used in grates designed for burning culm or slack coal. *Fay.*

culm driver. In anthracite coal mining, one who hauls cars of culm (anthracite waste) to the dumping or loading point. *D.O.T. 1.*

culm footman. In anthracite coal mining, one who works at the bottom of the plane (incline) up which cars of culm (anthracite waste) are hauled by a hoisting cable for dumping. *D.O.T. 1.*

culm headman. In anthracite coal mining, one who works at the top (head) of a plane (incline) up which cars of culm (anthracite waste) are hauled by a hoisting cable for dumping. *D.O.T. 1.*

culmiferous. Containing culm as coal. *Standard, 1964.*

culmination. a. Applied to the highest point on the crown of a nappe. *A.G.I.* b. Portion of a fold system, generally more or less at right angles to the folds, and away from which the folds plunge. *A.G.I.*

culm loader. In anthracite coal mining, one who shovels culm (anthracite waste) into mine cars for haulage. *D.O.T. 1.*

culm man. In anthracite coal mining, a general term applied to workers handling culm (anthracite waste) as distinguished from coal. Usually designated according to job, as culm driver; culm engineer; culm footman; culm headman; culm loader; culm runner. *D.O.T. 1.*

culm measures. The name for the shaly and gritty formation containing them. *Arkell.*

culm runner. *See* car runner. *D.O.T. 1.*

cultch. Broken bricks. *Bureau of Mines Staff.*

culture. Those features of the terrain that have been constructed by man, such as roads, trails, buildings, and canals; also, boundary lines and all names and legends. *Seelye, 2.*

culture tube. Synonym for acid bottle. *Long.*

culver. Som. A blue stone used for steps. *Arkell.*

culvert. A covered channel, or a pipe of large diameter taking a watercourse below ground level. Also applies to a tunnel through which water is pumped into, or emptied from, a drydock. *Ham.*

cumberlandite. An ultramafic igneous rock composed of magnetite, ilmenite, olivine, and minor plagioclase. *A.G.I.*

Cumberland method of mining. *See* top slicing and cover caving; top slicing combined with ore caving. *Fay.*

cumbraite. A dacite or rhyodacite containing calcic plagioclase (bytownite phenocrysts and labradorite groundmass) and pyroxene in a glassy groundmass which is potentially composed of andesine, sanidine, and quartz. *A.G.I.*

cumengeite. A light indigo-blue oxychloride of lead and copper, $PbCl_2.Cu(OH)_2$; tetragonal. Small crystals of pyramidal form. *English.*

cumengite. a. Same as cumengeite. *English.* b. Same as volgerite. *English.*

Cummings' sedimentation method. An approximate method of particle size analysis having the merit of giving a weight and/or size (weight/size) distribution directly. *Dodd.*

cummingtonite. a. An amphibole, $(Mg,Fe)_7(Si_8O_{22})(OH)_2$; monoclinic. Same composition as anthophyllite but usually higher in iron. *Dana 17.* b. Synonym for rhodonite. *Hey 2d, 1955.*

cumulative curve. A curve relating the total percentage (ordinate) smaller than a given value (abscissa) into which the total statistical population has been subdivided (that is, specific gravity less than a given value or size fraction smaller than a given value). Total ordinate equals 100 percent at the upper end of the range. *Bureau of Mines Staff.*

cumulative error. Noncompensating, bias due to error in method, personal equation, or mechanism, which always operates either to show shortfall or high result. *Pryor, 3.*

cumulative float curve. The curve obtained from the result of a float and sink analysis by plotting the cumulative yield at each specific gravity against the mean ash of the total floats at that specific gravity. *B.S. 3552, 1962.*

cumulative frequencies (sea and swell). Percentages of surface waves or pressure fluctuations exceeding any specified height and period combination. *Hy.*

cumulative plot. Graphic representation of cumulative curve results of screen analysis, in which the cumulative percentage of weight is plotted against the screen aperture, usually both to logarithmic scale. *Pryor, 3.*

cumulative sink curve. The curve obtained from the results of a float and sink analysis by plotting the cumulative yield of sinks at each specific gravity against the mean ash of the total sinks at that specific gravity. *B.S. 3552, 1962.*

cumulite. Proposed by Vogelsang for a type of crystallite formed of a more or less rounded aggregate of globulites, usually occurring in the groundmass of glassy volcanic rocks. *A.G.I.*

cumulo dome. A protrusion of viscous lava from a volcanic vent with little lateral spreading. *A.G.I. Supp.*

cumulophyre. Used by Cross, Iddings, Pirsson, and Washington for a porphyritic rock in which the phenocrysts are arranged in clusters or in irregular groups. *Schieferdecker.*

cumulophyric. Applied to glomeroporphyritic texture in the widest sense, that is, when the clusters of crystals forming composite phenocrysts are not necessarily aggregates of the same mineral. Synonym for glomeroporphyritic. *Holmes, 1928; A.G.I.*

cumulose. Pertaining to accumulations of dead plant and animal remains that have formed in place with relatively little detrital sediment; cumulose deposits include peat, muck, and swamp soils. *Stokes and Varnes, 1955.*

cumulose deposits. *See* cumulose.

cumulo-volcano. Synonym for cumulo dome. *A.G.I. Supp.*

cundered. A lifter hole or a hole drilled to throw the burden upward. Such a hole is known as a cundered hole. *Bureau of Mines Staff.*

cundy; cundie. a. Scot. The spaces from which coal has been worked out, partly filled with dirt and rubbish between the packs. *See also* goaf. *Fay.* b. Aust. The passage under a roadway into which an endless rope passes out of the way at the end of its track. Also called conduct. A variation of conduit. *Fay.* c. Any small passageway made to improve ventilation or facilitate movement of materials. It is generally made through a pack or along the rib side of a longwall face. *B.S. 3618, 1963, sec. 2.*

cuneiforme. Fr. Wedge-shaped. *Bureau of Mines Staff.*

cup. a. Sheet metal part, the product of the first deep-drawing operation. *ASM Gloss.* b. Any cylindrical part or shell closed at one end. *ASM Gloss.* c. Synonym for cup leather. *Long.*

cupaloy. A copper alloy containing 99.4 percent copper, 0.5 percent chromium, and 0.1 percent silver. *Hess.*

cup-and-ball jointing. A cross jointing of columnar igneous rocks, in which one face of the joint is concave and the other face is convex; as in the columns of the Giant's Causeway, Ireland. *Holmes, 1928.*

cup and cone. A machine for charging a shaft furnace, consisting of an iron hopper with a large central opening, which is closed by a cone or bell, pulled up into it from below. In the annular space around this cone, the ore, fuel, etc., are placed, then the cone is lowered to drop the materials into the furnace, after which it is again raised to close the hole. *Fay.*

cup and cone fracture. *See* cup fracture.

cup baller. *See* batter-out II. *D.O.T. 1.*

cup coral. A solitary coral, as opposed to a colonial coral. *A.G.I.*

cupel. a. A small cup made of bone ash used in gold or silver assaying with lead. *A.G.I.* b. The hearth of a small furnace used in commercial separation of precious metals from lead. *Webster 3d.*

cupel dust. A powder used in purifying metals. Also called coppel dust. *Fay.*

cupellation. a. The process of assaying for precious metals with a cupel. *A.G.I. Supp.* b. Oxidation of molten lead containing gold and silver to produce lead oxide thereby separating the precious metals from the base metal. *ASM Gloss.*

cupellation process. A process for freeing silver, gold, or other nonoxidizing metals from base metals which can be oxidized. The metallic mixture is placed in a cupel, which is a shallow, porous cup, and roasted in a blast of air. The base-metal oxides are absorbed in the cupel, leaving the pure metal to be decanted. *CCD 6d, 1961.*

cupeller. One who refines gold and silver in type of reverberatory furnace known as cupel. *D.O.T. Supp.*

cupelo. A small shaft furnate. *Bureau of Mines Staff.*

cupferron. A colorless crystalline salt, $C_6H_5N(NO)ONH_4$, that is a precipitant for copper and iron from solutions and is also used in the analysis of other metals, especially of the uranium group. *Webster 3d.*

cup fracture; cup-and-cone fracture. Fracture, frequently seen in tensile test pieces of a ductile material, in which the surface of failure on one portion shows a central flat area of failure in tension, with an exterior extended rim of failure in shear. *ASM Gloss.*

cup grease. A heavy-bodied, semisolid grease used as a lubricant. *Crispin.*

cup gun. A spray gun with a fluid container as an integral part. *ASTM C286-65.*

cup handler. *See* handler. *D.O.T. 1.*

cupid's darts. *See* fleches d'amour. *C.M.D.*

cup jolly. *See* cup maker. *D.O.T. 1.*

cup leather. The shallow, cup-shaped packing disk or ring on a pump or hydraulic piston made of leather or a resilient material such as rubber-impregnated fabrics. *Long.*

cup maker. One who forms cups of pliable clay on revolving mold by pressing a shaping tool, called a jolly, down into the clay. Also called cup jolly; jollier. *D.O.T. 1.*

cupola. a. A cylindrical vertical furnace for melting metal, especially gray iron, by having the charge come in contact with the hot fuel, usually metallurgical coke. *ASM Gloss.* b. A dome-shaped projection of the igneous rock of a batholith. Many stocks are cupolas on batholiths. *Fay.* c. A circular kiln, with a domed roof, used for burning brick. *Fay.*

cupola block. A modified circle brick. *Bureau of Mines Staff.*

cupola brick. *See* key brick. *Dodd.*

cupola furnace. A shaft furnace used in melting pig iron (with or without iron or steel scrap) for iron castings. The lining is firebrick. Metal, coke, and flux (if used) are charged at the top and air is blown in near the bottom. *C.T.D.*

cupola refractories. Destruction-resistant refractories as used in the cupola furnace. Usually dense, stiff-mud fire clay brick is used in the hot zone, but sometimes natural silica stone and mica schist are used. For extreme conditions of abrasion and slag erosion, high-heat duty firebrick may be more economical than intermediate heat duty firebrick. Patching mixtures usually are of either silica sand and first quality plastic fire clay or crushed refractory brick and plastic fire clay. *Henderson, pp 264-265.*

cupped wire. Wire in which internal cavities have been formed during drawing. *C.T.D.*

cupping. a. The first deep drawing operation. *ASM Gloss.* b. The fracture of severely worked rods or wire where one end has the appearance of a cup and the other that of a cone. *ASM Gloss.* c. Pouring slip over areas of a (porcelain enamel) part during draining to produce uniform application. *ASTM C286-65.* d. A convex or concave arcing of a coated abrasive, caused by an excess or lack of moisture in the backing and the bond. *ACSG, 1963.*

cuppy fracture. A condition occurring in wiredrawing when too great a reduction of area is attempted at each drawing thus causing the wire to lose its ductility. *Sinclair, V, p. 3.*

cuprene. $(C_7H_6)_2$; molecular weight, 180.23; polymerization product of acetylene obtained by passing acetylene over reduced copper at or above 180° C; a yellowish-brown solid. Used in explosives. *Bennett 2d, 1962.*

cupric. a. Used in naming copper compounds in which the copper has a valence of 2, or is bivalent. *CCD 6d, 1961.* b. Of, pertaining to, or containing copper in the bivalent state; for example, cupric oxide (CuO). *Webster 3d.*

cupric borate. *See* copper metaborate. *CCD 6d, 1961.*

cupric chloride. *See* copper chloride. *CCD 6d, 1961.*

cupric oleate. *See* copper oleate. *CCD 6d, 1961.*

cupric oxide. Tenorite, when found in nature; copper monoxide in chemistry. *Weed, 1918.*

cupriferous. Yielding or containing copper. *Standard, 1964.*

cupriferous pyrite. *See* chalcopyrite. *C.M.D.*

cuprite; ruby copper ore; red oxide of copper. A secondary mineral, Cu_2O; crimson, scarlet, vermilion, deep or brownish-red color; adamantine or dull luster; superior in hardness to cinnabar and proustite and differs from them in color or streak; inferior in hardness to hematite; brownish-red streak; specific gravity, 5.85 to 6.15; contains 88.8 percent cuprous oxide, 11.2 percent oxygen; soluble in nitric and concentrated hydrochloric acids. Found in the United States, England, Germany, France, Siberia, Australia, China, Peru, and Bolivia. A source of copper. *CCD 6d, 1961.*

cuproapatite. A variety of apatite from Chile containing copper. *Standard, 1964.*

cuproauride. The gold cupride of Karabash, Ural Mountains, is a mixture of 63 percent Cu_3Au_2 and $AgAu_4$. The former, as a new mineral, is called cuproaride. *Spencer 15, M.M., 1940.*

cuprocalcite. Apparently merely an intimate mixture of cuprite and calcium carbonate; Mohs' hardness, 3; specific gravity, 3.9; vermilion-red color; soluble in hydrochloric acid. *Weed, 1918.*

cuprocopiapite. A variety of copiapite containing 6 percent CuO, from Chile. *Spencer 15, M.M., 1940.*

cuprodescloizite. A green to greenish-black hydrous vanadate of lead, zinc, and copper, between descloizite and mottramite, $7(Pb,Zn,Cu)O.2V_2O_5.H_2O$; 6.74 percent CuO, 12.24 to 14.85 percent ZnO, 53.01 to 54.93 percent PbO, and 17.40 to 22.50 percent V_2O_3; Mohs' hardness, 3.5; specific gravity, 5.9 to 6.2. Part of the vanadium may be replaced by arsenic. Found only in the oxidized zone; usually in radial mammillary or reniform masses. *Hess.*

cuproferrite. Pisanite. *Weed, 1918.*

cuprojarosite; kuprojarosit. A variety of melanterite containing copper (4.40 percent CuO) and magnesium (4.29 percent MgO). *See also* jarosite. *Spencer 15, M.M., 1940.*

cuprokirovite. A variety of melanterite, $(Fe,Mg,Cu)SO_4.7H_2O$, containing 3.36 percent MgO and 3.18 percent CuO, resulting from underground fires in the Kalata mine, Kirovgrad, Ural Mountains. *See also* kirovite. *Spencer 15, M.M., 1940.*

cupromagnesite. A copper and magnesium sulfate; crystallization monoclinic; occurs in crust on lava; bluish-green color. An alteration product, occurring as incrustations, from Mt. Vesuvius. *Weed, 1918.*

cupromontmorillonite. Interpretation of the Russian name medmontite. *Spencer 19, MM., 1952.*

cuproplumbite. Sulfide of lead and copper, near $Cu_2Pb_2S_3$. Probably a mixture. *Hey 2d, 1955.*

cuprorivaite. Hydrous silicate of copper, calcium, aluminum, and sodium, as small blue grains from Vesuvius. Named from a supposed relation to rivaite. *Spencer 15, M.M., 1940.*

cuprosklodowskite. A strongly radioactive, grass green mineral, $Cu(UO_2)Si_2O_7.6H_2O$; orthorhombic, occurring as a secondary mineral resulting from the alteration of pitchblende; found associated with other uranium minerals. *Crosby, pp. 13-14.*

cuprotungstite. A tungsten-bearing mineral, $CuWO_4+2H_2O$, also $(CaCu)WO_4+2H_2O$. Its composition is variable and may easily be mistaken for some mineral of the epidote group. *Fay.*

cuprous. Of, pertaining to, or containing copper in the univalent state; for example, cuprous oxide (Cu_2O). *Webster 3d; Hess.*

cuprous manganese. A variety of bog manganese containing appreciable percentages of copper oxide, also frequently containing cobalt oxide. *Bennett 2d, 1962.*

cuprous oxide. *See* copper oxide, red. *CCD 6d, 1961.*

cuprous sulfide; copper sulfide; chalcocite. Black; orthorhombic; Cu_2S; melting point, 1,100° C; soluble in nitric acid; insoluble in water; and specific gravity, 5.52 to 5.82. Occurs as the mineral chalcocite. A source of copper. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-173.*

cuprozincite. A bluish-green basic carbonate of copper and zinc, $RCO_3.R(OH)_2$, with $R=Cu: Zn=9:2$. A zinc-bearing malachite, botryoidal or earthy; monoclinic. From Tsumeb, south west Africa. *English.*

cup wheel. A grinding wheel shaped like a cup or bowl. *See also* flaring cup. *ACSG, 1963.*

curb. a. A timber frame, circular or square, wedged in a shaft to make a foundation for walling or tubbing, or to support, with or without other timbering, the walls of the shaft. *Fay.* b. The heavy frame or sill at the top of a shaft. *Fay.* c. In tunnel construction, a ring of brickwork or of cast iron, at the base of the shaft, surmounting a circular orifice in the roof of the tunnel. A drum curb is a flat ring of cast iron for supporting the brickwork having the same diameter externally as the shaft of brickwork. Temporary curbs of oak are also used. *Fay.* d. An iron border to the incorporating bed of a gunpowder mill. *Webster 3d.* e. An iron casing in which to ram loam molds for casting. *Webster 2d.* f. The walls of a chamber in which sulfuric acid is manufactured. *Webster 3d.* g. A wood, cast-iron, or reinforced concrete ring, made in segments, forming a foundation for a masonry or cast-iron circular shaft lining. The curb is set on a firm ledge of rock notched into the periphery of the shaft. It may be removed at a later stage. Synonym for wedging curb; bricking curb; crib. *See also* foundation curb; water ring. *Nelson.* h. A socket of wrought iron or steel for attaching a ring hook or swivel to the end of a rope used for mine hoisting or haulage. *C.T.D.* i. A coaming around the mouth of a well or shaft. *Hess.* j. *See* binder. *Mason.* k. A shaft support ring for walling or tubbing. *Mason.* l. The border of a road at the edging to a verge or footpath, made of precast concrete or granite blocks. *Ham.*

curb bend. A special shape of wall tile. *Dodd.*

curbing. *See* curb, a; crib; cribbing; back casing. *Fay.*

curb tubbing. Eng. A solid wood lining of a shaft. *Bureau of Mines Staff.*

curf. a. Som. The floor of an underground road which is being taken up. *See also* canch. *Fay.* b. Synonym for kerf. *Long.*

curie. a. The unit of radioactivity. Defined as the quantity of any radioactive nuclide in which the number of disintegrations per second is 3.70×10^{10}. *NRC-ASA N1.1-1957.* b. An earlier definition of the curie was: The quantity (in grams) of radon in equilibrium with 1 gram of radium. *NRC-ASA N1.1-1957.* c. The basic unit that describes the intensity of radioactivity in a sample of material. One curie equals 37 billion disintegrations per second or approximately the radioactivity of 1 gram of radium. *L&L.*

Curie point; Curie temperature. a. The temperature at which there is a transition in a substance from one phase to another of markedly different magnetic properties. Specifically, the temperature at which there is a transition between the ferromagnetic and paramagnetic phases. *Webster 3d.* b. The temperature at which the anomalies that characterizes a ferroelectric substance disappear; either the upper or the lower temperature limit of the ferroelectric statee. *Webster 3d.*

Curie's law. The susceptibility of a paramagnetic substance is inversely proportional to the absolute temperature. A law of magnetism that has been replaced by the Curie-Weiss law. *Webster 3d.*

Curie temperature. The temperature of magnetic transformation below which a metal or alloy is magnetic and above which it is paramagnetic. *ASM Gloss.*

curing. a. Any process which keeps concrete moist during the early stages of hardening. Curing may be performed by (1) preventing the rapid evaporation of mixing water; (2) periodical wetting of concrete; or (3) a combination of both. *Nelson.* b. The process adopted to insure the hardening of concrete by preventing excessive evaporation or extremes of temperature. *Taylor.* c. The process during which polymerization takes place. *Phillips.*

curiol. A term in Costa Rica for jasper blackened by enclosed manganese. *Hess.*

curite. A very rare, orange-red, strongly radioactive, orthorhombic mineral, $2PbO.5UO_3.4H_2O$, an oxidation product of uraninite; found associated with torbernite, soddyite, sklodowskite, fourmarierite, and other secondary uranium minerals; at times, found as complete pseudomorphs after uraninite. *Crosby, p. 14.*

curium. A silvery metallic element, atomic number, 96, discovered in 1944 by Seaborg, Pames, and Ghiorso. They synthesized curium 242 by helium-ion bombardment of plutonium 239. Named for Pierre and Marie Curie. The only known valance is 3; symbol, Cm; specific gravity, about 7. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-108.* This very rare metal has been isolated in extremely small quantities from neutron-irradiated americium during work on atomic-energy projects. The metal was prepared by reduction of curium fluoride (CmF_3) with barium metal vapor at 1,275° C. *Bureau of Mines Staff.*

curl. Eng. Gray calcareous grit, often blue inside. *Arkell.*

curled bedding. *See* curly bedding. *Pettijohn.*

curley cannel; curly cannel. a. Eng. Cannel coal which breaks with a conchoidal or curly fractures. *Fay.* b. Eye coal. *Arkell.*

curling. An enamel defect similar to crawling. *Enam. Dict.*

curlstone. Shrop. Ironstone exhibiting cone-in-cone formation. *Fay.*

curly bedding. Small-scale deformation preserved in formerly unconsolidated or plastic sediments that is confined to a single bed or a zone between undisturbed beds. Usually formed by subaqueous slumping or gliding. Synonym for slip bedding. *A.G.I. See also* convolute bedding.

curly coal. Coal which has a curly or conchoidal fracture. *Compare* wool. *Arkell.*

curly coal. a. Scot. A pumpherstone oil shale. Its thickness is about 6 feet, and it yields 20 gallons of crude oil and 60 to 70 pounds of ammonium sulfate per ton. *Fay.* b. In the United States, any folded and distorted oil shale. *Fay.*

curly stone. Shrop. Shale belonging to the coal formation, which on exposure to the air hardens and assumes a peculiar form, sometimes called cone-upon-cone. Also called curlstone. *Arkell.*

current. a. The part of a fluid body (as water or air) moving continuously in a certain direction. *Webster 3d.* b. The swiftest part of a stream. *Webster 3d.* c. A tidal or a nontidal movement, often horizontal, of lake or ocean water. Synonym for drift. *Webster 3d.* d. Condition of flowing. Flow marked by force or strength. Synonym for flow; flux. *Webster 3d.* e. The velocity of flow of a fluid in a stream. *Webster 3d.*

current bedding. a. A particular form of crossbedding. *B.S. 3618, 1964, sec. 5.* b. Synonym for crossbedding. *Hess. See also* false bedding. *Fay.*

current crescent; crescentic scour mark; crescent cast. Small crescentic rounded ridge, commonly with pit in center; crescent convex up-current. A cast of a horse-shoe shaped moat eroded on up-current side of an obstacle such as a pebble, shell, etc. *Pettijohn.*

current cross ripple. One of the ripples that result from the interference of a current with a pre-existing set of ripples. They are formed only if the action of the current is sufficiently weak and of very short duration. As there is no oscillation of the current, there is no reason for a transformation into the hexagonal pattern, and the two sets of ripples may intersect at any angle. *A.G.I.*

current decay. In spot, seam, or projection welding, the controlled reduction of the welding impulse from its peak current amplitude to a lower value in controlled time to prevent rapid cooling of the weld nugget. *ASM Gloss.*

current density. The amount of current per unit area of electrode. *ASM Gloss.*

current drift. Synonym for ripple mark. *A.G.I.*

current efficiency. The proportion of current used in a given process to accomplish a desired result; in electroplating, the proportion used in depositing or dissolving metal. *ASM Gloss.*

current electrode. A piece of metal connected to a cable which, when buried in the earth in a shallow hole or lowered into a well, provides enough contact to permit the passage of substantial electrical currents into the surrounding earth. *A.G.I.*

current leakage tester. *See* earth-fault tester. *Langefors, p. 145.*

current lineation. *See* parting lineation. *Pettijohn.*

current mark. An irregular structure produced by erosion on tidal flats where the falling tidal waters erode numerous channels and leave uneroded areas as flat plateaus between channels. Channel fillings made during the burial of such surfaces may resemble casts of logs. Current marks are also made in the beach zone on the lee side of obstructions. A small depression begins at the obstruction and extends downward toward the water. They are common on beaches in the tidal zone on the downshore side of pebbles, shells, etc. *A.G.I.*

current meter. a. An instrument, as a galvanometer, for measuring the strength of an electric current. *Standard, 1964.* b. An instrument for measuring the velocity of a current. It is usually operated by a wheel equipped with vanes or cups which is rotated by the action of the impinging current. A recording device is provided to indicate the speed of rotation which is correlated with the velocity of the current. *H&G.*

current ripple. A type of ripple mark produced by the action of a current flowing steadily in one direction over a bed of sand. A current ripple has a long, gentle slope toward the direction from which the current comes, and a shorter, steeper slope on the lee side. Sand grains removed from the gentle slope are carried to the crest of the current ripple and are dropped down the steeper slope, causing the ripple to migrate slowly with the current, much as sand dunes migrate with the wind. Some investigators restrict the term ripple mark to oscillation ripples and use the term current mark for the asymmetrical type. *A.G.I.*

current ripple mark. a. A common synonym for transverse ripple mark. *Pettijohn.* b. *See* water-current ripple mark. *A.G.I.*

current rose. A graphical representation of currents, usually by 1° quadrangles, using arrows of different length for the cardinal and intercardinal compass points to show resultant drift and frequency of set for a given period of time. *Hy.*

curry pit. Leic. A hole sunk from an upper to a lower portion of a thick seam of coal through which the return air passes from the stalls to the airway. *Fay.*

cursing in work. Can. False affidavit of assessment work on mining claims. *Hoffman.*

curtain. a. A sheet of brattice cloth hung across an entry in such a way that it prevents the passage of the air current but does not hinder the passage of mules or mine cars. *Fay.* b. In coal mines, curtains are used to deflect the air from the entries into the working rooms and are used to hold the air along the faces. They are usually made of a number of overlapping strips of heavy curtain material which should be of fireproof or fire-resistant material. Also called check curtains. *Kentucky, p. 93. See also* blasting curtain. c. Synonym for cover. *Long.* d. A thin sheet of dripstone hanging from the ceiling or projecting from the wall of a cave. *Schieferdecker.*

curtain arch. An arch of refractory brickwork that supports the wall between the upper part of a gas producer and the gas uptake. *Dodd.*

curtain drain; intercepting drain. A drain that is placed between the water source and the area to be protected. *Nichols.*

curtain hole. Synonym for cover hole. *Long.*

curtain of coal. In Western Pennsylvania, a thin pillar left in lieu of timbers for support. It also has the advantage of being a permanent wall and thus assists in directing ventilation. *Fay.*

curtains. Darkened areas in the ground coat enamel, presumably the result of a boiling or blistering condition during the ground coat firing and often showing a bronzed condition as from hard firing. Sometimes called "loops" or "looping." *Enam. Dict.*

curtain wall. A nonbearing wall built between columns or piers for the enclosure of a building but not supported at each story. *ACSG.*

curtisite. a. A crystalline hydrocarbon, in composition corresponding to $C_{24}H_{18}$. It is found in a form of greenish deposits from a hot spring in California. *Tomkeieff, 1954.* b. A discredited term equal to idrialite. *American Mineralogist, v. 41, No. 1-2, January-February, 1956, p. 168.*

curvature, earth (correction for). An adjustment applied to a long line of sight in the computation of difference in elevation. Atmospheric refraction partially compensates for earth curvature. Hence, correction tables take both curvature and refraction into account. *A.G.I.*

curvature of gravity. A vector quantity calculated from torsion-balance data indicating the shape of the equipotential surface. It points in the direction of the longer radius of curvature. *A.G.I.*

curvature value. Quantity, determined by the torsion balance, that is related to the second derivative of the gravity potential with respect to the horizontal coordinates. *Schieferdecker.*

curve. A smooth bend in a mine roadway or railway. *See also* haulage curve; vertical curve. *Nelson.*

curved brakes. A caliper or suspended post type of brake for winding or other engines. The two brakeshoes are curved to the brake path and anchored near the center line of the drum. *Nelson.*

curved discharge trough. A short curved section of trough used on the discharge end of a shaker conveyor which is located alongside car tracks or another conveyor. It permits discharge of the coal with a minimum of spillage. *Jones.*

curved fault. The fault surface is curved. *Schieferdecker.*

curved fracture cleavage. The cleavage planes in graded beds that cut more directly across the lower coarser parts of the bed and curve to a more diagonal direction in the upper finer parts of the bed. The curved fracture cleavage is convex outward from an anticlinal axis. *A.G.I. Supp.*

curved jib. A chain coal cutter jib with the outer end bent upwards or downwards through 90°. Thus, the machine can make a horizontal and also a vertical cut in one operation. Curved jibs make coal preparation easier but their use is limited due to the excessive strain and wear on the cutter chain. *See also* multicut chain. *Nelson.*

curved line. One which changes its direction constantly; that is, no part of the line is straight. *Jones, 2, p. 81.*

curved ripple marks. Ripple marks with crests which appear curved or crescentic in plan view. *Pettijohn.*

curved-tube manometer. This is a modification of the inclined tube manometer. The tube is curved in such a form that it is possible to have approximately equal spacing of the divisions on a velocity or flow scale. This gage, while retaining the advantage of increased sensitivity at low differential pressures common to the inclined type, enables a wide range of flow measurements to be made with one setting of the instrument. It can be supplied with a pressure, velocity, or quantity scale, the pressure scale being the most universal in its application. *Roberts, I, p. 28.*

curve grease. A grease adapted for use on railroad curves. *Porter.*

curve resistance. This resistance may be taken from one-half to 1 pound per ton per degree of curve for that part of the train on the curve. The degree of curve is found by dividing 5,730 by the radius of the curve in feet, since 5,730 is the radius of a 1° curve. *Lewis, p. 213.*

curvette. A horst or a graben structure. *A.G.I. Supp.*

curvilinear fault. A fault with a curvilinear displacement in the fault plane. *Schieferdecker.*

cusec. A unit of water flow or airflow and equals 1 cubic foot per second. *See also* modified Atkinson formula. *Nelson.*

cuselite. Light-colored varieties of biotite-augite porphyry containing abundant phenocrysts of andesine and a few phenocrysts of the manganese-iron minerals in a feldspathic groundmass; from Cusel, Saar basin, Germany. *Holmes, 1928.*

cushion. a. A course of some compressible substance, such as soft wood, inserted between more rigid material. In mine support, it can be placed between the footwall or the hanging wall and the concrete, or internally in the support. *Spalding, p. 109.* b. Same as die cushion. *ASM Gloss.*

cushion blasting. A method of blasting in which an airspace is left between the explosive charge and the stemming, or in which the shothole is of substantially larger diameter than the cartridge. *B.S. 3618, 1964, sec. 6.*

cushion cut. A style of faceting gems in which the finished gem is roughly rectangular in outline but with gently outward curving sides and rounded corners. *Sinkankas.*

cushioned hammer. A power hammer striking a cushioned blow. *Standard, 1964.*

cushion firing. *See* water ampul stemming. *Nelson. See also* cushion shot.

cushion idlers. Special idler rollers covered with some form of shock-absorbing material, for example, rubber, and normally used at ransfer points. *Nelson.*

cushion shooting. *See* cushion shot.

cushion shot; cushioned shot. A shothole that is not tamped from the explosive to the mouth of the hole but has an untamped length between the explosive and the tamping in which the gases formed by the explosion can expand and press on the coal or other rock to be broken. Sometimes a spacer is inserted and sometimes a cartridge of untamped, finely ground rock dust. Sometimes the space is left beside or above the cartridge or both above and around it. Any of these spaces forms a cushion. *Zern.*

cusp. a. A landform characterized by a projection with indentations of crescent shape on either side (as along a shoreline or in a mountain front). *Webster 3d.* b. One of a series of naturally formed mounds of beach material separated by crescent-shaped troughs spaced at more or less regular intervals along the beach face. Also called beach cusp. *A.G.I.*

cuspate. Having a cusp; shaped like a cusp. A cuspate shoreline or a cuspate delta, for example. *Webster 3d.*

cuspate bar; cuspate barrier. A V-shaped bar or barrier formed by the growing together of two oblique spits. *Schieferdecker.*

cuspate barrier. *See* cuspate bar. *Schieferdecker.*

cuspate foreland. A triangular foreland of alluvial material. *Schieferdecker.*

cuspate ripple mark. Asymmetric current ripple marks with a somewhat barchan-like shape, the horns pointing into the current. Also known as current mark; linguoid ripples; cusp ripples. *Pettijohn.*

cuspidate. a. Having a cusp; terminating in a point. *Webster 3d.* b. With an apex somewhat abruptly and sharply concavely constricted into an elongated, sharply pointed tip. *A.G.I.*

custom mill; customs mill. a. A mill which buys ores for treatment or which treats ores for customers. *Hess.* b. A plant receiving ore for treatment from more than one mine. *Pryor, 4.*

custom ore. Ore bought by a mill or smelter, or treated for customers. *Hess.*

custom plant; custom mill. A mill, concentrator, or smelter which receives ore or partly processed mineral for treatment in terms of an appropriate contract, priced on tonnage, complexity of operation, permissible losses, and specification of feed, product, and (perhaps) lost tailings. *Pryor, 3.*

custom smelter. A smelter which buys ores or treats them for customers. *Hess.*

cut. a. To intersect a vein or working. *Fay.* b. To excavate coal. *Fay.* c. To shear one side of an entry or crosscut by digging out the coal from floor to roof with a pick. *See also* undercut, a. *Fay.* d. Eng. In Somerset, a staple or drop pit. *Fay.* e. Scot. *See* buttock. *Fay.* f. Eng. The depth to which a drill hole is put in for blasting. *Fay.* g. A term applied where the cutting machine has cut under the coal to a depth of five feet and for a width of fifteen feet. *Fay.* h. The drill hole pattern for firing a round of shots in a tunnel or sinking shaft, for example, the burn cut. *Nelson.* i. A machine cut in a coal seam, for example, floor cut. *Nelson.* j. *See* stint. *Nelson.* k. An excavation, generally applied to surface mining; to make an incision in a block of coal; in underground mining, that part of the face of coal that has been undercut. *B.C.I.* l. In mining, when used in conjunction with shaft and drift, a surface opening in the ground intersecting a vein. *Ricketts, I.* m. To drive to or across a lode. *Gordon.* n. The group of holes fired first in a round to provide additional free faces for the succeeding shots. *B.S. 3618, 1964, sec. 6.* o. Depth to which material is to be excavated (cut) to bring the surface to a predetermined grade; the difference in elevation of a surface point and a point on the proposed subgrade vertically below it. *Seelye, 2.* p. S. Afr. In development work the term cut refers to the location and direction of holes blasted first to provide a free face to which other holes may break, for example, draw cut, horizontal cut, pyramid cut, burned cut, etc. *Beerman.* q. S. Afr. The term is used for machine stoping of reef and for intersecting a reef. *Beerman.* r. To lower an existing grade. *Nichols.* s. An artificial depression. *Nichols.* t. To stop an engine, or throttle it to idling speed. *Nichols.*

cutain. A Russian bituminous coal composed largely of cuticles. *Bureau of Mines Staff.*

cut-and-carry method. Progressive die-fabricating method where the part remains attached to the strip or is forced back into the strip to be fed through the succeeding stations of a progressive die. *ASM Gloss.*

cut and cover. A method of construction in which excavation is made to formation level and then filled back over a tunnel after its lining has been constructed. *Ham.*

cut and fill. a. The construction of a road or railway on undulating ground which is partly excavation and partly fill. *Nelson.* b. In a meander, the lateral planation that occurs on one side of the stream is accompanied by deposition on the opposite side of the stream. *A.G.I.* c. A structure resulting from the removal of a small portion of a bed or lamina before deposition of an overlying bed or lamina. *A.G.I.* d. Small erosional channels subsequently filled. Also called scour and fill; washout. *Pettijohn.*

cut-and-fill stoping. A stoping method in which the ore is excavated by successive flat or inclined slices, working upward from the level, as in shrinkage stoping. However, after each slice is blasted down all broken ore is removed, and the stope is filled with waste up to within a few feet of the back before the next slice is taken out, just enough room being left between the top of the waste pile and the back of the stope to provide working space. The term cut-and-fill stoping implies a definite and characteristic sequence of operations: (1) breaking a slice of ore from the back; (2) removing the broken ore; and (3) introducing filling. *BuMines Bull. 390, 1936, p. 10.*

cutback asphalt. Asphalt to which is added a solvent to make the asphalt transportable or to permit its use for various purposes, for example, as a binder of an aggregate of stones and gravel in roadbuilding. As the solvent evaporates, the asphalt hardens into a solid again. *Williams.*

cutback products. In roadbuilding, petroleum or tar residuums which have been fluxed with distillates. *Bureau of Mines Staff.*

cutbank. The concave bank of a meandering stream that is maintained as a steep or even overhanging cliff by the impinging of water at its base. *Stokes and Varnes, 1955.*

cut chain. Scot. A system of working underground self-acting inclined planes from several different levels, by means of chains of various lengths which are regulated according to the level from which coal is lowered. *Fay.*

cut-chain brae. Scot. An incline on which cut chains are used. *Fay.*

cut coal. Scot. In stoop-and-room working, coal cut on two sides where two rooms at right angles to each other just meet. *Fay.*

cut gears. Gears with machine-cut teeth as distinguished from cast gears. *Crispin.*

cut glass. Fine quality of glass articles produced by forming and afterward decorating with designs by grinding and polishing on special wheels. *Mersereau, 4th, p. 328.*

cut glaze. A faulty glaze, spots or patches being bare or only very thinly covered. The common cause is contaminated area on the biscuit ware, that is patches of oil, grease, dust, or soluble salts. A fault resulting in a similar appearance is knocking. *See also* knocking. *Dodd.*

cut holes. a. The first hole or group of holes fired in a drift or tunnel face. Also known as the cut portion of the blasting round. *Lewis, p. 164.* b. In tunneling, easers so drilled and fired as to break out a leading wedge-shaped hole and thus enable the later holes in the complete round of shots to act more effectively. *Pryor, 3. See also* drill-hole pattern.

cuticle. Waxy layer formed on outer walls of epidermal cells. *A.G.I.*

cutinite. a. A variety of exinite. The micropetrologic constituent, or maceral, of cuticular material. *Compare* sporinite. *A.G.I.* b. Maceral of the exinite group consisting of plant cuticle. *A.G.I. Supp.*

cutinite coal. This type coal consists of more than 50 percent of cuticle, the fragments of which occur embedded in gelito-collinite, fusinito-collinite and collinite of fusinitic nature. In addition to cuticle, spores, resin bodies and fragments of finely fusinized and gelified tissue are present. Leaf parenchyme and stem tissue, bordered by cuticle, may also be seen. Hand specimens of this type of coal are grayish-black, matt or semi-matt, finely striated or sometimes even banded. It breaks angularly, and generally has high ash. Cutinite coal occurs as thin bands in seams of different geological age and its use is largely determined by the other forms of coal with which it is associated. *IHCP, 1963, part I.*

cutlery marking. *See* silver marking. *Dodd.*

cutoff. a. In firing a round of shots, a misfire due to severance of fuse owing to rock shear as adjacent charge explodes. *Pryor, 3.* b. A quarryman's term for the direction along which the granite must be channeled, because it will not split. Same as hardway. *Fay.* c. *See* cutoff entry. *Fay.* d. The number of feet a bit may be used in a particular type of rock (as specified by the drill foreman. *Long.* e. Minimum percentage of mineral in an ore that can be mined profitably. *Long.* f. A wall, collar, or other structure intended to reduce percolation of water along otherwise smooth surfaces, or through porous strata. *Seelye, 1.* g. A device for cutting off; as a mechanism for shutting off the admission of a working fluid (as steam) to an engine cylinder. *Webster 3d.* h. The point in the stroke of the piston of a steam engine where the entrance of live steam is stopped by the closure of the inlet valve. *Long.* i. To close, shut off, or terminate. *Long.* j. A new and relatively short channel formed when a stream cuts through the neck of an oxbow. *Webster 3d.*

cutoff entry. An entry driven to intersect another and furnish a more convenient outlet for the coal. Also called cutoff. *See also* entry, b. *Fay.*

cutoff grade. a. In ore estimation, the lowest grade that will meet costs. *McKinstry, p. 473.* b. The lowest grade of mineralized rock that qualified as ore in a given deposit, that is, rock of the lowest assay that is included in an ore estimate. *A.G.I.* c. Term sometimes used to define the assay grade below which an ore body cannot be profitably exploited. *Pryor, 3.*

cutoff hole. Missed hole resulting from the failure of a blasting cap to detonate owing to the breaking of a fuse or conductor or to some other similar cause. *Fraenkel.*

cutoff machine man. *See* cutoff saw operator. *D.O.T. 1.*

cutoff man. *See* brick-cutting machine operator. *D.O.T. 1.*

cutoff saw operator. In the stonework industry, one who operates an abrasive sawing machine to cut off the ends of slabs or blocks of marble, granite, and stone to reduce them to specified length. Also called cutoff machine man. *D.O.T. 1.*

cutoff scar. Marks on the base of a glass bottle made by the Owen's suction machine; however, the scar is largely caused during the final blowing operation. *Dodd.*

cutoff shot. A shot in a delay round in which the charge has been wholly or partially exposed to atmosphere by reason of the detonation of an earlier shot in the round. *B.S. 3618, 1964, sec. 6.*

cutoff wheel. A thin abrasive wheel for severing or slotting any material or part. *ASM Gloss.*

cutout. a. The act or process of removing diamonds from a used or dull bit by dissolving the crown metal by corrosive action of an acid or electrolytic dissolution. Also, the diamonds recovered or salvaged by such means. *Long.* b. Opening made in a mine working in which a drill or other equipment may be placed so as not to interfere with other mining operations. *Long.* c. A place in a coal seam where part of the coal has been removed by erosion and the hollow or channel filled by sand or shale. *See also* washout; low, a. *A.G.I.* d: (Forest of Dean). *See* crut; branch, a. *Fay.* e. Eng. A fault which dislocates a seam of coal more than its entire thickness. *Fay.* f. A device (as a switch, circuit breaker, valve, or clutch) for interrupting or closing a connection. *Webster 3d.* g. *See* washout. *Pettijohn.*

cut over. Mid. To cut a seam of coal in a longwall working, over or beyond the first joint or cleat. *Fay.*

cut point. a. The point of intersection of a drill hole and a fault plane. *A.G.I. Supp.* b. The value of a property (for example, density or size) at which a separation into two fractions is desired or achieved. *B.S. 3552, 1962.*

cuts. Scot. Strips of coal worked off the sides of pillars. Also called slices; skips. *Fay.*

cut shot. a. A shot designed to bring down coal which has been sheared or opened on one side. *Fay.* b. A shot which initially breaks ground to provide a free face for subsequent shots. *B.S. 3618, 1964, sec. 6.*

cut sizes. Any flat glass sheet cut to specific dimensions. *ASTM C162-66.*

cut stone. a. Originally, an artificially broken and shaped carbon; now generally, a faceted diamond used as an ornament. *See also* gem. *Long.* b. Structural unit for limestone that consists of blocks that are cut to specified dimensions and surface tooled. *AIME, p. 330.*

cuttable. Diamond material suitable for cutting into gems. *I.C. 8200, 1964, p. 149.*

cutter. a. A term employed in speaking of any coal-cutting or rock-cutting machines; the men operating them, or the men engaged in underholing by pick or drill. *Fay.* b. A joint, usually a dip joint, running in the direction of working; usually in the plural. *Fay.* c. At Mount Pleasant, Tenn., an opening in limestone, enlarged from cracks or fissures by solution, that is filled by clay and usually contains valuable quantities of brown phosphate rock. *Fay.* d. A solution crevice in limestone underlying Tennessee residual phosphate deposits. *A.G.I. Supp.* e. A joint in a rock that is parallel to the dip of the strata. *C.T.D.* f. A crack in a crystal that destroys or lessens its value as a lapidary's stone. *Fay.* g. On a hydraulic dredge, a set of revolving blades at the end of the suction line. *Nichols, 2.* h. An apparatus used for removing scale from the inside of pipes. *Sinclair, IV, p. 32.* i. A workman engaged in grinding designs on glass. *ASTM C162–66.* j. One who cuts flat glass. *ASTM C162–66.* k. The tool used in cutting glass. *ASTM C162–66.* l. A device whereby the material is severed from the original mass by means of passing knives, wires, or similar equipment through the mass. *ACSG, 1963.* m. Synonym for underreamer lug. *See also* cutting edge, b. *Long.* n. Applied to closed or inconspicuous seams along which the rock may separate or break easily. *BuMines I.C. 8182, 1963, p. 7.*

cutter bar. That part of a chain mining machine that supports the cutting chain and extends under the coal; the bar provides the track for the cutting chain. *Fay; B.C.I.*

cutter chain. The endless chain carrying picks which travels around the jib of a chain coal cutter at a speed varying from 320 to 650 feet per minute. *See also* coal-cutter picks. *Nelson.*

cutter-down. One who cuts excess glass from stems of heated glassware, using pincers (nippers) or a wooden stick. Also called glass cutter-down; stem cutter. *D.O.T. 1.*

cutter dredge; suction cutter. In alluvial mining, one which loosens the alluvium by means of a cutting ring, at the end of a suction pipe through which the products are pumped up for treatment. *Pryor, 3.*

cutterhead pipeline dredge. A hydraulic dredge in which the suction action is augmented by a rotating propeller that operates at the point of suction. The cutterhead performs two functions: it cuts into and loosens compacted soils and soft rock such as coral, and it increases dredge capacity by channeling the soils into the end of the suction pipe. The efficiency of a dredge is based on its capacity to handle soils rather than water, and the cutterhead serves to maintain an optimum ratio of about 1 cubic foot of soil handled per 5 cubic feet of water. *Carson, p. 354.*

cutter helper. *See* machine helper. *D.O.T. 1.*

cutter loader. A longwall machine that cuts and loads the coal onto a conveyor as it travels across the face. Cutter loaders may be grouped according to the thickness of web cut: as (1) thick web machines, such as the A.B. Meco-Moore, which cuts and loads up to 6 feet; (2) medium web machines, which take about 2½ feet, such as the Gloster-getter, Anderton shearer, and Trepanner; (3) narrow web or plough-type machines, which take from 1 to 12 inches of coal during each traverse of the face. *Nelson.*

cutter, machine. *See* machine man. *D.O.T. 1.*

cutter-off. One who cuts surface of window glass with steel cutting wheel as continuous glass sheet emerges from top of automatic drawing machine. Also called window-glass cutter-off. *D.O.T. 1.*

cutter operator. *See* machine man. *D.O.T. 1.*

cutter plough; Schramhobel cutter plough. A plough-type cutter loader developed for use in hard coal seams. It has four horizontal stepped precutting blades, which make a precut from 8 to 12 inches, to weaken the coal immediately in front of the machine. It can be single or double-ended, and is hauled along the face by winches. The coal is loaded onto a panzer conveyor which is advanced behind the machine by compressed air rams. *See also* plough. *Nelson.*

cut terrace. A shelf carved in the shore of a lake by the action of waves and currents. It is bounded on both its shoreward and lakeward margins by steeper slopes; the former inclines upward and forms a sea cliff, the latter slopes downward and forms a terrace scarp. The upper limit is a horizontal line marking the level of the water at the time it was formed, and its surface slopes gently lakeward. *A.G.I.*

cutter stall. N. of Eng. A small area of coal flanking the mother gate which the cutter cannot reach and which is removed by hand. Usually this is made ahead of the face line and so facilitates cutter turning and provides easy access to the face when the cutter is parked at the mother gate end. *Trist.*

cuttery. Scot. Much intersected with joints or fissures, for example, cuttery sandstone. *Fay.*

cut-through. a. Thirling; slit; a short connecting road. *Mason.* b. N. Staff. An opening betwen headings every 18 to 20 yards in mines having a steep inclination. *See also* dip, 1 and m. *Fay.* c. Aust. A connection between bords, used for ventilation and traveling purposes. *Fay.* d. A passage cut through the coal, connecting two parallel entries. Also called crosscut; breakthrough. *Rice, George S.*

cutting. a. Eng. The end or side of a stall next to the solid coal where the coal is cut with a pick in a vertical line to facilitate breaking down; channeling. *Fay.* b. The opening made by shearing or cutting. *Fay.* c. Low-grade ore or refuse obtained from dressing ore. *Fay.* d. The operation of making openings across a coal seam as by channeling, or beneath a coal seam as by undercutting. *Fay.* e. Holing by hand or machine. *Mason.* f. Buttock; fast side. *Mason.* g. N. of Eng. The operation of undercutting coal with a mechanical cutter. The machine, which runs on electricity, employs two cuttermen. *Trist.* h. Excavating. *Nichols.* i. Lowering a grade *Nichols.* j. Scoring flat glass with a diamond or a steel wheel, and breaking it along the scratch. *ASTM C162–66.* k. Producing cut glass. *ASTM C162-66.*

cutting box. A box into which diamond dust falls when the diamonds which are cemented into the cutter and setter are rubbed against each other. *Fay.*

cutting chain. The sprocket chain which carries the steel points used for undermining the coal with chain mining machines. *Fay.*

cutting compound. Lard oil, soda water, or any of the various coolants used on work being machined. *See also* coolant. *Crispin.*

cutting curb. A curb upon which a shaft is built preparatory to forcing it into the ground by means of heavy weights known as kentledge in order to proceed with excavation inside the shaft. *Ham.*

cutting down. a. The trimming of shaft walls to increase its sectional area. *Zern.* b. Removing roughness or irregularities of a metal surface by abrasive action. *ASM Gloss.*

cutting drilling. A rotary drilling method in which drilling is effected through the cutting action of the drill steel which rotates while being pressed against the rock. *Fraenkel, v. 1, Art. 8 : 30, p. 21.*

cutting edge. a. The point or edge of a diamond or other material set in a bit that comes in contact with and cuts, chips, or abrades the rock. Also called cutting point. *Long.* b. That part of a bit in actual contact with rock during drilling operations. *Long.* c. The leading edge of a lathe tool where a line of contact is made with the work during machining. *ASM Gloss.*

cutting face. That part of a bit containing the cutting points, excluding the points inset as reamers. *Long.*

cutting flame. See oxidizing flame.

cutting fluid. A fluid, usually a liquid, used in metal cutting to improve finish, tool life, or dimensional accuracy. On being flowed over the tool and work, the fluid reduces the friction, the heat generated and the tool wear, and prevents galling. It conducts the heat away from the point of generation and also serves to wash the chips away. *ASM Gloss.*

cutting grain. The direction along a plane on which a diamond can be most easily abraded. *Long.*

cutting horizon. The position in a coal seam in which a horizontal machine cut is made. The normal cutting horizon is along the bottom of the seam. *See also* bottom cut. *Nelson.*

cutting list. The list of steel reinforcing bars for reinforced concrete construction, showing diameters and lengths, from which the contractor orders the reinforcement required. *See also* summary of reinforcement. *Ham.*

cutting machine. A power-driven machine used to undercut or shear the coal to facilitate its removal from the face. *B.C.I.*

cutting-machine operator. *See* machineman. *D.O.T. 1.*

cutting motor. The motor in a cutting machine which provides power for the operation of the cutting chain. Is used only where the machine has more than one motor. *Jones.*

cutting off. Removing a pot from the potters' wheel by cutting with a wire or string. *ACSG, 1963.*

cutting-off cutter. *See* cutting-off table. *Dodd.*

cutting-off road. A slant road in longwall workings, out of which the stall gates are branched parallel to the main road, and which at certain distances cut off a range of stalls to the rear. *Bureau of Mines Staff.*

cutting-off table; cutting-off cutter. A frame carrying a tightly stretched wire, or a system of such frames and wires, that operates automatically at a short distance from the mouthpiece of a pug or auger to cutoff clots or finished bricks or pipes from the extruded columns. *Dodd.*

cutting-off wheel; parting wheel. A thin abrasive wheel of the type used for cutting-off or for making slots; such wheels generally have an organic bond. *Dodd.*

cutting oils. Any of the heavy oils or combination of oils used as a metal lubricant in machining operations. The term does not properly include those watery solutions used merely as coolants. *Crispin.*

cutting-out piece. A short length of trench timbering which can be sawn out to facilitate striking of the timbering. *Ham.*

cutting point. Synonym for cutting edge. *See also* cutting edge, a. *Long.*

cutting price. Gr. Brit. The main item in a coal miner's pricelist. It gives the payment rate for cutting, winning, and loading the coal, as so much per ton or per cubic yard of coal seam worked. *See also* seam structure. *Nelson.*

cutting rate. a. Synonym for feed rate. *Long.* b. The amount of material removed by a grinding wheel per unit of time. *ACSG, 1963.*

cuttings. a. The particles of rock produced in a borehole by the abrasive or percussive action of a drill bit; excess material caused by the rubbing of core against core or core against steel; erosive effect of the circulating liquid; or cavings from the borehole. Also called borings; drill cuttings; drillings; sludge. *Long.* b. The fragmental rock samples broken or torn from the rock penetrated during the course of drilling. *A.G.I.* c. Eng. *See* holings. *SMRB, Paper No. 61.* d. *See* bug dust. *Mason.*

cutting sand. Is composed of sharp, solid quartz grains and is used as the abrasive for sawing stone. It is usually ungraded and about equivalent to a No. 1 sandblasting sand. *AIME, p. 15.*

cutting shoe. A wedge at the bottom of tubbing in caisson sinking to assist penetration in soft ground. *Nelson.*

cutting shot. Ark. A shot put in beside a cutting so as to blast some coal into it and to shatter the coal beyond for aid in making the next cutting. *See also* shot. *Fay.*

cutting size. Synonym for set diametr. *Long.*

cutting speed. a. The linear or peripheral speed of relative motion between the tool and workpiece in the principal direction of cutting. *ASM Gloss.* b. Synonym for feed rate. *Long.*

cutting stones. Diamonds set in a bit face having points or edges that will be in contact with and will cut or abrade the rock when drilling. *Compare* cutting edge; reaming stones. *Long.*

cutting table. Mechanical unit upon which the severing or slicing of a clay column is carried out. *ACSG, 1963.*

cutting tip. The part of a cutting torch from which gas issues. *ASM Gloss.*

cutting tools. *See* tool tips. *Dodd.*

cutting torch. *See* torch. *ASM Gloss.*

cutting wheel. A cutting disk, the edge of which is impregnated with an abrasive, such as diamond dust or aloxite. It is rotated at high speed and used to cut rock specimens into suitable sections for microscopic inspection after polishing. *Pryor, 3.*

cutty clay. a. Plastic clay used for making tobacco pipes. A cutty pipe is a short tobacco pipe, also known as a cutty, that is, short. *Arkell.* b. A variety of English ball clay that was formerly used for making tobacco pipes. *Dodd.*

cut-up. Scot. An excessive roof fall leaving a large open space above. *Fay.*

cut-work man. One who cuts burned roofing tile according to pattern, using a band saw, and colors the tile, using a paint spray gun. Also called special-shapes man. *D.O.T. 1.*

cuvette. a. Fr. A bowl or basin of pottery or china; a flat-bottomed piece containing a waterpot. *Standard, 1964.* b. The vessel in which molten glass is received from the refining pot and borne to the table for casting and rolling. *Standard, 1964.* c. A basin in which sedimentation is going on. *Challinor.*

cuyamite. A dark dike rock consisting of 43 to 46 percent labradorite, 30 to 32 percent augite, 20 percent analcite, 4 to 8 percent magnetite, 0 to 8 percent haüyne, and 0 to 8 percent hornblende. *Johannsen, v. 4, 1938, p. 243.*

Cuylen conveyor. A single-chain conveyor with an open side to facilitate power loading. *Sinclair, V, p. 305.*

Cuyuna. The name of an iron range in Minnesota. It is composed of the syllables, "Cuy" and "Una", the former being a contraction of the given name of Cuyler Adams who was active in the early development of that territory, and the last syllable is the name of his dog "Una." *Fay.*

CVR Abbreviation for continuous vertical retort. *See also* continuous vertical retort. *Dodd.*

C-wave. Synonym for coupled wave. *A.G.I.*

cwm Same as cirque. *Sinclair, II, p. 32.*

cwt Abbreviation for hundredweight; either 100 avoirdupois pounds or 112 avoirdupois pounds. *Fay.*

Cyamite. Trademark for an ammonia nitrate blasting agent which is not sensitive to the shock of an electric blasting cap, rifle slug, or primacord. The borehole must be primed with regular dynamite to shoot. *CCD 6d, 1961.*

Cyamon. Trademark for an ammonium nitrate blasting agent which is designed for safe handling in the field. It is not sensitive to a blasting cap, rifle slug, primacord, flame, or impact of heavy steel weights. *CCD 6d, 1961.*

Cyamon Primers for Explosives. Trademark for special primers sensitive to an electric blasting cap and primacord, used to detonate Cyamon blasting agents. *CCD 6d, 1961.*

Cyanamid. A trade name for a material containing about 50 percent true cyanamide (CH_2N_2) and 25 percent calcium hydroxide ($Ca(OH)_2$). Commercial Cyanamid is made by passing nitrogen over a heated mass of calcium carbide (CaC_2); it contains 35 percent nitrogen. *Fay.*

cyanamide. White; crystalline; CH_2N_2. Formed variously by the action of cyanogen chloride on ammonia. *Standard, 1964.*

cyanicide. Any substance present in a pulp which attacks or destroys the cyanide salt being used to dissolve precious metals. *Pryor, 4.*

cyanidation. A process of extracting gold and silver as cyanide slimes from their ores by treatment with dilute solutions of potassium cyanide or sodium cyanide. The slimes are subsequently fused and cast into ingots or bullion. *Henderson.*

cyanidation vat. A large tank, with a filter bottom, in which sands are treated with sodium cyanide solution to dissolve out gold. *C.T.D.*

cyanide. a. A compound of cyanogen usually with a more electropositive element or radical; a salt or an ester of hydrocyanic acid. *Webster 3d.* b. Potassium cyanide. *Webster 3d.* c. Sodium cyanide. *Webster 3d.* d. As a verb, to treat with a cyanide; as to subject to the cyanide process; to treat (iron or steel) by immersion in molten cyanide in order to produce a hard surface (casehardening) by causing carbon and nitrogen to be taken up in a thin outer layer. *Webster 3d.* e. Usually refers to cyanide solution in circulation in a mill treating gold or silver ores. The stock or solution is of two main types, barren from which all possible value has been extracted, and pregs or pregnant, which is charged with gold or silver and awaits their removel. *Pryor, 4.*

cyanide copper. Copper electrodeposited from an alkali-cyanide solution containing a complex ion made up of univalent copper and the cyanide radical; also, the solution itself. *ASM Gloss.*

cyanide hardening. Introducing carbon and nitrogen into the surface of a steel alloy by heating in a bath of molten sodium cyanide and usually followed by quench hardening. *Bureau of Mines Staff.*

cyanide man. In ore dressing, smelting, and refining, one who tends equipment in which finely ground gold or silver ore is treated with a cyanide solution to separate free gold or silver from the gangue (waste material). *D.O.T. 1.*

cyanide mill. A mill in which the cyanide process is used. *Webster 3d.*

cyanide neutralizer. *See* neutralizer. *Dodd.*

cyanide process. A process for the extraction of gold from finely crushed ores, concentrates, and tailings by means of cyanide of potassium or sodium used in dilute solutions. The gold is dissolved by the solution and subsequently deposited upon metallic zinc or by other means. *See also* MacArthur and Forest cyanide process. *Fay.*

cyanide pulp. The mixture obtained by grinding crude gold and silver ore and dissolving the precious-metal content in a sodium-cyanide solution. *CCD 6d, 1961.*

cyanide slimes. Precious metals in the form of finely divided particles precipitated from cyanide solutions used in their extraction from ores. *ASM Gloss.*

cyanide solution. In commercial dissolution of gold from its ores, a weak alkaline aqueous solution of sodium or calcium cyanide. When first applied to the pulped ore it is barren. When rich in gold it is pregnant. When contaminated to the point where it is no longer an efficient solvent it is foul and is discarded or regenerated. *Pryor, 3.*

cyaniding. a. The process of treating finely ground gold and silver ores with a weak solution of sodium or potassium cyanide, which readily dissolves these metals. The precious metals are obtained by precipitation from solution with zinc. *C.T.D.* b. Introducing carbon and nitrogen into a solid ferrous alloy by holding above Ac_1 in contact with molten cyanide of suitable composition. The cyanided alloy is usually quench-hardened. *ASM Gloss.*

cyanite. *See* kyanite.

cyanochalcite. A phosphoriferous variety of chrysocolla; from Nijni Tagilsk, Perm, U.S.S.R. *Weed, 1918.*

cyanochroite. A hydrous copper and potassium sulfate, $CuSO_4K_2SO_4+6H_2O$, carrying 14.3 percent copper. Crystallization, monoclinic; color, clear blue. An alteration product from Mt. Vesuvius. *Weed, 1918.*

cyanogen. a. A univalent radical; CN; present in hydrogen cyanide and in other simple and complex cyanides (as ferricyanides). *Webster 3d.* b. Colorless; flammable; poisonous gas; $(CN)_2$; an odor like that of peach leaves; variously formed (as by heating mercuric cyanide); and it polymerizes readily. *Webster 3d.*

cyanosite. Synonym for chalcanthite. *Hey 2d, 1955.*

cyanotrichite. A sky-blue to smalt blue, minutely crystalline or spheroidal hydrous sulfate of copper and aluminium, perhaps $4CuO.Al_2O_3SO_3.8H_2O$; 49.3 percent CuO; a weathered zone mineral. Also called lettsomite. *Dana 6d, p. 963.*

cyanotype. A photographic picture, as a blueprint, made with the use of a cyanide. *Standard, 1964.*

cyanuric chloride; cyanuric trichloride. Crystals; pungent odor; $C_3N_3Cl_3$; cyclic; specific gravity, 1.32; melting point, 146° C; soluble in chloroform, in carbon tetrachloride, in hot ether, in dioxane, and in ketones; and very slightly soluble in water (hydrolyzes in cold water). Used in explosives. *CCD 6d, 1961.*

cybernetics. a. The new science of coordination, communication, and control of all operations within a mine or other undertaking. *See also* automation. *Nelson.* b. The science of automatic control. *Osborne.* c. The theory of control and communication in machines or animals. *NCB.*

cybotaxis. A transient orientation of molecules in a liquid revealed by X-ray diffraction effects that are analogous to those produced by crystals. *Webster 3d.*

Cycadophytes. A phylum of Gymnosperms having both fernlike and cycadlike assemblages, including the three great groups Cycadofilidales (extinct), Bennettitales (extinct), and Cycadales (recent); found in coal. *Bureau of Mines Staff.*

cycle. a. N. of Eng. The complete sequence of face operations required to get coal. *Trist.* b. The length of time between the commencement, say, of two consecutive coal producing shifts; the sequence of operations, say, between two consecutive coal producing shifts. *Mason.* c. Two alternations in alternating electric current. *Mason.* d. The sequence of operations before one operation or event is repeated. *Mason.* e. An operation of a number of events which when completed, starts the same series of events over in the same order. Thus a mechanical refrigeration cycle consists of compression, condensing, expansion, evaporation, repeated over and over. *Strock, 10.* f. A series of events that is repeated. *Shell Oil Co.* g. An interval of time during which one sequence of a regularly recurring succession of events or phenomena is completed. *Webster 3d.* h. A series of changes, usually but not necessarily, leading back to the starting point. *Webster 3d.* i. The period in which a continent or any part of it is reduced from its initial form of uplift to base level. The time necessary to wear down a land and deposit its waste under the bordering sea. *A.G.I.* j. A periodic repetition of a phenomenon. In enamels, refers to the time required to load, fire, and unload a charge in a furnace or smelter. *Enam. Dict.* k. In open-pot practice (glass), the time between the first fill of batch and the casting. *ASTM*

C162-66. 1. A cycle is the complete sequence of values of a periodic quantity that occurs within one period. *H&G.*

cycle, igneous. The usual sequence of igneous events. First there are lava flows, then large intrusions, and finally dikes. *A.G.I.*

cycle of denudation. The alternate uplifting and wearing down by erosion, together constitute a cycle of denudation; from base level back to base level. *Compare* cycle of erosion. *A.G.I.*

cycle of erosion. a. The complete series of changes or stages through which a landmass passes from the inception of erosion on a newly uplifted or exposed surface through its dissection into mountains and valleys to the final stage when it is worn down to the level of the sea or to some other base level. The cycle is usually subdivided into youthful, mature, and old-age stages. One type or many types of erosion may be involved, and the landforms produced and destroyed depend to a large extent on the climate, geographic situation, and geologic structure of the landmass. *Stokes and Varnes, 1955.* b. The sequence of changes in a landscape from the start of its erosion by running water, waves and currents, or glaciers until it has been reduced to the base level of erosion which limits the activity of the agents concerned. Also called the geomorphic cycle. *Webster 3d.*

cycle of marine erosion. *See* shoreline cycle. *Schieferdecker.*

cycle of operations. In mining operations, such as tunnel driving, shaft sinking, and coal winning, there are certain tasks which must be repeated in cyclic fashion. In tunnel driving, they are (1) drilling the round; (2) charging and firing; (3) loading; and (4) supporting and track extension. This cycle of operations is time analyzed to achieve maximum efficiency and speed. For longwall face work, *see* cycle mining. *Nelson.*

cycle of sedimentation. a. A sequence of related processes and conditions repeated in the same order that is recorded in a sedimentary deposit. *A.G.I. Supp.* b. The cycle of sediment formation, transportation, and deposition. *A.G.I. Supp.*

cycle skipping. An instrumental phenomenon occurring in acoustic velocity logs. Very briefly, it consists of intervals where the velocity recorded drops sharply to very low values and, equally sharply, returns to a normal scale figure. Such a log is spiky. *Wyllie, pp. 144, 182.*

cycle time. The time required for the dipper of a mechanical shovel to push through the bank and fill, swing to the haul unit, unload, and swing back to the digging position. Cycle time is established under standard conditions of a 90° angle of swing and with an optimum depth of cut. *Carson, p. 46.*

cyclic. Applied to any action or process that after going through a certain course, or accomplishing a definite order of changes, begins again the same course or order, and so on indefinitely until some new influence stops or changes the action. *Fay.*

cyclic mining. A mining system in which each shift has a specific task to complete on the conveyor face. If the task on any shift is not completed in time, the following shifts are disorganized. In general, the face is machine cut during the night shift, shot-firing and hand-filling of the coal occupied the day shift, and the afternoon shift was responsible for moving the conveyor and roof supports to the new line of face. *See also* conventional machine mining; conventional mining. *Nelson.*

cyclic surge. In classification, periodic upset of correct separating density of pulp, resulting in wrong release of oversize from the closed grinding circuit. *Pryor, 3.*

cyclic test. In batch testes of small quantities of ore during development of method of concentration, the retention of selected fractions (usually middlings) for admixture with fresh samples. Purpose is to study effect of recycling minerals or solutions which they may have contaminated; also to observe effect of increased concentration of such compounds on the process as a whole. *Pryor, 3.*

cyclic twin. Composed of parts which appear to have been alternately revolved 180° upon nonparallel twinning planes. Depending on how many individual parts are involved, they are called trillings (3), fourlings (4), sixlings (6), and eightlings (8). *Fay.*

cyclic twinning. The repeated twinning of three or more individuals according to the same twin law but with the twinning axes not parallel. Often simulates a higher order of symmetry than that of the untwinned crystal. *A.G.I.*

cyclic winding. *See* automatic cyclic winding. *Sinclair, V, p. 124.*

cycling. The process of injecting gas, from which condensable hydrocarbons have been removed, into an oil and gas reservoir in order to maintain reservoir pressures and thus prevent retrograde condensation and loss of such liquids. In recycling, the stripped gas is injected repeatedly and the recovered vapors are extracted or stripped on the surface. *A.G.I.*

Cyclo-cell. A trade name for a modified form of froth flotation of coal, in which agitation is achieved by submerged vortex chambers which discharge a high-velocity jet of agitation slurry in the form of a hollow cone. Air admitted into this spray is split into a multitude of uniformly minute bubbles which disperse through the cell. Many of these washers are used in Pennsylvania. *Nelson.*

cyclograph. An electronic instrument in which the piece of metal to be tested is inserted in a coil which is part of the instrument and also part of a tuned circuit; the test piece thus becomes the core of the coil and produces measurable power losses in the tuned circuit which are used to produce cathode-ray oscillograms on screens incorporated in the instrument panel. The changes in the patterns produced on the screen, as different test pieces are inserted in the coil, indicate changes in such properties as case depth, core hardness, and carbon content. The instrument is particularly useful for sorting steels according to chemical analysis or heat treatment. *Osborne.*

cycloidal tooth. A type of gear tooth not now in common use. The side of the tooth is machined with a compound curve as distinguished from the involute tooth now in universal use. *Crispin.*

cyclone. a. Refers to the conical-shaped apparatus used in dust collecting operations and fine grinding applications. In principle, the cyclone varies the speed of air which determines whether a given particle will drop through force of gravity or be carried through friction of the air. *Enam. Dict.* b. A circular blowing apparatus for separating asbestos fibers from the rock after they have been loosened by fiberizing. *Mersereau, 4th, p. 210.* c. A classifying (or concentrating) separator into which pulp is fed, so as to take a circular path. Coarser and heavier fractions of solids report at apex of long cone while finer particles overflow from central vortex. Also called hydrocyclone. *Pryor, 4. See also* cyclone washer; centrifugal separation; centrifuge.

cyclone angle. Included angle of conical section of hydrocyclone. *Pryor, 3.*

cyclone classifier. A device for classification by centrifugal means of fine particles suspended in water, whereby the coarser grains collect at and are discharged from the apex of the vessel, while the finer particles are eliminated with the bulk of the water at the discharge orifice. *B.S. 3552, 1962.*

cyclone dust collector. An apparatus for the separation by centrifugal means of fine particles suspended in air or gas. *B.S. 3552, 1962.*

cyclone furnace. A forced circulation heat treatment furnace. The gas circulates at the rate of 176 feet per minute. The furnace is designed to operate at a maximum temperature of 760° C. and is either gas fired or electrically heated. *Osborne.*

cyclone overflow. A finer classified fraction, which leaves via vortex finder of hydrocyclone. *Pryor, 3.*

cyclone separator. A funnel-shaped device for removing material from an airstream by centrifugal force. *ASM Gloss.*

cyclone size. Diameter of cylindrical section of hydrocyclone. Also of inlet orifice diameter if round; dimensions or area in square inches if rectangle. *Pryor, 3.*

cyclone underflow. A coarser sized fraction which leaves via apex aperture of hydrocyclone. *Pryor, 3.*

cyclone washer. Cyclone washing of small coal originates from the Netherlands. Clean separation is effected with the aid of centrifugal force. The heavier shale particles move to the wall of the cyclone and are eventually discharged at the bottom while the lighter coal particles are swept towards the central vortex and are discharged through an outlet at the top. The washer may be used for cleaning coal up to three-fourths of an inch. The coal is normally de-slimed at about 0.5 millimeter before cleaning. The separating medium is water and ground magnetite, the bulk of which is recovered and returned to the circuit. A 20-inch cyclone has a feed capacity of about 50 tons per hour of coal sized between one-half inch and one-half millimeter. *See also* centrifugal separation. *Nelson.*

cyclonite. White; crystalline; $(CH_2)_3N_3(NO_2)_3$; a cyclic molecule; specific gravity, 1.82 (at 20° C); soluble in acetone; insoluble in water, in alcohol, in carbon tetrachloride, and in carbon disulfide; and slightly soluble in methanol and in ether. A very powerful explosive, 1.5 times as powerful as TNT. *CCD 6d, 1961.*

cyclopean stone. Blocks of hard unfractured rock at least 4 feet in smallest diameter suitable for constructing breakwaters. *A.G.I. Supp.*

cyclops agate. An eye agate with but one eye. *Shipley.*

cyclosteel. Steel produced by blowing iron-ore powder into a hot gas. *C.T.D. Supp.*

cyclothem. A series of beds deposited during a single sedimentary cycle of the type that prevailed during the Pennsylvanian period. The cyclothem, which ideally consists of 10 members (in western Illinois, the fifth member is a coal layer), indicates an unstable coastal environment in which marine submergence and emergence occurred. A cyclothem ranks as a formation in the scale of stratigraphic nomenclature. *A.G.I.*

cyclotron. A particle accelerator in which charged particles receive repeated synchronized accelerations or kicks by electrical fields as the particles spiral outward from their source. The particles are kept in the spiral by a powerful magnet. *L&L.*

cylinder. In hydraulic systems, a hollow cylinder of metal, containing a piston, piston rod, and end seals, and fitted with a port or ports to allow entrance and exit of fluid. *Nichols, 2.*

cylinder bushing. Different bore-size metal sleeves replacing the liners in a pump pressure cylinder, thereby changing pump delivery from low pressure with high volume to a higher pressure with lower volume, or vice versa. *Compare* pump liner. *Long.*

cylinder clearance. The volume remaining between the head of a piston and the end of the enclosing cylinder with the piston at the end of the stroke. In steam engines the clearance is the lineal distance between the piston and the cylinder head. *Long.*

cylinder cuts. In cylinder cuts the blasting is performed towards an empty hole in such a way that as the charges in the first, second, and subsequent holes detonate, the broken rock is thrown out of the cut. The opening is successively and uniformly (cylindrically) enlarged in its entire length. *Langefors, p. 230.*

cylinder displacement. The volume swept out of a cylinder in one working stroke of the piston. *Long.*

cylinder, graduated. a. A carefully graduated glass cylinder used for measuring the volume of liquids in the laboratory. *Shell Oil Co.* b. It is used in sedimentary petrography in particle-size analyses for determining the settling times and the equivalent spherical diameters of microscopic and submicroscopic (colloidal) mineral particles suspended in a fluid medium that are settling according to Stokes' law. The fluid medium is usually water or a dilute aqueous solution. *Bureau of Mines Staff.*

cylinder liner. A replaceable tubular insert lining the pressure cylinder of a piston pump or the cylinder of a reciprocating engine. *Compare* cylinder bushing. *Long.*

cylinder man. One who bakes lime bricks and cinder blocks in steam-pressure cylinders to hasten chemical reaction of hardening. *D.O.T. 1.*

cylinder oil. Mixture of mineral oil with 5 to 15 percent of animal or vegetable oils. *Crispin.*

cylinder penetration test. This is similar to the California bearing ratio test as originally developed by Porter in 1938 for the design of highway pavement thickness, but is used in particular relation to stabilized soils. *Ham.*

cylinder process. A process for manufacture of window glass wherein molten glass is blown and drawn into the form of a cylinder, which is subsequently split longitudinally, reheated in a flattening kiln, and flattened. *ASTM C162-66.*

cylinder wheel. A grinding wheel with a comparatively large hole, typically several inches in height, used in surface grinding where work is done by the side rather than the peripheral surface of the wheel. *ACSG, 1963.*

cylindrical drum. *See* parallel drum. *Nelson.*

cylindrical grinding. Grinding the outer surface of a part that rotates on centers or in a chuck. *See also* index feed. *ACSG, 1963.*

cylndrical land. Land having zero relief. *ASM Gloss.*

cylindrical map projection. A map projection produced by projecting the geographic meridians and parallels onto a cylinder which is tangent to (or intersects) the surface of a sphere, and then developing the cylinder into a plane. *A.G.I.*

cylindrical mill. Same as tube mill. *Stoces, v. 1, p. 583.*

cylindrical screen feeder. One type of feeder for plastic clay. It consists of a vertical cylindrical screen through which clay is forced by blades fixed to a vertical shaft that rotates within the cylinder. This machine not only feeds, but also mixes and shreds the clay. *Dodd.*

cylindrical structures; sandstone pipes. Vertical structures in sandstones, a few centimeters to several decimeters in diameter and several or more decimeters in length, with structureless interiors, attributed to rising water columns or spring channels. *Pettijohn.*

cylindrite. A blackish lead-gray, sulfostannate and sulfoantimonate of lead, $Pb_3Sn_4Sb_2S_{14}$. In cylindrical forms separating under pressure into distinct shells or folia. Massive. From Poopo, Bolivia. *English; Dana 7, v. 1, p. 482.*

cylindroconical drum. A combination of a cone and a cylinder. The ascending rope is wound on the smaller diameter of the cone at first, and as the engine reaches full speed after the period of acceleration the rope is wound on the larger cylindrical part. For deep shafts the rope is wound back on itself for the last part of the hoisting period, thus reducing the width of the drum. *Lewis, p. 244. See also* bicylindoconical drum.

cymogene. This term is archaic and should not be used. *ASTM D288-57.*

cymoid loop. The splitting of a vein along its dip or strike into two branches, both of which curve away from the general trend and then unite to resume a direction parallel to but not in line with the original trend. *See also* cymoid structure. *A.G.I.*

cymoid structure. A vein, or a vein-shaped structure, shaped like a reverse curve. *See also* cymoid loop. *A.G.I.*

cymophane. Synonym for cat's-eye. *See* chrysoberyl. *Dana 17.*

cymrite. Barium aluminum silicate, $BaA1Si_3O_8(OH)$, as hexagonal crystals from the Benallt manganese mine, Wales. Named from Cymru, the Welsh name for Wales. *Spencer 18, M.M., 1949.*

cyprine. A variety of vesuvianite or idocrase, of a blue tint, which is supposed to be due to copper. *Fay.*

cypritic steel. A steel containing approximately 15 percent chromium and 9 percent copper. It is claimed to be resistant to corrosion in the atmosphere and tap water, but its corrosion-resistant properties are inferior to the conventional austenitic chromium-nickel steels of the 18/8 type. *Osborne.*

cyrilovite. Brown tetragonal crystals, $4Fe_2O_3.3P_2O_5.5\frac{1}{3}H_2O$, in pegmatite from Cyrilov, Moravia. Named from locality. *Spencer 20, M.M., 1955.*

cyrotolite. A yellowish to brownish mineral containing zirconia, yttria, ceria, and other rare earths; also contains appreciable amounts of uranium and thorium. Found in pegmatites. *Sanford; Crosby, p. 88.*

cyst pearl. True pearl, which occurs in a sac or pouch within the tissues of a mollusc as distinguished from pearl which forms outside of the tissues or mantle, such as blister pearl, which is not a true pearl. *Shipley.*

Czochralski's reagent. An etchant for iron or steel, consisting of a solution of 10 to 20 percent ammonium persulfate in water. *Osborne.*

Czochralski technique. A method of growing single crystals of refractory oxides, and of other compounds, by pulling from the pure melt; the compound must melt congruently. *Dodd.*

D

d a. Abbreviation for density. *BuMin Style Guide, p. 59.* b. Abbreviation for specific volume. *Zimmerman, p. 100.* c. Abbreviation for dyne. *BuMin Style Guide, p. 59.* d. Abbreviation for deuteron. *Webster 3d.* e. Abbreviation for daughter of a radioactive element. *Webster 3d.* f. Abbreviation for derivative or differential coefficient; differential; differential of; for example, dx is the differential of x. *Zimmerman, p. 132.* g. Abbreviation for the prefix deci-, which indicates that the basic unit that follows is multiplied by one-tenth or by 10^{-1}. *Zimmerman, p. 33.* h. symbol for the spacing between successive identical planes in a crystal lattice. The list of d values obtained by X-ray methods is characteristic for each crystalline substance and is used for mineral identification. *A.G.I.* i. Abbreviation for decomposes. *Handbook for Chemistry and Physics, 45th ed., 1964, p. F-97.* j. Abbreviation for per unit of weight. *Zimmerman, p. 119.* k. Abbreviation for penny referring to a troy weight. *Zimmerman, p. 80.* l. Abbreviation for degree; dimensional. *Webster 3d.* m. Abbreviation for distance. *Zimmerman, p. 37.* n. Abbreviation for day. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-97.* o. Abbreviation for dam, date, division, double. *Webster 3d.* p. Abbreviation for drizzle; drizzling. *Zimmerman, p. 424.* q. As a subscript, the symbol for dissolution. *Zimmerman, p. 172.* r. As a subscript, the symbol for dilution. *Zimmerman, p. 172.* s. The symbol for intreplanar distance in Bragg's law ($n\lambda = 2d\sin\theta$, in which n is any integer, λ is the wavelength of the X-ray beam, and θ is the angle between the incident or the reflected X-ray beam and the diffracting planes of the crystal). The distance expressed by d is also called the spacing of the Bragg planes in a crystal; the crystal plane separation; the spacing between successive identical planes in a crystal structure; or the d-spacing. The list of d values with the relative intensities of the corresponding spectra obtained by X-ray diffraction methods is unique for each substance and is used to identify unknown minerals and other substances. *Bureau of Mines Staff; A.G.I.*

d a. Symbol for density. *Zimmerman, p. 169.* b. Symbol for interplanar distance in Bragg's law; spacing of Bragg planes in a crystal. *Zimmerman, pp. 151, 152, 158, 162, 165.* c. Symbol for distance between corresponding points of a grating or for grating space. *Zimmerman, pp. 154, 157.* d. Symbol for dextro-; dextrorotary. *See also d-. Handbook of Chemistry and Physics, 45th ed., 1964, pp. C-74, F-97.* e. Symbol for differential operator. *Zimmerman, p. 145.* f. Symbol for diameter. *Zimmerman, p. 169.* g. Symbol for distance. *Zimmerman, p. 169.* h. Symbol for distance between lens units in an optical system. *Zimmerman, p. 154.*

d- a. Abbreviated prefix meaning dextrorotatory or dextrorotary. Usually printed in italic; for example, *d*-tartaric acid. *Webster 3d.* b. Abbreviated prefix which generally, and according to convention, refers to optical rotation (dextrorotatory or dextrorotary), but which is sometimes used to refer to dextral molecular configuration, for which the capital letter *D*-, or the small capital letter ᴅ, is ordinarily reserved. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. C.-74, F-97; Webster 3d.* c. Lowercase *d*- and *l*- mean dextrorotatory and levorotatory, respectively, but the symbolic prefixes (+)- and (—)- are preferred for these. *CCD 6d, 1961.*

D a. Symbol for deuterium or hydrogen 2. *Webster 3d.* b. Symbol for Devonian. *USGS Sugg., p. 86.* c. Abbreviation for density and in parentheses, as (D), a symbol for density. *Zimmerman, pp. 34, 160.* d. Symbol for derivative for differential coefficient; for example, D_xy is the derivative of y with respect to x. *Zimmerman, pp. 34, 132.* e. As a subscript, the symbol for a line in the spectrum of sodium and for sodium light; for example n_D^{20} is the symbol for the index of refraction at 20° C in sodium light. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-74.* f. Symbol for diffusion coefficient and with subscript v, as D_v, the symbol for diffusivity of vapor. *Zimmerman, p. 36.* g. Abbreviation for diameter. Also abbreviated d. *Zimmerman, p. 35.* h. Symbol for distillation rate. *Zimmerman, p. 37.* i. Symbol for diopter. *Zimmerman, p. 36.* j. Symbol for electric flux density; dielectric flux density; displacement flux density; electric induction density; electric displacement; electric flux displacement; flux density displacement. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98; Zimmerman, pp. 153, 154, 156, 158, 258.* k. Abbreviation for drop. *Zimmerman, p. 202.* l. Abbreviation for double. *Zimmerman, p. 214.* m. Abbreviation for day. *Zimmerman, p. 33.* n. Abbreviation for dust. *Zimmerman, p. 440.* o. Abbreviation for descend; descending. *Zimmerman, p. 384.* p. Roman numeral for 500, and overscored as D, the Roman numeral for 500,000. *Zimmerman, p. 128.*

D a. Symbol for density. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98.* b. Symbol for diameter. *Zimmerman, p. 145.* c. Symbol for distillation rate. *Zimmerman, p. 148.* d. Symbol for coefficient of diffusion of a fluid and with subscript *v*, as D_v, the symbol for the diffusivity of vapor. *Zimmerman, pp. 145, 153.* e. Symbol for optical density; optical attenuation. *Zimmerman, pp, 153, 161.* f. Symbol for the power of a lens system; refracting power. *Zimmerman, p. 162.* g. Symbol for the angle of minimum deviation; angular dispersion. *Zimmerman, p. 153.*

D- a. Symbol for the abbreviated prefix indicating dextral or dextro-, meaning on or toward the right. Having a similar configuration at a selected asymmetric carbon atom in an optically active molecule to the configuration of dextrorotatory glyceraldehyde (*D*-glyceraldehyde). The D is usually printed in italic, as *D* or as a small capital letter D; for example, *D*-fructose. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-74; Webster 3d.* b. A prefix signifying the stereoisomeric form of an organic substance. It means that the substance has been correlated with the structure of *D*-glyceraldehyde or *L*-glyceraldehyde. However, for amino acids, *D*- or *L*- refers to the configuration of the lowest numbered asymmetric center (alpha-carbon atom), whereas for carbohydrates it refers to the configuration of the highest numbered asymmetric center. Lowercase *d*- and *l*- mean dextrorotatory and levorotatory, respectively, but the symbolic prefixes (+)- and (—)- are preferred for these. *CCD 6d, 1961.* c. Symbol generally refers to dextral molecular configuration according to convention, but sometimes it refers to optical rotation (dextrorotatory or dextrorotary) for which *d*- is ordinarily reserved. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-74.*

dab sampling. Same as spot sampling. *Sinclair, I, p. 255.*

dachiardite. a. A white to colorless monoclinic zeolite, a hydrous silicate of potassium, sodium, calcium, and aluminum, with some strontium and very small quantities of cesium and rubidium, $(Na_2,K_2,Ca)_3$-$A1_4(Si_2O_5)_9$, from a pegmatite at San Piero, Elba. Also called achiardite; zeolite mimetica. *Hess; English.* b. A new analysis corresponds to the formula $(K_2,Na_2,Ca)_{2.5}(A1_5Si_{19}O_{48}).14H_2O$. Dichiardite is therefore a dimorph of mordenite. *American Mineralogist, c. 46, No. 5-6, May-June 1961, p. 769.*

Dacian. Lower Upper Pliocene. *A.G.I. Supp.*

dacite. The extrusive equivalent of quartz diorite (tonalite). The principal minerals are plagioclase (andesine and oligoclase), quartz, phroxene or hornblende or both, minor biotite, and minor sanidine. All these minerals may occur as phenocrysts in a glassy or finely crystalline groundmass of alkalic feldspar and silica minerals. Biotite, sanidine, and hornblende are more prominent in rocks transitional into quartz latite and rhyodacite. *A.G.I.*

dacitoid. A volcanic rock having the chemical composition of dacite but free from modal quartz. *Holmes, 1928.*

dacker. Eng. Insufficient ventilation of a mine; dead air. *Fay.*

dacker of wind. Derb. Poor ventilation in a mine. *Fay.*

dactylite. A symplectite in which one of the minerals projects fingerlike into the second mineral. *Schieferdecker.*

dactylitic. A textural term applied to fingerlike projections from a continuous crystal, for example, fingers of biotite and the intercalated quartz between them, together forming a symplectite. *Holmes, 1928.*

dactylotype. A textural term applied by Shand in 1906 to the intergrowth of sodalite with orthoclase in borolanite and its associates. The sodalite has been altered to pinitic mica and appears in threadlike or vermicular aggregates closely packed in a matrix of orthoclase. *Holmes, 1928.*

dactylotype intergrowth. A mineral intergrowth in which thin successive layers resemble a fingerprint pattern, as in some orthoclase-nepheline intergrowths. *Hess.*

dad. N. of Eng. In coal mining, to mix (firedamp) with atmospheric air to such an extent that the mixture is incapable of exploding. Also called dash. *Fay.*

dadding. The circulation, control, and utilization of air produced by the fan to ventilate the mine workings. *See also* circulation of air. *Nelson.*

Daelen mill. An early type of universal rolling mill provided with both vertical and horizontal rolls so that a part could be rolled on all sides in one operation. *Osborne.*

Daeves's reagent. An etchant used to distinguish carbides in chromium steels and tungstides in high speed steels. The solution contains 20 grams of potassium ferricyanide and 10 grams of potassium hydroxide in 100 milliliters of water. In the cold it etches carbides in chrome steels and tungstides in about 20 seconds but about 5 minutes in boiling solution is required to color cementite. *Osborne.*

dag. a. Aust. A system whereby the earnings of members of the Coal miners' Federation are practically equalized. *Compare* darg. *Fay.* b. Corn. Hand ax. *Pryor, 3.* c. Corn. Deflocculated Acheson graphite used in aquadag, oil dag, etc. *Pryor, 3.*

dagger. Ark. A t-shaped iron about 4 feet long, used to force an auger into hard coal. The point is placed in a hole dug in the floor while the miner drilling the hole presses his breast against the crossbar. The end of the auger fits into any one of a number of recesses in the stem of the dagger. *Fay.*

Dagner condenser. A series of muffle-shaped pipes through which distilled zinc is passed for condensation. *Fay.*

dahamite. A name derived from Dahamis, on the island of Socotra, and given by Pelikan to a brown dike rock, having a compact texture and red phenocrysts of tabular albite or albite-oligoclase. The mineralogical composition obtained by recasting an analysis was 43.8 percent albite, 2.8 percent anorthite, 12.2 percent orthoclase, 31.5 percent quartz, and 6.8 percent riebeckite. The rock appears to be a variety of paisanite. *Fay.*

dahlite. A carbonate-apatite mineral, or association, occurring as concretionary spherulites. *Pettijohn, 2d, 1957, p. 202.*

dahllite. A resinous yellowish white hydrous calcium phosphate and carbonate, 2 $Ca_3P_2O_8.CaCO_3.\frac{1}{2}H_2O$; contains 39 percent P_2O_5; H. 5; G. 3.053. *Hess.*

Dahlstrom's Formula. Classification through the hydrocyclone. *Pryor, 3.*

daily manning sheet. A sheet which informs the mine manager, on a daily basis, exactly where his men are working on every shift; which jobs are manned and which are not; what output and O.M.S. is achieved; what overtime is worked; what allowances have been agreed, and what is the approximate daily labor cost for each district and for the mine. *See also* manpower deployment chart. *Nelson.*

daily report. *See* boring journal. *Fay.*

Dakota WC3. An aircraft equipped for carrying out airborne mineralogical searches. The equipment includes 35 millimeter cinecamera: magnetometer, scintillation counter, and electromagnetic detector. All instruments are used simultaneously during a survey. The camera provides a continuous photographic coverage of the survey country. The crew consists of four men: pilot, navigator, and two technicians. *See also* geophysical prospecting. *Nelson.*

Dakotan. Lower Upper Cretaceous. *A.G.I. Supp.*

dale. a. Scot. A measure by which coal was formerly sold in the east of Scotland. *Fay.* b. A river valley running between hills or through high land. Synonym for valley. *Webster 3d.*

dalk. *See* dauk. *Arkell.*

dalles. A plural noun from the French plural of dalle meaning gutter. The rapids in a river confined between the walls of a canyon or a gorge. Also, the nearly vertical walls of a canyon or a gorge, usually containing a rapid. Locally used in the northwestern United States. *Webster 3d; A.G.I.*

Dalmation-type of coast. A drowned longitudinal coast, the mountain ranges of which have become islands, whereas the longitudinal and transverse valleys have become straits. *Schieferdecker.*

Dalton's law. a. In a mixture of gases, the total pressure is equal to the sum of the pressures that the gases would exert separately. *Standard, 1964.* b. *See* law of multiple proportions. *C.T.D.*

dalyite. Potassium zirconium silicate, $K_2ZrSi_6O_{15}$, triclinic, from Ascension Island, Atlantic Ocean. *Spencer 19, M.M., 1952.*

dam. a. A barrier to keep foul air or water, from mine workings. *See also* stopping; bulkhead. *Fay.* b. A retaining wall or bank for water. *C.T.D.* c. An airtight barrier to isolate underground workings which are on fire. *C.T.D.* d. A concrete seal or stopping built underground to prevent an inrush of water. The dam is keyed into solid ground and may be constructed with steel doors to give access for small mine cars. *Nelson.* e. A barrier to confine or raise water for storage or diversion or to create an hydraulic head. *Seelye, 1.* f. An obstruction, generally artificial, across a stream channel that serves to form a pond or a lake. *A.G.I. Supp.* g. A barrier preventing the flow of water. Especially a barrier (As a bank of earth or a wall of masonry or wood) built across a watercourse to confine and to keep back flowing water. *Webster 3d.* h. A body of water confined or held by a dam (as a millpond or a reservoir). *Webster 3d.* i. The wall of refractory material, forming the front of the forehearth of a blast furnace, which is built on the inside of a supporting iron plate (dam plate). Iron is tapped through a hole in the dam, and cinder through a notch in the top of the dam. *See also* Lurmann front. *Fay.*

damaged-ground rent. Eng. Usually double agricultural rent for land occupied by engines, heapstead, shops, houses, railways, etc. *Fay.*

damaging stress. The least unit stress, of a given kind and for a given material and condition of service, that will render a member unfit for service before the end of its normal life. It may do this by producing excessive set, or by causing creep to occur at an excessive rate, or by causing fatigue cracking, excessive strain hardening, or rupture. *Ro.*

damask. The etched or watered surface produced on polished (welded) steel by corrosion. *Fay.*

dam gradation. Synonym for contragradation. *A.G.I.*

damkjernite. An igneous dike rock from the Fen region of southern Norway. Possibly a variety of tjosite. Contains 32 percent pyroxene, 23 percent biotite, 16 percent nepheline, 8 percent epidote, 6 percent orthoclase, 4 percent magnetite, 2 percent titanite, 2 percent calcite, and 1 percent apatite. *Johannsen, v. 4, 1938, p. 277.*

damourite. A hydrous muscovite. *Fay.*

damourite schist. A schistose metamorphic rock composed largely or entirely of damourite. *Fay.*

damouritization. The process by which the feldspars and other aluminous silicates of a rock are transformed into damourite (a variety of muscovite). Ordinarily referred to as sericitization. *Holmes, 1928.*

damp. Any mine gas, or mixture of gases, particularly those deficient in oxygen. Damp is probably derived from the German dampf, meaning a fog or vapor. See also afterdamp; blackdamp; chokedamp; firedamp; stinkdamp, white damp. *Nelson.*

damp course. A course or layer of impervious material in a wall or floor to prevent the entrance of moisture from the ground or a lower course by capillarity. *ACSG.*

damped. Eng. Suffocated by gas or foul air in a mine. *Fay.*

damped balance. Has magnets or air dashpots to oppose beam oscillation and bring it to rest rapidly. *Pryor, 3.*

dampener. a. A mechanical modulating device used to reduce deleterious effect of sharp line-pressure fluctuations on pressure gages. Also called damper; gage saver. *Long.* b. A resilient material having the ability to absorb vibrations. *Long.*

damper. a. A mass of metal, or a short-circuited winding, placed on a machine in such a way as to tend to oppose any changes in the angular velocity, that is, to prevent hunting. It is also sometimes used on the moving part of an indicating instrument. *C.T.D.* b. An adjustable iron plate or shutter fitted across a boiler flue to regulate the draft. *C.T.D.* c. A device for damping out torsional vibration in an engine crankshaft, the energy of vibration being dissipated frictionally within the damper. *C.T.D.* d. A mechanical modulating device. *See also* dampener, a. *Long.*

damper man. In the coke products industry, a laborer who regulates dampers of pipes leading to coke ovens. *D.O.T. 1.*

damping. a. In seismology, a resistance, contrary to friction, independent of the nature of the contacting surface. Being proportional to the speed of motion, it diminishes with the latter to nothing. *Schieferdecker.* b. A force opposing vibration, damping acts to decrease the amplitudes of successive free vibrations. Damping may result from internal friction within the system, from air resistance, or from mechanical or magnetic absorbers. *A.G.I. Compare* attenuation.

damping capacity. The ability of a metal to absorb vibration (cyclical stresses) by internal friction, converting the mechanical energy into heat. *ASM Gloss.*

damping constant. In damped seismographs this term is by definition equal to one-half the ratio of the damping resistance (force per unit velocity) to the moving mass. It has the dimensions of a frequency. *A.G.I.*

damping down. In pyrometallurgy, reduction of air supply to a furnace, to lower temperature or reduce working rate. *Pryor, 3.*

damping factor. The ratio of the damped and the undamped frequency of a seismograph or seismometer. *A.G.I.*

damping ratio. a. The damping ratio for a system with viscous damping is the ratio of actual damping coefficient to the critical damping coefficient. *H&G.* b. The ratio of two equiphase peak amplitudes within one period of a damped seismograph or seismometer. The ratio is always greater than unity since the greater amplitude is divided by the succeeding amplitude. *A.G.I.*

damping ropes. A term sometimes applied to rubbing ropes. *Nelson.*

dam plate. In a blast furnace, the cast-iron plate which supports the dam or dam stone in front. *See also* dam. *Fay.*

damposcope. Scot. An instrument invented by Professor Forbes, Glasgow, for detecting firedamp. *Fay.*

dampproofing. The treating of a wall with some impervious material to prevent moisture from oozing through. *Crispin.*

damp sheet. S. Staff. A large sheet placed as a curtain or partition across a gate road to stop and turn an air current. *Fay*

dampy. Mid. Mine air mixed with so much carbonic-acid gas as to cause the lights to burn badly or to go out. *Fay.*

dam shale. A Scottish oil shale. *Fay.*

damsite testing. Boreholes drilled to determine petrological and structural features of the rock or overburden materials at or near the area on which the foundations of a dam will rest. *Long.*

dam stone. The wall of firebrick or stone inclosing the front of the hearth in a blast furnace. *See also* dam. *Fay.*

dan. a. Mid. A tub or barrel, sometimes with and sometimes without wheels, in which mine water is conveyed along underground roadways to the sump or raised to the surface. *Fay.* b. A small box or sledge for carrying coal or waste in a mine. *Fay.*

danaite. A variety of mispickel or arsenopyrite, (Fe,Co)AsS, in which 5 to 10 percent of the iron is replaced by cobalt. Monoclinic. *C.M.D.; Dana 17.*

danalite. A vitreoresinous, flesh-red to gray, translucent sulfosilicate, $(GlFeZnMn)_7Si_3O_{12}S$, crystallizing in the isometric system. It is a zinciferous variety of helvite. *Standard, 1964.*

danburite. A mineral, $CaB_2(SiO_4)_2$, that is cut for collectors; transparent to translucent; dark orange-yellow, yellowish-brown, yellowish-brown to colorless, grayish color; orthorhombic; Mohs' hardness, 7 to 7.5; specific gravity, 3.0; refractive index, 1.630 to 1.636; phosphoresces reddish when heated; fluoresces pale blue. It resembles topaz, more in chemical composition and physical properties than in appearance. *Shipley.*

dancalite. An extrusive igneous rock that is an analcite trachyandesite with feldspar phenocrysts in a gray-brown groundmass. *Johannsen, v. 4, 1938, p. 189.*

dancer rolls. Rolls for the control of the rate of travel of coiled strip through a pickling bath in continuous operations. *Osborne.*

dander. Gr. Brit. A piece of slag; a calcined cinder. *Webster 3d.*

dandered coal. Scot. Coal burned by, and generally mixed with, trap rock. *See also* natural coke. *Fay.*

dandered rock. Term used among Scottish miners for coal altered by an igneous intrusion. *Tomkeieff, 1954.*

dandies. York. A miner's term for the lower part of a coal seam. *Tomkeieff, 1954.*

dandy. Staff. A miner's term for black carbonaceous shale (bass) weathered brown between the laminae. It is combustible and can be used as an inferior fuel. *Tomkeieff, 1954.*

danger board. a. A barrier erected by any employee to denote a dangerous condition in a place, usually marked "DANGER" and which can only be removed at an official's direction. *B.C.I.* b. (Scot.) A board on which notice is given, warning against entering a dangerous part of the mine workings. *See also* fireboard. *Fay.*

danger signal. A signal consisting of a board, shovel, or other material with appropriate markings thereon, placed in front of a room or entry containing an explosive mixture of firedamp. Also, a placard to indicate the location of dangerous machinery, electric wires, explosives, mine openings, etc. *Fay.*

dangler. The flexible electrode used in barrel plating to conduct the current to the work. *ASM Gloss.*

Danian. Lowermost Paleocene or uppermost Cretaceous. *A.G.I. Supp.*

Daniell cell. A primary cell with a constant electromotive force of about 1.1 volts having as its electrodes copper in a copper sulfate solution and zinc in dilute sulfuric acid or zinc sulfate, the two solutions being separated by a porous partition. *Webster, 3d.*

Danielson-Lindemann deflection test. A procedure for assessing the ability of vitreous enamelware to suffer a small degree of bending without the enamel cracking. The procedure has been standardized by the American Ceramic Society. *Dodd.*

Danish amber. Amber from the coasts of Denmark. *See also* Baltic amber. *Shipley.*

Danish flint pebbles. Pebbles of superior hardness, toughness, and uniformity found on the shores of Greenland but marketed through Denmark. For grinding media, they have long been a standard and are marketed in sizes ranging from 1 to 8 inches. *AIME, p. 14.*

danks. Black shale mingled with fine coal. *Standard, 1964.*

danks' puddler. A revolving mechanical puddler. *See also* puddling. *Fay.*

dannemorite. A manganiferous member of the cummingtonite-grunerite series from Dannemora, Sweden; yellowish-brown to greenish-gray, columnar or fibrous; specific gravity, 3.4 to 3.5. *Dana 6d, p. 386.*

Danner process. A mechanical process for continuously drawing glass cane or tubing from a rotating mandrel. *ASTM C162-66.*

danny. An open crack at the base of the neck of a bottle. *Dodd.*

D'Ansite. A tetrahedral mineral, $MgSO_4.3NaCl.9Na_2SO_4$; isotropic; probably formed in close association with vanthoffite. *American Mineralogist, v. 43, No. 11–12, November-December 1958, p. 1221.*

dant. a. Eng. In the Newcastle coalfield, soft, inferior coal; mineral charcoal. *Fay.* b. Soft sooty coal found in face and back slips or cleats; fine slack coal. *C.T.D.* c. *See* danty coal. *Tomkeieff, 1954.* d. To reduce, as a metal, to a lower temper. *Standard, 1964.*

danty. N. of Eng. Disintegrated coal. *Fay.*

danty coal; danty metal; dant; dent. Eng. Term used among Northumberland and Durham mines for soft, sooty coal or coaly shale. *Tomkeieff, 1954.*

danty metal. *See* danty coal. *Tomkeieff, 1954.*

daourite. Same as rubellite. *Shipley.*

dap. a. A notch cut in a timber to receive another timber. *Zern.* b. *See* legs. *Kentucky, p. 141.*

dapeche. Coallike organic material of unknown nature. *Tomkeieff, 1954.*

Dapex process. In leaching of uranium ores, the stripping of the pregnant or royal solution with dialkylphosphoric acid dissolved in kerosine. *Pryor, 3.*

daphnite. An iron aluminum silicate. *Osborne.*

dapple. External or internal surface irregularity in a glass container. *Dodd.*

darapskite. A hydrous sodium nitrate and sulfate mineral, $NaNO_3Na_2SO_4+H_2O$. *Fay.*

Darby process. A method of carburizing open hearth steel which consists of treating the molten steel with carbon in the form of charcoal, graphite, or coke. *Osborne.*

Darco. U.S. Trade name for activated charcoal. *Hess.*

darcy. A unit of porous permeability in physics equal to the permeability of a medium through which the rate of flow of a fluid having one centipoise viscosity under a pressure gradient of one atmosphere per centimeter would be one cubic centimeter per second per square centimeter cross section. *Compare* Darcy's law. *Webster 3d.*

Darcy's law. a. A statement in fluid dynamics: the velocity of flow of a liquid through a porous medium due to difference in pressure is proportional to the pressure gradient in the direction of flow. *Webster 3d.* b. Applies to the velocity of the percolation of water in saturated soil. It is the product of the coefficient of permeability and the hydraulic gradient. *Ham.*

darg. a. A specified day's work, usually at the coalface. *See also* stint. *Nelson.* b. A task, or a fixed quantity of coal, agreed to be produced per shift for a certain price. *C.T.D.* c. Scot. To work by the day. *Fay* d. *Compare* dag. *Fay.* e. A north German name for meadow or moor peat buried under clay. *Tomkeieff, 1954.* f. Peat formed from marine vegetation. *Holmes, 1928.*

darger. Scot. One who works by the day. *Standard, 1964.*

dark adaptation. When the eye experiences a change in environment the retina alters sensitivity to accord with the prevailing conditions. If the change is to a higher brightness level, decrease in retinal sensitivity is accomplished rapidly, but if the change is to a lower level, increase in sensitivity of the retina takes time. Complete adaptation to darkness may reqire from 30 to 40 minutes, varying for different individuals. *Roberts, II, p. 84.*

dark-colored mineral. Synonym for dark mineral. *A.G.I. Supp.*

dark field illuminator. A device incorporated in certain tyeps of inverted metallurgical microscopes by means of which the specimens may be obliquely illuminated on all sides. *Osborne.*

dark ground. Indirect illumination of stage of microscope, causing objects to be brightly displayed by oblique rays against a dark background. *Pryor, 3.*

dark mineral. Any one of a group of rock-forming minerals that are dark-colored even in thin section. Synonym for mafite. *A.G.I. Supp.*

Darko. A trade name for a material made by carbonizing lignite and pulverizing the coke to pass a 60 mesh screen. It is used for decolorizing oils, syrups, and other liquids. Gasoline and other cleaning liquids are treated with darko and caustic soda. *Hess.*

dark-red heat. Next to the lowest color on the color scale, generally given as about 650° C (1,202° F). *Bureau of Mines Staff.*

dark red silver ore. Pyrargyrite. *Pryor, 3.*

dark ruby silver. *See* pyrargyrite. *Fay.*

dark sulfur. Crude sulfur containing up to 1 percent oil or carbonaceous material and is dark in color. *BuMines Bull. 630, 1965, p. 903.*

darlingite. A varietey of lydian stone from Victoria, Australia. *English.*

darrlinge. Ger. Residue of copper resulting from the process of separating silver from copper by liquidation. *Fay.*

dart valve. A drain for a well bailer that opens automatically when rested on the ground. *Nichols.*

Darwin glass. Tasmanian tektite. *A.G.I. Supp.*

darwinite. A misnomer for whitneyite. *Dana 6d, p. 45.*

dash. N. of Eng. *See* dad. *Fay.*

dashing. Eng. Increasing the amount of air in mines to prevent explosions of mine gases. *See also* dad. *Fay.*

dashpot. a. An appliance for damping out vibration. It consists of a piston attached to the object to be damped and fitting loosely in a cylinder of oil. *See also* hydrabrake retarder. *Nelson.* b. A similar device for closing the valves in a Corliss engine, actuated by atmospheric pressure or by a contained spring. *Webster 2d.*

dasymeter. An instrument for testing the density of gases. It consists of a thin glass globe, which is weighed in the gas or gases under observation, and then in an atmosphere of known density. *Osborne.*

data for settlement. Agreed terms on which payment for a consignment of mineral is made. *Pryor, 3.*

dataller. A day wage man in a coal mine, for example, engine driver, laborer, pump attendant, and sometimes repairers and packets. *Nelson.*

datalling. Eng. Blowing (blasting) down roof in a mine. *Fay.*

datal worker. N. of Eng. A day-wage worker employed in areas up to but not at the face, for example, on the haulage. *Trist.*

data processing. A series of planned actions motivated by input signals for a defined purpose. *Pryor, 3, p. 31.*

datholite. Synonym for datolite. *Hey 2d, 1955.*

dating. Any of a variety of methods used to determine the age of a naturally occurring substance or artifact. When a process is known to proceed at a certain rate in a material, leading to either the buildup or to the loss of a component, the age may be determined by an analysis that measures the amount of the buildup or loss. These processes may be either chemical or nuclear, and the latter may be either spontaneous or induced by cosmic rays. Examples of the former include the dating of ancient bones from the known rate of deposition of fluoride in bone when exposed to ground waters, and the dating of glass from its degree of devitrification. Nuclear methods have been uniquely valuable for dating because the rates of such processes remain unchanged within the range of the extremes of conditions found on earth. By measuring the quantity of helium or of lead in uranium-bearing minerals, the age of the substance, or at least the length of time that the substance has existed as a solid deposit, may be calculated. By inference, this same measurement applied to the oldest igneous rocks gives an age for the earth. *CCD 6d, 1961.*

dative bond. *See* semipolar bond. *Pryor, 3.*

datlers. Lanc. Men who work underground, and are paid by the day; not contractors. *Fay.*

datolite. A hydrous silicate of boron and calcium, $CaB(SiO_4)(OH)$; usually in crystals; monoclinic. The mineral is used as a gem. *Sanford; Dana 17.*

datolite group. A group of minerals, the species of which are usually regarded as orthosilicates, $HR'R''SiO_5$ or $R'_3R''_2(SiO_5)_2$; $R' = Ca, Be, Fe$, chiefly; $R'' =$ Boron, the yttrium (and cerium) metals, etc. All of the minerals of this group crystallize in the monoclinic system. *Fay.*

datum. A point, line, or surface with reference to which positions (as elevations) are measured or indicated (as a permanent bench mark in leveling or mean sea level in a topographical survey); specifically, the mean low-water mark of all tides assumed as a basis of reckoning but not admitting rigorous scientific determination. *Webster 3d.*

datum level. The level (usually mean sea level or the mean level of the nearest considerable body of water) from which altitudes are measured in surveys. *Weed, 1922.*

datum plane. A horizontal plane used as a reference from which to reckon heights or depths. *H&G.*

datum water level. The level at which water is first struck in a shaft sunk on a reef or gutter. *Zern.*

daub. Eng. Clay mixed with chopped straw, used for plastering, Lancashire. *Arkell.*

dauberite. Synonym for zippeite. *Crosby, p. 62.*

daugh. a. Scot. The floor of a coal seam or where holing is done. *Nelson.* b. Underclay, soft fire clay. *Compare* dauk. *Arkell.*

daughter element. The element formed when another element undergoes radioactive decay. The latter is called the parent. The daughter may or may not be radioactive. *CCD 6d, 1961.*

daughter products. Decay products of freshly purified and isolated uranium. When all daughter elements are present in the same amount, no further change takes place in the quantity of daughter elements. The substance is then in equilibrium. *Ballard.*

dauk; dawk; douk. Eng. Tough; compact; sandy clay. *Fay.*

Dauphine diamond. Rock crystal (quartz). *Shipley.*

Dauphine law. The law governing a twinning observed in the hexagonal system commonly shown by quartz in which two right-hand or two left-hand crystals interpenetrate after one has revolved 180° about the twinning axis. *Hess.*

Dauphine twin. *See* Dauphine law. *Hess.*

Dautriche test. *See* velocity of detonation.

davainite. A rock consisting essentially of brown hornblende which is paramorphic after pyroxene, the amount of other minerals, such as feldspar, being small. *Holmes, 1928.*

davidite. A moderately to strongly radioactive mineral containing titanium, iron, rare earths, uranium, vanadium, and chromium; dark brown to brownish-black. Found in pegmatites associated with quartz, biotite, ilmenite, rutile, iron, and copper sulfides. Also found in hypersthene gabbro and anorthosite accompanied by scapolite, quartz, calcite, molybdenite, rutile, sphene, and tourmaline; it is obvious that the mineralization was introduced into the basic rocks by emanations from underlying granites. This is the only known occurrence of primary uranium minerals in basic rocks. One of three known primary uranium ore minerals. *Crosby, pp. 70–71; BuMines Bull. 556. 1956. p. 945.*

davidsonite. A term for greenish-yellow beryl. *Shipley.*

Davis bit. Synonym for Davis cutter bit. *Long.*

Davis calyx drill. A rotary drill similar to the diamond core drill except that the annular groove is cut either by a steel chisel or by a plain hollow rod using chilled shot. When the core is of sufficient length to be withdrawn, some grit is added to the mud flush, which becomes wedged tightly between the core and base of the barrel. When the rods are raised the core is broken off and brought to the surface. *Nelson.*

Davis cutter bit. An annular-shaped, sawtoothlike bit used on shot drills to cut core in soft formations in which shot is ineffective as a cutting medium. Also called Davis bit. *Long.*

Davis furnace. A long, one-hearth reverberatory furnace, heated by lateral fireplaces for roasting sulfide ore. *Fay.*

Davis magnetic tester. An instrument for testing the magnetic content of ores and for checking the efficiency of wet magnetic separators recovering magnetite and ferrosilicon in heavy-media processes. It consists of an inclined glass tube set between the pointed poles of a powerful electromagnet or permanent magnet. The ore sample is introduced into the water-filled tube and agitated to insure thorough washing of the arrested magnetics. The unit is continuously rated, having a power consumption of 230 watts, the motor drive being one-twentieth of a horsepower. *Nelson.*

davisonite. A white hydrous phosphate of calcium and aluminum, $6CaO.Al_2O_3.2P_2O_5.5HO_2$; stout fibers forming botryoidal crusts. Probably hexagonal. From Fairfield, Utah. *English.*

Davis Revergen kiln. The word Revergen is a trade mark. A gas-fired kiln of the open flame type; the flame does not come in actual contact with the ware. The combustion air is preheated by regenerators (hence the name) below the kiln. The design was introduced by Davis Gas Stove Companay, Ltd., Luton, England; the firm has since been absorbed by Gibbons Bros., Ltd., Dudley, England. *Dodd.*

Davis wheel. A railway tire consisting of a soft plate and boss, and a wear resistant tread of water toughened manganese steel, cast integrally within. *Osborne.*

davreuxite. A hydrated mica in narrow plates that looks like acicular crystals. *Hess.*

Davy lamp. A safety lamp invented by Sir Humphrey Davy in 1815 for the protection of coal miners. Its safety feature consisted of a fine-wire gauze inclosing the flame to keep it from coming in contact with mine gas. *Fay. See also* flame safety lamp; safety lamp.

Davy man. Newc. The man who trims and repairs the Davy lamps. *Fay.*

davyne; davina. A colorless to white, translucent, vitreous to pearly silicate and carbonate of aluminum and calcium of uncertain composition but near cancrinite. *Hess.*

dawling. Derb. A failing ore body, both in quality and quantity. *Fay.*

dawsonite. A basic carbonate of aluminum and sodium, $Na_3Al(CO_3)_3.2Al(OH)_3$, occurring in thin incrustations of white radiating bladed crystals. *Fay.*

Dawson producer. A furnace used for the manufacture of producer gas. *Fay.*

day. a. A term used to signify the surface; for example, driven to day, meaning to daylight, therefore to the surface. *Fay.* b. Wales. The surface of the ground over a mine. *Fay.* c. Eng. In the Derbyshire coalfield, ore that is found near the surface. *Fay.* d. Applied to coal or any useful rock found at or very near the surface, for example, day coal. *Tomkeieff, 1954.* e. In mining, generally a period of 8 hours for work on the three-shift system, or 24 hours if referring to the output or to machinery. *C.T.D.*

day coal. The topmost stratum of coal; so called from its being nearest to daylight. *Standard, 1964.*

day drift. An adit, drift, or tunnel ending at the surface. *Pryor, 3.*

day eyes. In Wales, inclined planes driven from the surface to the coalbed. *Fay.*

day fall. *See* crop fall. *Fay.*

day hole. Any heading or level in a mine communicating with the surface. *Fay.*

day level. Scot. A level driven from the surface; an adit. *Fay.*

daylight. a. Synonym for day shift. *Long.* b. When an underground mine working meets the surface it is said to daylight. *Long.* c. The maximum clear distance between the pressing surfaces of a hydraulic press with the surfaces in their usable open position. Where a bolster is supplied, it shall be considered the pressing surface. *See also* shut height. *ASM Gloss.*

daylight lamps. Artificial daylight lamps are either ordinary lamps, but with a special blue glass casing, or mercury vapor lamps. Considerable use of these lamps is made in the enameling industry for such work as matching colors, checking production ware against standard color samples, etc. Many plants and laboratories have standardized on daylight lamps for all lighting equipment. This equipment is particularly valuable on dark or cloudy days. *Hansen.*

daylight mine. Scot. A mine or drift extending to the surface. *Fay.*

dayman. A coal mine employee paid by the day as distinguished from those paid by the piece, or by contract. Also called company man. *Fay.*

day pair. Corn. Miners who work underground during the day; the day shift. *Fay.*

day shift. A group of drillers, miners, or laborers, who work during the daylight hours. Also called daylight. *Long.*

dayside. Corn. The upper side. *Bureau of Mines Staff.*

day stones. Loose stones on the surface. *Arkell.*

day tank. A periodic melting unit, usually designed to be emptied by each day of hand gathering. *ASTM C162-66.*

day wage. A fixed rate of wages per shift, of so many hours, irrespective of the amount of work done. The day wage system applies to men on varied work which is not amenable to piecework. *Nelson.* Also called daywork; company work. *Pryor, 3.*

day water. Surface water. *Webster 2d.*

daywork. All work other than that done by the piece or contract, such as repairing roads, handling cars, etc. Also called company work and does not include work for which the men are paid by the month. Work performed by daymen. *Fay.*

dazed. Eng. Timber that is decayed is called dazed timber. *SMRB, Paper No. 61.*

dazzling white heat. Division of the color scale, generally given as above 1,540° C (2,804° F). *Bureau of Mines Staff.*

db Abbreviation for decibel. *BuMin Style Guide, p. 59.*

dc Abbreviation for direct current. *BuMin Style Guide, p. 59.*

dc (direct chill) casting. A continuous method of making ingots or billets for sheet or extrusion by pouring the metal into a short mold. The base of the mold is a platform that is gradually lowered while the metal solidifies, the frozen shell of metal acting as a retainer for the liquid metal below the wall of the mold. The ingot is usually cooled by the impingement of water directly on the mold or on the walls of the solid metal as it is lowered. The length of the ingot is limited by the depth to which the platform can be lowered; therefore, it is often called semicontinuous casting. *ASM Gloss.*

DCL fusion-cast refractory. A fusion-cast refractory, for example, glass tank block, made by a process that largely eliminates the cavities liable to occur as a result of shrinkage during cooling; the mold is L-shaped and is tilted while it is being filled so that the shrinkage cavities concentrate in the smaller leg of the L (the lug), which is then sawed off and discarded. DCL = diamond cut lug. *Dodd.*

D-coal. A maceral made of substances which predominate in the durainous bands of coal. Applied to the microscopic coal particles found in the lungs of miners. *Tomkeieff, 1954.*

Deacidite resins. Trade name of synthetic ion-exchange resins. *Pryor, 3.*

deactivation. a. In froth flotation, treatment of one or more species of mineral particles to reduce their tendency to float; modification of action of activating agent for similar purpose. *Pryor, 3.* b. The process of prior removal of the active corrosive constituents, usually oxygen, from a corrosive liquid by some chemical means, such as the controlled corrosion of expendable metal. *Henderson.*

dead. a. Eng. In Cornwall, unventilated. *Fay.* b. Applied to a vein or piece of ground, unproductive. *Fay.* c. Eng. The creep, after subsidence or upheaval has taken place to the full extent. *Fay.* d. An unproductive mine. *Pryor, 3.* e. A term used to describe wire rope that does not spin. *Sinclair, V, p. 6.* f. Means at, or about, zero potential, and disconnected from any live system. *Nelson.* g. Said of coal when it is under no pressure, and without sound. When such a condition exists, it does not warp and burst. *Compare* alive, d. *Stoces, v. 1, p. 270.*

dead air. a. The air of a mine when it contains carbonic-acid gas (blackdamp), or when ventilation is sluggish. *Fay.* b. Stagnant air. *B.S. 3618, 1963, sec. 2.*

dead annealing. Heating steel to a temperature above the critical range, holding at that temperature, followed by very slow cooling, in order to develop the greatest possible commercial softness or ductibility. *Osborne.*

dead axle. a. A fixed shaft functioning as a hinge pin. *Nichols.* b. A fixed shaft or beam on which a wheel revolves. *Nichols.*

dead band. In flotation, the range through which an input can be varied without initiating response. *Fuerstenau, p. 545.*

dead beds. Unproductive strata or veins as opposed to bearing or quick beds. Also called dead veins. *See also* deads; barren ground. *Arkell.*

dead-burned. a. The state of a basic refractory material resulting from a heat treatment that yields a product resistant to atmospheric hydration or recombination with carbon dioxide. *ASTM C 71-64.* b. Completely calcined. *A.I.S.I. No. 24.*

dead-burned dolomite. A specially sintered or double-burned form of dolomitic quicklime, which is further stabilized by the addition of iron, that is chemically inactive and is employed primarily as a refractory for lining open-hearth steel furnaces. *Boynton.*

dead-burned magnesia. A sintered product consisting mainly of magnesia in the form dense weather stable refractory granules. *Bureau of Mines Staff.*

dead-burned magnesite. The granular product obtained by burning (firing) magnesite or other substances convertible to magnesia upon heating above 1,450° C long enough to form dense, weather-stable granules suitable for use as a refractory or in refractory products. *ASTM C 71-64.*

dead-burned refractory dolomite. Raw refractory dolomite that has been heated with or without additives to a temperature sufficiently high and for a long enough time to decompose the carbonate structure so as to form calcium oxide and periclase in a matrix that provides resistance to subsequent hydration and recombination with carbon dioxide. *ASTM C 71-64.*

dead burnt. Calcination of limestone, dolomite, magnesite to point where associated clay vitrifies and reduces slaking quality. *Pryor, 3.*

dead-burnt plaster. Anhydrous $CaSO_4$ made by heating plaster for 3 hours at 800° F. *Bennett 2d, 1962 Add.*

dead cave. A cave in which the formations are dry; a cave in which deposition and excavation have ceased. *A.G.I.*

dead center. a. Perfectly alined and centered. *Long.* b. A position in which a single-cylinder engine cannot start itself because the crank arm parallels the centerline of the piston and cylinder, a condition that may occur when the piston is at either end of the stroke. *Long.* c. A stationary center to hold rotating work. *ASM Gloss.*

dead chert. Synonym for chalky chert. *A.G.I.*

dead coal. a. A Kansas term for a noncoking coal mined from strip pits. *Fay.* b. When coal is allowed to stand for a length of time, the weieght of the roof on the pillars, caused by crush and creep, renders the coal dead or tough. Also called tough coal. *Mason, v. 1, p. 103.*

dead-dipping. The act or process of giving a pale dead color by acid, as to brass. *Standard, 1964.*

dead end. a. An entry, gangway, level, or other mine passage extending beyond the mine workings into solid coal or ore; a stub. *See also* stub entry. *Fay.* b. Underground passageway either blocked or not holed through. *Pryor, 3.* c. Blind alley underground. *Pryor.* d. The unworked end of a drift or working. *Hess.* e. An unventilated underground mine passage extending some distance beyond other mine workings into solid rock. *Long.* f. The end of a drilling line or cable made fast to some stationary part of the drill rig or to a deadman. *Long.* g. The closed end of a pipe or pipe system. *Long.* h. A term used in coal mining for the terminating of all electric wiring (except cables to equipment) out by the last crosscut where ample ventilation will reduce the possibility of an electric arc causing an explosion. This applies to all wiring, whether trolley, feeder, lighting circuit, or otherwise. *Kentucky, p. 245.* i. A cul-de-sac. Synonym for blind heading. *B.S. 3618, 1963, sec. 2.* j. A passageway blocked at one end. *A.G.I.*

deadened. Mercury which has become contaminated and will no longer amalgamate freely with gold. *Pryor, 3.*

daedened mercury. *See* floured. *Fay.*

deadfall. A dumping platform at the mouth of a mine. *Standard, 1964.*

dead glacier. A stagnant glacier; a fossil glacier. *Fay.*

dead ground. a. Rock in a mine that, although producing no ore, requires to be removed in order to get a productive ground. *Fay.* b. A faulty or barren area of coal strata. *Fay.* c. Ground devoid of valuable mineral, ore, or coal. *Nelson.* d. In mining subsidence, ground that has settled and no further movement is expected. *Nelson.* e. Portions of ore deposit too low in value to repay exploitation. *Pryor, 3.* f. The part of a lode where there is no ore. *Gordon.* g. S. Afr. Barren ground. *Beerman.*

deadhead. a. To return to the commencement of a cut without excavating; usually for the commencement of a new cut after completion of its predecessor. *Austin.* b. An extra length given to a cast object, as a cannon, to put pressure on the molten metal below so that dross and gases may rise into it; a sullage piece; a sinking head. *Standard, 1964.* c. That part of a casting filling up the ingate; a sprue. *Standard, 1964.* d. Can. Logs forced into the bottom of a waterway during timber drives. *Hoffman.*

deadheading. Traveling without load, except from the dumping area to the loading point. *Nichols.*

dead hole. a. One that extends into solid coal beyond the part that can be broken by the maximum safe charge of explosive. *Zern, p. 668.* b. A shothole so placed that its width at the point (toe), measured at right angles to the drill hole, is so great that the heel is not strong enough to at least balance the resistance at the point (toe). *Zern, p. 669.* c. A shallow hole in an iron casting. *Standard, 1964.*

deading. Glouc.; Som. Same as deadwork, a. *Fay.*

deadlime. Decomposed chalk. *Arkell.*

deadline. a. A row of marked empty powder kegs or other danger signal placed by the fireboss to warn miners not to enter workings containing gas. *Fay.* b. The part of a block-and-tackle cable from the traveling block to the deadline anchor. *Long.* c. The unused part of a pipe system. *Long.*

deadline anchor. The fixed point on a drill rig or deadman to which a deadline of a block and tackle is attached. *Long.*

dead load. a. The actual weight of all permanent construction comprised in a building. *Nelson.* b. The downward pressure on a structure caused by gravity only, such as the weight of a long string of drill rods suspended from the sheave in a drill derrick. Also called static load. *Long.* c. That of structure and its permanent nondynamic load. Also referred to as deadweight. *Pryor, 3.*

dead lode. A lode not containing valuable minerals in paying quantity. *Fay.*

deadman. a. A wooden block used to guard the mouth of a mine against runaway cars. *Fay.* b. A buried log, timber, concrete block, or the like serving as an anchor to which a pulling line can be attached. *Long.*

deadmen's graves. Aust. Gravelike mounds in the basalt underlying auriferous gravels. *Fay.*

dead-mild steel. Steel containing 0.07 to 0.15 percent carbon. *See also* wrought iron. *Nelson.*

dead pearl. Trade term for pearl with lusterless or dead white appearance. *Shipley.*

dead plate. a. A nearly horizontal iron plate, at the mouth of the furnace under a steam boiler, on which the bituminous coal charges are laid to be partly coked before they are pushed upon the grate where their solid carbon is consumed. The gases evolved on the dead plate pass over the grate and are burned. *Fay.* b. In automatic production, a stationary plate receiving a glass article awaiting transfer. *ASTM C162-66.*

dead quartz. Quartz carrying no valuable mineral. *Fay.*

dead reel. A storage reel. *Nichols.*

dead rent. Of a mineral lease, the rent which must be paid whether or not minerals are being extracted. *Pryor, 3.*

dead riches. Base bullion. *Fay.*

dead roast. a. A roasting process for complete elimination of sulfur. *ASM Gloss.* Also called sweet roast. *Newton, p. 287.* b. Roasting to remove volatiles within specified temperature range. *Pryor, 3.* c. In fluidization roasting, restriction of entering air to permit oxidation of sulfides, while not allowing process to proceed to any marked degree of sulfate roasting. *Pryor, 3.*

dead roasting. Sulfide ores are dead roasted when all the sulfur possible to drive off by roasting has been eliminated. *Weed, 1922.*

dead rock. The material removed in the opening of a mine, that is of no value for milling purposes. Waste rock. *Fay.*

dead rope. Aust. Same as buffer rope. *Fay.*

deads. a. Corn. The waste rock, packed in excavations from which ore or coal has been extracted. *Fay.* b. The barren rock which incloses the ore on every side. The wall rock. *Fay.* c. Refuse from a mine not containing ore. *Gordon.*

dead small. N. of Eng. The smallest coal which passes through the screening or separating apparatus. *Fay.*

dead-soft. The state of metal which has been fully annealed. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

dead steel. a. Fully killed steel which sinks quietly in the ingot mold during solidification. b. The term is also applied to steel which fails to respond to heat treatment due to the fact that it has been worked at excessively high temperatures, for example, 1,300° C to 1,350° C. *Osborne.*

dead-stroke hammer. A power hammer striking an uncushioned or inelastic blow. *Standard, 1964.*

dead time. In flotation, the interval of time between initiation of an input and the start of the resulting response. It may be qualified as 'effective' if extended to the start of the build-up time; 'theoretical' if the dead band is negligible; and 'apparent' if it includes the time spent with an appreciable dead band. *Fuerstenau, p. 545.*

dead true. a. A core barrel or drill rod that does not oscillate or vibrate when rotated at high speed is said to be dead true. *Long.* b. Perfectly straight and centered. *Long.*

dead water. Standing or still water. *Webster 3d.*

deadweight. a. The unrelieved weight of any inert mass; a heavy or oppressive burden. *Webster 3d.* b. The weight of a vehicle or carrier itself as distinguished from carried or live load. *Crispin.* c. The difference, in tons, between a ship's displacement at load draught and light draught. It comprises cargo, bunkers, stores, fresh water, etc. *C.T.D.*

dead work. a. Work that is not directly productive—the removal of rock, debris, or other material which is not directly productive of coal—though it may be necessary for exploration and future production. Unfinished work. *Fay; B.C.I.* b. Unproductive or stone work; the handling of stone or dirt as a preliminary step to winning and working the coal seam. The aim is to keep the dead work per yard of face or ton of coal to the minimum practicable figure. *See also* unproductive development. *Nelson.* c. Any kind of miner's work other than actual coal getting and transport. *Mason.* d. Work done by a contractor not provided for in his yardage or tonnage contract rates. *Mason.* e. Explorotory or preparatory work, such as cleaning falls of roof, removing rock, etc., during which little or no coal is secured. *Hudson.* f. The development of a mine when no ore is being raised. *Gordon.* g. S. Afr. Necessary work to reach and exploit the valuable portions of the mine. Shaft sinking, crosscutting, driving of levels, etc., belong to dead work. *Beerman.*

dead zone. That part of the mined strata which has completely settled down after subsidence. *Briggs, p. 61.*

deaf coal. Term used among British miners for coal altered by an igneous intrusion. *Tomkeieff, 1954.*

deaf ore. Derb. Gouge containing small grains of valuable mineral. Considered as indicating that the main ore body is not far away. *Fay.*

de-air. To remove air from ceramic mixtures during the dry pressing or plastic forming operation by the application of a partial vacuum. *A.I.S.I. No. 24.*

de-aired brick. Brick molded or formed from a mix which has been subjected to a partial vacuum during the process of manufacture. *A.R.I.*

de-airing. The removal of air from plastic clay or body, from the moist powder in dry-pressing, from casting slip, or from plaster during blending. There are various devices for submitting these materials to a partial vacuum during their processing. De-airing is most commonly practiced in extrustion, shredded plastic clay being fed to the pug, or auger, via a de-airing chamber. *Dodd.*

de-airing machine operator. One who tends a machine that removes air bubbles and excessive moisture from wet clay before it is molded or pressed, manipulating speed control and automatic clay feed control switches, levers, and valves. *D.O.T. 1.*

deal. a. Plank used in shaft and gallery construction. *Fay.* b. A board or plank of varying dimensions. In Canada, the standard size is 12 feet by 9 inches by 3 inches. In England, the maximum width is 9 inches, and the maximum thickness 3 inches. *Standard, 1964.*

deal end. Eng. A plank less than 6 feet long. *Standard, 1964.*

dealer. An operator on the stock exchange who buys and sells on his own account and who makes his profit from differences in prices rather than from commissions. *Hoov, p. 281.*

dean. Corn. The end of a level. *Fay.*

debacle. a. A great rush of waters, which breaking down all opposing barriers, carries forward the broken fragments of rocks and spreads them in its course. *Fay.* b. A breaking up of ice in a river. A violent dispersion of disruption. *Webster 3d.*

De Bavay process. A method of froth flotation invented in 1904 in which a 40-mesh sand was deslimed, acid washed and conditioned with castor oil and paraffiin before cascading flotation. *Pryor, 3.*

debiteuse. A slotted, floating clay block through which glass issues in the Fourcault process. *ASTM C162-66.*

debitumenization. Used by Lyell and others and referring to the removal of volatile material from coal as a result of heat and pressure. Obsolete. *A.G.I.*

Deblanchol rotary furnace. A cylindrical refractory-lined shell, provided with a gas flue leading to a recuperator at one end, and a fuel and air port at the other. Air for combustion is preheated in the recuperator, and oil firing is adopted. The furnace may be used for melting gray iron and nonferrous metals; it is claimed to have many advantages, including simplicity, low cost, close control and speed of melting. *Osborne.*

deblooming. Masking the fluorescence of mineral oils. *Shell Oil Co.*

deblooming agents. Mononitronaphthalene and yellow coal tar dyes are sometimes used for deblooming. *Shell Oil Co.*

debris. a. Rock fragments, sand, earth, and sometimes organic matter, in a heterogeneous mass, as at the foot of a cliff. *Fay.* b. The silt, sand, and gravel that flow from hydraulic mines; referred to by miners as tailings, slums, and sometimes slickens. *See also* tailings. *Fay.* c. Any loose material caused by a shot, fall, smash, explosion, etc. *Mason.* d. Any material, including floating trash, suspended sediment, or bed load, moved by a flowing stream; detritus. *Seelye, 1.*

debris bag. A dirt-filled bag used for pack walls and chocks. *See also* sandbag. *Nelson.*

debris cone. A fan-shaped deposit of soil, sand, gravel, and boulders built-up at the point where a mountain stream meets a valley, or otherwise where its velocity is reduced sufficiently to cause such deposits. *See also* alluvial cone. *Seelye, 1.*

debris dam. A dam in a watercourse that retains sand and gravel. *Ham.*

debris deposits. Refuse from hydraulic mining operations. *Fay.*

debris slide. A small, rapid movement of largely unconsolidated material that slides or rolls downward to produce an irregular topography. *Leet.*

deburring. Removing burrs, sharp edges, or fins from metal parts by filing, grinding, or rolling the work in a barrel with abrasives suspended in a suitable liquid medium. Sometimes called burring. *ASM Gloss.*

Debye-Huckel theory. Strong electrolytes are completely dissociated, and increase in conductivity on dilution, due to decreased electrostatic energy acting between the separated ions. *Pryor, 3.*

decarborane. A solid with a heating value of 28,200 to 29,300 British thermal units per pound. *BuMines Bull. 630, 1965, p. 151.*

decahydrate. A compound of 10 molecules of water. *Webster 3d.*

decal. *See* decalcomania. *Enam. Dict.*

decalcomania; decal. Picture or design on glass, ceramic ware, or enamel surfaces produced by transferring from specially prepared paper. *Enam. Dict.*

decalescence. A phenomenon, associated with the transformation of alpha iron to gamma iron on the heating (superheating) of iron or steel, revealed by the darkening of the metal surface owing to the sudden decrease in temperature caused by the fast absorption of the latent heat of transformation. *ASM Gloss.*

decalescence point. *See* critical point. *Pryor, 3.*

decantation. The settlement of a solid from a liquid. The principle is used in ore concentration and in coal-washing plants. *See also* countercurrent decantation. *Nelson.*

decanter. a. A vessel used to decant or to receive decanted liquids. *Webster 3d.* b. An apparatus for sorting and classifying tailings from gold-washing operations. *Fay.*

decanting. In a compressed air caisson where air-lock space is very limited, decanting is the sequence of locking men through in 10 to 15 minutes from pressures higher than 18 pounds per square inch. Immediately following, the men enter a larger man lock specially designed for recompressing them to full working pressure and then decompressing at the correct rate, which varies from 1 to 5 minutes for each pound per square inch pressure above atmosphere. *See also* caisson disease. *Ham.*

decarbonization. Surface decarbonization on an enameling iron is the reaction taking place which converts the exposed carbon into carbon dioxide (gas) during the annealing process. *Hansen.*

decarbonize. To remove carbon by chemical reaction, genrally with oxygen. *Mersereau, 4th, p. 407.*

decarburization. The loss of carbon from the surface of a ferrous alloy as a result of heating in a medium that reacts with the carbon at the surface. *ASM Gloss.*

decauville. A French name for an automatic or balanced inclined tramway. *Hess.*

decay. a. The general disaggregation of rocks; it includes the effects of both the chemical and mechanical agents of weathering with, however, a stress on the chemical effects. *Stokes and Varnes, 1955.* b. The process of transformation of plant material into humus. *Tomkeieff, 1954.* c. The spontaneous radioactive transformation of one nuclide into a different nuclide or into a different energy state of the same nuclide. Every decay process has a definite half-life. *See also* half-life. *L&L.*

decay coefficient. In vibration, radioactive emission or phosphorescence, a coefficient used in expressing intensity as a function of time:

$$I = I_o e^{-ct}$$

where I is intensity at time, t, I_o is the original intensity, and C is the decay coefficient. *ASM Gloss.*

decay constant. The constant ratio of the number of radioactive atoms disintegrating in any specified short unit interval of time to the total number of atoms of the same kind still intact at the beginning of that interval. *Webster 3d.*

decay curve. A graphic presentation of the manner in which a quantity decays with time or, rarely, with distance through matter; usually refers to radioactive decay or decay of electrical and acoustical signals. *ASM Gloss.*

decay distance. The distance between an area of wave generation and a point of passage of the resulting waves outside the area. *Hy.*

decay heat. The heat produced by the decay of radioactive nuclides. *L&L.*

decay period. Reciprocal of decay coefficient. *ASM Gloss.*

Deccan basalt; Deccan trap. A fine-grained, nonporphyritic, tholeiitic basaltic lava, covering an area of about 200,000 square miles in the Deccan region of southeast India and consisting essentially of labradorite, clinopyroxene, and iron ore. Olivine is generally absent, or is present in a minor amount, usually near the bottom of flows. Corresponds to the plateau basalt of the Pacific Northwest and the Thulean province of western Scotland, northeast Ireland, and Iceland. *A.G.I.*

dechenite. Natural lead metavanadate, $Pb(VO_3)_2$; molecular weight 405.11; yellow to red; specific gravity 5.6 to 5.8; hardness 3 to 4. *Bennett 2d, 1962.*

Dechenne process. A method of removing pipe and impurities from steel intended for making tires and hoops. The anvil of the forge hammer or press is provided with a hemispherical hollow of suitable size; the ingot, large enough for one disc, is placed on it upside-down. The ingot is then flattened down to approximately the thickness of the tire to be made, and the piped and segregated metal is forced into the hollow of the anvil. The disc is then placed on a ring support, and the center is punched out, the piped and segregated metal being removed at the same time. *Osborne.*

decibar. The pressure exerted per square centimeter by a column of sea water 1 meter tall is approximately 1 decibar. The depth in meters and the pressure in decibars, therefore, are expressed by nearly the same numerical value. *Hy.*

decibel. The unit for measuring sound intensity. Named in honor of Alexander Graham Bell (1847–1922). When sound or noise is created it gives off energy which is measured in decibels. *Crispin.*

decinormal solution. A solution used for titration which contains one-tenth gram equivalent per liter: $\frac{N}{10}$ *Pryor, 3.*

decision function. Rule made to control a specific sampling investigation, which defines the point at which no further observations are to be made, and the nature of the decision which is to be agreed. In a series of sampling operations each successive decision function depends on those which have preceded it. *Pryor, 3.*

deck. a. One of the separate compartments or platforms into which a cage is divided to hold cars. *See also* multideck cage. *Nelson.* b. The surface of a concentrating table. *Nelson.* c. The refractory top of a car used in a tunnel kiln or bogie kiln. *Dodd.*

deck charge. a. A charge which is divided into several separate components along a quarry borehole. *Compare* column charge. *B.S. 3618, 1964, sec. 6.* b. A charge separated by stemming. *Carson, p. 320.*

decke; decken. *See* nappe. *Mather.*

decken structure. A series of great overthrust folds with nearly parallel and horizontal axial planes. *Fay.*

decking. a. The operation of changing the tubs on a cage at top and bottom of a shaft. Also called caging. *Fay.* b. Separating charges of explosives by inert material which prevents passing of concussion, and placing a primer in each charge. *Nichols.* c. The multiple layer loading of ware for firing. *ASTM C286-65.*

decking level. The level at which a cage comes to rest at the pithead and pit bottom for unloading and loading mine cars. The distance from the upper to the lower decking level is the winding depth. *Nelson.*

deck load. A charge of dynamite spaced well apart in a borehole, and fired by separate primers or by a detonating cord. *Nichols.*

deck loading; spaced loading. A method of loading quarry blastholes in which the explosive charges in each hole are separated by lengths of stemming. This method enables the explosive to be distributed according to the hardness of the beds. Usually adopted in wellhole blasts. *Nelson.*

deck molding. Trimming made to match cresting or ridging, on clay-tiled roofs, and used for the purpose of covering the planes of a roof which has a flat deck. *Fay.*

deck screens. Two or more screens, usually of the vibrating type, placed one above the other for successive processing of the same run of material. *Nichols.*

declaratory statement. In practical mining operations, a term applied to the statutory certificate of location, and a certificate or statement of the location, containing a description of the mining claim, verified by the oath of the locator, performing, when recorded, a permanent function. It is the beginning of the locator's paper title, is the first muniment of such title, and is constructive notice to all the world. *Ricketts, I.*

declared efficiency. The efficiency assigned by the maker under certain specified conditions. *Nelson.*

declination. a. The angle which the magnetic needle makes with the geographic meridian. It is said to be east or west, depending on which way the north end of the needle points, east or west of the geographic meridian. *Fay.* b. Angular elevation of a star above celestial equator when truly north of observer. *Pryor, 3.* c. Angular deviation of magnetic compass from true North, observed in conditions where no local deviation affects it. *Pryor, 3.* d. The angular change in the course of a borehole induced by deflection techniques, usually expressed in degrees. *Long.* e. Sometimes a synonym for inclination. *See also* inclination. *Long.*

declination maps. Maps on which isogonic lines are shown. *Mason, V. 2, p. 719.*

declining conveyor. A conveyor transporting down a slope. *See also* retarding conveyor.

ASA MH4.1-1958.

declinometer. An instrument, often self-registering, for measuring or recording the declination of the magnetic needle. *Standard, 1964.*

decollement. The independent disruption, by folding or faulting, of sedimentary beds by sliding over the underlying rocks. *A.G.I.*

decollement structure. A term borrowed from structural geology and applied to folded strata that have slid over underlying, generally undisturbed beds. *Pettijohn.*

decolorizers. a. Materials added for the express purpose of improving the appearance of the glass by hiding the yellow-green color due to iron impurities. Actually they increase the total absorption of light by the glass and cannot be satisfactorily employed if more than a certain amount of iron is present. *C.T.D.* b. Materials added to clays or ceramic mixes to improve the fired color, (that is, lime or magnesia will neutralize part of the color of iron compounds, if sulfur fumes are absent). *Bureau of Mines Staff.*

decolorizing. The process of producing a colorless appearance in glass. *ASTM C162-66.*

decolorizing agents. Charcoals, blacks, clays, earths, or other materials of highly adsorbent character that are used to remove undesirable color. *CCD 6d, 1961.*

decompose. a. To resolve or to separate into constituent parts or elements, as by means of chemical agents or by natural decay. Especially, to cause to decay or to rot. *Standard, 1964.* b. To become separated into elements; hence, to putrefy; to decay; to rot. *Standard, 1964.*

decomposed. Rock or ore altered and leached by air and water. *Weed, 1922.*

decomposing furnace. A furnace used in the conversion of common salt into sulfate of soda, aided by the action of sulfuric acid. *Fay.*

decomposition. The breaking down of minerals by themselves or in rocks through chemical processes, usually related to weathering. *A.G.I.*

decomposition potential. The minimum potential difference necessary to decompose the electrolyte of a cell. *ASM Gloss.*

decomposition value. Minimum voltage at which continuous electric current flows through an electrolytic solution of normal strength. *Pryor, 3.*

decompression. The process of reducing high air pressure gradually enough so as not to injure men who have been working in it. *Nichols.*

decompression illness. A condition among underwater workers and mine rescue teams that is caused by ascending too quickly from deep dives. The blood absorbs nitrogen when it is subjected to greater pressures than the normal atmospheric pressure, and the deeper a man dives, and the longer he stays underwater, the greater becomes this abnormal charge of excess nitrogen in the blood and body tissues. On ascending towards the surface, the reduction in pressure causes the release of bubbles of nitrogen, and, if the nitrogen is released too quickly, it gives rise to pains in the joints and muscles of the arms and legs, called diver's bends. In more severe cases, the bubbles may collect in the spinal cord and produce diver's palsy; while in acute cases, the nitrogen may accumulate in the heart and cause death. This illness can be avoided by limiting the time spent underwater and by controlling the time taken to ascend. *McAdam, p. 163.*

decontamination. The removal of radioactive contaminants from surfaces, as by cleaning and washing with chemicals. *L&L.*

decorated. Adorned, embellished, or made more attractive by means of color or surface detail. *ASTM C242-60T.*

decorating firing. The process of firing pottery ware after the application of colored or metallic decoration; the temperature is usually 700° to 800° C and this fixes the decoration and makes it durable. *See also* enamel firing. *Dodd.*

decoration. The process of firing in which the burning fuel is supplied with sufficient oxygen to assume complete oxidation. *ACSG, 1963.*

decoration, underglaze. A ceramic decoration applied directly on the surface of ceramic ware and subsequently covered with a transparent glaze. *ASTM C242-60T.*

decoration, inglaze. A ceramic decoration applied on the surface of an unfired glaze and matured with the glaze. *ASTM C242-60T.*

decoration, overglaze. A ceramic or metallic decoration applied and fired on the previously glazed surface of ceramic ware. *ASTM C242-60T.*

decorative stone. a. A stone used as architectural trimmings in columns, fireplaces, and store fronts. It may sometimes be set as in silver, or gold-filled jewelry, but then usually as curio stones, for example, malachite and marble. *Shipley.* b. A term sometimes used alternately with ornamental stone. *Shipley.*

decoupling. A method for decreasing the seismic effect of an underground explosion. The method involves the firing of the explosive in the center of an underground cavity so that the surrounding earth is not in close proximity to the explosive. *L&L.*

decrepitate. a. To roast or calcine (as salt) so as to cause crackling or until crackling stops. *Webster 3d.* b. A mineral is said to decrepitate when it flies to pieces on being heated. *Hess.*

decrepitation. a. The breaking up with a crackling noise of mineral substances when exposed to heat, as when rock salt is thrown upon the fire. *Fay.* b. Method of differential disintegration of closely sized mineral, part of which explodes and is separable by finer screening. *Pryor, 3.* c. Obsolete method of tunnelling, called fire setting. *Pryor, 3.*

decussate texture. A texture in which the axes of contiguous crystals lie in diverse directions. This crisscross structure is most noticeable in rocks composed dominantly of minerals having a columnar habit. *A.G.I.*

Dednox. Trademark for asphalt-gilsonite railroad protective coatings. *CCD 6d, 1961.*

dedolomitization. a. The recrystallization of a dolomite or a dolomitic limestone consequent on contact metamorphism; essentially involving the breaking down of the dolomite into its two components, $CaCO_3$ and $MgCO_3$. The former merely recrystallizes into a coarse calcite mosaic, but the latter breaks down further into MgO and CO_2. The MgO may occur in the rock as periclase, much more commonly as brucite, and when in the presence of silica, magnesium silicates such as forsterite are formed. *See also* forsterite marble. *C.M.D.* b. The dissociation of dolomite to form calcite and periclase, the latter usually hydrating to form brucite, as in brucite marble or predazzite. Presumably this takes place by contact metamorphism at rather low pressures. *A.G.I.*

dedusting. A cleaning process in which dust and other fine impurities are removed. Dedusting is accomplished both by pneumatic means and by screening, either wet or dry. Also known as aspirating. *Mitchell, p. 716-717.*

deeds. N. of Eng. Debris or waste thrown upon the spoil bank (dump). A variation of deads. *Fay.*

de-electronation. Oxidation, by removal of electron(s) during chemical reaction. *Pryor, 3.*

de-enameling. The removal of porcelain enamel from the base metal. *ASTM C286-65.*

de-energize. To disconnect any circuit or device from the source of power. *NCB.*

deep. a. Corn. The lower portion of a vein; used in the phrase "to the deep," that is, downward upon the vein. *Fay.* b. Workings below the level of the pit bottom or main levels extending therefrom. *Fay.* c. Forest of Dean; Lanc. A vein, seam, mine, or bed of coal or ironstone. *Fay.* d. Term used to designate ocean bottom depressions of great depth, usually deeper than 6,000 meters. *Hy.*

deep cell count. A method for examining the mineral particle content of drilling water. In this method, a glass cell is filled with the water, a little acid is added, and the sample placed under a microscope. Dark ground illumination is used which shows up the suspended particles. The number of these is counted, and this number, multiplied by a factor, gives the number of particles per cubic centimeter. *Higham, p. 257.*

deep coal. Eng. Coal seams lying at a depth of 1,800 feet or more below the surface. *Fay.*

deep compaction. Vibroflotation, sand piling, or similar compaction method adopted for consolidating granular soils such as sand and gravel. *Ham.*

deep cut. Alternative name for cut glass. *Dodd.*

deep drawing. The process of cold working or drawing sheet of strip metal by means of dies into shapes involving considerable plastic distortion of the metal; e.g., automobile mudguards, electrical fittings, etc. *C.T.D.*

deep etching. Severe etching of a metallic surface for examination at a magnification of 10 diameters or less to reveal gross features, such as segregation, cracks, porosity, or grain flow. *ASM Gloss.*

deep hole. a. According to diamond drillers, a term currently understood to apply to boreholes 3,000 feet or more in depth. *Long.* b. In petroleum drilling, a borehole over 8,000 feet deep. *Long.*

deep-hole blasting. Blasting a quarry or opencast face by using small- or medium-diameter holes drilled from top to bottom of the face. *Nelson.*

deep lead (pronounced as the verb to lead). Alluvial deposit of gold or tin stone buried below a considerable thickness of soil or rock. *Fay.*

deep level. a. Trans. The first mining properties developed from the surface were estopped from trespassing beyond their side lines projected downward. The next mine on the dip of the lode became known as the "deep-level" mine or "deep." *Fay.* b. S. Afr. The distinction of deep level and ultradeep level is a vague one, and has changed with the times. Ultradeep is now a mining level at a vertical depth of 9,000 feet and over. *Beerman.*

deep mining. The exploitation of coal or mineral deposits at depths exceeding about 3,000 feet. It would appear that the deepest coal mine in the world is the Rieu du Coeur colliery at Quaregnon, Belgium (4,462 feet) with a rock temperature of 126° F, and it is planned to go even lower to 4,650 feet. The deepest gold mine is understood to be the Western Deep Level in the Republic of South Africa at 10,200 feet. *See also* two-stage hoisting. *Nelson.*

deep penetration electrode. This is used for the arc welding of heavy steel components. It is economical of weld metal, quick in action, and it reduces the need for accurate edge preparation. *See also* welding. *Ham.*

deep placers. Sandy or gravelly beds or bottoms of ancient streams long since covered over by lava. *Ricketts, p. 144.*

deep sand. An oil sand which is located below 2,500 feet beneath the surface. *Shell Oil Co.*

deep scattering layer. Applied to widespread strata in the ocean that scatter or return vertically directed sound as in echo depth sounding. These layers, which are evidently of biological origin, are located at depths ranging from 150 to 200 fathoms during the day with most of them migrating to or near the surface during the night. Abbreviation, dsl. *Hy.*

deep sea. Usually means the sea beyond the continental shelf; particularly as deep-sea floor. *Challinor.*

Deep-Sea System. *See* Benthic Division. *Hy.*

deep-seated rocks. *See* intrusive rocks.

deep-seated vein zone deposits. It is estimated that these deposits were formed at depths of 12,000 feet or more beneath the earth's surface and under conditions of temperature ranging from 300° to 575° C. The deposits are commonly tubular or veinlike in form, though some are irregular in shape. Examples of this type are found in the tin deposits of Cornwall, England, and in Bolivia; the gold quartz veins of the Appalachian Mountains; the copper-tourmaline veins in various parts of the world; and the silver-lead-zinc deposits in British Columbia. *Lewis, p. 274.*

deep-sea terrace. The benchlike feature bordering an elevation of the deep-sea floor at depths greater than 300 fathoms (1,800 feet). *Schieferdecker.*

deepside. The working of 5 to 10 yards of the coal seam on the dip side of an advance gate. It gives some protection from crush along the rib side and also accommodates dirt from the gate instead of conveying it to the surface. *See also* self-stowing gate. *Nelson.*

deep sinker. Aust. A tall drinking glass; also the drink it contains, so called in fanciful allusion to the shaft of a mine. *Fay.*

deep underwater nuclear counter. An ultrasensitive radiation measuring device for analyzing the sea's naturally occurring radioactive sources. Consists of a radiation detector contained in a pressure-tight sea probe which is lowered on a cable over the side of ship. Abbreviation, dunc. *Hy.*

deep unmanned submersibles. A jet-propelled submersible designed to follow a prescribed underwater path for collecting oceanographic information or for mapping sea bottoms. Abbreviation, dums. *Hy.*

deep water. Water of a depth exceeding one-half the length of the waves concerned. *Schieferdecker.*

deep well. A borehole put down through an upper impervious bed into a lower pervious one, from which a supply of water is obtained. *Nelson.*

deep-well pump. a. Any kind of pump delivering from a well, shaft, or borehole. *B.S. 3618, 1963, sec. 4.* b. An electrically driven pump located at the low point in the mine to discharge the water accumulation to the surface. *ASA C42.85, 1956.* c. Consists of a series of centrifugal pump impellers mounted on a single rotating shaft. The casings are termed bowls and the impellers are of the axial or mixed-flow type. Available in capacities ranging from 25 to 10,000 gallons per minute. It can be used in wells from 25 to 800 feet in depth and from 6 to 24 inches in diameter. *Carson, p. 208.*

deep-well turbines. This is a simple type of vertical centrifugal pump having one or more stages or bowls which are supported from the motor head on the surface by means of screwed or flanged column pipe sections, each usually 10 feet long. The line shafting from the motor to the impellers is sectional to correspond with the column section, and may operate in a sectional extra-heavy enclosing tube if oil is used as a lubricant, or may be exposed to the water when the pump is built to be water-lubricated. *Pit and Quarry, 53rd, Sec. E, pp. 92-93.*

deep winding; deep hoisting. a. Broadly, shaft winding from depths of about 3,000 feet and over (coal mining). In the case of shafts deeper than about 5,000 feet (gold and metal mining), two-stage hoisting may be used. *See also* winding. *Nelson.* b. Hoisting from depths below 5,000 feet in one lift. *Spalding.*

deep workings. Workings on the lower side of a level in an inclined seam. *See also* dip workings. *Nelson.*

deerhorns. Tubing-head fittings that help to bring a well under control when it starts to flow. *Hess.*

Deerparkian. Middle Lower Devonian. *A.G.I. Supp.*

defect. A condition that impairs the usefulness of an object or of a part. *ASM Gloss.*

deferred annuity. A special form of annuity in which a specified number of years elapses before the annuity begins. *Lewis, p. 370.*

deficient coal. Ark. Coal more difficult to mine than the standard, and for which the miners are paid an extra price. *Fay.*

deficient place. Aust. A working place in which men cannot make fair average wages, and for which they are given extra pay. *Fay.*

definite proportions law. A chemical compound always contains the same elements in the same proportions by weight. *Compare* Dalton's law. *Liddell 2d, p. 239.*

deflagrate. To burn; burst into flame; specifically, to burn rapidly with a sudden evolution of flame and vapor, as a mixture of charcoal and niter thrown into a red-hot crucible. *Fay.*

deflagrating mixture. An explosively combustible mixture, as one containing niter. *Standard, 1964.*

deflagration. a. An explosive combustion reaction that moves through a mixture of reactants at a speed less than that of sound in the mixture; when unconfined, a deflagration may or may not produce significant overpressure. *Bureau of Mines Staff.* b. The process of deflagrating; specifically, a chemical reaction producing vigorous evolution of heat and sparks or flame and moving through the material, as black-powder or smokeless powder, at a speed less than that of sound—distinguished from detonation. *Webster 3d.* c. To burn with sudden and startling combustion. Describes explosion of blackpowder, in contrast with more rapid detonation of dynamite. *Nichols.*

deflation. Removal of loose material by the wind, leaving the rocks bare to the continuous attack of the weather. *Webster 2d.*

deflect. To intentionally change the course of a borehole at a point some distance below the collar. Also called wedge; wedge off. *Long.*

deflected. A borehole, the course of which has intentionally or unintentionally been changed at some point below the collar. *Long.*

deflecting. The act or process of intentionally or unintentionally changing the course of a borehole at a point some distance below the collar. *Long.*

deflecting block; spreader block. A block of refractory material, triangular in cross section, that is built into a coke oven below a charging hole; the sharp edge of the block is uppermost and this deflects or spreads the stream of descending coal so that it comes to rest more uniformly in the oven. *Dodd.*

deflecting core. The core removed from a deflected borehole. *Long.*

deflecting plug. a. Synonym for base plug. *Long.* b. Sometimes used by petroleum drillers as a synonym for deflecting wedge. *Long.*

deflecting wedge. A class of devices intentionally placed in a borehole to change its course. All such devices are basically long, tapered, concave metal plugs which can be set at a predetermined point and bearing in a borehole to deflect or change its course. Also called correcting wedge; deflecting plug; deflection wedge; Hall-Rowe wedge; spade-end wedge; Thompson wedge. *Long.*

deflection. A change in the intended course of a borehole produced intentionally or unintentionally by various conditions encountered in the drill hole or by the operational characteristics of the drilling equipment used. Also called deviation. *Long.*

deflection angle. a. The angular change in the course of a borehole produced accidentally or intentionally. *Long.* b. In railroad surveying, the angle formed at any point of a curve between the tangent and a chord of 100 feet, and is, therefore, one-half the degree of curve. *Fay.* c. In survey traverse, the angle between the extension of the line just completed and the next one. *Pryor, 3.* d. An angle which a survey line makes with the preceding line produced beyond the station occupied, and differs from the included angle by 180°. *Mason, V. 2, p. 745.* e. In surveying, the angle between one survey line and the prolongation of another survey line which meets it. *See also* intersection angle. *C.T.D.* f. Horizontal angle measured from the forward prolongation of the preceding line, right or left, to the following line. *Seelye, 2.*

deflection bit. A taper bit, generally a bullnose type, used to drill down past the deflecting wedge when deflecting a borehole. *Long.*

deflection dial. The load indicating gage on a penetrometer, which is a soil-testing device used to determine some of the loadbearing characteristics of silt and sandy soils. *See also* cone penetrator. *Long.*

deflection of plumbline. The angle between the actual direction of the plumbline and that of the normal to the spheroid that represents the figure of the earth. Sometimes called station error. *Seelye, 2.*

deflection plug. Synonym for base plug. *Long.*

deflection point. Point of deflection on a refraction T-X graph separating two segments that correspond to different wave paths. *Schieferdecker.*

deflection wedge. A wedge-shaped tool inserted in a borehole to direct the bit along a prescribed course. Also called whipstock (undesirable usage). *B.S. 3618, 1963, sec. 3.* Synonym for deflecting wedge. *Long*

deflectometer. An instrument for gaging any deflections of a structure. *Ham.*

deflector. A device across the path of a conveyor placed at the correct angle to deflect objects or discharge bulk material. Also called a plow. *ASA MH4.1-1958.*

deflector sheet. A sheet of brattice or other material erected in a roadway or face to remove a firedamp layer. It is usually set at an angle of about 45° from the horizontal and inclined in the direction of airflow. *Nelson.*

deflector-wedge ring. An annular steel ring attached to the upper end of a deflecting wedge, having a slightly smaller diameter than that of the borehole in which the wedge is inserted, serving as a stabilizing ring to hold and center the wedge in the borehole. Also called rose ring. *Long.*

deflocculant. a. Any organic or inorganic material which is used as an electrolyte to disperse nonmetallic or metallic particles in a liquid, (that is, basic materials such as calgonate, sodium silicate, soda ash, etc., are used as deflocculants in clay slips). *Bureau of Mines Staff.* b. A basic material, such as sodium carbonate or sodium silicate, used to deflocculate. *ACSG.*

deflocculate. a. To disperse a clay suspension so that it has little tendency to settle and has a low viscosity, together with a low-water content. *ACSG, 1963.* b. The dispersal of nonmetallic particles in a liquid to form a suspension that has little tendency to settle. *Bureau of Mines Staff.* c. To break up from a flocculated state; to convert into very fine particles. Synonym for peptize. *A.G.I.*

deflocculating. a. The thinning of the consistency of a slip by adding a suitable electrolyte. *ASTM C 286-65.* b. The process of making clay slips or suspension using electrolytes or deflocculants. *Bureau of Mines Staff.*

deflocculating agent; deflocculant; dispersing agent. An agent that prevents fine soil particles or clay particles in suspension from coalescing to form flocs. *ASCE P1826.*

deflocculation. A state of colloidal suspension in which the individual particles are separate from one another, this condition being maintained by the attraction of the particles for the dispersing medium (for example, hydration) or by the assumption of like electrical charges by the particles, thus resulting in their mutual repulsion, or both. It is generally possible to deflocculate a gel to such an extent that it loses its gel strength entirely, thus becoming a Newtonian fluid, in which case it is known as a sol. The relative contribution of hydration and electrostatic repulsion to the deflocculation of a suspension accounts in large measure for the wide variation in viscosities and gel strengths of suspensions partially flocculated by different means; as for example, a partial flocculation of drilling fluid by cement on one hand, and by salt water on the other. Some suspensions can be deflocculated repeatedly by mechanical agitation alone, thus giving a reversible gel-sol, sol-gel transformation known as thixotropy. *Brantly, 1.*

defluorinated stone. China stone from Cornwall, England, from which the small amount of fluoride present has been removed by flotation. *Dodd.*

defoaming. Eliminating foam. *ASM Gloss.*

deformation. Change in the form or in the dimensions of a body produced by stress. Elongation is often used for tensile strain, compression or shortening for compressive strain, and detrusion for shear strain. Elastic deformation is such deformation as disappears on removal of stress; permanent deformation is such deformation as remains on removal of stress. *Compare* set. *See also* strain. *Ro.*

deformation bands. Parts of a crystal which have rotated differently during deformation to produce bands of varied orientation within individual grains. *ASM Gloss.*

deformation eutectic. The composition within a system of two or more components which, on heating under specified conditions, develops sufficient liquid to cause deformation at the minimum temperature. *ACSG, 1963.*

deformation of rocks. a. Restrictedly, the distortion of rock masses by pressure, evidenced by foliation, mutual indentation of pebbles in conglomerate, distortions of fossils, stylolites, etc. *Standard, 1964.* b. Any change in the original shape of rock masses. Folding and faulting are common modes of deformation. *Fay.*

deformation point. a. The temperature observed during the measurement of expansivity by the interferometer method at which viscous flow exactly counteracts thermal expansion. The deformation point generally corresponds to a viscosity in the range from 10^{11} to 10^{13} poises. *ASTM C 162-66.* b. The temperature at which a nonmetallic material melts and deforms. *See also* fusion point. *Bureau of Mines Staff.*

deformation temperature. The temperature at which, when a ceramic material is heated under specified conditions, the rate of subsidence becomes equal to the rate of thermal expansion. With glass, this temperature corresponds to a viscosity of 10^{11} to 10^{12} poises. *Dodd.*

deformed bar. Reinforcing steel bar having recurrent deformation with the object of increasing the bond strength. *Taylor.*

deformed crossbedding. Crossbedding with foresets overturned or buckled in the downcurrent direction usually prior to deposition of the overlying bed. Foreset dip angle may also be altered by subsequent tectonic folding. *Pettijohn.*

deformed crystal. A crystal bent or twisted out of its normal shape, so that the angles between its crystal faces may differ widely from those on the regular form. *See also* distorted crystal. *Shipley.*

deformeter. An instrument used in scale model analyses of a structure. The method derives from research by Professor A. J. Sutton Pippard, F.R.S., in Great Britain, and from similar research in the United States. *Ham.*

defrother. An agent, for example, butanol, that destroys or inhibits froth. *Pryor, 3.*

deg Abbreviation for degree. Abbreviated ° when denoting measurement with temperature scales. *BuMin Style Guide, p. 59.*

degasification. Progressive loss of gases in a substance leading to the formation of a more condensed product. Applied primarily to the formation of solid bitumens from liquid bitumens, but also used in connection with caol formation. *Tomkeieff, 1954.*

degasifier. A substance that can be added to molten metal to remove soluble gases which might otherwise be occluded or entrapped in the metal during solildification. *ASM Gloss.*

degassing. a. Removing gases from liquids or solids. *ASM Gloss.* b. In pyrometallurgy, addition of deoxidants (phosphorus, aluminum, silicon, etc.) to remove hydrogen from molten metals before casting. *Pryor, 3.*

degassing equipment. a. The equipment for extracting the gas from an oil well drilling fluid. The presence of gas reduces the density of the fluid. *Nelson.* b. The pumps and equipment used in firedamp drainage. *Nelson.*

degaussing. Method of demagnetization in which substance is passed through a coil which carries alternating current of progressively diminishing strength. *Pryor, 3.*

degourdi. The preliminary low temperature (800° to 900° C) firing of feldspathic porcelain, as practiced in Europe; the second (glost) firing is at approximately 1,400° C. (French word meaning warming as distinct from the high temperature, grand feu, glost firing.) *Dodd.*

degradation. a. The excessive crushing of coal during cutting, loading, and transportation. All face machines cause degradation, and this has become a problem at collieries where the market calls for the larger sizes. The degradation of a coking coal is of lesser importance. *See also* fragmentation. *Nelson.* b. Breakage of coal incidental to mining, handling, transport, or storage. *B.S. 3323, 1960.* c. The general lowering of the surface of the land by erosion processes, especially by the removal of material through erosion and transportation by flowing water. *Fay.*

degradation screens. Screens used for removing the small sizes caused by breakage in handling from sized coal just before it is loaded for shipment. Degradation screening is necessary usually where a sized coal is picked, mechanically cleaned, stored, conveyed, or otherwise handled so that breakage occurs after it is sized on the main screens. This applies particularly to domestic coal, which should reach the consumer in as attractive a condition as possible. *Mitchell, p. 818.*

degrade. To wear or scour by erosion. *Webster 3d.*

degraded illite. Illite that has lost much of its potassium as the result of prolonged leaching. *A.G.I. Supp.*

degrading stream. *See* corrading stream. *A.G.I.*

degradinite. In 1955, K. Asai proposed to the Nomenclature Subcommittee of the International Committee for Coal Petrology that this term should be accepted to describe the most common constituent of the Tertiary coals of Japan. Degradinite resembles vitrinite and has no definite form. It forms the groundmass of the hydrite of Japanese Tertiary coals and encloses exinite, resinite, and sclerotinite. Micrinite, fusinite, and semifusinite are less commonly associated with it. *IHCP, 1963, part I.*

degraissant. *See* grit. *ACSG, 1963.*

degras. The grease obtained in scouring wool. Used to increase the visccosity of lubricants, and also in belt dressings. *Crispin.*

degreasing. Removal of oil and grease films from metal surfaces before electroplating, galvanizing or enameling. *Pryor, 3.*

degreasing machine. An electrically driven machine including high-pressure pump and special cleaning solution for removing grease and oil from underground mine machines as a prevention of mine fires. *ASA C42.85:1956.*

degree. a. A unit space or a unit division marked on various instruments, as thermometers and astronomical instruments. *Standard, 1964.* b. A 360th part of the circumference of a circle; the principal unit of measure for arcs and angles. *Webster 3d.*

degree-day. The product of 1 day and the number of °F the daily mean temperature is below 65° F. Thus, on a day when the mean temperature is 40° F, there are 25 degree-days. The degree-day unit is used in eliminating the weather variable in determining heating load efficiency and in predicting fuel consumption. *Strock, 10.*

degree-hour. The product of 1 hour and (usually) the number of °F the hourly mean temperature is above a base point, usually 85° F. Thus, in an hour when the temperature is 92° F, there is 7 degree-hours on an 85° F base. The degree-hour is used in measuring, roughly, the cooling load in summer for cases where process heat, heat from human beings, and humidity are relatively unimportant as compared with dry-bulb temperature. *Strock, 10.*

degree of compaction. The degree of compaction of a soil sample. *Ham.*

degree of consolidation; percent of consolidation. The ratio, expressed as a percentage, of the amount of consolidation at a given time within a soil mass, to the total amount of consolidation obtainable under a given stress condition. *ASCE P1826.*

degree of curve. The number of degrees at the center of a circle subtended by a chord of 100 feet. Occasionally, in highway surveying, it is defined as the central angle subtended by an arc of 100 feet. *Seelye, 2.*

degree of freedom. a. A possibility of motion or change in any determining element of position. No rigid body can possess any more than six degrees of freedom. *Standard, 1964.* b. In any system, the number of variables, such as temperature, pressure, concentration, etc., which can be changed independently without destroying any of the phases. *Standard, 1964.*

degree of liberation. In mineral dressing, the degree of liberation of a certain mineral or phase is the percentage of that mineral or phase occurring as free particles in relation to the total of that mineral occurring in the free and locked forms. *Gaudin, p. 70.*

degree of locking. In mineral dressing, the degree of locking of a mineral is the percentage occurring in locked particles in relation to the total occurring in the free and locked forms. *Gaudin, p. 70.*

degree of packing. Of an explosive, the loading weight per unit of nominal volume, which is always known. Its unit is kilogram per cubic decimeter. The degree of packing defined in this way is 6 percent greater than the density of the explosive in the drill hole. *Langefors, p. 110.*

degree of saturation. a. The percentage of the volume of water-filled voids to the total volume of voids in a soil. *Nelson.* b. Ration of weights of water vapor in air at given conditions and at saturation, with temperature constant. Specific humidities are usually employed. Measured in percent. *Hartman, p. 8.* c. *See* percent saturation. *ASCE P1826.*

degree of sensitivity. *See* remolding index. *ASCE P1826.*

degree of size reduction. Ratio of the surface areas of the broken or crushed material to those of the feed material. *B.S. 3552, 1962.*

degree of sorting. The measure for the spread of grain-size distribution. *Schieferdecker.*

degree rule. Synonym for clinometer rule. *Long.*

degrees Kelvin. Absolute temperature on the centigrade scale, or degrees C plus 273.16. *Strock, 10.*

degrees Rankine. Absolute temperature on the Fahrenheit scale, or degrees F plus 459.6. *Strock, 10.*

Dehne filter. Plate-and-frame type of pressure filter. *Pryor, 3.*

Dehottay process. A variation of the freezing method of shaft sinking, in which liquid carbon dioxide is pumped into the ground instead of brine. *See also* Oetling freezing method. *Nelson.*

dehrnite. A hydrous phosphate of calcium, sodium, and potassium; hexagonal; crystalline crusts and minute crystals; grayish- to greenish-white. The mineral from Dehrn, Nassau, Germany is richer in sodium, conforming nearly to the formula $7CaO.Na_2O.2P_2O_5.H_2O$, whereas the mineral found near Fairfield, Utah is described as $14CaO.2(Na,K)_2O.4P_2O_5.3(H_2O,CO_2)$. *See also* soda-dehrnite. *English.*

dehumidification. The process of removing moisture from mine air so as to increase its cooling capacity—an important factor in environmental health and comfort in deep mining. *See also* dry kata cooling power; effective temperature. *Nelson.*

dehumidified air. Air dried artificially by compression and re-expansion to increase its cooling power in ventilating hot mines. *C.T.D.*

dehydrate. To render free from water. *Webster 3d.*

dehydrated. Freed from water or lacking water. *ASTM STP No. 148-D.*

dehydrated stone. One from which the normal water content has been evaporated, usually by natural processes. *Shipley.*

dehydrated tar. Brown, thick liquid. Used in waterproofing. *Bennett 2d, 1962.*

dehydration plant operator. In petroleum production, one who removes water and other impurities from natural gas in an automatically controlled treating plant. Also called gas dehydration plant attendant. *D.O.T. 1.*

dehydration. a. Removal of H_2O from molecular compound by heat or chemical action; drying. *Pryor, 3.* b. The removal of water, as from fines in wet separation methods. *See also* centrifuge. *Nelson.* c. Removal of moisture, whether free or chemically combined. *ACSG, 1963.*

dehydrator; dryer. A device or material which will remove water from a substance. *Strock, 10.*

dehydroabietylamine. This material is used to stabilize the viscosity of ceramic inks. *Lee.*

dehydrogenation. The removal of hydrogen from a chemical compound. *Shell Oil Co.*

deil. Scot. A tool for unscrewing broken rods in a borehole. *Fay.*

deionization. Removal of ions from solution by chemical means. *ASM Gloss.*

Deister table. Proprietary type of shaking table used in mineral processing. *Pryor, 3.*

deKhotinsky cement. A thermoplastic cement which is not attacked by water, sulfuric acid, nitric acid, hydrochloric acid, carbon disulfide, benzene, gasoline, or turpentine, and is very little affected by ether, chloroform, or alkalies, but is readily dissolved by ethyl alcohol. Used for cementing glass, metal, and porcelain. *CCD 6d, 1961.*

dekorite. Bakelite. *Shipley.*

delafossite. An iron, copper, and aluminum oxide containing 37.9 percent copper, 47.99 percent iron sesquioxide, and 3.52 percent aluminum sesquioxide. From Ekaterinburg, Perm, U.S.S.R. *Weed, 1918.*

De Lattre pickling process. The pickling liquor contains per liter, 1 gram mole of ferrous sulfate, ½ gram mole of hydrochloric acid and 1 gram mole of sulfuric acid. This solution is maintained at a constant temperature of 50° C to 55° C by steam coils, and the ratio of the two acids is maintained during the whole pickling operation by appropriate additions of both acids and the inhibitor which consists of gelatin peptonized by hydrochloric acid. Pickling is carried on until the total ferrous-sulfate concentration reaches 326 to 394 grams per liter, when the solution is passed to the recovery plant. *Osborne.*

delatynite. A variety of amber from Delatyn in the Galician Carpathians, differing from succinite in containing rather more carbon (79.93 percent), less succinic acid (0.74 to 1.67 percent), and no sulfur. *English.*

De Lavaud process. A method for the centrifugal casting of pipes. The pipes are cast in a steel cylinder or mold, which revolves in a hollow cylindrical jacket. The space between the outside of the mold and the inside of the jacket is filled with water. The driving mechanism is a Pelton water wheel, which is attached to the bell end of the mold. *Osborne.*

delawarite. An aventurine feldspar from Delaware County, Pa.; a pearly orthoclase. *Hess.*

delay action. In blasting, firing of a round of shots in planned seequence so that cut or relief holes are blown first. Delay-action electric detonators have largely replaced safety fuses for this purpose, successive shots being separated by milliseconds. *Pryor, 3.*

delay cap; delay detonator. A detonator which explodes at a predetermined fraction of a second after the passage of the current from the exploder. The original delay detonator was of the safety fuse type. Later, Nobels' Explosives developed the gasless type of delay detonator, wherein a special delay element containing a slow-burning composition supersedes the safety fuse. Delay detonators are ignited by an electric current passing through the bridge wire. To fire a single detonator a minimum current of 0.6 ampere applied for one-twentieth of a second is necessary. *See also* short delay detonator. *Nelson.*

delayed filling. Filling in which the mined-out rooms are filled later, generally on a large scale and when the neighboring sectionse are already being mined. *Stoces, v. 1, p. 275.*

delayed fishscaling. A fishscaling defect that occurs after the final porcelain enamel processing. *ASTM C286-65.*

delayed neutrons. Neutrons emitted by radioactive fission products in a reactor seconds or minutes after a fission takes place. Fewer than 1 percent of the neutrons are delayed, the majority being prompt neutrons. *L&L.*

delayed pillar extraction. A pillar method of working in which the coal pillars are not extracted until the whole workings have been driven to the boundary. It is sometimes adopted when a seam a short distance above is worked simultaneously. Delayed pillar working increases the difficulty of ventilation and the amount of deadwork is increased due to the crushing of coal pillars. *Nelson.*

delayed quench. One in which the material is not quenched immediately on coming from the solution heat-treat furnace. This allows precipitation to proceed to a point where mechanical properties and corrosion resistance are lowered. *Light Metal Age, v. 16, No. 9, October, 1958, pp. 17-24.*

delayed yield. A phenomenon involving a delay in time between the application of a stress and the concurrence of the corresponding yield point strain. *ASM Gloss.*

delay electric blasting cap. An electric blasting cap with a delay element between the priming and detonating composition to permit firing of explosive charges in sequence with but one application of the electric current. *ASA C42.85, 1956.* It detonates about one or two seconds after the electric current has passed through the bridge. It is made in two kinds, first and second delay, and is used in connection with regular, waterproof, or submarine electric blasting caps for blasting in tunnels, shafts, etc., where it is desirable to have charges fired in succession without the necessity of the blaster returning betweeen shots. *Fay.*

delay electric igniter. An electrical device using a fuse as the delay element by which it is possible with the use of a blasting cap on each fuse to detonate a number of charges in succession. *Fay.*

delay element. a. That part of a delay detonator interposed between the fusehead and the priming charge. *B.S. 3618, 1964, sec. 6.* b. The delay element of a detonator consists of a thick-walled metal tube filled with a composition which will burn at a uniform rate. Thus the flash from the fusehead ignites the upper surface of the column of delay composition which then burns uniformly downwards and in turn ignites the initiating composition of the detonator. *McAdam II, p. 57.*

delay firing. The firing of several shots in sequence, at designed intervals of time, usually by means of delay detonators, detonating relays, or sequence switches. *B.S. 3618, 1964, sec. 6.*

delay interval. The nominal period between the firing of successive delay detonators in a series of shots. *B.S. 3618, 1964, sec. 6.*

delay rental. A payment, commonly made annually on a per acre basis to validate a lease in lieu of drilling. *Wheeler.*

delay time. Additional time for any segment of a ray path over the time which would be required to traverse the horizontal component of that segment at highest velocity encountered on a trajectory. For a layer of velocity V_0 and thickness L overlying a substratum of velocity V_1, the delay time, $D = 2 L \cos i/V_0$ where $i = \sin^{-1} V_0/V_1$. Synonym for intercept time. *A.G.I.*

deldoradite. A deep-seated igneous rock consisting of light-colored nepheline syenite. *Johannsen, v. 4, 1938, p. 77.*

deleading. Removal of the lead coating formed on steel during cold drawing through dies when lead is used as the lubricant. The removal is usually effected by immersing in acid. *Osborne.*

delessite. A chloritic mineral of scaly or short fibrous appearance filling cavities or seams in basic igneous rocks. *Fay.*

delf. a. Forest of Dean; Lanc. A vein, seam, or bed of coal or ironstone. *Fay.* b. Eng. Excavation; usually a mine; a quarry. *Webster 3d.* c. A thin layer of coal or ironstone. *Nelson.*

delfman. Eng. A miner or workman in a stone quarry. *Fay.*

delftware. A calcareous earthenware having an opaque white glaze and monochrome overglaze decoration. Originated in Delft, Holland. *ASTM C242-60.*

delhayelite. Orthorhombic laths in a melilite-nephelinite lava from Mt. Shaheru, Kivu, Republic of the Congo; near $(Na,K)_4Ca_5Al_6Si_{32}O_{80}.18H_2O.3(Na_2,K_2)(Cl_2,F_2,SO_4)$. *Hey, M.M., 1961.*

delicate flute casts. *See* furrow flute cast. *Pettijohn.*

deliquescence. The act or process of becoming liquid by the absorption of moisture from the air. Certain salts have this property, for example, calcium chloride. *Crispin.*

deliquescent. Capable of becoming liquid by the absorption of moisture from the air. For example, calcium chloride crystals. *Standard, 1964; Bureau of Mines Staff.*

delivery. a. The final act of any glass-forming unit on a particular article; consists of motion to remove the article from the mold. *ASTM C162-66.* b. The process or equipment used for directing charges or gobs of glass to a forming machine. *ASTM C162-66.* c. The point where the stream of water issues from a pump or pipe. *Peel.*

delivery column. *See* rising main. *Nelson.*

delivery drift; offtake drift. A drift or adit connected to a shaft from a point on the surface at a lower level than the shaft top and used as an outlet into which mine pumps discharge, so reducing the height through which the water must be lifted. Also called jackhead. *B.S. 3618, 1963, sec. 4.*

delivery gate. Eng. A road into which a face conveyor delivers the coal. *SMRB, Peper No. 61.*

delivery table. a. A conveyor which transports material from the discharge of a machine. *ASA MH4.1-1958.* b. A table to which a chute discharges. *ASA MH4.1-1958.*

delivery valve. a. Usually a valve at the outlet of a delivery pipe. *B.S. 3618, 1963, sec. 4.* b. The sluice valve between a pump and its delivery pipe or delivery column. *B.S. 3618, 1963, sec. 4.* c. The outlet valve forming part of a reciprocating pump. *B.S. 3618, 1963, sec. 4.*

dellenite. a. An extrusive rock between rhyolite and dacite in composition, and broadly, the extrusive equivalent of granodiorite. *Webster 2d. Compare* toscanite. *Fay.* b. Synonym for plagioclase rhyolite. *Webster 2d.*

Delmontian. Uppermost Miocene or lower Pliocene. *A.G.I. Supp.*

delorenzite. a. A moderately to strongly radioactive, black, orthorhombic mineral found in pegmatite with strueverite, columbite, ilmenite, tourmaline, spessartite, and beryl. *Crosby, p. 15.* b. A discredited term equal to tanteuxenite. *American Mineralogist, v. 45, No. 5-6, May-June 1960, p. 756.*

delphinite. A yellowish-green epidote from France. Same as thallite; oisanite. *Shipley.*

delphs. York. The working places in ironstone quarries. *Nelson.*

Delprat method. *See* overhand stoping, b. *Fay.*

Delprat process. Pioneer method of froth flotation, patented in 1903, later merged to the Potter-Delprat process (1904). Ore pulp, sulfuric acid and carbonates were reacted in a wedge-shaped box. Tailings underflowed and a froth rich in CO_2 and carrying concentrates overflowed. *Pryor, 3.*

delrioite. A microcrystalline efflorescence, $CaSrV_2O_7.3H_2O$, found on sandstone on a dump of the Jo Dandy mine, Montrose County, Colo. *Hey, M.M., 1961.*

delta. A plain underlain by an assemblage of sediments that accumulate where a stream flows into a body of standing water where its velocity and transporting power are suddenly reduced. Originally so named because many deltas are roughly triangular in plan with the apex pointing upstream. *Leet.*

delta bedding. Refers to inclined bedding presumed to originate as foresets of small deltas. *Pettijohn.*

delta clay. One which has accumulated in the delta of a river. Such deposits are not as common as clay deposits formed in other ways. *ACSB-1.*

delta connected. A delta-connected power system is one in which the windings of transformers or alternating-current generators are connected to form a triangular phase relationship, and with the phase conductors connected to each point of the triangle. *I.C. 7962, 1960, p. 21.*

delta ferrite. *See* ferrite. *ASM Gloss.*

deltafication. The process of forming a delta at the mouth of a river. *Fay.*

deltaic. a. Pertaining to or like a delta. *Fay.* b. Having or forming a delta. *Fay*

deltaic deposits. Sedimentary deposits laid down in a river delta. *Hy.*

delta iron. The polymorphic form of iron stable between 1,403° C and the melting point (about 1,532° C). The space lattice is the same as that of alpha iron and different from that of gamma iron. *C.T.D.*

deltaite. A discredited mineral term since it is a mixture of crandallite plus hydroxylapatite. *American Mineralogist, v. 46, No. 3-4, March-April 1961, p. 467.*

delta metal. Brass containing about 1.8 percent added iron, characterized by high tensile strength. *Pryor, 3.*

delta plain. The plain formed by the accumulation of silt at the mouth of a stream or by overflow along its lower course. It may be called a delta plain or simply a delta. *A.G.I.*

delta shoreline; deltaic coast. Shoreline or coast, formed by deltas built up in the sea (or in a lake). *Schieferdecker.*

deltoidal cast. *See* frondescent cast. *Pettijohn*

deltoid dodecahedron; deltohedron. An isometric hemihedral form of 12 faces, each a quadrilateral, distributed as determined by the tetrahedral type of symmetry. *Fay.*

delvin. Corn. A gray, talcky, slaty stone that tinners call killas or raze. *Arkell.*

Demag cappel. A rope cappel used in Koepe winding, particularly in Germany. The rope is led along the side of the eye and secured by a hinged retaining arm lined with rubber, and then turned round the eye and held in position by pressure exerted by knee-action links. *See also* G.H.H. cappel. *Nelson.*

Demag drag-belt shuttle conveyor. Consists of a single length of belting, half the length of a double unit face, which is shuttled backwards and forwards along the face by means of low-type winches at each end of the face, interlocked and fitted with limit switches. The coal is ploughed off the belt at the loader gate onto the gate conveyor. *Sinclair, V, p. 305.*

demagnetization. The process of reducing the magnetism in a magnetized body. This may be achieved by applying a magnetizing force which opposes that producing the original magnetizing force or by exposing the body to an alternating magnetic field which is gradually reduced to zero. A permanent magnet may be demagnetized by heating to a red heat or by rough usage. *Osborne.*

demagnetize. a. To deprive of magnetic polarity, as in demagnetizing drill rods by applying heat or by laying them on the ground. *Long.* b. To disperse, by means of a suitable magnetic field, solids in a dense medium which have flocculated magnetically. *B.S. 3552, 1962.* c. To deprive of magnetic properties. *Webster 3d.*

demand charge. That part of a utility service charged for on the basis of the possible demand as distinguished from the energy actually consumed. *Strock, 10.*

demand factor. Ratio of the maximum demand to the connected load. *Strock, 10.*

demand meters. Instruments or meters for measuring the maximum demand during an agreed period of time, usually a month. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

demand power; peak power. The maximum amount of energy consumed in any consecutive number of minutes, for example, 15 or 30 minutes, during the month. Demand is measured in kilowatts and is the average rate of consumed energy during the peak period. This method of establishing the maximum demand rate does not penalize the company for very short peaks. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

demantoid. A transparent, green variety of andradite, having a brilliant luster and used as a gem. Also called Uralian emerald. *Dana 17, p. 403.*

Demenge process. The hardening of the face of a steel ingot by carburizing one side in the casting mold. *Standard, 1964.*

demidovite. A phosphoriferous variety of chrysocolla from Tagilsk, Perm, U.S.S.R. *Weed, 1918.*

demijohn. A glass container for wine or spirits; it has a narrow neck and a capacity of over 2 gallons. The name is derived from the French Dame Jeanne, a popular 17th century name for this type of large bottle. *Dodd.*

demineralization. a. Water softening by use of zeolites or resins to remove cations. *Pryor, 3.* b. *See* deionization. *Lowenheim.*

Deminrolit apparatus. Portable deionizing appliance taking out cations and anions in two successive stages. *Pryor, 3.*

demoiselle. The eroded portion of an adobe pillar extended up from the ground about 2½ feet, and wherever small pebbles had been included in the mud of adobe these had locally protected the material behind it and so yielded small hoodoolike headed pillars directed toward the wind and about 3 inches in length. Such slender demoiselles resulting from the embedding of harder nodules within rocks, the surfaces of which have been drilled away by natural sand blast, have been described by Walther. *A.G.I.*

demorphism. All the processes by which rocks are broken down and decomposed. *Johannsen, v. 1, 2d, 1939, p. 172.*

dempy. A mine or part of a mine which is prone to outbursts and accumulations of noxious gases. *Nelson.*

demulsibility. The rate of separation of the components of an emulsion. *API Glossary.*

demulsification. Breakdown into separate phases of a relatively stable emulsion, by such means as flocculation with a surface-active agent or removal of an emulsifying agent. *Pryor, 3.*

demurrage. The detention of a vessel, railroad car, or other vehicle beyond an allotted time; usually by failure to unload same within a specified number of hours or days. *Crispin.*

dendriform. Resembling a tree; arborescent; dendritic; descriptive of certain minerals. *Fay.*

dendrite. a. A branching figure resembling a tree produced on or in a mineral or stone (as in the moss agate) by an oxide of manganese or other foreign mineral; the mineral or stone so marked. *Webster 3d.* b. A crystallized arborescent form (as of gold or silver). *Webster 3d.*

dendritic. Branching like a tree; for example, some crystallized native gold. *Fay.*

dendritic agate. Agate such as mocha stone and moss agate, which have inclusions of iron or manganese oxide arranged in forms resembling trees, ferns, and similar vegetation. *Shipley.*

dendritic and arborescent. A mineral in treelike or mosslike forms, for example, manganese oxide. *Nelson.*

dendritic drainage. In a region underlain by horizontally bedded rock, the valleys extend in many directions without systematic arrangement and are described as dendritic (treelike). *See also* insequent. *A.G.I.*

dendritic markings. Treelike markings, usually quite superficial, occurring on rock surfaces, on joint faces, and on other fractures in rocks, frequently consisting of an oxide of manganese or an oxide of iron. Less frequently, the appearance is caused by the inclusion of a mineral of dendritic habit in another mineral or rock; for example, chlorite in silica to form moss agate. *C.M.D.*

dendritic opal. Common opal with treelike inclusions. *Shipley.*

dendritic powder. In powder metallurgy, metal particles, usually of electrolytic origin, and possessing a typical dendritic structure. Also called arborescent powder. *Henderson.*

dendritic texture. A texture in which the minerals have a branching treelike form. *Schieferdecker.*

dendroid. Dendritic; arborescent. *Fay.*

dendrolite. Same as dendrite. *Hess.*

denier. A unit of yarn size, based on the number of grams in a length of 9,000 meters. *Phillips.*

Denison core barrel. Synonym for Denison sampler. *Long.*

denningite. A mineral, $(Mn,Zn)Te_2O_5$; colorless to pale green tetragonal plates and platy masses from Sonora, Mexico. *Hey, MM, 1964; Fleischer.*

dennisonite. a. A hydrous phosphate of calcium and aluminum; found as white crusts in variscite nodules. *Sinkankas.* b. Original erroneous name for davisonite. *Hey 2d, 1955.*

Dennison method. A method of preparing the surface of shafts and similar objects in which the surface is threaded to hold particles of molten sprayed metal. After cutting, the tops of the threads are knurled to a depth of about 0.015 inch. No other treatment is necessary. *Osborne.*

Denoel formula. A formula used for calculating the thickness of tubbing:

$$t = R_1 - R = \left\} \sqrt{\frac{T}{T - 2P}} - 1 \right\}, \text{ where}$$

t is the thickness of tubbing required in centimeters, R_1 and R external and internal diameters of lining in centimeters, T is the safe stress of 1,000 kilograms per cubic centimeter, in cast iron, and P is the water pressure in kilograms per cubic centimeter. This may be simplified to the approximate formula: $t = \frac{2PR}{2T - 3P}$. *Sinclair, II, p. 318.*

denounce. Mex. To offer for record legal notice of a claim for a mining concession covering a described area of land, the mining rights for which are held by the government. *Webster 3d. See also* denuncia. *Fay.*

dense. a. Compact, fine-grained, lacking pore space. *Ballard.* b. In optical glass, the subclass of a higher index of refraction. *ASTM C162-66.*

dense concrete. Concrete weighing more than 120 pounds per cubic foot is designated as dense. This does not necessarily indicate strength. *Ham.*

dense graded aggregate. Graded mineral aggregate which contains a sufficient number of very small particles to reduce the void spaces in the compacted aggregates to a minimum. *API Glossary.*

dense liquid. A homogeneous liquid or solution of specific gravity greater than that of water, which can be used in industry or in the laboratory to divide coal into two fractions of different specific gravities. *B.S. 3552, 1962.*

dense-media separation. a. Heavy media separation, or sink float. Separation of sinking heavy from light floating mineral particles in fluid of intermediate density. Abbreviation, DMS. *Pryor, 4.* b. Separation of relatively light (floats) and heavy ore particles (sinks), by immersion in a bath of intermediate density. This is the dense or heavy media, a finely ground slurry of appropriate heavy material in water. Barite, ferrosilicon, and galena are in principal use. *Pryor, 3.*

dense medium. A fluid formed by the artificial suspension in water of heavy particles (for example, magnetite, barytes, and shale), which can be used in industry or in the laboratory to divide coal into fractions of different specific gravities. *B.S. 3552, 1962.*

dense-medium jigging. This method involves two essential features: (1) the circulation in the jig of a 1.7 to 2.0 specific gravity bone middling, approximately three-sixteenths of an inch to 0 in size, which fills the interstices of the jig bed and in effect converts the jig into a float-and-sink machine; and (2) the use of a suction stroke to hold the medium in the bed and prevent its washing over with the coal. *Mitchell, p. 516.*

dense-medium process. A process for the washing of coal, in which the desired separation is effected in a dense medium. *B.S. 3552, 1962.*

dense-medium recovery; medium solids recovery. The collection, for reuse, of medium solids from dilute medium, usually understood to include the removal, in whole or in part, of contaminating fine coal and clay. *B.S. 3552, 1962.*

dense-medium washer. A machine for cleaning coal and other materials which uses a dense fluid in which the coal floats and shale sinks. The fluid consists of water intimately mixed with sand, or finely ground magnetite or even shale, and agitated to maintain its consistency. The fluid has an effective specific gravity ranging from 1.3 to 1.9. In general, coal from about 8 inches down to 1 inch is washed by dense medium, below 1 inch by Baum washer, and below 0.75 millimeter (where cleaning is necessary) by froth flotation. Magnetite as the dense medium solid is preferred as it can be easily recovered by magnetic separators and also the upper limit of the specific gravity is higher (up to 2.0). *See also* coal-preparation plant. *Nelson.*

dense noncrystalline tonstein. This type tonstein consists almost entirely of fine-grained kaolin groundmass, showing weak aggregate polarization, containing here and there isolated corroded crystals of kaolinite. Such bands are commonly more than 100 millimeters thick and light in color. *IHCP, 1963, part I.*

dense rock. A rock with small, even grains tightly compacted. *Stokes and Varnes, 1955.*

densifier. An alloy designed to impart density and homogeneity of structure to any mixture to which it may be added. Density, in the sense of a fine, close-grained structure, is essential to pressure-tight metal parts. *See also* addition agent. *Henderson.*

densimeter. An apparatus used to determine the relative density, or specific gravity, of a substance, such as of a drilling mud. *Long.*

densimetric curve; specific gravity curve. Any curve obtained from the results of a float and sink analysis by plotting the yield of floats or sinks against the specific gravity. *B.S. 3552, 1962.*

Denison sampler. A large-size, swivel-type double-tube core barrel designed for soil-testing work to obtain relatively undisturbed corelike samples of soft rock and/or soil formations. The inner tube is provided with a thin wall liner and a finger- or basket-type core lifter or core-retaining device. Also called Denison core barrel. *Long.*

densiscope. A name for a specific gravity apparatus made in Vienna, and designed especially for obtaining specific gravity of pearls as an indication, but not a proof, of their genuineness (cultured pearls usually have a higher specific gravity). *Shipley.*

densitometer. An instrument for the measurement of the density of an image produced by light, X-rays, gamma rays, etc., on a photographic plate; used in some dust-sampling instruments. *Nelson.*

density. a. The mass of a substance per unit volume. *Webster 3d.* b. The quality or state of being dense; closeness of texture or consistency. *Webster 3d.* c. The distribution of a quantity (as mass, electricity, or energy) per unit usually of space (as area, length, or volume). *Webster 3d.* d. Although density is defined as mass per unit volume, the term is frequently used in place of unit weight in the field of soil mechanics. *See also* unit weight. *ASCE P1826.* e. The ratio of the mass of any volume of a substance to the mass of an equal volume of a standard substance; for example, water is used as the standard substance to which the ratio of a quantity of a drill mud is compared. *Long.* f. Having the quality of being dense, hard, or compact. *Long.* g. Weight of a substance in grams per cubic centimeter (at specified temperature when close accuracy is needed). For liquids and solids, it equals specific gravity. Density fluids are heavy liquids used in float-sink tests. Of a particle, the true density is its mass (m) divided by volume (v) excluding pores; its apparent density is its mass divided by volume (m/v) including open but excluding closed pores. Of a mass of particles (powder), the apparent density is mass divided by volume (m/v); the bulk density mass divided by volume (m/v) under stated freely poured conditions; and the tap density mass divided by volume (m/v) after vibrating or tapping under stated conditions. *Pryor, 3. See also* apparent density; bulk density.

density contract. The difference in density of the valuable mineral and the host rock. *Lewis, p. 350.*

density-control device. An automatic device to control the density of the medium in or entering the separating bath in a dense-medium process. *B.S. 3552, 1962.*

density current. A current caused by differences in densities, for example, an excess of evaporation, cooling, or dilution in a restricted basin or an open sea. *Schieferdecker.*

density distribution. In vertical section the stratification of the different water densities is stable. In a horizontal direction differences in density can exist only in the presence of currents. In the oceans, water of a given density which sinks from the sea surface tends to spread at the depth in which water of its density is found. The sound velocity pattern and the ray path of the sound wave depend on the density distribution. *Hy.*

density, dry. The weight (dry) of a substance per unit volume at a stated temperature. *Taylor.*

density logger. An instrument for direct measurement of formation densities in boreholes. This tool furnishes a log of back-scattered gamma radiation which is a simple function of formation density. A logarithmic scale makes it possible to read densities directly from the log. The logger consists of a radiation source, usually cobalt 60, at one end of the tool and a detector, generally a Geiger counter, about 18 inches away at the other end. The outer wall of the logger is lined with lead shielding which has two slits so positioned that the only radiation from the source which reached the detector is that deflected back from the formation by Compton scattering. *Dobrin, pp. 227-228.*

density of dust cloud. The number of ounces of coal dust per cubic foot (or grams per cubic meter) of space, suspended in the air or gases in a specified zone. *Rice, George S.*

density of gases. The vapor density of a gas, or its density relative to hydrogen, is the number of times a volume of the gas is heavier than the same volume of hydrogen, the volume of both gases being at the same temperature and pressure. *Cooper.*

density of seams. a. An indication of the spacing of seams in the strata; the seam density is said to be high if the seams are close together, or low if they are widely separated. *B.S. 3618, 1963, sec. 1.* b. The ratio of the sum of the thickness of a number of adjacent seams to the thickness of an arbitrarily chosen sequence of strata. *B.S. 3618, 1963, sec. 1.*

density ratio. In powder metallurgy, the ratio of the determined density of a compact to the absolute density of metal of the same composition, usually expressed as a percentage. *ASM Gloss.*

dent. *See* danty coal. *Tomkeieff, 1954.*

dental. A tooth-shaped projection formed on a surface over which water flows, in order to diminish the force of the flow. *Ham.*

dental alloys. Gold and silver base alloys with platinum and palladium; used for bridges, fillings, braces and similar work. *Bennett 2d, 1962.*

dental porcelain. Feldspathic porcelain, shaped, tinted, and fired for use as false teeth; the firing is sometimes carried out in a partial vacuum to remove small air bubbles and, therefore, insure maximum density and strength. *Dodd.*

dental work. The act or process of filling cracks, crevices, or caverns encountered in drilling a borehole with cement or grout; also, the cracks, etc., so filled. *Long.*

dentated sill. A sill formed with notches to break the force of a stream, thereby reducing scour. *Ham.*

denture clutch. A jaw clutch. *Nichols.*

denty coal. Same as danty coal. *Tomkeieff, 1954.*

denudation. The sum of the processes that result in the wearing down of the surface of the earth, including wear by running water, solution, and wind action. The term is wider in its scope than erosion, the restriction proposed by Lyell that limits it to the action of running water has not been generally adopted. *Hess.*

denude. To wear away or to remove overlying matter from and so expose to view, as the underlying rocks. *Standard, 1964.*

denuded. Rocks exposed by denudation. *Fay.*

denuncia. a. Sp. In Mexico and Spanish America, the judicial proceedings by which a person claims and secures the right to a mine which he has discovered, or one the title to which has been lost or forfeited by the neglect of the owner to work it, or by his having violated the mining ordinances. *Fay.* b. A similar judicial proceeding by which waste or abandoned lands may be preempted. *Fay.*

Denver cell. A flotation cell of the subaeration type, in wide use. Design modifications include receded-disk, conical-disk, and multibladed impellers, low-pressure air attachments, and special froth withdrawal arrangements. *Pryor, 3.*

Denver jig. Pulsion-suction diaphragm jig for fine material, in which makeup (hydraulic) water is admitted through a rotary valve adjustable as to portion of jigging cycle over which controlled addition is made. *Pryor, 3.* Used in coal preparation for the removal of sulfur from thickener underflow material prior to its treatment by froth flotation. *Mitchell, p. 429; p. 431.*

Denver mud. *See* bentonite. *Hess.*

deoxidation. The process of extracting the oxygen content of a dissolved oxide, or of removing dissolved oxygen, with the aid of a reducing agent. *Henderson.*

deoxidize. To remove oxygen by chemical reaction, generally with carbon. *Mersereau, 4th, p. 407.*

deoxidized copper. Copper from which cuprous oxide has been removed by adding a deoxidizer, such as phosphorus, to the molten bath. *ASM Gloss.*

deoxidizer. A substance that can be added to molten metal to remove either free or combined oxygen. *ASM Gloss.*

deoxidizing. a. The removal of oxygen from molten metals by use of suitable deoxidizers. *ASM Gloss.* b. Sometimes refers to the removal of undesirable elements other than oxygen by the introduction of elements or compounds that readily react with them. *ASM Gloss.* c. In metal finishing, the removal of oxide films from metal surfaces by chemical or electrochemical reaction. *ASM Gloss.*

departure. The length of the projection of a traverse course on a line perpendicular to the meridian (length of course times sine of bearing). Also called easting or westing. *Seelye, 2.*

dependent shot. A charge of explosives in a borehole that depends for its effect upon the result of one or more previously fired shots. *Buerua of Mines Staff.*

dephlegmator; separator. An instrument used in the refining of petroleum to arrest the oil mechanically carried over by the vapor. *Fay.*

dephosphorization. Elimination of phosphorus from steel, in basic steelmaking processes. Accomplished by forming a slag rich in lime. *See also* acid process; basic process; Bessemer process; open-hearth process. *C.T.D.*

dephosphorizing. Removal of part or all of residual phosphorus from steel in basic smelting. *Proyor, 3.*

deplanation. All physiographic processes which tend to reduce the relief of a district, and so eventually cause the topography to become increasingly plainlike in contour; dominantly by subtracting material from the area or areas affected. *Hess.*

depleted uranium. Uranium having a lower content of uranium 235 than the 0.72 percent found in natural uranium. It is found in spent fuel elements or as byproduct tails of uranium-isotope separation. *L&L; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-143.*

depletion. The act of emptying, reducing, or exhausting, as the depletion of natural resources. In mining, specifically said of ore reserves. *Fay.*

depletion allowance. A proportion of income derived from mining or oil production that is considered to be a return of capital not subject to income tax. *A.G.I. Supp.*

depletion, economic. The reduction in the value of a mineral deposit as the minerals reserves. *Fay*

depletion, physical. The exhaustion of a mine or a petroleum reservoir by extracting the minerals. *Williams.*

deployment of manpower. The allocation of men to jobs at the beginning of the shift, to replace absentees, to avoid delays, and minimize discontent. *See also* manpower deployment chart. *Nelson.*

depocenter. An area or site of maximum deposition. *A.G.I.*

depolarization. Reduction of polarization by changing the electrode film. *ASM Gloss.*

depolarizer. A substance which produces depolarization. *ASM Gloss.*

deposit. a. Anything laid down. Formerly applied only to matter left by the agency of water, but now includes mineral matter in any form that is precipitated by chemical or other agencies, as the ores in veins. *Fay.* b. Mineral deposit or ore deposit is used to designate a natural occurrence of a useful mineral, or an ore, in sufficient extent and degree of concentration to invite exploitation. *Fay.*

deposition. a. The process of natural accumulation of rock material thrown down or collected in strata by water, wind, or volcanic action; also, the material thus deposited. Opposite of denudation. *Standard, 1964.* b. The precipitation of mineral matter from solution, as the deposition of agate, vein quartz, etc. *Fay.*

deposition efficiency. In welding, the ratio of the weight of deposited weld metal to the net weight of electrodes consumed, exclusive of stubs. *ASM Gloss.*

deposition of sediments. A process whereby rock debris, which has been suspended in water, drops to the bottom out of suspension. This occurs when the transportation velocity of the medium drops below the minimum necessary to maintain suspension. *Hy.*

deposition sequence. The order in which the increments of weld metal are deposited. *ASM Gloss.*

depotassication. The removal of potassium, particularly from clay minerals. *A.G.I. Supp.*

depp. Derb. The continuance of ore with depth. *Fay.*

depreciation. a. Reduction of assets of a working mine through rundown of ore reserve, obsolescence, and wear and tear. *Pryor, 3.* b. The loss in value which machinery sustains through age and through wear and tear. *Crispin.*

depreciation fund. A fund set aside to replace a piece of depreciable property when it is worn out. *Fay.*

depressant. A chemical which causes substances, for example, a finely powdered sulfide mineral, to sink through a froth, in froth flotation. The mineral so sunk is said to be depressed. *Nelson.*

depressed coast. *See* depressed shoreline. *Schieferdecker.*

depressed flute casts. Depressed, flat, or weakly developed flute casts. *Pettijohn.*

depressed shoreline; depressed coast. Coast having undergone an absolute subsidence. *Schieferdecker.*

depressed water level; pumping water level. The lowest level of ground water during drainage or pumping. *B.S. 3618, 1963, sec. 4.*

depressing agent. In froth flotation process, one which reacts with particle surface to render it less prone to stay in the froth, thus causing it to wet down as a tailing product. Depressants act by complexing elements at surface lattices of minerals which might carry charge attractive to conditioning agents; by destroying collector coating; by surface modification of particles. *Pryor, 3.*

depression. a. The depression is enclosed on all sides by elevations of the sea bed. *A.G.I.* b. A low place of any size on a plain surface, with drainage underground or by evaporation; a hollow completely surrounded by higher ground and having no natural outlet for surface drainage. *A.G.I.* c. A lowering, sinking or diminution. *A.G.I.* d. In surveying, the angular distance of an object beneath the horizontal plane that passes through the observer. *Webster 3d.*

depression contour. One of the contours representing a depression that has no surface outlet. To distinguish them from other contour lines, they are marked on the downslope side with short transverse lines termed hachures. *Stokes and Varnes, 1955.*

depressors. Those substances (usually inorganic) whose presence in the pulp prevents the anchoring of the collector molecules on a mineral surface, and thus inhibits flotation of the mineral. Contrary to activator. *Newton, p. 100.*

depth. S. Afr. The word alone generally denotes vertical depth below the surface. In the case of incline shafts and boreholes it may mean the distance reached from the beginning of the shaft or hole, the borehole depth or inclined depth. *Beerman.*

depth-controlled shoot. An ore shoot that formed directly as a result of the decrease in temperature or pressure, or both, in the ore-bearing fluids as they migrated upward through the earth's crust. *Stokes and Varnes, 1955.*

depth gage. A gage used by woodworkers and metalworkers for testing the depth of holes and recessed portions. *Crispin.*

depth indicator. A dial or other appliance on a winding apparatus which indicates to the man in charge the position of the cage in the shaft. The indicator must be in addition to any mark on the rope or drum. *Nelson.*

depth marker. A small metal tag or wooden block placed in the core box at the bottom of the core recovered from each run, on which is marked the depth at which the core was cut in the borehole. *Long.*

depth micrometer. A precision gage with micrometer adjustment, used to determine the depth of holes, slots, counterbores, or the distance from one surface to a lower level, etc. *Crispin.*

depth of cut. The thickness of material removed from the workpiece in a single pass. *ASM Gloss.*

depth of focus. Depth of hypocenter below the earth's surface. *Schieferdecker.*

depth of fusion. The depth to which the base metal melted during welding. *ASM Gloss.*

depth of penetration. *See* joint penetration; root penetration. *ASM Gloss.*

depth of soil exploration. The soil sampling is usually carried down to include all deposits likely to have a bearing on the stability of mine structures. The shear tests are made in each bed below the foundation to a depth of at least 1½ times the breadth of the foundations. Hence, the larger the loaded area the deeper is its influence felt and the tests necessary. *See also* site investigation. *Nelson.*

depth of stratum. The vertical distance from the surface of the earth to a stratum. *A.G.I.*

depth per bit. The length of borehole which can be drilled with a steel bit until it must be resharpened. *Streefkerk, p. 15.*

depth point. In seismic work, a position at which a depth determination of a mapped horizon has been calculated. *A.G.I.*

deputation work. Gr. Brit. When workmen are selected by their fellow workmen employed at the same mine to interview the management with reference to wage matters or disputes, or to accompany their permanent trade union official for the same purpose, it is called deputation work. *Nelson.*

deputy. a. An underground official in a mine of coal, stratified ironstone, shale, or fire clay, with statutory responsibility for the safe and proper working of a district of the mine. Also called examiner; fireman (undesirable usage). *B.S. 3618, 1963, sec. 2.* b. Within limits, he is also in charge of the men working in the district. *Nelson.* c. Eng. In Northumberland and Durham, the man who sets timbers or props in a coal mine is sometimes called a deputy. *Nelson.* d. N. of Eng. A junior official responsible for safety precautions and mining operations in a face district. *Trist.* e. N. of Eng. A man who fixes and withdraws the timber supporting the roof of a mine, attends to the safety of the roof and sides, builds stopping, puts up bratticing, and looks after the safety of the miners. *Fay.* f. Eng. In the Midland coalfield, an underground official who looks after the general safety of a certain number of stalls (rooms) or of a district, but who does not set the timber himself although he has to see that it is properly done. *Fay.* g. A mine boss. *Fay.*

deputy overman. Newc. The man who lays the plates and sets the timber for the miners, and has charge of a portion of the mine. *Fay.*

deputy's district plan. Gr. Brit. The plan required by law, which shows the limits of each deputy's district and the meeting station. *B.S. 3618, 1963, sec. 1.*

deputy's qualifications. Gr. Brit. A deputy must hold either a colliery manager's or an undermanager's certificate or a deputy's certificate. He must be capable of making accurate tests for flammable gas with a flame safety lamp, and possess a hearing and first-aid certification. In addition, a deputy must have had not less than 5 years practical experience below ground of which not less than 2 years were spent at the coal face. *Nelson.*

deputy surveyor; mineral surveyor. A person appointed by the Surveyor General of the United States to make proper surveys of lode or placer mining claims, prior to the issuing of a patent. *Fay.*

deputy system. N. of Eng. The plan of having all the timbering in working places performed by specially appointed deputies. *See also* deputy, e. *Fay.*

derail; derailer. A safety device for derailing mine cars, usually installed on grades to protect miners working below. Similar devices are used on railroads. *See also* drop log. *Bureau of Mines Staff.*

derailing drag. *See* backstay. *Nelson.*

derailment. The accidental running of a tram off the rails, usually due to stones or dirt fouling the track. *See also* wagon rerailer. *Nelson.*

derail unit. This device locks to rails to derail cars. Wedge construction eliminates spiking. It protects workers in railroads and mines against wild cars, switching cars or sudden car movement. Some types are equipped with a warning flag. *Bests, p. 371.*

derby. A massive piece, of intermediate size (extending to more than 100 pounds), usually cylindrical, of primary metal made by bomb reduction, such as uranium from uranium tetrafluoride and magnesium. *See also* biscuit; dingot. *ASM Gloss.*

derbylite. A black, brown antimonate and titanate of iron. $FeO.Sb_2O_5.5FeO.TiO_2$. Minute prismatic crystals and twins. Orthorhombic. *English.*

Derby pocket safety ohmmeter. A circuit tester which consists of a high-sensitivity moving-coil instrument with a 1.5-volt dry battery providing the low operating current. The battery is housed in a separate sealed compartment of the robust wooden case. Internal resistances are incorporated in the instrument and connected so that it is impossible for the whole output of the battery to flow through the circuit under test. In use, the two ends of the circuit to be tested are connected to the two terminals on the instrument, and the resistance of the circuit is registered on the 0–300 ohm scale when the button on the side of the ohmmeter is depressed. *McAdam II, p. 65.*

Derby Press. Trade name; a machine for the repressing of wire-cut building bricks. *Dodd.*

Derbyshire spar; Derby spar. Fluorite, found abundantly in Derbyshire, England. Same as fluorspar. *Fay.*

derbystone. Amethyst-colored fluorite. *Shipley.*

derivative rock. A rock derived by erosion or comminution of previously existing rocks or rock material, as a sedimentary rock and volcanic tufa. *Standard, 1964. Compare* ingenite.

derived fossils. Fossils that are not native to the rock in which they are found. For example, the pebbles in a conglomerate may enclose fossils or fragments of fossils. Such fossils are manifestly older than the conglomerate and are termed derived fossils. *Nelson.*

derived fuel. A fuel obtained from a raw fuel by some process of preparation for use, for example, coke, charcoal, benzol, and petrol. *Nelson.*

derived neutral. A derived neutral is a neutral point or connection established by the addition of a zigzag or grounding transformer to a normally ungrounded delta power system. *I.C. 7962, 1960, p. 22.*

dermal deformation. A deformation in the upper part of the sialic crust of the earth. *Schieferdecker.*

dermatitis. A skin disease caused by the application of dust or liquids. In coal mining, the dusts may be coal or stone dust and the liquids may be mine waters, oil or grease, perspiration and acids or alkalis. The majority of cases occur in deep and hot mines having high wet-bulb temperatures. *Mason, v. 1, p. 344.*

dermolith. Fluent basaltic lava characterized by a smooth, billowy, or ropy surface and ordinarily containing numerous spherical vesicles. Synonym for pahoehoe. Obsolete. *A.G.I.*

derrick. a. The framed wood or steel tower placed over a borehole to support the drilling tools for hoisting and pulling drill rods, casing, or pipe. Sometimes incorrectly called a tower. *Long.* b. Any of various hoisting apparatus employing a tackle rigged at the end of a beam. *Webster 3d.* c. Eng. In Cornwall, a digger; a miner. *Fay.* d. A frame erected around the mouth of a borehole for operating and handling the boring tools. A simple derrick consists of three iron or wooden legs secured together at the top. A winch is provided with a rope running over a pulley fixed at the top of the derrick so that the boring rods can be raised quickly when it is necessary to change the chisel or clean the borehole. *Nelson.* e. The framework over a borehole, used primarily to allow lengths of drill rod to be added to the drilling column. *B.S. 3618, 1963, sec. 3.* f. A three- (or more) legged framework for supporting drill rods and tackle in deep boring; a temporary three-legged headframe, or headgear, for a shaft. *Mason.* g. Warwick; anchor prop or anchor girder. *Mason.* h. A safety girder, bar, or prop to stop a runaway on inclined haulage roads; runaway warwick. *Mason.* i. A pulley fixed on a scaffolding above a shaft, over which passes a rope or cable, to which is attached the kibble or cage which is drawn up by a horse or a winding engine. *Gordon.* j. A nonmobile tower equipped with a hoist. Synonym for crane. *Nichols.*

derrick builder. *See* rig builder. *D.O.T. 1.*

derrick car. A wrecking car or construction car carrying a derrick. *Standard, 1964.*

derrick cellar. Synonym for celler. *Long.*

derrick crane. A crane in which the top of the post is supported by fixed stays in the rear and the jib is pivoted like the boom of a derrick. *Fay. See also* derricking jib crane. *C.T.D.*

derrick crown. The topmost part of a derrick on which the sheave wheel or crown block is mounted. *Long.*

derrick floor. The working platform at the base of the derrick, more or less level with the collar of a borehole or at a level slightly above the top of the casing or standpipe. *Long.*

derricking. Operating like a derrick in the raising and lowering of the jib. *Webster 3d.*

derricking jib crane. A jib crane in which the [redacted] of the jib, and hence the radius of action, can be varied by shortening or lengthening the tie ropes between the post and the jib. *C.T.D.*

derrick irons. a. The crown block or sheave wheel. *Long.* b. Hardware used in constructing a framed wooden derrick. *Long.*

derrickman. In petroleum production, one who works as a crew member on a rotary drilling rig, performing well drilling and derrick rigging activities and assists in supervision of the drilling crew. Also called rotary derrickman. *D.O.T. 1.*

derrick pulley. A sheave or pulley mounted on the crown of a drill derrick. *Long.*

derrick rope. The rope used for supporting and hoisting the boom on jib cranes and excavators. *Ham.*

derrick stone. Stone of sufficient size as to require handling in individual pieces by mechanical means, generally 1 ton up. *H&G.*

Derv fuel. In the United Kingdom, applied to types of gas oil suitable for use as fuels for high-speed compression-ignition engines.

The term is an abbreviation of Diesel Engine Road Vehicle. *Ham.*

desalting; desalinizing. Any process for making potable water from sea water or other saline waters. Distillation is the oldest method. Reuse of vapors through compressive distillation or multiple-effect evaporation is practiced in order to limit heat consumption. Distillation with solar heat is expensive because the large areas required result in high equipment investments. Electrodialysis is an inherently good method because the energy is used to remove the small proportion of salt from the relatively large quantity of water instead of removing the water from the salt. Its practical use is restricted because of membrane deterioration, scale formation, and inefficient use of energy. Other methods are freezing by direct contact of refrigerant with sea water; foam separation; liquid-liquid extraction; various nonelectric membrane processes; and ion exchange. *CCD 6d, 1961.* These processes are called desalination. *Bureau of Mines Staff.*

desanding screen. A shaker-type screen for removing the sand and water from the products of a Chance washer. *Nelson.*

de Saulesite. A green amorphous hydrous silicate of nickel and zinc; contains 30.0 percent nickel and 3.2 percent zinc. *Hess.*

descaling. a. Removing the thick layer of oxides formed on some metals at elevated temperatures. *ASM Gloss.* b. Removal of calcareous encrustations from piping by mechanical or chemical methods; pickling of steel to remove oxides; cleaning boiler tubes and plates. *Pryor, 3.*

descensional ventilation; homotropal ventilation. A ventilation system in which the downcast air is conducted to the top end of the workings (in inclined seams) and it then flows downhill along the face. In deep mines, the system helps to keep the faces cool. *See also* ventilation. *Nelson.*

descension theory. The theory that the material in veins entered from above. *Fay.*

descloizite. A vanadium ore, 4(Pb,Zn)O.$V_2O_5.H_2O$. *Osborne.*

descriptive gemmology. The classification, composition, properties, trade grades, sources, and the methods of recovery, fashioning, and use of gem minerals and gem materials and their substitutes. *See also* gemmology. *Shipley.*

descriptive mineralogy. That branch of mineralogy devoted to the description of the physical and chamical properties of minerals. *Fay.*

deseaming. Removal by chipping of surface blemishes from ingots or blooms. *Pryor, 3.*

desert. a. Applied somewhat loosely to any waste and uninhabited tract of land; but strictly and more especially to wide, open, and comparatively barren tracts. *A.G.I.* b. A region in which few forms of life can find sustenance. Thus, by reason of cold, the vast expanse of ice in Greenland is a desert; indeed, it is so inhospitable a desert that, in a large part of its area, no animal or plant can live. The term, however, is commonly applied to those lands on which there is so little rainfall that only a few especially adapted animals and plants can live. About one-fifth of the land surface has an annual rainfall of less than 10 inches and, therefore, is desert. *A.G.I.* c. A region so devoid of vegetation as to be incapable of supporting any considerable population. There are four kinds of deserts: (1) the polar ice and snow deserts, marked by perpetual snow cover and intense cold; (2) the middle latitude deserts, in the basinlike interiors of the continents, such as the Gobi, characterized by scant rainfall and high summer temperatures; (3) the trade-wind deserts (notably the Sahara), which have negligible precipitation and a large diurnal temperature range; and (4) coastal deserts that occur where there is a cold ocean current along the western coast of the landmass, as in Peru. *A.G.I.*

desert crust. *See* desert pavement. *A.G.I.*

desert glass. Obsidian or moldavite. *Shipley.*

desert lands. All lands exclusive of timber lands and mineral lands which will not, without irrigation, produce some agricultural crop. *Ricketts, I.*

desert pavement. a. Synonym for desert crust. *A.G.I.* b. Applied by Free to a phenomenon previously observed by others. When loose material containing pebbles or larger stones is exposed to wind action, the finer dust and sand are blown away and the pebbles gradually accumulate on the surface, forming a sort of mosaic that protects the finer material underneath from attack. *A.G.I.* c. Where the vegetation or lack of it allows the wind to comb the surface freely, a curious pavement of stones results. *A.G.I.*

desert rat. In the Western United States, a prospector, especially one who works and lives in the desert, or who has spent much time in arid regions. The name is derived from a small rodent common throughout much of the Great Basin and Southwestern United States. *Fay.*

desert rose. A group of crystals formed in sand, soft sandstone, or clay. The crystals are usually calcite and less commonly barite, gypsum, or celestite. The first two occurrences are known as sand calcite and sand barite, respectively. *Hess.*

desert varnish. a. A surface stain or crust of manganese oxide or iron oxide, of brown or black color, and usually with a glistening luster, which characterizes many exposed rock surfaces in the desert. It not only coats ledges of rock in place but also coats boulders and pebbles that are scattered over the surface of the ground. *USGS Bull. 730, 1923, p. 87.* b. The thin chocolate-brown or black deposit prevalent on rock surfaces in desert regions. *A.G.I.* c. A coating of iron oxides or of manganese oxides on rock surfaces. *A.G.I.*

desiccant. A substance having an affinity for water. Used for drying purposes. *Bennett 2d, 1962.*

desiccate. To dry up; to deprive of or to exhause of moisture; to preserve by drying. *Webster 3d.*

desiccation. A drying out; used in connection with sediments that lose water. Also applied to the process of evaporation from bodies in arid regions, thus producing evaporites. *A.G.I.*

desiccation cracks; desiccation fissures. Cracks in sediment produced by drying. *See also* mud crack. *Pettijohn.*

desiccation fissures. *See* desiccation cracks. *Pettijohn.*

desiccation mark. Synonym for mud crack. *Pettijohn.*

desiccator. A short glass jar fitted with an airtight cover and containing some desiccating substance (as calcium chloride), above which is placed the material to be dried or to be protected from moisture. *Webster 3d.*

desierto. Mex. Desert. *Fay.*

design. A type of diamond-drill fitting that, when standardized, has specific dimensions and thread characteristics establishing interchangeability of parts made by different manufacturers, and size by specific dimension of the set core-bit inside diameter. Design characteristics supplement the group characteristics that provide for integration of ranges. The design characteristics of drill fittings are established by the second letter in two-letter names and by the third letter in three-letter names. Letters denoting design may establish interchangeability of all parts, as in the M-design core barrel, or only of certain parts, as in the X-design core barrel. *Compare* group, f; range, e. *Long.*

designated size. The particle size at which it is desired to separate a feed by a sizing operation. *B.S. 3552, 1962.*

designed borehole deflection. The turning of a borehole along a different course at depth. This may be achieved, but not without difficulty. The cutting bit is guided upon its new course by the curved surface of a deflecting wedge which is positioned with the aid of a modified Oehman instrument. In petroleum drilling, much use is made of holes that are deflected at a predetermined depth. The technique is known as whipstocking. *Nelson.*

design horsepower. The specified horsepower for a chain drive, multiplied by a service factor. It is the value used to select the chain size for the drive. *J&M.*

design load. The load generally taken as the worst combination of forces and loads which a structure is calculated to sustain. The term is similarly applied to such projects as air conditioning. *Ham.*

design temperature. The temperature which an apparatus or system is designed to (1) maintain or (2) operate against under most extreme conditions. The former is the inside design temperature; the latter, the outside design temperature. *Strock, 10.*

desilication. a. The removal of silica from a rock; the freeing of silica by the breakdown of silicates. *A.G.I.* b. The removal of silica from a magma by reaction with the wall rock, as with limestone, to form crystalline calcium silicates. *A.G.I.*

desiliconization. The removal of silicon. In the case of metals, the removal of the element silicon; in the case of minerals, the removal of the oxide silica, SiO_2. *Bennett 2d, 1962.*

desiliconize. To free from silicon or any of its compounds. *Fay.*

desiliconizing. A practice of jetting oxygen into pig iron before it is charged into the steel furnace; this oxidizes and removes most of the silicon. *Newton, p. 328.*

desilverization. The process of removing silver (and gold) from lead after softening. *See also* Parke's process; Pattinson's process. *C.T.D.*

desilverized lead. Silver-free lead, as obtained by Parkes or Pattinson process. *Bennett 2d, 1962.*

desilverizing kettle. A circulating kettle 3 to 4 feet deep used for the desilverization of base bullion. *Fay.*

desired value; set point. In Great Britain, the independently set reference in a control system. Called reference input in the United States. *NCB.*

desired value signal. That which shows the desired value of the process being controlled. *Pryor, 3, p. 31.*

desliming. a. The removal of slimes from coal or a mixture of coal and water, however accomplished. *B.S. 3552, 1962.* b. Classification of a pulp into two fractions, relatively coarse and fine. Removal of primary (nonvaluable) slimes before treating ores for recovery of values. *Pryor, 3.*

desliming screen. A screen used for the removal of slimes from larger particles, usually with the aid of water sprays. *B.S. 3552, 1962.*

deslurrying. Fines removal by wet methods. *B.S. 3552, 1962.*

desmine. *See* stilbite. *Fay.*

desmite. The amorphous groundmass, which is transparent in thin sections, binding together the constituents of bituminous coal of high grade. Applies to the transparent variety of residuum found in high-grade coals. *Tomkeieff, 1954.*

Desmoinesian. Lower middle Pennsylvanian. *A.G.I. Supp.*

desmoisite. A finely banded spilosite. *See also* adinole; desmosite; schalstein; spilosite; spotted slàte. *A.G.I.*

desmosite. A finely banded spilosite. *A.G.I.*

desorption. The reverse process of adsorption whereby adsorbed matter is removed from the adsorbent. The term is also used as the reverse process of absorption. *NRC-ASA N1.1-1957.*

dessication. Drying out; loss of water from any given substance. *Weed, 1922.*

destressed area; destressed zone. a. In strata control, a term used to describe an area where the force is much less than would be expected after considering the depth and type of strata. *Compare* overstressed. *Mason, v. 1, p. 143.* b. A region of low stress behind the walls of a stoped-out region. *Isaacson, p. 109.*

destressing. In deep mining, relief of pressure on abutments of excavation. Performed by drilling laterally and blasting to loosen the zones of peak stress. The peak load surrounding the stope walls is thus transferred deeper into the undisturbed rock, and a proetctive barrier is formed. *Pryor, 3.*

destructional. Pertaining to destruction or shaped by destructive forces, as a plain that has been shaped by erosion. *Standard, 1964.*

destructional cliff. A cliff formed by erosion; for example, sea cliff, river cliff, cuesta scarp, ice-scoured wall, ice-quarried cliff, fault-line cliff, and landslide scar. *Stokes and Varnes, 1955.*

destructive distillation. The distillation of solid substances accompanied by their decomposition. The destructive distillation of coal results in the production of coke, tar products, ammonia, gas, etc. *C.T.D.*

destructive testing. Testing methods, the use of which destroy or impair the part or product insofar as its intended use is concerned, but which give proof or an indication of the strength or quality of similar or duplicate parts or products. Such tests involve the subjection of the test piece to various influences, of destructive magnitude, such as impact, stress, pressure, cyclic movement, etc. *See also* nondestructive testing. *Henderson.*

destructive wave. One of the waves that erode a beach. *Schieferdecker.*

destructor. A plant which disposes of large amounts of refuse, usually by burning. *Ham.*

desuing. Corn. *See* dissuing. *Fay.*

desulfurization of steel. The removal of a high proportion of sulfur from steel by calcium carbide. The bath is brought to a good heat (1,550° to 1,570° C) and lime and fluorspar are added to make fluid basic slag. The calcum carbide, usually 50 to 100 pounds, is injected in powder form, by means of a dispenser, directly into the steel. The number of injections made depend upon the initial sulfur and the reduction required. *Nelson.*

desulfurize. To free from sulfur; to remove the sulfur from an ore or mineral by some suitable process, as by roasting. *Fay.*

desulfurizer. A material for reducing the sulfur content of cast iron or steel in the supola or smelter. *Hansen.*

desulfurizing. a. Removal or reduction of sulfur in gas, chemicals, and steel. *Pryor, 3.* b. Precipitation of soluble sulfides during cyanidation of gold ores. *Pryor, 3.*

detachable bit. A drilling bit which is threaded or tapered and is removable from the drill steel; not formed as an integral part of the drill steel. The all-steel bit can be resharpened, but the tungsten carbide insert type may be nonresharpenable. Also known as rip bit or knockoff bit. *Bureau of Mines Staff.*

detachable cable sealing box. Designed so that it can be disconnected and detached from associated apparatus without disturbing the sealing of the cable. *B.S. 3618, 1965, sec. 7.*

detached head pulley. *See* head pulley, a.

detaching hook. An appliance which releases automatically the winding rope from the cage should an overwind occur. The hook is placed between the skip shackles, or the cage slings, and the winding rope cappel. A detaching plate is fitted to girders below the winding sheave, and in the event of an overwind, the hook becomes locked in the plate, thus suspending the skip or cage, while the winding rope is simultaneously liberated. *See also* Ormerod detaching hook; King detaching hook. *Nelson.*

detail drawing. A large-scale drawing showing all small parts, details, dimensions, etc. *Nichols.*

detailed soil survey. The final soil tests at a site as guided by the general soil survey. The tests may be performed in situ by mobile laboratory units, or the samples are sent to the nearest soils laboratory. *See also* preliminary soil survey. *Nelson.*

detector. *See* seismometer. *A.G.I.*

detector, magnetic. See magnetic detector. *ASA MH4.1-1958.*

detectoscope. A manufacturer's trade name for (1) a misnamed hand apparatus which both magnifies and illuminates stones from above, thus actually making it more difficult to detect inclusions, and (2) a gem-testing instrument employing eight different color filters. *Shipley.*

detergency. Process in which liquid and/or solid adherent matter is removed from a solid's surface by use of a liquid (the detergent medium). Degreasing, cleansing, scouring. *Pryor, 3.*

detergent. A chemical compound that acts to clean surfaces and to keep foreign matter in solution or suspension. *Nichols.*

detergent oil. A lubricating oil having special sludge dispersing properties which is used in some internal-combustion engines. These properties are usually conferred on the oil by the incorporation of special additives, which give it the ability to hold sludge particles in suspension as well as to promote engine cleanliness. *Ham.*

detergents, synthetic. Materials which have a cleansing action like soap but are not derived directly from fats and oils. Synthetic detergents are surface-active agents and have structurally unsymmetrical molecules containing both hydrophilic, or water-soluble, groups and hydrophobic, or oil-soluble, hydrocarbon chains. Used in ore flotation. Abbreviation, syndets. *CCD 6d, 1961.*

determinative gemmology. The science of differentiating (1) between the various gemstones, (2) and between gemstones and their substitutes, and (3) between such substitutes. *Shipley.*

determinative inclusion. In determinative gemmology, an inclusion, the nature of which assists in the determination of the exact identity of an unknown stone. *Shipley.*

determinative mineralogy. That branch of mineralogy which comprises the determination of the nature, composition, and classification of minerals, by means of physical tests, blowpipe analyses, chemical analyses, differential thermal analyses, X-ray diffraction, etc., and the examination of the crystallographic and the optical properties. *Fay.*

detinning. Treatment by chlorination of tin-bearing scrap for recovery of tin as its chloride. *Pryor, 3.*

detonate. a. To cause to explode by the application of sudden force. *Standard, 1964.* b. To explode suddenly with a loud report. *Standard, 1964.*

detonating fuse. A fuse consisting of high explosive that fires the charge without the assistance of any other detonator. *Fay.* It consists of a high-explosive core of pentaerythritol tetranitrate (P.E.T.N). enclosed in tape and wrapped with textile countering yarns. Usually this fuse is then reinforced or completely enclosed in a strong waterproof plastic outer cover. The finished external diameter is normally about 0.2 inch. *McAdam II, p. 59.* Primacord is the best known brand. *Nichols. See also* Cordtex; safety fuse. *Nelson.*

detonating gas. A gaseous mixture which explodes violently on ignition (as two volumes of hydrogen with one volume of oxygen, forming water). *Webster 2d.*

detonating powder. Any powder or solid substance, as mercury fulminate, which, when heated or struck, explodes with violence and a loud report. *Webster 2d.*

detonating primer. A primer exploded by a fuse, used to fire high explosiives. *Fay.*

detonating rate. The velocity with which the explosion wave travels through the column of charge. *Streefkerk, p. 42.*

detonating relays. A device for obtaining short-delay blasting in conjunction with the detonating fuse. It consists essentially of two open-ended delay detonators coupled together with flexible neoprene tubing. *McAdam II, p. 60.*

detonating tube. A eudiometer for making explosions. *Webster 2d.*

detonation. a. An explosive decomposition or explosive combustion reaction that moves through the reactant(s) at greater than the speed of sound in the reactant(s) to produce (1) shock waves and (2) significant overpressure, regardless of confinement. *Bureau of Mines Staff.* b. The very sudden change of unstable substances from a solid or liquid to a gaseous state with the evolution of great heat and accompanied by a sudden report. *Fay.* c. A violent chemical reaction resulting in flame and pressure, such as an explosion of mercury fulminate. As used in connection with a coal-dust explosion, it refers to an extremely fast violent stage, usually in a limited area. *Rice, George S.* d. A chemical reaction which propagates into the reacting medium at a supersonic rate. *I.C. 8137, 1963, p. 76.* e. An extremely rapid explosion; the firing of an explosive charge by fuse or electric detonator. *Nelson.* f. The action of converting the chemicals in an explosive charge to gases at a high pressure, by means of a self-propagating shock wave passing through the charge. *B.S. 3618, 1964, sec. 6.* g. The action or process of detonating; specifically: a chemical reaction producing vigorous evolution of heat and sparks or flame and moving through the material detonated, as a high explosive such as dynamite or TNT, at a speed greater than that of sound—distinguished from deflagration. *Webster 3d.* h. A violent explosion. *Webster 3d.* i. Abnormally rapid combustion in an internal-combustion engine that replaces or occurs simultaneously with normal combustion and is manifested by loss of power, overheating, rough operation, and a characteristic knock. *Webster 3d.*

detonation traps. Devices that prevent a detonation initiated in one part of a system from propagating to another. *I.C. 8137, 1963, p. 22.*

detonation velocity. When the explosive detonates it is transformed into a glowing mass of gas having a high pressure and a high temperature. The speed at which the reaction front moves forward through a cylindrical charge is called the detonation velocity. *Fraenkel, v. 3, Art. 16:01, pp. 13, 15.*

detonation wave. An explosion wave progressing with a permanent maximum speed with reference to the mass of the detonating substances or gaseous mixtures; in other words, without reference to the walls of the passageway. It is not probable that a true detonation wave is obtainable with coal dust. *Rice, George S.*

detonator. A device for producing detonation in a high-explosive charge, and initiated by a safety fuse or by electricity. *B.S. 3618, 1964, sec. 6. See also* blasting cap; electric detonator.

detonator case. A container for carrying detonators in mines. It is so constructed that, when closed, a detonator or the leads of a detonator cannot come into contact with either the metal of the case or any metal outside the case. *Nelson.*

Detrex Soniclean process. A metal cleaning process in which ultrasonic energy is combined with a chlorinated solvent vapor degreasing. The parts are immersed in the cleaning solution which is vibrated by high-frequency sound waves above the audible range. It is claimed that the results are similar to hand wiping because of the direct impact of the solvent on the surface. *Osborne.*

detrital. Descriptive of minerals occurring in sedimentary rocks that were derived from preexisting igneous, sedimentary, or metamorphic rocks. Synonym for clastic; allogenic. *A.G.I.*

detrital deposits. Placer or detrital deposits are composed of minerals that have been released by weathering and later have been transported, sorted and collected by natural agencies into valuable deposits. Such minerals are usually of high specific gravity and are resistant to abrasion and weathering. Examples are gold, diamonds, platinum, tin (cassiterite), monazite, magnetite and ilmenite, these last two being the common constituents of black sand. *Lewis, p. 276.*

detrital limestone. A limestone formed from the debris of older limestones. *A.G.I.*

detrital mineral. Literally, any mineral, the granulation of which results from detrition; but in sedimenatry petrology, the term is restricted to the grains of heavy minerals found in sand and other sediments, and separated therefrom by passing through a heavy liquid. *See also* heavy minerals. *C.T.D.*

detrital rock. A rock composed of particles or fragments eroded from pre-existing rocks. *Stokes and Varnes, 1955.*

detrition. a. The processes involved in producing detritus and in removing material from a land surface. *A.G.I.* b. Erosion of rock by natural forces. The resulting fragments are detritus. *Pryor, 3.*

detritus. a. Incoherent sediments produced by the erosion of rocks through the various geologic agencies. *See also* rock waste. *Fay.* b. Fragmental material, such as sand, silt, and clay, derived from older rocks by disintegration. The unconsolidated deposits produced by the accumulation of detritus are detrital sediments. *A.G.I.* c. A mixture of minute vegetable debris which eventually becomes converted into coal. *Tomkeieff, 1954.* d. Accumulation on the sea bottom of particles worn from rocks by mechanical means and broken organic material. *Hy.*

detritus chamber. A tank through which sewage passes, allowing suspended solids to settle on the bottom from where they can be removed. *Ham.*

detritus slide. The slow downhill movement of detritus, with clays and shales acting as slippage surfaces. *See also* soil creep. *Nelson.*

Detroit furnace. *See* Detroit rocking furnace. *Bennett 2d, 1962.*

Detroit rocking furnace. An indirect arc furnace with graphite electrodes entering horizontally from opposite ends, rocked continuously on supporting rollers. *Bennett 2d, 1962.*

detrusion. A lateral deformation in which particles of a body apparently slip past each other as a result of shearing force. *Bureau of Mines Staff.*

deuteric. Alterations in an igneous rock produced during the later stages of the consolidation of the magma from which the rock formed. *Compare* paulopost. The term distinguishes such early magmatic alterations from the more strictly secondary changes produced during a later period of alteration. *Holmes, 1928.*

deuterium. A hydrogen isotope, the nucleus of which contains one neutron and one proton and is therefore about twice as heavy as the nucleus of normal hydrogen which has only one proton. Deuterium is often referred to as heavy hydrogen. It occurs in nature as 1 part in 6,500 parts of normal hydrogen. *L&L.* Its mass is 2.0147 ± 0.00007 atomic mass units. The symbol D is often used to designate deuterium in compounds, as HDO for molecules of that composition. Official chemical nomenclature uses the designation d with a number which designates the carbon atom to which the deuterium is bound; for example, 2-d propane designates CH_3-$CHDCH_3$. *NRC-ASA N1.1-1957.*

deuterodiorite. Diorite formed by the metamorphism of diabase or gabbro, wholly or in part cataclastic. *A.G.I. Supp.*

deuterogenic. Relating to secondary rocks formed from pre-existing rocks. *Stokes and Varnes, 1955.*

deuteromorphic. Applied to crystals indicating that their shapes have been acquired or modified by the action of mechanical or chemical processes on the forms which they originally possessed. Deuteromorphic forms are described as (1) tectomorphic when the modifications are due to magmatic corrosion; (2) lytomorphic when due to aqueous solutions; (3) schizomorphic when due to cataclastic processes; (4) clastomorphic when due to denudation as in the rounded or angular grains of a detrital sediment; and (5) neomorphic when any one of the preceding types has been regenerated by zones of secondary growth in crystalline continuity. *Holmes, 1928.*

deuteron. The nucleus of the deuterium atom that consists of one proton and one neutron and is used as a projectile in nuclear bombardments, as with a cyclotron; symbols, D or d. *Webster 3d.*

de Vathaire process. Selective removal of sulfur from pig iron in the fused state by contacting with a mixture of barium cyanide, lime, and carbon. *Bennett 2d, 1962.*

De-Vecchis process. A method for the smelting of pyrites which entails the roasting and magnetic concentration of the raw material followed by reduction in a rotary kiln or electric furnace. The product may be briquetted and reduced in the blast furnace, but is better smelted in an electric furnace. In France, the process is of importance in connection with the production of sponge iron which is afterwards worked up into steel in the basic open hearth or electric furnace. *Osborne.*

develop. a. To open a mine and ore; more or less, to search, prospect, explore. *von Bernewitz.* b. To traverse a mineralized body horizontally by drives and vertically by shafts or winzes, in order to prove its extent. *C.T.D.* c. To open up ore bodies by shaft sinking, tunneling, or drifting. *Ballard.*

developed blank. A blank that requires little or no trimming when formed. *ASM Gloss.*

developed ore. Ore which is so completely exposed that its yield with respect to tonnage and tenor is essentially certain and which, in addition, is available to immediate withdrawal by the mining method being employed. *Forrester, p. 553.*

developed reserves. a. The tonnage of ore which has been developed, sampled, and blocked out, or exposed on at least three sides. In coal mining, the tonnage of coal known to exist by development headings. Also called assured mineral. *Nelson.* b. Mineral reserves proved by underground penetration. *Truscott, p. 177.*

developer. a. In photography, a processing solution that reduces the exposed grains of an emulsion to metallic silver, thus making the image visible. *ASM Gloss.* b. In xeroradiography, a dry powder used to make the electrostatic image visible. *ASM Gloss.* c. In penetrant inspection, a material used to draw the penetrant back to the surface, thus revealing the location of cracks or fissures. *ASM Gloss.*

development. a. To open up a coal seam or ore body as by sinking shafts and driving drifts, as well as installing the requisite equipment. *Nelson.* b. Work of driving openings to and in a proved ore body to prepare it for mining and transporting the ore. *Lewis, p. 20.* c. The amount of ore in a mine developed or exposed on at least three sides. *C.T.D.* d. S. Afr. The work done in a mine to open up the paying ground or reef and, in particular, to form drives or haulages around blocks of ore which are then included under developed ore reserves. *Beerman.* e. A geologic term, applied to those progressive changes in fossil genera and species that have followed one another during the deposition of the strata of the earth. *Fay.*

development drift; slant. A main tunnel driven from the surface, or from a point underground, to gain access to coal or ore for exploitaiton purposes. *Nelson.*

development drilling. Delineation of the size, mineral content, and disposition of an ore body by drilling boreholes. *Long.*

development drivages. The shafts, tunnels, laterals, crosscuts, and staple pits to prove and render accessible the coal or ore to be extracted. *See also* productive development; unproductive development. *Nelson.*

development engineer. In bituminous coal mining, one who operates a hoist to raise and lower men, rock, and supplies during development work (sinking shafts and driving horizontal underground passages prior to the actual mining of coal from a seam). *D.O.T. 1.*

development gang. A team of men, working to a fixed time schedule, and responsible for having a new face, ready equipped with roof supports, pipes, drilling machines, etc., by the time the face in production is worked out. *See also* dismantling gang. *Nelson.*

development miner. *See* miner.

development plan. A plan showing the proposed development of the mine workings, and kept for operational purposes. *B.S. 3618, 1963, sec. 1.*

development rock. S. Afr. The rock broken during development work in payable ground, which contains both valuable and barren rock and is, therefore, included in the tonnage sent to the reduction plant of a mine. *Beerman.*

development sampling. Sampling for the establishment of reserves and conducted primarily upon the exposures along the development drivages. *Nelson.*

development work; developmental work. Work undertaken to open up ore bodies as distinguished from the work of actual ore extraction. Sometimes development work is distinguished from exploratory work on the one hand and from stope preparation on the other. *A.G.I.*

Devereaux agitator. An upthrust propeller, stirring pulp vigorously in a cylindrical tank, used in leach agitation of minerals. *Pryor, 3.*

deviate. To change the course of a borehole. *Compare* deflect; walk; wander. *Long.*

deviating. Synonym for deflecting. *Long.*

deviation. a. Turning or wandering from the proper course. *Nelson.* b. The departure of a tunnel from its proper bearing. *Nelson.* c. The wandering of a borehole from its intended course. *B.S. 3618, 1963, sec. 3.* d. S. Afr. The deviation of a borehole is the result of rock conditions or technical imperfections which prevent the drilling of a completely straight hole. *Beerman.* e. Synonym for deflection. *Long.* f. The distance, measured in a horizontal plane, between two surveyed points in a borehole or between the collar and any point below the collar in a borehole. Also called dislocation; throw. *Long.* g. In statistical appraisal of a series of observations two methods of measuring scatter are mean deviation and standard deviation. *Pryor, 3.* h. The difference between an experimental result and an arbitrary central value, usually the experimental mean value. *B.S. 1017, 1960, pt. 1.*

deviator stress. The difference between the major and minor principal stresses in a triaxial test. *ASCE P1826.*

devil. a. Aust. An automatic arrangement for detaching a set of skips from the main-and-tail-rope haulage system. *Fay.* b. Drag; backstay; trailer. *Mason.*

devilline. A dark emerald-greeen to verdigris-green hydrated basic sulfate of copper and calcium, $Cu_4Ca(SO_4)_2(OH)_6.3H_2O$; monoclinic. *Dana 7, v. 2, pp. 590–591.* Also called herrengrundite; lyellite; devillite; urvolgyite. *Hey 2d, 1955.*

devillite. Synonym for devilline. *Spencer 21, M.M., 1958.*

devil's bed. *See* topgallant rag. *Compare* old man. *Arkell.*

devil's dice. Cubes of brown iron ore, pseudomorphs of pyrites found in alluvial workings. *Gordon.*

devil's dirt. Old Eng. Ore difficult to assay or treat. *Hess.*

devil's dough. A hard, gray-white siliceous rock. *Compare* devil's bed; old man; daugh; dauk. *Arkell.*

devil's dung. Eng. Green-coated flints in glauconitic silt, forming the Bullhead bed at the base of the Thanet sand. *Compare* bears' muck; cat dirt; pig's dirt. *Arkell.*

devil's pitchfork. A fishing tool used in drilling wells. *Bureau of Mines Staff.*

devitrification. a. Deferred crystallization which, in glassy igneous rocks, converts obsidian and pitchstone into dull cryptocrystalline rocks (usually termed felsites) consisting of minute grains of quartz and feldspar. Such devitrified glasses reveal their originally vitreous nature by traces of perlitic and spherulitic textures. *C.M.D.* b. The process by which glassy rocks break up into definite minerals, which are usually minute and are chiefly quartz and feldspar. c. The change from a glassy state to a crystalline state after solidification. *Fay.* d. In ceramics, a surface defect manifested by loss of gloss as a result of crystallization. *ASTM C286-65.*

devitrified glass. A type of ceramic material that, while in the form of a molten glass, is shaped by one of the conventional glass-making processes, and is subsequently devitrified in a controlled manner so that the finished product is crystalline. The crux of the process is the precipitation, during cooling of the shaped ware, of nucleating agents previously added in small amounts to the glass batch; the nucleated article is then heated to a temperature at which the nucleated crystals can grow. Devitrified glass products can be made in a wide range of compositions; the properties can therefore be varied, but typically the ware is impermeable and has high strength and good thermal shock resistance. Uses include radomes, high temperature bearings, and domestic ovenware. *See also* radome. *Dodd.*

devitrify. To destroy the glasslike character of volcanic glasses by changing from the vitreous state to the crystalline state. *Stokes and Varnes, 1955.*

devitrite. A crystalline product of the devitrification of many commercial glasses; the composition is $Na_2O.3CaO.6SiO_2$; its field of stability in the ternary system is small and far removed from its own composition; when heated to 1,045° C, devitrite decomposes into wollastonite and a liquid. *Dodd.*

devolatilization. Progressive loss of volatiles by the substance undergoing coalification process. *Tomkeieff, 1954.*

Devonian. The fourth period, in order of decreasing age, of the periods comprising the Paleozoic era. It followed the Silurian period and was succeeded by the Mississippian period. Also, the system of strata deposited at that time. Sometimes called the Age of Fishes. *Fay.*

Devonian system. The rocks formed during the Devonian period, between the Silurian and the Mississippian periods. In the type locality in England, Devonian rocks are of two facies—marine, occurring typically in Devonshire and Cornwall, England, and continental (the Old Red Sandstone). *C.T.D.*

De Vooy's process; Barvoy's process. The sink-float or dense-media process used for coal cleaning. The separating fluid is a clay-barite water pulp. *Pryor, 3.*

De Vries test. A test to give the relative hardenabilities of deep hardening steels. A 1-inch-diameter bar 6 inches long is end-quenched from the austenitizing temperature in a fixture so constructed that the top of the bar is kept at approximately 650° C during the quench. This makes the temperature in the bar a function of the distance from the quenched end and allows the steel in the bar to transform isothermally at the various temperatures. After the bar has been in the fixture for an hour, it is taken out and given an overall quench. The austenitic areas in the bar then transform to martensite. The amount of transformation at each temperature is determined by making hardness measurements along the side of the bar and comparing the hardness at each position with the maximum hardness. By comparing the loss in hardness at various points with the temperature at those points during the quench the relative amount of transformation at any temperature can be estimated and thus the relative hardenability of different steels can be determined. *Osborne.*

Dewar-Redwood process. A method for cracking petroleum (1899) by the use of a suitable still and a condenser in free communication with each other, that is, without any valve between them, the space in the still and condenser not occupied with liquid being charged with air, carbonic-acid gas, or other gas, under the required pressure and the condenser being provided with a regulated outlet for the condensed liquid. A full description of the process is contained in Sir Boverton Redwood's standard work on petroleum. *Fay.*

dewater. To remove water from a mine; an expression used in the industry in place of the more technically correct word, unwater. *Hudson.*

dewatering. a. Removing water by pumping, drainage, or evaporation. *Nichols, 2.* b. The pumping out of a drowned shaft or waterlogged workings as a safety measure or as a preliminary step to resumption of development in the area. Submersible pumps may be used for dewatering. *Nelson.* c. *See* dewatering classifier. *Nelson.* d. The mechanical separation of a mixture of coal and water into two parts, one which is relatively coal-free, the other relatively water-free, with respect to the original mixture. Coarser coals are dewatered by drainage hoppers and bins, shaking vibrating screens, conveyors and chutes fitted with slots or stationary screens of either wedge or round wire construction, and perforated bucket elevators. The same methods can be used for dewatering coal minus one-half inch in size, and in addition centrifuges, vacuum filters, and sludge tanks and other thickening devices in combination with centrifuges or filters are used. *Mitchell, p. 649. See also* Bird centrifuge; McNally-Carpenter centrifuge; CMI centrifuge. e. In metallurgy, a process generally carried on only to the extent of producing a damp cake, in two steps: (1) in thickeners, which remove most of the water, and (2) in filters, which receive the thickened pulp and yield the damp mineral cake. If further dewatering is desired, driers reequiring fuel for evaporation of moisture are essential; *Gaudin, p. 9.* f. In mineral processing, removal of part of the liquid from a pulp. Performed in thickener, classifier, hydrocyclone, settling bed or cone, on filter, on screen (coal preparation). *Pryor, 3.* g. The process in which solid material either submerged or containing liquid is conveyed or elevated in a manner which allows the liquid to drain off while the solid material is in transit. *ASA MH4.1-1958.* h. The removal of water from wet materials by means other than evaporation. *B.S. 3552, 1962.*

dewatering classifier. A settling tank for clarifying washer circulating water or for concentrating gold slimes before cyaniding. The tank may have a continuously working rake which moves the sludge towards the outlet pipe in the bottom. *See also* dryer. *Nelson.*

dewatering coal. The removal of moisture from coal after it has passed through the washer. The coal is passed over vibrating screens with usually ½-inch apertures, and most of the water including the minus ½-inch coal, drains away. The plus ½-inch coal quickly drains to a free moisture content of less than 4 percent depending on size. The minus ½-inch coal is then passed over high-speed vibrating screens with ½-millimeter aperture decks. The coarse fraction, one-half inch to one-half millimeter usually is dewatered by this process to a free moisture content between 10 and 15 percent. The product may be further dewatered in centrifuges. *Nelson.*

dewatering elevator. Similar to the continuous bucket elevator, it is often used in sand and gravel plants where the dredge line discharges to a sump. The dewatering elevator digs the material from the sump, allowing the water to drain out through perforations in the backs of the buckets while being elevated, and discharges to the plant for further processing. The only essential differences between this and the regular continuous bucket elevator are the perforated buckets, which also often have renewable manganese-steel lips to allow for the wear caused by excavating the gravel from the sump. The dewatering elevator resembles in many ways the dredging elevator used on bucket-ladder dredges. *Pit and Quarry, 53rd, Sec. C, pp. 34-35.*

dewatering screen. A screen used for the separation of water from solids. *B.S. 3552, 1962.*

dewaxing. Removing the exependable wax pattern from an investment mold by heat or solvent. *ASM Gloss.*

dew bed; dew stone. Eng. A grayish, blue-centered, hard, crystalline, shelly stone, used for road metal. It rests upon the Yeoville sands. *Arkell.*

deweylite. A discredited mineral term since it is a mixture of clinochrysolite (but in some samples lizardite) and stevensite. *American Mineralogist, v. 47, No. 5–6, May-June 1964, pp. 811-812.*

dewindtite. A very rare, strongly radioactive, canary-yellow, orthorhombic mineral, $Pb_3(UO_2)_5(PO_4)_4(OH)_4.10H_2O$, found associated with torbernite and other secondary uranium minerals. *Crosby, pp. 15-16.*

dewpoint. The temperature to which air must be cooled, at constant pressure and constant water vapor content, in order for saturation to occur. Since the pressure of the water vapor content of the air becomes the saturation pressure, the dewpoint may also be defined as the temperature at which the saturation pressure is the same as the existing vapor pressure. *A.G.I.* Also called saturation point.

dewpoint hygrometer. An instrument for determining the dewpoint; a type of hygrometer. It operates in the following manner. A parcel of air is cooled at constant pressure, usually by contact with a refrigerated polished metal surface. Condensation appears upon the metal surface at a temperature slightly below that of the thermodynamic dewpoint of the air. The observed dewpoint will differ from the thermodynamic dewpoint depending upon the nature of the condensing surface, the condensation nuclei, and the sensitivity of the condensate-detecing apparatus. *H&G.*

dextral fault. A tear fault (wrench fault), or a fault with a considerable component of tear (strike slip) motion, that shows relative displacement to the right on the distant side when viewed from either side. The opposite is a sinistral fault. *Challinor.*

dextrin. a. A carbohydrate, $(C_6H_{10}O_5)_x$, hydrolyzed from starch by dilute acids. Used in flotation as depressant. *Pryor, 3.* b. An intermediate product formed by the hydrolysis of starches. Industrially it is made by the treatment of various starches with dilute acids or by heating dry starch. The yellow or white powder or granules are soluble in water and insoluble in alcohol and ether. It is colloidal in properties and describes a class of substances, hence it has no definite formula. Used for decorating ceramics. *CCD 6d, 1961.*

dextrogyrate; dextrorotatory. Causing the plane of polarization of radiant energy, as light or radiant heat, to rotate to the right, that is, clockwise, the light being propagated from the observer. *Standard, 1964.*

dezincification. Corrosion of some copper-zinc alloys involving loss of zinc and the formation of a spongy, porous copper. *ASM Gloss.*

dezuing. *See* zur; dissuing. *Fay.*

DF Abbreviation for drop forge. *Zimmerman, p. 202.*

df stone Abbreviation for defluorinated stone. *See also* defluorinated. *Dodd.*

dg Abbreviation for decigram. *BuMin Style Guide, p. 59.*

d'Huart reagent. An etching reagent which reveals not only the macrostructure and faults, such as piping, segregation, particularly sulfur and phosphorus, and cracks, but also slip lines in mild steel which have been stressed beyond their elastic limit. The composition is as follows: 100 milliliters of distilled water, 100 milliliters of concentrated hydrochloric acid, 40 grams of crystallized chromic acid, 16 grams of anhydrous nickel chloride. The reagent is prepared by dissolving the nickel salt in the hydrochloric acid solution with gentle heat. After cooling, the chromic acid is added and the reagent is then ready for use. Its action is very rapid, the duration of attack varying from a few seconds to one minute at most, and the solution should be freshly prepared when required. *Osborne.*

diabantite. A chloritic mineral found filling cavities in basic eruptive rocks, like basalt and diabase. *Fay.*

diabase. a. In the United States, a hypabyssal rock of the composition of gabbro but having an ophitic texture and consisting of labradorite laths in a matrix of augite with magnetite a common accessory. *Webster 3d.* b. In England, dolerite is used in place of diabase, and diabase is restricted to an altered dolerite in which the original pyroxene has been converted into secondary amphiboles, the plagioclase has been more or less albitized, and the ilmenite converted into leucoxene and magnetite. *C.T.D.*

diabase-amphibolite. Amphibolite formed by the dynamic metamorphism of diabase. *Compare* metadiorite. *A.G.I. Supp.*

diabase-porphyrite. A porphyry, the groundmass of which is finely crystalline diabase and the phenocrysts of which are primarily plagioclase. It is contrasted with augite porphyrite, the phenocrysts of which are primarily augite. *Fay.*

diabasic. Applied to a texture of igneous rocks in which discrete crystals or grains of pyroxene (usually augite) fill the interstices between lath-shaped feldspar (usually plagioclase) crystals. Characteristic of diabases and some gabbros. Ophitic is synonymous. *A.G.I.*

diablastic. Relating to the intergrowth of two or more minerals; the intergrowth can be parallel, radiate, or have some less regular arrangement. Synonym for sieve texture. *A.G.I.*

diaboleite. A sky-blue oxychloride of copper and lead; $2Pb(OH)_2.CuCl_2$; minute, tabular crystals; tetragonal; resembles linarite. From Mendip Hills, Somersetshire, England. *English.*

diabrochite. A metamorphic rock formed by wet recrystallization or by partial fusion but without any intimate penetration by visible granitic material as in magmatite. *A.G.I.*

diachronism. The transgression across time planes by a geologic formation. A bed of sand when traced over a wide area may occur in different time zones in different places because it was deposited during a long continued marine transgression. The bed becomes younger in the direction in which the sea advanced. Same as diachronous. *C.T.D.*

diachronous. Pertaining to or during the period of the earth's existence, but differing in geologic age. *A.G.I.; A.G.I. Supp.*

diaclase. A line of rectangular fracture; applied by Daubree to explain the fact that the lines of weakness in the earth's surface are perpendicular to one another. *Standard, 1964.*

diaclinal. Crossing a fold; as, a diaclinal river. *Webster 3d.*

diadactic structure. The structure exhibited by varved clays and silts, in which each sedimentation unit is marked by a gradation upward from coarse-grain size to fine-grain size. Synonym for graded bedding. *A.G.I.*

diadochite. A hydrated ferric phosphate and sulfate mineral, brown or yellowish in color. *Fay.*

diagenesis. a. Any change occurring within sediments subsequent to deposition and before complete lithification that alters the mineral content and physical properties of the sediments. *Bureau of Mines Staff.* b. Recombination or rearrangement resulting in a new product, as in the formation of larger crystalline grains from smaller ones. *Webster 3d.*

diagenetic deposits. Deposits consisting dominantly of minerals crystallized out of sea water, such as manganese nodules. *H&G.*

diaglyph. A marking or hieroglyph formed during diagenesis. *Pettijohn.*

diagnostic mineral. a. Such a mineral as olivine, nepheline, quartz, etc., which indicates an igneous rock is undersaturated or oversaturated. There are also diagnostic minerals in sedimentary and metamorphic rocks. Synonym for symptomatic mineral. *A.G.I.* b. A mineral, the presence of which permits certain deductions pertaining to the geologic history of the rock or sediment. *Bureau of Mines Staff.*

diagonal bedding. Bedding diagonal to the principal surface of accumulation. An obsolete synonym for inclined bedding. *Pettijohn.*

diagonal brace. A structural member in compression or tension, or both, at different times. It is usually designed and used to stiffen a frame against windloads. *Ham.*

diagonal coast. Coast oblique to the direction of the strike of the coastal formations. *Schieferdecker.*

diagonal eyepiece. The specially designed eyepiece for a prismatic telescope used in surveying high altitudes. *Ham.*

diagonal fault. A fault that strikes diagonally to the strike of the adjacent strata. Synonym for oblique fault. *Billings, 1954, p. 141.*

diagonal joints. a. Joints diagonal to the strike of the cleavage. *Zern.* b. In igneous rocks, joints which occur at 45° to the flow lines and are caused by shear. *Lewis, p. 603.*

diagonal lamination. Synonym for crossbedding. *Pettijohn.*

diagonal scour marks. Scour marks formed by concentration of smaller scour marks, generally longitudinal flutes, into distinct rows which alternate with areas where scour marks are less abundant or are absent. Arranged in rows diagonal to the main direction of flow. *Pettijohn.*

diagonal-slip fault. A fault in which the net slip is diagonal down or up the fault plane; for example, a fault which is neither a strike-slip nor a dip-slip fault. Synonym for oblique-slip fault. *Billings, 1954, p. 140.*

diagonal staple. N of Eng. A shallow pit sunk in a sloping or diagonal direction at the back of the main beam of a pumping engine and in which the lever beam works. *Fay.*

diagonal stratification. Same as false bedding; cerrent bedding; crossbedding. *Fay.*

diagonal tension. The principal tensile stress in reinforced and prestressed concrete. *Ham.*

diagram factor. The ratio between the actual mean effective pressure developed in a steam-engine cylinder and the ideal pressure deduced from the hypothetical indicator diagram. *C.T.D.*

diagrid floor. An open grid of diagonally intersecting structural ribs spanning a floor space. This form of construction may be in steel, concrete, or prestressed concrete and has the advantage of lightness combined with strength. *Ham.*

dial. a. A compass used for surface and underground surveying. It is fitted with sights, spirit levels, and a vernier, and mounted on a tripod. *Pryor, 3.* b. Corn. To make a mine survey. *Pryor, 3.*

dial gage. A sensitive instrument which measures deflections of one-thousandth of an inch or less by a needle moving on a graduated dial. *Ham.*

dialing; dialling. a. The process of running an underground traverse with a mining dial. *C.T.D.* b. Surveying, usually magnetic, using miner's dial. *Pryor.* c. The operation of making a survey with the dial. *Fay.*

Dialite. High alumina refractory brick. *Bennett 2d, 1962.*

diallage. A dark green or bronze-colored monoclinic pyroxene, which in addition to the prismatic cleavages, has others parallel to the vertical pinacoids. Mohs' hardness, 4; specific gravity, 3.2 to 3.35. Used also as a prefix to many rocks containing the mineral. *A.G.I.; Webster 3d; Fay.*

diallagite. A coarse-grained, deep-seated ultramafic igneous rock consisting essentially of diallage with small amounts of other minerals in an accessory role only; essentially monomineralic and a differentiation produuct of a gabbroic magma. *C.T.D.*

diallogite. Synonym for rhodochrosite. *Hey 2d, 1955.*

dialysis. The separation of substances in solution by means of semipermeable membranes (as of parchment, cellophane, or living cells) through which the smaller molecules and ions diffuse readily but through which the larger molecules and colloidal particles diffuse very slowly or not at all. Such separations are important in nature (as in living organisms and in soils) and have many applications (as in blood fractionation or in the recovery of sodium hydroxide in the manufacture of viscose). Used especially in the separation of noncolloids from colloids. *Webster 3d.*

diam Abbreviation for diameter. *BuMin Style Guide, p. 59.*

diamagnetic. Having a negative magnetic permeability in vacuum, therefore, diamagnetic particles are repelled by magnetic field. Opposite of paramagnetic. *Pryor, 3.*

diamagnetic material. A material whose specific permeability is less than unity and is therefore repelled weakly by a magnet. *ASM Gloss.*

diamagnetism. a. The property of certain substances by virtue of which they are repelled from both poles of a magnet and tend to set with the longer axis across the lines of magnetic force. Opposite of paramagnetism. *Standard, 1964.* b. That branch of science that deals with diamagnetic phenomena and bodies. *Standard, 1964.*

diamant. a. Obsolete English spelling of diamond. *Long.* b. French spelling of diamond. *Long.*

diamantiferous. Bearing or containing diamonds. *Shipley.*

diamantini. *See* glass frost. *Dodd.*

Diamel. A trade name for a magnesia spinel brick. *Hess.*

diameter. The greatest distance across a circle or through a sphere, the line of distance necessarily passing through the center of the circle or sphere. *Brantly, 2.*

diametric rectifier circuit. A circuit which employs two or more rectifying elements with a conducting period of 180 electrical degrees, plus the commutating angle. *Coal Age, 1.*

diamidogen sulfate. *See* hydrazine sulfate. *CCD 6d, 1961.*

diamine sulfate. *See* hydrazine sulfate. *CCD 6d, 1961.*

diamon. A local exepression used in Great Britain to denote ammonium nitrate-diesel oil mixtures. *Institution of Mining and Metallurgy. Symposium on Opencast Mining, Quarrying, and Alluvial Mining. London, 16-19 November 1964. Paper 12, p. 7.*

diamond. a. A pointed wooden or iron arrangement placed between rails, just before a curve or switch, where tram cars are liable to be derailed, to force them to remain on the rails. If the skips are traveling in one direction only, the diamond is pointed at one end; if traveling backward and forward on the same rails, both ends are pointed. *Fay.* b. A diamond of industrial grade used as the cutting element in drill bits. Also called boart; bort; bortz; carbon; congo. *B.S. 3618, 1963, Sec. 3.* c. The hardest known substance composed of carbon crystallized in the isometric system, the more common crystal forms being the octahedron and rhombic dodecahedron. The cube and some complex and combination forms of the isometric system are found, as well as rounded, distorted, twinned, and cryptocrystalline forms. Although very hard, diamond has excellent cleavage and breaks readily under a blow, yielding flat surfaces parallel to the octahedral planes. Diamonds usually are classified as either gems or industrials on the basis of color, shape, size, crystal form, and the size and location of inclusions or other imperfections. Diamonds sometimes also are classified on a geographical basis, such as Angolas, Brazilians, congos, Sierra Leones, or West Africans. This does not strictly mean that diamonds so classed come from that specific geographical area but that they are similar to stones characteristically produced by mines in that locality. A method for synthesizing diamonds has been developed, and small industrial diamonds have been produced on a commercial scale. These synthetic diamonds are commonly called manmade diamonds. *Long. See also* manmade diamond; natural diamond.

diamond ballas. An important industrial variety of diamond. The stones are spherical masses of minute diamond crystals arranged more or less radially. They have no well-defined cleavage planes and thus have great resistance to abrasion. While the term, ballas, was first applied to such stones from Brazil, diamonds of similar structure known as Cape and African ballas are found. In color, ballas ranges from white to varying shades of black. While Cape and African ballas are not as hard as the Brazilian, they include some fine and unusual stones. Production is small. Rarely, if ever, used for diamond drilling but very valuable for diamond tools. *Cumming.*

diamond bit. A rotary drilling bit studded with bort-type diamonds. *A.G.I.* Also called boart bit; boart-set bit; bort bit; bort-set bit; bortz bit; bortz-set bit. *Long.*

diamond-bit setter. See diamond-drill setter. *D.O.T. 1.*

diamond boring. Precision boring with a shaped diamond (but not with other tool materials). *ASM Gloss.*

diamond broker. A person who buys packets of diamonds from the marketing agency of the Diamond Syndicate or other source, resorts the diamonds, and acts as a retail agent selling directly to consumers. *Compare* diamond buyer; diamond dealer. *Long.*

diamond buyer. A person who buys diamonds directly from the producer at or near the site where the diamonds are found or mined. Not to be confused with diamond broker who is sometimes miscalled a diamond buyer. *Long.*

diamond chip. A fragment of a diamond crystal. Also called chip; chip diamond. *Long.*

diamond chisel. A cutting chisel having a diamond or V-shaped point. *Fay.*

diamond cleavage. The plane along which a diamond crystal can be split easily. The four planes paralleling the faces of an octahedron are those generally referred to as the cleavage planes, or diamond cleavage. All crystalline diamonds are more or less brittle and will be fractured by a sufficiently violent blow, but the irregular surface of a fracture cannot be mistaken for the brilliant flat surface produced by cleaving. The carbon has no cleavage, and in ballas cleavage is absent or very poorly defined. *Long.*

diamond cleaving. The act or process of splitting diamonds into smaller pieces, which may be more readily used as tool points, gems, or drill diamonds. *Long.*

diamond concentration. The ratio of the area of a single-layer bit face covered by the inset diamonds or, in an impregnated bit, the bulk proportion of the crown occupied by diamonds. *Long.*

diamond content. The number of carats of diamonds inset in the crown of a diamond bit. Also called stone content; stone weight. *Long.*

diamond core drill. A rotary-type drill machine using equipment and tools designed to recover rock samples in the form of cylindrical cores from rocks penetrated by boreholes. *See also* core drill; diamond drill. *Long.*

diamond coring. The act or process of obtaining a core sample of rock material using a diamond-inset annular bit as the cutting tool. *Long.* This tubular bit and attached core barrel are rotated at a speed under controlled pressure by means of hollow steel, flush-jointed rods through which water is pumped to cool the bit and remove rock cuttings. With the advance of the bit, a cylindrical core of rock passes up into the core barrel, where it is held by a core lifter or other device. *Cumming, p. 17.*

diamond count. a. The number of diamonds set in the crown of a specific diamond bit. Also called bit count; stone count. *Long.* b. Sometimes incorrectly used to indicate the average size of the diamonds inset in a specific bit. *See also* carat count. *Long.*

diamond crown. The cutting bit in diamond drilling. It consists of a steel shell containing in its face and edges small cavities into which black diamonds are set. In some types of crown the diamonds can be removed and reset for further use. Grooves, called waterways, are usually provided in the face of the crown to allow the passage of the drilling fluid. For surface-set bits in diamond drilling, it is recommended that 2 to 20 stones per carat should be used in soft ground (such as shale); 10 to 80 stones per carat in medium ground (such as sandstone); and 20 to 150 stones per carat in hard ground (such as granite). *See also* burned bit. *Nelson.*

diamond cubic. With respect to atomic arrangements, similar to the diamond in having the two face-centered cubic arrangements of atom centers either of which is displaced with respect to the other by one-fourth of the diagonal of the unit cube. *Henderson.*

diamond cut. *See* pyramid cut. *B.S. 3618, 1964, sec. 6.*

diamond cutter. a. An individual skilled in the art of shaping diamonds as gems. *Long.* b. A tool in which a single diamond, shaped as a cutting point, is inset. *Long.*

diamond cutting. One of the three processes by which diamonds are prepared for use as ornaments or in the arts, the others being diamond cleaving and diamond polishing. *Fay.*

diamond dealer. Synonym for diamond broker. *Long.*

diamond dies. Industrial stones that have been pierced to permit their use for drawing wire of a constant diameter. *I.C. 8200, 1964, p. 13.*

diamond drill. A drilling machine with a rotating, hollow, diamond-studded bit that cuts a circular channel around a core, which can be recovered to provide a more or less continuous and complete columnar sample of the rock penetrated. Diamond drilling is a common method of prospecting for mineral deposits. *A.G.I. Supp.* Also called adamantine drill; core drill; diamond core drill; rotary drill. *Long.*

diamond-drill cover. Boreholes drilled with a diamond drill and bits into rock surrounding an underground opening for the purpose of detecting water-bearing fissure or structures. *Compare* cover. *Long.*

diamond-drill crew. The men needed to operate a diamond drill properly. *Long.*

diamond driller. One who sets up and operates a diamond drill that is used to obtain solid cores of strata drilled through so that the character of the ground, the wealth of ore, or strength of material for foundations may be determined. He may set diamonds in the bit as they become worn or chipped, or are lost (diamond-drill setter). Also called core driller; core-drill operator; diamond-drill operator; diamond-drill runner; diamond-point drill operator; shot-core drill operator; test borer; test-hole driller; wash driller. *D.O.T. 1.*

diamond-driller helper. One who assists in the erection and operation of a core drill that bores into rock, earth, and other minerals to obtain core samples. Also called core-driller helper; core-drill-operator helper; diamond-point-drill-operator helper; drill-runner helper; shot-core-drill-operator helper; test-borer helper; test-hole-driller helper; wash-driller helper. *D.O.T. 1.*

diamond drill-hole probe. *See* Geiger-Müller probe. *Long.*

diamond drilling. The act or process of drilling boreholes using bits inset with diamonds as the rock-cutting tool. The bits are rotated by various types and sizes of mechanisms motivated by steam, internal-combustion, hydraulic, compressed-air, or electric engines or motors. *See also* diamond drill. *Long.*

diamond-drill men. Members of a diamond-drill crew or persons trained to perform one or more duties connected with the operation of a diamond drill. *Long.*

diamond-drill operator. *See* diamond driller. *D.O.T. 1.*

diamond-drill pipe. Synonym for drill rod. *Long.*

diamond-drill rod. Synonym for drill rod. *Long.*

diamond-drill runner. *See* diamond driller. *D.O.T. 1.*

diamond-drill sample. The core brought to the surface in the core barrel. The cuttings in the uprising drilling fluid will also provide sampling material. *See also* core recovery. *Nelson.*

diamond-drill setter. One who cuts recesses in head of diamond drilling bit, with hand or power-driven metalworking tools, to prepare it for receiving diamonds. Diamond setting may be performed by a diamond driller. Also called diamond-bit setter; diamond setter. *D.O.T. 1.*

diamond dust. a. Finely fragmented and powdered diamonds used as a cutting, grinding, and polishing abrasive or medium. *Long.* b. A diamond powder produced in the cutting of gems. *Pryor, 3.*

diamond exposure. The proportional mass of a diamond protruding beyond the surface of a matrix metal in which the diamond is inset. *Compare* bit clearance. *Long.*

diamond grade. The worth of a diamond as based on an individual sorter's interpretation of somewhat arbitrary standards of color, presence of flaws, soundness, and shape. *Long.*

diamond groove. A groove of V-section in a roll. *Fay.*

diamondiferous. Any substance containing diamonds; generally applied to rock or alluvial material containing diamonds but also may be used in referring to other diamond-impregnated substances, such as the crown of a diamond-impregnated bit. *Long.*

diamond impregnated. Having diamonds distributed throughout a matrix. *Compare* surface set. Long.

diamond-impregnated bit. Synonym for impregnated bit. *Long.*

diamond life. The amount of cutting a diamond will accomplish before being completely worn away by abrasion. In bits, diamond life usually is expressed in the number of feet drilled in a specific rock before the inset diamonds become too dulled to continue cutting or are lost by roll out or completely worn away by abrasion. *Long.*

diamond loss. The difference between the amount of diamond set in a bit and the usable diamond salvaged from the same bit when worn is considered the diamond loss. The loss may be expressed in carat per bit, in carat per foot drilled, or in carat per 100 feet of borehole drilled in a specific rock. *Long.*

diamond matrix. a. A metal or metal alloy forming the material in which the diamonds inset in a bit crown are embedded. Also called bit-crown metal; bit-crown matrix; bit matrix; crown metal; matrix. *Long.* b. The rock material in which diamonds are formed naturally and occur, such as in kimberlite. *Long.*

diamond needle. A small-diameter hollow metal tube attached to a flexible rubber tube through which air is pulled by a suction or vacuum pump. The suction created at the tip of the metal tube enables a bit setter to pick up and place a small diamond in a bit mold with greater facility than with tweezers.. Called a needle because the metal tube generally is made by using a discarded hypodermic needle. Also called diamond pickup needle; diamond pickup tube; diamomnd pipe. *Long.*

diamond orientation. The act or process of purposely setting a diamond in a bit or cutting tool in such a manner that a specific crystal face or hard vector plane of the diamond will be the face or plane in contact with the material being cut or abraded by the diamond. *Long.*

diamond-particle bit. A surface-set or impregnated type of diamond bit in which the inset diamonds are small fragments of diamonds. *Long.*

diamond pattern. Manner in which the inset diamonds are arranged or distributed about the crown of a bit with or without conforming to some predetermined geometric arrangement. *Long.*

diamond pickup needle. Synonym for diamond needle. *Long.*

diamond pickup tube. Synonym for diamond needle. *Long.*

diamond pipe. a. Term used for an occurrence of kimberlite in volcanic pipes large enough and sufficiently diamondiferous to be minable. The size and shape of these pipes depend on the position of the planes of structural weakness in the country rock through which the molten kimberlite passed. They may be columnar, tabular, or irregular in shape and where mining is deep enough the diamond pipe is found to decrease in area and assume a dikelike habit. *I.C. 8200, 1964, p. 31.* b. Synonym for diamond needle. *Long.*

diamond-point bit. Synonym for mud bit. *Long.*

diamond-point drill operator. *See* diamond driller. *.D.O.T. 1.*

diamond powder. Same as diamond dust. *Long.*

diamond pressure. The proportional amount of the total feed pressure applied to a diamond bit theoretically borne by an individual diamond inset in the face of the bit. Also called pressure per diamond; pressure per stone; stone pressure. *Long.*

diamond-pyramid hardness test. An indention hardness test employing a 136° diamond-pyramid indenter and variable loads enabling the use of one hardness scale for all ranges of hardness from very soft lead to tungsten carbide. *ASM Gloss. See also* Vickers hardness test.

diamond quality. Synonym for diamond grade. *Long.*

diamond reamer. A device to enlarge a borehole, consisting of a length of pipe behind the bit and core barrel, set with diamonds to cut into the walls of the borehole. *Nelson.*

diamond salvage. The recovery of fine diamond fragments and powders that are present in the swarf and sludge from diamond grinding operations, as well as material from diamond-pointed tools, wheel dressers, diamond-drill bits, and broken or discarded diamond wiredrawing dies and grinding wheels. *BuMines Bull. 630, 1965, p. 307.*

diamond saw. A circular metal disk having diamonds or diamond dust inset in its cutting or peripheral edge. Employed to cut rocks and other brittle substances. *Long.*

diamond-saw splitter. Synonym for core saw. *Long.*

diamond sawyer. In the stonework industry, one who uses a saw in which block diamonds are inserted in the teeth. *D.O.T. 1.*

diamond scale. Instrument on which diamonds are weighed with weight units calibrated in carats; scales vary from a folding 50-carat-capacity type, small enough to fit in a coat pocket when closed, to those large enough to weigh several thousand carats at one time. *Long.*

diamondscope. An especially designed illuminator employing a gemstone holder of special design, a binocular microscope, and a combination baffle which affords examination of stones by either transmitted light, or by reflected light incident to all pavilion facets only, and against either a white or black background. It has the effect of eliminating most reflections from the facets on the crown so that inclusions (imperfections) may be easily observed and identified. Used for both the identification of colored stones and the grading of diamonds. *Shipley.*

diamond scrap. As used in the diamond-drilling industry—broken diamonds and diamond fragments deemed unfit for reuse in a diamond bit. In other industries using diamond-pointed tools, any piece of diamond salvaged from a tool and deemed unfit for reuse in the same kind of tool. *Long.*

diamond screen. A perforated metal or wirecloth sieve used to sort diamonds or fragments of diamonds according to size. *Long.*

diamond-set. Contains inset diamonds. *Long.*

diamond-set bit. A rock-boring or rock-cutting tool, the cutting points of which are inset diamonds. *Long.*

diamond-set inserts. Small, shaped metallic slugs inset with diamonds designed to be brazed or welded into slots or depressions machined in a metal bit or reaming-shell blank. *Long.*

diamond-set ring. A powdered metal-alloy band encircling a reaming shell in which diamonds are inset mechanically. *Long.*

diamond setter. Formerly, persons skilled in the art of handsetting a diamond bit; also, persons trained to set diamonds in a mold to produce a so-called mechanically set bit. A few are being trained currently to handset, but the technique is rapidly becoming a lost art. *Long.*

diamond shoe. a. A diamond-set washover shoe. *Long* b. Term sometimes erroneously applied to a diamond-set casing bit and/or a set casing shoe. *Long.*

diamond size. According to the diamond-drilling and bit-setting industries, the size of a diamond is always expressed in the number of nearly equal size diamonds having a total weight of 1 carat; hence an 8-diamond size means 8 stones weighing 1 carat; a 40-diamond size means that there are 40 diamonds having a total weight of 1 carat. *Long.*

diamond spar. Same as corundum. *Fay.*

diamonds per carat. The number of relatively equal size diamonds having a total weight of 1 carat. Also called stones per carat. *Long.*

diamond system. Synonym for diamond drill; diamond drilling. *Long.*

diamond tin. Large bright crystals of cassiterite. *Fay.*

diamond tools. a. Tools and equipment used to drill a borehole with diamond-set bits. *Long.* b. Any tool, the cutting point of which is a diamond, sometimes an inset whole stone or a shaped fragment of a diamond. *Long* c. A diamond, shaped or formed to the contour of a single-pointed cutting tool, for use in the precision machining of nonferrous or nonmetallic materials. *ASM Gloss.*

diamond-tooth saw. A circular saw for cutting stone with points of the teeth of pieces of diamonds. *Mersereau, 4th, p. 301.*

diamond tweezers. Sharp, pointed tweezers used to pick up and manipulate single diamonds. *Long.*

diamond washer. An apparatus used for washing diamondiferous gravel. It has a bottom discharge with three coarse screens above, each one being removable. The shaker works in two bush logs, hollowed out to suit, and embedded in the ground. The screens are 8-,4-,2-, and 1 -millimeter mesh, the 8-millimeter screen being on top and the 1-millimeter screen at the bottom. The shaker is worked by a man standing on it at each end, and rocking it from side to side by a peculiar motion of the legs, the rocking motion begin ended each time by a sudden sharp jerk to one side. In West Africa the washer is commonly referred to as the shaker. *Griffiths, S. V., pp. 8-10.*

diamond wear. Synonym for diamond loss. *Long.*

diamond wheel. a. A grinding wheel in which crushed and sized industrial diamonds are held in a resinoid, metal, or vitrified bond. *ASM Gloss.* b. Synonym for diamond saw. *Long.*

diamontiferous. *See* diomondiferous. *Long.*

dianite. Synonym for columbite. *Crosby, p. 119.*

diaphaneity. The quality or state of being diaphanous. Specifically, the ability of a mineral to transmit light. *Webster 3d. Compare* transparent; semitransparent; translucent; opaque. *Fay.*

diaphanous. Allowing light to show or to shine through. *Webster 3d.*

diaphorite. a. A mineral like freieslebenite in composition, $(Pb.Ag_2)_5Sb_4S_{11}$, or $5(Pb,Ag_2)S.2Sb_2S_3$, but orthorhombic in form. *Fay.* b. Synonym for allagite. *Hey 2d, 1955.*

diaphragm. a. A porous or permeable membrane separating anode and cathode compartments of an electrolytic cell from each other or from an intermediate compartment. *ASM Gloss.* b. Universal die member made of rubber or similar material used to contain hydraulic fluid within the forming cavity and transmit pressure to the part being formed. *ASM Gloss.* c. A flexible partition between two chambers. *Nichols, 2.* d. The crosshair ring or metal piece holding the crosshairs or spider lines in a telescope. Also called reticule. *Seelye, 2.* e. In photography, a device for controlling the amount of light passed by a lens and for cutting out such rays as would tend to mar the perfection of the image. Also called the stop. *Seelye, 2.*

diaphragm jig. In the gravity concentration of minerals, a jig with a flexible diaphragm used to pulse water. The Bendelari, Pan-American, Denver, and Conset are examples. *Pryor, 3.*

diaphragm pump. A positive displacement pump used for lifting small quantities of water and discharging them under low heads. It has a plunger arm operating either on an eccentric shaft or a rocker-arm thrusting on a rubber diaphragm stretched over a cylinder. As the diaphragm is depressed, the water and air in the cylinder is forced out through the discharge side of the pump. As the diaphragm is lifted, a vacuum is created in the cylinder, and water is forced in. *Carson, p. 202.*

diaphragm-type washbox. A washbox in which the pulsating motion is produced by the reciprocating movement of a diaphragm. *B.S. 3552, 1962.*

diaphthoresis. Synonym for retrogressive metamorphism; retrograde metamorphism. *See also* diaphthorite. *A.G.I.*

diaphthorite. A cataclastic schist with characteristic minerals of upper deep magmas which have developed at the cost of protogene minerals of lower deep magmas. Relict structures may be present. *Hess.*

diaphthoritic. Relates to rocks which have been affected by diaphthoresis. *Schieferdecker.*

diapir fold. An anticline in which a mobile core, such as salt, has injected the more brittle overlying rock. Synonym for piercing fold; piercement fold. *Billings, 1954, p. 59.*

diaschistic. Derived from a larger, parent igneous mass, but differing from it in composition; said of certain dikes associated with igneous intrustions. Contrasted with aschistic. *Fay.*

diasphaltene; soft asphalt. Portion of bitumen soluble in ether or in carbon disulfide but insoluble in a mixture of equal parts of ether and alcohol. *Bennett 2d, 1962.*

diaspore. A natural hydrous aluminum oxide, $Al_2O_3.H_2O$, occurring in bauxite and with corundum and dolomite. White, gray, yellowish, and greenish; luster, vitreous to pearly; specific gravity, 3.35 to 3.45; Mohs' hardness, 6.5 to 7. Found in Arkansas, Missouri, Pennsylvania; Switzerland; U.S.S.R.; Czechoslovakia. Used as a refractory, abrasive. A possible source of aluminum. *CCD 6d, 1961.*

diaspore brick. A high-alumina brick manufactured substantially from diaspore clay. *A.R.I.*

diaspore clay. A rock consisting essentially of diaspore bonded by flint clay. Commercial diaspore clay of the purest grade usually contains between 70 and 80 percent alumina after calcination. *HW.*

diasporogelite. The colloidal form of aluminum hydroxide, $Al_2O_3.H_2O$. One of the ingredients of bauxite. Also called sporogelite; cliachite. *English.*

diastatic. Pertaining to or due to the movements resulting from the forces which produce deformation of the earth's surface. *Fay.*

diastem. a. A break represented in other regions, often within the same formation, by a bed or series of beds. *A.G.I.* b. A depositional break of less magnitude than a disconformity and which is represented elsewhere by a group of strata of less than formation value. *A.G.I.* c. A depositional break or a hiatus of assumed minor duration. A diastem represents an intraformational break and is therefore represented by deposits of less than formation rank elsewhere. There is no faunal or floral change across the diastem. *A.G.I.*

diasteria. An asteria which exhibits a star by transmitted light only. Of little or no importance as a jewel. *See also* asteria. *Shipley.*

diasterism. Asterism seen by transmitted light. *See also* asterism; epiasterism. *Shipley.*

diastrophe. An event characterized by a deformation of the earth's crust. *Standard, 1964.*

diastrophism. The process of deformation that produces in the earth's crust its continents and ocean basins, plateaus and mountains, folds of strata, and faults. Com-
b. Of or relating to diathermy. *Webster 3d.*

diathermanous. a. Transmitting infrared radiation. *Webster 3d.* b. Allowing the free passage of the rays of heat as a transparent body allows free passage of light. *Standard, 3d.*

diathermic. a. Diathermanous. *Webster 3d.* b. Of or relating to diathermy. *Webster 3d.*

diathermy. The generation of heat in tissue for medical or surgical purposes by the application of high-frequency electric currents of various wavelengths by means of electrodes and other instruments. *Webster 3d.*

diatom. A microscopic unicellular plant which has an envelope (frustule) or outer skeleton of hydrated silica, close to opal in composition, and usually in two parts, though some have a ring-shaped frustule and these grow in chains. They inhabit both fresh water and salt water, and their frustules form masses of diatomaceous earth or shale attaining a thickness of thousands of feet. *Hess.*

diatomaceous. Formed from the silicious skeletons of diatoms. *Shipley.*

diatomaceous earth. *See* diatomite. *BuMines Bull 630, 1965, p. 314.*

diatomic. a. Consisting of two atoms; having two atoms in the molecule. *Webster 3d.* b. Having two replaceable atoms or radicals. *Webster 3d.*

diatomite; diatomaceous earth; kieselguhr. A fossil accumulation of diatoms, usually with some radiolaria and smaller amounts of foraminifera. Diatomite is essentially amorphous, hydrated, or opaline silica with various contaminants, such as silica sand, clay minerals, iron, alkalies, and alkaline earths. Unprocessed diatomite has a hardness of between 4 and 6½ on Mohs' scale. It is widely used as a filter medium, as industrial filler, for thermal and acoustical insulation, in ceramics, and numerous other uses. The largest deposits in the United States are in California. Erroneous nomenclature includes infusorial earth, infusorial silica, and tripolite. *BuMines Bull. 630, 1965, pp. 313-314.*

diatom ooze. A deep-sea deposit, resembling flour when dry, largely composed of the frustules of diatoms and containing a small but variable proportion of calcareous organisms and mineral particles. *Holmes, 1928.*

diatomous. Having a single distinct diagonal cleavage; applied to certain crystals. *Standard, 1964.*

diatom prism. A prism attached to a microscope to give oblique illumination for observing very fine markings. *Standard, 1964.*

diatom saprokol. A saprokol containing a large amount of diatoms. *Tomkeieff, 1954.*

diatreme. A volcanic vent or pipe drilled through enclosing country rocks (usually flat-lying sedimentary rocks) by the explosive energy of the gas-charged magmas. The diamond-bearing kimberlite pipes of South Africa are examples. *Holmes, 1920.*

diazodinitrophenol; dinol. $C_6H_2ON_2(NO_2)_2$; molecular weight, 210.11; yellow; crystalline or amorphous powder; and specific gravity, 1.63. Used in blasting caps as a substitute for mercury fulminate. *Bennett 2d, 1962.*

dibasic. An acid, such as H_2SO_4, that contains 2 hydrogen atoms which can be replaced by 2 monovalent basic atoms. *Pryor, 3.*

dibhole. Eng. The lowest part of a mine, into which the water drains; a dump. *Standard, 1964.*

diborane. (B_2H_6), a gas having a heating value of 31,200 to 33,300 British thermal units per pound. *BuMines Bull. 585, 1960, p. 143.*

dibutyl butyl phosphonate. Colorless; liquid; mild odor; $C_4H_9P(O)(OC_4H_9)_2$; stable; insoluble in water; miscible with most common organic solvents; specific gravity, 0.948 (at 20° C, referred to water at 4° C); and flash point, 310° F. Used in heavy metal extraction and solvent separation; in gasoline additives; as an antifoam agent; and as a plasticizer. *CCD 6d, 1961.*

dibutyl carbinol. 2-methyl-1-butanol; a frother used in the flotation process. *Pryor, 3.*

dicalcium orthophosphate. *See* calcium phosphate, dibasic. *CCD 6d, 1961.*

dicalcium silicate; dicalcium orthosilicate. One of the components of cement; colorless; $2CaO.SiO_2$ or Ca_2SiO_4; orthorhombic or monoclinic; specific gravity, 2.97 to 3.28, depending on allotropic form; and melting point, 2,130° C. Obtained as a byproduct in electric-furnace operation. Used to neutralize acid soils. *See also* Portland cement. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-163.*

dice. a. Eng. Term used in Lincolnshire for an oil shale. *Tomkeieff, 1954.* b. The more or less cubical fracture of tempered glass. *ASTM C162-66.*

dice blocks. *See* throat. *Dodd.*

dice coal. Leic. Layers in a coal seam which naturally break or split into small pieces resembling dice. *Fay.*

dice mineral. A Wisconsin term for small cubic galena. *Fay.*

dicey. A term describing a rock which breaks into small pieces resembling dice. *B.S. 3618, 1964, sec. 5.*

dicey clay. Any clay or mudstone with a cuboidal fracture, as in the Kimmeridge clay. *Arkell.*

dicey coal. *See* dice coal. *Tomkeieff, 1954*

dicey coal. Corn. A lode possessing many horizontal joints. *Fay.*

dichroic colors. A term loosely used to refer to either the two colors observable in a dichroic stone or the three colors in a trichroic stone. Same as twin colors. *See also* dichroscope. *Shipley.*

dichroism. *a.* Pleochroism in which the colors are unlike when a crystal is viewed in the direction of two different axes. *Webster 3d.* b. The property of some bodies of differing in color with the thickness of the transmitting layer or of some liquids of differing in color with the degree of concentration of the solution. *Webster 3d.* c. The property of some surfaces of reflecting light of one color and transmitting light of other colors. *Webster 3d.*

dichroite. A hydrated, aluminum-magnesium-iron silicate mineral, $H_9(Mg,Fe)_4Al_8Si_{10}O_{37}$. Synonym for iolite; cordierite. *Fay.*

dichromate; bichromate. A salt containing the divalent Cr_2O_7 radical. *Hackh's Chem. Dict.*

dichromate treatment. A chromate conversion coating produced on magnesium alloys in a boiling solution of sodium dichromate. *ASM Gloss.*

dichromic. Containing 2 atoms of chromium or their equivalents in the molecule. *Webster 3d.*

dichroscope. An instrument designed to detect two of the different colors emerging from pleochroic (that is, dichroic or trichroic) gems. Contains a rhomb of Iceland spar and a lense system in a short tube, and exhibits the two colors side by side. *Shipley.*

dickinsonite. A green, hydrous phosphate mineral, chiefly of manganese, iron, and sodium. *Fay.*

Dickinson's fault plane theory. In 1898, Joseph Dickinson stated that the direction of subsidence may be judged by analogy from the slopes taken by faults and mineral veins. He also advanced that in seams of moderate inclination, a larger protective pillar is required on the rise side than on the dip side of any area to be supported. *See also* dome theory. *Nelson.*

dickite. A form of basic hydrated silicate of aluminum, $Al_4(Si_4O_{10})_3(OH)_{12}.3H_2O$, of the same chemical composition as kaolinite with which it is grouped, and from which it differs only in the details of atomic structure and in certain physical properties. *C.M.D.; Dana 17.*

diclinic. A crystal having two of the three axes inclined to the third and perpendicular to each other. *Standard, 1964.*

didier-march kiln. A coal-fired tunnel kiln; typically, there are four fireboxes, two on each side. *Dodd.*

didymium. a. The name applied to commercial mixtures of rare earth elements obtained from monozite sand by extraction followed by the elimination of cerium and thorium from the mixture. The name is used like that of an element in naming mixed oxides and salts. The approximate composition of didymium from monazite, expressed as rare earth oxides is 46 percent lanthana, La_2O_3; 10 percent praseodymia, Pr_6O_{11}; 32 percent neodymia, Nd_2O_3; 5 percent samaria, Sm_2O_3; 0.4 percent yttrium earth oxides; 1 percent ceria, CeO_2; 3 percent gadolinia, Gd_2O_3; and 2 percent others. The mineral bastnaesite could also be a source of didymium mixtures. For uses, *see* didymium salts. *CCD 6d, 1961.* b. The name didymium has also been applied to mixtures of the elements praseodymium and neodymium because such mixtures were once thought to be an element and was assigned the symbol, Di. *CCD 6d, 1961.*

didymium salts. Salts derived from commercial didymium mixtures. Used for coloring glass; decolorizing glass; and in metallurgical research. *CCD 6d, 1961.*

didymolite. A dark gray silicate of aluminum and calcium, $2CaO.3Al_2O_3.9SiO_2$. Small twinned crystals. Monoclinic. From Tatarka River, Yeniseisk District, Siberia, U.S.S.R. *English.*

die. a. A piece of hard iron, placed in a mortar to receive the blow of a stamp or in a pan to receive the friction of the muller. Between the die and the stamp or muller the ore is crushed. *Fay.* b. Various tools used to impart shape to material primarily because of the shape of the tool itself. Examples are blanking dies, cutting dies, drawing dies, forging dies, punching dies, and threading dies. *ASM Gloss.* c. In powder metallurgy, the part or parts making up the confining form into which a powder is pressed. The parts of the die may include some or all of the following: die body, punches, and core rods. Synonym for mold. *ASM Gloss.* d. Synonym for bell tap. *Long.* e. The form used in the process of manufacturing diamond-set bits by casting or powder metal methods. Also called bit mold. *Long.* f. A tool used to cut threads on bolts or piping. *Long.* g. A mold used for forming ceramic shapes from plastic or semiplastic nonmetallic materials or compositions. *Bureau of Mines Staff.* h. A metal case through which clay is forced to impart the dimension and shape of the unit; may be cored or solid; a metal form for molding. *ACSG, 1963.*

die block. The tool steel block into which the desired impressions are machined and from which forgings are produced. *ASM Gloss.*

die body. In powder metallurgy, the stationary or fixed part of a die. *ASM Gloss.*

die casting. a. A casting made in a die. *ASM Gloss.* b. A casting process where molten metal is forced under high pressure into the cavity of a metal mold. *ASM Gloss.* c. Casting in permanent molds. *Pryor, 3.*

die-casting alloys. Alloys that are suitable for die casting, and which can be relied on for accuracy and resistance to corrosion when cast. Aluminum-, copper-, tin-, zinc-, and lead-base alloys are those generally used. *C.T.D.*

die clearance. Distance between mating die members. *ASM Gloss.*

die collar. Synonym for bell tap. *Long.*

die cushion. A press accessory located beneath or within a bolster or die block to provide an additional motion or pressure for stamping operations; actuated by air, oil, rubber, or springs, or a combination thereof. *ASM Gloss.*

die earth. Eng. A local term at Coalbrook Dale for the Wenlock shale, because this stratum lies beneath all the mining ground of the district—the minerals dying out, as it were, at this stratum. *Fay.*

die forging. A forging whose shape is determined by impressions in specially prepared dies. *ASM Gloss.*

die forming. The shaping of metal to a desired configuration through the use of a die and the force required. *ASM Gloss.*

Diehl process. Method of cyanidation of gold ores in which cyanogen bromide is used to aid leaching of tellurides. *Pryor, 3.*

die holder. a. A plate or block, upon which the die block is mounted, having holes or slots for fastening to the bolster or bed of the press. *ASM Gloss.* b. In metallurgy, one who sets up and operates a die-holder carriage of an extrusion press. *D.O.T. Supp.*

dieing machine. A high-speed vertical press, the slide of which is activated by pull rods extending to the drive mechanism below the bed. *ASM Gloss.*

die insert. In powder metallurgy, a removable liner or part of a die body or punch. *ASM Gloss.*

dielectric. a. A material which offers relatively high resistance to the passage of an electric current but through which magnetic or electrostatic lines of force may pass. Most insulating materials, for example, air, porcelain, mica, and glass, are dielectrics and a perfect vacuum would constitute a perfect dielectric. *NCB.* b. An insulator. A term applied to the insulating material between the plates of a capacitor. *H&G.*

dielectric constant. The numerical expressions of the resistance to the passage of an electric current between two charged poles. It is the ratio of the attraction of two oppositely charged poles as measured in a vacuum to their attraction in a substance. *Hess.* The dielectric constant, which corresponds to permeability in magnetic materials, is a measure of the polarizability of a material in an electric field. This property determines the effective capacitance of a rock material and consequently its static response to any applied electric field, either direct or alternating. The dielectric constant of a vacuum is unity. For most hard rocks it ranges from about 6 to 16 electrostatic units. For wet soils and clays it is somewhat greater than this, extending up to 40 or 50 electrostatic units. *Dobrin, pp. 341-342.*

dielectric heating. A method of high frequency heating in which the object to be heated, which must be nonconducting, is placed in a high frequency alternating field where it is heated by the continually reversed polarization of the molecules. It has found application in the foundry for the drying of sand cores. *Osborne.*

dielectrics. Nonconductors of electricity may, under the influence of neighboring electric bodies, become electrically polarized by induction. Such materials are known as dielectrics. Their electromotive force is called dielectric polarization or dielectric induction. The strength of the electromotive force is determined by the dielectric constant. *Hess.*

dielectric separation. Method of ore treatment based on differences between dielectric constants of minerals suspended in an intermediate nonconducting fluid, when subjected to electric fields. Of limited use in laboratory work. *Pryor, 3.*

dielectric strength. The maximum potential gradient that a dielectric material can withstand without rupture. *Lowenheim.*

die lines. Lines or markings on formed, drawn, or extruded metal parts caused by imperfections in the surface of the die. *ASM Gloss.*

die lubricant. a. A solution that is used to facilitate the flow of plastic clay through a die or to prevent sticking of clay compositions to dies or molds during the forming process. *See also* lubricant; mold lubricant. *Bureau of Mines Staff.* b. In powder metallurgy, a lubricant applied to the walls of the die and punches to facilitate the pressing and ejection of the compact. *ASM Gloss.*

die lubrication. Machine oils of a light variety or soap solutions are used for the lubrication of dies used in the forming of steel shapes. The procedure eases the strain on the metal and die and may prevent hair-lining in the subsequent enameling process. Machine oils should not be used to lubricate enamel ware blanks, due to difficulty encountered in cleaning with alkaline baths. *Hansen.*

dienerite. A gray-white nickel arsenide, Ni_3As; cubic crystals; isometric. From Radstadt, Salzburg, Austria. *English.*

die nipple. Synonym for belll tap. *Long.*

diente. Binding stone in Mexican masonry. *See also* tizón. *Fay.*

die opening. In flash or upset welding, the distance between the electrodes, usually measured with the parts in contact but before welding has commenced or immediately upon completion of the cycle. *ASM Gloss.*

die presser. One who operates screw press or hydraulic press to squeeze clay materials into shape of electrical porcelain ware, such as insulators. Also called former; tube-machine operator. *D.O.T. 1.*

die pressing. Term used in some sections of the industry for dry pressing. *See also* dry pressing. *Dodd.*

die radius. The radius on the exposed edge of a drawing die, over which the sheet flows in forming drawn shells. *ASM Gloss.*

dies. a. Hard metal forms for receiving metal and shaping articles, under pressure. *Mersereau, 4th, p. 426.* b. The dies used for drawing or stamping are made of chilled, hardened tool steel. These dies will vary in size and weight. *Hansen.*

die scalping. Removing surface layers from bar, rod, wire, or tube by drawing through a sharp-edged die to eliminate minor surface defects. *ASM Gloss.*

diesel-electric locomotives. Diesel-electric locomotives are available in sizes ranging from 10 tons up to the heaviest classes. The electric drive facilitates the use of full engine horsepower at all locomotive speeds and provides wide flexibility of control. *Pit and Quarry, 53rd, Sec. A, p. 114.*

diesel engine. A type of internal-combustion engine in which air is compressed to a temperature sufficiently high to ignite fuel injected directly into the cylinder, where the combustion and expansion actuate a piston. Thermodynamically, its operation approximately follows the ideal diesel cycle. Diesel engines may be of either the four-stroke-cycle design or the two-stroke-cycle design. The efficiency of the diesel engine (32 to 38 percent) is higher than that for other engines. Named after Rudolf Diesel, a German mechanical engineer, who patented this type of engine in 1892. *Webster 2d.*

diesel hammer. A pile driving drophammer operated by a type of diesel engine. *Ham.*

Diesel index. An expression developed to correlate aniline point and API gravity with cetane number. Diesel index $= \frac{GA}{100}$ where G is the API gravity of an oil, and A is the aniline point of the oil. *Francis, 1965, v. 1, p. 295.*

dieseling. In a compressor, explosions of mixtures of air and lubricating oil in the compression chambers or other parts of the air system. *Nichols.*

diesel locomotive. A locomotive driven by a diesel engine and widely used in mines for the haulage of mine cars. It is at its best when handling heavy loads along relatively heavy gradients. A 100-horsepower diesel locomotive, weighing 15 tons, can give good continuous service. *See also* locomotive haulage. *Nelson.*

diesel oil. Fuel for diesel engines obtained from the distillation of petroleum. Its efficiency is measured by the so-called cetane number. It is composed chiefly of aliphatic hydrocarbons. Its volatility is similar to that of gas oil. Also used in oil-base drilling muds. *CCD 6d, 1961. See also* gas oil.

diesel rig. Any drill machine powered by a diesel engine. *Long.*

diesel squeeze. Pumping dry cement mixed with diesel oil through casing perforations to recement water-bearing areas and leave oil-bearing areas unaffected. *Wheeler.*

diesel truck. In opencast mining, a powerful and robust diesel-engined vehicle carrying from a few to over 100 cubic yards of earth or rock. Also used in trackless transport in tristate mines. *Pryor, 3.*

die set. A standardized tool or tool holder consisting of a die base and punch plate for the attachment of a die and punch, respectively. *ASM Gloss.*

diesinking. Forming or machining a depressed pattern in a die. *ASM Gloss.*

die steels. Steels of the plain carbon or the alloy types, which must be of high quality which is usually attained by special methods of processing. Essentially, they are steels used in making tools for cutting, machining, shearing, stamping, punching and chipping. *BuMines Bull. 556, 1956, p. 815.*

die stock. A contrivance for holding dies used in screw cutting. *Fay.*

Dietert tester. An apparatus for the direct reading of a Brinell hardness after impression without the aid of magnification or conversion tables. After the impression is made, the reading is taken by pressing gently against the part so that the depth pin guides itself into the center of the impression. Brinell hardness is read directly from the dial. The needle can be put back to zero by means of an exterior control if it becomes bent after long usage or when it has been subjected to shock. *Osborne.*

diethylene glycol dibutyl ether. Practically colorless; liquid; characteristic odor; $C_4H_9O(C_2H_4O)_2C_4H_9$; slightly soluble in water; and specific gravity, 0.8853 (at 20° C, referred to water at 20° C). A high boiling point, inert solvent with applications in extraction processes and an extractant for uranium ores. *CCD 6d, 1961.*

diethylene glycol distearate. *See* diglycol stearate. *CCD 6d, 1961.*

diethylene glycol monostearate. *See* diglycol monostearate. *CCD 6d, 1961.*

diethyl ethylphosphonate. Colorless; liquid; mild odor; $C_2H_5P(O)(OC_2H_5)_2$; miscible with most common organic solvents; soluble in water; specific gravity, 1.025 (at 20° C, referred to water at 4° C); and flash point, 220° F. Used in heavy metal extraction and in solvent separation. *CCD 6d, 1961.*

die tripper. *See* leverman. *D.O.T. 1.*

dietzeite. A dark golden-yellow iodate and chromate of calcium, $2CaO.I_2O_5.CrO_3$. Crystals prismatic, tabular; commonly fibrous, or columnar. Monoclinic. From Atacama, Chile. *English.*

dievrite. *See* ilvaite. *C.M.D.*

die welding. Forge welding between dies. *ASM Gloss.*

difference effect. The difference between the local corrosion and the normal corrosion of the anodic member of a galvanic couple. The difference effect is positive when the local corrosion is greater than the normal corrosion and negative when it is less. *BuMines Bull. 619, 1964, p. 206.*

difference in gage of drill bits. The difference in diameter of the bits when passing from one length (change) of drill steel to the next longer one of a set. *Fraenkel.*

difference of potential. The difference in electrical pressure existing between any two points in an electrical system or between any point of such a system and the earth. Determined by a voltmeter. *Fay.*

differential. The unit which provides the main gear reduction between the motor and the rear wheels and compensates for the different distance traveled by each rear wheel when turning corners. *API Glossary.*

differential anatexis. A selective fusion of deeep-seated rocks. *Schieferdecker.*

differential compaction. a. The relative change in thickness of mud and sand (or limestone) after burial due to reduction in pore space. Under loading the mud compacts more than the sand (or limestone), accentuating the initial dip of the beds and developing conformable sections which thicken and thin locally. *A.G.I.* b. The compression in sediments produced by the weight of the overburden and by the condition and nature of the sediments involved. In addition to the physical compression, the forcing out of water and the drying of sediments are important considerations. *A.G.I.* c. Assume that a hill composed of resistant rock 500 feet high is buried under a sheet of homogeneous sediments that are 1,500 feet thick over the surrounding lowlands and 1,000 feet thick over the hill. Furthermore, assume that these sediments, because of the compaction, decrease 20 percent in thickness. Over the top of the hill, the sediments will lower 200 feet, whereas over the lowlands, the surface will lower 300 feet. The sediments are thus deformed into an anticline. *A.G.I.*

differential curvature. A quantity represented by the acceleration due to gravity times the difference in the curvatures in the two principal planes, that is, $g(1/_{p1} - 1/_{p2})$, where p1 and p2 are the radii of curvature of the two principal planes. *A.G.I.*

differential erosion. Unequal reaction to a uniform process of erosion. Rocks vary in their resistance, so that erosion is selective in its effects and the more resistant rocks stand out while the less resistant are more rapidly worn away. It largely depends on the relative hardness of the rocks, but relatively soft rocks may be resistant if much of the rain sinks in instead of forming erosive streams. *Challinor.*

differential fault. It is very common that a fault differs in the amount of movement or displacement at different points along the fault plane. It even may happen that there is a displacement of many feet, or even of hundreds of feet, along one section of the fault, and practically no movement whatever at a certain point, which has served as the pivot. *Stokes and Varnes, 1955.*

differential flotation. Separating a complex ore into two or more valuable minerals and gangue by flotation. Also called selective flotation. *ASM Gloss.* These separate concentrates are made possible by the use of suitable depressors and activators. *Newton, p. 101.*

differential grinding. Application of comminution in such a way as to accentuate differences in grindability between the various mineral species in the ore. Therefore, in suitable cases, the relatively tough mineral particles remain coarse while the more friable ones are finely ground. *Pryor, 3.*

differential heating. Heating that produces a temperature distribution within an object in such a way that, after cooling, various parts have different properties as desired. *ASM Gloss.*

differential pressure. The difference between twod absolute pressures. *Roberts, I, p. 18.*

differential pressure flowmeter. An instrument for measuring water and water-ore slurries in ore dressing and coal dressing processes. It works on the principle that the rate of flow is proportional to the square root of the differential pressure between the upstream and downstream sides of a constriction in the pipe carrying the fluid to be measured. The constriction is usually an orifice plate, a Venturi tube, or a flow nozzle. The meter gives the flow measurement directly on a recording chart or indirectly by transmitting either a pneumatic or electrical signal for use at a remote location. *See also* automation. *Nelson.*

differential-pressure sticking. A problem occurring when the drill string comes in contact with the wall of the borehole in the presence of a high differential pressure into the formation. The severity of sticking depends upon the magnitude of this pressure differential, the area of contact between pipe and mud filter cake, and the friction which must be overcome to move the pipe. *American Petroleum Institute, Drilling and Production Practice, 1963, p. 80.*

differential pulley block. A lifting tackle used by builders which comprises an endless chain threaded over two wheels, slightly different in diameter, turning on the same shaft. As the diameters become closer so the lifting power increases. This block prevents the chain from running back and permits one man to lift 1,000 pounds or more in safety. *Ham.*

differential pumping engine. A compound direct-acting pumping engine, generally of the horizontal class. *Fay.*

differential relays. These relays operate on current induction and are used to protect alternating-current equipment from internal faults in individual equipment or from faults in sections of distribution system, including transformers, various rotating units, and transmission lines. When used on transformers, they operate on a fixed percentage of unbalance (approximately a 50-percent ratio) between the primary and secondary windings. The principle of the differential relay is that what enters must leave, except that with transformers the ratio will be different, but this difference is compensated for by using current transformer with corresponding ratios. These relays monitor the current of an electrical system or equipment. When the rated percentage of unbalance is reached the relay operates a breaker and interrupts service until the fault is corrected. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

differential settlement. The uneven lowering of different parts of a building. When differential settlement takes place, stresses are induced with the result that distortion may occur with attendant fractures. Such fractures may become so serious that the safety of the building in involved. *Nelson.*

differential thermal analysis. A method of analyzing a variety of minerals, especially clays and other aluminiferous minerals. The method is based upon the fact that the application of heat to many minerals causes certain chemical and physical changes and are reflected in endothermic and exothermic reactions. By comparing the changes in temperature of a mineral heated at a definite rate with that of a thermally inert substance (alumina, for example) heated under the same conditions, a curve or pattern is obtained that is characteristic of the particular mineral under examination. *Henderson.*

differential thermogravimetry; DTG. A technique for the study of the changes in weight of a material when heated; it has been applied, for example, in following the dehydration process of clay minerals. *Dodd.*

differential weathering. When rocks are not uniform in character but are softer or more soluble in some places than in others, an uneven surface may be developed; in deserts by the action of the wind and in humid regions by solution. Columns of rock which have been isolated in any way show the effect of differential weathering. *A.G.I.*

differentiate. One of the different kinds of igneous rocks formed as the result of magmatic differentiation. *Bateman.*

differentiated. Applied to intrusions, such as sills, dikes, laccoliths, batholiths, etc., that are made up of two or more rock types produced by the splitting of a parent magma. *Hess.*

differentiated dike. A dike that consists of more than one kind of rock because of magmatic differentiation of an originally homogeneous magma into two or more fractions. *Billings, 1954, p. 307.*

differentiated sill. A sill that consists of more than one kind of rock because of magmatic differentiation of an originally homogeneous magma into two or more fractions. *Billings, 1954, pp. 295-296.*

differentiation. a. A process by which two or more rocks of different composition are derived from a single body of magma. *Bateman.* b. In mineral processing, separation of succession of mineral species from mixture in ore pulp by flotation. *Pryor, 3*

diffracted wave. One whose front has been changed in direction by an obstacle or other nonhomogeneity in the medium by a means other than reflection or fraction. *Hy.*

diffraction. a. A modification which light undergoes in passing by the edges of opaque bodies, or through narrow slits, or in being reflected from ruled surfaces, in which the rays appear to be deflected producing fringes or parallel light and dark or colored bands. *Webster 3d.* b. Diffraction is the name given to that process which allows sound waves to bend around obstacles that are in their path. *H&G.* c. When seismic waves strike the corner or end of a reflecting or refracting surface, this corner will in itself serve as a point source for radiating waves back to the surface. This radiation is known as diffraction. *Dobrin, p. 27.*

diffraction grating. An optical device used to analyze a beam of light or electromagnetic wave into constituent wavelengths. In one form, a pattern of equidistant fine lines is ruled on a glass (transmission) or a metal (reflection) surface. *Pryor, 3.*

diffraction mottling. A diffuse diffraction pattern on a radiograph resulting from X-raying thin sections of crystalline material. *ASM Gloss.*

diffraction pattern. Diffracted X-rays recorded on film, giving a means of identification of a powder. *Bureau of Mines Staff.*

diffusate. A product of diffusion; as, the material that passes through the membrane in dialysis; also, the liquid into which such material diffuses. *Webster 3d.*

diffuse. Term used to describe an anomaly whose metal values are subdued and do not show any pronounced focal point. *Hawkes, 2, p. 154.*

diffuser. a. The inner shell and water passages of a centrifugal pump. *Nichols.* b. *See* evasé. *B.S. 3618, sec. 2, 1963.*

diffuser chamber. A chamber in a turbine pump consisting of a number of fixed blades. The water on leaving the impeller is guided outwards by these blades with the minimum of eddying and swirling. *Nelson.*

diffusion. a. The permeation of one substance through another, such as gas through gas, liquid, or solid; solute through solvent; liquid through liquid or solid; and finally solid through solid. The pressure corresponding to that exerted by dissolved material in its diffusion from a more concentrated to a less concentrated part of a solution is called osmotic pressure. *Holmes, 1928.* b. Spreading of a constituent in a gas, liquid or solid, tending to make the composition of all parts uniform. *ASM Gloss.* c. The spontaneous movement of atoms or molecules to new sites within a material. *ASM Gloss.* d. Migration due to motion of particles of a given phase tending to increase volume occupied or to penetrate adjacent phases. Usually mutual across interphase. Unlike osmosis which only affects movement of solvent molecules. *Pryor, 3.* e. Flow relative to each other of the constituents of a single-phase mixture. Such relative flow may occur when the different parts of the mixture are in disequilibrium. *NRC-ASA N1.1-1957.*

diffusion coating. a. An alloy coating produced at high temperatures by the inward diffusion of the coating material into the base metal. *ASM Gloss.* b. Composite electrodeposited coatings which are subsequently interdiffused by thermal treatment. *ASM Gloss.*

diffusion coefficient. A factor of proportionality representing the amount of substance in grams diffusing across an area of one square centimeter through a unit concentration gradient in one second of time. *ASM Gloss.*

diffusion flame. A flame whose rate is controlled by a diffusive mixing process. *I.C. 8137, 1963, p. 76.*

diffusion of gases. The property that all gases possess of diffusing or spreading one into the other. *See also* Graham's law. *Nelson.*

diffusion pattern. A dispersion pattern resulting from upward movement of ions in vadose water. *Hawkes.*

diffusion sintering. Term used for true solid state sintering by those who allow a wider meaning than this to the word sintering itself, when used without qualification. *See also* sintering. *Dodd.*

diffusivity. The relative rate of flow per unit area of a particular constituent of a mixture divided by the gradient of composition, temperature, or other property considered to be causing the diffusion. *NRC-ASA N1.1-1957.*

dig. a. To mine coal; applied to bituminous workings. *See also* gouge, c. *Fay.* b. To excavate; make a passage into or through, or remove by taking away material. *Fay.* c. Crushed strata. *Nelson.*

dig-down pit; sunken pit. A pit that is below the surrounding area on all sides. *Nichols*

digenite. A blue to black mineral associated with chalcocite, Cu_9S_5; isometric. *Dana 17.*

digestion. Biochemical decomposition of organic matter whereby complex substances are broken down and resolved into simple and harmless matter. *Ham.*

digger. a. One that digs in the ground; as, a miner or a tool for digging. *Webster 3d.* b. A man who is paid by the ton for coal produced; a miner in the stricter sense. Originally the digger mined or undermined the coal; now the term is applied to the man who merely shoots out the coal. *Fay.* c. A machine for removing coal from the bed of streams, the coal having washed down from collieries of culm banks above. *Zern.* d. In Butte, Mont., means the clothing miners wear underground; a pair of denim bib overalls and a denim jacket. *Bureau of Mines Staff. See also* miner. *D.O.T. 1.*

digger edges. The formed serrated edges of the buckets used for digging purposes on a bucket loader. *ASA MH4.1-1958.*

digger tools. The formed tools, interspaced with the buckets of a bucket loader to aid in digging action. *ASA MH4.1-1958.*

digging. a. Mining operations in coal or other minerals. *Fay.* b. Region; locality; quarters; lodging. *Webster 2d. See also* diggings. *Fay.* c. A sudden erratic increase in cutting depth or in the load of a cutting tool caused by unstable conditions in the machine setup. Usually the machine is stalled, or either the tool or the workpiece is destroyed. *ASM Gloss.*

digging bit. According to English drillers, a noncoring bit usually similar to a steel drag or mud bit. *Long.*

digging cycle. Complete set of operations a machine performs before repeating them. *Nichols, 2.*

digging height. *See* bank height. *Bureau of Mines Staff.*

digging line. On a shovel, the cable which forces the bucket into the soil. Called crowd in a dipper shovel, drag in a pull shovel, and dragline and closing line in a clamshell. *Nichols.*

digging resistance. The resistance which must be overcome to dig a formation. This resistance is made up largely of hardness, coarseness, friction, adhesion, cohesion, and weight. *Nichols, 3, p. 3-4.*

diggings. a. Applicable to all mineral deposits and mining camps, but as used in the United States applied to placer mining only. *See also* bar diggings. *Fay.* b. Superficial mining work. *Pryor, 3.*

digital computer. Machine which makes mathematical computations by methods in which digits are added or subtracted in accordance with the coding signals to which the machine is sensitive. *Pryor, 3.*

digital indicator. A device that indicates the magnitude of a measured quantity in digital numbers, usually in decimal or binary form. *ASM Gloss.*

diglycol monostearate; diethylene glycol monostearate. Small, white flakes; available in regular or water-dispersible types; $C_{17}H_{35}COOC_2H_4OC_2H_4OH$. Used as a temporary binder for ceramics and grinding wheels and as a mold-release lubricant for die casting. *CCD 6d, 1961.*

diglycol stearate; diethylene glycol distearate. A white, waxlike solid; faint fatty odor; $C_{17}H_{35}COOC_2H_4)_2O$; disperses in hot water; soluble (hot) in alcohol, in oils, and in hydrocarbons; melting point, 54° to 55° C; and specific gravity, 0.9333 (at 20° C, referred to water at 4° C). Used as an emulsifying agent for oils, solvents, and waxes; as a temporary binder for abrasive powders for the manufacture of abrasive and grinding wheels; and also as a binder for clays for ceramic insulation. *CCD 6d, 1961.*

dihedral. Having two sides, as a figure; having two faces, as a crystal. *Fay.*

dihedral angle. The angle of penetration of one phase or grain between two adjacent grains. *VV. See also* angle, a.

dihydric alcohol; glycol. Alcohol containing two hydroxy groups; for example, CH_2-OH.CH_2OH. *Bennett 2d, 1962.*

dike; dyke. a. A discordant tabular body of igneous rock that was injected into a fissure when molten, that cuts across the structure of the adjacent country rocks, and which usually has a high angle of dip. It should not be confused with a vein. *Bureau of Mines Staff.* b. An embankment of earth or stone to prevent flooding by the sea or by a stream; a levee. *Webster 3d.* c. An embankment of earth around a drill sump or tank. *Long.* d. An embankment to impound a body of water or mill tailing. *Long.*

diked land; diked marsh; polder. A tract of low land reclaimed from the sea or other body of water by dikes. *Schieferdecker.*

diked marsh. *See* diked land. *Schieferdecker.*

dikelet. A small offshoot or apophysis from a dike. *Standard, 1964.*

dike ridge. A wall-like ridge created when erosion removes softer material from along the sides of a dike. *Stokes and Varnes, 1955.*

dike rock. The solidified igneous rock, which, while molten, was injected into a fissure in older rocks. Not to be confused with rock forming a vein or sill. *See also* dike, c. *Long.*

dike set. A group of parallel dikes. *Billings, 1954, p. 307.*

dike swarm. A group of parallel dikes, but more numerous than in a dike set. *Billings, 1954, p. 307.*

diking; dyking; embanking. To surround or protect a tract of land or marsh with dikes. *Schieferdecker.*

diktyonite. A migmatite with a netlike structure. *Schieferdecker.*

dilatancy. a. The property of granular masses of expanding in bulk with change of shape. It is caused by the increase of space between the individually rigid particles as they change their relative positions. *Fay.* b. The expansion of cohesionless soils when subject to shearing deformation. *ASCE P1826.* c. The property of a silt which, when a pat is shaken vigorously in the palm of the hand, moisture will appear on the surface but can be worked back by pressing and squeezing. A clay does not exhibit this property. *Nelson.* d. Property of certain suspensions in which resistance to flow increases at a greater rate than the increase in rate of flow; for example, as in quicksand. *Bennett 2d, 1962 Add.* e. Behavior whereby there is an apparent decrease in the liquid content of a colloidal structure during mechanical agitation (because of the volume increases). *VV.*

dilatation. *See* dilation, b. *A.G.I.*

dilatational wave. Synonym for P-wave; compressional wave. *A.G.I.; A.G.I. Supp.*

dilation. a. The expansion of ice from the freezing of water in fissures. *A.G.I.* b. Deformation that is a change in volume, but not in shape. Synonym for dilatation. *Billings, 1954, p. 15.* c. In volcanology, the widening process of an initial fissure concomitant with the injection of magma. *A.G.I.*

dilation vein. One of the fat lenses in schists and thought to have been caused by the bulging of the schistose rocks under pressure transmitted by the mineralizing solutions. *Bateman, 1950, p. 111.*

dilatometer. An instrument for measuring the expansion or contraction in a metal resulting from changes in such factors as temperature or allotropy. *ASM Gloss.*

diligence. To prosecute drilling with due diligence to success or abandonment means, that there must be a product capable of division between the parties in the proportions mentioned in the lease. Unless this is done, drilling is not prosecuted to success. The rule is that whatever, under the circumstances, would be reasonably expected of operators of ordinary prudence, having regard to the interest of both lessor and lessee, is what is required. *Ricketts, II.*

dillenburgite. An impure chrysocolla containing copper carbonate. *Weed, 1918.*

dillue. Corn. To separate (tin ore) by washing in a hand sieve. *Webster 3d*

dillueing. The washing of small ore in a fine sieve. *Nelson.*

dilluer. Corn. A fine hair sieve for tin ore. *Fay.*

dilluing. Upgrading fine cassiterite by panning it in water in a close-meshed sieve. *Pryor, 3.*

dilly. a. Any of various horse-drawn vehicles (as a light wagon or cart). *Webster 3d.* b. A haulage system on a short incline in a mine. *Webster 3d.* c. N. of Eng. A counterbalance mounted upon two pairs of tram wheels by means of which the empty tubs are carried up an underground incline of a greater inclination than 1 in 3. *Fay.* d. A self-acting incline handling light loads. *Nelson.*

dilly boy. One who rides a dilly or attends it. *Fay. See also* incline man.

dilly brow. Eng. *See* balance brow. *SMRB, Paper No. 61.*

dilly hole. a. A small-diameter cased hole alongside the borehole proper. The dilly hole is as deep as the kelly or grief stem is long and acts as receptacle in which the kelly may be stored during round trips, casing, or other operations in which it is not used. *Long.* b. A small sludge-catchment basin placed between the collar of the borehole and the main drill sump. *Long.*

dilly rider. In bituminous coal mining, a laborer who rides and attends a dilly (light wagon, truck, or water cart) used to haul coal or water underground or at the surface of a mine, loading, unloading, and cleaning it. *D.O.T. 1.*

dilsh. a. S. Wales. Rubbish coal or culm. *Arkell.* b. S. Wales. Black argillaceous rock, clod, or rashings. *Arkell.* c. A band of inferior coal. *Nelson.*

diluent. a. That which dilutes or makes more fluid; a fluid that weakens the strength or consistency of another fluid upon mixing. *Fay.* b. Waste rock in ore. *Hess.* c. In solvent extraction, the inert liquid used to dissolve the extractant. This must be practically immiscible with water; and the one that is almost universally used is kerosine. *Newton, p. 440.* d. *See* carrier solvent.

Pryor, 3.

dilute. Relatively weak in concentration; to lessen the strength of by adding more solvent. *Crispin.*

dilute medium. Medium of specific gravity below that in the separating bath and usually occurring as a result of spraying the bath products for the removal of adhering medium solids. *B.S. 3552, 1962.*

dilution. The contamination of ore with barren wall rock in stoping. The assay of the ore after mining is frequently 10 percent lower than when sampled in place. *Nelson.* Synonym for contamination. *Long.*

diluvial. a. Pertaining to floods. *Fay.* b. Related to or consisting of diluvium. *Fay.*

diluvium. a. Sand, gravel, clay, etc., in surficial deposits. *See also* drift. Formerly, according to some authors, alluvium was the effect of the ordinary, and diluvium was the effect of the extraordinary action of water. Diluvium has passed out of use as not precise, and more specific names for the different kinds of material have been substituted. *Fay.* b. Formerly applied to the unsorted and sorted deposits of the Glacial period, as contrasted with the water-sorted alluvium. *Compare* alluvium. *Fay.*

dimensional analysis. In scale model analysis of various structures affected by the flow of liquids, the principle of dynamic similarity applied to determine the relationship between variables, such as speed and density of fluid and the length of a scale model compared with that of its full size prototype. *Ham.*

dimensional coordination. Sizing of various constructional units to make construction easier. *ACSG, 1963.*

dimensional orientation. A preferred orientation that is shown by the shape of the individual grains. *A.G.I.*

dimensional rated capacity. The weight of a specified material per foot of belt length which a belt conveyor will transport. *NEMA MB1-1961.*

dimensioning. The process of adjusting the edge dimensions of a plate, by grinding or lapping, to achieve maximum activity and freedom from erratic activity and frequency changes over a given range of temperature. In AT and BT plates, these effects depend on the extent of coupling between high harmonics of the flexural mode and the fundamental shear frequency, as determined by the edge dimensions. In ordinary practice, all plates are arbitrarily cut to fixed dimensions and the operator individually hand tailors each plate during the finishing process to achieve optimum results; in predimensioning the optimum dimensions are first found experimentally and are effected en masse during manufacture before the finishing operation. *AM, 1.*

dimension stone. Naturally occurring rock material cut, shaped or selected for use in blocks, slabs, sheets, or other construction units of specified shapes or sizes, and used for external or interior parts of buildings, foundations, curbing, paving, flagging, bridges, revetments, or for other architectural or engineering purposes. This term is also applied to quarry blocks from which pieces of fixed dimension may be cut. Marble, granite, limestone, and sandstone provide the bulk of dimension stone, although slate, diorite, basalt, and diabase, are included. *BuMines Bull. 630, 1965, p. 876.*

dimension work. Masonry consisting of stones whose dimensions are fixed by specification. *Fay.*

dimentian rock. A granitoid and schistose rock, found in Wales, lower than the arvonian. *Fay.*

dimetric system. Same as tetragonal system. *Shipley.*

dimming test. To determine the durability of optical glass, the surface is subjected to the action of air saturated with water vapor at a definite temperature (usually 80° C) for a specified period. Any dimming of the surface is then observed. *Dodd.*

dimorphism. The property of crystallizing in two different crystal systems but being chemically identical; for example, calcium carbonate crystallizing as calcite (hexagonal rhombohedral) and as aragonite (orthorhombic). *Standard, 1964.*

dimorphite. An orange-yellow arsenic sulfide mineral obtained as a volcanic product and closely related to orpiment. *Standard 1964.*

dimorphous. Having the same chemical composition but crystallizing in two different crystal systems. *Compare* trimorphous; polymorphous; allotropic. *A.G.I.*

dimple. A defect consisting of a shallow depression in the porcelain enamel. *ACSG, 1963.*

dimpled current mark. An obsolete name used for interference ripple mark. *Pettijohn.*

dimpling. a. Stretching a relatively small shallow indentation into sheet metal. *ASM Gloss.* b. In aircraft, stretching metal into a conical flange for the use of a countersunk head rivet. *ASM Gloss.*

DIN Abbreviation for Deutsche Industrie Normen, that is, German Industrial Standards. *C.T.D.*

Dinantian. Lower Carboniferous. *A.G.I. Supp.*

Dinas brick. A refractory brick, almost entirely composed of silica from the Dinas clay in the Vale of Neath, England. *Fay.*

Dinas rock. A natural rock or sand of high silica content, used as an acid refractory. *C.T.D.*

dingle. A narrow valley; a shady glen or hollow. *Standard, 1964.*

dingot. An oversized derby (possibly a ton or more) of a metal produced in a bomb reaction, such as uranium from uranium tetrafluoride and magnesium. The term ingot for these metals is reserved for massive units produced in vacuum melting and casting. *See also* biscuit; derby. *ASM Gloss.*

Ding's magnetic separator. In its earlier form, a mineral separator to which the material was fed by a vibrating conveyor and passed through successive zones of magnetic influence. The zones were covered by the rims of rotating disks which became magnetized, carried the particles having magnetic susceptibility out of the fields, were demagnetized, and dropped the concentrate beyond the edge of the belt. Now made with rollers having an induced magnetism; dried, finely crushed ore passes over the rollers in a thin stream from which particles attracted by the magnets are drawn out. *Hess; Liddell 2d, p. 386.*

dinite. A crystalline yellowish hydrocarbon melting at a low temperature and occurring in lignite. *Tomkeieff, 1954.*

dinitrogen trioxide. Red-brown gas; black liquid or solid, N_2O_3; specific gravity, 1.447^2; melting point, $-102°$ C; soluble in water; molecular weight, 76.02. *Bennett 2d, 1962.*

dinkey. A small locomotive used to move cars in and about mines and quarries. *Fay.*

dinking. Using a hollow punch with a knife-like edge which acts against a wooden fiber or resiliently mounted metallic plate for cutting non-metallic materials and light-gage soft metals. *ASM Gloss.*

dinnerware. Ceramic whiteware made in a given pattern and in a full line of articles comprising a dinner service. *ASTM C242-60T.*

Dinoflagellates. *See* Protozoans. *Hy.*

dinosaur leather. A term locally applied to complex sole markings, probably including both flute and load casts. *Pettijohn.*

dint. To cut into the floor of a roadway to obtain more headroom. *Fraenkel.*

dinter. A man employed on floor excavation or dinting on a roadway. *Nelson.*

dinting; bate. Excavating and removing a layer of floor along a roadway to gain headroom. *Nelson.*

dioctahedral. Refers to the structure of layered clay minerals in which only two-thirds of the possible octahedral positions of aluminum are occupied by other cations. *A.G.I. Supp.*

diogenite. An achondritic meteorite composed essentially of bronzite with small amounts of oligoclase; the same as oligoclase chladnite. *Holmes, 1928.*

diopside. A calcium-magnesium silicate, $CaMg(Si_2O_6)$. Monoclinic. Color white to light-green; deepens with increase of iron. Luster vitreous. Mohs' hardness, 5 to 6; specific gravity, 3.2 to 3.3. Diopside is found as a contact metamorphic mineral in crystalline limestones. It is also found in regionally metamorphosed rocks. Occurs in Connecticut and New York, and in Italy, U.S.S.R., Austria, and Switzerland. Transparent varieties have been cut and used as gemstones. *Dana 17, pp. 436-437.*

diopside cat's-eye. Fine green chrome diopside cat's-eye, from Burma. *Shipley.*

diopside, fused. A synthetic diopside, $CaMgSi_2O_6$, produced in the electric furnace and used as a refractory. Natural diopside is a mineral and is also sometimes used as a gemstone. *CCD 6d, 1961.*

diopside jadeite. A pyroxene intermediate between jadeite and diopside. From the Tuxtla statuette, Tuxtla, southeast Mexico. *English.*

diopsidite. A basic igneous dike rock consisting essentially of diopside and accessory iron ore, pleonaste, garnet, etc. The original rock contains about 95 percent chrome diopside and 5 percent other constituents. *Johannsen, v. 4, 1938, p. 455.*

dioptase. A rare, hydrated silicate mineral of copper, $Cu_6(Si_6O_{18}).6H_2O$; trigonal. Found occasionally, as rich emerald-green crystals, in association with other copper ores. Also emerald copper. *C.T.D.; Dana 17.*

dioptric. The system used in lighthouses in which the rays of light from the flame are collected and refracted in a given direction by a lens placed in front of the light. *Haggar.*

diorite. a. A plutonic igneous rock composed essentially of sodic plagioclase (usually andesine) and hornblende, biotite, or pyroxene. Small amounts of quartz and orthoclase may be present. *A.G.I.* b. An intrusive rock, often called greenstone. *Gordon.*

diorite-aplite. *See* aplite. *Hess.*

diorite-porphyrite. A porphyry, the groundmass of which is a finely crystalline diorite, and the phenocrysts of which are primarily plagioclase. It is contrasted with hornblende porphyrite, the phenocrysts of which are primarily hornblende. *Fay.*

dioritite. An igneous rock consisting of diorite-aplite. *Johannsen, v. 3, 1937, p. 61.*

dioxide ore. A term which has been used somewhat in the Western United States for manganese ore. *Hess.*

dip. a. The angle at which a bed, stratum, or vein is inclined from the horizontal. *Lewis, p. 20.* b. The angle of a slope, vein, rock stratum, or borehole as measured from the horizontal plane downward. *Long.* c. A miner's word not found in the mining act. The term there used is downward course, which is synonymous with dip. The direction of the vein or lode as it goes downward into the earth is called the dip. It may vary from a perpendicular to the earth's surface to an angle perhaps only a few degrees below the horizon. The same vein or lode may have different dips. *Ricketts, p. 137.* d. S. Afr. The inclination of the reef or strata from the horizontal position, measured at a right angle from the strike. In the Republic of South Africa, the dip is expressed as an angle of so many degrees. In Rhodesia, the dip of a gold lode may also be described by giving a ratio of so many feet horizontally to so many feet vertically. *Beerman.* e. The angle and direction of tilt in strata. *Wheeler.* f. To incline downhill. *Mason.* g. The full inclination. *Mason.* h. The direction of the true or steepest inclination. *Mason.* i. The lower workings of a mine. *Hudson.* j. The slope of layers of soil or rock. *Nichols.* k. To slope downward from the surface. *Fay.* l. Eng. A heading or other underground way driven to the deep. *Fay.* m. A dip entry, dip room, etc. A heading driven to the full rise in steep mines. *Fay. See also* apparent dip; full dip; true dip. n. In terrestrial magnetism, the angle formed by the lines of total magnetic force and the horizontal plane at the earth's surface; reckoned positive if downward. *Hy.* o. In mines, the increase in depth of a moored mine case, due to current force against the case and cable. *Hy.*

dip-and-fault structure. A structure in which an inclined series of beds, dipping in one direction, is cut by gravity (normal) faults dipping in the opposite direction. Sometimes the result is superficial movements under gravity. *A.G.I.*

dip-arrow map. A crude map used in the field, showing the approximate position of the structures. *Hess.*

dip brazing. Brazing by immersion in a molten salt or metal bath. Where a metal bath is employed, it may provide the filler metal. *ASM Gloss.*

dip calculation. Any of a number of methods of converting observed seismic arrival time values to the dip of a reflector; most commonly the conversion of delta T values to dip values by a conversion factor based upon the geometry of the seismic array and approximate seismic propagational velocity. *A.G.I.*

dip compass. An instrument to measure magnetic intensity by means of a magnetic needle fixed to swing in a vertical plane so that it can readily be deflected downward by magnetic materials. Used to explore for subsurface deposits containing magnetic materials. May also be called dip needle, dipping compass, dipping needle, doodle bug magnetometer. *Long.*

dip-corrected map. A map that shows stratified formations in their original position before movment. *Ballard.*

dip cut. In cutting out blocks of stone, the cut which follows a line at right angles to the strike. *Fay.*

dip entry. An entry driven downhill so that water will stand at the face. If it is driven directly down a steep dip it becomes a slope. *See also* entry; slope. *Fay.*

dip equator. *See* aclinic line. *H&G.*

dip face. A face proceeding towards the dip of the seam. *Briggs, p. 23.*

dip fault. A fault that strikes approximately perpendicularly to the strike of the bedding or cleavage. *Billings, 1954, p. 141.*

diphase cleaning. Removing soil by a composition which produces two phases in the cleaning tank, a solvent phase and an aqueous phase. Cleaning is effected by both solvent action and emulsification. *ASM Gloss.*

diphead. A drift inclined along the dip of a coal seam. *Webster 3d.*

dipheading. In tunneling, a dipheading is one driven downward to the deep. *Pryor, 3, p. 132.*

diphead level. a. A mine level connecting an engine shaft with the rooms or chambers. *Standard, 1964.* b. The main level, drift, or slope. *Fay.*

diphenylcarbazide. White; crystals; $(C_6H_5NHNH)_2CO$; decomposes in light; soluble in alcohol and in benzene; insoluble in water; and melting point, 173° C. Used for the determination of copper and other metals. *CCD 6d, 1961.*

dip joint. A joint that strikes approximately perpendicularly to the strike of the bedding or cleavage. *Billings, 1954, p. 107.*

dip meter. a. An instrument used to record the amount and direction of the dip of strata exposed in the sides of a borehole. *B.S. 3618, 1963, sec. 3.* b. *See* Schlumberger dip meter. *Sinclair, III, p. 107.*

dip needle. Synonym for dip compass. *Long.*

dipole. a. Coordinate valence link between two atoms. *Pryor, 3.* b. Electrical symmetry of a molecule. When a molecule is formed by sharing of two electrons between a donor atom and an acceptor, it is more positive at the donor end and more negative at the acceptor end, and has a dipole moment of the order of 10^{-18} electrostatic unit. Dipole moment is also the couple required to maintain the dipole at right angles to an electrical or magnetic field of unit inetnsity. *Pryor, 3.*

dipole moment. Product of the dipole charge and hte dipole length. *VV.*

dippa. Corn. A small pit sunk on a lode to catch water; a pit sunk on a bunch ore. *Fay.*

dipped joint. A thin joint made by dipping the brick before laying in mortar of thin consistency or by pouring a thin mortar over a course of brick before laying the next course. *A.R.I.*

dipper. a. A digging bucket rigidly attached to a stick or arm on an excavating machine; also the machine itself. *Bureau of Mines Staff.* b. N. of Eng. A downthrow, or a fault. *Fay.*

dipper dredge. A dredge in which the material excavated is lifted by a single bucket on the end of an arm, in the same manner as in the ordinary steam shovel. *Fay.*

dipper dredger; dipper-bucket dredger. A dredger consisting of a single large bucket at the end of a long arm, swung in a vertical plane by gearing. The bucket capacity may be up to about 12 cubic yards. *C.T.D.*

dipper factor. *See* fill factor. *Woodruff, v. 3, p. 499.*

dipper shovel. A revolving shovel that has a push-type bucket rigidly fastened to a stick that slides on a pivot in the boom. *Nichols.*

dipper stick. a. The straight shaft which connects the digging bucket with the boom on an excavating machine or power shovel. *Nichols, 2.* b. Name for the standard revolving dipper shovel. *Nichols, 2.*

dipper trip. A device which unlatches the door of a shovel bucket to dump the load. *Nichols, 2.*

dipping. a. Wales. Same as dip. *Fay.* b. In Scotland it is called a dook. *Fay.* c. The process of coating a metal shape by immersion in slip, removal, and draining. In dry process enameling, the method of coating by immersing the heated metal shape for a short time in powdered frit. *ASTM C286–65.* d. Glazing by immersing the biscuit piece in a glaze slip. *ACSG.* e. Coating of metals by immersion in molten zinc or tin. *Pryor, 3.*

dipping needle. A needle, consisting of a steel magnet, similar to that in a miners' dial, but pivoted at the center so as to be free to rotate vertically. It is used to locate the presence of shallow deposits of magnetic ores. The magnetometer has now replaced the dipping needle for large-scale prospecting work. *See also* geophysical prospecting. *Nelson.* Synonym for dip compass. *Long.*

dipping sonar. Sonar equipment used by helicopters and hydrofoils. *Hy.*

dipping weight. *See* pick-up. *ASTM C286-65.*

dipple. Eng. Same as dip, l. *Fay.*

dip reading. An angular measurement taken in an inclined borehole by using one of several types of borehole-surveying devices or techniques. *Long.*

dip separation. The distance between two parts of a disrupted bedding plane, measured in the fault plane parallel to its dip. *Schieferdecker.*

dip shift. The component of the shift (or slip) parallel with the fault dip. *Fay.*

dip shooting. Any system of seismic surveying where the primary concern, both instrumental and computational, is the registration and computation of reflections for dip values, with minor emphasis on correlation of records from shot point to shot point. *A.G.I.*

dip side. a. Scot. The lowest side of a room or wall. Also called laigh side. *Fay.* b. The side dipping downhill away from the point of reference. *Mason.*

dip slip. The component of the slip in the direction of the true dip of the fault plane. *Schieferdecker.*

dip-slip fault. a. A fault in which the net slip is practically in the line of the fault dip. *A.G.I.* b. A fault where the relative movement is vertical. *See also* oblique slip fault. *Nelson.*

dip slope. A landform developed in regions of gently inclined strata, particularly where hard and soft strata are interbedded. A long, gentle sloping surface which parallels the dip of the bedding planes of the strata below ground. *C.T.D.*

dip split. A current of intake air directed into or down a dip. *Fay.*

dip-strike symbol. The symbol used on geological maps to show the strike and dip of some planar feature, such as bedding, foliation, joints, etc. *A.G.I.*

dip switch. Ark. A slant or piece of track connecting the back entry or air course of a dipping coal seam with the main entry or gangway. *Fay.*

dip tank. a. Usually a metal lined bath containing liquid enamel. *Hansen.* b. *See* recirculating dip tank. *ACSG, 1963.*

dip test. As used in the diamond-drilling industry, an angular measurement of the inclination of a borehole taken with a clinometer. *See also* acid-dip survey. *Long.*

dip throw. The component of the slip measured parallel with the dip of the strata. *Fay.*

dip valley. A valley trending in the direction of the general dip of the rock layers of the region. Contrasts with a strike valley. *Stokes and Varnes, 1955.*

dip workings. a. The workings which are on the lower side of the level or gate road in an inclined seam. Dip workings may present water problems and require pumping. Also called deep workings. *Nelson.* b. Underhand excavations in which miner works downward and lifts spoil to removal point. Not self-draining. *Pryor, 3.*

dipyre; dipyrite. A variety of scapolite consisting of a mixture of the meionite and mariolite molecules. It includes those minerals with 54 to 57 percent silica, and occurs in elongated square prisms in schists, diorite, etc. Also called mizzonite. *C.T.D.; Webster 3d.*

dipyrization. The metamorphic process, sometimes involving pneumatolytic or allied agencies, by which feldspars of a rock are replaced by scapolite, called dipyre in the United Kingdom. *See also* scapolitization. *Hess.*

direct-acting controller. One in which an increasing measured value in the input signal produces an increasing controller output, and vice versa. *Pryor, 3, p. 31.*

direct-acting haulage. *See* direct-rope haulage. *Nelson.*

direct-acting pump. A pump in which the water cylinder and piston are connected by the same piston rod to the steam or air cylinder so that the stream or air pressure acts straight through to the water piston. *Long.*

direct-acting reciprocating air engine. This type is used to drive small pumps, the air cylinder and the water cylinder having a common piston rod, and the air supply to its cylinder being controlled by a slide valve operated off its own piston rod. Its simplicity and robustness makes it very suitable for rough work such as draining the working face of a cross-measure drift or a heading. *Mason, v. 2, p. 381.*

direct arc furnace. One in which an arc is struck between an electrode and the material charged into the furnace. *Pryor, 3.*

direct attack. A method of effecting extinction of mine fires using water or the effluent of chemical fire extinguishers. When a mine fire is readily accessible to the firefighting personnel, extinction of it may be achieved by direct application of some substance which will cool down the hot mass below its ignition temperature, or, in the case of oils, will arrest the volatilization process by sealing or emulsifying the oil surface. *Mason, v. 1, p. 284.*

direct chill casting. *See* dc (direct chill) casting.

direct current. An electric current flowing in one direction only and sensibly free from pulsation. Abbreviation, dc. *See also* alternating current. *Nelson.*

direct-current cleaning. Same as cathodic cleaning *ASM Gloss.*

direct-current generator; dynamo. A generator for the production and delivery of direct current. *See also* alternating-current generator. *Nelson.*

direct-cycle reactor system; single-cycle reactor system. A nuclear power plant system in which the heat-transfer fluid circulates through the reactor and then passes directly to the turbine in a continuous cycle. *L&L.*

direct-dip-reading chart. *See* direct-reading capillarity chart. *Long.*

directed practical training. The scheme introduced by the National Coal Board of Great Britain to train miners for managerial and other responsible positions in the coal industry. *See also* ladder plan. *Nelson.*

direct expansion. An arrangement of a refrigerant evaporator where the refrigerant itself expands in an evaporator in the airstream. *Strock, 10.*

direct extrusion. *See* extrusion. *ASM Gloss.*

direct fire. A method of maturing porcelain enamel or ceramic ware wherein the products of combustion come in contact with the ware. *ASTM C286-65.*

direct-fired furnace. A melting furnace having neither recuperator nor regenerator. *ASTM C162-66.*

direct-fired heater. A fuel-burning device in which the heat from the fuel is transferred through metal to air which is then introduced to the space to be heated. *Strock, 10.*

direct-fired unit. A heater in which the flame's heat is transferred to metal plates and thence directly to the air to be heated. A warm air furnace is direct fired; a boiler is indirect. *Strock, 10.*

direct firing. a. The combustion of coal effected by burning directly on a grate. *Fay.* b. A method of firing wherein the products of combustion comes in contact with the ware. *ACSB, 3.*

direct flushing. Flushing in which the water rises along the rod on its outer side, that is, between the walls of the borehole and the rod, and with such a velocity that the broken rock fragments are carried up by this water current. *Stoces, v. 1, p. 79.*

direct haulage. The system in which an engine with a single drum and rope draws loaded trucks up an incline. The empties run downhill dragging the rope after them. *C.T.D.*

direct-heat drier. A drier in which heat is received by radiation from floors, walls, and roof. *ACSG, 1963.*

direct initiation. The placing of the detonator in the last cartridge to be inserted in the shothole with the active end of the detonator pointing inwards. This position tends to minimize the risk of gas ignition. *See also* inverse initiation. *Nelson.*

direction. Angle to the right (clockwise) from an arbitrary zero direction. Used chiefly in triangulation. *Seelye, 2.*

directional drilling. a. The art of drilling a borehole wherein the course of the hole is planned before drilling. Such holes are usualy drilled with rotary equipment, and are useful in drilling divergent tests from one location, tests which otherwise might be inaccessible, as controls for fire and wild wells, etc. *A.G.I.* b. Drilling in which the course of a borehole is controlled by deflection wedges or other means. The technique of directional drilling is used: (1) to deflect a deviated borehole back on to course and (2) to deflect a borehole off course, either to bypass an obstruction in the hole or to take a second core. *B.S. 3618, 1963, Sec. 3.* c. Curving a rotary drill hole to avoid obstacles or to reach side areas. Also called offset drilling. *Nichols.*

directional drilling engineer. In petroleum production, one who directs use of special oil well drilling techniques and tools to control direction of drilling and thereby overcome certain production problems. *D.O.T. 1.*

directional hydrophone. A hydrophone the response of which varies significantly with the direction of sound incidence. *Hy.*

directional load cast. Originally interpreted as flowage cast but same as flute casts. *See also* flute cast. *Pettijohn.*

directional overcurrent relays. These differ from straight overcurrent relays in that they are primarily used for ground protection. They are designed to measure fault current in one or two sections. Whether faults will cause flow in one or two directions is determined by system conditions. The two-directional relay is used on transmission lines where ground-fault currents flow in either direction. These relays provide directional as well as overcurrent protection. Other directional relays provide phase protection. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

directional properties. Properties whose magnitude varies depending on the relation of the test axis to a specific direction within the metal. The variation results from preferred orientation or from fibering of constituents or inclusions. *ASM Gloss.*

directional solidification. The solidification of molten metal in a casting in such a manner that feed metal is always available for that portion that is just solidifying. *ASM Gloss.*

directional work. *See* directional drilling. *Long.*

direction-finding methods. Electromagnetic exploration methods in which one determines the direction of the magnetic field associated with the currents. *Schieferdecker.*

direction indicator. Any one of a number of geophysical devices used to determine the deviation of a borehole from vertical. *A.G.I.*

direction of irrigation. Direction of flow of irrigation water. Usually at right angles to the supply ditch or pipe. *Nichols.*

direction of strata. a. The strike or line of bearing. *Fay.* b. The direction of the line formed by the intersection of the individual stratum with the horizontal plane. The direction of this line is customarily referred to north. *See also* strike. *Bureau of Mines Staff.*

direction of tilt. The azimuth of the normal to the axis of tilt. *Seelye, 2.*

directions image. *See* interference figure. *C.T.D.*

directivity. Sound energy which is confined to a beam by mechanical and/or electronic means. *Hy.*

directivity index. A measure of the directional properties of a transducer. It is the ratio in decibels of the average intensity of response over the whole sphere surrounding the projector or hydrophone to the intensity or response on the acoustic axis. *Hy.*

direct labor. A method of carrying out mining works in which the owners, Board, or Authority, carry out the scheme by employing labor and purchasing the necessary equipment. The method is in contrast to work entrusted to outside contractors for performance at a fixed sum.

Nelson.

directly controlled variable. In flotation, that variable whose value is sensed to originate a feedback signal in a control loop. *Fuerstenau, p. 543.*

direct method. A mouth-to-mouth method of artificial respiration, and one which is still very useful in cases where the asphyxiated person is suffering from injuries in the ribs or arms. The patient is laid on his back and his air passages are cleared. A handkerchief, if available, is placed over the patient's mouth, and while holding the nostrils tight to prevent the escape of air, the operator blows forcibly into the mouth to inflate the lungs and simulate the action of inhalation. Exhalation occurs naturally, but if the patient's ribs are undamaged, exhalation can be assisted by gentle pressure on his lower ribs. Also called inflation method. *McAdam, p. 92.*

direct-on-face stower. A new development in pneumatic stowing in which the stowing machine is located directly in line with the stowing track, thus eliminating bends and using the shortest possible pipeline. It can stow material which the conventional type cannot handle. The low air pressure required to operate the stower is supplied by an inbye compressor. *Nelson.*

direct on steel. Finish coat porcelain enamel applied to steel. Special steel is required for white. *Bryant.*

Director. The director of the Bureau of Mines. *U.S. BuMines Federal Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. I Underground Mines, October 8, 1953.*

direct oxidation. The reaction of metals with dry gases, leading to the formation of oxide or other compounds on the surface; it does not occur to a pronounced extent except at elevated temperature. *C.T.D.*

direct plot. In making a graph of particle distribution (screen analysis), a plot in which the abscissa shows the size and the ordinate the percentage of sample of that size. *Pryor, 3.*

direct quenching. Quenching carburized parts directly from the carburizing operation. *ASM Gloss.*

direct raw-water cooling system. A cooling system in which water, received from a constantly available supply, such as a well or water system, is passed directly over the cooling surfaces of the rectifier and discharged. *Coal Age, 1.*

direct-reading capillary chart. A graduated scale printed on transparent paper, which, when used in the prescribed manner, enables one to determine the true angle a borehole is inclined from readings taken directly on the etch plane in an acid bottle. This eliminates the need for a protractor or goniometer and for a capillarity-correction chart. *Long.*

direct-reading tachometer. A tachometer used on sloping sites, from which the horizontal distance to a staff, and the difference in level between the instrument and the observed point, may be read directly without need to measure the vertical angle. *Ham.*

direct-rope haulage. a. A system of incline haulage, comprising one rope and one drum. The engine hauls up the journey of loaded cars, then the empties are connected to the rope and returned to the bottom by gravity. The drum incorporates a clutch to allow it to run loose on the shaft when required. Direct-rope haulage can be used on gradients from 1 in 15 upwards. With special hoisting carriages and safety devices, the system may be used on very steep inclines. *See also* balanced direct-rope haulage. Also called direct-acting haulage. *Nelson.* b. Haulage in which a loaded truck is pulled up the slope by a hoist while an empty one descends perhaps passing halfway on a loop of single track. Also called brake incline; engine plane. *Pryor, 3.*

direct runoff. That part of the runoff which consists of water that has not passed beneath the surface since it was last precipitated out of the atmosphere. *A.G.I.*

direct shear test. A shear test in which soil under an applied normal load is stressed to failure by moving one section of the soil container (shear box) relative to the other section. *ASCE P1862.*

direct stress. Stress which is entirely tensile or entirely compressive, without any bending or shear. *Ham.*

direct teeming; top pouring. The transfer of molten steel from a ladle, through one or more refractory nozzles, directly into the ingot mold. *Dodd.*

direct weighing method. Same as hydrostatic weighing. *Shipley.*

dirigem. Copyrighted trade name for green synthetic spinel. *Shipley.*

dirt. a. Eng. Clay, bind, or other useless waste produced in mining. *Fay.* b. N. of Eng. Foul air or firedamp. *Fay.* c. In the Wisconsin zinc district, ore and waste as broken in the mines. *Fay.* d. Auriferous gravel, wash, or paydirt. *Fay.* e. In Joplin, Mo., crude lead-zinc ore. The concentrate is called ore. *Fay.* f. The overburden, consisting of unconsolidated rock, glacial debris, or other earth material overlying bedrock. *Long.* g. Material carrying valuable minerals in placer ground. *Canadian Mining Journal v. 61, 1940, col. 2., par. 4, p. 649.* h. Visible black specks causing rejection on inspection. Usually dirt or scale, but may be glass eye blisters, or boiling from the ground coat. *Bryant. See also* specks, black.

dirt band. a. A layer of dirt interbedded in a coal seam. *See also* composite seam. Also called dirt parting. *Nelson.* b. A layer of mineral matter lying parallel to the bedding plane in a seam of coal and thicker than a parting. Also called shale band. *B.S. 3552, 1962.* c. A band of debris-filled ice alternating with clearer ice in a glacier. *Fay.* d. *See* dirt bed, a. *Fay.*

dirt bed. a. Eng. A thin stratum of soft, earthy material interbedded with coal seams. Also called dirt band. *Fay.* b. Old soil in which trees, fragments of timber, and numerous plants are found. *Fay.*

dirt bing. Scot. A debris heap; a waste heap. *Fay.*

dirt-dump engineer. *See* dump motorman. *D.O.T. 1.*

dirt fault. An area of crushed coal, or a partial or total replacement of the coal by a soft, carbonaceous shale or slate with more or less coal running through the mass in thin stringers; not a true fault. *Fay.*

dirtman. *See* groundman. *D.O.T. 1.*

dirt parting. *See* dirt band.

dirt picker. *See* slate picker. *D.O.T. 1.*

dirt scraper. A road scraper or a grading shovel, used in leveling or grading ground. *Fay.*

dirt scratcher. a. A person whose duty it is to take down loose rock, clear away dirt, and perform such other like work as requires no special skill or experience. *Fay.* b. *See* brusher. *D.O.T. 1.*

dirt shoveler. *See* wasteman. *D.O.T. 1.*

dirt slips. *See* clay vein, a. *Kentucky, p. 24.*

dirty arkose. Inexact term for rocks that may be graywackes or lithic arenites. *Pettijohn, 2d, 1957, pp. 322-323.*

dirty casting. A casting containing an excessive amount of nonmetallic inclusions in the body of the metal. *Osborne.*

dirty coal. Scot. A coal seam with thick partings of blaes or fire clay; a very ashy coal. *Fay.*

dirty finish. *See* finish. *Dodd.*

dirty metal. Metal containing an excessive amount of nonmetallic inclusions. *Bennett 2d, 1962.*

dirty steel. Steel containing an excessive amount of nonmetallic inclusions. *Osborne.*

dirty ware. Foreign matter that occasionally disfigures pottery ware as taken from the kiln; potential sources of the dirt include the atmosphere, both in the factory and in the kiln, the placers' hands, the kiln lining, and the kiln furniture. *Dodd.*

disability glare. The cause of impaired visibility in the neighborhood of a glare source can be understood when it is remembered that the instantaneous visual range is determined by the eye adaptation level. On a low brightness scene unaffected by glare, eye adaptation makes possible the recognition of small brightness differences all over the field of view. If a glare source is introduced into that field the eye adaptation level is raised, particularly in the retinal area of the image of the glare source, and the least brightness difference which can be detected is higher than before. Consequently much of the field of view which could previously be seen now becomes invisible. *Roberts, II, p. 93.*

disappearing filament pyrometer. An optical pyrometer consisting of a small telescope with an electrically heated filament placed in its focal plane. A hot surface within a kiln or furnace is focused through the telescope and the current supplied to the filament is adjusted until the apparent temperature of the filament and furnace coincide, the filament then disappearing in the general color of its background. The corresponding temperature is read from a scale on the instrument. *Dodd.*

disappearing highlight test. A test to determine the degree of attack of a vitreous enameled surface after an acid-resistance test. *Dodd.*

discard. a. The material extracted from the raw coal and finally thrown away. Also called dirt; stone. *B.S. 3552, 1962.* b. The portion of an ingot cropped off to remove the pipe and other defects. Also called crop. *C.T.D.*

disc bit. Synonym for disk bit. *Long.*

discharge. a. The production or output from crushing or processing machines, such as ball mills, thickeners, or stamp batteries. *Nelson.* b. The expulsion of the pulp from a stamp-mill mortar. It is also used to designate the distance from the bottom of the screen to the top of the die, because this figure determines, more than any other factor, the rapidity of the expulsion of the pulp. Also called issue. *Fay.* c. Outflow from a pump, drill hole, piping system, or other mechanism. *Long.* d. The quality of water, silt, or other mobile substances passing along a conduit per unit of time; rate of flow; cubic feet per second; liters per second; millions of gallons per day, etc. *Seelye, 1.*

discharge chute. A chute used to receive and direct material or objects from a conveyor. *ASA MH4.1-1958.*

discharge curve. A curve which relates the water level of flowing water to its discharge. *Ham.*

discharge head. The sum of static and dynamic head. The vertical distance between intake and free delivery of pump is static head. Allowance for friction, power loss, propeller slip, and issuing velocity is made for calculating the overall discharge head. *Pryor, 3.*

discharge station. A place where bulk materials or objects are removed from a conveyor. *ASA MH4.1-1958.*

discharge valve. A valve used to retard or accelerate flow through a pipe, as distinct from a stop valve. *Ham.*

discharge velocity. The rate of discharge of a liquid (usually water) through a porous medium per unit of total area perpendicular to the direction of flow. *ASCE P1826.*

discharging arch. *See* relieving arch. *ACSG.*

discipline. Employee discipline implies subjection to authority or instructions given by a mine official. For management, it connotes the right to direct and control mining operations in an orderly, safe, and efficient way. *Nelson.*

discission, space of. *See* space of discission.

discoidal. Of, like, or producing a disk. *Webster 3d.*

discolith. A discoidal coccolith. *Webster 3d.*

discomfort glare. Circumstances may exist in which glare discomfort is more apparent than disability in a lighting installation. For example, where mains lighting is installed on a hand loaded coal face, the miner generally works with his head averted from the incident light, that is, with his side or back to the line of lamps. It is only when he turns to cast his spade full of coal on to the conveyor that he experiences glare effects. Since this periodic and momentary exposure to the light sources gives a series of glare shocks to the visual process, and also since there is no need to discriminate detail when casting from a shovel, discomfort is more important than disability here. *Roberts, II, p. 93.*

disconformity. a. An unconformity between parallel strata; *compare* angular unconformity. *A.G.I. Supp.* b. Such an unconformity is marked by appreciable erosional relief; *compare* paraconformity. *A.G.I. Supp.* c. Local contact plane in dike where flow structures are discordant. *A.G.I. Supp.*

discontinuity. a. An abrupt change in the physical properties of adjacent materials in the earth's interior. *Mather.* b. Any interruption in the normal physical structure or configuration of a part, such as cracks, laps, seams, inclusions, or porosity. A discontinuity may or may not affect the usefulness of a part. *ASM Gloss.*

discontinuity lattice. *See* lattice. *Pryor, 4.*

discontinuous deformation. Deformation of rocks accomplished by rupture rather than by flowage. *G.S.A. Memo 6, 1938, p. 33.*

discontinuous precipitation. Precipitation, mainly at the grain boundaries of a supersaturated solid solution, accompanied by the appearance of two lattice parameters: (1) of the solute atoms still in solution, and (2) of the precipitate. *See also* continuous precipitation. *ASM Gloss.*

discontinuous reaction series. That branch of Bowen's reaction series, including olivine, pyroxene, amphibole, and biotite; each change in the series representing an abrupt phase change. *A.G.I.*

discontinuous yielding. The nonuniform plastic flow of a metal exhibiting a yield point in which plastic deformation is inhomogeneously distributed along the gage length. It may occur, under some circumstances, either at the onset of or during plastic flow in metals not exhibiting a yield point. *ASM Gloss.*

discordance. A lack of parallelism between contiguous strata; an unconformity. *Standard, 1964; Fay.*

discordant. Used to describe an igneous rock contact that cuts across the bedding or the foliation of the adjacent older rocks. *Billings, 1954, p. 290.*

discordant bedding. Synonym for crossbedding. *A.G.I.*

discordant injection. An igneous mass injected across bedding planes. *Fay.*

discordant stratification. An unconformable stratification. *See also* discordance. *Fay.*

discovery. a. The term has a technical meaning in mining. It may be defined as knowledge of the presence of the valuable minerals within the lines of the location or in such proximity thereto as to justify a reasonable belief in their existence. But in all cases there must be a discovery of mineral, in both lode and placer claims, as distinguished from mere indications of mineral. In other words, in a lode location there must be such a discovery of mineral as gives reasonable evidence of the fact either that there is a vein or lode of rock in place carrying the valuable mineral; or, if it be claimed as placer ground, that it is valuable for such mining. *Ricketts, pp. 346-347.* b. Pac. The first finding of the mineral deposit in place upon a mining claim. A discovery is necessary before the location can be held by a valid title. The opening in which it is made is called discovery, shaft; discovery, tunnel; etc. The finding of mineral in place as distinguished from float rock constitutes a discovery. *See also* mine, m, for discovery of a mine. *Fay.*

discovery claim. The first claim in which a mineral deposit is found, and when this is within a gulch or on a stream the claims are simply marked or numbered from the discovery claim either by letters or figures up or down the gulch or stream. *Fay.*

discovery vein. The mineral vein on which a mining claim is based. *See also* secondary vein. *Nelson.*

discovery well. The well that discovered oil or gas in a pool hitherto unknown. *A.G.I.*

discrepancy. The difference between results of duplicate measurements. *Seelye, 2.*

disequilibrium assemblage. Associated minerals not in thermodynamic equilibrium. *G.S.A. Memo 73, 1958, p. 17.*

dish. a. Derb. A rectangular box about 28 inches long, 4 inches deep, and 6 inches wide in which ore is measured. *Fay.* b. Corn. A measure holding 1 gallon, used for tin ore dressed ready for the smelter. *Fay.* c. Corn. The landowner's or landlord's part of the ore. *Fay.* d. N. of Eng. The length or portion of an underground engine plane nearest to the pit bottom, upon which the empty tubs (cars) stand before being drawn inby. *Fay.* e. Aust. A gold pan. Gold-bearing gravel or other material found by panning. *Bureau of Mines Staff.* f. *See* pan, a and b. *Long.*

disharmonic fold. a. A fold that changes in form with depth. *Billings, 1954, p. 58.* b. A fold in which abrupt changes in geometric relations occur in passing from one bed to another, especially where alternations of plastic and rigid beds occur. *A.G.I.*

disharmonic folding. Folding in which individual folds change in form or magnitude with depth. Such changes may occur gradually or abruptly. *Billings, 1954, p. 58.*

dishing. Forming a shallow, concave surface, the area being large compared to the depth. *ASM Gloss.*

dishmaker. One who forms oval dishes on a revolving mold with a shaping tool (jigger) and an eccentric (a device causing the mold to move back and forth as well as to rotate, so an oval shape will be produced). *D.O.T. 1.*

dish plate. Eng. A plate or rail concaved to receive the front wheels of a tub to secure it while teeming. *Webster 2d.*

dish wheel. A grinding wheel shaped like a dish. *ACSG, 1963.*

disinfectant. A gas, liquid, or solid used to destroy disease germs. *Crispin.*

disintegrate. a. To break up by the action of chemical and/or mechanical forces. *A.G.I.* b. To separate or decompose into fragments; to break up; hence, to destroy the wholeness, unity, or identity of. *Ballard.*

disintegrating mill. A mill that reduces material by shredding rather than by direct compression and shear. A pin disintegrator has revolving disks from which protrude steel pins capable of opening up appropriate material, for example, asbestos. *Pryor, 3.*

disintegration. a. The breaking up and crumbling away of a rock, caused by the action of moisture, heat, frost, air, and the internal chemical reaction of the component parts of rocks when acted upon by these surface influences. *Fay.* b. That stage in the decomposition of vegetable and animal substances which takes place in the presence of oxygen and moisture and which may be regarded as a slow combustion of organic substance leaving no solid carbon compounds and producing only volatile substances, namely carbon dioxide and water. *Compare* moldering; peat formation; putrefaction. *A.G.I.* c. The loosening of mineral grains in the zone above fresh rock. *Legrand.* d. The physical breakdown of material, usually shale, as a result of immersion in water or weathering. Also called dissociation. *B.S. 3552, 1962.* e. In powder metallurgy, the reduction of massive material to powder. *ASTM B243-65.* f. Disruption of the structure of brick by cracking. *Bureau of Mines Staff.* g. Radioactive breakdown in natural isotopes or radioelements, resulting in the emission of high-speed particles and rays. *C.T.D. Supp.*

disintegration constant. Decay constant. *Webster 3d.*

disintegration index. A measure of the durability of a hydraulic cement proposed by T. Merrimen. The test involves shaking with a lime-sugar solution followed by titration of one aliquot against HC1 with phenolphthalein as indicator and another with methyl orange as indicator. The disintegration index is the difference between the two titrations. The test was superseded by the test now known as the Merriman test. *See also* Merriman test. *Dodd.*

disintegrator. a. A mill for comminuting ore to a fine dry powder such as by impact breaker. *Nelson.* b. A machine for reducing by means of impact the particle size of the coal or pitch binder, or both. Also called beater. *B.S. 3552, 1962.* c. A machine used for the size reduction of some ceramic materials. A rotor is rapidly revolved within a casing, both rotor and casing having fixed hammers which impact on the material being ground. *Compare* hammer mill, a. *Dodd.*

disintegrator crusher. A machine for crushing soft materials which consists of a large, smooth roll operated at a low speed and a small-toothed roll operated at a high speed. *ACSG, 1963.*

disk. *See* tappet. *Fay.*

disk-and-cup feeder. A reagent dispenser used in the flotation process. Cups, mounted around the periphery of a slowly rotating disk driven by a fractional horsepower motor, dip into a reservoir of reagent and upon rising deliver a closely controlled quantity to the process, usually to conditioners. *Pryor, 3.*

disk bit. A roller-type rock bit with smooth-edged cutter disks instead of toothed or serrated cones. The term is seldom used, as the disk bit has been more or less replaced by serrated-tooth roller-cone rock bits. *Long.*

disk brake. A brake that utilizes friction between fixed and rotating disks, or between disks and shoes. *Nichols.*

disk clutch. A coupling that can be engaged to transmit power through one or more disks squeezed between a backplate and a movable pressure plate, and that can be disengaged by moving the plates apart. *Nichols.*

disk coal cutter. A coal cutter whose cutting unit consisted of a disk or wheel, armed at its periphery with cutters. The first disk machine, with detachable picks was patented in 1861. The disk coal cutter is obsolescent. *Nelson.*

disk couplings. Consists of driving and driven flanged hubs with projecting fingers or lugs which mesh from alternate flanges having holes, projecting fingers or lugs which mesh with holes in the disk. In some cases, the disk is replaced by a spider section which meshes between the jaws of the driving and driven hubs. *Pit and Quarry, 53rd, Sec. D, p. 66.*

disk fan. An axial-flow fan with a series of blades formed by cutting and bending flat sheets or plates. When rotated the disk imparts to the air a motion along the axis of the fan shaft. *Strock, 10.*

disk feeder. a. A feeder consisting of a rotating horizontal metal disk under the opening of a bin such that the rate of turning or opening of the gate governs the quantity delivered. *ACSG, 1963.* b. *See* rotary table feeder. *ASA MH4.1-1958.*

disk filter; American disk filter. A continuous dewatering filter in which the membrane (filter cloth) is stretched on segments of a disk. These disks rotate through a tank of slurry. The vacuum inside the disk draws the liquid through the cloth to discharge; the solids forming a cake on the filter cloth is lifted clear of the slurry tank and separately discharged, by application of air pressure behind the filter cloth. *Pryor, 3.*

disk grinder. A machine on which rigid, large, bonded abrasive disk wheels are used. *ACSG, 1963.*

disk grinding. Grinding with the flat side of an abrasive disk or segmental wheel. *ASM Gloss.*

disk grizzly. *See* grizzly. *Mitchell, p. 132.*

disk mill. A laboratory grinding mill with two circular plates almost parallel, of which one is fixed while the other rotates. Ore fed centrally between the plates is ground and discharged peripherally. The disk breaker (obsolescent) had two saucer-shaped disks working in similar fashion. *Pryor, 3.*

disk wheel. A bonded abrasive product, which may be nut-inserted, bolt-inserted, washer-inserted, or plate-mounted, that can be mounted on a faceplate for grinding on the side opposite the inserts. *ACSG, 1963.*

dislocation. a. The shifting of the relative position of a boulder in a borehole or of the rock on either side of a crack or fissure cutting across a borehole. *Long.* b. The offset in a borehole. Also called deviation; throw. *Long.* c. A general term to describe a break in the strata, for example, a fault. A washout is a disurbance but not a dislocation. *Nelson.* d. The displacement of rocks on opposite sides of fracture. *Pryor, 3.* e. In metallurgy, the structural defect in metal or crystal, produced by distortion. *Pryor, 3.* f. A linear crystal defect. *VV.*

dismantling gang. A team of men employed in a pulling apart and removing machines, equipment, and supports from a face which has ceased to be productive and has been abandoned. *See also* development gang. *Nelson.*

dismembered stream. When the normal cycle of stream development is interrupted by the subsidence of the land, and the lower part of a river valley is drowned by invasion of the sea, some of the tributaries no longer join the trunk stream, but empty by independent mouths. Thus, a single stream system is dismembered. *A.G.I.*

dismembered valley system. Valley system, the main valley of which has been betrunked so far by cliff retreat, that now the side valleys debouch independently. *Schieferdecker.*

dismicrite. An inclusive term for very fine-grained limestones of obscure origin; resembles micrite but contains irregular bodies of sparry calcite. *A.G.I. Supp.*

disordered solid solution. A condition when the atoms in a solid solution are dispersed at random; they do not take preferential positions. *Newton, p. 181.*

dispatcher. a. An employee who controls or keeps track of the traffic on haulageways and informs underground workers by telephone when to move trains or locomotives. *B.C.I.* b. *See* motor boss. *D.O.T. 1.*

dispatching system. A system employing radio, telephones, and/or signals (audible or light) for orderly and efficient control of the movements of trains of cars in mines. *ASA C42.85:1956.*

dispersal pattern. In geochemical prospecting, a pattern or the distribution of the metal content of soil, rock, water, or vegetation. *A.G.I.*

dispersant. A dispersing agent; especially a substance (as a polyphosphate) for promoting the formation and stabilization of a dispersion of one substance in another. *Webster 3d.*

dispersed element. One of the elements not greatly enriched during the geochemical cycle, and that formed few or no independent minerals; commonly present as minor constituents in minerals of more abundant elements and not concentrated with any particular element. Examples are gallium, indium, and scandium. *A.G.I.*

disperse medium. Homogeneous phase (gas, liquid, or solid) through which particles are dispersed to form a relatively stable sol. Mainly descriptive of colloidal dispersion. *See also* disperse system. *Pryor, 3.*

disperse system. A two-phase system consisting of a dispersion medium and a dispersed phase; a dispersion. *Webster 3d.*

dispersibility of dust. The ease with which a dust is raised into suspension. *Sinclair, I, p. 253.*

dispersing agent. a. A material that increases the stability of a suspension of particles in a liquid medium by deflocculation of the primary particles. *ASM Gloss. See also* deflocculating agent. b. Dispersant, deflocculating or peptizing agent. One which acts to prevent adherence of particles suspended in fluid, and delays sedimentation. *Pryor, 3.* c. Reagents added to flotation circuits to prevent flocculation, especially of objectionable colloidal slimes. Sodium silicate is frequently added for this purpose and there is some indication that it has value in coal froth flotation where a high percentage of clay slimes is present. *Mitchell, p. 574.*

dispersion. a. The act or process of dispersing or the state of being dispersed. *Webster 3d.* b. A dispersed substance; a dispersed phase. A system (as an emulsion or a suspension) consisting of a dispersed substance and the medium in which it is dispersed. *Compare* colloid; disperse system. *Webster 3d.* c. The selective separation of a nonhomogeneous emission in accordance with some characteristic (as wavelength, particle mass, speed, or energy); especially, the separation of light into colors by refraction or diffraction with the formation of a spectrum. A measure of the degree of dispersion for any region of the spectrum, commonly being the derivative of the separation with respect to the chosen characteristic (as wavelength). *Compare* dispersive power. *Webster 3d.* d. The scattering of the values of a frequency distribution from their average. *Webster 3d.* e. In optical mineralogy, the optical constants for different parts of the spectrum. *Fay.* f. The fairly permanent suspension of finely divided (undissolved)particles in a fluid. *API Glossary.* g. The creation of a dispersion by deflocculation. *B.S. 3552, 1962.* h. Variation of refractive index with wavelength of light. *See also* R-value; Nu-value. *ASTM C162-66.*

dispersion halo. A region surrounding an ore deposit in which the ore-metal concentration is intermediate between that of the ore and that of the country rock. *A.G.I.*

dispersion hardening. *See* precipitation hardening. *C.T.D.*

dispersion medium; continuous phase; external phase. The liquid, gaseous, or solid phase in a two-phase system in which the particles of the dispersed phase are distributed. *Webster 3d.*

dispersion pattern. Elements are distributed in earth materials in characteristic patterns which may be used as guides. A dispersion pattern is classed as primary if it is formed at depth by an igneous or metamorphic process, or secondary if formed at the earth's surface by weathering, erosion, or surface transportation. *Lewis, p. 297.*

dispersion-strengthened metal. An intimate combining of metals with nonmetallics in which small amounts of some hard, stable compound uniformly distributed as colloidal particles, increases the elevated-temperature strength without appreciably changing other properties. *Encyclopaedia Britannica.*

Britannica Book of the Year, 1963, p. 550.

dispersive power. The power of a transparent medium to separate different colors of light by refraction as measured by the difference in refractivity for two specified widely differing wavelengths divided by the refractivity at some specified intermediate wavelength. *Webster 3d.*

dispersoid. A body that has been dispersed in a liquid. *Fay.*

Dispex. Trade name; ammonium polyacrylate, sometimes used as a deflocculant in clay slips. *Dodd.*

disphenoid. In crystallography, a solid bounded by eight isosceles triangles. *Standard, 1964.*

displaced ore body. An ore body which has suffered a disruption or displacement after initial deposition. Geological mechanisms such as folding, faulting, or igneous intrusion normally causes displacement. In some cases, secondary enriched ore deposits are formed laterally at some distance from the zone of leaching of the primary ore zone and are often referred to as displaced ore bodies. The direction of flow of the ground waters leaching the ore body are the displacing mechanisms in this instant. *Bureau of Mines Staff.*

displaced outcrop. An outcrop that has moved downhill during a landslide or soil creep. *Nelson.*

displaced seam. A coal seam which has been dislocated by a fault. *Nelson.*

displacement. a. The lateral movement of a point, usually at the surface, during subsidence. *Nelson.* b. A general term for the change in position of any point on one side of a fault plane relative to any corresponding point on the opposite side of the fault plane. *Ballard.* c. The word displacement should receive no technical meaning, but is reserved for general use; it may be applied to a relative movement of the two sides of the fault, measured in any direction, when that direction is specified; for instance, the displacement of a stratum along a drift in a mine would be the distance between the two sections of the stratum measured along the drift. The word dislocation will also be most useful in a general sense. *Fay.* d. For air compressors, the volume displaced by the net area of the piston of the compressor multiplied by the length of the stroke in feet and by the number of strokes made per minute. For multistage compressors, the displacement refers to the low-pressure cylinder only. *Lewis, p. 663.* e. The volume of liquid delivered by a single stroke of a pump piston. *Long.* f. Sometimes used as a synonym for offset deflection; deviation; dislocation; throw. *Long.* g. The capacity of an air compressor, usually expressed in cubic feet of air per minute (c.f.m.). *Long.*

displacement micromanometer. *See* Hodgson's micromanometer. *Roberts, I, p. 36.*

displacement pump. One in which compressed air or steam, applied in pulses, drives out water entering the pump chamber between pulses, a nonreturn valve preventing reverse flow. *Pryor, 3. See also* air displacement pump.

displacement theory. In geology, continents originally formed one large land mass, which fractured and drifted to present dispersion. *Pryor, 3.*

displacement-type float. A device for measuring the liquid level in sumps or vessels. It consists of a float, whose vertical height is greater than the level range being measured and whose weight is such that it would sink in the fluid if not supported. It is placed in a float chamber and supported in such a way that as the liquid level rises around the displacer float it creates a buoyant force equal to the weight of the liquid displaced. This force is measured and since it is proportional to level, the force measurement becomes a level measurement. The device is used on sumps containing high gravity slurries. *See also* automation. *Nelson.*

displacer. A large stone in concrete, often referred to as a plum. *Ham.*

displacive transformation. A change in crystal symmetry as a result of changes in bond length or bond angles (as contrasted to reconstructive transformations). The short-range order is unchanged; the long-range order is changed. *VV.*

disposal. Scot. The quantity of mineral sold. *Fay.*

disposal well. A well drilled or used for disposal of brines or other fluids in order to prevent contamination of the surface by such wastes. *A.G.I.*

disrupted seam. A coal seam intersected by a fault or where its continuity is excessively broken. *Nelson.*

disruptive. Applied to that kind of force exerted by an explosive that tends to shatter the rock into fragments. *Fay.*

disruptive strength. The failure stress under hydrostatic tension. *ASM Gloss.*

dissected. Cut by erosion into hills and valleys or into flat upland areas separated by valleys. Especially applicable to plains or peneplains in the process of erosion after uplift. *Fay.*

dissection. The effect of erosion in destroying the continuity of a relatively even surface by cutting ravines or valleys into it. *Fay.*

dissector. A person employed to classify defective pottery ware according to the nature of the fault. *Dodd.*

disseminated. a. Fragments of mineral dispersed in a rock. *Statistical Research Bureau.* b. To be scattered or diffused through; to be permeated with. *Fay.*

disseminated crystals. Crystals which are found not attached to the mother rock; sometimes with well-devloped faces and doubly terminated. *Shipley.*

disseminated deposit. A type of ore deposit in which the ore minerals occur as small particles or veinlets scattered through the country rock. Though not very abundant, such deposits are sometimes of great size and often form important sources of copper ore. *Nelson. See also* disseminated ore.

disseminated ore. Ore in which the valuable mineral is fairly evenly distributed through the gangue as crystals or aggregates of regular size. *Pryor, 4.*

disseminated sulfide. Sulfide scattered as specks and veinlets through rocks and constituting not over 20 percent of the total rock volume. *A.G.I.*

disseminated values. In ore, values fairly regularly scattered as minute particles through the gangue or other matrix. *Pryor, 3.*

dissemination. Applied to dispersed crystallization of early formed crystals of ore minerals in deep-seated magmas and to dispersed formations of ore minerals in a more general sense. *Schieferdecker.*

dissociate. a. To resolve (a complex) into elements; to segregate. *Standard, 1964.* b. To decompose gradually by the action of heat in a confined space (a substance, the constituents of which, when the temperature is lowered, will recombine, forming the original body). *Standard, 1964.* c. To break to pieces, to decompose, fall apart, etc. *Mersereau, 4th, p. 235.*

dissociation. The act or process of dissociating or the state of being dissociated; as, the process by which a chemical combination breaks up into simpler constituents usually capable of recombining under other conditions. Especially the action of heat or other forms of energy on gases and the action of solvents upon dissolved substances. *Webster 3d.*

dissociation constant. Equilibrium constant for a reaction proceeding in both directions, showing for stated conditions a state of balance between dissociation and reassociation. When used with respect to ionization, ionization constant. Of very low-solubility compounds, solubility product. In Ostwald's dilution law the dissociation K is

$$K = \frac{m^2}{(1 - m)\,V},$$

where a molar weight has been dissolved in V liters and m is the degree of ionization. *Pryor, 3.*

dissociation tension. A property associated with every oxide which measures the stability of the oxide; for example, when equilibrium has been established at a given temperature, the dissociation tension of the oxide is numerically equal to the partial pressure of the surrounding oxygen. *Newton, p. 148.*

dissolution. a. The act or process of dissolving or breaking up; as, a separation into component parts. *Webster 3d.* b. The taking up of a substance by a liquid with the formation of a homogeneous solution. *C.T.D.*

dissolution, space of. *See* space of dissolution.

dissolving tank. A small tank used for dissolving solid cyanide and preparing a concentrated solution. *Fay.*

dissue. Corn. To break the rock from the walls of a rich lode in order to move the ore without taking with it much gang. *Standard, 1964.*

dissuing. Corn. Cutting out the selvage or gouge of a lode to facilitate the extraction of ore. *See also* zur; resuing. *Fay.*

distance blocks. Wooden blocks placed in between the main spears and the side pump rods by which the proper distance between them is adjusted. *Fay.*

distance lag; velocity lag. In flotation, a delay attributable to the transport of material or the finite rate of propagation of a signal or condition. *Fuerstenau, p. 545.*

distance piece. A block or similar device used to maintain the correct position and spacing of reinforcing bars or of formwork during concreting. *Ham.*

distant admixture. Given by Udden to the grade or grades, in a sediment containing several size grades, most different in size from the dominant (maximum) grade. *A.G.I.*

distaxy. Unlike crystallographic orientation in a mineral grain and its overgrowth. *G.S.A. Memo 50, 1952, p. 7.*

disthene. Synonym for kyanite. *Fay.*

disthenite. A rock composed almost entirely of kyanite (disthene) associated with quartzite and amphibolite. *Hess.*

distillate. The liquid obtained by condensing a vapor. *Nelson.*

distillate oil. Gasworks coal tar or coke-oven coal-tar distillate, for example, creosote.

Bennett 2d, 1962.

distillation. a. The process of decomposition whereby the original chitinous material of certain fossils has lost its nitrogen, oxygen, and hydrogen, and is now represented by a film of carbonaceous material. Synonym for carbonization. *A.G.I.* b. The process of heating a substance to the temperature at which it is converted to a vapor, then cooling the vapor, and thus restoring it to the liquid state. *Shell Oil Co. See also* destructive distillation; fractional distillation. c. A process of evaporation and recondensation used for separating liquids into various fractions according to their boiling points or boiling ranges. *C.T.D.* d. In pyrometallurgy, distillation involves the vaporization of metals or metallic compounds, and the subsequent recovery of the vapor in condensers as a liquid or solid. Distillation processes are used only for metals or metallic compounds which have relatively low boiling points, such as mercury, cadmium, and zinc. *E.C.T., v. 8, p. 937.*

distillation furnace. A reverberatory heating furnace in which the charge is contained in a closed vessel and does not come in contact with the flame. It has a combustion chamber in which the gases are burned around the retorts containing zinc ore, the retorts resting on shelves inside the chamber. *Fay.*

distillation, of petroleum. The process by which heat is applied to the crude oil in order that its constituents may pass off in vapor, and by suitable arrangements subsequently collected in the form of a liquid. *Fay.*

distorted crystal. A crystal whose faces have developed unequally, some being larger than others. Some distorted crystal forms are drawn out or shortened, but the angle between the faces remains the same. *See also* deformed crystal. *Shipley.*

distortion. a. A change in shape due to stress *Challinor.* b. The act of distorting; as, a twisting or deforming out of a natural, normal, or original shape, form, or condition. *Webster 3d.* c. Any deviation from the desired shape or contour. *ASM Gloss.* d. In aerial photography, deformation of images caused by tilt. If there is tilt but no relief, displacements are radial from the isocenter, and their magnitudes depend on the angle and direction of tilt. If both tilt and relief exist, the combined displacements are not radial from any single point. *Seelye, 2.*

distortional wave. Synonym for equivoluminar wave; secondary wave; shear wave; S-wave; transverse wave. *A.G.I.*

distrene. A polystyrene plastic; specific gravity, 1.05; refractive index, 1.58. Adaptable to imitating amber. *Shipley.*

distributary. a. An outflowing branch of a river, as occurs characteristically on a delta. *A.G.I.* b. A river branch flowing away from the main stream and not rejoining it. Opposite of tributary. *Webster 3d.*

distributed load. A design load calculated and distributed evenly along a structural member. *See also* live load. *Ham.*

distributing magazine. A place or building, either near the mine entrance or underground, in which explosives are stored for current use. Only one day's supply should be kept at such points. The main supply of explosives is kept in a magazine generally a safe distance from the mine or any mine buildings. *Kentucky, p. 188.*

distribution. a. The thicknesses of the walls of a glass article over its entire area. *ASTM C162-66.* b. *See* diamond pattern. *Long.*

distribution box. The mine-type distribution box is a portable piece of apparatus with an enclosure through which an electric circuit is carried to one or more machine-trailing cables from a single incoming feed line, each trailing cable circuit being connected through individual over-current protective devices. *ASA M2.1-1963.*

distribution curve. Graph showing cumulative frequency as ordinate against variate value as abscissa. *Pryor, 3.*

distribution of function. In management, term replacing, Delegation of Authority. with immediate responsibility placed at point where control must be exercised. *Pryor, 3.*

distribution rods. Small-diameter rods, usually at right angles to the main reinforcement, intended to spread a concentrated load on a slab, and to prevent cracking. *Taylor.*

distribution steel. Subsidiary reinforcement in a reinforced concrete slab, laid at right angles to the main reinforcing bars to maintain them in position during concreting, and to assist in distributing loads. *Ham.*

distributive fault. A fault that divides into several smaller faults. *Rice.*

distributive faulting. Faulting that is distributed over several planes of movement. *A.G.I.*

distributive province. The environment embracing all rocks that contribute to the formation of a contemporaneous sedimentary deposit, including the agents responsible for their distribution. *Schieferdecker.*

distributor. a. A device for distributing the charge when dumped into a blast furnace. *Fay.* b. An apparatus for directing the secondary current from the induction coil to the various spark plugs of a multicylinder engine in their proper firing order. *Compare* timer. *Webster 3d.*

distributor box; distributor head. Box, which receives feed from launder, pipe, or pump and splits it into parallel mill circuits. Box attached to deck of shaking table which receives sands and distributes them along top of deck at feed end. *Pryor, 3.*

district. a. In the States and Territories west of the Missouri (prior to 1880), a vaguely bounded and temporary division and organization made by the inhabitants of a mining region. A district has one code of mining laws, and one recorder. Counties and county officers have practically taken the place of these cruder arrangements. *Fay.* b. A limited area of underground workings. *Fay.* c. A coal mine is generally divided into sections or districts for purposes of ventilation and daily supervision. A district is usually under the supervision of a deputy and ventilated by a split. A large or highly mechanized district may have two or more deputies and an overman. *Nelson.* d. An underground section of a coal mine served by its own roads and ventilation ways; a section of a coal mine. *C.T.D.* e. *See* flat, j. *SMRB, Paper No. 61.*

district rope. Aust. A rope used for hauling skips in a district or section of a colliery. *Fay.*

disturbance. a. The bending or faulting of a rock or stratum from its original position. *Fay.* b. Folding and/or faulting that affects a large area but is not extensive enough to be called a revolution. The distinction between a disturbance and a revolution is very arbitrary. *A.G.I. See also* dislocation.

disturbed. a. Descriptive of an ore body that has been faulted or broken. *Hess.* b. Ore body lacking defined walls and characteristic shape. *Pryor, 3.* c. Unsettled country rock. *von Bernewitz.*

disturbed ground. a. A general term for an area which is geologically abnormal. *Nelson.* b. An area where mining has caused the ground to heave and deform. *Bureau of Mines Staff.*

disulfide. *See* bisulfide. *Pryor, 3.*

disused workings. Workings which are no longer in operation but which are not classified as abandoned. *B.S. 3618, 1963, sec. 1.*

ditch. a. A drainage course in a mine, generally following a natural contour. *B.C.I.* b. An artificial watercourse, flume, or canal, to convey water for mining. A flume is usually of wood; a ditch, of earth. *Fay.* c. Leic. To clog; to impede. *Fay.* d. The drainage gutter along gangways and openings in anthracite mines. *Hudson.* e. A surface water channel cut to bring mining water into control. *Pryor.* f. A slot cut in the earth's surface and left open. *Compare* trench. *Carson, p. 146.* g. An artificial channel, usually distinguished from a canal by its smaller size. *Seelye, 1.* h. Generally, a long narrow excavation. *Nichols.* i. In rotary drilling, a trough carrying mud to a screen. *Nichols.* j. The artificial course or trough in which the drill circulation fluid is conducted from the collar of the borehole to the sump; also, to dump and discard contents of a bailer, without taking a sample, into a ditch leading away from the collar of a borehole. Also called canal; chute. *Long.* k. To shrow away or discard. *Long.*

ditchdigger. A laborer who shovels dirt, rock, and rubbish from underground drainage ditches into mine cars to keep ditches open for flow of underground water. Also called ditcher; ditchman; drainman. *D.O.T. 1.*

ditch drain. A gutter excavated in the floor of a gangway or airway to carry the water to the sump, or out to the surface. *Fay.*

ditched top. *See* sticky coal, b.

ditcher. a. A mobile tracked machine fitted with an endless chain of buckets used for shallow vertically sided trenching. *Nelson.* b. A drill mounted on a frame that rotates about a central axis. It is used to cut circular trenches for the production of large grindstones. Also called circle cutting drill. *Fay.* c. *See* ditchdigger. *D.O.T. 1.*

ditching. a. The making of ditches. *Standard, 1964.* b. The digging or making of a ditch by the use of explosives. *See also* propagated blast. *Fay.*

ditching car. A car provided with derricks and scoops to excavate ditches, as in a railway cut. *Standard, 1964.*

ditching dynamite. A 50-percent straight dynamite designed for ditch blasting by the propagation method. *DuPont, 1966, p. 33.*

ditching machine. An excavating machine for digging trenches. *Standard, 1964.*

ditchman. *See* ditchdigger. *D.O.T. 1.*

ditch powder. A mixture of coal, sodium nitrate, sulfur, rosin, and about 10 percent nitroglycerin. Used as a low-grade dynamite for loosening of earth in farm ditching and in railroad excavation. *Bennett 2d, 1962.*

ditch water. The stale or stagnant water collected in a ditch. *Fay.*

ditch wiring. The method of connecting electric blasting caps in such a way that the two free ends can be connected at one end of the line of holes. *Fay.*

dithiocarbamate. A flotation collector agent of the general formula $X_2N.CS.SM$, X being hydrogen, aryl, or alkyl radical. *Pryor, 3.*

dithionate process. A process for extracting manganese from low-grade oxide ores. The manganese ore is leached with dilute sulfur dioxide gas in the presence of calcium dithionate solution, the manganese being recovered from solution by precipitation with slaked lime and then nodulized or sintered. *Osborne.*

dithiophosphates. In mineral processing, flotation collector agents, marketed as Aerofloats by the American Cyanamid Company. *Pryor, 3.*

dithizone. Diphenylthiocarbazone. Used in geochemical prospecting to detect traces of metal in ground wtaer. *Pryor, 3.*

ditroite. A coarse-grained, deep-seated rock, falling in the alkali-syenite subdivision. Consists essentially of alkali feldspar, together with nepheline (elaeolite), sodalite, and (usually) a small content of soda amphiboles and/or soda pyroxenes. *C.T.D.*

diurnal fluctuations. Variations occurring within a 24-hour period and related to the rotation of the earth. *Hy.*

diurnal inequality. a. The departure easterly or westerly from the mean value of the declination for the day. *Mason, v, 2, p. 719.* b. In tides, the difference in height and/or time of the two high waters or of the two low waters of each day; also, the difference in velocity of either of the two flood currents or of the two ebb currents of each day. *Hy.*

diurnal variation. a. The daily variation in the earth's magnetic field. *A.G.I.* b. In tides, having a period or cycle of approximately 1 lunar day (24.84 solar hours). The tides and tidal currents are said to be diurnal when a single flood and single ebb occur each lunar day. *Hy.*

divalent; bivalent. Having a valence of 2; for example, cobalt which has valences of 2 and 3. *Webster 3d.*

diver. Small plummet, so adjusted as to density that by rising or falling it can be used to show whether specific gravity of pulp is above or below a desired control point. If pulp is opaque, diver can initiate magnetic signal, or in a pulp containing magnetic material can carry radioactive marking material. *Pryor, 3.*

divergence. S. Afr. The departure of actual values from normal values, etc. *Beerman.*

divergence loss. That part of the transmission loss which is due to the spreading of sound rays in accordance with the geometry of the situation. For example, in the case of spherical waves emitted by a point source, the sound pressure at a point 20 yards distant from the source will be only half as great as the sound pressure 10 yards from the source. *Hy.*

divergent. Extending in different directions from a point; radiating. *Shipley.*

diver method. A technique for the determination of particle size by sedimentation. The specific gravity at a given depth in a sedimenting suspension is determined by means of small loaded glass divers of known specific gravities in a range between the specific gravity of the dispersion medium and that of the homogeneous suspension. If a diver is placed under the surface of a sedimenting suspension, it will descend to a level where its weight is equal to the weight of suspension displaced; it will then continue to descend at the same rate as the largest particles at the level of its geometrical center of gravity and at a greater rate than all the particles in the suspension located above that level. *Dodd.*

diver's bends. *See* decompression illness. *McAdam, p. 163.*

diversion. A channel so excavated as to divert a stream or river away from a working site in order that construction might safely proceed to completion. *Ham.*

diversion valve. A valve which permits flow to be directed into any one of two or more pipes. *Nichols.*

diversity factor. The ratio of the sum of the individual maximum loads during a period to the simultaneous maximum loads of all the same units during the same period. Always unity or more. *Strock, 10.*

diversity ratio. The relationship between the maximum and minimum illumination over a given plane area. *Nelson.*

diver's palsy. *See* decompression illness. *McAdam, p. 163.*

diver's paralysis. Similar to caisson disease. *Ham.*

divide. a. The land crest marking the boundary between adjacent watersheds; in North America the Continental Divide separates the waters flowing into the Atlantic Ocean from those flowing into the Pacific. *Sinkankas* b. The watershed or height of land from which the heads of streams flow in opposite directions. Also called dividing range. *Fay.*

divided cell. A cell containing a diaphragm or other means for physically separating the anolyte and catholyte. *Lowenheim.*

dividers; bunton. Cross-steel or timber pieces in a circular or rectangular shaft. They serve to divide the shaft into compartments and may also carry the cage guides, etc. *Nelson.*

dividing slate. A stratum of slate separating two benches of a coalbed; a parting. *Fay.*

diviner. One who purportedly divines the location of oil, gas, water, or ore deposits in the earth; a dowser. *A.G.I.*

diving apparatus. *See* Dunlop diving apparatus; A.N.S. amphibian apparatus. *McAdam, pp. 163-166.*

diving bell. A watertight, bell-shaped steel chamber which can be lowered to or raised from a freshwater or seawater bed by a crane. It is open at the bottom and filled with compressed air, so that men can prepare foundations and undertake similar construction work underwater. *Ham.*

diving saucer. A circular-shaped submersible for undersea exploration. Already successfully put to use by Capt. Jacques-Yves Cousteau, a French oceanographer. *Hy.*

divining; dowsing. A method of searching for water or minerals by holding a hazel fork (or other device) in the hands, and the free end is said to bend downwards when a discovery is made. In the Middle Ages, the divining rod was closely associated with the mine surveying profession. The water diviner has not succeeded when submitted to impartial scientific tests. *Nelson.*

divining rod. A forked piece of tree branch considered by some to have magic properties when held in the hands of a dowser. The branch is supposed to dip when held over oil, gas, water, or ore deposits, depending upon the specialty of the dowser. Agricola discussed this method of exploration in De Re Metallica, published in 1556. Synonym for dowsing rod; wiggle stick. *A.G.I.*

divisional plane. A plane which divides a rock into separate masses, large or small, in the same way as a joint, or a fissure. *Fay.*

division gate. A structure dividing the flow between two or more laterals. *Ham.*

division method. One of three recognized methods for determining the average velocity of airflow in a mine roadway by anemometer. This is the precise method of determining the mean velocity of the air current. The cross-sectional area is divided off, or is imagined to be so divided, into a number of portions of equal area, and the central velocity of each subdivision is ascertained. The number of subdivisions will depend upon the shape of the airway. and the nature of the flow. This method takes time, and is used only for very important work, such as fan testing. *Compare* single spot method; traversing method. *Roberts, I, p. 50.*

Division Order. A statement issued by the pipe line purchasing company setting out the names and fractional participations of the working interest and royalty ownership under a producing property. *Wheeler.*

division rope. Aust. *See* buffer rope. *Fay.*

division wall. A wall of refractory bricks between two adjacent settings in a bench of gas retorts. *Dodd.*

divot. Term used in Northern England and in Scotland for peat or turf. *Tomkeiff, 1954.*

dixanthogen. A breakdown product of xanthate collectors (flotation agents) with some residual value for that purpose. *Pryor, 3.*

dixenite. A nearly black hydrous arsenite and silicate of manganese, $MnSiO_3.2Mn_2(OH)$-AsO_3. Rhombohedral. Aggregates of thin folia. From Langban, Sweden. *English.*

dizzue. Corn. *See* dissuing. *Fay.*

djalmaite. A very rare, moderately to strongly radioactive, yellowish-brown, greenish-brown, or brownish-black, isometric mineral, $(U,Ca,Pb,Bi,Fe)\ (Ta,Cb,Ti,Zr)_3O_9$.-$nH_2O$, found as shining octahedral crystals in granite pegmatite associated with columbite, magnetite, samarskite, garnet, beryl, tourmaline, and bismuth minerals; from Brejauba, Minas Geraes, Brazil. The tantalum analogue of betafite. *Crosby, pp. 16-17; Spencer 16, M.M., 1943.*

Djulfian. Upper upper Permian. *A.G.I. Supp.*

djurleite. A mineral, $Cu_{.96}S$. *Hey, MM, 1964; Fleischer.*

dkl Abbreviation for dekaliter. *BuMin Style Guide, p. 59.*

dkm Abbreviation for dekameter. *BuMin Style Guide, p. 59.*

dkm^2 Abbreviation for square dekameter. *BuMin Style Guide, p. 62.*

D-link. A flat iron bar attached to chains, and suspended by a rope from a windlass. It forms a loop in which a man sits when lowered or raised in a shaft or winze. *Fay.*

D.L.T. reagents. Condensation products of ethanolamine and higher fatty acids, used as flotation agents (collectors). *Pryor, 3.*

dm Abbreviation for decimeter. *BuMin Style Guide, p. 59.*

do. Leic.; Derb. *See* bout, b. *Fay.*

do-. A prefix indicating that one factor dominates over another within the ratios 7 to 1 and 5 to 3 (7 and 1.67); for example, docalcic, dofemic, and dosaic. *Hess.*

doab. a. The tract of land between two streams immediately above their confluence. *Standard, 1964.* b. The confluence of two streams. *Standard, 1964.*

doar. Corn. The earth; whence ore, the earth of metals. *Fay.*

dobbin. Semiautomatic chamber dryer, consisting of rotating compartments, in which the clayware, as it comes from the cup- or plate-making machines, is dried on or in the plaster molds. *Rosenthal.*

dobby wagon. York. A cart for conveying waste material (rock, etc.) from a mine. *Fay.*

dobie. a. An irregular shape of either raw or burned material used sometimes in a stage of the manufacture of refractories. *A.R.I.* b. A molded block of ground clay or other refractory material, usually crudely formed, and either raw or fired. *HW.* c. The mudcap or adobe method of secondary blasting and/or breaking boulders on the surface or in a borehole. *See also* mudcap. *Long.* d. Synonym for adobe. *Long.*

dobie man. *See* blaster. *D.O.T. 1.*

Dobson prop. An hydraulic prop which is basically a self-contained hydraulic jack with an integral pump unit built into the prop. It is designed to yield at 25 tons and has a setting load of 6 tons. *Nelson.*

Dobson support system. A self-advancing support for use on longwall faces. One unit embodies three props. The front prop, which is attached to the face conveyor, carries two roof bars side by side which give cantilever support over the conveyor track. The two rear props are mounted on a common floor bar and carry a single roof bar which passes between the two front bars. The front prop is attached to the rear structure only by the advancing ram within the box structure of the floor bar. *Nelson.*

dock. a. In New York and Pennsylvania, a local term among bluestone quarrymen and dealers for yards where the bluestone is unloaded as hauled from the quarries, and reloaded for transportation by rail or water to its destination. *Fay.* b. A crib for holding loose or running rock from obstructing a track or passageway. *Fay.*

dock boss. In anthracite and bituminous coal mining, a foreman who checks run-of-mine coal (coal not sized, screened, or cleaned) in mine cars or as it is dumped on picking tables for removal of impurities by slate pickers. Also called docking boss; gager. *D.O.T. 1.*

docked. Alleged unfair or mistaken deductions from a miner's wages. *Nelson.*

docket. A pay ticket containing particulars of shifts worked, coal filled, yardage driven, and other work done, including the total wages less deductions. *Nelson.*

docking. The immersion of building bricks in water as soon as they are taken from the kiln; this is done only when the bricks are known to contain lime nodules and is a method for the prevention of lime blowing. *See also* lime blowing. *Dodd.*

docking boss. *See* dock boss. *D.O.T. 1.*

docrystalline. Suggested by Cross, Iddings, Pirsson, and Washington for hypocrystalline rocks in which the ratio of crystals to glass is less than 7:1 and greater than 5:3. Obsolete. *Johannsen, v. 1, 1939, p. 208.*

doctor. a. To treat a poor-quality carbon with substances such as oil, wax, gutta-percha, solder, gum, or resin, to camouflage its defects, hence changing its appearance to make it look like a better grade stone. Also called dope. *Long.* b. A makeshift, temporary repair. *Long.* c. As used in the mining industry, to salt. *Long.*

doctor blade. a. A thin, flexible, piece of steel used for smoothing a surface, for example, for cleaning excess color from the engraved copper plate used in printing on pottery. *Dodd.* b. A blade used for parting thin ceramic sheets or wafers of the type used in miniature condensers. *Dodd.*

doctor of sick mines. *See* grave robber. *Hoov, p. 275.*

doctor solution. A solution made by adding litharge to a sodium hydroxide solution. Used in sweetening petroleum distillates (as naphtha) by reaction with any malodorous sulfur compounds (as mercaptans) present. *Webstre 3d.*

document glass. An ultraviolet absorbing glass used for protecting documents. *ASTM C162-66.*

Dodd buddle. *A* round table resembling in operation a Wilfley table, and also like the Pinder concentrator except that it is convex instead of concave. The tables does not revolve but has a peripheral jerking motion imparted to it circumferentially by means of a toggle movement. *Liddell, 2d, p. 386.*

dodecacalcium heptaluminate. $12CaO.7Al_2O_3$; melting point, 1,455° C. A constituent of high alumina hydraulic cement. This compound was formerly believed to be pentacalcium trialuminate ($5CaO.3Al_2O_3$). *Dodd.*

dodecahedral cleavage. In the isometric system, a cleavage parallel to the faces of the rhombic dodecahedron. *Fay.*

dodecahedral mercury. Native amalgam containing 75 percent mercury and 25 percent silver. *Fay.*

dodecahedron. a. An isometric form composed of 12 equal rhombic faces, each parallel to one axis and intersecting the other two axes at equal distances, specifically named the rhombic dodecahedron. *Fay.* b. An isometric form composed of 12 equal pentagonal faces, each parallel to one axis and intersecting the other two axes at unequal distances; specifically named the pentagonal dodecahedron of the pyritohedron from the occurrence of some pyrite crystals in this form. *Fay.* c. Also called Brazilian stone by diamond-bit setters because, before discovery of the African diamond fields, practically all diamonds, other than carbon, produced in Brazil and used in diamond bits were dodecahedral-shaped diamonds. *Long.*

dodecant. One of the 12 divisions into which space is divided by the four reference axes of the hexagonal crystal system. *A.G.I. Supp.*

Dodge crusher. Similar to the Blake crusher, except the movable jaw is hinged at the bottom. Therefore the discharge opening is fixed, giving a more uniform product than the Blake with its discharge opening varying every stroke. *Liddell 2d, p. 356.* This type of crusher gives the greatest movement on the largest lump. *Fay.*

Dodge pulverizer. A hexagonal barrel revolving on a horizontal axis, containing perforated die plates and screens. Pulverizing is done by steel balls inside the barrel. *Liddell 2d, p. 356.*

DOFP. Direct-on finish process of vitreous enameling. *Dodd.*

dog. a. Any of various devices for holding, gripping, or fastening something. *Webster 3d.* b. A drag for the wheel of a vehicle. *Webster 3d.* c. Scot. A hook-headed spike for fastening down flat-bottomed rails. d. Scot. A spring hook, most commonly in use for attaching a sinking bucket to the winding rope. *Fay.* e. An iron bar, spiked at the ends, with which timbers are held together and steadied. *Fay.* f. A short, heavy iron bar, used as a drag behind a car or trip of cars when ascending a slope to prevent them running back down the slope in case of an accident; a drag. *Fay.* g. *See* casing dog; pipe dog. *Fay.* h. Can. Slang for hopeless property or mining stock. *Hoffman.* i. A heavy duty latch. *Nichols.* j. To hold, grip, or fasten. *Long.* k. A nonstandard or poorly made tool or piece of drilling equipment. *Long.* l. A round iron rod, with the pointed ends bent at right angles. *Stauffer.* m. A kind of nail with the top bent at right angles instead of having a head. *Mason.* n. A device attached to the workpiece by means of which the work is revolved. *ACSG, 1963.* o. A trigger which limits the advance of a traversing table. *ACSG, 1963.*

dog-and-chain. a. An iron lever with a chain attached by which props are withdrawn. *Fay.* b. *See* dog belt. *Fay.*

dog belt. Mid. A strong broad piece of leather buckled around the waist, to which a short piece of chain is attached, passing between the legs of the man drawing a dan (tub) in a mine. *Fay.*

dog clip. Aust. Same as clip. *Fay.*

dogger. a. A concretionary mass of calcareous sandstone. *A.G.I. Supp.* b. An ironstone concretion. *A.G.I. Supp.* c. Clev. A bed of inferior ironstone overlying the main seam. *Fay.* d. Scot. An irregular piece of stony coal in a seam. *Fay.*

doggy. a. S. Staff. An underground superintendent, employed by the butty. *Fay.* b. Eng. Haulage corporal. *Mason.*

doghole. A small opening from one place in a coal mine to another; smaller than a breakthrough. *Fay.*

doghole mine. Name applied to small coal mines that employ fewer than 15 miners. The so-called dogholes are most numerous in Kentucky, but there are many in Virginia and West Virginia. *Bureau of Mines Staff.*

dogholes. *See* doghole mine.

dog hook. a. Eng. A long hook for drawing any empty wagon. *Fay.* b. A strong hook or wrench for separating iron boring rods. *Fay.* c. An iron bar with a bent prong, used in handling logs. *Fay.*

doghouse. a. A term used in Joplin, Mo., for a washroom; dryhouse; changehouse. *Fay.* b. A term used in Joplin, Mo., for a box or platform on which a can or bucket rests at the bottom of a shaft. *Fay.* c. The structure enclosing the drill platform and machine. *Long.* d. A small shelter in which members of a drill crew change clothing. *Long.* e. *See* forechamber. *Fay.* f. A small boxlike vestibule on a glass furnace into which the batch is fed, or which facilitates the introduction and removal of floaters. *ASTM C162-66.*

dog iron. A short bar of iron with both ends pointed and bent down so as to hold together two pieces of wood into which the points are driven; or one end may be bent down and pointed, while the other is formed into an eye, so that if the point be driven into a log, the other end may be used to haul on. *Zern.*

dogleg. a. An abrupt, angular change in the course of a borehole; also, the deflected borehole drilled from a parent hole to make an additional intersection of a vein or other structure. *Long.* b. An abrupt bend or kink in a wire rope or cable. *Long.* c. An abrupt bend in a path, piping system, or road. *Long.*

dogleg severity. Same as deflection angle; hole curvature. *Long.*

dog-on; dug-on. Scot. To put the hutches on the cage. This term probably had its origin in the hooking of the bucket to the rope by means of a dog hook. *Fay.*

dogs. a. Eng. In the plural; bits of wood at the bottom of an air door. *Fay.* b. *See* cage shuts. *Fay.* c. *See* dog. *Fay.* d. A tool for gripping pipes and other round material or parts. *Mason.*

dog spike. A spike generally used to fasten rails to the sleepers when laying track. Their length should be one-half inch less than the depth of the sleeper into which they are being pounded. *Sinclair, V, p. 263.*

dog's teeth; dragon's teeth. A fault sometimes found on the edges of a rectangular extruded column of clay, the greater friction at the corners of the die holding the clay back relative to the center of the extruding column; if this corner friction is too great, it results in a regular series of tears along the edges of the column. Methods for curing the fault are increasing the moisture content of the clay, improving the lubrication of the die, or enlarging the corners of the die at the back of the mouthpiece. *Dodd.*

dogstone. A rough or shaped stone used for a millstone. *Fay.*

dog's tooth. Brick so laid that their corners project from the face of floaters. *ACSG.*

dogtooth pearl. Tusklike baroque pearl. *Shipley.*

dogtooth spar. A variety of calcite that occurs in acute crystals resembling the tooth of a dog. *Webster 3d.*

dogwatch. Aust. The night shift in a colliery. *See also* graveyard shift. *Fay.*

dog whipper. Eng. A master hauler. *Nelson.*

dohyaline. Suggested by Cross, Iddings, Pirsson, and Washington for hypocrystalline rocks that are dominantly glass, and in which the ratio between crystals and glass is less than 3:5 and greater than 1:7. Obsolete. *Johannsen, v. 1, 2d, 1939, p. 208.*

doit. Eng. Foulness, or damp air. *Fay.*

dol. Corn. Any part or share of the adventure or tin ore, as one-eighth, one-sixteenth, one-thirty-second, or the like. *Fay.*

dolarenite. Dolomite rock composed of sand-sized grains. *A.G.I. Supp.*

dole. A division of a parcel of ore. Also spelled dol. *Fay.*

dolerine. A variety of talc schist containing feldspar and chlorite as the chief varietal minerals; from the Pennine Alps. *Holmes, 1928.*

dolerite. a. In the United States, a dark igneous rock, the mineral constituents of which are not determinable megascopically. *Webster 3d.* b. A coarse basalt. *See also* diabase. *Webster 3d.* Also called bluestone.

doleritic. *See* ophitic; diabasic. *A.G.I.*

dolerophanite. A brown opaque anhydrous basic copper sulfate, $2CuO.SO_3$; contains 53.1 percent copper; reported from Vesuvius. *Larsen, p. 215.*

dolina. One of the natural funnelform water tubes worn down vertically through limestone strata to underground drainage. *Satndard, 1964.*

doline. a. Called by English writers swallow hole, sinkhole, or cockpit, it is a rounded hollow ranging from 30 to 3,000 feet in diameter and from 6 to 330 feet in depth. It may be either dish-, funnel-, or well-shaped. Besides being a simple basin, the doline also occurs as a chimney communicating below with blind cavities, with underground river courses, or with systems of fissures, the first are known in France as avens, and the second in Jamaica as light holes. Synonym for dolina. *A.G.I.* b. It. A funnel-shaped cavity which communicates with the underground drainage system in a limestone region. *A.G.I.*

dollar. A unit of reactivity. One dollar is the amount of reactivity in a reactor due to delayed neutrons alone. *L&L.*

dollie. *See* dolly, h. *Long.*

dolly. a. Aust. An instrument used for breaking and mixing clay in the puddling tub. *Fay.* b. A heavy timber shod with iron, and hung from a tree or other support and formerly used for crushing quartz. *Fay.* c. To break up quartz with a piece of wood shod with iron, in order to be able to wash out the gold. *Fay.* d. A trucklike platform, with a single roller attached, used in shifting beams, lumber, etc., and serving as a fixed roller when inverted. *Standard, 1964.* e. A counterbalance weight sometimes used in a hoisting shaft. *Nelson.* f. A tool used to sharpen drills. *Stauffer.* g. A unit consisting of draw tongue, an axle with wheels, and a turntable platform to support a trailer gooseneck. *Nichols.* h. A low wheel-mounted frame designed to support heavy pieces of equipment while being moved. *Long.* i. A stationary roller. *Long.* j. *See* car. *ASA MH4.1-1958.* k. To concentrate (ore) by the use of a dolly. *Standard, 1964.* l. A wooden disk for stirring the ore in a dolly tub, in ore concentration by the tossing and packing process. *Standard, 1964.* m. *See* dolly tub. *Fay.*

dolly dimples. A slight defect in cast-iron vitreous enamelware, blisters in a leadless enamel having almost completely healed. *Dodd.*

dollying. N.S.W. The operation applied in the field in which the vein or reef material is first reduced to a powder in order that its free gold content can be tested. The fine powder is then washed in a prospecting dish in the usual way. *New South Wales, pp. 139-140.*

dolly pot. A simple appliance to reduce small quantities of ore to a fine form suitable for washing. *See also* prospecting dish. *Nelson.*

dolly tub; kieve. A large wooden tub used for the final washing of valuable minerals separated by water concentration in ore dressing. *See also* tossing; dolly. *C.T.D.*

dolly wagon. A wagon for the conveyance of dirt from a mine. *C.T.D.*

dolly wheels. Pairs of wheels used to support rods of a Cornish pump working on a slope. *Pryor, 3.*

dololutite. A very fine-grained dolomite rock. *A.G.I. Supp.*

doloma. Calcined dolomite, that is a mixture of the oxides CaO and MgO. *Dodd.*

dolomicrite. A dolomite rock consisting of less than 2 percent allochems. *A.G.I. Supp.*

dolomite. a. A carbonate of calcium and magnesium, $CaMg(CO_3)_2$; rhombohedral; usually some shade of pink or flesh color, but may be colorless, white, gray, green, brown, or black; transparent to translucent; luster, vitreous, pearly in some varieties; Mohs' hardness, 3.5 to 4; specific gravity, 2.85. In the United States is found as masses of sedimentary rock in many of the Middle Western States, and in crystals in the Joplin district. Mo. Used as a building and ornamental stone, for the manufacture of certain cements. *Dana 17, pp. 338–340.* b. A term applied to those rocks that approximate the mineral dolomite in composition. Occurs in a great many crystalline and noncrystalline forms the same as pure limestone, and among rocks of all geological ages. When the carbonate of magnesia is not present in the above proportion, the rock may still be called a magnesian limestone, but not a dolomite, strictly speaking. *Fay.* c. A limestone containing in excess of 40 percent of magnesium carbonate as the dolomite molecule. *ASTM C119-50.*

dolomite brick. Brick made mostly of dolomite and used for furnace linings. *Hess.*

dolomite, fused. A mixture of cubic crystals of calcium and magnesium oxides, fused in the electric furnace. *CCD 6d, 1961.*

dolomite marble. A crystalline variety of limestone, containing in excess of 40 percent of magnesium carbonate as the dolomite molecule. *ASTM C119-50.*

dolomitic. Composed of or similar to dolomite. *Fay.*

dolomitic conglomerate. Som. Breccia conglomerate of Keuper age. *Arkell.*

dolomitic lime. Lime containing 30 to 50 percent magnesium and 70 to 50 percent calcium oxide as contrasted with a lime containing 95 to 98 percent calcium oxide. *ASTM STP No. 148-D.*

dolomitic limestone; dolomite limestone. a. A limestone containing dolomite, but in which the content of $CaCO_3$ exceeds that of $MgCO_3$. *Holmes, 1928.* b. A calcareous sedimentary rock containing calcite or aragonite in addition to dolomite. *C.M.D.*

dolomitite. A rock composed of dolomite. *See also* dolostone. *A.G.I. Supp.*

dolomitization; dolomization. The process by which limestone, $CaCO_3$, becomes dolomite, $CaMg(CO_3)_2$, through the substitution of magnesium for some of the calcium. If the conversion from a limestone formation to a dolomite formation is complete and the $MgCO_3$ content of the rock approximates the maximum percentage, the 45.7 weight-percent of $MgCO_3$ in the mineral dolomite, considerable shrinkage occurs that is expressed physically by the appearance of pores, cavities, and fissures that may amount to as much as 11 percent by volume of the original rock. *Bureau of Mines Staff.*

dolomorphic. In an insoluble residue, a condition in which calcite or dolomite has been replaced by an insoluble mineral which fills the rhombohedral dolomoldic cavity in chert or in another matrix. *A.G.I.*

doloresite. A hydrous vanadium oxide, $3V_2O_4.4H_2O$; monoclinic (pseudo-orthorhombic). Dark-brown alteration product of montroseite in sandstone from the Colorado Plateau. Named for the Dolores River, Colo. *Spencer 21, M.M., 1958.*

dolorudite. A dolomite rock consisting of grains larger than sand size. *A.G.I. Supp.*

dolostone. Proposed by Strock for a sedimentary rock composed of fragmental, concretionary, or precipitated dolomite of organic or of inorganic origin. *A.G.I.*

dolphin. A fixed mooring in the open sea formed of a number of piles, or a guide for ships entering a narrow harbor mouth. *Ham.*

domain. A substructure in a ferromagnetic material within which all of the elementary magnets (electron spins) are held alined in one direction by interatomic forces; if isolated, a domain would be a saturated permanent magnet. *ASM Gloss.*

domatic. Relating to a dome; a horizontal prism. *Shipley.*

dome. a. A symmetrical structural uplift having an approximately circular outline in plan view, and in which the uplifted beds dip outwards more or less equally in all directions from the center, which is both the highest point of the structure and locally of the uplifted beds. *Bureau of Mines Staff.* b. A mountain having a smoohtly rounded summit of rock that resembles the cupola or dome on a building. *A.G.I.* c. An open crystal form consisting of two parallel faces that truncate the intersections of two sets of pinacoids and are astride a symmetry plane. Formerly, considered to be an open crystal form which parallels either one of the lateral axes, a or b, and cuts the other lateral axis, b or a, and the vertical axis c. *Bureau of Mines Staff. See also* salt dome. d. In Morrison's pressure ring theory concerning large excavations, it is postulated that the stress concentration at the surface of an opening is relieved and that the areas of higher stress move back into the surrounding rock, where stability is reestablished. This new area is referred to as a dome, and it includes the surface between the fracture zone and the area of maximum stress, the stress being a function of the shape of the dome. *Lewis, pp. 622–623.* e. Roof of a furnace that is roughly hemispherical in shape; the hood of a copper anode furnace. *Bureau of Mines Staff.* f. An acoustically transparent transducer enclosure, usually streamlined, used with echo ranging or listening devices to minimize turbulence and cavitation noises arising from the passage of the transducer through the water. *Hy.* g. The steam chamber of a boiler. *Compare* air dome. *Long.*

dome brick. A brick in which both the large and the side faces are inclined towards each other in such a way that, with a number of these bricks, a dome can be built. *Dodd.*

dome plug. A refractory shape, usually made of aluminous fireclay or of a refractory material of still higher alumina content, used in the top of the dome of a hot-blast stove. *See also* hot-blast stove. *Dodd.*

Domerian. Upper Charmouthian. *A.G.I. Supp.*

domestic coal. a. Coal for use around colliery in miners' houses or for local sale. *Zern.* b. Sized coal for use in houses. Same as house coal. *Zern.* c. Coal used in country of origin; not for foreign consumption. *Zern.*

domestic coke. Domestic coke is normally a byproduct at coal-gas plants and commercial byproduct plants. The general characteristics of the coal, therefore, are fixed by the requirements for gas and coking coals. Domestic coke varies greatly in quality, dependent upon the coal locally available and the quality of domestic fuel with which the coke competes. Coke containing less than 10 percent ash is an exceptionally good domestic fuel. *Mitchell, p. 120.*

domestic sampling. Routine sampling by mine officials for systematic control of mining operations. *See also* development sampling. *Nelson.*

dome theory. Fayol, a Frenchman, in 1885 stated that strata movements caused by underground excavations were limited by a kind of dome which had for its base the area of excavation, and that the movements diminished as they extended upwards from the center of the area. This is known as the dome theory. *See also* harmless depth theory; normal theory. *Nelson*

domeykite. A reniform and botryoidal, tin-white to steel-gray copper arsenide, Cu_3As; also found massive and disseminated. *Fay.*

dominant vitrain. A field term to denote, in accordance with an arbitrary scale established for use in describing banded coal, a frequency of occurrence of vitrain bands comprising more than 60 percent of the total coal layer. *A.G.I.*

doming. As result of stope excavation a region is set up above the open space, thought of as the dome. An inverted counterpart exists in the footwall, the stress of the unsupported rock being transferred to the stressed zone back of the stope face. If the rocks have reacted elastically, there is an expansion dome; when shear cracks are set up it is a fracture dome. *Pryor, 3.*

domite. An extrusive rock composed essentially of sodic sanidine with minor oligoclase, and biotite; commonly has a glassy groundmass and contains occult quartz. A plagioclase bearing trachyte with occult quarta. *A.G.I.*

donarite. An explosive consisting of 70 percent ammonium nitrate, 25 percent trinitrotoluol, and 5 percent nitroglycerin. *Hackh's Chem. Dict.*

donbassite. A group of hydrous aluminosilicates, $H_{14}Al_8Si_5O_{29}$, etc., with small amounts of Fe, Mg, Ca, Na, closely resembling pyrophyllite. Named from locality, Donetz Basin, Ukraine, U.S.S.R. *Spencer 16, M.M., 1943.*

donk. N. of Eng. Clay or soft earth, found in crossveins and flats. *See also* doak. *Fay.*

donkey. a. A winch with drums which are controlled separately by clutches and brakes. *Nichols.* b. *See* barney. Also used synonymously for donkey engine; donkey pump; donkey hoist. *Fay.*

donkey engine. a. Eng. A small steam engine attached to a large one, and fed from the same boiler; used for pumping water into the boiler. *Zern.* b. Eng. A small steam engine. *Zern.*

donkey engineer. In anthracite and bituminous coal mining, a general term for the attendant of a small auxiliary engine, powered by steam or compressed air, used to drive pumps to drain sumps (pits in which excess water is collected) or supply water to boilers, or to operate a hoist for a shallow shaft. Also called donkey runner. *D.O.T. 1.*

donkey hoist. A small auxiliary hoisting drum and engine operated by steam, by compressed air, and sometimes by an electric motor or an internal-combustion engine. *Long.*

donkey pump. Any of several kinds of combined pump and steam engine. It may be operated independently of the engine; used to supply water to a boiler, drain sumps, etc. *Fay.*

donkey runner. *See* donkey engineer. *D.O.T. 1.*

donkey winch; yarder. A two-drum towing winch. *Nichols.*

donnick; donock; donnock. Variations of dornick. *Fay.*

donor levels. Energy levels formed in the energy gap by excess electrons. *VV.*

doodlebug. a. The essential treatment plant of a small dredge set on a pontoon. There is usually a hopper into which the dragline dumps its spoil and which may have a grizzly arrangement, according to the nature of the gravel. A water supply washes the contents of the hopper into a revolving screen, feeding the fines over riffled tables and rejecting the stones and oversize by means of a stacker. This treatment plant or washing unit can be floated in the excavation dug by the dragline and is the ideal unit to install when small-scale operations are to be carried out below water level or where it is not necessary to use dry opencast paddock methods. *Harrison, p. 174.* b. Any one of a large number of unscientific devices with which it is claimed water, mineral, and oil deposits can be located. *A.G.I.* c. *See* douse; douser. *Long.*

doodlebugger. a. An operator of a small nonfloating placer dredge fed by a dragline or a shovel. *Bureau of Mines Staff.* b. *See* douser. *Long.*

doodler. *See* machine scraper. *D.O.T. 1.*

dook. a. Scot. A mine or roadway driven to the dip, usually the main road. *See also* slope. *Fay.* b. Som. An underground inclined plane. *Fay.*

dook workings. Scot. Workings below the level of the shaft bottom. *Fay.*

door. a. A hinged or sliding frame or piece of wood, metal, stone or other material, generally rectangular, used for closing or opening an entrance or exit, as to a house, room, or other enclosure. *Standard, 1964.* Doors are placed in air passages of mines to prevent the ventilating current from taking a short cut to the upcast shaft, and to direct the current to the working face. *Fay.* b. A mine door is used for the purpose of directing the air current from its course on one entry so that it will traverse another entry, and also, to permit haulage equipment to pass through the first entry. It is essential in the construction of a mine door that it be hung so as to close with the ventilating pressure. In other words, the ventilating pressure will help to keep the door tightly closed. All efforts should be made to prevent leakage around the doors and when possible they should be hung in pairs to form air-locks to prevent unnecessary loss of air by being short-circuited. *Kentucky, p. 88. See also* automatic door; air door; separation door; steel separation door.

doorboy. *See* doorman. *D.O.T. 1.*

door chain. Scot. A chain with adjusting screw by which the bucket and clack door of a pump are suspended. *Fay.*

doorheads. Scot. The roof or top of the workings at a shaft. *Fay.*

doorman. A laborer who opens ventilation doors in underground haulageways to allow trains and cars to pass to and from shaft or surface. Also called doorboy; door tender; door trapper; gateman; nipper; trapper; trapper boy. *See also* brattice man. *D.O.T. 1.*

door opening tile. Standard rectangular tile for spanning door openings. *Bureau of Mines Staff.*

door piece. The part of a pump which provides access to the valves. *Peel.*

doorstead. a. Eng. Upright timbers in the sides of levels for supports. *Fay.* b. Doorway. *Webster 3d.*

door stoop. Scot. A pillar or block of mineral left around a shaft for its protection.

Fay.

door tender. One whose duty it is to open and close a mine door before and after the passage of a train of mine cars; a trapper. *Zern.*

door trapper. *See* door tender. *Fay.*

door-type sampler. A soil-sampling tube or barrel equipped with an auger-type cutting shoe and made to be rotated to obtain samples of sand, gravel, and other granular material. The body of the sampler is essentially a tube in which a small opening or window is machined and equipped with a covering, which can be latched shut while the sample is being taken. When the sampler is removed from the ground, the latch is released and the sample removed through the door or window. Also called window-tyep sampler. *Long.*

dop. a. A copper cup with a wooden handle, in which a gem is soldered to be held while being cut or polished. *Standard, 1964.* b. A device in which a diamond or other gem stone is held while being cut. *Webster 3d.*

dopatic. Applied by Cross, Iddings, Pirsson, and Washington to porphyritic rocks in which the groundmass is dominant, the ratio of groundmass to phenocrysts being greater than 5:3 and less than 7:1. *Johannsen, v. 1, 2d, 1939, p. 208.*

dope. a. Absorbent material, as sawdust, infusorial earth, mica, etc., used in certain manufacturing processes, as in making dynamite. *Webster 2d.* b. Heavy grease or other material used to protect or lubricate drill rods and/or open gears, chain and sprockets, etc. Also called gunk; rod dope; rod grease. *Long.* c. To apply a lubricant to drill rods, rod couplings, open gears, etc. *Long.* d. To doctor a drill diamond. *See also* doctor, a. *Long.* e. A rubberlike compound applied to granite surfaces before inscriptions are cut in the granite. *AIME, p. 328.* f. A viscous liquid put on pipe threads to make a tight joint. *Nichols.* g. Slang for mold lubricant. *ASTM C162-66.*

Doppler. A self-contained electronic system that makes use of Doppler's principle of frequency shift of waves emanating from a moving source. In this system, a pulsed or continuous wave is sent diagonally downward fore and aft, and the frequencies are compared in order to obtain the true ground speed. The heading is obtained from a special magnetic compass and is maintained by a directional gyro used as an integrating device. The distance thus determined has a precision better than one part in a thousand, which is sufficient for most geophysical surveys. *Dobrin, p. 323.*

Doppler effect. A shift in the measured frequency of a wave pattern caused by movement of the receiving device or the wave source. The moving receiver will intercept more or fewer waves per unit time, depending on whether it is moving toward or away from the source of the waves. By analogy, in a reactor, since fission cross sections depend on the relative velocity of the neutrons and the uranium atoms (neutron movement can be considered wave motion), vibration of the uranium atoms in a fuel element due to the increased operating temperature leads to the Doppler effect. This Doppler effect can vary the reactivity of the reactor. *L&L.*

dopplerite. a. The term dopplerite was introduced by W. Haidinger in 1849. It is applicable only to material occurring in peat and soft brown coal. According to R. Potonie, distinction should be made between secondary true dopplerite, recently formed in fissures in soft brown coal, and fossil dopplerite (Zittavite) originating at the peat stage of soft brown coal. It is a black gelatinous material, solidifying as a result of loss of water to a black lustrous solid and chemically consists principally of free humic acids or as humic acid salts such as calcium humate. The properties of dopplerite are valueless for coal upgrading. Appreciable proportions of dopplerite have a detrimental effect on the strength of brown coal briquettes and brown coal coke. Dopplerite can be used as pigment in paints or coloring materials. Synonym for torf-dopplerit; Weichbraunkohlen-dopplerit. Analogous terms are peat gel; brown coal gel. *IHCP, 1963, part I.* b. A gel composed of ulmins (in peat) derived from plant carbohydrates either directly by bacterial action, or by chemical reactions between carbohydrates and amino acids produced by bacterial destruction of proteins. It was also suggested that dopplerite is the material that has impregnated vitrain and with later alteration, has produced the luster and conchoidal fracture of vitrain. It is further possible that altered dopplerite may constitute the parent material of structureless vitrain. *A.G.I.* c. An asphalt found in New Zealand and some parts of Siberia, U.S.S.R. It resembles elaterite. *Fay.*

dopplerite sapropel. A variety of sapropel which contains much humic acid. *Tomkeieff, 1954.*

Dordonian. Synonym for Maestrichtian. *A.G.I. Supp.*

dore. Gold and silver bullion which remains in a cupelling furnace after the lead has been oxidized and skimmed off. *Fay.*

dore bullion. Same as base bullion. *Compare* dore. *Fay.*

doreite. A lava of the andesite type containing almost equal amounts of potash and soda. Considered to establish a transition between latites, shoshonites, and andesites. *Hess.*

dore silver. Crude silver containing a small amount of gold, obtained after removing lead in a cupelling furnace. Same as dore bullion; dore metal. *ASM Gloss.*

Dorfner test. A test for stress in glazed ware proposed by J. Dorfner; a cylinder of the ware is partly glazed and the shrinkage of the glazed portion is noted. *Dodd.*

Dor furnace. A regenerative zinc-distillation furnace with heat-recuperating chambers at the ends of the furnace instead of beneath the combustion chamber. *Fay.*

dorgalite. An igneous rock consisting of an olivine basalt. *Johannsen, v. 3, 1937, p. 282.*

dormant volcano. *See* volcano. *A.G.I.*

Dorn effect. The electrophoretic potential difference of a liquid resulting from the fall of particles through the liquid. *Hess.*

dornick. a. A roundish stone or chunk of rock usually of a size suitable for throwing by hand. *Webster 3d.* b. A boulder of iron ore found in limonite mines. *Webster 3d.*

dorr. A name proposed for glacial troughs opening both ways out of a mountain range, regardless of submergence. *Hess.*

Dorr agitator. Circular tank equipped with bottom rakes, central air lift, and rotating launder at top. Used to aerate and stir pulp during cyanidation of gold ores. *Pryor, 3.*

Dorr mill. A tube mill designed for operation as a closed-circuit wet-grinding unit. *See also* tube mill. *Dodd.*

Dorr rake classifier. A mechanical classifier consisting of an inclined settling tank and a rake-type conveying agitating mechanism. Feed introduced at the low end of the tank flows over a distributing apron toward the high end of the tank. The heavier materials of sand size settle into the rake zone and are raked up the slope and out the tank; slime and finer sands are carried over the rear wall in suspension. *Taggart, 1945, sec. 8, pp. 06-07.*

Dorr thickener. Large cylindrical vat with peripheral overflow and central bottom discharge. Ore pulp fed in at top center, gravitates down and is moved to discharge area by slowly circling ploughs while relatively clear liquid overflows. *Pryor, 3.*

dorry machine. Apparatus for testing the abrasion resistance of a ceramic; the flat ends of cylindrical test pieces are abraded under standardized conditions by movement in contact with a specially graded sand. *Dodd.*

Dortmund - Horder - Hutten Union (D-H) method. *See* vacuum degassing.

Dosco miner. A heavy, crawler-tracked, 200-horsepower cutter loader designed for longwall faces in seams over 4½ feet thick, and takes a buttock 5 feet wide. The maximum cutting height is 7½ feet. Dimensions: length 17¾ feet, width 4½ feet, and height 3¾ feet. The cutterhead consists of seven cutter chains mounted side by side and can be moved up and down radially to cut the coal from roof to floor. It delivers the coal onto the face conveyor by a short cross conveyor. Capacity is over 400 tons per machine and over 4 tons output per man per shift. *Nelson.*

dose. a. A special charge used in a blast furnace, designed to cure furnace troubles. *Fay.* b. The amount of ionizing radiation energy absorbed per unit mass of irradiated material at a specific location, such as a part of the human body. Measured in reps, rems, and rads. *L&L.* c. For ionizing radiation the following terms have been internationally defined: absorbed dose, exposure dose, and integral absorbed dose. The word dose is frequently used to refer to any one of the above terms according to the context. *NCB.*

dosemeter; dosimeter. Any instrument which measures radiation dose. *NRC-ASA N1.1-1957.*

dosemic. Applied by Cross, Iddings, Pirsson, and Washington to porphyritic rocks in which the phenocrysts are dominant, the ratio of groundmass to phenocrysts being greater than 1:7 and less than 3:5. *Schieferdecker.*

dose, permissible. The amount of radiation which may be received by an individual within a specified period with expectation of no harmful result to himself. (Supersedes the term tolerance dose.) For long-continued X-ray or gamma-ray exposure of the whole body, it is 0.3 r per week measured in air. *NRC-ASA N1.1-1957.*

dose rate. The radiation dose delivered per unit time and measured, for instance, in rems per hour. *See also* dose. *L&L.*

dosimeter. *See* dosemeter.

dosing siphon. Automatic siphon for emptying the contents of a dosing tank. *Ham.*

dosing tank. A tank into which partly treated or raw sewage flows. When a prescribed quantity has collected, it is automatically discharged for treatment. *Ham.*

dot. A small refractory distance piece for separating cranks and setters. *See also* crank; setter. *Dodd.*

dot agate. White chalcedony with round, colored spots. *Shipley.*

dot chart. a. Graphical aid used in correction of station gravity for terrain effect, or computing gravity effects of irregular masses; can be used also in magnetic interpretation. A graticule. *A.G.I.* b. A graphical, transparent chart used in the calculation of the gravity effects of various structures; dots on the chart represent unit areas. *A.G.I.*

dot holes; dots. Eng. Small holes or openings in a vein, Derbyshire. *Arkell.*

dottling. The setting of pottery flatware horizontally on thimbles. *See also* thimble. *Dodd.*

double. In rotary drilling, two pieces of drill rod left fastened together during raising and lowering. *Nichols.* Also called couple; couplet.

double A. One of several terms (or letter symbols) used to designate medium-quality drill diamonds. *Long.*

double-acting hammer. A forging hammer in which the ram is raised by admitting steam or air into a cylinder below the piston, and the blow intensified by admitting steam or air above the piston on the downward stroke. *ASM Gloss.*

double-acting pump. Scot. A pump which discharges at both forward and backward stroke. *Fay.*

double-action die. A die designed to perform more than one operation in a single stroke of the press. *ASM Gloss.*

double-action forming (or drawing). Forming or drawing where more than one action is achieved in a single stroke of the press. *ASM Gloss.*

double-action mechanical press. A press having two independent parallel movements by means of two slides, one moving within the other. The inner slide or plunger is usually operated by a crankshaft, whereas the outer or blank-holder slide, which dwells during the drawing operation, is usually operated by a toggle mechanism or cams. *ASM Gloss.*

double-action press. A press for handling two operations for each revolution of the press. It carries two rams, one inside the other, so actuated that one motion immediately follows the other. *Crispin.*

double-action pump. A pump whose water cylinders are equipped with intake and discharge valves at each end; hence liquid is delivered by the pump on both the forward and the backward strokes of the pump piston. *Long.*

double arch. Two separate parallel arches, built on the same skew or on two skews with faces in the same plane. *Bureau of Mines Staff.*

double bank. a. To take up a claim parallel with and adjoining another claim containing an auriferous vein or deposit. *Fay.* b. Working with double sets or relays of men. *Fay.*

double-bank cages. In Wales, cages having two decks, or a multiple of two, so that decking (caging) may be performed at two levels or banks. *Fay.* Also called multiple-deck cages.

double-base powder. Ballistic powder containing nitrocellulose plus nitroglycerin, chiefly. *Bennett 2d, 1962 Add.*

double-bevel groove weld. A groove weld in which the joint edge of one member is beveled from both sides. *ASM Gloss.*

double block. a. A pair of multiple-sheave blocks reeved with rope or lines; a block and tackle. *Long.* b. Two pulleys or small sheaves mounted on a single shaft within a frame or shell. *Long.*

double bond. In organic chemistry, a double linkage between two atoms of the same element; for example, ethylene; $H_2C=CH_2$. One link is frequently stronger than the other. *Crispin.*

double-branch elbow. A fitting that, in a manner, looks like a tee, or as if two elbows had been shaved and then placed together, forming a shape something like the letter Y or a crotch. *Strock, 3.*

double-burned. Burned at a high temperature. This does not mean two firings. *AISI, No. 24.*

double-burned dolomite. a. Dolomite, with additions of oxides of iron, burned at a high temperature. *A.R.I.* (This does not mean two firings.) b. Clinkered dolomite. *AISI, No. 24.*

double-cavity mold. A mold possessing two cavities for simultaneous fabrication of two articles of glass. *ASTM C162-66.*

double-cavity process. Any glass-forming process that uses two charges of glass and forms them simultaneously. *ASTM C162-66.*

double clutching. Disengaging and engaging the clutch twice during a single gear shift in order to synchronize gear speeds. *Nichols.*

double-cone bit. A roller-type bit having two serrated, cone-shaped cutting members. *See also* roller bit. *Long.*

double core barrel. a. A core barrel with an inner tube to hold the core. The inner tube does not rotate during drilling, thereby giving a better core recovery. *Nelson.* b. Synonym for double-tube core barrel. *Long.*

double core-barrel drill. A core drill having an inner tube that is suspended on ball bearings and thus may remain still while the outer tube revolves. It is designed to bring out a core from a delicate material with a minimum of breaking or other damage. *Fay.*

double corkscrew. A fishing tool having a pair of projecting, intertwined, corkscrew-shaped prongs used for removing broken drill steel or other obstacles from drill holes. *Bureau of Mines Staff.*

double-crank press. A mechanical single-action press of such width that the slide is operated by a crankshaft having two crankpins to which two connections are attached. *ASM Gloss.*

double crib. Eng. Two crib sets are placed back to back to form a two-compartment crib-lined raise. This technique is employed in weak ground in place of a double compartment separated by only a single dividing member. *Bureau of Mines Staff.*

double crossover. *See* scissors crossover. *Ham.*

double-cut file. A file having teeth formed by two lines of cuts intersecting with each other. *Ham.*

double-cut sprocket. For double-pitch roller chains, a sprocket having two sets of effective teeth. Tooth spaces for the second set are located midway between those of the first set. *J&M.*

double-deck gangway. A method of silling or working out 10 feet or so above the haulage level and forming a double-deck gangway. Chutes are constructed at intervals for ore transfer into mine cars. *Nelson.*

double decomposition. The name given to a chemical reaction in which two compounds take part, both are decomposed and two new substances formed by an interchange of radicals. Also called double replacement. *Cooper.*

double-diamond bottom. Ark. An arrangement of track at the shaft bottom consisting of two parallel tracks (one to each compartment of the shaft) with a double crossover track between them. *Fay.*

double dipping. Glazing by twice dipping a pottery shape into a vessel filled with glaze. *ACSG, 1963.*

double-divided oven. *See* Wilputte oven.

double-double unit conveyor. A longwall conveyor layout in which the center or main gate serves two double units, one on each side. The gate belts from each double unit deliver the coal onto cross-gate belts which in turn deliver to the main gate conveyor and then by trunk conveyor or cars to the pit bottom. Single or double units are usually preferred. *Nelson.*

double draining. A defect evidenced by flowing of the slip on the ware which occurs after it appears that draining has been completed. *ASTM C286-65.*

double drill column. A pair of drill columns connected by a heavy horizontal arm on which a rotary- or percussive-type drill machine can be mounted. *See also* drill column. *Long.*

double drum. Hoisting device having two cable spools or drums rotating in opposite directions. *Long.*

double-drum hoist. A hoist with two drums which can be driven separately or together by a clutch. *See also* main-and-tail haulage. *Nelson.*

double-duo mill. Has two pairs of rolls, mounted in one stand, one pair of rolls being higher than, and in advance of the other. *Osborne, p. 357.*

double-ended. A term applied to any cutter loader which can cut both ways on a longwall face without turning at each end. This requires cutting units at both ends of the machine and duplication of other essential parts. *Nelson.*

double-ended pick; reversible pick. A diamond-shaped coal-cutter pick which is held in a special holder and chain. Both ends of the pick are used and then discarded. The type is used widely in the United States. *See also* coal-cutter picks. *Nelson.*

double-engine plane. Loads are raised or lowered on a slope by a stationary engine and wire rope, as in an inclined shaft. There is a double track, or three rails and turnout; the descending trip assists the engine to raise ascending trip, thus eliminating dead load, except rope. *Peele, v. 1, sec. 11, p. 42.*

double entry. a. A pair of entries in flat or gently dipping coal so laid out that rooms can be driven from both entries; twin entries. *See also* entry, b. *Fay.* b. A system of ventilation by which the air current is brought into the rooms through one entry and out through a parallel entry or air course. *Fay.* c. *See* main entry, b. *Nelson.*

double-entry room-and-pillar mining. *See* room-and-pillar. *Fay.*

double-entry zone test. A test in which coal dust is placed in each of two connected parallel entries. *Rice, George S.*

double extra heavy. Synonym of double extra strong. *Long.*

double extra strong. A certain class of very thick walled pipe, which sometimes is used as a drivepipe; often incorrectly called double extra heavy or extra heavy pipe. *Long.*

double-face ware. Ware which has a finish coat on both surfaces. *ASTM C286-65.*

double-fagoted iron. *See* fagoted iron. *C.T.D.*

double-frit glaze. A glaze containing two frits of different compositions. As an example, a glaze may contain a lead frit and a leadless frit; the glaze is therefore rendered highly insoluble by the inclusion in the second frit of those constituents liable to increase lead solubility. *Dodd.*

double glazing. a. Glazing with two panes separated by spacers and a layer of dehydrated air which prevents misting. *C.T. D. Supp.* b. Two coats of glaze applied one over the other. *ACSG, 1963.*

double-gob process. *See* double-cavity process. *ASTM C162-66.*

double hammer; duplex hammer. A forging device striking on opposite sides, as of a bloom. *Standard, 1964.*

doublehand drilling. Manual rock drilling with a long handled sledge hammer requiring both hands. A second man holds the drill and turns it between strokes. Two or even three strikers may work together. *Pryor, 3.*

doublehanded gear. Newc. Heavy drilling tools which require two men to use them. *Fay.*

doubleheader. Applied to quarry equipment consisting of two independent channeling machines on a single truck, operated by one man. *Fay.*

double headings. The driving of two coal headings, parallel and side by side, for development purposes. Usually a pillar 10 to 20 yards wide is left between them. Formerly it was the practice at many coal mines to drive only one heading from which the stalls were turned off right and left. Two headings simplify ventilation and provide a second egress in an emergency. *Nelson.*

double helical bag conveyor. Closely spaced parallel tubes with right and left hand rounded helical threads rotating in opposite directions on which bags or other objects are carried while being conveyed. *ASA MH4.1-1958.*

double-hydraulic feed. A diamond-drill hydraulic-feed mechanism having two parallel pressure cylinders with piston rods connected by means of a yoke to the drive rod between the two cylinders. *Long.* Also called double-cylinder feed.

double-image prism. A prism made of Iceland spar (optical calcite) giving two images of equal intensity but polarized at right angles to each other. *Standard, 1964.*

double-inlet fan. A centrifugal fan in which air enters the impeller on both sides. *B.S. 3618, 1963, sec. 2.* Also called double-width fan.

double intakes. *See* two intakes. *Nelson.*

double jack. a. A two-hand heavy hammer, usually weighing about 10 pounds. *Compare* single jack, a. *Long.* b. A double or twin-screw drill column. *Long.*

double jacking. Can. Rock drilling by hand performed by two men, one holding the steel bit and the other swinging the sledge hammer. *Hoffman.*

double-J groove weld. A groove weld in which the joint edge of one member is in the form of two J's, one from either side. *ASM Gloss.*

double jigback. An aerial ropeway in which two parallel track ropes are used, each carrying a carriage. *See also* jigback. *Nelson.*

double-leg bucket elevator. A type of bucket elevator having the carrying and return runs enclosed in separate casings between the head and boot. *See also* bucket elevator. *ASA MH4.1-1958.*

double leg en masse conveyor. An en masse conveyor or elevator in which the carrying and return runs are operated in separated parallel and adjacent casings. *ASA MH4.1-1958.*

double load. A charge in a borehole separated by a quantity of inert material for the purpose of distributing the effect, or for preventing part of the charge blowing out at a seam or fissure, in which case the inert material is placed so as to include the seam. *Fay.*

double mast. *See* A-frame. *Long.*

double-men. *See* double-pick. *Fay.*

double meridian distance. The sum of the perpendicular distances from the two ends of any line of a traverse to the initial, or reference, meridian. *Seelye, 2.*

double packing. A form of strip packing which removes the localized high roof pressure from the vicinity of a roadway into a region in the goaf. It consists of two parallel packs adjacent to, and on each side of, the roadway, with the packs immediately at the roadsides built of such a width as to offer less resistance than wider and stronger packs (called buttress packs) more remote from the roadway. The principle of double packing was developed by Dr. D. W. Phillips in Great Britain. *Compare* single packing. *Nelson.*

double parting. A bypass for mine cars. *See also* junction. *Nelson.*

double pearl. A pearl formed of two distinct pearls united under a nacreous coating. *Shipley.*

double-pick; double-men. Corn. Two men who use one pick, one during the day, and one at night, so that the pick is kept constantly at work. *Fay.*

double-pitch roller chain. A roller chain having double the pitch of a standard roller chain, otherwise having standard pins, bushings, and rollers. *J&M.*

double-pulley-drive conveyor. A conveyor in which power is transmitted to the belt by two pulleys. Examples are (1) tandem-drive conveyor and (2) dual-drive conveyor. *NEMA MB1-1961.*

double-reading theodolite. A theodolite with which it is possible to observe, from one position, the readings of the diametrically opposite points of both horizontal and vertical circles. *C.T.D.*

double reduction. Two sets of gears in series that both reduce speed and increase power. *Nichols.*

double-refracting spar. Same as Iceland spar. *Fay.*

double refraction. Refraction shown by certain crystals that split the incident ray into two refracted rays, polarized in perpendicular planes. *See also* birefringence. *Standard, 1964; A.G.I.*

double-roll breaker. A coalbreaker which, in the main, relies on the impact of special teeth for the bulk of reducing, rather than on the compression between the rolls. An important feature is adjustment, which may be made during operation. The machines are flexible enough to produce top size ranging from 6 to 14 inches. *Mitchell, pp. 200-202.*

double-roll crusher. A machine for breaking down ore, rock, or coal and to discharge the crushed material below. It consists of heavy iron or steel cylinders revolving toward each other, the surfaces of which may be smooth or toothed—usually the latter. The smallest type can deal with lumps up to 8 inches and the largest will take 20 inches. The crushed material varies from about 6 to 1½ inches and under. It is often used for crushing coal for mechanical stokers or as a first step in preparing pulverized coal for firing boilers. *See also* spring-roll crusher. *Nelson.*

double-roll press; Belgian press. A press in which pressure is applied by the mating of one or more pairs of indented rolls of equal diameter, revolving in opposite directions. *B.S. 3552, 1962.*

double-roll verge tile. A single lap roofing tile having a roll on both edges so that verges on the two sides are similar. *Dodd.*

double-room system. *See* room-and-pillar. *Fay.*

double rose cut. Form of cutting consisting of two rose-cut forms joined along their bases. *See also* rose cut. *Shipley.*

double-round nose. The cross-sectional view of the cutting face portion of a coring bit when its profile is a full half circle, the radius of which is one-half the wall thickness or kerf of the bit face. *Long.*

double-round nose bit. *See* double-round nose. *Long.*

doubles. Som. The repeated folds or overlaps of the coal strata in the Radstock district. *Fay.*

double-screened ground refractory material. A refractory material that contains its original gradation of particle sizes resulting from crushing, grinding, or both, and from which particles coarser and finer than two specified sizes have been removed by screening. *ASTM C71-64.*

double-seal manhole cover. A manhole cover cast with two parallel flanges around its edges which fit into corresponding recesses in the supporting frame and into which they are bedded in grease or similar sealing compound. *Ham.*

double setting. A leveling procedure whereby observations are duplicated by resetting the instrument to detect errors of measurement immediately. Also called dual setting. *BS 3618, 1963, sec. 1.*

double-shear steel. Steel that has been twice welded and drawn out. *Standard, 1964.*

double-shell tile. Tile with double faces separated by short webs. *See also* single-shell tile. *ACSG, 1963.*

double shift. a. Two sets of men at work, one set relieving the other. *Fay.* b. To employ two shifts of men, or to work double shift. *Fay.*

double-shift places. At collieries where there is only one recognized coal-winning shift in the 24 hours, it is a general practice to have double shifts (and sometimes treble) of workmen in development headings which require a speedy advance. *Nelson.*

double-sighting. The method of double-sighting consists in reading once with the telescope normal and once with it inverted, and taking the mean of the two values thus obtained. It eliminates the effect of certain instrumental errors and reduces the personal error of observation. *Urquhart, sec. 1, p. 27.*

double sintering. Process of roasting rich ore in which the ore is sintered at a rapid rate to partially reduce the sulfur content, followed by crushing the resultant mass and sintering again at a slower rate. *Bennett 2d, 1962.*

double sling. A chain or rope sling which is also termed a two-leg sling. *Ham.*

double-spaced neutron log. This method employs two neutron logging tools with different spacings between the source and the detector or two detectors in the same tool at different spacings. The spacings usually differ by 6 to 10 inches. The long-spaced log is run slowly and with a large time constant so that its statistical variation is not excessive, for the counting rate is much lower than that of the regular-spaced log. This technique has proved to be a potent technique for discriminating gas sands from oil sands in Venezuela. *Wyllie, p. 149.*

double spiral cut. A cylindrical drill-round cut whose spiral hole pattern gives the widest opening and permits opposite holes to be ignited successfully. This gives the best cleaning of the opening and safety in the advance is increased, since one section of the double spiral can give breakage irrespective of the other. *Langefors, p. 244.*

double stall. An earlier system of working thick seams in South Wales. Two narrow stalls are turned off the heading and after advancing some 8 to 12 yards (so as to leave a pillar of coal next to the heading) are connected and the coal between them worked as a single face. Double stalls are intermediate between pillar-and-stall and longwall. *Nelson.*

double standard. A brick (particularly a refractory brick) that is twice as wide as a standard square, for example, 9 by 9 by 3 inches. *Dodd.*

double-sweep tee. A tee made with easy curves between body and branch, that is, the center of the curve between run and branch lies outside the body. *Strock, 3.*

doublet. An assembled stone of two portions, bound together by a colorless cement or fused together. If both portions are of the species being imitated, it is a genuine doublet; if of one portion it is a semigenuine doublet; if it contains no portion of the species being imitated, it is a false doublet; if no portion is a genuine mineral, then it is an imitation doublet. The stone to which this term is most generally applied is a semigenuine doublet of glass with a thin garnet top. **See also** hollow doublet. *Shipley.*

double-tape fuse. Fuse of superior quality, or having a heavier and stronger covering. *Zern.*

double-thread method. A procedure for determining the coefficient of thermal expansion of a glass by forming a thread by fusing a fiber of the glass under test to a fiber of a glass of known expansion; from the curvature of the double-thread, when cold, the coefficient of expansion of the glass under test can be calculated. *Dodd.*

double timber. In Wales, two props and a bar placed across the tops of them to support the roof and sides of a heading. *Fay.* Double timber was the recognized mode of support prior to the advent of steel rings. *Nelson.*

double-track portable switch. A tub-changing arrangement for a tunnel face. The double-track loop is superimposed on the tunnel track and equipped with ramps, clamps, and spring switches so arranged that the loaded cars take one track outwards while the empties take the other inwards. The shovel loader may be used to tow the switch as the tunnel advances. A simple traverser is usually preferred. *Nelson.*

double-trolley system. A system of electric traction where, instead of the running rails, a second insulated contact wire is used for the return or negative current. It avoids trouble due to stray earth currents. *C.T.D.*

double-tube core barrel. A core barrel consisting of two nesting tubes attached to a common headpiece threaded to connect to a drill rod. The inside tube holds the core, and the bottom end of the outside tube is threaded to connect with a reaming shell to which a coring bit is fitted. A narrow annular space is left between the tubes; through this the cuttings-removal fluid is conducted from the drill rod to the face of the bit and from there to the outside of the outer tube. The core enters the inner tube, where it is protected from the wash effects of the circulating fluid except for a short space between the lower end of the inner tube and the face of the bit. Numerous kinds of both rigid- and swivel-type double-tube core barrels are manufactured. *Long.*

double-tube core barrel, rigid-type. A double-tube core barrel having both the inner and the outer tubes rigidly coupled to a common headpiece. *Long.*

double-tube core barrel, swivel-type. A double-tube core barrel having the upper end of the inner tube coupled to the core-barrel head by means of an antifriction device, such as a roller or ball bearing; hence, the inner tube tends to remain stationary when the outer tube, which is rigidly coupled to the core-barrel head, is rotated. *Long.*

double-tube rigid barrel. Synonym of double-tube core barrel, rigid type. *Long.*

double-U groove weld. A groove weld in which each joint edge is in the form of two J's or two half-U's, one from either side of the member. *ASM Gloss.*

double-unit conveyor. A longwall conveyor layout from 200 to 280 yards long, developed between two tailgates with a main gate in the center of the face. The main gate conveyor is served by two face conveyors and may act as an intake or a return airway. The tailgates may serve as supply roads. This form of layout is favored as it enables the maximum tonnage of coal being obtained with the minimum of roadway excavation and maintenance. **See also** double-double unit conveyor. *Nelson.*

double-unit longwall face. N. of Eng. Two adjacent longwall faces, usually each of the same length, on either side of a main or mother gate. In northwest Durham, each face is usually 80 to 90 yards making 160 to 180 yards in all. *Trist.*

double-V groove weld. A groove weld in which each joint edge is beveled from both sides. *ASM Gloss.*

double-wall cofferdam. A cofferdam consisting of two parallel lines of steel sheet-piling, the space between being backfilled to insure both stability and water tightness. *Ham.*

double wedge cut. A drill-hole pattern consisting of a shallow wedge within an outer wedge and is often used to obtain deep pull in hard rock. *Nelson.* **See also** wedge cut.

double-welded joint. A butt, edge, tee, corner, or lap joint in which welding has been done from both sides. *ASM Gloss.*

double wicket. A method of working in which rooms are driven from adjacent headings to meet at their extremities. *Zern.*

double-wing auger. An auger with two flights or screws on the discharge end. *ACSG, 1963.*

double working. N. of Eng. Two hewers (miners) working together in the same heading. *Fay.*

doubling. a. Scot. Thickening of a seam sometimes due to its being folded over or doubled. *See also* doubles. *Fay.* b. A process for the treatment of antimony sulfide or crude antimony containing the sulfide by fusing it with iron or other antimony containing iron so as to form an iron sulfide, the removal of which eliminates both iron and sulfur. *Webster 3d.*

doubling time. The time required for a breeder reactor to produce as much fissionable material as the quantity typically contained in its core plus the quantity tied up in its fuel cycle (fabrication, reprocessing, etc.). Estimated to be from 10 to 20 years. *L&L.*

doubly plunging fold. A fold that plunges in opposite directions from a central point. In a doubly plunging anticline, the plunge is away from this point; in a doubly plunging syncline, the plunge is toward this point. *Billings, 1954, pp. 49-50.*

doubly refractive. Possessing the property of double refraction. *Shipley.*

doubly terminated crystals. *See* termination. *Shipley.*

douce. Same as douse. *Long.*

doucer. Same as douser. *Long.*

doucing. Same as dousing. *Long.*

doucing rod. Same as dousing rod. *Long.*

dough. Same as daugh, b. *Arkell.*

doughnut. The cylinder of coal formed by a coal auger. *Nelson.*

Douglas furnace. A horizontal, revolving cylindrical furnace having a central flue. *Fay.*

Douglas process. *See* Hunt and Douglas process. *Fay.*

douk; douke; dowk. Eng. A soft clay found in veins. Probably derived from the Saxon deagan, meaning to knead or mix with water. *Fay.*

doup out. Scot. To connect a drift with one formerly driven in stoop-and-room workings. *Fay.*

dour holing. Scot. Difficult undercutting in hard coal or stone. *Fay.*

douse. a. Commonly used by drillers as a synonym for scientific (geophysical) devices, such as the seismograph, torsion balance, magnetometer, dip needle, etc., used to locate and delineate subsurface structures in which water, oil, or minerals may occur. Also called doodlebug; doodlebugger; douce; doucer; dowse; dowser. *Long.* b. To locate and delineate subsurface structures in which water, oil, or minerals may occur by the use of various scientific devices, such as the seismograph, torsion balance, magnetometer, dip needle, etc. Also called doodlebugging; doucing; dowsing. *Long.* c. Commonly used by drillers as a synonym for devices, as divining rod, forked tree limb, or other nonscientific contraptions, supposedly useful in locating subsurface formations containing water, oil, or minerals. Also called divining rod; doodlebug; douce; doucer; doucing rod; dowse; dowser; dowsing rod. *Long.* d. To supposedly locate and delineate formations bearing water, oil, or mineral by use of a divining rod or other nonscientific contraption. Also called doodlebugging; doucing; dowsing. *Long.* e. To beat out or extinguish an ignited jet of firedamp. Also spelled douce; dowse. *Fay.* f. To search for deposits of ore, for lodes, or water, by aid of the dousing or divining rod. *Fay.* g. To plunge into a liquid, as in quenching a piece of hot metal during a hardening process. *Crispin.*

douser. a. Synonym for douse. *See also* douse, a. *Long.* b. Commonly used by drillers as a name for a person skilled in the use of geophysical devices. Also called doodlebugger; doucer; dowser. *Compare* douse, a and b. *Long.* c. Commonly used by drillers as a name for a person supposedly having the ability to locate formations in which water, oil, or minerals occur by the use of divining rod or other nonscientific contraption. Also called doodlebugger; doucer; dowser. *Compare* douse, b and c. *Long.*

dousing rod. Commonly used by drillers as a name applied to a wooden wand, rod, forked tree limb, or twig (usually witch hazel) supposedly useful in locating formations bearing water, oil, or mineral. Also called divining rod; doodlebug; dowsing rod. *Compare* douser, b and c. *Long.*

doverite. A fluocarbonate of yttrium and calcium, $YtFCO_3.CaCO_3$, as fine-grained aggregates giving an X-ray pattern similar to that of synchysite. From an iron mine at Dover, Morris County, N.J. Named from locality. Contains about 45 percent rare-earth oxides. *Spencer 21, M.M., 1958; BuMines Bull. 585, 1960, p. 970.*

Dow cell. The Dow electrolytic cell is a steel shell about 16 feet long, 5 feet wide, and 6 feet deep. The electrolyte contains about 60 percent NaCl, 15 percent $CaCl_2$, and 25 percent $MgCl_2$; it is maintained at a temperature of 700° to 750° C by controlled firing underneath the cell. *Newton, p. 481.*

dowels. a. Round, headless iron pins, inserted halfway into each of two abutting timbers to prevent slipping. *Stauffer.* b. Short rods, extending approximately equally into two abutting pieces of concrete, to increase the strength of the joint. *Taylor.*

Dowex. Proprietary name (Dow Chemical Company) of ion-exchange resins, notably Dowex 50, an acid polysterene cation exchanger, and Dowex -3, a basic anion exchanger. *Pryor, 3.*

dowk. N. of Eng. Dark-colored clayey material forming part of a vein. *Standard, 1964. See also* douk. *Fay.*

Dow metal. Magnesium alloys (electron) containing aluminum, maganese, silicon, and possibly zinc. *Pryor, 3.*

down. Eng. Underground; in the pit. *Fay.*

down brow. Lanc. A dip incline underground. *Fay.*

downbuckling. A downwarping by lateral compression of the entire thickness of the crust, which causes the formation of a major geosynclinal downwarp at the surface and the immersion of large masses of sialic matter into the substratum. *Schieferdecker.*

downcast. a. The shaft through which the fresh air is drawn or forced into the mine; the intake. *Fay.* b. That side of a fault on which the strata have been displaced downwards in relation to the upthrow or upcast side. *C.T.D.* c. Eng. A fault which throws a coal seam downwards. *See also* downleap. *Fay.*

downcast shaft. The shaft down which the fresh air enters the mine or workings. *See also* upcast shaft. *Nelson.*

downcomer. A pipe to conduct something downward; such as (1) a pipe for leading the hot gases from the top of a blast furnace downward to the dust collectors and flue system, and (2) a tube larger in diameter than the water tubes in some water-tube boilers to conduct water from each top drum to a bottom drum under the influence of thermal circulation. *Webster 3d*

downcutting. *See* climb cutting. *ASM Gloss.*

downdip. Parallel to or in general direction of the dip of a bed, rock stratum, or vein. *Long.*

downdraft. A downward current of air or other gas (as in a mine shaft, kiln, or carburetor). *Webster 3d.*

downdraft kiln. An enclosed periodic kiln, round or rectangular. Hot gases from the fireboxes pass to the crown and are then pulled down through the ware by the draft and discharged into a stack. *ACSG, 1963.*

downdraw. The process of continuously drawing glass downward from an orifice. *ASTM C162-66.*

downdrift. In a mine drift, the direction of predominant water movement. *Bureau of Mines Staff.*

downer. a. Som. A rest or cessation from work, say half an hour, taken during a shift or turn. *Fay.* b. *See* crib, f. *C.T.D.*

downfall. S. Staff. A downthrow. *Fay. See also* downcast; downleap.

downfeed. In surface grinding, the rate at which the grinding wheel is fed into the work. *See also* surface grinding. *ACSG, 1963.*

downgrade. a. To classify a substance as lower quality than warranted. *Long.* b. To reduce the value by the addition of a diluent, as in adding waste rock to ore. *Long.*

downhand welding. Same as flat-position welding. *ASM Gloss.*

downhole. a. A borehole drilled at any angle inclined downward in a direction below the horizon. b. In a borehole. *Compare* downhole equipment. c. Sometimes used as the collar. *Long.*

downleap. Mid. A dislocation of strata equipment used inside the borehole below the collar. *Long.*

downleap. Mid. A dislocation of strata which has caused a coal seam to be abruptly cutoff and brought below its original level. *See also* downthrow. *Fay.*

downmilling. *See* climb milling. *ASM Gloss.*

downs. Eng. The rounded, dry, and unwooded chalk hills of Kent, Surrey, Sussex, and adjacent counties. *Fay.*

Downs cell. *See* Downs process. *Bennett 2d, 1962.*

downset. Scot. A short drift to the dip. *Fay.*

downslope ripple. A ripple that migrates down a sloping surface. *Pettijohn.*

downslope time. In resistance welding, time associated with current decrease using slope control. *ASM Gloss.*

downspouts. Lanc. Pipes fixed down the sides of a shaft for conducting water from one level or sump to another. *Fay.*

Downs process. Method of producing sodium from fused sodium chloride, in which a central carbon electrode, rising through the bottom, releases chlorine which is collected through a collecting dome while side cathodes permit the collection of liquid sodium. *Bennett 2d, 1962.*

downstream face. The dry side of a dam. *Nichols.*

downsucking. The immersion of large masses of the sialic crust into the substratum and its melting or solution therein. *Schieferdecker.*

downtake. *See* downcomer.

down-the-hole drill. A percussive or hammer drill in which the bit-driven mechanism is located immediately behind the drill bit and is small enough in diameter to permit it to enter and follow the bit down into the hole drilled. *Bureau of Mines Staff.*

down-the-hole extensometer. A device used to measure differential strains in a drill hole. *Bureau of Mines Staff.*

downthrow. a. The wall of a fault that has moved relatively downward. Downthrown is preferred by the U.S. Geological Survey. *A.G.I.* b. The amount, measured vertically, of downward displacement of beds caused by a fault. *B.S. 3618, 1964, sec. 5.*

downthrow fault. A fault which has displaced the strata downwards relative to the workings approaching it. It would be an upthrow fault to workings on the opposite side. *Nelson.*

downthrow side. The lower side of a fault after displacement has occurred. *B.S. 3618, 1964, sec. 5.*

downtime. a. Drilling time lost in repair, fishing, cementing operations, or moving rig from one hole to another. *Long.* b. Applies to any piece of mining equipment which is nonoperative for any reason. *Bureau of Mines Staff.* c. Production time lost through mechanical breakdown, adjustment, maintenance, lack of power or of feed. *Pryor, 3.*

Downtonian. Uppermost Silurian or lowermost Devonian. *A.G.I. Supp.*

downward continuation. Interpretation method in which the values of a component of the magnetic field at lower levels are computed from the values at the surface. *Schieferdecker.*

downward course; course downward. In mining, the course of the vein from the surface downward. *Bureau of Mines Staff.*

downward enrichment. A term which is synonymous with secondary enrichment, as the latter has applied to enrichment of ore bodies by the downward percolation of waters. *Fay.*

downward percolation. *See* sand leaching.

downwarp. Opposite of upwarp. *A.G.I.*

Dow process. A process for the production of magnesium by electrolysis of molten magnesium chloride. *ASM Gloss.*

dowse. To use the divining rod (as in search of water or ore). *Webster 3d. See* douse. *Fay.*

dowser. A divining rod for dowsing; also, one who uses a divining rod. *See also* divining rod. *Webster 3d; Fay.*

dowsing. Searching for water, oil, or minerals with a dowsing rod. *A.G.I. Supp.*

dowsing rod; dowzing rod. Som. *See* divining rod; dowser. *Fay.*

Dow's mining salts. A mixture of NaBr and NaBrO, used in extracting gold from tellurides. *Hess.*

Dowson gas. A mixture of producer gas and water gas obtained by passing steam and air over heated coal or coke in a Dowson producer. *Bureau of Mines Staff.*

Dowson producer. A furnace used for the manufacture of producer gas. *Fay.*

Dowtherm. Organic liquid with a high boiling point. Used in heat exchange. *Pryor, 3.*

Dowty hydraulic tub retarder. A retarder which consists of lengths of steel channel with attached rubbing strips which operate on the face of the wheels above center. The action is controlled by a hydraulic cylinder containing opposed pistons. The hydraulic pressure is supplied from an accumulator, in which pressure is maintained by means of a 5-horsepower electric motor-driven pump which is sufficient for 10 retarder unit. *Mason, v. 2, p. 529.*

Dowty prop. A prop which is in effect a self-contained hydraulic jack of tubular steel construction and consisting of two tubes, the upper one telescoping into the lower. The upper (or inner) tube acts both as a reservoir for the oil and as a container for the pump, yield valve, and other accessories. *Nelson.*

Dowty roofmaster. A self-contained, oil-operated steel support for use on a mechanized longwall face. It has support frames constructed of rigid roof and floor members supported by yielding hydraulic props. Two and three prop units are connected alternately to the armored conveyor by means of jacks mounted in the floor members, to carry long and short cantilever roof beams respectively. *See also* self-advancing supports. *Nelson.*

doz Abbreviation for dozen. *BuMin Style Guide, p. 59.*

dozer Abbreviation for bulldozer; shovel dozer. *Nichols, 2. See also* bulldozer.

dozer shovel; shovel dozer. A tractor equipped with a front-mounted bucket that can be used for pushing, digging, and truckloading. *Nelson.*

dozzle. *See* core. *Dodd.*

dph Abbreviation for diamond pyramid hardness. Also abbreviated DPH. *BuMin Style Guide, p. 59.*

D.P.N. Diamond pyramid hardness number. *Bennett 2d, 1962.*

D.P. reagents. Flotation reagents made by DuPont are: DP. 243 a 50 percent aqueous paste of lorolamine (lorol being a mixture of primary straight-chain alcohols). D.P.Q. is lauryl trimethyl ammonium bromide. Others include D.P.Q.B., D.P.C., D.P.N. and D.P.L.A. *Pryor, 3.*

dr Abbreviation for dram. *BuMin Style Guide, p. 59.*

Drachenfels trachyte. A trachyte containing phenocrysts of sanidine and oligoclase in a groundmass of lath-shaped microlites of orthoclase with sparing biotite, hornblende, and magnetite. *Holmes, 1928.*

dradge. Corn. The inferior portions of ore separated from the best ore by cobbing. *Fay.*

dradgy lode. Eng. A lode through which the mineral is so thinly disseminated as to be scarcely worth the expense of dressing. Such lode, ore stuff, or stone is called dragy. *Fay.*

Draeger breathing apparatus. A long-service, self-contained, oxygen-breathing apparatus with an entirely lung-governed oxygen feed. It will enable a man to do hard work for a period of 5 hours; in doing normal work, the apparatus will last for 7 hours, and, in the event of a rescue brigade being trapped, it will sustain the men for 18 hours if they were to sit down and rest. The apparatus proves more efficient than the wearer, because it is doubtful if rescue brigades could work for 5 hours under the conditions which exist after underground explosions or fires. It weighs 40 pounds, and is carried on the wearer's back inside a light metal protecting case with hinged doors. *McAdam, pp. 29-30.*

Draeger escape apparatus. A self-contained, oxygen-breathing apparatus that weighs 21½ pounds, and is carried on the back of the wearer. It gives protection for 1 hour against all poisonous gases or shortage of oxygen. The main parts of the apparatus are protected by a reinforced aluminum case, and, when the apparatus is not being used, the facepiece and corrugated breathing tube lie inside the lid in the space above the oxygen cylinder and the potash canister. To be used, all the wearer has to do is to open the lid, put on the facepiece, and shoulder the apparatus; the oxygen supply is automatically turned on when the lid is opened. *McAdam, pp. 55-57.*

Draeger self-rescuer. A German made apparatus that is well protected against mechanical damage by an elaborate covering of protection layers. The entire apparatus is enclosed by an outer steel case of two parts and secured by a steel band. When the red end of this band is pulled sharply, the two parts of the case fall apart and pull open the top of a rubber bag covered with layers of paraffin wax and aluminum foil. The self-rescuer is then pulled out of this bag and is ready for use. Because of this protective covering, the respirator can be stored for several years without undergoing deterioration. Each month the filter is cleaned and its condition is checked by weight. If it weighs more than 1 percent above the required 35 ounces, it is discarded. *McAdam, pp. 68-70.*

draft. a. A term used in Wales for allowance coal; about 360 pounds per week to every householder. *Fay.* b. In general, the act of drawing, or the thing drawn. *Webster 2d.* c. A quantity drawn, or drawn forward, up, or out, especially at one time. *Webster 2d.* d. A current of air in a closed-in space (as a room, ventilator, furnace, or chimney. *Webster 3d.* e. The area of an opening or group of openings for discharge of water; as, the draft of a turbine wheel. *Webster 2d.* f. A survey line in a traverse. Also called leg. *B.S. 3618, sec. 1, 1963.* g. The pressure difference causing flow of a fluid, usually applied to convection flow, such as chimneys, and usually measured in inches of water. *Strock, 10.* h. Resistance to movement of a towed load. *Nichols, 2.* i. The angle or taper on the surface of a punch or die or the parts made with them which facilitates the removal of the work. *ASM Gloss.* j. The change in cross section in rolling or wiredrawing. *ASM Gloss.* k. Taper put on the surfaces of a pattern so that it can be withdrawn successfully from the mold. *ASM Gloss.*

draftage. A deduction made from the gross weight of mineral when transported, to allow for loss. *Zern.*

draft engine. Corn. An engine used for pumping. Fay.

draft gage. An instrument used to measure the small pressure differentials below atmospheric; for example, an inclined manometer to measure the pressure difference between a flue and the atmosphere for combustion control. *ACSG, 1963.*

draft hole. An opening through which air is supplied to a furnace. *Fay.*

drafting. An operation consisting of drawing or attenuating slivers, reducing them to finer sizes. *Phillips.*

draftsman, geological. In petroleum production, one who performs the duties of a draftsman but specializes in making maps, diagrams, profiles, and cross sections to represent geological stratigraphy and locations of oil and gas deposits, by correlating and interpreting data obtained from topographical surveys, from well logs, and from geophysical prospecting. *D.O.T. 1.*

draftsman, geological. In petroleum production, one who specializes in drawing subsurface contours in rock formations from the data obtained by a geophysical prospecting party. He plots maps and diagrams from computations based on recordings of seismograph, gravimeter, magnetometer, and other petroleum prospecting instruments, and from prospecting and surveying field notes. *D.O.T. 1.*

draft stabilizer. A device to maintain a constant draft in a fuel-burning device. *Strock, 10.*

draft tube. The steel casing through which water leaves a turbine after having given up in energy. *Ham.*

drag. a. A wooden or iron bar placed between the spokes of the wheels of trams to check their speed upon an inclined way. A brake or sprag. *Fay.* b. An appliance to be attached to the rear of a loaded train of cars to prevent the cars from running down the incline or grade in case the cable should break. *Fay.* c. The frictional resistance offered to a current of air in a mine. *Fay.* d. Fragments of ore torn from a lode by a fault. Such fragments are scattered along the line of the fault and are usually inclosed within crushed or brecciated pieces of the rock traversed by that fault. Secondary mineralization along the fault may obscure the true character of the drag in which case the difference in associated minerals may prove suggestive. *Fay.* e. An iron blasthole cleaner; drag twist. *Standard, 1964.* f. A runnerless sled for drawing rough heavy stone, etc.; a stoneboat. *Standard, 1964.* g. A heavy iron bar attached behind a trip of mine cars when ascending a grade to prevent them from running away in the event of an accident causing cars to become uncoupled. *Hudson.* h. Backstay; trailer; devil. *Mason.* i. A bar hinged to rake off trucks, which fouls the track and derails the last one if they begin to run backward. *Pryor, 3.* j. The flexuring of strata associated with faults. In a normal fault, the coal seam often bends upwards on the downthrow side and downwards on the upthrow side. Thus, drag is an indication of direction of displacement of the beds. Also called terminal curvature. *See also* coal leads. *Nelson.* k. A haulage drag. *See also* backstay. *Nelson.* l. Pulling a bucket into the digging, or the mechanism by which the pulling is done or controlled. *Nichols, 2.* m. Resistance created by friction. *Long.* n. The uptilted or downtilted curve in rock beds or strata adjacent to a fault. *Long.* o. Distortion of beds adjacent to a fault. *Ballard.* p. The lower part of a flask. The mold having been prepared in the two parts of the flask, the cope is put upon the drag before casting. After casting, the flask is opened by removing the cope. *Fay.* q. In an inclined stope, the weight of the arch block is resolved into two components, one at right angles to the dip, which tends to close the opening, and one parallel to the dip, which tends to produce movement of the hanging wall with respect to the footwall. This movement is known as drag, or creep. *Higham, p. 104.* r. The resistance to shrinkage during the firing process of the foot or base of a ceramic article, resting on the kiln slab or sagger. *ACSG, 1963.*

dragade. *See* drag ladle. *ASTM C162-66.*

drag angle. The angle at which the leading surface of a cutting plane or point meets the surface to be cut. If less than 90°, the angle is said to be negative; if over 90°, it is called a positive rake or drag angle. *Compare* rake. *Long.*

dragbar; backstay. Aust. An iron bar fastened to the back of a skip to prevent the latter running down hill in case the hauling rope breaks. *See also* drag, b. *Fay.*

drag bit. a. A noncoring or full-hole boring bit, which scrapes its way through strata which must not be too hard. It may be a two-, three-, or four-bladed pattern with various curves and cutaways. The drilling fluid passes down through the hollow drill stem to the cutting point. *See also* roller bit. *Nelson.* b. Various kinds of rigid steel bits provided with fixed (as contrasted to the movable or rolling cutting points of a roller bit) and sometimes replaceable cutting points, which are rotated to drill boreholes in soft to medium-hard rock formations. *See also* diamond-point bit; fishtail bit; mud bit. *Long.*

drag bolt. A coupling pin. *Standard, 1964.*

drag brake. On a revolving shovel, the brake which stops and holds the drag (digging) drum. *Nichols, 2.*

drag breccia. Fragments of rock in the brecciated zone of a fault. *Long.*

drag bucket. A bucket widely used in sampling sea-floor rock deposits in all depths up to and exceeding 30,000 feet. *See also* drag dredging. *Metro, p. 245.*

drag cable. In a dragline or hoe, the line that pulls the bucket toward the shovel. *Nichols.*

drag chain. a. A chain used to make fast a wheel of a vehicle or wound around a skid runner on a drill to act as a braking device. *Long.* b. The endless linked chain to which flights are attached in a chain-and-flight conveyor. *Jones.*

drag-chain conveyor. A type of conveyor having one or more endless chains which drag bulk materials in a trough. *ASA MH4.1-1958. See also* drag conveyor. *C.T.D.*

drag classifier. Inclined trough which receives ore pulp, and classifies it into settling solids and relatively fine pulp overflow. The settled material is continuously dragged up slope and out by a continuous belt, perhaps provided with transverse scrapers. *Pryor, 3.*

drag coefficient. A factor representing the ratio of the aerodynamic drag acting especially on an airfoil to the product of the airspeed and the area of the airfoil. *Webster, 3d.*

drag conveyor; drag-chain conveyor. A conveyor in which an endless chain, having wide links carrying projections or wings, is dragged through a trough into which the material to be conveyed is fed; it is used for loose material. *C.T.D. See also* chain conveyor. *Nelson.*

drag cut. a. A cut on which groups of holes are drilled at increasing heights above floor level and at increasing angles from the free face. The shots are fired to break out successive wedges of strata across the width of the face. *B.S. 3618, 1964, sec. 6.* b. A drill-hole pattern widely used in high-speed drilling. The cut holes are inclined downwards to cut a wedge along the floor, the other holes being drilled to break to the cut holes. Also called horizontal cut. *Nelson.* c. A cut in which the cut holes are angled in the vertical plane towards a parting in order to breakout the ground along the parting. Drag cut rounds are suitable for small drifts 6 or 7 feet wide or where shallow pulls are sufficient, but the drag cut does not find much application in large-scale drifting practice. *McAdam II, p. 120.*

drag dips. Local changes of attitude brought about by drag near a fault. *Stokes and Varnes, 1955.*

drag dredging. A method in which the bucket is lowered to the sea floor and dragged over the ocean floor for some distance in order collect samples. Dredge and trawl hauls normally can only give a rough indication of heavy or light concentrations of the minerals within an area. *Mero, p. 155.*

drag engineer. *See* slope engineer. *D.O.T. 1.*

drag fault. In the stationary block, caused by the overthrusting movement. *Schieferdecker.*

drag folds. In a narrow sense, minor folds that form an incompetent bed when the competent beds on either side of it move in such a way as to subject it to a couple. The axes of the minor folds are perpendicular to the direction in which the beds slip; the acute angle between the main bedding and the axial planes of the drag folds indicate the direction of the shear. In a broad sense, used for any fold that is a subsidiary part of a larger fold. *A.G.I.*

dragged. A surface texture on clay facing bricks produced by a tightly stretched wire contacting the column of clay as it is extruded from the pug in the wire-cut process; this texture is also known as rippled. *Dodd.*

drag in. Water or solution carried into another solution by the work and the associated handling equipment. *ASM Gloss.*

drag ladle. To produce cullet by ladling glass from the melt into water. *ASTM C162-66.*

dragline. A type of excavating equipment which casts a rope-hung bucket a considerable distance, collects the dug material by pulling the bucket toward itself on the ground with a second rope, elevates the bucket, and dumps the material on a spoil bank, in a hopper, or on a pile. *Bureau of Mines Staff. See also* excavator.

dragline boom. A crane boom used with a drag bucket. *Carson, p. 104.*

dragline engineer. *See* slope engineer. *D.O.T. 1.*

dragline excavator. A mechanical excavating appliance consisting of a steel scoop bucket which is suspended from a movable jib; after biting into the material to be excavated, it is dragged towards the machine by means of a wire rope. *C.T.D.*

dragline scraper. An apparatus for moving soil, gravel, or other loose material. It ordinarily consists of a scraper attached to an endless cable or belt operated by a drum or sprocket wheel, and can be drawn back and forth by the operator at the drum. *Bureau of Mines Staff.*

drag loader. *See* dragman. *D.O.T. 1.*

dragman. In metal mining, one who operates a scraper loading machine, known as a drag, to load ore into cars or chutes. Also called drag loader; drag operator. *D.O.T. 1.*

drag mark. Cast of long, narrow, even grooves, varying from near microscopic to several centimeters in width and depth. Presumed to be formed by stone or shell pulled along the mud bottom by attached algae. Term proposed to designate grooves formed by dragging objects and to exclude grooves formed by sliding objects (slide marks). *See also* groove cast. *Pettijohn.*

dragon. S. Staff. A barrel in which water is raised from a shallow shaft. *Fay.*

dragonite. A fabulous stone said to be obtained from the head of the flying dragon. Quartz crystals, found in gravel, which have lost their brilliancy and angular form, and consequently their identity, were formerly thought to have had the origin indicated above. *Fay.*

dragon's blood. Deep red; amorphous lumps; melting point, 120° C; soluble in alcohol, in ether, and in volatile and in fixed oils; and insoluble in water. Used as a pigment and in coloring plasters, marble, and stoneware. *CCD 6d, 1961.*

dragon's-skin. A part of a fossil stem (genera Lepidodendron and Sigillaria) with the leaf-scar pattern suggesting scales; so called by miners and quarrymen. *Webster 2d.*

dragon's-tail. A towed thermistor chain used to measure sea temperature. Comparatively new, it is being used with apparent success. *Hy.*

dragon's teeth. *See* dog's teeth. *Dodd.*

drag operator. *See* dragman. *D.O.T. 1.*

drag ore. Broken fragments of ore disrupted from the faulted ends of an ore body and contained within the fault between the faulted portions. *Stokes and Varnes, 1955.*

drag out. Solution carried out of a bath by the work and the associated handling equipment. *ASM Gloss.*

drag-out loss. Misplacement of relatively fine material due to its adherence to a coarser fraction being settled and dragged out in mechanical classification or heavy-media separation. *Pryor, 3.*

drag-over mill. *See* pull-over mill.

drag rake. Synonym for negative rake. *Long.*

drags. Steel bars with a hook at one end and prongs at the other, which are inserted in the drawbar at the rear of the tub ascending an incline so as to prevent it running back. *Mason, v. 2, pp. 529-530.*

drag sawyer. *See* ripsawyer. *D.O.T. 1.*

drag scraper. a. A. digging and transporting device consisting of a bottomless bucket working between a mast and an anchor. *Nichols.* b. A towed bottomless scraper used for land leveling. Called leveling drag scraper to distinguish from cable type. *Nichols.*

dragshovel. A shovel equipped with a jack boom, a live boom, a hinged stick, and a rigidly attached bucket, that digs by pulling toward itself. Also called hoe; backhoe; pullshovel. *Nichols.*

dragsman. N. of Eng. A man employed as a pusher of tubs (cars) in underground working places. *Fay.*

dragstaff. A pole projecting backward and downward from a vehicle, to prevent it from running backward. *See* backstay; drag, b. *Fay.*

drag-stone mill. A mill in which ores are ground by means of a heavy stone dragged around on a circular or annular stone bed. *Webster 3d. See also* arrastre. *Fay.*

drag stones. *See* millstone. *Barger.*

drag striae; striation cast. Essentially a microgroove cast and presumed to form in same manner as the large groove casts. *Pettijohn.*

drag technique. A method used in manual arc welding where the electrode is in contact with the assembly being welded without being in short circuit. The electrode is usually used without oscillation. *ASM Gloss.*

drag twist. A spiral hook used for wiping a blast hole with hay before charging with black powder. *Stauffer. See also* corkscrew.

drain. a. A conduit or open ditch for carrying off surplus ground or surface water. Closed drains are usually buried. *Seelye, 1.* b. The movement of porcelain enamel as it flows from a piece to give a smooth coat during draining. *Bryant.*

drainage. a. Mine drainage usually implies gravity flow of water to a point remote from mining operation. *See also* drain tunnels; water hoists. *Nelson.* b. Drainage to prevent water from entering the soil and causing it to soften and endanger superimposed structures. *Nelson.* c. The process of removing surplus ground or surface water by artificial means. *Seelye, 1.* d. The manner in which the waters of an area are removed. *Seelye, 1.* e. The area from which waters are drained; a drainage basin. *Seelye, 1.* f. Much of the water that falls on the surface is drained away by running down the slopes to the lowest places to which it can flow, hence the surface water bodies—streams, lakes, and swamps, taken collectively, have come to be known as the drainage, and the individual water bodies as drainage features. *A.G.I.*

drainage area. a. A term applied to that area of a reservoir contributing oil or gas to a well. It is a poor descriptive term because it suggests gravity rather than pressure as the agent of movement. It is inexact because any such area is affected by thickness, porosity, permeability, and pressure. *A.G.I.* b. The area (square meters, acres, etc.) of a drainage basin. *Seelye, 1.* c. Catchment area; drainage basin. *Seelye, 1.*

drainage basin. a. The area from which water is carried off by a drainage system; a watershed or a catchment area. *Seelye, 1.* b. *See* basin, c. *Fay.*

drainage divide. A drainage divide is the rim of a drainage basin. It is the boundary between adjacent drainage basins. The term watershed has been used to mean both basin and drainage divide, and the uncertainty of meaning entailed by this double usage makes the term undesirable. *A.G.I.*

drainage head. a. The furthest or highest spot in a drainage area. *Nichols.* b. Difference in elevation between two points in an area to be drained. *Bureau of Mines Staff.*

drainage hole. Synonym for drain hole. *Long.*

drainage level. *See* water level. *Nelson.*

drainage pattern. The configuration in plan view of the stream courses in any given area. Such self-explanatory terms as radial, dendritic, trellis, and rectangular are applied to common types of stream patterns. *Stokes and Varnes, 1955.*

drainage system. a. A stream and its tributaries constitute a drainage system, and the area drained by a river system through a valley system is a drainage basin. *A.G.I.* b. A drainage system consists of a surface stream or a body of impounded surface water, together with all other surface streams and bodies of impounded surface water that are tributary to it. *A.G.I.*

drainage trench. A channel cut alongside a mine roadway to provide for drainage and enable the proper ballasting of the rail track. The trench may be lined with precast concrete sections to a carefully laid gradient. *Nelson.*

drainage tunnel. A tunnel constructed mainly for drainage purposes. It may collect surface waters or water from old workings and thus prevent it seeping down to active workings at lower levels. A central drainage tunnel may serve several mines and thus reduce pumping charges. *Nelson.*

drain casting; hollow casting. Forming ceramic ware by introducing a body slip into an open porous mold, and then draining off the remaining slip when the cast has reached the desired thickness. *ASTM C242-60T.*

drained shear test. A shear test on a clay sample after completed consolidation under normal load, carried out in drained conditions. The strengths given by drained tests are higher than those from undrained tests. *Nelson.*

drain hole. a. A borehole drilled into a water-bearing formation or mine workings through which the water can be withdrawn or drained. *Long.* b. Any hole provided in the base covering or housing on a machine through which oil or liquids can be withdrawn. *Long.*

draining. a. The part of the dipping or flow-coating process in which the excess slip flows from suitably positioned ware. *ASTM C286-65.* b. The process of removing excessive slip from plaster molds in forming slip-cast ware; also the removal of excessive glaze from bisque ware after dipping. *Bureau of Mines Staff.*

drain line. A nonuniform thickness of coating appearing as a line or streak in dipped or flow-coated ware. *ASTM C286-65.*

drainman. a. In metal mining, a laborer who regulates flow of tailings, through flumes or pipes (mixture of waste minerals and water resulting from treatment of ore for recovery of valuable minerals) in back filling (filling of working places from which all ore has been mined) in such manner that water will be drawn off and the sand left for filling purposes. *D.O.T. 1.* b. *See* ditchdigger. *D.O.T. 1.*

drain tile. a. Pipe of burned clay, concrete, etc., in short lengths, usually laid with open joints to collect and remove drainage water. *Seelye, 1.* b. Tile of circular cross section designed to conduct and control ground water. *ACSG, 1963.*

drain tunnels. A method of disposing of mine water. Long tunnels have been driven in some mining districts for the purpose of passing under the lower workings of several mines and tapping the water for the entire group. Where topographic features permit, a drain tunnel—more properly called an adit—may also be driven to serve a single mine. The chief advantages of a drain tunnel lie in saving the cost of pumping and eliminating the danger of the mine being flooded through failure of the pumps. *Lewis, p. 632.*

drain valve. Small petcock or valve through which unwanted liquids that collect in a pipe system or mechanism are drained. *Long.*

Drake's well. The first successful oil well drilled in this country, by Edwin Drake at Titusville, Penn., in 1859. *Mersereau, 4th, p. 198.*

drakonite. An extrusive igneous rock consisting of a plagioclase-bearing alkali trachyte. *Johannsen, v. 4, 1938, p. 35.*

dranyam. A new cutter loader devised by Maynard Davies and developed at the Central Engineering Establishment of the National Coal Board of Great Britain. A shearer drum is carried on a vertical shaft in contrast to the horizontal shaft in the Anderson shearer. *Nelson.*

draper washer. Vertical-current separator (obsolete) used to separate shale from coal. *Pryor, 3.*

drapery. Curtainlike forms of travertine, usually formed through the union of a row of stalactites. *A.G.I.*

draping. Warping induced in the beds overlying a reef, believed to be caused by differential compaction rather than by tectonic influence. *Schieferdecker.*

draught. a. S. Staff. The quantity of coal hoisted in a given time. *See also* draft, c. *Fay.* b. The pressure required to supply air to a furnace and to remove the flue gases from the furnaces. Natural draught is produced by a chimney, while artificial draught is produced by fans and is controlled by the speed of the fans, variation in the pitch of the fan blades, or by dampers. *Francis, 1965, v. 1, p. 137.*

dravite. According to Kunitz, one of the three chief varieties of tourmaline. It is a complex borosilicate of magnesium and sodium, and may be referred to as magnesium tourmaline. Used as a gemstone. *C.M.D.*

draw. a. So. Staff. Strictly speaking, the distance on the surface to which the subsidence or creep extends beyond the workings. *Fay.* b. The effect of creep upon the pillars of a mine. *Fay.* c. To draw the pillars; to mine out the pillars, or to pull or rob them after the rooms are worked out. In Arkansas, called pull. *Fay.* d. Scot. The distance that mineral is hauled by trammers. *Fay.* e. To raise ore, coal, rock, etc., to the surface; to hoist. *Fay.* f. To extract timber or steel from the waste or old roads. *See also* sylvester. *Nelson.* g. The horizontal distance on the surface ahead of the coal face influenced by subsidence. *See also* angle of draw. *Nelson.* h. To wind—said of hoisting or winding; to haul. *Mason.* i. The break in the strata from the coal face to the surface; the angle between this break and the vertical. *Mason.* j. To transport by hand; to put; to tram. *Mason.* k. To allow ore to run from working places, stopes, through a chute into trucks. *C.T.D.* l. To withdraw timber props or sprags from overhanging coal, so that it falls down ready for collection. *C.T.D.* m. To collect broken coal in trucks. *C.T.D.* n. To remove broken ore by gravity from stopes, chambers, or ore bins by aid of chutes or conveyors. *Pryor, 3.* o. In metallurgy, to remove pattern from foundry mold (flask). An internal fissure in a casting, caused by inadequate feeding during its solidification. *Pryor, 3.* p. To pull bit-blank metal toward a diamond by peening and calking when handsetting a diamond bit. *Long.* q. A small valley or a gully. *Nichols.* r. *See* pull. *Lewis, p. 622.* s. In geology, a sag or troughlike part of the land surface leading up from a stream valley to a gap between two hills. *Legrand.*

drawability. A measure of the workability of a metal subject to a drawing process. This term is usually expressed to indicate a metal's ability to be deep-drawn. *ASM Gloss.*

draw a charge. a. Remove explosives. *Zern.* b. Removing the coke from an oven. *Zern.*

drawbar. a. A bar that is used to connect a steam locomotive and tender and is secured in the drawhead of the locomotive by a pin. *Webster, 3d.* b. A bar or heavy beam under the body of a railway car and projecting at the end for coupling cars. Some arrangement for coupling is placed at the outer end, and an arrangement of springs at the inner end, to lessen recoil in starting, coupling, etc. *Standard, 1964.* c. In a tractor, a fixed or hinged bar extending to the rear, used as a fastening for lines and towed machines or loads. *Nichols.* d. In a grader, the connection between the circle and the front of the frame. *Nichols.* e. A submerged clay block used to define the position of sheet glass during drawing. *ASTM C162-66.*

drawbar horsepower. The power available at the tractor drawbar for moving the tractor and its towed vehicles forward. It is generally between 80 and 85 percent of the power developed by the engine. *Carson, p. 68.*

drawbar pull. a. The pull a tractor can exert on a load attached to the drawbar. Depends on power, weight, and traction. *Nichols.* b. The effort exerted by the locomotive on the train; it is the tractive effort less the force required to move the locomotive. The track resistance of the locomotive is ordinarily taken as 20 pounds per ton of locomotive weight. Consequently the drawbar pull would be $500 - 20 = 480$ pounds per ton weight for a locomotive with steel wheels. *Lewis, p. 213.*

draw bead. a. A bead or offset used for controlling metal flow. *ASM Gloss.* b. Riblike projections on draw rings or hold-down surfaces for controlling metal flow. *ASM Gloss.*

drawbench. The stand that holds the die and drawhead used in the drawing of wire, rod, and tubing. *ASM Gloss.*

drawcut. a. In underground blasting, cut holes that are inclined upward. *Lewis, p. 165.* b. In rock blasting, bottom cut. *Pryor, 3.* c. *See* drag cut. *Nelson.*

drawdown. a. The lowering of the water table or piezometric surface caused by pumping (or artesian flow). *A.G.I.* b. Vertical distance the free-water elevation is lower or the reduction of the pressure head due to the removal of free water. *ASCE P1826.* c. Difference, in feet, between the static water level and the pumping water level of a wall. *Legrand.* d. The difference between the static and the flowing bottom-hole pressure. *Institute of Petroleum, 1961.*

drawer. a. Scot. A man or boy who takes ore or rock from the working face to the shaft, or terminus of the horse or haulage road. One who pushes trams or drives a horse underground. *Fay.* b. Derb. A man who hoists ore or rock by means of a windlass, or otherwise, from a shaft. *Fay.* c. Putter; trammer; wagoner; a person who moves tubs either manually or with a machine. *Mason.*

draw firing. Removal of the load from the furnace for a short time prior to the completion of burning to equalize heating of all areas. Also called draw burning. *Bryant.*

draw gang. A group of men employed to cut and handle glass as it comes from the lehr. *ASTM C162-66.*

drawgear. The term includes drawbars, chains, shackles, detaching hooks, etc., used in haulage, winding, and hoisting. *Nelson.*

drawhead. Set of rolls or dies mounted on a drawbench for forming a section from strip, tubing, or solid stock, *See also* Turk's-head rolls. *ASM Gloss.*

draw hole. An aperture in a battery through which the coal or ore is drawn. *Fay.*

drawing. a. Recovering the timbers, chocks, etc., from the goaves. This work is commonly performed with the use of the dog and chain. *Fay.* b. Knocking away the sprags from beneath the coal after holing. *Fay.* c. Raising coal through a shaft or slope. *Fay.* d. In hydraulic mining, throwing the water beyond the dirt to be removed and causing it to flow toward the giant. *Compare* goosing. *Fay.* e. Removing or pulling out the crown bars in a tunnel. *Stauffer.* f. The term used in Lancashire, England, and Scotland for tramming. *Nelson.* g. The movement of tubs. *Pryor, 3.* h. Forming recessed parts by forcing the plastic flow of metal in dies. *ASM Gloss.* i. Reducing the cross section of wire or tubing by pulling it through a die. *ASM Gloss.* j. A misnomer for tempering. *ASM Gloss.* k. Continuous forming of sheet, tube, or fibrous glass from molten glass. *VV.*

drawing a jud. a. N. of Eng. Bringing down the face of coal, by withdrawing the sprags. *Fay.* b. *See* jud, d. *Fay.*

drawing an entry. Removing the last of the coal from an entry. *Fay.*

drawing chamber. The part of a tank furnace for flat glass from which the sheet of glass is drawn. *Dodd.*

drawing compound. A substance applied to prevent pickup and scoring during drawing or pressing operations by preventing metal-to-metal contact of the work and die. *ASM Gloss.*

drawing down. Reduction of cross section of steel by forging. *Pryor, 3.*

drawing engine. Eng. A winding or hoisting engine. *Fay.*

drawing lift. The lowest lift of a Cornish pump, or that lift in which the water rises by suction (atmospheric pressure to the point where it is forced upward by the plunger). *Fay.*

drawing-machine operator. One who observes the progress of a continuous flat sheet of window glass from the glass-melting tank to the top of an automatic drawing machine (the sheet of glass passes in a continuous flow through a series of adjustable asbestos rolls), making adjustments to rolls to prevent warping and breakage of sheet. Also called flat-drawing-machine operator, window glass. *D.O.T. 1.*

drawing road. Scot. An underground passage along which ore is conveyed. *Fay.*

drawings. Diagrams made to a definite scale and according to engineering principles of projection and so on. The drawings issued with the tender documents show the works to be carried out in accordance with the contract as definitely and in as much detail as is possible. The drawings may be supplemented from time to time by the issue of general and detailed drawings. *See also* machine drawing. *Nelson.*

drawing small. When a winding rope, from the effects of wear and tear, has become less in diameter or in thickness from that cause, it is said to be "drawing small." *Fay.*

drawing timber. The removal of timbers and supports from abandoned or worked out mine areas. This work is highly specialized and should be attempted only by the most experienced men. Generally, timbers are pulled by a timber puller which permits the operator to be under a safe roof while doing this work. In some cases, where so much weight is resting on the timber that it cannot be removed safely, it must be shot out by use of explosives, and the roof allowed to fall. *Kentucky, p. 151. See also* sylvester.

draw kiln. Scot. A limekiln in which the process of calcination is carried on continuously, the raw limestone and fuel being put in at the top and the lime withdrawn at the bottom. *Fay.*

drawknife. A curved, two-handled knife used in digging clay. *Nichols.*

drawlift. Same as drawing lift. *Fay.*

drawman. *See* grizzly worker. *D.O.T. 1.*

draw marks. *See* scoring; galling; pickup; die lines. *ASM Gloss.*

drawn. The condition in which an entry or room is left after all the coal has been removed. *Fay. See also* rob. *B.C.I.*

drawn clay. Clay that is shrunk or decreased in volume by burning. *Fay.*

drawn glass. Glass made by continuous mechanical drawing operation. *ASTM C162-66.*

drawn shell. An article formed by drawing sheet metal into a hollow structure having a predetermined geometrical configuration. *ASM Gloss.*

drawn stem. *See* stemware. *Dodd.*

drawn tube. A tube produced by drawing a tube bloom through a die. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17–24. Glossary of terms used in the aluminum extrusion industry.*

drawpiece. Any drawn part. *ASM Gloss.*

drawpin. A removable pin that attaches a load to a drawbar. *Nichols.*

drawplate. A circular plate with a hole in the center contoured to fit a forming punch, used to support the blank during the forming cycle. *ASM Gloss.*

drawpoint. a. A spot where gravity fed ore from a higher level is loaded into hauling units. *Nichols.* b. Heavy chisel cut across the face of a bit blank a short distance from a diamond to serve as a starting point for calking the metal toward and around a diamond being handset. *Long.*

draw radius. The radius at the edge of a die or punch over which the work is drawn. *ASM Gloss.*

draw ring. A ring-shaped die part over the inner edge of which the metal is drawn by the punch. *ASM Gloss.*

draw slate. A soft slate, shale, or rock approximately 2 inches to 2 feet in thickness, above the coal, and which falls with the coal or soon after the coal is removed. *Fay.*

draw tongue. A bar hinged to a towed machine, fitted with some device for attaching it to a tractor. *Nichols.*

draw trials. Ceramic test pieces drawn from a kiln at various temperatures. *Bureau of Mines Staff.*

draw wood; draw trees. Scot. To extract and recover mine timbers. *Fay.*

draw works. a. In rotary drilling, that part of the equipment functioning as a hoist to raise or lower drill pipe and in some types, to transmit power to the rotary table. *A.G.I.* b. A countershaft and drum substituted in rotary drilling for the band wheel, calf wheel, bull wheel, and sand reel used in the cable-tool method as a means of handling drill-string-equipment casing and drivepipe in the course of drilling a borehole; modern designs provide gears for several speeds. *Long.*

dredge. a. Large floating contrivance utilized in underwater excavation for the purpose of developing and maintaining water depths in canals, rivers, and harbors; raising the level of lowland areas and improving drainage; constructing dams and dikes; removing overburden from submerged ore bodies prior to open-pit mining; or to recover subaqueous deposits having commercial value. Dredges exist in a variety of modifications using dippers, clamshells, bucket ladders, scrapers, and hydraulic systems as means of excavation, and they may or may not be self-propelled. Also called dredging machine. *Bureau of Mines Staff.* b. Any apparatus used for excavating underwater. *C.T.D.* c. A large raft or barge on which are mounted either a chain of buckets or suction pumps and other appliances, to elevate and wash alluvial deposits and gravel for gold, tin, platinum, diamonds, etc. *C.T.D.* d. A type of bag net used for investigating the fauna of the sea bottom where it is too rough to admit of trawling. *C.T.D.* e. *See* dradge. *Standard, 1964.* f. Very fine mineral matter held in suspension in water. *Fay.* g. In dry process enameling: (1) the application of dry, powdered frit to hot ware by sifting, and (2) the sieve used to apply powdered porcelain enamel frit to the ware. Also called dredging. *ASTM C286-65.*

dredge boat. a. A boat bearing a dredging machine, especially one used in dredging river channels and in mining gold-bearing sand and gravel. *Fay.* b. The hull of a dredge. *Hess.*

dredge claims. The bed of an unnavigable river is open to location and patent as public land, when the opposite banks thereof have not passed into private ownership. Proprietors bordering on such streams, unless restricted by the terms of their grant from the government, hold to the center of the stream, notwithstanding the running of meander lines on the banks thereof, as the true boundary of the land is the thread of the stream. *Ricketts, p. 144.*

dredgeman. *See* dredgemaster. *D.O.T. 1.*

dredgemaster. In metal mining, one who supervises and operates a dredge which is used to mine metal-bearing sands or gravels (gold, tin, or platinum) at the bottom of lakes, rivers, and streams. Also called dredgeman. *D.O.T. 1.*

dredge peat. Very dark brown pulplike peat dredged from the bottoms of ponds and lakes; dries to hard mass without evident vegetable structure. *Tomkeieff, 1954.*

dredge pump. A heavy-duty-type pump with chrome-carbide or manganese steel liners and impellers. In silts or rounded sand grains their life is often a matter of months, but where sharp-grained sands or large gravel sizes are being handled, casing and impeller lives may be figured in hours. *Carson, 2, p. 64.*

dredger. a. A vessel specially equipped for dredging. *See also* bucket-ladder dredge; dipper dredger; grab dredger; sand-pump dredger; suction-cutter dredger. *C.T.D.* b. One who dredges. *Webster 3d.* c. A dredging machine. *Webster 3d.*

dredger excavator. An excavator working on the same principle as the bucket-ladder dredger but designed to work on land. *C.T.D.*

dredge sump. N. of Eng. A small reservoir at the bottom of a shaft, in which the water collects and deposits any sediments or debris. *Fay. See also* settling pit.

dredging. a. The act of using a dredge. *Fay.* b. The material brought up by a dredge. *Fay.* c. A form of excavation conducted under water. *C.T.D.* d. The removal of soils from under water, using the water as a means of transportation to convey the soils to final positions. It might be considered a variant of loose bulk excavation, and, without the presence of water, the excavation might be handled by similar methods. *Carson, p. 28.* e. S. Afr. Washing alluvial deposits on a large scale by means of dredgers. *Beerman.* f. N.S.W. Raising silt, loose sand, etc., in a scoop or by suction. Used for such minerals as alluvial gold and tin. *New South Wales.*

dredging conveyor. A scraper partially immersed in a vessel containing liquid and used for removing any solids which may settle therein. *B.S. 3552, 1962.*

dredging machine. *See* dredge, a. *Fay.*

dredging pump. A pump for drawing up silt, loose sand, etc., as in dredging. *Fay.*

dredging sump. A tank, forming part of the water circuit, in which slurry or small coal settles and is removed continuously by means of a scraper chain or scraper buckets. Also called drag tank; smudge sump. *B.S. 3552, 1962.*

dredging tube. The large tube of a dredging machine that operates by suction. *Standard, 1964.*

dredging well. The opening through a dredging vessel in which the bucket ladders work. *See also* bucket-ladder dredger. *C.T.D.*

dredgy ore. Corn. A rock impregnated with or traversed by minute veins of mineral. Also called dradgy ore; drady trade. *Fay.*

dreelite. A variety of barite. *Fay.*

dreigas. A mixture of producer gas, blast furnace gas, and coke oven gas, that is drei (meaning three gases), for the firing of open-hearth furnaces. Used in Germany. *Osborne.*

dreikanter. A borrowed German term for three-faceted pebbles shaped by sandblasting. *See also* ventifact; faceted pebble. *A.G.I.*

Dresbachian. Lower Croixan. *A.G.I. Supp.*

dress. a. To sort ore. *Gordon.* b. To resurface worn teeth on a roller or other bit by welding on a hard-surfacing alloy. *See also* face, b; hardface, a. *Long.* c. To recalk the worn face of a handset diamond bit. *Long.* d. To resharpen and restore to size the bits used in cable-tool drilling. *Long.* e. To dress a tool means to restore a tool to its original shape and sharpness by forging or grinding. *Crispin.* f. The furrowing on a millstone face. *Webster 2d.* g. To clean ore by breaking off fragments of the gangue from the valuable mineral. *See also* ore dressing. *Fay.*

dressed rocks. Same as roches moutonnées. *Standard, 1964.*

dresser. a. Mid. A tool used by colliers and banksmen for splitting large lumps of coal, and for cleaning coal for the market. A nooper. *Fay.* b. A tool or apparatus for cutting and dressing the furrows on the face of a millstone. *Fay.* c. A person skilled in the art of heating, shaping, and sharpening churn-drill bits. Also called tool dresser. *Long.* d. The superintendent of persons employed in picking, washing, and dressing ore. *Fay.* e. In the plural, those persons engaged in ore dressing. *Fay.* f. A tool using rotating metal cutters for truing, shaping, and dressing of grinding wheels. Three types are the Bell, Huntington, and Star dressers. *ACSG, 1963.*

dressing. a. Originally referred to the picking, sorting, and washing of ores preparatory to reduction. The term now includes more elaborate processes of milling and concentration of ores. *Barger.* b. The shaping of dimension stone. *Barger.* c. Eng. In the Midland coalfield, trimming and cleaning up a stall face after the loaders have left off work. *Fay.* d. The separation from a lump of coal of adherent inferior material by chipping with a hammer or by other similar means. *B.S. 3552, 1962.* e. Can. Developing claims to take them out of wildcat class. *Hoffman.* f. S. Afr. Sorting, cleaning, and concentrating ores for metallurgical purposes. *Beerman.* g. *See* ore dressing. *Nelson.* h. Removing dulled grains from the cutting face of a grinding wheel to restore cutting quality. *ACSG, 1963.* i. To alter the cutting face for grinding special contours. *ACSG, 1963.*

dressing amalgamation plates. The process of softening the amalgam, in amalgamation, by the addition of mercury. The amalgam is then removed with a scraping tool and finally the copper plates are again coated with mercury. *Nelson.*

dressing a mine. A method of fraud carried out by a representative of the seller, by systematically mining out all the low-grade or barren spots in the vein, leaving only the high-grade spots exposed. This method is used on deposits of lead, zinc, and copper where the values are in the form of sulfides or other minerals distributed in a coarse and irregular manner in the vein. It may also be used in a gold or silver mine if the seller is familiar enough with the difference between high- and low-grade ore. In a mine dressed for sale, there is a lack of straight lines which is in itself suggestive. The back or top of a drive or stope will have a billowy appearance, which is the result of gouging out the low-grade places. *Hoov, p. 80.*

dressing floor. The floor, place, or yard where ores are rough dressed or sorted. *Fay.*

dressing works. *See* concentrator; ore dressing. *Fay.*

Dressler kiln. The first successful muffle-type tunnel kiln was that built by Conrad Dressler in 1912. The name is now applied to a variety of kilns designed and built by the Swindell-Dressler Corp., Pittsburgh, Pa. *Dodd.*

drewite. A variety of calcium carbonate precipitated from seawater by bacterial action. *English.*

dribble. Material which adheres to the conveying medium and, being carried beyond the discharge point, drops off along the return run. *ASA MH4.1-1958.*

dribbling. In underground excavation, fall of small stone and debris from roof, warning that a heavy fall may be imminent. *Pryor, 3.*

driblet. A term applied to pyroclastic masses of lava, mostly larger than lapilli, which assumed their characteristic forms while plastic, and chiefly as a consequence of forces acting at the time of detachment from the magma or at the time of landing during flight. The term spatter is essentially synonymous. *A.G.I.*

driblet cone. A small, fantastic cone, formed by the adhesion of congealing driblets of liquid lava from a volcanic blowhole; opposite of cinder cone. Synonym for hornito. *Standard, 1964; A.G.I.*

dried calcium sulfate. *See* plaster of Paris. *Bennett 2d, 1962.*

drier. An oven used for removing water from damp molded ware by heat, supplemented usually with forced circulation of air. *A.R.I.*

drier feeder. a. One who places wet ceramic ware in a drier. *Bureau of Mines Staff.* b. One who lifts freshly enameled parts, such as those used in the manufacture of stoves, from a conveyor with a long hook and transfers them to the drying-oven conveyor. *D.O.T. 1.*

drier man. In salt production, one who tends operations of rotary driers through which crushed salt is run to drive off contained moisture prior to grinding, examining the salt discharged from the driers to see that evaporation of moisture is complete. *D.O.T.1.*

drier tender. One who wraps damp burlap sacks around refractory blocks in drying room to prevent drying of the block centers before the outsides. *D.O.T. 1.*

drier white. A term given to superficial discoloration of clayware during drying; the most common cause is adherence of soluble salts to the surface of the ware. *See also* kiln white. *ACSG, 1963.*

dries. Seams in the rock, which are usually invisible in the freshly quarried material, but which may open up in cutting or on exposure to the weather. *See also* dry, b. *Fay.*

drift. a. A horizontal passage underground. A drift follows the vein, as distinguished from a crosscut, which intersects it, or a level or gallery, which may do either. *Fay.* b. In coal mining, a gangway or entry, above water level and generally on the slope of a hill, driven horizontally into the coal seam. *Fay; B.C.I.* c. A horizontal opening in or near an ore body and parallel to the course of the vein or the long dimension of the ore body. *Beerman.* d. A passageway driven in the coal from the surface, following the inclination of the bed. *Hudson.* e. N. of Eng. A heading driven on the strike of the coal seam. *Fay.* f. N. of Eng. An inclined roadway driven in stone either underground or from the surface to the workings. *Trist.* g. Forest of Dean. A hard shale. *Fay.* h. To make a drift; to drive. *Webster 3d.* i. A horizontal gallery in mining and civil engineering driven from one underground working place to another and parallel to the strike of the ore. It is usually of a relatively small cross section. Larger sections are usually called tunnels. *Fraenkel.* j. A heading driven obliquely through a coal seam. *C.T.D.* k. A heading in a coal mine for exploration or ventilation. *C.T.D.* l. An inclined haulage road to the surface. *C.T.D.* m. Usually an inclined tunnel from the surface to the coal seams to be developed. It serves the same purpose as a shaft but is considerably cheaper. A drift may be in stone or coal. If the coal seam outcrops in a valley, the drift may be driven down in the seam. *See also* drift mining; footwall drift; hanging wall drift. *Nelson.* n. N.S.W. A passage driven through country rock to intersect a seam or vein. *New South Wales.* o. N.S.W. Loose sand which tends to flow. *New South Wales.* p. The deviation of a borehole from its intended direction or target. *Compare* walk. *Long.* q. A tool used for flattening dents or straightening the inward bulges in casing or other pieces of tubular equipment. *Long.* r. S. Afr. The alluvial material on top of bedrock. *Beerman.* s. In oil well surveying, the angle from a drill hole to the vertical. *See also* inclination (which is measured from the horizontal). *Cumming.* t. Any rock material, such as boulders, till, gravel, sand, or clay, transported by a glacier and deposited by or from the ice, or by or in water derived from the melting of the ice. Generally used of the glacial deposits of the Pleistocene epoch. Same as detrital deposits. *Fay.* u. A flat piece of steel of tapering width used to remove taper shank drills and other tools from their holders. *ASM Gloss.* v. A tapered rod used to force mismated holes in line for riveting or bolting. Sometimes called a driftpin. *ASM Gloss.* w. Aerial photography. Apparent rotation of aerial photographs with respect to the true line of flight, caused by failure to orient the camera to compensate for the angle between that line and the direction in which the airplane is heading. *Seelye, 2.* x. In geophysics, a time variation common to nearly all sensitive gravimeters, due to slow changes occurring in the springs or mountings of the instrumental systems; this variation is corrected by repeated observations at a base station and in other ways. *A.G.I.* y. Speed of current flow downwind. *Hy.*

driftage. a. In Great Britain, any place driven in a mine. *Zern.* b. In England, also called drift. *Zern.*

drift and pillar. N. Staff. A system of working coal similar to the room and pillar system. *Fay.*

drift angle. a. The angular deviation of a borehole from vertical and/or its intended course. *Long.* b. *See also* deflection angle. *Long.*

drift angle buildup. The rate of the increase in the drift angle which is generally expressed as the number of degrees increase for a specific drilled footage; for example, 2° per 100 feet. *Long.*

drift band. Ill. A thin band or layer of soft earthy material occurring in a coal seam. *Fay.*

drift bed. In geology, a layer of drift of sufficient uniformity to be distinguished from associated ones of similar origin; a drift stratum. *Fay.*

drift bedding. A term proposed to replace false bedding. An obsolete term for inclined bedding. *Pettijohn.*

driftbolt. a. A bolt for driving out other bolts or pins. *Webster 3d.* b. A metal rod for securing timbers resembling a spike but with or without point or head. *Webster 3d.*

drift clay. *See* boulder clay. *A.G.I.*

drift coal. Same as allochthomous coal. *Tomkeieff, 1954.*

drift coalfields. Coalfields formed by forests on higher ground being carried away by floods into lakes. *Mason, v. 1, p. 4.*

drift copper. Native copper found in gravel and clay, far from the original ore body, from which it has been carried by glaciers. *Weed, 1922.*

drift curve. Graph of a series of gravity values read at the same station at different times and plotted in terms of instrument reading versus time. *A.G.I.*

drift deposit. Any accumulation of glacial origin; glacial or fluvioglacial deposit. *Fay.*

drifted. a. A borehole, the course of which has deviated or departed from the intended direction or did not reach its intended target. *Long.* b. Inward-bulged casing that has been straightened by the use of a drift. *See also* drift, q. *Long.* c. A horizontal underground passage parallel to or along a vein or related structure. *Long.*

Drift epoch. Same as Glacial epoch. *Fay.*

drifter. a. An excavator of mine drifts. *Webster 3d.* b. A drill crewman, miner, or laborer who travels from place to place, only working a short period of time at each place. *Compare* boomer. *Long.* c. An air-driven, percussive rock drill; also called leyner; liner. *Long.* d. A person skilled in the use of air-driven, percussive rock drills and other processes utilized in excavating horizontal underground passages or tunnels. *Long.*

drifter bar. *See* drill column. *Long.*

driftter drill. The heaviest form of hammer drill made in various sizes depending upon the severity of the work to be done. The heaviest type weighs over 200 pounds and is used for holes up to 20 feet in depth. Must be mounted on a column or bar. *Lewis, p. 87.*

drift driller. In metal mining, one who operates a heavy, mounted, compressed-air, rock-drilling machine in driving drifts (horizontal passages running parallel to the vein opened up to facilitate mining of the ore). *D.O.T. 1.*

drifter drill operator. *See* driller, machine. *D.O.T.1.*

drift frame. *See* square sets. *Stauffer.*

drift gravel. Gold or tin-bearing gravel lying on slate or granite and covered with basalt. *von Bernewitz.*

drift ice. Any ice that has drifted from its place of origin. *Hy.*

drift indicator. Various types of mechanical or photographic devices used to determine the compass bearing and inclination of the course of a borehole. *Compare* clinometer; Maas compass. *Long.*

drifting. a. The coal mining term for the driving of underground tunnels through stone. *McAdam II, p. 119.* b. Opening a drift; driving a drift. *See also* drift. *Fay.* c. Tunneling along the strike of ore. *Pryor, 3, p. 140.* d. Tunneling; crutting. *Mason.* e. Cars, locomotives, etc., drift when they will run by gravity but not attain a dangerous speed. *Zern.* f. Deviating from the intended direction, such as a borehole during the process of drilling. *Long.* g. Excavating a horizontal underground passage parallel to or along a vein or related structure. *Long.* h. Straightening inward bulges in casing by using a special tool. *Long.*

drifting back. N. Staff. The operation of mining the pillars toward the pit bottom as soon as the cross headings are driven. *Fay.*

drifting curb. A wooden frame forced downward through quicksand, having planks driven at the back of it to keep out the sand and water. *Fay.*

drift line. Line of drifted material left on the shore, marking the highest stage of the flood. *Schieferdecker.*

driftman. In bituminous coal mining, one who is engaged in driving a drift, a horizontal passageway underground following the coal vein in a mine. *D.O.T. 1.*

drift map. A map showing the distribution of various glacial and fluvioglacial deposits, generally called drift. *Fay.*

driftmeter. A device used to determine deviation of drill pipe from the vertical as well as the depth at which deviation occurs. *A.G.I.*

drift mine. a. A placer or gravel deposit worked by underground mining methods. *Webster 3d.* b. One opened by a drift. *Pryor, 3, p. 140.* c. A mine that opens into a horizontal or practically level seam of coal. This type of mine is generally the easiest to open as the mine opening enters into the coal outcrop. *Kentucky, p. 330.*

drift mining. a. A term applied to working alluvial deposits by underground methods of mining. The paystreak, varying from 2 to 8 feet, sometimes greater, is reached through an adit or a shallow shaft. Wheelbarrows or small cars may be used for transporting the gravel to a sluice on the surface. If relatively large, the deposit is removed in a system of regular cuts or slices taken across the paystreak, working generally in a retreating fashion from the inner limit of the gravel. Drift mining is more expensive than sluicing or hydraulicing; consequently it is used only in rich ground. *Lewis, p. 390.* b. The working of relatively shallow coal seams by drifts from the surface. The drifts are generally inclined and may be driven in rock or in a seam. Drift mining may be viewed as intermediate between opencast coal mining and shaft or deep mining. *See also* development drift. *Nelson.*

drift net. In oceanography, a form of gill net used for fishing at or near the surface; allowed to drift with the tide; used especially by herring boats or drifters. *See also* gill net. *C.T.D.*

drift peat. A peat deposit associated with or embedded in glacial drift. *Fay.*

drift salt. Fluffy, flaky salt particles due to wind and wave action which produce a mist over the surface of solar salt ponds. The mist contains minute particles of salt which are driven to the lee shore, and deposited as a scale. *Kaufmann.*

drift scratches. Marks on the surface of solid ledges of rocks, supposed to have been produced by the grinding action of masses of soil, gravel, and rocks, during glacial movement. *Fay.*

drift set. A strong timber set in a drift which may form the anchorage for the timber sets of the stope above. *Nelson.*

drift sheet. A sheetlike body of glacial drift, continuous or discontinuous, deposited during a single glaciation (for example, Cary drift sheet) or during a closely related succession of glaciations (for example, Wisconsin drift sheet). *A.G.I.*

drift slabs. Slabs of more than ordinary length, used especially for holding back dirt, sand, and water from a shaft. *Fay.*

drift slicing. Side slicing as a method of stoping massive deposit. Alternative to top slicing. *Pryor, 3.*

drift stope. The excavation of the development drift together with the stope in overhand stoping. Employed in cases where the hanging wall is strong. *Nelson.*

drift stoping. *See* sublevel stoping. *Fay.*

drift theory. That theory of the origin of coal which holds that the plant matter constituting coal was washed from its original place of growth and deposited in another locality where coalification then came about. *See also* allochthonous coal. *A.G.I.*

driftway. *See* drift, a. *Fay.*

driftwood peat. Peat formed from driftwood. *Tomkeieff, 1954.*

driggoe. Corn. The lower pump in a set or tier; the working piece. Also called drigger. *Fay.*

drikold. *See* dry ice. *Pryor, 3.*

drill. a. Any cutting tool or form of apparatus using energy in any one of several forms to produce a circular hole in rock, metal, wood, or other material. *See also* calyx drill; churn drill; core drill; diamond drill; rock drill; rotary drill; shot drill. *Long.* b. To make a circular hole with a drill or cutting tool. *Long.* c. Types of drills include singlehand, double-hand (worked manually); percussion drills (jackhammer, drifters, stopers) using compressed air; and rotary drills (diamond shot, calyx) powered by air or electricity. Alluvial drills include Banka (hand) and churn (power). *Pryor, 3.*

drillability. a. The relative speed at which a material may be penetrated by a drill bit. High drillability denotes easy penetration at a fast rate. *Long.* b. The specific value of the drilling properties of a rock expressed in terms of the drilling rate under certain technical conditions. *Fraenkel.*

drill ahead; drilling ahead. a. To sink a borehole into solid or unconsolidated rock material, such as overburden or glacial till, to a considerable depth below the bottom of the casing or drivepipe. *Long.* b. To restart or resume drilling operation. *Long.* c. To drill boreholes in advance of mine workings to explore for or locate old mine workings or a water-bearing formation. *Long.*

drill bar. A drill column that is set horizontally instead of vertically in an undergronud workplace. *Long.*

drill base. Metal or wood framework on which a drilling machine is mounted. *Long.*

drill bit. One of a number of different types of detachable cutting tools used to cut circular holes in rock, wood, metal, etc. Also called drill crown in Africa and England. *Long.*

drill boom. An adjustable arm projecting from a drill carriage to carry a drill and hold it in position. *B.S. 3618, 1964, sec. 6.*

drill bort; drilling bort. Synonym for drill diamonds. *Long.*

drill bortz; drilling bortz. Synonym of drill diamonds. *Long.*

drill by; drilled by; drilling by. Same as bypass, d. *Long.*

drill cable; drilling cable. In a strict sense, the term should only be used to designate the heavy rope or cable used as the connecting link between the drill stem and the walking beam on a churn drill. However, the term now is commonly used to signify any cable or wire rope used in hoisting drill rods, casing, and other borehole-drilling equipment used with a drill machine, such as a calyx drill, diamond drill, etc. Also called drilling line; drill line. *Long.*

drill capacity. The lineal feet of drill rod of a specified size that a hoist on a diamond or rotary drill can lift or that the associated brake is capable of holding on a single line; also sometimes used to designate the size of a drill machine, based on the depth to which it is capable of drilling. *Long.*

drill carriage; jumbo. A movable platform, stage or frame which incorporates several rock drills and usually travels on the tunnel track; used for heavy drilling work in large tunnels. *See also* drill frame. *Nelson.*

drill casing. Synonym for casing. *Long.*

drill change. The limiting depth of drilling with any one size of bit, after which a smaller bit must be used. *Nelson.*

drill collar; drilling collar. A length of extra heavy wall drill rod or pipe connected to a drill string directly above the core barrel or bit, the weight of which is used to impose the major part of the load required to make the bit cut properly. A drill collar is usually of nearly the same outside diameter as the bit or core barrel on which it is used. Not to be confused with guide rod. *Long.*

drill column. a. A length of steel pipe equipped with a flat cap at one end and a jackscrew on the opposite end by means of which the pipe can be wedged securely in a vertical or horizontal position across an underground opening to serve as a base on which to mount a small diamond or rock drill. Also called bar; drifter bar; drill bar; jack bar. *Long.* b. Synonym for drill stem. *Long.*

drill contract; drilling contract. An agreement between a drilling contractor and a second party specifying the conditions under which boreholes are to be drilled for the second party. In soil- and foundation-testing work, a drill or drilling contract commonly is called a boring contract. *Long.*

drill contractor; drilling contractor. Owner of an equipped drill machine who will, under specified conditions and for an agreed price, drill boreholes for another party. A contractor doing soil- and foundation-testing work commonly is called a boring contractor. *Long.*

drill control; drilling control. A mechanism that is regulated manually or set to control automatically the speed at which a bit penetrates rock being drilled. *Long.*

drill core. A solid, cylindrical sample of rock produced by an annular drill bit, generally rotatively driven but sometimes cut by percussive methods. *See also* core. *Long.*

drill cradle. The metal channel on which a heavy drill is fed forward as drilling proceeds. *B.S. 3618, 1964, sec. 6.*

drill crew. Men needed to operate a drill machine properly. *Long.*

drill crown; drilling crown. Synonym for drill bit; drilling bit. *Long.*

drill cuttings. Synonym for well cuttings. *A.G.I. Supp. See also* cuttings; sludge.

drill derrick; drilling derrick. *See* derrick. *Long.*

drill diamonds. Industrial diamonds used in diamond-drill bits and reaming shells for coring, cutting, or reaming rock. Drill diamonds usually contain obvious imperfections and inclusions, although the finer grades approach toolstones in quality. Also called drill bort; drilling bort; drilling diamonds; drillings. *Compare* toolstones. *See also* industrials. *Long.*

drill doctor. A mechanic or shop that sharpens and services drill bits, tools, and steels. *Nichols.*

drilled extrusion ingot. A hollow extrusion ingot made by drilling a cast solid extrusion ingot. *ASM Gloss.*

drilled well. A well sunk by means of drilling tools that may extend to depths of more than 20,000 feet. *A.G.I. Supp.*

drill engineer. *See* driller, machine. *D.O.T.1.*

driller. a. A person who has acquired enough knowledge and skill to enable him to operate and to assume the responsibility of operating a drill machine. Also called drillman; drill runner; runner; tool pusher. *Long.* b. The man in charge of the rig and crew during one tour and who handles the drilling controls. *Brantly, 2.* c. A drilling machine. *Standard, 1964.* d. Can. Property being diamond drilled as compared to one undergoing underground development. *Hoffman.* e. N. of Eng. Uses an electric or pneumatic twist drill to make shotholes in the coal. Shotholes in the gateway caunches are usually put on by the stoneman. *Trist.* f. *See* cable driller. *D.O.T. 1.*

driller helper. *See* prospecting driller helper. *D.O.T. 1.*

driller, machine. a. In anthracite and bituminous coal mining, one who operates a compressed-air or electric rotary drilling machine in working places in a mine to drill holes into the working face of coal so that the mass may be broken up by blasting with explosives that are inserted and set off in the holes. Also called drill engineer; drillman; power driller. *D.O.T. 1.* b. In the quarry industry, one who operates a heavy, mounted, compressed-air, percussion rock drilling machine on a ledge or the floor of a quarry to drill holes into the working face of the rock so that the mass may be broken up by blasting with an explosive that is inserted and setoff in the holes. May be designated according to type of drill or mounting used, as drifter drill operator or tripod drill operator. Also called drillman; stone driller. *D.O.T. 1.*

driller's mud. A mineral-laden fluid used as a circulation medium when drilling a borehole with a diamond- or rotary-drilling machine. *See also* mud. *Long.*

drill extractor. Tool for retrieving broken piece of drill from borehole. *Pryor, 3.*

drill feed. The mechanism for advancing the drill bit during boring. *Nelson.*

drill fittings. Devices, parts, and pieces of equipment used downhole in drilling a borehole. Also called downhole equipment. *Long.*

drill floor; drilling floor. A plank-covered work area around the collar of a borehole at the base of a drill tripod or derrick. *Long.*

drill fluid; drilling fluid. Usually water or mud-laden water (sometimes applied to compressed air, natural gas, or oil) circulated through a drill string to keep the bit cool and to wash cuttings produced away from the bit face. Also called circulation fluid; fluid circulation. *Long. See also* circulating fluid.

drill footage. The number of lineal feet of borehole drilled, usually expressed in number of feet per shift. *Long.*

drill frame. A drill mounting often made at the mine to suit the tunnel requirements. It usually comprises two or three arch girders strapped together to form a replica of the tunnel shape but smaller in size. The structure is mounted on wheels and provision is made for clamping the drills to various parts of the frame according to the drill-hole pattern in use. It contains a central opening to allow the passage of the loading machine, cars, or conveyor. *Nelson.*

drill free; drilling free. A condition occurring when the bit is no longer cutting because it is being held suspended above the bottom of the borehole by the drill rods or by a blocking or upstanding piece of core. Also called drill off. *Long.*

drill gage. The width across the cutting bit or diameter of the drilled hole. With tungsten-carbide bits it is possible to drill long holes without the loss of gage. *Nelson.*

drill head; swivel head. a. The assembly which applies the drilling pressure and rotation to the drill rods. Also called boring head. *B.S. 3618, 1963, sec. 3.* b. Obsolete synonym for drill bit. *Long.*

drill hole. a. A hole in rock or coal made with an auger or a drill. *Bureau of Mine Staff.* b. Technically, a circular hole drilled by forces applied percussively; loosely and commonly, the name applies to a circular hole drilled in any manner. *Long.* c. Used by diamond drillers as a synonym for borehole. *Compare* borehole. *Long.*

drill-hole counting. When the results of a survey indicate a possible ore deposit, test holes may be drilled and a special adaptation of a scintillation counter, called a drill-hole counter, may be lowered in the hole in an attempt to locate, outline, and assay an ore body. The drill-hole counter can distinguish between formations by their radiation intensity. *Dobrin, p. 392.*

drill-hole pattern. The number, position, depth and angle of the shot holes forming the complete round in the face of a tunnel or sinking pit. A good drill-hole pattern will ensure the maximum possible pull and the fragmentation for easy loading without excessive scatter of material. *Nelson.*

drill-hole record. A description of the borehole based on the daily logs from the driller and the samples and the report of the geologist. *Nelson.*

drill-hole returns. The circulation fluid and entrained cuttings overflowing the collar when drilling a borehole. *Long.*

drill-hole survey. *See* borehole survey. *Long.*

drill in; drilling in; drilled in. a. The act or process of setting or advancing casing or pipe through overburden with a drill machine by rotating a bit-shod string of casing or pipe. *Long.* b. To drill through the cap rock into an underlying oil-, water-, or gas-bearing formation. *Long.*

drilling. a. The act or process of making a circular hole with a drill. *See also* drill. *Compare* boring. *Long.* b. The operation of tunneling or stoping, whether with a compressed-air rock drill, a jackhammer, or a drifter. *C.T.D.* c. Use of a compressed-air rock drill to prepare rock for blasting. *Pryor, 3.* d. The operation of making deep holes with a drill for prospecting, exploration, or valuation. *Pryor, 3.* e. Two general methods of drilling have come to be recognized: (1) percussion systems, which consist of breaking up the ground by means of a sharp-pointed instrument of a particular form, which is made to strike the ground in a series of blows; and (2) rotary systems, which aim at the extraction of a core or permit all the disintegrated material to be washed away. *Fay.* f. Commonly used in prospecting for, and in the development of, ore or coal lands. *Fay.*

drilling column. The column of drill rods to the end of which the bit is attached. *B.S. 3618, 1963, sec. 3.*

drilling fluid. The thick fluid kept circulating in a borehole to clear the chippings and cool the chisel, etc. *See also* mud flush. *Nelson.*

drilling jig. a. A device very accurately made of cast or wrought iron which becomes a guide for the drilling of holes. The work is fastened in the jig, and the drill is guided through holes drilled in the face of the jig itself. The use of a jig makes interchangeable work easily obtainable. *Crispin.* b. A portable drilling machine worked by hand. *Fay.*

drilling life. *See* bit life. *Long.*

drilling line. In a churn drill, the cable that supports and manipulates the tools. *Nichols.*

drilling machine. A hand-operated, or power-driven machine for boring shot holes or boreholes, in coal, ore, mineral, or rock. *See also* drifter drill; percussive drill; rotary drill; rotary-percussive drill. *Nelson.*

drilling machine operator helper. In metal mining, one who shovels up loose ore or rock in the working place to facilitate setting up and operating drill. Also called drill operator helper. *D.O.T. 1.*

drilling mud. A suspension, generally aqueous, used in rotary drilling and pumped down through the drill pipe to seal off porous zones and to counterbalance the pressure of oil and gas; consists of various substances in a finely divided state among which bentonite and barite are most common. Oil may be used as a base of water. *A.G.I. Supp.*

drilling-mud weighting materials. Class name given to materials which are added to drilling mud to control gas, oil, water, or formation pressures and to aid in maintaining the walls of the open hole. *CCD 6d, 1961.*

drilling pattern. A plan showing the location, direction, length, and firing sequence of the drill holes in a round. *Fraenkel.*

drilling platform. Auxiliary equipment for drilling at heights above head level. The drilling platform is generally assembled and dismantled for each series of drilling operations. *Fraenkel.*

drilling pressure; drill pressure. *See* bit load. *Long.*

drilling rate. a. The depth of penetration achieved per unit of time with a given type of rock drill, bit diameter, air pressure, etc. Also called penetration rate. *Fraenkel.* b. The overall rate of advancement of the borehole. *B.S. 3618, 1963, sec. 3.*

drillings. a. Synonym for drill diamonds. *Long.* b. Incorrectly used as a synonym for cuttings. *Long.* c. Sometimes designates drill diamonds ranging from 4 to 23 stones per carat in size. *Long.*

drilling thrust. *See* bit load. *Long.*

drilling time. a. In rotary drilling, the time required for the bit to penetrate a specified thickness (usually 1 foot) of rock. The rate is dependent on many factors. *A.G.I.* b. The elapsed time, excluding periods when not actually drilling, required to drill a well. *A.G.I.*

drilling tools. An assembly of tools including the bit, drill pipe, etc., used in well drilling. *Shell Oil Co.*

drilling tower; drill tower. Synonym for derrick. *Long.*

drilling up. Preliminary digging out the clay in the taphole of a furnace. This is done usually by hand, air, or electric drill. *Fay.*

drilling weight; drill weight. Total weight, expressed in pounds or tons, applied to a bit while drilling. Also called bit load; bit thrust; drilling pressure; drilling thrust. *Long.*

drill jars; drilling jars. a. A loose-fitting or sliding connector in a drill stem by means of which a sharp, jarring blow can be delivered to a string of drill tools to dislodge the string when it is stuck in a borehole. *Long.* b. Incorrectly used as a synonym for drive hammer. *Long.*

drill line; drilling line. Sometimes used as a synonym for drill cable; drill string. *Long.*

drill log; drilling log. The record of the events and the type and characteristics of the formations penetrated in drilling a borehole. Also called boring log. *Compare* log. *Long.*

drill machine; drilling machine. A portable mechanism used in drilling boreholes, drill holes, or wells. Also called drill; drill rig. *Long.*

drillman. a. Synonym for driller. *Long.* b. A member of a drill crew. *Long.* c. *See* driller, machine. *D.O.T. 1.*

drill mounting; drill rig. An appliance to provide a feed pressure and a support for the drilling machine usually in tunnels. Four main types of drill mountings are in use, namely, the post, the air leg, the drill frame, and the drill carriage. *Nelson.*

drill mud; drilling mud. Water mixed with clay (usually bentonite) and sometimes other material such as ground barite, oil, etc., used as a rotary and/or diamond-drill circulation medium. *Compare* circulation fluid; drill fluid. *Long.*

drill off; drilling off. Used by rotary and diamond drillers as a synonym for drill free. *See also* drill free. *Long.*

drill operator, pneumatic. In stonework industry, one who drills holes in slabs or blocks of building stone for the insertion of wire or rods in mounting or fastening them in place, using a compressed air driven drill. *D.O.T. 1.*

drill out; drilling out. a. To penetrate or remove an obstruction in a borehole by a drilling operation. *Long.* b. To complete a borehole or group of boreholes. *Long.* c. To determine location and areal extent of an ore body or petroleum reservoir by a number of boreholes. *Long.*

drill output. The volume of rock (in tons) corresponding to the footage drilled per hour. *Streefkerk, p. 15.*

drill over; drilling over. a. The act or process of drilling around the outside of casing or drill-string equipment stuck in a borehole, using a washover shoe or a bit and core barrel. *Long.* b. To drill down over core lost in a borehole. *Long.*

drill pattern; drilling pattern. The placement of a number of boreholes in accordance to a predetermined geometric arrangement. *Long.*

drill pipe. In rotary drilling, the heavy steel pipe rotated to give motion to the drilling bit, and through which circulation of drilling fluid is maintained. *A.G.I.* b. A petroleum driller's term for drill rods. *Long.*

drill platform; drilling platform. Synonym for drill floor; drilling floor. *Long.*

drill press operator. In the stonework industry, one who operates an upright drilling machine to drill holes into finished blocks and slabs of stone, such as marble, granite, and slate. May be designated according to type of machine, as radial drill operator. *D.O.T. 1.*

drill pressure; drilling pressure. *See* bit load. *Long.*

drill rate; drilling rate. a. The number of feet of borehole drilled in a specified interval of time; for example, drilling rate was 80 feet per day. *Long.* b. Price, expressed in dollars, per foot of borehole completed in accordance with terms specified in a drill contract. *Long.* Synonym for feed rate. *Long.*

drill rig. a. A drill machine complete with all tools and accessory equipment needed to drill boreholes. Also called drilling rig. *Long.* b. Any means of supporting a rock drill at its work. *B.S. 3618, 1964, sec. 6. See also* drill mounting.

drill rod; drilling 'rod. Hollow, externally flush-coupled rods connecting the bit and core barrel in a borehole to the swivel head of a rotary-drill rig on the surface. Unit lengths of rod are usually 10 feet long and composed of two threaded parts, (a short pin-threaded coupling and a box-threaded length of heavy-wall steel tubing) connected together. The term "drill pipe" is applied to rods used in a similar manner on rotary rigs in petroleum-drilling operations. Also called diamond-drill pipe; diamond-drill rod; drill pipe. *Compare* drill pipe. *Long.*

drill-rod bit. A noncoring bit designed to be coupled to a reaming shell threaded to couple directly on a drill rod instead of a core barrel. *Long.*

drill-rod drive quill. Synonym for drive quill. *Long.*

drill rope. A left-lay, plant-fiber rope, usually about 1¼ inches in diameter, used on diamond drills in drivepiping operations in lieu of the wire hoisting line, as it can be wrapped around the hoist drum or cathead to manipulate a chopping bit or drive hammer more easily than can a wire hoisting cable. *Long.*

drill runner. a. The tunnel miner who normally handles the rock drills for blasting purposes. *Nelson.* b. *See* driller. *Long.*

drill-runner helper. *See* diamond-driller helper. *D.O.T. 1.*

drill sampling. a. A method of sampling a deposit by means of a drill or borehole. The boreholes may be spaced at the corners of squares or triangles at distances according to the nature and extent of the deposit. *See also* exploratory drilling; soil sample. *Nelson.* b. The sampling of gravel deposits or extensive low-grade ore deposits by use of drills. *Hoov, p. 38.*

drill series. Synonym for drill diamonds. *Long.*

drill shack; drill shanty. The shelter enclosing the working area around the collar of a borehole. *Compare* changehouse. *Long.*

drill shanty. *See* drill shack. *Long.*

drill sharpening machines. Machines for sharpening detachable bits and for making shanks. Detachable bits are sharpened by grinding and may stand from 4 to 7 or 8 regrinds, with occasional rehardening. *Lewis, p. 98.*

drill site; drilling site. Spot where drill rig will be or has been set up. *Long.*

drill sludge; drilling sludge. *See* cuttings. *Long.*

drill speed; drilling speed. May be used by drillers as a synonym for drill bit revolutions per minute; drill rate; feed rate; feed ratio; feed speed; rate of penetration. *Long.*

drill stand. *See* drill rig, b. *B.S. 3618, 1964, sec. 6.*

drill steel. a. Steel made either by the crucible process or in the electric furnace, as these methods give the best control of raw materials and the resultant composition of the steel. Various analyses of drill steel come within the following range: 0.68 to 0.90 percent carbon, 0.15 to 0.30 percent manganese, 0.01 to 0.03 percent sulfur, 0.01 to 0.03 percent phosphorus, and trace to 0.30 percent silicon. Drill steel is composed of tiny crystals called microconstituents, and these crystals of which there are several kinds, change from one kind to another at certain temperatures, even though the steel is in the solid form, and these changes have a marked effect on the physical characteristics of the steel. *Lewis, pp. 93-94.* b. A round or hexagonal steel rod for boring in coal, ore, or rock. It consists of shank, shaft, and bit. It forms an important part of jackhammers and drifters. *Nelson.* c. Hollow steel connecting a percussion drill with the bit. *Nichols.* d. *See* rod; stem. *B.S. 3618, 1964, sec. 6.*

drill-steel set. A series of integral drill-steel sizes consisting of starter and follower bits, necessary for drilling a hole to a certain depth. The length increment is usually determined by the wear of the bit and the feed length of the feeding device. *Fraenkel.*

drill stem. a. In standard drilling, a cylindrical bar of steel or iron screwed onto the cable tool bit to give it weight. *A.G.I.* b. In rotary drilling, a string of steel pipe screwed together and extending from the rig floor to the drill collar and bit at the bottom of the hole. The drill pipe transmits the rotating motion from the rotary table to the bit and conducts the drilling mud from the surface to the bottom of the hole. *A.G.I. See also* drill string.

drill-stem test. A test of the productive capacity of a well when still full of drilling mud. The testing tool is lowered into the hole attached to the drill pipe and placed opposite the formation to be tested. Packers are set to shut off the weight of the drilling mud, and the tool is opened to permit the flow of any formation fluid into the drill pipe, where it can be measured. *A.G.I.*

drill string; drilling string. a. The assemblage of drill rods, core barrel and bit or drill rods, drill collars, and bit in a borehole, which is connected to and rotated by the drill machine on the surface at the collar of the borehole. Also called drill stem. *Long.* b. As used by cable-tool or churn drillers, the assemblage of bit, stem, rope, or cable in a borehole connected to the walking beam of the churn drill on the surface. *Long.*

drill sump. *See* sump, n. *Long.*

drill thrust; drilling thrust. *See* bit load. *Long.*

drill time; drilling time. Amount of time, expressed in hours per shift or percent of shift time, that bit is on bottom and drilling. *Long.*

drill tripod. *See* tripod. *Long.*

drill water. *See* drill fluid. *Long.*

Drinker method. *See* Schafer-Nielsen-Drinker method. *McAdam, p. 89.*

drink time. Eng. Mealtime. *Fay.*

drip. a. A name given to an apparatus attached to natural-gas wells to exclude from the mains any liquid, such as oil or water, that may accompany the gas. It usually consists of four iron tubes placed vertically, the inner two being connected by a cross tube. During the passage of the gas through this apparatus, the liquid becomes separated and accumulates in a tube called a tail piece, from which it is blown out from time to time. Any opening arranged to take a liquid from a line carrying gas, as condensation from a steam line. *Fay.* b. The slope or inclination of a stratum. *Standard, 1964* c. A projecting piece of material so shaped as to throw off water and prevent its running down the face of the wall or other surface of which it is a part. *ACSG.*

drip blower. In petroleum production, one who opens valves at well and at low points along natural gas lines to draw off the natural gasoline into drums, a tank truck, or a waste recovery system. *D.O.T. 1.*

drip feeder. a. Oil reservoir set to discharge lubricant at steady rate in drops per minute. *Pryor, 3.* b. Reagent feeder sometimes used in flotation process to meter chemicals into pulp. *Pryor, 3.*

dripping fault. A fault down which small quantities of water seep into the mine workings. A dripping fault is a hazard as mining operations may loosen or open the fault fracture and cause an inrush of water. *Nelson.*

drip-point grid tile. Patented acid-resisting tower packing which has maximum effective contact surface. *Bureau of Mines Staff.*

dripstone. a. A drip, as along an eaves, made of stone. *Webster 3d.* b. Calcium carbonate in the form of stalactites and stalagmites. *Webster 3d.*

drip valve. *See* feed-control valve. *Long.*

drivage. A general term for a roadway, heading, or tunnel in course of construction. It may be horizontal or inclined but not vertical. *Nelson.*

drive. a. To excavate horizontally, or at an inclination, as in a drift, adit, or entry. Distinguished from sinking and raising. *Fay.* b. Aust. A level, drift, or tunnel in a mine. *Fay.* c. A tunnel or level in or parallel to and near a mineralized lode or vein as distinct from a crosscut, which only gives access normal to the lode. *Pryor, 3.* d. An underground passage for exploration, development, or working of an ore body. It may be taken along the lode or parallel to it. Drives are made at appropriate levels below the surface. In a working mine, the ore from stopes above the level descends to the drive below, along which it is transported towards the shaft or main entry. *Nelson.* e. The means by which mechanical power is transmitted to an appliance such as a conveyor. *Nelson.* f. To advance or sink drive pipe or casing through overburden or broken rock formation by chopping, washing, or hammering with a drive hammer or by a combination of all three procedures. *Long.* g. To excavate a horizontal underground passage or tunnel. *Long.* h. Any power-transmission system, such as belt drive, gear drive, chain drive, electric drive, etc. *Long.* i. To dig or make a tunnel. *Nichols.* j. To hammer down piling. *Nichols.* k. *See* driving. *C.T.D.*

drive block. *See* drive hammer. *Long.*

drive-block extension. *See* drive-hammer extension. *Long.*

drive cap; driving cap. *See* drive head, b. *Long.*

drive casing. Heavy, thick-walled casing, which is stronger than standard casing, and hence may be driven through overburden or material with less danger of being damaged than standard casing. *Long.*

drive chain. The chain used to convey power and motion between the speed reducer of the power unit and the head shaft on a chain conveyor. *Jones.*

drive chuck. Mechanism at lower end of a diamond-drill drive rod on the swivel head by means of which the movements of the drive rod can be imparted to the drill string. Also called chuck. *Long.*

drive clamp. A collar fitted on a churn drill string to enable it to be used as a hammer to drive casing pipe. *Nichols.*

drive collar. a. Extra thick walled pipe or casing coupling against which the blow of a drive block is delivered when driving or sinking drivepipe or casing. *Long.* b. An oversize rod or casing coupling on which the blows of a drive block are delivered when casing is being driven or an attempt is being made to jar loose stuck casing or a drill-rod string. *Long.* c. Incorrectly used as a synonym for drive shoe; drive hammer. *Long.*

drive fit. A type of force fit. *ASM Gloss.*

drive gear; drive gears. a. The gear at the end of a diamond-drill motor drive shaft, which engages and rotates the diamond-drill swivel-head bevel gear; the latter in turn rotates the swivel-head drive rod. *Long.* b. Equipment used primarily in driving pipe or casing. *Long.*

drive hammer. A heavy sleeve-shaped weight used as a hammer or piledriver for driving pipe or casing into overburden or other soft rock materials. Also called anvil; anvil block; drive block. *Long. See also* casing drive hammer.

drive-hammer extension. An annular-shaped piece of heavy steel, which is made to be attached to the bottom end of a drive block when a heavier-than-normal drive block is needed. Also called drive-block extension. *Long.*

drivehead. a. The driving mechanism for a conveyor. The expressions head-end drive, intermediate drive, and tail-end drive, indicate the position of the drivehead or heads. *Nelson.* b. A heavy iron cap or angular coupling fitted to top of pipe or casing to receive and protect the casing from the blow delivered by a drive block when casing or pipe is driven through overburden or other material. Also called drive cap; driving cap. *Long.* c. The swivel head of a diamond- or rotary-drill machine. *Long.*

drivehead yoke. A heavy steel ring fitted around a jar rod and resting on a drivehead attached to rods connected to a drive sampler used in soil-sampling operations. The ring is equipped with two links to which the pulldown lines can be attached and by means of which the sampler is forced slowly and steadily downward into the material being sampled. *Long.*

drive jack. *See* jack.

driven cast-in-place pile. Reinforced concrete pile cast by driving into the ground a steel casing which is then filled with concrete. The concrete is consolidated into place by a hammer, and the casing is generally withdrawn immediately after placing the concrete. *Ham.*

driven pile. A timber, reinforced concrete, or steel pile driven to a specified set, by a drophammer, a steam hammer, or a diesel hammer. *Ham.*

driven well. A well which is sunk by driving a casing, at the end of which there is a drive point, without the aid of any drilling, boring, or jetting device. *Fay.*

drivepipe. a. A thick-walled outside-coupled pipe, fitted at its lower end with a sharp steel shoe. It may be driven through overburden or other material by repeated piledriverlike blows delivered to the upper end of the pipe by a heavy drive block. *Long.* b. Casing pipe driven into deep drill hole to hold back water or prevent caving. In shallow drilling of alluvials, bottom pipe of string which may be battered down. Drivehead and drive shoe are also used in this work. *Pryor, 3.* c. Pipe driven short distance into dumps or unconsolidated ground to obtain samples. *Pryor, 3.*

drivepipe ring. a. A heavy sleevelike device attached to a drill floor to steady and guide the pipe or casing being driven. *Long.* b. A device for holding the drivepipe while being pulled from well. *Fay.*

drivepipe shoe. A drive shoe threaded to fit on the bottom end of a drivepipe. Also called drive shoe; pipe drive shoe; pipe shoe. *Long.*

drive pulley. Applied to the pulley or drum driven through gearing by some source of power and which, through contract friction, drives a conveyor belt. Drive pulleys are frequently placed in tandem to provide a greater surface contact with the belting. The term driving rolls is also used for such pulleys. *Jones.*

drive quill. a. The sleeve fitting around and imparting rotational movement to the drive rod in the swivel head of a diamond-drill machine. *Long.* b. A term sometimes incorrectly used as a synonym for drive rod. *Long.*

driver. a. A person who drives a horse or mule in a mine. *Fay.* b. One who controls the movements of a locomotive motor car, or the like. *Webster 2d.* c. Eng. A bit of iron for forcing the wood into a blasting hole. A tamping iron. *Fay.* d. Eng. A bit man who breaks down the coal in the stalls with hammers and wedges, after the holing is finished. A miner. *Fay.*

driver boss. A person in charge of the drivers in a mine. *See* driver, a. *Fay.*

drive rod. a. Threaded hollow shaft in the swivel head of a diamond-drill machine through which the energy supplied by the drill motor is imparted to the drill string. Also called drive spindle; spindle; spindle rod. *Long.* b. Synonym for jar rod. *Long.*

drive-rod bushing. A metal sleeve used to fill the annular space between a drill rod and the inside of the upper end of a drive rod or feed screw on the swivel head of a diamond-drill machine. The sleeve steadies the drill rod and reduces its tendency to wabble or vibrate inside the drive rod. *Long.*

drive sample. A dry sample of soft rock material, such as clay, soil, sand, etc., obtained by forcing, without rotation, a short, tubular device into the formation being sampled by hydraulic pressure or the piledriver action of a drive hammer. *Long.*

drive sampler. A short tubelike device designed to be forced, without rotation, into soft rock or rock material, such as clay, sand, or gravel, by hydraulic pressure or the piledriver action of a drive hammer to procure samples of material in as nearly an undisturbed state as possible. *Long.*

drive sampling. The act or process of obtaining dry samples of soft rock material by forcing, without rotation, a tubular device into the material being sampled by pressure generated hydraulically, mechanically, or by the piledriver action of a drive hammer. *Long.*

drivescrew. The threaded drive rod in a gear-feed swivel head on a diamond drill. *Long.*

drive section. That section of a belt conveyor which transmits power to the belt. It consists of a framework, the driving pulleys or rolls, and the gearing necessary for driving the pulleys. *Jones.*

drive shaft. a. Main driving shaft on which the drive and conveyor sprocket wheels or pulleys are mounted. This shaft is connected to the drive unit through a coupling, sprocket wheel, gear, or other form of mechanical power transmission. *ASA*

MH4. 1–1958 b. A shaft used to support the end of a conveyor screw in a trough end and as a driving connection between a conveyor screw and the power transmitting medium. *ASA MH4.1-1958.*

drive shoe. a. A sharp-edged, heavy wall sleeve or coupling of rolled, cast, or forced steel, not set with diamonds, attached to bottom end of drivepipe or casing to act as a cutting edge and protector for pipe or casing being driven into overburden or other rock material. *Long.* b. Sometimes incorrectly used as a synonym for casing shoe bit and/or pipe-shoe bit. Also called casing shoe, pipe shoe. *Long. See also* casing drive shoe; drivepipe shoe.

drive sleeve; driving sleeve. Synonym for drive hammer. *Long.*

drive spindle. Synonym for drive rod. *See also* drive rod, a. *Long.*

drive tube. Synonym for drive rod; drive sampler. *Long.*

drive unit. The mechanism which imparts the reciprocating motion to a shaker conveyor trough line. The term is frequently shortened to drive, such as shaker drive, uphill drive, etc. *Jones.*

drive wedge. A metal wedge, driven into a wooden or soft-metal base plug in a borehole, that acts as a fixed point on which and by means of which a deflection wedge may be set and oriented. *Long.*

driving. a. Extending excavations horizontally or near the horizontal plane. *Compare* sinking; raising. *Nelson.* b. The making of a tunnel or level (a drive) in a mineralized lode or vein, as distinct from making one in country rock (crosscutting). *C.T.D.* c. Breaking down coal with wedges and hammers. *C.T.D.* d. A long narrow underground excavation or heading. *Fay.* e. Eng. In the Bristol coalfield, a heading driven through rock. *Fay.*

driving band. The steel band fixed around the head of a timber pile to prevent brooming. *Ham.*

driving cap. Steel cap placed above line of casing pipes of drill hole to protect threaded top of pipe while driving them deeper. Driving shoe gives protection to the bottom pipe of line. *Pryor, 3.*

driving head. The driving mechanism of a belt conveyor. It consists of an electric motor or compressed-air turbine connected through a train of reduction gearing to the drum or drums. Motion is imparted to the belt by the frictional grip between it and the drums. The whole is contained in strong covers. *Sinclair, V, p. 286.*

driving helmet. *See* driving cap. *Ham.*

driving on line. The keeping of a heading or breast accurately on a given course by means of a compass or transit. In Arkansas, called driving on sights. *Fay.*

drongs. *See* klippen. *Hess.*

drop. a. Large, funnel-shaped masses of rock hanging from the roof down into a coal seam. They usually occur in numbers, and are often arranged in rows in some general direction. They often have a flange on two sides suggesting they are casts of hollows connected by a large crack. Slight bedding parallel to the sides and horizontal in the center gives the appearance of their having originated from quicksand running in, as in the case of infilled sandblows in many earthquake areas. *Raistrick & Marshall, 1939, p. 94.* b. To lower the cage to receive or discharge the car when a cage of more than one deck is used. *Fay.* c. *No. of Eng.* A chute down which coal is run into keels or boats. *Fay.* d. To allow the upper lift of a seam of coal to fall or drop down. *Fay.* e. *Eng.* The quantity of coal brought down at one cutting. *Fay.* f. *Scot.* The apparatus by which mineral is let down a blind shaft to a lower level. *Fay.* g. Scot. To work the upper portion of a thick seam after the lower portion has been worked. *Fay.* h. *Scot.* To stop work. *Fay.* i. The vertical displacement in a downthrow fault; the amount by which the seam is lower on the other side of the fault. *C.T.D.* j. In an air lift, the distance the water level sinks below the static head during pumping. *Lewis, p. 687.* k. The small downward descent of the upper section of a drill rod, casing, or pipe into a lowerlike section when the threads of the box- and pin-threaded parts match, so that upper and lower sections may be screwed together without cross-threading. *Long.* l. The sudden descent of a bit that occurs when a bit encounters a cavity or cuts through a hard rock and enters a very soft rock, for example, a driller may say the bit hit a cavity and dropped 6 inches. *Long.* m. To lose equipment in a borehole. *Long.* n. To lower drill-string equipment into a borehole. *Long.* o. A defect in a casting due to a portion of the sand dropping from the cope or other overhanging section of the mold. *ASM Gloss.*

drop arch. An auxiliary brick arch projecting below the general inner surface of the arched roof of a furnace, brick conduit or like structure. *Dodd.*

drop ball. A method of breaking oversize stones left after quarry blasting. The balls weigh from 30 hundredweight to 2 tons (many use old cones from gyratory breakers) and are dropped from a crane on to the oversize stone. The drop height varies from about 20 to 33 feet. The method is economical and avoids secondary blasting. *Nelson.*

drop-bottom bucket. A bottom-opening container used for placing concrete. *Ham.*

drop-bottom cage. A cage so designed that the middle section of the floor drops a few inches when the cage is lifted from the keps. The mine car is thus kept stationary and secure. *Nelson.*

drop-bottom car. A mine car so constructed that all the haulage motor has to do is to pull the loaded trip across the dump. A trigger trips the flaps in the bottom of the car, allowing the coal to drop out, and a second one closes the flaps as the car leaves the dump. *Kentucky, p. 212. See also* mine cars.

drop boxes. Boxes placed at intervals along tailings line to compensate for slope in excess of that required to keep the pulp moving gently through its launders or pipes. *Pryor, 3.*

drop chalk. *See* prepared calcium carbonate.

drop clack. A valve made to drop into the lower end of a working barrel of a lifting pump when, from any cause, the lower valve ceases to act and the door piece is underwater. *Standard, 1964.*

drop cut. The initial cut made in the floor of an open pit or quarry for the purpose of developing a bench at a level below the floor. *Bureau of Mines Staff.*

drop doors. Hinged doors closing the bottom of the cupola furnace which drop down to allow the furnace to be cleaned. *Mersereau, 4th, p. 479.*

drop elbow. A small sized ell that is frequently used where gas is put into a building. These fittings have wings cast on each side. The wings have small countersunk holes so that they may be fastened by wood screws to a ceiling or wall for framing timbers. *Strock, 3.*

drop-forge. To forge between dies by a drophammer or punch press. *Webster 3d.*

drop forging. A forging made with a drophammer. *ASM Gloss.*

drophammer. a. A forging hammer that depends on gravity for its force. *ASM Gloss.* b. A pile driving hammer that is lifted by a cable and that obtains striking power by falling freely. *Nichols.* c. Synonym for drive hammer. *Long.*

drop log. A timber which in an emergency can be dropped by a remote control across a mine track at the top or bottom of an incline to derail cars. *Bureau of Mines Staff.*

drop of a hanging wall. *See* closure. *Spalding, p. 159.*

drop of water. A rounded (waterworn), colorless, and transparent pebble of topaz. *Schaller.*

drop on. Portable rail crossing used to transfer wagons from one track to another. *Ham.*

drop out. *See* roll out. *Long.*

dropped core. Pieces of core not picked up or those pieces that slip out of the core barrel as the barrel is withdrawn from the borehole. *Long.*

drop machine brick. Brick formed by dropping a clot or slug of a prepared mix considerable distance (approximately 15 feet) into a mold after which the extra material is slicked off the top. *AISI, No. 24*

drop machine silica brick. Silica brick formed by automatically dropping a quantity of a prepared mix a considerable vertical distance into a mold. *A.R.I.*

drop mold brick. *See* drop machine brick. *AISI, No. 24.*

drop molding. The process of forming brick by dropping a clot or slug of a prepared mix a considerable distance (approximately 15 feet) into a mold after which the extra material is slicked off the top. *AISI, No. 24.*

drop penetration test. *See* dynamic penetration test. *Ham.*

dropper. a. A spar dropping into the lode. *Zern.* b. A feeder. *Zern.* c. A branch leaving a vein on the footwall side. *Zern.* d. Water dropping from the roof. *Zern.* e. The small deposit or stalactite left by the water that has dropped or is still dropping from the roof. *Zern.* f. A branch vein pointing downwards. *See also* leader. *Nelson.* g. *See* car runner; car dropper. *D.O.T. 1.*

dropping. Molding by heating in a mold without the use of pressure. *ASTM C162-66.*

dropping bottle. Laboratory reagent bottle so constructed as to deliver contents one drop at a time. Funnels and pipettes can be similarly equipped. *Pryor, 3.*

dropping pillars and top coal. Aust. The second working, consisting of drawing the pillars, and in thick seams breaking down the upper portion of the seam that was left temporarily in position. *Fay.*

dropping point. A test made on greases which will show their heat resisting properties. Also called melting point. *Shell Oil Co.*

droppings. Drops of water falling from the roof into a gangway or breast. *Korson.*

dropping stones. Eng. Stalagmites. *Arkell.*

drop pit. A shaft in a mine, in which coal is lowered by a brake wheel. *Fay.*

drops. Drops of 12 inches or more in a line of sluices which are formed by allowing the discharge end of one box to rest on the head of the succeeding sluice, instead of telescoping into it. This method insures a drop of 12 inches or more (depending on the depth of the sluice box) at the end of each sluice, which usually is sufficient to disintegrate fairly stiff clay. *Griffith, S. V., p. 61.*

drop shaft. A monkey shaft down which earth and other matter are lowered by means of a drop (that is, a kind of pulley with brake attached); the empty bucket is brought up as the full one is lowered. *Zern.*

drop-shaft method. This sinking system consists in the use of a cutting shoe on the bottom of a shaft lining which is being continually augmented as the shoe descends, the material inside the lining being excavated. *Sinclair, II, p. 299.*

drop sheet. N. of Eng. A door made of canvas, by which the ventilating current is regulated and directed through the workings. *See also* curtain. *Fay.*

drop shot. Shot made by dropping or pouring melted lead as opposed to such as are cast, as buckshot and bullets. *Fay.*

drop stamping. *See* drop forging. *C.T.D.*

drop staple. Eng. An interior shaft, connecting an upper and lower seam, through which coal is raised or lowered. *Fay.*

dropstone. A stalactitic variety of calcite. *Fay.*

drop sulfur. Granulated sulfur obtained by pouring melted sulfur into water. *Standard, 1964.*

drop tee. One having the same peculiar wings as the drop elbow. *Strock, 3.*

drop throat. *See* submarine throat. *ASTM C162-66.*

drop tin. Granulated tin obtained by pouring melted tin into wtaer. *Standard, 1964.*

drop warwicks. Steel joists hinged to a substantial cross joist in the roof which are held up by a stirrup during normal running. If a tram runs away down the incline, the stirrup is disengaged by means of a wire operated from the top of the incline; one end of the hinged joist falls into the rail track and arrests the runaway. *Mason, v. 2, p. 530.*

drop ways. Openings connecting parallel passages that lie at different levels. *A.G.I.*

drop weight. Synonym for drive hammer. *Long.*

drop weights. A method of breaking oversize stones after primary blasting at a quarry. *See also* drop ball. *Nelson.*

drop zinc. Zinc in globular form. *Standard, 1964.*

dross. a. Small coal which is inferior or worthless, and often mixed with dirt. *Nelson.* b. Refuse or impurity formed in melted metal. A zinc-and-iron alloy forming in a bath of molten zinc, in galvanizing iron. *Standard, 1964.* c. The scum that forms on the surface of molten metals largely because of oxidation but sometimes because of the rising of impurities to the surface. *ASM Gloss.*

dross bing. Pile of refuse from a washer. *Zern.*

dross coal. Scot. In cannel coal districts, common or free coal. *See also* free coal, d. *Fay.*

drossy coal. Derb. Coal containing pyrite. *Fay.*

drown. a. The failure of a cement slurry to set properly in a borehole because of its being admixed with too much water. *Long.* b. To flood or mix with an excessive amount of water. *Long.*

drowned; drowned out. Flooded; said of mines underwater. *Fay.*

drowned coast. *See* shoreline of submergence. *Schieferdecker.*

drowned level. a. A level that is underwater. *Hess. See also* blind level, c. *Fay.* b. Part of a drainage drift which, being below both discharge and entry levels, is constantly full of water. Also called inverted siphon. *B.S. 3618, 1963, sec. 4.*

drowned valleys. Valleys of a dissected land surface, the lower parts of which have been inundated by the sea as a result of submergence of the land margin. *A.G.I.*

drowned waste. Old workings full of water. *Fay.*

drub. a. Eng. Slate, Somerset coalfield. *Arkell.* b. Eng. Shale, slate, dross, or rubbish, Yorkshire coalfield. *Arkell.*

drub coal. York. Miner's term for coaly shale or impure coal. *Tomkeieff, 1954.*

drug. a. Carbonaceous shale. *Time.* b. York. Miner's term for coaly shale. *Tomkeieff, 1954.*

druggon. S. Staff. A square iron or wooden box, used for conveying fresh water for horses, etc., in a mine. *Fay.*

druidical stone. Synonym for graywether. *A.G.I.*

druid stones. Eng. Sarsen stones, so called because used in Stonehenge and other supposed Druid temples and circles. *Arkell.*

drum. a. The large cylinder or cone on which the rope is coiled when hoisting a load up a shaft. *C.T.D.* b. A cylindrical or polygonal rim type of wheel around which cable, chain, belt, or other linkage may be wrapped. A drum may be driven or driving. The face may be smooth, grooved, fluted, or flanged. *ASA MH4.1-1958.* c. Eng. In the Lancashire coalfield, a brick, iron, or wooden cylinder, used when sinking a shaft through sand. *Fay.* d. *See* running the drum. *Fay.* e. A metal cask for shipment of oil, gasoline, etc. *Fay.* f. The spoollike part of a hoisting mechanism on which the cable or wire line is wound. *Long.* g. A container having a liquid capacity of 55 gallons. *See also* barrel, d. *Long.* h. In a conical mill, the cylindrical central section. *Pryor, 3.* i. Winding drum used to hoist cages and skips through mine shaft. *Pryor, 3.* j. A general term for a roller around which a belt conveyor is lapped. It may be a driving-, jib-, loop-, tension-, or a holding-down drum. *Nelson.* k. *See* haulage drum; winding drum. *Nelson.* l. Term sometimes applied to the mouth of a port in a glass-tank furnace. *Dodd.* m. A wooden former of the type that was used in making the side of a sagger by hand. *Dodd.*

drum curb. *See* curb, c. *Hess.*

drum counterweight rope. Balance rope direct from drum drive. *Ham.*

drum feeder. *See* roll feeder. *ASA MH4.1-1958.*

drum filter. Cylindrical drum, which rotates slowly through trough-shaped bath fed continuously with thickened ore pulp. Segments of drum are successively connected to vacuum tank, low-pressure compressed air, etc., to aid formation and discharge of filter cake and removal of filtrate. *Pryor, 3.*

drum gate. Spillway gate, in the shape of a sector of a circle, which is opened or closed by means of valves arranged to admit or release water. *Ham.*

drum head. N. of Eng. A short heading formed to the rise of a level, or bank head, in which the drum of a self-acting inclined plane is fixed. *Fay.*

drum-head process. A process used in Europe for the shaping of flatware; it was developed on account of the shortness of the feldspathic porcelain body. A slice of the pugged body is placed on a detachable drum-head which fits on the batting-out machine. The drum-head, with the shaped disk lying on it, is then removed and inverted over the jigger-head, the bat then being allowed to fall on the mold for its final jiggering. *Dodd.*

drum horns. Wrought-iron arms or spokes projecting beyond the surface or periphery of flat-rope drums, between which the ropes coil or lap. *Fay.*

drumlin. Oval-shaped hill composed of glacial drift, with its long axis parallel to the direction of movement of a former ice sheet. *Mather.*

drumman. *See* slope engineer. *D.O.T. 1.*

drumming. The process of sounding the roof of a mine to discover whether rock is loose. *Fay.*

drummy. a. Loose coal or rock that produces a hollow, loose, open, weak, or dangerous sound when tapped with any hard substance to test condition of strata; said especially of a mine roof. *Fay; B.C.I.* b. The sound elicited when bad (loose) roof is tested by striking with a bar. *Hudson.*

drum or drop shaft. *See* caisson sinking. *Nelson.*

drum pulley. A pulley wheel used in place of a drum. *See also* Koepe system. *Fay.*

drum rings. Cast-iron wheels, with projections, to which are bolted the staves or laggings forming the surface for the hoisting cable to wind upon. The outside rings are flanged, to prevent the cable from slipping off the drum. *Fay.*

drum runner. *See* incline man. *D.O.T. 1.*

drum screen. A screen in the shape of a cylinder or truncated cone, turning on its own axis, used in sewage treatment. *Ham.*

drum separator. A slowly rotating cylindrical vessel which separates run-of-mine coal into clean coal, middlings, and refuse. It consists of different and adjustable specific gravities. The low gravity medium in one compartment separates a primary float product (clean coal), the sink material being lifted and sluiced into the second compartment where middlings and true sinks (stone) are separated. *Nelson.*

drum shaft; drop shaft. *See* caisson sinking. *Nelson.*

drum sheave. Aust. a. A cylindrical drum placed vertically on the inside of a curve, against which the main rope of a main-and-tail-rope system moves when rounding the curve. *Fay.* b. A vertical idler. *Hess.*

druse. a. A cavity lined with crystals, particularly if a rather small cavity; it may be in a vein or rock, such as a small solution cavity, a steam hole in lava, or a lithophysa in volcanic glass; in mining, it is known as a vug, especially the larger ones; it is not a geode, which is a hollow nodular concretion that can be separated from the enclosing rock. *Hess.* b. The crust of crystals lining a small cavity in a rock. *Hess.*

drusy. a. Cavities in mineralized veins or lodes. *Nelson.* b. Covered with minute crystals. *Fay.*

drusy cavities. Geodes. *C.M.D.*

drusy mosaic. A crystalline mosaic produced by the deposition of minerals from solution in cavities other than the pores between sedimentary particles. *A.G.I. Supp.*

drusy structure. *See* miarolitic structure. *C.M.D.*

dry. a. Miner's changehouse, usually equipped with baths, lockup cubicles, and means of drying wet clothing. *Pryor, 3.* b. Scot. A joint in the roof of a coal seam, which cannot usually be discovered until the roof falls. *Fay.* c. A borehole in which no water is encountered or a borehole drilled without the use of water or other liquid as a circulation medium. Also called dry hole; duster. *Long.* d. A borehole that did not encounter mineral-, oil-, or gas-producing formation. Also called blank hole; dry hole; duster. *Long.* e. A drying house. *Webster 2d.* f. Desiccated, in vacuum or with use of gentle heat to remove moisture without changing structure of material treated. Absolute drying is not possible owing to tenacity of capillary sorption. *Pryor, 3.* g. A metal containing too large a proportion of oxygen; not sufficiently poled; said of copper in process of refining. *Standard, 1964.*

dry air. Air with no water vapor. *Strock, 10.*

dry amalgamation. Treating ores with hot dry mercury. *Fay.*

dry ash-free basis. An analysis expressed on the basis of a coal sample from which the total moisture and the ash have in theory been removed. *B.S. 3323, 1960.*

dry assay. The determination of the quantity of a desired constituent in ores, metallurgical residues, and alloys, by methods which do not involve liquid means of separation. *See also* assay; wet assay. *Nelson.*

dry block; dry blocking. The intentional act or process of running a core bit without circulating a drill fluid until the cuttings at and inside the bit wedge the core solidly inside the bit. *Long.*

dry blower. *See* dry washer. *Hess.*

dry blowing. A process sometimes used where water is scarce. The separation of free gold from the accompanying finely divided material is effected by the use of air currents. *See also* dry cleaning. *Nelson.*

dry body. An unglazed stoneware type of body. The term has been applied, for example, to cane ware, jasper ware, and basalt ware. *Dodd.*

dry-bone ore. A miner's term for an earthy, friable carbonate of zinc, smithsonite. Often frequently applied to the hydrated silicate, so-called calamine. Usually found associated in veins or beds in stratified calcareous rocks accompanying sulfides of zinc, iron, and lead. *Fay.*

dry boss. *See* changehouse man. *D.O.T. 1.*

dry-bulb temperature. Temperature of air as indicated by a standard thermometer, as contrasted with wet-bulb temperature dependent upon atmospheric humidity. *Bennett 2d, 1962.*

dry-bulb thermometer. A thermometer with an uncovered bulb, used with a wet-bulb thermometer to determine atmospheric humidity. The two thermometers constitute the essential parts of a psychrometer. *H&G.*

dry casting. A method of casting in which the molds are made of sand and afterwards dried. *Fay.*

dry cell. A primary cell which does away with the liquid electrolyte so that it may be used in any position. *Crispin.*

drycleaned coal. Coal from which impurities have been removed mechanically without the use of liquid media. *B.S. 3323, 1960.*

dry cleaning. The cleaning of coal or ore by air currents as opposed to wet cleaning by water currents. Appliances for the dry cleaning of coal were first introduced about 1850 and since that date a variety of methods have been developed. *See also* Kirkup table. *Nelson.*

drycleaning table. An apparatus in which drycleaning is achieved by the application of air currents and agitation to a layer of feed of controlled depth on the table surface. *B.S. 3552, 1962. See also* Kirkup table.

dry coal. Coal containing but little hydrogen. *Fay.*

dry copper. Underpoled copper from which oxygen has been insufficiently removed when refining, so that it is undesirably brittle when worked cold or hot. *Pryor, 3.*

dry coke. A laboratory term applied to coke which has been dried to constant weight in accordance with definite prescribed methods. In the case of lump coke, the temperature shall be not less than 104° C, nor more than 200° C; in the case of coke passing a 250-micron (No. 60) sieve, the temperature shall be not less than 104° C, nor more than 110° C for a period of 1 hour. *ASTM D121-62.*

dry criticality. Reactor criticality achieved without a coolant. *L&L.*

dry cyaniding. Same as carbonitriding. *ASM Gloss.*

dry density. The weight of a unit volume of a dry sample of soil, after the latter has been heated at a temperature of 105° C. *Ham.*

dry density/moisture ratio. The relationship between the density of a sample of soil in a dry state and its moisture content for a given degree of compaction. Such relationship can be determined from a curve which will reveal the optimum moisture content. *Ham.*

dry diggings. a. Placers not subject to overflow. *Fay.* b. Placer mines or other mining districts where water is not available. *Standard, 1964.*

dry disk. A machine for finishing the faces of abrasive wheels. *ACSG, 1963.*

dry distillation. *See* destructive distillation. *Fay.*

dry dock. A dock into which a ship is waterborne. After the dock gates have been closed, the water is pumped out of the dock, allowing the ship to rest on keel blocks in readiness for maintenance and repairs to hull and superstructure. *See also* graving dock. *Ham.*

dry drilling. Drilling operations in which the cuttings are lifted away from the bit and transported out of a borehole by a strong current of air or gas instead of a fluid. *Long.*

dry ductor. Compressed-air drill which traps and removes drilling dust instead of sludging it with added water. *Pryor, 3.*

dry edging. Rough edges and corners of glazed ceramic ware due to insufficient glaze coating. *ASTM C242-60T.*

dryer. a. An apparatus for drying ores, or finished products. Dryers are of various types, such as revolving, cylindrical, zigzag, tower, and cast-iron plates. *Fay.* b. A heated place, such as a cabinet, chamber, tunnel, or shaft, in which ceramic raw materials or ware are heated to remove water or moisture; the many types vary in size, shape, and source of heat. *ACSG, 1963.*

dryer scum. *See* scum. *Dodd.*

dryer white. A white scum which forms on brick during drying. *Fay. See also* efflorescence.

dry fatigue. A condition often appearing in wire rope and often caused by shock loads in winding. These shock loads are produced by picking up the cage from the pit bottom with slack chains or by lifting heavy pithead gates or covers. *Sinclair, V, pp. 12-13.*

dry fineness. The fineness of a sample of foundry sand from which the clay has not been removed and which has been dried at 105° to 110° C. *Osborne.*

dry-foot. Ware with no glaze on the foot. *ACSG, 1963.*

dry friction damping. *See* coulomb damping. *H&G.*

dry gage. *See* drag ladle. *ASTM C162-66.*

dry galvanizing. A process in which steel is fluxed in hot ammonium chloride and subsequently dried by hot air before being passed through a bath of molten zinc. *Ham.*

dry gas. A natural gas consisting principally of methane (CH_4) and ethane (C_2H_6), and devoid of the heavier hydrocarbons. Usually produced from a formation that does not contain petroleum or condensate. Also applied to gas that has been produced and from which liquid components have been removed. *A.G.I.*

dry grinding. Any process of particle size reduction carried on without the liquid medium. Enamel frits for the dry process industry are ground dry, whereas water millings, containing clay and other mill additions, are used in the wet process. *Enam. Dict.*

dry hole. a. A drill hole in which no water is used for drilling, as a hole driven upward. *Standard, 1964.* b. A well in which no oil or gas is found. *Fay.* c. Blasting hole driven without use of dust-allaying water. *Pryor, 3.*

dry-hole contribution. a. Payment, by someone not financially interested in an oil lease, to aid in the drilling of a test well, that is due whenever a specified depth is reached without the discovery of oil in paying quantity. Benefit is derived from the geologic information so obtained. *A.G.I. Supp.* b. Cash contribution usually on a footage basis in support of a test well payable if venture is a dry hole. *Wheeler.*

dry hone. An artificial razor hone in which the sharpening crystals or grains are so blended with the bond that good results can be obtained without the use of lubricants. *Fay.*

dryhouse. *See* changehouse, b. *Long.*

dryhouse man. *See* changehouse man. *D.O.T. 1.*

dry ice; drikold. Solid carbon dioxide. *Pryor, 3.*

dry ice test. A test for the detection of glass imitations. If a crystalline substance such as a gem mineral be placed in contact upon a piece of dry ice (solidified carbon dioxide, CO_2), a squeaking noise can be heard. This is not true of noncrystalline substances, such as glass and plastic. *Shipley.*

drying. a. The removal of water from ores, concentrates, or fluxes and in some cases from air by heat. Drying of solid material is commonly accomplished by bringing the hot solids in direct contact with hot air or gases and evaporating the water. *E.C.T., v. 8, p. 936.* b. Removal by evaporation, of uncombined water or other volatile substance from a ceramic raw material or product, usually expedited by low-temperature heating. *ASTM C242-60T.* c. The removal of water from a solid by thermal means in the presence of air. *Francis, 1965, v. 2, p. 780.*

drying crack. A defect characterized by a fissure in the (porcelain enamel) bisque. *ACSG, 1963.*

drying-machine operator. One who dries newly formed ware or decorated ware in drying machine. Also called drier man; pot drier. *D.O.T. 1.*

drying off. The process by which an amalgam of gold is evaporated, as in gilding. *Fay.*

drying oven; porcelain oven. An oven for firing porcelain. *Standard, 1964.*

drying-room man. *See* drying-tunnel man. *D.O.T. 1.*

drying shrinkage. a. The shrinkage of concrete caused by evaporation. More precisely, it is the difference between the length of a specimen cut from concrete, which has been matured and subsequently saturated, and its length when dried to constant length, the result being expressed as a percentage of the dry length. *Taylor.* b. Ceramic ware (and particularly clayware) that is shaped from a moist batch shrinks during drying; the drying shrinkage is usually expressed as a linear percentage, for example, the drying shrinkage of china clay is usually 6 to 10 percent, that of a plastic ball clay is 9 to 12 percent. To produce ware (for example, electroceramics or refractory bricks) of high dimensional accuracy, the drying and firing shrinkages must be low; this is achieved by reducing the proportion of raw clay and increasing the proportion of nonplastic material in the batch, which is then shaped by dry-pressing, for example. *Dodd.*

drying-tunnel man. One who tends a number of drying tunnels in which moist brick and tile products are dried several hours or as much as 2 or 3 days prior to their being baked. Also called drying-room man; dry-kiln operator. *D.O.T. 1.*

dry janitor. *See* changehouse man. *D.O.T.1.*

dry joint. Positive separation at the plane of contact between adjacent structural components to allow relative movement arising from differences in temperature or shrinkage. *Ham.* b. One made without gasket, packing, or smear of any kind, as a ground joint. *Strock, 3.*

dry kata cooling power. A measure of the rate of heat loss from the bulb of the kata thermometer. Although the cooling power as obtained by this instrument is not a measure of the capacity of an atmosphere to cool the human body, nevertheless, it is useful for comparing different atmospheres and provides a convenient index of the comfort condition of a working place in a mine. Experience indicates that a face will be reasonably comfortable for working if the dry kata cooling power is above 7 and the air velocity above 200 feet per minute. *See also* effective temperature. *Nelson.*

dry kiln. A kiln used to dry greenware at lowest possible heat. *ACSG, 1963.*

dry-kiln burner. *See* kiln burner. *D.O.T.1.*

dry-kiln operator. *See* drying-tunnel man. *D.O.T. 1.*

dryman. A man in charge of the building in which workmen change their clothes. *Fay. See also* changehouse man. *D.O.T. 1.*

dry method. a. The method of mixing the raw materials of Portland cement in a dry state. *Fay.* b. In chemical analysis, the treatment of the compound with dry reagents, as blowpiping in qualitative analysis and assaying in quantitative analysis. *Standard, 1964.* c. In magnetic-particle inspection, a method in which a dry powder is used to detect magnetic leakage fields. *ASM Gloss.*

dry-milled fire clay. Fire clay ground in a dry pan and passed over a screen. *Bureau of Mines Staff.*

dry-mill man. *See* dry-pan operator. *D.O.T.1.*

dry mineral matter free basis. An analysis expressed on the basis of a coal sample from which the total moisture and the mineral matter have in theory been removed. *B.S. 3323, 1960.*

dry mining. In dry mining every effort is made to prevent the ventilating air picking up moisture, and throughout the ventilation circuit there is a wide gap between wet- and dry-bulb temperatures. Dry-bulb temperatures are therefore comparatively high. *Spalding.*

dry mix. a. A mix containing little water in relation to its other components. *Taylor.* b. *See* dry process. *ASTM C242-60T.*

dry ores. A name given at lead and copper smelters to ores which contain precious metals (gold and silver) but insufficient lead or copper to be smelted without the addition of richer lead or copper ores. *Newton, Joseph. Introduction to Metallurgy, 1938. pp. 205-207. See also* natural ore.

dry pack. Concrete or mortar which is just damp, often described as semidry, used as filling or grout for joining two structural members and consolidated by ramming with a suitable tool. *Ham.*

dry-packed concrete. A mix sufficiently dry to be consolidated only by heavy ramming. *Taylor.*

dry pan. A pan-type rotating grinding machine, equipped with heavy steel rollers or mullers which do the grinding, and having slotted plates in the bottom through which the ground material passes out. *HW.*

dry-pan charger. One who assists dry-pan operator by dumping dry shale, clay, or brick in measured quantities in dry pans that grind them preparatory to mixing and molding. May be designated according to brick or tile product for which the dry pans grind material, as dry-brick-pan charger. Also called dry-pan feeder. *D.O.T. 1.*

dry-pan operator. One who tends and supervises loading of a battery of dry pans and screens used for grinding and sifting clay preparatory to tempering and molding. Also called dry-mill man. *D.O.T. 1.*

dry peat. Peat, formed under drier conditions than moor peat, and consisting of connected, thickly laid humic masses which can be cut with a knife. It shows numerous plant remains recognizable with the naked eye. *Stutzer and Noe, 1940, p. 91.*

dry placers. Gold-bearing alluvial deposits found in arid regions. In some deposits the gold is in the cementing material that binds the gravel together. Because of the lack of water, various machines have been devised for the dry washing of these deposits; such machines commonly include some form of pulverizer and jigs or tables which use compressed air instead of water in their operation. *Lewis, p. 390.*

dry-powder extinguisher. An extinguisher containing a chemical powder that is noncorrosive, nontoxic, nonfreezing, and a nonconductor of electricity. It is shot out of the container by the detonation of a small charge placed in the head of the container. This type of extinguisher can be easily recharged at underground fires by unscrewing the head cap, refilling the container with more powder, and fitting a new expellent cartridge to the head cap before replacing it. Used as effectively as the carbon dioxide gas extinguisher in fighting fires involving flammable liquids, or where there is danger of electric shock. *McAdam, pp. 120-123.*

dry press. A mechanical press for forming brick from slightly moistened granular material. *A.R.I.*

dry-pressed brick. Brick formed in molds under high pressures from relatively dry clay (5 to 7 percent moisture content). *ACSG, 1963.*

dry-pressing. The shaping of ceramic ware under high pressure (up to 14,000 pounds per square inch), the moisture addition being kept to a minimum (5 to 6 percent) or, with some materials, eliminated by the use of a plasticizer, for example, a stearate. Dry pressing is used in the shaping of wall and floor tiles (when it is often referred to as dust pressing), most high-grade refractories, abrasive wheels, the Fletton type of building brick (the moisture content for pressing is in this case 19 to 20 percent), and many articles in the electroceramic industry. The process is also sometimes referred to as semi-dry pressing. *Dodd.*

dry-press process. A method of forming claywares by using slightly moistened clay in pulverized form and pressing it into steel dies. *Fay.*

dry process; dry mix. a. A method of treating ores by heat as in smelting; used in opposition to wet process where the ore is brought into solution before extraction of the metal. *See also* wet process. *Fay.* b. The process of making Portland cement in which the raw materials are ground and burned dry. *Mersereau, 4th, p. 235.* c. Process whereby dry powdered enameling materials are applied to a preheated surface. *VV.* d. The method of preparation of a ceramic body wherein the constituents are blended dry, following which liquid may be added as required for consequent processing. *ASTM C242-60T.*

dry process enameling. A porcelain enameling process in which the metal article is heated to a temperature above the maturing temperature of the coating (usually, 1,600° to 1,750° F), the coating materials applied to the hot metal as a dry powder, and fired. *ASTM C286-65.*

dry puddling. A process of decarbonization on a siliceous hearth in which the conversion is effected rather by the flame than by the reaction of solid or fused materials. As the amount of carbon diminishes, the mass becomes fusible and begins to coagulate (come to nature), after which it is worked together into lumps (puddle balls, loups) and removed from the furnace to be hammered (shingled) or squeezed in the squeezer, which presses out the cinder, etc., and compacts the mass at welding heat, preparatory to rolling. Silicon and phosphorus are also largely removed by puddling, passing into the cinder. *See also* puddling. *Fay.*

dry return. A condensate line in a steam heating system carrying both water and air, usually located above the boiler waterline. *Strock, 10.*

dry rods. Scot. Pump rods outside the delivery pipes or rising main. *Fay.*

dry rot. A rapid decay of timber which causes its substance to be reduced to a fine powder. *Crispin.*

dry rotary drilling. *See* dry drilling. *Long.*

dry-rubbing test. A test to determine the degree of attack of a vitreous enameled surface after an acid resistance test. *Dodd.*

dry rubble. Rough stone laid into a wall without mortar. *Crispin.*

dry running. To unknowingly or knowingly drill with a bit when the flow of the coolant and cuttings-removal fluid past the bit has been inadvertently or deliberately cut off. *Compare* dry block; dry drilling. *Long.*

drys. *See* dry, b. *Fay.*

dry sample. A sample obtained by drilling procedures in which water or other fluid is not circulated through the drill string and sampling device; hence the in situ characteristics of the sample have not been altered by being mixed with water or other fluid. *Compare* drive sample. *Long.*

dry-sample barrel. Short, tubular devices used to obtain dry samples of soil and other soft rock material. *See also* dry sample. *Long.*

dry sampler. a. Various auger and/or tubular devices designed to obtain unwetted samples of soft rock material, such as clay, sand, soil, etc., by drilling procedures wherein water or other fluid is not circulated during the operation. *Compare* drive sampler. *Long.* b. A person skilled in the art of dry sampling. *Long.*

dry sampling. The act or process of obtaining dry samples of soft rock material with various auger or tubular devices utilizing dry-drilling techniques. *See also* dry sample; dry sampler. *Long.*

dry sand. a. A stratum of dry sand or sandstone encountered in well drilling. A nonproductive sandstone in oilfields. *Fay.* b. Green sand dried in an oven to remove moisture and strengthen it (a dried-sand mold is a mold of green sand which is treated as above). *Freeman.*

dry sand mold. A mold made of sand and then dried. *ASM Gloss.*

dry screening. The screening of solid materials of different sizes without the aid of water. *B.S. 3552, 1962.*

dry season. In tropics, period characterized by low rainfall. *Pryor, 3.*

dry separation. The elimination of the small pieces of shale, pyrite, etc., from coal by a blast of air directed upon the screened coal. *See also* wind method. *Fay.*

dry sharpening stone. A stone so constituted that its crystals break away from its binding material so rapidly that the particles of steel have no chance to fill the pores of the stone. Sandstone and coarse gritted scythestones are good examples. *Fay.*

dry spray. A defect confined to sprayed ware manifesting itself in the fired porcelain enamel as a rough, sandy texture. *ASTM C286-65.*

dry steam coal. Coal of rank just below anthracite. *B.S. 3323, 1960.*

drystone. Composed of stones not cemented with mortar, as a drystone wall. *Fay.*

dry strength. The mechanical strength of a ceramic material that has been shaped and dried but not fired; it is commonly measured by a transverse strength test. *Dodd.*

dry sweating. A process by which impure blister copper is exposed to long oxidizing heating below fusion point. *Standard, 1964.*

dry unit weight. The weight of soil solids per unit of total volume of soil mass. Also called unit dry weight. *ASCE P1826.*

dry wall. A rock wall set up without cementing material. *See also* drystone. *Fay.*

dry-walling. Obsolescent method of supporting underground workings, by use of waste rock built into rough walls. *Pryor, 3.*

dry-wall method. *See* overhand stopping, b. *Fay.*

dry wall stone. Thin-bedded limestone and sandy beds. Suitable only for mortarless fencing walls. *Arkell.*

dry wash. *See* wash, q. *Fay.*

dry washer. a. A machine for extracting gold from dry gravel. It consists of a frame in which there is a rectangular bellows made of canvas; the upper part of the bellows is made by a plane set at an angle of about 20°, across which are riffles. On the top of the machine is a screen on which gravel is shoveled. The screened gravel falls to a riffled plane from which it feeds to the riffles on the bellows. The screen and upper riffles are shaken by an eccentric worked with a crank, and the same crank actuates the bellows which blow the dust from the gravel passing over the riffles. The gold is caught behind the riffles. Only gravel in which no moisture can be seen can be worked successfully by a dry washer. *Hess.* b. A man who operates a dry washer. Same as dry blower. *Hess.*

dry weight. The weight per unit area of the bisque. *ASTM C286-65.*

dry well. a. A deep hole, covered and usually lined or filled with rocks, that holds drainage water until it soaks into the ground. *Nichols.* b. An unproductive oil or gas well; a duster. *Hess.*

D-shell molding. A modification of the normal shell molding process based upon the use of sand and a special oil which serves as the binder. Such a mixture can be handled by normal core-blowing equipment and molds are in effect produced by a core-making technique. For this purpose a pattern which provides the desired cavity form, is employed in conjunction with a contour plate. The latter follows, generally, the form of the pattern, but need not duplicate that form with any particular accuracy. Sand, treated with the binder oil, is blown into the space between pattern and contour plate, and the spacing of the two determines the average thickness of the shell. Local incidental variations in thickness are not important, but variations may be deliberately introduced when it is desired to obtain greater shell strength over certain areas. Alternatively, the contour plate may be of such a form as to provide reinforcing ribs on the shell. *Osborne.*

DTA. *See* differential thermal analysis. *VV.*

DTG. *See* differential thermogravimetry. *Dodd.*

D-truck. Aust. A low side-opening truck, used for conveying coal for home consumption, and from which the coal has to be shoveled. *Fay.*

dual-cycle reactor system. A nuclear system in which part of the steam of the turbine is generated directly in the reactor and part in a separate heat exchanger. A combination of the direct-cycle and indirect-cycle systems. *L&L.*

dual-drive conveyor. A conveyor having a belt drive mechanism in which the conveyor belt is in contact with two drive pulleys, each of which is driven by a separate motor. *NEMA MB1-1961.*

dual haulage. In strip mining, the use of two types of haulage at the same mine for transporting coal from the face to the preparation plant. Usually, coal is transported from the loading shovel to a transfer station by motorized units, and rail haulage is used to haul the coal from this point to the preparation plant. *R. I. 3416, 1938, p. 19.*

dualin. A variety of dynamite consisting of 4 to 5 parts nitroglycerin, 3 parts sawdust, and 2 parts potassium nitrate. *Webster 2d.*

dual-purpose reactor. A nuclear reactor designed to achieve two purposes; for example, to produce both electricity and fissionable material. *L&L.*

dual rope. York. A hemp capstan rope upon which men ride in a mine shaft. *Fay.*

dual setting. *See* double setting. *B.S. 3618, 1963, sec. 1.*

dubbers. Corn. In clay mining, men who keep the strakes or guillies clear. *Hess.*

Dubb's asphalt. *See* sulfurized asphalt. *Bennett 2d, 1962.*

Duchemin's formula. The wind pressure per square foot (N) on an inclined surface is

$$N = F \frac{2 \sin a}{1 + \sin^2 a}$$

F being force of wind in pounds per square foot normal to a surface and a the angle of the inclined surface. *Pryor, 3.*

duchess. Slate size (24 by 12 inches). *Pryor, 3.*

duck. A fabric material, usually of woven cotton but of synthetic fibers also, used to construct conveyor belts and filter cloths. *Pryor, 3.* Duck is manufactured in several strengths, expressed in terms of weight, as 28 oz. duck etc., which is the weight of a linear yard of 42-inch-wide fabric. Generally increased longitudinal strength is provided by having a heavier yarn and greater count in the longitudinal warp threads than the transverse filler threads. *ASA MH4.1-1958.*

duckbill. The name given to a shaking-type combination loading and conveying device, so named from the shape of its loading end and which generally receives its motion from the shaking conveyor to which it is attached. *B.C.I.*

duckbill loader. *See* shaker-shovel loader. *Nelson.*

duckbill operator. In bituminous coal mining, one who operates a small power shovel that has a round-nosed scoop, called a duckbill, to load coal into cars in a mine. *D.O.T. 1.*

duckbill pick. A duckbill-shaped coal-cutter pick which is forged by the roller type of machine from dies and is the type largely used today. The machine shaping of the pick ensures uniformity. It gives a constant clearance as the point wears down and is particularly suitable for fused-carbide tipping. *Nelson.*

duckfoot. A pipe bend at the bottom of a shaft column or rising main fitted with a horizontal base sufficiently strong for the weight of the rising main to rest upon it. Also called duckfoot bend. *B.S. 3618, 1963, sec. 4.*

duckfoot bend. *See* duckfoot. *B.S. 3618, 1963, sec. 4.*

duck machine. An arrangement of two boxes, one working within the other, for forcing air into mines. *Zern.*

duck's-nest tuyere. One having a cupped outlet. *Standard, 1964.*

ducktownite. A term used in Tennessee for an intimate mixture of the minerals pyrite and chalcocite. *Fay.*

ducon Abbreviation for dust concentrator, which is a device used to collect dry cuttings ejected from a borehole in which air or gas is used as a circulation medium. *Long.*

duct. A pipe or air passage for ventilation in a mine. *Mersereau, 4th, p. 352.*

duct fan. An axial-flow fan mounted in, or intended for mounting in, a section of duct. *See also* tube-axial fan; vane-axial fan. *Strock, 10.*

ductile. a. In mineralogy, capable of considerable deformation, especially stretching, without breaking; said of several native metals and occasionally said of some tellurides and sulfides. *A.G.I.* b. Pertaining to a substance that readily deforms plastically. *A.G.I.* c. Capable of being permanently drawn out without breaking; such as, a ductile metal. *Webster 3d.*

ductile cast iron. High carbon ferrous product containing spheroidal graphite. *Bennett 2d, 1962 Add.*

ductile crack progagation. Slow crack propagation that is accompanied by noticeable plastic deformation and requires energy to be supplied from outside th body. *ASM Gloss.*

ductile iron. *See* nodular cast iron. *ASM Gloss.*

ductility. a. The ability of a material to deform plastically without fracturing, being measured by elongation or reduction of area in a tensile test, by height of cupping in an Erichsen test or by other means. *ASM Gloss.* b. The capacity of a metal to elongate, when under pull from the ends, without cracking or breaking. *Weed, 1922.* c. Minerals are ductile when they can be drawn out into wires, and these properties belong only to metallic minerals and, of those, only to native metals. Ductile minerals are always malleable. *Nelson.*

ductility test. A test on asphalt to determine its capability of being permanently drawn out or stretched. *API Glossary.*

ductilometer test. A reverse bend test for strip and wire. It differs from conventional tests in the method of bending, the specimen being gripped along its entire length save for a short central portion which is bent freely through a specified angle. The deformed length is approximately equal to 1.5 times the diameter, and the number of bends to fracture varies inversely with the angle of bend. The constant of proportionality and the (extrapolated) angle of bend at which the wire does not fail, are indices of the mechanical properties of the wire. *Osborne.*

ducting. Sections of air duct. *B.S. 3618, 1963, sec. 2. See also* ventilation tubing.

ducts, ventilation. *See* ventilation ducts.

Ductube. Trade name for a plastic or rubber tube inflated by compressed air to form cable ducts in concrete. After the concrete has set, it is deflated and withdrawn. *Ham.*

dudgeonite. The mineral annabergite with about one-third of the nickel replaced by calcium. *Fay*

Dudley rock. A fossiliferous limestone of the English Wenlock Upper Silurian. *Fay.*

Dudzeele process. A method of treating metals intended to be drawn or rolled, in which they are first coated with lead by amalgamating the surface, preferably by treating with a solution of mercury salt and then dipping them into molten lead. A suitable mercury salt solution contains about 50 grams of mercury chloride in a liter of a dilute solution of hydrochloric acid at 6° B, saturated with ammonium chloride. *Osborne.*

due. The amount of royalty or ore payable to the lord of the manor or owner of the soil. *Fay.*

dues. Corn. *See* due. Also called dish. *Fay.*

duff. a. Fine dry coal (usually anthracite) obtained from a coal-preparation plant. The size range is three-sixteenths of an inch to zero inch. *See also* slack. *Nelson.* b. Smalls, usually with an upper size limit of three-eights of an inch (9 to 5 millimeters). *B.S. 3323, 1960.* c. Term used among British miners for a fine mixture of coal and rock. *Tomkeieff, 1954.* d. Aust. The fine coal left after separating the lumps; very fine screenings; dust. *Fay.* e. Coal dust and other unsaleable small coal produced in anthracite mines. *Pryor, 3.*

duffer. Aust. An unproductive claim or mine. *Hess.*

Duff furnace. A furnace used for the manufacture of producer gas. *Fay.*

duffy. a. Scot. Soft; inferior. *Fay.* b. Buggy; cuttings; gummings; kirvings. *Mason.*

dufrenite. A hydrous iron phosphate mineral containing approximately 27.5 percent P_2O_5, 62 percent Fe_2O_3, and 10.5 percent H_2O. Exact composition doubtful. *Sanford.*

dufrenoysite. a. A native sulfarsenide of lead, $Pb_2As_2S_5$. *Sanford; Hey 2d, 1955.* b. Synonym for binnite. *Hey 2d, 1955.* c. Synonym for sartorite. *Hey 2d, 1955.*

duftite. There are two minerals of the composition $PbCuAsO_4(OH)$. Duftite alpha is orthorhombic and the X-ray powder pattern is very similar to those of descloizite and mottramite; isomorphous with mottramite; space-group Pnma (D^{16}_{2h}). Duftite beta is orthorhombic, disphenoidal, and forms a complete series of solid solutions with conichalcite, $CaCuAsO_4(OH)$; isomorphous with conichalcite; space group $P2_12_12_1$ (D_2^4). M. Fleischer says it would be preferable to drop the terms duftite alpha and duftite beta, to restrict the name duftite to what is called here duftite alpha, and to rename duftite beta. *American Mineralogist, v. 42, No. 1-2, January-February 1957, p. 123.*

duggle. Corn. *See* troil. *Fay.*

duin. A gold-washing dish used in Jashpur, India. *Fay.*

dukeway. Som. A method of hoisting coal on an incline from the working face to the pit bottom by a rope attached to the winding engine at surface in such a way that while the cage is going up, the empty trams are running down the incline, and as the cage descends the loaded cars are brought up to the shaft. *Fay.*

dukey. a. A platform on wheels on which trams are placed in a horizontal position to be raised or lowered on very steep self-acting inclines. *Nelson.* b. A set of trams traveling on an inclined haulage road underground. *Nelson.*

dukey rider. a. In Wales, a boy who accompanies the trams upon an incline plane. *Fay. b. See* brakeman, c. *D.O.T. 1.*

dulang. In the Malay Peninsula, a batea or shallow wooden bowl for washing gravel for tin or gold. *Bureau of Mines Staff.*

dulang mine. A small alluvial deposit worked with dulangs. *Bureau of Mines Staff.*

dulang woman. A woman who washes for tin or gold with a dulang. *Bureau of Mines Staff.*

Du Lite process. A method for blackening steel surfaces such as rifie barrels or camera parts. The process is one of simple immersion and the coating consists essentially of molybdenum and iron oxides. The corrosion resistance may be enhanced by impregnation with oil or wax. *Osborne.*

dull. a. Brist. Slack ventilation; insufficient air in a mine. *Fay.* b. As applied to the degree of luster of minerals, means those minerals in which there is a total absence of luster, as chalk or kaolin. *Fay.*

dull attritus. A field term denoting the degree of luster of attrital coal as it compares to the brilliant luster of vitrain associated in the same locality. *Compare* bright attritus; medium-bright attritus. *A.G.I.*

dull-banded coal. Coal consisting of vitrain and durain with more or less minor clarain and minor fusain. *Compare* bright-banded coal. *A.G.I.*

dull coal; dulls. a. Any coal which absorbs the greater part of incident light instead of reflecting it. Stopes recognizes two kinds of dull coal—durain and fusain. *Tomkeieff, 1954.* b. The constituent of banded coal macroscopically somewhat grayish in color, of a dull appearance, less compact than bright coal, and breaking with a rather irregular fracture. It consists mainly of two kinds of material; thin black bands interlayed by a lighter colored granular-appearing matter. Microscopically, it is shown to consist of smaller anthraxylon constituents together with a few other constituents, such as cuticles and bark-like constituents embedded in a general matrix, the attritus. *A.G.I.* c. A variety of banded coal containing from 20 to 0 percent of pure, bright ingredients (vitrain, clarain, and fusain), the remainder consisting of clarodurain and durain. *Compare* bright coal, d.; semibright coal; intermediate coal; semidull coal. *A.G.I.*

dulling. The wearing away of the cutting edges of abrasive grains through use. It occurs to some degree during any abrasive operation and will finally result in inefficient cutting or abrading at which time the coated abrasive should be discarded or shifted to lighter work, regardless of its appearance. *ACSG, 1963.*

dullness. A lack of normal gloss on the enamel surface. *Bryant.*

dull-red heat. Division of the color scale, generally given as about 700° C (1,292° F). *Bureau of Mines Staff.*

dulls. *See* dull coal. *Tomkeieff, 1954.*

dulong. A Malayan term for hardwood pan shaped like a section of the surface of a sphere and used as a miner's pan in prospecting, sample washing, and manual concentration of cassiterite. *Pryor, 3.*

Dulong and Petit's law. That the specific heat of an element multiplied by its atomic weight is approximately constant and equal to 6.2. *Osborne.*

Dulong's formula. A formula for estimating or calculating the heating value of coals. To obtain British thermal units per pound, the formula is: Low calorific power equals $14{,}600C + 61{,}500\ (H - \frac{0}{8}) + 4{,}000S - 1{,}050\ (9H + W)$. To obtain calories per kilogram, the formula is: Low calorific power equals $8{,}100C + 34{,}200\ (H - \frac{0}{8}) + 2{,}200S - 586(9H + W)$. *Newton, p. 130.*

dumalite. A variety of trachyandesite. *Holmes, 1928.*

dumasite. An uncertain green chlorite lining small cavities in volcanic rocks; some what resembles clinochlore. *Hess.*

dumb barge. A barge similar to a hopper barge, frequently used to take dredged material from a dredger to the dumping ground. *Ham.*

dumb bolts. Scot. Bolts at joints of single-plated pump rods, at right angles to those through the plates, to prevent the latter from tearing the wod. *Fay.*

dumb buddle. A buddle without revolving arms or sweeps, for concentrating tin ores. *Nelson.*

dumb'd. Choked or clogged, as a grate or sieve in which the ore is dressed. *Fay.*

dumb drift. a. A passage leading from an airway to a point in a shaft some distance above an inset to allow the ventilating current to bypass a station where skips or cages are loaded. *B.S. 3618, 1963, sec. 2.* b. A roadway driven through the waste in longwall mining to provide packing material. *Nelson.*

dumb fault. a. A break in strata caused by a current of water eroding a portion of it during the general period of its deposition. *Fay.* b. An unconformity. *Hess.* c. A term used by miners for a washout. *Nelson.*

dumb furnace. A ventilating furnace in which the foul flammable air from remote parts of the mine enters the upcast higher up than the hot gases from the fire. *Webster 2d.*

dumb screen. A chute in which there are no meshes or bars for separating the coal, and down which the run-of-mine coal passes from the tubs direct to the railway wagon. It is used in small mines where the coal is sold as loaded underground or at mines where the coal is conveyed by wagon to a central coal-preparation plant. *Nelson.*

dumb screw. Scot. A screwjack. *Fay.*

dummy. a. N. Staff. A low truck on four wheels running upon rails and loaded with pig iron or some other heavy material; employed in steep coalbeds as a balance weight to bring up an empty tub or car. *Fay.* b. A paper bag filled with sand, clay, etc., for tamping or for separating two charges in a double-loaded borehole. *Fay.* c. A short piece of core or core-size cylinder of rubber or other material placed in the core lifter in an empty core barrel to guide the first part of a newly cut core into the core lifter. Also called dummy core; guide core. *Long.* d. A mechanical device, operated by the blower's feet, for wetting, raising, opening, and closing the paste mold in mouth-blowing glassware. *ASTM C162-66.* e. A cathode, usually corrugated to give variable current densities, that is plated at low-current densities to remove preferentially impurities from a plating solution. *ASM Gloss.* f. A substitute cathode that is used during adjustment of operating conditions. *ASM Gloss.*

dummy block. In extrusion, a thick unattached disk placed between the ram and billet to prevent overheating of the ram. *ASM Gloss.*

dummy core. *See* dummy, c. *Long.*

dummy elevator. A second elevator for boosting tailings to higher stacking levels. *Bureau of Mines Staff.*

dummy gate. N. of Eng. A small gate made on the face between the mother gate and tailgate for the purpose of getting stone to make strip packs for roof support (when goaf roof is supported and not allowed to cave). *Trist.*

dummying. Plating with dummy cathodes. *ASM Gloss.*

dummy locator. One whose name is used by a locator to secure for the latter's benefit a greater area of mineral land than is allowed by law to be appropriated by a single person, and any location made in pursuance of such a scheme or device is without legal support and void. *Ricketts, p. 449.*

dummy maker. In bituminous coal mining, a laborer who fills paper cartridges (cylinders) with clay, adobe, or rock dust, used for stemming (tamping clay or other material on top of explosives) drill holes in the working face to be blasted down. *D.O.T. 1.*

dummy road. A road driven forward in the waste of a conveyor face for the sole purpose of securing stone for packing purposes. *Nelson.*

Du Mont cyclograph. An instrument for measuring and recording changes in magnetic and electrical properties of steel samples under test. It is essentially an extremely sensitive oscillator. The test coil which is placed about the specimen while a fatigue test is in progress is part of the oscillating circuit, the readings of the cyclograph being a function of the losses in the specimen. *Osborne.*

dumontite. A very rare, strongly radioactive, yellow, orthorhombic mineral, $Pb_2(UO_2)_3(PO_4)_2(OH)_4.3H_2O$; occurs filling cavities in masses of torbernite. *Crosby, p. 17.*

Dumont's blue. Another name for smalt. *See also* smalt. *Dodd.*

dumortierite. An aluminum borosilicate, $(Al,Fe)_7O_3(BO_3)(SiO_4)_3$, occurring in schists and gneisses and, more rarely, in pegmatite dikes. Orthorhombic; blue, greenish-blue, violet, pink color; transparent to translucent; Mohs' hardness, 7; luster vitreous; specific gravity, 3.26 to 3.36. Found in France, Malagasy Republic, Brazil, Mexico, and in the United States in California, Nevada, New York, and Arizona. Used extensively in spark-plug porcelain and in the manufacture of special refractories. *Dana 17, pp. 413-414; CCD 6d, 1961.*

dumortierite quartz. A massive, opaque variety of quartz (aggregate) colored by intergrown crystals of dumortierite. Deep blue to violetish blue, sometimes dull or blackish blue. *Shipley.*

Dumoulin process. A method whereby copper is deposited on a rotating mandrel and later stripped off as a long strip, which is then drawn into wire without recasting. *Liddell 2d, p. 493.*

dump. a. A place where the ore taken from a mine is tipped. *Gordon.* b. A spoil heap at the surface of a mine, or a pile of small coal or duff stored for future reclamation. *Nelson.* c. The point where a face conveyor discharges its coal into mine cars. *Nelson.* d. A pile or heap of ore, coal, culm, slate, or rock. *Fay.* e. The tipple by which the cars are dumped. *See also* tipple. *Fay.* f. To unload a car by tipping it up. *Fay.* g. Calif. The fall immediately below a hydraulic mine. *Fay.* h. The fall available for disposal of refuse at the mouth of a mine. *Fay.* i. Eng. A deep hole in the bed of a stream or pond. *Webster 2d.* j. To empty, as in removing core from a core barrel or ore from a mine car. *Long.* k. A pile or heap of waste rock material or other nonore refuse near a mine. *Long.* l. To discard. *Long.* m. A large heap of culm, rock, or refuse, usually the waste product resulting from breaker operations. *Hudson.* n. Can. Accumulation of excavated rock at a mine, which may be ore or waste. Term also applied to mill tailings. *Hoffman.* o. The intention with which the owner of the property extracts the ore from the ground, and the purpose and intention of the owner with which it is placed on the dump, is controlling in arriving at a solution of the question whether the ore after having been extracted and placed in the dump is personalty or realty. *Ricketts, I.* p. The place of deposit of debris from an excavation. *Stauffer.*

dump bailer. A bailer used in borehole-cementation work, provided with a valving device that empties the contents of the bailer (cement) at the bottom of a borehole. Also called liquid dump bailer. *Long.*

dump boss. In anthracite coal mining, a foreman who is in charge of dumpers working in a breaker where coal is crushed, sized, and cleaned for market. *D.O.T. 1.*

dumpcart. A cart having a body that can be tilted or a bottom opening downward for emptying the contents without handling. *Webster 3d.*

dumped fill. Excavated material transported and dumped in a heap, generally to preestablished lines and grades. Should be kept free of tree stumps, organic matter, trash, and sod if any future use of the fllled area is contemplated. *Carson, p. 362.*

dumper. a. A wheeled car with an elevated turntable on which is a track. A mine car run on the upper, horizontally revolving track can be dumped sidewise or endwise. Used for the disposal of refuse on a rock or slate dump. Also called hurdy girdy. *Zern.* b. A highly mobile truck which transports severed ore or dirt to dumping site, if necessary over very rough ground. Also called dumping wagon. *Pryor, 3.* c. The man in charge of the loading of coal at the dump end of a conveyor. *Nelson.* d. A tippler. *Nelson.* e. A dump truck. *Nelson.* f. One that dumps; such as, a dumpcart, dump truck. *Webster 3d.* g. Scot. A tool for keeping a borehole circular. *Fay.*

dumper, head. In bituminous coal mining, a foreman in charge of unloading or dumping operations at the mine surface. *D.O.T. 1.*

dump hoistman. In bituminous coal mining, one who operates a hoisting engine that drives a haulage cable by means of which cars of rock, slate, or other refuse are hauled up an incline to be dumped. Also called inclined-rock-dump hoistman; rock-dump hoistman; rock hoistman; slate-hoist engineer; slate hoistman. *D.O.T. 1.*

dump hook. A chain grabhook having a lever attachment for releasing it. *Webster 3d.*

dump house. The building where the loaded mine cars are emptied into the chutes. *Fay.*

dumping bucket. A lifting bucket with a tilt or drop bottom. *Standard, 1964.*

dumping wagon. *See* dumper, b. *Pryor, 3.*

dump leaching. Term applied to dissolving and recovering minerals from subore-grade materials from a mine dump. The dump is irrigated with water, sometimes acidified, which percolates into and through the dump, and runoff from the bottom of the dump is collected and mineral in solution is recovered by a chemical reaction. *Bureau of Mines Staff.*

duplex pump. A positive displacement pump with two water or liquid cylinders side by side and geared so that the piston strokes in the cylinders alternate. Such a pump may be either single or double action, depending on the number and placement of intake and discharge valves on the cylinder and may be designed so as to deliver a low volume of liquid at high pressures. *Compare* centrifugal pump; rotary pump; triplex pump. *Long.*

dumpling. A mass of ground left undisturbed until the final stages of excavation, when it is removed. In the intermediate stages it may be used as a support for timbering to the excavations. *Ham.*

dump moraine. A kind of terminal moraine consisting of material dropped either from the surface or from the interior of the glacier. *Standard, 1964.*

dump motorman. In bituminous coal mining, one who operates a mine locomotive (motor) to haul cars of dirt, rock, slate, or other refuse to the dump at the surface of an underground mine. Also called dirt-dump engineer; refuse engineer. *D.O.T. 1.*

dump room. Space available for disposing of waset from a mine. *Bureau of Mines Staff.*

dump skip. A skip with an attachment that dumps the load automatically. *Fay.*

dump truck. A truck or semitrailer that carries a box body with a mechanism for discharging its load. *Nichols.*

dump wagon. A large-capacity side-, bottom-, or end-discharge wagon (or skip) on tired wheels or crawler tracks; usually tractor towed. *Nelson.*

dumpy level. A surveyor's level with a short usually inverting telescope that is rigidly fixed to a table and capable only of rotary movement in a horizontal plane. *Webster 3d.*

dun beds. Eng. Four bands of blue-centered limestone in the Lower Lias, Bath. *Arkell.*

dun cow. Eng. A bed of stone in the Swanage quarries. *Arkell.*

dundasite. A white basic carbonate of lead and aluminum, $\mathrm{Pb(AlO)_2(CO_3)_2.4H_2O}$. Spherical aggregates of tufts of minute, radiating needles. From Dundas and Mt. Read, Tasmania; Trefriw, Carnarvonshire, Wales; Wensley, Derbyshire, England. *English.*

dun dicks. Term used among miners in the English Midlands for fairly strong banded dull and bright coal with a dirty appearance. *Tomkeieff, 1954.*

dundy. Term used among Scottish miners for coal altered by igneous intrusion. *Tomkeieff, 1954.*

dune. A hill or ridge of loose drifting sand or volcanic ash heaped by wind. *Hess.*

dune sand. A fine-grained sand with well-rounded particles, which has been accumulated by the winds from more mixed deposits and blown into shifting heaps. Also known as blow sand. *Carson, 2, p. 82.*

dungannonite. A variety of diorite containing corundum and nepheline. *A.G.I.*

dungy drift. Som. A name of a coal seam at Mells. *Tomkeieff, 1954.*

dunite. A peridotite consisting almost wholly of olivine containing accessory pyroxene and chromite. *A.G.I.*

Dunkard series. Continental strata, including thin coal seams, similar to the Pennsylvanian, but of Permain age, occurring in North America. Strata of the same age are marine in Kansas, but include marginal red beds with gypsum, and thick salt deposits were formed later in the Kansas Basin. *C.T.D.*

dun lime. Eng. Altered limestone adjacent to faults and dikes, Kettlewell. *Arkell.*

Dulop diving apparatus. A self-contained diving apparatus fitted with twin cylinders, and capable of allowing the wearer to operate in depths of up to 80 feet for 1½ hours when using a breathing mixture of 60 percent oxygen and 40 percent nitrogen charged at a pressure of 120 atmospheres. A mouthpiece and nose clip are used with this apparatus, and goggles can be worn to keep water out of the eyes. *McAdam, p. 166.*

Dunnachie kiln. A gas-fired chamber kiln designed by J. Dunnachie. The first such kiln was built at Glenboig, Scotland, in 1881 for the firing of firebricks. Important features are the solid floor and the space between the two lines of chambers. *Dodd.*

dunn bass. Lanc. An argillaceous shale in coal mines. *See also* bind, a. *Fay.*

Dunnet shale. An oil shale, from 4 to 12 feet in thickness, found in Scotland; it yields from 24 to 33 gallons of crude oil per ton. *Fay.*

duns. Glouc. Argillaceous shale. *See also* cliff, a; bind, a. *Fay.*

dunstone. a. Derb. Ironstone in beds or seams. *Fay.* b. In Wales, a hard kind of fire clay, or underclay. *Fay.* c. Derb. A local term for certain magnesium limestones of a yellowish dun or cream color, occurring near Matlock. *Fay.*

dunt; dunting. A crack, or the formation of cracks (which may be invisible), in ware cooled too rapidly after it has been fired. *Dodd.*

dunted. Said of ware which cracks after firing in the biscuit oven. *C.T.D.*

dunting. *See* dunt. *Dodd.*

dun whin. A hard compact stone sometimes found in coal seams. *Nelson.*

Duobel. Trademark for high-velocity permissible explosives furnished in seven grades based upon velocity and cartridge count; poor water resistance. Used for mining coal where lump coal is not a factor. *CCD 6d, 1961.*

duoflex checker system. A checker arrangement for hot-blast stoves. The gas used is only partially cleaned and may contain from 0.5 to 1.5 grams of dust per cubic meter of gas. The top zone of the checkers is formed of straight-walled vertical passages, and the middle zone of vertical passages in each of which two opposite walls are continuously curved and the other two are straight, while the bottom zone is formed of vertical passages in each of which all four walls are continuously curved. *Osborne.*

duo mill. A mill used in the manufacture of seamless steel tubes. It consists of a number of stands, each containing one pair of rolls. The rolls have a semicircular groove cut in each; the size of these grooves diminishes as the tube passes from one stand to the next and thus gives the required reduction. Successive roll axes are set at 90° in order to roll out any fins which may be formed. The whole series of rolls is driven through gearing from one main motor. *Osborne.*

Duovac method. A magnetic particle testing technique which involves the use of a moving magnetic field which magnetizes the part under test in many directions. Electrical contact heads set up a circular field in the part, and another device, usually a coil, produces a longitudinal field. In order to produce the moving field, the power supply provides two or more different currents simultaneously. The combined currents set up magnetizing forces essentially at right angles to each other and so timed as to produce a moving field in the part. While magnetized, the part is usually sprayed with fluorescent magnetic particles which have been found effective in the location of even the smallest defects. It is then inspected under black light. *Osborne.*

duplex breaker. A breaker having more than one crushing chamber. *Fay.*

duplex channeler. A type of channeling machine which cuts two channels simultaneously. *Fay.*

duplex compressor. Two compressors, side by side, and made in the combination of simple steam and simple air cylinder, simple steam and compound air cylinders, or compound steam and compound air cylinders. *Lewis, p. 671.*

duplex hammer. *See* double hammer. *Fay.*

duplexing (duplex process). Any two-furnace melting or refining process. *ASM Gloss.*

duplex pick A coal-cutter pick which allows a cut to be made in either direction without turning the pick. It is drop forged with a tip of fused tungsten carbide. *Nelson.*

duplex pump. Displacement pump for handling pulps. Two cylinders are so geared that one piston falls while other rises. Can lift small tonnages to good heights. *Pryor, 3.*

duplex steel. Steel produced by first refining in a Bessemer converter and afterward completing the process in the open-hearth furnace. *Mersereau, 4th, p. 407.*

duplex Talbot process. A combination of the duplex and the Talbot continuous process. Molten steel from the Bessemer converter, already freed of its carbon, silicon, and manganese contents, is charged into the Talbot furnace. As this molten steel is poured through the oxidized slag, the phosphorus is removed almost immediately. Sometimes pig iron is poured in afterwards which raises the carbon content of the bath and aids in its deoxidation. A portion of the heat can usually be tapped about an hour after this addition. *Osborne.*

duplex wire. Two insulated-copper leading wires wrapped together with paraffined cotton covering. *Fay.*

duplicate sampling. The placing of alternate samples of coal or ore in different containers which are then analyzed separately. Each container thus holds a subsample taken at intervals throughout the sampling period. *Nelson.*

duplicating. In machining and grinding, reproducing a form from a master with an appropriate type of machine tool, utilizing a suitable tracer or program-controlled mechanism. *ASM Gloss.*

duplication of coal. Cases when the coal seam is double thickness due to geological causes: (1) by means of a bedding glide; (2) during the formation of a washout, entire masses of the coaly matter may be lifted by the water current from its bed and floated raftlike and redeposited upon an undisturbed coalbed and so produce a duplication of the seam of limited extent. *Nelson.*

Dupont process. A heavy-liquid minerals separation process in which organic liquids of high specific gravity, known as parting liquids, are used. Their specific gravities range from 1.00 to 2.96, have very low viscosities, and therefore, serve ideally for the medium in the sink-and-float separation of solid materials. This process is used to clean run-of-mine anthracite, refuse banks, or mixtures of the two. The sizes of coal that can be cleaned are No. 1 buckwheat, and larger. This includes sizes up though broken. *Mitchell, pp. 475-476.*

duporthite. A fibrous, hydrous, magnesium-aluminum silicate; flexible in thin fibers like asbestos; found in serpentine. *Hess.*

durability. a. The capacity of a gem to withstand the effects of abrasion, impact, and chemical action. *Pearl, p. 122.* b. As applied to foundry sand, refers to the rate of deterioration of the sand in use due to the dehydration of its contained clay. *Osborne.*

durain. The term was introduced by M. C. Stopes in 1919 to designate the macroscopically recognizable dull bands in coals. Bands of durain are characterized by their gray to brownish black color and rough surface with dull or faintly greasy luster; reflection is diffuse; they are markedly less fissured than bands of vitrain, and generally show granular fracture. In humic coals, durain occurs in bands up to many centimeters in thickness. Widely distributed, but with exceptions not abundant. *IHCP, 1963, part I.*

duralumin. An aluminum-base alloy containing 3.5 to 5.5 percent copper, 0.5 to 0.8 percent magnesium, 0.5 to 0.7 percent manganese, and up to 0.7 percent silicon, which can be cast, forged, and rolled hot or cold. It is capable of age-hardening, for example, precipitation hardening at room temperature, after quenching from about 520° C, but precipitation is more marked and the process is accelerated if aging is carried out at a temperature of about 150° C, that is, artificial aging. *Osborne.*

durangite. An orange-red, fluoarsenate of sodium and aluminum, $Na(AlF)AsO_4$, occurring in monoclinic crystals. *Fay.*

duration curve. Curve showing the quantity of flow through a river during a stated period, for purposes of power generation. The area under the curve shows the total quantity which flowed down the river in the time under observation. *Ham.*

durbachite. A plutonic rock consisting largely of orthoclase, biotite, and hornblende, with subordinate plagioclase, and accessory quartz, apatite, sphene, zircon, and opaque oxides. Mafic constituents constitute about half the rock. A dark biotite-hornblende syenite. *A.G.I.*

durfeldtite. A lead, silver, copper, manganese, and iron sulfobismuthite, $3(Pb,Ag,Cu,Mn,Fe)S.Sb_2S_3$; occurs in acicular crystals; luster, metallic; light gray color; Mohs' hardness, 2.5; specific gravity, 5.4; found in Peru. It is related to stylotypite. *Weed, 1918.*

durgy. Corn. Anything low or short. A variation of durgan, a dwarf. *Fay.*

duricrust. The case-hardened crust of soil formed in semiarid climates by the precipitation of salts at the surface of the ground as the groundwater evaporates. Contains aluminous, ferruginous, siliceous of calcareous material. *A.G.I.*

durinite. a. Strictly speaking, this is not a maceral, but the name can be used for repetitive description. *Tomkeieff, 1954.* b. The major maceral, or micropetrological constituent of durain. It is a heterogeneous material, generally semiopaque in thin section, being a matrix of minutely macerated fragments which may be resolved generally, but even in thinnest sections leaves a residium often opaque. All parts of plants may be included but (with few exceptions) spores are most conspicuous, and the minutely fragmented nature of all else is characteristic. Mincrinite, exinite, cutinite, resinite, collinite, xylinite, suberinite, and fusinite may be present. *A.G.I.*

durionizing. A process, of electrodepositing hard chromium, on the wearing surfaces of parts as a protection against wear by friction. *Osborne.*

Duriron. A high-silicon iron having a typical composition of iron, 0.08 percent maximum carbon, 0.35 percent manganese, and 14.5 percent silicon. *Henderson.*

durit. Ger. Name for durain. *Tomkeieff, 1954.*

durite. In 1955, the Nomenclature Subcommittee of the International Committee for Coal Petrology resolved to use this term for the microlithotype consisting principally of the following groups of macerals: inertinite (micrinite, fusinite, semifusinite, and sclerotinite) and exinite, particularly sporinite. Durite contains at least 95 percent inertinite and exinite. The proportions of these two groups of macerals may vary widely, but each must be greater than the proportions of vitrinite and neither must exceed 95 percent. Durite E and durite I connote durites rich in exinite and inertinite, respectively. It is found in many coals, in fairly thick bands, principally in durains and the duller type of clarain, generally common. *IHCP, 1963, part I.*

durn. Corn. A frame of timbering, like a doorframe. Also spelled durns; durnz; durnze. *Fay.*

duroclarain. A rock-type coal consisting of the maceral vitrinite (telinite or collinite) and large quantities of other macerals, mainly micrinite and exinite. Micrinite is present in lesser quantities than is true with clarodurain. *Compare* clarodurain. *A.G.I.*

duroclarite. a. This term was introduced in 1956 by the Nomenclature Subcommittee of the International Committee for Coal Petrology to designate the microlithotype with maceral composition between those of clarite and durite but closer to clarite than durite. Further specification is that the proportion of vitrinite must exceed that of inertinite. It occurs in fairly thick bands, and is widely distributed and, like clarodurite, is a common constituent of most humic coals. The technilogical properties of duroclarite are intermediate between those of clarite and durite, but because of the predominance of vitrinite over inertinite they resemble those of clarite more closely than those of durite. *IHCP, 1963, part I.* b. Coal microlithotype intermediate between clarite and durite; vitrinite, exinite, and inertinite each exceed 5 percent and the last is less abundant than vitrinite. *Compare* clarodurite. *A.G.I. Supp.*

durofusain. Durain in which the conglomerate elements consist for the greater part of fusain. *Compare* fusodurain. *A.G.I.*

durokawimeter. A magnetoinductive testing instrument for acceptance testing of light alloys, which is claimed to detect faulty heat treatment, cracks in castings, and variations in chemical composition. *Osborne.*

duroline pipe. Steel pipe coated with low-lime cement; used with corrosive solutions. *Bennett 2d, 1962.*

durometer. With this instrument, a 10-millimeter steel ball is released from an iris diaphragm and drops onto the specimen by gravity. The surface of the specimen is inclined at 45° to the horizontal, and deflects the rebounding ball onto a calibrated horizontal glass plate. The latter carries paper covered with carbon paper so that the rebounding ball marks the distance of rebound, and this represents the hardness. *Osborne.*

durotelain. Telain with minute inclusions of durain. *Compare* telodurain. *A.G.I.*

durovitrain. Vitrain with minute inclusions of durain. *Compare* vitrodurain. *A.G.I.*

durox dynamite. Ammonia dynamite; used in mining rock, salt, talc, etc. *Bennett 2d, 1962.*

Durville process. A casting process that involves rigid attachment of the mold in an inverted position above the crucible. The melt is poured by tilting the entire assembly, causing the metal to flow along a connecting launder and down the side of the mold. *ASM Gloss.*

dussertite. A member of the jarosite group, $BaFe_3(AsO_4)_2(OH)_5.H_2O$. *American Mineralogist, v. 28, No. 1, January 1943, p. 63.*

dust and fume monitor. This instrument is designed to provide a continuous record of dust, fume and gas concentrations in work environments, over an extended period of time. Air being sampled is drawn through a filter tape at measured rates up to 8 liters per minute by means of an oilless diaphragm pump. The filter is used for subsequent laboratory analysis. Different models have sampling periods ranging from 15 minutes to 1 hour. *Bests, p. 579.*

dust barrier. *See* stone-dust barrier. *Nelson.*

dust bell. The seal at the bottom of the dust catcher, dust leg, or water-seal valve, which is opened periodically to drain flue dust from the system. *Fay.*

dust-box tender. One who shovels and sweeps up loose clay which has spilled around machines and stores it in a dust box or hopper for reuse. Also called hopper tender; scrapman. *D.O.T. 1.*

dust catcher. a. A device attached to the collar of a borehole to catch or collect dry, dustlike rock particles produced in dry-drilling a borehole. *Compare* ducon. *Long* b. Any device in which dust is collected or extracted from furnaces gases, etc. *Bureau of Mines Staff.*

dust chamber. a. An inclosed flue or chamber filled with deflectors, in which the products of combustion from an ore-roasting furnace are passed, the heavier and more valuable portion settling in the dust chamber and the volatile portions passing out through the chimney or other escape. *Fay* b. Room air system, flue or dust extractor, where larger particles can drop out of stream of gas and be periodically removed. Used in conjunction with cyclones, electrostatic precipitators, and bag filters. *Pryor, 3.*

dust cloud. Coal or other dust particles carried in suspension in the air by currents and eddies. *Rice, George S.*

dust coat. An enamel coating sprayed thin and relatively dry. *Enam. Dict.*

dust collecting buckets. Portable buckets are approved by the U.S. Bureau of Mines for overhead drilling operations using fluted augers. The unit consists of a collecting bucket, a hanger assembly, and a rubber hood. The auger is placed through the bucket and the unit is held to the mine roof by the hanger assembly. The rubber hood provides a dust seal between the bucket and the mine roof. The bucket can be disassembled easily after each operation. *Bests, p. 374.*

dust collection. Removal from atmosphere of mill or from transfer points where dust is thrown up. Partially closed ventilating systems are used, which incorporate bag filters, Cottrells, cyclones, washing chambers, and spray towers. *Pryor, 3.*

dust collector. An apparatus for separating solid particles from air or gas and accumulating them in a form convenient for handling. *B.S. 3552, 1962.* Used in conjunction with local-exhaust systems for auxiliary ventilation and for this purpose is occasionally mounted directly on loading and continuous mining machines. Also used for cleaning recirculated air in the main ventilation system. It removes contaminants of the particulate type from an airstream before discharge into the main airstream. It is designed to clean the air of dusts, smoke, mists, fumes, pollen, etc., but is employed in mining mainly for dusts. *Hartman, p. 67. See also* velocity reducing collector; fabric-type dust collector; dust catcher; ducon.

dust consolidation. The binding of coal dust on roadway surfaces to prevent it becoming airborne by any disturbance. One method is to spread calcium chloride over the dust so that it absorbs water and forms a pasty cake which does not rise into suspension when men travel on the roadway. *See also* stone dust. *Nelson.*

dust counter. A portable apparatus (as the Koltze tube, an impinger, etc.) used to measure dust concentration in a mine or mill, as a health precaution. *Pryor, 3.*

dust counting microscope. The microscope is especially equipped and adjusted for the quantitative analysis of dust samples. Typical models magnify 100 times and include a substage lamp for correct illumination and counting cells to hold samples. Also available are microscopes with sampling pumps and sample slides all combined in one assembly. Useful for quick, on-the-spot surveys or for tentative checking of dust control effectiveness. *Bests, p. 579.*

dust devil. A small whirlwind containing sand or dust seen especially in tropical deserts. Also dust whirl. *Webster 3d. See also* dust storm. *Fay.*

duster. a. In Wales, a man employed in cleaning tramways of dust and dirt in and about mines. *Fay* b. An unproductive borehole drilled in the hope of discovering economically useful amounts of water, mineral, oil, or gas. *Long* c. A drill crew member who drifts from job to job and stays at any one place for such a short period of time that the dust kicked up by his feet when he first started to work has hardfly settled before he quits and drifts on to another drilling job. *Compare* boomer; drifter. *Long* d. *See* dry hole. *Brantly, 2.*

dust explosion. An explosion which consists of a sudden pressure rise caused by the very rapid combustion of airborne dust. Ignition of suspensions of combustible dusts can occur in the following ways: (1) initiation by flame or spark, (2) propagation by a gas explosion or blasting, and (3) spontaneous combustion. Little is known about the last-named mechanism, which is relatively rare in mines. The most frequent causes of major coal mine explosions in the United States today are electric arcs, open flames, and explosives. *Hartman, pp. 48-49 See also* coal-dust explosion.

dust extraction. The removal of solid particles suspended in gas or ambient air. *B.S. 3552, 1962.*

dust extractor. An appliance to collect or precipitate suspended dust. Dust extraction is often necessary at coal-preparation plants, loading stations, and also underground. The appliance may be a cyclone, fabric filter, spray tower, scrubber, or an electrostatic separator. *See also* dust precipitator; dust trap. *Nelson.*

dust firing. The burning of coal dust in the laboratory of the furnace. *Fay.*

dust-free conditions. In Great Britain, the arbitrary standards laid down by the National Coal Board in 1949 as representing comparative dust-free conditions in coal mines. These are as follows: stone dust, 450 particles per cubic centimeter (size range, 0.5 to 5.0 microns); anthracite, 650 particles per cubic centimeter (size range, 1 to 5 microns); and coal, 850 particles per cubic centimeter (size range, 1 to 5 microns). *Nelson.*

dust gold. Pieces of gold under 2 to 3 pennyweights; very fine gold. *Fay.*

dust hazard. Refers to the discomforts that may result from constant exposure to dust, particularly those of a siliceous nature. *Enam. Dict.*

dust hood. a. A cover for any receptacle (for example, bunker) or apparatus (for example, screens) designed to prevent the escape of dust. *B.S. 3552, 1962* b. The flared inlet end of a system of trunking erected to remove dust by air suction to a point where it can be collected. *B.S. 3552, 1962.*

dust hopper. A hopper placed underneath the scraper, rapping roller, or other belt cleaner, to collect the dust and dirt as it is removed from the belt; any tank or vessel to receive and retain dust. *Nelson.*

dusting. a. Spontaneous falling to a powder, particularly of material containing a large amount of calcium orthosilicate, which suddenly expands when it is cooled from red heat. *See also* calcium orthosilicate; dust. *Dodd* b. In dry-process vitreous enameling, synonym for dredging. *Dodd* c. In wet-process vitreous enameling, a defect during spraying resulting in localized concentrations of almost dry slip. *Dodd* d. The cleaning of an applied coating of vitreous enamel slip after it has dried, preparatory to firing. *Dodd* e. Applying a powder, such as sulfur to molten magnesium, or graphite to a mold surface. *ASM Gloss.* f. The disintegration of a material caused by inversion, an example being a product containing dicalcium silicate which, on cooling, changes from the beta to the gamma crystal form. Sometimes erroneously called slaking. *A.R.I.*

dusting clay. Any finely divided pulverized clay that can serve as a diluent, a carrier, or an extender in the preparation of insecticide dusts and which aids in the adhesion of the insecticide to foliage. *CCD 6d, 1961.*

dusting loss. a. Shortfall in expected weight of sands or finely ground materials due to wind action or loss when transported in open trucks. *Pryor, 3* b. In laboratory sampling, the loss of part of a sample undergoing test, through leakage of particles into the atmosphere. *Pryor, 4.*

dusting-off. Removal of dust from dry enamel prior to firing. Usually with a wool duster. *Bryant.*

dust-laying oils. Crude oils, heavy asphalt oils, tars, solutions of petroleum asphalt in gas oils, liquid asphalt, and emulsions of oils and water, used for laying dust on roads. *Fay.*

dustless zone. A section of the mine entry from which dust has been removed as completely as possible by scraping or sweeping, aided by a compressed-air blast. *Rice, George S.*

dustman. One who dumps the dust catcher or loads the dust at blast furnaces. *Fay.*

dustpan dredge. A dredge containing a suction head that is pushed over the underwater ground much as a dustpan would be. About 8 inches high, the dustpan may be from 20 to 40 feet long and is supplied with jets along its face to stir up the bottom surface. *Carson, 2, p. 56.*

dust particle counter. This automatic, direct reading, photoelectric dust counter measures the airborne dust concentration in number of particles per cubic foot. It is self-contained, comprising a remote test head, connecting cable and meter. This instrument can be permanently installed, incorporated into a recording or warning system or used in the field. *Bests, p. 589.*

dust plan. A plan kept with the book in which stone-dust samples are recorded. It shows the sampling zones in each roadway, distinguished by color, letter, number, or mark, and identified with that roadway. The plan is required at every British coal mine employing 100 persons or more below ground. *Nelson.*

dustplate. A vertical iron plate, supporting the slag runner of an iron blast furnace. *Fay.*

dust precipitator. On a larger scale, sinter plant gas may be cleaned by precipitators with very high efficiencies. The dust is precipitated in a dry state, suitable for pelletizing and feeding back onto the sinter strand. *See also* thermal precipitator. *Nelson.*

dust pressing. *See* dry-pressing. *Dodd.*

dustproofing. A surface treatment, as with oil or calcium chloride solution, to prevent or reduce the dustiness of coal in handling *B.S. 3552, 1962.*

dust recovery; dust collection. The accumulation in a convenient form for handling of solid particles suspended in air or gas. *B.S. 3552, 1962.*

dust-reducing spray compound. This substance forms a crustlike coating over materials which are liable to cause air pollution problems if subjected to erosion. The substance is sprayed on the stockpile and may include coloring matter to identify treated areas. It is designed to make no appreciable change in materials. Used to reduce dust from the commercial or industrial qualities of a large variety of outdoor storage of coal, sulfur, metal ores, etc. *Bests, p. 591.*

dust sampling. The taking of air samples to assess its degree of dustiness, either on a mass basis or on particle count in a known volume of air. Numerous instruments have been developed for this purpose. Dust sampling is also necessary to assess the efficiency of stone dusting. *See also* automatic dust sampler; konimeter; size selector; thermal precipitator. *Nelson.*

dust-sampling impinger. A portable instrument for getting dust samples in order that corrective measures can be taken for dust control and the prevention of respiratory diseases. Dust laden air is impinged in sampling flasks by manual, compressed air, or electrical suction devices. Dust counts are made from the collected air at laboratories with microscopes and counting cells. *Bests, p. 579.*

dust sand. All grains from .025 to .04 millimeter in diameter which are washed out by a stream having a velocity of 1.5 millimeters per second. *A.G.I.*

dust storm. Any wind which picks up and fills the air with dust. In the drier regions, such storms may pick up and carry sand (sand storms) and fine gravel. The loesses of China and the Missouri River region have been formed by dust storms that carried the dust long distances. *Hess.*

dust suppression. The prevention or reduction of the dispersion of dust into the air, for example, by water sprays. *B.S. 3552, 1962.*

dust-suppression jib. A coal-cutter jib designed to conduct water through ducts, or other arrangement, to the back of kerf, to suppress dust and reduce the gas-ignition hazard. *See also* whale-type jib. *Nelson.*

dust-suppression man. A man employed in coal mines to apply measures to allay coal dust on mine roadways and along the coal faces. He may also be in charge of dust suppression in rock drivages. *See also* rock dust, d. *Nelson.*

dust-suppression system. With this system, dust can be suppressed before it becomes airborne. A series of nozzles discharge a chemical compound in a fine spray to materially reduce the amount of water or other liquids necessary to saturate fly ash and eliminate dust. The compound also aids in the diffusion of the liquid dust suppressant, allowing it to penetrate deeper into the material. This system can be used at any point in the handling of bulk materials, wherever dust is a hazard. *Bests, p. 597.*

dusttight. A case so constructed that dust will not enter the enclosure. *ASA M2. 1-1963.*

dust trap. An appliance for the dry collection of dust during drilling in rock. The rock chippings, dust, and air are sucked from the borehole through a rubber hose to a drum-type container with filters. The drum is discharged and the filters renewed periodically. In some of the newer types, the dust is extracted through the hollow drill rods. *See also* C.P. Hemborn dust extractor; Holman dust extractor; wet drill. *Nelson.*

dust well. a. Perhaps the most interesting feature of the surface of the glacier (Igloodahonuyne glacier) was its numerous dust wells, a phenomenon which Nordenskjold brought pointedly to public attention some years since. They are cylindrical tubes penetrating the ice to a depth of 6 to 8 inches, or occasionally a little more. They range in size from tubelets which would scarcely more than admit a lead pencil up to wells a foot or more in diameter. *A.G.I.* b. A pit in glacier or sea ice produced when small dark particles on the ice surface are heated by sunlight and sink down into the ice. *A.G.I.*

dust wetting agent. Chemical compounds which aid in the control of dry dusts such as coal and silica help prevent explosions and respiratory injury to workers. These compounds are of two types. One kind is used in a dry state and controls dust by absorbing moisture from the air. The second type is an agent for increasing the wetting effectiveness of water by breaking the surface tension and permitting the water compound mixture to thoroughly cover the treated area. *Bests, p. 597.*

dusty spray. Dusting of enamel from a gun so that it does not produce a wet film. *Bryant.*

dusty tinplate. Tinplate from which the dust from the branning machine has not been completely removd. *Osborne.*

Dutch bond. The arrangement of brick forming a modification of Old English bond, made by introducing a header as the second brick in every alternate stretching course with a three-quarter brick beginning the other stretching course. This gives alternate stretcher and header courses with alternate stretchers in vertical alinement. *AISI, No. 24.*

Dutch drop. A haulage term used at Anaconda, Mont., for flying switch. *Fay.*

Dutch kiln. An early type of updraft intermittent kiln for the firing of bricks; it had a number of small chimneys in the roof. *Dodd.*

dutch mattress. A mattress constructed of **timber** and reed to protect a riverbed or seabed from scour. *Ham.*

Dutch metal. Low brass, especially in the form of foil; imitation gold leaf. Also called Dutch leaf; Dutch gold. *Webster 3d.*

dutch oven. A combustion chamber built outside and connected with a furnace. *HW See also* forechamber.

Dutch penetrometer. *See* penetrometer. *Long.*

Dutch sieve bend. Stationary screen with close-spaced wedge wire bars across wet pulp feed, set around arc of circle. *Pryor, 3.*

Dutch State mines process. A sink-float process used principally for coal cleaning. The process uses a water suspension of loess (a natural claylike material) in special trough-type separators provided with drag conveyors. *E.C.T., v. 7, p. 297.*

Dutch tile. A flat enameled earthenware tile painted in colors (usually in blue) with inscriptions and designs; often used for decorating chimney pieces and fireplaces. *Standard, 1964.*

dutch twill. A type of wire cloth weave; a weave in which the first shute wire crosses over the first and second warp wires, under the third and fourth warp wires, and the second shute wire crosses under the first warp wire, over the second and third warp wires, under the fourth and fifth, etc. *Henderson.*

duttonite. A vanadium hydroxide, $VO(OH)_2$ or $V_2O_4.2H_2O$; monoclinic; minute pale-brown scales; pseudoorthorhombic. An alteration product of montroseite in sandstone from Colorado. *Spencer 21, M.M., 1958.*

duty. a. A measure of the effectiveness of a steam engine, usually expressed in the number of foot-pounds (or kilogram-meters) of useful work obtained from a given quantity of fuel. *Fay.* b. Of a Cornish pumping engine, the number of pounds of water raised 1 foot high with a consumption of 112 pounds of coal. *Fay.* c. Derb. That part of the ore which belongs to the lord or owner of the mine, usually every thirteenth dish. *See also* due. *Fay.*

duty cycle. For electric resistance welding equipment, the percentage of time that current flows during a specified period. *ASM Gloss.*

duty of giants. It is usually stated to be 1½ cubic yards of gravel per 24 hours for every cubic foot of water per minute used, or in other words, 1 cubic foot of water per minute will treat 1½ cubic yards of gravel per 24 hours. The duty of giants varies considerably with local conditions, such as the height of the gravel banks, the nature of the gravel bedrock, head of water obtainable, size of jet, etc. *Griffith, S. V., p. 95.*

duty of the miner's inch. The number of cubic yards of gravel that can be broken down and sent through the sluice by 1 miner's inch of water for 24 hours. It depends upon the height of the bank, the character of the gravel and the bedrock, the grade of the bedrock, the type of sluice, and the pressure of the water. In well-rounded gravel without large stones, the duty of the miner's inch is from 4½ to 6 cubic yards of gravel for 24 hours. Under less favorable conditions, the duty may range from 2.8 to 4.6 cubic yards for 24 hours. *Lewis, p. 387.*

duty ore. Corn. The landlord's share of the ore. *Fay.*

duxite. A dark brown, opaque resin from the lignite at Dux, Bohemia. Similar to muckite, walchowite, and neudorfite. *A.G.I.*

D-valve. A valve used to control the admission and exhaust of steam in the cylinders of some steam engines. *API Glossary.*

DVM creep limit. Stress producing a creep rate not exceeding 10^{-4} millimeters per millimeter per hour in the 25th to 35th hour. *Osborne.*

DVM test piece. An impact test piece designed for use at low temperatures. It is 55 millimeters times 10 millimeters times 10 millimeters and carries a rounded notch 3 millimeters deep and 2 millimeters in diameter. *Osborne.*

dwarf Brinell tester. A portable ball hardness tester in which the load is applied by means of a vice or lever. It carries a special lens for measuring the diameter of the impression and from which the Brinell hardness value can be read directly. *Osborne.*

dwarf wall. Walls or partitions which do not extend to the ceiling; also, interior walls between the topmost ceiling level and the finished roof level. *ACSG.*

Dwight-Lloyd machine. Sintering machine in which feed moves continuously on articulated grates pulled along by chains in belt-conveyor fashion. Controlled combustion on these grates causes the minerals to sinter. *Pryor, 3.*

Dwight-Lloyd process. Blast roasting in which air currents are drawn downward through the ore mass. *Bennett 2d, 1962.*

Dwight-Lloyd roaster. A multihearthed circular furnace, through which horizontal rabbles revolve and move the feed across each hearth, so that it falls peripherally to the one below and then works inward to central discharge for next hearth below. Rising heat and air provide the roasting conditions. *Pryor, 3.*

Dwight-Lloyd sintering. *See* Dwight-Lloyd process. *Bennett 2d, 1962.*

dy; dytorv; dyjord. Swedish name for reddish sapropel (organic ooze) formed by precipitation of humic substances from brown-colored water. It is characterized by a flocculent colloidal structure. *Tomkeieff, 1654.*

Dy Chemical symbol for dysprosium. *Hand-*

book of Chemistry and Physics, 45th ed., 1964, p. B-1.

Dyas. The Permian series of strata in part of Western Europe, where it comprises two well-marked subdivisions. *Fay.*

dye absorption; dye penetration. A test for porosity in ceramic products that are nominally non-porous. It is applied, for example, to porcelain insulators for which British Standard 137 stipulates that there shall be no sign of dye penetration after a fractured specimen has been immersed for 24 hours in a 0.5 percent solution of fuchsine in alcohol under a pressure of 2,000 per square inch. *Dodd.*

dyed stones. Minerals which are artificially dyed to improve their color or to imitate a more valuable stone. Usually fade or discolor. *Shipley.*

dye line print. A contact print which has largely replaced the blueprints. *Pryor, 3.*

dye penetrant. Penetrant with dye added to make it more readily visible under normal lighting conditions. *ASM Gloss.*

dye penetrant inspection. Used for detecting surface porosity or cracks, more particularly in nonmagnetic substances. The part to be examined is cleaned and coated with a dye which penetrates any small cracks or openings. The surface is then wiped clean and coated with a white powder. The dry powder soaks up the dye which is still held in the defects and thereby indicates their position. *Ham.*

dye penetration. *See* dye absorption. *Dodd.*

Dyer method. A procedure for shaping the socket of a clay sewer-pipe. *Dodd.*

dyestone. *See* Clinton ore. *Fay.*

dyestone fossil. Same as dyestone; fossil ore. *Fay.*

dyestone ranges. Applied to the outcrop of Clinton iron ores extending through Maryland, Virginia, West Virginia, and into Tennessee. *Fay.*

dying out. Applied to veins that gradually get narrower and narrower until they cease entirely. Also called tailing out. *Fay.*

dying shift. The graveyard or night shift. *Pryor, 3.*

dyke. The British spelling of dike. *See also* dike. *Hess.*

dyking. *See* diking. *Schieferdecker.*

dyn Abbreviation for dyne. *BuMin Style Guide, p. 59.*

Dynamagnite. Dynamite with magnesia alba as absorbent. *Bennett 2d, 1962.*

dynamic. Forces tending to produce motion. *Nichols.*

dynamic balance. A condition of rest created by equal strength of forces tending to move in opposite directions. *Nichols.*

dynamic braking. A method of retarding an electric winder or haulage in which a direct current is injected into the alternating-current winder motor stator during the deceleration period; the motor then acts as an alternator and the negative load of the winding cycle is absorbed as electric power and wasted as heat in the controller. Compared with reverse current braking, it saves power, but the energy dissipated in braking is again wasted in the rotor resistance. *See also* electric braking. *Nelson.*

dynamic creep. Creep that occurs under conditions of fluctuating load or fluctuating temperature. *ASM Gloss.*

dynamic damping. Usually found in seismographs or seismometers where damping of motion is desired that is in proportion to the velocity of the moving mass. *A.G.I.*

dynamic electrode potential. The electrode potential measured when current is passing between the electrode and the electrolyte. *Lowenheim.*

dynamic geology. Dealing with the causes and processes of geological change. *A.G.I.*

dynamic head. a. That head of fluid which would statically produce the pressure of a given moving fluid. *Standard, 1964.* b. Total pressure measured in head. *Strock, 10.*

dynamic load. a. An alternating or variable load. *Osborne.* b. *See* live load. *Long.*

dynamic loading. Loading from units (particularly machinery) which, by virtue of their movement or vibration, impose stresses in excess of those imposed by their dead load. *Taylor.*

dynamic magnification. Factor indicating the magnification as a function of V, the indicator magnification, T and T_v. the periods of vibration of the ground and the pendulum respectively, and a factor related to the damping. This factor is not constant as it depends on both periods of vibration (the resonance effect). *Schieferdecker.*

dynamic metamorphism. Metamorphism produced exclusively or largely by rock deformation, principally folding and faulting. Synonym for dynamometamorphism. *A.G.I.*

dynamic method. *See* Young's modulus of elasticity. *Lewis, p. 566.*

dynamic meter. The specific work unit, 10^5 dyne centimeters per gram, necessary to lift the unit mass 1 meter against the force of gravity. *Hy.*

dynamic penetration test. *See* penetration test. *Nelson.*

dynamic pile formula. A formula by which the safe load on a pile is calculated from the energy of the hammer blow and the penetration of the pile under each blow. Hiley's formula is of this type. *Ham.*

dynamic positioning. A deep water drilling method. In this method, a series of outboard engines are mounted on opposite sides of the vessel to give it extreme maneuverability. Position is maintained by automatic centering in a circle of sonar reflectors placed around the drilling target, either on the bottom or suspended by taut wire buoys. Several drilling ships are now equipped with this facility. *Institution of Mining and Metallurgy, Symposium on Opencast Mining, Quarrying, and Alluvial Mining, London, 16-19 November 1964, Paper 7, p. 5.*

dynamic regional metamorphism. Metamorphism which results in the formation of metamorphic rocks, such as schist and gneisses. *Lewis, p. 604.*

dynamics. Mathematics concerned with forces not in equilibrium and therefore, exhibiting free or potential energy. Electrodynamics has to do with electrons; thermodynamics, with atoms and molecules. Particle dynamics is that of moving masses. *Pryor, 3.*

dynamic similarity. This principle states that if a scale model of an hydraulic structure operates at a speed corresponding precisely with that of the full size structure, then resistance, R, density, d, length, 1, and velocity, v, are related as follows:

$$\frac{R_1}{R_2} = \frac{d_1 \times 1_1^2 \times v_1^2}{d_2 \times 1_2^2 \times v^2}.$$

See also dimensional analysis. *Ham.*

dynamic strength. Resistance to impact or vibratory stress. *Osborne.*

dynamic stress. Stress which is suddenly applied and thus tends to produce motion in the part under test, as in the Izod test. *Osborne.*

dynamite. a. An industrial explosive which is detonated by blasting caps. The principal explosive ingredient is nitroglycerin or specially sensitized ammonium nitrate. Diethyleneglycol dinitrate, which is also explosive, is often added as a freezing point depressant. A dope, such as good pulp, and an antacid, as calcium carbonate, are also essential. *See also* blasting gelatin. *CCD 6d, 1961.* b. A general term relating to explosives in which the principal constituent, nitroglycerin, is contained within an absorbent substance. *B.S. 3618. 1964, sec. 6.* c. Nitroglycerin absorbed in kieselguhr, a powerful blasting explosive. Originally contained 75 perecnt nitroglycerin. *Pryor, 3.* d. A composition of detonating character containing nitroglycerin. Detonating character is used with intention, because nitroglycerin enters into the composition of mixtures which are propellants, and which are not dynamite. There are other compositions of matter containing nitroglycerin which are not dynamite, but we cannot have a dynamite which does not contain nitroglycerin. The strength varies according to the percentage of nitroglycerin contained. At present the absorbents are fibrous organic materials; oxygenating compounds added to the nitroglycerin also have some absorbtive power. Frequently called giant powder. *Fay.* e. To charge with dynamite. *Webster 3d.* f. To blow up or shatter with dynamite. *Webster 3d.*

dynamite gelatin. Dynamite made by gelatinizing the nitroglycerin with collodion cotton before the addition of the absorbent. *Bennett 2d, 1962.*

dynamiter. One who uses, or is in favor of using, dynamite or similar explosives for unlawful purposes. *Fay.*

dynamo. A machine for converting mechanical energy into electrical energy by magnetoelectric induction. A dynamo may also be used as a motor. *Webster 2d.*

dynamo exploder. A powerful exploder usually operated by a vertical rack, which, on a downward movement, drives an armature. At the end of the stroke of the rack bar an internal short-circuiting device opens and the current generated by the rapidly revolving armature passes into the shot-firing circuit. Two exploders in common use, Nobel's 30-shot and the Army Mk VII, operate in this way. *See also* exploder. *Nelson.*

dynamogranite. Augen gneiss containing much microline and orthoclase. *A.G.I.*

dynamometamorphism. Same as dynamic metamorphism. *Fay.*

dynamometer. Appliance used in engineering to measure power either as output, input, or transitional. *Pryor, 3.*

Dynamon. A permissible explosive of the ammonium nitrate group. *Stoces, v. 1, p. 119.*

dynamo steel sheet. Sheet made from steel of low hysteresis loss (for example, silicon steel), as used in the manufacture of transformers and other electrical machinery. *Osborne.*

dynamothermal. Pertaining to processes within the earth involving pressure and heat that bring about changes in rocks. *Bateman.*

dynamothermal metamorphism. Metamorphism resulting from combined effects of heat and directed pressure. *A.G.I.*

dyne. The fundamental unit of force in the centimeter-gram-second (cgs) system; the force which, applied to a mass of 1 gram for 1 second, would give it a velocity of 1 centimeter per second. It equals about 1.02 milligrams, or about 1/64 grain. *Standard, 1964.*

Dynobel No. 2. A high strength, low density permitted explosive; no water resistance. It is used for coal blasting in a machine-cut seam of medium hardness in dry conditions. *Nelson.*

dyscrasite. A natural antimonide of silver, Ag_3Sb; color and streak, silver-white; luster, metallic; usually tarnished; Mohs' hardness, 3.5 to 4; specific gravity, 9.74; found in Germany, France, and Canada. An ore of silver. *CCD 6d, 1961.*

dyscrystalline. Descriptive of igneous rocks whose mineral grains are too small to be seen without a microscope, refers to the groundmass of a porphyry. *A.G.I. Supp.*

dysluite. Zinc-managanese-iron, brownish gahnite from Massachusetts and New Jersey. *Shipley.*

dysodile. A fine-textured carbonaceous sediment deposited in deep water under anaerobic conditions. *A.G.I. Supp.*

dysprosium. A rare earth element or lanthanide having atomic number 66. A lustrous silvery metal; hexagonal; valence, 3; atomic weight, 162.50; specific gravity, 8.536; melting point, 1,465° to 1,505° C; boiling point, 2,600° C; reacts slowly with water; and is soluble in dilute acids. Symbol, Dy. *See also* rare earth metals. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-108, B-174.*

dysprosium oxide; dysprosia. A rare earth oxide; white; Dy_2O_3; isometric; specific gravity, 7.81 (at 27° C); and melting point, 2,340° ± 10° C. Used as a nuclear-reactor control-rod component and a neutron-density indicator. *Lee; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-174.*

dystome spar. Synonym for datolite. *Fay.*

dystomic. Having an imperfect fracture or cleavage. *Fay.*

dysyntribite. A name given by C. U. Shepard to a mineral or rock in St. Lawrence County, N.Y., which contains a hydrated silicate of aluminum and potassium and is related to pinite; the name means hard to crush. *Compare* parophite. *Fay.*

dzhalindite. A yellow-brown alteration product of indite, $In(OH)_3$. *See also* indite. *Hey, M.M., 1964; Fleischer.*

dzhezkazganite. An incompletely described mineral from the Dzhezkazgab copper ores, Kazakhstan, U.S.S.R., containing 40 to 50 percent rhenium and 15 to 20 percent copper, probably an alloy or a sulfide; appears to be amorphous to X-rays. Named from the locality. *Hey, M.M., 1964.*

dzhu. Corn. To cut ahead on one side of a face, so as to increase the efficiency of blasting on the remainder. *See also* dissuing; hulk, a. *Fay.*

E

e a. Symbol for the base of the natural (Naperian) system of logarithms, being the *x*th root of the expression $1 + x$, as x approaches the limit 0, and having the approximate numerical value 2.7182818+. *Zimmerman, pp. 15, 64, 132.* b. Symbol for kinematic elasticity. *Zimmerman, p. 40.* c. Abbreviation for electron; symbol for the charge of an electron; electronic charges. *BuMin Style Guide, p. 59; Zimmerman, p. 40.* d. Abbreviation for energy. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-95.* e. Abbreviation for erg. *GPO Style Manual, p. 157.* f. Abbreviation for evaporation. *Zimmerman, p. 42.* g. Symbol for partial pressure of water vapor. *Zimmerman, pp. 118, 425.* h. Symbol for quantity of electricity, especially of an electrostatic charge. *Zimmerman, p. 87.* i. Symbol for single electrode potential. *Zimmerman, p. 40.* j. Symbol for terminal voltage between lines; instantaneous value of an alternating voltage. *Zimmerman, pp. 107, 117.* k. Abbreviation for efficient; efficiency. *Webster 3d.* l. As a subscript, the symbol for effective. *Zimmerman, p. 378.* m. Abbreviation for eccentricity of application of load; symbol for the eccentricity of a curve and of a conic section. *Zimmerman, pp. 39, 129.* n. Abbreviation for exposure. *Webster 3d.* o. Abbreviation for error. *Webster 3d.*

e a. Symbol for an electronic charge; electronic charge equal to and opposite in sign to that of an electron. The symbol $-e$ (minus *e*) is used to denote the negative charge of the electron. *Zimmerman, p. 152, 155, 169.* b. Symbol for the base of the natural (Naperian) system of logarithms, being the *x*th root of the expression $1 + x$, as x approaches the limit 0, and having the approximate numerical value 2.7182818+. *Zimmerman, pp. 145, 151.* c. Symbol for kinematic elasticity. *Zimmerman, p. 185.* d. Symbol for the coefficient of resilience; coefficient of restitution. *Zimmerman, p. 152, 1964.* e. Symbol of quantity of electricity, especially an electrostatic charge. *Zimmerman, p. 171.* f. With subscript, the symbol for single electrode potential. *Zimmerman, p. 171.*

e- Prefix denoting absence or lack of; for example, estriate means not striated. *A.G.I.*

E a. Abbreviation for east; eastern. *BuMin* b. Abbreviation for earth. *Webster 3d.* c. Chemical symbol first suggested for Einsteinium, but Es has replaced it. *CCD, 6d, 1961.* d. Abbreviation for energy; symbol for internal energy for any weight; intrinsic energy for any weight. *Zimmerman, pp. 41, 58, 59.* e. With subscript k, as E_k, the symbol for kinetic energy and with subscript p, as E_p, the symbol for potential energy. *Zimmerman, p. 41.* f. Abbreviation for elasticity; symbol for Young's modulus of elasticity; Young's modulus; modulus of elasticity. *Webster 3d; Zimmerman, pp. 40, 121.* g. Symbol for oxidation-reduction potential. *Webster 3d.* h. Symbol for electrode potential and with a subscript, the symbol for single electrode potential. *Zimmerman, p. 40.* i. Symbol for the electromotive force of voltaic cells. *Zimmerman, p. 40.* j. Symbol for voltage; for terminal voltage between lines; direct or effective value of an alternating voltage. *Zimmerman, pp. 107, 117.* k. Symbol for electric intensity; electric field strength. *Zimmerman, pp. 154, 156.* l. Symbol for illumination. *Zimmerman, p. 56.* m. Abbreviation for evaporation; evaporativity. *Zimmerman, pp. 42, 424.* n. Abbreviation for eccentricity. *Webster 3d.* o. Symbol for entrainment ratio. *Zimmerman, p. 42.* p. Symbol for sound-energy density. *Zimmerman, p. 99.* q. Abbreviation for estimate; estimated; estimated ceiling height. *Zimmerman, pp. 42, 440.* r. Abbreviation for engine; engineer; engineering. *Webster 3d; Zimmerman, p. 41.* s. Abbreviation for equatorial; equatorial air mass. *Zimmerman, pp. 6, 42.* t. Abbreviation for enamel. *Zimmerman, p. 214.* u. Abbreviation for edge. *Zimmerman, p. 237.* v. Abbreviation for entrance. *Webster 3d.* w. Abbreviation for end, for example, E in E to E for end to end. *Zimmerman, p. 202.* x. Symbol for sleet. *Zimmerman, p. 98.*

E a. Symbol for energy; energy in general; total energy; intrinsic energy. *Zimmerman, pp. 145, 155, 170.* b. With the subscript *k*, as E_k, the symbol for kinetic energy; with the subscript *p*, as E_p, the symbol for potential energy; and with the subscript *v* as E_v, the symbol for energy of vibration. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98; Zimmerman, p. 155.* c. Symbol for sound-energy density. *Zimmerman, p. 189.* d. Symbol for Youngs' modulus of elasticity; Young's modulus; modulus of elasticity. *Zimmerman, pp. 160, 167, 366.* e. Symbol for electromotive force; electromotive force of voltaic cells. Enclosed in parentheses, as (*E*), also a symbol for electromotive force. *Zimmerman, pp. 155, 171, 258.* f. With subscript, the symbol for single electrode potential. *Zimmerman, p. 171.* g. Symbol for direct voltage; effective value of an alternating voltage. *Zimmerman, p. 148.* h. Symbol for evaporation. *Zimmerman, p. 148.* i. Symbol for illumination; illuminance or the amount of illumination. *Zimmerman, pp. 158, 190.*

eaglestone. A concretionary nodule of clay ironstone about the size of a walnut that the ancients believed an eagle takes to her nest to facilitate egg-laying. *Webster 3d.* Same as aetite. *Fay.*

ear. a. The inlet or intake of a fan. *Fay.* b. Derb. A small iron loop or ring fixed on the sides of tubs, etc. to which side chains are attached. *Fay.*

earing. The formation of scallops (ears) around the top edge of a drawn part caused by differences in the directional properties of the sheet metal used. *ASM Gloss.*

earlandite. A pale yellow to white hydrated calcium citrate, $Ca_3(C_6H_5O_7)_2.4H_2O$. Fine-grained nodules. In the sediments of Weddell Sea, Antarctica. *English.*

early magmatic deposits. Deposits of magmatic origin formed during the early stages of magma solidification. *Bateman.*

early magmatic ore deposit. Straight magmatic deposits resulting from ore (mineral) crystallization and accumulation during a stage earlier than the crystallization of the rock silicates. *Schieferdecker.*

ears. The crosspiece forming two projections, one on each side of a sprag, near to the handle. The ears prevent the sprag, or drag, which is used to lock the wheels of tubs or trains on inclines, from falling through the spokes. *C.T.D.*

ear shell. The popular name for Haliotis. *See also* abalone. *Shipley.*

earth. a. The solid matter of the globe in distinction from water and air; the ground; the firm land of the earths' surface. *Fay.* b. Loose material of the earth's surface; the disintegrated particles of solid matter in distinction from rock. *Fay.* c. Material which can be removed and handled economically with pick and shovel or by hand, or which can be loosened and removed with a power shovel. *A.G.I.* d. *See* soil. e. Soft shaly or clayey ground when sinking through the coal measures. *Fay.* f. *See* ground.

earth amber. A term rarely used to distinguish mined amber from sea amber. Also to describe amber, the outer portion of which has deteriorated in luster, transparency, and color. *Shipley.*

earth auger. a. A hand-boring tool for testing clays, soils, or shallow deposits. *See also* auger. *Nelson.* b. A dry-sampling device consisting of a helical-fluted rod encased by a cylindrical tube. The fluted rod is equipped with cutting edges, and the cuttings collect and are retained within the tube. *Long.*

earth balsam. A variety of asphalt. *Tomkeieff, 1954.*

earth borer. An auger for boring into the ground, working in a cylindrical box to retain the cut earth until the tool is withdrawn. *Standard, 1964.*

earth coal. a. A name sometimes given to lignite. An earthy brown coal. *Fay.* b. Mineral coal, as distinguished from charcoal. *Webster 3d.*

earth color. A pigment of mineral origin; for example, red iron oxide. *Bennett 2d, 1962.*

earth current. A light electric current apparently traversing the earth's surface but which in reality exists in a wire grounded at both ends, due to small potential differences between the two points at which the wire is grounded. *Standard, 1964.*

earth dam. One built of gravel, earth, broken rock, sand, silt with impervious clay core or facing. *Pryor, 3.*

earth din. An earthquake. *Standard, 1964.*

earth drill. An auger. *Nichols.*

earthed. Means connecting to the general mass of earth in such a manner as will ensure at all times an immediate discharge of electrital energy without danger. *Nelson. See also* grounded.

earthed system. Electrically, one with one neutral point or pole connected to earth. *Pryor, 3.*

earthenware clay. A plastic, fine textured clay, nearly free from lime and gypsum (as they cause blistering); air shrinkage less than 8 percent; slakes in a few minutes or requires grinding which is usually too expensive; no cracking in air; tensile strength, 125 pounds per square inch, or more; incipient vitrification reached between cones 010 and 05; vitrification at least two cones higher; color, burned usually, not important unless very bad; fire shrinkage, 8 percent maximum. *Hess.*

earthfall. A landslide. *Webster 3d.*

earth fault. Electrical short circuit from live conductor to earth. *Pryor, 3.*

earth fault latchout. A feature of an earth fault protective system which requires the earth fault relay to be manually reset. *B.S. 3618, 1965, sec. 7.*

earth fault lockout system. An electrical system whereby a circut is monitored to prevent application or restoration of supply if an earth fault exists. *B.S. 3618, 1965, sec. 7.*

earth fault meter. An instrument for measuring the insulation fault at low voltage without polarization. This instrument is more informative in checking detonators in loaded holes than the insulation meter. *Langefors, p. 146.*

earth fault protection. A system of protection designed to cause the supply to a circuit or system to be interrupted when the leakage current to earth exceeds a predetermined value. Also called earth leakage protection. *B.S. 3618, 1965, sec. 7.*

earth fault tester. An apparatus used to prevent or reduce current leakage to the ground when blasting in conducting ore bodies, in wet shale or clay, and in underwater blasting, especially in salt water. The apparatus has no battery and can be used when loading the hole to check if the conducting wires have become damaged during this operation. *Langefors, pp. 145-146.*

earth flax. An early name for asbestos. *See also* amianthus. *Fay.*

earthflow. A combination of slump and mudflow. *Leet.*

earth foam. The mineral aphrite. A foliated pearly variety of calcite near argentine. The softer varieties approach chalk. *Fay.*

earthing a conductor. Establishing an electrical connection between a conductor and the earth. An important safeguard in electrical installations. *Nelson.*

earthing system. An electrical system in which all the conductors are earth. *Nelson.*

earth leakage protection. A protective system which operates as a result of leakage of current from electrical machines to earth. For electrical apparatus in mines, the usual method of leaking protection is known as the core balance system. This depends for its action on the balance of the currents in three phases. When a fault occurs, the balance is disturbed and the resulting magnetic effect in the transformer core induces a current in the secondary circuit, so energizing the tripping coil and operating the tripping mechanism on the circuit breaker. It may be operated by a leakage current as low as 5 percent of the full load current of tthe circuit. *Nelson.*

earth metal. A metal whose oxide is classed as an earth. *Webster 3d.*

earth movement. A differential movement of the earth's crust; elevation or subsidence of the land. *Webster 3d.*

earth-moving plant. A vast variety of construction equipment, which includes various forms of dozers, excavators, scrapers, scarifiers, and graders. Oversize pneumatic tires, diesel engines, and hydraulic or compressed air servo devices have contributed greatly to advanced designs in this field. *Ham.*

earth of bone. Eng. A phosphate of lime sometimes termed "bone phosphate," derived from bones by calcination. *Fay.*

earth oil. Same as petroleum. *Webster 3d.*

earth pillars. Synonym for hoodoos; pillar. *A.G.I.*

earth pitch. Mineral tar, a kind of asphalt. *Webster 2d.*

earth pressure. The pressure or force exerted by soil on any boundary. *See also* active earth pressure; passive earth pressure; at rest (earth pressure). *ASCE P1826.*

earth pulsation. A slow undulation of the earth's crust so gradual and slight as to escape ordinary observation. *Standard, 1964.*

earthquake. a. A local trembling, shaking, undulating, or sudden shock of the surface of the earth, sometimes accompanied by fissuring of by permanent change of level. Earthquakes are most common in volcanic regions, but often occur elsewhere. *Fay.* b. Groups of elastic waves propagating in the earth, setup by a transient disturbance of the elastic equilibrium of a portion of the earth. *A.G.I.*

earthquake period. The period during which a district is subjected to earthquake shock without any long pause. *Ham.*

earthquake-proof constructions. Buildings of sufficiently strong construction to withstand even heavy shocks. *Schieferdecker.*

earthquake region. Area in which the earthquake is observed. *Schieferdecker.*

earthquake sounds. Sounds in air generated by earthquake waves of audible frequencies. *Leet.*

earthquake waves. The wave motions, in the materials of the earth, originating at the seismic focus; seismic waves. *Challinor.*

earth return circuit. A telegraphic circuit using one transmisison wire, the return current passing through the earth and thereby encountering a low resistance. *C.T.D.*

earth's crust. The external part of the earth, accessible to geological investigation. The use of this term does not necessarily imply that the rest of the earth is not also solid. *Fay.*

earth sculpture. *See* land sculpture. *Fay.*

earths, green; terre verte. Collective name for various pale bluish-green earths formed by the disintegration of minerals, principally those of the hornblende type. Used as pigments. They are somewhat deficient in body and intensity of hue and are now largely replaced by manufactured pigments. *CCD 6d, 1961.*

earth slide. A term applied to the downslope movement of a part of an earth embankment when the distance moved is sufficient to break up the blocks and pulverize the earth enough so that the major part of the moving mass moves in a somewhat fluid manner. *Compare* earth slump. *Bureau of Mines Staff.*

earth slope. The angle of superficial slope naturally assumed by rock debris, earthy detritus, etc., when piled up in mounds or ridges. *Standard, 1964.*

earth slump. A term applied to downslope movement of part of an earth embankment in blocklike masses without other apparent deformation than the change in level. *Compare* earth slide. *Bureau of Mines Staff.*

earth's magnetic poles. Areas in the higher latitudes where the lines of magnetic force converge. *Hy.*

earth stone. A term sometimes applied to mined amber to distinguish it from sea amber. *Shipley.*

earth-tide correction. There are two methods of correcting for the tidal effect. One is to construct daily charts of the tidal variation in gravity with time from readings on a stationary instrument and to correct all readings in the field by means of such charts. The other method is for the observer to return to the base station so often that earth-tide effects will be fully incorporated into the instrumental drift curve. *Dobrin, pp. 234-235.*

earth tilting. A slight movement or displacement of the surface of the ground as in some forms of earthquakes. *Fay.*

earth tremor. A slight earthquake. *Standard, 1964.*

earth wave. Any elastic vibration of the earth, either from natural causes such as earthquakes and storms, or created artificially by traffic, blasting, seismic exploration, etc. Seismologists recognize two main groups of earth waves: (1) body waves which are propagated in all directions through the elastic body of the earth, and (2) surface waves which require discontinuities such as the rock-air interface at the earth's surface for their propagation. Body waves are of two types, P (for primary) compressional or longitudinal waves, and S (for secondary) transverse or shear waves. Among the surface waves are a variety of transverse and rotational types, such as Rayleigh (R), Love (Q), hydrodynamical, and coupled waves. *Stokes and Varnes, 1955.*

earth wax. *See* ozocerite.

earthwork. An excavation or an artificial banking of ground. *Ham.*

earthy. a. In mineralogy, roughish to the touch; dull and lusterless. *Standard, 1964.* b. Consisting of minute particles loosely aggregated; claylike, dull. *Shipley.*

earthy breccia. Proposed by Woodford for an aggregate of angular fragments in which rubble (diameter greater than 2 millimeters), sand, and silt clay are each present in proportion greater than 10 percent. *A.G.I.*

earthy brown coal. A brown, friable mineral, sometimes forming layers in beds of lignite. In general, it is not a true coal, for a considerable part of it is soluble in ether and benzol, and often in alcohol. *See also* leucopetrite; bathvillite. *Fay.*

earthy calamine. An early name for hydrozincite. *Fay.*

earthy coal. *See* earth coal, a. *Fay.*

earthy cobalt. Asbolan, asbolite, black cobalt oxide. Wad with up to 40 percent cobalt oxide. Streak black and shining. *Pryor, 3.*

earthy fracture. A fracture resembling that of a lump of hard clay. *Fay.*

earthy lead ore. A variety of cerussite. *Fay.*

earthy lignite. A lignite with no apparent structure and is soft and friable. *See also* woody lignite. *Nelson.*

earthy manganese. a. Wad. *Hess.* b. *See* bog manganese. *Bennett 2d, 1962.*

easement. a. An incorporeal right existing distinct from the ownership of the soil, consisting of a liberty, privilege, or use of another's land without profit or compensation; a right-of-way. *Fay.* b. A legalized permission granted by the owner to allow movement of drilling equipment across his land and/or to allow borehole-drilling operations to be conducted thereon. *Long.* c. Right, privilege, or grant of use legally recognized, which affects ownership of land, for example, a right-of-way. *Pryor, 3.* d. In surveying, an easement curve is a transition curve. *Pryor, 3.*

easement curve. Commonly known as a transition curve. *Ham.*

easer. One of a number of holes surrounding the cut and fired immediately after it. *B.S. 3618, 1964, sec. 6.*

easer holes. Holes drilled around the cut to enlarge the cut area so that the trimmers may break out the ground to the required dimensions. The positioning and number of the easer holes will depend upon the pattern of the cut shots. *McAdam II, pp. 124-125.*

easing air. The air that is admitted through the feed holes of an annular kiln at one stage in the firing of fletton bricks; the purpose is to check the rapid rise of temperature consequent on the ignition of the organic matter present in such bricks. *Dodd.*

East African pearl. *See* African pearl. *Shipley.*

eastern method. *See* pick and dip.

easting. In surveying, departure or easterly distance from a north-south survey line or datum point. *Pryor, 3.*

Eastman survey instrument. Various models of a particular make of mechanical and photographic borehole-drift indicators; the single-shot models are small enough to be used in EX diamond-drill holes. *See also* drift indicator. *Long.*

easy fired. Clayware, particularly earthenware, is said to be easy fired if it has been fired at too low a temperature and/or for too short a time. *Dodd.*

easy way. Scot. Easiest plane of splitting in granite, Aberdeenshire. *Compare* hardway; second way. *Arkell.*

eat out. a. N. of Eng. To turn a heading or holing to one side in order to mine the coal on the other side of a fault without altering the level course of the heading. *Fay.* b. Said of a seam when the district or working place reaches a fault, or the boundary of old workings, or any other barren part of a mine. *C.T.D.*

eaves course; eaves tile. A course of special size roofing tiles, eaves tiles, for use at the eaves of a roof to obtain the correct lap. *Dodd.*

eaves tiles. *See* eaves course. *Dodd.*

Ebano. Trade name for a residual pitch from Mexican petroleum. *Fay.*

ebb. Gr. Brit. Shallow; for example, a coal seam is ebb when near the surface; the shaft is ebb which is sunk to it. *Webster 3d; Fay.*

ebb-and-flow structure. In sedimentary rocks, a structure characterized by an alternation of crossbedded and horizontally bedded layers thought to be the result of deposition during the ebb and flow of tides. *A.G.I.*

ebb channel. Tidal channel in which the ebb currents are stronger than the flood currents. *Schieferdecker.*

ebb current. The movement of the tidal current away from shore or down a tidal stream. *Schieferdecker.*

ebb tide. A nontechnical term referring to that period of tide between high water and the succeeding low water; falling tide. *Compare* flood tide. *A.G.I.*

E-bit. A nonstandard and now obsolete size of core bit. *Long.*

eboulement. Fr. Adapted from the French for sudden rock falls and earth slips in mountainous regions. *Fay.*

ebuliscope. An instrument for observing the boiling point of liquids, especially for determining the alcoholic strength of a mixture by the temperature at which it boils. *Osborne.*

ebullition. The act, process, or state of boiling or bubbling up. *Webster 3d.*

E casing. Never standard, and now an obsolete size of casing. *See also* Mesabi E casing. *Long.*

eccentric. a. A device for converting continuous circular into reciprocating rectilinear motion, consisting of a disk mounted out of center on a driving shaft, and surrounded by a collar or strap connected with a rod. Rotation of the driving shaft gives the rod a back-and-forth motion. *Standard, 1964* b. A wheel or cam with an off-center axis of revolution. *Nichols* c. A device used on engines for changing the rotary motion of the crankshaft into a reciprocating motion on the slide valve *Crispin* d. Coupled rotating system in which the two members are not coaxial, so that they are rhythmically displaced to a controlled extent at each revolution. *Pryor, 3.*

eccentric bit. A modified form of chisel used in drilling, in which one end of the cutting edge is extended further from the center of the bit than the other. The eccentric bit renders underreaming unnecessary. It is very useful in hard rock. *Fay.*

eccentric-bit load. A bit subjected to a load unevenly distributed and concentrated on one part of the perimeter of the bit face. Also called eccentric-bit pressure; eccentric load; eccentric thrust. *Long.*

eccentric-bit pressure. *See* eccentric-bit load. *Long.*

eccentricity. A load or component of a load normal to a given cross section of a member is eccentric with respect to that section if it does not act through the centroid. The perpendicular distance from the line of action of the load to either principal central axis is the eccentricity with respect to that axis. *Ro.*

eccentric load. A load imposed on a structural member at a point distant from the center of the member, whereby a bending moment is created equal to the load multiplied by the arm. *Ham.*

eccentric pattern. A mode of arranging diamonds set in the face of a bit in such a manner as to have rows of diamonds forming eccentric circles so that the path cut by each diamond slightly overlaps that of the adjacent stones. *Compare* concentric pattern. *Long.*

eccentric press. A mechanical press in which the eccentric and strap are used to move the slide, rather than a crankshaft and connection. *ASM Gloss.*

eccentric signal. Triangulation: Signal placed at some point other than directly over the triangulation station, and not in line with the station and the instrument. *Seelye, 2.*

eccentric station. Triangulation: Point where an instrument is placed for the measurement of horizontal angles when it is not practicable to set up directly over the actual station. *Seelye, 2.*

eccentric thrust. *See* eccentric-bit load. *Long.*

ecdemite. A bright yellow to green lead chlorarsenite, perhaps $Pb_4As_2O_7.2PbCl_2$, occurring as a mineral in crystal or massive form and as an incrustation. Also called heliophyllite. *Fay.*

ECE coal classification. This system utilizing proximate analysis was devised by the Coal Committee of the Economic Committee for Europe. It is based partly on the National Coal Board Code system and partly upon the ASTM coal classification. The parameters used are caking and coking properties for coals containing less than 33 percent of volatile matter, and calorific value on the moist, ash-free basis (30° C, 96 percent humidity) for coals containing more than 33 percent of volatile matter. *Francis, 1965, v. 1, p. 36.*

echadero. Mex. Level place near a mine, where ore is cleaned, piled, weighed, and loaded. Also called patio of the mine. *Fay.*

echar planilla. Mex. Gobbing; packing; filling with waste material. *Fay.*

echelon; en echelon. An arrangement of faults, veins, etc., in which the individuals are staggered like the treads of a staircase. *Ballard.*

echelon cell. Wedge-shaped glass cell used in absorption spectrography. *Pryor, 3.*

echelon faults. Separate faults having parallel but steplike trends; the group having one more or less general direction but with the individuals parallel to each other and at an angle to that direction. Thought to be the result of torsion in a region of differential diastrophism. *A.G.I.*

Echinodermata. The thorny skins, such as starfish, sea urchins, and sea lilies. These creatures have a nervous system as well as a sort of stomach. *Mason, V. 1, p. 26.*

echinoid. One of a group of invertebrates (a class of the echinodermata) which includes the sea urchines and their close allies. *A.G.I.*

echo. An acoustic signal which has been reflected or otherwise returned with sufficient magnitude and time delay to be detected as a signal distinct from that directly transmitted. *Hy.*

echogram. A graphic recording of various sonic devices which shows ocean bottom profiles and delineates the bedding planes and dissimilar rock contacts to a depth of 1,500 feet into the sediments. An echo is generated by the primary sound impulse at each marked change in density of the sediment. The depth below sea level of the contact between the unconsolidated sediments and the bedrock or between rocks of different densities can thus be determined. The graphs are especially useful in locating sediment traps, drowned river valleys, and in the case of submerged beaches, geomorphic forms. *Mero, pp. 20, 22.*

echo ranging. Locating underwater objects by sending sound pulses into water. Target range is derived by measuring transit time of sound pulse. *Hy.*

echo sounder. In oceanography, a sounding apparatus, used in sea water, for determining automatically the depth of sea beneath a ship. It makes use of echo delay, and is operated generally by transmitting an impulse of sound and obtaining an indication of the time elapsing before the return of the echo. *C.T.D.*

eckermannite. An alkali-amphibole, $Na_4Mg_2AlFe'''(Si_4O_{11})_2(O,OH,F)_2$, containing 11.30 percent Na_2O, 2.41 percent K_2O; from Norra Karr, Sweden. *Spencer 17, M.M., 1946.*

eckrite. A variety of soda-amphibole near arfvedsonite in its optical characters but near glaucophane in chemical composition. From Eqe, West Greenland. *Spencer 19, M.M., 1952.*

ecliptic. The apparent yearly path of the sun in the heavens. *Gordon.*

eclogite. A coarse-grained, deep-seated ultramafic rock, consisting essentially of garnet (almandine-pyrope) and pyroxene (omphacites). *C.T.D.*

ecology. The study of animals and plants to gain knowledge regarding their environment. The knowledge is also helpful to the mining geologist. *Nelson.*

economic boiler. An improved form of the Lancashire boiler, in which the hot gases of combustion pass from the main furnace flues through banks of small fire tubes. The boiler occupies less space and for equal evaporation, it is only about half the length of a Lancashire boiler. *Nelson.*

economic coal reserves. The reserves in coal seams which are believed to be workable with regard to thickness and depth. In most cases, a maximum depth of about 4,000 feet is taken, and a minimum thickness of about two feet. The minimum economic thickness varies according to quality and workability. *Nelson.*

economic geology. a. The science of locating and processing ores. *Hurlbut* b. Study of minerals in connection with their utility and possible profitable extraction. Also, study of earth and rocks as these effect engineering projects. *Pryor, 3. c.* The practical application of geologic theories to mining; really mining geology. *See also* geology. *von Bernewitz.*

economic mineral. Any mineral having a commercial value. *See also* ore. *Fay.*

economic ratio. The ratio between steel and concrete in reinforced concrete work, which allows the safe strength of both to be developed. *Nelson.*

economic stripping ratio. A ratio that indicates the economics of opencast mining. It is based on: A equals the value of the ore per ton in pounds; B equals the production costs per ton of ore through to the refined metal stage, but excluding the stripping costs; and C equals the stripping costs per ton of overburden. Thus, the economic stripping ratio equals $\frac{A - B}{C}$. The ratio is a limiting one, for only if the overall stripping ratio is less than that given by the formula will the pit be profitable. For a steeply inclined ore body the ratio will rise to an uneconomic figure fairly rapidly as the ratio of waste to ore increases. *Nelson.*

economizer. An arrangement to preheat the feedwater before it enters the steam boiler. The water flows through a bank of tubes placed across the flue gases as they leave the boiler. *Nelson.*

economy brick. A brick whose nominal dimensions are 4 x 4 x 8 inches. *ACSG.*

ecostratigraphy. The study and classification of stratified rocks with respect to their origin and environment of deposition. *A.G.I. Supp.*

eddy. A circular movement of water. Eddies may be formed where currents pass obstructions or between two adjacent currents vowing counter to each other. *Hy.*

eddy-current brake. Arrangement by which internal currents are induced in a mass of metal as it moves relative to a magnetic field. *Pryor, 3.*

eddy-current testing. A nondestructive testing method in which eddy-current flow is induced in the test object. Changes in the flow caused by variations in the object are reflected into a nearby coil or coils for subsequent analysis by suitable instrumentation and techniques. *ASM Gloss.*

eddy flow. *See* turbulent flow. *Ham.*

eddy loss. Energy lost by eddies as distinct from that lost by friction. *Ham.*

eddy markings. Circular or semicircular markings on bedding planes that may either by concentric or overlap. *Pettijohn.*

eddy rock. York. Quarrymen's and well sinkers' term for false-bedded rocks. *Arkell.*

eddy's theorem. States that the bending moment at any point in an arch is equal to the product of the horizontal thrust and the vertical distance between the line of thrust and the center line of the arch. *Ham.*

edelfall. A German term for a shoot of precious metal ore. *Schieferdecker.*

Edenian. Lower Cincinnatian. *A.G.I. Supp.*

edenite. A light-colored aluminous magnesium-calcium amphibole, $Ca_2NaMg_5(AlSi_7O_{22})(OH,F)_2$; monoclinic. A variety of the mineral hornblende. *Dana 17.*

edge bowl. A hollow bowl about 7 inches deep and containing the slot through which glass is drawn in the Pittsburgh process. *See also* Pittsburgh process. *Dodd.*

edge coal. a. Steeply inclined coal seams. *Nelson.* b. Eng.; Scot. Highly inclined seams of coal, or those having a dip greater than 30°. Also called edge seam. *Fay.* c. An old name for a vertical coal seam. Also called rearing mine. *Tomkeieff, 1954.*

Edge Coal Group. A subdivision of the Lower Carboniferous rocks of the Midland Valley of Scotland. So named from their steep dip where they plunge underground, off the Pentland anticline, to form the East Lothian coalfield. Now frequently known as the Limestone Coal Group. *C.T.D.*

edge dislocation. *See* dislocation. *ASM Gloss.*

edge joint. A joint between the edges of two or more parallel or nearly parallele members. *ASM Gloss.*

edge lining. The painting, by hand or machine, of a colored line around the edge of pottery. *Dodd.*

edge mill. An ore-grinding machine of the Chile mill type. *Webster 3d.* Also called edge runner and chaser. *Fay.*

edge preparation. The trimming of plate edges by mechanical shearing or flame-cutting equipment in preparation for welding. *Ham.*

edger. a. The long piece of timber in a wooden pillar or crib. *See also* crosspiece. *Fay.* b. In forging, the portion of a die which generally distributes the metal in portions required for the shape to be forged, usually a gathering operation. A rolling edger shapes the stock into various solids of revolution; a ball edger forms a ball. *ASM Gloss.*

edge rails. Scot. Rails of rolled iron or steel on the upper edge of which the wheels run. *Fay.*

edge-runner mill. A crushing and grinding unit depending for its action on heavy mullers, usually two in number, that rotate relative to a shallow pan which forms the base; the pan bottom may be solid or perforated. *Compare* end-runner mill. *Dodd.*

edge seam mining. The working of steeply inclined coal seams, many features of which are comparable to metal mining. *See also* stope. *Nelson.*

edge skew. A brick modified so that one side is inclined at an angle other than 90° to the ends. *A.R.I.*

edgestone. A sandstone used for curbing, sills, caps, and coping. *AIME, p. 333.*

edgewater. The water surrounding or bordering oil or gas in a pool. Edgewater usually encroaches on a field after much of the oil and gas has been recovered and the pressure has become greatly reduced. *A.G.I.*

edge well. A well so located as to be at the edge of oil or gas accumulation or at the edge of a lensed reservoir; a well at or near the contact of oil and/or gas and water. *A.G.I.*

edge wheel. *See* edge mill. *Fay.*

edgewise conglomerate. A conglomerate consisting of small, flat pieces of (usually calcareous) rocks packed in such a manner as to lie steeply inclined with reference to the bedding plane of the stratum. *A.G.I.*

edgewise structure. An arrangement of more or less tabular pebbles set at varying and steep angles to the bedding; some such arrangements have been attributed to sliding. *Pettijohn.*

edging. a. In forming, reducing the flange radius by retracting the forming punch a small amount after the stroke but prior to releasing the pressure. *ASM Gloss.* b. In forging, removing flash that is directed upward between dies, usually accomplished in a lathe. *ASM Gloss.* c. In rolling, working metal where the axis of the roll is parallel to the thickness dimension. *ASM Gloss.* d. Grinding the edge of flat glass to a desired shape or size. *See also* centering. *ASTM C162–66.* e. An operation in enamel work that improves the appearance and utility of edges of porcelain-enameled parts, such as brushing the edges or applying black overspray on edges. The process of removing dried cover coat from the edge of a piece of ware to expose an underlying enamel. Edging may also denote the application of colored enamel to the edge after brushing. *Enam. Dict.*

edging brush. A stiff-bristled brush with metal guide, used to remove bisque from edges of ware before the firing operation. *ASTM C286-65.*

edingtonite. A white, grayish-white or pink, hydrous barium and aluminum silicate mineral, perhaps $BaAl_2Si_3O_{10}+3H_2O$. *Fay.*

edinite. Prase. *Shipley.*

edisonite. a. Titanic acid, rutile, occurring in golden-brown, orthorhombic crystals. *Fay.* b. A name proposed for a mottled blue turquoise. *Shipley.*

Edison magnetic separator. Early type of machine in which ferromagnetic particles falling past a magnet were relatively deflected. *Pryor, 3.*

Edison three-wire system. *See* three-wire system. *Kentucky, p. 251.*

edolite. A feldspar-mica-hornfels, sometimes with cordierite and/or andalusite. *See also* astite; aviolite; hornfels; keralite; lyptynolite; proteolite; seebenite. *A.G.I.*

E.D.T.A. method. This method for determining hardness of water which is based on the use of disodium dihydrogen ethylene diamine tetraactetate is fundamentally a colorimetric test and is an advance on the soap method. It gives more accurate results, is simple and quick to use and requires no great skill. It also has the advantage of distinguishing accurately between calcium and magnesium hardness, which is necessary for water treatment control. *Cooper, pp. 378-379.*

eduction pipe. The exhaust pipe from the low-pressure cylinder to the condenser. *Fay.*

eductor. A device for utilizing the cavitation produced at a pipe constriction. It is a pump that is able to pump air as well as water, using water as an operating medium. The eductor consists of a pipe orifice through which water is pumped at a high velocity. *Carson, p. 228.*

Edwards roaster. Furnace with series of horizontal stepped hearths each equipped with stirring rabbles. Used to sweet-roast or desulfurize pyritic concentrates, notably gold-bearing sulfides. Moist to wet feed progresses step by downward step, meeting hot gases produced toward discharge end from burning pyrite. *Pryor, 3.*

eelgrass. A submergent marine plane Zostera marina, which has long narrow leaves. *Hy.*

eenie coal. Scot. Coal slightly altered through nearness to whin, the broken edges of which show bright circular spots more or less distinct, like eyes. *Fay.*

effective acoustic center. The effective acoustic center of an acoustic generator is the point from which the spherical sound waves, observable at remote points, appear to diverge. *Hy.*

effective area of an orifice. The cross sectional area of an orifice, through which liquid flows, multiplied by the coefficient of discharge, a constant depending upon the shape of the orifice. *Ham.*

effective band width. In a measuring system, selectivity responsive to energy distributed in a spectrum, the effective band width is given in terms of a hypothetical system which satisfies two requirements: (1) over its assigned frequency band it has a uniform response equal to the maximum response of the actual system; and (2) the width of this uniform response band is such that, if frequency is plotted to a linear scale, the areas under the response-frequency characteristics of the hypothetical and of the actual systems will be equal. *Hy.*

effective belt tension. That portion of the total tension in a conveyor belt effective in actually moving the loaded belt. It is often referred to as horsepower pull. Effective tension is the difference between tight side tension and slack side tension. The components which become effective tension when added together include the effort to move the load, the effort to rotate the idlers, any snub or bend pulleys, and the takeup assembly, to overcome the resistance created by any sag of the belt between idlers or the internal resistance of the material as it is displaced slightly when passing over the idlers, to operate a tripper if the conveyor is discharged by such means, and to lift the material if the conveyor is inclined upward from the loading point. *ASA MH4.1-1958.*

effective breaking force. A product of the weight, strength and the degree of packing, calculated per volume of a given drill hole. *Langefors, p. 118.*

effective depth. The distance in a beam or slab between the center of the tensile reinforcement and the extreme surface in compression. *Taylor.*

effective diameter. a. The effective diameter of an excavation is the size of that excavation within its stress ring; it includes not only the actual hole in the rock but the destressed loose and semiloose rock which surrounds it. *Spalding.* b. Particle diameter corresponding to 10 percent finer on the grain-size curve. Also called effective size. *ASCE P1826.*

effective drainage porosity. *See* effective porosity. *ASCE P1826.*

effective force. The force transmitted through a soil mass by intergranular pressures. *ASCE P1826.*

effective grounding. In mining, effective grounding means that the path to ground from circuits, equipment, or conductor enclosures is permanent and continuous and has carrying capacity ample to conduct safely any currents liable to be imposed upon it. The path to ground associated with high-voltage alternating-current systems will have impedance low enough to limit potential above ground to a maximum of 100 volts during the flow of ground fault current and to facilitate operation of the circuit protective devices. On low-voltage systems the sustained voltage above ground, appearing on the frames of power utilizing equipment during existence of a ground fault, will not be greater than 35 volts; except when ground circuit check systems requiring higher voltage are used, a maximum of 100 volts for a duration of 0.2 second is permissible. When bonded or mechanically connected track is available, such track is considered the grounding medium for direct current equipment only. *ASA M2.1-1963.*

effective height of a column. A value taken in calculating slenderness ratio which varies from 0.70 times the actual height of the column fully restrained in position and direction to twice the column height for a column fully restrained at one end and free at the other. *Ham.*

effective horsepower. The amount of useful energy that can be delivered by an engine. *Crispin.*

effectively grounded. A term meaning grounded through a grounding connection of low enough impedance (inherent, intentionally added, or both) that fault grounds, which may occur, cannot build up voltages exceeding limits established for apparatus, circuits, or systems. *ASA M2.1-1963.*

effective multiplication factor. *See* multiplication factor. *L&L.*

effective permeability. a. The observed permeability of a porous medium to one fluid phase under conditions of physical interaction between this phase and other fluid phases present. *A.G.I.* b. A measure of the ability of a rock to transmit a given fluid when the rock contains more than one fluid. *Institute of Petroleum, 1961, pp. 20-21.*

effective piece weight. The weighted average weight of the pieces of sink material as found by separating a given coal product at any required specific gravity. This is usually done by dividing the sink pieces into a sufficient number of groups, or cells, so that the weights of the pieces included in a group do not differ widely. *Mitchell, p. 102.*

effective pillar area. The area of solid coal within the fractured and crushed edges of the pillar. The supporting capacity of a coal pillar diminishes progressively as the fracturing extends deeper with the passage of time. *Nelson.*

effective porosity; effective drainage porosity. a. In hydrology, often used in the same sense as specific yield. It is the ratio of the volume of water, oil, or other liquid which, after being saturated with that liquid, it will yield under any specified hydraulic conditions to its own volume. *A.G.I.* b. The property of rock or soil containing intercommunicating interstices, expressed as a percent of bulk volume occupied by such interstices. *A.G.I.* c. The ratio of the volume of the voids of a soil mass that can be drained by gravity to the total volume of the mass. *ASCE P1826.*

effective pressure. *See* effective stress. *ASCE P1826.*

effective rake. The angle between a plane containing a tooth face and the axial plane through the tooth point as measured in direction of chip flow through the tooth point. Thus, it is the rake resulting from the cutter geometry as well as the actual direction of the chip flow. *ASM Gloss.*

effective rate. *See* nominal rate. *Fay.*

effective screen aperture. The cut point (equal errors or partition size) at which a screening process operates in dividing the material treated into two size fractions. *B.S. 3552, 1962.*

effective screening area; open area. Total area of the apertures expressed as a percentage of the useful area of a screen. *B.S. 3552, 1962.*

effective size. *See* effective diameter. *ASCE P1826.*

effective sound pressure. The effective sound pressure at a point is the root-mean-square value of the instantaneous sound pressures over a time interval at the point under consideration. In the case of periodic sound pressures, the interval must be an integral number of periods or an interval which is long compared with a period. In the case of nonperiodic sound pressure, the interval should be long enough to make the value obtained essentially independent of small changes in the length of the interval. *Hy.*

effective span. The distance between the centers of supports, or the clear distance between supports plus the effective depth of the beam or slab, the lesser value being taken. *Taylor.*

effective stress; effective pressure; intergranular pressure. The average normal force per unit area transmitted from grain to grain of a soil mass. It is the stress that is effective in mobilizing internal friction. *ASCE P1826.*

effective teeth. The number of sprocket teeth that engage the chain rollers during one revolution of the sprocket. Applies to sprockets for double-pitch roller chains. *J&M.*

effective temperature. A measure of warmth which is often employed to assess the health and comfort conditions of mine workings. By refrence to a chart, any combination of dry- and wet-bulb temperatures and air velocity can be expressed in terms of effective temperature. Two scales of effective temperature have been devised: (1) a basic scale applicable to person stripped to the waist (that is, hot mines); and (2) a normal scale applicable to normally clothed workmen (that is, normal mine conditions). In general, a working place underground is reasonably comfortable if the effective temperature is below 70 (normal scale) and the air velocity above 200 feet per minute. *See also* dry kata cooling power. *Nelson.*

effective throw. The distance between the nozzle and the point where the jet reaches a maximum height of 5 feet above the nozzle and begins to break up into drops. The effective throw of a jet should be 34 feet. *Sinclair, I, pp. 278-279.*

effective unit weight. That unit weight of a soil which, when multiplied by the height of the overlying column of soil, yields the effective pressure due to the weight of the overburden. *ASCE P1826.*

effervescence. Evolution of gas in bubbles from a liquid. *Shipley.*

effervesce. To bubble and hiss (as of fermenting liquors or carbonated water). *Webster 3d.*

efficiency. a. Mechanical efficiency is the ratio of work output to work input. *Nelson.* b. Labor efficiency is measured in terms of output per hour or per shift. Maximum efficiency is attained by a worker when he accomplishes the maximum amount of work with the least physical exertion. *Nelson.* c. The efficiency of management as a whole is determined by the results obtained, that is, in making the mine a profitable concern with a low accident rate. *Nelson.* d. The efficiency of any machine is the ratio of the useful work output from the machine to the work input to the machine. This is usually expressed as a percentage. *Morris & Cooper, p. 147.* e. Ratio of output energy to that put into a powered system. In assessment of process, percentage reporting as a designated fraction of the total in the feed is spoken of as efficiency, but strictly this is improper usage. *Pryor, 3.* f. Statistically, the variance percent, of a measured performance from a norm stated (perhaps arbitrarily) as 100 percent. *Pryor, 3.* g. With respect to a physical quantity which may be stored, transferred or transformed by a device, the ratio of the useful output of the quantity to its total input is its efficiency. *Hy.* h. A very useful factor in comparing machines. It is a comparison between the brake horsepower and the indicated horsepower. That is, efficiency equals $\frac{\text{BHP}}{\text{IHP}}$ times 100 percent. *Mason, v. 2, pp. 351, 353.* i. The efficiency of a luminous source is the ratio of the total luminous flux emitted to the total power consumed. In the case of electric lamps, it is expressed in lumens per watt. *Sinclair, I, p. 200.*

efficiency engineer. A technical officer who examines processes, methods, and operations in a mine, mill, or smelter, and connecting links with a view to their improvement of maintenance at an agreed operating standard. Today tends to be absorbed into Work Study Group, doing operational research. *Pryor, 3.*

efficiency miner. A term frequently applied to a boss miner, or a contract miner. *Fay.*

efficiency of a rectifier. The ratio of the power output to the total power input. *Coal Age, 1.*

efficiency of screening. The weight of underflow (excluding oversize) expressed as a percentage of the total weight of material below the reference size in the feed. *B.S. 3552, 1962.*

efficiency of separation. In coal washing this maybe expressed as:

$$\text{efficiency} = \frac{\text{Actual yield of clean coal x 100}}{\text{Theoretical yield at the ash content of the clean coal.}}$$

The efficiency of separation thus expresses as a percentage what proportion of the float coal obtained by float-and-sink analysis will be recovered in practice by a particular washer. The theoretical yield is derived by plotting the cumulative yield of the reconstituted feed coal against the appropriate cumulative ash content and reading off the yield corresponding to the ash content of the clean coal actually obtained. *Nelson.*

efficiency of sizing. The weight of material correctly placed above or below the reference size, expressed as a percentage of the weight of corresponding material in the feed. *B.S. 3552, 1962.*

efficiency, organic; efficiency, recovery. The ratio (normally expressed as a percentage) between the actual yield of a desired product and the theoretically possible yield (based on the reconstituted feed), both actual and theoretical products having the same percentage of ash. *B.S. 3552, 1962.*

efficiency performance. Any measure of the accuracy of a separation. *B.S. 3552, 1962.*

efficient airway size. For a given air quantity, the efficient airway size is that above which further enlargement would not produce a significant reduction in pressure absorbed per unit of length. *See also* volumetric efficiency. *Nelson.*

efficient structure. A structure in which the load-bearing members are arranged in such a way that the weights and forces are transmitted to the foundations by the cheapest means consistent with safety and permanency. *Nelson*

effloresce. To change on the surface, or throughout to a whitish, mealy, or crystalline powder from the loss of water of crystallization on exposure to the air. *Webster 3d.*

efflorescence. a. In geology, the formation of crystals by the evaporation of water from solutions brought to the surface by capillarity. Efflorescence is of considerable importance in arid and semiarid regions where crystals of gypsum, calcite salt, mirabilite, natron, etc., form in cracks beneath particles of fragmental rocks, loosening them and allowing them to fall or to be blown away by the wind. *Hess.* b. White to gray, soluble salt deposits which have a crystalline appearance that develops on the surface of ceramic ware after a period of exposure to the weather. *Bureau of Mines Staff.* c. A whitish powder, sometimes found on the surface of masonry by deposition of soluble salts. *See also* scum; scumming. *ACSG.* d. To dry or crystallize into a white powder. *ACSG.*

efflorescent. In mineralogy, forming an incrustation or deposit of grains or powder that resembles lichens or dried leaves; not uncommonly due to loss of water of crystallization. *Fay.*

efflorwick test. A test for the likelihood of the formation of efflorescence on a clay building brick. A cylinder, made by shaping and firing a red clay known to be free from soluble salts, is allowed to absorb any soluble salts dissolved by distilled water from the crushed sample to be tested; the clay cylinder is then dried and examined for efflorescence. *Dodd.*

effluent. a. Applied by Dana to those igneous magmas which discharge from a volcano by way of a lateral fissure. *See also* superfluent; interfluent. *Fay.* b. A liquid, solid, or gaseous product, frequently waste, discharged or emerging from a process. *ASTM STP No. 148-D.*

effluent cave. A cave to be entered at the lower end where a stream issues or is known to have issued. *Schieferdecker.*

effluent seepage. Seepage out of the lithosphere. *A.G.I.*

effluent stream. A stream or reach of a stream is effluent with respect to ground water if it receives water from the zone of saturation. *A.G.I.*

effosion. The digging out from the earth, as of fossils, etc. *Fay.*

effusion. That property of gases which allows them to pass through porous bodies, that is, the flow of gases through larger holes than those to which diffusion is strictly applicable. *Osborne.*

effusive. In petrology, poured out or erupted on the surface of the earth in a molten state, before solidification: said of a certain class of volcanic igneous rocks. *See also* extrusive. *Fay.*

effusive period. The period in the development of an effusive igneous rock between its appearance at the earth's surface and its solidification. *Standard, 1964.*

efydd. A Wales term for copper. *Fay.*

egg coal. a. In anthracite, coal which passes through 3¼- to 3-inch round holes and over 2⁷⁄₁₆-inch round holes. *See also* anthracite coal sizes. *Jones.* b. In bituminous coal, pieces which pass through 4-inch round holes and over 1½-inch round holes (sizes are not uniform but vary with the coalfield). *Jones.*

eggette. *See* briquette. *Fay.*

egg hole. Derb. A notch cut in the wall of a lode to hold the end of a stempel. A hitch. *Fay.*

egg-shaped sewer. An ovoid-shaped sewer placed with its smaller radius down, this shape giving a satisfactory flow when the sewer is nearly empty. *Ham.*

eggshell. a. Very thin translucent porcelain. *ACSG, 1963.* b. **In porcelain enamel,** a semimatte, glaze or porcelain enamel surface resembling eggshell in texture; sometimes a defect. *ACSG, 1963.*

eggshell finish. A practical description of matte surface texture in glass or enamel surfaces. A desired feature in some ground coats. *Enam. Dict.*

eggshelling. The texture of a fired glaze similar in appearance to the surface of an eggshell. *ASTM C242-60T.*

eggshell porcelain. The bodiless porcelain of china, in which the clay body appears as a transparent membrane between two coats of thin, bright glaze. *C.T.D.*

eggshell turquoise. Turquoise with a crackled appearance due to a fine, irregular arrangement of matrix which appears like cracks in an eggshell. *Shipley.*

eggstone. Same as oolite. *Standard, 1964*

E glass. A fiber glass of low alkali content ($\leqq$ 1 percent Na_2O). *Dodd.*

eglestonite. A brownish-yellow, darkening on exposure to black, oxychloride of mercury, Hg_4Cl_2O. Minute, modified deodecahedrons; isometric. Terlingua, Tex. *English.*

eglomise. Back painting or gilding of glass. It is usually protected by metal foil, varnish, or a sheet of glass. The name is derived from an 18th century French picture framer, Glomy, who used the technique. *Haggar.*

egress. a. The provision of two or more exits from a confined space containing machinery to minimize the risk of a person being trapped in the event of an outbreak of fire or escape of steam or noxious gases. The same applies to mine workings. *Nelson.* b. A place of exit. *Jones.*

egueiite. A yellowish-brown basic hydrous phosphate of ferric iron with a little calcium and aluminum, $5(FePO_4)_2.1/3\ Ca_3(PO_4)_2.2Fe(OH)_3.20H_2O$; amorphous; small nodules with fibrous lamellar structure. From Eguei, Sudan. *English.*

Egyptian alabaster. Banded calcite found near Thebes, Egypt. Same material as onyx marble. *Shipley.*

Egyptian asphalt. A glance pitch found in the Arabian desert between the Nile River and the Red Sea. Specific gravity, 1.10 (at 77° F); contains over 99 percent nonmineral content; soluble in carbon disulfide; and melting point, 285° F (ball and ring). *CCD 6d, 1961.*

Egyptian blue. A frit containing many crystals of $CuO.CaO.4SiO_2$ in a glassy, blue to green matrix. It was used to form molded objects in ancient Egypt and in Achaemenid Iran. Also used in powdered form as a pigment for frescoes. *ACSG, 1963.*

Egyptian emerald. Emerald from the ancient Egyptian mines of Gebel Sikait, Gebel Zarbara in northern Etbai, near the Red Sea, which were rediscovered in 1818, but principally produce cloudy stones of light color. *Shipley.*

Egyptianized clay. A clay to which tannin has been added in order to make it more plastic. *CCD 6d, 1961.*

Egyptian jasper. A variety of jasper occurring in rounded pieces scattered over the surface of the desert, chiefly between Cairo and the Red Sea; used as a broochstone and for other ornamental purposes. *C.T.D.* Also called Egyptian pebble.

Egyptian pebble. Synonym for Egyptian jasper. *Fay.*

Egyptian peridot. Term properly applied only to peridot from St. John's Island in the Red Sea. *Shipley.*

Egyptian turquoise. Term properly applied to turquoise found on the Sinai Peninsula, Egypt, from which turquoise has come since Biblical times; usually greenish blue, sometimes fine blue and unusually translucent. *Shipley.*

Ehrhardt powder. Any of a series of explosive mixtures containing potassium chlorate, together with tannin, powdered nutgalls, or cream of tartar. Used for blasting, shells, etc. *Fay.*

EHV *See* extra high voltage.

Eichhorn-Liebig furnace. A handworked muffle furnace. *Fay.*

eiderdown. A sleeping bag used in cold weather by Canadian gold miners. *Hoffman.*

Eimco drill jumbo. The rocker shovel of the Eimco loader is used to support a horizontal drill bar on which the drills or drifters are mounted. The bar is a pneumatic cylinder with telescopic stinger grips at each end. This bar is clamped to the lip of the bucket of the rocker shovel, raising or lowering of the bar being accomplished by means of the bucket elevating mechanism. On the stinger arms, clamps are provided to prevent the arms from retracting should the air supply fail. The load is carried on the stinger ends and no vibration is transmitted to the loader. The bar is made in a full range of sizes for drifts from 6 to 17 feet wide. *Mason, V. 2, pp. 602, 604.*

Eimco rocker shovel. This shovel is widely used for stone loading. Various models are available to meet particular conditions of track gage, mine car size or headroom available. The loading bucket, mounted on a rocker arm, is pushed forward into the pile of debris; the rocker arm is then actuated to swing the loaded bucket over the rocker carriage and to deliver the bucket load into a mine car or, in the case of one of the models, on to a variable-speed belt conveyor which in turn delivers into the mine car. The machines operate on a rail track and, swivelling on the carriage, can sweep across the width of the heading. On raising the bucket for discharge, the device is self-centering. *Mason, V. 2, pp. 607-608.*

einkanter. A pebble with a face cut by windblown sand. The face is formed at right angles to the wind. *Hess.*

einsteinium. A transuranic element, not found in nature. Atomic number, 99; mass number of the most stable isotope known, 254. Discovered in 1952. Produced by the bombardment of uranium 238 by nitrogen nuclei. Symbol, Es or E. *Gaynor; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-109; Webster 3d.*

Eirich mixer. An underdriven wet pan mixer. *Dodd.*

eisenchrysotile. *See* greenalite. *Hay, M.M., 1961.*

eisener hut. Ger. Name for iron hat or gossan. *Weed, 1922.*

eisen platinum. *See* ferroplatinum.

eisenwolframite. Synonym for ferberite. *Hey, M.M., 1961.*

eitelite. A hexagonal mineral, $Na_2O.MgO.2CO_2$; from an oil well in Utah. *Spencer 20, M.M., 1955.*

ejecta; ejectamenta. Material thrown out by a volcano, such as ash, lapilli, and bombs. *A.G.I.*

ejectamenta. Synonym for ejecta. *A.G.I.*

ejected blocks. The larger fragments of a volcanic breccia, generally derived from the internal or subjacent rocks of a volcano, and often highly metamorphosed. *Hess.*

ejector. a. A device which is mounted in such a way that it removes or assists in removing a formed part from a die. *ASM Gloss.* b. A cleanout device, usually a sliding plate. *Nichols.* c. A device in which a high velocity jet acts to entrain mechanically a second fluid to withdraw it from some region of like pressure and to deliver with low turbulence the mixture to a region of higher pressure. *Strock, 10.*

ejector half. In die casting, the movable half of a die containing the ejector pins. *ASM Gloss.*

ejector rod. A rod used to push out a formed piece. *ASM Gloss.*

eka-. A prefix denoting the element occupying the next lower position in the same group in the periodic system. Used in the naming of new elements and unstable radioelements. *C.T.D.*

ekanite. A mineral, $(Th,U)(Ca,Fe,Pb)_2Si_8O_{20}$; metamict, recrystallizing on heating to a tetragonal phase. From Eheliyagoda, Raknapura District, Ceylon. *Hey, M.M., 1961.*

ekerite. An arfvedsonite granite comparatively poor in quartz, containing soda microcline and microperthite, with arfvedsonite and aegirine. The rock is normally equigranular, but passes marginally into ekerite porphyry. *Hess.*

ela. A Ceylonese term for a drain, as around a gem pit. *Bureau of Mines Staff.*

elaeolite; eleolite. A massive form of the mineral nepheline, greenish gray or, when weathered, red in color, usually shapeless, but in some South African syenites exhibiting the hexagonal prismatic form of nepheline. *C.T.D.* It is best known by the rock name eleolite syenite, a synonym for nepheline syenite, but the latter is preferable. *See also* nepheline syenite. *Fay.*

elastic. Capable of sustaining stress without permanent deformation; the term is also used to denote conformity to the law of stress-strain proportionality. An elastic stress or elastic strain is a stress or strain within the elastic limit. *Ro.*

elastic aftereffect. A lagging elastic recovery, of minor proportions, following a decrease in or removal of the load. *See also* anelasticity. *ASM Gloss.*

elastic axis. The elastic axis of a beam is the line, lengthwise of the beam, along which transverse loads must be applied in order to produce bending only, with no torsion of the beam at any section. Strictly speaking, no such line exists except for a few conditions of loading. Usually the elastic axis is assumed to be the line that passes through the elastic center of every section. The term is most often used with reference to an airplane wing of either the shell or multiple-spar type. *Compare* torsional center; flexural center; elastic center. *Ro.*

elastic bitumen. *See* elaterite.

elastic boundary. The boundary of an underground opening which requires no support. The material around this boundary may be considered to be in the elastic state and no pressure need be exerted against the boundary to prevent the material from fracturing and falling into the opening. *Woodruff, v. 1, p. 38.*

elastic center. The elastic center of a given section of a beam is that point in the plane of the section lying midway between the flexural center and center of twist of that section. The three points may be identical and are usually assumed to be so. *Compare* flexural center; torsional center; elastic axis. *Ro.*

elastic constants. a. Certain mathematical constants that serve to describe the elastic properties of matter. *A.G.I.* b. Modulus of elasticity, either in tension, compression, or shear, and Poisson's ratio. *ASM Gloss.*

elastic curve. The curve assumed by the axis of a normally straight beam or column when bent by loads that do not stress it beyond the proportional limit. *Ro.*

elastic deformation. A nonpermanent deformation, after which a body returns to its original shape when the load is released. Often limited to that deformation in which stress and strain are linearly related in accordance with Hooke's law. *A.G.I. See also* deformation.

elastic design. Design of a structure based on working stresses which are about one-half to two-thirds of the elastic limit of the material. For redundant frames, this method of design is replaced by the plastic design. *Ham.*

elastic discontinuity. Boundary between strata that reflects seismic waves. *A.G.I. Supp.*

elastic energy. *See* strain energy. *Ro.*

elastic flow. Flow which decreases logarithmically with time. *Lewis, p. 579.*

elastic hysteresis. Erroneously used for mechanical hysteresis. The effect is inelastic. *ASM Gloss.*

elasticity. The property or quality of being elastic, that is, an elastic body returns to its original form or condition after a displacing force is removed. *A.G.I. See also* Hooke's law.

elasticity of bulk. a. The property possessed by all substances by which they tend to recover their original volume after being compressed or extended. *Hess.* b. The elasticity for changes in the volume of a body caused by changes in the pressure acting on it. The bulk modulus is the ratio of the change in pressure to the fractional change in volume. *See also* elasticity. *C.T.D.*

elasticity of form. The property possessed by solid bodies by which they tend to recover their original form after being distorted. A perfectly rigid body cannot be deformed by any stress. *Holmes, 1928.*

elastic limit. a. Of rock, yield point; maximum stress from which it can recover apparently unchanged. Also called its elastic deformation. If stressed beyond this point there is disruption or permanent deformation. *Pryor, 3.* b. That point or amount of force at which a material will not return to its original length when subjected to a straight pull. When a string of drill pipe is pulled and stretched beyond a point at which it will not return to its original length, it may be said to have been pulled beyond its elastic limit. *Brantly, 2. Compare* proportional limit; apparent elastic limit; yield point; yield strength. c. The greatest stress an elastic solid can sustain without undergoing permanent deformation. *Webster 3d.* d. The greatest stress for which the strain of an elastic body is proportional to the stress. *Webster 3d.*

elastic mineral. A mineral which yields to a bending stress, but when released, it returns to its former position (a plate of white mica). *Stokes and Varnes, 1955, p. 149.*

elastic mineral pitch. Elaterite. *Fay.*

elastic modulus. Modulus of elasticity. *Webster 3d.*

elastic rail spike. A form of rail fastening, of which many designs are available. *Ham.*

elastic ratio. The ratio of the elastic limit to the ultimate strength. *Ro.*

elastic rebound. The recovery of elastic strain. *A.G.I.*

elastci rebound theory. Faulting arises from the sudden release of elastic energy which has slowly accumulated in the earth. Just before the rupture, the energy released by the faulting is entirely potential energy stored as elastic strain in the rocks. At the time of rupture the rocks on either side of the fault spring back to a position of little or no strain. This theory was proposed by Harry Fielding Reid. *A.G.I.*

elastic scattering. *See* scattering. *L&L.*

elasitc solid. A solid that yields to applied force by changing shape or volume, or both, but returns to its original condition when the force is removed. The amount of yield is proportional to the force. *Leet.*

elastic state of equilibrium. A state of stress within a soil mass when the internal resistance of the mass is not fully mobilized. *ASCE P1826.*

elastic strain. Deformation per unit of length produced by a load on a material, which vanishes with removal of the load. *Ham.*

elastic strain energy. *See* strain energy. *ASM Gloss.*

elastic surface waves. Waves which travel only on a free surface where the solid elastic materials transmitting them are bounded by air or water. *Leet, 2, p. 69.*

elastic waves. Mechanical vibrations in an elastic medium. *ASM Gloss.*

elastic zone. In explosion-formed crater nomenclature, the remote zone that undergoes no measurable permanent deformation. *Mining and Minerals Engineering, v. 2, No. 2, February 1966, p. 65.*

elaterite; elastic bitumen. A massive, amorphous, dark-brown hydrocarbon ranging from soft and elastic to hard and brittle. It melts in a candle flame without decrepitation, has a conchoidal fracture, and gives a brown streak. Is obtained from Colorado and Utah. Sometimes known as mineral caoutchouc. *See also* wurtzilite. *Fay; Crispin.*

Elau type E' lamp. This lamp is now in use in France and North Africa. It includes a three-cell nickel-cadmium battery of voltabloc type of 10 ampere-hours capacity, and represents a revolutionary change in alkaline cap lamp design in that the battery is hermetically sealed. No topping-up or flushing-out of the battery is needed and maintenance is thereby eased. *Roberts, II, p. 264.*

elbaite. a. A hypothetical molecule assumed to be present in tourmaline, expressed by the formula $H_8Na_2Li_3Al_3B_6Al_{12}Si_{12}O_{62}$. The pale red tourmaline from San Piero in Campo, Elba, is nearly pure elbaite. *English.* b. Synonym for rubellite. *Hey 2d, 1955.* c. Synonym for ilvaite. *Hey 2d, 1955.*

elbow. a. A fitting that makes an angle between adjacent pipes. The angle is always 90°, unless other angle is stated. Also called ell. *Fay.* b. An acute bend in a lode. *Fay.*

el conveyor. A trough-type roller or wheel conveyor consisting of two parallel rows of rolls or wheels set at a 90° included angle, with one row providing a sloped carrying surface and the other acting as a guard. *See also* roller conveyor; wheel conveyor. *ASA MH4.1-1958.*

El Doradoite. A locally coined trade name for a blue quartz, sometimes cut as a gem stone. From El Dorado County, Calif. *Shipley.*

electret. An electrical analogue of a permanent magnet; a material that is permanently electrified and exhibits electrical charges of opposite sign at its extremities. In order to retain their charge for a long period (days or weeks) ceramic electrets must be polarized at high temperature; materials that have been treated in this way include the titanate dielectrics. *Dodd.*

electric air drill. A type of tripod drill operated by compressed air supplied by a portable motor-driven compressor that accompanies the drill. *Fay.*

electrical conductivity. The numerical equal of the reciprocal of resistivity. The unit of conductivity in mhos per centimeter. *Hy.*

electrical dipole. Displaced center of positive and negative charges. *VV.*

electrical discharge machining. Machining in which metal is removed by an electrical spark in a dielectric fluid. *ASM Gloss.*

electrical disintegration. Metal removal by an electrical spark acting in air. It is not subject to precise control, the most common application being the removal of broken tools, such as taps and drills; hence, the shop name tap buster. *ASM Gloss.*

electrical double layer. Helmholtz layer. Zone which surrounds a particle in aqueous suspension or other electrolyte. Transition zone between the monomolecular zone of shear immediately coupled ionically to the discontinuity lattice at the particle's surface and the normal aqueous phase which exists from 50 to 5,000 angstrom beyond. This zone of change contains a superconcentration of ions drawn from the normal population of the liquid phase. *See also* zeta-potential. *Pryor, 3.*

electrical energy. The energy of moving electrons. *Leet.*

electrical engineer; electrician. An engineer in charge of all electrical plant and associated labor at a mine or colliery. He has an assistant in charge of all the underground electrical equipment, operations and labor. The electrical engineer is under the authority of the colliery manager. *Nelson.*

electrical heat. When a current flows in a circuit which contains resistance, heat is produced and the resistance and conductors of the circuit are raised in temperature. The electric fire and the filament lamp are good applications of this. The heat produced is proportional to the square of the current, that is, twice the current produces four times the heat. *Mason, V. 2, p. 395.*

electrical interlock. A device or contact incorporated in the control circuit and actuated by some other device to cause or prevent a function under certain predetermined conditions of operation. *I.C. 8149, 1963, p. 19.*

electrical line splicer. In petroleum production, one who splices single or multiple conductor cables used in lowering electrical testing or surveying instruments into oil or gas wells or bore holes. Also called cable splicer. *D.O.T. 1.*

electrically suspended gyroscope. Foil-wrapped coils around the gyro create the magnetic fields used to bring the rotor up to operating speed and then are de-energized, allowing the rotor to operate in coasting condition. Abbreviation, esg. *Hy.*

electrical method. A geophysical prospecting method which depends on the electrical characteristics of rocks. There are three main methods, namely, measurement of natural potentials, resistivity methods, and inductive methods. Measurable natural potentials are only found in association with sulfide ores. The resistivity and inductive methods both measure the electrical resistance of a section of the earth. *See also* geophysical prospecting. *Nelson.*

electrical plan. A plan, drawn to the same scale as the working plan, which shows the position of all electrical apparatus installed underground except signals and telephones. *Nelson.*

electrical porcelain. A hard fired vitrified whiteware designed to act as an electrical insulator, as in spark plugs, power terminals, etc. *Enam. Dict.*

electrical potential. Energy required to carry unit charge from an infinite distance to a given point. *Pryor, 3.*

electrical precipitation. The removal of suspended particles from gases by the aid of electrical discharges. The electrical current used may be alternating or direct. The alternating current agglomerates the suspended particles into larger aggregates causing rapid settling, especially if the gases are quiescent. The direct current is used when large volumes of rapidly moving gas, such as occur in smelter flues, are treated. The suspended particles within a strong electric field of constant polarity become charged and are then attracted to a plate (electrode) of opposite charge. *Fay.*

electrical prospecting. Prospecting that makes use of three fundamental properties of rocks. One is the resistivity, or inverse conductivity. This governs the amount of current that passes through the rock when a specified potential difference is applied. Another is the electrochemical activity with respect to electrolytes in the ground. This is the basis of the self-potential method. The third is the dielectric constant. This gives information on the capacity of a rock material to store electric charge, and it must be taken into consideration when high-frequency alternating currents are introduced into the earth, as in inductive prospecting techniques. Electrical methods are more frequently used in searching for metals and minerals than in exploring for petroleum, mainly because most of them have proved effective for only shallow explorations. *Dobrin, pp. 339-340.*

electrical prospecting engineer. In petroleum production, one who designs and develops electrical and electronic instruments and equipment used in petroleum prospecting with the seismograph, magnetometer, or other instruments which detect and measure various physical properties of the earth's crust. Also called electrical engineer, geophysical prospecting. *D.O.T. 1.*

electrical protection. Protection is provided by fuses or other suitable automatic circuit-interrupting devices for preventing damage to circuits, equipment, and personnel by abnormal conditions, such as overcurrent, high or low voltage, and single phasing. *ASA M2.1-1963.*

electrical puncturing. A rock fracturing technique widely applied to secondary fragmentation in quarries. Puncturing, which is similar to arcing in a gas, is characterized by an almost instantaneous action and is accompanied by a mechanical weakening of the dielectric and a lowering of the resistance of the puncture path. If, after puncturing, a high frequency current continues to pass between the contacts, the action of the conduction current and electric field will rapidly heat the rock, leading to thermal puncture in which the dielectric is transformed into a good conductor along the puncture path. Further intensive heating will give rise to thermal stresses sufficient to fracture the rock. *Mining and Minerals Engineering, v. 1, No. 5, January 1965, p. 183.*

electrical resistance inclinometer. An instrument to indicate when a long hole in a coal seam is deviating into the roof or floor. It may be used in underground gasification and pulsed-infusion shotfiring. It uses, inter alia, a pellet of mercury to indicate the gradient by its position along a tube. *Nelson.*

electrical resistance strain gage. An appliance for measuring strain and may be employed in roof-control research. It makes use of the change in electrical resistance of a thin wire when stretched under the influence of strata strain. *See also* acoustic strain gage; mechanical extensometer. *Nelson.*

electrical rock fracture. A rock fracturing technique in which electrical energy is used directly in fracturing the rock either by heating it in a variable electric or electromagnetic field set up in the rock by a high-frequency electric current, or by the direct puncturing of the rock by an electric current. *Mining and Minerals Engineering, v. 1, No. 5, January 1965, p. 182.*

electrical slate. Slate principally of the mica variety. It should have high mechanical and dielectric strength, be readily machinable, and have low porosity. *BuMines Bull. 630, 1965, p. 882.*

electrical steel. A special steel used for making sheets for motors, dynamos and transformers. The steel has low carbon, sulfur, phosphorus and manganese contents, with silicon ranging from 0.3 to 4.3 percent, depending on the particular application. Electrical steel sheets are sold with guaranteed electrical properties and are made in acid open-hearth furnaces. Calcium silicide is used to reduce sulfur contents to the low limits specified for the steel. *Nelson.*

electrical system. A system in which all the conductors and apparatus are electrically connected to a common source of electromotive force. *Nelson.*

electrical twinning. A type of twinning in quartz in which the two or more intergrown parts are related as by a rotation of 180° about the common Z = *c* axis. The separate individuals of the twin are either all right-handed or all left-handed. Electrical twinning cannot be detected by optical tests but can be recognized by etching, X-ray study, pyroelectric tests, or by the distribution of the x (5161) or s (1121) faces. Also known as Dauphine twinning; orientational twinning; 180° twinning. *AM, 1.*

electrical well logging. The process of recording the formations traversed by a drill hole, based on the measurements of two basic parameters observable in uncased holes; namely, the spontaneous potential (S.P.) and the resistivity of the formations to the flow of electric currents. The detailed study in situ of the formations penetrated by a drill hole, based on measurements made systematically by lowering an apparatus in the hole responding to the following physical factors or parameters: (1) the resistivities of the rocks; (2) their porosity; (3) their electrical anisotropy; (4) their temperature; and (5) the resistivity of the drilling muds. *A.G.I.*

electric arc-furnace melter. In the iron and steel industry, one who supervises the operation of a battery of electric arc furnaces in which metal is melted and purified. *D.O.T. 1.*

electric axis. *See* piezoelectric axis. *Hess.*

electric battery. *See* galvanic cell. *H&G.*

electric bell. A simple signaling device in which pressure on a button causes a current, provided by a Leclanché cell, to flow through a small electromagnet. This in turn attracts a strip of soft iron attached to a hammer, the movement of which strikes a blow on a bell. *Nelson.*

electric blasting. The firing of one or more charges electrically, whether electric blasting caps, electric squibs, or other electric igniting or exploding devices are used. *Fay.*

electric blasting cap. a. A device for detonating charges of explosives electrically. It consists essentially of a blasting cap, into the charge of which a fine platinum wire is stretched across two protruding copper wires, the whole fastened in place by a composition sulfur plug. The heating of the platinum wire bridge by the electric current ignites the explosive charge in the cap, which in turn detonates the high explosive. *Fay.* b. Detonator fired electrically. *Pryor, 3.* c. *See* electric detonator. *Nelson.*

electric boosting. An auxiliary method of adding heat to the glass in a gas- or oil-fired tank by passing electric current through the molten glass. *ASTM C162-66.*

electric braking. A system in which a braking action is applied to an electric motor by causing it to act as a generator. *Nelson.*

electric cable. The conducting wires through which an electric current is conveyed to points in and about a mine, where it is required for lighting or motive power. *See also* armored cable. *Nelson.*

electric cable reel mine locomative. *See* electric mine locomotive.

electric calamine. Zinc silicate, or calamine; so called on account of its strong pyroelectric properties, and to distinguish it from smithsonite. *See also* calamine. *Webster 2d.*

electric cap lamp. This lamp consists of a flat portable battery that is strapped around the miner's waist and is connected by an insulated cord to a small electric light and reflector that is fastened on the front of his cap. With this lamp, the miner's hands are always free and the light is directed on the spot where he is working. There are two types of electric cap lamps: those with the lead or acid battery and those with the alkaline or Edison battery. Both types have been approved by the U.S. Bureau of Mines. *Lewis, p. 735. See also* flame safety lamp; safety lamp.

electric cement. Cement consisting of resin, beeswax, and red ocher. Used for cementing brass to glass. *Bennett 2d, 1962.*

electric charge. A property of matter resulting from an imbalance between the number of protons and the number of electrons in a given piece of matter. The electron has a negative charge; the proton, a positive charge. Like charges repel each other; unlike, attract. *Leet.*

electric coal cutter. A coal cutter operated by an electric motor; used in coal mines. *C.T.D.*

electric coal drill. An electric motor-driven drill designed for drilling holes in coal for placing blasting charges. *ASA C42.85:-1956.*

electric controller. The device used for starting and controlling an electric motor on a mining belt conveyor. *NEMA MB1-1961.*

electric crab reel mine locomotive. *See* electric mine locomotive.

electric detonator. In the electric detonator, a fusehead assembly replaces the safety fuse and, when an electric current is passed through the fusehead, it ignites a flashing composition which, in turn, initiates the explosive charge in the detonator. A typical modern electric detonator consists of four main components, namely: (1) the detonator tube containing the explosive charge; (2) the fusehead; (3) the neoprene plug closure; and (4) the leading wires. *McAdam II, p. 53.*

electric drill. A mechanically operated drill employing neither compressed air nor steam, but driven by an electric motor. Used chiefly in mining operations. *Fay.*

electric ear. System used to control grinding rate in a ball mill; a microphone listens to the grinding sound and maintains this by varying the rate of new feed to the mill. *Pryor, 3.*

electric emerald. A glass imitation of emerald. *Shipley.*

electric exploder. A former designation for electric blasting cap. *Fay.*

electric explosion-tested mine locomotive. An electric mine locomotive equipped with explosion-tested equipment. *ASA C42.85:-1956.*

electric eye; electric ear. The former is a photoelectric cell arranged in connection with monitoring flow, turbidity, height of material in ore bin, etc.; the latter is a microphonic signal using noise level to check loading of ball mill. *Pryor, 4.*

electric-eye method. A method of finding large diamonds in which the dry crushed ore is screened to remove minus 1½-inch material and passed in a thin layer on a moving belt. The belt passes through a band of intense polarized light which, if reflected from a large diamond, actuates a photoelectric cell. The impulse can stop the belt, sound an alarm, or otherwise call attention to the presence of a large diamond. It is expected that this device can also be used for separating smaller diamonds. *I.C. 8200, 1964, p. 74.*

electric furnace. A furnace using electricity to supply heat. *Mersereau, 4th, p. 458.*

electric furnaces for melting and refining metals. Several types of electric furnace are used in the metallurgical industries, both ferrous and nonferrous; all these furnaces are lined with refractory materials, the larger furnaces generally being bricked, the smaller furnaces usually having a monolithic refractory lining which is rammed into place. The chief types of such furnaces are: direct arc, in which the electric current passes through the charge; indirect arc, in which the arc is struck between the electrodes only; induction furnace, in which the metal charge is heated by eddy-currents induced in it. Induction furnaces may be operated at high frequency (h.f. induction furnaces) or at low frequency (l.f. induction furnaces). *Dodd.*

electric fuse. A metallic cup, usually containing fulminating mercury, in which are fixed two insulated conducting wires held by a plug, the latter holding the ends of the wires near to but not touching each other. At this plug is a small amount of a sensitive priming. When an electric current is sent from the battery through these conductors, the resulting spark fires the priming, then the fulminate and the charge of the explosive proper. *Stauffer.*

electric gathering mine locomotive. An electric mine locomotive, the chief function of which is to move empty cars into, and to remove loaded cars from, the working places. *ASA C42.85:1956. See also* gathering locomotive.

electric haulage mine locomotive. An electric mine locomotive used for hauling trains of cars, which have been gathered from the working faces of the mine, to the point of delivery of the cars. *ASA C42.85:1956.*

electric hoist. *See* electric winder.

electric-hoist man. *See* hoistman. *D.O.T. 1.*

electric horsepower. Equal to 746 watts. *Crispin.*

electrician. A person appointed in writing by the manager of the mine to supervise the working and maintenance of electrical apparatus in the mine. *See also* electrical engineer. *Nelson.*

electrician's solder. Rosin fluxed tin-lead alloys with a low melting point. *Bureau of Mines Staff.*

electric ingot process. A continuous method of melting and casting metal with progressive solidification. The molten metal is completely protected from the atmosphere. There is minimum segregation, and as no refractory linings are used there is no contamination. Sound ingots with high yield and no pipe are produced, and as the method possesses extreme flexibility it is possible to make small as well as relatively large ingots. *Osborne.*

electricity. A material agency which, when in motion, exhibits magnetic, chemical, and thermal effects and which, whether in motion or at rest, is of such a nature that when it is present in two or more localities, within certain limits of association, a mutual interaction of force between such localities is observed. Recent investigations indicate that it is discrete or granular in nature and that there may be two kinds, positive and negative. In general, its effects differ according to whether it is at rest or in motion. At rest it is called static; is usually produced by friction; manifests itself chiefly in attractions and repulsions and in violent discharges like lightning; does not produce currents; and has no use in the arts. In motion it is called dynamic or current electricity and this form has been widely developed. *Standard, 1964.*

electric lamps. *See* cap lamp; hand electric lamp. *Nelson.*

electric locomotive. a. A locomotive in which the driving power is supplied by electric motors, supplied either from a battery (battery locomotive), from a diesel-driven generator mounted on a vehicle (diesel electric locomotive), or from a contact wire or rail (track electrification). *C.T.D.* Also called a motor and used in mine haulage. *Fay. See also* electric mine locomotive. b. The electric locomotives used in pit and quarry service are arranged to operate from an overhead trolley wire, from a third rail alongside the running rains, from a storage battery mounted on the locomotive chassis, or even the combinations of trolley or third rail with battery. *Pit and Qua y, 53rd sec. A, p. 114.*

electric log. The log of a well or borehole obtained by lowering electrodes in the hole and measuring various electrical properties of the geological formations traversed. Electrical current is introduced by a number of methods. *A.G.I. See also* microlog.

electric logging. a. A technique originally devised by the Schlumberger brothers, in which electrical measurements are made, and recorded at the surface, while a series of electrodes or coils is caused to traverse a borehole. The resulting curves can be used for purposes of geological correlation, and under favorable circumstances also for the recognition of some rock properties and for indicating the nature and amount of the fluids in the pores of the rock. *Institute of Petroleum, 1961.* b. The act or process of taking resistivity, porosity, electrical anisotrpy, etc., measurements in a borehole using an electromagnetic teleclinometer or other electrode device. Also called electrical logging. *Long.*

electric master fuse. *See* multifuse igniter. *Nelson.*

electric mine locomotive. An electric locomotive designed for use underground; for example, in such places as coal, metal, and salt mines, tunnels, and in subway construction. The following types are defined by the American Standards Association: (1) combination type—a locomotive which receives power either from a trolley wire distribution system or from a storage battery carried on the locomotive; (2) storage battery type—a locomotive which receives its power supply from a storage battery mounted on the chassis of the locomotive; (3) trolley type—a locomotive which receives its power supply from a trolley wire distribution system; (4) permanent tandem type—two locomotive units permanently connected together and provided with one set of controls so that both units can be operated by a single operator; (5) separate tandem type—two locomotive units which can be coupled together and operated from one controller as a single unit, or else separated and operated as two independent units; (6) crab reel type—a locomotive equipped with an electrically driven winch, or crab reel, for the purpose of hauling cars by means of a wire rope from places beyond the trolley wire; and (7) cable reel type—a locomotive equipped with a reel for carrying an electric or conductor cable which is used to conduct power to the locomotive when operating beyond the trolley wire. *See also* locomotive; electric locomotive; mine locomotive; electric haulage mine locomotive; electric permissible mine locomotive; electric gathering mine locomotive. *ASA C42.85:1956.*

electric motor. *See* motor. *Nelson.*

electric mule. Electric motor. *Korson.*

electric permissible mine locomotive. An electric locomotive carrying the official approval plate of the U. S. Bureau of Mines. *ASA C42.85:1956.*

electric polarization. Dipole effect given to electrically neutral atom when its component electrons are displaced in an electric field. *Pryor, 3.*

electric powder fuses. These fuses were designed so that electrical shotfiring methods could be used for initiating blasting powder. The powder fuse consists of a thick paper tube containing a small charge of blasting powder, with an ordinary low-tension fusehead fixed at one end. On passing electric current through the fusehead it flashes and sets off the blasting powder in the tube, which can then initiate the main charge of blasting powder in the shot hole. *McAdam II, p. 59.*

electric precipitation. The collection of suspended dust by causing the particles to become electrically charged in such a manner, as to attract each other and to form aggregates so large as to cause them to settle. *Bureau of Mines Staff.*

electric prospecting instruments. Geophysical prospecting instruments which measure the electrical characteristics of rocks. *Nelson.*

electric resistance. The opposition of an electric circuit to the flow of current. *Kentucky, p. 263.*

electric resistance strain gage. This gage consists essentially of a grid of fine wire cemented to a paper membrane which can be attached to the surface under investigation. The ends of the wire grid are spot welded to a metal strip for the terminal connections. The use of these gages depends upon the fact that certain alloys show a linear relationship between applied strain and electrical resistance, so that if a wire constructed from one of these alloys is fixed to the surface of an object subject to variable strain, the change of resistance in the wire will be a measure of the change of strain in the object. *Isaacson, pp. 209-210.*

electric rotary drill. A hand-held rotary drill driven by an electric motor and may be used in rock or coal. It may be of fan-cooled design with several rod speeds to suit different rocks. The use of aluminum or aluminum alloys is not favored where methane is liable to be present. This drill produces considerably less dust than the percussive drill. *Nelson.*

electric shock. Accidents from electricity are common in and around mines. Electricity causes shock by paralyzing the nerve center that controls breathing or by stopping the regular beat of the heart. Some symptoms of electric shock are sudden loss of consciousness, absence of respiration or respiration that cannot be detected, weak pulse, and probable burns. *Kentucky, p. 362.*

electric-shovel-crane man. *See* shovel-crane man. *D.O.T. 1.*

electric shovels. Most of the larger modern machines are electrically driven and are equipped with the Ward-Leonard system of control, which allows alternating current of fairly high voltage to be carried to the shovel over a very flexible electric cable. This cable is usually carried on a sled back of the shovel or on a reel on the shovel base. The current drives an alternating current motor, which is connected to, and drives, direct current generators, one for each of the operations of the shovel, and an exciter. Each direct current generator and the direct current motor which it drives are in a closed circuit. The field in each circuit is regulated by magnetic contactors or by rotating controls actuated by master controllers at the operator's position. *Pit and Quarry, 53rd, Sec. A, pp. 91-92.*

electric slope engineer. In bituminous coal mining, one who operates a hoist powered by electricity to haul loaded and empty cars along a haulage slope to surface of mine. *D.O.T. 1.*

electric sponge. An electric centrifugal pump consisting of a small vertical centrifugal pump so designed that it will draw water if it is only 2 or 3 inches deep. It is placed in the water at the bottom of a shaft and lifts the water up to a horizontal centrifugal pump placed about 50 feet above. *Lewis, pp. 186-187.*

electric squib. A small shell containing an explosive compound that is ignited by the electric current brought in through the lead wires. Used for firing single small holes loaded with black powder. *Lewis, p. 117.*

electric steel. Steel made in the electric furnace. *Mersereau, 4th, p. 458.*

electric storage battery locomotive. *See* battery locomotive. *Nelson.*

electric survey. *See* electric log; electric logging. *Long.*

electric system. A system that includes all electric equipment and circuits that pertain to operation of the mine and that are under the control of the mine officials. *ASA M2.1-1963.*

electric traction. The haulage of vehicles by electric power, derived from overhead wires or third rail, storage batteries, or from diesel-driven generators mounted on the vehicles. *Ham.*

electric trolley locomotive. *See* electric mine locomotive.

electric welding. A process of welding in which the parts to be joined are heated to fusion by an electric arc (arc welding) or by the passage of a large current through the junction; used in uniting steel rails, tubing, etc. *See also* thermite. *Fay.*

electric wheel. A wheel containing the motor and all the required gearing so that it is an independent drive unit. A vehicle may be equipped with four such units to obtain four-wheel drive. *Woodruff, v. 3, p. 511.*

electric winder. A winder or hoist driven by a direct current or alternating current electric motor. The direct current motor with Ward-Leonard control is perhaps the most common for winders of about 1,000 horsepower and over. The electric motor is very suitable for the Koepe winder because it provides a uniform driving torque which minimizes the possibility of rope slip. *Nelson.*

electroacoustic transducer. A transducer for receiving waves from an electric system and delivering waves to an acoustic system or vice versa. *Hy.*

electroanalysis. Use of electrolysis or conductometery in instruments, such as a polarograph, or a spectrograph (sorption or emission) in quantitative and qualitative analysis. Also, deposition of metal on a weighted cathode in the gravimetric method of electroanalysis. *Pryor, 3.*

electrobrightening. A process of reversed electrodeposition which, in certain conditions, results in anodic metal taking on a high polish. *C.T.D.*

electrobronze. To electroplate with bronze. *Standard, 1964.*

electrocast brick. A refractory material made by fusing refractory oxides in an electric furnace and pouring the molten material into molds to form finished shapes. *A.R.I.*

electrocast process. A method of producing refractory materials in the desired form by mixing the raw materials in the requisite proportions, heating to fusion in an electric furnace, and casting. *Osborne.*

electrocement. Cement made by adding lime to molten slag in an electric furnace. *Bennett 2d, 1962.*

electroceramics. A group of ceramic materials of various compositions having electrical and other properties that render them suitable for use as insulators for power lines and in many electrical components. In terms of tonnage made, electrical porcelain is the most important; more specialized types include cordierite, steatite, titanate ceramics and zircon porcelain. *Dodd.*

electrochemical. Chemical action employing a current of electricity to cause or to sustain the action. *Crispin.*

electrochemical corrosion. Corrosion which occurs when current flows between cathodic and anodic areas on metallic surfaces. *ASM Gloss.*

electrochemical equivalent. The weight of an element, compound, radical, or ion involved in a specified electrochemical reaction during the passage of a unit quantity of electricity, such as a faraday, an ampere-hour, or a coulomb. *Lowenheim.*

electrochemical series. Same as electromotive force series. *ASM Gloss.*

electrochemistry. a. Technique that uses electrical action to promote chemical change. *Pryor, 3*. b. That of electrolysis, ion behavior in ionizing solvents. *Pryor, 3, p. 80.*

electrocopper. To plate or cover with copper by means of electricity. *Fay.*

electrode. a. Conducting body that is brought in conducting contact with the ground. *Schieferdecker.* b. The conductor by which current enters and leaves an electrolyte when subjected to an externally impressed potential. *H&G.* c. A conductor (as a metallic substance or carbon) used to establish electrical contact with a nonmetallic portion of a circuit (as in an electrolytic cell, a storage battery, an electron tube, or an arc lamp). *See also* anode; cathode. *Webster 3d.* d. In arc welding, a current-carrying rod which supports the arc between the rod and work, or between two rods as in twin carbon-arc welding. It may or may not furnish filler metal. *See also* bare electrode; carbon electrode; coated electrode. *ASM Gloss.* e. In resistance welding, a part of a resistance welding machine through which current and, in most cases, pressure are applied directly to the work. The electrode may be in the form of a rotating wheel, rotating roll, bar, cylinder, plate, clamp, chuck, or modification thereof. *ASM Gloss.* f. An electrical conductor for leading current into or out of a medium. *ASM Gloss.*

electrode burn-off rate. The rate at which an electrode is consumed by an arc in units of mass per time per arc power. *BuMines Bull. 625, 1965, p. VII.*

electrode cable. Same as electrode lead. *ASM Gloss.*

electrode configuration. Pattern in which the electrodes are set up. *Schieferdecker.*

electrode consumption rate. The rate at which an electrode is consumed by an arc in units of mass per time per arc current. *BuMines Bull. 625, 1965, p. VII.*

electrode deposition. The weight of weld metal deposit obtained from a unit length of electrode. *ASM Gloss.*

electrode force. The force between electrodes in spot, seam, and projection welding. *ASM Gloss.*

electrode holder. A device used for mechanically holding the electrode and conducting current to it. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.*

electrode lead. The electric conductor between the source of arc-welding current and the electrode holder. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.*

electrode melting rate. The rate at which an electrode is consumed by an arc in units of mass per time. *BuMines Bull. 625, 1965, p. VII.*

electrodeposition. The deposition of a substance upon an electrode by passing electric current through an electrolyte. Electroplating (plating), electroforming, electrorefining, and electrowinning result from electrodeposition. *ASM Gloss.*

electrode potential. a. The potential difference at the surface of separation between the electronic and electrolytic conductors which make up the electrode. In the terminology of corrosion it is sometimes called the open-circuit potential. *BuMines Bull. 619, 1964, p. 206.* b. The potential of a half-cell as measured against a standard reference half-cell. *ASM Gloss.*

electrode reaction. The chemical reaction taking place at an electrode in contact with a solution; the reaction consists of the addition of electrons from the electrode to a substance in the solution, or the removal of electrons by the electrode from a substance in solution. *A.G.I.*

electrode ring. Special refractory shapes, in the roof of an electric arc steel furnace, forming an opening through which an electrode is inserted. *See also* bull's-eye. *Dodd.*

electrode skid. In spot, seam, or projection welding, the sliding of an electrode along the surface of the work. *ASM Gloss.*

electrode spacing. Distance between successive electrodes. *Schieferdecker.*

electrodialysis. Dialysis accelerated by an electromotive force applied to electrodes adjacent to the membranes. Useful in removing electrolytes from naturally occurring colloids. *Webster 3d.*

electroendosmosis. The movement of fluids through porous diaphragms caused by the application of an electric potential. *Lowenheim.*

electroextraction; electrowinning. The application of electrolysis to recover metal from its salts. *Nelson.*

electrofiltration. The electromotive force set up between the two sides of the sheet when an electrolyte is forced through a sheet of some pervious solid dielectric. This electromotive force is proportional to the pressure, to the electrical resistivity of the liquid, and inversely proportional to its viscosity. *Lewis, p. 321.*

electrofiltration potential. Potential that is set up when a solution is forced through a porous medium. *Schieferdecker.*

electroforming. Making parts by electrodeposition on a removable form. *ASM Gloss.*

electrofusion. The process of fusion in an electric furnace. *See also* fusion casting. *Dodd.*

electrogalvanizing. The electroplating of zinc upon iron or steel. *ASM Gloss.*

electrographic. The effect of cathode rays on a metal surface, by which the metal becomes less sensitive to the action of etching vapors. *Hess.*

electrokinetic potential. *See* zeta potential. *Webster 3d.*

electroless plating. Immersion plating where a chemical reducing agent changes metal ions to metal. *ASM Gloss.*

electroluminescence. Luminescence which is activated by an electrical potential. *VV.*

electrolysis. a. Chemical change resulting from the passage of an electric current through an electrolyte. *ASM Gloss.* b. Transfer or transport of matter through a medium by means of conducting ions. The medium may consist of fused slats or conducting solutions which permit free movement of ions toward the countercharged electrodes immersed in the system. Faraday's laws state: (1) the weight of material changed at each electrode is proportional to the quantity of electricity passed through the solution, and (2) the weights of material changed at the different electrodes are proportional to the equivalent weights of the substances changed. Electrolysis causes chemical decomposition when passage of a current causes ions to move toward oppositely charged electrodes, where they may be discharged, liberated, deposited, or chemically reacted. *Pryor, 3.*

electrolyte. a. A nonmetallic electric conductor (as a solution, liquid, or fused solid) in which current is carried by the movement of ions instead of electrons with the liberation of matter at the electrodes; a liquid ionic conductor. *Webster 3d.* b. A substance (as an acid, base, or salt) that, when dissolved in a suitable solvent (as water) or when fused, becomes an ionic conductor. *Webster 3d.* c. For ceramic applications, an electrolyte is a substance capable of dissociating partly or completely into ions in water. For clay dispersions, the basic electrolytes promote deflocculation while the acidic electrolytes produce the opposite effect, flocculation. *Lee.*

electrolytic. Of or relating to electrolysis or an electrolyte; produced by electrolysis. *Webster 3d.*

electrolytic brightening. Same as electropolishing. *ASM Gloss.*

electrolytic cell. a. An assembly, consisting of a vessel, electrodes, and an electrolyte, in which electrolysis can be carried out. *ASM Gloss.* b. A voltaic cell to which an external electromotive force greater than the electromotive force developed by the voltaic cell is impressed across the electrodes. *H&G.*

electrolytic cleaning. Removing soil from work by electrolysis, the work being one of the electrodes. The electrolyte is usually alkaline. *ASM Gloss.*

electrolytic conduction. The conduction of electricity accompanied by the actual transfer of matter (migration of ions), which is shown by the occurrence of chemical changes at the electrodes. *C.T.D.*

electrolytic copper. Copper which has been refined by electrolytic deposition, including cathodes which are the direct product of the refining operation, refinery shapes cast from melted cathodes, and, by extension, fabricators' products made therefrom. Usually when this term is used alone, it refers to electrolytic tough pitch copper without elements other than oxygen being present in significant amounts. *ASM Gloss.*

electrolytic corrosion. Galvanic action caused by electrical contact of two different metals in presence of an electrolyte, so that an electromotive force is set up. *Pryor, 3.*

electrolytic deposition. a. The production of a metal from a solution containing its salts by the passage of an electric current through the solution. In electrorefining, the operation is carried out in an electrolytic cell in which the metal is deposited upon the cathode or starting sheet. *Henderson.* b. Same as electrodeposition. *ASM Gloss.*

electrolytic dissociation; ionization Dissociation in a solvent of molecules of the dissolving substance as cations and anions. *Pryor, 3*

electrolytic dissolution. The act or process of dissolving the diamond matrix metal in the crown of a bit utilizing the chemical decompositional effects of a direct electrical current on a metal object submerged in an acidic solution. *Long.*

electrolytic iron. A very pure iron produced by an electrolytic process. It has excellent magnetic properties and is often used in magnet cores. *Crispin.*

electrolytic lead. Lead refined by the Betts process; has purity of about 99.995 to 99.998 percent lead. *C.T.D.*

electrolytic machining. A combination of grinding and machining where a metal-bonded abrasive wheel, usually diamond, is the cathode in physical contact with the anodic workpiece, the contact being made underneath the surface of a suitable electrolyte. The abrasive particles produce grinding and act as nonconducting spacers permitting simultaneous machining through electrolysis. *ASM Gloss.*

electrolytic pickling. Pickling where electric current is used, the work being one of the electrodes. *ASM Gloss.*

electrolytic polishing. To produce a smooth bright surface on (metal) by immersion as an anode in an electrolytic bath. *Webster 3d.*

electrolytic powder. In powder metallurgy, powder produced either by electrolytic deposition, by the pulverization of an electrodeposit, or from metal made by electrodeposition. *ASM Gloss.*

electrolytic process. a. A process employing the electric current for separating and depositing metals from solution. The process has many modifications and is used for (1) recovering metals as tin from scrap, (2) refining as of copper for electroplating, (3) recovering metal from ore as by a combination of leaching, and (4) electrolytic deposition. *Fay.* b. As used by the diamond-bit-setting industry, the process in which the chemical decompositional effects of subjecting metal objects immersed in an acidic solution to a flow of direct electric current is utilized to dissolve the metal in the crown of a worn diamond bit to free and salvage the diamonds. *Long.*

electrolytic protection. *See* cathodic protection. *ASM Gloss.*

electrolytic reduction. Removal of oxygen (or decrease of its active valency in the case of a positive element) by electrical means. *Pryor, 3.*

electrolytic refining. Suspension of suitably shaped metal ingots as anodes in an electrolytic bath, alternated with sheets of the same metal in a refined state which act as starters or cathodes. Impurities remaining on the anodes are detached as anode slime, or are dissolved in the electrolyte from which they must be systematically removed (stripped). *Pryor, 3.*

electrolytics. The extraction and refining of metals by the use of electric currents. *Newton, p. 449.*

electrolytic solution pressure. Equilibrium between electrostatic attraction and ionic diffusion when a metal is immersed in an electrolyte which contains its ions. *Pryor, 3.*

electrolytic wirebar. Copper ingot electrolytically refined and suitable for rolling into wire. *Pryor, 3.*

electrolytic zinc. Zinc exceeding 99.9 percent purity, produced by electrodeposition. *Pryor, 3.*

electrolyze. a. To decompose a compound, either liquid, molten, or in solution, by an electric current. *ASTM STP No. 148-D.* b. To subject to electrolysis. *Webster 3d.*

electromachining. a. Electrical discharge machining. *ASM Gloss.* b. Electrolytic machining. *ASM Gloss.*

electromagnet. A core of magnetic metal (as soft iron) that is surrounded wholly or in part by a coil of wire, that is magnetized when an electric current is passed through the wire, and that retains its power of attraction only while the current is flowing. *Webster 3d. See also* magnet, d.

electromagnetic brake. One in which rubbing surfaces are pressed together when electric current is passed through a solenoid; also, system in which magnetic attraction is set up when one component acts as an electromagnet. *Pryor, 3.*

electromagnetic damping. Commonly found in seimometers of the induction type. It may be used in mechanical seismographs by employing a copper plate moving between two permanent magnets. Induction seismometers depend upon voltage generated by motion of coil in the magnetic field. *A.G.I.*

electromagnetic detector. An instrument used in aerial geophysical prospecting for the direct detection of conducting ores, such as the sulfides of copper, zinc, nickel and lead. An alternating electromagnetic field of suitable frequency is created in the area explored. Transmitted by the aircraft, this field is received by the conducting body in the earth and reradiated with some change in phase. The resultant field is picked up by the bird, towed behind the aircraft, and compared with the transmitted field. The phase shift is measured automatically and recorded as a profile during flight. *See also* geophysical prospecting. *Nelson.*

electromagnetic geophone. The simplest and most widely used type of geophone. It consists of a coil and a magnet, one rigidly fixed with respect to the earth and the other suspended from a fixed support by a spring. Any relative motion between the coil and magnet produces an electromotive force across the coil's terminals which is proportional to the velocity of the motion. *Dobrin, p. 41.*

electromagnetic induction. A wire cutting lines of force of a magnetic field has induced in it an electromotive force. *Crispin.*

electromagnetic methods. Group of electrical exploration methods in which one determines the magnetic field that is associated with the electrical current through the ground. *Schieferdecker.*

electromagnetic prospecting. A geophysical method employing the generation of electromagnetic waves at the earth's surface; when the waves penetrate the earth and impinge on a conducting formation or ore body, they induce currents in the conductors which are the source of new waves radiated from the conductors and detected by instruments at the surface. *A.G.I.*

electromagnetic radiation. Radiation consisting of electric and magnetic waves that travel at the speed of light; for example, light, radio waves, gamma rays, and X-rays. All can be transmitted through a vacuum. *L&L.*

electromagnetic separation. a. Process used to remove ferromagnetic minerals or metals from relatively nonmagnetic ones, using a field or flux of suitably controlled strength to effect the differentiation. It is performed dry on crushed ore, wet on ore pulps. *Pryor, 3.* b. The use of electromagnets to remove ferrous products or tramp iron from bulk materials, as they travel along a conveyor, over a drum, or into a revolving screen. *See also* electrostatic separator; tramp iron. *Nelson.*

electromagnetic spectrum. The entire range of electrical energy, extending from the extremely long rays of radio and electricity at one end to the extremely short X-rays at the other. The visible spectrum (visible light) is included. *Shipley.*

electromagnetic surveying. The act or process of using a geophysical method of systematically measuring electromagnetic waves in a specific area of the earth's surface or in an area adjacent to boreholes. *See also* electromagnetic prospecting. *Long.*

electromagnetic waves. A wide range of vibrations not requiring any known material medium for their propagation, for example, gamma rays, X-rays. *Nelson.*

electromagnetism. Every electric current generates a magnetic field which is in a plane perpendicular to the current. The strength of the field is proportional to the current and in the case of a long, straight wire is inversely proportional to the distance from the wire. This principle is important in magnetic prospecting insofar as it forms the basis for certain types of geomagnetic instruments. *Dobrin, p. 268.*

electromechanical transducer. A transducer for receiving waves from an electric system and delivering waves to a mechanical system or vice versa. *Hy.*

electrometallurgy. A term covering the various electrical processes for the industrial working of metals; for example, electrodeposition, electrorefining, and operations in electric furnaces. *C.T.D.*

electrometer. a. An instrument for measuring small quantities of electricity. Used to determine the position and polarity of the X axes in blanks, etc., by measurement of the electric charges released by slight pressure. Also known as squeeze meter; polarity indicator; piezometer. *AM, 1.* b. A calibrated electroscope. *Hess.*

electrometric titration. A hydrogen electrode is immersed in the acid solution under test, and is connected to a calomel electrode; pH change is observed during titration with alkali, and electromotive force (EMF) is plotted against volume of this alkali. A pronounced inflection is shown at neutral or change point. *Pryor, 3.*

electromotive force. Something that moves or tends to move electricity. The amount of energy derived from an electrical source per unit quantity of electricity passing through the source (as a cell or a generator). *Webster 3d.* Abbreviation, emf.

elecromotive force series. The elements can be listed according to their standard electrode potentials. The more negative the potential, the greater the tendency of the metals to corrode but not necessarily at higher rates. This series is useful in studies of thermodynamic properties. A hydrogen gas electrode is the standard reference and is placed equal to zero. All potentials are positive or negative with respect to the hydrogen electrode. Also known as the emf series. *H&G.*

electron. One of the constituent elementary particles of an atom. A charge of negative electricity equal to about 1.602×10^{-19} coulomb and having a mass when at rest of about 9.107×10^{-28} gram or 1/1837 that of a proton. The mass sometimes is thought to reside wholly as energy in the electrostatic field of the particle, in which case the radius of the electron must be about 10^{-13} centimeter and the electron has a magnetic moment and an angular momentum believed to result from the spin of the particle. *Webster 3d.* Electrons surround the positively charged nucleus of the atom and determine the chemical properties of the atom. *L&L.*

electron affinity. Ability of oxidizing agent to capture electrons and therefore modify a substance. Relative strength with which an atom holds adjacent valence electrons. *Pryor, 3.*

electronation. a. Addition of one or more electrons to an element during chemical reaction, therefore reduction. *Pryor, 3.* b. Deelectronation, or oxidation is removal of one or more electrons. *Pryor, 3.*

electron beam furnace. A furnace in which metals are melted in a vacuum at very high temperatures by bombardment with electrons. *HW.*

electron beam melting. A melting process in which heat is supplied by a beam of electrons directed at the metal in high vacuum. *Thomas.*

electron capture. A type of radioactive transformation in which an electron from one of the inner shells of an atom is captured by the nucleus; especially important in the transformation $K^{40}-A^{40}$. *A.G.I.*

electron compound. A term used to describe intermediate phases of metal systems that have both a common crystal structure and a common ratio of valence electrons to atoms. Thus, CuZn, Cu_3Al, Cu_5Sn, and FeAl all have the body-centered cubic structure and an electron-to-atom ratio of three to two. *ASM Gloss.*

electron diffraction. Registration of scattering of stream of electrons due to their impact on nuclei in atoms of crystal lattices. The beam is directed slantwise on the surface examined, in high vacuum. *Pryor, 3.*

electro-negative. Descriptive of element or group which ionizes negatively, or acquires electrons and therefore becomes negatively charged anion. In electrolysis moves to anode. *Pryor, 3.*

electronegative potential. The potential of an electrode that is relatively active or anodic with respect to other electrodes and is made of material that is at the active end of the emf or galvanic series. The sign of potential is negative. *BuMines Bull. 619, 1964, p. 206.*

electron gas. Mobile electrons, as in metal lattice structure. *Pryor, 3.*

electron holes. Electron-deficient sites which provide acceptor energy levels. These are positive charge carriers. *VV.*

electronic canary. *See* electronic CO detector.

electronic ceramics. Inorganic, nonmetallic products which are subjected to a high temperature during manufacture or use and whose properties make them of value in applications in the field of electronics. Electronic ceramics (or ceramics for electronics) have been broadly classified into the areas of linear dielectric, nonlinear dielectric, magnetic, semiconductor, and composite. *ACSG, 1963.*

electronic CO detector; electronic canary. A portable, lightweight instrument for detecting carbon monoxide in mine air. It records the amount on a meter, and when the carbon monoxide is present in dangerous proportions it gives audible and visible warning. The device uses a combination of physical, chemical, and electronic techniques. *Nelson.*

electronic filter. An air cleaner in which matter in the airstream is electrically charged, then attracted to surfaces oppositely charged. *Strock, 10.*

electronic golds. Special preparations for conductive coating applications in ceramics where resistance to strong acids and migration is required. Used for applications on semiconductors (transistors, diodes, etc.), special capacitors, and printed circuits. *CCD 6d, 1961, p. 546.*

electronic high-level indicator. An electronic device to enable the maximum capacity of a bin to be utilized while obviating damage to conveyors and other equipment. Probes from the device are situated at the desired positions within the bin. When the ore reaches a predetermined level on a probe, a change in electrical capacity causes the unit to operate a warning signal to inform the operator that the ore level is at the maximum safe height. Alternatively, the device will shut down the feeder or conveyor if desired. *Nelson.*

electronic liquid density instrument. The instrument consists of a glass float on the end of a thin rod suspended in the liquid. The float-rod is supported by means of two flat springs so that it is constrained to precise vertical motion. The float-rod assembly carries a coil similar to the voice-coil of a dynamic loud speaker and a differential transformer core. Vertical movement of the float is detected by the electrical response of the differential transformer. The coil moves in a strong, radial, magnetic field and when the float is buoyed up by the liquid, the reaction force between the coil and the field is used to pull it down. Thus, balance is achieved at a null position by adjusting the coil current while observing the null indicator. *H&G.*

electronic log. The record of log of a borehole obtained by lowering a gamma ray, Geiger-Müller, or scintillation probe into the hole and measuring the gamma-ray emissions of the various rock formations traversed by the borehole. *Long.*

electronic logger. Various devices that, when lowered into a borehole, are capable of detecting and recording the intensity of the gamma rays emitted by radioactive substances in the rock formation traversed by the borehole. Also called gamma-ray probe; Geiger counter; Geiger-Müller counter; Geiger-Müller probe; Geiger probe; radiation detector; scintillation counter; scintillation probe; scintillometer. *Long.*

electronic logging. The act or process of logging a borehole with an electronic logger. *See also* electronic logger. *Long.*

electronic microscope. An instrument similar to the ordinary light microscope, but producing a much magnified image, which is received on a fluorescent screen and is recorded by using a camera. Instead of a beam of light to illuminate the material, a parallel beam of electrons is used. Its magnification is up to about 100,000. *Nelson.*

electronic palladium. Palladium metal with fluxes and vehicles for application on green ceramic bases that are fired at extreme temperatures and permit multiple laminations of electroded ceramic sheets used for capacitor manufacture. *CCD 6d, 1961.*

electronics. The utilization based on the phenomena of conduction of electricity in a vacuum (thermionic valves), in a gas (thyratrons) and in semiconductors (transistors). *NCB.*

electronic sentry; detection device. A device for mounting on any direct current mobile mining machine that receives its power through a portable cable. The device cuts off the power from the machine and its trailing cable in the event of a ground fault, short circuit, or break in the cable, and prevents electrical flow as long as the trouble exists. *Nelson.*

electronic sorting. *See* La Pointe picker. *Pryor, 3.*

electronic tramp iron detector. An appliance to prevent large pieces of tramp iron from entering the primary breaker when the ore feed is by conveyor. The applilance is straddled across the conveyor and when tramp metal (magnetic or nonmagnetic) of dangerous size passes under the detector it automatically stops the conveyor and sounds an alarm, and will not restart motion until the tramp material is removed. *Nelson.*

electronic weighing. *See* weighing-in-motion system. *Nelson.*

electron microscope. One using a stream of electrons instead of light to throw shadow of opaque object on a fluorescent viewing screen. Enlargements are practicable up to 400,000 diameters with a hundredfold depth of focus as compared to light microscopes. *See also* microscope. *Pryor, 3.*

electron-shared bond. *See* covalent bond. *Hurlbut.*

electron shell. Group of orbital (extra nuclear) electrons moving at same average radius from atomic nucleus, and arranged in accordance with principal quantum numbers. *Pryor, 3.*

electron volt. The quality of kinetic energy gained by an electron when it is accelerated through a voltage difference of 1 volt. *L&L.*

electro-osmosis. a. A filtering of liquid conductors, under the influence of electric current, through porous or semipermeable partitions with a speed that is independent of their thickness but varying with their nature and section. *Taylor.* d. Diffusion of a substance through a membrane in an electric field. If electromotive force is applied to a colloidal solution and soluble particles are held by a membrane, the dispersion medium migrates in the opposite direction to that which would be taken by the soluble particles. *Pryor, 3.* c. Pressure of a solution against electric potential. *A.G.I. Supp.*

electrophoresis; cataphoresis. Movement of colloid particles toward an oppositely charged electrode through a solution. *Pryor, 3.*

electroplate. To plate with an adherent continuous coating by electrodeposition; especially, to plate with a metal. *Webster 3d.*

electroplating. Electrodepositing metal (may be an alloy) in an adherent form upon an object serving as a cathode. *ASM Gloss.*

electropneumatic lighting. Where compressed air is available this is a convenient and safe method of lighting since the well glass surrounding the bulb is flushed out with compressed air by a special valve before the self-contained generator commences to run; afterwards the exhaust from the turbine is passed through the lamp fitting with a small back pressure of 1½ to 2 pounds per square inch, preventing ingress of methane. The equipment can be used underground where the use of electricity is prohibited and for both roadway and face lighting. *Sinclair, I, pp. 226-227.*

electropolishing. Enhancing the surface finish by preferential dissolution of metal at the anode. The current density and hence solution rate, is greatest at sharp points. *ASM Gloss.*

electropositive. a. Positively charged; having more protons than electrons. An electropositive ion in a cation. *Pryor, 3.* b. Term used to describe substances that end to pass to the cathode in electrolysis. *Mersereau, 4th, p. 533.*

electropositive potential. The potential of an electrode that is relatively noble or cathodic with respect to other electrodes and is made of material that is at the inactive end of the emf or galvanic series. The sign of the potential is positive. *BuMines Bull. 619, 1964, p. 206.*

electrorefining. The process of anodically dissolving a metal from an impure anode and depositing it in a more pure state at the cathode. *Lowenheim.*

electroscope. Any of various instruments for detecting the presence of an electric charge on a body, for determining whether the charge is positive or negative, or for indicating and measuring the intensity of radiation by means of the motion imparted to charged bodies (as strips of goldleaf) suspended from a metal conductor within an insulated chamber. *Webster 3d.*

electrostatic bunching. Flocculation of particles during dry screening due to binding electrical forces at their surfaces. *Pryor, 4.*

electrostatic capacity. Quantity of electricity needed to raise system one unit of potential. *Pryor, 3, p. 68.*

electrostatic cleaning process. A method of cleaning small sizes of coal, namely, 2 millimeters to 0.1 millimeter by passing the material over a slowly rotating roller through an electrostatic field of high voltage existing between the earthed roller and an adjacent wire. The coal and impurities are electrified to relatively the same extent, but the coal loses its charge very slowly and is carried further round by the roller than the impurities and separation is effected with reasonable efficiency. *Nelson.*

electrostatic dust and fume sampler. An accurate means of collecting even very fine particles for analysis. Dust, fume, or mist particles, including metallic fumes, are drawn into the portable samples, preionized, and precipitated electrostatically in a collecting cylinder. This equipment permits precise quantitative and qualitative analysis so that proper measures for safeguarding workers and processes can be taken. These units should never be used in explosive atmospheres. *Bests, p. 579.*

electrostatic precipitator. The most efficient of the dust samplers, the electrostatic precipitator is a medium-volume instrument. Air is drawn through a metal tube serving as a collecting surface (the anode) in which a platinum wire mounted axially acts as the ionizing and precipitating electrode (the cathode). A potential of about 10,000 volts direct current is maintained across the tube and wire. The assembly mounting and collecting tube contains a small fan to induce air flow. *Hartman, p. 54.*

electrostatics. Science of electric charges captured by bodies which then acquire special characteristics due to their retention of such charges. In electrostatic separation, dry mineral particles acquire charges as they pass through a high-voltage field. They are then deflected from their natural falling path in accordance with the attraction or repulsion due to the influence of their retained charge as they pass other charged bodies. Electrostatic bunching is particle cling during the laboratory screening of dry material in which frictional electric charge is set up. *Pryor, 3.*

electrostatic separation. a. A process of ore concentration based upon the electrostatic principle that like charges repel and unlike charges attract one another. *Henderson.* b. A method of separating materials by dropping feed material between two electrodes, positive and negative, rotating in opposite directions. Nonrepelled materials drop in a vertical plane; susceptible materials are deposited in a forward position somewhat removed from the vertical plane. *ASM Gloss.* c. Another name for high tension separation. *Pryor, 3, p. 208.*

electrostatic separator. A vessel fitted with positively and negatively charged conductors and may be used for extracting dust from flue gas or for separating mineral dust from gangues. *Nelson.*

electrostatic spraying. A process in which particles that are to be sprayed are given an electrostatic charge opposite to that on the ware to be sprayed; this attracts the sprayed particles to the ware. Although technically applicable to vitreous enameling, this method of spraying has so far been little used in the ceramic industry. *Dodd.*

electrostatic strength. As applied to electric blasting caps, a measure of the detonator's ability to withstand electrostatic discharges without exploding. *Fraenkel, v. 3, Art. 16:10, p. 5.*

electrostatic transducer. A transducer which consists of a capacitor and depends upon interaction between its electric field and the change of its electrostatic capacitance. *Hy.*

electrostenolysis. The deposition of metals in capillary pores of diaphragms when solutions of the metals are electrolyzed. *Hess.*

electrostriction. a. A deformation caused by electrical stress. *Standard, 1964.* b. The phenomenon wherein some dielectric materials experience an elastic strain when subjected to an electric field, this strain being independent of the polarity of the field. *H&G.*

electrotape; microdist. A phase comparison base line measuring system similar to tellurometer and geodimeter. It is similar to tellurometer in that radar frequencies are used whereas in the geodimeter light waves are employed. All three systems use a 10 megacycle crystal as the basis of their measurement so one period or lane width is 15 meters in the electrotape and tellurometer and is 7.5 meters in the geodimeter due to the method of measuring. *H&G.*

electrotechnics. The science of the methods, processes, and operations in which electricity is applied in the industrial arts. Also called electrotechnology. *Standard, 1964.*

electrothermics. A term describing those processes in which the electric current used for producing metallurgical reactions is used solely for its heating effect. *E.C.T., v. 8, p. 939. Compare* electrolysis.

electrotinning. Electroplating tin on an object. *ASM Gloss.*

electrotyping. Electroforming, as applied to printing plates. *Lowenheim.*

electrovalent bond. Valence bond created between atoms by transfer of one or more electron. The atom losing an electron (donor) becomes positively charged. The receiving atom becomes negatively charged and they are combined (compounded) by the resulting electrostatic attraction. *Pryor, 3.*

electrowinning. Recovery of a metal from an ore by means of electrochemical processes. *ASM Gloss.*

electrowon tungsten. *See* tungsten direct-from-ore process.

electrum. Old name of amber, a fossil gum; also, a gold-silver alloy, occurring naturally with up to 26 percent silver. *Pryor, 3.*

electrum metal. An alloy of gold and silver; contains from 55 to 88 percent gold. *Pryor, 3.*

Elektron alloys. Alloys based on magnesium, the additional elements being aluminum (3 to 12 percent), manganese (less than 0.4 percent and zinc less than 3½ percent). *Pryor, 3.*

element. a. A substance which cannot be decomposed into other substances. *A.G.I.* b. A substance all of whose atoms have the same atomic number. The first definition was accepted until the discovery of radioactivity (1896), and is still useful in a qualitative sense. It is no longer strictly correct, because (1) the natural radioactive decay involves the decomposition of one element into others, (2) one element may be converted into another by bombardment with high-speed particles, and (3) an element can be separated into its isotopes. The second definition is accurate, but has the disadvantage that it has little relevance to ordinary chemical reactions or to geologic processes. *A.G.I.*

elemental carbon. Carbon made from peat coke by calcination; used for dry-cell electrodes. *Bennett 2d, 1962 Add.*

elemental sulfur. Sulfur in the original elemental condition, such as flowers of sulfur. *Shell Oil Co.*

elementary cell; unit cell. The simplest form which includes all the characteristics of a crystal. It is repeated indefinitely to form the lattice structure of a crystal. *Hess.*

elementary molecule. One consisting of a combination of like atoms, for example, O_2. *Pryor, 3.*

elementary particle. Originally applied to any particle that could not be further subdivided; now applied only to protons, electrons, neutrons, antiparticles, and strange particles, but not to alpha particles and deuterons. *L&L.*

element, chemical. A substance that cannot be separated by ordinary chemical means into substances different from itself. *Shell Oil Co.*

element, linear. In structural petrology, a fabric element of rodlike form where one dimension is much greater than the other two. *A.G.I.*

element 102. Named nobelium; symbol, No. *See also* nobelium; actinide elements. *CCD 6d, 1961.* The acceptance of the name nobelium was apparently premature. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-109.*

element stone. Opal. *Shipley.*

eleolite. The massive or coarsely crystalline variety of nepheline. *Dana 17, pp. 501–502.*

eleolite syenite. *See* nepheline syenite.

elephant ear. A fine-grained, flat sponge used in finishing pottery. *ACSG, 1963.*

elephant jasper. A dark to light-brown jasper with scattered small, black dendritic inclusions. *Shipley.*

elephant's trunk. *See* hydraulic ejector. *Ham.*

Elers ware. Fine unglazed stoneware made first by Elers in Staffordshire, England, about 1690. *ACSG.*

elev Abbreviation for elevation. *BuMin Style Guide, p. 59.*

elevante. Mex. An overhand stope. *Fay.*

elevating conveyor. Any conveyor used to discharge material at point higher than that at which it was received. Term is specifically applied to certain underground mine conveyors. *ASA MH4.1-1958.*

elevating grader. A grader equipped with a collecting device and elevator, by which the loosened material can be loaded to spoil banks or into vehicles for transport. *Nelson. See also* belt loader.

elevation. a. A particular height or altitude above a general level; as, the height of a locality above the level of the sea; of a building, etc., above the level of the ground. *A.G.I.* b. In the United States, the term generally refers to height in feet above mean sea level. *A.G.I.* c. Altitude above sea level of the following useful reference points: (1) ground level of a drilling location; (2) derrick floor; and (3) top of rotary or kelly bushing (from which the depth of the hole is usually measured). *Wheeler.* d. In an air lift, the distance the water is raised above the surface. *Lewis, p. 687.*

elevation correction. In gravity measurements, the corrections applied to observed gravity values because of differences of station elevation to reduce them to any arbitrary reference or datum level, usually sea level. The corrections consist of (1) the free-air correction, to take care of the vertical decrease of gravity with increase of elevation, and (2) the Bougeur correction, to take care of the attraction of the material between the reference datum and that of the individual station. In seismic measurements, the corrections applied to observed reflection time values due to differences of station elevation in order to reduce the observations to an arbitrary reference datum or fiducial plane. *A.G.I.*

elevator. a. A device for raising or lowering tubing, casing, or drive pipe, from or into well. *See also* casing elevator. *Fay.* b. An endless belt or chain conveyor with cleats, scoops, or buckets for raising material. *Webster 3d.* c. A cage or platform and its hoisting machinery, as in a building or mine, for conveying persons or goods to or from different levels. *Webster 3d.* In England called a lift. d. An apparatus used to facilitate the removal of coal from shuttle cars or low conveyors into mine cars. *B.C.I.* e. A vertical or steeply inclined conveyor. *B.S. 3552, 1962.* f. A type of conveyor for raising coal, stone, ore, or slurry, usually at the coal preparation plant or mill. Normally it comprises a series of steel buckets attached to an endless chain. It has a capacity up to 120 tons per hour. *See also* bucket elevator. *Nelson.* g. A cage hoist. *Nichols.* h. A machine that raises material on a belt or a chain of small buckets. *Nichols.* i. A hinged circle or latch block provided with long links to hang on the hoistlike hook and used to hoist collared pipe, drill pipe and/or casing, and drill rods provided with elevator plugs. Some large elevators are fitted with slips for use on uncollared or flush-outside tubular equipment. *Long.* j. A term sometimes and incorrectly used as a synonym of lifting bail. *Long. See also* hydraulic dredge; vertical reciprocating conveyor.

elevator bucket. A vessel generally rectangular in plan and having a back suitably shaped for attachment to a chain or belt and a bottom or front designed to permit discharge of material as the bucket passes over the head wheel of a bucket elevator. *ASA MH4.1-1958.*

elevator cup. *See* elevator bucket. *ASA MH4.1-1958.*

elevator dredger. A dredger fitted with a bucket ladder. *Ham.*

elevator kiln. A kiln into which a setting of ware is raised from below; the ware is set (outside the kiln) on a refractory base which is subsequently elevated by jacks into the firing position. Kilns of this type have been used, for example, in the firing of abrasive wheels. *Dodd.*

elevator plug. A short steel plug provided with a pin thread by means of which it may be coupled to the upper end of a stand of drill rods. Its diameter is greater than that of the drill rod to which it is attached, and hence it provides a shoulder that can be grasped by an elevator. When each stand of rod is provided with an elevator plug and an elevator is used in lieu of a rod-hoisting plug, the handling of rods is facilitated and a round trip can be made in less time. Also called rod plug. *Long.*

elevator pump. An endless band with buckets attached, running over two drums for draining shallow ground. *Zern.*

elevator rope. A rope used to operate an elevator. *Zern.*

Elie ruby. Scot. A variety of pyrope found in small garnetlike grains in the trap tuff of Kincraig Point, near Elie, in Fife. *Fay.*

Elihu Thompson process. A method of electric welding of iron. *Fay.*

eliquate. a. To liquate; smelt. *Webster 3d.* b. To part by liquation. *Webster 3d.*

eliquation. *See* liquation. *Fay.*

elkerite. a. A variety of bitumen formed through a slow oxidation of petroleum. *Tomkeieff, 1954.* b. A name applied to a subgroup of pyrobitumens rich in oxygen and partly soluble in alkali. They resemble an earthy brown coal and probably represent a product of intense weathering of bitumens. *Tomkeieff, 1954.*

elkhornite. A hypabyssal igneous rock consisting of a labradorite-bearing augite syenite. *Johannsen, v. 3, 1937, p. 92.*

ell. A sleeve curved at an angle for going around corners. The most common is the 90° ell, but other angles, usually 45° or 60° are available. *Kentucky, p. 119.*

ell balls; elled balls. S. Wales. Ironstone in shale above the ell coal or elled coal. *Arkell.*

ellestadite. A lavender to rose calcium sulfate and silicate, containing chlorine and fluorine and minor amounts of CO_2 and P_2O_5. It is a sulfate-apatite, with P_2O_5 almost entirely replaced by SO_3 and SiO_2. Hexagonal; crystals and stringers. The end member of the apatite group, resembling wilkeite. From Crestmore, Calif. *English.*

ellipse of stress. An ellipse, drawn proportional to the principal stresses in a plane at a point, shows resultant stress at any angle through the point. *Ham.*

ellipsoidal. A structural term applied to spilitic and similar rocks which, as a result of the conditions under which they consolidated, are disposed in a series of sacklike or pillowlike masses; same as pillow structure. *Holmes, 1928.*

ellipsoid of strain. An ellipsoid that represents the state of strain at any given point in a body; it has the form assumed under stress by a sphere centered at the point in question. *Ro.*

ellipsoid of stress. An ellipsoid that represents the state of stress at a given point in a body; its semiaxes are vectors representing the principal stresses at the point, and any radius vector represents the resultant stress on a particular plane through the point. For a condition of plane stress (one principal stress zero) the ellipsoid becomes the ellipse of stress. *Ro.*

elliptical opening. Opening in which the vertcial cross section is an ellipse. *BuMines Bull. 587, 1960, p. 2.*

elliptical polarization. Manner in which the intensity and direction of an electrical or magnetic field change as a function of time, that results from the superposition of two alternating fields that differ in direction and in phase. *Schieferdecker.*

Ellis vanner. Vanning machine with gyratory movement. *Pryor, 3.*

elluvial. A term used by British geologists to indicate residual deposits as distinguished from alluvial- or stream-moved deposits. *Hess.*

Elmore jig. A plunger-type jig of either single or mulitple compartments. Its distinguishing features are: (1) an automatic control in the form of a cylinder that measures the specific gravity of the mixture of coal and refuse; (2) the refuse draw is a star gate under the overflow lip in each compartment, which extends the full width of the jig; and (3) the hutch is commonly collected with a screw conveyor and discharged through the refuse elevator. Used both for treatment of nut and slack sizes of bituminous coal. *Mitchell, pp. 423–424.*

Elmore process. This inventor's bulk-oil process (1902) mixed finely ground pulped ore with equal quantities of oil in a vessel with some crude surface-active agent, and then overflowed the oil, now loaded with the valuable mineral. These were then separated by centrifuging and washing. In the Elmore vacuum process a thick aqueous ore-pulp was mixed with a little oil, diluted and subjected to vacuum which caused air to be released from solution and rise to form a mineralized froth, which overflowed from the separating vessel. *Pryor, 3.*

elongated piece. One in which the ratio of the length to width of its circumscribing rectangular prism is greater than a specified value. *ASTM C125-66.*

elongate irregular marks. Elongate, somewhat irregular scour marks intermediate in size between channels and flutes. *Pettijohn.*

elongation. a. A term that is both general and specific. Generally, the extension of a material in the tension test at any specified point, (for example, yield point elongation). Specifically, the extension of a material at rupture in the tension test. *H&G.* b. In tensile testing, the increase in the gage length, measured after fracture of the specimen within the gage length, usually expressed as a percentage of the original gage length. *ASM Gloss.*

elpasolite. An isometric, colorless mineral, $4[K_2NaAlF_6]$, distinct from cryolite; no cleavage, fracture uneven, has the luster of cryolite; isotropic. From Pikes Peak region, Colo. *American Mineralogist, v. 33, No. 1-2, January-February 1948, p. 84.*

elpidite. A white to brick-red basic hydrous silicate of sodium and zirconium, $H_6Na_2Zr(SiO_3)_6$. Crystals crude-prismatic; usually fibrous columnar. Orthorhombic. From Narsarsuk, Greenland; Kola Peninsula, Russian Lapland. *English.*

Elsburg series. S. Afr. The uppermost subdivision of the Witwatersrand system. *Beerman.*

Elsner's equation. In dissolution of gold by dilute aerated cyanide solution (the cyanide process for gold extraction), this reads:—$4Au+8NaCN+O_2+2H_2O = 4NaAu(CN)_2+4NaOH$. Analogous equation is given for silver. Other mechanisms have been suggested by Janin and Bodlaender, the latter requiring two stages of reaction with the intermediate formation of hydrogen peroxide. *Pryor, 3.*

Eltran method. Electrical exploration method in which an electrical transient is sent into the earth and the change in shape of this transient is studied. *Schieferdecker.*

eluant. Liquid used to displace captured ions from the zeolite or resin on which they are held; also, in ion exchange processes, solution used for elution. *Pryor, 3.*

eluate. In the ion exchange process, pregnant solution eluted from loaded resins. *Pryor, 3.*

elutheromorphic. Relates to new minerals which have been formed during metamorphism and which are independent of preexisting minerals as regards to their shapes. The word is contrasted with pseudomorphic which applies to minerals which take their forms from the minerals which they replace. *Schieferdecker.*

elution. In the ion exchange process, removal of uranium or other ions from loaded resins by suitable chemical solution (eluant). *Pryor, 3.*

elutriate. To subject to elutriation. *Webster 3d.*

elutriation. a. Purification or sizing by washing and pouring off the lighter or finer matter suspended in water, leaving the heavier or coarser portions behind. *Fay.* b. In powder metallurgy, classification of powder particles by means of rising stream of gas or liquid. *ASM Gloss.* c. Laboratory classification in which sands are sorted in rising columns of fluid, under precise conditions of control. *Pryor, 2.* d. A process of washing, decantation, and settling which separates a suspension of a finely divided solid into parts according to their weight. It is especially useful for very fine particles below the usual screen sizes and is used for pigments, clay dressing, and ore flotation. *CCD 6d, 1961.* e. The desorption of ions from an ion exchanger. *NRC-ASA N1.1-1957.*

elutriator. An appliance for washing or sizing very fine particles, based on the principle that large grains settle at a faster rate through a liquid than small grains of the same material. The medium is commonly an upward current of water. *Nelson. See also* hydrosizer. *Pryor, 3.*

eluvial. Formed by the rotting of rock in place to a greater or less depth. *Fay.*

eluvial gravels. Those gravels resulting from the disintegration in situ of the rocks which contributed to their formation, in contrast to alluvial material, which is transported away by water and deposited elsewhere. Some gem deposits are eluvial. *Nelson.*

eluvial horizon. The layer from which material has been removed in solution or in water suspension and in which silt and sand-sized particles have become concentrated. *Schieferdecker.*

eluvial ore deposit. A residual ore deposit almost formed in situ but mostly displaced by creep. Synonym for eluvial placer. *Schieferdecker.*

eluvial placers. Placer minerals concentrated near the decomposed outcrop of the source deposit by rain wash, not by stream action. *Bateman.*

eluvials. Sands and gravels weathered in situ from local rocks. Perhaps moved by wind, but not by streaming action. *Pryor, 3.*

eluviation. The movement of soil material from one place to another within the soil, in solution or in suspension, when there is an excess of rainfall over evaporation. Horizons that have lost material through eluviation are referred to as eluvial and those that have received material as illuvial. Eluviation may take place downward or sidewise according to the direction of water movement. As used, the term refers especially, but not exclusively, to the movement of colloids, whereas, leaching refers to the complete removal of material in solution. *A.G.I.*

eluviation, chemical. A process in the formation of soil in which decomposition occurs and certain products thus liberated are translocated in true or colloidal solution to be deposited in other horizons, under the influence of water movements within the soil. *A.G.I.*

eluviation, mechanical. The removal from soil of the finer fractions of its mineral content by washing down to lower levels. *A.G.I.*

eluvium. Atmospheric accumulations in situ, or at least only shifted by wind, in distinction to alluvium, which requires the action of water. *Fay.*

elvan. Cornish term for pneumatolized granite rocks containing tourmaline, fluorite, or topaz. *Pryor, 3.*

elvan course. A plutonic dike; an elvan dike. *Fay.*

elve. The handle of a miner's pick. A variation of helve. *Fay.*

emaldine. Same as emildine. *Shipley.*

emanation. a. The escape of radioactive gases from the materials in which they are formed; for example, radon from radium and krypton and xenon from a substance undergoing fission. *NRC-ASA N1.1-1957.* b. A name given to element 86 or radon; symbol, Em. The names radon and emanon are also used. The naturally occurring radon isotopes of mass numbers 219, 220, and 222 are known as actinon, thoron, and radon, respectively. The longest-lived isotope is radon 222, half-life, 3.825 days. *NRC-ASA N1.1-1957.*

emanation deposits. The group of ore deposits of gaseous magmatic origin. *Schieferdecker.*

emanations. The released gaseous products of magmatic fluids, which may contain elements found in hypogene mineral deposits. *Schieferdecker.*

emanations, magmatic. A combination of volatile and nonvolatile materials given off by a magma at various stages in its history, and with various compositions and densities. The term usually includes both aqueous liquids and gases, and both the pegmatitic and the hydrothermal fluids. *See also* mineralizer. *A.G.I.*

emanations, volcanic. Volatile or nonvolatile materials emitted from volcanoes, fumaroles, or lavas at the earth's surface, usually consisting of a mixture of water vapor and one or more of the other volcanic gases. *A.G.I.*

embanking. *See* diking. *Schieferdecker.*

embankment. a. Artificial ridge of earth and broken rocks, such as a dike or railroad grade across a valley. *A.G.I. Supp.* b. A fill whose top is higher than the adjoining surface. *Nichols.*

embatholithic. The fourth stage in erosion of metalliferous batholith, when exposed areas of intruding rocks are nearly equal to the areas of invaded rock. *See also* cryptobatholithic. *A.G.I.*

embatholithic deposit. A mineral deposit found in or outside the rim of an intrusive rock complex of which the exposed area is nearly equal to the areas of the invaded rock. *Schieferdecker.*

embayed coast. A coast with many projecting headlands, bays, and outlying islands. It usually results from submergence. *Stokes and Varnes, 1955.*

embayment. A deep depression in a shoreline forming a large, open bay. *Fay.*

embedment pressure. A measure of the maximum pressure required to embed a steel ball to a given depth in a rock. This gives a direct indication of the resistance of the formation to embedment by a propping material and the effect of the rock on proppant deformation. *American Petroleum Institute. Drilling and Production Practice, 1963, p. 138.*

embolite. a. A chlorobromide silver mineral, Ag(Cl,Br); sectile; isometric. *Sanford; Dana 17.* b. The chief silver ore in some of the Chile mines; occurring as yellow-green incrustations and masses. *C.T.D.*

emborrascarse. Mex. To become barren by pinching out, etc. *Fay.*

emboss. To decorate, ornament or reinforce with raised surfaces. Usually effected by stamping in metalwork for enameling. *Enam. Dict.*

embossed. A decoration in relief, or excised on the ware surface. *ASTM C242-60T.*

embossing. Raising a design in relief against a surface. *ASM Gloss.*

embossing die. A die used for producing embossed designs. *ASM Gloss.*

embrechite. A migmatite in which the structural features of the usual crystalline schists are still preserved, although often partly obliterated by metablastesis (recrystallization and growth of preferred minerals or mineral groups). Includes augen gneisses, banded gneisses (phlebites), and the like. *A.G.I.*

Embrey vanner. Variation from the Frue with inclined deck and end shake. (Obsolete). *Pryor, 3.*

embrittlement. Reduction in the normal ductility of a metal due to a physical or chemical change. *ASM Gloss.*

Emerada. A trademark name for a yellowish-green synthetic spinel. *Shipley.*

emerald. Variety of beryl—gem stone. Green color due to trace of chromium. Oriental emerald is a colored corundum gem. *Pryor, 3.*

emerald copper. Same as dioptase. *Fay.*

emerald cut. A rectangular step-cut faceted gem with corners beveled and all surfaces covered by a series of rectangular facets or steps. *Sinkankas.*

emerald filter. Same as emerald glass. *Shipley.*

emerald glass. a. Any green glass, such as used in the manufacture of imitation stone. *Shipley.* b. A glass of emerald color made by fusing beryl; specific gravity, 2.5; refractive index, 1.52. *Shipley.* c. The usual trade name for a color filter through which genuine emeralds and some other genuine stones appear reddish to violetish while glass imitations and some genuine stones appear green. Same as beryloscope. *See also* Walton filter; detectoscope. *Shipley.*

emeraldine. A coined name for green-dyed chalcedony. Also, a name for a dark-green dye for fabrics, of no gemmological interest. *Shipley.*

emerald jade. Semitransparent to translucent jadeite of emerald color. Also called imperial jade. *Shipley.*

emerald malachite. Same as dioptase. *Shipley.*

emerald matrix. Any rock embedded with emerald, especially one composed of feldspar and quartz. *Shipley.*

emerald nickel. *See* zaratite. *Fay.*

emerald triplet. a. An assembled stone usually consisting of a crown and pavilion of rock crystal bound together by green transparent cement. Sometimes green or colorless beryl is used for the crown and occasionally also for the pavilion. Glass is often used for the pavilion, and sometimes for the crown as well, but the trade still calls it an emerald triplet. *See also* triplet. b. A triplet consisting of (1) a thin plate of red garnet for the table, (2) rock crystal for the body, and (3) green glass for the lower part. Rare. *Shipley.* c. A term that is loosely and incorrectly used to designate green doublets. *Shipley.*

emeralite. A light-green tourmaline from Mesa Grande, Calif. *Shipley.*

emerandine. Dioptase. *Schaller.*

emerged bog. A bog which grows normally above the water level, drawing up the water by its sponginess, and becoming much thicker than an immersed bog. *Standard, 1964.*

emerged coast. *See* shoreline of emergence. *Schieferdecker.*

emergence. a. A term which implies that part of the ocean floor has become dry land but does not imply whether the sea receded or the land rose. *A.G.I.* b. Point at which an underground stream comes to the surface. *A.G.I.* c. In paleobotany, an outgrowth, consisting of epidermal and cortical tissues lacking vascular tissues, for example, rose prickles. *A.G.I.*

emergency door. *See* steel separation door; safety door. *Nelson.*

emergency lighting. The Act requires that safety lighting be provided in all places lighted by electricity where a lighting failure would cause danger. Such places include coal handling and preparation plants and wherever there is moving machinery. The requirement is generally satisfied by using batteries as the emergency power source. *Nelson.*

emergency winding. An arrangement to wind men in a shaft in cases of a lengthy and widespread failure of electrical supply from electricity board networks. For this purpose transportable winders with diesel or diesel-electric drives of sizes from 100 to 200 horsepower may be used. A typical equipment consists of a towing vehicle and trailer which carries the electric winder complete. The 100-horsepower, direct-current, motor-driven winder is fully equipped to meet statutory requirements. In cases where the cages in the shaft are beyond the lifting power of the winder, a plummet cage, accommodating 6 to 7 men, is used. *Nelson.*

emergents. Algae and sea grasses which are at least partially exposed at lowest low water. *Hy.*

emery. An impure mineral of the corundum or aluminum oxide type used extensively as an abrasive before the development of electric-furnace products. *ASM Gloss.*

Emery-Dietz gravity corer. A sampling device capable of working even under moderately adverse sea conditions. The corer weighs about 650 pounds in air and consists essentially of a shaft, weights, and coring tube. *H&G.*

emerying. A polishing process in which a light scroll, in combination with carborundum powder as an abrasive, is applied in finer grades to the surface being polished. This process usually follows ironing and precedes buffing. *AIME, p. 328.*

emery rock. A rock containing corundum and iron ores. *See also* corundolite. *A.G.I.*

emery stone. A mixture of gun shellac and emery, or emery and clay used for emery wheels. *Fay.*

emery wheel. A wheel coated with emery, or made of emery stone; used for grinding or polishing. *Standard, 1964.*

E Mesabi casing. *See* Mesabi E casing. *Long.*

emf. *See* elecromotive force. *Pryor, 3.*

emildine. A spessartite garnet that contains yttrium, but no chromium, and little or no magnesium; from southwest Africa. *English.*

emilite. Identical with emildine. *English.*

eminence. A mass of high land; a high ground or place. *A.G.I.*

emission spectrum. A spectrum regarded as characterizing the body that emits the rays rather than one through which they pass. *Standard, 1964.*

emissivity. The ratio of radiant energy emitted by a body to that emitted by a perfect black body. A perfect black body has an emissivity of 1; a perfect reflector, an emissivity of 0. *Strock, 10.*

emissivity, thermal. The capacity of a material for radiating heat; commonly expressed as a fraction or percentage of the ideal black body radiation of heat which is the maximum theoretically possible. *HW.*

Emley plastometer. An instrument designed primarily for assessment of the plasticity of building plaster; it has also been used for the testing of clay. The material to be tested is placed on a porous disk which is mounted on a vertical shaft; as the shaft revolves, it rises, pressing the sample against a conical metal disk, the motion of which is resisted by a lever. Equilibrium is reached when the force of the sample under test against the metal disk is equal to the stress acting through the lever; the average relative tangential force for the first 5 minute period is taken as an index of plasticity. *Dodd.*

emmonite. A variety of strontianite in which the stronium is partially replaced by calcium. *Standard, 1964.*

emmonsite. Probably a hydrated ferric tellurite. In thin yellow-green scales. *Fay.*

Emory picker. A chute with narrow openings for the cleaning of coal. The slate traveling slowly because of friction falls into the openings and thus is removed from the coal which rolling freely down the incline is carried over the narrow gaps. *Zern.*

Emperor Press. Trade name; a dry-press brickmaking machine of the rotary table type. *Dodd.*

emphysema. A swelling or inflation due to abnormal presence of air in the tissues. Subcutaneous emphysema is the presence of air in the tissues just under the skin. When seen in diving, it usually involves the skin of the neck and nearby areas. Mediastinal emphysema is the presence of air in the tissues in the vicinity of the heart and large blood vessels in the middle of the chest. Unless extreme, neither of these conditions is likely to cause serious difficulty. If emphysema is extreme, air embolism will usually be present also. *H&G.*

Empire drill. a. A light, hand-operated churn drill for testing placers from 100 to 125 feet deep, though it is more commonly used for shallower holes. It consists of a string of 4-inch casing, to the lower end of which is screwed a toothed cutting shoe. To the upper part, projecting above the ground, is fastened a round steel platform on which men stand while operating the drilling tools. The casing can be turned by men or a horse on the end of a long sweep fastened to the platform. The core of material inside the casing is loosened and brought to the surface by a drill pump on the end of a string of rods. Special tools are made for drilling in difficult ground. Because of its light weight, this is an economical drill for deposits in remote regions difficult of access. *Lewis, pp. 74-75.* b. A term often misused as a synonym for churn drill. *Long.*

empire method. *See* Banka method. *B.S. 3618, 1963, sec. 3.*

empirical. Relying on or proceeding on the information derived from experience and observation for lack of other knowledge. Proceeding strictly experimentally or by the trial and error method. *Webster 3d.*

empirical formula. The simplest formula of a compound which expresses its composition by weight. *Cooper.*

emplace. a. To move to a particular position, said of intrusive rocks. *A.G.I. Supp.* b. To develop in a particular place, said of ore deposits. *A.G.I. Supp.*

emplacement. A process by which igneous rock intrudes or an ore body is developed in older rocks. *A.G.I. Supp.*

emplectite. A sulfide of copper and bismuth, $(Cu_2Bi_2S_4)$, sometimes used as a source of bismuth, occurring at Tannenbaum and elsewhere as thin striated gray metallic prisms intimately associated with quartz. *C.M.D.*

emplectum. *See* emplectite.

empressite. A pale bronze silver telluride; AgTe; fine granular; massive; probably identical with muthmannite. From Empress Josephine mine, Kerber Creek district, Colo. *English.*

empties. Empty mine or railroad cars. Empty railroad cars are called "flats" in Arkansas. *Fay.*

empty. An empty car, truck, tub, box, or wagon. *Mason.*

empty-car puller. In bituminous coal mining, a laborer who pulls empty cars from cage or detaches them from hoisting cable when hoisting of loaded cars is done on one side of the shaft or haulage slope and lowering is done on the other. *D.O.T. 1.*

empty-cell process. The creosoting of timber under pressure but without applying an initial vacuum. Air will therefore remain in the wood cells, so that total absorption of the preservative is low. *Ham.*

empty coupler. *See* coupler. *D.O.T.1.*

empty rope. Any winding or hauling rope from which the load upon it has been removed. *Fay.*

empty track. A track for storing empty mine cars. *Fay.*

empty trip. Applies to empty coal, ore, and waste cars returning for another load. *Fay.*

empyrical. a. Of or pertaining to combustion; rare usage. *Standard, 1964.* b. Having a combustible principle, as coal; rare usage. *Standard, 1964.*

e.m.s. N. of Eng. Earnings per manshift. *Trist.*

Emsian. Upper Lower Devonian. *A.G.I. Supp.*

Ems method. The condensation of dust and fumes from calcining furnaces by use of large flues filled with parallel rows of sheet iron. *Fay.*

emu Abbrivation for electromagnetic unit. *BuMin Style Guide, p. 59.*

emulsification. a. The phenomenon of holding finely divided particles of a liquid in suspension with the body of another liquid.

Shell Oil Co. b. In metal cleaning, the suspending of finely divided matter, for example, mineral oil or grease, in an alkaline solution assisted usually by agitation and heating. *Hansen.*

emulsifier. a. Synonym for mud mixer. *Long.* b. A machine for mixing water, oil, or resins with a saponifying or other agent to form an emulsion. *Long.* c. A saponfying or other agent added to water and oil or water and resins, causing them to form an emulsion. *Long.* d. In penetrant inspection, a material that is added to some penetrants, after the penetrant is applied, to make a water-washable mixture. *ASM Gloss.*

emulsifying agent. A material in small quantities that increases the stability of a dispersion of one liquid in another. *ASM Gloss.*

emulsion. a. Milkification. A liquid mixture in which a fatty or resinous substance is suspended in minute particles almost equivalent to molecular dispersion. *Fay.* b. A combination of water and oily material made miscible with water through the action of saponifying or other agent. *Fay.* c. A suspension of one finely divided liquid phase in another. *ASM Gloss.* d. The mud-laden fluids used in petroleum drilling often contain substances that are emulsified; hence diamond drillers often refer to mud used in diamond drilling as an emulsion. *Long.*

emulsion breaking rate. In uranium technology, rate of disengagement of phases (aqueous and organic carrier). *Pryor, 3.*

emulsion cleaner. A cleaner consisting of organic solvents dispersed in an aqueous medium with the aid of an emulsifying agent. *ASM Gloss.*

emulsion injection. An artificial cementing process in which bituminous emulsion is injected into soils with a particle size equivalent to that of coarse sand, ranging ing from 2 to 0.6 millimeters. *Ham.*

emulsion texture. A texture showing minute blebs or rounded inclusions of one mineral, irregularly distributed in another mineral. *Schieferdecker.*

emulsoid. Colloidal soluble with water or other liquid as dispersion medium, the product having a lower surface tension and a higher viscosity; differs from a suspensoid in that it is reversible (able to return to soluble after evaporation). *Pryor, 3.*

emulsols. Proprietary wetting agents used in froth flotation. Range includes quaternary ammonium compounds with aliphatic substituents; pyridinium salts; unidentified cationics. *Pryor, 3.*

enamel. Glassy coating for metals. *VV. See also* porcelain enamel. *ACSG, 1963.*

enamel, aluminum. *See* aluminum enamel. *ASTM C286-65.*

enamel-back tubing. Glass tubing, the back half of which (the tube being held vertically) is seen to consist of white or colored ply glass. *See also* ply glass. *Dodd.*

enamel, beading. *See* beading enamel. *ASTM C286-65.*

enamel, blackboard. *See* chalkboard enamel. *ASTM C286-65.*

enamel brick clay. Similar to clays used for manufacture of buff face bricks. *See also* brick clay. *CCD 6d, 1961.*

enamel bricks. Fine quality of glazed bricks. *Mersereau, 4th, p. 260.*

enamel brusher. *See* brusher. *D.O.T.1.*

enamel burner. *See* oven tender. *D.O.T.1.*

enamel, cast-iron. *See* cast-iron enamel. *ASTM C286-65.*

enamel, chalkboard. *See* chalkboard enamel. *ASTM C286-65.*

enamel clay. Ball clays which are capable of floating nonplastic enamel slips so that they will spray and dip more evenly. Enamel clays usually contain some alkali and must be as low as possible in carbon. *CCD 6d, 1961.*

enamel color. A ceramic color for the onglaze decoration of pottery. *Dodd.*

enamel, copper. *See* copper enamel. *ASTM C286-65.*

enameled brick. Brick with a glazed or enamellike surface. *Crispin.*

enamel firing. In the British pottery industry, this term is synonymous with decorating firing. *Dodd.*

enamel furnaces. Usually recuperative muffle furnaces for burning enameled ware. *Bureau of Mines Staff.*

enameling. Production of hard glazed finish or coating on metal or ceramics. If by fusion, vitreous enameling. *Pryor, 3.*

enameling iron. A very low-carbon, low-metalloid, open-hearth, cold-rolled sheet steel, produced specifically for use as a base metal for porcelain enamel. *ACSG, 1963.*

enamel kiln. a. A muffle kiln for firing painted and gilded ware. *C.T.D.* b. A kiln for enameling porcelain. Also called enameling kiln. *Standard, 1964.*

enamel, luminescent. *See* luminescent enamel. *ACSB, 3.*

enamel-oven feeder. One who hangs parts on a moving conveyor that lowers the parts into a vat of enamel, lifts them out, and carries them through a drying oven (enamel-oven unloader). Also called hanger; oven loader. *D.O.T. 1.*

enamel, porcelain. A vitreous coating applied to a metal base by proper application and firing. *Enam. Dict.*

enamel scrapings. *See* scrapings. *ASTM C286-65.*

enamel smelting furnaces. Rotary oil-fired furnaces or small tanks for making enamel frit. *Bureau of Mines Staff.*

enamels, reclaim. *See* reclaim. *ASTM C286-65.*

enamelware. Any of the varied steel, aluminum, or copper shapes that have been coated in porcelain enamel. The products of the kitchenware industry are commonly referred to as enamelware. *Enam. Dict.*

enamelware beader. One who puts a decorative coating on the beading of enameled ware by hand. Removes utensil from conveyor. Dips finger tips covered with rubber finger stalls in vat of enamel and rubs enamel onto beading. Dips handle into enamel. Returns utensil to conveyor. *D.O.T. 1.*

enamel wiper. One who removes cooking utensils and other ware, that have been dipped in enamel, from the dipping tongs and stands them on needle points. Wipes enamel from rim to permit application of another color, and suspends articles on hooks for transfer to drying oven. Also called cleaner and wiper; dipper helper; enamelware wiper; wet cleaner; wiper and cleaner. *D.O.T. 1.*

enantiomorphous. In crystallography, similar in form but not superposable related to each other as the right hand is to the left, hence, one the mirror image of the other. *A.G.I.*

enargite. A natural copper arsenic sulfide, Cu_3AsS_4, found in metallic veins. May contain some antimony. Grayish-black to iron-black color; grayish-black streak; luster, metallic; Mohs' hardness, 3; specific gravity, 4.45. Found in Montana, Utah, Colorado; Peru; Yugoslavia. An ore of copper and arsenic. *CCD 6d, 1961.*

en cabochon. A style of cutting used in the case of certain gemstones, notably garnets (carbuncles), and those gems which depend for their beauty largely upon minute orientated inclusions, such as cat's-eye, crocidolite, star ruby, and star sapphire. Such stones are not faceted, but a smooth-domed surface is produced, the plan of the stone being circular or oval. *C.M.D.*

encampanado. Mex. A shaft which does not reach the lower level of the mine. *Fay.*

encapillar. Mex. To start work in a new gallery. *Fay.*

encapsulation. The sealing of an electronic component, particularly of a semiconductor, generally with a ceramic sealing compound. *Compare* potting material. *Dodd.*

encastre. a. Applied to the end-fixing of a beam built in at its ends. *Ham.* b. *See* fixed. *Ro.*

encaustic. A term loosely applied to articles decorated with impressed designs filled in with colored slip and then fired. *C.T.D.*

encaustic tiles. Ceramic tiles in which a pattern is inlaid with colored clays, the whole tile then being fired. *Dodd.*

enchada. *Braz.* A kind of hoe used by gold washers. *Fay.*

enclave. An outcrop of one rock group entirely surrounded by that of another rock group. Certain outliers and inliers, and a window, might be called enclaves; but the term is chiefly useful when the time and structural relationships between the two groups are uncertain. *Challinor.*

enclosed switch. An electric switch that is totally enclosed to guard against contact and flash hazards. *Bureau of Mines Staff.*

enclosure wall. An exterior nonbearing wall in skeleton frame construction, anchored to columns, piers, or floors, but not necessarily built between columns or piers or wholly supported at each story. *ACSG.*

encrinites. a. The original and general term for the crinoidea. *A.G.I.* b. Crinoid coquina. *A.G.I.*

encroachment. a. To work coal or mineral beyond the boundary which divides one mine area from another; to work coal from a barrier pillar which has been left as a safety measure. Also called trespass. *Nelson.* b. The advancement of water, replacing withdrawn oil or gas in a reservoir. *A.G.I.*

encrusting forms. Marine life which forms a hard surface on submerged objects by attachment fouling. *Hy.*

end. a. Solid rock face at termination of tunnel. *Pryor, 3.* b. The secondary cleavage more or less at right angles to the bord or face cleat. *Mason.* c. The extremity of a drive. *Gordon.* d. A direction parallel to the main natural line of cleat or cleavage in coal. Also called end line. *TIME.* e. Scot. A room or working place facing the ends or secondary joints of a seam, that is, in the line of the main joints. Also called butt. *Fay.* f. Eng. The inner extremity of a heading or stall. *Fay.* g. Eng. *See* headways. *SMRB, Paper No. 61.*

end arch. A brick shape used for the construction of arches and sprung roofs; the large faces are inclined towards each other in such a way that one of the end faces is smaller than the other. *Dodd.*

end bands. Half-tile, made by cutting whole tile longitudinally, and used where the roof butts against a vertical surface. *Fay.*

end-bearing piles. *See* bearing piles. *Nelson.*

end-bump table. A mechanically operated, sloping table by which heavy and light minerals are separated. The end motion imparted to the table tends to drive all minerals up the slope of the table, but a flow of water carries the quartz and other light minerals down faster than the mechanical motion carries them up. The heavy minerals settle to the bottom and finally reach the upper end and are delivered into a proper receptacle. The Gilpin County, Imlay, and Golden Gate concentrators are the chief types. *Liddell 2d, p. 386.*

end clearance angle. *See* clearance angle. *ASM Gloss.*

end cleat. a. The minor joints in a coal seam coursing at about right angles to the major joints. *See also* cleat. *Nelson.* b. *See* end joint. *Pryor, 3.*

end clinometer. A clinometer designed to be fitted only to the bottom end of a drill-rod string as contrasted with a line clinometer that can be coupled into the drill-rod string at any point between two rods. *Long.*

end-construction tile. Tile designed to receive its principal stress parallel to the axes of the cells. *ASTM C43-65T.*

end contraction. Contraction of water area flowing over a weir, in which the notch is narrower than the stream in which the weir is placed. *See also* contracted weir. *Ham.*

end course; on-end. Scot. At right angles to, or facing, the end joints. *Fay.*

end-cut tile. Tile designed to be laid with the axes of the cells vertical. *ACSG.*

end cutting-edge angle. The angle of concavity between the face-cutting edge and the face plane of the cutter. It serves as relief to prevent the face-cutting edges from rubbing in the cut. *ASM Gloss.*

end-discharge tippler. A framework to discharge the coal or mineral from a mine car or a wagon by elevating the rear end and deliver the load from its front end onto a screen, chute, or bunker below track level. *See also* tippler. *Nelson.*

end-dump car. *See* mine cars. *Lewis, p. 222.*

end dumping. Process in which earth is pushed over the edge of a deep fill and allowed to roll down the slope. *Carson, p. 362.*

end dump truck. *See* rear dump truck.

endeka nitrocellulose; high-grade guncotton. $C_{24}H_{29}O_9(NO_3)_{11}$; molecular weight, 1,143.56; white fibers; and soluble in acetone. Used in shells and in mines. *Bennett 2d, 1962.*

endellionite. Synonym for bournonite. *Hey 2d, 1955.*

endellite. A mineral, $Al_2Si_2O_5(OH)_4.2H_2O$, having a structure in which kaolinite-type layers alternate with single layers of water molecules; related to halloysite. *Compare* hydrohalloysite; hydrokaolin. *American Mineralogist, v. 28, No. 1, January 1943, p. 1.*

Endell plastometer. *See* Gareis-Endell plastometer. *Dodd.*

enderbite. A rock of the charnockite series composed of quartz, plagioclase, hypersthene, and accessory magnetite and zircon. A medium-grained, gray plutonic rock with conspicuous blue quartz. *Hess.*

end face; face on end. A coal face that is at right angles to the main cleats in the seam. *Nelson.*

end feather. *See* feather brick. *Dodd.*

end-fired furnace. A furnace with fuel supplied from the end wall. *ASTM C162-66.*

end flow. Flow of metal at the ends of steel rails when in service, caused by impact and the pressure of railroad wheels. *Bennett 2d, 1962.*

endgate. a. Gate at the front end of a car as it travels toward the dump. This gate has hooks which are engaged at the dump by stirrups which lift it, so that when the dump pitches forward the coal slides under the uplifted endgate and is discharged onto a chute or over a dump pile. *Zern.* b. A gate leading to and at right angles to an end face. Also called ending. *TIME.*

endgate car. A mine car constructed with one hinged end that lifts up as the car is tilted down, permitting the coal, ore, and waste to run out. *Kentucky, p. 211. See also* mine cars.

endgate hooks. *See* endgate. *Zern.*

end grain; grain end. Corn. A highly jointed part of a granite mass. *Arkell.*

ending. a. A road driven at right angles to the end cleat. *Mason.* b. Eng. An adit driven in a direction with the grain of the coal. *Fay.*

endings. A pillar method of working. *See also* narrow work, b. *Nelson.*

endiopside. A contraction of enstatite diopside for a clinopyroxene intermediate in composition between enstatite and diopside. *Spencer 16, M.M., 1943.*

end joint. A joint at right angles to the face cleats in a coal seam. Also called end cleat; butt cleat. *Pryor, 3.*

endless chain. A device for hauling coal in which a chain passes from the engine along one side of the road around a pulley at the far end and back again on the other side of the road. Empty cars, attached to one side of the chain by various kinds of clips or hooks are hauled into the mine; loaded cars attached to the other side of the chain are hauled out of the mine. *Korson.*

endless-chain haulage. *See* endless-rope haulage. *Fay.*

endless rope. A rope that moves in one direction, one part of which carries loaded cars from a mine at the same time that another part brings the empties into the mine. *Zern.*

endless rope haulage. A popular form of rope haulage in British coal mines, although it is gradually giving way to locomotive haulage. Two rail tracks are used, one for the empty tubs traveling inbye and one for the loaded tubs being hauled outbye simultaneously. The endless steel rope passes round a pulley, which is rotated by an engine through suitable gearing, and around a return sheave at the inbye end of the haulage road. The tubs are attached singly or in sets at regular intervals. The rope travels continuously in one direction at a speed of about 2½ miles per hour. The system is capable of hauling over long distances, but requires wide roadways to accommodate the double track. The system is normally used on relatively flat roadways. There are severe practical problems on steep gradients. *See also* haulage clip; tension carriage. *Nelson.*

endlichite. A variety of the mineral vanadinite in which the vanadium is partly replaced by arsenic. *Dana 17.*

endlines. The boundary lines of a mining claim which cross the general course of the vein at the surface. If the side lines cross the course of the vein instead of running parallel with it, they then constitute endlines. When a mining claim crosses the course of the lode or vein instead of being along such lode or vein, the endlines are those which measure the width of the claim as it crosses the lode. *Fay.*

endlines not parallel. Extralateral rights are allowed on a claim whose endlines converge, but they are not allowed in case the endlines diverge. Converging endlines on a claim would have the disadvantage of giving the owner of such a claim a continually diminishing length of vein on working down the dip. *Lewis, p. 33.*

end-member. a. One of two or more relatively simple compounds or substances occurring in a mixture. *A.G.I. Supp.* b. One of two or more distinctive forms between which more or less gradual and continuous variation occurs. *A.G.I. Supp.*

end milling. A method of machining with a rotating peripheral and an end cutting tool. *See also* face milling. *ASM Gloss.*

end moraine. A ridgelike accumulation of drift built along the margin of a valley glacier or ice sheet. *USGS Prof. Paper 262, 1955, p. 112.*

endobatholithic. The fifth stage in erosion of a (metalliferous) batholith in which the invaded rocks lie only as islands or roof pendants. *See also* cryptobatholithic. *A.G.I.*

endobatholithic deposit. A mineral deposit found in or near an island or roof pendant of invaded rock (very often in a small cupola of intrusive rock in a roof pendant), of which the exposed areas are reduced to small remnants surrounded by invading rock complexes. *Schieferdecker.*

endoblastic structures. Those minute structures produced in individual host crystals, either by the separation from solid solution of oriented and usually intersecting sets of crystal needles, plates or rods, or oriented film and roughly euhedral negative cavities, filled or empty. The term does not apply to larger inclusions in crystals, for which the expression poikilitic has long been used. *Hess.*

endoenzyme. An enzyme that remains within the cell that produced it. *I.C. 8075, 1962, p. 63.*

endoergic. Synonym for endothermic. *NRC-ASA N1.1-1957.*

end of coal. The direction, or section, at right angles to the face; sometimes called the butt. *Fay.*

endogene. *See* endogenetic, b. *Hess.*

endogenetic. a. Pertaining to rocks resulting from physical and chemical reactions, their origin being due to forces within the material. In general, they are nonclastic, chemical precipitates formed by solidification, precipitation, or extraction of the mineral matter from the states of igneous fusion, aqueous solution, or vaporization. *Compare* authigenic. *A.G.I.* b. Applied to processes that originate within the earth and to rocks, ore deposits, and landforms which owe their origin to such processes. Opposite of exogenetic. Synonym for endogenic. *Holmes, 1920.*

endogenic. *See* endogenetic, b.

endogenous. Formed by processes interior to the earth's surface, as by aqueous deposition in veins: said of mineral or rock masses. Synonym for endogenetic; endogenic. Opposite of exogenous. *Standard, 1964; A.G.I.*

endogeospheric elements. The group of elements probably belonging to the interior of the earth (siderophile elements, chalcophile elements, and a specific part of the lithophile elements). This group is more or less identical to the metallogenic elements of the earlier classifications. *Schieferdecker.*

endoglyph. A hieroglyph found within a single layer. *Pettijohn.*

endometamorphism; endomorphism. The modification produced in an igneous rock due to the partial or complete assimilation of portions of the rocks invaded by its magma; a phase of contact metamorphism in which attention is directed to the changes suffered by the intrusive body instead of to those produced in the invaded formations. *See also* endomorphic. *Holmes, 1920.*

endomorph. A crystal of one species enclosed in one of another. *Webster 3d.*

endomorphic. Pertaining to or characteristic of contact metamorphism that takes place within the cooling eruptive rock; resulting from the reaction of the wall rock upon the peripheral portion of an eruptive rock mass. *Fay.*

endomorphism. *See* endometamorphism. *Hess*

endomorphous. Of, or pertaining to, endomorph. *Shipley.*

end-on. Working a seam of coal, etc., at right angles to the cleat, or natural planes of cleavage. *Fay.*

end-on working. Working of coal seam at right-angles to the natural cleats, joints or slips. *Pryor, 3.*

endoscope. In gemmology, an instrument which affords a magnified image of the drill hole of a pearl. Used to distinguish between genuine and cultured pearl. A modification of it directs onto the walls of the drill hole a tiny beam of light, the subsequent path of which through the pearl reveals whether the structure of its core is concentric (real pearl) or parallel (cultured pearl). *See also* pearl microscope. *Shipley.*

endoscopic stage. A special microscope stage used for distinguishing between drilled genuine and cultured pearls. Incorporates the principle of the endoscope. *Shipley.*

endosmosis. The transmission of a fluid inward through a porous septum or partition which separates it from another fluid of different density. Opposite of exosmosis. *Fay.*

endosmotic. Of or pertaining to the flow or diffusion of water or solutions through the invisible pores of a rock inward to fissures. *Fay.*

endostratic formation. Bedding in clays resulting from alternating, desiccation, and saturation by groundwater. *Hess.*

endothermic. Accompanied by the absorption of heat. *C.T.D.* Opposite of exothermic.

endothermic reaction. A chemical reaction that takes place with absorption of heat. The dehydration of kaolinite is a reaction of this type. *Dodd.*

endpiece. Corn. *See* wallplate. *Fay.*

end plate. *See* sideplate. In timbering, where both a cap and a sill are used, and posts act as dividers, the posts become the end plates. *Fay.*

end point. a. The temperature at which the last portion of oil has been vaporized in ASTM or Engler distillation. Also called final boiling point. *Shell Oil Co.* b. That at which titration or other chemical action is deemed complete. *Pryor, 3.*

end-port furnace. A furnace with ports for fuel and air in the end wall. *ASTM C162-66.*

end-product. The stable nuclide that is the final member of a radioactive disintegration series. *NRC-ASA N1.1-1957.*

end runner. *See* riser brick. *Dodd.*

end-runner mill. A small grinding unit, primarily for laboratory use, operating on the principle of the pestle and mortar; the runner is set eccentrically in the mortar, which is mechanically driven. *Compare* edge-runner mill. *Dodd.*

ends. York. Headings which are driven on the end or end-on. *Fay.*

end skew. A brick so modified that one end is inclined at an angle other than 90° to the two largest faces. *A.R.I. See also* skew brick.

end slicing. *See* top slicing combined with ore caving. *Fay.*

end span. A span which is a slab or a continuous beam at its interior support only. *Ham.*

end thrust. The thrust exerted from the end of a structural member. This term is also applied particularly to the end thrust of a centrifugal pump towards its suction end, resisted by a thrust bearing. *Ham.*

endura emerald. A coined name used for glass imitation sold by a particular distributor and still sometimes used for any glass imitation of emerald. *Shipley.*

endurance. The ability of a metal or a fabricated structure to recover from or to withstand repeated stress loadings or fluctuations. *Pryor, 3.*

endurance limit. Limiting stress below which specimens can withstand hundreds of millions of repetitions of stress without fracturing. Considerably less than the rupture strength. Also called fatigue limit. *A.G.I.*

endurance ratio. a. Ratio of the endurance limit to the ultimate static tensile strength. *Ro.* b. Same as fatigue ratio. *ASM Gloss.*

endurance strength. The highest stress repeated application or reversal of which a material can withstand without rupture for a given number of cycles is the endurance strength of that material for that number of cycles. Unless otherwise specified, reversed bending is usually implied. *Compare* endurance limit. *Ro.*

endwall. a. The brick, concrete, or stonework construction at the sides of an excavation built to carry a flat or arched roof. Also called sidewall. *Spalding, p. 160.* b. The vertical refractory wall, furthest from the furnace chamber, of the downtake of an open-hearth steel furnace. *Dodd.* c. One of the two vertical walls terminating a battery of coke ovens or a bench of gas retorts; it is generally constructed of refractory bricks and heat insulating bricks with an exterior facing of building bricks. *Dodd.* d. *Compare* gable wall. *Dodd.*

en echelon. a. Parallel structural features that are offset like the edges of shingles on a roof when viewed from the side. *A.G.I.* b. In steps; in echelon. A term used with reference to (1) a faulting structure resembling a series of steps, in which the fault planes dip in the same general direction and at about the same angle, and (2) the repeated parallel occurrence of lenticular ore bodies or vein—echelon veins. *Nelson.*

enelectrite. Minute, colorless, monoclinic, lath-shaped crystals, presumably a hydrocarbon; found in chemawinite (variety of amber), Cedar Lake, Manitoba, Canada. *Tomkeieff, 1954.*

energizing coil. Primary coil that is used in the inductive methods to set up the electric currents in the earth. *Schieferdecker.*

energy. a. The ability of a body to perform work. *Shell Oil Co.* b. The capacity for producing motion. Energy holds matter together. It can become mass, or can be derived from mass. It takes such forms as kinetic, potential, heat, chemical, electrical, and atomic energy, and can be changed from one of these forms to another. *Leet.* c. Kinetic energy is that due to motion, and potential energy is that due to position. In a stream the total energy at any section is represented by the sum of its potential and kinetic energies. *Seelye, 1.*

energy absorption. A term that is both general and specific. Generally, it refers to the energy absorbed by any material subjected to loading. Specifically it is a measure of toughness or impact strength of a material; the energy needed to fracture a specimen in an impact test. It is the difference in kinetic energy of the striker before and after impact, expressed as total energy (foot-pound or inch-pound) for metals and ceramics, and energy per inch of notch for plastics and electrical insulating materials. *H&G.*

energy band. Energy spectrum of valence electrons in a polyatomic material. Conduction is not significant if the energy band is filled. *VV.*

energy efficiency. The product of the current efficiency by the voltage efficiency. *Lowenheim.*

energy gap. Forbidden part of the energy spectrum of valence electrons. If the lower energy band is filled, electrons must be activated across this gap before electronic conduction is realized. *VV.*

energy level. The distance from an atomic nucleus at which electrons can have orbits. May be thought of as a shell surrounding the nucleus. *Leet.*

energy of rupture. The work done per unit volume in producing fracture. It is not practicable to establish a definite energy of rupture value for a given material, because the result obtained depends upon the form and proportions of the test specimen and the manner of loading. As determined by similar tests on similar specimens, the energy of rupture affords a criterion for comparing the toughness of different materials. *Ro.*

enforced order mixer. *See* Frenkel mixer. *Dodd.*

engine. a. A machine by which power is applied to the doing of work, particularly one that converts some motive energy, especially heat, into mechanical power. *Standard, 1964.* b. Eng. A collier's term for enginehouse or building, arching, etc., within which a steam engine is fixed. *Fay.*

engine barrel. Scot. A large water barrel used in sinking shafts. *Fay.*

engine boy. A young person in charge of the drive for a face conveyor; he starts and stops the conveyor according to the supply of empty cars at the discharge end. *Nelson.*

engine distillate. A refined or unrefined petroleum distillate similar to naphtha but often of higher distillation range. *ASTM D288-57.*

engineer. A person who is trained in or who follows as a calling or profession a branch of engineering (as civil, military, electrical, mining, or structural engineering). *Webster 3d.*

engineered brick. A brick whose nominal dimensions are 3.2 by 4 by 8 inches. *ACSG.*

engineering geology. a. The application of the geological sciences to engineering practice for the purpose of assuring that the geologic factors affecting the location, design, construction, operation, and maintenance of engineering works are recognized and adequately provided for. *A.G.I.* b. A branch of geological science, forming a link between geology and engineering, particularly civil and mining. It provides a basis of theory to guide engineering practice where earth or rock materials are directly or indirectly involved. *See also* mining geology; soil mechanics. *Nelson.*

Engineering News formula. A pile driving formula which is as follows: $P = \frac{2Wh}{s + c}$ where P is the allowable load on the pile; W is the weight of a drophammer, or the weight of the moving parts of a single-acting steam or airhammer; h is the distance through which a drophammer falls or the stroke of a steam or airhammer, expressed in feet; s is the average penetration per blow for the last few blows, expressed in inches; and c is a constant, equal to 1.0 for a drophammer and 0.1 for a steam or airhammer. The values for P and W are expressed in the same units, in either pounds or tons. The formula as written includes a safety factor of 6. *Urquhart, Sec. 8, pp. 63, 65.*

engineering psychology. *See* human engineering. *Nelson.*

engineer's chain. Has a hundred links, each 1 foot long. Gunter's chain, formerly much used in land surveys, is 66 feet long and has a hundred links, each 7.92 inches long. *Crispin.*

engineer's transit. Theodolite. *Pryor, 3.*

engine keeper. Scot. A brakeman. *Fay.*

engineman. a. Eng. One who works a winding, hauling, fan, pumping, or other engine. *See also* engineer. *Fay.* b. The man in charge of winding engine. Also called brakesman. *Peel.*

engine pit. Eng.; Scot. A shaft used entirely for pumping purposes. *Fay.*

engine plane. a. A system of rope haulage in which the loads are raised or lowered on the slope by a steam or electric hoist. In the simplest form only one track and one rope are required, and power is used for raising the load. Double engine planes have two separate tracks or three rails and a passing turnout. *Lewis, p. 225.* b. Eng. An underground way, either level or dipping inbye and outbye, or both (undulating), along which the cars are conveyed to and from the workings by engine power. *See also* endless chain; endless rope; main rope; tail rope. *Fay.* c. A passageway having a steep grade along which cars are raised and lowered by a rope attached to an engine; a plane. In Arkansas, limited to planes down which coal is lowered. When the coal is hoisted, the plane is known as a slope. *Fay.* d. A roadway, horizontal or inclined, on which tubs or cars are hauled by rope haulage. *Nelson.* e. Direct rope haulage. *Pryor, 3.* f. Eng. A mechanical haulage road. *SMRB, Paper No. 61.*

engine road. Scot. A haulage road worked by engine power. *Fay.*

engine seat. Scot. The platform or foundation to which an engine is fastened. *Fay.*

engine shaft. Usually the principal shaft in a mine, and the one at which the hoisting and pumping are done. *Fay.*

engine tenter. N. Staff. A brakeman. *Fay.*

engine-turned ware. Ceramic bisque ware that is lined or fluted in a special lathe. *ACSG.*

engine-turning lathe. A lathe having an eccentric motion and used to incise decoration on pottery ware before it is fired. *Dodd.*

enginewright. Mid. A practical man whose duty about a colliery is to inspect the machinery, ropes, and other appliances. *Fay.*

englacial. Embedded in a glacier, as englacial drift; being within the body of a glacier, as an englacial stream. *Webster 3d.*

englacial till. *See* till. *Fay.*

English amber. *See* British amber. *Shipley.*

English and Turner factors. *See* thermal expansion factors for glass. *Dodd.*

English bond. A bond which is made of alternate courses of stretchers and headers with a one-half brick piece soap or closer, next to the corner header. *AISI, No. 24.*

English brilliant cut. A cushion-shaped brilliant with eight star facets, eight upper break facets, eight lower break facets, four pavilion facets, a table, and a culet. *See also* star cut. *Shipley.*

English copper process. Obtaining copper by reducing copper ores in a reverberatory furnace. *Bennett 2d, 1962.*

English crossbond. A modification of English bond in which stretcher courses break joints with each other. *Bureau of Mines Staff.*

English cupellation. A method of refining silver in which a small reverberatory furnace with a movable bed and a fixed roof is used. The bullion to be cupelled is charged gradually and the silver is refined in the same furnace where the cupellation is carried on. *Fay.*

English furnace. A small furnace for the distillation of zinc. The English furnaces differ from other types by distilling the zinc per descensum instead of per ascensum. *Fay.*

Englishite. A hydrous phosphate of calcium, potassium and aluminum, $4CaO.K_2O.$-$4Al_2O_3.4P_2O_5.14H_2O$; probably orthorhombic; highly cleavable layers; white. Found near Fairfield, Utah. *English.*

English kiln. A transverse arch chamber kiln with a system of flues and dampers above the chambers permitting any two chambers to be connected. It was designed by A. Adams in 1899 for the firing of building bricks made from highly bituminous clays. *Dodd.*

English method. A method of smelting lead ore in which the characteristics are: a large charge of lead ore, a quick roasting, a high temperature throughout, and the aim to extract all the lead in the reverberatory. The hearth inclines toward the middle of one of the sides, the lead collects in the furnace and is tapped at intervals into an outside kettle. *Fay.*

English pink. *See* chrome tin pink. *Dodd.*

English process. In copper smelting, the process of reduction in a reverberatory furnace, after roasting, if necessary. *Fay.*

English salts. Epsom salts. *Webster 2d.*

English translucent china. Ceramic tableware, etc., introduced in 1959 by Doulton Fine China, Ltd., in contrast to English bone china. It is feldspathic, but differs from continental porcelain in that it is biscuit fired at a higher temperature than the glost fire. *Dodd.*

English tubbing. A form of tubbing with outside flanges, for lining circular shafts sunk through heavily watered strata. *See also* tubbing. In England, cast iron began to be used as a shaft lining at the beginning of the 19th century and was mainly due to the initiative of Mr. Buddle, Senr. *Nelson.*

English white. *See* prepared calcium carbonate. *Bennett 2d, 1962.*

English zinc furnace. A furnace in which zinc is reduced and distilled from calcined ores in crucibles. *Fay.*

engobe. Slip coating applied to a ceramic body for imparting color, opacity, or other characteristics and then covered with a glaze. *Bennett 2d, 1962 Add.*

engorgement. The clogging of a furnace. *Fay.*

engrafted valley system. Valley system consisting of originally independent rivers, contracted to one system in consequence of negative movements of the sea level. *Schieferdecker.*

engraving. The process of carving figures, letters, etc., upon glass by abrasive means. *ASTM C162-66.*

enhydrite. A mineral (as nodules of chalcedony) having cavities containing water. *Standard, 1964.*

enhydrous. Containing water; having drops of included fluid; as, enhydrous chalcedony. *Standard, 1964.*

enigmatite. *See* aenigmatite.

enlarging shots. Boreholes driven after the face of the rock has been unkeyed, and two or three free faces have thus been provided. *Stauffer.*

en masse conveyor. A conveyor comprising a series of skeleton or solid flights on an endless chain or other linkage which operates in horizontal, inclined, or vertical paths within a closely fitted casing for the carrying run. The bulk material is conveyed and elevated en masse in a substantially continuous stream with a full cross section of the casing. *ASA MH4.1-1958.* Also called chain conveyor.

en masse feeder. *See* conveyor-type feeder. *ASA MH4.1-1958.*

Enochkin series. The middle portion of the thick Jurassic succession of Alaska, consisting of shales, sandstones, and conglomerates; represented in northwest Alaska by a very great thickness of plant-bearing continental strata. *C.T.D.*

enriched uranium. Uranium in which the percentage of the fissionable isotope, uranium 235, has been increased above the 0.71 percent contained in natural uranium. *L&L; Handbook of Chemistry and Phys-*

ics, 45th ed., 1964, p. B-143

enrichment. a. The action of natural agencies which increases the metallic content of an ore. Secondary sulfide enrichment refers to the formation of new sulfide minerals which contain a larger percentage of the metals. *Fay.* b. *See* isotopic enrichment. *L&L.*

enrichment, secondary. Silver, copper, and other lodes decompose at the surface, and the sulfides become converted into oxysalts, which are carried deeper into the lode by descending waters. In the zone immediately between the weathered outcrop and the unaltered sulfides, that is, in the zone of secondary enrichment, chemical action takes place between the descending waters bearing oxysalts and the unaltered sulfides, resulting in the formation of a new series of minerals whose members are often very rich in the valuable metal of the lode. As a result of this chemical concentration workable ore bodies may result from rather low-grade ores. *See also* gossan; mineralization; zones of lode. *Nelson.*

enrockment. A mass of large stones thrown into water to form a base (as for a pier). *Webster 3d.*

ensayar. Sp. To assay. *Fay.*

ensaying. Assaying. *Hess.*

Ensign-Bickford hot-wire lighter. A fuse lighter similar to a Fourth-of-July sparkler, that burns for 2½ minutes, sufficient time to light 30 to 50 fuses. The lead splitter is a lead tube about one-eighth inch in diameter filled with a slow-burning powder that burns at the rate of 36 seconds per foot with a hot splitting flame. *Lewis, p. 120.*

Ensign-Bickford master fuse lighter. A shell, similar to a shotgun cartridge, which contains an ignition compound in the base. As many as 7 fuses can be pushed into the shell until the fuses contact the ignition compound. The lighting of one fuse which burns into the shell sets off the compound and ignites the other 6 fuses. *Lewis, 120.*

Enslin apparatus. This apparatus for the determination of the water-absorption capacity of clays was originally designed by O. Enslin for testing soils. It consists of a U-tube, one arm of which is connected via a 3-way tap to a calibrated horizontal capillary tube; the other arm ends in a funnel with a sintered-glass base on which is placed a weighed sample of clay. Water is allowed to contact the sample and the amount absorbed is read from the capillary tube. The result is expressed as a percentage of the weight of the dry clay. *Dodd.*

ensonify. The penetration of sound into any particular part of the sea. *Hy.*

enstatite. A mineral, $MgO.SiO_2$, of the same composition as compounds which may be formed in slags in service. *Bureau of Mines Staff.*

enstatite cat's-eye. Enstatite which, when cabochon cut, has a chatoyant effect, but not a well-defined eye. *Shipley.*

enstatitfels. *See* enstatolite. *Hess.*

enstatolite. A coarse-grained, yellowish- or greenish-gray igneous rock consisting essentially of enstatite with some chromite grains; also, talc, chlorite, and magnesite. *Hess.*

enstenite. Winchell's name for orthorhombic pyroxenes of the isomorphous series, $MgSiO_3$-$FeSiO_3$. *Compare* clinoenstenite. *English.*

enterolithic structure. Small folds resulting from changes in volume due to chemical changes in a rock. *A.G.I.*

enthalpy. a. Heat contained per unit mass (h): $h = u + pv$, where u is internal energy and pv is flow work (pressure times volume). *Pryor, 3.* b. Total heat content of air; the sum of the enthalpies of dry air and water vapor, per unit weight of dry air. Measured in British thermal units per pound. *Hartman, p. 8.* c. For most engineering purposes, heat content or total heat above some base temperature. Specific enthalpy is the ratio of total heat to weight of substance. *Strock, 10.*

entombment. The act or fact of burial of a rock body of distinctive form and origin by rocks of a different kind. *Challinor.*

entoölitic. Applied to oölitic structures that have formed through the filling of small preexisting cavities by successive coatings on their walls. *Stokes and Varnes, 1955.*

entrained-bed carbonization. A U.S. Bureau of Mines process in which coals generally unsuitable for making coke strong enough to perform satisfactorily in conventional blast furnace practice, are made suitable. Using entrained-bed carbonization, such coals are processed to yield a char, as well as useful coal tars and oils. The char, in turn, is mixed with similar coals to obtain a metallurgical-fuel blend. *Bureau of Mines Staff.*

entrainment. a. The suspension of liquid droplets, gas bubbles, or fine solid particles being carried by a stream of fluid. *NRC-ASA N1.1-1957.* b. A physical carrying along of fine droplets of brine in the stream of vapor. *Kaufmann, p. 225.*

entrance head. The head necessary to promote flow into a conduit or similar structure. This comprises both entrance loss and velocity head. *Ham.*

entrance lock. Lock providing entrance for vessels to a dock in which the water level differs from that outside. *Ham.*

entrance loss. The head lost in friction and turbulence of water at the inlet to a conduit. *Ham.*

entrenched meander. Streams which have reached the advanced stage of one cycle hold their courses in the second cycle, and cut down in the old meanders; the result is a meandering stream in a young valley. These conditions constitute entrenched meanders. Synonym for intrenched meander. *A.G.I.*

entropy. a. A measure of the unavailable energy in a system, that is, energy that cannot be converted into another form of energy. *A.G.I. Supp.* b. A measure of the mixing of different kinds of sediment; high entropy is appraoch to unmixed sediment of one kind. *A.G.I. Supp.* c. Ratio of amount of heat added to air to the absolute temperature at which it is added. Measured in British thermal units per degree Reaumur. *Hartman, p. 8.* d. Specific entropy is the ratio of entropy to weight of substance. *Strock, 10.*

entropy change; $\triangle$ S. Quantity of heat absorbed from surroundings, divided by absolute temperature. *Pryor, 3.*

entropy unit; E.U. 1 calorie divided by degree divided by mole. Entropy change being latent heat absorbed divided by temperature at which change occurs, the entropy of fusion divided by mole of ice at O° C., is

$$S = \frac{1437}{273.2} = 5.26 \text{ cal. x deg.}^{-1} \text{ x mole}^{-1}$$
$$= 5.26 \text{ E.U.}$$

This can only be calculated directly in a reversible process such as change of state. *Pryor, 3.*

entry. a. In coal mining a haulage road, gangway, or airway to the surface. *Fay.* b. An underground passage used for haulage or ventilation, or as a manway. Back entry, the air course parallel to and below an entry. Distinguished from straight entry, front entry, or main entry. Dip entry, an entry driven down hill so that water will stand at the face. If it is driven directly down a steep dip it becomes a slope. Gob entry, a wide entry with a heap of refuse or gob along one side. Slab entry, an entry which is widened or slabbed to provide a working place for a second miner. Double entry, a system of opening a mine by two parallel entries; the air current is brought into the rooms through one entry and out through the parallel entry or air course. Cutoff entry, an entry driven to intersect another and furnish a more convenient outlet for the coal. Single entry, a system of opening a mine by driving a single entry only, in place of a pair of entries. The air current returns along the face of the rooms, which must be kept open. Triple entry, a system of opening a mine by driving three parallel entries for the main entries. Twin entry, a pair of entries close together and carrying the air current in and out, so laid out that rooms can be worked from both entries. Also called double entry. *Fay.* c. A coal heading. To develop a coal mine in the United States, one or more sets of main entries are driven into the take. Each set consists of four to eight coal headings, connected at intervals by crosscuts. From these, and usually at right angles, butt entries, three to six in number, are driven at intervals of up to 1,500 yards. Between the sets of butt entries, face entries, three to four in number, are driven at intervals of up to 500 yards to form a block or panel. The entries to split the panels may be 12 to 20 feet wide and at 50 to 100 feet centers. Each entry is made as productive as possible and productivity is often higher in the entry work than in pillar extraction. *See also* pillar-and-stall. *Nelson.* d. As applied in the appropriation of public land means that act by which an individual acquires an inceptive right to a portion of the unappropriated soil of the country. *Ricketts, I.* e. Scot. The beginning of a lease. *Fay.*

entry air course. A passage for air parallel to an entry. *Fay, p. 20.*

entry conveyor. *See* underground mine conveyors; entry table. *ASA MH4.1-1958.*

entry driver. A combination mining machine designed and built to work in entries and other narrow places, and to load coal as it is broken down. An undercutting frame and two vertical shearing frames serve to undercut and shear the sides of the coal, so that the ram equipped with bars and operated by hydraulic jacks, can break down the coal. The height at which the ram operates against the coal, when the undercut and shearing are completed, is adjustable. A conveyor in the undercutting frame carries the broken down coal back to another conveyor mounted on a turntable so that the coal can be loaded into a mine car, or slate can be deposited on the gob side of the entry. The entire machine is mounted in a pan. *Kiser, 1, p. 28.*

entry driver operator. In bituminous coal mining, one who operates a type of coal cutter known as a heading machine, that is adapted to the driving of underground haulageways in coal from one part of the mine to another or to the surface. Also called entry driving machine operator. *D.O.T. 1.*

entry driving machine operator. *See* entry driver operator. *D.O.T. 1.*

entryman. a. A miner who works in an entry. *Fay.* b. One who enters upon public land with intent to secure an allotment under homestead, mining, or other laws. *Webster 3d.* c. In anthracite and bituminous coal mining, one who is engaged in driving a haulageway, airway, or passageway from one place to another in the mine or to the surface. Also called heading driver. *D.O.T. 1.*

entry stumps. Pillars of coal left in the mouths of abandoned rooms to support the road, entry, or gangway until the entry pillars are drawn. In Arkansas, these pillars are called entry stumps even when the rooms are first driven, before any pillars are pulled or the rooms abandoned. *Fay.*

entry table. A conveyor which transports material to the feeding position of a machine. *ASA MH4.1-1958.*

envelope. a. The outer part of a recumbent fold; especially used to contrast the sedimentary cover of a recumbent anticline with the crystalline cone. *A.G.I.* b. A metamorphic rock surrounding an igneous intrusion. *A.G.I. Supp.* c. In a mineral, an outer part separate in origin from (later than) an inner part. *Challinor.*

envelope kiln. Alternative name, particularly in the United States, for top-hat kiln or shuttle kiln. *See also* top-hat kiln; shuttle kiln. *Dodd.*

environment. The aggregate of all the surrounding conditions, influences, or forces affecting a locus of sedimentation. *Schieferdecker.*

eo. Indicating the dawn or beginning of an epoch, as Eocene. *Standard, 1964.*

Eocene. a. An epoch of the Tertiary between the Paleocene and Oligocene and strata of that age; considered by some to be the oldest Tertiary and includes the Paleocene. *A.G.I. Supp.* b. Originally, the older Tertiary included Oligocene. Synonm for Eogene. *A.G.I. Supp.*

Eocryptozoic. Early Precambrian. *A.G.I. Supp.*

Eogene. The lower of two Cenozoic subdivisions, consisting of Paleocene, Eocene, and Oligocene. *Compare* Neogene. *A.G.I. Supp.*

eolation. The process by which wind modifies land surfaces, both directly by transportation of dust and sand and by the work of sandblasts, and indirectly by wave action on shores; eolic gradation. *Standard, 1964.*

eolian. a. Of, relating to, formed by, or deposited from the wind or currents of air. Eolian was formerly spelled aeolian. *See also* eolian rock. *Fay.* b. Applied to sand dunes which have been accumulated by the wind. *Gordon.*

eolian crossbedding. Crossbedding produced by wind. *Stokes and Varnes, 1955.*

eolian deposit. Wind-deposited accumulations, such as loess and dune sand. *Stokes and Varnes, 1955.*

eolianite. Introduced by Sayles for all consolidated sedimentary rocks which have been deposited by the wind. *A.G.I.*

eolian marble. A name given by Hitchcock to the crystalline granular limestone of Mount Eolus, Vt. *Fay.*

eolian placer. A placer concentrated by wind action. *Bateman.*

eolian rock. A fragmental rock, composed of wind-drifted materials. For example, the drift sandrock, the common building stone of Bermuda. *Fay.*

eolith. Dawn stone. Oldest known stone implements, believed to have been developed by early man. Found in gravels. *Pryor, 3.*

eolotropic. *See* aeolotropic.

eon. A period of existence; an age. Used by some geologists to subdivide all geologic time into two broad categories. *Bureau of Mines Staff.*

Eopaleozoic. Formerly used for the earlier portion of Paleozoic time, including the Cambrian, Ordovician, and Silurian. Obsolete. *A.G.I.*

Eosite. Trade name for a rose-colored Tibet stone. *Shipley.*

eosphorite. A pink to rose-red mineral with the formula, $(Mn'',Fe'')Al(PO_4)(OH)_2.H_2O$; isomorphous with childrenite. *Hey 2d, 1955; Dana 7, v. 2, pp. 936-937.*

Eötvös balance. A sensitive torsion balance for measuring variations in the density of the underlying rocks and that records the horizontal gradient of gravity. *Webster 3d.*

Eötvös unit. The unit of measurement in work with Eötvös torsion balance having the dimensions of acceleration divided by length, for the gradient and differential curvature values. For the gradient, 1 Eötvös unit (1E) = 1 x 10^{-9} gallons per horizontal centimeter. *A.G.I.*

Eozoic. Precambrian; Prepaleozoic. Formerly applied to the rocks now included in the Archean and Algonkian systems and the corresponding geologic periods, being intended to supplant Azoic when it was learned that the Azoic rocks contain some fossil remains. Obsolete. *Fay.*

epaulet. A style of cutting gems. *Hess.*

epeiric. Applied to shallow seas that cover or have covered large parts of continents without being disconnected from the ocean. *Stokes and Varnes, 1955.*

epeirogenic. Of or relating to epeirogeny. *Webster 3d.*

epeirogeny. The deformation of the earth's crust by which the broader features of relief (as continents, ocean basins, and greater plateaus) are produced. *Compare* diastrophism. *Webster 3d.*

ephemeral stream. A stream which flows in direct response to precipitation. *Fay.*

epi-. a. A prefix indicating alteration. *A.G.I.* b. A prefix indicating that the rock belongs in the uppermost zone of metamorphism; that is, it originated under moderate temperature, low hydrostatic pressure, and powerful stress. *See also* apo-; cata-; kata-; meso-; meta-. *A.G.I.* c. A Greek prefix signifying on or upon. *A.G.I.*

epiasteria. An asteria which, cut cabochon and in the correct crystallographic direction and observed by reflected light, exhibits the optical phenomenon of a star. *See also* asteria; diasteria. *Shipley.*

epiasterism. Asterism seen by reflected light, as in star ruby or sapphire which is cut cabochon to reveal the asteria. *Shipley.*

epibatholithic. The third stage in which erosion has exposed small parts of the barren core below the dead line. *See also* cryptobatholithic. *A.G.I.*

epibatholithic deposit. A mineral deposit found in or outside the outer rim of an intrusive body of which small parts of the barren core are already exposed by erosion. *Schieferdecker.*

epibatholithic stage. When erosion has gone deep enough to expose small parts of the barren rock that lies below the dead line. *A.G.I.*

epibenthic dredge. This bottom sampler developed by Scripps Institution consists of a pair of sheet-metal skis attached to a light framework for a silk or nylon net. A sheet of heavy canvas fastened beneath the net protects it from tearing. Removable rakers in front of the net stir up the bottom as the dredge advances, permitting the net to capture the creatures contained in the sediment. A bottom-walking wheel connected to a small veederroot counter indicates the distance over the bottom the device travels during a haul. The epibenthic dredge is lowered in the ocean with an ordinary hydrographic winch, and will go as far down as 4,500 feet. Collecting speed of the dredge is only 2 knots eliminating wire angle problems. *H&G.*

epibenthos. In oceanography, animals and plants found living below low tidemark and above the hundred fathoms line. *C.T.D.*

epicenter. Point on the earth's surface directly above the focus of an earthquake. *Mather.*

epicentral area. Area surrounding the epicenter. *Schieferdecker.*

epiclastic. Consisting of the consolidated detritus of preexistent rocks not volcanic. *Standard, 1964.*

epicontinental. Situated upon a continental plateau or platform, as an epicontinental sea. *Fay.*

epicrystalline. Both sedimentary and crystalline in character; said of strata. *Standard, 1964.*

epidermal deformation. Deformations affecting the outer cover of the earth's crust, such as slumping, volcanotectonic collapse, sliding, compressive settling, etc. *Schieferdecker.*

epidermophytosis. *See* athlete's foot. *Sinclair, 1, p. 195.*

epidiabase. Metamorphosed diabase with amphibolitized augite. *A.G.I. Supp.*

epididymite. A colorless basic silicate of sodium and beryllium, $HNaBeSi_3O_8$; orthorhombic. Crystals tabular, striated. From Narsarsuk, Greenland; Langesundfiord, Norway. *English.*

epidiorite. A doleritic or basaltic rock in which the augite has suffered alteration to hornblende, so that the rock approaches the composition of a diorite. Distinguished from diabase by the less extreme alteration of the feldspars. *Holmes, 1920.*

epidosite. A rock consisting of epidote and quartz and sometimes containing gold. Banded epidosites are sometimes used for ornamental stones. *CCD 6d, 1961.*

epidote. A basic silicate of aluminum, calcium, and iron. One form is $Ca_2(AlOH)$

$(AlFe_2)(SiO_4)_3$; monoclinic; Mohs' hardness, 6 to 7; specific gravity, 3.25 to 3.5; and a common secondary constituent of igneous rocks. *Pryor, 3.*

epidotization. Metamorphism in which epidote is formed from other minerals. *Webster 3d.*

epigene. a. Formed, originating, or taking place on or not far below the surface of the earth. *Webster 3d.* b. A crystal that is not natural to the substances in which it is found. *Compare* pseudomorph. *Webster 3d; Fay.*

epigene relief. Includes hills, ridges and peaks, valleys, gorges, and canyons, certain plains and plateaus, basins of various sorts, and other minor features sculptured into or constructed upon hypogene or preexisting epigene features by the action of the external or epigene agents, like rivers, winds, glaciers, oceans, and others, which effect the surface of the earth and the outermost zones of the lithosphere. *Stokes and Varnes, 1955.*

epigenesis. The change in the mineral character of a rock due to outside influences. *Compare* metamorphism. As applied to ore deposits, epigenetic deposits are younger than the country rock containing them. *Webster 3d; Fay.*

epigenetic. Produced on or near the earth's surface, for example, epigenetic disintegration, epigenetic valleys, etc. In petrography, it is usually applied to mineral deposits of later origin than the enclosing rocks, or to the formation of secondary minerals by alteration. Contrasted with syngenetic. *Johannsen, v. 1, 2d, 1939, p. 175.*

epigenetic deposit. a. A mineral deposit formed later than the enclosing rocks. Deposits of this nature are formed in openings in the rocks or by replacement. *Stokes and Varnes, 1955.* b. Deposits formed subsequently to the enclosing rock by the mother liquor penetrating into surrounding rocks and depositing minerals. Most mining districts containing epigenetic deposits are commonly characterized by the presence of intrusive igneous rocks, complex folding and deformation of the geologic structure of the district, and by alteration of the country rock through the chemical action of the circulating mineral solutions. These deposits can be classified into six groups: (1) contact-metamorphic deposits; (2) pegmatite deposits; (3) deposits of the deep-seated vein zone; (4) deposits of the intermediate vein zone; (5) deposits of the shallow vein zone; and (6) surface deposits formed by springs of magmatic origin. *See also* deep-seated vein zone deposits; intermediate vein zone deposits; shallow vein zone deposits; spring deposits; contact-metamorphic deposit; pegmatite deposits. *Lewis, pp. 273-275.*

epigenetic drainage. Drainage by streams whose courses were determined by the conditions of an older, higher land surface now eroded. *Stokes and Varnes, 1955.*

epigenetic ore deposit. A term generally applied to ore (mineral) deposits of later origin than the enclosing rocks. *Schieferdecker.*

epigenetic pattern. A dispersion pattern formed by the subsequent introduction of metal from an outside source. *Hawkes, 2, p. 26.*

epigenetic stream. Proposed by Richthofen for what is now referred to as superposed stream. Obsolete. *A.G.I.*

epigenic. Epigene. *Hess.*

epigenite. Described as a steel-gray metallic mineral with a black streak and an uneven fracture, $4CuS_2.3FeS.As_2S_5$; Mohs' hardness, 3.5. *Hess.*

epiglyphs. A hieroglyph on top of a bed. *Pettijohn.*

epineritic environment. The marine bottoms to a depth maximum 20 fathoms. *Schieferdecker.*

epiphesis. *See* apophysis. *Fay.*

epiplankton. In oceanography, plankton found in depths of less than one hundred fathoms. *C.T.D.*

Epiric. Upper Permian and Triassic. *A.G.I. Supp.*

epistilbite. A colorless zeolite, chemically similar to heulandite; hydrated silicate of calcium and aluminum, crystallizing in the monoclinic system. *C.M.D.*

epistolite. A white, hydrous siliconiobate and titanate, chiefly of sodium; monoclinic; rectangular plates; commonly in curved folia with pearly luster. From Julianehaab, Greenland. *English.*

epitaxy. Induced orientation of the crystal lattice of an electrodeposit at the plane of contact with the undisturbed underlying metal. *ASM Gloss.*

epithermal. Applied to hydrothermal deposits formed at low temperature and pressure. *Bateman.*

epithermal deposit. A deposit formed in and along fissures or other openings in rocks by deposition at shallow depths from ascending hot solutions. *A.G.I.*

epizone. a. The uppermost zone of metamorphism in Grubenmann's system for the classification of metamorphic rocks. Grubenmann's original scheme was extended by Niggli, in whose epizone are also included the products of low-temperature contact metamorphism near the outer boundary of an aureole, and rocks that have been affected by low-temperature hydrothermal metasomatism involving introduction of magmatically derived material. *Schieferdecker.* b. The upper zone of metamorphism. The distinctive physical conditions in this zone are moderate temperature, lower hydrostatic pressure, and powerful stress. The rocks characteristically produced include mylonites and cataclastic rocks generally, phyllites, chlorite schists, talc schists, porphyroids, and in part marbles and quartzites. *A.G.I.* c. The metamorphic environment characterized by low temperature and hydrostatic pressure, with or without high stress, resulting in chemical and mechanical metamorphism; characterized by hydrous silicate minerals. *A.G.I.*

epm Abbrivation for equivalents per million. *BuMin Style Guide, p. 59.*

epoch. a. A geologic time unit corresponding to a series; a subdivision of a period; formerly used for other smaller divisions of geologic time. *A.G.I. Supp.* b. In terrestrial magnetism, a period of time over which magnetic elements are considered; usually 10 years. *Hy.*

epoxy. Compound in which an oxygen atom is joined across two carbons, for example, epoxypropane. *Pryor, 3.*

epoxy resins. Resins that are finding increasing use in the ceramics industry. Used in tile installations, in ceramic fiber laminates, in printing inks, in adhesives, in coatings, in potting materials, and as casting materials. *Lee.*

epsilon structure. A Hume-Rothery designation for structurally analogous close-packed phases or electron compounds, like $CuZn_3$, that have ratios of seven valence electrons to four atoms. Not to be confused with the epsilon phase as indicated on a constitution diagram. *ASM Gloss.*

epsomite. A mineral composed of hydrous magnesium sulfate. $MgSO_4.7H_2O$; orthorhombic. *Sanford; Dana 17.*

epsom salt. Same as epsomite. *Fay.*

eq.s. explosive. An unsheated explosive incorporating cooling agents, which is equivalent in safety (relating to the ignition of methane/air mixture) on a charge/weight basis to an explosive having a sheath of cooling agents around it. Abbreviation for equivalent-to-sheated explosive. *B.S. 3618, 1964, sec. 6.*

equal angle. A metal angle section with each leg of equal length. *Ham.*

equal-area net. A type of projection of points on a sphere to a flat surface (circle). The areas of every square degree on the projection are equal. *A.G.I.*

equal-errors cut point; wolf cut point. The density at which equal portions of the feed material are wrongly placed in each of two products of a specific-gravity separation. *B.S. 3552, 1962.*

equal-errors size. The separation size at which equal portions of the feed material are wrongly placed in each of two products of a sizing operation. *B.S. 3552, 1962.*

equal expectation, rule of. If two oil wells under similar conditions produce equal quantities during any given year, the quantities they produce thereafter, on the average, will be approximately equal, regardless of their relative ages. *A.G.I.*

equal-falling particles. Particles possessing equal terminal velocities. They are the oversize material and form the underflow of a classifier. *See also* Stokes law. *Nelson.*

equalization of winding load. The balancing of the weight of the winding rope which varies considerably during a winding cycle. *See also* balance rope; winding; winding drum. *Nelson.*

equalizing bed. Bed of ballast or concrete in the bottom of a trench on which pipes are laid. *Ham.*

equal lay. Ropes of which the layers of wires in strands have all been laid to the same length of lay. Also known as parallel lay. *Ham.*

equant. Applied to crystals having the same or nearly the same diameter or the same dimensions in all directions; equant crystals may be polyhedral, spheroidal, or irregularly anhedral. *A.G.I.; Schieferdecker.*

equant element. In structural petrology, a fabric element of approximately equal dimensions. *A.G.I.*

equation. In a chemical reaction no matter is created and none is destroyed. Hence, the same numbers of the same atoms exist after the change as before it, but after the change they are not combined together in the same way as they were before the change took place. This fact can be best expressed by means of statements involving only formulae and symbols: such statements are known as equations. *Cooper.*

equation, chemical. Expression which shows formulas of reacting compounds and resulting products (change of state). Conforms with laws of conservation of mass. An ionic equation expresses ion-reaction, for example,

$$Ba{+}{+} + SO_4{=} \approx BaSO_4$$

the arrow showing reversibility tending toward equilibrium. *Pryor, 3.*

equation of motion. The Newtonian law of motion states that the product of mass and acceleration equals the vector sum of the forces. In meteorological and oceanographic use, both sides of the equation of motion are divided by mass to give force per unit mass. The forces considered in ocean currents are gravity, Coriolis force, pressure gradient force, and frictional forces. *Hy.*

equation of state. One connecting pressure (p), volume (v) and temperature (t) for a substance. *Pryor, 3.*

equator. The great circle midway between the two poles and dividing the grain into two polar hemispheres. *A.G.I.*

equi. A combining form meaning equal, or equally, from the Latin aequus (equal). *Webster 3d.*

equiareal projection. Projection from the center of a sphere through a point on its surface to a plane tangent at the south pole so constructed that areas between meridians and parallels on the plane are equal to corresponding ones on the surface of the sphere. *A.G.I. Supp.*

equiaxed crystals. Polyhedral crystals formed by spontaneous crystallization in the interior of a mass of metal in a mold. Distinguished from columnar crystals and chill crystals. *C.T.D.*

equiaxed grain structure. A structure in which the grains have approximately the same dimensions in all directions. *ASM Gloss.*

equiform. Applied to the crystals of equigranular rocks, when they have the same, or nearly the same, shape. *Schieferdecker.*

equigranular. A textural term applied to rocks, the essential minerals of which are all of the same order of size. *Holmes, 1920.*

equilibrant. An adjective applied to a force that will balance two or more other forces. *Billings, 1954, p 10.*

equilibrium. a. When two or more forces act upon a body in such a manner that the body remains at rest the forces are said to be in equilibrium, or in a perfect balance. *Morris and Cooper, p. 173.* b. Chemical equilibrium is reached when a reversible reaction is proceeding at the same rate in each direction. Metastable equilibrium is a steady unsatisfied state which will undergo further change on addition of the phase necessary to complete its stability. Physical equilibrium can connote stable coexistence of a substance in two or more phases, such as solid, liquid, and/or vapor. *Pryor, 3.* c. A state when a fixed proportion of daughter elements or gamma-ray emitters are present in normal amounts. The normal stage in decay of uranium from an isolated, pure state, about a million years. It is only at this stage or thereafter that radioactivity will indicate correct proportions of uranium on a counter. *Ballard.*

equilibrium diagram. A graphical representation of the temperature, pressure, and composition limits of phase fields in an alloy system as they exist under conditions of complete equilibrium. In metal systems, pressure is usually considered constant. *ASM Gloss. See also* constitution diagram.

equilibrium eutectic. The composition within any system of two or more crystalline phases which melts completely at the minimum temperature, or the temperature at which such a composition melts. *ACSG, 1963.*

equilibrium moisture content. The moisture content of a soil when the water is static. *Nelson.*

equilibrium moisture of coal. The moisture content retained at equilibrium in an atmosphere over a saturated solution of potassium sulfate at 30° C, and 96 to 97 percent relative humidity. When the sample, before such equilibrium, contains total moisture at or above the equilibrium moisture, the equilibrium moisture may be considered as equivalent to inherent or bed moisture; and any excess may be considered as extraneous moisture. *ASTM D121–62.*

equiplanation. From the Latin aequus meaning equal and the Latin planus meaning a plain. Equiplanation includes all the physiographic processes which tend to reduce the relief of a region and cause the topography eventually to become more plainlike in contour without involving any loss or gain of material, that is, the quantities of material remain apparently equal, or are not increased or decreased by the plain-producing process or processes. Material may be exported from certain districts during the time that equiplanation is in progress, but this export takes place independently of the equiplanating. *A.G.I.*

equipment flowsheet. A diagram indicating, preferably by symbols, the units of plant to be used in the various operational steps carried out within a coal-preparation plant. *B.S. 3552, 1962.*

equipotential line. a. A line along which water will rise to the same elevation in piezometric tubes. *ASCE P1826.* b. A line along which the potential is everywhere constant for the attractive forces concerned. *Bureau of Mines Staff.*

equipotential-line method. A technique used in electrical prospecting requiring artificial currents. It is based on the principle that if two electrodes are inserted in the ground and if an external voltage is applied across them, there will be a flow of current through the earth from one electrode to the other. If the medium through which the current flows is homogeneous in its electrical properties, the flow lines will be regular and, in a horizontal plane, symmetrical about the line joining the electrodes. Any inhomogeneities in these properties will cause distortions in the lines of current flow. Such distortions indicate the existence of buried material with higher conductivity than its surroundings, so that it attracts the flow lines toward itself, or with lower conductivity so that it tends to force the lines into the surrounding medium. *Dobrin, p. 345.*

equipotential surface. A surface on which the potential is everywhere constant for the attractive forces concerned. *A.G.I.*

Equisetales. Trees which were well represented in the Coal Measures forests by the type known as Calamites. The tree was straight, growing up to 50 feet and more in height, and reproduction was by means of spores formed in slender cones attached to the smaller branches. *Nelson.*

equity. The loss or gain in performance considered as an annuity whose term is the life of the machine. *Lewis, p. 374.*

equivalence, coefficient of. A factor used in converting amounts of aluminum, iron, and manganese into equivalent amounts of zinc, in relation to their effect on the constitution of brass. *C.T.D.*

equivalent. a. In geology, corresponding in geologic age or in stratigraphic position; applied to formations, etc. *Fay.* b. Applied to mineral grains or particles of varying shapes, diameters, and density that fall through water at an equal velocity. Usually used in the plural. *Fay.* c. Weight (gram) of element combining with or displacing 1 gram of hydrogen. Weight of compound dissolved in one liter of normal (N) solution (which could combine with 1 gram hydrogen or 8 grams oxygen). *Pryor, 3.* d. The figure which expresses the volume of a refractory shape, as compared to the volume of a 9 by 4½ by 2½ inch standard 9-inch brick. *Bureau of Mines Staff.*

equivalent absorption. With any sound-absorbing substance, the surface area which absorbs sound energy at the same rate as that of a known test unit. *Hess.*

equivalent bending moment. A bending moment which, acting alone, would produce in a circular shaft a normal (tensile or compressive) stress of the same magnitude as the maximum normal stress produced by a given bending moment and a given twisting moment acting simultaneously. *Ro.*

equivalent circuit. An electrical network, the frequency response of which is identical to that of a quartz oscillator plate. *AM, 1.*

equivalent diameter. The diameter of a hypothetical sphere composed of material having the same specific gravity as that of the actual soil particle and of such size that it will settle in a given liquid at the same terminal velocity as the actual soil particle. Also called equivalent size. *ASCE P1826.*

equivalent evaporation. The quantity of water which would be evaporated by a given apparatus if the water is received by the apparatus at 212° F, and vaporized at that temperature under atmospheric pressure. It is expressed in pounds per hour. *Strock, 10.*

equivalent fluid. A hypothetical fluid having a unit weight such that it will produce a pressure against a lateral support presumed to be equivalent to that produced by the actual soil. This simplified approach is valid only when conditions of deformation are such that the pressure increases linearly with depth and the wall friction is neglected. *ASCE P1826.*

equivalent foot-candle. *See* foot-lambert. *Sinclair, I, p. 200.*

equivalent free-falling diameter. *See* equivalent particle diameter. *Dodd.*

equivalent grade. In textural classification, it refers to the arithmetic mean size. *A.G.I.*

equivalent length. The resistance of a duct or pipe elbow, valve, damper, orifice, bend, fitting, or other obstruction to flow expressed in the number of feet of straight duct or pipe of the same diameter which would have the same resistance. *Strock, 10.*

equivalent molecular unit. In the Niggli calculation of the molecular norm, the sum of all cations in the formula of a given mineral. Thus, $Na_2O.Al_2O_3.2SiO_2$ equals 6 nepheline equivalent units, because there are 6 cations in the formula. *A.G.I.*

equivalent of a base. The number of parts by weight of the base which, by reaction with an acid, bring about the replacement of 1 part by weight of hydrogen. *Cooper.*

equivalent of an acid. The number of parts by weight of the acid which contain 1 part by weight of replaceable hydrogen. *Cooper.*

equivalent of a salt. The number of parts by weight of the salt, produced by the replacement of 1 part by weight of hydrogen in the corresponding acid. *Cooper.*

equivalent orifice. A term suggested by Murgue which compares the resistance of air of a mine to the resistance of a circular opening in a thin plate through which the same quantity of air flows under the same pressure as in the mine:

$$E.O. = \frac{0.00039Q}{\sqrt{W.G.}} = \frac{0.00089Q}{\sqrt{P}} = \frac{53Q_k}{\sqrt{P}}$$

where E.O. equals the equivalent orifice in square feet; Q equals flow of air in cubic feet per minute; W.G. equals inches of water gage; P equals pressure in pounds per square foot; and Q_k equals flow of air in kilocusecs. The formula is based on a vena contracta of 0.65 for the flow through the orifice. *Lewis, p. 712.*

equivalent particle diameter; equivalent free-falling diameter. A concept used in evaluating the size of fine particles by a sedimentation process; it is defined as the diameter of a sphere that has the same density and the same free-falling velocity in any given fluid as the particle in question. *Compare* particle size. *Dodd.*

equivalent proportion law. *See* law of equivalent proportion.

equivalent radius. The radius of a spherical particle of density 2.65 (the density of quartz) which would have the same rate of settling as the given particle. *A.G.I.*

equivalent sheathed explosives. Ordinary permitted explosives to which extra common salt has been added and which appear to have the good effects of actual sheathed explosives. Used in many mines. *Cooper, p. 347.*

equivalent temperature. A composite of mean radiant temperature and air temperature; also defined as the mean temperature of the environment effective in controlling the rate of sensible heat loss from a black body in still air when the surface temperature and size of the black body are comparable to those of the human body. Where the enclosure surface (mean radiant temperature) and air temperatures are equal, this temperature is also the British equivalent temperature; when not equal the British equivalent temperature is that temperature at which a body with an 80° F surface temperature will lose sensible heat at the same rate as in the given environment. *Strock, 10.*

equivalent twisting moment. A twisting moment which, acting alone, would produce in a circular shaft a shear stress of the same magnitude as the shear stress produced by a given twisting moment and a given bending moment acting simultaneously. *Ro.*

equivalent weight. It equals the molecular weight of the substance or a submultiple of it, chosen according to some convention. *A.G.I.*

equivolumnar wave. Synonym for distortional wave; secondary wave; shear wave; S-wave; transverse wave. *A.G.I.*

Er Chemical symbol for erbium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

era. a. A large division of geologic time; specifically, a division of geologic time of the highest order, comprising one or more periods. The eras generally recognized are the Archeozoic, Proterozoic, Paleozoic, Mesozoic, and Cenozoic. *Fay.* b. The Am. Comm. Strat. Nomen. recommended (1954) that Early Precambrian be substituted for Archeozoic and Late Precambrian for Proterozoic. *A.G.I.*

E-ray. Abbreviation for extraordinary ray. *A.G.I.*

erbia. *See* erbium oxide. *CCD 6d, 1961.*

erbium. A silvery metallic element of the rare earth group. Found in euxenite and in the same minerals as dysprosium (gadolinite, fergusonite, and xenotime). Symbol, Er; valence, 3; hexagonal; atomic number, 68; atomic weight, 167.26; specific gravity, 9.051; melting point, 1,497° C; boiling point, 2,900° C; insoluble in water; and soluble in acids. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-109, B-174.*

erbium family. The rare earth elements dysprosium (atomic number, 66), holmium (atomic number, 67), erbium (atomic number, 68), and thulium (atomic number, 69). They are a subgroup of the yttrium family. *Hess.*

erbium oxalate. A reddish microcrystalline powder; $Er_2(C_2O_4)_3.10H_2O$; decomposes at 575° C; and insoluble in water and in dilute acids. Oxalates of the rare earth metals are used to separate the latter from common metals. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-174.*

erbium oxide; erbia. Pink; transforms to isometric at 1,300° C; Er_2O_3; readily absorbs moisture and carbon dioxide from the atmosphere; specific gravity, 8.64; specific heat, 0.065; infusible; insoluble in water; and is slightly soluble in mineral acids. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-174.* Used for infrared absorbing glass; as a phosphor activator; and in microwave ferrites. *Lee.*

erbium sulfate octahydrate. Pink; monoclinic; $Er_2(SO_4)_3.8H_2O$; soluble in water; specific gravity, 3.217; and loses $8H_2O$ at 400° C. Used to determine the atomic weight of the rare earth element, erbium. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-174.*

erdkohle. Ger. Earth coal. *Tomkeieff, 1954.*

erdöl. Ger. Petroleum. *Tomkeieff, 1954.*

eremeyevite. A hexagonal, vitreous-lustered mineral, $AlBO_3$; colorless to pale yellowish-brown; conchoidal fracture; no cleavage; found as single crystals on Mt. Soktuj, Nertschinsk district, eastern Siberia, U.S.S.R. *Dana 7, v. 2, pp. 330–332.*

erg. An absolute centimeter-gram-second (cgs) unit of work representing the work done by a force of 1 dyne acting through a displacement of 1 centimeter in the direction of the force. *Compare* joule. *Webster 3d.*

ergonomics. The study of man in relation to his working environment. *See also* human engineering. *Nelson.*

Erian. Middle Devonian. *A.G.I. Supp.*

Erian orogeny. Early Devonian diastrophism. *A.G.I. Supp.*

ericaite. Boracite containing up to 2.32 percent MnO. *Spencer 21, M.M., 1958.*

Erichsen test. A cupping test in which a piece of sheet metal, restrained except at the center, is deformed by a cone-shaped spherical-end plunger until fracture occurs. The height of the cup in millimeters at fracture is a measure of the ductility. *ASM Gloss.*

Ericsson telephone. A telephone used in mine rescue stations. This portable signaling device consists of a base station unit connected by a flexible twin-core cable to an advance station unit, and signals can be sent to and received by both units by means of buzzers. The base party can speak to the advance party, and the loudspeaker on the advance-station unit conveys the instructions to all members of the rescue team. *McAdam, p. 176.*

Erinide. A trademark name for a yellowish-green synthetic spinel. *Shipley.*

erinoid. A casein plastic used for molding many common objects and sometimes for inferior gem imitations. Specific gravity about 1.33; refractive index about 1.53 to 1.54. *Shipley.*

eriochalcite. A bluish-green to greenish-blue halide of copper, $2[CuCl_2.2H_2O]$. Fracture conchoidal; luster, vitreous. Identical with antofagastite. *Dana 7, v. 2, pp. 44–46.*

erionite. A hydrous silicate of calcium, potassium, sodium, and aluminum, $H_2CaK_2Na_2Al_2Si_6O_{17}.5H_2O$; color, white; orthorhombic; aggregates of wooly fibers. A zeolite near stilbite in composition. From Durkee, Oregon. *English. See also* offretite. *Mineralogical Magazine, v. 33, No. 256, March 1962, pp. 66–67.*

eriophorum peat. Peat composed mainly of eriophorum or cotton grass, also contains moss, heather, etc. *Tomkeieff, 1954.*

erlan. A metamorphic schist composed essentially of augite. *Standard, 1964.*

erles. Eng. Earnest money. *Fay.*

E rod bit. A Canadian standard, noncoring bit having a set diameter of 1.460 inches. More commonly called 1½ E drill-rod bit. *Long.*

erode. To wear away, as land, by the action of water. Also, to produce or to form by erosion, or by wearing away, as glaciers erode U-shaped valleys. *Stokes and Varnes, 1955.*

erodible. Capable of or subject to being eroded (as by the action of water and wind). *Webster 3d.*

eroding stress. The shear stress of water flowing across a sloping land surface. Its symbol is F_1. *A.G.I. Supp.*

erose. Descriptive of a margin which appears eroded, or gnawed, or of a jaggedness that is too small to be considered fringed, or too irregular to be regarded as toothed. *A.G.I.*

erosible. Synonym for erodible. *Webster 3d.*

erosion. a. The group of physical and chemical processes by which earth or rock material is loosened or dissolved and removed from any part of the earth's surface. It includes the processes of weathering, solution, corrasion, and transportation. The mechanical wear and transportation are effected by rain, running water, waves, moving ice, or winds, which use rock fragments to pound or to grind other rocks to powder or sand. *Fay.* b. It includes all processes by which earthy matter or rock is loosened and removed from place to place. In the United States, erosion includes weathering, corrasion, and transportation. *USGS Bull. 730, 1923, p. 88.* c. Destruction of metals or other materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles or matter in suspension. When corrosion occurs simultaneously, the term erosion-corrosion is often used. *ASM Gloss.* d. The wearing away of a solid substance by repeated impact action of a solid, liquid, of gas. *ASTM STP No. 148-D.*

erosion, accelerated. Erosion at a rate higher than is considered to be normal and natural for the site. It is generally caused by man, usually through the reduction of the vegetal cover. *A.G.I.*

erosional flood plain. A flood plain that has been created by the lateral erosion and the gradual retreat of the valley walls. *Leet.*

erosional unconformity. The surface separating older rocks, that have been subjected to erosion, from the younger sediments or sedimentary rocks which cover them. *A.G.I.*

erosional vacuity. That part of a lacuna resulting from erosion of formerly existing rocks at an unconformity. *A.G.I. Supp.*

erosion caldera. A large amphitheaterlike volcanic depression resulting from the enlargement of a caldera or a crater by erosional processes. An example is the Papenoo caldera of Tahiti. *A.G.I.*

erosion channel. *See* classical washout. *Nelson.*

erosion-corrosion. This is the combination of erosion phenomenon and corrosion phenomenon which produces a high rate of local attack of the base metal. Since many materials are corrosive resistant because of a productive oxide film adhering to their surface, when corrosive fluids strike this film it is eroded away leaving the base metal unprotected from corrosion. *H&G.*

erosion cycle. The succession of stages through which a newly uplifted landmass must pass before it is worn down to a peneplain or to a surface near sea level. In the juvenile stages, the surface is sharply cut by canyons; in the mature stages, it may disappear and the topography be characterized by high, steep hills and fairly open valleys; and in the old-age stages, the land is so worn down that the streams meander sluggishly across a lowland. *Stokes and Varnes, 1955.*

erosion fault scarp. Where erosion has acted unequally along a fault on account of the difference in hardness between a crushed zone and an intact rock, the resultant cliff may be termed an erosion fault scarp. *See also* fault-line scarp. Obsolete. *A.G.I.*

erosion, geologic norm of. The process on or in a given land form undisturbed by the activities of man and his agents. *A.G.I.*

erosion grooves. Appear to be the longitudinal ripple marks. Closely spaced lines of straight-sided scour marks. *Pettijohn.*

erosion intensity. The mass of material eroded per unit area per unit time. Its symbol is e_r. *A.G.I. Supp.*

erosion of refractories. Mechanical wearing away of the surfaces of refractory bodies in service by the washing action of moving liquids, such as molten slags or metals. *HW.*

erosion proportionality factor. The ratio of erosion intensity to erosion stress. A measure of the quantity of material removed per unit of applied eroding force. Its symbol is k_e. *A.G.I. Supp.*

erosion ramp. A sloping belt of reef rock immediately above the reef flat where marine erosion is active on an atoll islet. *A.G.I. Supp.*

erosion scarp. A scarp produced by the agents of erosion. *A.G.I.*

erosion surface. a. A land surface shaped by the disintegrating, dissolving, and wearing action of streams, ice, rain, winds, and other terrestrial and atmospheric agencies *Fay.* b. An area which has been flattened by subaerial or marine erosion to form an area of relatively low relief at an elevation close to the baselevel (sea level) existing at the time of its formation. Relics of such surfaces may now be found far above sea level owing to the falling baselevel, below the present ocean surface. *H&G.*

erosion thrust. A thrust fault along which the hanging wall moved across an erosion surface. *A.G.I.*

erosive. a. Having the property of wearing away or corroding; corrosive. *Fay.* b. Wearing away; acting by erosion. *Fay.* c. Having the power of accomplishing erosion. *Stokes and Varnes, 1955.*

erpoglyph. A term applied to worm castings. *Pettijohn.*

erratic. *a.* One of the large waterworn and iceborne blocks or boulders which are scattered generally over the higher and middle latitudes of the Northern Hemisphere. *A.G.I.* b. A rock which has been transported from a distance, generally by ice. *A.G.I.* c. A transported rock fragment different from the bedrock on which it lies, either free or as part of a sediment. Generally applied to fragments transported by glacier ice or by floating ice. *A.G.I.*

erratic assay. An assay of a sample that shows a distinctly higher (or lower) value than the assays of other samples in its vicinity. *A.G.I.*

erratic blocks. Eng. *See* erratic. Rounded erratic blocks are called boulders. *Fay.*

erratics. a. A term applied to coal and rock pebbles, boulders and fossil tree trunks found in, or associated with, coal seams. The study of these erratics throws valuable light on the origin and formation of coal seams. *Nelson.* b. Stones, ranging in size from pebbles to large boulders, which were transported by ice, and on melting, were left stranded on alien soil and far from their original source. As with the Coal Measures erratics, they furnish valuable evidence on the Ice Age. *Nelson.*

error. Difference between observed or calculated value and the true one. *Pryor, 3.*

error band. Statistically, range of determined values inside which the correct value is presumed to lie. All samples or determinations inside this band are taken to be valid experimentally. *Pryor, 3.*

error curve; tromp error curve. A partition curve drawn to defined conventional scales with the portion showing recoveries over 50 percent reversed to enclose an error area. *B.S. 3552, 1962.*

error of traverses. *See* closure, error of. *Seelye, 2.*

error signal. A signal in an automatic control system which represents the discrepancy between the desired and the actual performance, and which is used to apply the necessary corrections. *NCB.*

erubescite. Bornite. *Pryor, 3.*

eruption. The emission or ejection at the earth's surface, through a crater, pipe, or fissure, of such material as lava, heated water, gases, mud, stones, and dust. It is characteristic of volcanoes and geysers and is usually more or less sudden, violent, and explosive. *Fay.*

eruption, volcanic. The emission or ejection of volcanic materials at the earth's surface from a crater or pipe or from a fissure. Central eruptions are those in which volcanic materials are emitted from a central vent or pipe or ordinarily result in the formation of a volcanic cone. Fissure eruptions are those in which lava or pyroclastic materials emanate from a relatively narrow fissure or a group of fissures, commonly building lava plains and lava plateaus. The character of volcanic eruptions varies from relatively quiet outpourings of fluid lava, as in most Hawaiian eruptions, to violent explosions accompanied by showers of volcanic ash, like that of Krakatao in 1883. *A.G.I.*

eruptive. a. Applied to igneous rocks that reach the surface of the earth in the molten state. *A.G.I. Supp.* b. Refers to material thrown out by a volcano. *A.G.I. Supp.* c. Sometimes applied to any igneous rock, but this usage is not recommended. *A.G.I. Supp.*

eruptive breccia. Synonymous with volcanic breccia. *A.G.I.*

eruptive vein. A vein filled by the eruption of igneous material from below. *Standard, 1964.*

erythrite. a. Synonym for erythritol. *CCD 6d, 1961.* b. Cobalt bloom. A natural hydrated cobalt arsenate, $Co_3(AsO_4)_2 \cdot 8H_2O$, found in oxidized parts of cobalt and arsenic-bearing veins. Crimson, peach, red, pink, or pearl gray in color, with adamantine or pearly luster. Contains 37.5 percent cobalt oxide. Soluble in hydrochloric acid; Mohs' hardness, 1.5 to 2.5; specific gravity, 2.91 to 2.95. Found in California, Colorado, Idaho, Nevada; Ontario, Canada. Used for coloring glass and ceramics. *CCD 6d, 1961.*

erythrocalcite. A hydrated copper chloride, $CuCl_2+nH_2O$. An alteration product from Mt. Vesuvius. *Weed, 1918.* Synonym for eriochalcite.

erz cement. A ferruginous hydraulic cement formerly made in Germany; it has now given place to Ferrari cement. *See also* Ferrari cement. *Dodd.*

Erzgebirgian orogeny. Early Upper Carboniferous diastrophism. *A.G.I. Supp.*

Es Chemical symbol for Einsteinium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

escalator clause. In a contract likely to require labor over a substantial period, a clause providing for readjustment of agreed payments in the event of defined events, for example, change in wage rates. *Pryor, 3.*

escape. a. Eng. A second or additional shaft by which the men may get out of the mine in case of accident to the other shafts. Also an upcast; escape pit; escapeway. *Fay.* b. A wasteway for discharging the entire flow of a stream. *Seelye, 1.*

escape apparatus. An apparatus used to give underground workers adequate protection against carbon monoxide and other noxious gases at mine fires and explosions. There are two main types available: (1) simple, lightweight, self-contained breathing sets which can be used in poisonous atmospheres or in atmospheres deficient in oxygen, and (2) carbon monoxide filters which give protection against carbon monoxide poisoning but can only be used when the atmosphere contains sufficient oxygen to support life. *McAdam, p. 48.*

escape clause. Provision in contract absolving signatory from penalty in specific circumstances. *Pryor, 3.*

escape shaft. A shaft driven especially to permit egress from the mine in case of emergency. *B.C.I.*

escapeway. An opening through which the miners may leave the mine if the ordinary exit is obstructed. *Fay.*

escar. *See* esker. *Fay.*

escarpment. a. A cliff or a relatively steep slope separating level or gently sloping tracts. *Fay.* b. In gently inclined strata, the abruptly truncated and clifflike outcrops of the resistant beds are called escarpments. *A.G.I.* c. The steep face presented by the abrupt termination of strata. *A.G.I.*

Eschka's mixture. A mixture of 2 parts magnesium and 1 part dried sodium carbonate; used as a reagent for determining sulfur in coal or coke. *Hackh's Chem. Dict.*

eschynite. A columbate of rare earths, $(Ce,Ca,Fe^2,Th)(Ti,Cb)_2O_6$. An end member of the isomorphous eschynite-priorite series; orthorhombic; black to brown color; moderately to strongly radioactive. Found in nepheline syenite and in the nepheline-free miascite, with feldspar, zircon, and samarskite, at Miask, in the Ilmen Mountains, U.S.S.R.; also found in gold sands in Norway and in granite pegmatite in Silesia. Also spelled aeschynite. *Crosby, pp. 18-19; Frondel, p. 179.*

escrow. A deed or bond, money, or a piece of property delivered into the keeping of a third party by one party to a contract or sometimes taken from one party to a contract and put in trust to be returned only upon the performance or fulfillment of some condition of the contract or to insure such performance of fulfillment by some other disposition. *Webster 3d.*

esf Abbreviation for electrostrictive force. *BuMin Style Guide, p. 59.*

eskar. *See* esker.

eskebornite. A mineral, perhaps FeSe, (Fe,Cu)Se, or $(Cu,Fe)_{1.1}Se$. Very similar to pyrrhotite in physical properties, but much softer. Magnetism highly variable according to orientation. Optically hexagonal or pseudohexagonal, but the X-ray pattern is cubic, similar to that of sulvanite. *American Mineralogist, v. 39, No. 7-8, July-August, 1954, pp. 691-692; v. 46, No. 3-4, March-April, 1961, p. 467.*

esker; escar; eskar; osar. a. A glaciofluviatile landform, which is most commonly called an esker in the United States. It is also called os (singular) and osar (plural) in the United States, having been derived from the Swedish as (singular) and asar (plural). Also spelled eschar; asar. *Bureau of Mines Staff.* b. A long, winding gravel ridge deposited in the bed of a subglacial stream. *C.T.D.* c. A long, narrow, often sinuous, ridge or mound of sand, gravel, and boulders deposited between ice walls by a stream flowing on, within, or beneath a stagnant glacier. *Compare* kame. *Webster 3d.* d. A serpentine ridge of gravel and sand. It is often associated with kames and is taken to mark a channel in the decaying ice sheet, through which a stream washed much of the finer drift, leaving the coarser gravel between the ice walls. *A.G.I.*

esker delta; osar delta. When a glacial stream, on emerging from its ice tunnel, enters a lake, it builds a delta with the load of sediment that it carries. With the disappearance of the ice dam the lake is drained, but the delta remains, and if an esker was built in the ice tunnel, it will extend up to the delta. Such an esker-fed delta may be called an esker delta. *A.G.I.*

esker fan; osar fan. A small plain of gravel and sand built at the mouth of a subglacial tunnel or of a channel in the ice. It is associated with an esker or an esker-like chain of deposits made in the ice sheet at the same time. *A.G.I.*

esker lake; osar lake. A lake which owes its existence and outline to the presence of an esker or of eskers. *A.G.I.*

esker terrace; osar terrace. The sediment, termed osar terraces (esker terraces), crosses hill and valleys just the same as the osars (eskers), and these topographic relations are inconsistent with the hypothesis that they are valley drift, though in the valleys their situation is such that they must have been subject to the action of streams, often were eroded by them, and often were overlain by valley drift. *A.G.I.*

eskolaite. Chromium oxide, Cr_2O_3, isomorphous with hematite, from Outokumpu, Finland. Essentially identical with merumite, which has priority, but merumite was imperfectly described and was believed to be hydrated; the name eskolaite is to be preferred. *Hey, M.M., 1961.*

esmeraldite. A medium coarse-grained to a medium fine-grained igneous rock with a hypautomorphic granular texture. The essential minerals are quartz and muscovite, with muscovite usually less abundant than quartz. Feldspar, if present, does not exceed 5 percent. *Johannsen, v. 2, 1932, p. 17.*

Esperanza classifier. A classifier of the free-settling type in which the settled material is removed by dragging it up an inclined plane by means of a continuous belt of flat blades or paddles. It is continuous in its operation. *Liddell 2d, p. 391.*

esplanade. A broad bench or terrace bordering a canyon, especially in the plateau areas of the southwestern United States. *Stokes and Varnes, 1955.*

espley rock. A conglomerate or breccia with rapid lateral passage through grit to fine sandstone; cement usually ferruginous with some lime and alumina. Characteristically developed amid variegated clays of Etruria Marl group of Upper Coal Measures in the English Midlands. *Arkell.*

essential. In petrology, necessarily present in a particular type of rock, being required by the definition of that rock type; applied to the characteristic in a particular rock. *Fay.*

essential ejecta. a. Pyroclastic detritus, whether loose or indurated, which is of immediate, juvenile, magmatic origin. *A.G.I.* b. Fresh magmatic material thrown out in liquid form by a volcano. Synonymous with juvenile ejecta. *A.G.I.*

essential mineral. a. One of those mineral constituents of a rock that are necessary to its classification and nomenclature. An essential constituent is not necessarily a major constituent, for the presence in a rock of minor amounts of such minerals, as nepheline, olivine, or quartz may affect its classification. *See also* accessory mineral. *A.G.I.* b. A mineral essential to national defense for which no great difficulty of procurement during war is anticipated, but which requires constant surveillance because future developments may necessitate reclassification as strategic or critical. In 1941, essential minerals of the United States included arsenic, copper, helium, iron, lead, magnesium, molybdenum, petroleum, phosphates, potash, sulfur and pyrite, uranium, zinc, and zirconium. *Hess.*

essexite. a. A coarse-grained, plutonic igneous rock that is essentially an alkali gabbro, having a preponderance of soda. Named from Essex County, Mass. *C.T.D.* b. A plutonic rock composed essentially of plagioclase, hornblende, biotite, and titanaugite, with subordinate alkali feldspar and nepheline. An alkalic gabbro. *A.G.I.*

esskohle Ger. Steam coal. Tomkeieff, 1954.

essonite. A cinnamon-colored variety of hessonite; called hyacinth when used as a gem, though the term more properly belongs to zircon. *Sanford; Dana 17.*

EST Abbreviation for Eastern Standard time. Also abbreviated est. *Zimmerman, p. 39.*

established dune. Sand can only be moved by the wind when it is dry and when only a little vegetation is growing on it. In a humid climate, the prevailing moisture and the favorable conditions for the growth of vegetation are factors that tend to arrest the advance of sand dunes. When these conditions become dominant, the dunes are soon covered with vegetation and their movement stopped. They become established dunes. *A.G.I.*

Estates Department. Gr. Brit. Each Area of the National Coal Board has an Estates Department for matters covering the many houses and farms owned by the Board. It performs its duties much in the same way as a good estate agent would for a landlord. A further duty of the department is the investigation of subsidence damage claims by property owners. *Nelson.*

estavel. An underground stream in a karst region. *A.G.I. Supp.*

esterellite. A name given by Michel-Levy to a variety of diorite porphyry from Esterel, France. The rock shows some peculiarities of chemical composition which have given it special interest in discussions relating to differentiation. *Fay.*

estimate. An approximate figure, based on rough application of experience cum mental arithmetic to a problem at an early stage of discussion. Not a firm, basic datum. *Pryor, 3.*

estovers. Eng. Necessary supplies; especially wood that a tenant is allowed to take from the landlord's premises for the necessary fuel or implements used by himself and his resident servants or for necessary repairs. *Webster 3d.*

estramadurite. A massive variety of apatite found in Estramadura, Spain. A phosphate ore. *Hey 2d, 1955; English.*

estuarine. Of, relating to, or formed in an estuary. *Webster 3d.*

estuarine clay. A clay deposited in depressed valleys, or estuaries of the sea, or in lakes. It is represented by certain Wisconsin types, those of the Hudson River Valley, and by many Columbia clays along the Atlantic Coast. *USGS Prof. Paper 11, 1903, p. 19.*

estuarine delta. A delta built into a preexisting estuary. *A.G.I. Supp.*

estuarine deposit. A mixed deposit of organisms and sediments of both marine and fluviatile origin. Along river channels, they grade upstream into typical freshwater river-channel deposits; seaward, they grade into marine deposits, and laterally, they grade into deposits consisting of mud-cracked clays, silts, some sands, and at times, peat. *A.G.I.*

estuarine deposition. Sedimentation in the environment of an estuary. The deposits differ from those which form in a deltaic environment, chiefly in their relationship to the strata of the adjacent land, and they are usually of finer grain size and of more uniform composition. Both estuarine and deltaic deposits are characterized by brackish water and by their containing land-derived animal and plant remains. *C.T.D.*

estuarine sand. Sand produced by the precipitation of finely divided fragmental material carried down by the rivers to the sea. Estuarine sands are frequently laminated. Although silica is the chief constituent of estuarine sands, clay is often present. *A.G.I.*

estuary. a. The mouth of a river where the tide meets the river current. *Webster 3d.* b. An arm of the sea at the lower end of a river. *Webster 3d.* c. A drowned river mouth caused by the sinking of the land near the coast, or by the rising of the ocean surface. *Webster 3d.* d. A drainage channel adjacent to the sea in which the tide ebbs and flows. Some estuaries are the lower courses of rivers or smaller streams, others are no more than drainage ways that lead sea water into and out of coastal swamps. *A.G.I. Supp.*

estuary coast. A coast showing many estuaries. *Schieferdecker.*

esu Abbreviation for electrostatic unit. *BuMin Style Guide, p. 59.*

E.T.C. English translucent china. *See also* english translucent china. *Dodd.*

etch. To attack the surface of glass with hydrofluoric acid or other agent, generally for marking or decoration. *ASTM C162-66.*

etch angle. The angle formed between the true horizon and the actual plane of the etch ring in an acid bottle as measured before capillarity corrections are applied. Also called apparent angle. *Compare* apparent dip. *Long.*

etch cleaning. Removing soil by dissolving away some of the underlying metal. *ASM Gloss.*

etch cracks. Shallow cracks in hardened steel, containing high residual surface stresses, produced on etching in an embrittling acid. *ASM Gloss.*

etched. a. Applied to a rough, frosted surface, as of minerals or of sand grains. *A.G.I.* b. Pitted or corroded in such a manner that a pattern of pits or lines is produced that is related to the crystal structure or to the tectonic structure. *See also* frosting. *A.G.I. c.* Weathered so that the surface is roughened. *See also* centering. *ASTM C162-66.* d. Treated by etching. *ASTM C162-66.* e. Ceramic surfaces so affected by acid, alkalis, or other chemicals as to have lost gloss to a slight extent, or taken on a rough surface, are said to have been etched. *Enam. Dict.*

etch figure; etching figure. A marking consisting usually of a minute pit produced by a solvent (or an etchant) on the crystal face of a mineral and revealing its crystalline or molecular structure. *Webster 3d.*

etching. a. A process of engraving in which the lines are produced by the action of an acid or a mordant. *Fay.* b. Used in studying the composition and structure of metals and crystals. *Fay.* c. The frosting or roughening of the surface of a sand grain or of a crystal by means of a solvent. *A.G.I.*

etching acid. *See* hydrofluoric acid. *Long.*

etching pits. Small cavities formed on the surface of metals during etching. *C.T.D.*

etch line. A line of demarcation between the etched and unetched portions of the inside of an acid bottle, used to determine the inclination of a borehole by an acid-dip survey. *Long.*

etch method; etching method. A method, using a soda-lime glass tube partially filled with a dilute solution of hydrofluoric acid, of determining the angle at which a borehole is inclined at any specific point of its course below the collar. *See also* acid-dip survey. *Long.*

etch pattern. Regular surface marking developed by solvent action on smooth surface of alloy or crystal, and characteristic for that specific substance. The reagent used is an etchant, usually of an acid in water or alcohol. *Pryor, 3.*

etch period; etching period. *See* etch time. *Long.*

etch ring. Synonym for etch line. *Long.*

etch time; etching time. The time required for a dilute solution of hydrofluoric acid, of a specific strength, to etch the inside of an acid bottle enough so that the line of demarcation between the etched and unetched portions of the acid bottle is clearly discernible. *Long.*

etch tube. Synonym for acid bottle. *Long.*

ethane. Colorless; gaseous; C_2H_6; contained in the gases given off by petroleum and in illuminating gas. *Crispin.*

ethanol. *See* ethyl alcohol. *C.T.D.*

ether. Colorless; liquid; $(C_2H_5)_2O$. Made by treating alcohol with sulfuric acid. Chiefly used in the manufacture of smokeless powder and as a solvent for gums, fats, waxes, etc. *Crispin.*

ether axes. *See* axes of elasticity. *Fay.*

ethical gemmology. The study of the correct and incorrect nomenclature of gems, with emphasis on names and terms which may mislead or deceive purchasers. *Shipley.*

ethmolith. A crosscutting intrusive body of plutonic rock that narrows downward and is funnel-shaped. *A.G.I.*

ethyl alcohol. A colorless, volatile, flammable liquid, C_2H_5OH, which is in fermented and distilled liquors. Also called ethanol. *API Gloss. See also* alcohol.

ethylene. Colorless; flammable; unsaturated; gas; C_2H_4. Contained in illuminating gas. *Crispin.*

ethylenediamene. Used as an electrolyte to transform coal into a tan-gray substance with a relatively high hydrogen-to-carbon ratio. *Bureau of Mines Staff.*

ethylene dibromide. The chief compound of bromine used with tetraethyl lead as a gasoline antiknock fluid. Acts as a scavenging agent, preventing lead from depositing on cylinders, valves, and spark plugs of gasoline engines. Also used as a reagent in the synthesis of dye and pharmaceutical intermediates, as an anesthetic, sedative, and antispasmodic agent, and as a solvent for gums and waxes, It is being used increasingly in fumigation preparations for control of insects and pests in soil and seeds. *BvMines Bull. 585, 1960, p. 151.*

ethylene glycol. A highly explosive liquid, $C_2H_4(NO_3)_2$; somewhat volatile; nonfreezing; explosive base. Used as an antifreeze. *Lewis, p. 104.*

ethyl orthosilicate; ethyl silicate; tetraethyl orthosilicate. a. Colorless; liquid; $(C_2H_5)_4SiO_4$; molecular weight, 208.22; specific gravity, 0.9357; boiling point, 165.5° C; insoluble in water; and soluble in ethyl alcohol. Used in manufacturing weatherproof mortars and in hardening stone. *Bennett 2d, 1962.* b. Flammable; faint odor; hydrolyzed by water to an adhesive form of silica; and flash point, 125° F. Used as a preservative for stone, brick, concrete, plaster; to weatherproof and to acidproof mortar and cements; and for refractory bricks and other molded objects. *CCD 6d, 1961.*

etindite. a. leucite nephelinite. *A.G.I.* b. An extrusive igneous rock intermediate in composition between leucitite and nephelinite. One composition was 42 percent titanaugite, 29 percent nepheline, 15 percent leucite, 7 percent magnetite, and 7 percent sphene, perofskite, and apatite. *Johannsen, v. 4, 1938, p. 367.*

Etroeungtian. Synonym for Strunian. A.G.I. *Supp.*

Etruria marl. A brick clay occurring in the Carboniferous system and used for the manufacture of bricks and roofing tiles, particularly in the Midlands and North Wales. These clays have a high iron content; they fire to a red color under oxidizing conditions but under reducing conditions they fire to the blue color of the well-known Staffordshire engineering brick. *Dodd.*

Etruscan ware. Basalt ware having an encaustic decoration, mainly in red or white in imitation of early Italian Etruscan pottery. *Dodd.*

ettle. a. N. of Eng. Waste. *See also* attle, a. *Fay.* b. To intend; to appoint; to arrange. *See also* attle, b. *Fay.*

ettlings N of Eng. Earnings; wages. *Fay.*

ettringite. A hexagonal mineral, $[Ca_{52}Al_{12}]$ $[S_{28}Si_4H_{64})O_{192}][H_2O_{192}]$. *Mineralogical Magazine, v. 33, No. 256, March 1962, pp. 59-64.*

eu Abbreviation for entropy unit. *BuMin Style Guide, p. 59.*

eu-. From the Greek neuter of eys meaning good. A combining form meaning well, good, most typical. *Webster 3d.*

Eu Chemical symbol for europium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

eu-autochthony. Applies to plant remains which are now found in the exact place and more or less in the correct relative positions in which they grow, for instance, roots, stumps, and even entire trunks. *IHCP, 1963, part I.*

eubitumn. A collective name for fluid, viscid, and solid bitumens that are easily soluble in organic solvents. Petroleum, ozokerite, elaterite, and asphalt are examples. *Tomkeieff, 1954.*

eucairite. A silver and copper selenide carrying 25.3 percent copper and 43.1 percent silver. Crystallization, isometric; luster, metallic; silver-white to lead-gray color; Mohs' hardness, 2.5; specific gravity, 7.5; streak, shining; also occurs massive and granular. From Smaland, Sweden; Copiapo, Chile. *Weed, 1918.*

eucalyptus oil. Frothing agent used in flotation. Essential oil distilled from leaves of eucalyptus trees. *Pryor, 3.*

euchlorine. An emerald-green basic sulfate of potassium, sodium, and copper, $4(K,Na)_2SO_4.6CuSO_4.3Cu(OH)_2$. A thin incrustation on lava. Orthorhombic. From Vesuvius, Italy. *England.*

euchroite. A vitreous, bright emerald or leak green, transparent to translucent hydrous copper arsenate mineral, $Cu_3As_2O_8.$-$Cu(OH)_2+6H_2O$, crystallizing in the orthorhombic system. *Fay.*

euclase. A natural basic aluminum-beryllium silicate, $Be_2Al_2(SiO_4)_2(OH)_2$; colorless, light blue, or green; vitreous luster; Mohs' hardness, 7.5; specific gravity, 3.05 to 3.10. Found in Austria, Russia, Brazil, Peru, and Tasmania. Used in gem stones. *CCD 6d, 1961.*

eucolite. Similar to eudialyte, but optically negative. *Crosby, p. 99.*

eucrite. A variety of gabbro composed essentially of bytownite or anorthite, augite, hypersthene, and minor olivine. An olivine gabbro containing a highly calcic plagioclase. *A.G.I.*

eucryptite. A lithium mineral, $Li_2O.Al_2O_3.$-$2SiO_2$. When heated, the beta form expands in one direction and contracts in another direction; it is a constituent of special ceramic bodies having zero thermal expansion. *Dodd.*

eucrystalline. A textural term meaning well crystallized and applied to igneous rocks, such as granites, which are well crystallized. *A.G.I.*

eudialyte. An optically positive, rare, weakly radioactive, hexagonal mineral, $(Ca,Na,Ce, etc)_5(Er,Fe,Cb,etc.)_2Si_6O_{18}((OH,Cl)$; pale pink, carmine, red, or brown; found in nepheline syenite and granite, commonly associated with arfvedsonite, sodalite, feldspar, aegirite, catapleiite, and astrophyllite. *See also* eucolite. *Crosby, pp. 99–100.*

eudidymite. A white, tabular monoclinic mineral with 1 perfect and 1 imperfect cleavage; $Na_2O.2BeO.6SiO_2.H_2O$; lamellar twinning always present; Mohs' hardness, 6; specific gravity, 2.55. *Larsen, p. 104.*

eudiometer. An instrument for the volumetric measurement and analysis of gases. *Webster 3d.*

eudyalite. *See* eudialyte.

eugeosyncline. An orthogeosyncline in which volcanic rocks are abundant. *A.G.I.*

eugranitic. Resembling or pertaining to normal granite, as eugranitic texture. Same as granitoid. *Stokes and Varnes, 1955.*

euhedral. In petrology, bounded by its own crystal faces; automorphic; said of some minerals in a crystalline rock and contrasted with subhedral and anhedral. *Fay.*

eukrite. An achondrite (stony meteorite) that is chiefly augite and anorthite; abbreviated as eu. *Hess.*

euktolite. A name derived from the Greek words for desired rock and given by Rosenbusch to one which filled a gap in his classification of rocks. The same rock had been previously named venanzite. *Fay.*

Euler crippling stress. The crippling load, P, of a strut divided by its cross-sectional area, A, calculated from the formula, $\frac{P}{A} = \pi^2 E \frac{k^2}{l^2}$, where E is Young's modulus, k is the radius of gyration of the section, and l is the effective length of the strut. *See also* slenderness ratio. *Ham.*

Eulerian methods of current measurement. A measurement of the rate of flow past a geographically fixed point; current meter methods. *Hy.*

Euler velocity field. The Euler method assumes that the velocity of all particles of the fluid has been defined. On this assumption the velocity field is completely described if the components of the velocity can be represented as function of the coordinate and time. *H&G.*

eulite. Orthopyroxenes containing 70 to 90 mole-percent of $FeSiO_3$. A contraction of eulysite, a rock in which the mineral occurs. *Spencer 18, M.M., 1949.*

Eulittoral zone. *See* Benthic division. *Hy.*

eulysite. An iron-manganese-rich metamorphic rock characterized by the presence of manganiferous fayalite, and often containing hedenbergite, iron-rich hypersthene, grunerite, garnet, and magnetite. *A.G.I.*

eulytite. A silicate of bismuth, $Bi_4Si_3O_{12}$, occurring usually in minute dark brown or grayish tetrahedral crystals. *Fay.*

euosmite. Brownish-yellow fossil resin with pleasing odor that occurs in brown coal. *Tomkeieff, 1954.*

eupatheoscope. A black, hollow copper cylinder heated electrically to the surface temperature of a human being. The heat loss from the cylinder in a given environment is equivalent to that lost by a human being; thus, equivalent temperature. *Strock, 10.*

euphyllite. A white sodium-potassium mica that is intermediate between muscovite and paragonite. *Standard, 1964.*

eurite. Applied to compact felsitic rocks without phenocrysts, having the composition of quartz porphyry or porphyry. Also used in a wider sense to cover all aphanitic rocks of granitic composition whether porphyritic or not. *A.G.I.*

europium. a. A metallic element of the rare earth group, contained in black monazite, gadolinite, samarskite, and xenotime. Symbol, Eu; isometric; atomic weight, 151.96. *C.T.D.* b. Gray metal; atomic number, 63; valences, 2 and 3; melting point, 826° C; boiling point, 1,439° C; specific gravity, 5.259; insoluble in water; and stable in air and in water. The most sparsely distributed of the terbium family of rare earths. Isolated by the electrolysis of its anhydrous trichloride in a bath of fused alkali chloride. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-110.*

europium chloride. $EuCl_3$; molecular weight, 258.32; yellow needles; melting point, 850° C; and specific gravity, 4.89 (at 20° C). *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-174.*

europium oxide; europia. Rare earth oxide; pale rose; Eu_2O_3; melting point, above 1,300° C; and specific gravity, 7.42. Used as a nuclear-control-rod material and in fluorescent glass. *Lee; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-175.*

europium sulfate. $Eu_2(SO_4)_3.8H_2O$; molecular weight, 736.23; pale rose crystals; no melting point because it loses $8H_2O$ at 375° C; soluble in water; and specific gravity, anhydrous, 4.95. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-175.*

eusapropel. A well-matured organic ooze. *Tomkeieff, 1954.*

euscope. A grain size comparator. *Osborne.*

eustacy; eustatic change. a. A worldwide change of sea level, contrasted with local diastrophic uplift or subsidence of the land. *Webster 3d.* b. A simultaneous, worldwide change of sea level caused by a change in the volume of the sea water that resulted from either the melting of continental ice sheets (continental ice caps) or their formation. *Bureau of Mines Staff.*

eustatic. a. Pertaining to a simultaneous, worldwide change in sea level. *A.G.I.* b. Pertaining to a real, worldwide change in sea level, and not to a relative change in sea level resulting from local coastal subsidence or elevation. *A.G.I.* c. Relating to or characterized by eustacy. *See also* eustacy. *Webster 3d.*

eustatic movements. Absolute movements of the sea level (due to changes in the capacity of ocean basins, to changing climatic circumstances, etc.), having a great influence on the development of coasts. *Schieferdecker.*

eustratite. A compact, lamprophyric dike rock with rare phenocrysts of olivine and corroded hornblende and still fewer green augite and feldspar phenocrysts in a partly glassy groundmass. This glass has the chemical composition of potential sanidine and nepheline. *Johannsen, v. 4, 1938, p. 178.*

Eutaw group. A subdivision of the Cretaceous system in the Southern United States, lying between the Tuscaloosa, which it overlaps northwards, and the overlying Selma chalk. The Tombigbee sand occurs at the top of the group. *C.T.D.*

eutaxic. Of or relating to stratified ore deposits. Opposite of ataxic. *Webster 3d.*

eutaxitic. Applied to a structure of certain volcanic rocks with a streaked or blotched appearance due to the alternation of bands or elongated lenses of different color, composition, or texture; the bands, etc., having been ejected originally as individual portions of magma which were drawn out together in a viscous state and formed a heterogeneous mass by welding. The term is most appropriately used in describing the structure of a majority of welded tuffs. *Holmes, 1920.*

eutectic. a. As a noun, an alloy or a solution having its components in such proportions that the melting point is the lowest possible with those components. *Webster 3d.* b. The characteristic microstructure resulting from the solidification of a metal of a eutectic composition. *Webster 3d.* c. As an adjective, relating to a eutectic or to its composition (eutectic mixture) or to the temperature at which it melts or freezes (crystallizes) which is the eutectic point. *Webster 3d.* d. An isothermal reversible reaction in which a liquid solution is converted into two or more intimately mixed solids on cooling, the number of solids formed being the same as the number of components in the system. *ASM Gloss.* e. An alloy having the composition indicated by the eutectic point on an equilibrium diagram. *ASM Gloss.* f. An alloy structure of intermixed solid constituents formed by a eutectic reaction. *ASM Gloss.*

eutectic alloys. Such alloys as aluminum and silicon, cadmium and bismuth, cadmium and zinc, silver and lead. They are made up of two metals entirely soluble in each other when liquid but on setting or freezing the crystals of the individual metals form. *Crispin.*

eutectic change. The transformation from the liquid state to the solid state in a eutectic mixture. It involves the simultaneous crystallization of two components in a binary system and of three in a ternary system. *C.M.D.*

eutectic melting. Melting of localized micro areas whose composition corresponds to that of the eutectic in the system. *ASM Gloss.*

eutectic mixture. A discrete mixture (not a compound) of two or more minerals which have crystallized simultaneously from the mutual solution of their constituents, the two or more minerals being in definite proportions. Simultaneous crystallization sometimes gives rise to graphic texture, but it does not necessarily do so, as the development of graphic intergrowth involves other factors besides eutectic proportions. *Stokes and Varnes, 1955.*

eutectic point; eutectic temperature. The lowest melting temperature obtainable with a mixture of components, provided the components do not form solid solutions. *A.G.I.*

eutectic ratio. The ratio of solid phases crystallizing from the eutectic liquid at the eutectic temperature. It is such as to yield a gross composition for the crystal mixture that is identical with that of the liquid. Most frequently stated in terms of weight-percent. *A.G.I.*

eutectic structure. The particular arrangement of the constituents in a eutectic alloy which arises from their simultaneous crystallization from the melt. *See also* graphic texture. *C.T.D.*

eutectic system. A binary or ternary alloy system in which one particular alloy solidifies at a constant temperature which is lower than the beginning of solidification in any other alloy. *C.T.D.*

eutectic temperature. The lowest melting temperature in a series of mixtures of two or more components. *HW.*

eutectic texture; eutectoid texture. Intergrowths of minerals, either along crystallographic or bleb boundaries, resembling those precipitated from eutectic solutions. *A.G.I.*

eutectofelsite. *See* eutectophyre. *Hess.*

eutectoid. a. An isothermal reversible reaction in which a solid solution is converted into two or more intimately mixed solids on cooling, the number of solids formed being the same as the number of components in the system. *ASM Gloss.* b. An alloy having the composition indicated by the eutectoid point on an equilibrium diagram. *ASM Gloss.* c. An alloy structure of intermixed solid constituents formed by a eutectoid reaction. *ASM Gloss.*

eutectoid texture. A graphic texture with each grain showing the complicated graphic intergrowth. *Schieferdecker.*

eutectophyre; eutectofelsite. A whitish, earthy, tufflike rock made up of fine, interlocking aggregates of quartz and orthoclase. *Hess.*

eutomous. In mineralogy, having distinct cleavage; cleaving readily. *Fay.*

eutrophic. Applied to a lake which is rich in dissolved nutrients, but is frequently shallow and has seasonal oxygen deficiency in the stagnant bottom waters. *Webster 3d.*

eutrophic peat. Peat rich in plant nutrients, nitrogen, potassium, phosphorus, and calcium. Synonymous with calcareous peat. *Tomkeieff, 1954.*

euvitrain. Structureless vitrain; collite; xylovitrain. Vitrain that is shown microscopically to consist of completely jellified and hardened plant material showing no cellular structure whatever. It can be further differentiated into two subvarieties based on the mode of formation. *Compare* provitrain. It is subdivided into collain and ulmain. *A.G.I.; Tomkeieff, 1954.*

euvitrinite. A variety of the major maceral vitrinite. The micropetrological constituent or maceral of euvitrain. Further divisible into two subvarieties, ulminite and collinite. *See also* collinite, b. *Compare* provitrinite. *A.G.I.*

euxamite. Radioactive radium mineral found in Brazil. *Bennett 2d, 1962.*

euxenite; loranskite. A rare-earth mineral, $(Y,Ca,Ce,U,Th)(Nb,Ta,Ti)_2O_6$; color, brownish-black; luster, brilliant to vitreous; Mohs' hardness, 5 to 6; specific gravity, 5 to 5.9. Found in Norway, Malagasy Republic, Canada, and Pennsylvania. A source of uranium, niobium, and tantalum. *CCD 6d, 1961.*

euxinic. a. Relating to a rock facies that includes black shales and graphitic sediments of various kinds. *Webster 3d.* b. Applied to a restricted circulation (barren basin) environment, or to the sediments deposited in such an environment. *A.G.I.*

euxinic basin. A poorly ventilated basin, such as the Gulf of Karabugas on the Caspian Sea. *A.G.I.*

euxinic deposition. Deposition in a deep and nearly isolated sea in which the muds are rich in organic matter, but where the deeper waters are often toxic and, except for anaerobic bacteria, no life is found. The Black Sea is an example. *A.G.I.*

ev Abbreviation for electron volt. *BuMin Style Guide, p. 59.*

evaluate. To fix a valuation, but not to appraise. *Shipley.*

evaluation. The fixing of a evaluation, not an appraisal. Used in preference to the word valuation which is often confused with appraisal. *Shipley.*

Evans cell. A nitro-oxygen cell with iron electrodes and sodium chloride electrolyte. *Osborne.*

evansite. A rare, weakly radioactive, massive mineral, $Al_3(PO_4)(OH)_6.6H_2O$; colorless to milky white, sometimes with a bluish, greenish, or yellowish tinge; varieties high in iron are brown, reddish-brown, or colorless; found associated with limonite and allophane. Small amounts of uranium have been found in some specimens of evansite. *Crosby, pp. 120-121.*

evapocryst. An individual primary evaporite grain. *A.G.I. Supp.*

evapocrystic. Refers to the primary texture of evaporites in which no linearity or laminations of grains is evident. *A.G.I. Supp.*

evapolensic. Refers to primary nonporphyritic roughly laminated texture in evaporites. *A.G.I. Supp.*

evapoporphyrocrystic. Refers to a texture in evaporites in which larger primary grains occur with a finer matrix. *A.G.I Supp.*

evaporate. a. To convert into vapor. *A.G.I.* b. To pass off a vapor; to give forth vapor; to undergo evaporation; to convert from a liquid state into vapor; to draw off in vapor or fumes; or to expel moisture from, as by heat, leaving the solid portions or residue. *Webster 3d.*

evaporated. A liquid converted to its vapor by the application of heat or reduced pressure. *ASTM STP No. 148-D.*

evaporating dish; evaporating pan. A shallow dish of glass, porcelain, or metal used in processes requiring evaporation. *Fay.*

evaporation. a. The change by which any substance is converted from a liquid state into and carried off in vapor. Specifically, the conversion of a liquid into vapor in order to remove it wholly or partly from a liquid of higher boiling point or from solids dissolved in or mixed with it. *Compare* distillation; sublimation. *Webster 3d.* b. The process of evaporating or concentrating by conversion of a part into vapor. *Webster 3d.* c. In hydrology, the process by which water becomes a vapor at a temperature below the boiling point. *A.G.I.* d. The act of drying or concentrating. *Crispin.*

evaporation gage. A graduated vessel of glass for determining the rate of evaporation of a liquid placed in it, in a given time and exposure. *Fay.*

evaporation opportunity. The ratio of the rate of evaporation from a land or water surface in contact with the atmosphere, to the evaporativity under existing atmospheric conditions. It is the ratio of actual to potential rate of evaporation, and it is generally stated as a percentage. Also called relative evaporation. *A.G.I.*

evaporative centrifuge. A batch-separating device in which a mixture to be separated is introduced into the centrifuge as a liquid. The vapors are removed from a point near the axis of the centrifuge, having been separated by diffusion through the centrifugal field. *NRC-ASA N1.1-1957.*

evaporative cooling. a. The conversion of sensible heat to latent heat with addition of moisture and practically no change in total heat content of air. *Hartman, p. 320.* b. Cooling by the evaporation of water; heat for which is supplied by the air; feasible where the wet-bulb depression is marked, and consequently widely used in dry climates. *Strock, 10.*

evaporative equilibrium. With a sling psychrometer, when the wet-bulb temperature finally reaches a stable point. *Strock, 10.*

evaporativity. The rate of evaporation under the existing atmospheric conditions from a surface of water that is chemically pure and which has the same temperature as the atmosphere immediately above it. Also called potential rate of evaporation. *A.G.I.*

evaporite. a. One of the sediments which is deposited from aqueous solution as a result of extensive or total evaporation of the solvent. *A.G.I.* b. One of the salts that results from the evaporation of ocean water or of saline lakes. *Bateman.* c. Rocks, such as anhydrite, rock salt, and potash salts, formed by evaporation of lakes or seas. *B.S. 3618, 1964, sec. 5.*

evaporite-solution breccia. A breccia which can be demonstrated to have resulted from the solution removal of evaporites. *A.G.I.*

evasé; diffuser. An outlet passage of gradually increasing cross-sectional area leading from a fan. *B.S. 3618, sec. 2, 1963.*

evasé chimney. A passage of gradually increasing area through which the whole of the air discharged by a fan must pass. The velocity of the air is gradually reduced and much of the kinetic energy is transformed into equivalent pressure energy. Also called expanding chimney. *Nelson.*

Eve method. An artificial respiration method which requires the use of a specially designed rocking stretcher. The patient is placed face downwards on the stretcher and strapped securely in position. The push-pull action of the diaphragm can be induced artificially by rocking the patient from a position of 50° above to 50° below the horizontal. The change in position should be made promptly, but the number of complete cycles of inspiratory and expiratory movements should not exceed 10 per minute. A mercury indicator is attached to the side of the rocking stretcher to ensure the operator of keeping the correct timing. *McAdam, pp. 87-89.*

even-course ashlar. Structural unit for limestone that consists of blocks of uniform height for each course, although succeeding courses may vary in thickness. *AIME, p. 330.*

even-crested ridges. a. Applied to high Appalachian ridges, the tops of which are at almost a common level, indicating that a plain reconstructed by filling the surface depressions to the level of the ridge tops is an old peneplain. Also called even-crested skyline; even-crested summit areas; even-crested uplands; accordant summit levels. *A.G.I.* b. The general accordance of summit levels in a surface of high topographic relief, suggesting that the highest reconstructed plain is a peneplain that resulted from a previous cycle of erosion. *A.G.I.*

even fracture. A fracture surface which is flat or nearly flat, as in chert. *Nelson.*

evening emerald. Peridot, which loses some of its yellow tint by artificial light, appearing more greenish. *Shipley.*

evenkite. Paraffin wax, $C_{21}H_{42}$, as white, optically biaxial scales in a vein of sulfide ores from the district of the Evenki people, Lower Tunguska river, Siberia, U.S.S.R. *Spencer 20, M.M., 1955.*

event, seismic. Applied to any definite phase change or amplitude difference on a seismic record. It may be a reflection, a refraction, a diffraction, or a random signal. *A.G.I.*

everglade. A tract of swampy land covered mostly with tall grass. A swamp or an inundated tract of low land. It has local usage in the southern United States. *A.G.I.*

everlasting lamps. N. of Eng. Natural jets of firedamp or small blowers which continue to burn as long as gas is given off. *Fay.*

Everson process. An early flotation process using from 6 to 20 percent oil and up to 1 percent acid, patented by Carrie Everson, whose husband was a pioneer in this field. *Pryor, 3.*

evjite. Hornblende gabbro containing labradorite or bytownite as the only light-colored mineral. The hornblende must be primary and not uralitic. *Compare* bojite. *A.G.I. Supp.*

evolutionary operation. A method of process operation which introduces tightly controlled variations designed to transfer laboratory-proved improvements into changes leading to better commercial production. *Pryor, 3.*

evolution sulfur. Sulfur present in a substance as a sulfide, so that on the application of moderate heat or acids, a gaseous sulfur compound is given off. *Hess.*

ex-. Prefix denoting absence or lack of; for example, exstipulate means without stipules. *A.G.I.*

examiner. a. A metal or coal mine deputy. The ventilation- and dust-suppression officials, workmen's inspectors, and others may also be called examiners. *Nelson.* b. The official who inspects the workings before and during the shift. *Mason. See also* coal mine inspector; fire boss; metal mine inspector; fireman; deputy.

excambion. Scot. An exchange of land or minerals. *Fay.*

excavating cableway. Cableway fitted with a bucket suitably designed for excavating. *Ham.*

excavation. Digging and removing soil; blasting, breaking, and loading of coal, ore, or rock in mines. Continued excavation implies continued loading and clearing away. *See also* hydraulic mining pick; pneumatic pick. *Nelson.*

excavation deformation. The zone around any excavation within which a structure might be disturbed by rock movements resulting from that excavation. *Nelson.*

excavator. The term embraces a large number of power-operated digging and loading machines. These are used increasingly in opencast mining and in quarrying. *Nelson.* Variants are the grab, skimmer, trencher, rotary digger, bucket wheel, and grader. *Pryor, 3. See also* bulldozer; continuous-bucket excavator; dragline; power shovel; walking dragline. *Nelson*

excavator base machine. A tracted prime mover to which can be fitted a variety of front-end excavating and lifting appliances. *Nelson.*

excellent fumes. Fumes that contain a minimum of toxic and irritating chemicals. *Nichols.*

exception; reservation. A reservation or exception of the minerals in a tract of land conveyed is a separation of the estate in the minerals from the estate in the surface, and it makes no difference whether the word used is excepted or reserved. *Ricketts, I.*

excess air. In practice, complete combustion cannot be obtained without slightly more air than is theoretically necessary. The amount of this excess air varies with the design and mechanical condition of the appliance, but ranges from 15 percent upwards. *Nelson.*

excess hydrostatic pressure; hydrostatic excess pressure. The pressure that exists in pore water in excess of the hydrostatic pressure. *ASCE P1826.*

excessive amounts of dust. Means bituminous coal dust in the air in such amount as to create a potential explosion hazard. To be a potential explosion hazard, a cloud of bituminous coal dust must contain at least 0.04 ounce of dust per cubic foot of air, which is so dense that visibility will be very low and breathing difficult. *BuMines Coal-Mine Inspectors' Manual, June 1966, pt. 3-16b, p. 41.*

excessive location. A mining claim in excess of the width allowed by law. *Fay.*

excess reactivity. Reactivity over and above that needed to achieve criticality. Excess reactivity is built into a reactor (by using extra fuel) in order to compensate for fuel burnup and the accumulation of fission-product poisons during operation. *See also* reactivity. *L&L.*

exchangeable bases. *See* ionic exchange. *Dodd.*

exchange capacity. The capacity to exchange ions as measured by the quantity of exchangeable ions in a soil. *ASCE P1826.*

exchange capacity, anion. *See* anion exchange capacity. *ACSG, 1963.*

exchange capacity, cation. *See* cation exchange capacity. *ACSG, 1963.*

excitation. The addition of energy to a system, thereby transferring it from its ground state to an excited state. Excitation of a nucleus, an atom, or a molecule can result from absorption of photons or from inelastic collisions with other particles or systems. *NRC-ASA N1.1-1957.*

excitation anode. An electrode that is used to maintain an auxiliary arc in the vacuum tank. *Coal Age, 1.*

excitation equipment. The equipment used for starting, maintaining, and controlling the arc. *Coal Age, 1.*

excitation time. The minimum time for which electric current must flow in the fusehead of a detonator to insure its ignition. *B.S. 3618, 1964, sec. 6.*

excited. Excited atom, one with electrons at super-normal energy levels; excited state of particle, one in which surface is not in equilibrium with ambient fluid. *Pryor, 3.*

excited state. The state of an atom or nucleus when it possesses more than its normal energy. The excess energy is usually released eventually as a gamma ray or photon. *L&L.*

exciter. An auxiliary generator that supplies energy for the field excitation of another electric machine. *Lowenheim.*

exclusion area. The area immediately surrounding a nuclear reactor where human habitation is prohibited in order to assure safety in the event of accident. *L&L.*

exclusive prospecting license; E.P.L. Grant of right to prospect a designated area for a limited period. *Pryor, 3.*

excursion; power excursion. A sudden, rapid rise in the power level of a reactor caused by supercriticality. Excursions are usually quickly suppressed by the reactor's negative temperature coefficient and/or by control rods. *L&L.*

exempted claim. A mining title on which exemption from otherwise essential activity has been granted. *Pryor, 3.*

exemptions. Exemption laws are grants of personal privileges to debtors, which may be waived by contract or surrender or by neglect to claim before sale. *Ricketts, I.*

exfoliate. a. To peel off in concentric layers, as some rocks weather. The concretionary structure of some greenstones is brought out in this way, the weathered surface showing rounded masses with the successive spherical layers falling off. *Fay.* b. To peel off in shreds, thin layers, or plates, as bark from a tree trunk. *A.G.I.* c. To swell up and to open out into leaves or plates in a direction at right angles to the leaves or plates, thus opening like a book or extending like an accordion. For example, vermiculite exfoliates when it is heated and extends its individual crystals into curving, wormlike or accordionlike aggregates of plates. *Fay; Bureau of Mines Staff.*

exfoliation. a. The phase of weathering that involves the breaking loose of thin concentric shells, slabs, spalls, or flakes from rock surfaces. *Webster 3d.* b. The breaking off or peeling off of scales or lamellae, as concentric sheets from rock surfaces by the action of either physical or chemical forces. *A.G.I.* c. A type of corrosion that progresses approximately parallel to the outer surface of the metal, causing layers of the metal to be elevated by the formation of corrosion product. *ASM Gloss.* d. The property of some hydrous silicates, notably vermiculite, of permanently expanding concertina-wise when rapidly heated to a temperature above that at which water is evolved. *Compare* bloating; intumescence. *Dodd.*

exfoliation dome. a. A large, rounded, domal feature produced in homogeneous igneous rock by the process of exfoliation. *A.G.I.* b. An exfoliation dome is produced by spalling which may result from alternate freezing and thawing, from the heat of forest fires, or from the removal of overlying rock pressure by erosion. The large, dome-shaped, igneous-rock structures in Yosemite National Park, Calif., are classic examples of exfoliation domes. *Bureau of Mines Staff.*

exhalation. a. Any vapor or gas arising from substances or surfaces exposed to the atmosphere. *Fay.* b. Any gas or vapor formed beneath the surface of the earth and escaping either through a conduit or fissure, or from molten lava or a hot spring; an emanation. *Fay.* c. An exhaling or sending forth, as of steam or vapor. Something that is exhaled or given off or that rises in the form of gas, fumes, or steam. For example, a foul exhalation from the marsh. *Webster 3d.*

exhaust fan. In coal mining, a fan which sucks used air from a mine and thereby causes fresh air to enter by separate entries to repeat the cycle. *B.C.I.*

exhausting auxiliary fan; suction fan. An auxiliary fan which exhausts air from the face of a tunnel through ducting or piping and discharges it into the return side of the airway off which the tunnel branches. *See also* auxiliary ventilation. *Nelson.*

exhaustion. a. In mining, the complete removal of ore reserves. *Fay.* b. The process of completely extracting from a substance whatever is removable by a given solvent. *Fay.*

exhaust purifier. Attached to the exhaust manifold of diesel motors up to four cycles, this purifier reduces noxious and irritating fumes in mines and other enclosed spaces such as tunnels. The purifier consists of a heavy steel shell enclosing the catalytic sections that burn hot gases to carbon dioxide and water vapor. Purified gases are fed through a water-filled tank and condensed. *Bests, p. 374.*

exhaust system. A system in which the flue and chimney or blower arrangement are used to remove air or gases from a kiln or drier. *ACSG, 1963.*

exhaust ventilation. A system of ventilation in which the fan draws air through the workings by suction. Opposite of forced ventilation. *B.S. 3618, 1963, sec. 2.*

exhumed topography. Monadnocks, mountains, or other topographic forms buried under younger rocks and exposed again by erosion. *A.G.I.*

exine. a. The outer of the two layers forming the wall of certain spores. *Webster 3d.* b. The spore coat. *A.G.I. Supp.*

exinite; liptinite. a. M. C. Stopes in 1935 used the term exinite for the constituent represented by the exines of spores in coal. C. A. Seyler in 1932, however, used the term with its present meaning designating the following group of macerals—sporinite, cutinite, alginite, resinite. The macerals grouped under the term exinite are not necessarily exines but appear to have similar technical properties. The term liptinite was introduced by A. Ammosov in 1956. Little information is so far available on the technological behavior of pure exinite. By comparison and extrapolation it has proved possible, however, to deduce that in coals with more than 35 percent volatile matter exinite is the maceral group richest in volatile matter and in hydrogen (about 80 percent and about 9 percent respectively). In coals with 18 to 25 percent volatile matter, exinite is more resilient than the vitrinite; in coals with more than 25 percent volatile matter, it has even greater resilience than micrinite. Exinite, therefore, increases the strength of bands in which it occurs and in broken coal concentrates in particles greater than 1 millimeter. *IHCP, 1963, part I.* b. The micropetrologic constituent, or maceral, of spore exines and cuticular matter. *See also* sporinite; cutinite. *A.G.I.*

exinoid. A coal constituent similar to material derived from plant exines. *A.G.I. Supp.*

exinonigritite. Nigritite derived from spore exines. *Tomkeieff, 1954.*

existent corner. A claim corner whose position is evidenced by a monument or its accessories as described in the field note record, or whose location can be identified by the aid of acceptable testimony. *Seelye, 2.*

exit table. *See* runout table. *ASA MH4.1-1958.*

exo-. A combining form from the Greek exo signifying out of, out, outside of, outside, or outer. *Webster 3d.*

exocast. The exterior mold of a fossil. *A.G.I. A.G.I. Supp.*

exogene. *See* exogenic. *Hess.*

exogene effect. An effect induced upon the invaded rocks by the igneous intrusion. *Bateman, 1950, p. 83.*

exogenetic. a. Pertaining to a rock composed of fragments of older rocks and owing its origin chiefly to agents acting from without. *A.G.I.* b. Applied to processes originating at or near the surface of the earth, such as weathering and denudation, and to rocks, ore deposits, and landforms which owe their origin to such processes. Opposite of endogenetic; endogenic. *Holmes, 1920.*

exogenetic rock. A rock formed by processes owing their origin to the external part of the earth. *Schieferdecker.*

exogenic. Same as exogenous. *A.G.I.*

exogenic differentiation. Chemical differentiation during a cycle of rock weathering and sediment transportation and deposition. *A.G.I. Supp.*

exogenite. A secondary mineral deposit of differing composition from the enclosing rock and younger than the enclosing rock. It often occurs as an incrustation filling a cavity. *A.G.I.*

exogenous. a. Produced from without; originating from or due to external causes. *Webster 3d.* b. Composed of materials derived from the processes of erosion or produced by metamorphism through contact with an adjacent igneous intrusion. Synonym for exogenetic; exogenic. Opposite of endogenous. *Webster 3d.* c. Added to the outside, as a foraminiferal test. *A.G.I.*

exogenous dome. *See* volcanic dome. *A.G.I.*

exogenous inclusion. *See* accidental inclusion. *A.G.I.*

exogenous lava dome. Synonym for shield volcano. *A.G.I.*

exogeospheric element. One of the group of typical elements of the atmosphere and of the lithosphere; the atmophile elements and the more typical lithophile elements. *Schieferdecker.*

exogeosyncline. a. A parageosyncline that lies along the cratonal border and obtains its sediments from erosion of complementing highlands in the orthogeosynclinal belt that lies outside of the craton. *A.G.I.* b. A transverse basin extending from an orthogeosyncline into a craton. *Webster 3d.*

exoglyph. A hieroglyph on surface of bed as opposed to internal hieroglyph (endoglyph). *Pettijohn.*

exograph; roentgenograph; shadowgraph. The impression made on a sensitized surface by X-rays passed through an object. *Hess.*

exometamorphic; exomorphic. A descriptive term for those changes which are produced by contact metamorphism in the wall rock of the intrusion; opposite of endomorphic. *Fay.*

exometamorphism; exomorphism. The modifications produced in the invaded rocks by intrusions which transverse them; contact metamorphism in the usual sense as contrasted with endometamorphism or endomorphism. *A.G.I.*

exomorphism. *See* exometamorphism. *Hess.*

exorheic region. A region that is drained by rivers that flow into the ocean. Opposite of endorheic region. *A.G.I. Supp.*

exosmosis. The process of osmosis in an outward direction. *C.T.D. Compare* endosmosis.

exosphere. Space beyond the earth's atmosphere. It begins at a height of about 1,000 kilometers. *A.G.I. Supp.*

exothermic; exothermal. Characterized by or formed with the evolution of heat. Opposite of endothermic; endothermal. *Webster 3d.*

exothermic reaction. A reaction that proceeds with the evolution of heat. *A.G.I.*

exotic. That which has been introduced from other regions. *Fay.*

exotic limonite. Limonite precipitated in rock other than that which formerly contained the iron-bearing sulfide. *A.G.I.*

expanded blast furnace slag. The lightweight cellular material obtained by controlled processing of molten blast furnace slag with water, or with water and other agents, such as steam or compressed air, or both. *ASTM C125-66.*

expanded clay. See lightweight expanded clay aggregate. *Dodd.*

expanded foot. The lobe or fan of ice formed where the lower portion of a valley glacier leaves the confining walls of a valley and expands onto a level surface. *A.G.I.*

expander. An inert material, such as carbon or barium sulfate, added to the active material in accumulator plates in order to prevent shrinkage of the mixture. *C.T.D.*

expanding. A process used to increase the diameter of a cup, shell, or tube. *See also* bulging. *ASM Gloss.*

expanding cement. Hydraulic cement of special type produced from clinker, gypsum, and blast furnace slag, as experimentally developed in France by Professor Lossier. This expands during setting and initial hardening, and the expansion can be controlled. *Ham.*

expanding cutter. See expansion cutter. *Long.*

expanding electrode test. A geophysical test based on the resistivity method to determine underground geological structure. *Nelson.*

expanding metals. Alloys of bismuth, which expand on cooling and solidifying; for example, 2 parts antimony to 1 part bismuth. *C.T.D.*

expanding plug. *See* expansion plug. *Long.*

expanding reamer. A reamer which is capable of slight adjustment in diameter by means of a coned internal plug acting in a partially split length of the tool. *Nelson.*

expanding waterway. A channel or groove incised into and across the face of a bit, the depth and/or width of which gradually increases from the inside to the outside walls of the bit. *Long.*

expansion. Synonym for dilatation. *Schieferdecker.*

expansion bend. A bend in a pipeline that takes up movement due to temperature change and that prevents damage. *Pryor, 3.*

expansion bit. A drill bit that may be adjusted to cut various sizes of holes. The adjustment of some types may be accomplished by mechanical means while the bit is inside the borehole. Also called paddy; paddy bit. *Long.*

expansion bolt. A bolt equipped with a split casing which acts as a wedge; used for attaching to brick or concrete. *Crispin.*

expansion chamber. Empty enclosed space above drying stove. *Noke.*

expansion coefficient. A measure of the rate of expansion with change of temperature. *Hess.*

expansion cutter; expanding cutter. A borehole drill bit having cutters that may be expanded to cut a larger size hole than the size of the bit in its unexpanded state; also, a device equipped with cutters that may be expanded inside casing or pipe to sever, or cut slits or holes in, the casing or pipe. *Compare* paddy. *Long.*

expansion dome. Imaginary dome of rock above underground working, matched by similar inverted dome below the stope. The dome lies inside the zone of stress due to an unsupported ground, but is partially destressed owing to expansion and peripheral transfer of load. *Pryor, 3.*

expansion fissure. In petrography, one of a system of irregularly radiating fissures which ramify through feldspars and other minerals adjacent to olivine crystals that have been replaced by serpentine. Expansion fissures are characteristic of norites and gabbros. The alteration of olivine to serpentine involves a considerable increase in volume, and the stresses that are produced as the result of this increase in volume are relieved by the fissuring of the surrounding minerals. *A.G.I.*

expansion fit. A fit easily made by placing a cold (subzero) inside member into a warmer outside member and allowing an equalization of temperature. *ASM Gloss.*

expansion joint. a. In conveyors a joint construction arranged to permit sliding of joining members, yet providing continuity of support for the conveying medium. Its purpose is to accommodate change in length caused by expansion or contraction, chain slack, or takeup movement. *ASA MH4.1-1958.* b. Permanent joints between different parts of the work, formed to allow small relative movements normal to the joint to occur without the development of serious stresses. *See also* control joints. *Taylor.* c. A joint arranged between two parts to allow these parts to expand with temperature rise, without distorting laterally; for example, the gap left between successive lengths of rail, or the joint made between successive sections of carriageway in road construction. *C.T.D.* d. Eng. A special pipe joint used in long pipelines to allow for expansion; for example, a horseshoe bend, a corrugated pipe acting as a bellows, a sliding socket joint with a stuffing box. *C.T.D.* e. A device for overcoming the motion of expansion and contraction in pipes due to heat or cold. In steam and hot water heating systems, the expansion joints in risers are of the (1) sliding sleeve type or (2) sylphon bellows type. The latter are preferable on low-pressure systems up to 15 pounds pressure. *Crispin.* f. An open joint left for thermal or permanent expansion of brick in furnace construction. *Bureau of Mines Staff.*

expansion loop. Either a bend like the letter U or a coil in a line of pipe to provide for expansion or contraction. *Fay.*

expansion plug. Various devices that may be lowered into a borehole and mechanically expanded to tightly seal or plug the borehole at any predetermined point. *Compare* deflecting plug. *Long.*

expansion reamer. Synonym for underreamer. *Long.*

expansion ring. A hoop or ring of U-section used to join lengths of pipe so as to permit of expansion. *Fay.*

expansion rollers. Rollers fitted to one end of a bridge to allow for expansion and contraction due to change of temperature, the other end of the bridge being fixed. *Ham.*

expansion rule. Special rule used in making molds for silica brick to correct for burning expansion. *Bureau of Mines Staff.*

expansion spalling. Spalling due to permanent growth of the fire face. *Bureau of Mines Staff.*

expansion tamping. A term used in quarrying when the drill hole above the powder charge is filled for several inches with hay, tow, or the like, followed by several inches of clay lightly tamped and finally by well-packed stemming. *Fay.*

expansive clay. A clay containing a substantial amount of montmorillonite, and whose tendency to expand depends largely upon the percentage of this clay which it contains. *Carson, 2, p. 90.*

ex parte. Partisan; evidence from one side only. *Pryor, 3.*

expected tonnage. The calculated tonnage of recoverable ore in the mine. *Lewis, p. 519.*

expending beach. A beach formed with the chief aim of absorbing wave energy. *Ham.*

experimental beryllium oxide reactor. Used to test fuel elements, it is intermediate step toward development of a propulsion system using a gas-cooled atomic reactor. Abbreviation, ebor. *Hy.*

experimental face; trial face. A normal longwall face on which new machines, such as a cutter loader, may be put to work to gain experience and perhaps improved. Such trials may disclose weaknesses and they would also indicate the best support system, turnover and other operating factors. *See also* standby face. *Nelson.*

expert. One who has acquired special skill in or knowledge of a particular subject through professional training or practical experience; a specialist. *Webster 3d.* Often applied to a mining engineer, as a mining expert. *Fay.*

explode. a. To undergo rapid combustion with sudden release of energy in the form of heat that causes violent expansion of the gases formed and consequent production of great disruptive pressure and a loud noise; as, dynamite explodes. *Webster 3d.* b. To burst violently as a result of pressure from within; as, a steam boiler may explode. *Webster 3d.*

exploder. a. A cap or fulminating cartridge, placed in a charge of gunpowder or other explosive, and exploded by electricity or by a fuse. Also called detonator. *Fay.* b. Electric shot-firing apparatus specially designed to provide a source of electric energy of sufficient power to fire electric detonators. Each type of exploder is designed to fire a specific number of shots in series, and exploders are rated accordingly, for example, single-shot exploders, 30-shot exploders, and 100-shot exploders. *McAdam II, p. 62.* c. A small hand machine for supplying the electric current for firing shots in mines and quarries. In Great Britain, exploders are of two general types: (1) exploders which contain no form of stored electrical energy, but generate the current by means of a dynamo; and (2) exploders in which a capacitor, previously charged either by a battery or a dynamo contained in the exploder, supplies the current for discharge into the shot-firing circuit. Also called battery; blasting machine. *See also* Beethoven exploder; dynamo exploder; Little Demon exploder; M.E. 6 exploder. *Nelson.* d. A chemical employed for the instantaneous explosion of powder. *Zern.*

exploit. a. To make complete use of; to utilize. *Fay.* b. To research or to experiment; to explore. *Fay.* c. To employ or to utilize selfishly, without regard to right or justice. *Fay.* d. Excavate in such a manner as to utilize material in a particular vein or layer, and waste or avoid surrounding material. *Nichols.* e. To turn a natural resource to economic account. For example, to exploit a mineral deposit. *Webster 3d.*

exploitation. a. The process of winning or producing from the earth the oil, gas, minerals, or rocks which have been found as the result of exploration. *A.G.I.* b. The extraction and utilization of ore. *Fay.*

exploration. a. The search for coal, mineral, or ore by (1) geological surveys; (2) geophysical prospecting (may be ground, aerial, or both); (3) boreholes and trial pits; or (4) surface or underground headings, drifts, or tunnels. Exploration aims at locating the presence of economic deposits and establishing their nature, shape, and grade and the investigation may be divided into (1) preliminary and (2) final. *See also* preliminary exploration. Also called prospecting. *Nelson.* b. Work involved in gaining a knowledge of the size, shape, position, and value of an ore body. *Lewis, p. 20.* c. A mode of acquiring rights to mining claims. *Fay.*

exploration company. A prospecting and development syndicate, with large financial resources that enable it to maintain a considerable staff and carry on simultaneous operations in many fields. *Hoov, p. 253.*

exploration drilling. Drilling boreholes by the rotary, diamond, percussive, or any other method of drilling for geologic information or in search of a mineral deposit. *Long.*

exploration syndicate. A syndicate made up of a group of people who organize for the purpose of engaging an intelligent prospector or young engineer-geologist, outfitting him with transportation and sampling equipment, and sending him to the mining districts to prospect and to investigate likely claims. *Hoov, pp. 252-253.*

exploratory drift. A drift that is driven in an ore deposit for the purpose of exploring the deposit both horizontally and vertically to see whether or not it will be worth working. *Stoces, v. 1, p. 70.*

exploratory drilling. The putting down of boreholes from the surface or from underground workings, to seek and locate coal or mineral deposits and to establish geological structure. Exploratory drilling is frequently done from underground workings, the holes being drilled upwards, horizontally or downwards as required. For underground drilling, roller bits, diamond crowns or tungsten-carbide bits may be used and can be coring or noncoring. Rotary boring is the predominant method for exploratory work from the surface, particularly where cores of significant deposits are required. *See also* diamond drilling. *Nelson.*

exploratory well. A well drilled either in search of a new, and as yet undiscovered, field of oil or gas, or with the expectation of extending the limits of a field already partly developed. *A.G.I.*

exploratory work. Mining operations to determine the size of the deposit, and also its character along the strike as well as to the dip. This is done by making drives and inclines. These openings follow the deposit both in strike and dip. They are designed in such a way so as to make it possible to use them for mining proper should the exploration turn out favorably. *Stoces, v. 1, p. 214.*

explore. To search, develop, or prospect. *von Bernewitz.*

explorer's alidade. Same as gale alidade. *A.G.I.*

exploring drift; exploring place. The working drift approaching old workings whose exact position is uncertain, bored as a precaution against an unexpected holing. *Peel.*

exploring heading. a. A heading driven horizontally upwards or downwards from mine workings for exploration purposes. *Nelson.* b. A heading driven in advance of the workings as a special safeguard when approaching waterlogged workings whose position is uncertain. *See also* inrush of water. *Nelson.* c. A heading driven ahead in an area intersected by faults or washouts to explore the ground and regain the disrupted coal seam. *Nelson.*

exploring mine. Scot. A working place driven ahead of the others to explore the field. A prospect. *Fay.*

explosibility curves. Curve lines drawn through coordinating points, indicating ignition or propagation, in which the rectilinear coordinates of the diagram are factors of volatile fixed carbon ratios, total incombustible, density of dust, size of dust particles, and firedamp, if any, in the air current. *Rice, George S.*

explosibility limit. The addition of inert dust to coal dust decreases its explosibility, and when enough has been added an explosion cannot occur. The point at which explosion cannot occur is said to be the explosibility limit of the coal in question. *Rice, George S.*

explosible. Capable of being exploded. *Webster 3d.*

explosimeter. a. An instrument for testing explosibility by measuring the concentration of combustible gases and vapors in air. *Webster 3d.* b. An instrument for measuring low concentrations of combustible gases and vapors in air; it is designed to indicate 100 percent for lower explosive-limit mixtures; it must be calibrated for each gas- or vapor-air system for which it is to be used. *Bureau of Mines Staff.*

explosion. a. A violent and rapid chemical reaction, usually accompanied by a loud report in which a large volume of gas at a high temperature is produced. *See also* colliery explosion. *Nelson.* b. A rapid oxidation, accompanied by heat and flame, of firedamp, coal dust, or other strongly flammable material, resulting in a great and sudden development of gases and pressure; when in a mine passage it may become increasingly violent as it progresses in either direction, depending on a continuance of the gas or dust. *Rice, George S.* c. The rapid release of pressure without regard to its source. *I.C. 8137, 1963, p. 76. d.* A sudden breaking apart, shattering, or bursting in pieces by internal pressure, as that of gas or steam. *Standard, 1964.* e. A rapid increase of pressure in a confined space. Explosions are generally caused by the occurrence of exothermic chemical reactions in which gases are produced in relatively large amount. *C.T.D.* f. An act of exploding: a violent expansion or bursting that is accompanied by noise and is caused by a sudden release of energy from a very rapid chemical reaction, from a nuclear reaction, or from an escape of gases or vapors under pressure, as in a steam boiler. *Compare* deflagration; detonation. *Webster 3d.* g. The noise made by such bursting. *Webster 3d.* h. A large-scale, rapid, and spectacular expansion, outbreak, or other upheaval. *Webster 3d.* i. Sudden release of pressure by rupture of a confining medium. *Bureau of Mines Staff.* j. Sudden release of energy accompanied by increase in pressure and/or volume. *See also* coal mine explosion. *Bureau of Mines Staff.*

explosion breccia. A deposit of coarse, indurated, volcanic debris containing blocks torn from the walls of a volcanic vent and lying in a matrix of comminuted rock. The absence of magmatic ejecta indicates that the explosions which gave rise to this type of rock are of phreatic origin. *A.G.I.*

explosion caldera. A caldera resulting primarily from a violent volcanic explosion which blows out a huge mass of rock, leaving a broad, deep basin in its place. Relatively rare and small in size compared to collapse calderas. An example is Bandaisan in Japan, where phreatic eruptions were followed by enormous avalanches that left an amphitheaterlike basin. *A.G.I.*

explosion crater. A volcanic crater formed by a violent explosion, commonly developed along rift zones on the flanks of large volcanoes and occasionally at the summit of volcanoes. It is distinguished from ordinary craters at the top of volcanic cones and from pit craters, which are produced largely by collapse. Synonymous with explosion pit. *A.G.I.*

explosion dust. The dust deposited from the cloud raised by the explosion which settles after the explosion has died down, only part of which may be traversed by the flame. *Sinclair, I, p. 266.*

explosion-hazard investigation. The investigation of a mine to determine the possibility of an explosion occurring by reason of the kind, size, purity, and dryness of the coal dust along the mine passages and the presence or absence of firedamp. It also determines the degree of the hazard of an explosion from natural conditions and of one arising through the neglect or ignorance of the mine personnel. The purpose of such investigations is to make specific recommendations for reducing that hazard to a negligible point by appropriate methods and continued diligence. *Rice, George S.*

explosion pit. Synonymous with explosion crater. *A.G.I.*

explosion pressure. The pressure developed at the instant of an explosion. *Streefkerk, p. 42.*

explosion proof. a. The term explosion-proof casing or enclosure that is so constructed and maintained as to prevent the ignition of gas surrounding it by any sparks, flashes, or explosions of gas that may occur within such enclosures. *Fay.* b. Said of electrical apparatus so designed that an explosion of flammable gas inside the enclosure will not ignite flammable gas outside. Such an apparatus is used in mines or other places having an explosive atmosphere. Also called flameproof. *C.T.D.* c. In fiery mines, fitting, motor, switch, or fixture so made and maintained as to preclude possibility of sparks, arcs, or heat sufficient to initiate explosion in surrounding air or mine dust. *Pryor, 3.* d. *See* flameproof enclosure. *Nelson.*

explosion-proof mine apparatus. An apparatus that is capable of withstanding explosion tests established by the U.S. Bureau of Mines; namely, internal explosions of methane-air mixtures, with or without coal dust present, without igniting surrounding explosive methane-air mixtures, and without damage to the enclosure or discharge of flame. *ASA M2.1-1963.*

explosion-proof motors. The U. S. Bureau of Mines has applied the term "explosion proof" to motors constructed so as to prevent the ignition of gas surrounding the motor by any sparks, flashes, or explosions of gas or of gas and coal dust that may occur within the motor casing. *Fay.*

explosion-proof stopping. Sandbag stoppings strengthened by incorporating arched girders or rolled steel joists, suitably placed and anchored into the roof and floor or sides of the mine road, placed across the shortest dimension of the road. *Mason, V. 1, pp. 287-288.*

explosions from molten iron. An explosion caused by molten iron coming in contact with water or wet material. *Fay.*

explosion-tested equipment. In explosion-tested equipment, housings for electric parts are designed to withstand internal explosions of methane-air mixtures without causing ignition of such mixtures that surround the housings. *ASA M2.1-1963.*

explosion tuff. A tuff, the constituent ash particles of which have been dropped directly into place after being ejected from a volcanic vent. The term distinguishes such tuffs from the more ordinary types which are washed into place. *Holmes, 1920.*

explosion wave. a. From the French, onde explosive, and coined by Bertholet, signifying that wave or flame which passes through a uniform gaseous mixture with a permanent maximum velocity. The rate of the explosion wave is a definite physical constant for each mixture. The explosion wave travels with the velocity of sound in the burning gas which itself is moving rapidly forward en masse in the same direction, so that the explosion wave is propagated far more rapidly than sound travels in the unburned gas. *Fay.* b. Strictly speaking, a detonation wave. *Rice, George S.*

explosive. a. Any mixture or chemical compound by whose decomposition or combustion gas is generated with such rapidity that it can be used for blasting or in firearms, for example, gunpowder, dynamite, etc. *Fay.* b. A substance which undergoes a rapid chemical change, with production of large volumes of gas. High pressures are set up when the action occurs in a confined space such as a borehole and consequently the surrounding coal or ore is broken. The change is effected either by burning, as with low explosives, such as gunpowder, or by detonation, as with high explosives. *See also* explosive factor; Morcol; permitted explosives. *Nelson.* c. That which is liable to explode or to violently burst forth from within by force. *Crispin.* d. In coal mining, there are two main classes permitted and nonpermitted, that is, those which are safe for use in coal mines and those which are not. Ammonium nitrate mixtures are mostly used in coal mines; nitroglycerin derivatives in metal mines. *C.T.D.*

explosive antimony. A black powder obtained by the rapid cooling of antimony vapor, or by the electrolysis of a solution of antimony chloride in hydrochloric acid, using a platinum cathode and an antimony anode. When scratched, the hard black mass deposited on the cathode will explode. It may consist of a solid solution of antimony trichloride in metallic antimony. *Camm.*

explosive cooling agent; coolers. A substance added to a permitted explosive to cool the explosion flame and thus reduce the risk of igniting mine gases. The agent may be sodium chloride and sodium bicarbonate. *Nelson.*

Explosive D. Ammonium picrate. *Bennett 2d, 1962.*

explosive drilling. A technique developed for deep-hole drilling in especially strong and abrasive rocks. In this method, a series of small underwater explosions are used to break the rock at the bottom of the hole, the fragments from each explosion being washed away by the flushing water. The explosive used is in the form of a liquid which is transported down the hole unmixed in nonexplosive chemical components which are then automatically mixed in correct proportions for maximum sensitivity at the drill head. Since the energy is liberated at the bottom of the hole there is no energy loss with depth and since the explosion is underwater, the shock wave is transmitted with maximum efficiency. *Mining and Minerals Engineering, v. 1, No. 5, January 1965, p. 183.*

explosive dusts. Dusts which are combustible when airborne. They include metallic dusts (magnesium, aluminum, zinc, tin, iron), coal (bituminous, lignite), and sulfide ores. *Hartman, p. 41.*

explosive factor; powder factor. The ratio between the burden of a shothole in tons or cubic yards and the weight of explosive charge in pounds, that is, tons (or cubic yards) per pound of explosive. The factor is dependent on the rock and the fragmentation required, but 5 tons per pound is about average in quarry blasting. To minimize secondary blasting, some quarrymen prefer a factor of about 3 tons per pound. *See also* blasting. *Nelson.*

explosive force. A force represented with separate values for the heat liberated by the explosive decomposition and the detonating rate. *Streefkerk, p. 42.*

explosive forming. Shaping metal parts in confined die cavities where the forming pressure is generated by an explosive charge. *ASM Gloss.*

explosive fringe. *See* flammable fringe. *B.S. 3618, 1963, sec. 2.*

explosive index. The percentage of pyroclastic ejecta among the total products of a volcanic eruption. *A.G.I. Supp.*

explosive limits. The limits of percentage composition of mixtures of gases and air (or oxygen) within which an explosion takes place when the mixture is ignited. *Institute of Petroleum, 1961.*

explosively anchored rockbolt. *See* rockbolt, explosively anchored.

explosiveness of dust. The explosiveness of a dust is its ability to produce violent effects and is measured by the pressure produced after the explosion has traveled a fixed distance under standard conditions. *Sinclair, I, p. 252.*

explosive oil. *See* nitroglycerin. *CCD 6d, 1961.*

explosive, permissible. *See* permissible explosive. *Fay.*

explosive pressing. A process for comparison by the blast of an explosion within the mold containing the powder to be compacted. *Dodd.*

explosive, primary. *See* primary explosive. *Bennett 2d, 1962.*

explosive ratio. The weight of explosive per cubic feet of rock broken. A ratio used largely in the United States. *Nelson.* Also called powder factor.

explosives. Gunpowder—black powder; KNO_3, sulfur and carbon. Nitrate mixtures, nitrates other than potassium. Chlorate mixtures, contain $K.ClO_3$. Dynamites, contain nitroglycerin. Guncotton, nitrated cellulose or other nitro-compounds. Permitted safety, may be used in coal mine. (Cardox, airdox.) Picrates, contain picric acid. Tri-nitro-toluene (T.N.T.). *Pryor, 3.*

explosives casting. In explosives casting, large amounts of low-cost ammonium nitrate mixtures are loaded into medium-sized drill holes in a usual ratio of more than 1 pound of powder per cubic yard of overburden. The explosive charges are detonated through millisecond delay electric blasting caps. When the shot is fired, a large part of the overburden is blasted into the pit away from the high wall and up on the spoil pile where it attains a favorable angle of repose. *Woodruff, v. 3, p. 467.*

explosive sensitiveness. The ease with which an explosive will detonate or explode. An explosive must be sufficiently insensitive to withstand any shocks which may occur in handling or transporting, but, at the same time, it must detonate when initiated by an ordinary detonator, and also transmit the detonation wave from one cartridge to another in a shot hole. *Nelson.*

explosive shattering. This method consists in soaking the ore thoroughly in water and then heating to 180° C under a pressure of 150 pounds per square inch. The pressure is then suddenly released, and the absorbed water is converted to steam which disrupts the ore. Explosive shattering is said to be more effective than ordinary crushing and grinding in liberating mineral particles without harmful overgrinding. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 238.*

explosive store; powder house. A surface building at a mine where explosives and detonators may be kept. In Great Britain, the store must be licensed by the local authority either for gunpowder or mixed explosives. It must be at certain minimum distances from other buildings and the maximum quantity of explosives that may be kept is fixed. *Nelson.*

explosive strength. A measure of the amount of energy released by an explosive on detonation and its capacity to do useful work. Several methods of expressing explosive strength are used, but in most cases the figures are calculated from the deflection of a freely suspended ballistic mortar in which small explosive charges are fired. *Nelson.*

explosive stripping. A method, encouraged by the introduction of lower cost AN-FO explosives, in which by using an excess of explosives in the strip mine bench, up to about 40 percent of the overburden can be removed from the coal seam by the energy of the explosive, thereby requiring no excavation. *Encyclopaedia Britannica. Britannica Book of the Year, 1964, p. 570.*

explosive volcano. A volcano characterized by periodic eruptions of great violence and explosive force. *Standard, 1964.*

exposed coalfield. A coalfield where the Coal Measures outcrop at the surface all around its margin or boundary. South Wales is a good example of an exposed coalfield. *See also* concealed coalfield. *Nelson.*

exposed finish tile. A hollow clay building block, the surfaces of which are intended to be left exposed or painted; the surface may be smooth, combed, or roughened. *Dodd.*

exposure. a. The proportional mass of a diamond or other cutting medium protruding beyond the surface of the metal in which it is inset in the face of the bit. Sometimes incorrectly called clearance. *Long.* b. In geology, the condition or fact of being exposed to view, either naturally or artifically. Also, that part of a rock, a bed, or a formation which is exposed; an outcrop. *Fay.*

exposure dose. Expressed in roentgens, is a measure of the total ionization that the quantity of radiation could produce in air. *BuMines Bull. 630, 1965, p. 747.*

exposures. S. Afr. Portions of the pay ore exposed in development operations, etc. *Beerman.*

expression rolls. A pair of steel rolls which, when rotated, will force a clay column through a die or along a cutting-off table (as in shaping of bats for roofing-tile manufacture). *Compare* crushing rolls. *Dodd.*

exsiccation. Drying by draining; forced evaporation of moisture. *Bennett 2d, 1962.*

exsolution. a. The separation of individual minerals in solid solution when the temperature is lowered. *Bateman.* b. Solid solutions of some pairs of minerals form only at high temperatures and become unstable at lower temperatures. When these solid solutions cool slowly, one mineral may separate out of the other at a certain point in the cooling-temperature curve. This is unmixing, or exsolution. *Bateman, 1950, p. 32.*

exsolutional. Applied to those sedimentary rocks that solidify from solution either by precipitation or by secretion. *A.G.I.*

exsolution mineral. One of the unmixing minerals that form through exsolution from other minerals by cooling and are mostly included in them. *Schieferdecker.*

exsolution texture. The texture of any intergrowth of minerals formed by the exsolution of one or more guest minerals from a host mineral by unmixing under certain conditions of cooling. The term comprises:

Crystallographic or oriented intergrowth textures; cell, cellular, net, or mesh textures; oleanderleaf texture; emulsion texture; pseudoeutectic or graphic texture; eutectoid texture, etc. *Schieferdecker.*

exsolved. *See* exsolution. *A.G.I.*

exsudation. The scaling off of rock surfaces through the growth of salines by capillary action. It probably has only local importance as a weathering process. *A.G.I.*

extendable conveyor. a. For bulk materials is usually of troughed design and may be lengthened or shortened while in operation. Commonly used in underground mine conveyor work. *ASA MH4.1-1958.* b. For packaged materials, objects, or units conveyor may be one of several types including roller, wheel, and belt conveyors. Construction is such that conveyor may be lengthened or shortened within limits to suit operating needs. *ASA MH4.1-1958.*

extended charges. Explosive charges spaced at intervals in a quarry or opencast blast hole. *See also* deck loading. *Nelson.*

extended consequent stream. A consequent stream flowing seaward on a newly emerged coastal plain that extends the course of an older stream with headwaters in the old land behind the coastal plain. *A.G.I.*

extended head pulley. *See* head pulley, a.

extended stream. When a region near the sea is uplifted and a submerged continental shelf becomes part of the coastal plain, the streams of the older land are extended across it. *A.G.I.*

extender. A mineral substance used to dilute and cheapen paint but which also may be useful in facilitating the suspension of the pigment, increasing moisture resistance, giving a dull finish, thickening primers for filling porous surfaces, improving abrasion resistance, or improving brushing qualities. Extenders include asbestos, barite, calcite (whiting), celestite, clay, diatomaceous earth, dolomite (siliceous), gypsum, magnesite, mica (including sericite), quartz (including tripoli), slate flour, talc, vermiculite, and witherite. *BuMines I.C. 7264, December 1943, p. 19; Hess.*

extensible conveyor. A conveyor which is capable of being lengthened or shortened while in operation. *NEMA MB1-1961.*

extensible discharge trough. Consists of two or more shaker conveyor troughs, nested, to be installed on the discharge end of the pan line so as to provide for adjustment of the position of the discharge point. After adjustment, they are locked in place. *Jones.*

extensional fault. A normal fault believed to have resulted from the stretching of the earth's crust. *A.G.I. Supp.*

extension barrel. Synonym of extension core barrel. *Long.*

extension core barrel. A core barrel, the length of which may be increased by coupling similar sections. *Long.*

extension coupling. Coupling consisting of a threaded tubular section around which a loose- or tight-fitting ring is placed. The coupling connects the core barrel to the first drill rod. Also called guide-ring coupling. *Long.*

extension fracture. One of the fractures that form parallel to a compressive force. In a sense, they are tension fractures. *Billings, 1954, p. 96.*

extension joint. One of the joints that form parallel to a compressive force. In a sense, they are tension fractures. *Billings, 1954, p. 117*

extension ore. Possible ore believed to exist ahead of ore exposed in the face of a drift. *Forrester, p. 554.*

extension tongs. *See* brown tongs. *Long.*

extension well. A productive outpost well. *See also* outpost well. *A.G.I.*

extensometer. a. Instrument used for measuring small deformations, deflection, or displacements. *BuMines Bull. 587, 1960, p. 2.* b. An instrument for measuring changes caused by stress in a linear dimension of a body. *ASM Gloss.*

exterior panel. Panel of a slab whose support is discontinuous on at least one edge. *Ham.*

external grinding. Grinding the external surface of a rotating workpiece. *ASM Gloss.*

external mold. The impression in the adjoining rock of the outer sides of the hard parts of an organism. *A.G.I.*

external rotation. The rotation of small mineral aggregates in metamorphic rocks, the internal relationships of which are little disturbed. *G.S.A. Memoir 6, 1938, p. 36.*

external sintered tip pick. *See* sintered carbide-tipped pick. *Nelson.*

external vibrator. A vibrator used to facilitate concrete placing, being fixed to the shuttering as distinct from an internal vibrator, which is immersed in the concrete. *Ham.*

external waste. S. Afr. Unpayable or waste rock on the outsides of a band or several bands of ore; internal waste is between bands of ore which are mined together. *Beerman.*

extinction. a. In optical mineralogy, the arresting of a beam of light by polarization, by the imperfect transparency of the medium, or otherwise. *Fay.* b. A position at which a birefringent substance on the stage of a polarizing microscope with crossed nicols is dark, even though the line of sight is not parallel to an optic axis; also the darkness thus obtained. *A.G.I.* c. When a birefringent mineral is examined between crossed Nicol prisms or Polaroid disks and no light is transmitted the mineral is said to be in a position of extinction. There are four such positions during a complete rotation of 360°. *Anderson*

extinction angle. The angle through which a section of an anisotropic crystal must be revolved from the trace of a known crystallographic plane or direction to the position of maximum darkness or extinction under the petrographic microscope. It is diagnostic in the identification of a mineral grain. *Fay; A.G.I.*

extinction direction. a. In optical mineralogy, the position of extinction of a mineral grain expressed in angular degrees with respect to a crystallographic axis, a crystal face, a cleavage trace, or a twin plane. *Bureau of Mines Staff.* b. One of two directions in a crystal that are parallel to the vibration planes of the crossed nicols of the petrographic microscope. *A.G.I. Supp.*

extinctive atmosphere. An atmosphere created behind mine seals when the supply of oxygen is completely cut off thereby bringing combustion to an end. *Roberts, I, p. 99.*

extinct volcano. *See* volcano. *A.G.I.*

extine. The outer coat of a pollen grain. *A.G.I.*

extinguish. To put out; to quench. *Jones.*

extoölitic. An oölitic structure built up around a core from within outward; a small concretion. Opposite of entoölitic. *Fay.*

extracontinental geosyncline. A geosyncline situated outside a continent and marginal to it. *A.G.I. Supp.*

extract. Substance, or substances, separated from petroleum products by the selective action of a solvent in solvent-extraction processes other than dewaxing. Extracts are generally aromatic in character. *See also* raffinate. *Institute of Petroleum, 1961.*

extractable metal. A metal that can be extracted from a sample by any given chemical treatment. *Hawkes.*

extractant. In solvent extraction, the active organic reagent which forms an extractable complex with uranium. *Newton, p. 440.*

extraction. a. The process of mining and removal of coal or ore from a mine. *Nelson.* b. The separation of a metal or valuable mineral from an ore, or concentrate. *See also* percentage extraction. *Nelson.* c. Percentage of ore body actually severed and removed to surface. *Pryor, 3.* d. S. Afr. Extracting metal from ore, often expressed as a percentage. *Beerman.* e. Used in relation to all processes that are used in obtaining metals from their ores. Broadly, these processes involve the breaking down of the ore both mechanically (crushing) and chemically (decomposition), and the separation of the metal from the associated gangue. Extraction metallurgy may be conveniently divided into ore dressing, pyrometallurgy, hydrometallurgy, and electrometallurgy. *Bureau of Mines Staff.* f. A designation for that part of the metallic content of the ore which is obtained by a final metallurgical process, as the extraction was 85 percent. *Compare* recovery. *Fay.* g. The process of dissolving and separating out specific constituents of a sample by treatment with solvents specific for those constituents. *ASTM STP No. 148-D.* h. In refining, this term usually applies to solvent extraction which consists of separating by solvent or solvents the desired part from the undesired material. *Shell Oil Co.* i. In chemical engineering, the operation wherein a liquid or solid mixture is brought into contact with an immiscible or partially miscible liquid to achieve a redistribution of solute between the phases. *NRC-ASA N1.1-1957.*

extraction metallurgy. Primary work of producing metal from ores or their concentrates. *Pryor, 3.*

extraction naptha. A naptha suitable for extraction purposes. *ASTM D288-57.*

extraction ratio. Ratio of the mined area to the total area. *BuMines Bull. 587, 1960, p. 2.*

extraction tower. A tower containing packing, baffle plates, or sprays arranged so as to provide intimate contact between the immiscible or partially miscible phases in an extraction process. *NRC-ASA N1.1-1957.*

extraction ventilation. The ventilation of a tunnel face (or mine) by an exhaust fan. *See also* exhausting auxiliary fan. *Nelson.*

extraction water. Superheated water pumped into wells to melt and to extract molten sulfur from salt domes. *G.S.A. Memoir*

50, 1952, p. 9.

extractive distillation. Separation by distillation of a relatively nonvolatile azeotrope formed from an added compound and one of the constituents of the original mixture. *NRC-ASA N1.1-1957.*

extractive metallurgy. The extraction of metals from their ores or from the naturally occurring aggregates of minerals by various mechanical and chemical methods. The major divisions of extractive metallurgy may be classified as mineral dressing, pyrometallurgy, hydrometallurgy, and electrometallurgy. *E.C.T., v. 8, p. 934.*

extract layer. The liquid layer in a solvent extraction system into which the desired solute is extracted. *NRC-ASA N1.1-1957.*

extractor. One who or that which extracts; as a drill extractor. *Standard, 1964.*

extractor box. *See* zinc box. *Fay.*

extrados. The exterior arc of an arch, as in a tunnel. *Sandstrom.*

extradosal. The fractured ground outside of the fracture zone. In many mines, extradosal bursts occur more frequently than intradosal; that is, the extradosal ground ahead of the working face serves as an abutment which supports the superincumbent rock to the surface. *Lewis, pp. 624-625. Compare* intradosal.

extra-duty glazed tile. A ceramic tile with a glaze that is sufficiently durable for light-duty floors and all other surfaces inside buildings provided that there is no serious abrasion or impact. *Dodd.*

extra dynamite. Differs from straight dynamite in that a portion of the nitroglycerin content is replaced with sufficient ammonium nitrate to maintain the grade strength, manufactured in grade strengths of from 20 to 60 percent. It is lower in velocity and water resistance than straight dynamite, but is less sensitive to shock and friction and less flammable. *Carson, p. 308. See also* low-density explosive. *Kentucky, p. 165.*

extra-flexible hoisting rope. A rope consisting of 8 strands of 19 wires each with a large hemp center. *H&G, p. 129.*

extraglacial deposit. A sedimentary deposit laid down by glacial waters beyond the margin of the ice. *Stokes and Varnes, 1955.*

extrahazardous. Unusually dangerous; specifically used in insurance in classifying occupational risks, as mining is extrahazardous. *Fry.*

extra heavy. When applied to pipe, means pipe thicker than standard pipe; when applied to valves and fittings, indicates goods suitable for a working pressure of 250 pounds per square inch. *Strock, 3.*

extra-heavy drill rod. Sometimes used as a synonym for drill collar. *Long.*

extra-heavy pipe. A class of thick-walled pipe usually designated as double extra strong by pipe manufacturers. Sometimes used in lieu of drill rods in wash-boring operations in sinking pipe through deep overburden. *Long.*

extra-heavy wash rods. *See* extra-heavy pipe. *Long.*

extra high voltage; EHV. A development in the electric utility industry which permits a half-million volts to be jammed into a conductor and carried to distant places on a single new transmission line (6 were previously required). This development makes possible greater use of mine-mouth generating plants, reduces the price of electricity, and thereby makes coal more competitive since transportation of coal to distant plants becomes unnecessary. *Bureau of Mines Staff.*

extralateral. Situated or extending beyond the sides; specifically noting the right of a mine owner to the extension of a lode or vein from his claim beyond the sidelines, but within the vertical planes through the endlines. *Fry.*

extralateral right. In the United States Mining law, said of the right which one who locates on the public domain, a claim in which a vein comes to an apex, has to parts of the vein beyond the planes passed through the sidelines of his claim, but lying within vertical cross planes passed through the endlines. *Fay.*

extralite. An explosive mixture consisting of ammonium nitrate and carbonate, liquid and solid hydrocarbons, and zinc chlorate. *Standard, 1964.*

extramensurate ore bodies. Those difficult to explore and measure much in advance of mining, in which the value of prospects for ore based on geologic evidence exceeds the value of proved reserves throughout most of the life of mines supported by them. *McKinstry, p. 477.*

extramorainic. Situated outside of or beyond the terminal moraine of a glacier. *Fay.*

extraneous ash; secondary ash. a. The mineral matter in coal which was introduced during the formation of the seam. It consists of clayey or sandy particles which were blown or washed into the plant debris as it was accumulating. *See also* inherent ash; secondary mineral matter. *Nelson.* b. Coal ash consisting of sediment deposited with the plant debris. *A.G.I. Supp.* c. Ash arising from mineral matter associated with, but not inherent in, coal. *B.S. 3323, 1960.* d. Ash in coal derived from inorganic material deposited with coal or in cracks in coal. *Tomkeieff, 1954.*

extraneous coal. *See* extraneous ash. *Pryor, 3.*

extraordinary ray; E-ray. a. In optically uniaxial crystals, the ray of polarized light which vibrates in a plane that includes the vertical crystallographic axis and has the direction of its vibration constantly changing as the direction of its path through the crystal changes. Thus, the velocity of the ray will correspondingly vary, and its index of refraction will not in general obey the sine law. *Fay; Bureau of Mines Staff.* b. In optically uniaxial crystals, the ray of polarized light that vibrates at an angle to the basal pinacoid and the refraction of which varies with that angle. *A.G.I.*

extrapolation. Projection of a graphic curve beyond the line of points established from plotting data. *Pryor, 3.*

extra-special improved plough. A grade of wire rope used for winding with a tensile strength of between 115 and 125 tons per square inch. *Mason, v. 2, p. 461.*

extra-strong pipe. Synonym for double extra strong. *Long.*

extraterritorial rights. Sometimes affect employment in alien countries by giving immunity from some laws. May affect working conditions. *Pryor, 3.*

extravasation. The eruption of molten or liquid material from the earth, as lava from a vent, water from a geyser, etc. *Stokes and Varnes, 1955.*

extruded hole. A hole formed by a punch which first cleanly cuts a hole and then is pushed farther through to form a flange with an enlargement of the original hole. *ASM Gloss.*

extruded section. The most common type of light alloy structural section, produced by extrusion. *Ham.*

extruded tube. A seamless tube produced by extrusion. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24. Glossary of terms used in the aluminum extrusion industry.*

extrusion. a. The operation of producing rods, tubes, and various solid and hollow sections, by forcing heated metal through a suitable die by means of a ram; applied to numerous nonferrous metals, alloys, and other substances. *C.T.D.* b. The act or process of extruding; thrusting or pushing out; also, a form produced by the process; a protrusion. *Webster 3d; Webster 2d.* c. The emission of magmatic material (generally lavas) at the earth's surface; also, the structure or form produced by the process, such as a lava flow, a volcanic dome, or certain pyroclastic rocks. *A.G.I.* d. Lava or mud forced out, as through a vent or a fissure, onto the earth's surface. *Webster 3d.* e. Plastic clay is forced through a mouthpiece of a pugmill or a press, forming a rod or a tube, which can be cut to the desired length. *Rosenthal.*

extrusion billet. A cast or wrought metal slug used for extrusion. *ASM Gloss.*

extrusion defect. A defect of flow in extruded products caused by the oxidized outer surface of the billet flowing into the center of the extrusion. It normally occurs in the last 10 to 20 percent of the extruded bar. Also called pipe; core. *ASM Gloss.*

extrusion ingot. A solid or hollow cylindrical casting used for extruding into rods, bars, shapes, or tubes. *ASM Gloss.*

extrusive. a. Pertaining to igneous material poured out on the surface of the earth in a molten state and to fragmental material of all sizes erupted from volcanic vents. Lava flows and tuff beds are common examples. *Stokes and Varnes, 1955.* b. An extruded rock or body. *Stokes and Varnes, 1955.* c. Of, relating to, or produced by geologic extrusion, such as volcanic eruptions and other extrusive phenomena. Extrusive rocks formed after lava reached the earth's surface. An igneous rock mass produced by geologic extrusion. Synonym for effusive. Contrasted with intrusive. *Fay; Webster 3d.*

extrusive igneous body. Magma extruded upon the earth's surface, forming lava flows. *Bateman.*

extrusive rock. Any igneous rock derived from a magma or from magmatic materials that was poured out or ejected at the earths' surface, as distinct from an intrusive or plutonic igneous rock which has solidified from a magma that has been injected into older rocks at depth without reaching the surface. Synonymous with effusive rock; volcanic rock. *A.G.I.*

exudation. The action by which all or a portion of the low melting constituent of a compact is forced to the surface during sintering. Synonymous with sweating. *ASTM B243-65.*

exudation vein. *See* segregated vein.

exude. a. To discharge gradually through pores or small openings, as liquid, gum, or moisture; give off or out by slow percolation; as the pines exude pitch. *Standard, 1964.* b. To ooze or flow slowly forth through pores, cracks, or gashes; as gums exude from wounded trees. *Standard, 1964.*

ex vessel. A price quoted ex vessel used in connection with a port name means all costs paid until free of the ship's tackle at the port designated. *Hess.*

eye. a. The top or mouth of a shaft. *B.S. 3618, 1963, sec. 2.* b. The central or intake opening of a radial-flow fan. *B.S. 3618, 1963, sec. 2.* c. Entrance to mine working, at which daylight can be seen from within. *Pryor, 3.* d. The hole in a pick or hammer head which receives the handle. *Fay.* e. The opening at the top of a beehive coke oven for charging. *Mersereau, 4th, p. 364.* f. The opening in the bottom of a pot furnace through which the flame enters. *ASTM C162-66.*

eye agate. Agate with concentric bands which may be of various alternating colors, about a dark center. *Shipley.*

eye and eyebrow structure. A structure in some of the rhyolites of the Sudbury, Ontario, area consisting of crescent shaped bodies of quartz with pealike masses of quartz on the concave side. The convex side is toward the top of the flow. *A.G.I.*

eye assay. An estimate of the valuable mineral content of a core or ore sample as based on a visual inspection. *Long.*

eyeball assay. Synonym for eye assay. *Long.*

eyebolt. A rod or bolt having an eye or loop at one end and threaded at the other end. *Long.*

eye coal; circular coal. Coal characterized by the occurrence of small circular or elliptical structural disks or eyes arranged in parallel planes either in, or normal to the bedding, and having shiny surfaces that reflect light like small mirrors. The individual eyes usually have a central point around which frequently appear several circular zones which are bent like the rim of a plate. Radiating striae are noticeable, being more distinct on the edge and finer in the center. *A.G.I.*

eyed structure. Synonym for augen structure. *A.G.I.*

eyeletting. Displacing material about an opening in sheet or plate so that a lip protruding above the surface is formed. *ASM Gloss.*

eye of a shaft. *See* eye, a. *Fay.*

eyes. Derb. Small cavities lined with crystals, in the alabaster rock, Chellaston quarries. *Arkell.*

eyesight. A window or other opening in a tuyere through which the operator can see into the melting zone of the blast furnace. *Mersereau, 4th, p. 399.*

eyestone. Eng. An agate which shows in the center a spot or spots more highly colored than the concentric layers. *Fay.*

eykometer. a. A device for making static measurements of the yield value of a mud fluid. *Hess.* b. An instrument for the determination of the yield point of clay suspensions. *Dodd.*

ezcurrite. Hydrous sodium borate, $2Na_2O.5B_2O_3.7H_2O$, with characters very similar to those of kernite ($Na_2B_4O_7.4H_2O$). Associated with kernite, borax, tincalconite in the Tincalayu mine, province of Salta, Argentina. *Spencer 21, M.M., 1958.*

ezteri. Sp. Am. A green jasper with reddish veins; a kind of bloodstone. *Fay.*

F

f a. Abbreviation for fusion. *Zimmerman, pp. 49, 172.* b. Abbreviation for freezing. *Webster 3d.* c. Abbreviation for frequency. *Zimmerman, p. 48.* d. Symbol for coefficient of friction; friction factor. *Zimmerman, pp. 26, 48, 49.* e. Abbreviation for function, for example, f(x) is the function of x. *Zimmerman, p. 132.* f. Symbol for activity coefficient; molecular concentration; activity coefficient on a molal basis. *Zimmerman, pp. 4, 25.* g. Abbreviation for fugacity. *Zimmerman, p. 49.* h. As a subscript, the symbol for saturated liquid at saturation pressure and temperature. *Zimmerman, p. 94.* i. Symbol for relative humidity. *Zimmerman, p. 157.* j. Symbol for focal length. *Webster 3d.* k. Symbol for the relative aperture of a photographic lens; often printed *f/* or *f.* *Webster 3d.* l. Abbreviation for foot, furlong. *Webster 3d.* m. Abbreviation for fathom. *Zimmerman, p. 44.* n. Abbreviation for farad. *BuMin Style Guide, p. 59.* o. Abbreviation for fluid; symbol for fluid ounce. *Zimmerman, pp. 46, 470.* p. Abbreviation for fine, formed, formula, fragmentation, fuel. *Webster 3d.* q. Abbreviation for flat. *Zimmerman, p. 46.* r. Abbreviation for fordable. *Zimmerman, p. 47.* s. Abbreviation for failure, fragile. *Webster 3d.* t. Abbreviation for fire. *Zimmerman, p. 45.* u. Abbreviation for fair, forward, full. *Webster 3d.* v. Abbreviation for fog. *Zimmerman, p. 47.*

f a. Symbol for frequency, including frequency in electric circuits, mechanics, acoustics. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98; Zimmerman, pp. 56, 189.* b. Symbol for coefficient of friction; friction factor. *Zimmerman, p. 146.* c. Symbol for function; for example, $f(x)$ is the function of x. *Zimmerman, p. 132.* d. Symbol for distribution function. *Zimmerman, p. 156.* e. Symbol for activity coefficient; molar concentration; activity coefficient on a molal basis. *Zimmerman, pp. 145, 170.* f. Symbol for relative humidity. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98.* g. Symbol for focal length; focal length of object space. The symbol f' is used for focal length of image space. *Zimmerman, p. 156.* h. Symbol for the relative aperture of a photographic lens. Also the symbol *f/* is used. *Webster 3d.* i. Symbol for fugacity. *Zimmerman, p. 145.* j. Symbol for acceleration. *Zimmerman, p. 169.* k. Symbol for degrees of freedom in Gibbs' phase rule and in kinetic theory. *Zimmerman, p. 153.* l. As a subscript, the symbol for filament. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98.*

F a. Chemical symbol for fluorine. *Zimmerman, p. 144.* b. Abbreviation for Fahrenheit *BuMin Style Guide, p. 59.* c. Abbreviation for force. Also abbreviated f. *Webster 3d; Zimmerman, p. 47.* d. Symbol for concentrated force; load. *Zimmerman, p. 47.* e. Symbol for free energy. *Zimmerman, p. 48.* f. Abbreviation for friction. *Zimmerman, p. 48.* g. Abbreviation for farad; Faraday: faraday; symbol for Faraday's constant. *Zimmerman, pp. 44, 171, 203.* h. Abbreviation for function; for example, F (x) is the function of x. *Zimmerman, p. 132.* i Abbreviation for fuel. *Zimmerman, p. 204* j. Symbol for luminous flux. *Zimmerman, p. 65.* k. Abbreviation for fine. *Webster 3d.* l. Abbreviation for fire. *Zimmerman, p. 203.* m. Abbreviation for filament. *Zimmerman, p. 254.* n. Abbreviation for fog. *Zimmerman, p. 441.* o. Abbreviation for flat. *Zimmerman, p. 203.* p. Abbreviation for frame. *Zimmerman, p. 359.*

F a. Symbol for force; gravitational force; stretching force or tension; tension in a spring or in a membrane. Also a symbol for gravitational force with a subscript g, as F_g. *Zimmerman, pp. 156, 157, 165, 169.* b. Symbol for total load force; total load due to pressure; concentrated load. *Zimmerman, pp. 145, 174.* c. Symbol for weight. *Zimmerman, p. 167.* d Symbol for friction. *Zimmerman, p. 146.* e. Symbol for feed rate. *Zimmerman, p. 148.* f. Symbol for Faraday's constant or equivalent. *Zimmerman, p. 156.* g. Symbol function; for example, $F(x)$ is the function of x. *Zimmerman, p. 132.* h. Symbol for distribution function. *Zimmerman, p. 154.* i. Symbol for luminous flux. *Zimmerman, p. 156.* j. Symbol for Gibbs' free energy. *Zimmerman, p. 145.*

°F. Degrees Fahrenheit. *Dodd.*

fa Abbreviation for fayalite. *A.G.I.*

Faber du Faur furnace. A cubical crucible furnace built into cast-iron framework, mounted on trunnions in order that the furnace may be turned over and the contents emptied. Used in the desilverization of zinc crusts. *Fay.*

fabianite. A mineral, $CaB_3O_5(OH)$, monoclinic crystals from halite at Rehden, Diepholz, Germany. Are distinct from the synthetic compound. *Hey, M.M., 1964; Fleischer.*

Fabian system. May be described as the father of freefall drilling systems, all others having originated from it, although it is not now used in its original form. *See also* freefall. *Fay.*

fabric. The special arrangement and orientation of rock components, whether crystals or sedimentary particles, as determined by their sizes, shapes, etc. *A.G.I. Supp.*

fabricate. To assemble, construct, or manufacture. *Hansen.*

fabrication. The cutting, punching, stamping, or otherwise forming trimmed sheet mica into shapes for use in end-products. *Skow.*

fabric axes. *See* axes, fabric. *A.G.I.*

fabric, depositional. In structural petrology, a depositional fabric results from deposition of unconsolidated rock components from a fluid medium, as in undeformed, unmetamorphosed sediments or in igneous rock gravity differentiates. *A.G.I.*

fabric element. A rock component, ranging from an atom or an ion to a mineral grain or a group of mineral grains in pebbles, lenses, layers, etc., that acts as a unit in response to deformative forces. *A.G.I. Supp.*

fabric growth. Used in structural petrology. A growth fabric results where the orientation of the fabric elements is independent of stress and resultant movement. For example, growth from the walls of a fissure, growth in a pressure shadow, etc. *A.G.I.*

fabric habit. The relations between the shape of a mineral grain and its lattice structure. *A.G.I. Supp.*

fabrics. Asbestos cloth after weaving. *Sinclair, W.E., p. 483.*

fabric-type dust collector. This type of collector utilizes a fabric or cloth to remove the dust particles from the air. The basic idea is the same as that employed in vacuum cleaners, but there is usually an automatic or self-cleaning feature for recovering the dust. Fabric-type dust collectors should not be subjected to excessively abrasive or corrosive materials, or high temperatures that might injure the fabric, unless special materials have been employed for that purpose. Bags and tubes employing glass filter fabric are capable of handling gases with temperatures up to 550°F, and also can withstand the action of many corrosive gases. Fabric-type collectors fall into two groups on the basis of design. One uses the fabric in a closed bag or a series of small diameter bags commonly called tubes, while the other has the fabric on a frame like a screen. *Pit and Quarry, 53rd, sec. B, p. 268.*

face. a. The solid surface of the unbroken portion of the coalbed at the advancing end of the working place. *I.C. 8001, 1960, p. 1.* b. The face of coal is the principal cleavage plane at right angles to the stratification. Driving on the face is driving against or at right angles with the face. *Fay.* c. A point at which coal is being worked away, in a breast or heading; also, working face. *Fay.* d. The surface exposed by excavation. The working face, front, or forehead, is the face at the end of the tunnel heading, or at the end of the full-size excavation. *Fay.* e. A cleat or back. *Fay.* f. Eng. To place a full tub in position for being lowered on an incline, Lancashire coalfield. *Fay.* g. The face of the coalbed. *Hudson.* h. A working place from which coal or mineral is extracted. *See also* coalface; face height. *Nelson.* i. The exposed surface of coal or other mineral deposit in the working place where mining, winning, or getting is proceeding. *C.T.D.* j. The smooth surface of the coal as contrasted to butt. *B.C.I.* k. Can. Extremity of underground mine passage. *Hoffman.* l. The end of a drive. *Gordon.* m. The main cleavage; bord cleat. *Mason.* n. The more or less vertical surface of rock exposed by blasting or excavating, or the cutting end of a drill hole. *Nichols.* o. An edge of rock used as a starting point in figuring drilling and blasting. *Nichols.* p. The width of a roll crusher. *Nichols.* q. That part of a bit in contact with the bottom of a borehole when drilling is in progress and which cuts the material being drilled. Also called cutting face; working face. *Long.* r. To cover or build up a surface, such as the face or cutting points of a bit, with a layer of metal usually applied by a welding method. *See also* dress; hard face. *Long.* s. The bottom of a drill or borehole. *Long.* t. The principal frontal surface presenting the greatest area such as the face of a pile of material, the point at which material is being mined, etc. *ASA MH4.1-1958.* u. The outer surface of a pulley in contact with a belt; the outer surface of a gear, roll, or drum usually expressed in terms of inches of width. *ASA MH4.1-1958.* v. In structure, the original upper surface of a stratum especially if it has been raised to a vertical or a steeply inclined position. *A.G.I. Supp.* w. In crystallography, the plane surface of a crystal. *A.G.I. Supp.* x. As a verb, to be directed toward younger rocks, for example, overturned strata and structures face downward. *A.G.I. Supp.* y. The exposed surface of a wall or masonry unit. *ACSG.* z. The surface of a unit designed to be exposed in the finished masonry. *ACSG, 1963.* aa. The part of a wheel that does the grinding *ACSG, 1963.* bb. In a lathe tool, the surface against which the chips bear as they are formed. *ASM Gloss.*

face-airing. The operation of directing the intake air to, and along the working face of a mine. The term was used in the early part of the 18th century to describe the coursing of air naturally induced in a coal mine. *See also* circulation of air. *Nelson.*

face area. The working area inby the last open crosscut in an entry or a room, including the pillar being extracted or longwall being mined. *I.C. 8001, 1960, p.1.*

face belt conveyor. A light belt conveyor employed at the face. It is the type generally used in conventional machine mining. *Nelson.*

face belt joints. Three types of face belt joints are used: (1) hinged plate type which are attached to the belt by means of copper rivets and connected together by means of pins; (2) wire hook joints, the most popular for face belts—the hooks are inserted by means of a hand-operated machine and are connected by a flexible steel pin; and (3) spliced joint, in which a portion on each side of the belt is cut away so as to provide a splice, and this is secured by cramped-type pins which are inserted and knocked over by hand. *Mason, v. 2, p. 487.*

face boss. In bituminous coal mining, a foreman in charge of all operations at the working faces where coal is undercut, drilled, blasted, and loaded. Also called face foreman. *D.O.T.1.*

face brick. Building brick especially selected for the face of a wall. *AISI, No. 24.*

face brick clay. Red, white, or buff burning clay, semirefractory or refractory; requirements similar to those for pressed brick clay. *CCD 3d, 1942, p. 195.*

face-centered. Relating to a crystal space lattice in which each cubic unit cell has an atom at the center and at the corners of each face. *Webster 3d.*

face cleat. a. A well-defined joint or cleavage plane in a coal seam. *Compare* butt cleat. *See also* face. *Fay.* b. The major joints in a coal seam. *See also* cleat. *Nelson.* c. Planes of easiest breakage. *Lewis, p. 542.* d. The principal cleat in coal. Face or hewing face primarily means the vertical wall of coal facing the miner working in the direction of a boardway (a gallery at right angles to the principal cleat). Also called face; facing. *Arkell.*

face concentration. The ratio of pithead output (tons) to length of face (yard) or tons per yard of face. The management objective is to keep this figure as high as practicable. *See also* concentration of output. *Nelson.*

face conveyor. a. Any type of conveyor employed at the face. In coal mines, belts are widely used, with the trend towards armored conveyors with machine mining. *Nelson.* b. A conveyor, generally 10 to 100 feet in length, used parallel to the face in room and pillar mining to move material along the face to a room conveyor. Face conveyors may or may not be sectional; those conveyors which are 20 feet or less in length are usually nonsectional. *NEMA MB1-1961.* c. Any conveyor used parallel to a working face which delivers coal into another conveyor or into a car. *Jones.* d. A mechanical conveyor at the face of a working upon which coal is loaded by hand. *Grove.* e. *See* underground mine conveyors. *ASA MH4.1-1958.*

faced crystal. Applied in the trade to a natural mass of quartz bounded by one or more of the original crystal faces. *AM, 1.*

face deputy. A deputy in metal mining. *Nelson.*

face-discharge bit. A bit designed for drilling in soft formations and for use on a double-tube core barrel, the inner tube of which fits snugly into a recess cut into the inside wall of the bit directly above the inside reaming stones. The bit is provided with a number of holes drilled longitudinally through the wall of the bit through which the circulation liquid flows and is ejected at the cutting face of the bit. Also called bottom-discharge bit; face-ejection bit. *Long.*

faced wall. A wall in which the facing and backing are so bonded with masonry or otherwise tied as to exert common action under load. *ACSG.*

face-ejection bit. Synonym for face-discharge bit. *Long.*

face entry. An entry driven at right angles to the face cleat and parallel to the butt cleat. *B.C.I.*

face equipment. Face equipment is mobile or portable mining machinery having electric motors or accessory equipment normally installed or operated in by the last open crosscut in an entry or room. *I.C. 7962, 1960, p. 21.*

face foreman. *See* face boss. *D.O.T. 1.*

face half and half. Eng. A longwall face crossing the main cleavage planes of the seam at an angle of 45°. *SMRB, Paper No. 61.*

face hammer. Used for rough dressing stones. It has one blunt end and one cutting end. *Crispin.*

face haulage. a. The transportation of mined coal from the working face to an intermediate haulage. It is accomplished by shuttle cars, conveyors, locomotives, and mine cars, or by combinations of such equipment. *Woodruff, v. 3, p. 52.* b. *See* primary haulage. *Kentucky, p. 210.*

face height. The vertical height of a quarry or opencast face from top to toe, that is, the height of overburden and coal, ore, or stone. A face height is chosen that can be reached by the excacator so that all scaling of loose material can be accomplished by the machine, thus eliminating the necessity for men to go over the face on ropes to bar off loose ground. Where the height exceeds this figure, a form of benching may be adopted. *Nelson.*

face left. *See* face right. *Pryor, 3.*

facellite. Original spelling of phacellite. *Hey 2d, 1952.*

face loading pan. A shaker conveyor pan or trough which has been widened for one half of its length to provide a greater loading surface when used at the face. *Jones.*

faceman. *See* miner. *D.O.T. 1.*

face mechanization. On a longwall face, the term implies the use of some type of cutter loader with perhaps self-advancing supports, giving a quicker turnover and higher productivity. In the case of a rock drivage the term would mean the regular use of a shovel loader. *See also* conventional machine mining. *Nelson.*

face milling. Milling a surface that is perpendicular to the cutter axis. *ASM Gloss.*

face of hole. The bottom of a borehole. *Long.*

face of weld. The exposed surface of an arc or gas weld on the side from which the welding was done. *ASM Gloss.*

face-on. a. When the face of the breast or entry is parallel to the face cleats of the seam. *See* face, b. *Fay.* b. Working of a mine in a direction parallel to the natural cleats. *Compare* end-on. *C.T.D. Supp.*

face on bord. *See* bord face. *Nelson.*

face on end. *See* end face. *Nelson.*

faceplate. A glass or plastic window worn over the scuba or skin divers face and designed to provide an air space between the diver's eyes and the water. The faceplate permits both eyes to see in the same plane. A full faceplate covers the eyes, mouth and nose while a regular faceplate covers the eyes and nose only. *H&G.*

face right; face left. Position of the vertical circle of theodolite with respect to telescope, viewed from eyepiece end. *Pryor, 3.*

face run. N. of Eng. The time during which a coal getting machine is moving along the face. *Trist.*

face sampling. The cutting of pieces of ore and rock from exposed faces of ore and waste. The faces may be natural outcrops or faces exposed in surface trenches and pits. Face samples may be taken by cutting grooves or channels of uniform width and depth across the face or sections of the face or by picking off small pieces all over the face, more or less at random. *BuMines Bull. 419, 1939, p. 46.*

face shield. A guard fitted to a miner's helmet as a protection to the eyes and face where flying particles are a danger. It usually takes the form of a detachable wraparound face shield about 8 inches deep and fitted to a top band. It gives protection without in any way impairing the wearer's vision or working capacity. *See also* protective clothing. *Nelson.*

face shovel equipment. An excavator base machine fitted with boom and bucket for excavating and loading material from an exposed face above track level. *Nelson.*

face signal. N. of Eng. A wire stretched along the face to control, directly or indirectly, the running of the face conveyor. *Trist.*

face signaling. The system for transmitting signals from points on a conveyor face to the operator at the control panel near the main gate. On some plough faces, the signals on the conveyor are spaced every 5 yards. Each switch contains a push which transmits the signals to a lockout device which stops the conveyor and plough and it cannot be restarted until the catch is released. *See also* signalling system. *Nelson.*

face slip. a. The front slip of a coal seam. *Fay.* b. An inclined joint in coal sloping away from the hewing face. *Arkell.*

face stone. A diamond inset in the face portion of a bit. *Compare* kerf stone. *Long.*

facet. a. The polished plane surface of a cut gemstone. *Fay.* b. One of the small plane surfaces produced on a diamond or on other precious stones in cutting, especially to enhance its brilliance and beauty. A similar surface on other material, as one cut on a pebble by natural forces. *Webster 3d.* c. Any nearly plane surface abraded on a rock fragment, as by glaciation, for example. *A.G.I.* d. Asymmetrically scalloped rock surfaces. Synonym for flute. *A.G.I.* e. As a verb, to cut facets upon. *Webster 3d.*

facet cut. A type of cut gem bounded by plane faces as distinguished from cabochon cut or other unfaceted cut. Also called faceted cut. *See also* facet; cutting. *Shipley.*

faceted boulder. The boulders are ground flat on one or more sides, according as they have been forced to turn in their bedding of ice, and the surfaces are scored with sets of parallel scratches. Such faceted and ice-scratched boulders are very characteristic, and can never be mistaken for river boulders, or boulders of any other origin. *A.G.I.*

faceted pebble. A highly significant and interesting result of sand corrosion on loose stones is the faceted pebble or windkanter. It generally has three or more faces ground flat, by the sand blown over it at different times, and these faces meet in sharp angles. These angles do not represent the direction of the wind at the time of cutting, but rather the more or less accidental meeting of faces cut at different times. Walther described einkanter, irregular windkanter, dreikanter, and parallel kanter from the Lybian desert, all formed by the wind blowing in one direction only. *See also* dreikanter glyptolith. *A.G.I.*

faceted spur. a. In a river valley, the spurs between ravines run down and die out at, or near, the river. In a glaciated valley, the spurs are ground away by longitudinal glacial erosion up to the top of the ice and after its recession, terminate in more or less well-defined inverted V-shapes in the wall of the main valley. These glaciated spurs are described as faceted. *A.G.I.* b. The end of a ridge which has been truncated or steeply beveled by stream erosion, glaciation, or faulting. *A.G.I.*

face timber. The timber used to support the working portion of a coal face. *TIME.*

face timbering. The placing of safety posts at the working face to support the roof of the mine. The safety post is the most important timber in a mine as exposure is greater at this point than any other since the newly exposed top is always of unknown quality. *Kentucky, p. 149.*

faceting machines. Mechanical devices for holding stones during grinding or polishing facets upon them. By their use facets can be placed at the exact angles which theoretically result in producing the most brilliant stone. Rarely used in fashioning diamonds or the more valuable colored stones where recovery of a greater amount of weight is more important than maximum brilliancy. *See also* grinding; polishing. *Shipley.*

face transfer point. *See* transfer point. *Nelson.*

face waling. A waling fitted across the end of a trench and held in position by the ends of the main walings. *Ham.*

face wall. A wall built to sustain a face cut into the earth in distinction to a retaining wall, which supports earth deposited behind it. *Zern.*

face worker. A miner who works regularly at the face. In a coal mine it means colliers, conveyor shifters, face packers, etc. *Nelson.*

facieology. The study of facies. *A.G.I. Supp.*

facies. a. The aspect belonging to a geologic unit of sedimentation, including mineral composition, type of bedding, fossil content, etc. Sedimentary facies are areally segregated parts of differing nature belonging to any genetically related body of sedimentary deposit. *G.S.A. Mem. 39, 1949, p. 8.* b. In petrography: (1) the general appearance or nature of one part of a rock body as contrasted with other parts; (2) part of a rock body as differentiated from other parts by appearance or composition; and (3) a kind of rock distinguished from other more or less related kinds. In stratigraphy: (1) a stratigraphic body as distinguished from other bodies of differing appearance or composition; and (2) a lateral subdivision of a stratigraphic unit. *Compare* lithofacies; biofacies; tectofacies. *A.G.I. Supp.* c. The combination of the physical and biological characters exhibited by a geological formation at a particular point. *Ballard.* d. The local rock-type development in a formation of lateral variation. *Wheeler.*

facies change. The lateral or vertical change in the lithologic or paleontologic characteristics of contemporaneous deposits. As facies relationships are usually complex, the exact feature selected for mapping or discussion should be clearly designated. *Stokes and Varnes, 1955.*

facies contour. A line indicating equivalence in lithofacies development, for example, a particular value of the sand to shale ratio. *A.G.I. Supp.*

facies departure map. A map showing areal relations of facies based on the degree of similarity to some paritcular sedimentary composition. *A.G.I. Supp.*

facies evolution. Gradual change in the nature of facies and their relations within a particular area. *A.G.I. Supp.*

facies family. A group of closely related and associated facies, for example, different parts of an organic reef. *A.G.I. Supp.*

facies fauna. A group of animals adapted to life on a restricted type of sea floor or other environment. *A.G.I.*

facies fossil. A fossil, usually a species, which is adapted to life in a restricted environment. *A.G.I.*

facies, igneous. A variety of igneous rock. Especially applied to an igneous rock that in some respects is a departure from the normal or typical rock of the mass to which it belongs. For example, a mass of granite may grade into a porphyritic facies near its borders. *Fay.*

facies map. A map showing the distribution of different types of sedimentary facies occurring within a designated geologic unit. *A.G.I.*

facies sequence. A succession of vertically related facies. *A.G.I. Supp.*

facies strike. The direction indicated by facies contours. *A.G.I. Supp.*

facies suite. All broadly related facies, for example, all marine deposits. *A.G.I. Supp.*

facies tract. A system of different but genetically interconnected facies. The term originally included the areas of erosion which furnished sediments to the areas of deposition. *A.G.I. Supp.*

facing. a. Aust. The main vertical joints often seen in coal seams; they may be confined to the coal, or continue into the adjoining rocks. *See also* cleat. *Fay.* b. A powdered substance (as graphite) applied to the face of a mold or mixed with sand that forms it, to give a smooth surface to the casting. *Webster 3d.* c. A face slip or joint as opposed to a back slip. The plane is incined towards the observer from floor to roof. *Nelson.* d. Applied to the original direction of a layer. *A.G.I.* e. In machining, generating a surface on a rotating workpiece by the traverse of a tool perpendicular to the axis of rotation. *ASM Gloss.* f. In founding, special sand placed against a pattern to improve the surface quality of the casting. *ASM Gloss.* g. Any material, forming a part of a wall, used as a finishing surface. *ACSG.*

facing brick. A brick made especially for facing purposes, often treated to produce surface texture and made of selected clays or otherwise treated to produce desired color. *ACSG*.

facing of strata. The direction of the top of beds is especially important in steeply dipping or overturned beds. The tops of the beds or their facing is determined by ripple marks, graded bedding, crossbedding, mud cracks, pillow structure, etc. *A.G.I.*

facing sand. *See* molding sand.

facing tile. Tile designed for use in exterior or interior walls, partitions, or columns where the faces of units are to be left exposed. *ACSG*.

facing wall. Concrete used as a lining instead of timber sheeting against the earth face of an excavation, especially when asphalt tanking is required. *Ham.*

facsimile. An exact copy or reproduction. *See also* imitations; **synthetic stone**. *Shipley*.

facsimile crystallization. Synonymous with mimetic crystallization. *G.S.A. Mem. 6, 1938, p. 39.*

factor. a. One who makes it his business to sell merchandise or property intrusted to him for that purpose, receiving a commission on the amount of sales; a commission merchant; often in combination with the name of the merchandise; as, coal factor. Factors and brokers are both and equally agents, but with this difference: the factor is intrusted with the property which is the subject matter of the agency; the broker is only employed to make a bargain in relation to it. *Standard, 1964*. b. One of the several elements, circumstances, or influences which tend to the production of a given result. *Fay.*

factor of safety. a. The ratio, allowed for in design and manufacture, between the breaking load on a member or appliance (for example, a winding rope) and the safe permissible load on it. *Nelson. Compare* allowable stress; margin of safety. b. The ratio of the ultimate breaking strength of the material to the force exerted against it. If a rope will break under a load of 6,000 pounds, and it is carrying a load of 2,000 pounds, its factor of safety is:

$$\frac{6{,}000}{2{,}000} = 3, \text{ or f.s } 3$$

Brantly, 2.

factor of stress concentration. Irregularities of form such as holes, screw threads, notches, sharp shoulders, etc., when present in a beam, shaft or other member subject to loading, may produce high localized stresses. This phenomenon is called stress concentration, and the form irregularities that cause it are called stress raisers. The ratio of the true maximum stress to the stress calculated by the ordinary formulas of mechanics (flexure formula, torsion formula, etc.), using the net section but ignoring the changed distribution of stress, is the factor of stress concentration for the particular type of stress raiser in question. *Ro.*

factor of utilization. The ratio of the allowable stress to the ultimate strength. For cases in which stress is proportional to load. the factor of utilization is the reciprocal of the factor of safety. *Ro.*

factory scrap. The scrap mica resulting from cutting, punching, or stamping trimmed sheet mica into shapes for use in various end products. *Skow.*

faddom. Eng. A fathom, 6 feet, commonly used as a measure by miners. *Fay.*

fade. Attack of the surface of glass causing an oily or whitish surface. *ASTM C162-66.*

fadeometer. An instrument used to measure the comparative fading properties of colored materials, on exposure to calibrated conditions of artificial sunlight and humidity. *Enam. Dict.*

fading. Partial or complete loss of color (in whiteware) due to excessive heat treatment. *ACSG, 1963.*

Faenza white. In ceramics, a fine enamel of stannic oxide characteristic of some varieties of majolica ware. *Fay.*

Fagergren cell. A froth-flotation cell in which a squirrel-cage rotor is driven concentrically in a vertical stator. Air is drawn down the rotor shaft and dispersed into the pulp. The laboratory model (500 and 1,000 gram) is widely used in test work. *Pryor, 3.*

Fagersta cut. This cut is drilled with handheld equipment. The empty hole is drilled in two steps, the first as an ordinary hole and the second as an enlargement of this pilot hole. The cut is something between a four-section cut and a double spiral cut. The Fagersta cut is drilled with light equipment, which makes it suitable for use in mines and in small drifts, where drilling with heavy machines is not profitable. *Langefors, pp. 247-248.*

fagot; faggot. a. Made by forming a box with four long, flat bars of wrought iron and filling the interior with scrap and short lengths of bar. *C.T.D.* b. *See* pile, g and h. *Fay.*

fagoted iron. Wrought-iron bar made by heating a fagot to welding heat and rolling down to a solid bar. If the process is repeated, double-fagoted iron is obtained. *C.T.D.*

fagoting. Revetment of riverbanks with brushwood fagots in such places as grass cannot grow. Fagots are instrumental in collecting fine silt. *Ham.*

faheyite. A mineral, $(Mn,Mg,Na)Be_2Fe_2'''$-$(PO_4)_4.6H_2O$; hexagonal, as white fibers in pegmatite from Brazil. *Spencer 20, M.M., 1955.*

fahlband. A term originally used by German miners to indicate certain bands of schistose rocks impregnated with finely divided sulfides but not always rich enough to work. *Fay.*

fahlerz. Ger. A gray copper ore. Sometimes called fahl ore. *Fay.* Synonym for tetrahedrite; tennantite. *A.G.I.*

fahlite. A variety of fahlerz. *Fay.*

fahlore; gray copper ore. A group of minerals, $(Cu,Fe,Zn,Ag)_{12}(Sb,As)_4S_{13}$, consisting essentially of sulfantimonides or sulfarsenides of copper. Substitution of iron, zinc, silver, mercury, and lead is known for part of the copper, and of bismuth for arsenic and antimony. *See also* tetrahedrite; tennantite; freibergite; schwatzite. *CCD 6d, 1961.*

fahlum metal. A white alloy containing 40 percent tin and 60 percent lead. Used in the manufacture of cheap jewelry. *Crispin.*

fahlunite. An altered form of iolite. *Fay.* Synonym for cordierite. *Hey 2d, 1955.*

Fahrenheit. Gabriel Fahrenheit, a German physicist (1686-1736). His name is given to the commonly used thermometer scale in which the freezing point of water is 32° and the boiling point is 212°. *Crispin.* To convert from the Fahrenheit scale to the centigrade scale, subtract 32 and multiply by 5/9. Symbol. F. *C.T.D.*

Fahrenwald machines. These include (1) a hydraulic classifier and (2) a flotation cell marketed as the Denver Sub A. *Pryor, 3.*

faience. a. Originally the French name for the earthenware made at Faenza, Italy, in the 16th century; the ware had a tin opacified glaze and in this resembled majolica and delftware. The meaning has now changed. In France, faience is any glazed porous ceramic ware; faience fine is equivalent to English earthenware. In England, the term faience now refers to glazed architectural ware, for example, large glazed blocks and slabs (not dust-pressed glazed tiles). In the United States, faience ware signifies a decorated earthenware having a transparent glaze. *Dodd.* b. A body composed of crushed quartz grains with no apparent adhesive remaining. The bodies, such as beads (earliest), figurines, pottery, and special shapes, are glazed and sometimes molded. *ACSG, 1963.*

faience mosaic. Faience tile that is less than 6 square inches in facial area, usually five-sixteenths to three-eighths inches thick, and usually mounted to facilitate installation. *ASTM C242-60T.*

faience tile. Glazed or unglazed tile, generally made by the plastic process, showing characteristic variations in the face, edges, and glaze that give a handicrafted nonmechanical decorative effect. *ASTM C242-60T.*

faience ware. Formerly a decorated earthenware with an opaque glaze, but currently designating a decorated earthenware having a transparent glaze. *ASTM C242-60T.*

faikes; fakes; blaes. Shaly sandstone. *Pryor, 3.*

failed hole. A drill hole loaded with dynamite which did not explode. *Fay.*

failure. Applied when a structure element can no longer fulfill the purpose for which it was designed. Any structure will probably give evidence of being unsafe before actual collapse. *Ham.*

failure by rupture. See shear failure. *ASCE P1826.*

fainting. Temporary loss of consciousness caused by an insufficient supply of blood to the brain and is a mild form of physical shock. Fainting may be caused by an injury, the sight of blood, exhaustion, heat, lack of air, fright, or joy. *Kentucky, p. 379.*

fair. One of several terms used to designate a low-quality drill diamond. *Long.*

fairchildite. A potassium and calcium carbonate, $K_2CO_3.CaCO_3$, hexagonal, formed by the fusion of wood-ash in burnt trees. On hydration it yields buetschliite and calcite. *Spencer 18, M.M., 1949.*

fairfieldite. A triclinic, pearly to subadamantine lustered mineral, $Ca_2(Mn,Fe)(PO_4)_2$-$2H_2O$, isomorphous with collinsite; white, also greenish-white, pale straw-yellow, salmon-yellow color; uneven fracture; found in pegmatite at Branchville, Fairfield County, Conn.; also found as an alteration of dickinsonite and as pseudomorph after rhodochrosite. *Dana 7, v 2, pp. 720-721; Hey 2d, 1955.*

fairing. The shaping of an object, to enable the airstream to slip past it without turbulence, is known as fairing. It is usually carried out by additions of metal sheeting, brickwork, or concrete. *Spalding.*

fairlead. a. A block, ring, or strip of plank with holes that serves as a guide for the running rigging or for any ship's rope and keeps it from chafing. *Webster 3d.* b. A device which lines up cable so that it will wind smoothly onto a drum. *Nichols, 2.* c. Applies to the swivel pully on the drag rope of a dragline excavator. *Ham.*

fairlight clay. A Cretaceous clay of the Hastings, England, area that finds use in making building bricks. *Dodd.*

fairy stone. a. Scot. A fantastically shaped calcareous or ferruginous concretion formed in alluvial clays. *Fay.* b. A cruciform, twinned staurolite crystal. *Bureau of Mines Staff.* c. A fossil sea urchin or echinoid. *Standard, 1964.*

fake. a. York. A crossbedded and banded siltstone. *Nelson.* b. Scot. A well-laminated and banded siltstone. *Nelson.* c. A vernacular term for platy formations, such as micaceous flagstones associated with oil shales or coal seams. Also spelled faiks; faikes. *Holmes, 1928.* d. A soft soldering fluid used by jewelers. *Fay.*

fake opal. A variety of opalized quartz. *von Bernewitz.*

fake reflection. Accidental lineup of disturbances on the seismogram simulating a reflection. *Schieferdecker.*

fake set. A temporary set of timber used to hold up bad ground until there is space for the permanent set. *von Bernewitz.*

fakey rock. York. Flaggy standstone or siltstone. *Arkell.*

fakey sandstone. Scot. Flaggy sandstone. *Arkell.*

Falconbridge process. Recovery of nickel from a nickel-copper matte. After crushing and roasting to remove sulfur, the copper is acid-leached, filtered off and electrolyzed. The residual solids are melted, cast as anodes and refined electrolytically to produce nickel. *Pryor, 3.*

falding furnace. A mechanically raked muffle furnace having three hearths with combustion flues under the lowest hearth. *Fay.*

fales. Stones with two or more differently colored layers. *Shipley.*

fall. a. A mass of roof or side which has fallen in any subterranean working or gallery, resulting from any cause whatever. *Fay.* b. A length of face undergoing holing or breaking down for loading. *Fay.* c. A mass of rock, coal, or ore which has collapsed from the roof or sides of a roadway or face. Falls of ground are responsible for the greatest proportion of underground deaths and injuries. *Nelson.* d. The rolling of coal from the face into the room, usually as the result of blasting; sometimes the amount blasted down. Locally, also the caved roof after the coal is extracted. *B.C.I.* e. The collapse of the roof of a level or tunnel, or of a flat working place or stall; the collapse of the hanging wall of an inclined working place or stope. *C.T.D.* f. A mass of stone which has fallen from the roof, or sides of an underground roadway, or from the roof of a working place. *C.T.D.* g. To blast, wedge, or in any other way to break down coal from the face of a working place. *C.T.D.* h. To crumble or break up from exposure to the weather; clays, shales, etc., fall. *Fay.* i. To break down; to collapse. *Fay.* j. Descent from a higher to a lower level. *Fay.* k. Working by falls. A system of working a thick seam of coal by falling or breaking down the upper part after the lower portion has been mined. *Compare* caving system. *Fay.* l. A precipitous descent of water. A cascade, a cataract, or a waterfall. *Webster 3d.* m. The flow or descent of one body of water into another. *A.G.I.*

fall block. A block pulley which rises and falls with the load in a lifting tackle. *Ham.*

fallers. a. Movable supports for a cage. Also called fangs; keps. *Nelson.* b. Lanc. Synonym for cage shuts. *Fay.*

falling. Scot.; N. of Eng. An overlying stratum which falls or comes down as the mineral is extracted from under it. Sometimes called following. *Fay.*

falling-head test. A soil permeability test in which the borehole is filled up with water and the rate at which the water falls is observed. *Institution of Mining and Metallurgy. Symposium on Opencast Mining, Quarrying, and Alluvial Mining. London, 16-19 November 1964, Paper 17, p. 5.*

falling pin seismometer. In reality a limit-recorder of the intensity of ground vibrations initiated by a quarry or opencast blast. It consists essentially of a level glass base on which a number of ¼-inch-diameter pins of lengths ranging from 6 to 15 inches are stood upright. The pins stand inside hollow steel rods so that each pin can fall over independently of the others. The longer the pin the less energy required to topple it. In practice it has been accepted that if the shorter pins (up to 10 inches) remain standing, then there is no possibility of structural damage to a building by a quarry blast. *See also* vibrograph. *Nelson.*

falling slag. Blast furnace slag that contains sufficient calcium orthosilicate to render it liable to fail to a powder when cold. Such a slag is precluded from use as a concrete aggregate by the limits of composition specified in British Standards 1047. *See also* calcium orthosilicate. *Dodd.*

falling stone. A meteorite. *Webster 2d.*

falling tide. Synonym for ebb tide. *Schieferdecker.*

fall line. a. A line joining the waterfalls on a number of successive rivers that marks the point where each river descends from the upland to the lowland and the limit of navigability. *Webster 3d.* b. A line characterized by numerous waterfalls, as the edge of a plateau in passing which the streams make a sudden descent. *Webster 2d.* c. A large river, the valley of which extends across a coastal plain often has low falls or rapids near the inner margin of the plain, which determine the limit of navigation. The falls occur where the river passes from a steeper slope on the resistant rocks of the older land to a nearly level channel excavated in the weak strata of the plain. A line drawn through the falls on successive rivers is called the fall line. *A.G.I.*

fall of ground. Rock falling from the roof into a mine opening. *Weed, 1922. See also* fall, a. *Fay.*

fallout; radioactive fallout. Debris (radioactive material) that settles to earth after a nuclear explosion. Fallout takes two forms: (1) Local fallout that consists of the denser particles injected into the atmosphere by the explosion. They descend to earth within 24 hours near the site of the detonation and in an area extending downwind for some distance (often hundreds of miles), depending on meteorological conditions and on the yield of the detonation. (2) Worldwide fallout that consists of lighter particles which ascend into the upper troposphere and stratosphere and are distributed over a wide area of the earth by atmospheric circulation. They are then brought to earth, mainly by rain and snow, over periods ranging from months to years. *L&L.*

fall ridder. *See* bordroom man. *C.T.D.*

fall table. A hinged platform to cover the mouth of a shaft. *Nelson.*

fall zone. The region of waterfalls or rapids in a river where it passes from the older interior land to the inner margin of the coastal plain. What appears on a map as a fall line is usually a fall zone in actuality with respect to a particular river. *Bureau of Mines Staff.*

false amethyst. An early name for violet-colored fluorite when cut as a gem. Other colors of the same mineral were called false emerald, ruby, sapphire, or topaz. *Fay.*

false anomaly. An area of high metal content that cannot be used as a guide to ore. *Hawkes, p. 335.*

false anticline. An anticlinelike structure produced by compaction of sediment over a resistant mass such as a buried hill or reef. *A.G.I.*

false bedding. a. Bedding affected by currents, usually erratic and with frequent changes in direction. *A.G.I.* b. An old term for crossbedding. *See also* crossbedding; pseudo cross-stratification. *Pettijohn.*

false bottom. a. Aust.; U.S. A bed of drift lying on the top of other alluvial deposits, beneath which there may be a true bottom or a lower bed of wash resting directly upon the bedrock. *Fay.* b. A strip of wire screening nailed to a wooden frame, the latter being slightly narrower than the width of the sluicebox; in use the frame is placed in the bottom of the sluice, with or without riffles being placed on top. For the purpose of cleaning up, the frame is removed and the fine sand, containing gold, is scraped up and placed into pans for washing down. False bottoms are employed for saving both fine and coarse gold. *Griffith, S. V. p. 63.* c. A floor of iron placed in a puddling machine. *Fay.* d. A flat, hexagonal or cylindrical piece of iron upon which the ore is crushed in a stamp mill; the die. In Victoria, Australia, it is called stamper bed. *Fay.* e. An insert put in either member of a die set to increase the strength and improve the life of the die. *ASM Gloss.*

false chrysolite. Same as moldavite. *Shipley.*

false cleavage. a. Synonymous with strainslip cleavage; close-joints cleavage. *A.G.I.* b. A secondary cleavage superposed on a slaty cleavage. *Fay.* c. A weak cleavage that is at an angle to the slaty cleavage. Some is fracture cleavage. Minute foldings of parallel-arranged constituents, as in micaceous slates, may yield a plane of weakness parallel to the limbs of the folds, causing a cleavage that has been called in part false cleavage. *A.G.I.* d. Closely spaced surfaces, a millimeter or so apart, along which a rock splits. The surfaces are either minute faults or the short limbs of small folds. *A.G.I.*

false diamond. Several natural minerals are sometimes completely colorless and, when cut and polished, make brilliant gems. These include zircon, white sapphire, and white topaz. All three, however, are birefringent and can easily be distinguished from true diamond. *C.M.D.*

false doublet. *See* doublet. *Shipley.*

false emerald. Green fluorite. *Shipley.*

false equilibrium. The growth of a metastable or monotropic phase under conditions apparently indicating true equilibria, as in the development of andalusite crystals where sillimanite actually represents the stable phase. *A.G.I.*

false esker. An eskerlike landform composed of till instead of water-laid drift. *Bureau of Mines Staff.*

false fossils. Mineral structures imitating organisms. *Mason, v. 1, p. 25.*

false galena. Sphalerite. *Webster 3d.* An obsolete term for blende. *C.T.D.*

false gate. A gate carried forward in the seam thickness only (which must be over 3 feet), with cut-throughs as required to the main gate. The false gate has a short conveyor which takes the face conveyor coal and delivers it to the main gate conveyor through a crosscut a short distance behind the face. This layout enables the main gate rippings to be worked on three shifts. *Nelson.*

false gossan. a. The oxidized outcrop of a basic rock, such as basalt, or of an iron ore. *See also* gossan. *Nelson.* b. Transported iron, precipitated by reacting rocks, may form an iron-stained area that resembles a true gossan. *Bateman, 1950, p. 254.*

false hyacinth. Same as hessonite. *Shipley.*

false indication. In nondestructive inspection, an indication that may be interpreted erroneously as a discontinuity. *ASM Gloss.*

false lapis. a. Lazulite. *Shipley.* b. Blue-dyed agate or jasper. *See also* Swiss lapis. *Shipley.*

false lapis lazuli. Lazulite. *Schaller.*

false lead. Blende (zinc blende). *C.M.D.*

false leaders. A steel mast placed on the ground and held upright by guy ropes. Its function is both to guide a pile during driving and to hold the weight of a steam pile-hammer above it. *See also* hanging leaders. *Ham.*

false-leg arches. Temporary arch legs used adjacent to the face conveyor in an advance gate to allow the conveyor being moved forward and still maintain the gate supports. The conveyor side half-arch is temporarily replaced by props and crossbars (false legs). When the conveyor has passed the half-arch is bolted back in position. *Nelson.*

false mud cracks. Some polygonal patterns, such as those formed in soils, and some fucoidal networks resemble those produced by drying and therefore have been called false mud cracks. *See also* parting cast. *Pettijohn.*

false nephrite. A misnomer for serpentine, Transvaal jade, or other green mineral similar in appearance to nephrite. *Shipley.*

false part. In founding, a part of a flask used temporarily in forming a mold. *Standard, 1964.*

false ruby. Some species of garnet (Cape ruby) and some species of spinel (balas ruby, ruby spinel) possess the color of the ruby. *C.M.D.*

false sapphire. Blue fluorite. *Shipley.*

false set. a. A light, temporary lagging set of timber supporting the side and roof lagging until the drive is advanced sufficiently to allow the heavy permanent set to be put in when the false set is taken out and used again in advance of the next permanent set. *Engineering and Mining Journal, v. 139, No. 4, April 1938, p. 55.* b. A temporary support for forepoles used in driving a tunnel in soft ground. Also called horsehead. *Nichols.*

false stratification. An early term for cross-bedding. Rarely used in the United States. *Pettijohn.*

false stull. A stull so placed as to offer support or reinforcement for a stull, prop, or other timber. *Fay.*

false superposition. An overturn in strata, as the older rocks have been thrust over the newer ones. *Standard, 1964.*

false topaz. A yellow variety of quartz resembling topaz. *Fay.*

false wiring. Same as curling. *ASM Gloss.*

falsework. Usually temporary framework, bracing, or support used as an aid in construction and removed when construction is completed. *Crispin.*

Falter apparatus. Apparatus designed by A. H. Falter for the determination of the softening point of a glass by the fiber-elongation method as defined by J. T. Littleton. *See also* softening point. *Dodd.*

falun brilliants. Name for theater jewelry made of a lead-tin alloy. *Shipley.*

famatinite. A copper-antimony sulfide mineral, $3Cu_2S.Sb_2S_5$, containing 43.3 percent copper. *Sanford.*

Famennian. Upper Upper Devonian, below Strunian. *A.G.I. Supp.*

famille rose. A series of red colors obtained from gold (purple of Cassius). *ACSG.*

famille verte. A series of green colors obtained from chromic oxide used in the 18th century on decoration of china or porcelain. *ACSG, 1963.*

family. When a number of genera agree in certain major structural characters, they are grouped together to form a family. *See also* order. *Nelson.*

family of igneous rocks. Subgroups, under clans, in the classification of igneous rocks, for example, the syenite family. *A.G.I.*

famp. a. Cumb. Decomposed limestone, but in some other districts, a very fine-grained siliceous bed. *Fay.* b. Newc. Soft, tough, thin shale beds. *Fay.*

fan. a. A ventilator to exhaust or blow the air current necessary to circulate the mine roadways and workings. Until about 1930, mine fans were of the centrifugal or radial-flow type with an efficiency up to 65 percent. Axial-flow fans then became popular because of their higher efficiency (up to 80 percent) and smaller size. Because of their noise, axial-flow fans are not usually practicable to obtain a pressure of more than 4 to 5 inches water gage per stage, whereas for new coal mines, fan pressures of 12 to 15 inches water gage may be needed. For such pressures three-stage fans are required and they are costly. During the last decade, or so, radial-flow fans have been greatly improved and are as efficient as the best axial-flow fan. Modern radial-flow fans have an efficiency approaching 90 percent and are generally favored for pressures exceeding about 5 inches water gage. It is now general practice to install two fans at collieries, one to act as a standby. *See also* aerofoil-vane fan. *Nelson.* b. To drill a number of boreholes each in a different horizontal or vertical direction from a single-drill setup. *Long.* c. A dispersion pattern that spreads predominantly to one side of the source of material. *Hawkes.* d. An accumulation of debris brought down by a stream descending through a steep ravine and debouching in the plain beneath, where the detrital material spreads out in the shape of a fan, forming a section of a very low cone. *See also* alluvial fan. *A.G.I.*

fan blower. A rotating fan for producing a current of air. It may be used for carrying off fumes as of chemicals, for ventilating, and for forced draft in furnaces. *Crispin.*

fan characteristics. The behavior of a fan under various conditions cannot be expressed in simple mathematics but may be shown graphically by suitable curves, known as the fan's characteristic curves or characteristics. The variables of interest are pressure, volume flowing, power consumed, fan speed, fan efficiency, and mine resistance. *Roberts, I, p. 187.*

fan cleavage. Cleavage which, if studied over a large enough area, dips at different angles so that, like the ribs of a fan, it converges either upward or downward. *A.G.I.*

fan cut. A cut in which holes of equal or increasing length are drilled in a pattern on a horizonal plane or in a selected stratum to break out a considerable part of it before the rest of the round is fired; the holes are fired in succession in accordance with the increasing angle they form in relation to the face. *B.S. 3618, 1964, sec. 6.*

fancy. A term that has been applied to semiprecious stones prized for other qualities than intrinsic value. *Bureau of Mines Staff.*

fancy agates. Agates showing delicate markings and intricate patterns. *Shipley.*

fancy lump coal. a. Soft coal from which all slack and nut coal has been removed. *Fay.* b. Ark. Semianthracite coal of larger size than grate coal. *Fay.*

fancy sapphire. a. A sapphire of any hue other than blue or colorless, although colorless is included by some. *Shipley.* b. An incorrect term under which assorted lots of sapphires and sometimes as many as a dozen other mineral species of almost every conceivable color are sold. *Shipley.*

fancy stone. a. A variety of a gemstone which is less often encountered commercially, such as a fancy sapphire. *Shipley.* b. An unusually fine gemstone, particularly a diamond of unusually fine color grade. *Shipley.*

fan delta. A gently sloping alluvial deposit formed where a steep stream runs from a mountain gorge or canyon out upon a more open valley or lowland. *A.G.I.*

fan drift. a. The short tunnel connecting the upcast shaft with the exhaust fan. In the case of a forcing fan, the fan drift is connected to the downcast shaft. Surface (gallery-type) drifts are being favored at a number of British collieries. These are quite as efficient and often cheaper to construct than the conventional type of drift in which the shaft mounting is situated approximately 60 to 80 feet below the shaft collar. Modern fan drifts conduct very large volumes of air and are designed to achieve streamline flow as far as practicable. *See also* ventilation, reversal of. *Nelson.* b. The enclosed airtight passage, road, or gallery from the mine to the fan. *Mason.* c. The passage or duct for the intake of a ventilating fan on a mine. *C.T.D.* d. An airway leading from a mine shaft, or airway, to a fan. *B.S. 3618, 1963, sec. 2.*

fan drift doors. When there are two fans at a mine it is necessary to install isolation doors for each drift leading to each fan, in order to prevent the working fan drawing air from the outside atmosphere. With modern fan layouts, the fan drift may be 16 feet or more square and pass 600,000 cubic feet per minute of air and sometimes more. Modern fan drift doors can be fixed in any position from full-open to full-closed and can be manipulated by one man from outside the fan drift. Doors of the butterfly type are often used and can be opened manually or by power. *Nelson.*

fan drilling. *See* fan, b. *Long.*

fan efficiency. The ratio obtained by dividing useful power output by power input. This is expressed as a percentage. Fan efficiency is understood to mean that airpower is calculated from volume flowing and total pressure, on the assumption that the air does not change in volume. The velocity pressure, present in the air leaving the evasé, is considered as a loss. The power input is that supplied to the fan shaft and thus includes the loss in the fan bearings but excludes all losses in the drive. *Roberts, I, pp. 185-186.*

fan-efficiency tests. *See* overall ventilation efficiency; thermometric fan test; volumetric efficiency. *Nelson.*

fanega. Mex. A variable unit of dry measure, usually 90.815 liters; of superficial measure usually 3.5663 hectares. *Fay.*

fan engineer. In anthracite and bituminous coal mining, one who maintains and operates a fan system that forces fresh air into or exhausts foul, dust-laden air from underground workings for ventilation. May, according to type of machinery, regulate and control the temperature and humidity of the air. Also called fan-engine engineer; fanner; fan runner; fan tender. *D.O.T. 1.*

fan exhaust. An electric fan used for the removal of enamel dust from the spray booth, or fumes from the pickle room, thus safeguarding the health of the worker. *Enam. Dict.*

fan fold. An anticlinal fold in which the two limbs dip toward one another, or a syncline in which the two limbs dip away from one another. *Billings, 1954, p. 42.*

fang. a. Scot. The power of a pump bucket to form a vacuum. Hence, a pump has "lost the fang" when so much air passes the bucket that a vacuum cannot be made until water is poured on the top of the bucket. b. Derb. An air course, cut in the side of the shaft or level, or constructed of wood. *Fay.* c. In Wales in the plural, cage shuts. *Fay.* d. Kep. *Nelson.*

fang bolt. Used for attaching ironwork to timber. The nut is a plate with teeth which bite into the wood. To tighten, the bolt is turned while the nut remains stationary. *Crispin.*

fanging; fanging pipes. a. Eng. Wooden air pipes used in mine ventilation. *See also* fang, b. *Fay.* b. *See* brattice, a. *C.T.D.*

fanglomerate. a. Proposed by Lawson for an ancient alluvial fan deposit at Battle Mountain, Nev., which has been firmly cemented since deposition. *A.G.I.* b. A fanglomerate is composed of heterogeneous materials which were originally deposited in an alluvial fan but which since deposition have been cemented into solid rock. *USGS Bull. 730, 1923, p. 88.*

fanhead. The area on an alluvial fan close to the apex. *A.G.I.*

fan laws. The general fan laws are the same for either axial-flow or centrifugal fans. These laws are as follows: (1) air quantity varies directly as fan speed; quantity is independent of air density (twice the volume requires twice the speed); (2) pressures induced vary directly as fan speed squared, and directly as density (twice the volume develops four times the pressure); (3) the fan-power input varies directly as the fan speed cubed and directly as the air density (twice the volume requires eight times the power); and (4) the mechanical efficiency of the fan is independent of the fan speed and density. *BuMines Bull. 589, 1960, p. 24.*

fanman. One who controls operation of an electric fan for cooling kilns after burning and also for building up kiln fires before burning. *D.O.T. 1.*

fan mesa. A remnant of an alluvial fan left standing in the process of the degradation of the fan. *A.G.I.*

fanner. Scot. A small portable hand fan. *See also* Blow-George. *Fay. See* fan engineer. *D.O.T. 1.*

Fanning's equation. Frictional pressure drop ($\triangle p_f$) of fluid flowing in a pipe is

$$\triangle p_f = 2f \left[\frac{v^2}{g}\right]\left[\frac{1}{d}\right]$$

where f is a function of the Reynolds number, v = rate of flow, g is acceleration due to gravity, 1 and d are length and diameter of pipe. *Pryor, 3.*

Fann viscosimeter. A specific make of viscosimeter. *See also* viscosimeter. *Long.*

fan rating. The head, quantity, power, and efficiency to be expected when a fan is operating at peak efficiency. *Hartman; p. 183.*

fan runner. *See* fan engineer. *D.O.T. 1.*

fan scarp. A fault scarplet or little fault scarp entirely in piedmont alluvium or in an alluvial fan. *A.G.I.*

fan shaft. a. The ventilating shaft to which a mine fan is connected. *B.S. 3618, 1963, sec. 2.* b. The spindle on which a fan impeller is mounted. *B.S. 3618, 1963, sec. 2.*

fan shooting. A refraction type of seismic shooting in which a fan of detectors is laid out from a single shot point. Arrival times of refraction impulses at the detectors, when less than normal, may indicate the presence of relatively shallow salt masses (salt domes) encountered by seismic ray paths. *A.G.I.; A.G.I. Supp.*

fan static pressure. a. The total ventilating pressure required to circulate the air through a mine less the natural ventilation pressure. Also called fan useful pressure. *Nelson.* b. The difference between the fan total pressure and the fan velocity pressure. *B.S. 3618, 1963, sec. 2.*

fan structure. An arrangement of closely folded strata such that the axial planes of the folds dip on each side of a mountain pass or range toward the central axial plane of the range itself, so that the whole has a structure, in cross section, resembling that of an open fan held upright. *Fay.*

fan tender. *See* fan engineer. *D.O.T. 1.*

fan test. A fan test comprises observations of air quantity, total pressure, and power, while the fan is running at a known constant speed. *Roberts, I, p. 206.*

fan-topped pediment. A pediment with a thin (50- to 200-foot) covering of alluvial fans. *A.G.I.*

fan total head. Equal to the fan static head plus the velocity head at the fan discharge corresponding to a given quantity of air flow. *Hartman, p. 181.*

fan total pressure. The algebraic difference between the mean total pressure at the fan outlet and the mean total pressure at the fan inlet. *B.S. 3618, 1963, sec. 2.*

fan velocity pressure. The velocity pressure corresponding to the average velocity at the fan outlet. *B.S. 3618, 1963, sec. 2.*

fan width. Centrifugal fans are referred to as single or double width, depending on the construction of the impeller. A double width fan has two impellers mounted side by side and rigidly coupled on the same shaft. This has the same effect as operating fans in parallel and produces approximately twice the quantity of a single width fan. *Hartman, p. 177.*

F.A.Q. Fair average quality. *Hess.*

farad. The practical meter-kilogram-second (mks) unit of capacitance equal to the capacitance of a capacitor between the plates of which appears a potential of 1 volt when it is charged by 1 coulomb of electricity. The unit is the standard in the United States. Abbreviation, f. *Webster 3d.*

faraday. The quantity of electricity transferred in electrolysis per equivalent weight of any element or ion, being equal to about 96,500 coulombs per gram equivalent. *Webster 3d.*

Faraday effect. The rotation of the plane of polarization produced when plane-polarized light is passed through a substance in a magnetic field, the light traveling in a direction parallel to the lines of force. For a given substance, the rotation is proportional to the thickness traversed by the light and to the magnetic field strength. *C.T.D.*

Faraday's law. a. The amount of chemical change produced by an electric current is proportional to the quantity of electricity. *Lowenheim.* b. The quantities of different substances liberated by a given quantity of electricity are proportional to their chemical equivalent weights. *Lowenheim.*

fare. In Wales, standing coal, or coal unholed or uncut. *Fay.*

Far East Rand. S. Afr. The area between Boksburg and Heidelburg, Transvaal, limited in the north and east by the outcrops or sub-outcrops of the Main reef, but not yet limited in the south. *Beerman.*

farewell rock. The highest rock formation of the Millstone grit of South Wales, England, occurring immediately beneath the Coal Measures. Since all workable coal seams occur in the overlying Coal Measures, it is useless to search for coal in these rocks, hence the miners' term farewell rock. *Nelson.*

farmers' drill. A straight-fluted twist drill, used on soft metals. *Crispin.*

farmout. Donation of acreage in support of a drilling deal. *Wheeler.*

faro. a. A small atoll-shaped reef with lagoons a few meters to 30 meters deep, forming part of a barrier or atoll rim. In some places, the rim consists of a row of round or oblong faros with hardly any normal reefs in between them. *A.G.I.* b. A small angular reef forming part of a barrier or atoll. *A.G.I.*

Farrar process. Method of case-hardening iron by use of ammonium chloride, manganese dioxide and potassium ferro-cyanide. *Pryor, 3.*

farren wall. A cavity wall (4-inch cavity) for house construction. *Dodd.*

farringtonite. A monoclinic phosphate mineral, essentially $Mg_3(PO_4)_2$, but with iron and silicon present; occurs as colorless to wax-white to yellow material peripheral to olivine nodules; from Saskatchewan, Canada. A meteorite. *American Mineralogist, v. 46, No. 11-12, November-December 1961, p. 1513.*

farrisite. A name derived from Lake Farris in Norway, and applied by Brögger to a very peculiar rock, which occurred only in one small dike. The rock is finely granular in texture and consists of some soda-bearing tetragonal mineral related to melilite, together with barkevikite, colorless pyroxene, biotite, serpentine pseudomorphs after olivine, magnetite, and apatite. *Fay.*

far set. Mid. To timber and sprag the far end of a stall, preparatory to holing. *Fay.*

farsundite. A hypersthene-hornblende granite.

Hess.

fascicular schist. A schist with elongated ferromagnesian minerals lying in a plane but otherwise unoriented. *G.S.A. Memoir 6, 1938, p. 70.*

fascine. a. Fr. A fagot; a bunch of twigs and small branches used for forming foundations on soft ground. *Fay.* b. Bunches of branches and twigs laid on bad roads. *von Bernewitz.*

faserkohle. German name for fusain. *Tomkeieff, 1954.*

fashioned gem stone. One which has been cut and polished. *See also* fashioning (of gems). *Shipley.*

fashioning of gems. Includes slitting, cleaving, cutting, polishing, and other operations employed in preparing rough gem material for use in jewelry; also the determination of the proportions. *Shipley.*

Fashoda garnet. Dark-red to brownish-red pyrope garnet from Tanganyika, Africa. *Shipley.*

Fashoda ruby. a. Iron-rich pyrope garnet from Tanganyika, Africa. Same as Fashoda garnet. *Shipley.* b. In the trade, refers usually to any red garnet. *Shipley.*

fasibitikite. A gray variety of riebeckite-aegirine granite containing eucolite and zircon from Ampasibitika, Malagasay Republic. *Holmes, 1928.*

fasicular. Relating to or consisting of bundles. *Stokes and Varnes, 1955.*

fasinite. A crystalline rock composed mainly of augite and nepheline, with subsidiary olivine, biotite, etc. It is chemically equivalent to berondrite, and differs from bekinkinite by the absence of hornblende and analcite. *Holmes, 1928.*

fasrige. The components of the rocks are largely threadlike or rodlike, and are arranged in approximately parallel lines (parallel-fasrig) or unoriented (verworren-fasrig, as in gypsum, asbestos, etc.). Subdivisions are kornig-fasrig with very short unoriented rods, as in amphibolite, some gypsum, etc., and schiefrig-fasrig, with longer individuals, interwoven in planes, as in hornblende schist, etc. Synonym for fibrous. *Stokes and Varnes, 1955.*

fassaite. *See* augite.

fast. a. Eng. In the Lancashire coalfield, the first hard bed of rock found after sinking through sand or quick ground, upon which a wedging crib is generally laid. *Fay.* b. When a heading or bord end is not in communication with another one by a breakthrough, but has only one open end, it is said to be fast or called a fast place. *Fay.* c. Having a solid side more or less at right angles to the working face. *Mason.* d. A heading or working place which is driven in the solid coal, in advance of the open places, said to be in the fast. *C.T.D.* e. A hole in coal which has had insufficient explosive used in it, or which has required undercutting. *C.T.D.* f. A heading or stall driven in the fast or solid coal, with rib sides. *See also* narrow stall. *Nelson.*

fast break. In magnetic-particle inspection, an interruption of the current flowing in the magnetizing coil such that the collapsing field induces eddy currents and strong magnetization in the test part. *ASM Gloss.*

fast breeder reactor. A nuclear reactor that operates with fast neutrons and produces more fissionable material than it consumes. *L&L.*

fast cord. It consists of three central paper strings coated with a black powder composition and held together with cotton countering. These are then enclosed in an extruded layer of plastic incendiary composition and finished with an outer plastic covering. The overall diameter of fast igniter cord is approximately 0.10 inch. *McAdam II, p. 61.*

fast country; fast ground. Solid or undisturbed rock. The same as fast. *Arkell.*

fast-delay detonation. A loosely applied term for any method for the firing of blasts involving the use of the blasting timer or millisecond delay caps. *Streefkerk, p. 17.*

fast end. a. The part of the coalbed next to the rock. *Fay.* b. A gangway with rock on both sides. *See also* loose end, a. *Fay.* c. The limit of a stall in one direction, or where the face line of the adjoining stall is not up or level with, nor in advance of, it. *Fay.*

fast feed. *See* fast gear. *Long.*

fast-feed gear. *See* fast gear. *Long.*

fast gear. a. As used by drillers in referring to the feed gears in a gear-feed swivel head, the pair of gears insatlled in the head that produces the greatest amount of bit advance per revolution of the drill stem. Also called fast feed; high feed. *Long.* b. As used by drillers in referring to the speed at which the drill motor rotates the drill stem or hoist drum, the transmission gear position giving the fastest rotation per engine revolutions per minute. *Long.*

fast ice. Sea ice which remains fast, generally in the position where it originally formed, by being attached to a shore, or to grounded icebergs or growlers. *Schieferdecker.*

fast junking. *See* junking, b. *Fay, p. 372.*

fast line. That portion of the cable or wire line, reeved through a block and tackle, that runs from the stationary block to the hoisting drum on a drill machine. *Compare* deadline. *Long.*

fast-needle survey. A dial survey adopted to overcome the difficulty of loose-needle surveying in the presence of local magnetic influences. The bearings of lines are derived from those immediately preceding and the survey is oriented from a correct magnetic bearing or other known base. *Mason, v. 2, p. 725.*

fast neutron. A neutron with energy greater than 0.1 million electron volt. *See also* thermal neutron. *L&L.*

fast place. Scot. A drift or working place in advance of the others. *Fay.*

fast powder. Dynamite or other explosive having a high-speed detonation. *Nichols.*

fast reactor. A reactor in which the fission chain reaction is sustained primarily by fast neutrons rather than by thermal or epithermal neutrons. Fast reactors contain little or no moderator to slow down the neutrons from the speeds at which they first are ejected from a fissioning nucleus. *L&L.*

fast shot. Newc. A charge of powder exploding without the desired effect. *Fay.*

fast side. a. Scot. The side not sheared in a room where shearing is done on one side only. *Fay.* b. The rock adjoining the coal. *Arkell.* c. The side which has a solid side. *Mason.* d. The end of the face where there is a solid face more or less at right angles. *Mason.* e. Eng. That part of a face which has solid coal on one side. Also called rib side. *SMRB, Paper No. 61.*

fast wall. Eng. The wall in which bearing doors are placed. *Fay.*

fat. a. A white or yellowish substance forming the chief part of adipose tissue. It may be solid or liquid; is insoluble in water; and when treated with an alkali, the fatty acid unites with the alkaline base to make soap. *Fay.* b. A term used in flotation. *Fay.* c. Rich, high-grade ore. Fat coal is high in gas-producing volatiles. *Pryor, 3.*

fatal accident. As defined by the U.S. Bureau of Mines the accident shall be considered a fatal coal-mine accident when less than five persons are killed and property damage is slight (except ignitions and mine fires). *Bureau of Mines. Instructions for Disaster, Fatal-Accident, and Miscellaneous Health and Safety Reports, April, 1966, Chapter 4.1, p. 32.*

fat amber. Opaque yellowish amber. *Shipley.*

fat boys; fatters. Boys or men employed to lubricate axles of tubs or wagons and rollers of haulage gear. *C.T.D.*

fat clay. a. Clay of relatively high plasticity. Opposite of lean clay. *A.G.I.* b. A fine-grained clay, which in the plastic state, can be readily formed with pressure, but shows slight swelling when the pressure is released. Usually very sticky. *Bureau of Mines Staff.*

fat coal. A coal which contains a relatively high percentage of volatile matter. *Nelson.*

fat concrete. A concrete containing a large proportion of mortar. *Taylor.*

fathogram. A continuous profile of the depth obtained by echo soundings. *A.G.I.*

fathom. a. Corn. Six feet. A fathom of mining ground is six feet square by the whole thickness of the vein, or in Cornish phrase, a fathom forward by a fathom vertical. *Fay.* b. A measure used for sea depths and sometimes for shaft and rope lengths. *Nelson.* c. In alluvial deep-lead mining, a square fathom is a section of wash 6 feet by 6 feet on the bottom with a height depending on the depth of wash extracted. If the height is 3 feet the fathom would contain 108 cubic feet. *Nelson.* d. In lead mining, sometimes a volume of 6 feet by 6 feet by 2 feet. *Nelson.* e. Sometimes given as the unit of performance of a rock drill, that is, fathoms per shift. *Nelson.* f. In mining, fathom is a 6-foot cube of rock, or alternately 6 feet by 6 feet by width of lode on which contract payment may be based, Cornish custom. *Pryor, 3.* g. In general mining, the volume of a 6-foot cube; in gold mining, often a volume 6 feet by 6 feet by the thickness of the reef. *C.T.D.* h. S. Afr. Mining reports referring to fathoms usually mean square fathoms. *Beerman.* i. A unit of linear measurement that equals 6 feet or 1.828 meters. *Crispin.*

fathomage. Scot. Payment made to miners per fathom driven or cut. *Fay.*

fathometer. An instrument used in measuring the depth of water by the time required for a sound wave to travel from surface to bottom and for its echo to be returned. It may be used also for measuring the rise and fall of the tides in offshore localities. *H&G.*

fathom tale. Corn. *See* tutwork, b. This name probably arises from the payment for such work (tutwork) by the space excavated, and not by the ore produced. *Fay.*

fatigue. Of metals, failure under repeated stress. Notch fatigue is premature failure initiated at a notch, scratch, or blemish. *Pryor, 3.*

fatigue life. The number of cycles of stress that can be sustained prior to failure for a stated test condition. *ASM Gloss.*

fatigue limit. The maximum stress below which a material can presumably endure an infinite number of stress cycles. If the stress is not completely reversed, the value of the mean stress, the minimum stress, or the stress ratio should be stated. *ASM Gloss.*

fatigue of metals. A deterioration in the crystalline structure and strength of metals due to repeated stresses above a certain critical value. *See also* annealing. *Nelson.*

fatigue range. The maximum range of stress which a metal will withstand indefinitely. When the maximum stress in tension equals that in compression, the fatigue range is twice the fatigue limit. The mean stress, or half the range, must be stated to define the fatigue conditions. *Ham.*

fatigue ratio. The ratio of the fatigue limit for cycles of reversed flexural stress to the tensile strength. *ASM Gloss.*

fatigue strength. *See* endurance limit. *Ro.*

fatigue strength reduction factor. Alternative term for factor of stress concentration in fatigue. *Ro.*

fatigue test. A test made on a material to determine the range of alternating stress to which it may be subjected without risk of ultimate failure. By subjecting a series of specimens to different ranges of stress, while the mean stress is constant, a stress-number curve is obtained. *C.T.D.*

fat lime. a. A pure lime (quick or hydrated), distinguishing it from an impure or hydraulic lime; it is also used to denote a lime hydrate that yields a plastic putty for structural purposes. *Boynton. Compare* lean lime. b. Lime containing more than 95 percent calcium oxide. It hydrates very rapidly, with a great evolution of heat and voluminous powder formation. Also called rich lime. *Bennett 2d, 1962.*

fat lute. A mixture of pipe clay and linseed oil, used for filling joints, apertures, etc. *Fay.*

fat mortar. A mortar containing a high percentage of cementitious components that tends to be sticky and adheres to the trowel. *ACSG.*

fat stone. Name for nepheline. Its fractured surfaces have a greasy luster. *Shipley.*

fatters. See fat boys. *C.T.D.*

fatty amber. Same as flohmig amber. *Shipley.*

fatty luster; greasy luster. Having the brilliancy of a freshly oiled reflecting surface, characteristic of slightly transparent minerals, such as serpentine and sulfur. *Nelson.*

Fauck's boring method. An earlier percussive boring method used largely on the Continent for exploration, etc. The cutting tool is given a rapid but very short stroke and the hole is flushed by water passing down through the hollow rods. No beam is used, but the rope to which the boring tools are suspended has an up-and-down motion imparted to it by an eccentric. The arrangement gives up to 250 strokes per minute with a stroke length as low as 3¼ inches. *Nelson.*

Faugeron kiln. A coal-fired tunnel kiln of a design proposed in 1910 by E. G. Faugeron; the distinctive feature is the division of the tunnel into a series of chambers by division walls on the cars and drop arches in the roof. Such kilns have been used for the firing of feldspathic porcelain. *Dodd.*

fauld. a. The tymp arch or working arch of a furnace. *Fay.* b. Scot. Same as fold. *Standard, 1964.*

faulding boards; folding boards. Catches in a mine shaft to facilitate the stopping of the cage at intermediate coal seams. *C.T.D.*

fault. a. A fracture or a fracture zone along which there has been displacement of the two sides relative to one another parallel to the fracture. The displacement may be a few inches or many miles. *A.G.I.* b. A break in the continuity of a body of rock. It is accompanied by a movement on one side of the break or the other so that what were once parts of one continuous rock stratum or vein are now separated. The amount of displacement of the parts may range from a few inches to thousands of feet. Various descriptive names have been given to different kinds of faults. *See also* closed fault; dip fault; dip-slip fault; distributive fault; flaw fault; gravity fault; heave fault; hinge fault; horizontal fault; longitudinal fault; normal fault; oblique fault; oblique-slip fault; open fault; overlap fault; overthrust fault; parallel-displacement fault; pivotal fault; reverse fault; rotary fault; step fault; strike fault; strike-slip fault; thrust fault; transcurrent fault; translatory fault; underthrust fault; vertical fault. *Fay.* c. *See* epigenetic ore deposit; growth of faults. *Nelson.* d. In coal mining, a sudden thinning or disappearance of a coal seam. Also known as a want or pinchout. *Kentucky, p. 21.* e. A displacement of rock formations along a plane or zone of fracture in which one side is termed upthrown; the other, downthrown. *Wheeler.* f. Eng. A dislocation or displacement of the strata. Also called hitch; step; trouble. *SMRB, Paper No. 61.*

fault-angle valley. The original or subsequently modified valley at the junction of the descending backslope of one tilted block and the scarp of the next upland block. *A.G.I.*

fault basin. A region depressed relatively to the surrounding region and separated from it by bordering faults. *A.G.I.*

fault bench. Irregular benches are produced on the sides of hills and mountains by certain kinds of faulting. Their surfaces may be undulating or hummocky and need not be horizontal along their length. There may be a slight depression, and sometimes a saddle, between the outer edge of such a bench and its inner edge where it meets the hillside. *See also* fault terrace. *A.G.I.*

fault block. a. A mass bounded on at least two opposite sides by faults. It may be elevated or depressed relatively to the adjoining region, or it may be elevated relatively to the region on one side and depressed relatively to that on the other side. *A.G.I.* b. A body of rock bounded by one or more faults. *A.G.I.* c. The displaced mass of rocks on either side of a fault plane *See also* footwall; hanging wall. *Nelson.*

fault block mountain. *See* block mountain; fault block. *A.G.I.*

fault breccia. a. The assembly of broken fragments frequently found along faults. *A.G.I.* b. The crushed rock produced by the friction of the two walls of a fault rubbing against each other. *Schieferdecker.* c. *See* breccia; gouge; leather bed. *Nelson.*

fault bundle. A group of faults. *Fay.*

fault casing. A layer of hardened clay lining the fault plane and often showing groovings and striae due to the rock movement along the fault plane. *Arkell.*

fault cave. A cave developed along a fault or a fault system. *Schieferdecker.*

fault cliff. Synonymous with fault scarp.

fault coal. Aust. A name used for inferior coal in the Clermont district, Queensland, which occurs not only near faults, but also away from them. *Fay.*

fault coast. The essential feature of a fault coast is a fault scarp separating a higher-standing earth block, which, after faulting, forms the land, from a lower-lying block, which, after faulting, is depressed below sea level. It may be a level sea floor, or it may be a land surface with low, moderate, or strong relief. The vertical displacement on the fault may be small or great if the pre-faulting surface has low relief, but, if the pre-faulting surface has strong relief, a continuous fault coast can be formed only by a vertical movement of hundreds, perhaps thousands, of feet; that is, the movement must be sufficient to submerge the ridges of the downthrown block. *A.G.I.*

fault complex. An intricate system of interconnecting and intersecting faults of the same or of different ages. *A.G.I. Supp.*

fault deflection. A deviation in the course of a fault caused by its interception by another fault. *Schieferdecker.*

fault dip. The vertical inclination of a fault plane, or a shear zone, measured from the horizontal plane. *Fay.*

fault drag. Distortion of the bedding which may occur in the vicinity of a fault plane. *B.S. 3618, 1964, sec. 5.*

faulted mountain. Synonymous with block mountain. *A.G.I.*

fault embayment. A depressed region in a fault zone or between two faults invaded by the sea. The Red Sea and Tomales Bay on the San Andreas fault in California are examples. *A.G.I.*

fault escarpment. *See* fault scarp. *A.G.I.*

fault fissure. The fissure produced by a fault, even though it is filled afterward by a deposit of minerals. *Fay.*

fault fold. A fold accompanied by steep faults that are parallel to the fold and are contemporaneous with the folding. *A.G.I.*

fault gap. A depression between the offset ends of a ridge developed on a resistant rock layer that has been displaced by a transverse fault. *Stokes and Varnes, 1955.*

fault gouge. Finely ground material filling, or partly filling, a fault zone. It is sometimes a slippery mud, which coats the surfaces of the fissure or cements the breccia. *Stokes and Varnes, 1955.*

fault groove. One of the undulations deeper than fault striae but similarly formed. They record larger movements and have greater significance as indicating the direction of movement. *Stokes and Varnes, 1955.*

fault growth. Fault development by countless slippages along the fault plane. *See also* growth of faults. *Nelson.*

fault hade. The inclination of the fault plane from the vertical plane, usually expressed in degrees. *Nelson.*

fault heave; fault shift. The amount of lateral movement of the strata at a fault. The fault throw and heave are essential elements of a fault and form basic values when exploring and driving to recover the disrupted coal seam. *Nelson.*

faulting. The movement which produces relative displacement of adjacent rock masses along a fracture. *Fay.*

fault inlier. An isolated exposure of the overridden rock in a region of thrust faulting. It is surrounded by rocks of the overriding block and is thus separated from other surface exposures of rock like itself. *Stokes and Varnes, 1955.*

faultline; fault trace; fault outcrop. The intersection of a fault surface or a fault plane with the surface of the earth or with any artificial surface of reference. *Compare* fault trace; fault trend. *Fay.*

faultline coast. A type of wave-straightened coast. *See also* wave-straightened coast. *A.G.I.*

faultline scarp. a. A scarp which has been produced by differential erosion along an old faultline. *A.G.I.* b. A scarp that is the result of differential erosion along a faultline rather than the direct result of the movement along the fault. *See also* obsequent faultline scarp; resequent faultline scarp. *Billings, 1954, p. 155.*

faultline-scarp shoreline. This shoreline is the result of several geologic events: Faulting to bring weak beds opposite resistant beds, peneplanation of both weak and resistant beds to a common level, uplift to permit erosion of the weak-rock area to a lowland with resulting exposure of a faultline scarp by this differential erosion, and finally, partial submergence to bring the sea against the faultline scarp. The faultline-scarp shoreline differs from the fault shoreline because it was caused by submergence and not by recent faulting. It differs from the fault-scarp shoreline because the partially submerged surface was caused by differential erosion and not by faulting. *Bureau of Mines Staff; A.G.I.*

faultline valley. A valley that follows the line of a fault. Fault valleys are usually straight for long distances. *Stokes and Varnes, 1955.*

faultline-valley shoreline. A rectilinear shoreline indirectly dependent upon faulting may result from the partial submergence of a valley which has been eroded along the crushed zone of a fault, or along a narrow strip of infaulted weak rock. *A.G.I.*

fault mosaic. An area divided by intersecting faults into blocks that have settled in varying degrees. *Stokes and Varnes, 1955.*

fault mountain. Synonym for mountain of dislocation. *A.G.I.*

fault outcrop. Synonymous with fault line; fault trace. *Bureau of Mines Staff.*

fault plane. a. The plane along which faulting has taken place. *Compare* fault surface. *Schieferdecker.* b. A fault surface without notable curvature. *A.G.I.*

fault plate. The surface along which a fault has occurred. *See also* hade. *Ham.*

fault ridge. A relatively elevated elongated fault block lying between two faults with approximately parallel strikes. *A.G.I.*

fault rock. The crushed rock produced by the friction of the two walls of a fault rubbing against each other. *Fay.*

fault scarp; fault escarpment; fault cliff. a. A relatively steep, straight slope of any height owing its relief directly to the movement along the fault, even though erosion may have greatly scarred the initial topography. *Billings, 1954, pp. 153-155.* b. The cliff formed by a fault. Most fault scarps have been modified by erosion since the faulting occurred. *A.G.I.* c. An escarpment that coincides more or less closely with a line of faulting, the escarpment occurring on the high side of the dislocation. *A.G.I.*

fault-scarp coast. A straight coast produced by recent faulting. Such a coast has no continental shelf, has deep water near shore, or has submarine slopes which are a continuation of the land slopes. *Shepard, p. 73.*

fault-scarp shoreline. If faulting develops a true fault scarp on any land surface, and depression of the land or elevation of the sea level partially submerges this land surface in such a manner as to bring the sea level to rest against the scarp, there will result a fault-scarp shoreline. *A.G.I.*

fault set. Two or more parallel faults within an area. *A.G.I.*

fault shift; fault heave. The lateral movement of the rocks at a fault. In a normal fault it represents the barren ground on a plan of the area (coal mining). *Nelson.*

fault shoreline. When the block on the downthrown side of a fault is so far depressed as to permit the waters of sea or lake to rest against the fault scarp, it is a fault shoreline. *See also* fault coast. *A.G.I.*

fault smash. A mining term to describe the crushed ground along and in the vicinity of a fault plane and applies particularly to thrust faults. The fault smash tends to obscure the fault pattern and makes diagnosis more difficult. *Nelson.*

fault space. The space between the walls of an open fault. *Fay.*

fault striae. The scratches on faulted surfaces caused by forced movement of particles or projecting hard points against the fault walls. They may indicate the direction of movement on the fault. *Stokes and Varnes, 1955.*

fault strike. The direction, with respect to North, of the intersection of the fault surface, or of the shear zone, with a horizontal plane. *A.G.I.*

fault stuff. Rock filling a fault; fault breccia. *Arkell.*

fault surface. The surface of a fracture along which dislocation has taken place, and if without appreciable curvature, it is called a fault plane. *Nelson. Compare* fault plane.

fault system. a. A system of parallel or nearly parallel faults. *Schieferdecker.* b. It consists of two or more fault sets that were formed at the same time. *A.G.I.*

fault terrace. a. A terrace formed by two parallel fault scarps on the same declivity, thrown in the same direction. *Fay.* b. One of the terraces on a slope resulting from step faulting in which the downthrow is systematically on the same side of several parallel faults. *Billings, 1954, p. 196.*

fault throw. The amount of vertical displacement of the rocks due to faulting. The most important faulting feature from the mining aspect. *Nelson.*

fault trace. a. The line of intersection of a fault plane with the earth's surface. *Compare* fault line; fault trend. *Fay.* b. The intersection of a fault and the earth's surface, as indicated by the dislocation of fences, roads, etc., by ridges and furrows in the ground, by diagonal ruptures of the turf, etc. *A.G.I.*

fault trap. A trap, the closure of which results from the presence of one or more faults. *A.G.I.*

fault trellis drainage pattern. A trellis pattern found where a series of parallel faults have brought together bands of resistant and weak rock. *A.G.I.*

fault trough. A relatively depressed fault block lying between two faults with approximately parallel strikes. *A.G.I.*

fault-trough coast. A coast along a narrow arm of the sea which floods a fault trough. The coasts of the Gulf of California and the Red Sea are examples. *A.G.I.*

fault vein. A mineral vein deposited in a fault fissure. *Fay.*

fault vent. A volcanic vent located on a fault. *Fay.*

fault walls. That portion of the fault blocks at the fault plane. *See also* footwall; hanging wall. *Nelson.*

fault wedge. A wedge-shaped block of rock between two faults. *Stokes and Varnes, 1955.*

faulty structure (of stones). Irregularities of crystallization; also subsequent breakage or separation between the atomic planes, such as a cleavage crack, cloud, or feather. *Shipley.*

fault zone. a. A fault, instead of being a single clean fracture, may be a zone hundreds or thousands of feet wide. The fault zone consists of numerous interlacing small faults or a confused zone of gouge, breccia, or mylonite. *Billings, 1954, p. 125.* b. The ground or mass between the fault walls in the case of an open fault; the broken and smash ground along the fault plane. The fault zone may provide important evidence regarding the direction and amount of fault throw. *See also* closed fault; coal leads; shear zone. *Nelson.*

fauna. a. All the invertebrate and vertebrate animals of any given age or region. All the plants are similarly called its flora. *Fay.* b. The animals of any place or time that lived in association with each other. The limitations of any fauna are relative. They may be interpreted broadly as of the fauna of a continent or of a geologic period, or restrictively as of the fauna of a small area of the sea bottom during a single season. A paleontologic fauna consists only of those animals whose remains are preserved as fossils. *A.G.I. Supp.*

faunal. Of, or pertaining to, a natural assemblage of animals. *A.G.I.*

faunizone. a. A succession of stratified rocks characterized and delimited by the nature of its contained fossil fauna. *A.G.I.* b. A biostratigraphic unit characterized by the presence of a particular fauna that may have either time or environmental significance. *Compare* assemblage zone. *A.G.I. Supp.* c. A biostratigraphic unit consisting of various more or less overlapping biozones. It has dominantly time-stratigraphic significance. *A.G.I. Supp.*

faunule. Proposed by Fenton in 1928 for a diminutive fauna. Applied in paleontology to an association of animals found in a single stratum or in a succession of strata of limited thickness. *A.G.I.*

fausted ore. Eng. Refuse lead ore which undergoes a second dressing. *Fay.*

fausteds. Eng. The waste left in the sieve as separated from the ore. *Fay.*

faustite. The zinc analogue of turquoise, $(Zn,Cu)Al_6(PO_4)_4OH_8.5H_2O$, containing 7.74 percent ZnO, 1.61 percent CuO; fine-grained, apple-green masses; from Nevada. *Spencer 20, M.M., 1955.*

Faust jig. A plunger-type jig, usually built with multiple compartments. It has three distinguishing features: (1) plungers on both sides of the screen plate, which are accurately synchronized; (2) the refuse is withdrawn through kettle valves near the overflow lips in the respective compartments; and (3) the hutch is commonly discharged periodically by the operator by means of suitable hand valves operated from the working floor. This jig is used extensively on slack sizes of bituminous coal. *Mitchell, pp. 422-423.*

Fauvelle. A system of drilling, that was invented in 1846 by an Englishman, Beart, and a French engineer, Fauvelle, providing for the continuous removal of the detritus from the well by means of a water flush or current of water. All the water-flush system now in use are modifications of the Fauvelle system, which has long ceased to be employed in its original form. *Fay.*

favas. Braz. In the diamond fields, brown pebbles, consisting of a hydraded phosphate, or of titanium and zirconium oxides, and regarded as good indications of the possible presence of diamonds. *Fay.*

favas de zirconio. Braz. Rounded pebbles of baddeleyite. *Hess.*

favorable locality. The experienced prospector always seeks a favorable locality, which may be in the neighborhood of a mining district or else in a locality that contains favorable rocks and structures and appears as if it might contain the mineral sought. *See also* critical area. *Nelson.*

f-axis. In structural petrology, the axis of rotation, normal to t, around which a gliding plane may be bent. *G.S.A. Mem. 6, 1938, p. 89.*

fayalite. A silicate of iron, Fe_2SiO_4, belonging to the chrysolite group; orthorhombic. *Dana 17.*

fayance. *See* faience.

fayence. *See* faience.

faying surface. The surface of a piece of metal (or a member) in contact with another to which it is or is to be joined. *ASM Gloss.*

Fayol's theory. *See* harmless depth theory. *Briggs, p. 54.*

FCC (diamond) lattice. A unit cell in which there is one atom at each corner of the cell, one in the center of each face, and four interior atoms disposed along opposing diagonals each a distance of a/4 from the top and bottom respectively. *Newton, p. 177.*

F-coal. Coal material that predominates in fusain bands. It occurs as microscopic particles in the lungs of miners. *A.G.I. Supp.*

Fe. Chemical symbol for iron. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

fea; fey. Shrop. Workable measures, usually ironstone. *Arkell.*

feasibility studies. In mineral processing, amenability tests. *Pryor, 3.*

feasible ground. Ground that can be easily worked, and yet will stand without the support of timber and boards. *Fay.*

feather. a. To blend the edge of a new material smoothly into the old surface. *Nichols, 2.* b. A slightly projecting narrow rib lengthwise on a shaft, arranged to catch into a corresponding groove in anything that surrounds and slides along the shaft. *Zern.* c. *See* plug and feathers. *Fay.* d. A fault, in glass, of feather-like appearance and caused by seed produced by foreign matter picked up by the glass during its shaping. *See also* seed. *Dodd.* e. A fault in wired glass resulting from bending of the transverse wires. *Dodd.*

feather alum. *See* alunogen; halotrichite. *Fay.*

feather amphibolite. A metamorphic rock in which porphyroblastic crystals of hornblende tend to form stellate groups on the planes of schistosity. *See also* amphibolite; garbenschiefer. *A.G.I.*

feather bed. a. Eng. Hard, bituminous, pinkish limestone, crowded with shells. *Arkell.* b. Eng. Irregular, compact shell limestone of variable thickness, in the Middle Purpeck beds of Swanage. *Arkell.*

feather brick. A specially molded brick of the shape that would be produced by cutting a standard square diagonally from one edge. This could be done in three ways to produce a feather end (or end feather), a feather-end-on edge, or a feather side (or side feather) depending on whether the diagonal terminates, for a 9 by 4½ by 3-inch brick, at a 4½-inch edge, a 3-inch edge, or a 9-inch edge. *Dodd.*

feather combing. A method of decoration in which a fine point is lightly drawn across superimposed slips of different colors in the wet state. *ACSG, 1963.*

featheredge. a. The thin end of a wedge-shaped piece of rock or coal. *Fay.* b. A passage from false to true bottom. *Zern.* c. Eng. The thinning off of a portion of the roof strata due to false bedding. *SMRB, Paper No. 61.* d. A sharp edge, such as that produced when a brick is cut lengthwise from corner to corner to produce a triangular cross section. *ACSG, 1963.*

featheredge brick. A brick so modified that one of the largest faces is inclined from one side to the opposite side (where the thickness is reduced to one-eighth inch). *ACSG, 1963.*

feathered tin. Pure tin in a granulated condition; granulated tin is prepared by pouring the molten metal into cold water. *Standard, 1964.*

feather end. *See* feather brick. *Dodd.*

feather ends. Firebricks with tapered ends. *Osborne.*

feather gypsum. Same as satin spar. *Shipley.*

feathering. a. Featherlike figures appearing in defective glazes. *C.T.D.* b. *See* plug and feathers. *Fay.*

feather joint. One of a series of joints that branch at an angle from a larger joint or fault. *A.G.I.*

feather ore. *See* jamesonite.

feather quartz. Quartz in imperfect crystals, the bases of which meet at an acute angle along a central plane so that a cross section somewhat resembles a feather. *Hess.*

feathers. Two long wedge-shaped pieces of steel or iron which are inserted at the back of a drill hole in coal, between which a long wedge is driven up, forcing the feathers apart, and thereby breaking down or loosening the coal. *See also* plug and feathers. *Fay.*

feather shot. Copper granulated by being poured molten into cold water. *Webster 3d.*

feather side. *See* feather brick. *Dodd.*

feathers of litharge. Crystals of litharge. *Fay.*

fecal pellet. The excrement, mainly of invertebrates. It occurs especially in modern marine deposits, but it also occurs as a fossil in sedimentary rocks. Usually a fecal pellet is of simple ovoid form and measures 1 millimeter or less. More rarely, it is rod-shaped with either longitudinal or transverse sculpturing. Also called a casting. A coprolite is of similar origin but it is much larger. *Bureau of Mines Staff; Pettijohn, 2d, 1957, p. 220.*

federal mine inspector. *See* mine inspector.

fee. a. Mid. To load the coal, from a heading into cars. *Fay.* b. Property, as mineral land. *Fay.*

feed. a. Forward motion imparted to the cutters or drills of rock-drilling or coal-cutting machinery, either hand or automatic. *Fay.* b. In stonecutting, sand and water employed to assist the saw blade in cutting. *Fay.* c. The longitudinal movements imparted to a drill stem to cause the bit to cut and penetrate the formation being drilled. *Long.* d. The distance a drill stem on a diamond drill may be advanced into the rock before the rods must be rechucked; for example, a driller may say a drill is equipped with an 18-inch feed, meaning that the bit may be made to drill a maximum distance of 18 inches each time the drill stem is chucked-up in the drive rod of the swivel head. *Long.* e. A mechanism which pushes a drill into its work. *Nichols.* f. The process of supplying material to a conveying or processing unit. *Nichols.* g. Material for treatment supplied to an appliance or plant. *B.S. 3552, 1962.* h. The water supply which is pumped into a boiler at boiler pressure by the feed pump. *Nelson.* i. *See* drill feed. *Nelson.* j. That treated for removal of its valuable mineral contents. Also, feed to any machine or process along a mill's flow line. Also called mill-head ore. *Pryor, 3.* k. The material, as ore, upon which a crusher or grinding mill operates. The material supplied to a furnace or other metallurgical process. *Fay.* l. The rate at which a cutting tool or grinding wheel advances along or into the surface of a workpiece, the direction of advance depending upon the type of operation involved. *ASM Gloss.*

feedback. In automatic control of a process, control of an earlier stage by means of variance registered at a later stage. *Pryor, 3.*

feedback control system. A control system, comprising one or more feedback control loops, which combines functions of the controlled signals with functions of the commands to tend to maintain prescribed relationships between the commands and the controlled signals. *NRC-ASA N1.1-1957.*

feed boot. A small surge hopper mounted at the input end of some machines to simplify loading and to maintain an even supply of material. *See also* feeder; plate feeders. *Nelson.*

feed check valve. A nonreturn valve in the delivery pipe between feedwater pump and boiler. *C.T.D.*

feed control. System of valves or other mechanical device controlling the rate at which longitudinal movements are imparted to the diamond- or rock-drill stem and/or the cutting teeth on a coal-cutting machine. *Long.*

feed-control valve. A small valve, usually a needle valve, on the outlet of the hydraulic-feed cylinder on the swivel head of a diamond drill used to control minutely the speed of the hydraulic piston travel and, hence the rate at which the bit is made to penetrate the rock being drilled. Also called drip valve; needle valve. *Long.*

feed cylinder. A hydraulic cylinder and piston mechanism, such as that on a diamond-drill swivel head to transmit longitudinal movements to the drive rod and chuck to which the drilling stem is attached. Also called hydraulic cylinder. *Long.*

feed-end blocks. In rotary kilns, special fire clay shapes or rotary kiln blocks so installed as to reduce the kiln diameter. *Bureau of Mines Staff.*

feeder. a. Very small fissures or cracks through which methane escapes from the coal. As working faces are advanced, fresh feeders are encountered in each fall of coal. *Kentucky, p. 70.* b. A small stream of gas escaping from a coal crevice. *Korson.* c. Any flow of water or gas entering a mine. *B.S. 3618, 1963, sec. 4.* d. A small vein carrying ore running into a larger one. Also called leader. *Gordon.* e. A conveyor or bunker structure for delivering coal or other broken material at a controllable rate. *See also* feeder conveyor; plate feeders. *Nelson.* f. A cable of high current carrying capacity which connects power stations to substations. *Nelson.* g. A flow of water from the strata or from old workings. *Nelson.* h. *See* Lofco car feeder. *Nelson.* i. A conveyor adapted to control the rate of delivery of bulk material, packages or objects, or a device or mechanism which controls, separates, or assembles objects. *ASA MH4.1-1958.* j. A blower of gas, as in a coal mine. *Fay.* k. Synonymous with feeder vein. *Bureau of Mines Staff.* l. A spring or a stream. *Fay.* m. A mechanical device for regularly producing and delivering gobs of glass to a forming unit. *ASTM C162-66.* n. In foundry, feeder is a runner or riser so placed that it can feed molten metal to the contracting mass of the casting as it cools in its flask, therefore preventing formation of cavities or porous structure. The feeder head, or hot top, is a similar reservoir of excess metal at the top of a vertically poured ingot. In a casting the feeding head may be stirred during cooling by pumping action of a feeding rod. *Pryor, 3.*

feeder and catchers tables. A pair of reversible conveyors, entry and exit, which provide for repeat feeding of metal being processed through a rolling mill. *ASA MH4.1-1958.*

feeder chainman. *See* car-haul man. *D.O.T. 1.*

feeder channel. The part of the forehearth of a tank furnace, producing container glass or pressed glassware, that carries the molten glass from the working end to the feeder mechanism. *Dodd.*

feeder circuit. A feeder circuit is a conductor or group of conductors and associated protective and switching devices installed on the surface, in mine entries, or in gangways, but not extending beyond the limits set for permanent mine wiring. *ASA M2.1-1963.*

feeder connection. The opening or surrounding blocks in a furnace wall to receive the channel leading to the feeder. *ASTM C162-66.*

feeder conveyor. a. A short auxiliary conveyor designed to receive coal from the face conveyor and load it onto the gate conveyor. Also called stage loader. *See also* gate-end loader. *Nelson.* b. Any conveyor which transports material to another conveyor. *NEMA MB1-1961.* c. A short conveyor belt that supplies material to a long belt. *Nichols.*

feeder-fed bottle machines. *See* bottle-making machines. *C.T.D.*

feeder gate; feeder plug. A shaped refractory used to adjust the rate of flow of molten glass in the feeder channel. *Dodd.*

feeder head. *See* hot top. *C.T.D.*

feeder nose. *See* feeder spout. *Dodd.*

feeder opening. *See* feeder connection. *ASTM C162-66.*

feeder plug. *See* feeder gate. *Dodd.*

feeder process. *See* gob process. *ASTM C162-66.*

feeder sleeve; feeder tube. A cylindrical tube that surrounds the feeder plunger in a glass forming machine. *Dodd.*

feeder spout; feeder nose. The part of the feeder in a glass tank furnace containing an opening in which the orifice ring is inserted; it forms the end of the forehearth. *Dodd.*

feeder trough. In a duckbill, the trough which is attached to the conveyor pan line and serves as a base on which the feeder trough rides. *Jones.*

feeder tube. *See* feeder sleeve. *Dodd.*

feeder vein. A small vein joining a larger vein. *Fay.*

feed gear; feed gears. The gearing or assemblage of three to four pairs of matched gears in a gear-feed swivel head of a diamond drill by means of which the drill string coupled to the feed screw is made to advance and penetrate the formation. *Long.*

feed grinding. *See* crossfeed grinding; downfeed; indexfeed. *ACSG, 1963.*

feedhead. Synonym for swivel head. *Long.*

feeding. a. Conveying metal stock or workpieces to a location for use or processing, such as wire to a consumable electrode, strip to a die, or workpieces to an assembler. *ASM Gloss.* b. Pouring additional molten metal into a freshly poured mold to care for volume shrinkage during progressive setting. *Freeman.*

feeding baffle. A door or gate which can be opened or closed to regulate the discharge of material from a hopper, bin, or chute. *Nelson.*

feed materials. Refined uranium or thorium metal or their pure compounds in a form suitable for used in nuclear reactor fuel elements or as feed to uranium-enrichment facilities. *L&L.*

feed nut. The threaded sleeve fitting around the feed screw on a gear-feed drill swivel head, which is rotated by means of paired gears driven from the spindle or feed shaft. Rotation of feed nut causes the feed screw and attached drilling stem to advance. With a 300-pair of feed gears engaged, the feed nut revolves 300 times to advance the drill stem 1 inch. *Long.*

feed off. The act or process of applying feed pressure to a drill bit by allowing the hoist line to pay out slowly when the drill stem is suspended from the hoist line and rotated by a kelly. *Long.*

feedometer. Device which weighs a passing stream of ore. *See also* weightometer. *Pryor, 3.*

feed pan; little pug. A horizontal container which delivers the feed to the press at a uniform rate. *B.S. 3552, 1962.*

feed pipe. A main line pipe; one which carries a supply directly to the point of use, or to secondary lines. *Crispin.*

feed pressure. a. Total weight or pressure, expressed in pounds or tons, applied to drilling stem to make the drill bit cut and penetrate the formation being drilled. *Long.* b. Pressure, expressed in pounds per square inch, required to force grout into a rock formation. *Compare* injection pressure. *Long.* c. Pressure, expressed in pounds per square inch (psi), required to force-feed water into a steam boiler. *Long.*

feed pump. The pump which provides a steam boiler with feedwater. *Nelson.*

feed quill. Synonym for feed nut; sometimes improperly used as a synonym for feed screw. *Long.*

feed rate. Rate at which a drilling bit is advanced into or penetrates the rock formation being drilled expressed in inches per minute, inch per bit revolution, number of bit revolutions per inch of advance, or feet per hour. Also called cutting rate; cutting speed; forward speed; penetration feed; penetration rate. *Long.*

feed ratio. The number of revolutions a drill stem and bit must turn to advance the drill bit 1 inch when the stem is attached to and rotated by a screw- or gear-feed-type drill swivel head with a particular pair of the set of gears engaged. (Example. When a screw-feed swivel head of a diamond drill equipped with three pairs of gears, having a feed ratio of 100, 200, and 400, is operated with the 100-pair engaged, the drill stem must revolve 100 times to advance the bit 1 inch, if the 200-pair is engaged, the drill stem rotates 200 times per inch advanced, and if the 400-pair is engaged the stem must rotate 400 times to advance the bit 1 inch). *Long.*

feed regulator; feeder. A mechanical device for controlling the rate of supply of feed. *B.S. 3552, 1962.*

feed screw. The externally threaded drill-rod drive rod in a screw- or gear-feed swivel head on a diamond drill, sometimes incorrectly called a feed quill or feed spindle. *Long.*

feed shaft. *a.* A short shaft or countershaft in a diamond-drill gear-feed swivel head rotated by the drill motor through gears or a fractional drive and by means of which the engaged pair of feed gears is driven. *Long.* b. *See* fire pillar. *Dodd.*

feed speed. Normally used by drillers to denote feed ratios. *See also* feed ratio. *Long.*

feed spindle. Synonym for feed shaft; sometimes incorrectly used as a synonym for drive rod and/or feed screw. *Long.*

feed travel. The distance a drilling machine moves the steel shank in traveling from top to bottom of its feeding range. *Nichols.*

feedwater. Water which is often purified, heated to nearly boiler temperature, and deaerated before being pumped into a steam boiler by the feed pump. *Nelson.*

feedwater heater. An apparatus for heating water before it is fed to a boiler. *Standard, 1964.*

feed wheel. *See* regulating wheel. *ACSG, 1963.*

fee engineer. One who (usually a mining engineer) looks after the interest of the owner of mineral rights. His specific duties are to check up the amount of ore mined by the lessor (operator); see that no undue waste is permitted, and that royalties are paid according to contract. *Fay.*

feel. *a.* S. Staff. To examine the roof of a seam of coal with a stick or rod by poking and knocking it. *Fay.* b. The act of listening to the action of the engine and pump and occasionally feeling the intensity of the vibration of the drilling string to determine or judge how efficiently the bit is cutting. *Long.*

feigh. Refuse or dirt from ore or coal. *C.T.D.*

Feinc filter. Drum filter of vacuum type in which a parallel system of strings takes the place of the usual closely fitted filter cloth. These strings are led off on the descending side of the drum's cycle, and carry their charge of filter cake to a sharp turning point, where this is detached while the strings return through spacing combs and rollers to the drum. *Pryor, 3.*

feinig. A jewel diamond having its grain in regular layers. *Compare* naetig. *Brady, 4th ed, 1940, p. 164.*

feinkohle. Same as formkohle. *Tomkeieff, 1954.*

fekes. a. Scot. Shale and slate. *See also* faikes. *Fay.* b. Scots colliers' term for post stone or freestone bands. *Arkell.*

feldspar; felspar. One of a group of rock-forming minerals which includes microcline, orthoclase, plagioclase, and anorhtoclase. Mohs' hardness, 6; specific gravity, 2.5 to 3. Industrially important in glass and ceramic industries. Orthoclase ($K.A1.Si_3O_8$) becomes soda orthoclase on partial replacement of potasium by sodium. Other formulas include albite ($Na.A1.Si_3O_8$) and anorthite ($CaA1_2Si_2O_8$). *Pryor, 3.*

feldspar convention. *See* rational analysis. *Dodd.*

feldspar jig. A small coal washer to deal with the ½ to 0 inch range. It works on the same basic principle as the Baum washer, but in view of the small-size material a feldspar (specific gravity 2.6) bed is provided on the perforated grid plates to prevent the bulk of the feed passing straight through the perforations. Stratification of the raw feed takes place in the usual way. *Nelson.*

feldspar sunstone. Sunstone. *Schaller.*

feldspar-type washbox. A washbox to clean small coal, in which the pulsating water is made to pass through a layer of graded material, for example, feldspar, situated on top of the screen plate. *B.S. 3552, 1962.*

feldspathic. Containing feldspar as a principal ingredient. *Fay.*

feldspathic emery. Is similar to spinel emery but contains in addition from 30 to 50 percent plagioclase feldspar. Pure magnetite often is found in streaks within this mass. *AIME, p. 7.*

feldspathic graywacke. a. High-rank graywacke (of Krynine). *Pettijohn, 2d, 1957, pp. 328-329.* b. A graywacke containing a quantity of feldspar as individual grains or in small fragments of rock. *Bureau of Mines Staff.*

feldspathic sandstone. A sandstone containing from 10 to 25 percent feldspar grains and which is intermediate between a pure quartzose sandstone and an arkose. Synonym for subarkose; arkosic sandstone. *A.G.I.*

feldspathic tawite. An igneous rock, intermediate in composition between tawite and a sodalite syenite composed essentially of sodalite and alkali feldspar (the former being predominant) with aegirine. *Holmes, 1928.*

feldspathides. *See* feldspathoids.

feldspathization. The introduction of feldspars into a rock, or the replacement of other rock-forming minerals by feldspars. *A.G.I.*

feldspathize. To introduce feldspars into a rock, or to replace other rock-forming minerals with feldspars. *A.G.I.*

feldspathoids. A collective term including several minerals, aluminosilicates of sodium, potassium, or calcium, that are similar in composition to the feldspars, but contain less silica than the corresponding feldspar. Leucite and nepheline are the most common, others are melilite, hauynite, nosean, and sodalite. The German equivalent feldspat vertreter, which means feldspar substitute, indicates the chief occurrence of these minerals; they take the place of feldspars in igneous rocks that are too low in silica for feldspar to form or that contain more alkalies and aluminum than can be accommodated in the feldspars. *A.G.I. Compare* lenad; foids; feloids.

feldstone. A rock having a fine granular structure, and composed chiefly of feldspar and quartz. *Gordon.*

felite; felith. A constituent of portland cement clinkers. *English.*

felith. *See* felite.

fell. a. Eng. A tract of waste land; a moor. *Standard, 1964.* b. A barren hill or upland level; high, rocky ground, now little used except in proper names of hills. *Standard, 1964.* c. One of the many names for lead ore, formerly current in Derbyshire, England. *See also* riddle. *Fay.* d. The finer pieces of ore which pass through the sieve or riddle in sorting. *Standard, 1964.*

Fellenius' circular arc method. Failure of a clay slope involves slipping of the earth on a circular arc. Research was undertaken in Sweden on this type of failure after a considerable length of Gothenburg harbor had slipped into the sea in 1916. This circular arc method was worked out by Petterson and developed by Fellenius in 1927. *Ham.*

fell heap. Derb. A pile of ore and rock as it comes from the mine, placed in a convenient place for dressing. *Fay.*

fells shale. A Scottish oil shale, which yields from 26 to 40 gallons of crude oil and from 20 to 35 pounds of ammonium sulfate per ton. *Fay.*

feloids. A group of minerals comprising the the feldspars and feldspathoids. *English.*

felsenmeer. a. German for sea of rock. Above the limit for the growth of trees (the treeline or timberline), rock destruction proceeds with great rapidity, as is indicated by the wild and chaotic confusion of pieces of rock. There is no equivalent English term for felsenmeer. It is pre-eminently characteristic of lofty mountain slopes. *A.G.I.* b. Any considerable area, usually fairly level or of only gentle slope, which is covered with moderate size or large blocks of rock. Synonmous with block fields; stone fields. *A.G.I.*

felsic. A mnemonic adjective derived from (fe) for feldspar, (l) for lenads or feldspathoids, and (s) for silica and applied to light-colored rocks containing an abundance of one or all of these constituents. Also applied to the minerals themselves, the chief felsic minerals being quartz, feldspars, feldspathoids, and muscovite. Synonym for acid (as applied to igneous rocks); silicic. *A.G.I.*

felsic mineral. A feldspar, a feldspathoid, or a silica mineral, such as quartz. A mnemonic term derived from feldspar, lenads or feldspathoids, and silica for the feldspars, feldspathoids, and quartz which are actually present in an igneous rock. Felsic is also applied to a rock composed predominantly of a mineral or minerals of this group of minerals. Not synonymous with salic. *Schieferdecker.*

felsiphyric. Synonym for aphaniphyric. *A.G.I.*

felsite. a. A finely crystalline, igneous quartz-feldspar rock with or without phenocrysts. It is composed of microscopic feldspar, quartz, and glass. Synonymous with petrosilex. *Fay.* b. An igneous rock with or without phenocrysts, in which either the whole or the groundmass consists of a cryptocrystalline aggregate of felsic minerals, quartz and potassic feldspar being those characteristically developed. When phenocrysts of quartz are present, the rock is called a quartz felsite, or, more commonly, a quartz porphyry. *A.G.I.* c. Field term for any fine-grained acid igneous rock whose exact composition has not been determined. *Ballard.*

felsitic. A textural term ordinarily applied to dense, light-colored igneous rocks composed of crystals that are too small to be readily distinguished with the unaided eye. In this sense, the term is essentially synonymous with microcrystalline. Occasionally, it is used as a microscopic term and applied to the groundmass of porphyritic rocks which are not glassy but are too fine-grained for the mineral constituents to be determined with the microscope. In this sense, it is synonymous with cryptocrystalline. The terms microcrystalline and cryptocrystalline are preferred. *Johannsen, v. 1, 2d, 1939, p. 211.*

felsitic rock. A fine-grained, light-colored igneous rock, including rhyolite and felsite, and also andesite if it is light colored. *Compare* basaltic rock; granitic rock. *A.G.I.*

felsitoid. Having a felsitic appearance, with an exceedingly compact aphanitic texture. Applied to metamorphic rocks. *Fay.*

felsöbanyite A massive snow-white hydrous aluminum sulfate mineral, $2A1_2O_3SO_8.1OH_2O$. *Fay.*

felsophyre. A contraction of felsite porphyry. A general term for a quartz porphyry having a felsitic or a cryptocrystalline groundmass. *A.G.I.*

felsophyric. A textural term proposed by Vogelsang and applied to porphyries having a felsitic or cryptocrystalline groundmass. *A.G.I.*

felspar. A British spelling of felspar following an error by Kirwan. *Hess.*

felstone. A very compact and uniform kind of feldspar. *See also* felsite. *Fay.*

felted. Synonym for felty. *A.G.I.*

felt papers. Used as sheating papers on roofs and side walls for protection against dampness, heat, and cold. Those used for roofing are often impregnated with tar, asphalt, or chemical compounds. *Crispin.*

felty. A textural term applied to dense, holocrystalline igenous rocks or to the dense, holocrystalline groundmass of porphyritic igneous rocks consisting of tightly appressed microlites, generally of feldspar, interwoven in irregular, unoriented fashion. If, as is characteristic of many andesites and trachytes, the crowded microlites of feldspar are disposed in a subparallel manner as a result of flow, and their interstices are occupied by microcrystalline or cryptocrystalline material, the texture is called pilotaxitic or trachytic. Synonym for felted. *A.G.I.*

female. a. The recessed portion of any piece of work into which another part fits is called the female portion. *Crispin.* b. Synonym for box. *Long.*

female thread. Synonym for box thread. *Long.*

femic. A mnemonic adjective derived from (fe) for iron and (m) for magnesium. Applied to the group of standard normative minerals in which these elements are an essential component, including the pyroxene and olivine molecules and most of the normative accessory minerals (magnetite, ilmenite, and hematite). The corresponding mnemonic adjective for the ferromagnesian minerals actually present in a rock is mafic. *A.G.I.*

femic minerals. Geologically, those which contain iron and magnesium as calculated in the United States scheme of rock classification. *Pryor, 3.*

feminine. Refers to rubies of a pale tine. *Hess.*

femmer. Fragile, weak, or slender as in the case of a thin, soft roof bed over a coal seam. *Nelson.*

femolite. Colloform material with formula near $(Mo,Fe)S_2$, with iron near 6.5 percent gives a weak X-ray pattern near that of molybdenite, from which it shows minor differences. A superfluous name for an inadequately characterized substance. *Hey, M.M., 1964.*

fen. a. Low peaty land covered wholly or partly with water. *Webster 3d.* b. Ground wet enough to be more or less thickly overgrown with reeds and other aquatic vegetation. *A.G.I.* c. Low swampy land; a moor; a marsh. *A.G.I.*

fenaksite. A pale-rose monoclinic silicate of ferrous iron and alkalies from a pegmatite associated with an ijolite-urtite intrusion at Khibina, Kola peninsula, U.S.S.R. Named from the composition, iron-sodium-potassium-silicon. The name is easily confused with phenakite. *Hey, M.M., 1961.*

fence. a. A guard around exposed and moving parts of machinery. It ensures that personnel working near the machine cannot inadvertently contact any moving parts, so preventing accidental injury to hands or feet. *Nelson.* b. A timber barrier across the entrance to abandoned, unventilated, or unsafe workings. *Nelson.* c. Aust. An obstruction, such as a bar or cross sticks, placed across an underground passage past which men have no right to travel. *Fay.* d. Aust. To make a drive (trench) around the boundaries of an alluvial claim, to prevent wash dirt from being worked out by adjoining claim holders. *Fay.*

fence diagram. Three or more geologic sections showing the relationship of wells to subsurface formations. The scales diminish with distance from the foreground to give proper perspective. When several sections are used together, they form a fencelike enclosure, hence the name. Similar in some respect to a block diagram, but it has the advantage of transparency which is not possible in a block diagram. *A.G.I.*

fence guards. S. Staff. Rails fixed around the mouth of a shaft, or across the shaft at a landing to keep people and objects from falling in. *Fay.*

fences. An accomplice of the high grader who generally sells or disposes of the stolen high-grade ore, since the high grader can rarely send his metal to the mint without committing himself, and will not ordinarily go to the trouble to steal unless there is some market for the stolen material. *Hoov, p. 493.*

fender. A thin pillar of coal adjacent to the gob, left for protection while driving a lift through the main pillar. *Bureau of Mines Staff.*

fender pile. Usually a free standing timber pile driven into the seabed or riverbed just adjacent to a berth. Its function is to absorb impact from a berthing vessel. *Ham.*

fend off; fend-off bob. Eng. A beam hinged at one end (the other end having a free reciprocating motion) fixed at a bend in a shaft or upon an inclined plane, to regulate the motion of and to guide the pump rods passing round the bend. *Fay.*

fenite. a. A hybrid aegirine syenite produced by the action of iolite magma on granite. *A.G.I. Supp.* b. A contact-altered country rock around a carbonate plug. *A.G.I. Supp.* c. An igneous-rock hybrid between the ijolite-melteigite series of rocks and the biotite-granite country rocks of the Fen area, Norway. Composed of 70 to 90 percent alkali feldspar, 5 to 25 percent aegirine and subordinate alkali hornblende, sphene, apatite, and calcite reported as primary. *Johannsen, v. 4, 1938, p. 32.*

Fenoscandia. An ancient stable region in northwestern Europe. *A.G.I. Supp.*

fen peat. Peat that accumulated in stagnant or in slowly flowing water. *Tomkeieff, 1954.*

fenster. German for window. An erosional break through an overthrust sheet or through a large recumbent anticline through which the rocks beneath the thrust sheet are exposed at the surface. The term fenster or window has sometimes been used erroneously in the United States for areas in which the normal stratigraphic succession has not been disturbed by faulting, but where older strata are exposed along the eroded crest of an anticline. Synonym for window. *A.G.I.*

ferberite. An iron tungstate mineral, $FeWO_4$; monoclinic. Applied to the wolframites which carry little or no manganese. Ferberite contains 76.3 percent tungsten trioxide, WO_3. *Sanford; Dana 17.* Synonym for eisenwolframite. *Hey, M.M., 1961.*

Ferets law. States that the strength (S) of cement or concrete is related to its mixing ratio by the equation $S = K[c/(c + w + a)]^2$ where c, w and a are the absolute volumes of the cement, water and air in the mix. This relationship was proposed by R. Feret at the beginning of the century. *Dodd.*

ferganite. A very rare, strongly radioactive, possibly orthorhombic, sulfur-yellow translucent mineral, $U_3(VO_4)_2.6H_2O$, found associated with other uranium minerals. Ferganite may be a leached or weathered product of tyuyamunite. *Crosby, p. 20.* A vanadium ore. *Osborne.*

ferghanite. Same as ferganite. *English.*

fergusite. a. An intrusive rock composed essentially of pseudoleucite and subordinate alkalic pyroxene, with accessory opaque oxides, olivine, apatite, and biotite. *A.G.I.* b. A variety of shonkinite or dark nepheline syenite containing orthoclase-nepheline pseudomorphs after leucite; named for Fergus County, Mont. *Holmes, 1928.*

fergusonite. An oxide of yttrium, erbium, niobium, and tantalum, $(Y,Er)(Nb,Ta)O_4$; sometimes containing small amounts of other rare earths, and uranium, zirconium, thorium, calcium, iron, and titanium. Found in pegmatites. Color gray, brown, or black; luster, dull to vitreous; streak, brown or gray; Mohs' hardness, 5.5 to 6.5; specific gravity, 5.6 to 5.8. Found in North Carolina, South Carolina, Virginia, Texas, Norway, Sweden, and Africa. A rare-earth mineral. *CCD 6d, 1961.*

fermentation. The process of decomposition of carbohydrates with the evolution of carbon dioxide or the formation of acid, or both. *Tomkeieff, 1954.*

fermium. A synthetic radioactive element with atomic number 100 that was discovered in the debris from the 1952 hydrogen-bomb explosion. Fermium has since been prepared in a nuclear reactor by irradiating californium, plutonium, or einsteinium with neutrons, in a cyclotron by bombarding uranium with accelerated oxygen ions, and by other nuclear reactions. Named for Enrico Fermi. It has chemical properties similar to those of the rare earth erbium. Symbol, Fm; mass number of the most stable isotope, 253. *See also* actinide elements. *CCD, 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-92, B-110.*

fermorite. A pinkish-white to white hydrofluoarsenate and phosphate of calcium and strontium, consisting largely of the arsenic analogue of apatite, $3[(Ca,Sr)_3(P,As)_2O_8].Ca(OH,F)_2$. Crystalline masses. Hexagonal. From Sitapar, India. *English.*

fernandinite. a. A dull green hydrous calcium vanadyl vanadate, $CaO.V_2O_4.5V_2O_5.14H_2O$. Cryptocrystalline fibrous. Massive. From Minasragra, Peru. *English.* b. A vanadium ore. *Osborne.*

ferralitic soil. Tropical soil characterized by a large content of iron oxide. *Compare* laterite. *A.G.I. Supp.*

Ferrari cement. A sulfate resistant cement consisting principally of $3CaO.SiO_2$, $2CaO.SiO_2$, and $4CaO.A1_2O_3.Fe_2O_3$. The sulfate resistance results from the formation of a protective film of calcium ferrite around the calcium aluminate crystals formed by hydrolysis of the brownmillerite. *Dodd.*

Ferraris furnace. a. An inclined reverberatory furnace for calcining sulfide ore. *Fay.* b. A gas-fired, heat-recuperative furnace for the distillation of zinc ore. *Fay.*

Ferraris screen. A screening machine, utilizing inclined supports, developed in southern Europe for screening small sizes of ore and sand. The wooden screen frame is set horizontally and supported on flexible wooden staves inclined at about 65° from the horizontal. The connecting rod also is inclined to the screen frame, so as to be approximately at right angles to the supports. *Mitchell, p. 136.*

Ferraris table. An ore-concentration table consisting of a plane rubber belt traveling between rollers furnished with broad flanges to keep the belt in line. It has a slope from side to side. The feed is at the upper corner, and washing is by jets directed across the table. *Liddell 2d, p.*

386.

Ferraris truss. Supporting batten used originally as a slanting support under shaking screen. When the screen was pushed forward the radial motion of the truss caused it to rise slightly, giving a throwing motion to the load and aiding the gravity-assisted return as the reciprocating action of the screen vibrator was reversed. Principle used in such shaking tables as the James. *Pryor, 3.*

ferrate. Any of various classes of compounds containing iron and oxygen in the anion or regarded as so constituted: As (1) a strongly oxidizing dark red salt analogous to the chromates and sulfates and formed in various ways (as by heating iron filings with a nitrate), or (2) ferrite. *Webster 3d.*

Ferrel's law. A statement of the fact that currents of air or water are deflected by the rotation of the earth to the right in the northern hemisphere and to the left in the southern hemisphere. *A.G.I. See also* Coriolis force.

ferreto zone. Reddish brown or reddish zone in permeable near-surface material that is produced under conditions of free subsurface drainage by the deposition of secondary iron oxide. *A.G.I. Supp.*

ferric. Of, pertaining to, or containing iron in the trivalent state; for example, ferric chloride ($FeC1_3$). *Standard, 1964.*

ferric chloride; ferric trichloride; iron chloride; molysite. Black-brown; hexagonal; $FeC1_3$; specific gravity, 2.898 (at 25° C); melting point, 306° C; decomposes at 315° C; and very soluble in water, in alcohol, in ether, and in glycerol. Used to produce decorative surface effects on ceramics and it is an oxidizing, chlorinating, and condensing agent. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-182.*

ferric chromate; iron chromate. Yellow powder; $Fe_2(CrO_4)_3$; soluble in acids; and insoluble in water and in alcohol. Used in metallurgy and in ceramics (color). *CCD 6d, 1961.*

ferric ferrocyanide. *See* Prussian blue.

ferric fluoride; iron fluoride. Green, orthorhombic; FeF_3; melting point, above 1,000° C; soluble in acids and in water; and specific gravity, 3.52. Used in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-182.*

ferric furnace. A high, iron blast furnace, in the upper part of which crude bituminous coal is converted into coke. *Fay.*

ferric hydroxide. A brown flocculent precipitate which dries to the oxide, $Fe(OH)_3$; specific gravity, 3.4 to 3.9; melting point, loses water below 500° C; soluble in acids; insoluble in water, alcohol, and ether. Used in water purification and in manufacturing pigments. *CCD 6d, 1961.*

ferricopiapite. A variety of copiapite in which X in the formula $X(OH)_2.Fe'''_4(SO_4)_6.nH_2O$ is mainly ferric iron. Similarly, ferrocopiapite and magnesiocopiapite when X is mainly ferrous iron or magnesium. *Spencer 15, M.M., 1940.*

ferric oxide; ferric oxide, red; red iron trioxide; iron sesquioxide; red iron oxide; hematite; red hematite; red iron ore; rouge. Dense; red-brown to black; hexagonal trigonal; Fe_2O_3; specific gravity, 5.12 to 5.24; melting point, 1,565° C; soluble in acids; and insoluble in water. Found in nature as the mineral hematite. Used in metallurgy as a source of iron; in gas purification; as a laboratory reagent; as a laboratory reagent; as a catalyst; and in polishing. *CCD, 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-183.*

Ferric oxide, red. *See* ferric oxide. *CCD, 6d, 1961.*

ferricrete. a. A soil zone more or less cemented by iron oxide. *A.G.I. Supp.* b. Pocket word for ferruginous concreted gravel. A variety of calcrete with ferruginous cement. *Compare* silcrete. *Arkell.*

ferricrust. The hard crust of an iron-bearing concretion. *Schieferdecker.*

ferric vanadate; ferric metavanadate; iron metavanadate. Grayish-brown powder; $Fe(VO_3)_3$; soluble in acids; and insoluble in water and in alcohol. Used in metallurgy. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-184.*

ferricyanide process. A wet scrubbing process for removing hydrogen sulfide from fuel gases in which sodium ferricyanide is used as a scrubbing medium. This reacts with hydrogen sulfide to form the ferrocyanide, which is then oxidized to reform ferricyanide, precipitating sulfur. The sulfur is recovered by filtration. *Francis, 1965, v. 2, p. 428.*

ferride. A member of a group of elements that are related to iron. The group includes chromium, cobalt, manganese, nickel, titanium, and vanadium, besides iron. *A.G.I.*

ferrielectric. Unbalanced orientation of electrical dipoles. Intermediate between ferroelectric and antiferroelectric. *VV.*

ferrierite. A colorless to white hydrous silicate of aluminum, magnesium, and sodium, $A1_2(Si_2O_5)_5R'_2.6H_2O$, with $R'_2 = Mg{:}Na_2{:}H_2 = 1{:}1{:}1$. A magnesium zeolite related to mordenite. Spherical aggregates of thin, blade-shaped crystals. Orthorhombic. From Kamloops lake, British Columbia, Canada. *English.*

ferrifayalite. A mineral, $(Fe,Fe,Mn)_{2-x}SiO_4$, with 32 to 47 percent Fe_2O_3 and 27 to 12 percent FeO, from the Cherkassk massif, Kuraminsk, Siberia, U.S.S.R. The homogeneity of the material is doubtful, and the name premature. *Hey, M.M., 1964.*

ferriferous. a. Synonym for ferruginous. Containing iron. *A.G.I.* b. Applied to rocks containing iron minerals, such as hematite, limonite, and siderite. *Bureau of Mines Staff.*

ferrilite. A variety of common trap rock or diabase. *Fay.*

ferrimagnetic material. A material which macroscopically has properties similar to those of a ferromagnetic material but which microscopically also resembles an antiferromagnetic material in that some of the elementary magnetic moments are alined antiparallel. If the moments are of different magnitudes, the material may still have a large resultant magnetization. *ASM Gloss.*

ferrimagnetism. Unbalanced orientation of magnetic moments. Intermediate between ferromagnetism and antiferromagnetism. *VV.*

ferrimolybdite; molybdic ocher; iron molybdate; molybdite. A natural hydrated molybdate of iron, $Fe_2(MoO_4)_3.8H_2O$; color, yellow; luster, silky to earthy, usually occurs as fibrous crusts. Found in New Mexico, Arizona, California, Nevada, and Pennsylvania. *CCD 6d, 1961.*

ferrinatrite. A hydrated sulfate of sodium and ferric iron, $Na_3Fe(SO_4)_3.3H_2O$; grayish-white, whitish-green color; brittle; splintery fracture; luster, vitreous. Found in Atacama Desert, Chile. Formerly called ferronatrite, but name changed since the mineral to which that names applies is a ferric, not a ferrous sulfate. *Dana 7, v. 2, pp. 456–457; English.*

ferrisepiolite. Group name to include gunnbjarnite and xylotile. *Hey, M.M., 1961.*

ferrisicklerite. A dark-brown phosphate of manganese and iron, $12RO.5Fe_2O_3.9P_2O_5$ with R = Mn'' and lithium. An intermediate member of the series triphylite-ferrisicklerite-heterosite, in which iron predominates over managnese. From Varuträsk, Sweden. *English.*

ferrisymplesite. An amber-brown hydrous arsenate of ferric iron, $3Fe_2O_3.2As_2O_5.16H_2O$; fibrous. From Cobalt, Ontario, Canada. *English.*

ferrite. a. Pure, or nearly pure, metallic iron, as a crystallin constituent of manufactured iron and steel. *English.* b. Native iron, such as the terrestrial iron from Disko lybdate of iron, $Fe_2(MoO_4)_3.8H_2O$; color, Island, Greenland. *English.* c. Ferruginous pseudomorphs after olivine. *English.* d. An amorphous iron hydroxide, occuring in many rocks in red or yellow particles. *English.* e. Used alternatively as a mineral or chemical name for green to brown needles, Ca_2AlFeO_5 to $Ca_2Fe_2O_5$, present in basic slags. Those of the composition Ca_2AlFeO_5, are identical with brownmillerite. *Spencer 19, M.M., 1952.* f. A solid solution of one or more elements in body-centered cubic iron. Unless otherwise designated (for instance, as chromium ferrite), the solute is generally assumed to be carbon. On some equilibrium diagrams there are two ferrite regions separated by an austenite area. The lower area is alpha ferrite; the upper, delta ferrite. If there is no designation, alpha ferrite is assumed. *ASM Gloss.* g. In the field of magnetics, substances having the general formula $M^{++}O.M_2^{+++}O_3$, the trivalent metal often being iron. *ASM Gloss.* h. Allotropic iron as the alpha ferrite is stable below 912° C, soft, magnetic, with body-centered cubic lattice, and dominates the structure of wrought iron. Gamma ferrite is stable from 912° to 1,400° C, and is nonmagnetic, dissolves carbon to form a solid solution with face-centered cubic lattice. Ferrites are also compounds of trivalent iron with such divalent metals as cobalt, nickel, and manganese, and are used where special magnetic hysteresis is needed. They also include mixed oxides of iron, manganese, aluminum, etc., which might be called ferromagnetic ceramics, as they are made by firing, as with pottery. Thus produced they have special insulating qualities as they do not carry eddy currents when responding to external magnetic fields, a property valuable in very high-frequency transformers. The name ferrite is also loosely applied to some iron ores. *Pryor, 3.*

ferrite spinels; ferritspinelle. A collective name for minerals of the magnetite series, ferrite compounds, $RFe_2O_4(R{=}Mg,Fe,Zn,Mn,Zn)$, in the spinel group. *Spencer 20, M.M., 1955.*

ferritic stainless steels. Steels that contain from 18 to 30 percent chromium, that are not hardenable by heat treatment, and that are magnetic. The mechanical properties of these alloys lie between those of the martensitic and the austenitic alloys. Since these steels do not have exceptionally high mechanical properties, they are used in applications where the best combination of mechanical properties and oxidation or corrosion resistance is desired. *Henderson, p. 378.*

ferritization. The metasomatic alteration of other minerals into ferrite. *Fay.*

ferritspinelle. *See* ferrite spinels.

ferritungstite. A pale yellowish to brownish-yellow hydrous tungstate of ferric iron, $Fe_2O_3.WO_3.6H_2O$. Microscopic hexagonal plates; ocherous. Hexagonal. Deer Trail district, Washington. *English.* The original material from the Deer Trail district contained jarosite intimately mixed with the ferritungstite, both minerals being very fine grained. New data obtained on ferritungstite from Mineral County, Nevada, show that it is tetragonal, commonly dipyramidal, with the formula $Ca_2Fe_2''Fe_2'''(WO_4)_7.9H_2O$. *American Mineralogist, v. 42, No. 1-2, January-February 1957, p. 83.*

ferriturquoise. A variety of crystallized turquoise containing 5 percent Fe_2O_3, from Lynchburg, Va. *Spencer 16, M.M., 1943.*

ferro-. A combining form, denoting (1) derivation from iron or a composition containing iron and (2) specifically, the presence of iron in the ferrous condition. *Standard, 1964.*

ferroactinolite. A hypothetical molecule, $Ca_2Fe''_5Si_8O_{22}(OH)_2$, to explain the composition of the amphibole group. *Spencer 18, M.M., 1949.*

ferroalloy. An alloy of iron that contains a sufficient amount of one or more other chemical elements to be useful as an agent for introducing these elements into molten metal, usually steel. *ASM Gloss.*

ferroalluaudite. Synonym for varulite. *Hey, M.M., 1964.*

ferroan dolomite. Dolomite in which not more than 50 percent of the magnesium has been replaced by iron. *A.G.I. Supp.*

ferroantigorite. A hypothetical molecule, $H_4Fe''_3Si_2O_9$, corresponding to antigorite, $H_4Mg_3Si_20_9$, to explain the composition of the chlorites. Described as iddingsite pseudomorphous after fayalite. *English.*

ferroboron. A boron iron alloy containing 0.20 to 24 percent boron. Boron alloys are marketed in a number of grain sizes. *BuMines Bull. 630, 1965, p. 151.* A boron iron alloy containing from 0.20 to 24 percent foron. *BuMines Bull. 585, 1960, p. 143.*

ferrocarpholite. A mineral, $H_4FeAl_2Si_2O_{10}$; orthorhombic; analogous to carpholite with iron in place of manganese. *Spencer 19, M.M., 1952.*

ferrochrome. An alloy of iron and chromium. *Pryor, 3.*

ferrocoke. A mixture of coke and iron made by coking a mixture of coal with an iron oxide such as limonite, magnetite, or ilmenite. *Hess.*

ferrocoke process. In this process, coal of suitable type and size is blended with finely crushed iron ore or fine ore concentrates and carbonized in the usual way. The resulting coke contains metallic iron and is used in the blast furnace as part of the normal burden. *Osborne.*

ferroconcrete. A term which is being replaced by reinforced concrete. *Nelson.*

ferrocopiapite. *See* ferricopiapite. *Spencer 15, M.M., 1940.*

ferroeckermannite. The hypothetical amphibole end-member $Na_3Fe^{+2}_4AlSi_8O_{22}(OH)_2$. *Hey, M.M., 1964.*

ferrodenite. A hypothetical molecule, $NaCa_2Fe_5''AlSi_7O_{22}(OH)_2$, to explain the composition of the amphibole group. *Spencer 18, M.M., 1949.*

ferroelectric. Spontaneous electrical polarization with all dipoles in the same direction. The polarity can be reversed by an external electrical field. *VV.*

ferroferrilazulite. Artificially produced monoclinic iron phosphate approximating to $Fe''Fe_2'''(PO_4)_2(OH)_2$, isomorphous with lazulite with Fe in place of Mg and Al. Later named barbosalite. At high temperature it changes over to a tetragonal modification, lipscombite. *Spencer 20, M.M., 1955.*

ferroferrite. The name suggested by Stead for a constituent consisting essentially of pure iron. He further suggested that when iron is associated with large quantities of an element with which it forms solutions such as phosphorus, nickel, aluminum, manganese, silicon, chromium, and vanadium, the constituents so formed should be known as phosphoferrite, nickelferrite, aluminoferrite, manganoferrite, silicoferrite, chromoferrite, and vanadoferrite. *Osborne.*

ferrogabbro. A gabbro in which the pyroxene or olivine, or both, are exceptionally high in iron. *A.G.I.*

ferrohastingsite. A variety of hastingsite rich in iron, FeO being considerably more than double MgO. This is the original hastingsite from Dungannon, Hastings County, Ontario, Canada. *English.*

ferrohexahydrite. A name for the hypothetical monoclinic end-member, $FeSO_4.\ 6H_2O$. *Hey, M.M., 1961.*

ferrohortonolite. Members of the olivine group containing 70-90 mol. percent of Fe_2SiO_4. *Spencer 15, M.M., 1940.*

ferrohypersthene. Members of the enstatite-orthoferrosilite series between hypersthene (80-50 mol. percent enstatite) and orthoferrosilite (12-0 percent En). *Compare* iron hypersthene. *Spencer 16, M.M., 1943.*

ferrolite. a. Wadsworth's name for rocks composed of iron ores. *Fay.* b. A name for a black iron slag, said to be satisfactory for fashioning into gemstones. *Shipley.*

ferromagnesian. Containing iron and magnesium. Applied to certain dark silicate minerals, especially amphibole, pyroxene, biotite, and olivine, and to igneous rocks containing them as the dominant constituents. *Fay.*

ferromagnesian silicate. A silicate in which the positive ions are dominated by iron, magnesium, or both. *Leet.*

ferromagnesite. An iron-bearing variety of magnesite used for refractories owing to its ability to bond under heat. *CCD 6d, 1961.*

ferromagnetic. a. Of, or relating to, a class of substances characterized by abnormally high magnetic permeability, a definite saturation point, and appreciable residual magnetism and hysteresis. Iron, nickel, cobalt, and many alloys are ferromagnetic. *Webster 3d.* b. Refers to those paramagnetic materials having a magnetic permeability considerably higher than 1. They are attracted by a magnet. *A.G.I.*

ferromagnetic material. a. A material that in general exhibits the phenomena of hysteresis and saturation and whose permeability is dependent on the magnetizing force. Microscopically, the elementary magnets are aligned parallel in volumes called domains. The unmagnetized condition of a ferromagnetic material results from the overall neutralization of the magnetization of the domains to produce zero external magnetization. *ASM Gloss.* b. The three substances, iron, nickel, and cobalt, are so considerably more magnetic than any other susbtances, that they are placed in a group by themselves; they are termed ferromagnetic substances. *Merriman.*

ferromagnetic substance. A substance such as iron which is vastly more magnetic than any other susbtance. *See also* lifting magnet; magnet. *Nelson.*

ferromagnetism. Spontaneous magnetic orientation of all magnetic moments in the same direction. The orientation can be reversed by an external magnetic field. *VV.*

ferromanganese. A ferroalloy containing manganese as the special additive. *Bureau of Mines Staff.*

ferromatic prop. A hydraulic prop of continental origin, employing the system of hydraulic injection. The prop is extended and set by injecting water-emulsion fluid under pressure from a central power pack via hose extending along the coalface. *Nelson.*

ferromiyashiroite. The hypothetical amphibole end-member $Na_3Fe^{2+}_3Al_3Si_7O_{22}(OH)_2$. *Hey, M.M., 1964.*

ferromolybdenum. A molybdenum-iron alloy produced in the electric furnace or by a thermite process. It is used to introduce molybdenum into iron or steel alloys and as a coating material on welding rods. *BuMines Bull. 630, 1965, p. 597.*

ferronickel. A nickel-steel alloy used for rheostats and coils. *Crispin.*

ferrophosphorous. An iron of high phosphorous content used in making steel for tinplate. *Crispin.*

ferroplatinum. A dark gray to almost black, native platinum alloy containing sufficient iron to be attracted by a magnet. Analyses show 16 to 21 percent iron, 71 to 78 percent platium, and more or less iridium. Same as iron platinum; eisen platinum. *Hess.*

ferroprussiate paper. Specially sensitized paper so treated that it can be used for producing blueprints. *Ham.*

ferrosalite. A variety of the clinopyroxene salite (sahlite), rich in iron. *Spencer 16, M.M., 1943.*

ferroselite. Iron selenide, $FeSe_2$, orthorhombic, resembling marcasite, from Tuva, Siberia, U.S.S.R. Named from the composition. *Compare* achavalite; eskebornite. *Spencer 21, M.M., 1958.*

ferrosilicon. Alloy of iron and silicon, used in steel and corrosion-resistant cast iron. With 15 percent silicon, forms the solid constituent of the separating fluid in dense-media baths, this concentration giving good grain strength, rust resistance and amenability to cleaning by use of wet magnet. *Pryor, 3.*

ferrosilite. A pyroxene, $Fe_2(Si_2O_6)$. Identical with iron-hypersthene. Minute needles in obsidian. From Lake Naivasha, Kenya, east Africa. *English; Rice; Dana 17.*

ferrospinel. a. Spinel with iron as the chief trivalent ion. *VV.* b. Synonym for hercynite (of Zippe). *Hey, M.M., 1961.*

ferrosundiusite. The hypothetical amphibole end-member $Na_2CaFe^{2+}_3Al_4Si_6O_{22}(OH)_2$. *Hey, M.M., 1964.*

ferrotschermakite. A hypothetical molecule, $Ca_2Fe_3''Fe_2'''Al_2Si_6O_{22}(OH)_2$, to explain the composition of aluminous amphiboles. *See also* tschermakite. *Spencer 17, M.M., 1946.*

ferrotungsten. A ferroalloy containing tungsten as the special additive. *Bureau of Mines Staff.*

ferrous. a. Designation for iron salts in which the iron is bivalent; for example, ferrous chloride ($FeCl_2$). *Bennett 2d, 1962.* b. Of, pertaining to, or containing iron in the bivalent state. *Standard, 1964.*

ferrous alloying elements. The various elements used for alloying with steel are: nickel, manganese, vanadium, silicon, zirconium, chromium, tungsten, molybdenum, beryllium, copper, titanium, aluminum, and uranium. *Camm.*

ferrous ammonium sulfate; iron-ammonium sulfate; Mohr's salt. Light green; monoclinic; $Fe(SO_4).\ (NH_4)_2SO_4.\ 6H_2O$; decomposes at 100° to 110° C; soluble in water; insoluble in alcohol; and specific gravity, 1.864 (at 20° C, referred to water at 4° C). Used in metallurgy. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-150.*

ferrous fluoride octahydrate; iron fluoride octahydrate. Green crystals; $FeF_2.8H_2O$; loses $8H_20$ at 100° C; soluble in acids; slightly soluble in water; soluble in hydrofluoric acid; insoluble in alcohol and in ether; and specific gravity, anhydrous, 4.09. Used in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-182.*

ferrous metal. A metal with iron as its major constituent; relatively heavy, usually magnetic, and in most of its forms, quite strong. *See also* nonferrous metal. *Nelson.*

ferrous metallurgy. The metallurgy of iron and steel. *Newton, p. 8.*

ferrous mineral. Any mineral having a considerable portion of iron in its composition. *Shipley.*

ferrous oxide. This lower oxide, FeO, tends to be formed under reducing conditions; it will react with SiO_2 to produce a material melting at about 1,200° C, hence the fluxing action of ferruginous impurities present in some clays if the latter are fired under reducing conditions. Melting point, 1,420° C; specific gravity, 5.7. *Dodd.*

ferrous sulfate heptahydrate; iron sulfate heptahydrate; copperas; green copperas; melanterite. Green; monoclinic; $FeSO_4.7H_20$; often brownish yellow from oxidation and efflorescence; soluble in water; slightly soluble in alcohol; specific gravity, 1.89; and it loses $6H_20$ at 90° C and $7H_2O$ at 300° C. Used in metallurgy in producing electrolytic iron; in precipitating gold from its solutions; and in etching aluminum. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-183.* Used in water purification and in Prussian blue. *Bennett 2d, 1962.*

ferrous sulfide; iron sulfide; iron protosulfide; iron sulfuret; iron monosulfide; troilite. Dark brown or black; metallic; hexagonal; FeS; soluble in acids; insoluble in water; specific gravity, 4.75 to 5.40; and melting point, 1,193° to 1,199° C. The manufactured sulfide is used for generating hydrogen sulfide; in ceramics; and in making other sulfides. *See also* pyrite. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-183.*

ferro-vanadium. Alloy used in shock-resistant car steels. *Pryor, 3.*

ferrox. A mixture of about 90 percent hydrous iron oxide and 10 percent Portland cement used for desulfurizing producer gas or other gas. The ferrox is granulated so that the gas readily passes through a mass of it. *Hess.*

ferroxdure. A sintered oxide consisting mainly of the oxide $BaFe_{12}0_{19}$, and used for the production of permanent magnets. *Osborne.*

ferruccite. A sodium fluoborate, $NaBF_4$. Minute crystals. Orthorhombic. From Vesuvius, Italy. *English.*

ferruginate. a. Cemented with iron minerals, generally limonite. *A.G.I. Supp.* b. As a verb, to stain with iron. *A.G.I. Supp.*

ferruginous. a. Containing iron. Synonym for ferriferous. *Fay.* b. Descriptive of rocks having a red color but not necessarily an abnormally high iron content. *A.G.I. Supp.*

ferruginous chert. A sedimentary deposit consisting of chalcedony or of fine-grained quartz and variable amounts of hematite, magnetite, or limonite. *USGS Monograph 19, 1892, pp. 192-193.*

ferruginous deposit. A sedimentary rock containing enough iron to justify exploitation as iron ore. The iron is present, in different cases, in silicate, carbonate, or oxide form, occurring as the minerals chamosite, thuringite, siderite, hematite, limonite, etc. The ferruginous material may have formed contemporaneously with the accompanying sediment, if any, or it may have been introduced later. *C.T.D.*

ferruginous manganese ore. A term used by the Bureau of Mines for those ores containing 10 to 35 percent manganese. *BuMines Bull. 630, 1965, p. 554.*

ferruginous ores. Gangue, principally oxides of iron. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 205.*

ferruginous rocks. Rocks of this group are usually carbonate of iron which has partially or wholly replaced limestone. *Mason, V.1, p. 13.*

ferruginous sandstone. A sandstone rich in iron as the cementing material or as grains, or both. *Fay.*

ferruginous schist. A schistose rock notably high in iron. *See also* basic schist; itabirite; jaspilite; schist; taconite. *A.G.I.*

ferrule. a. A metal ring or cap on the end of a cane, handle of a tool, post, or the like, to strengthen or protect it. *Standard, 1964.* b. A bushing or thimble inserted in the end of a boiler flue or the like, to spread it and make it a tight joint. *Standard, 1964.* c. A short pipe coupling. *Standard, 1964.* d. As used by drillers in Africa and the United States, a synonym for case; casing. *Long.*

fersmanite. *See* fersmannite.

fersmannite; fersmanite. A brown titanium-bearing silicate, monoclinic, $Ca_4Na_2Ti_4Si_3O_{18}F_2$. *Dana 17, pp. 413, 601.*

Fersman's law. Parallel orientation of feldspar prism edges with the edge between two adjacent rhombohedral planes of quartz in graphic granite so that the c axis of the quartz forms an angle of 42° 16′ with the c axis of the feldspar. *Hess.*

fersmite. A very rare, weakly radioactive, possibly orthorhombic, black mineral, $(Ca,Ce,Na)(Nb,Ti,Fe,Al)_2(O,OH,F)_6$, found in syenite pegmatites; associated with microcline, plagioclase, biotite, pyrochlore, alkali hornblende, apatite, sphene, magnetite, zircon, xenotime, and orthite. *Crosby, pp. 71-72.*

fertile material. In nuclear technology, any substance which is not capable of sustaining a chain reaction but which can be converted into a fissionable material in a nuclear reactor. Uranium 238 (which can be converted to plutonium 239) and thorium 232 (which can be converted to uranium 233) are fertile materials. *CCD 6d, 1961.*

fervanite. A very rare, weakly radioactive, probably monoclinic, golden-brown mineral, $Fe_4V_4O_{16}.5H_2O$, found in coatings and fracture fillings; associated with hewettite, steigerite, carnotite, and tyuyamunite. *Crosby, p. 121.* A vanadium ore. *Osborne.*

Fery radiation pyrometer. An instrument in which the heat radiated from the hot body is focused, by means of a concave mirror, on to a small central hole behind which a small thermocouple is placed in front of two small, inclined, mirrors. The instrument is sighted on to the hot body and focused by rotating a screw until the lower and upper halves of the image coincide; the electromotive force generated by the thermocouple is indicated on a galvanometer. The instrument, once focused, gives continuous readings and may be connected to a recording indicator. *Osborne.*

festoon. A type of cross lamination resulting from (1) the erosion of plunging troughs having the shape of a quadrant of an elongated ellipsoid, (2) the filling of the troughs by sets of thin laminae conforming in general to the shape of the trough floors, and (3) the partial destruction of the filling laminae by subsequent erosion, producing younger troughs. *A.G.I.*

festoon bedding. Crossbedding tangential to the lower stratification plane and truncated at the top, with a curved upper surface giving a wedge-shaped appearance. *Ballard.*

festoon crossbedding. *See* festoon cross lamination. *Pettijohn.*

festoon cross lamination. a. Elongate, semi-ellipsoidal, crosscutting erosional troughs filled in with conformally laminated strata. Same as trough cross-stratification. *Pettijohn.* b. Crossbedding deposited on a concave surface. *Pettijohn.*

festooned pahoehoe. A type of pahoehoe, the surface of which is marked by ropy festoons, which are convex in the direction of lava flow and which are the result of drag caused by the flowing of the liquid lava beneath the plastic crust. *USGS Bull. 994, 1953, p. 35.*

fetch. The unobstructed distance which the wind can travel to any point when raising waves. *See also* Stevenson's formula. *Ham.*

fetid. a. Having the odor of hydrogen sulfide or rotten eggs. The odor is elicited by friction from some varieties of quartz and limestone. *Fay.* b. Having a disagreeable odor caused by the occurrence of certain bituminous substances or of hydrogen sulfide. This odor is apparent when some varieties of limestone and quartz are broken or are rubbed vigorously. *A.G.I. Supp.*

fetid calcite. A variety of calcite. *Hey 2d, 1955.*

fetid sandstone. *See* stinkstone. *Fay.*

fettkohle. Ger. Medium volatile coal. *Bureau of Mines Staff.*

fettle. a. To cover or line the hearth of (a reverberatory furnace) with fettling. *Webster 3d.* b. To clean and smooth (as a metal or plastic) after casting or molding. *Webster 3d.* c. To remove fins, mold marks, and rough edges from dry, or nearly dry, ware. *A.C.S.G., 1963.*

fettler. One who removes excess dried glaze from dipped tile with sandpaper and knife. Also called tile edger. *See also* finisher. *D.O.T.1.*

fettling. a. N. of Eng. Cleaning up any underground roadway, etc. *Fay.* b. Protecting the bottom of the open-hearth furnace with loose material, such as ore, sand, etc.; also, the material so used. *Henderson.* c. The removal of extraneous portions, such as flash and sprue, from castings and forgings. *Henderson.* d. The removal, in the clay state, and usually by hand, of excess body left in the shaping of pottery ware at such places as seams and edges. *Compare* scrapping. *Dodd.* e. The process of repairing a steel-furnace hearth, with dead-burned magnesite or burned dolomite, between tapping and recharging the furnace. *Dodd.* f. Finishing the surface of a ceramic article in white hard clay state with a tool, or smoothing it with tow (towing). *Rosenthal.*

feying. A local term in the English brick industry for the cleaning up of a clay pit floor after an excavator has been at work. *Dodd.*

FFI log. *See* free fluid index. *Wyllie, p. 157.*

fiard. An irregular inlet, formed by glacial scour in a low rocky coast. *Schieferdecker.*

fiards. Small, glacially excavated bays which dissect, in a great number, glaciated low rocky coasts. *Schieferdecker.*

fiasco. An ignominius failure of any kind; a complete breakdown. Said of a mining venture which has resulted in failure. *Fay.*

fiasconite. An igneous rock that is an anorthhite-leucite basanite with 13 percent anorthite, 17 percent leucite, 48 percent augite, 15 percent olivine, 3 percent nephelite, and 1.7 percent iron ores. *Johannsen, v. 4, 1938, pp. 307-308.*

fiber. a. The smallest single strands of asbestos or other fibrous materials. *Mersereau, 4th, p. 210.* b. An individual filament made by attenuating molten glass. A continuous filament is a glass fiber of great or indefinite length. A staple fiber is a glass fiber of relatively short length (generally less than 17 inches). *ASTM C162-66.* c. Ceramic fibers are made from a batch consisting of alumina and silica (separate or already combined as kaolin or kyanite) together with a borosilicate flux; zirconia may also be present. Other types of ceramic fiber are made from fused silica and from potassium titanate. These fibers are used in the production of lightweight units for thermal, electrical, and sound insulation; they have also been used for high-temperature filtration, for packing, and for the reinforcement of other ceramic materials. *Dodd.*

Fiberfrax. Trademark for ceramic fiber made from alumina and silica. Available in bulk as blown, chopped and washed; long staple; paper; rope; roving; blocks; inert to most acids and unaffected by hydrogen atmosphere; resilient. Used in high temperature insulation of kilns and furnaces; heating elements; burner blocks; rolls for roller hearth furnaces and piping; insulating electrical wire and motors; insulating jet motors; sound deadening. *CCD 6d, 1961.*

Fiberglas. Trademark for a variety of products made of or with glass fibers or glass flakes including mats and rovings used for reinforcing organic and inorganic materials such as polyester and epoxy resins, bitumens, etc., for protecting underground pipelines against corrosion; coarse fibers in the form of packs used for filtering gases or liquids as in heating and ventilating systems and chemical processes. *CCD 6d, 1961.*

fiberizing. Beating asbestos rock into fiber or separating the fibers. *Mersereau, 4th, p. 210.*

fiber rope; hemp rope; Manila rope. A rope made from vegetable fiber such as common hemp, sisal, or jute. The rope is nonkinking and therefore is sometimes used for hoisting in prospecting windlasses. *Nelson.*

fiber stress. A term used for convenience to denote the longitudinal tensile or compressive stress in a beam or other member subject to bending. It is sometimes used to denote this stress at the point or points most remote from the neutral axis, but the term stress in extreme fiber is preferable for this purpose. Also, for convenience, the longitudinal elements or filaments of which a beam may be imagined as composed are called fibers. *Ro.*

fibroblastic. a. That texture of metamorphic rocks resulting from the development of minerals with a fibrous habit during recrystallization. *Schieferdecker.* b. Synonymous with nematoblastic. *A.G.I. Supp.*

fibroferrite. A mineral with a probable composition of $Fe(SO_4)(OH).5H_2O$ for fully hydrated material. It occurs as fine-fibrous crusts and masses. Color, pale yellow or straw-yellow to nearly white; also greenish-gray and yellowish-green to pale green. *Dana 7, v. 2, pp. 614-615.*

fibrolite; sillimanite. One of three crystalline forms of aluminum sillicate, Al_2SiO_5, the others being andalusite (low temperature) and kyanite (high temperature). Sillimanite occurs commonly as felted aggregates of exceedingly thin fibrous crystals, hence the name fibrolite, in contact metamorphosed aluminous sediments such as mudstones, shales, etc. Crystals of a pale sapphire blue are used as gems. *C.T.D.*

fibrolite cat's-eye. A pale greenish fibrolite with fibrous inclusions which, when cut, produces a chatoyant effect but not a well-defined cat's-eye. *Shipley.*

fibrolithoid. A substitute for celluloid. *Shipley.*

fibrous. a. Applied to minerals that occur in fibers, as asbestos. *Stokes and Varnes, 1955.* b. Synonym for asbestiform. *Bureau of Mines Staff.* c. Consisting of fine threadlike strands, for example, satin spar. *Nelson.*

fibrous aggregate. A crystalline aggregate composed of closely packed fibers. Takes a good polish. *Shipley.*

fibrous anhraxylon. Thin strands of anthraxylon having the appearance of threads in thin sections. *Bureau of Mines Staff.*

fibrous calcite. Translucent calcite composed of fibrous crystals, which, like fibrous gypsum, with which it is often confused, causes a silky sheen. When cut cabochon, it produces a girasol or chatoyant effect, but not a true cat's-eye. Also like fibrous gypsum, it is called satin spar but less correctly. *Shipley.*

fibrous gypsum. Satin spar. *See also* fibrous calcite. *Shipley.*

fibrous materials. Any tough material of threadlike structure employed to prevent loss of circulation or to restore circulation in porous formations. *Brantly, 1.*

fibrous peat. a. Peat composed of the fibrous remains of plants. It is fibrous, spongy, moderately tough, and nonplastic. It does not shrink much on drying. Also called woody peat. *See also* pseudofibrous peat; amorphous peat; mixed peat. *Tomkeieff, 1954.* b. Firm, moderately tough peat in which plant structures are only slightly altered by decay. It shrinks little on drying. *Francis, p. 149.*

fibrous silica. An extracted glass filament which has a very high silica content with traces of iron, calcium, and magnesium. The fibers can be produced in a batted form or spun into thread and woven into cloths, tapes, sleevings and other textile materials. Thermal and chemical properties are similar to those of vitreous silica. *CCD 6d, 1961.*

fibrous structure. a. In forgings, a structure revealed as laminations, not necessarily detrimental, on an etched section or as a ropy appearance on a fracture. It is not to be confused with the silky or ductile fracture of a clean metal. *ASM Gloss.* b. In wrought iron, a structure consisting of slag fibers embedded in ferrite. *ASM Gloss.* c. In rolled-steel plate stock, a uniform, fine-grained structure on a fractured surface, free of laminations or shale-type discontinuities. As contrasted with part (a) above, it is virtually synonymous with silky or ductile fracture. *ASM Gloss.* d. If the crystals in a mineral aggregate are greatly elongated and have a relatively small cross section, the structure or texture is fibrous. The fibers may be parallel, as in corcidolite and sometimes in gypsum and cerussite. When the fibers are very fine, they may impart a silky luster to the aggregate, as in crocidolite and satin-spar gypsum. There is also a feltlike type. Fibrous crystals may radiate from a center, producing asteriated or starlike groups, either coarse or fine, as frequently observed in pyrolusite, wavellite, natrolite, and tourmaline, and sometimes in stibnite and other minerals. Also called fibrous texture. *C.M.D.*

fibrous texture. A texture marked by elongated blades with serrated or fibrous edges, resembling a feather or a plume. *Schieferdecker.*

fibrous wax. A fibrous ozokerite. *Tomkeieff, 1954.*

fichtelite. Crystalline scales of a white, translucent hydrocarbon having approximately the composition, C_5H_8, that occurs in fossil wood. It is soluble in ether but not in alcohol. *Tomkeieff, 1954.*

fictile. a. Molded, or capable of being molded into the form of an art work or artifact. *Webster 3d.* b. A piece of fictile ware. *Webster 3d.* c. Made of earth or clay; of or pertaining to pottery. *Standard, 1964.* d. Said of all thrown, modeled, molded, and carved clay work. *C.T.D.*

fictive temperature. The transition temperature between a supercooled liquid and a glass. *VV.*

Fidler-Maxwell kiln. A straight tunnel kiln designed to be fired with gas, coal, or oil; a distinctive feature was the use of cast-iron recuperators in the cooling zone. *Dodd.*

fidler's gear. Lifting tackle designed for laying heavy blocks at any angle, used in the blockwork of a jetty or quay wall below water level. *Ham.*

fiducial interval. A measure of confidence in precision of a set of sample data. For a given numerical value of fiducial interval, the number of samples required from a given deposit to give an accurate measure of its value can be determined. *Lewis, p. 350.*

fiducial mark. a. An index line or point. A line or point used as a basis of reference. *A.G.I.* b. In photogrammetry, index marks rigidly connected with the camera lens through the camera body and forming images on the negative which defines the principal point of the photograph. *A.G.I.*

fiducial point. a. In surveying, accurately established reference point to which field measurements are tied. *Pryor, 3.* Triangulation point; bench mark.

fiducial time. A time on a seismograph record that may be marked to correspond, by employing necessary corrections, to a datum plane in space. *A.G.I.*

fiducial-time correction. In this method, the corrected times are used instead of depths. The application of an assumed or measured velocity distribution and the change from directly determined times to calculate depths is made only as a final step on those times which, from correlation with other times or from general geologic information, are considered to be of sufficient interest to be converted to depths. *A.G.I.*

fieg. In Wales, a term for a crack in the roof, often letting in water. *Fay.*

field. a. A section of land containing, yielding, or worked for a natural resource. For example, a coalfield, an oilfield, or a diamond field. *Webster 3d.* A large tract or area, as large as many square miles, containing valuable minerals. *See also* coalfield. *Fay.* b. A large, unbroken expanse of sea ice. *Webster 3d.* An area of drift ice of such an extent that its limits cannot be seen from the ship's masthead. Synonym for ice field. *Schieferdecker.* c. The scene of observation, as of actual phenomena, outside of a laboratory. Geologists working in the field, for example. *Webster 3d.* d. The usually circular area visible through the lens system of an optical instrument, such as a microscope. *Webster 3d.* e. A region of space in which a given effect (as gravity, magnestism, or electricity) exists and has a definite value at each point. *Webster 3d.* A region or space traversed by lines of force (as gravitational, magnetic, or electric). *Webster 2d.* f. The immediate locality and surroundings of a mine explosion. *Fay.* g. As an adjective, it means made, conducted, or used in the field. For example, field geology, field map, field method, etc. *Webster 3d.* h. A colliery, or firm of colliery proprietors. *Fay.* i. Outdoor surveys or investigations as in field geology. *Nelson.* j. The expanse or area of wall between openings and corners, composed for the most part of stretcher units. *ACSG.* k. S. Afr. Synonym for goldfield. *Fay.*

field ampere turns. The number of windings multiplied by the number of ampheres surrounding an electric field. *Pryor, 3.*

fieldbook. A book used in surveying, engineering, geology, etc., in which are set down the angles, stations, distances, observations, etc. *Fay.*

field capacity. The amount of water held in a soil by capillary action after gravitational water has percolated downward and drained away. It is expressed as the ratio of the weight of the water retained to the weight of the dry soil. *Stokes and Varnes, 1955.*

field classification of rocks. A classification of rocks made in the field. It is based on features distinguishable in hand specimens by using a hand lens, a knife, an acid bottle, etc. The classification may be refined or modified by subsequent examination with a microscope or other techniques that are generally used in a laboratory. *Stokes and Varnes, 1955.*

field compaction trial. Tests carried out under site conditions to determine the best combination of (1) type of compaction plant; (2) thickness of loose soil layer; (3) number of passes; and (4) moisture content (where variation is possible) in order to achieve the highest possible soil densities. *Nelson.*

field drain. The more usual term applied to agricultural drains. *Ham.*

field-drain pipe. An unglazed, fired clay pipe, generally 3 inches or 4 inches in diameter and about 1 foot long, for the drainage of fields; occasionally these pipes have a flattened base, or longitudinal ribs, to facilitate alignment during laying. *Dodd.*

field engineer. In petroleum production, one who directs civil, electrical, and mechanical engineering activities concerned with production and transmission of natural gas, gasoline, and oil, and with provision of utilities at an oilfield, or gasfield or in a pipeline system. *D.O.T.1.*

field focus. The total area or volume which the source of an earthquake occupied. If a fault is the source, the focus is the local fault surface, and is called the field because it is inferred from the area of shaking, as observed in the field. *A.G.I.*

field geology. a. The study of rocks and rock materials in their natural environment and in their natural relations to one another. Field geology seeks to interpret the surface features and their relationship to underground structures, and forms the basis of coal and mineral prospecting, particularly in regions where geological maps are not available. *See also* subsurface geology. *Nelson.* b. Points to practical work in the open field, as distinguished from the researches which may be carried on in the library or laboratory. *Challinor.*

field ice. Synonym for sea ice. *A.G.I.*

field investigation. In reference to experimental-mine tests, the investigation made at a mine when a large sample is taken for testing at the experimental mine, this investigation including the taking of road dust, rib dust, mine air, and standard coal samples, and the noting of conditions affecting the safety of the mine. *Rice, George S.*

fieldite. A zinciferous variety of tetrahedrite. *Weed, 1918.*

field-laboratory operator. One who analyzes mine water for acid, copper, and iron content by removing samples of water that flow to and from the precipitation drum, and who performs routine chemical tests. *D.O.T. Supp.*

field map. A map made in the field and bearing observations of various kinds upon which the final map is based. *Stokes and Varnes, 1955.*

field moisture equivalent. The minimum water content expressed as a percentage of the weight of the oven-dried soil, at which a drop of water placed on a smoothed surface of the soil will not immediately be absorbed by the soil but will spread out over the surface and give it a shiny appearance. *ASCE P1826.*

field moisture equivalent of soils. *See* moisture equivalent. *Stokes and Varnes, 1955.*

field of veins. An area traversed by numerous veins. *Schieferdecker.*

field-reversal hypothesis. The concept that the earth's magnetic field has been reversed periodically. *A.G.I. Supp.*

field rivet. *See* site rivet. *Ham.*

field seismologist. *See* observer, a. *D.O.T. 1.*

field setter. A person skilled in the art of handsetting diamond bits, working at or near the site of one or more operating drills to set bits to be used. *Long.*

fieldwork. Work done, observations taken, or other operations, as triangulartion, leveling, making geological observations, etc., in the field or upon the ground. *Fay.*

fierry. To split, as slate. *Hess.*

fiery. Containing an explosive gas; said of a gaseous mine. *Fay.*

fiery dragon. Derb. Toadstone. *Arkell.*

fiery heap. Eng. The deposit of rubbish and waste or unsalable coal which ignites spontaneously. *Fay.*

fiery mine. a. A mine in which the seam or seams of coal being worked give off a large amount of methane. *Fay.* b. One in which there is danger of explosion due to coal dust or flammable gas. *Pryor, 3.* c. A gassy mine; a mine where gas ignitions and outbursts have occurred in the past. *Nelson.*

fifth wheel. a. The weight-bearing swivel connection between highway-type tractors and semitrailers. *Nichols.* b. An unnecessary machine or person working on a job. *Nichols.* c. A wheel used to automatically operate the dump mechanism of mine ore cars. *Bureau of Mines Staff.*

fighting. Eng. Said of a ventilating current when the motion of the air is first in one direction and then in another, due to the weight or pressure of the ventilating current of air in a mine becoming equal or nearly so in both the downcast and upcast shafts. *Fay.*

Figuier's gold purple. A tin gold color, produced by a dry method; it has been used for porcelain decoration. *Dodd.*

figure cuts. *See* V-cuts. *Skow.*

figured glass. Flat glass having a pattern on one or both surfaces. *ASTM C162-66.*

figure stone. Agalmatolite. *Webster 3d.*

Fijian soapstone. A soapstone of a post-Tertiary age found in the Fiji Islands, in which no fossil has yet been discovered. *Standard, 1964.*

filamented pahoehoe. A type of pahoehoe, the surface of which has a lacy or filamented appearance caused by the bending over and laying down of innumerable threads of lava produced by the escape of gas bubbles from the surface. Most of the threads have fallen back on the surface of the flow and are commonly alined in the direction of flowage. This is the commonest type of pahoehoe surface, and generally it is superposed on the ropy, hummocky, or entraillike forms. *USGS Bull. 994, 1953, p. 35.*

filament winding. Basically filament winding is the technique of coating small filaments of materials, usually glass, with a resin, usually an epoxy. Filament windings are used to especially impart higher compression strengths and better corrosion resistance to sea structures. *H&G.*

filar micrometer. In its usual form consists of an ocular containing a fine wire which can be moved across the field by means of a thumbscrew for the purpose of measuring size. *Hess.*

file hardness. Hardness as determined by the use of a file of standardized hardness on the assumption that a material which cannot be cut with the file is as hard as, or harder than, the file. Files covering a range of hardnesses may be employed. *ASM Gloss.*

filiform. *See* wiry. *Nelson.*

filiform texture. Threadlike crystals of one mineral embedded in another mineral. *A.G.I.*

filigree. a. Delicate ornamental work, used chiefly in decorating gold and silver. *Crispin.* b. Naturally occurring native metals (for example, gold, silver, or copper) in lacelike form. *Bureau of Mines Staff.*

filite. A smokeless powder used in Italy. *Webster 2d.*

fill. a. Any sediment deposited by any agent to fill or to fill partly a valley, a sink, or other depression. *A.G.I.* b. Manmade deposits of natural soils and waste material. *ASCE P1826.* c. Material deposited or washed into a cave passageway. Fill is generally prefixed by a work describing its dominant grain size; for example, sand fill, silt fill, clay fill, gravel fill, etc. *A.G.I.* d. Material used to fill a cavity or a passage. An embankment to fill a hollow or a ravine, or the place filled by such an embankment. Also, the depth of the filling material when it is in place. As a verb, to make an embankment in or to raise the level of a low place with earth, gravel, or rock. *Webster 3d.* e. The unit charge of batch into a tank or pot. *ASTM C162-66.* f. Tailings, waste, etc., used to fill underground space left after extraction of ore. Termed hydraulic fill, if flushed into place by water. *See also* pack, c. *Pryor, 3.* g. Eng. To load trams in the mine. *Fay.* h. An earth or broken rock structure or embankment. *Nichols.* i. Soil that has no value except bulk. *Nichols.* j. Soil or loose rock used to raise a grade. *Nichols.*

filled bitumen. Bitumen containing a filler consisting of finely powdered Portland cement or hydrated lime. *Ham.*

filled stopes. Stopes which have been filled with barren stone, low-grade ore, or sand after the ore has been extracted. *See also* metal mining. *Nelson.*

filled valley. A valley in a wide basin in an arid or a semiarid region containing abundant alluvium in the form of fans, flood plains, and lake deposits. *A.G.I. Supp.*

filler. a. The men or boys who shovel coal or ore into tubs or onto a face conveyor. The shift on which the fillers work is known as the filling shift or coaling shift. *Nelson.* b. One who works in the stopes putting the filling waste into place in the mined-out rooms, transports the waste, and serves the tipping and filling machines. *Stoces, v. 1, p. 649.* c. One who fills. *Mason.* d. A coal getter during his two years' training. *Mason.* e. In the stonework industry, one who prepares marble blocks for sawing; measures graded blocks and marks them for most economical cut, using a rule, straightedge, and crayon; checks slabs after they have been sawed from blocks to see that they conform to correct measurement. *D.O.T. 1.* f. A mineral used for a specific purpose in a manufactured product but which is not an essential constituent. *A.G.I.* g. A mineral substance added to a product to increase the bulk or weight of the product, or to dilute expensive materials, and often also to improve the product. Any inert material that is added to obtain the weight or the bulk needed to give the desired composition or physical condition. Such mineral matter as clay, talc, or titanium dioxide that is added to paper in papermaking to increase the opacity and to improve the printing quality, or dry limestone dust or the dust from another suitable rock used in the surface mixture of sheet-asphalt pavement or examples of fillers. *Webster 3d.* h. A moist, puttylike mixture of inorganic materials used to fill holes in iron castings to insure an even surface for enameling. *Enam. Dict. See also* plugging compound. i. A nonreacting additive to the molding compound to change its physical characteristics, such as increasing bulk, reducing shrinkage, improving strength, and increasing heat resistance and dielectric strength. *BuMines R.I. 5971, 1962, p. 3.*

filler and drayer. A man who fills tubs at the coal face and pushes them to the main haulage road. *C.T.D.*

filler clay. A clay used in a crushed or ground state for purposes other than for the production of ceramic materials or products, and generally behaving as an inert ingredient. While such clays may sometimes change the properties of the product, they are themselves unchanged in compounding for use. Filler clays may or may not be white. *See also* rubber and paper clay, each of which is a particular class of filler clay. *ACSB-1.*

filler, head. In stonework industry, a foreman who supervises a crew of workers engaged in moving and preparing marble for cutting with gang saws. *D.O.T. 1.*

filler-in. *See* painter, hand. *D.O.T. 1.*

filler-joist construction. A floor, or roof, constructed with rolled steel joists 6 by 3 inches in section or smaller, spaced at from 18 to 30 inches apart and supported on main-span beams. The voids between the joists may be filled with plain or reinforced concrete, or with hollow tiles or woodwool slabs (for roofs) covered by appropriate concrete topping. *Ham.*

filler metal. Metal added in making a brazed, soldered, or welded joint. *ASM Gloss.*

filler wires. Small wires in a strand for spacing larger wires and supporting them in position. *Ham.*

fillet. a. A radius (curvature) imparted to inside meeting surfaces. *ASM Gloss.* b. A concave cornerpiece used on foundry patterns. *ASM Gloss.* c. The concave curved junction of two surfaces which would otherwise meet at an angle. Fillets are used at reentrant angles in the design of brick shapes, to lessen the danger of cracking. *HW.* d. Rounded corner in square or rectangularly shaped openings. *BuMines Bull. 587, 1960, p. 2.*

fillet weld. A weld, approximately triangular in cross section, joining two surfaces essentially at right angles to each other in a lap, tee, or corner joint. *ASM Gloss.*

fill factor. The approximate load the dipper actually is carrying expressed as a percentage of the rated capacity. The fill factor is commonly called the dipper factor for shovels or the bucket factor for draglines. *Woodruff, v. 3, pp. 499-500.*

filling. a. Eng. The places where trams are loaded in the workings. *Fay.* b. The waste material used to fill up old stopes or chambers. *Weed, 1922.* c. Allowing a mine to fill with water. *Weed, 1922.* d. The loading of tubs or trucks with coal, ore, or waste. *C.T.D.* f. Loading of mineral into mine trucks; shoveling onto conveyors; gob stowing; packing old stopes with waste. *Pryor, 3.* g. Clogging of the abrasive coat by swarf. It may be reduced in many operations by using an open-coat construction or a lubricant. *See also* swarf. *ACSG, 1963.*

filling deposits. a. A general term for deposits filling preexisting cavities, replacing the term "crustified deposits" proposed by Posepny. *Fay.* b. Replacement deposition. *Bureau of Mines Staff.*

filling material. a. Material such as waste, sand, ashes, and other refuse used to fill in worked-out areas of excavation. *Stoces, v. 1, p. 207.* b. Backfill. *Bureau of Mines Staff.*

filling-out. Aust. Shoveling into skips and taking to the surface, as filling-out burning material when a small fire occurs in a mine. *Fay.*

filling pieces. Rocks of such size as to fill the open spaces between crib timbers, etc. *Fay.*

filling point. The level up to which a glass bottle has the nominal capacity. *ASTM C162-66.*

filling system. *See* sublevel stoping, b. *Fay.*

filling up; silting up. Of a bay with mud or sand. *Schieferdecker.*

filling-up method. *See* overhand stoping, b. *Fay.*

fill off. *See* strip, d. *Mason.*

fill terrace. a. Part of a former alluvial valley floor built upward by deposition of valley-filling sediments. *A.G.I. Supp.* b. Comprises a series of terms, including, alluvial terrace, glacial terrace, and others, which are formed after the rejuvenation of a stream-filled valley or a valley surface made by aggregation. *A.G.I.*

film. a. A term used in flotation meaning a coating, layer, or thin membrane. *Fay.* b. A thin layer of a substance, at the most, a few molecules thick, generally differing in properties from other layers in contact with it. *C.T.D.*

film badge. A package of photographic film worn like a badge by workers in the nuclear industry to measure exposure to ionizing radiation. The absorbed dose can be calculated by the degree of film darkening caused by the irradiation. *L&L.*

film coefficient. The heat transferred by convection per unit area per degree temperature difference between the surface and the fluid. Also called unit convection conductance; surface coefficient. *Strock, 10.*

film flotation. Early stage in development of modern flotation process for concentration of minerals, notably sulfides. The containing pulp was agitated with oil which then floated up, carrying selected minerals. This mineralized film was then overflowed or skimmed off. *Pryor, 3.*

film mica. Knife-trimmed mica split from the better qualities of block mica to any specified range of thicknesses between 0.0012 and 0.004 inch. *Skow.*

film, monomolecular; film, unimolecular. Surface coating at interface between solid and fluid, one molecule thick and continuous over an appreciable area. *Pryor, 3.*

film sizing; reverse classification. Sorting of mineral particles on such flattish surfaces as sluices and shaking tables in accordance with the sizes of the particles moved by a flowing film of water, which exercises transporting force proportional to the cross section exposed to flow. *Pryor, 3.*

film-sizing tables. A table used in ore dressing for sorting fine material by means of a film of flowing water. These tables may be considered as surface tables, from which the products are removed before they have found a bed, so that the washing is always done on the same surface; also building tables or buddles, on which the products are removed after they have formed a bed. These use the relative transporting power of a film of water flowing on a quiet surface, which may be either rough or smooth, to act upon the particles of a water-sorted product. The smaller grains, of high specific gravity, are moved down the slope slowly or not at all by the slow undercurrent; the larger grains, of lower specific gravity, are moved rapidly down the slope by the quick upper current. *Liddell 2d, p. 387.*

film strength. The relative resistance of the bisque to mechanical damage. *ASTM C286-65.*

film, unimolecular. *See* film, monomolecular. *Pryor, 3.*

filter. a. A device for separating solids or suspended particles from liquids or fine dust from ventilating or cooling air. An electrical air filter can collect airborne contaminants ranging from about 60 to under 1 micron in size. *See also* vacuum filtration. *Nelson.* b. In ore treatment, separating device incorporating a separating membrane on which solids are retained. The plate-and-frame filter is intermittent in action, and has channeled plates covered by membranes, separated by spacing frames, which fill as pulp is forced in and filtrate is drawn out, appliance being opened and emptied periodically. The drum filter is a horizontal drum rotated slowly through a semicircular tank in which pulp is kept stirred by reciprocating paddles. Vacuum applied to inside of drum draws filtrate through filter cloth at surface, leaving a cake which, after emergence and perhaps washing with sprays, is scraped off on the down-running side of the drum. The leaf filter is intermittent, and used to clarify liquids or separate small quantities of suspended matter, for example, gold slimes after precipitation with zinc from cyanide solutions. Membrane, perhaps precoated with diatomaceous earth, dips into liquid being treated. Genter filter is an assisted thickener. A round tank receives pulp, which is drawn to suspended socks or membranes distended by wood balls, to which a cycle of vacuum followed by blow-back is applied automatically. Cake formed during vacuum period is sloughed off, falls to bottom of tank and is gathered and removed as underflow by means of slowly rotating rakes. The bag filter is used to remove dust and free particles from gas streams. The centrifugal filter acts by use of centrifugal force. *Pryor, 3. See also* filtration. c. A layer, or a combination of layers, of pervious materials designed and installed in such a manner as to provide drainage and yet prevent the movement of soil particles by flowing water. Also called protective filter. *ASCE P1826.* d. A porous bed of sand or of other material that separates matter held in suspension, or dissolved impurities or coloring matter from a liquid or a gas that is passed through it. *Webster 3d.* e. As a verb, to subject to the action of a filter; to pass a liquid or a gas through a filter for the purpose of purifying, or separating, or both. To act as a filter, to remove from a fluid by means of a filter, to percolate. *Webster 3d.* f. An electric device in seismic instruments that permits selection of frequency characteristics appropriate for the ground motion it is desired to record. *A.G.I.* g. In radiography, a device, usually a thin metallic layer, inserted into a beam of radiation so as to modify the transmitted spectrum of radiation. It may be used to enhance or reduce contrast, or to minimize undesirable scattered radiations. *ASM Gloss.* h. In compressors, cleaners for the intake air which should be free from dust to minimize wear in the compressor. A simple screen can be made by building an intake box with panels of ½-inch mesh wire screen covered with cheese cloth. One type, made of frames 20 x 20 inches and giving an effective opening 18 x 18 inches or 2½ square feet, contains metallic filaments coated with a viscous fluid. Each frame has a capacity of 800 cubic feet of air per minute. *Lewis, p. 683.* i. In photography, a glass or gelatin plate placed in front of, in, or back of the lens, to modify on the film or plate the effect of light, of different colors, or of some particular color. *Seelye, 2.* j. Resistances, inductances, and capacitances, or any one or combination of these, which allows the comparatively free flow of certain frequencies or of direct current while blocking the passage of other frequencies. An example is the filter used in a power supply, which allows the direct current to pass, but filters out the ripple. *Hy.*

filter aid. a. A low-density, inert, fibrous, or fine granular material used to increase the rate and improve the quality of filtration. *ASM Gloss.* b. Diatomaceous earth, used either to coat a filter cloth or as a thick filtering layer which can be ploughed off with its load of cake from a rotating drum filter. *Pryor, 3.*

filter bed. a. A pond or tank having a false bottom covered with sand, and serving to filter river or pond water. *Fay.* b. A fill of pervious soil that provides a site for a septic field. *Nichols.* c. A general name for a contact bed or any similar bed used for filtering purposes. *C.T.D.*

filter block. A hollow, vitrified clay masonry unit, sometimes salt-glazed, designed for trickling filter floors in sewage disposal plants. *ACSG, 1963.*

filter cake. a. The compacted solid or semisolid material separated from a liquid and remaining on a filter after pressure filtration. *Institute of Petroleum, 1961.* b. The layer of concentrated solids from the drilling mud left behind on the walls of a borehole, or on a filter paper in filtration tests on mud. *Institute of Petroleum, 1961.*

filter cake texture. The physical properties of a cake as measured by toughness, slickness, and brittleness. *Brantly, 1.*

filter candle. A porous ceramic tube, which may be rounded and closed at one end, made with a high porosity and of substantially uniform pore size. *Dodd.*

filter cloth. The fabric used as a medium for filtration; for example, nylon cloth, blanket cloth, finely woven wire mesh, or finely woven glass thread. *B.S. 3552, 1962.*

filter correction. In seismic work, a correction of recorded times made necessary by the use of different filters in the instrumentation. The correction simulates the use of a constant filter. *A.G.I.*

filtered light. A term commonly used to refer to light which has passed through a colored glass (a filter) which absorbs the rays of some hues, allowing those of other hues to pass through. *Shipley.*

filter feed trough. A tank containing the pulp to be filtered, generally fitted with an agitator to maintain the solids in the pulp in suspension, and in which the drum or disk of a rotary vacuum filter is partially immersed. *B.S. 3552, 1962.*

filter glass. Glass, usually colored, used in goggles, helmets, and hand shields to exclude harmful light rays. *ASM Gloss.*

filtering effect. The differential damping of pressures or of vertical oscillation of water particles with increasing depth, depending upon the wave period. At a given depth longer waves are damped less than shorter waves. *Hy.*

filtering stone. Any porous stone, such as sandstone through which water is filtered. *Fay.*

filter loss. The amount of fluid delivered through a permeable membrane in a specified time. *Brantly, 1.*

filter material. Graded granular material which permits water to pass through it but retains solid matter. *Ham.*

filter-operator helper. One who assists the concentrate-filter operator by regulating flow of concentrate from the pipeline. *D.O.T. Supp.*

filter paper sampler. A high-volume sampler using a plain or pleated fibrous filter of various materials and weaves to collect dust particles as air is drawn through the instrument by a suction pump. In one instrument, the air flow is maintained constant (at one of three selected rates), even when dust begins to clog the filter. Very high efficiencies can be attained with special filter materials (fiber glass, membranes). *Hartman, p. 53.*

filter-plant foreman. A foreman who supervises workers engaged in extracting water from concentrate, using settling tanks and filter machines, and in loading filtered concentrate into railroad cars. *D.O.T. Supp.*

filter press. a. A form of pressure filter, noncontinuous in operation, used in coal preparation for the removal of water from slurries, tailing and similar products. *B.S. 3552, 1962.* b. A filter consisting usually of a series of rigid corrugated plates with intervening filter medium (as cloth) assembled in a framework so that the suspension to be filtered can be forced under pressure into the assembled press and the solids can collect as cake between the plates. *See also* plate-and-frame filter. *Webster 3d.*

filter pressing. a. Squeezing out of a residual magma from the interstices of a mush of crystals. A process similar to squeezing water out of a sponge. *Bateman.* b. The process of the straining out of liquid when an igneous rock has partly crystallized and then is subjected to pressure by earth movements, etc. *Bateman, 1950, p. 51.* c. A process of magmatic differentiation in which a magma having crystallized to a mush of interlocking crystals in liquid becomes compressed, permitting the liquid to move toward regions of lower pressure and hence to become separated from the crystals. *A.G.I.*

filter pump. An aspirator for hastening the process of filtering by creating a partial vacuum. *Standard, 1964.*

filter sand. Sand suitable for use in filtering the suspended matter from water. *A.G.I.*

filter stick. Short glass tube with filtering septum used in laboratory sampling. *Pryor, 3.*

filter-type respirator. A protective device which removes dispersoids from the air by physically trapping the particles on the fibrous material of the filter. It offers no protection against gases or vapors, or atmospheres deficient in oxygen. Many workers, however, are subjected to dusts, fumes, and mists in sufficient quantity to impair health. Common examples are the dusts of cement, coal, flour, limestone, silica, and asbestos encountered in mining, grinding, and crushing operations; the metallic fumes of welding, smelting, and refining processes; and the mists formed by the disintegration of a liquid in such work as spray-coating, atomizing, and chromium-plating. The U.S. Bureau of Mines tests and approves this type of respirator for one of the three distinct classes of dusts, fumes, and mists, or for various combinations of those classes. *Bests, p. 100.*

filter well. A system used in the lowering of ground water. *Ham.*

filtrate. The liquid product from the filtration process. *B.S. 3552, 1962.*

filtration. a. A process for separating solids from liquids by allowing the liquid to pass through a finely woven cloth or gauze which retains the solids, using vacuum or pressure to accelerate the separation. *B.S. 3552, 1962.* b. Commercially, the separation of relatively clear filtrate from pulp, with arrest of solids on suitable membrane, usually moved continuously so as to discharge a ribbon or filter cake. All metallurgical filters contain a canvas (or other fabric) diaphragm which serves as the filtering medium, and the filtrate is forced through the filter cloth either by suction or pressure. The clear liquid passes through, and the suspended solids remain on the filter cloth in the form of a filter cake. *Pryor, 2; Newton, p. 104.*

filtration differentiation. a. A difference in rock character resulting from a filtration effect during intrusion. *Hess.* b. *See* filter pressing. *A.G.I.*

filtration qualities. The filtration characteristics of a drilling fluid. These qualities are inversely proportional to the thickness of filter cake deposited on the face of a porous medium and the amount of water allowed to escape from the drilling fluid into or through the medium. *Brantly, 1.*

filtration rate. The measure of the amount of filtrate from a drilling fluid passing through or into a porous medium. Filter loss and cake thickness constitute the determining factors of filtration qualities. *Brantly, 1.*

Filtrol. Trade name for bentonite. *Hess.*

filty. Som. A local term for firedamp. *Fay.*

fimmenite. A variety of spore peat. *Tomkeieff, 1954.*

fin. a. The thin sheet of metal squeezed out between the collars of the rolls in a roll train. *Fay.* b. A fault, sometimes occurring in pressed or blown glassware, in the form of a thin projection following the line between the parts of the mold. Also called flash. *Dodd.* c. The feather edge obtained when cutting flat glass. *ASTM C162-66.*

final controlling element. In flotation, that controlling element which directly changes the value of the manipulated variable. *Fuerstenau, p. 543.*

final drive. A set of reduction gearing close to or inside of a drive wheel. *Nichols.*

final exploration. The detailed investigation of a coal or mineral area on which a preliminary report was favorable. The final exploration of an area may involve a costly boring program, surveys, and sampling. *See also* preliminary exploration. *Nelson.*

final set. The time required for a hydraulic cement to develop sufficient strength to resist a prescribed pressure. In the usual Vicat needle test, this stage of the setting process is defined as that at which the needle point will, but its circular attachment will not, make a depression on the surface of the cement. *Dodd.*

final setting time. The time during which a fresh paste of cement and water will stiffen by a given amount. *See also* initial setting time. *Ham.*

finandranite. A coarse igneous rock consisting of potassium-rich syenite composed of 88 percent microcline and 9 percent torendrikite (amphibole) with some biotite, ilmenite, and 3 percent apatite. *Johannsen, v. 3, 1937, p. 13.*

find. a. Eng. A sinking or driving for coal, etc., attended with success. *Fay.* b. A thing found or discovered; especially, a valuable discovery; as, a find of minerals. *Standard, 1964.*

findlings quartzite. A compact, cemented quartzite of a type occurring in Germany as erratic blocks, hence the name, which is the German word for foundling. This type of quartzite, which is used as a raw material for silica-brick manufacture, is composed of about 60 percent of quartz grains set in 40 percent of a chalcedonic matrix. In Germany, the term is being displaced by the more informative term cemented quartzite. *Dodd.*

fine. Sometimes used to designate high-quality drill diamonds. *Long.*

fine adjustment screw. A tangent screw on a theodolite. *Ham.*

fine aggregate. a. Aggregate in which the largest particles have a diameter of less than one-fourth inch. *Shell Oil Co.* b. In the crushed stone industry, fine aggregate is commonly regarded as the material passing a ⅜-inch sieve and almost entirely passing the No. 4 sieve. *AIME, p. 286.* c. Aggregate which passes a 3/16-inch British Standard test sieve and contains only so much coarser material as may be specified. *Taylor.*

fine annealing. Annealing to an extremely low stress and uniform index of refraction. *ASTM C162-66.*

fine chemicals. Chemicals produced in relatively small quantities for use in limited quantities; for example, silver nitrate. *Bennett 2d, 1962.*

fine coal. English translation of German feinkohle. *Tomkeieff, 1954.*

fine cold asphalt. A wearing course of bitumen and fine aggregate which may be spread or compacted when either cold or warm. *Ham.*

fine flake salt. A fine size of grainer salt with thin, delicate flakes. *Kaufmann.*

fine gold. a. Almost pure gold. The value of bullion gold depends on its percentage of fineness. *See also* fineness; float gold. *Fay.* b. In placer mining, gold in exceedingly small particles. *Hess.*

fine-grained. Descriptive of rocks composed of small grains. Generally the term is used only in a relative way, but an average size of less than 1 millimeter has been suggested. *Stokes and Varnes, 1955.*

fine-grained rocks. Rocks in which the crystals are very fine-grained or else the whole or part is glass. These are the volcanic rocks. *Mason, v. 1, p. 11.*

fine-grained soil. Soil consisting mostly of clay and silt, more than 50 percent by weight smaller than 0.074 millimeter in diameter. *A.G.I. Supp.*

fine grinder; pulverizer. A machine for the final stage of size reduction, that is to -100 mesh. Such machines include ball mills, tube mills, and ring-roll mills. *Dodd.*

fine grinding. Fine grinding is usually performed in a mill rotating on a horizontal axis and containing balls, rods, or pebbles (grinding media) which serve to grind the ore in the mill. The different mills used in fine grinding are known as ball mill, pebble mill, Hardinage mill, tube mill, etc. *Newton, p. 65.*

fine industrials. Synonym for toolstones. *Long.*

fine material. All sediment finer than 0.062 millimeter; also called wash load. *USGS Prof. Paper 462-F.*

fine metal. The higher grades of copper regulus or matte obtained in the English process of copper smelting. Included are the following four varieties which are distinguished by appearance and copper content: (1) blue, containing about 60 percent copper; (2) sparkle, about 74 percent copper; (3) white, about 77 percent copper; and (4) pimple, about 79 percent copper. *Fay.*

fineness. a. The degree of purity of gold, for example, gold 950 fine contains 950 parts of pure gold, and 50 of other matter. *See also* carat. *Nelson.* b. Parts per thousand in purity. *Bureau of Mines Staff.* c. The proportion of pure silver or gold in jewelry, bullion, or coins often expressed in parts per thousand and being in United States silver, coin nine-tenths or .900 fine and in English gold, coin eleven-twelfths or .9166 fine. *Webster 3d.* d. A measure of the specific surface area or particle-size distribution. *Taylor.* e. The state of subdivision of a substance. *C.T.D.*

fineness factor. A measure of average particle size obtained by summing the products of the reciprocal of the size grade midpoints times the frequency of particles in each class expressed as a decimal part of the total frequency. *A.G.I.*

fineness modulus. a. An empirical factor obtained by adding the total percentages of a sample of the aggregate retained on each of a specified series of sieves, and dividing the sum by 100. *AIME, p. 289.* b. One-hundredth of the sum of the cumulative values for the amount of material retained on the series of Tyler or U.S. sieves including half sizes up to 100 mesh. Example:

On 4 mesh 2 percent
On 8 " 13 "
On 16 " 35 "
On 30 " 57 "
On 50 " 76 "
On 100 " 93 "

Sum = 276 ÷ 100 = 2.76 fineness modulus. *Dodd.*

fineness of enamel. A measurement of the degree to which a frit has been milled in wet or dry form, usually expressed in grams residue retained on a certain mesh screen from a 50-milliliter or a 100-gram sample. *ASTM C286-65.*

fine raggings. Eng. Pieces of ore deposited at the bottom of a sieve. *Fay.*

finery. A furnace or hearth in which best quality bar iron is produced from white pig iron (used particularly in Sweden). *C.T.D.*

fines. a. Very small material produced in breaking up large lumps, as of ore or coal. *Zern.* b. Small pieces of rock and dirt that fall from the mine roof, and generally, though not always, precede a falling of heavy material and consequently signify danger. *Fay.* c. In general, the smallest particles of coal or mineral in any classification, process, or sample of the run-of-mine material. *See also* anthracite fines. *Nelson.* d. Coal having a maximum particle size usually less than one-sixteenth inch (1.6 millimeter) and rarely above one-eigth inch (3.2 millimeters). *B.S. 3552, 1962.* e. Coal with a maximum particle size usually less than one-eighth inch (3.2 millimeters); also applied in a general sense to the content of fine material in a coal. *B.S. 3323, 1960.* f. Clay or silt particles in soil. *Nichols.* g. The finer-grained particler of a mass of soil, sand, or gravel. *Seelye, 1.* h. In hydraulic sluicing, the material that slowly settles to the botom of a mass of water. *Seelye, 1.* i. The fine fraction of a sediment or the product of rock crushing, particularly that which passes through a grading sieve. *A.G.I. Supp.* j. The fraction of sand and gravel finer than 0.074 millimeters in particle diameter. *A.G.I. Supp.* k. The portion of a soil finer than a number 200 U.S. standard sieve. *ASCE P1826.* l. The product passing through the screen when the material from the zinc boxes of a cyanide mill is rubbed over a sieve. *See also* shorts. *Fay.* m. Ores in too fine or pulverulent a condition to be smelted in the ordinary way. *Standard, 1964.* n. Sand grains that are substantially smaller than the predominating size in a batch or lot of foundry sand. *ASM Gloss.* o. In powder metallurgy, the portion of a powder composed of particles which are smaller than a specified size, currently less than 44 microns. *See also* superfines. *ASM Gloss.* p. Fine particles of any ceramic material (that is, this term is relative to the produce being made. Some products may require some -325 mesh material; others -20 mesh. "Fines" as related to one product would be —325 mesh; for the other, -20 mesh.) *Bureau of Mines Staff.*

fine sand. All grains between 0.25 and 0.125 millimeter in diameter. *A.G.I.*

fine silt. *See* silt grade. *C.T.D.*

fine silver. Pure silver, 1000 parts fine or 100 percent silver. *BuMines Bull. 630, 1965, p. 811.*

fines removal. The removal of fine particles from a feed material, by either wet or dry methods, to facilitate treatment or utilization of the remainder. *B.S. 3552, 1962.*

fine zinc. A name given to the highest grades of commercial spelter or zinc. *Camm.*

finger. a. A pair or set of bracketlike projections placed at a strategic point in a drill tripod or derrick, generally at a level with one of the work platforms, to keep a number of lengths of drill rods or casing in place when they are standing in the tripod or derrick. Also one of the flexible prong parts of a basket lifter. *Long.* b. One of the cutting edges on a finger bit. *See also* finger bit. *Long.* c. A minor structure radiating from a major structure. *A.G.I. Supp.*

finger bar. a. Aust. An iron rod attached to a cage with the end bent in such a way as to keep the skips from running off the cage while being raised or lowered. *Fay.* b. Pivoted length of wood used to support unit in stamp battery when hanging up. *See also* cam stick. *Pryor, 3.*

finger basket. *See* basket, a. *Long.*

finger bit. A steel rock-cutting bit having fingerlike, fixed, or replaceable, steel-cutting points affixed. *Long.*

finger board. A board with projecting dowels or pipe fingers located in the upper part of the drill derrick or tripod to support stands of drill rod, drill pipe, or casing. *Compare* finger. *Long.*

finger-car. A small four-wheeled bogie having two uprights from which project pairs (usually 10 in number) of fingers; these can be raised or lowered by a lever and cam. Finger-cars are used in the Keller system of handling bricks. *See also* Keller system. *Dodd.*

finger chute. Steel rails hinged independently over ore chute, to control rate of flow of rock. *Pryor, 3.*

finger coal. Natural coke occurring in small hexagonal columns where coal was altered by an igneous intrusion. *Stutzer and Noe, 1940, p. 299.*

finger grip. a. A finishing tool designed to recover a broken drill rod or dropped tool from a borehole. *Long.* b. Eng. A tool used in boring for gripping the upper end of the rods. *Fay.*

fingering. a. The lateral dividing of a sand body or other rock unit into two or more bodies. Applied also to dividing streaks of porosity, some of which are more or less permeated with fluid. *A.G.I.* b. The intrusion of water in the form of a finger or a tongue when oil is removed. *A.G.I.* c. The movement of fluids along a nonuniform front, by which the displacement of one fluid by another is more rapid at one point than at an adjacent point. *A.G.I.*

finger lake. One of several, associated, long, narrow rock basins occupied by lakes. *A.G.I.*

Fingerlakesian. Lower Upper Devonian. *A.G.I. Supp.*

finger lifter. A basket-type core lifter. *Long.*

finger raise. Steeply sloping openings permitting caved ore to flow down raises through grizzlies to chutes on the haulage level. *Bureau of Mines Staff.*

finial. Ornamental pieces of burned clay used for finishing off the joining of the ridge line with the hips, ridge line at gables, or top of a tower. *Fay.*

fining. a. The conversion of cast into malleable iron in a hearth or charcoal fire. *Fay.* b. *See* refining. *Fay.* c. The process by which the molten glass approaches freedom from undissolved gases. *ASTM C162-66.* d. The act of making clear or pure; as, the fining of a precious metal. *Crispin.*

fining agent. Substance which aids expulsion of bubbles in glass manufacture, for example, As_2O_3; substance that forms a quick-settling precipitate with suspended matter and thus clarifies a liquid, for example, albumen. *Bennett 2d, 1962.*

fining time. Shortest term required to produce a glass free of bubbles varying with the composition and the temperature of treatment. *Bennett 2d, 1962.*

finish. a. The surface condition, quality, or appearance of a metal. *ASM Gloss.* b. Stock on a forging to be removed when finish-machined. *ASM Gloss.* c. Any aftertreatment performed on fibrous glass products previous to their end use. *Phillips.* d. The part of a bottle for holding the cap or closure. *ASTM C162-66.* e. Stage in melting process after glass appears free of seeds. *ASTM C162-66.*

finish coat. Final porcelain enamel coating. It may be a one-coat finish. *ACSB, 3.*

finished steel. Steel that is ready for the market and has been processed beyond the stages of billets, blooms, sheet bars, slabs, and wire rods. *ASM Gloss.*

finisher. a. A person having charge of a furnace during the melting and fining of the glass. *ASTM C162-66.* b. The workman who does the final work, such as polishing or putting the handle or foot on a piece of ware. *ASTM C162-66.* c. One who removes rough edges from green ware, such as plates, cups, or handles, and smooths it with sponge. Also called fettler; shaper; sponger. *D.O.T. 1.* d. *See also* glazing machine operator. *D.O.T. 1.*

finish grade. The final grade required by specifications. *Nichols.*

finish grinding. The final grinding action on a workpiece where the objectives are surface finish and dimensional accuracy. *ASM Gloss.*

finishing jig. The jig used to save the smaller particles of ore in a concentrator or stamp mill. *Weed, 1922.*

finishing lime. A type of refined hydrated lime, milled in such a manner that it is suitable for plastering, particularly the finish coat. Putty derived from this hydrate possesses unusually high plasticity. *Boynton.*

finishing rolls. The last roll, or the one that does the finest crushing in ore dressing, especially in stage crushing. *Fay.*

finishing temperature. The temperature at which hot working is completed. *ASM Gloss.*

finish machining. Analogous to finish grinding. *ASM Gloss.*

finish mold. *See* neck mold. *Dodd.*

finish tile. Tile with a face that may be used as a finished wall. *ACSG, 1963.*

fink truss. A frequently used symmetrical steel roof truss effective over a maximum span of 50 feet. *Ham.*

fin-neck bolt. Similar to carriage bolt. Used through wood or through wood and metal. Two fins under the head prevent turning while the nut is being tightened or loosened. *Crispin.*

finned tube. Extended (grilled) surface in the form of fins on tubes or pipe. *Strock, 10.*

finnemanite. A gray, olive-green to black chloroarsenite of lead, $Pb_5Cl(AsO_3)_3$. Prisms and crystalline crusts. Hexagonal. From Langman, Sweden. *English.*

Finnish amber. Amber from the shores of Finland. *See also* Baltic amber. *Shipley.*

fiord; fjord. a. A long, deep, arm of the sea, occupying a portion of a channel having high steep walls, a bottom made uneven by bosses and sills, and with side streams entering from high-level valleys by cascades or by steep rapids. *A.G.I.* b. A narrow, deep, steep-walled inlet of the sea that was formed by the submergence of a mountainous coast. *Fay.* c. A sea-occupied segment of a glaciated trough. *A.G.I.* d. Where the sea enters a deeply excavated glacial through after the melting away of the glacier, a fiord results. A rise of sea level may occur and allow the sea to enter glaciated valleys, or it may increase the depth of water in true fiords; but it is not necessary to assume such a rise to account for fiords. Along with or since the rise of sea level that drowned the valleys of many coasts after the Ice Age, fiord regions rose isostatically as they were relieved of a great load of ice. It is clear that glaciers have excavated troughs far below sea level; and it is in general such troughs that have been entered by the sea as the glaciers melted forming fiords. *A.G.I.*

fiord coast; fiorded coast. A glaciated coast, characterized by a partial submergence of glacial troughs. *Schieferdecker.*

fior di persicor. A white marble with veins and clouds of purple or red, from Albania. *Fay.*

fiord lake. A lake in a glacially excavated rock basin of a U-shaped valley at low elevation. *A.G.I. Supp.*

fiord shoreline. A shoreline characterized by the development of numerous fiords; as, for example, the west coast of Norway. *Stokes and Varnes, 1955.*

fiord valley. A deep, narrow channel occupied by the sea, and extending inland often for as far as 50 or 100 miles. *A.G.I.*

fiorite. Siliceous sinter, named from Mount Santa Fiora, Tuscany, Italy. An opal occurring near hot springs. *Fay.*

fire. a. To blast with gunpowder or other explosives. *Fay.* b. A word shouted by miners to warn one another when a shot is fired. *Fay.* c. Eng. A collier's term for the explosive gas in mines. *Fay.* d. To explode or blow up. The expression "the pit has fired" signifies that an explosion of firedamp has taken place. *Fay.* e. Fuel in a state of combustion, as on a hearth, in a grate, furnace, etc. *Fay.* f. Flashes of spectrum colors from the facets of a cut stone, due to dispersion. *See also* dispersion. *Anderson.* g. The manifestation of rapid combustion, or combination of materials with oxygen. *Leet.*

fire agate. a. A glass imitation of fire opal. *Shipley.* b. Same as goldstone. *Shipley.*

fire assay. The assaying of metallic ores, usually gold and silver, by methods requiring a furnace heat. It commonly involves the processes of scorification, cupellation, etc. *Standard, 1964.*

fireback. The back wall of a furnace or fireplace. *Fay.*

fireball. The luminous ball of hot gases which forms a few millionths of a second after a nuclear explosion. *L&L.*

fire bank. The spoil heap at the surface of a colliery, when burning or heated by spontaneous combustion. *Nelson.*

fire bars. Cast-iron bars forming a grate on which fuel is burnt, as in domestic fires, boiler furnaces, etc. *C.T.D.*

fire blende. Pyrostilpnite. *Fay.*

fireboard. A blackboard on which the fire boss indicates every morning, by chalk marks, the amount of gas in different parts of the mine. *Fay.*

fire boss. a. A person designated to examine the mine for gas and other dangers. In certain states, the fire boss is designated as the mine examiner. *U.S. BuMines Fed. Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. I Underground Mines, Oct. 8, 1953.* b. A state certified supervisory mine official who examines the mine for firedamp, gas, and other dangers before a shift comes into it and who usually makes a second examination during the shift; in some states, it is used loosely to designate assistant or section foreman. *B.C.I.* c. A colliery deputy. *Nelson.* d. Also called examiner; fire viewer; gas boss; gas man; mine examiner. *D.O.T. 1.*

firebox. a. A chamber (as of a furnace or steam boiler) that contains a fire; specifically, the compartment of a steam locomotive in which the fuel is burned. *Webster 3d.* b. One of the small refractory lined chambers, built wholly or partly in the wall of a kiln, for combustion of the fuel. *Dodd.*

firebreak. A strip across the area in which either no combustible material is employed, or in which, if timber supports are used, sand (not waste rock) is later filled and packed tightly round them. Where timber is not used in stope supports, the firebreaks are simply stretches in the levels or winzes in which timber lagging is replaced by some other substance, such as steel or concrete. *Spalding, p. 226.*

fire breeding. S. Staff. Said of any place underground showing indications of a gob fire. *Fay.*

firebrick. a. Bricks made from a very refractory clay to withstand intense heat. *Mersereau, 4th, p. 260.* b. An aluminosilicate brick of fire-clay composition. *VV.*

fire bridge. The separating low wall between the fireplace and the hearth of a reverberatory furnace. *Fay.*

firebug. *See* mine patrolman. *D.O.T. 1.*

fire chamber. That part of a furnace which contains the fuel, as in a puddling furnace. *Standard, 1964.*

Fire-Chek Keys. Trade name; pyrometric cones made by Bell Research, Inc., E. Liverpool, Ohio. *Dodd.*

fire classification. The following explains the National Fire Protection Association classifications. Class A fires are defined as those in ordinary solid, combustible materials, such as coal, wood, rubber, textiles, paper, and rubbish. Class B fires are defined as those in flammable liquids, such as fuel or lubricating oils, grease, paint, varnish, and lacquer. Class C fires are defined as those in (live) electric equipment, such as oil-filled transformers, generators, motors, switch panels, circuit breakers, insulated electrical conductors, and other electrical devices. *I.C. 8149, 1963, p. 22.*

fire clay. a. A clay that is high in alumina or silica; diffusion is not less than cone 19 (1,515° C). Fire clays may be sedimentary or residual, plastic or nonplastic, and are dominantly composed of kaolinite. The classification of fire clays may be related to the composition, fiscal characteristics, refractoriness, use, association with other materials, etc., such as plastic fire clays, nonplastic fire clays, high-alumina fire clay, siliceous fire clay, flint clay, coal measure fire clay, sagger clay, high-heat duty fire clay, etc. *Bureau of Mines Staff.* b. An earthy or stony mineral aggregate which is composed essentially of hydrous silicates of aluminum with or without free silica. It is plastic when sufficiently pulverized and wetted, rigid when subsequently dried, and of sufficient purity and refractoriness for use in commercial refractory products. *HW.* c. Formerly used for almost any soft nonbedded clay immediately underlying a coalbed many of which are not refractory. *Compare* underclay. *A.G.I. Supp.* d. Soft, unbedded, gray or white clay, high in silica and hydrated aluminum silicates, and low in iron and alkalies. Fire clay forms the seat earth of many coalbeds and has value as refractory clay. Also called bottom stone. *Raistrick and Marshall, p. 22.* e. A stratum of rock found in anthracite mines which disintegrates on exposure to air. *Hudson.*

fire clay brick. A refractory brick manufactured substantially or entirely from fire clay. *HW. See also* first quality fire clay brick; second quality fire clay brick; third quality fire clay brick. *AISI, No. 24.*

fire clay goods. Mainly composed of fire clays with the addition of opening materials such as grog (granulated fire clay or sand). *Rosenthal.*

fire clay mineral. A poorly crystallized (partly disordered) kaolinite. *A.G.I.*

fire clay plastic refractory. A fire clay material tempered with water and suitable for ramming into place to form a monolithic furnace lining that will attain satisfactory physical properties when subjected to the heat of furnace operation. *ASTM C71-64.*

firecoat. A film produced on metallic surfaces by oxidation due to the action of heat. *Standard, 1964.*

fire crack. A fissure formed in metal during the process of reheating or that of annealing. *Standard, 1964.*

fire cracks. Cracks in ware caused by local temperature shock. *ASTM C162-66.*

fired. a. Eng. Said of a mine when an explosion of firedamp has taken place. *Fay.* b. Said of one who has been discharged from work. *Fay.*

firedamp. a. A combustible gas that is formed in mines by decomposition of coal or other carbonaceous matter, and that consist chiefly of methane; also the explosive mixture formed by this gas with air. *Webster 3d.* The gas is contained in the coal and often given off in large quantities, and explodes upon ignition when mixed with atmospheric air. *Fay.* Also called marsh gas; methane. b. A stone, brick, or concrete airtight stopping to isolate an underground fire, and to prevent the inflow of fresh air and the outflow of foul air. *See also* seal. Also called firewall. *Nelson.*

firedamp alarm. An instrument which gives a warning signal when the methane content in the atmosphere exceeds a known value. *Roberts, I, p. 83.*

firedamp cap. A small cap which forms over the flame of a safety lamp when sufficient firedamp (methane) is present. *C.T.D.*

firedamp, dangers of. Firedamp is dangerous because (1) it may cause suffocation, and (2) it may cause an explosion. The presence of firedamp in mine air reduces the oxygen available for breathing. If a flame safety lamp will not burn in the atmosphere there is danger of suffocation through oxygen deficiency. Firedamp explosions have been the cause of the worst coal mining disasters in history. *See also* methane. *Nelson.*

firedamp detector. Usually a portable device to detect the presence and determine the percentage of firedamp in mine air. *See also* methanometer; sampling instrument. *Nelson.*

firedamp detectors, automatic. *See* Ringrose firedamp alarm; Naylor Spiralarm. *Sinclair, I, pp. 28-29.*

firedamp detectors, nonautomatic. *See* Ceag Montlucon gas detector; McLuckie gas detector; S.M.R.E. firedamp recorder; M.S.A. methanometer. *Sinclair, I, pp. 29-31.*

firedamp drainage. The collection of firedamp from coal measures strata, generally into pipes, with or without the use of suction. Also called methane drainage. *B.S. 3618, 1963, sec. 2.*

firedamp drainage drill. A heavy compressed-air operated percussive, rotary or rotary-percussive drilling machine for putting up the boreholes in firedamp drainage. *See also* Hausherr DK9/51 drilling machine. *Nelson.*

firedamp explosion. An explosion of a flammable mixture of firedamp and air. *See also* colliery explosion. *Nelson.*

firedamp fringe. The zone of contact between the goaf gases and the ventilation air current at the face. *Roberts, I, p. 229.*

firedamp layer. A sheetlike accumulation of firedamp under the roof of a mine roadway where the ventilation is too sluggish to dilute and remove the gas. Although the term is new, the hazard existed since the earliest days of coal mining. A firedamp layer may be specified as one in which the gas is 5 percent or over and of a length greater than the width of the road in which it occurs. *Nelson.*

firedamp migration. The movement of firedamp through the strata or goaf of a mine. *B.S. 3618, 1963, sec. 2.*

firedamp pressure chamber. A method of firedamp drainage in coal mines without boring. When old gobs are drained, pressure chambers are built at the intake to, and at the return from, the worked-out district. These areas or chambers are sealed off and the pressure controlled either manually or automatically. The gas is drawn from the chambers in pipes passing out through the main return. The method provides a supply of gas and the underground conditions are safer. *Nelson.*

firedamp probe. A flexible rubber tube connected to a rod, which can be thrust into roof cavities and breaks so that a sample of the air may be transferred to a methanometer and its firedamp content determined. An aspirator attached to the methanometer is used to pump the air sample into the instrument. *Nelson.*

firedamp reforming process. Methane has twice the calorific value of town's gas, and in some cases, the gas obtained from firedamp drainage has to be modified by catalytic reforming before it can be passed into the mains. When mixed with steam and passed over a nickel catalyst, methane is converted to a mixture of hydrogen and carbon monoxide, and when this is blended with pure methane a gas having similar properties to town's gas is produced. *Nelson.*

firedamp tests. Tests to detect the presence and concentration of firedamp in mine workings. When carrying out a test with a safety lamp, the flame is lowered until it is about one-eighth inch high. It then consists of a small blue flame with a spot of yellow light in the middle. At the top there is a faint halo of paler blue known as the fuel cap, which must not be mistaken for a small gas cap. When firedamp is present it forms a faint bluish gas cap over the testing flame. The lowest percentage that can be estimated in this way is from 1 to 1¼ percent. As the percentage of gas increases, the gas cap gradually grows upwards, and at 2 percent it forms a triangle, about as high as the testing flame is wide. When the gas percentage increases further, the triangle gets taller and taller. *See also* flame safety lamp. *Nelson.*

fire decorating. The process of firing ceramic or metallic decorations on the surface of ceramic ware. *ASTM C242-60T.*

fire division wall. Any wall which subdivides a building so as to resist the spread of fire, but is not necessarily continuous through all stories to and above the roof. *See also* firewall. *ACSG.*

fired on. Decoration fused into the surface of glazed pottery or glassware. *Dodd.*

fire door. a. The door or opening through which fuel is supplied to a furnace or stove. *Fay.* b. A fireproof door in a building or in a mine, as a door to enclose an area in which there is a mine fire. *Fay.*

fired stone. Same as heated stone. *Shipley.*

fired zircon. Any zircon, the original natural color of which has been changed or entirely eliminated by heating. The induced colors often fade. *Shipley.*

fire engine. a. Scot. A name formerly given to the steam engine. *Fay.* b. Eng. A pump worked by hand for throwing water upon gob fires. *Fay.*

fire extinguisher. A portable or wheeled apparatus for putting out small fires by ejecting fire extinguishing agents that may consist of water alone, water and chemicals (as soda-acid solutions or foam), or chemicals alone (as carbon tetrachloride, carbon dioxide, or dry chemicals). *Webster 3d. See also* air foam extinguisher; carbon dioxide gas extinguisher; chemical foam extinguisher; dry-powder extinguisher; foam fire extinguisher; soda-acid extinguisher; water/carbon dioxide extinguisher.

fire face. The surface of refractory walls exposed to direct heat of a furnace. *Bureau of Mines Staff.*

fire feeder. a. An apparatus for feeding the fire of a furnace. *Fay.* b. A stoker. *Bureau of Mines Staff.*

firefighter. In metal mining, one who is trained in fighting fires at the surface and especially underground, being subject to immediate call; generally instructed in use of self-contained oxygen breathing apparatus. Also called fireman or helmet man. *D.O.T. 1.*

firefighting plan. A plan showing the positions of items of firefighting equipment. Separate plans are used for surface buildings and underground workings. *B.S. 3618, 1963, sec. 1.*

fire finished. Glassware that has received its final surface gloss by heating the ware, usually in a flame. *Dodd.*

fire flooding. *See* in situ combustion.

fire foam. A nonflammable blanket of foamed material (for example, alum, soda, and glue) used to extinguish fires where water would make matters worse, or where sealing off of oxygen is practicable. *Pryor, 3.*

firefountaining. As a noun, the rhythmic eruption of gas-charged lava (normally basaltic) from a volcanic vent, either a localized central vent or a fissure, forming a fountain of molten rock. Lava fountains are a common type of eruption in Hawaii. They issue from fissures along rift zones on the flanks of Mauna Loa, and commonly reach heights of 300 feet and even 1,000 feet in extreme cases. The coalescing of lava fountains along a fissure produces the so-called curtain of fire. *A.G.I.*

Firefrax. Brand names for series of air-setting and heat-setting cements, made from fire clay or kaolin, able to withstand high temperatures; used in laying and repairing firebricks, furnace linings, etc. *Bennett 2d, 1962 Add.*

fire glost. *See* glost firing.

fire grate. The grate which holds the fuel in many forms of heaters and furnaces. *Fay.*

fire-heavy. Eng. Words marked upon the scale of a mercurial barometer to indicate when much firedamp may be expected to be given off in the mine, and to show that extra vigilance is required to keep the ventilation up to its full strength. *Fay.*

fire inspector. *See* mine patrolman. *D.O.T. 1.*

fire kiln. An oven or place for heating anything. *Fay.*

fire lamp. a. Eng. An iron basket on three legs, or hung by chains from posts, in which coal is burnt to give light to miners where gas is not used. *Fay.* b. An iron bucket or basket of fire suspended in a pit shaft (shallow mine) to create a draught or ventilation through the workings. *Fay.*

fireman. a. Eng. A man whose duty it is to examine with a safety lamp the underground workings, to ascertain if gas is present, to see that doors, bratticing, stoppings, etc., are in good order, and generally to see that the ventilation is efficient. *See also* fire boss; fire fighter. *Fay.* b. In a metal mine, a miner whose duty it is to explode the charges of explosive used in headings and working places. *C.T.D.* c. In a fiery mine, the official who checks the underground explosive risk. *Pryor, 3.* d. In a coal mine, an official responsible for safety conditions underground. *See also* deputy. *C.T.D.*

fireman, fan. In bituminous coal mining, one who tends and fires the boiler generating steam for driving fans used for mine ventilation. *D.O.T. 1.*

fireman, tail rope. In bituminous coal mining, one who fires the boiler supplying steam for the engine which powers the tail-rope haulage system, a type of cable haulage used to raise and lower cars along an incline between the surface and a level in a mine. *D.O.T. 1.*

fireman, tipple. In bituminous coal mining, one who fires the boiler which generates steam for driving the machinery at the tipple where coal is prepared for market. *D.O.T. 1.*

fireman, washer. *See* fireman, washery. *D.O.T. 1.*

fireman, washery. In anthracite coal mining, one who tends and fires the boiler generating steam for driving the machinery in a coal-washing plant where coal is cleaned and separated from slate and other impurities to prepare it for market. Also called fireman, washer. *D.O.T. 1.*

fire marble. *See* lumachelle. *Fay.*

firemarks. a. Tiny indentations similar in appearance to pinholes, resulting from firing the enamel coating at a higher temperature or for a longer length of time than necessary. *ACSB-3.* b. In clayware, any defect in the appearance of a product resulting from direct contact with flame. *ACSG, 1963.*

fire opal. A hyacinth-red opal which gives out firelike reflections. *Fay.*

fire-opal glass. Translucent glass imitating fire opal, usually has a specific gravity of 2.4 or more. *Shipley.*

fire over. To allow a melting unit to idle at operating temperature. *A.S.T.M. C162-66.*

fire pan. York. *See* fire lamp, b. *Fay.*

fire patrolman. *See* mine patrolman. *D.O.T. 1.*

fire pillar. One of the vertical shafts, beneath each firehole, left in a setting of bricks in a top fired kiln. *Also* called feed shaft. *Dodd.*

fire pit. *See* lava pit. *A.G.I.*

fire point. Minimum temperature at which oil will burn continuously, as distinct from flashpoint. *Pryor, 3.*

fire-polish. To make glass smooth, rounded, or glossy by heating in a flame. *Bennett 2d, 1962 Add.*

fire polishing. The polishing of glassware, decorated with a pressed pattern, by holding it in a glory hole. *C.T.D.*

firepot. The vessel which holds the fire in a furnace. *Webster 3d.*

fire prevention officer. A suitable person appointed by the manager of a mine to inspect all fire-fighting appliances and equipment on the surface and underground. The equipment may include mobile pumps, hoses, extinguishers, etc. There are commonly fire stations on the surface and underground. There may be fire hydrants underground every 250 yards along main roadways to within about 50 yards of the face. *See also* mine fires. *Nelson.*

fireproofing. a. The act or process of making a thing fireproof. *Webster 3d.* b. The materials used in the process. *Webster 3d.* c. A general name applied to those forms used in the construction of floor arches, partitions, etc., for fireproof buildings. *Fay.*

fireproofing brick clay. *See* hollow brick clay. *C.C.D. 3d, 1942, p. 195.*

fireproofing tile. a. Tile for use as a protection for structural members against fire. *A.S.T.M. C43-65T.* b. Tile designed for use in exterior or interior walls, partitions, or columns where faces of the units are exposed. *ACSG.*

fire-refined copper. Copper which has been refined by the use of a furnace process only, including refinery shapes and, by extension, fabricators products made therefrom. Usually when this term is used alone, it refers to fire-refined, tough pitch copper without elements other than oxygen being present in significant amounts. *ASM Gloss. See also* fire refining.

fire refining. a. The refining of blister copper by oxidizing the impurities in a reveratory furnace and removing the excess oxygen by poling. May be used as an alternative to electrolytic refining, and in any case is carried out as a preliminary to this. *C.T.D.* b. Includes a number of processes used for the removal of impurities from impure metals produced by the smelting process. Impurities are removed by introducing air into the molten metal or exposing the metal to air, and by the addition of various fluxes and the removal of impurities as gases, drosses, or liquid slags. Lead, tin, and some types of impure copper are also fire-refined. *E.C.T., v. 8, p. 937.*

fire resistance. This term has at times been used indiscriminately to denote the resistance of a material to ignition or to the spread of flame. In the relevant British Standard 476, part 1, the meaning is restricted to the performance of complete elements of a building structure without regard to the performance of the materials of which they are composed. In the United States, fire tests for building construction and materials are the subject of American Society for Testing Materials—E119. *Dodd.*

fire rib. S. Staff. A solid rib or wall of coal left between workings to confine gob fires. *Fay.*

fire runner. In bituminous coal mining, one who enters mine immediately after blasting to search for any fires that might have been started by blast. Also called shotfirer runner; shot runner. *D.O.T. 1.*

fire sand. a. Refractory oxides or carbides used for furnace linings. *Bennett 2d, 1962.* b. A sand so free from fluxes that it is highly refractory. *Freeman. See also* foundry sand; furnace sand.

fire scale. Intergranular copper oxide remaining below the surface of silver-copper alloys that have been annealed and pickled. *ASM Gloss.*

fire seal. a. A strip across an area through which neither fire nor noxious gases can penetrate. It involves not only sealing of stopes but levels also. *Spalding, p. 226.* b. *See* sealing; explosion-proof stopping. *Mason, v. 1, p. 287.*

fire setting. An ancient method of tunneling through rock. A fire was built against the face of the mineral, which was then quenched with water, thus causing cracking. *Pryor, 3.*

fire, single. The process of maturing an unfired ceramic body and its glaze in one firing operation. *A.S.T.M. C242-60T.* Also called "one fire."

fire stink; gob stink. The smell given off when heating or spontaneous combustion occurs in the waste or elsewhere underground. *Nelson.*

firestone. a. Pyrite which was formerly used for striking fire; also, flint. *Webster 3d.* b. A stone or rock capable of withstanding a considerable amount of heat without injury. *C.T.D.* c. Synonymous with fire clay. *Fay.* d. In a slag hearth, a plate of iron covering the front of the furnace except for a few inches of space between it and the bedplate. *Webster 2d.*

fire styth. *See* fire stink. *Fay.*

fire tile. A tile, used in a furnace, which is unaffected by great heat. *Standard, 1964.*

fire travel. The movement of the zone of highest temperature around the gallery of an annular kiln. A typical rate of fire travel is one chamber per day, often a little faster. *Dodd.*

fire trier. Mid. A fire viewer. *Hess.*

fire-tube boiler. *See* Lancashire boiler. *Nelson.*

fire up. A command to start operating a drill either to collar a borehole or to restart work on the first working shift of a day. *Long.*

fire viewer. A person whose duty it is to examine the workings of a mine with a safety lamp. A fire boss. *Fay.*

firewall. a. A wall to prevent the spread of fire usually made of noncombustible materials; especially a wall completely separating two parts of a building from the basement to three feet above the roof and consisting of fire-resistive material and having all openings protected by automatically closing fire doors. *Webster.* b. A wall to retain oil in case of its escape from a tank or to prevent the spread of burning oil. *Webster 3d.*

firewatch miner. In metal mining, one who goes through a mine with his superior after each shift and looks for possible fire hazards. He works as a regular miner during the shift, but reports later, and makes his inspection after the shift has left the mine. *D.O.T. 1.*

firing. a. The process of initiating the action of an explosive charge or the operation of a mechanism which results in a blasting action. *B.S. 3618, 1964, sec. 6.* b. (Eng.) In the Derbyshire coalfield, the application of heat by building fires upon hard strata in order to soften them, preliminary to the use of the pick. *See also* fire setting. *Fay.* c. The act or process of applying fire or intense heat to anything; as, in stoking. *Standard, 1964.* d. In mining, the igniting of explosive charges. *Bureau of Mines Staff.* e. High-temperature treatment that sinters particles into a coherent product with desired properties. *VV.* f. The controlled heat treatment of ceramic ware in a kiln or furnace, during the process of manufacture, to develop the desired properties. *ACSG, 1963.* g. The process of heating ware to mature the applied coating into a porcelain enamel or a ceramic coating. *ACSG, 1963. See also* burning. h. Starting up a furnace or kiln. *Bureau of Mines Staff.*

firing a mine. Eng. Maliciously setting fire to a coal mine. *Fay.*

firing behavior. The changes in appearance and properties of ceramic ware when heated. *ACSG, 1963.*

firing cable. *See* shotfiring cable. *Nelson.*

firing circuit. *See* shotfiring circuit. *Nelson.*

firing cycle. The time required for firing (burning) the porcelain enamel. Or, more particularly, the chart of time and temperature for a burning operation. *Bryant.*

firing expansion. The increase in size that sometimes occurs when a refractory raw material or product is fired; it is usually expressed as a linear percentage expansion from the dry to the fired state. Firing expansion can be caused by a crystalline conversion (for example, of quartz into cristobalite, or of kyanite into mullite plus cristobalite), or by bloating. *See also* bloating. *Compare* after-expansion.

firing impulse. As applied to electric blasting caps, the minimum impulse of current required to fire a detonator. *Fraenkel, v. 3, Art. 16:10, p. 5.*

firing key. A special key which fits the exploder used in electric firing of blasting charges; carried by authorized shot firer. *Pryor, 3.*

firing line. Scot. An appliance used in former times for clearing a room of firedamp. A prop being set up near the face, a ring was fixed in it near the roof, and a cord or wire passed through the ring. Attaching his lamp to one end of the cord, the miner withdrew to a distance, and pulling the cord raised the lamp to the height necessary to explode the accumulated firedamp. *Fay.*

firing machine. a. A designation for the electric blasting machine. *Fay.* b. An apparatus for feeding a boiler furnace with coal. A mechanical stoker. *Fay.*

firing point. Eng. That point at which firedamp mixed with atmospheric air explodes. The percentages of gas vary from 6 to 13 percent, with the maximum explosibility at about 11 percent. *Fay.*

firing range. a. The range of firing temperature within which a ceramic composition develops properties which render it commercially useful. *ASTM C242-60.* b. The time-temperature interval in which a porcelain enamel or ceramic coating is satisfactorily matured. *ASTM C286-65.*

firing shrinkage. The decrease in size that usually occurs when ceramic ware is fired; it is usually expressed as a linear percentage contraction from the dry to the fired state. Firing shrinkage always occurs with shaped products containing plastic clay and often amounts to 5 to 6 percent. *Compare* after-contraction. *Dodd.*

firing temperature. The peak (top) temperature reached during firing. Normally considered as the setting for the furnace. *Bryant.*

firing time. The period during which the ware remains in the firing zone of the furnace to mature the coating. *ASTM C286-65.*

firkin. In England, a measure of capacity, usually one-fourth barrel. *Standard, 1964.*

firm. Corn. A solid shelf of rock; the same as bedrock. *See also* shelf. *Fay.*

firmament stone. Precious opal. *Shipley.*

firm clay. Clay or silt which can be spade dug and molded by squeezing in the hand. *Ham.*

firmly bound carbon dioxide. Carbon dioxide contained in calcium carbonate or in dissolved carbonate anions. *A.G.I. Supp.*

firn. a. More or less compacted snow-ice occurring above the snowline; it consists of small rounded crystalline grains formed from snow crystals. Also called névé. *C.T.D.* b. Snow above the glaciers which is partly consolidated by alternate thawing and freezing, but has not yet become glacier ice. *A.G.I.* c. Compacted, granular but still pervious, snow with a density usually higher than 0.4 but lower than 0.82. It is considered by some to be any snow that has survived one or more ablation seasons. Firn may later become glacial ice. *A.G.I.*

firn basin. The accumulation area of a glacier. *A.G.I.*

firn field. a. A mass of firn which is not part of a glacier. *A.G.I.* b. The accumulation area of a glacier. In this sense, it is synonymous with firn basin. *A.G.I.*

firnification. The process by which snow is changed into firn. *A.G.I.*

first. Sometimes used to designate high-quality drill diamonds. *Long.*

first aid. a. Emergency, crude repair of a bit made by a drill runner at the drill site. *Long.* b. The assistance or treatment given an injured workman immediately after, or as soon as possible after, the injury occurs. *Long.*

first arrival. The primary or first impulse recorded by seismographs. In the refraction method of seismic prospecting, the quantity observed is the time between the initiation of the seismic wave by an explosion and the first disturbance indicated by a seismic detector at a measured distance from the shot point. Since first arrivals only are considered, the wave causing the disturbance is that wave which has traveled the minimum time path between the shot point and the detector. *A.G.I.* Also called first impetus; initial impulse; initial kick. *Schieferdecker.*

first break. *See* weight break. *Briggs, p. 162.*

first bye. A diamond with a faint greenish tint. *Schaller.*

first-class conduction. Electrical conduction by the transfer of free electrons. The flow of electricity through a first-class or metallic conductor is a director flow of free electrons. Also called metallic conduction. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 22, 439.*

first-class lever. A bar having a fulcrum (pivot point) between the points where force is applied and where it is exerted. *Nichols.*

first-class ore; shipping ore. An ore of sufficient value to admit of selling to a smelter or reduction plant. *See also* second-class ore. *Nelson.*

first helper. One who tends an open-hearth furnace in which scrap iron is melted and purified to make steel; keeps records pertaining to weight of charges, time consumed in melting operations, and furnace temperature. Also called melter assistant; open-hearth furnace operator. *D.O.T. 1.*

first impetus. *See* first arrival. *Schieferdecker.*

first man. Leic. The head butty or coal getter in a stall. *Fay.*

first mining. In the room-and-pillar method, that part of the coal that is won from the rooms as distinguished from the second part which is the extraction of the remaining pillars. *Stoces, v. 1, p. 349.*

first-of-the-air. a. Ark. That part of the air current which has just entered a mine, or working place; the intake air. *Fay.* b. Ark. The working place of a mine, or the split, which is nearest the intake, or received the first of the air. *Fay.*

first order geosyncline. An extensive belt of major geosynclines such as that of the Alpine system. *A.G.I. Supp.*

first order nappe. An overturned, generally recumbent anticlinal fold in which the middle part of the overturned limb is replaced by a thrust fault. *A.G.I. Supp.*

first-quality fire clay brick. A trade term usually indicating fire clay brick of the high duty class, as classified by A.S.T.M. *A.R.I. See also* high-heat duty fire clay brick.

first ripping. The ripping work carried out as the roadway is being formed and driven forward. *See also* second ripping. *Nelson.*

firsts. a. N.S.W. The best ore picked from a mine. *New South Wales.* b. Pottery ware that has been selected as virtually free from blemishes. *Compare* lump; seconds. *Dodd.*

first side. The surface of plate which is ground and polished first. *ASTM C162-66.*

first water. Gems, particularly diamonds, of the highest value, irrespective of size, are said to be of the first water. In diamonds, the term applies to stones which are flawless, without color or are almost bluish-white. A slight amount of color detracts from the value and they are said to be off color. *Nelson.*

first way. Rift; reed; cleavage way. *See also* easy way. *Arkell.*

first weight. The first indication of roof pressure which takes place after the removal of coal from a seam. *C.T.D.*

first working; advance working. The removal of the coal in driving the entries and rooms. *Kentucky, p. 332. Compare* second working.

firth. a. A narrow arm of the sea. *Webster 3d.* b. The opening of a river into the sea. Synonym for estuary; frith (a variant spelling). *A.G.I.*

fir-tree bit. A rotary bit in which a number of cutting edges are arranged behind a pilot bit to enlarge the hole to the required diameter. *B.S. 3618, 1964, sec. 6.*

fir-tree crystal. A type of dendrite. *ASM Gloss.*

Fischer-Tropsch process. Hydrogenation of carbon monoxide to form hydrocarbons from coal or natural gases. *Pryor, 3.*

fish. a. Eng. To catch up a drowned clack by means of a fish head. *See also* fish head. *Fay.* b. To join two beams, rails, etc., together by long pieces at their sides. *Zern.* c. To pull up or out from, or as from some deep place, as if by fishing. Said of recovering lost or broken well-boring tools. *Fay.* d. The article recovered and/or the act or processes involved in the recovery of lost drilling tools, casing, or other articles from a borehole. Also called fishing. *Long.* e. Any foreign material in a well which cannot be removed at will. *Brantly, 2.*

fish backs. A term aplied to groups of closely spaced fractures in marble deposits. *Fay.*

fishbed. In geology, a deposit containing the fossil remains of fishes in predominant quantity among those of other marine animals. Also called bone bed. *Fay.*

fish bellied. Said of (1) steel girders with a convex lower edge; and (2) long straightedges, which are convex upward; such a form results in greater resistance to bending. *C.T.D.*

fished joint. A rail joint made by means of fishplates. *Ham.*

Fisher subsieve sizer. An apparatus using a gas permeability method for determination of the average particle diameter of powders. A sample, equal in weight (grams) to the true density of the material, is compacted between two porous plugs in a metal tube, to a known porosity. Air or a suitable gas, under a constant pressure head, is passed through the compressed sample and rate of flow measured by a calibrated flowmeter. The average particle diameter of the powder is indicated directly on a self-calculating chart by the liquid height in one arm of the flowmeter tube. No dispersion is required and the results are unaffected by particle shape. *Osborne.*

fisheye. a. A little-used name for moonstone, also for opal with a girasol effect. *Shipley.* b. A popular trade term for any transparent faceted stone so cut that its center is lacking in brilliancy. *Shipley.* c. A diamond cut too thin to present the maximum effect of brilliancy. *Bureau of Mines Staff.*

fisheye stone. A hydrated calcium silicate in which part of the calcium may be replaced by potassium. Synonym for apophyllite. *Fay.*

fish head. Scot. A tool for extracting clacks (valves) from mine pumps. *Fay.*

fishing. a. In drilling, the operation by which lost or damaged tools are secured and brought to the surface from the bottom of a well. *Fay.* b. The operation of attempting to recover a piece of drilling or other equipment broken off or lost from the drilling tools and left in the hole. *A.G.I.*

fishing jars. Jars having a longer stroke than drill jars. They are used in jarring loose a drilling string or casing stuck in a borehole. *Long.*

fishing job. Foreign material or tools in the hole which must be removed. *Brantly, 2.*

fishing salt; fishery salt. Coarse-grained salt produced in various ways, usually grainer or solar salt. *Kaufmann.*

fishing spear. A square-shaped, long-tapered tool, screwed on the end of either left-hand-threaded or rosined rods and used to fish or recover drill rods from a borehole one length at a time. *Long.*

fishing string. A length of drill rods (usually either left-hand-threaded or with the couplings rosined) used in fishing operations. *Long.*

fishing tap. A thread-cutting tool to cut threads inside a casing or other hollow part that is to be fished from a borehole. *Long.*

fishing tool. a. A tool to recover or overcome broken bits or other harmful objects from the bottom of a borehole. Pieces of metal are sometimes recovered by the use of a strong magnet attached to the drill string. *See also* screw bell. *Nelson.* b. Apparatus of various types used on the end of a drill string to fish or remove from the hole lost pieces of drilling equipment or tramp iron. *Long.*

fishing-tool operator. In petroleum production, one who extracts lost equipment and removes other obstacles that are encountered in the borehole while drilling oil or gas wells, or that obstruct flow from producing wells, by devising methods and directing use of special tools. Also called oil well fishing-tool operator. *D.O.T. 1.*

fishplate. Specially shaped steel plates for joining the end of one rail to the next rail in the track. The fishplates are fixed (one on each side) to overlap the rail ends and bolted through the rails. *Nelson.*

fish scale. A defect, sometimes occurring in sheet steel enamelware where a small chip or particle of the fired coating literally jumps from the surface, the chips being half-moon-shaped particles somewhat resembling the scales of a fish. Fish scale is a ground coat defect but often does not occur until the cover coat has been applied and burned. *Hansen. See also* delayed fish scaling; process fish scaling. *A.S.T.M. C286-65.*

fishtail. a. An abrupt and ragged termination of a coalbed that is considered to have resulted from a washout during the peat stage. The more or less leathery peat is believed to have been separated parallel to its bedding, permitting wedges of sand and silt to be forced into the separations in such a manner that, after the coalification has taken place, a cross section shows splayed and ragged coal separated by sandstone wedges. *Raistrick and Marshall, pp. 81-82.* b. The act or process of rotatively drilling a borehole with a fishtail bit. Also called fishtailing. *Long.* c. In roll forging, the excess trailing end of a forging. It is often used, before being trimmed off, as a tong hold for a subsequent forging operation. *ASM Gloss.*

fishtail bit. A rotary bit used to drill soft formations. The blade is flattened and divided, the divided ends curving away from the direction of rotation. It resembles a fishtail. *A.G.I.* Also called drag bit.

fishtail bolt. Anchor bolt having a split tail, cast into concrete or bedded in masonry. *Ham.*

fishtail mica. *See* A-structure. *Skow.*

fishtail structure. A coal seam structure sometimes observed along the fringe of a washout. It was probably produced by the water forcing open layers of the coaly mass and the injection of fine sand or silt into the splayed partings—the veins of coal branching out like a fishtail. *Nelson.*

fissile. a. Capable of being split, as schist, slate, and shale. *See also* fissility. *Fay; A.G.I.* b. Synonym for fissionable. Fissile is used more in England and in Canada than in the United States. *N.R.C.-A.S.A. N1.1-1957.*

fissile bedding. Bedding which consists of laminae less than 2 millimeters in thickness. *A.G.I.*

fissile material. *See* fissionable material. *L&L.*

fissile rock. A rock which splits into thin layers, no matter to what cause that splitting is due. *See also* slate. *Nelson.*

fissility. The quality of being fissile. *Webster 3d.* b. The property of rocks characterized by separation into parallel laminae, as slate, schist, etc. *Webster 2d.* c. The property of splitting easily along closely spaced parallel planes. *A.G.I.*

fission. a. The splitting of an atomic nucleus (as by bombardment with neutrons) especially into approximately equal parts, resulting in the release of enormous quantities of energy when certain heavy elements, such as uranium and plutonium, are split. Also called nuclear fission. Contrasted with fusion. *Webster 3d.* b. The splitting of an atomic nucleus into at least two parts of comparable size, accompanied by the ejection of two or three neutrons and occasionally other particles. *A.G.I.*

fissionable. Capable of undergoing fission, usually by the action of neutrons, but also of protons, deutrons, alpha particles, electrons, and gamma radiation. *A.G.I.*

fissionable material. Any material readily fissioned by slow neutrons; for example, uranium 235 and plutonium 239. *L&L.*

fission-product elements. Radioactive isotopes of atomic numbers 35 to 60, inclusive. *Bennett 2d, 1962 Add.*

fission-product poisoning. The absorption or capture of neutrons by fission products in a reactor, decreasing its reactivity. *L&L.*

fission products. The nuclides produced by the fission of a heavy element nuclide, such as uranium 235 or plutonium 239. Thirty-five fission-product elements from zinc through gadolinium have been identified from slow neutron fission. *N.R.C.-A.S.A. N1.1-1957.* They are of medium atomic weight, and almost all are radioactive; for example, strontium 90 and cesium 137. *L&L.*

fission yield. The quantity of energy released by fission in a nuclear explosion as distinct from that released by fusion. *L&L.*

fissle; fistle. The sound which is heard in a coal mine when the floor is rising because of pressure. *C.T.D.*

fissure. a. An extensive crack, break, or fracture in the rocks. A mere joint or crack persisting only for a few inches or a few feet is not usually termed a fissure by geologists or miners, although in a strict physical sense it is one. Where there are well-defined boundaries, very slight evidence of ore within such boundaries is sufficient to prove the existence of a lode. Such boundaries constitute the sides of a fissure. *See also* vein; lode; fissure vein. *Fay.* b. A high, narrow, relatively straight passageway in a cave. *A.G.I.*

fissure cave. A cave developed along a fissure. *Schieferdecker.*

fissured. Synonym for fractured. *A.G.I.*

fissured clay. A clay such as London clay, having a network of joints which open in dry weather. *See also* intact clay. *Ham.*

fissure eruption. *See* eruption, volcanic. *A.G.I.*

fissure system. A group of fissures having the same age and approximately parallel strike and dip. *Stokes and Varnes, 1955.*

fissure theory. The earliest theory to explain the occurrence of oil or gas in pools on anticlines. Proposed by Hunt in 1861, it assumes that the arching of strata caused them to break along the crest of the anticline, thus producing numerous small fissures. In 1878 Carll first pointed out that oil occurred in porous beds rather than in fractures or fissures. *A.G.I.*

fissure vein. a. A cleft or crack in the rock material of the earth's crust, filled with mineral matter different from the walls and precipitated therein from aqueous solution, or introduced by sublimation or pneumatolysis. *Fay.* b. A mineral mass, tabular in form, as a whole, although frequently irregular in detail, occupying or accompanying a fracture or a set of fractures in the enclosing rock. This mineral mass has been formed later than the country rock, either through the filling of open spaces along the latter or through chemical alteration of the adjoining rock. *Fay.* c. A fissure in the earth's crust filled with mineral. *Fay.* d. A fissure vein or lode may have in addition to the clear fissure filling of mineral a considerable amount of decomposed wall rock, clay, etc. *See also* fissure; lode; vein. *Fay.*

fistle. *See* fissle. *Fay.*

fit. a. The amount of clearance or interference between mating parts is called actual fit. Fit is the preferable term for the range of clearance or interference which may result from the specified limits on the dimensions (limits of size) of the shaft and hole. ASA B4.1-1955, Preferred Limits and Fits for Cylindrical Parts, standardizes on the names for 740 classes and sizes of fits each with a definite range of clearance or interference as a result of the given tolerances on hole and shaft. The standard gives 9 classes of running and sliding fits for 21 size ranges, 11 classes of clearance locations fits for 21 size ranges, 6 classes of transitional fits for 13 size ranges, 2 classes of interference locational fits for 21 size ranges, and 4 classes of force and shrink fits for 40 size ranges *ASM Gloss.* b. The adjustment of a glaze to a clay or to an already fired clay body. *ASCG. See also* glaze fit.

fitcher. Corn. To stick fast, as a drill. *Fay.*

fitchered. Said of a drill hold sufficiently crooked to make a drill stick. *Bureau of Mines Staff.*

fitchering. Corn. In drilling of short holes, jamming of bit in drill hole. *Pryor, 3.*

fit state. In Great Britain, adequate ventilation in a mine. *Mason, v. 1, p. 183.*

fittage. Newc. Expenses incurred in selling the coal. *Fay.*

fitter. a. Broadly, a skilled man who can rerepair and assemble machines in an engineering shop. In coal mining, there is at least one fitter employed underground on each shift. His main duties are the maintenance and repair of machinery, such as coal cutters, conveyors, pumps, haulages, etc. *See also* mechanic. *Nelson.* b. Eng. The person who sells coal at the shipping port. A coal factor. *See also* factor. *Fay.*

fitting. a. Scot. The whole machinery, plant, and works of a colliery. *Fay.* b. Scot. Selling coal, as the business of a fitter. *Fay.* c. Hand or bench work involved in the assembly of finished parts by a fitter. *C.T.D.*

fitting maker. *See* junction maker. *D.O.T. 1.*

fitting office. Newc. The office for the transaction of business relating to coal sales, at the shipping port. *Fay.*

fittings. a. Auxiliary and accessory tools and equipment needed to drill a borehole using either percussive, churn, rotary, diamond, or other types of drills. *Long.* b. Denotes the pieces to be attached to pipes to connect them or provide outlets, etc. *Long.* c. Small auxiliary parts of an engine or machine. *C.T.D.* d. Boiler accessories, as valves, gauges, etc. *C.T.D.* e. Special sizes and shapes of wall and floor tiles. In the United Kingdom, called fittings; in the United States, trimmers. *See also* oddments. Also called trimmers. *Dodd.*

fit-up. Formwork for concrete which is framed so that it can be struck as a complete unit without being damaged. *Ham.*

Fitz Mill. A type of fine grinding unit used, for example, in the preparation of the body for sparking plugs; trade name—W. J. Fitzpatrick Co. *Dodd.*

fiveling. A twinned crystal formed by fivefold cyclic twinning. *A.G.I. Supp.*

fix. a. The position on a map of a point of observation obtained by surveying processes. Also, the act of determining such a position. *A.G.I.* b. To fettle or line with a fix or fettling, consisting of ores, scrap, and cinder, or other suitable substances, the hearth of puddling furnace. *Fay.*

fixation. a. The act or process by which a fluid or a gas becomes or is rendered firm or stable in consistency, and evaporation or volatilization is prevented. Specifically, that process by which a gaseous body becomes fixed or solid on uniting with a solid body, as the fixation of oxygen or the fixation of nitrogen. *Fay.* b. A state of nonvolatility or the process of entering such a state; as, the fixation of a metal or the fixation of nitrogen in a nitrate by bacteria. *Standard, 1964.* c. A process by which dye colors are made permanent. *Standard, 1964.*

fix-bitumens. A group name for all authigenic, nonfluid bitumens; divided into stabile protobitumens and metabitumens. *Tomkeieff, 1954.*

fixed; clamped; built-in; encastré. A condition of support at the ends of a beam or column, or at the edges of a plate, which prevents the ends or edges from rotating in the plane of bending. It does not imply longitudinal constraint. *Compare* held. *Ro.*

fixed ash. a. The fine mud or silt washed in by water during the formation of the coal seam. *Mason, v. 2, p. 644.* b. *See* inherent ash.

fixed capital. That sunk in installation and works which is virtually unrealizable apart from its use in producing mineral which can be sold. Includes earthworks, shafts and tunnels, hydroelectric schemes of purely local value specific to the mine. *Pryor, 3.*

fixed carbon. a. In the case of coal, coke, and other bituminous materials, the solid residue other than ash, obtained by destructive distillation, determined by definite prescribed methods. *ASTM .D121-62.* b. A calculated figure obtained by subtracting from 100, the sum of the percentages of moisture, volatile matter, and ash. *B.S. 3323, 1960.* c. That part of the carbon which remains when coal is heated in a closed vessel until the volatile matter is driven off. It is the nonvolatile matter minus the ash. *Fay.*

fixed-cistern barometer. *See* Kew-type barometer. *Roberts, I, p. 19.*

fixed clip monocable. An aerial ropeway in which a moving endless rope both supports and transports carriers which are permanently fixed to it. The length of the line may be several miles. Individual loads are limited to about 2 hundredweight and total capacity seldom exceeds about 15 tons per hour. *See also* normal monocable; single jig-back. *Nelson.*

fixed coastal barrier. A barrier which has become partly or wholly attached to the mainland by landward migration or by silting up of the enclosed lagoon or tidal flat area. *Schieferdecker.*

fixed electrode method. A geophysical surveying method used in self-potential system of prospecting in which one electrode remains stationary while the other is grounded at progressively greater distances from it. The method indicates the mineral sought directly beneath the greatest anomaly and has been extensively and successfully used to prospect both mineral ores, such as pyrite, chalcopyrite and galena, and insulating material like cinnabar and stibnite. *Sinclair, II, pp. 194-195.*

fixed-feed grinding. Grinding where the wheel is fed into the work, or vice versa, by given increments or at a given rate. *ASM Gloss.*

fixed-flexible-type carrying idler. Consists of a flexible-type carrying idler mounted in a rigid frame which fixes the position of the points or roll support. *NEMA MB1-1961.*

fixed ground water. Ground water held in saturated material having interstices so small that it is permanently attached to the pore walls, and is usually not available as a source of water for pumping. *A.G.I.*

fixed guides; rigid guides. Wood bars or steel rails fixed vertically to cross buntons in a shaft. The cage shoes travel along the guides and therefore prevent the cage from swinging and doing damage in the shaft. Some skips are fitted with rubber-tyred rollers running on 6- by 4-inch steel channel guides. Guide shoes may be fitted to act as alternative guides in case of breakdown of rollers. Fixed guides are used when shaft space is limited, that is, when the clearances do not permit the use of flexible or rope guides. *Nelson.*

fixed needle traverse. In surveying, one made with compass fitted with sight line which can be moved above a graduated horizontal circle, so that the azimuth angle can be read as with a theodolite. Used for rough work where the local existence of magnetic material might deflect a swinging (loose) compass needle. *Pryor, 3.*

fixed-position welding. Welding in which the work is held in a stationary position. *ASM Gloss.*

fixed rent. Scot. The minimum yearly rent for use of a mineral field. *Fay. See also* minimum rent. *Nelson.*

fixed retaining walls. Walls which are rigidly supported at top and bottom. Such walls have to withstand a pressure much greater than that due to earth pressure on a free retaining wall. *Ham.*

fixed screen. A stationary inclined or curved panel, commonly of wedgewire, which is used to remove a large proportion of water and fines from a suspension of coal in water. *B.S. 3552, 1962.*

fixed wrench. A wrench the jaws of which are rigidly fixed and not adjustable; also, a rod-pulling wrench made by welding the movable jaw to the handle of a discarded Stilson or pipe wrench in such a position that the distance between the two jaws of the wrench is about one-eighth inch greater than the diameter of the rod on which the wrench will be used. *Long.*

fixing block. A building unit that may be made of clay, lightweight concrete or breeze, and that is sufficiently soft to permit nails to be driven in but sufficiently nonfriable to hold the nails firmly in position. Clay fixing blocks are made to have a high porosity, the pores being of controlled size. *Dodd.*

fixing moment. Bending moment required at the end support of a beam to fix it so that it will not rotate. *Ham.*

fixture. An article which may or may not actually be affixed to the freehold as, for instance, engines, boilers, hoisting works, mills, pumps, electric hoist firmly bolted to the substructure upon which it rests, the superstructure and engine house sufficiently affixed to the soil for mining purposes, a gallows frame together with the gallows and transformers forming integral parts of one mechanism. So, derricks, belt houses, wells, oil-well casing, tanks, pump house, camp house, and bunkhouse, affixed to the land become a part of the realty. *Ricketts, p. 377.*

fizelyite. A dark lead-gray sulfantimonite of lead and silver, $5PbS.Ag_2S.4Sb_2S_3$. Deeply striated prisms. Monoclinic. From Kisbanya, Romania. *English.*

flabby cast. A fault sometimes encountered in the casting of pottery ware. The article appears satisfactory as cast but subsequently deforms, either as a result of a thixotropic effect or because the interior of the casts is still fluid; if the cause is thixotropy, the amount of sodium silicate (Na) and Na_2CO_3 used as deflocculant should be increased; the second cause is most common in the casting of thick ware and is prevented by increasing the casting rate. *Dodd.*

flabellate. Resembling a fan in shape. *Webster 3d.*

flag. a. Sandstone or sandy limestone rocks, usually more or less micaceous, which are fissile along the bedding planes, splitting into slabs. Sometimes misnamed slates because used for roofing rather than paving. *Arkell.* b. A track signal or target. *Zern.* c. Ches. A bed of hard marl overlying the top stratum of a salt bed. *Fay.* d. A thin slab of stone. *See also* flagstone. *Fay.*

flagger. In bituminous coal mining, a laborer who attaches a flag to the rear car of a loaded train of cars (if flag is missing at end of haulage trip, it denotes train has lost one or more cars, and all motormen are warned). Also called flagman. *D.O.T. 1.*

flagging. a. In geophysical work, the use by surveyors of flags of cloth, paper, or plastic to mark instrumental or shot locations. *A.G.I.* b. A pavement of large stone slabs. *A.G.I. Supp.* c. Slabs of slate used for paving porches, patios, terraces, verandas, walkways, and for stepping stones. *A.I.M.E., p. 797.*

flagging a squib. Uncoiling the end of the paper which is impregnated with sulfur or some other combustible substance. Flagging the squib permits more time to elapse from the ignition of the unrolled paper and the firing of the charge of powder. *Fay.*

flaggy. a. Capable of being split into parallel-faced slabs thicker than slates. *Fay.* b. Strata from 10 to 100 millimeters thick. *A.G.I.*

flagman. *See* flagger. *D.O.T. 1.*

flags. Thin-bedded hard sandstones that can be used for flagstones. *A.G.I. Supp.*

flagstaffite. Colorless, transparent, orthorhombic crystals identical with terpene hydrate, $C_{10}H_{20}O_2.H_2O$, found with resin in the radial cracks of fossil pine trees. *Tomkeieff, 1954.*

flagstone. A rock that splits readily into slabs suitable for flagging. *Fay.*

flaikes. Sandstone which splits along the grain. *C.T.D.*

flail. A hammer hinged to an axle so that it can be used to break or crush material. *Nichols.*

flajolotite. A discredited term equal to tripuhyite, probably $FeSbO_4$. *American Mineralogist, v. 39, No. 3-4, March-April 1954, p. 405.*

flake. A flat fragment of a rock or a mineral with maximum dimension of less than 4 millimeters. *A.G.I.*

flake copper. Very thin scales of native copper. *Weed, 1922.*

flake mica. Finely divided mica recovered from mica and sericite schist and as a byproduct of feldspar and kaolin beneficiation. *See also* scrap mica. *Skow.*

flake powder. In powder metallurgy, flat or scalelike particles, relatively thin. *ASM Gloss.*

flake sulfur; float sufur. Pyrite occurring as thin flakes on the natural cleavage surfaces of coal that floats readily on the surface of the wash water in the washing process. *Mitchell, p. 67.*

flake white. A name sometimes given to pure white lead. *Fay.*

flaking. a. Thin chips or slivers that break from a ceramic surface. *Bureau of Mines Staff.* b. The breaking of small chips from a refractory face, particularly chrome ore containing refractories. This may be allied with bursting. *A.I.S.I. No. 24.*

flambé. A form of lusterware, usually red or yellow, with flamelike splashes of blue, violet, and other colors, giving changing tints in different aspects. *C.T.D.*

flambé glaze. A flow glaze with copper, which gives a variegated effect. *A.C.S.G., 1963.*

flamboyant structure. The optical continuity of the crystals or grains as disturbed by a divergent structure caused by slight differences in orientation. *A.G.I.*

flame. A burning mixture of a combustible gas (or vapor) and air. Solid fuels burn with a glow, but with little flame. Flames are normally hot, but under some conditions are cool. Principal types of flame are: luminous, nonluminous, long (lazy) flames, and short flames. *Francis, 1965, v. 2, p. 436.*

flame coal. High volatile bituminous coal that burns with a bright flame. *A.G.I. Supp.*

flame coloration. *See* flame reaction. *Fay.*

flame-coloration tests. In mineral identification, qualitative tests made by moistening powdered material with Hcl, placing a few grains on platinum or nickel-chrome wire, and noting any color imparted to blue Bunsen flame. Sodium gives a strong yellow flame; calcium light red; strontium crimson; barium green; potassium lilac; copper blue-green. *Pryor, 3.*

flame cutting. Steel and other metals can be cut with an oxyhydrogen, oxycoal gas, or oxyacetylene flame up to a thickness of about 40 inches. Modern flame cutting profiling machines operate to close tolerance. *Ham.*

flame drill method. Another name for jet piercing. *AIME, p. 326.*

flame gun. A large blowtorch using kerosine for fuel. *Nichols.*

flame hardening. A method for local hardening in which the steel is heated by a mechanically operated oxyacetylene blowpipe which traverses the object to be hardened at a predetermined rate. Quenching is often carried out by a jet of water following immediately behind, also mechanically controlled. The hardened layer may vary in depth from a mere skin to 0.25 inch, according to the material being treated. *Ham.*

flame inhibitor. A substance, such as hexachloroethane, used for coating limestone dust for use in stone-dust barriers. The inhibitor is dissolved in the waterproofing agent. Tests have indicated its effectiveness in preventing or reducing the propagation of coal-dust explosions. *Nelson.*

flame kiln. A limekiln burning wood. *Standard, 1964.*

flameless combustion. Term sometimes used for surface combustion. *See also* surface combustion. *Dodd.*

flame opal. a. Opal in which red play of color occurs in more or less irregular streaks. *Shipley.* b. A flash opal with red as the predominant color. *Shipley.*

flame photometry. The spectrum measurement of a substance heated to incandescence in a flame. *A.G.I. Supp.*

flame plating. This process, developed by Linde Air Products Company, is the application of a thin coating of refractory material to a surface by the introduction of the plating powder, oxygen, and acetylene into a chamber where the explosive gas mixture is detonated, the plating powder thus being melted and projected on the inner surface of the chamber and on any object within it. *Dodd.*

flameproof. A term descriptive of electrical machines, switches, and fittings demanded legally for use in fiery mines in Great Britain. Enclosing boxes with accurately fitted wide flanges are used. *Pryor, 3. See also* explosion proof. *C.T.D.*

flameproof construction. A flameproof enclosure for electrical apparatus, is one which, under normal working conditions, will withstand the internal explosion of a flammable gas which may exist within it, and which will prevent the transmission of a flame capable of igniting an explosive atmosphere outside the equipment. *Roberts, II, p. 141.*

flameproof enclosure. An enclosure for electrical apparatus which will withstand, without injury, any explosion of the prescribed flammable gas that may occur within it under practical conditions of operation within the rating of the apparatus (and recognized overloads, if any, associated therewith), and will prevent the transmission of flame such as will ignite the prescribed flammable gas which may be present in the surrounding atmosphere. *See also* certified apparatus. *B.S. 3618, 1965, Sec. 7.*

flame reaction. The characteristic coloration that certain chemical elements or their compounds impart to a nonluminous flame (as yellow from sodium or green from copper). *Webster 3d.*

flame recorder. Synonymous with photographic-paper recorder. *Rice, George S.*

flame-resistant cable. A portable cable that will meet the flame test requirements of the U.S. Bureau of Mines. *ASA C42.85, 1956.*

flames. Drag phenomena, occurring in the lower limb or in the autochthonous sedimentary cover, caused by overthrust folding. *Schieferdecker.*

flame safety lamp. A lamp, the flame of which is so protected that it will not immediately ignite firedamp. The original flame safety lamp was developed by Sir Humphrey Davy in 1815 and there are several varieties. The flame is generally surrounded by a cylindrical covering of wire gauze. An explosive or flammable mixture of gas entering the lamp will be ignited by the flame, but the flame of combustion will not pass through the cool gauze and ignite the gas outside the lamp. The illuminating power of these lamps is slightly more than 1 candlepower, and they will burn for an entire shift with one filling. Each lamp is generally provided with a relighting device, and with a magnetic lock to prevent the lamp being opened in the mine. The chief disadvantage of this lamp is its low illuminating power. *Fay; Lewis, pp. 734-735. See also* safety lamp; electric cap lamp.

flame spectrum. The spectrum obtained by volatilizing substances in a nonluminous flame. *Webster 3d.*

flame spinel. Intensely bright orange-red rubicelle. *Shipley.*

flame spraying. The process of coating a surface (of metal or of a refractory) by spraying it with particles of oxides, carbides, silicides, or nitrides that have been made molten by passage through an oxyacetylene or oxyhydrogen flame; the coating material can be fed into the flame either as a powder or as a continuous rod. The object is to provide a thin protective coating, usually to prevent oxidation, as in the flame spraying of alumina on to steel. *Dodd.*

flame straightening. Correcting distortion in metal structures by localized heating with a gas flame. *ASM Gloss.*

flame structure. a. Load cast showing some evidence of some horizontal slip. *A.G.I. Supp.* b. Load cast in which part of an underlying layer has been squeezed irregularly upward into the overlying layer. *A.G.I. Supp.* c. The mud plumes separating the downward bulging load pockets or load casts of sand at sand-shale interface. Also described as streaked-out ripples. Also called antidune; load wave. *Pettijohn.*

flame test. The use of the characteristic coloration imparted to a flame to detect the presence of certain elements. *A.G.I.*

flame trap. A device, consisting of a pack of thin stainless-steel plates set with a gap between each equal to one-fiftieth of an inch, placed in the air intake pipe of a compression-ignition engine to guard against possible emission of sparks or extreme heat. *Mason, v. 2, p. 448.*

flaming coal. Coal containing from 70 to 75 percent carbon and yielding from 50 to 65 percent powdery coke. It burns with a smoky flame with little or no agglomeration (or binding). *Nelson.*

flammability (dust cloud). The flammability of a dust cloud is its ability to promote a spreading inflammation away from the source of ignition. *Sinclair, I, p. 250.*

flammable. Capable of being easily ignited and of burning with extreme rapidity. This adjective is now used technically in preference to inflammable because of the possible ambiguity of the in- prefix. For example, certain equipment cannot be used for safety reasons in coal mines in which flammable gases are present. *Webster 3d.*

flammable fringe; explosive fringe. In a system where air (or other reactant gas) and a flammable gas are present, that region in which the two gases have mixed to produce a gas capable of propagating flame. *B.S. 3618, 1963, sec. 2.*

flammable mixture of gases. A mixture which, when once ignited, will allow flame to be self-propagated throughout the mixture, independent of and away from the source of ignition. In coal mines, it is only when the methane and air are mixed in certain definite proportions that the mixture is flammable and explosive, and will allow flame to spread in all directions. *See also* limits of flammability. *Nelson.*

flammkohle. Ger. High volatile coal; coal that burns with a strong flame. *Hess.*

flampard. Derb. A very rough, granular-structured stone. *Arkell.*

flamper. Derb. Clay ironstone in beds or seams. *Fay.*

flamrich screen. *See* resonance screen. *Nelson.*

flan. Shrop. A dark slate. *Arkell.*

flang. Corn. A two-pointed pick used by miners. *Fay.*

flange. a. Eng. In the Derbyshire coalfield, a place where the vein turns out of its course. *Fay.* b. Applied to a vein widening. *Fay.* c. The projecting annular rim around a cylinder, used for strengthening, fastening, or positioning. *ASM Gloss.* d. A circular metal plate that drives a grinding wheel. *ASM Gloss.* e. A foundry molder's tool for forming flanges. *Webster 3d.* f. A plate to close a pipe opening or other orifice; a blank flange. *Standard, 1964.* g. A rib or offset on a casting. *Crispin.* h. The circular faces of couplings or of pipe fittings. *Crispin.* i. The turned edge of a metal shape or plate which resists bending strain. *Crispin.* j. A ridge that prevents a sliding motion. *Nichols.*

flange bolts. Newc. Bolts for fastening pumps, or pipe flanges, together. *Fay.*

flanged bottom. An imperfection; an offset bottom of a bottle. *ASTM C162-66.*

flanged finish. *See* finish. *Dodd.*

flange wheel. A truck or trolley wheel having a flange or flanges at the edge to keep it from leaving the rail. *Crispin.*

flank. a. Another term for a limb of a fold. Also synonymous with leg; shank; branch; slope. *Billings, 1954, p. 34. See also* limb. b. The end surface of a tool that is adjacent to the cutting edge and below it when the tool is in a horizontal position as for turning *ASM Gloss.*

flank bore. *See* flank hole. *B.S. 3618, 1963, sec. 4.*

flank hole. a. A hole bored ahead of a working place, when approaching old workings. *C.T.D.* b. A borehole to detect water, gas, or other danger, driven from the side of an underground excavation in a line not parallel with the center line of the excavation. Also called flank bore; flanking hole. *B.S. 3618, 1963, sec. 4.*

flanking hole. A shothole drilled at an acute angle to the coal face for the purpose of trimming it. *B.S. 3618, 1964, sec. 6.*

flanking hole method. Holes bored into the face at an angle which may vary from 30° to 60° to the line of face and 6 feet to 7 feet in length. The distance between shot holes, the angle of the hole, and the charge, depend to a great extent on the hardness of the coal. As the coal grows harder the burden on each shothole must be reduced by placing the shotholes closer together and reducing the angle of the hole to the face. *McAdam II, p. 109.*

flanking moraine. The term moraine originally defined an accumulation of ice-borne rock rubbish dropped at the terminus, or along the sides, of an Alpine glacier. The term lateral moraine has established usage, as applied to a mountain glacier, and it should not be applied to the sidelong or flanking moraines left by lobes or tonguelike projections of an ice sheet. An appropriate term is flanking moraines. *A.G.I.*

flank production. Usually applied to the oil obtained around the periphery or flank of a geologic feature, as from the dragged-up and severed reservoirs on the flanks of a salt plug. *A.G.I.*

flanks. Outer edges of a carriageway, also referred to as shoulders. *Ham.*

flans. Shrop. Stony pieces of coal that will not burn. *Arkell.*

flap. a. A gravity-collapse structure. A bed that has slid down the side of an anticline and bent over so that it is now upside down. *A.G.I.* b. Same as clack, a *Long.* c. The hinged, flat disk mounted inside the lower end of a split- or other-type dry-sample barrel that closes and holds the sample within the barrel when it is withdrawn from a boring. *Long.*

flap door. Newc. A manhole door. *Fay.*

flapper. a. A laborer who flattens copper starting sheets by beating them against a rigid steel or copperplate with a wooden paddle to remove folds, buckles, and creases which tend to cause short circuits during electrolytic copper refining. *D.O.T. 1.* b. *See* clack, a. *Long.*

flapper topped air crossing. Eng. An air crosssing fitted with a double door or valve giving direct communication between the two air currents when forced open by the blast of an explosion. *Fay.*

flapper valve. *See* clack valve. *Long.*

flapping. a. Striking through the slag-covered surface of molten copper with a rabble blade just before the bath is poled to hasten oxidation. *ASM Gloss.* b. Striking the surface of molten copper with an iron scraper or rabble to increase the surface exposed to the air. *Mersereau, p. 482.*

flaps. Eng. Rectangular wooden valves about 24 by 18 by 1½ inches thick, hung vertically to the framework of the air chambers of a ventilator. A flap valve. *Fay.*

flap seat. *See* clack seat. *Long.*

flap trap. A nonreturn valve to prevent flooding. *Ham.*

flap valve. Nonreturn valve formed by hinged flap, which rises as fluid is drawn up through a pipe or chamber and falls back on its seating to prevent return flow. *Pryor, 3.*

flare bed. The refractory-lined duct that conveys gas from the producers to the combustion chambers in a setting of horizontal gas retorts. *Dodd.*

flared column head. Circular concrete column expanding to a cone shape below a floor slab, as seen in mushroom construction. *Ham.*

flare header. A brick fired on one end to a darker color than the face. *ACSG.*

flare-type bucket. A dragline bucket with a bowl of aluminum alloy covered top and bottom with steel wearing plates. Sides and back are of steel plates, and manganese steel is used for the lip and teeth. This bucket has no arch; thus weight is minimized. The sides are flared, permitting heaped loading, and the bucket dumps backward, not forward, thereby giving a somewhat longer dumping range. *Lewis, pp. 533-534.*

flaring cup. A cup wheel with the rim extending from the back at an angle so that the diameter at the outer edge is greater than at the back. *See also* cup wheel. *ACSG, 1963.*

flaser gabbro. A cataclastic gabbro in which are preserved lenses (phacoids, augen) of undeformed rock. *See also* allalinite; gabbro schist; mylonite; zobtenite. *A.G.I.*

flaser gneiss. A cataclastic rock, usually of igneous origin, with lenses (placoids, augen) of undeformed rock. *See also* augen gneiss; hartschiefer; kakirite; mylonite; stronalite. *A.G.I.*

flaser granite. A cataclastic granite with lenses (phacoids, augen) of undeformed rock. *See also* augen gneiss; mylonite; stronalite. *A.G.I.*

flaser structure. a. A structure developed in granitoid rocks and especially in gabbros by dynamic metamorphism. Small lenses of granular texture are set in a scaly aggregate that fills the interstices between them. It appears to have been caused by shearing that has crushed some portions more than others, and that has developed a kind of rude flow structure. *Fay.* b. A structure developed in gneisses, gabbros, etc., by dynamic metamorphism. Small lenses of granular material are separated by wavy ribbons and streaks of finely crystalline, foliated material, usually aggregates of parallel scales in wavy or in bent lines. *A.G.I.* c. Lenticles of fine sand or silt, commonly aligned and usually crossbedded, which superficially resembles the flaser structure of some mylonites and other sheared metamorphic rocks. *Pettijohn.*

flash. a. Ches. A subsidence of the surface due to the working of rock salt and pumping of brine. *Fay.* b. In forging, the excess metal forced between the upper and lower dies. *ASM Gloss.* c. In die casting, the fin of metal which results from leakage between the mating die surfaces. *ASM Gloss.* d. In resistance butt welding, a fin formed perpendicular to the direction of applied pressure. *ASM Gloss.* e. The formation, by surface fusion or vitrification, of a film of different texture and/or color on clay products or on glassware. In the firing of clay products, flashing may occur unintentionally; it is then a defect because of its uncontrolled nature. Bricks that are intentionally flashed make possible pleasing architectural effects. Flashed glassware is made by fusing a thin film of a different glass (usually opaque or colored) on the surface of the ware. *Dodd.* f. In structural brickwork, a sheet of impervious material secured over a joint through which water might otherwise penetrate. *Dodd.* g. A fault in glassware. *See also* fin, b. *Dodd.* h. The fin of excess body formed during the plastic pressing of ceramic ware, for example, electrical porcelain; it is removed by an auxiliary process. *Dodd.* i. Alternative name for casting spot. *See also* casting spot. *Dodd.*

flashboard. *See* stop log. *Ham.*

flash box. A box in which a light source, an electromagnet, and a telescope are all mounted in the pendulum apparatus of gravitational recording. *A.G.I.*

flash-butt welding. A resistance welding process which may be applied to rod, bar, tube, strip, or sheet to produce a butt joint. After the current has been switched on, the two parts are brought together at a predetermined rate so that discontinuous arcing occurs between the two parts to be joined. This arcing produces violent expulsion of small particles of metal (flashing) and a positive pressure in the weld area excludes air, minimizing oxidation. When sufficient heat has been developed by flashing, the parts are pressed together so that all fused and oxidized material is extruded from the weld. *Ham.*

flash coal dryer; suspension dryer. An appliance in which the moist coal is fed into a column of upward-flowing hot gases and moisture removal is virtually instantaneous. Suspension dryers are widely used in the United States for drying coals from one-half inch downwards in size. *See also* Cascade coal dryer; Raymond flash dryer. *Nelson.*

flashed. Clear glass encased with a thin layer of glass of another color. *Haggar.*

flashed brick. a. Variegated colored brick produced by the flashing process. *Bureau of Mines Staff.* b. Brick subjected to reducing conditions near the end of the firing cycle to develop the desired color. *ACSG, 1963.*

flashed glass. A term sometimes applied to glass colored by the application of a thin layer of densely colored glass to a thicker, colorless, base layer. *C.T.D.*

flashes. Shallow lakes created by the removal of coal. *Briggs, p. 11.*

flash fire opal. Same as flash opal. *Shipley.*

flash flood. A sudden flood resulting from a cloudburst. *A.G.I. Supp.*

flashing. a. Firing a kiln under reducing conditions to obtain certain desired colors on clayware; colors may be affected by adding manganese, salt, or zinc. *ACSG, 1963.* b. A thin impervious material placed in mortar joints and through air spaces in masonry to prevent water penetration and/or to provide water drainage. *ACSG, 1963.* c. Applying a thin layer of opaque or colored glass to the surface of clear glass or vice versa. *See also* striking. *ASTM C162-66.* d. In glassmaking, the reheating of partially formed glassware in a flashing furnace, to restore the plastic condition and to smooth rough edges. *Fay.*

flashing furnace. A furnace for reheating glass. *Fay.*

flashless nonhygroscopic powder. Smokeless powder containing flash-reducing substances, such as mineral salts, metals, etc., and rendered nonhygroscopic by a coating. Abbreviation, FNH powder. *Bennett 2d, 1962.*

flashlight powder. Two parts of powdered magnesium with one part of potassium chlorate. *Crispin.*

flash marks. a. Discoloration on the surface of a brick resulting from the adherence of fly ash or the impingement of a reducing flame during burning. *A.R.I.* b. Cross-set marks due to flashing reduction penetrating to certain sections of the brick. *ACSG, 1963.*

flash opal. An opal in which the play of color is limited to a single hue. *Shipley.*

flashpoint. a. The minimum temperature at which sufficient vapor, is released by a liquid or solid to form a flammable vapor-air mixture at atmospheric pressure. *I.C. 8137, 1963, p. 76.* b. The temperature to which an oil must be heated in a specified instrument for sufficient vapor to be given off to form a flammable mixture with air under the prescribed conditions. *Francis, 1965, v. 1, p. 271.* c. The temperature at which petroleum, being heated, begins to evolve vapor in such quantity that on the application of a small flame a momentary flash occurs due to the ignition of the vapor. Also called flashing point. *Fay.*

flash plate. A very thin final electrodeposited film of metal. *ASM Gloss.*

flash radiography. High-speed radiography in which exposure times are short enough to give an unblurred photograph of moving objects, such as fired projectiles and high-speed machinery. *ASM Gloss.*

flash roast. a. Rapid removal of sulfur as finely divided sulfide mineral is allowed to fall through a heated oxidizing atmosphere. *Pryor, 3.* b. Also called suspension roast. *Newton, p. 289.*

flash set. The setting of cement during or immediately after mixing. *Taylor. Compare* false set.

flash test. A trial to determine the flash point of volatile oils, such as kerosine. *Standard, 1964.*

flash wall. A continuous wall refractory brickwork built inside a downdraught kiln in front of the fireboxes; its purpose is to direct the hot gases towards the roof of the kiln and to prevent the flames from impinging directly on the setting. *Dodd.*

flash welding. A resistance butt-welding process in which the weld is produced over the entire abutting surface by pressure and heat, the heat being produced by electric arcs between the members being welded. *ASM Gloss.*

flask. a. A tinned vessel in which a miner carries oil for his lamp, or beverage for his lunch. *Fay.* b. In foundry work, a molding box which holds the sand into which molten metal is poured. Top half or part is its cope, bottom is drag, furnished with locating lugs. *Pryor, 3.* c. An iron bottle in which quicksilver is sent to market. It contains 76½ pounds. *Fay.* d. A necked vessel for holding liquids; especially, a broad, flattened vessel of metal or sometimes glass. *Webster 3d.*

flasrig. A German term for a texture found in gneisses, gabbros, etc., and caused by dynamic metamorphism. Short layers or small lenses of granular texture alternate with still thinner (flaser) layers composed of aggregates of parallel scales in wavy or bent lines. *Stokes and Varnes, 1955.*

flat. a. Eng. In the Derbyshire coalfield, a district or set of workings separated by faults, old workings, or barriers of solid coal. *Fay.* b. N. of Eng. A siding or station underground; a parting. *Fay.* c. In Arkansas, a railroad car of the gondola type for shipping coal. *Fay.* d. In mine timbering, horizontal crosspiece or cap used in roof support. *Pryor, 3.* e. Of a mining lode, one less than 15° from horizontal in its dip. *Pryor, 3.* f. A flat coal seam. *Korson.* g. N. of Eng. In single place workings, the area served by one or more putters. *Trist.* h. Eng. Any passbye to which the putters or trailers bring the full tubs. *SMRB, Paper No. 61.* i. Eng. The area of working places from which coal is brought to the same passby. *SMRB, Paper No. 61.* j. Eng. The area of working places under the supervision of a deputy overman. *SMRB, Paper No. 61.* Also called siding. k. In the Wisconsin and Illinois zinc district, flat is used for the horizontal joints or bedding planes along which ore has formed. *A.G.I.* l. Eng. In Derbyshire coalfield and N. Wales, a horizontol vein or ore deposit, which is auxiliary to a main vein. Also, any horizontal portion of a vein which is not horizontal elsewhere. *Fay.* m. A dull diamond bit. *Long.* n. Synonym for macle. *Long.* o. A level surface of land with little or no relief; a plain. A tract of wet, low-lying level land. *Webster 3d.* p. A general term meaning smooth, or even; a surface of low relief. *See also* tidal flat. *A.G.I.*

flat arch. a. An arch in which both outer and inner surfaces are horizontal planes. *H.W.* b. In furnace construction, a flat structure spanning an opening and supported by abutments at its extremities; the arch is formed by a number of special tapered bricks, and the brick assembly is held in place by their keying action. Also called a jack arch. *HW. See also* suspended arch.

flat-back arch. A 9- by 6-inch special arch brick, one large face of which makes an angle other than 90° with the edge faces. *Bureau of Mines Staff.*

flat-back stope. An overhand stoping method in which the ore is broken in slices parallel with the levels. Also called longwall stope. *Fay.*

flat belt conveyor. A type of belt conveyor in which the carrying run of the conveyor belt is supported by flat belt idlers or by a flat surface. *ASA MH4.1-1958.*

flat belt idler. An idler consisting of one or more rolls supporting the belt in a flat position. *ASA MH4.1-1958.*

flat bit. A dull diamond or percussive-type rock-cutting bit. *Long.*

flat-bottom crown. *See* flat-face bit. *Long.*

flat coal. Coal that is flat and hence not suitable for the market. *Mitchell, p. 182.*

flat coals. Scot. Seams of coal lying horizontal or at a low angle of inclination. *Fay.*

flat course. A course of brick laid in a wall with their largest faces horizontal. *A.R.I.*

flat cut. A manner of placing the boreholes, for the first shot in a tunnel, in which they are started about 2 or 3 feet above the floor and pointed downward so that the bottom of the hole shall be about level with the floor. *Fay.*

flat double cabochon. Same as lentil. *Shipley.*

flat drawn. Sheet glass made by the vertical drawing process. *Dodd.*

flat drill. A rotary end-cutting tool constructed from a flat piece of material provided with suitable cutting lips at the cutting end. *ASM Gloss.*

flat edge trimmer. A machine for trimming notched edges on shells. The slide is cam driven to obtain a brief dwell at the bottom of the stroke, at which time the die, sometimes called a shimmy die, oscillates to trim the part. *ASM Gloss.*

flat ends. Thin cleavages from the faces of a diamond crystal. *Bureau of Mines Staff.*

flat face. *See* flat-face bit. *Long.*

flat-face bit. A diamond core bit the face of which, in cross section, is square. Also called flat-bottom crown; flat-nose bit; square-nose bit. *Long.*

flat gel. A condition wherein the ten minute gel strength is substantially equal to the initial gel strength. *Brantly, 1.*

flat glass. A general term covering sheet glass, plate glass, and various forms of rolled glass. *ASTM C162-66.*

flat hole. A borehole following a near horizontal course. *Long.*

flat idler. A belt idler that supports the belt in a flat position. *NEMA MB1-1956.*

flatiron. A triangular-shaped, sloping-mesa type of hogback ridge, often occurring in series on the flank of a mountain. *A.G.I.*

flat jack. A hollow steel cushion formed of two almost flat discs, welded around the edge, which is inflated under controlled pressure. Jacks of this type were used by Freyssinet in the construction of the Plougastel bridge. *See also* jack. *Ham.*

flat joint. In igneous rocks, a joint dipping at 45° or less and randomly oriented with respect to other joints. *G.S.A. Mem. 5, 1937, p. 39.*

flat-joint pointing. A pointing in which the mortar is flush with the surface and is lined with the point of the trowel. *Standard, 1964.*

flat lad. Eng. Same as craneman, a. *Fay.*

flat lode. A lode which varies in inclination from the horizontal to about 15°. *Fay.*

flat-lying. Said of deposits and coal seams with a dip up to 5°. *Stoces, v. 1, p. 56.*

flat-lying gravity fault. *See* plane of stretching. *A.G.I.*

flat-lying joints. Joints occurring in some igneous rocks. The origin of such joints is somewhat uncertain. *Lewis, p. 603.*

flatman. N. of Eng. One who links (couples) the cars together at the flats, or levels. *See also* flat, b. *Fay.*

flat mass. Synonym for blanket deposit. *A.G.I. Supp.*

flatness. a. A measure of the shape of a pebble given by the sum of the long and the intermediate diameters of the pebble divided by twice the short diameter. *A.G.I.* b. A measure of the shape of a pebble given by the ratio of the radius of curvature of the most convex portion of the flattest face to the mean radius of the pebble. *A.G.I.*

flatnose bit. *See* flat-face bit. *Long.*

flatnose shell. A cylindrical tool with a valve at the bottom, for boring through soft clay. *Fay.*

flat of ore. A horizontal ore deposit occupying a bedding plane in the rock. *See also* flat. *Fay.*

flat-position welding. Welding from the upper side, the face of the weld being horizontal. Also called downhand welding. *ASM Gloss.*

flat rails. Scot. Tramrails. *Fay.*

flat rods. A series of horizontal or inclined connecting rods, running up upon rollers, or supported at their joints by rocking arms, to convey motion from a steam engine or water wheel to pump rods at a distance. *Fay.*

flat rope. A steel rope made up of a number of loosely twisted four-strand ropes placed side by side, the lay of the adjacent strands being in opposite directions to secure uniformity in wear and to prevent twisting during winding. The strands are sewn together with steel wire. At one period, flat ropes were widely used but round strand ropes are now preferred. *Nelson.*

flats. a. Eng. Subterraneous beds or sheets of traprock or whin. *Fay.* b. Eng. Tracts of coal seams which lie at a moderate inclination in districts containing highly inclined beds, North Staffordshire coalfield. *See also* flat. *Fay.* c. Narrow decomposed parts of limestones that are mineralized. *Fay.* d. Flatcars. *Zern.* e. Thin, flat pieces of diamond crystal. *Hess.* f. Small flat areas on diamonds inset in a bit crown caused by abrasion during contact with the rock drilled. *Long.* g. Synonym for macles. *Long. See also* macle.

flats and pitches. a. In the Upper Mississippi lead and zinc district the term is applied to the nearly horizontal solution openings in the Galena dolomite (flats) and the interconnecting inclined joints or fractures (pitches) in which the ore has been deposited. *A.G.I.* b. Applied to certain ore bodies of characteristic form that occur in regions of bedded sedimentary rocks. Such ore bodies have a steplike form with the flats following nearly horizontal bedding planes and the pitches following steeply dipping joint planes or fractures. *Stokes and Varnes, 1955.*

flat sheet. a. An iron sheet, laid at rail junctions, crossings, and ends underground, on which tubs or trucks can be turned. *C.T.D.* b. A steel plate laid on the floor at the face of a tunnel or heading before blasting to provide a smooth floor for shoveling the broken rock into tubs. *Nelson.* c. Synonym for blanket deposit. *AGI Supp.*

flat slab. Reinforced concrete slab designed to span in two directions. *Ham.*

flat-spiral auger shoe. A flat-faced dry-sample-cutting device consisting of a short tube of which one-half of the bottom end is equipped with a short, flat, spiral web, tipped with a cutting edge. *Compare* Iwan auger shoe. *Long.*

flatstones. More correct term for the Stonesfield slate and similar flags. *Arkell.*

flattened strand rope. A wire rope designed to give a greater wearing surface than ordinary round ropes and yet have about the same strength and flexibility. They have roughly some 50 percent more wearing surface than ordinary round ropes, owing to the Lang lay of wires. They are made in several forms. *Lewis, p. 249.*

flattened-strand triangular rope. A wire rope of the flattened-strand construction in which the strands are triangular in shape. *Zern.*

flattener. One who takes a cylindrical piece of glass like a wide tube, cracked longitudinally, and, after heating it to softening in a furnace, flattens it out to form a sheet. An old process only used for making special types of sheet. *C.T.D.*

flattening-furnace. A furnace in which split cylinder glass is flattened out into sheets. *Standard, 1964.*

flattening, plane of. In structural petrology, the pebbles or grains are flat and perpendicular to the greatest principal stress axis. The plane of schistosity is called a plane of flattening. *A.G.I.*

flattening test. A quality test for tubing in which a specimen is flattened between parallel plates that are closed to a specified height. *ASM Gloss.*

flatter. a. A man who uncouples empty tubs or trucks and couples on full tubs, to make up sets at the inbye sidings or putter's flat. *C.T.D.* b. A kind of hammer used by blacksmiths. *Crispin.* c. Aust. *See* flatman. *Fay.* d. *See* slick sheet, a. *Pryor, 3, p. 172.* e. *See* stoner. *Dodd.*

flatting. a. Derb. Hauling coal underground with horses and boys. *Fay.* b. York. Horizontal vein of spar or barytes in the lead mines. Also called flatting bed. *Arkell.* c. A process for truing-up handmade fire clay refractories while they are still only partially dried. Handmaking is now little used except for some special shapes. *Dodd.*

flatting mill. a. A rolling mill for breaking down bar metal to a sheet form. *Standard, 1964.* b. A roller mill for flattening grains of metal and reducing them to dust. *Standard, 1964.*

flatting stuff. York. Minerals from flatting beds. *Arkell.*

flat-topped ripple mark. Ripples with flat, wide crests separated by narrow troughs. *Pettijohn.*

flat trimmer. a. A workman who stands in a car in which coal is being loaded from a chute, whose duty it is to pick out slate, sulfur, and other impurities found in the coal. *Fay.* b. *See also* coal cleaner. *D.O.T. 1.*

flat trimmer, head. In bituminous coal mining, a foreman who is in charge of men picking impurities from coal as it is dumped into railroad cars at the mine surface. *D.O.T. 1.*

flat vein. Same as flat, 1; vein, i.

flat wall. Corn. A local term for footwall. *Fay.*

flat-wall-tile pressman. One who tends a battery of automatic presses that form flat wall tile from tempered clay. Also called tile-press tender, automatic. *D.O.T. 1.*

flatware. Plates, saucers, dishes, etc. *Compare* hollowware. *Dodd.*

flatware presser. One who presses clay by hand into the hollow of a mold to form ware of oval or irregular shape, such as pudding dishes, comb and brush trays, and bonbon dishes. Also called ware presser. *D.O.T. 1.*

flatwork. Derb. A horizontal mineral vein without connection with the surface. *Arkell.*

flatwork finisher. One who smooths plates, dishes, and other ware by setting piece on whirler which revolves it, and holding knife against it to remove rough marks. *D.O.T. 1.*

flatworking. Scot. A working of moderate inclination. *See also* flat, 1; flat lode. *Fay.*

flaw. a. A crack or inclusion in a diamond; also, internal twinning in a diamond. *Long.* b. A steep, transverse fault along which the displacement has been parallel to the strike of the fault. That is, a steep, transverse strike-slip fault. *Compare* tear fault. *See also* flaw fault. *A.G.I.* c. In dry process enameling, a defect of the ware that is cause for rejection. *ASTM C286-65.*

flaw fault. A rare type of fault, described by Suess, in which the strike is transverse to the strike of the rocks, the dip is high and varying from one side to the other in the course of the fault, and the relative movement is practically horizontal and parallel with the strike of the fault. *See also* flaw. *A.G.I.*

flawless. Used to describe a diamond which is free from all internal and external blemishes or faults of every description under skilled observation in normal, natural, or artificial light with a 10-power loupe, corrected for chromatic and spherical aberration. *Hess.*

flaxseed coal. A fine size of anthracite coal. *Webster 2d.*

flaxseed ore. An oölitic iron ore in which the oölites have been somewhat flattened parallel to the bedding plane so that they are disk-shaped rather than spherical. *A.G.I.*

fleak. Derb. A thatched cover to protect the miners while breaking and washing ore. *Fay.*

fleaking. Eng. Thinning the pillars of coal before abandonment. A variation of flake. *See also* flitching. *Fay.*

fleches d'amour. Acicular, hairlike crystals of rutile, a crystalline form of oxide of titanium, TiO_2, embedded in quartz. Used as a semiprecious gem stone. Also called love arrows, the literal translation of fleches d'amour. *C.M.D.*

fleck; flake. To scale or peel off suddenly; applies to shaley beds in the roof or to coal slab at the face. *Nelson.*

flecked. A variation in the solid color of an enamel or glaze secured by the addition of sized particles of frit of a different color. *ACSB-3.*

fleckschiefer. An argillaceous rock in which there has been incipient production of new minerals as a result of low-grade metamorphism. *See also* spotted slate. *A.G.I.*

fled. Said of pottery in which cracks have appeared after removal from the biscuit oven. *C.T.D.*

fleek. Mid. Coal or other rock is said to "fleek off" when humps or masses of it fall from a slip or fault in the workings without giving warning, or without much labor in cutting. A variation of flake. *Fay.*

fleet. The movement of a rope sidewise when winding on a drum. *See also* fleet angle. *Zern.*

fleet angle. a. The included angle between the rope, in its position of greatest travel across the drum, and a line drawn perpendicular to the drum shaft, passing through the center of the head sheave or lead sheave groove. *ASA M11.1-1960, p. 35.* b. Of hoisting gear in mine shaft's headworks, the angle between the sheave and extreme paying-off position on the winding drum; in good practice below 3°. *Pryor, 3.* c. As used by diamond drillers and miners, the angle between the two ends of a hoist drum as a base and the sheave wheel in a drill tripod or derrick or the headframe pulley as the apex. *Long.* d. As used by petroleum drillers, the side angle at which the rope or cable approaches the crown block sheave or pulley. *Long.* e. The maximum angle between a rope and a line perpendicular to the drum on which it winds. *Nichols.* f. Aust. The angle between the two ends of a winding drum as a base, and the headframe pulley or sheave as the apex. *Fay.*

fleet wheel. a. A grooved wheel or sheave that serves as a drum and about which one or more coils of a hauling rope pass. *Zern.* b. Surge wheel. *Mason.*

fleischerite. A mineral, $Pb_3Ge''(SO_4)_2(OH)_4\cdot 4H_2O$; hexagonal; from Tsumeb, Southwest Africa. *Hey, M.M., 1961.*

Fleissner process. A thermal drying, batch-type process, in which the action of high-pressure steam on a lump of lignite produces the following effects: The lump is heated inside and out to an approximately uniform temperature by its envelope of condensing steam. As the temperature rises and the pressure increases part of the colloidal water is expelled from the lump as a liquid. The lump shrinks as water leaves and the cells collapse and when the pressure is lowered more water leaves by evaporation caused by the sensible heat stored in the lump. When the pressure is lowered further by vacuum, additional moisture is evaporated, which cools the lump. *Mitchell, p. 702.*

Fleming's rule. A simple rule for relating the directness of the flux, motion, and electromotive force in an electric machine. The forefinger, second finger, and thumb, placed at right angles to each other, represent respectively the directions of flux, electromotive force, and motion or torque. If the right hand is used the conditions are those obtaining in a generator (Fleming's right-hand rule), and if the left hand is used the conditions are those obtaining in a motor (Fleming's left-hand rule). *C.T.D.*

Flemish bond. The arrangement of bricks made by alternating headers and stretchers in each course. The position of each header being in the center of the stretcher above and below. *A.I.S.I. No. 24.*

Flemish brick. A hard, yellow paving brick. *Standard, 1964.*

flenu coal. Belg. A long-flame smoky variety of bituminous coal occuring abundantly in the Belgian coalfields. Similar coal is found in Wales. *Fay.*

flerry. To split, as slate. *Standard, 1964.*

fletton. An English building brick made in the Fletton district, near Peterborough, by the semidry process from Oxford clay; this clay is shaly and contains much organic matter, which assists in the firing process. The crushing strength varies from about 2,000 to 4,500 pounds per square inch and the water absorption from about 17 to 25 percent weight. *Dodd.*

fleurus diamond. Quartz crystal. *Schaller.*

Fleuss apparatus. The first practical form of self-contained breathing apparatus, which was developed by H. A. Fleuss in 1879. Compressed oxygen, carried in a copper cylinder, was used in the apparatus; was used at Seaham colliery in 1881. *Nelson.*

flexibility. a. The ability to be bent repeatedly, within limits, without cracking or breaking. *API Glossary.* b. The property of bending, as shown in some minerals by experimenting upon their plates or laminae. A flexible mineral remains bent after the pressure is removed, as in talc, selenite, etc. *Nelson.*

flexible. a. As applied to the characteristic of tenacity in minerals, it means that the mineral will bend without breaking, and will remain bent, as talc. *Fay.* b. Bends without breaking and has no tendency to return to its original form. *A.G.I.* c. Capable of being flexed. Capable of being turned, bowed, or twisted without breaking. *Webster 3d.*

flexible cam. An adjustable pressure-control cam of spring steel strips used to obtain varying pressure during a forming cycle. *ASM Gloss.*

flexible coupling. A coupling used to connect shafts of adjacent rotating machines where flexibility is desirable, as in making a connection between a motor and a speed reducer in a chain conveyor power unit. The metal outside flanges are secured to inner flexible disks by bolts. *Jones.*

flexible ducts. *See* ventilation ducts. *Roberts, I, p. 225.*

flexible guides. *See* winding guides. *Sinclair, V, p. 46.*

flexible joint. Any joint between two pipes that permits one of them to be deflected without disturbing the other pipe. *Fay.*

flexible mineral. A mineral which yields to the bending stress and stays bent; for example, asbestos. *Stokes and Varnes, 1955, p. 149.*

flexible pavement. A waterproof top layer for a road or aircraft runway made of bituminous material which is assumed to have no tensile strength. *Ham.*

flexible sandstone. a. A fine-grained itacolumite. *Standard, 1964.* b. A sandstone, thin slabs of which will bend noticeably without breaking. *Hess.* c. Synonymous with itacolumite. *A.G.I.*

flexible silver ore. Same as sternbergite. *Fay.*

flexible-type carrying idler. Consists of one or more idler rolls arranged to form a catenary trough. This may be accomplished by mounting a single roll on a flexible shaft or by linking a series of rolls with individual rigid shafts. *NEMA MB1-1961.*

flexible ventilation ducting. Flexible tubes made from fabrics coated with rubber or polyvinyl-chloride (P.V.C.) for auxiliary ventilation. The ducting is made in lengths of 25, 50, and 100 feet, every length having a spring steel wire coupling ring sewn or welded into each end, and can be supported from a wire running along the roof. The advantages of flexible ducting over metal tubes are: (1) can be stored in a much smaller space; (2) less weight; (3) can conform to moderate bends much easier than metal pipes, and (4) cost of fixing is only a fraction of that incurred with metal pipes. *See also* ventilation tubing. *Nelson.*

flexible wall. Reinforced concrete retaining wall having a stem designed as a cantilever, as a beam or as both. *Ham.*

flexing. The bending of the conveyor belt which takes place as it wraps around the pulleys. The ply nearest the face of the pulley is under the minimum stress and the ply farthest from the face is under the maximum stress. Flexing stresses increase with a decrease in pulley diameters. *ASA MH4.1–1958.*

Flexlok. A patented circle brick, with book ends, used in domestic furnaces, cupolas, and acid tank linings. *Bureau of Mines Staff.*

flexural center; shear center. With reference to a beam, the flexural center of any section is that point in the plane of the section through which a transverse load, applied at that section, must act if bending deflection only is to be produced, with no twist of the section. *Compare* torsional center; elastic center; elastic axis. *Ro.*

flexural modulus of elasticity. The modulus of elasticity of a material in the flexure test. It may be calculated from a load-deflection diagram as follows:

$$E_F = \frac{L^3}{4bh^3}\left(\frac{P}{Y}\right)\text{(for rectangular specimen)}$$

$$E_F = \frac{0.425\ L^3}{d^4}\left(\frac{P}{Y}\right)\text{(for round specimen)}$$

where E_F = flexural modulus of elasticity, psi

$\frac{P}{Y}$ = slope of initial straightline portion of curve on load-deflecting diagram, pound/inch

L = span, inch

b = specimen width, inch.

H&G.

flexural rigidity. Second moment of the section of a beam multiplied by its Young's modulus. *Ham.*

flexural slip. Movement in relatively competent rocks in which the bending of layers dominates over the slip between them. *G.S.A. Mem. 6, 1938, p. 155.*

flexural strength. *See* modulus of rupture; transverse strength.

flexure. a. A bending or folding of strata under pressure. *Standard, 1964.* b. A bend in a rock. *Hess.* c. A general term for individual folds, warps, tilts, bends, or turns in rock strata. A flexure may be a broad open fold of large dimensions or a small closely compressed fold. *Stokes and Varnes, 1955.* d. Synonymous with fold. *A.G.I.* e. A broad domical structure. *A.G.I.* f. A slight folding. *A.G.I. Supp.*

flexure correction. A correction necessary in pendulum observations of gravity. The vibrating pendulum produces oscillations of the receiver case, of the pillar, and of the surface soil. Rather complex coupled vibration phenomena arise and the period of the pendulum itself changes. Numerous methods have been suggested to correct for this influence or to eliminate it. Since the correction is of the order of 10- to 40 x 10^{-7} sec. on solid rock or cement and may increase to as much as 500 x 10^{-7} sec. on marshy ground, it must be determined accurately. *A.G.I.*

flexure fold. *See* fold, flexure. *A.G.I.*

flexure folding. In the narrow sense, it refers only to the bending of strata. In the broad sense, it includes flexure-slip folding. *See also* flexure-slip folding. *A.G.I.*

flexure-slip folding. a. Folds in which the individual strata not only bend but also slip past one another. *Billings, 1954, pp. 89–90.* b. Movement in a layered rock in which competent bands are folded but slipping occurs along deformed s-planes in incompetent bands. The most common type of deformation. *A.G.I. Supp.*

flicker photometer. A photometer consisting of a plaster of Paris disk with the edges bevelled. The disk is rotated by clockwork inside a box placed on the photometer bench between the lamps under test. The eye sees the two sides of the disk in rapid succession and if one is more brightly lit than the other, a flickering effect is produced. By altering the position of the instrument until this flickering disappears, the point where the illumination on the two sides of the disk is equal may be found with considerable accuracy. *Mason, v. 1, p. 248.*

flight. a. The metal strap or crossbar attached to the drag chain of a chain-and-flight conveyor. *Jones.* b. Plain or shaped plates suitably made for attachment to the propelling medium of a flight conveyor. *ASA MH4.1–1958.* c. A term sometimes applied to one conveyor in a tandem series. *ASA MH4.1–1958.* d. The screw thread (helix) of an auger. *Nichols.*

flight conveyor. A type of conveyor comprising one or more endless propelling media, such as chain, to which flights are attached and a trough through which material is pushed by the flights. *ASA MH4.1–1958.*

flight conveyor, reciprocating. *See* reciprocating flight conveyor. *ASA MH4.1–1958.*

flight line. In an aeromagnetic survey or in other airborne geophysical surveys, a line drawn on a map or a chart to represent the course over which an airplane has been flown, or the course over which it is to be flown. *A.G.I.*

flight loader; Lambton flight. A standard coal cutter which has been modified to enable it to load prepared coal on to a face conveyor. The flights are short plates or boxes fitted into special holders in the ordinary cutter chain. The flights are articulated and held in position by loose pins to allow easy attachment and detachment. When loading, the jib is angled forward 10 to 30 degrees and the flights push the coal along the floor on to the conveyor. For a jib 4 feet 6 inches long, four flights are commonly used. Face lengths up to 200 yards can be loaded by this method. Degradation of coal is high. *Nelson.*

flight pattern. In an aeromagnetic survey or in other airborne geophysical surveys, the planned flying route used. *A.G.I.*

flinders diamond. A Tasmanian term for a variety of topaz. *Fay.*

flint. a. A variety of quartz, a cryptocrystalline substance composed of silica, SiO_2. It is very tough and breaks with a conchoidal fracture and cutting edges. Of various colors, white, yellow, gray, and black. Mohs' hardness, 7; specific gravity, 2.65. Flint pebbles from the coasts of England, Northern France, and Belgium are calcined and ground and used as a main source of silica by earthenware and porcelain manufacturers. *See also* chert. *Fay; Dana 17, p. 601; Rosenthal* b. Pulverized quartz of any type. *Hess.* c. Shrop. Fine-grained sandstone suitable for building purposes. *Fay.*

flint clay. a. A flintlike clay which when ground develops no plasticity. *A.G.I.* b. A very hard refractory clay which is largely composed of well-crystallized kaolin that breaks with a conchoidal fracture, similar to flint, hence the name. *Bureau of Mines Staff.*

flint-enameled ware. Rockingham-type pottery with a glaze flecked in yellow, brown, and blue; patented at Bennington, Vermont. *ACSG, 1963.*

flint fire clay. A hard or flintlike fire clay occurring as an unstratified massive rock, practically devoid of natural plasticity and showing a conchoidal fracture. *ASTM C71-64. See also* flint clay.

flint glass. a. A glass in which lead and potassium replace a considerable part of the lime and soda of ordinary glass. This gives a softer, more fusible, more lustrous and brilliant glass with high refraction and low dispersion and therefore of use as an optical glass. *CCD 6d, 1961.* b. A term used by the container industry for colorless glass. *ASTM C162–66.*

flintkote. An emulsion of petroleum asphalt in water for the protection of steel against the action of seawater. *Osborne.*

flintless stoneware. Defined in the Pottery (Health and Welfare) Special Regulations of 1950 as: stoneware the body of which consists of natural clay to which no flint or quartz or other form of free silica has been added. *Dodd.*

flint mill. a. A device in which flints on a revolving wheel produce a shower of sparks incapable of igniting firedamp, and once used to light miners at work. *See also* steel mill, a. *Fay.* b. In pottery works, a mill in which flints are ground. *Webster 2d.* c. Floating instrument platform in use in the Pacific Ocean. Similar in design to seagoing platform for acoustic research, and used as a base for oceanographic research. Flip is manned and can drift with currents. *Hy.*

flint optical glass. An optical glass with high dispersion and high index of refraction, usually forming the diverging elements of an optical system. Any optical glass possessing a Nu-value less than 50.0; or any optical glass with a Nu-value between 50.0 and 55.0 having a refractive index less than 1.60. *ASTM C162–66.*

flint pebbles. Colloidal quartz stones, found on the coasts of France, Belgium and England. They are rounded and have chemical and physical properties suitable for use in ball mills. *Enam. Dict.*

flint, potter's. Ground sand, very low in iron content. *Enam. Dict.*

Flintshire furnace. A reverberatory furnace with a depression, well, or crucible in the middle of the side of the hearth used for the roasting and reaction process on lead ores. *Fay.*

Flintshire process. Method of smelting galena concentrates in reverberatory furnace, with a crucible well in its hearth. *Pryor, 3.*

flint shot. Clean, dry, sharp sand; used in sand blasting. *Bennett 2d, 1962 Add.*

flint ware. An alternative name for stoneware. *C.T.D.*

flinty crush rock. A black flinty product of dynamic metamorphism associated with mylonite, and representing a fritted or partly fused variety of mylonite. It is generally structureless, but occasionally shows traces of incipient crystallization. *See also* buchite; hartschiefer; mylonite; pseudotachylyte; trap-shotten gneiss; ultramylonite. *Holmes, 1920.*

flinty slate. A common slate containing more than the normal percentage of silica. *Fay.*

flip-flop. a. A trigger circuit which has one stable or quasistable state and one unstable state, and which undergoes a complete cycle of change in response to a single triggering excitation. *NCB.* b. A glass decanter with a thin base. *Dodd.*

flipping turn. System of pulleys incorporated in the return-side tracking of belt conveyor, which turns it through 180°, so that any adherent abrasives do not come in contact with idler pulleys. *Pryor, 3.*

flit. a. To move, dismantle, or re-erect conveyors. *Sinclair, V, p. 286* b. N. of Eng. Move or transport (applied to coal-cutting equipment. *Trist.* c. *See* flitting. *T.I.M.E.*

flitch. N. Wales. A flat, elongate, galena ore body, found in the lead mines. *Arkell.*

flitching. a. Widening of underground roadway by removing rock from sides. *Pryor, 3.* b. The working of 2 to 5 yards or more of the rib side coal in a narrow stall or heading. *See also* skipping. *Nelson.*

flit plug. *See* cable coupling unit. *B.S. 3618, 1965, sec. 7.*

flit plug adaptor. See cable coupler adaptor. *B.S. 3618, 1965, sec. 7.*

flitter. Collier who moves a coal cutter to a new working place; to flit is to shift equipment. *Pryor, 3.*

flitting. Aust. Conveying a coal-cutting machine from one place to another. *Fay.*

flitting wagon. A low truck or trolley used in pillar methods of working to transport face machines from one heading or bord to another. *Nelson.*

float. a. The term float or float rock means bunches, blotches, pieces, or boulders of quartz or rock lying detached from, or resting upon the earth's surface without any walls. When found upon the unappropriated public domain it belongs to the finder. *Ricketts, I.* b. Debris from a lode transported from the original site and found on (or near) the surface. *Hoov, p. 94.* c. Also, fine gold and minerals float in panning and other operations, causing losses. *von Bernewitz.* d. Used by miners and geologists for pieces of ore or rock which have fallen from veins or strata, or have been separated from the parent vein or strata by weathering agencies. It is not usually applied to stream gravels. Float is also used as an adjective. *Fay.* Also called floater; float mineral; float ore. e. Scot. Intrusive traprock either at the surface or between strata. *Fay.* f. Eng. A clean rent or fissure in strata unaccompanied by dislocation. *Fay.* g. A timber platform, faced with boiler iron on both sides, and provided with rings at the corners for lifting. It is used in shaft work to prevent the crushing of the bottom timbers by flying fragments of rock. *Stauffer.* h. Values so fine that they float on the surface of the water when crushed or washed; for example, float gold. *C.T.D.* i. In reference to a dozer blade—to rest by its own weight, or to be held from digging by upward pressure of a load of dirt against its moldboard. *Nichols, 2.* j. That part of an automatic refuse extractor which is suspended in a washbox to indicate variations in the layer of heavy material on the screen plate. *B.S. 3552, 1962.* k. Used by drillers to describe the tendency of the bit in a flat-angle borehole to follow an increasingly flatter course as the depth of the borehole increases. *Long.* l. Various forms of ball-and-seat valves commonly inserted in casing and rod strings in such a manner as to keep drilling fluid out of the casing or rod string when lowered into a borehole. Also called float valve. *Long.* m. To lift a material by the buoyant action of a strong current or flow of a liquid medium; also, that material buoyant enough to float on the surface of a liquid medium. *Long.* n. In mineral concentration, term used in connection with response of a specific mineral to flotation process. *Pryor, 3.* o. The very fine dust which does not settle out of the air current in the pulverizing machinery but is strained out of the air by fine cloth bags. Also used to designate the fine dust collecting on the roof and timbers in any mine. *Rice, George S.* p. The floating part of an apparatus for indicating the height of water in a steam boiler or other vessel. *Fay.* q. A floating metal air container for indicating the height of liquid in a tank. *C.T.D.*

floatability. In mineral concentration, word used in connection with response of a specific mineral to flotation process. *Pryor, 3.*

float-and-sink analysis. Use of series of heavy liquids diminishing (or increasing) in density by accurately controlled stages for the purpose of dividing a sample of crushed coal into fractions either equal-settling or equal-floating at each stage. The floats at a given specific gravity are defined as the percentage floating at that density and the sinks have a defined higher density. Each product (minus one density and plus another) is ignited after weighing and the ash content is found. From this testing, a washability curve is drawn which relates density with ash content, in the form of cumulative float, sink and specific gravity curves. The ash curve plots ash against density for successive fractions. The densimetric curve plots specific gravity against cumulative weight. The Mayer curve (M-curve) plots cumulative weight against that of a constituent (for example, ash). *Pryor, 3.*

float coal. Small, irregularly shaped isolated deposits of coal imbedded in sandstone or in siltstone. They appear to have been removed from the original bed by washout during the peat stage and to have been carried a short distance and redeposited. Also called raft. *A.G.I.*

float copper. a. In the Lake Superior region, fine scales of metallic copper, especially produced by abrasion in stamping, which do not readily settle in water. *Fay.* b. Of rock or vein material, found as a loose fragment some distance from the vein outcrop or bed. *Webster 2d.*

float dust. Fine particles of coal suspended in the air. *Bureau of Mines Staff.*

floater. a. A single fragment of float. *Long.* b. Synonym for float valve. *Long.* c. British term for float. Also called float mineral; float ore. *Fay.* d. A refractory shape that is allowed to float on the surface of molten glass in a tank furnace in order to hold back any scum that may be present. *Compare* ring, f. *Dodd.*

floater hole. An opening in a tank through which floaters are placed. *ASTM C162-66.*

floaters. a. N.S.W. Loose fragments of rock, ore, and reef in the soil. *New South Wales.* b. Fire clay blocks floating in the batch of a tank furnace to keep the gall out of the working end (for the same purpose as the bridge). *Mersereau, 4th, p. 328.*

float glass process. A process for making sheet glass introduced in 1959 by Pilkington Bros. Ltd., at St. Helen's, England. A ribbon of glass is floated on molten tin, the product being sheet glass with truly parallel surfaces, both fire polished. *Dodd.*

float gold; flour gold. Particles of gold so small and thin that they float on and are liable to be carried off by the water. *Fay.*

floating. a. Descriptive of the relations of large sedimentary particles that are not in contact with each other and which are contained in a much finer grained matrix. *A.G.I. Supp.* b. Descriptive of quartz sand grains more or less sparingly disseminated in limestone. *A.G.I. Supp.* c. The equal spreading of plaster, stucco, or cement work by means of a board called a float. *Crispin.*

floating agent. As used in the vitreous enamel industry, this term is the equivalent of the English term suspending agent. *See also* suspending agent. *Dodd.*

floating block. Synonym for traveling block. *Long.*

floating cable. In seismic operations in water-covered areas, a cable connecting geophones suspended by floats. *A.G.I.*

floating calcite scales. Floating scales built up of small calcite rhombohedrons. *Schieferdecker.*

floating control system. As used in flotation, a system in which the rate of change of the manipulated variable is a continuous function of the actuating signal. *Fuerstenau p. 549.*

floating dock. An open-ended structure built up of steel plates, which can be floated or submerged by means of air chambers as required for ship repairs. *Ham.*

floating foundation. See buoyant foundation. *Ham.*

floating harbor. A system of floating booms moored so as to give breakwater protection against waves. *Ham.*

floating light. Cymophane. *Schaller.*

floating opal. Small pieces of gem opal, placed in glycerin in a transparent, drop-shaped or spherical glass container, for use principally as a drop on a neck ornament. *Shipley.*

floating peat. Peat composed of floating plants. *Tomkeieff, 1954.*

floating pipeline. A pipe supported on pontoons which is used for removing spoil from a suction dredger. *Ham.*

floating reef. Masses of displaced bedrock lying among alluvial detritus. *See also* float. *Fay.*

floating sand grain. An isolated sand grain, particularly in limestone, that is not in contact with other scattered sand grains. *A.G.I. Supp.*

floating spurs. Aust. Short-lived, flat quartz veins. *Fay.*

floating strainer. A buoyant pump suction end which draws its water from near the surface of the free-water level and thus pumping almost clear water. A floating strainer may be used in dealing with bodies of water other than in properly constructed sumps. *Nelson.*

floating-tube barrel. Synonym for double-tube core barrel, swivel-type. *Long.*

floating-tube core barrel. Synonym for double-tube barrel, swivel-type. *Long.*

float mineral. Small fragments of any ore carried away from the ore bed by the action of water or by gravity alone, often leading to the discovery of mines; also, metallic particles detached in stamping ore, and suspended in water. *Standard, 1964. See also* floater, c; float ore; float.

float ore. Fragments of vein material found on the surface, and usually downstream or downhill from the outcrop. *Fay.*

float rock. *See* float, a. *Long.*

floats. a. Fractions with a defined upper limit of specific gravity and so described, for example, floats, 1.40 specific gravity. *B.S. 3552, 1962.* b. As applied to asbestos, the fibers recovered from the precipitation of the dust in either filters, cyclone collectors, or other media. The fibers are fine and light and of varying lengths. *Sinclair, W. E., p. 288.*

floatstone. a. A cellular quartz rock. The honeycomb quartz detached from a lode is often called floatstone by miners. *Fay.* b. A variety of opal that floats on water; found in light, spongy, concretionary or tuberous masses. *Standard, 1964.* c. A bricklayer's rubbingstone for working out the defects in a brick that has been cut. *Standard, 1964.*

float sulfur. *See* flake sulfur. *Mitchell, p. 67.*

float switch. A switch actuated by a float for starting or stopping a pump motor as the level of the water rises or falls. *Ham.*

float test. Method for determining the consistency of bituminous materials. *Institute of Petroleum, 1961.*

float valve. a. Synonym for a ball-and-seat-type apparatus inserted in a pipe, casing, or drill-rod string being lowered into a borehole. *See also* float, 1. *Long.* b. A valve operated by a float. *Long.*

floc. a. A loose, open-structured mass formed in a suspension by the aggregation of minute (colloidal) particles. *ASCE P1826.* b. A small aggregate of tiny sedimentary grains. *A.G.I. Supp.* c. A flocculent mass formed by the aggregation of a number of fine suspended particles. Synonymous with floccule. *Webster 3d.*

flocculant. An agent that induces or promotes flocculation, or produces floccules or other aggregate formation, especially in clays and soils. For example, lime alters the soil pH and acts as a flocculant in clay soils. An acid reagent is also used as a flocculant. *Webster 3d.*

flocculate. a. As a verb, to cause to aggregate or to coalesce into small lumps or loose clusters or into flocculent mass or deposit. For example, the calcium cation tends to flocculate clays. *Compare* coagulate. Also, to aggregate or to coalesce into small lumps or loose clusters or into a flocculent mass or deposit. Especially applicable to colloids, clays, and soils. For example, certain clays flocculate readily. *Webster 3d.* b. As a noun, something that has flocculated. A flocculent particle or mass; a floc; a floccule. *Webster 3d.* c. A term used in the flotation process. *Fay.* d. To thicken a clay suspension by addition of an acid. *ACSG.* e. The addition of a suitable electrolyte to a clay suspension to cause the clay particles to agglomerate and settle. *Bureau of Mines Staff.*

flocculating. a. The thickening of the consistency of a slip by adding a suitable electrolyte. *ASTM C286-65.* b. The agglomeration of clay particles in a clay suspension by adding an electrolyte. *Bureau of Mines Staff.*

flocculating agent; flocculant. a. A reagent added to a dispersion of solids in a liquid to bring together the fine particles to form flocs. *B.S. 3552, 1962.* b. A substance which produces flocculation, as, for example, the inorganic acids, and which thereby promotes settling. *Fay.*

flocculation. a. The gathering of suspended particles into aggregations. Opposite of deflocculation. *Fay.* b. The process of forming flocs. *ASCE P1826.* c. The act or process of flocculating. A product of flocculating; a cluster; a conglomeration; or an aggregate. *Webtser 3d.* d. Coalescence of minute particles into floccules (often consisting mainly of water) to accelerate settlement as part of dewatering or thickening of a pulp. Appropriate chemicals are used to promote adhesion. *Pryor 2.* e. Agglomeration of the separate colloidal particles of a suspension into bunches or flocs with a loss of colloidal properties. In drilling fluid a flocculating agent such as brine may cause the clay particles to flocculate with the result that the solids settle out. Flocculation may give rise to enormous increases in gel strength. *Brantly, 1.*

floccule. A small loosely aggregated mass of material suspended in or precipitated from a liquid. One of the flakes of a flocculent precipitate. Synonymous with floc. *Webster 3d.*

flocculent. Resembling wool, therefore, wooly. Coalescing and adhering in flocks. A cloudlike mass of precipitate in a solution. From the Latin floccus, meaning a lock of wool. *Fay.*

flocculent deposit. An aggregate or precipitate of small lumps formed by precipitation. *Hy.*

flocculent structure. An arrangement composed of flocs of soil particles instead of individual soil particles. *ASCE P1826.*

flock. Any small tufted or flakelike mass of matter floating in a solution, especially if produced by precipitation. *Standard, 1964.*

flocs. Aggregates resulting from flocculation. *B.S. 3552, 1962.*

floc test; water test. A test for the durability of hydraulic cement, 1 gram of the cement is shaken with 100 milliliter of water in a test tube which is then placed on its side and allowed to stand for 7 days; if the amount of floc formed is very small, the cement is considered to be durable. *Dodd.*

Flodin process. A direct process for the manufacture of steel, by means of which iron with a carbon content from 0.2 percent upwards can be produced by smelting, in a specially constructed electric furnace, a mixture of hematite and coal, or charcoal, the process being continuous. The reduced metal accumulates at the bottom of the furnace from which it is tapped. Both sulfur and phosphorus are reduced to a low figure without additional refining, while the manganese and silicon contents are controlled in the same way as in the ordinary open-hearth process. It is claimed that the steel produced is superior in quality both to open hearth and Bessemer steel, and it is suggested that this superiority is due to the small amount of slag, and relative absence of gases. *Osborne.*

floe. a. A piece of sea ice, other than fast ice, from 10 meters in diameter to ice field size. *Schieferdecker.* b. An area of ice, other than fast ice, the limits of which are within sight, as distinct from an ice field. Also called a sea floe. *A.G.I.* c. A mass of floating ice some 100 feet to 5 miles across, that is not fast to any shore, that was formed by the breaking up of the frozen surface of a large body of water. *A.G.I. Supp.* d. Loose ganister or other rock, accumulated at the base of a slope. *Bureau of Mines Staff.*

floe-berg. a. The great stratified masses of salt ice that lie grounded along the shores of the Polar Sea are nothing more than fragments broken from the edges of the perennial floes. We called them floe-bergs, in order to distinguish them from, and yet express their kinship to, icebergs. *A.G.I.* b. A thick mass of floe ice heaped together by the collision of floes with each other or with the shore. *A.G.I.*

floe ice. Floating ice of much greater thickness is sometimes seen, but it is doubtful if these great thicknesess represent the ice formed by the freezing of undisturbed sea water. The ice formed in winter is often broken up in the summer into floating pieces, floe ice; and the floe ice is sometimes crowded together in ice packs. *A.G.I.*

floe rock. Rock occurring in or taken from a body of talus; usually refers to ganister. *A.R.I.*

floe till. *See* till. *Fay.*

floetz; flotz. A bed or stratum. As used by Werner, means a layer or bed enclosed conformably in a stratified series, but differing in character from the rocks in which it occurs. *Fay.*

flohmig amber. A fatty amber, resembling goose fat; full of tiny bubbles, but not as opaque as cloudy amber. *Shipley.*

flohmig bernstein. German name for an oily-looking dim amber. *Tomkeieff, 1954.*

floitite. A rock that contains biotite together with the typical minerals of the greenschist facies. *A.G.I.*

floocan. *See* flucan. *Pryor, 3.*

flood. a. Any relatively high streamflow which overtops the natural or artificial banks in any part of a stream or river. *A.G.I.* b. A rising and overflowing of a body of water that covers land that is not usually under water. *Webster 3d.* c. An outpouring of considerable extent, as a flood of lava. A great stream of lava that flows in a steady course. *Webster 3d.* d. The flowing in of the tide. The semidiurnal swell or rise of water in the ocean. Opposite of ebb. The highest point of a tide. *Webster 3d.* e. In sedimentary petrology, a term implying the occurrence of a particular species so far in excess of all others as to constitute almost a pure concentrate. *A.G.I.* f. As a verb, to cover or to cause to be covered with water or some other fluid. To fill an oil sand with water to displace and to expel the oil. *Webster 3d.*

flood basalt. *See* plateau basalt. *A.G.I.*

flood basin. The tract actually covered by water during the highest known flood, or the flat area between the sloping low plain on one side and the river land on the other side. It is occupied by heavy soils and commonly has either no vegetation or a strictly swampy vegetation. *A.G.I.*

flood casting. Term used in the British sanitary ware industry for the process of slip casting in which excess slip is removed from the mold by draining. In other sections of the pottery industry, the process is referred to merely as casting; in the United States, the process is known as drain casting. *Dodd.*

flood channel. Tidal channel in which the flood currents are stronger than the ebb currents. *Schieferdecker.*

flood current. The movement of the tidal current toward the shore or up a tidal stream. *Schieferdecker.*

flooded suction. *See* suction head. *Pit and Quarry, 53rd, Sec. E, p. 82.*

floodgate. a. Eng. A gate to let off excess of water in flood or other times. *Zern.* b. A gate for regulating the flow of water, as in a raceway. *Standard, 1964.*

flooding. The drowning out of a well by water that sometimes results from drilling too deeply into the sand. *A.G.I.*

flooding point. The limiting flow rate in two-phase countercurrent flow through a column above which the column is inoperable due to irregular flow. *NRC-ASA N1.1-1957.*

flood plain. a. The flat ground along a stream, covered by water at the flood stage. *Fay.* b. All great rivers annually flood portions of level land near their mouths, and cover the level land with sedimentary deposits. The whole area flooded is called the flood plain. *A.G.I.* c. A strip of relatively smooth land bordering a stream, built of sediment carried by the stream and dropped in the slack water beyond the influence of the swiftest current. *USGS Bull. 730, 1923, p. 88.* d. That portion of a river valley, adjacent to the river channel, that is built of sediments during the present regimen of the stream and which is covered with water when the river overflows its banks at flood stages. *A.G.I.*

flood-plain clay. Any clay underlying the flood plain of a river. *ACSB-1.*

flood-plain meander scar. Any and all features on a flood plain that mark the former course of a stream meander. *A.G.I.*

flood plain of aggradation. A flood plain formed by the building up of the valley floor by sedimentation. *Leet.*

flood-plain scroll. One of the patches of material having curved crescentic shapes originating from deposition along the inside curve of river meanders, and incorporated in large numbers into the flood plain. *Stokes and Varnes, 1955.*

flood-plain splay. A small fan often composed of coarse material and formed when an overoladed stream breaks through either an artificial or a natural levee and deposits due to a decrease in velocity. *A.G.I.*

flood tide. a. The flow, or rising toward the shore, is called the flood tide, and the falling away, ebb tide. *A.G.I.* b. That period of tide between low water and the succeeding high water; a rising tide. *A.G.I.*

flookan; flucan. A vein of clayey material; a vein of fine material and water which will run into underground workings if not stopped. *C.T.D.*

floor. a. The rock underlying a stratified or nearly horizontal deposit, corresponding to the foot wall of more steeply dipping deposits. *Fay.* b. A horizontal, flat ore body. *Fay.* c. The bed or bottom of the ocean. A comparatively level valley bottom; any low-lying ground surface. *A.G.I.* d. That part of any underground gallery upon which a person walks or upon which a tramway is laid. *Fay.* e. A plank platform underground. *Fay.* f. The upper surface of the stratum underlying a coal seam. *C.T.D.* g. The bottom of a coal seam or any other mineral deposit. *Arkell.* h. Plank-covered or steel-mesh-covered, level work area at the base of a drill tripod or derrick around the collar of a borehole in front of the drill. *Long.* i. Loose plank laid parallel with rock drift at the heading before blasting a round of holes to make easier the loading of broken rock by shovels. *Bureau of Mines Staff.*

floorboard. A thick wooden-plank member of a drill or other work platform. *See also* floor, h. *Long.*

floor break. The break or crack which separates a block of stone from the quarry floor. *Fay.* Also called floor cut. *Hess.*

floor brick. A brick having mechanical, thermal, and chemical resistance to the conditions to which it is likely to be exposed when used in an industrial floor. *Dodd.*

floor burst. A type of outburst generally occurring in longwall faces and preceded by heavy weighting due to floor lift. Gas evolved below the seam seems to collect beneath an impervious layer of rock, and a gas blister forms beneath the face, giving the observed floor lift. Later, the floor fractures and the firedamp escapes into the mine atmosphere. *Roberts I., pp. 72-73.*

floor clamp. Synonym for safety clamp in drilling boreholes. *Long.*

floor cut. a. A machine cut made in the floor dirt immediately below the coal seam. *See also* bottom cut. *Nelson.* b. A cut by means of which a block of stone is separated from the quarry floor. *See also* floor break. *Fay.*

flooring stone. Staff. Gypsum mixed with blue or green earth. *Arkell.*

floor lift. The upward heave of the floor beds after a coal seam has been extracted. *See also* creep. *Nelson.*

floor penetration. The breaking up or cutting into a friable floor by timber or steel supports. Footblocks or sills are sometimes used to increase the bearing area and reduce floor penetration. *Nelson.*

floor quarry; quarry tile. A heavy ceramic flooring material. Floor quarries (as distinct from floor tiles) are usually made by a plastic process. They are relatively thick (1 inch) and generally not less than 8 by 8 inches in size. They are hard fired to produce a body resistant to heavy abrasion and to attack by most industrial liquids, hence their wide use for factory floors. In the United Kingdom, the term is floor quarry, while in the United States, quarry tile is used. *Dodd.*

floor sand. Used foundry sand mixed with some new sand and coal dust. *Bennett 2d, 1962.*

floor sill. A large timber laid flat on the ground or in a level, shallow ditch to which are fastened the drill-platform boards or planking. *Long.*

floor-stand grinder. An offhand grinder mounting either one or two wheels on a horizontal spindle fixed to a metal base attached to the floor. *ACSG, 1963.*

floor station. A survey station secured in the floor of a mine roadway or working face. *B.S. 3618, 1963, sec. 1.*

floor tile. a. Ceramic tiles, normally unglazed, for flooring. It is difficult to draw a sharp distinction between floor tiles and floor quarries, but the former are always dry pressed, and they are relatively thin and do not normally exceed 6 by 6 inches in size. *Dodd.* b. One of the refractory shapes used in the construction of a gas retort; a group of these titles is laid horizontally to brace the retorts of a vertical setting and to limit the combustion flues. *Dodd.* c. Term used for a hollow fired-clay block for use in the construction of floors and roofs. *Dodd.*

floor trader. A free-lance dealer operating solely for his own profit through anticipating the trend of the stock market. *Hoov, p. 281.*

flop gate. An automatic gate used in placer mining when there is a shortage of water. This gate closes a reservoir until it is filled with water, when it automatically opens and allows the water to flow into the sluices. When the reservoir is empty the gate closes, and the operation is repeated. *Fay.*

flora. All the plants collectively of a given formation, age, or region. *Compare* fauna. *Fay.*

floran tin. Corn. Tin mineral scarcely visible in the rock; also, tin ore stamped very small. *Fay.*

florencite. A very rare, weakly radioactive, pale yellow, hexagonal mineral, $CeA1_3(PO_4)_2(OH)_6$, found in schists and placer sands; also known from pegmatites associated with fluorite and microcline. Isomorphous with hamlinite; from Brazil. *Crosby, p. 100; Hess.*

florescence. The rapid reproduction of plankton. *See also* plankton bloom. *Hy.*

Florida phosphate. Phosphate rock from Florida, usually fluorapatite $(CaF)Ca_4(PO_4)_2$, encountered as land pebble, hard rock, soft rock, or powder. *CCD 6d, 1961.*

Floridin. a. A trade name for fuller's earth worked by the Florindin Company at Quincy and Jamieson, Fla. *English.* b. Used in decolorizing petroleum and vegetable oils. *Fay.* Also spelled Floridine.

floridite. Applied at one time to phosphate rock from Florida. *Hess.*

florite. Activated bauxite; $A1_2O_3.3H_2O$ or $A1(OH)_3$, made by heating selected bauxites under controlled conditions to produce a porous and adsorptive material similar in many respects to activated alumina. *E.C.T., v. 1, p. 646.*

florizone. a. A zone characterized by its flora. *A.G.I. Supp.* b. A biostratigraphic unit characterized by the presence of a particular flora that may have either time or environmental significance. *A.G.I. Supp.*

florspar. *See* fluorite.

flos ferri. A coralloid variety of aragonite. *Fay.*

flosh. Corn. A rude mortar, with a shutter instead of a screen, used under stamps. *Fay.*

flospinning. Forming cylindrical-, conical-, and curvilinear-shaped parts by power spinning or flowing metal over a rotating mandrel. *ASM Gloss.*

floss. a. Fluid, vitreous cinder, floating in a puddling furnace. *Fay.* b. A floss hole. *Webster 3d.* c. White cast iron for converting into steel. *Webster 2d.*

floss hole. a. A small door provided at the bottom of a flue or chimney for the removal of ash. *Osborne.* b. A tap hole. *Fay.*

flot. a. Ore lying between the beds or at certain definite horizons in the strata. *Arkell.* b. Eng. Veins that branch off laterally, Alston Moor lead mines. *Arkell.*

flotagen. Collector agent used in flotation process, based on mercapto-benzthiozole. *Pryor, 3.*

flotation. a. The method of mineral separation in which a froth created in water by a variety of reagents floats some finely crushed minerals, whereas other minerals sink. *A.G.I. Supp.* Formerly the term flotation with descriptive adjectives was used for all processes of concentration in which levitation in water of particles heavier than water was obtained. Thus, if some particles were retained in an oil layer or at the interface between an oil layer and a water layer, the process was spoken of as bulk-oil flotation; if the particles were retained at a free water surface as a layer one particle deep, the process was skin flotation; and if the particles were retained in a foamy layer several inches thick, the process was froth flotation. Froth flotation is the process that has survived the test of time, and the term flotation is now used universally to describe froth flotation. *Gaudin 2, p. 1. See also* bulk flotation; bulk-oil flotation; film flotation; differential flotation; selective flotation; skin flotation. b. The weight supporting ability of a tire, crawler track, or platform on soft ground. *Nichols.*

flotation agent. A substance or chemical which alters the surface tension of water or which makes it froth easily. *See also* depressant. *Nelson.*

flotation cell. Appliance in which froth flotation of ores is performed. It has provision for receiving conditioned pulp, aerating this pulp and for separate discharge of the resulting mineralized froth and impoverished tailings. Types of cell include agitation (impeller, and splashing, now obsolete); pneumatic (in which air blown in agitates pulp), such as Hallimond laboratory cell, Callow, McIntosh, Forrester, Southwestern and Britannia; vacuum cells (Elmore and Clemens, obsolescent); subaeration with mechanized stirring and pressure-input air (M.S. cell, Agitair); subaeration, self-aerating mechanized cell (Fagergren, Denver, M.S.S.A., Humboldt, Boliden, K. & B., etc.); working parts of cell may include feed entry, impeller, middling return pipe, hood, **standpipe,** circulating ports, baffles (including crowding baffle), adjustable weir, lining plates, sand-relief ports, skimming paddle, froth launder. *Pryor, 3.*

flotation man. In ore dressing, smelting, and refining, one who tends flotation machines which are used to separate valuable minerals from gangue (waste material) in finely ground ore by causing the mineral to float in a liquid pulp while the gangue remains submerged. Also called flotation operator. *D.O.T.1.*

flotation middlings. Flotation products which may be re-treated. *B.S. 3552, 1962.*

flotation of crystals. The act or process of floating lightweight crystals in a body of magma. Opposite of crystal settling. *See also* crystal flotation. *A.G.I.*

flotation oil. Oil, such as creosote oil, pine oil, or turpentine. Used to wet a particular component of a powdered ore and cause it to concentrate in an airy froth. *Bennett 2d, 1962.*

flotation plane. Plane of a liquid surface in which a body floats. *Hess.*

flotation process. *See* flotation.

flotation reagents. Those used in the froth-flotation process. They include pH regulators, slime dispersants, resurfacing agents, wetting agents, conditioning agents, collectors, and frothers. *Pryor, 3.*

flotation regulator. An acid or an alkali used to control the pH of flotation solutions. *Bennett 2d, 1962.*

flotation time. The time necessary to make the separation into concentrate and tailing depends on such factors as particle size and reagents used, and must be known for determination of the size and number of flotation cells in the plant. *Fuerstenau, p. 365.*

Flotol. A synthetic reagent of the general nature of pine oil, used as frother in flotation process. *Pryor, 3.*

flotz. Ger. *See* floetz. *Fay.*

flour copper. a. Very fine scaly native copper that floats on water and is very difficult to save in milling. *Weed, 1922.* b. *See also* float copper. *Fay.*

floured. The finely granulated condition of quicksilver, produced to a greater or lesser extent by its agitation during the amalgamation process. The coating of quicksilver with what appears to be a thin film of some sulfide, so that when it is separated into globules these refuse to reunite. Also called sickening; flouring. *Fay.*

floured mercury. *See* floured. *Fay.*

flour gold. The finest size gold dust, much of which will float on water. *See also* float gold. *Fay.*

flour gypsum. Same as gypsite. *New South Wales, p. 54.*

flouring. Subdivision of mercury to the point where globules are minute and cease to reunite, leading to loss. This is due mainly to excessive shearing when mercury is mixed with gold-bearing ore as it is being ground. *Pryor, 3.*

flour salt. Very fine-grained vacuum pan salt. *Kaufmann.*

floury soil. Fine-grained soil having the appearance of clay when wet, but powdery when dry. *Ham.*

flow. a. That which flows or results from flowing. A mass of matter moving or that has moved in a stream, as a lava flow. *Fay.* b. The movement of a fluid, such as air, water, or magma (lava). *A.G.I.* c. The plastic deformation of solids. Synonymous with solid flow; rock flowage; plastic flow. *A.G.I.* d. A tabular-shaped body of lava that consolidated from magma on the surface of the earth. *A.G.I.* e. In ceramics, the flux used to cause color to run and blend in firing. *Fay.*

flowability. A characteristic of a foundry sand mitxure which enables it to move under pressure so that it makes intimate contact with all surfaces of the pattern or corebox. *ASM Gloss.*

flowage. An irreversible and permanent deformation of rocks without fracture. *A.G.I. Supp.*

flowage cast. Structures thought to be formed by the flowage of mobile, hydroplastic sand over the uneven bottom in the direction of slope. May be transverse, longitudinal, or multidirectional. Those, which seem to be produced by a combination of load-casting and current-oriented flow, have been termed flow cast. They are related to flame structures. *Pettijohn.*

flowage differentiation. The retarding effect produced by relatively stationary walls on the movement under the influence of pressure of a mush of crystals in a magmatic liquid, which may give rise to magmatic differentiation and also to the concentration of ore minerals. *Schieferdecker.*

flowage fold. a. A minor fold that is the result of the flowage of rocks toward a synclinal axis, toward which the minor folds are overturned. *A.G.I.* b. A fold in which the layers of rock are thinned at the crest of the fold and are thickened at the trough of the fold. *A.G.I. Supp.*

flowage structure. A rock structure, the appearance of which indicates that the material was in a state of flow immediately before consolidation. Also called fluidal structure. *Fay.*

flow-and-plunge structure. a. A variety of false bedding, consisting of short, obliquely laminated beds deposited irregularly, at various angles of slope, the result of tidal action, accompanied by plunging waves. *Fay.* b. A term which has been applied to cross-lamination. *Pettijohn.*

flow banding. A structure of igneous rocks that is especially common in silicic lava flows. It is due to the movement or flow of magmas or lavas. It exists as an alternation of mineralologically unlike layers. *A.G.I.*

flow blue. A deep cobalt blue which was used for underglaze printing on pottery. As the name indicates, the color tended to flow into the glaze, giving a blurred effect; this result was obtained by placing flow powder in the saggar containing the ware, chlorine evolved from the powder and combined with some of the cobalt, therefore rendering it slightly soluble in the glaze. *See also* flow powder. *Dodd.*

flow bog. A peat bog, the surface of which is likely to rise and fall with every increase or decrease of water. The water may come from rains or springs. *Fay.*

flow brazing. Brazing by pouring molten filler metal over a joint. *ASM Gloss.*

flow breccia. A type of lava flow, usually of silicic composition, in which fragments of solidified or partly solidified lava, produced either by explosion or by flowage, have become welded together or cemented together by the still fluid parts of the same flow. *Holmes, 1920.*

flow-button test. *See* fusion flow test. *Dodd.*

flow cast. a. The rolls, lobate ridges, and other raised features produced and preserved in the overlying sandstone are given the designation flow cast because they represent the filling of the negative features produced by the flowage of the soft underlying sediment. *See also* load cast. *Pettijohn.* b. Load casts modified by horizontal flowage of the burden during or after emplacement. *See also* flowage cast. *Pettijohn.* c. A roll, a lobate ridge, or some other raised feature produced on the underside of a sand layer by the sand having flowed into a depression in the underlying, soft hydroplastic sediment. The underlying rock, which is typically coal or mudstone, preserves no diagnostic structure. *A.G.I.*

flow channel. The portion of a flow net bounded by two adjacent flow lines. *ASCE P1826.*

flow characteristic. The rate at which a metal powder will flow through an orifice in a standard instrument, and/or according to a specified procedure. *Rolfe.*

flow cleavage. a. Cleavage that depends on the parallel arrangement of the mineral constituents of the rock and which developed during rock flowage. *Compare* fracture cleavage. *Fay*. b. That variety of rock cleavage that is the result of the solid flow of the rock. *See also* foliation. *A.G.I.*

flow coating. The process of coating a ceramic or metal shape by causing the slip to flow over its surface and allowing it to drain. *ASTM C286-65.*

flow curve. A graph of points obtained in a test for liquid limit. This shows number of blows on the horizontal, logarithmic scale and moisture contents on the vertical, arithmetic scale. The point of intersection between the flow curve and the 25-blows vertical line is the liquid limit. The flow curve takes the form of a straight line. *Ham.*

flow earth. Material on a slope characterized by local derivation and lack of sorting. *A.G.I. Supp.*

flower agate. a. Any moss agate. *Shipley.* b. Translucent chalcedony from Oregon. Contains inclusions of minerals, sometimes red, brown, or yellow and green, arranged in flowerlike forms, often of both red and green colors. *Shipley.* c. A term often applied to any moss agate or mocha stone with flowerlike markings. *Shipley.*

flower of iron. *See* flos ferri. *Fay.*

flowers. *See* mottling (of silica refractories). *Dodd.*

flowers of sulfur. A light yellow, pulverulent modification of sulfur formed when sulfur vapor is condensed. *Standard, 1964.*

flower stone. a. Flower agate. *Shipley.* b. Incorrect term for beach pebbles of chalcedony. *Shipley.*

flow failure. Failure in which a soil mass moves over relatively long distances in a fluidlike manner. *ASCE P1826.*

flow folding. Folding in incompetent beds which offer so little resistance to deformation that they assume any shape impressed upon them by the more rigid rocks surrounding them or by the general stress pattern of the deformed zone. Synonym for ptygmatic folding. *A.G.I.*

flow gneiss. A gneiss, the structure of which was produced by flowage in an igneous mass before complete solidification. *A.G.I. Supp.*

flow gradient. A drainageway slope determined by the evelation and distance of the inlet and outlet, and by required volume and velocity. *Nichols.*

flow hole. *See* throat. *ASTM C162-66.*

flowing film concentration. In metallurgy, a concentration based on the fact that liquid films in laminar flow possess a velocity which is not the same in all depths of the film. There is no flow at the bottom but maximum at or very near the top resulting from the internal friction of one layer upon another. By this principle lighter particles are washed off while the heavier particles accumulate and are intermittently removed. This is the stationary table known for thousands of years. Vanners and round tables have been developed from this basic principle, whereas bumping and shaking tables jointly utilize flowing film and other principles. *Gaudin, p. 280.*

flowing furnace. A reverberatory with inclined hearth, used in Cornwall, England, for treating roasted lead ores by the precipitation process. *Fay.*

flowing slope. *See* solifluction. *A.G.I.*

flowing well. a. A well in which pumping is not necessary to bring the fluid to the surface. *Fay.* b. A well that discharges water or oil at the surface without the aid of a pump or some other lifting device. *Stokes and Varnes, 1955.* c. A well in which the fluid is flowing to the surface because of pressure or entrained gas. *A.G.I.*

flow, lava. *See* lava flow. *A.G.I.*

flow layer. a. A rock layer, differing mineralogically or structurally from the adjacent layers, and which was produced by flowage before the complete solidification of the magma. *A.G.I. Supp.* b. A parallel orientation of flow elements in an igneous rock that results in a banded structure. Certain minerals are segregated into such layers or into very flat lenses of contrasting appearance. *Stokes and Varnes, 1955.*

flow line. a. Any internal structure in an igneous rock produced by the orientation of crystals. *See also* flow structure; flow texture. *A.G.I. Supp.* b. The path that a particle of water follows in its course of seepage under laminar flow conditions. *ASCE P1826.* c. Distinguishable differences (as of color, texture, or arrangement of crystals) indicative of flow having taken place in a plastic solid (as wrought metal or an igneous rock formation). *Webster 3d.* d. The hydraulic grade line. *Seelye, 1.* e. A conduit, as a pipe, laid on the hydraulic gradient. *Seelye, 1.* f. Flowage line. *Seelye, 1.*

flow-line arch. A structure in massive igneous rock similar to a schlieren arch but indicated by more or less obscure flow lines rather than by flow layers. *G.S.A. Mem. 5, 1937, p. 69.*

flow machine. A machine used in glassmaking; molten glass flows into it from a feeder under the action of gravity. *Dodd.*

flow mark. a. A small channel cut in a sedimentary surface by water currents. *A.G.I. Supp.* b. The impression of such a channel preserved in the overlying sediment. *A.G.I. Supp.* c. A small ridge formed on the upper surface of muddy sediment by a water current. *A.G.I. Supp.* d. *See* flute cast. *Pettijohn.*

flowmeter. a. A device installed in a drilling-fluid circulation system that registers the number of gallons of liquid circulated per minute and also indicates when the flow past the bit ceases. *Long.* b. A device which registers rate of flow and perhaps quantity of gases, liquids, and fluid pulps. Used in mineral dressing to measure rates and quantities of pregnant solutions in cyanide and to control liquid additions to pulps. *Pryor, 3.*

flow net. A graphic representation of the flow lines and the equipotential lines used in a study of seepage phenomena. *ASCE P1826.*

flow powder. A mixture formulated to evolve chlorine at the temperature of the glost firing of pottery and used in the production of flow blue. For ware covered with a lead glaze, a suitable composition is 22 percent NaCl; 40 percent white lead; 30 percent $CaCO_3$, and 8 percent borax. For use with a leadless glaze, a suitable mixture is 15 percent NaCl; 55 percent $MgCl_2$; 15 percent KnO_3, and 15 percent $CaCO_3$. *See also* flow blue. *Dodd.*

flow process. *See* gob process. *ASTM C162-66.*

flow, pseudoviscous. The type of solid flow which takes place under a strain and a stress too low to produce gliding flow, and produces instead intergranular movement and dimensional orientation for the most part. *A.G.I.*

flow rate. a. Weight of dry air flowing per unit time. Measured in pounds per hour. *Hartman, p. 8.* b. In powder metallurgy, the time required for a powdered sample of standard weight to flow through an orifice in a standard instrument according to a specified procedure. *ASM Gloss.*

flow rock. Ganister found loose on the side of a mountain. *A.I.S.I. No. 24.*

flow roll. a. A rounded mass of sandstone projecting into underlying argillaceous sediment either filling an eroded depression or produced by differential settling and compaction under overburden load. *A.G.I. Supp.* b. Pillow-sized and pillow-shaped bodies of sandstone which characterize certain beds. Presumed to form by deformation, perhaps a product of large-scale load-casting or of subaqueous slump. *See also* ball-and-pillow structure; flow structure; slump ball; pseudonodules; storm roller. *Pettijohn.*

flowsheet. A diagram showing the progress of coal or ore through a preparation or treatment plant. It shows the crushing, screening, cleaning, or refining processes to which the material is subjected from the run-of-mine state to the clean and sized products. The size range at the various stages may also be shown. *Nelson.*

flowsheet, liquids. A flowsheet to indicate the flow liquids throughout a series of operations. *B.S. 3552, 1962.*

flowsheet, materials. A flowsheet principally concerned with solid materials. *B.S. 3552, 1962.*

flowsheet, weighted. A materials flowsheet including a statement of the capacity in tons per hour at principal points in the plant. *B.S. 3552, 1962.*

flow side. The failure of a sloped bank of soil in which the movement of the soil mass does not take place along a well-defined surface of sliding. *ASCE P1826.*

flow stage. That stage in the solidification of a magma when it is still sufficiently fluid to flow as a liquid. *A.G.I.*

flowstone. a. A coating on the floor or on the wall of a cave, consisting of a sheet of calcium carbonate deposited by slowly flowing water. *Schieferdecker.* b. These accumulations assume forms that closely resemble masses of ice, and some of the cascades in stone are large and impressive. To distinguish this material from that deposited by dripping water, it has been called flowstone. *USGS Bull. 760, 1925, p. 110.* c. A deposit of travertine which has been deposited where water has been flowing in a very thin sheet over rocks. The term is applied chiefly to such aqueous deposits in caves. *Webster 3d.*

flow stress. The uniaxial true stress required to cause plastic deformation at a particular value of strain. *ASM Gloss.*

flow stretching. The orientation and possible deformation of crystals with their long axes in the direction of plastic flow in metamorphic rocks. *G.S.A. Mem. 5, 1937, p. 10.*

flow structure. a. A structure of igneous rocks, generally but not necessarily restricted to volcanic rocks, in which the stream lines or flow lines of the magma are revealed by alternating bands or layers of differing composition, of differing crystallinity, or of differing texture, or by a subparallel arrangement of prismatic or tabular crystals. *Holmes, 1920*. b. A structural feature that forms when a magma is solidifying into an igneous rock and while it is sufficiently liquid to flow. *See also* linear flow structure; planar flow structure. *A.G.I.* c. A structure due to the alinement of the minerals or the inclusions of an igneous rock so as to suggest the swirling curves, eddies, and wavy motions of a flowing stream. *Fay*. d. An oriented structure that developed in rock during flow. *Webster 3d*. e. A structure of igneous rocks which is caused by flow in a magma during crystallization. The flow may produce alternating bands of different composition, crystallinity, and texture, or a parallel orientation of prismatic and tabular crystals. Synonym for fluidal structure; fluxion structure. *Schieferdecker*. f. *See* ball-and-pillow structure. Also referred to as flow layer; flowfold; sandstone flow. *Pettijohn*.

flow surface. The plane separating adjacent flow layers. *G.S.A. Mem. 6, 1938, p. 44*.

flow symmetry. The symmetry of movement comparable to the symmetry of equal and interchangeable parts located with reference to a center or one or more axes or planes. *See also* axial symmetry; isotropic symmetry; monoclinic symmetry; orthorhombic symmetry; polar symmetry; tetragonal symmetry; triclinic symmetry. *A.G.I. Supp*.

flow test. A test for the consistency of concrete in terms of its tendency to spread when placed on a metal table and jolted under specified conditions. *Dodd*.

flow texture. A texture common in the glassy groundmass of extrusive rocks, especially lavas, in which the stream lines or flow lines of the once molten rock are revealed by a subparallel arrangement of prismatic or tabular crystals or microlites. Synonym for fluidal texture. *A.G.I.*

flowtill. Superglacial debris (ablation moraine) that moved laterally as a mudflow from glacial ice to an adjacent lower surface. *A.G.I. Supp*.

flow unit. One of the nearly contemporaneous subdivisions of a lava flow (usually basaltic) which consists of two or more parts which were poured one over the other during the course of a single eruption. In cross section, a typical flow unit has a lenticular form, ranging from about 100 to 300 feet wide and from 10 to 30 feet thick. Longitudinally, the flow unit may be as much as one-half mile long. *A.G.I.*

flow velocity of water in soil. The vector point function used to indicate the rate and the direction of movement of water through soil, the volume moving per unit of time, and the area normal to the direction of net flow. *A.G.I. Supp*.

F.L.P. In Great Britain, tests of every type of apparatus are made in explosive atmospheres before it is approved and allowed to use the official letters F.L.P. (flameproof). *Mason, v. 2, p. 432*.

flucan; flookan. a narrow band of crushed rock or clayey material found along a fault zone or vein of ore. *See also* breccia; gouge; selvage; pug. *Nelson*.

flucany lode. A lode having flucan on one or both walls, and sometimes in the center. *Fay*.

fluccan. *See* flucan. *Pryor, 3*.

fluctuate. In tidal information, generally refers to variations of the water level from mean sea level that are not due to tide-producing forces and are not included in the prediction heights of the tide. *Hy*.

flue. a. S. Wales. A furnace, such as a large coal fire at or near the bottom of an upcast shaft for producing a current of air for ventilating the mine. *Fay*. b. A tube or passageway in a steam boiler for hot gases or water (depending on whether boiler is a fire-tube or water-tube boiler) *Bureau of Mines Staff*. c. Lanc. Shale *Arkell*. d. A British term used in the same sense as the term tube is used in the United States. *Fay*. e. A passage or channel through which the products of combustion of a boiler or other furnace are taken to the chimney. *C.T.D.*

flue bridge. The separating low wall between the flues and the laboratory of a reverberatory furnace. *Fay*.

flue brush. A brush made of pieces of wire or steel used to cleanse the interior of a flue from scales and soot. *Fay*.

flue cinder. Iron cinder from the reheating furnace, so called because it runs out from the lower part of the flue. *Fay*.

flue dust. Dust passing into the flues of a smelter or metallurgical furnace and which, unless caught, passes out of the chimney. It is composed of particles of unchanged or oxidized ore, volatilized lead that has been converted into oxide, carbonate and sulfate ash, and fuel, volatilized products of arsenic, zinc, bismuth, etc. *Hess*.

flue liner. A fire clay shape for use in the flues and chimneys of domestic heating appliances. *Dodd*.

flue lining. Low-grade fire clay pipe of cylindrical or rectangular cross section used for lining flues. *Fay*.

fluellite. A white orthorhombic mineral with one indistinct cleavage, $AlF_3.H_2O$. *Larsen, p. 98*.

flue plate; flue sheet. A plate in a boiler for supporting the ends of flues. *Webster 2d*.

flue tops. A form of burned clayware, often of ornamental character, placed on the top of chimney flues. *Fay*.

fluid. a. As an adjective, having particules which move easily and change their relative position without a separation of the mass and which yield easily to pressure; capable of flowing; liquid or gaseous. *Webster 3d*. It differs from a solid in that it can offer no permanent resistance to change of shape. *C.T.D.* b. The distinction between fluid and plastic is generally in the degree of deformation under a given stress. *A.G.I.* c. As a noun, a substance that alters its shape in response to any force however small, that tends to flow or to conform to the outline of its container, and that includes gases and liquids and, in strictly technical use, certain plastic solids and mixtures of solids and liquids capable of flow. *Webster 3d*.

fluidal. Relating to or characteristic of a fluid, or relating to or characteristic of flowing motion. For example, the fluidal arrangement of the components of a metamorphic rock. *Webster 3d*.

fluidal structure. The oriented arrangement of mineral grains (in an igneous rock) caused by a movement or flow in the mass when it was partially crystallized. Also called flow structure; fluxion structure. *Fay*.

fluidal texture. a. A texture of a rock in which the arrangement of the minute crystals shows the lines of flow of the rock material while molten. *Webster 3d*. b. *See* flow texture. *A.G.I.*

fluid catalytic cracking. A cracking process first introduced commercially in 1936. Basically, it converts a heavy oil fraction into a high-grade motor spirit by a process of thermal decomposition with the aid of a catalyst. The product of this process is then fractionally distilled to separate out motor-spirit fractions, fuel-oil blending components and gases. The latter can be used as feedstocks for the manufacture of petrochemicals. *See also* fractional distillation. *Nelson*.

fluid circulation. *See* drill fluid. *Long*.

fluid clutch. A hydraulic coupling which does not increase torque. *Nichols, 2*.

fluid column. The number of feet of drilling fluid standing in a borehole while the drill is operating and/or the number of feet of drilling fluid remaining in a borehole with the drill string withdrawn. *Long*.

fluid contact. The surface in a reservoir separating two regions characterized by predominant differences in fluid saturation. Because of capillarity and other phenomena, the fluid-saturization changes is not necessarily abrupt or complete, nor is the surface necessarily horizontal. *A.G.I.*

fluid conveyor coupling. A device for overcoming the starting resistance of a conveyor fed by a constant-speed motor. It is used to allow the motor to reach full speed before starting the conveyor. *Nelson*.

fluid cut. *See* fluid wash. *Long*.

fluid drive; fluid clutch. An automotive power coupling that operates on a hydraulic turbine principle, the flywheel of the engine having a set of turbine blades connected directly to it and driving them in oil thereby turning another set of turbine blades attached to the transmission gears of the automobile. *Webster 3d*.

fluid energy mill. A size reduction unit depending for its action on collisions between the particles being ground, the energy being supplied by a compressed fluid, (for example, air or steam) that enters the grinding chamber at high speed. Such mills will give a product of 5μ or less; they have been used for the fine grinding of frits, kaolin, zircon, titania, and calcined alumina, but the energy consumed per ton of milled product is high. *Dodd*.

fluid flow. *See* Raleigh's law. *Lewis, p. 708*.

fluid-fuel reactor. A type of nuclear reactor (for example, a fused-salt reactor) the fuel for which is in fluid form. *L&L*.

fluidimeter. An instrument devised by J. Joshua Phillips for determining the fluidity of oils at various temperatures. *Fay*.

fluid inclusion. *See* inclusion, fluid, *A.G.I.*

fluidity. a. The quality, state, or degree of being fluid: a liquid or gaseous state. *Webster 3d*. b. The physical property of a substance that enables it to flow and that is a measure of the rate at which it is deformed by a shearing stress as contrasted with viscosity: the reciprocal of viscosity. *Webster 3d*. c. In mineral transport, term not confined to liquids and slurries, but also used for finely divided solids which flow readily in air currents, fluosolids reactors, or through dry ball mills. *Pryor, 3*.

fluidity factor. The relation between the densities of a fluid and the suspended solid particles which in part determines the sorting of transported sediment. *A.G.I. Supp.*

fluidization. a. A roasting process in which finely divided solid materials are kept in suspension by a rising current of air (or other gas). This produces a fluidized bed which provides an ideal condition for gas-solid reaction because each solid particle is in constant motion and in contact with the moving gas stream on all sides. The solid material must not contain pieces so large that the gas stream will not keep them in suspension and the temperature must be kept low enough that there is no fusion or agglomeration of the particles. *Newton, p. 292.* b. A bed of coal is fluidized when it is made to float by the upward movement of a current of liquid or gas. In such a bed friction between particles is zero and they become highly mobile. Fluidization is used in the calcination of various minerals, the coking of petroleum pitch, in Fischer-Tropsch synthesis, and in the coal industry. *Nelson.* c. The process in which gas passes through loose fine-grained material, mixes with it, and causes it to flow like a liquid. It may occur at the time of a volcanic eruption, as in a glowing avalanche. *A.G.I. Supp.*

fluidized bed. A cushion of gas between a powder and a porous ceramic support, which is generally in the form of slabs; a current of air or hot gases is forced through the porous ceramic under pressure. The principle is used as a method of conveying powders along a slightly inclined porous ceramic trough; the powder can be simultaneously dried and/or calcined. *Dodd.*

fluidized bed dryer. A cool dryer which depends on a mass of particles being fluidized by passing a stream of hot air through it. As a result of the fluidization, intense turbulence is created in the mass including a rapid drying action. The coarse dry coal is withdrawn from the opposite side of the chamber. Fine particles in the feed become entrained in the air and are extracted in a cyclone, while the finest particles may need removal by dry filters or wet scrubbers. The dryer has a high capacity and many are in use in the United States. *See also* cascade coal dryer; flash coal dryer. *Nelson.*

fluidized bed reactor. A nuclear reactor in which the fuel is in the form of small pellets suspended in an upwardly moving stream of liquid or gas coolant. *L&L.*

fluidized roasting. Oxidation of finely ground pyritic minerals by means of upward currents of air, blown through a reaction vessel with sufficient force to cause the bed of material to expand (boil). Reaction between mineral and air is maintained at a desired exothermic level by control of oxygen entry, by admission of cooling water, or by added fuel. *Pryor, 3.*

fluid-level measurement. A reflection seismic measurement in boreholes. The problem of determining the distance from the top of the well down to the surface of the fluid in the annular space through which fluid is pumped between the well casing and tubing has been solved by the application of the principle used in reflection prospecting. A sound wave is sent down the well in the annular space between the tubing and the casing, and the time is measured which a wave reflected from the surface of the fluid requires to come back to the surface of the ground. *A.G.I.*

fluid lubricated. The core barrelhead bearings and/or other rotating members in a drill string cooled and lubricated by water or mud-laden fluid circulated as the drilling fluid. *Long.*

fluid measure, apothecary's.
1 minim = 0.059 cubic centimeters (one drop)
60 minim = 3.55 cubic centimenters (one dram)
8 fluid drams = 28.4 cubic centimeters (one fluid ounce)
20 drams = 568 cubic centimeters (one pint).

Pryor, 3.

fluid passage. Synonym for waterway. *Long.*

fluid pressure. a. The force with which a stream of drilling fluid is ejected from a pump, usually expressed in pounds per square inch. *Long.* b. The force, expressed in pounds per square inch, exerted by the weight of the column of drilling fluid measured at any given depth in a borehole. *Compare* bottom-hole pressure, b and c. *Long.* c. The pressure exerted by fluid contained in rock. *A.G.I. Supp.*

fluid ton. Thirty-two cubic feet. A unit to correspond with the short ton of 2,000 pounds, and of sufficient accuracy for many hydrometallurgical, hydraulic, and other industrial purposes, it being assumed that the water or other liquid under consideration weighs 62.5 pounds per cubic foot. *Fay.*

fluid volume. The amount of drilling fluid circulated through the drill string, generally expressed in gallons per minute. *Long.*

fluid wash. The wearing away of core and parts of a drill string or bit exposed to the erosive forces of the rapid passage of the circulated drilling fluid. Also called fluid cut. *Long.*

flukan. Same as Flucan. *Fay.*

fluke. A rod used for cleaning drill holes before they are charged with explosives. *Fay.*

fluken. a. Corn. Gouge clay. *Arkell.* b. A crossvein composed of clay. *Arkell.*

flume. a. An inclined channel, usually of wood and often supported on a trestle, for conveying water from a distance to be utilized for power, transportation, etc., as in placer mining, logging, etc. *Fay.* b. A milltail. *Fay.* c. To transport in a flume, as logs. *Fay.* d. To divert by a flume, as the waters of a stream, in order to lay bare the auriferous sand and gravel forming the bed. *Fay.* e. An open trough or channel, made of wood or other material, used for conveying water. Also called launder; sluice; race. *B.S. 3618, 1963, sec. 4.* f. A ravine or gorge with a stream running through it. *Fay.*

flumed. The transportation of solids by suspension or flotation in flowing water. *ASTM STP No. 148-D.*

flume man I. In metal mining, one who lays and repairs wooden pipes or flumes used to convey water in and about a mine. *D.O.T. 1.*

flume man II. In metal mining, a laborer who patrols flume line (usually a wooden structure along a hillside) used to convey water to placer workings for washing and separating the gold, platinum, or other metals from the gravel in which it is found. Also called flume tender. *D.O.T. 1.*

flume tender. *See* flume man II. *D.O.T. 1.*

fluming. *See* flume, c and f. *Fay.*

flummery; flummery stone. N. Wales. Smooth porcellanous limestone, Carboniferous limestone, Hunts quarry, Porthywaen, and Vale of Clwyd. *Arkell.*

fluobaryt. A compact mixture of fluorite and barytes. *Hey 2d, 1955.*

fluoborite. A colorless hydrofluoborate of magnesium, $3MgO.B_2O_3.3Mg(F,OH)_2$. Prisms. Hexagonal. From Norberg, Sweden; Sterling Hill, N. J. *English.*

fluocerite. A very rare, weakly radioactive, hexagonal mineral, $(Ce,La,Nd)F_3$, found in pegmatites associated with gadolinite and allanite; commonly found with bastnasite; its color is pale yellow, becoming yellowish and reddish brown by alteration. *Crosby, p. 101.*

fluor. Synonym for fluorite. *Fay.*

fluoramphibole. Artificial amphibole with fluorine replacing the hydroxyl of hydroxyl amphibole. *English.*

fluorapatite. An apatite containing fluorine as: (1) apatite in which fluorine predominates over chlorine, hydroxyl, and carbonate; and (2) calcium phosphate fluorine, $Ca_5F(PO_3)_2$. *Webster 3d.*

fluorarfvedsonite. A variety of arfvedsonite rich in fluorine; $(Na,Ca)_{2\text{-}3}(Fe^{2+},Fe^{3+},Mg)_5\text{-}Si_8O_{22}(OH)_2$. *Hey, M.M., 1964.*

Fluorbarite. A trade name for a fluorite-barite mixture used in glassmaking. *A.G.I. Supp.*

fluor crown glass. An optical crown glass containing a substantial quantity of fluorine and having a very low index of refraction and low dispersion. *ATSM C162-66.*

fluoredenite. A mineral, artificial $NaCa_2Mg_5\text{-}(Si_{3.5}Al_{0.5}O_{11})_2F_2$. *Spencer 21, M.M., 1958.*

fluometry. *See* fluorimetry. *Pryor, 3.*

fluorene. An organic compound, C_{13},H_{10}, formed through burning of pyritous shale in Bohemia, Czechoslovakia. Later renamed kratochvilite. *Tomkeieff, 1954.*

fluorescence. a. The emission of visible light by a substance exposed to ultraviolet light. It is a useful property in examining well cuttings for oil shows and in prospecting for some minerals. *A.G.I. Supp.* b. The absorption of radiation at one wavelength, or a range of wavelengths, and its reemission as radiation of longer, visible wavelengths. *ASTM STP No. 148-D.*

fluorescent. Having the property to produce fluorescence. *Long.*

fluorescent lamp. a. Commonly and improperly designates an electric lamplike device emitting ultra-violet radiations or black light. *Long.* b. A glass globe or tube the inner surface of which is coated with a fluorescent substance that produces visible light when excited by an electrical current. *Long.*

fluorescent light. Light produced by a fluorescent lamp. *See also* fluorescent lamp. *Long.*

fluorescent magnetic-particle inspection. Inspection with either dry magnetic particles or those in a liquid suspension, the particles being coated with a fluorescent substance to increase the visibility of the indications. *ASM Gloss.*

fluorescent penetrant inspection. A type of nondestructive testing wherein a penerating type of oil or other liquid with which has been combined fluorescent material particles is applied over a surface and flowed into cracks, crevices, or other surface defects or irregularities, the excess removed and the article examined under the ultraviolet light. *Henderson.*

fluorescent screen. A screen that emits visible or actinic light when it is exposed to X-rays or gamma rays. It usually consists of a piece of cardboard coated with a phosphor. *ASM Gloss.*

fluorhectorite. The end-member $K_xMg_{3-x}Li_xSi_4O_{10}F_2$, where x is between ⅓ and ⅔. *Hey, M.M., 1964.*

fluoride. A compound of fluorine with one other element or radical. *A.G.I.*

fluorimetry; fluoremetry. Method of analysis based on intensity of fluorescence measured when using ultraviolet light. *Pryor, 3.*

fluorine. A nonmetallic element, the lightest of the halogens, isolated as a pungent, corrosive gas that is pale greenish yellow. It is extremely reactive, being the most electronegative (nonmetallic) of the elements. Symbol, F; valence, 1; atomic number, 9; atomic weight, 18.998; and density, 1.696 grams per liter (at 0° C and 1 atmosphere). *C.T.D.; Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-110.* Small quantities in water supplies promote resistance to dental decay. *C.T.D. Supp.*

fluorine minerals. Minerals containing fluorine, such as apatite, amblygonite, chondrodite, cryolite, fluorite, lepidolite, topaz, and others. *Fay.*

fluorite; fluorspar; florspar. A natural calcium fluoride, CaF_2, occurring in veins either alone or with metallic ores. It is the principal ore of fluorine and is weakly radioactive. Color yellow, green, purple, pink, red, blue, violet, white, or brown; isometric; luster, vitreous; Mohs' hardness, 4; specific gravity, 3.18. Found in Illinois, Kentucky, Tennessee, New Hampshire, Colorado, New Mexico, Arizona, Nevada, Utah, Montana, Texas, California, Washington; Canada, Mexico, England, Germany. Used as a flux in open hearth steel furnaces and in gold, silver, copper, and lead smelting; manufacture of hydrofluoric acid; manufacture of opalescent glass; emery wheels and certain cements. *Dana 17, pp. 325-328; CCD 6d, 1961; Crosby, p. 123.*

fluormagnesiorichterite. The synthetic amphibole end-member $Na_2Mg_6Si_8O_{22}F_2$. *Hey, M.M., 1964.*

fluormica. Group name for the fluorite-rich micas, natural or artificial. *Compare* fluorphlogopite. *Hey 2d, 1955.*

fluormica-fluoramphibole ceramic process. A process developed by the U.S. Bureau of Mines for making strong, machinable ceramics of high dielectric strength for potential use in aircraft radomes, brake blocks, grinding wheels, and similar applications. The process involves varying the proportions in synthetic fluormica-fluoramphibole mixtures to obtain ceramics that are not only strong and durable, but also can be machined and formed easily. *Bureau of Mines Staff.*

fluorogen. A substance which induces fluorescence in another substance with which it is mixed. *Bennett 2d, 1962.*

fluorographic method. A method involving exposing soil samples to ultraviolet light and recording the emitted light on a light-sensitive medium. The densities of the recorded sample images are measured by a transmission photometer. *A.G.I.*

fluorologging. A logging technique based on the principle that the rocks overlying an oil accumulation have anomalously high fluorescent intensities. The logs are prepared by plotting the fluorescent intensity of well cuttings against depth. *A.G.I.*

fluorometer. A device for measuring the intensity of fluorescence. *Bennett 2d, 1962.*

fluoroscope. An instrument consisting of a fluorescent screen and a source of ionizing radiation. Used to examine the image formed by opaque objects placed in the beam. *ASM Gloss.*

fluoroscopic screen. A fluorescent screen that has an emission in the portion of the spectrum to which the eye is most sensitive and hence, can be viewed directly. *ASM Gloss.*

fluoroscopy. An inspection procedure in which the radiographic image of the subject is viewed on a fluorescent screen, normally limited to low-density materials or to thin sections of metals because of the low-light output of the fluorescent screen at safe levels of radiation. *ASM Gloss.*

fluorosis. A chronic poisoning resulting from the presence of 0.9 miligrams per liter or more of fluorine in drinking water. Teeth become brittle, opaque white with a mottled enamel. *Bureau of Mines Staff.*

fluorphlogopite. A variety of phlogopite in which fluorine replaces hydroxyl, $F_2KMg_3(AlSi_3)O_{10}$. *English. See also* fluormica.

fluorspar. *See* fluorite.

fluortaeniolite. Original, incorrect spelling of fluortainiolite. *See also* fluortainiolite. *Compare* tainiolite; taeniolite. *Hey, M.M , 1964.*

fluortainiolite. The end-member $KMg_2LiSi_4O_{10}F_2$. *Hey, M.M., 1964.*

fluortremolite; fluoretremolite. Artificially produced tremolite containing 9.03 percent fluorine in place of hydroxyl. *Spencer 15, M.M., 1940.*

fluosilicates. Salts of fluosilicic acid, H_2SiF_6. Magnesium fluosilicate is used as a concrete hardener and in magnesium casting. Zinc fluosilicate is used as a concrete hardener. Copper fluosilicate has a similar use and barium fluosilicate is used in ceramic operations. Lead fluosilicate is used in the electrorefining and in the plating of lead. The zinc, magnesium, copper, and lead fluosilicates are soluble, in contrast with the sodium and potassium salts. *See also* sodium fluosilicate; ammonium fluosilicate. *CCD 6d, 1961.*

fluosilicic acid; hydrofluosilicic acid; silicofluoric acid; sand acid. Transparent; colorless; fuming; corrosive; liquid. $H_2SiF_6 \cdot xH_2O$; and soluble in water. Used in ceramics to increase hardness; in the manufacture of sodium, ammonium, magnesium, zinc, copper, barium, lead, and other fluosilicates; and in building (hardening cement, plaster of Paris, concrete flooring, preserving masonry). *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-175.*

fluosolids system. A method of roasting applied to finely divided material, in which air with sufficient strength is blown through a heated bed of mineral to keep it fluid, while reaction is controlled by continuous adjustment of rate of feed, cooling water, added fuel (including oxygen in air). Train of appliances includes instrument controls, air compressor, dust-collecting cyclones, and feed pump. *Pryor, 3.*

fluran. *See* floran tin.

flush. a. To operate a placer mine, where the continuous supply of water is insufficient, by holding back the water and releasing it periodically in a flood. *Webster 3d.* b. To fill underground spaces, as in coal mines, with material carried by water, which after drainage, forms a compact mass. *Webster 2d.* c. To clean out a line of pipes, gutters, etc., by letting in a sudden rush of water. *Zern.* d. The splitting of the edges of stone under pressure. *Zern.* e. Forming an even, continuous line or surface. *Zern.* f. Eng. A small flash due to ignited firedamp, Midland coalfield. *Fay.* g. *See* hydraulic mine filling. *Fay.* h. Any sudden flow of material or water into underground workings. *B.S. 3618, 1963, sec. 4.*

flush-coupled. Provided with couplings the outside diameter of which is the same as that of the unit pieces on which the coupling is fitted. *See also* flush-coupled casing. *Long.*

flush-coupled casing. A length (usually 10 feet) of steel tubing one end of which is provided with a short coupling having pin threads on both ends. The outside diameters of the coupling and the casing tube are equal, and the inside diameter of the coupling is usually about three-sixteenths of an inch smaller than the inside diameter of the casing tube. *Long.*

flush head. *See* water swivel. *B.S. 3618, 1964, sec. 6.*

flushing. a. A drilling method in which water or some other thicker liquid, for instance a mixture of water and clay, is driven into the borehole, through the rod and bit. The water rises along the rod on its outer side, that is between the walls of the borehole and the rod, and with such a velocity that the broken rock fragments are carried up by this water current (direct flushing); or water enters the borehole around the rod and issues upwards through the rod (indirect flushing). *Stoces, v. 1, p. 79.* b. In a colliery, diversion of ventilation to clear foul atmosphere; a dangerous method. *Pryor, 3.* c. In oil-well production, use of gravitated ground water to force oil or gas to the surface. *Pryor, 3.* d. Hydraulic stowing. *Nelson.*

flushing fluid. *See* drill fluid and flush. *Long.*

flush joint; flush-jointed. Two similar members joined in such a manner that either or both the outside and inside surfaces of the two members are flush. *Long.*

flush-joint casing. Lengths (usually 10 feet) of steel tubing provided with a box thread at one end and a matching pin thread on the opposite end. Coupled, the lengths form a continuous tube having a uniform inside and outside diameter throughout its entire length. *Long.*

flush-joint drivepipe. Thick-walled drivepipe, lengths of which are threaded and coupled together in the same manner as flush-joint casing. *See also* flush-joint casing. *Long.*

flush-joint pipe. a. A pipe or casing threaded and coupled together in the same manner as flush-joint casing and flush-joint drivepipe. *Long.* b. As used by individuals associated with the petroleum-drilling industry, a pipe threaded and coupled together in such a manner that the inside surfaces are flush and the outside surfaces are enlarged, forming a shouldered junction. *Long.*

flush out; flushing out. *See* flush.

flush production. The yield of an oil well during the early period of production. *Fay.*

flush-set. A bit or reaming shell in which the inset diamonds or other cutting points do not protrude beyond the metal holding them in place. *Long.*

flush water. Water used to assist the flow of materials in chutes or launders. *B.S. 3552, 1962.*

flute. a. A groove parallel or nearly parallel to the axis of a cylindrical piece, such as the grooves of a split-ring core lifter or the grooves in a core-barrel stabilizer ring. Also applied to grooves or webs following a corkscrewlike course around the outside surface of a cylindrical object, like the spiraled webs on an auger stem or rod. *Long.* b. Asymmetric scallopped rock surfaces. Drapes of dripstone or of flowstone. A descriptive term used in a commercial cave. Synonymous with facet. *A.G.I.* c. Discontinuous grooves and pockets, 2 to 10 or more centimeters long, formed on bedrock by action of turbulent flow of water. A loosely used synonym for flute cast. *Pettijohn.*

flute cast; scour cast; scour finger; vortex cast; lobate rill mark; turboglyph. A sole mark, a raised subconical structure, the upcurrent end of which is rounded or bulbous, the other end flaring out and merging with the bedding plane. Formed by filling of an erosional scour or flute. *Pettijohn.*

fluted core. Core the outside surface of which is spirally grooved or fluted. Also called corkscrew core. *Long.*

fluted coupling. A type of stabilizer. *Long.*

flutes. Substantially parallel depressions, cut in a glass article or molded in while the glass is plastic, for the purpose of decoration. *C.T.D.*

fluthwerk. Ger. Searching for ore in streams and riverbeds. *Fay.*

fluting. a. Smooth, gutterlike channels or deep, smooth furrows worn in the surface of rocks by glacial action. *Fay.* b. A peculiar method of surface decay by which granite or granite gneisses are left with a corrugated or fluted surface. In a large subangular fragment of granite, one side contains a dozen of these little channels, from 1 to 4 inches deep and from 3 to 10 inches apart from center to center. These channels run straight down the face of the rock. *A.G.I.* c. Forming longitudinal recesses in a cylindrical part, or radial recesses in a conical part. *ASM Gloss.*

fluvial. a. Of or pertaining to streams and rivers; produced by stream or river action, as a fluvial plain. *Webster 3d.* b. Applied to sand and gravel deposits laid down by streams or rivers. Such deposits are of fluvial origin. *von Bernewitz.*

fluvial cycle of erosion. The continuous series of changes involved in the complete reduction of a region to base level by the action of streams and rivers or by running water in general. *Stokes and Varnes, 1955.* Synonym for fluvial geomorphic cycle.

fluvial geomorphic cycle. The normal cycle of erosion by streams and rivers, leading to the formation of a peneplain. *A.G.I.* Synonym for fluvial cycle of erosion.

fluviatile. Growing near or belonging to streams or rivers; produced by the action of a stream or a river. Synonym for fluvial. *Standard, 1964.*

fluviatile deposit. A sedimentary deposit laid down by a stream or a river. *Fay.*

fluviatile sand. Fluviatile sands are usually sharp and consist of irregular fragments of numerous sizes. Quartz is usually the predominant mineral, but other minerals may be present in various proportions according to the conditions under which the rivers or streams are derived and according to the treatment that such minerals have undergone during transportation. *A.G.I.*

fluvio-aeolian; fluvio-eolian. Produced or caused by the action of streams and wind. For example, fluvio-aeolian geologic formations. *Webster 3d.*

fluvioglacial. *See* glaciofluvial. *Webster 3d.*

fluvioglacial drift. Drift transported by waters emanating from a glacier. *Webster 3d.*

fluviolacustrine. Of or pertaining to sedimentation partly in lake and partly in stream waters or to deposits laid down under alternating or overlapping lacustrine and fluviatile conditions. *Webster 3d.*

fluviomarine. a. Formed by the joint action of a river and the sea. For example, a deposit at the mouth of a river. Synonym for estuarine. *Fay.* b. Of or pertaining to a deposit brought into the sea from the land, and there rearranged by the waters of the sea. Such a deposit often contains the remains of land animals, freshwater animals, and marine animals. *A.G.I.*

fluvioterrestrial. Of or pertaining to the land and the fresh waters of the earth; not marine. *Standard, 1964.*

fluviovolcanic. Of or relating to the combined action of volcanoes and streams; for example, beds of fluviovolcanic ash. *Webster 3d.*

flux. a. In ceramics, any readily fusible glass or enamel used as a base or ground. *CCD 6d, 1961.* b. In physics, the rate of flow or transfer of electricity, magnetism, water, heat, energy, etc., the term being used to denote the quantity that crosses a unit area of a given surface in a unit of time. *CCD 6d, 1961.* c. In chemistry and metallurgy, a substance that promotes the fusing of minerals or metals or prevents the formation of oxides. For example, in metal refining an addition of some mineral to the furnace charge is made for the purpose of absorbing mineral impurities in the metal. A slag is formed which floats on the top of the bath and is run off. *CCD 6d, 1961.* d. In soldering and brazing, a substance which is applied to the portions to be united and which, on the application of heat, aids in the ready flowing of the solder and prevents the formation of oxides while the solder unites with the two parts to form a tight joint. *CCD 6d, 1961.* e. A substance added to a solid to increase its fusibility. *C.T.D.* f. A substance to reduce melting temperature. *Hurlbut.* g. The intensity of neutron radiation. It is expressed as the number of neutrons passing through 1 square centimeter in 1 second. *L&L.* h. Any chemical or rock added to an ore to assist in its reduction by heat, such as limestone with iron ore in a blast furnace. *von Bernewitz.* i. In metal refining, a material used to remove undesirable substances, like sand, ash, or dirt, as a molten mixture. Also used as a protective covering for certain molten metal baths. Lime or limestone is generally used to remove sand, as in iron smelting; sand, to remove iron oxide in copper refining. *ASM Gloss.* j. A bituminous material, generally liquid, used for softening other bituminous materials. *Urquhart, sec. 2, p. 81.* k. Any substance or mixture which lowers the normal vitrifying temperature of a ceramic body or composition, (that is, fluorspar, nepheline syenite, calcium oxide, etc.). *Bureau of Mines Staff.* l. An easily fusible material, such as borax, lead, lime, or silica, used in mixing enamels or glazes. *C.T.D.* m. Passage across a physical boundary, such as carbon dioxide from the atmosphere to the hydrosphere; or across a chemical boundary, as carbon dioxide from the atmosphere to organic matter. *A.G.I. Supp.* n. State of change. *A.G.I. Supp.* o. As a verb, to cause to become fluid; to treat with a flux, especially in order to promote fusion; to become fluid. *Webster 3d.*

flux blocks. Refractory shapes which are used in contact with molten glass in furnaces. *A.R.I.*

flux box. Refractory furnace blocks used in contact with glass in melting. *ACSG.*

flux factor. A factor for assessing the quality of steelworks grade silica refractories. It is defined in the American Society for Testing and Materials—C416 as the percentage of Al_2O_3 in the brick plus twice the total percentage of alkalies; for first quality (Type A) bricks, the flux factor must not exceed 0.50. *Dodd.*

flux gate; flux valve. A device based on the earth-inductor principle and used to indicate the direction of the terrestrial magnetic field. *Webster 3d.*

flux-gate magnetometer; saturable reactor. The essential element of this instrument, which is used for detailed studies of the earth's magnetic field on a local basis, is the flux-gate. This consists of two identical saturable cores of high permeability, oppositely wound with identical coils. An alternating current in these coils magnetizes them first with one polarity, then in the opposite sense. If an additional field is present, such as the earth's field, it will add to the flux in one coil while decreasing that in the other. As a result, the voltage drop across the two coils will differ. The amount of this difference is proportional to the unvarying field, which can therefore be measured by noting the average voltage difference between the two halves of the flux gate. This can be done to an accuracy of about ±1 gamma. In use, a part of the earth's field is balanced out by an additional winding surrounding both cores and carrying direct current. In airborne use, the recording flux gate is kept aligned with the magnetic field by the use of two additional flux gates. When these are at right angles to the earth's field, they generate no voltage, but if they depart from this position, they can be made to generate voltages which operate motors returning them to proper alignment. In this fashion, the recording element is held always parallel to the total field. *H&G.*

fluxing. a. Fusion or melting of a substance as a result of chemical action. *HW.* b. The development of the liquid phase in a ceramic body under heat treatment by the melting of low fusion components. *Bureau of Mines Staff.* c. Treating with a flux especially in order to promote fusion or softening. *Webster 3d.*

fluxing lime. Lump or pebble quicklime used for fluxing in steel manufacture. The term may be applied more broadly to include fluxing of nonferrous metals and glass. It is a type of chemical lime. *Boynton.*

fluxing ore. An ore containing an appreciable amount of valuable metal, but smelted mainly because it contains fluxing agents which are required in the reduction of richer ores. *Weed, 1922.*

fluxing stone. Consists of pure limestone or sometimes dolomite and is used in iron blast furnaces and foundries. Usually material below 2 inches in diameter is eliminated. The most desirable size is between 4 and 6 inches. *BuMines Bull. 630, 1965, p. 886.*

fluxion banding. Banding in rock consisting of flow layers. *G.S.A. Mem. 5, 1937, p. 15.*

fluxion structure. a. Includes such structures as flow lines, parallel orientation of phenocrysts, banding, elongation of vesicles, etc. Synonym for flow structure; fluidal structure. *Fay.* b. Structure in rocks involving one or more swirl axes. *A.G.I. Supp.* c. Internal structure of igneous rocks indicating flowage of magma. The orientation and arrangement of crystals into flow lines, for example, is a fluxion structure. *A.G.I. Supp.; Bureau of Mines Staff.*

fluxion swirl. The structure seen in thin sections of tectonites cut normal to B, indicating rotation. *G.S.A. Mem. 6, 1938, p. 138.*

flux line block. A refractory block for use in the upper course of the walls of a glass tank furnace. The flux line is the surface level of the molten glass and attack on the refractories is more severe at this level than beneath the molten glass. *Dodd.*

flux lines. a. Imaginary lines used as a means of explaining the behavior of magnetic and other fields. Their concept is based on the pattern of lines produced when magnetic particles are sprinkled over a permanent magnet. Sometimes called magnetic lines of force. *ASM Gloss.* b. *See* metal line. *ASTM C162–66.*

flux oil. Oil of low volatility suitable for softening bitumen or natural asphalt. *Institute of Petroleum, 1961.*

flux oxygen cutting. Oxygen cutting with the aid of a flux. *ASM Gloss.*

flux process. Manufacture of thin or terneplate, in which molten zinc chloride, with or without ammonium chloride, is used as flux on the surface of the fused metal pot. *Bennett 2d, 1962.*

flux spoon. A small ladle for dipping up a sample of molten metal for testing. *Fay.*

flux stone. Limestone, dolomite, or other rock used in metallurgical processes to lower the melting temperature of ore. *A.G.I.*

fly. a. In Montana, a gate or door in a hopper for diverting ore, rock, or coal from one bin or conveyor to another. *Fay.* b. A piece of canvas drawn over the ridgepole of a tent, doubling the thickness of the roof, but not in contact with it except at the ridgepole. *Fay.* c. The flap or door of a tent. *Fay.*

fly ash. a. Fine solid particles of noncombustible ash with or without accompanying combustible particles carried out of a bed of solid fuel by the draft and deposited in quiet spots within a furnace and flues or within a boiler setting, or carried out of a chimney with the waste gases and often recovered for use as a constituent in commercial products. *Webster 3d.* b. Finely divided material (which may have pozzolanic properties) from the precipitators near flues of power stations using pulverized coal. Also called pulverized fuel ash. *Taylor.*

flyback. The recycling period of the sawtooth-modulated frequency modulated oscillator. *H&G.*

flycatcher. Aust. A weir to which boards covered with gunny sacking are attached to catch float gold. *Hess.*

fly cutting. Cutting with a single-tooth milling cutter. *ASM Gloss.*

fly doors. N. of Eng. Doors in working roadways, opening either way. *Fay.*

fly dope. Insect repellent containing oil. *Hoffman.*

fly gate. An opening in a chute that can be opened or closed at will. In a chute for coal, a fly gate may be inserted so that if rock is deposited in the chute, it may be trapped out by opening the fly gate. *Zern.*

Flygt pump. A submersible pump developed in Sweden. It is available in a 1-inch discharge hose size and in a 3-inch size. The 1-inch pump produces about 5,000 gallons per hour at a 20-foot total static head, operating on a 110-volt, single-phase alternating current. *Carson, p. 206.*

flying ant. Spring-loaded pair of catch hooks used to aid in retrieving broken or discontinued pipes in shallow alluvial drilling. *Pryor, 3.*

flying arch. In a modern glass tank furnace the double walled bridge built across the furnace to separate the working end from the melting and refining end; the flying arch is independent of the general furnace structure. *Dodd.*

flying cradle. Eng. *See* cradle, a and b. *Fay.*

flying reef. Aust. A broken, discontinuous, irregular vein. *Fay.*

flying veins. A series of veins which overlap one another or even run into each other, one end having the appearance of a branch. *Nelson.*

flyrock. The rock fragments which are thrown and scattered during quarry or tunnel blasting. If more explosive energy is available than can be used in doing useful work in fracturing the rock, it is reflected in severe concussion and excessive throw. Flyrock indicates that the explosive factor needs adjustment. *Nelson.*

flysch. The widespread deposits of sandstones, marls, shales, and clays, which lie on the northern and southern borders of the Alps. Although consisting largely of sandy and calcareous shales (hence the name—in reference to their fissile character), the flysch also contains beds of sandstone and conglomerate. *A.G.I.*

flywheel. A heavy wheel used in a rotating system to reduce surges of power input or demand by storing and releasing kinetic energy as it changes its rate of rotation. *Pryor, 3.*

Fm Chemical symbol for fermium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

fmp Abbreviation for formation pressure. Also abbreviated FMP. *BuMin Style Guide, p. 59.*

fmv Abbreviation for formation volume factor. Also abbreviated FMV. *BuMin Style Guide, p. 59.*

fnp Abbreviation for fusion point. *BuMin Style Guide, p. 59.*

foach. Eng. Nearly synonymous with the old Cornish word, "pock," "pokkin," to push. A narrow level is called a "foaching little level." When a miner has not obtained what he considers a full price for his contract he would be likely to say "'twill do 'pon a foach," namely, it will do on a push. *Fay.*

foal. Newc. A young boy employed in putting coal. *Fay.*

foam. a. A collection of minute bubbles resulting from strong agitation of a liquid and forming a frothy, somewhat adhesive, and usually whitish mass. *Standard, 1964.* b. To gather, emit, or produce foam; froth. *Standard, 1964.* c. A layer of bubbles on the surface of molten glass. *ASTM C162–66.* d. A suspension, often colloidal, of a gas in a liquid. *C.T.D.*

foam drilling. A method of dust suppression in which thick foam is forced through the drill by means of compressed air and the foam and dust mixture emerges from the mouth of the hole in the form of a thick sludge. With this method the amount of dust dispersed into the atmosphere is almost negligible and the amount of water used is about 1 gallon per hour. Approximately 30 to 50 feet of drilling can be done with one filling of the unit. *Mason, v. 1, 304.*

foam-drive process. A process developed by the U.S. Bureau of Mines that utilizes detergent-type chemicals to increase the effectiveness of gas- and water-injection treatments to obtain higher petroleum production from old oilfields. The foam, produced by the mixture of these chemicals with gas and water, when injected in sufficient amounts into an oil-bearing formation, acts like an underground broom that is swept through the pores of oil-bearing formations by the water, gas, or other substance injected. *Bureau of Mines Staff.*

foamed clay. Lightweight cellular clayware for heat and sound insulation. Foam is generated in a clay slip, either mechanically or by a chemical reaction that evolves gas bubbles, and the slip is then caused to set. Some insulating refractories are made by this process. *Dodd.*

foamed concrete. a. Lightweight concrete in which the lightness is obtained by the formation in the plastic mix of bubbles of air or gas which are retained on setting and hardening. *Taylor.* b. *See* aerated concrete. *Dodd.*

foam fire extinguisher. A portable appliance useful for fighting underground fires. Foam extinguishers are of two types: (1) the chemical foam type in which two chemical solutions, an acid solution (aluminum sulfate) and an alkali solution (sodium bicarbonate), and foam-forming compounds are contained in the inner and outer concentric compartments respectively of the extinguisher; they are mixed by breaking a seal and inverting the extinguisher, when a stream of thick foamy fluid, consisting of a mass of small bubbles, results which forms a blanket over the burning material and also produces a cooling effect which assists in extinguishing the flame, and (2) the air foam type in which the air foam is produced mechanically. The outer container is filled with water and into it is placed a sealed cylindrical container in which is a charge of foam compound and a small charge of compressed carbon dioxide. When operated, a knob is struck sharply and the cylinder is punctured thus mixing the foam compound and the water which is aerated by a special nozzle as it exudes. *Sinclair, I, pp. 280–281.*

foam glass. Cellular glass, in the form of blocks, usually made by mixing powdered glass with a gasifying agent (for example, carbon or a carbon compound) the mixture then being heated for a short time to fuse the glass and trap the evolving gas bubbles. Foam glass is used as a structural heat insulating material. *Compare* bubble glass. *Dodd.*

foaming. In a boiler, the carryover of slugs of water into the piping, due to dirty water. *See also* priming. *Strock, 10.*

foaming agent. A material that tends to stabilize a foam. *ASM Gloss.* The same as frothing agent.

foaming earth. Synonym for aphrite. *See also* earth foam. *Fay.*

foam injection. The injection of foam into shotholes and connecting breaks to displace any firedamp present and to minimize further firedamp emission into the shotholes, thereby reducing the risk of ignition of the gas during shot firing. *B.S. 3618, 1964, sec. 6.*

foam line. A line in a tank dividing the foam-covered area from the clear area. *ASTM C162–66.*

foam plug. A secondary method of fighting underground fires, devloped in Great Britain in 1956. It consists of filling the fire area with soap bubbles which are moved forward by the air current. The foam is produced by passing the air current through a cotton net, saturated with a dilute solution of detergent, which is stretched across the mine roadway. The air passing through the net forms bubbles ½ to 1½ inches in diameter which honeycomb and form a plug of foam which tends to quench the fire and reduce its temperature to a point where it can be attacked directly and without protective clothing. *See also* high expansion foam. *Nelson.*

foam spar. Same as aphrite. *Fay.*

foamy. Applied to the structure of a vesicular rock in which the partitions between the vesicles form a fine network. *Schieferdecker.*

foamy amber. Frothy amber. Almost opaque chalky white amber. Will not take a polish. *Shipley.*

f.o.b. *See* free on board. *Pryor, 3.*

focal sphere. The theoretical sphere enclosing the focal region of an earthquake. *A.G.I. Supp.*

focus. In seismology, the source of a given set of elastic waves. The true center of an earthquake, within which the strain energy is first converted to elastic wave energy. *A.G.I.*

focused logging devices. Logging devices which are designed to focus their lines of current flow. *Wyllie, p. 80.*

fodder. a. N. of Eng. A unit employed in expressing weights of metallic lead, and equal to 21 hundredweight of 112 pounds avoirdupois. *Fay.* b. Eight pigs of cast iron. *Webster 2d.*

foddom; faddum. Scot. Fathom. *Fay.*

fog; mist; cloud. Dispersion of liquid as minute droplets in a gas. No sharp dividing line from dust. Formation is aided if condensation nuclei are present (dust particles, electrically charged gases, or ions). *Pryor, 3.*

foge. Corn. A forge for smelting tin. *Fay.*

fog quenching. Quenching in a fine vapor or mist. *ASM Gloss.*

foids. Proposed by Johannsen, derived by contracting the word feldspathoids, and used in his classification of igneous rocks to indicate that group of minerals. *A.G.I.*

foig. A crack or a break in the roof. *C.T.D.*

foil. Metal in sheet form less than 0.006 inch in thickness. *ASM Gloss.*

Foil back. Trade name for an assembled stone. There are three kinds of Foil back: (1) genuine Foil back, a genuine gemstone backed with colored or silver foil to improve its color or brilliancy, or both; (2) false Foil back, one in which a stone of a different species is backed with a color to imitate a more desirable one; and (3) imitation Foil back, one in which glass is substituted for a stone. *See also* lacquer back. *Shipley.*

foiling. A thin leaf of metal silvered and burnished and afterwards coated with transparent colors; employed to give color or brilliancy to pastes and inferior stones. *See also* Foil back. *Shipley.*

foil stone. An imitation jewel. *Fay.*

fold. a. The structure of rocks or strata that have been bent into a dome (anticline), a basin (syncline), a terrace (monocline), or a roll. This structure is observed mainly in mountainous regions, and is characteristic of both the altered and the unaltered sedimentary rocks. Strictly, a strong flexure of a stratum, with steeply inclined sides. Loosely and more commonly, any flexure of a stratum. *Fay; Standard, 1964.* b. A bend or an undulation in layered rocks caused by compression. *Bateman.* c. A bend in strata or in any planar structure. *A.G.I.* d. *See* lap. *ASTM C162–66.*

fold axis. *See* axis. *A.G.I.*

fold breccia. Breccia that has been produced by sharp folding of thin-bedded, brittle layers between which there are incompetent plastic beds. Synonym for riebungsbreccia. *Pettijohn, 2d, 1957, p. 281.*

fold coast. A coast, the configuration of which is controlled by folded rocks. *Shepard, p. 73.*

fold direction. Where a folded bedding surface is cylindrical, that is, has a degree of regularity such that it may be considered as being generated by a line moving in space parallel to itself, the direction of this line (one way and the opposite) is the fold direction of the surface. *Challinor.*

fold fault. A fault formed in causal connection with folding. *A.G.I. Supp.*

fold, flexure. A type of fold, microscopic to orogenic in size, in which movement took place normal to the axial line and parallel with the limbs, producing notable shortening. The thickness of the sliding prisms forming the limbs varies directly with the amplitude of the resulting fold. *A.G.I.*

folding. a. The folding or bending of strata is usually the result of compression that causes the formation of the geologic structures known as anticlines, synclines, monoclines, isoclines, etc. The amplitude (that is, the vertical distance from the crest to the trough) of a fold ranges from a fraction of an inch to thousands of feet. *C.T.D.* b. There are four principal types of folding recognized by geologists: (1) flexure folding: (2) flow folding; (3) shear folding; and (4) folding due to vertical movements. Folding, with its accompanying processes, almost invariably creates problems in the design of underground installations because it involves weakening of rock structures and may cause anomalous stress conditions to exist. *Lewis, pp. 592-593.*

folding boards. Scot. a. Shuts; a shifting frame on which the cage rests, in or at the top of a shaft. *Fay.* b. Synonym for chairs; dogs; keeps; keps. *Fay.* Also called faulding boards. c. In some small coal mines, also referred to as cage fans. *Bureau of Mines Staff.*

folding door. A door used to cover the shaft top during sinking, and operated by steam, compressed air, or hydraulic power. Balanced weights may be incorporated to assist in opening the doors. *Nelson.*

folding rule. A collapsible instrument used for measuring. *Crispin.*

fold mountain. A mountain resulting chiefly from large-scale folding of the earth's crust. *Stokes and Varnes, 1955.*

fold nappe. A recumbent fold, the reversed middle limb of which has been completely sheared out as a result of the great horizontal translation. *A.G.I.*

fold system. A group of folds showing common characteristics and trends and presumably of common origin. *A.G.I.*

folia. a. Close, often wavy bands, or laminations, up to 4 inches in thickness, of unlike mineral composition. The rocks in which they appear are said to be foliated. *Mather.* b. Thin flakes or leaves; lamallae. *Shipley.*

foliaceous. Consisting of thin (leaflike) laminae of a mineral substance. Having the form or thinness of a foliage leaf or a plate. Synonym for foliated. *Webster 3d.*

foliate. Suggested by Bastin in 1909 as a general term for any foliated rock. *A.G.I.*

foliated. a. Leaflike, such as micaceous or schistose rocks. *von Bernewitz.* b. The meaning is similar to that of laminated, but the latter term generally indicates a finer or more parallel division into layers. Foliated is applied instead to the approximate parallelism of the layers in such rocks as gneisses and schists. Synonym for foliaceous. *Fay.*

foliated coal. Coal occurring in thin plates or layers. *Fay.*

foliated structure. Used in a broad sense includes the textural or structural properties of certain rocks which permit them to be cleaved or parted along approximately parallel surfaces or lines. In this sense, the term includes bedding fissility and schistosity. *McKinstry, p. 641.*

foliate texture. A texture of platy minerals in parallel arrangement. *Schieferdecker.*

foliation. a. The banding or the lamination of metamorphic rocks as distinguished from the stratification of sedimentary rocks. *Fay.* b. A crystalline segregation of certain minerals in a rock, in dominant planes, which may be stratification planes (stratification foliation), joint planes (joint foliation), shear planes (cleavage foliation), or fracture planes under the strain of flexure (faulting foliation). *Standard, 1964*. c. The arrangement of minerals normally possessing a platy habit (such as the micas, the chlorites, and talc) in folia or leaves, lying with their principal faces and cleavages in parallel planes; due to their development under great pressure during regional metmorphism. *C.T.D.* d. The laminated structure resulting from segregation of different minerals into layers parallel to the schistosity. *A.G.I.* e. Considered synonymous with flow cleavage, slaty cleavage, and schistosity by many writers to describe parallel fabrics in metamorphic rocks, and considerable ambiguity attends their current use. *A.G.I.* f. More or less pronounced aggregation of particular constituent minerals of a metamorphic rock into lenticles or streaks or inconstant bands, often very rich in some one mineral and contrasting with constituent lenticles or streaks rich in other minerals. *McKinstry*. g. The ability of certain rocks to fracture along parallel surfaces. *Lewis, p. 599*.

foliation, axial-plane. *See* axial-plane foliation. *A.G.I. Supp.*

Folkstone marl. Eng. A stiff marl, varying in color from light gray to a dark blue; also known as gault. It abounds in fossils. *Fay*.

follower. a. Chainman at rear end in chaining survey. *Pryor, 3*. b. A drill used for making all but the first part of a hole the latter being made with a drill of larger gage, known as a starter. *Fay*. c. A piston that maintains a light pressure against a variable amount of fluid in a container. *Nichols*.

follower chart. A table showing the size of casing or pipe that should be placed in a borehole drilled with a specific-size bit and/or which sizes of casing or pipe can be nested inside each other. *Long*.

follower rail. The follower rail of a mine switch is the rail on the other side of the turnout corresponding to the lead rail. *Kiser, 2, p. 34*.

following. Scot. An overlying stratum which falls or comes down as the mineral is extracted from under it. *Fay*.

following clod. Scot. A thin argillaceous layer situated between a seam of coal (below) and limestone (above). *Arkell*.

following dirt. a. A thin bed of unconsolidated dirt; a parting between the top of a coal seam and the roof. *See also* pug. *C.T.D.* b. *See* following stone. *Nelson*.

following-in. Eng. Said of a shift arriving at a working place before the previous shift has finished work. *Fay*.

following stone. a. A bed of shale which occurs immediately over a coal seam and falls as the coal is worked. It causes a high proportion of stone in the run-of-mine coal. *See also* clod. Also called following dirt. *Nelson*. b. Eng. *See* ramble. *SMRB, Paper No. 61*.

following-up bank. York. A breadth of about 6 yards of coal taken off the working face. *Fay*.

following-up the whole with the broken. *See* bord-and-pillar method. *Fay*.

followup tag. The cardboard tag placed in the cartons, boxes, or cases of blasting supplies, used for identifying the date and place of manufacture. *Fay*.

Follsain process. A method for the sintering of the raw materials for the burden of blast furnaces in which continuous sintering (nodulizing) is carried out in a rotating tube furnace; at the discharge end is arranged a special tuyere comprising two concentric close-ended tubes parallel to the furnace axis, the outer tube having one nozzle near its closed extremity, the other having a number of nozzles protruding through the outer tube. The inner tube supplies air heated to 650° to 800° C; the outer ones carries cold air, which keeps the inner tube from softening and becoming deformed and itself becomes somewhat heated by the time it emerges from the nozzle. These jets are directed upon the material to be sintered. The fine iron-bearing material is mixed with a proportion of fuel; under the intensive action of the hot air blast, the fuel raises the temperature of the mixture sufficiently for sintering to occur, whereupon the material is discharged from the furnace. *Osborne*.

fondu. *See* high-alumina cement. *Ham*.

font. A reservoir above the mold for fusion-casting refractories; molten material from the font helps to fill the pipe. *See also* pipe. *Dodd*.

Fontainebleau limestone. *See* sand calcite.

fool's gold. Pyrite (FeS_2). *Pryor, 3*.

foot. a. Corn. An ancient measure containing 2 gallons or 60 pounds of black tin. *Fay*. b. The footwall. *Fay*. c. A foot is 12 inches in length on the vein, including its entire width, whether 6 inches or 60 feet, and its whole depth down toward the earth's center. *Standard, 1964*. d. In tamping rollers, one of a number of projections from a cylindrical drum. *Nichols*. e. The bottom of a slope, a grade, or a declivity. The lower part of any elevated landform. The foot of a hill, the foot of a mountain, etc., for example. *A.G.I.* f. The base of a ceramic shape. *Bureau of Mines Staff*.

foot-acre. *See* acre-foot. *Fay*.

footage. a. The payment of miners by the running foot of work; also, the sum given. *Standard, 1964*. b. *Compare* yardage; cordage. *Fay*. c. The number of feet of borehole drilled per unit of time, or that required to complete a specific project or contract. *Long*. c. So. Afr. Distance covered in development operations. The following distinctions are made: (1) total footage advanced or developed is the distance covered by driving on and off reef, including the distance of shaft sinking in some mines; (2) footage on reef, the distance covered on the reef horizon, and more or less in agreement with (3) footage sampled, namely, the distance over which samples have been taken and assayed; and (4) footage payable and unpayable, which is determined from the assays on the basis of an estimated limit above which the mining of such ore would be payable. *Beerman*.

footage block. *See* marker block. *Long*.

footage bonus. Wage payments in addition to regular wage given to drill-crew members for each foot of borehole completed in excess of a specified number of feet drilled in a stated length of time. *Long*.

footage cost. The total or overall cost of drilling 1 foot of a specific-size borehole under conditions existing at the place where the drilling is done. *Long*.

footage per bit. The average number of feet of borehole specific types of bits drill or can be expected to drill in a certain rock before the bit becomes dulled and is replaced, discarded, resharpened, or reset. *Long*.

foot ale. Derb. Ale bought with the first day's wages after a man begins work. All the miners join in a jollification. *Fay*.

foot blocks. Eng. Flat pieces of wood placed under props, in tunneling to give a broad base, and thus prevent the superincumbent weight from pressing the props down. *Fay*.

foot blower. A man who blows a small ball which is applied to the stem of a glass article and then opened out to form a foot. *C.T.D.*

footboards. Wooden boards, hinged together, for hand shaping the foot of glass stemware. *Dodd*.

foot-candle; lumen per square foot. The unit of illumination. The illumination in foot-candles of an object or surface is the candlepower of a light source divided by the square of the distance of the light source from the object or surface. *Sinclair, I, p. 200*.

foot caster. One who shapes glass foot (base) of stemware or other tableware. Cuts off required amount of molten glass from gob (mass of molten glass) held by gatherer with shears and attaches to stemware. Shapes foot by hand, using a clapper (two pieces of carbon fastened together with a hinged joint). Smooths and finishes the foot with a wooden buffer. *D.O.T. 1*.

foot clamp. Synonym for safety clamp. *Long*.

footeite. A hydrous basic copper oxychloride containing 55.3 percent copper. It is closely related to tallingite. Crystallization, monoclinic; color, deep blue. From Bisbee, Ariz. *Weed, 1918*.

foot-forming feeder. One who inserts glass stemware into a machine that automatically forms the bases on the stemware and burns off the excess glass from the stems. *D.O.T. 1*.

foothill. a. A distinct lower part of a mountain. One of the hills or minor elevations of a mountain range which lies next to the adjacent lower land and forms a transition between that and the higher portions. *Fay*. b. One of the lower subsidiary hills at the foot of a mountain, or of higher hills. Commonly used in the plural. *A.G.I.*

foot hole. Holes cut in the sides of shafts or winzes to enable miners to ascend and descend. *Zern*.

foothook. S. Staff. The large hoisting-rope hook that is attached to the skip. *Fay*.

foothook chain. S. Staff. A strong chain at the end of the rope, and connected with the foothook. *Fay*.

footing. a. The characteristics of the material directly beneath the base of a drill tripod, a derrick, or mast uprights. Also, the material placed under such members to produce a firm base on which they may be set. *Long*. b. The material on which the floor sills of a drill floor are set. *Long*. c. That portion of the foundation of a structure that transmits loads directly to the soil. *ASCE P1826*. d. Ground, in relation to its load-bearing and friction qualities. *Nichols*. e. A spreading course or courses forming the foot or foundation of a wall. *Standard, 1964*.

footlambert; equivalent footcandle. The unit of luminance, and is the brightness of a perfectly diffusing surface of 100 percent reflection factor when its illumination is 1 lumen per square foot. *Sinclair, I, p. 200.*

foot lid. Eng. *See* solepiece. *SMRB, Paper No. 61.*

footman. In salt production, a laborer who adjusts height of gate in chute leading from crusher by means of a lever, to regulate flow of crushed rock salt into vibrating screens which separate salt into various sizes prior to shipment or refining. *D.O.T. 1.*

footmark. *See* marker block. *Long.*

footpiece. *See* sill, e. *Fay.*

foot pins. The hinge which attaches the boom to a revolving shovel. *Nichols.*

foot-pound. A foot-pound is the amount of energy required to lift one pound a vertical distance of one foot. Abbreviation, ft.-lb. *Brantly, 2.*

foot poundal. The work done by a force of 1 poundal acting through a distance of 1 foot. *Nelson.*

foot-pound-second system; fps system. In this, the foot (0.3048 meter) is a measure of length; the foot-pound is work required to lift 1 pound a height of 1 foot; and the foot-poundal, the force needed to accelerate 1 pound for 1 foot in 1 second. *Pryor, 3.*

foot ridding. Dinting. *Mason.*

footrill; futteril; footrail. a. Eng. The entrance to a mine by means of a level driven into a hillside, An adit. *Fay.* b. A dip road, up which coal is brought. *Fay.* c. Direct drive into underground workings, either level or downsloped, not connected with surface by shaft. *Pryor, 3.*

foot rod. Scot. An iron rod at the foot of pump rods to which the bucket is attached. *Fay.*

foot screws. The three screws connecting the tribach, of a theodolite or other level, with the plate screwed to the tripod head. *Ham.*

foot section. A term used on both belt and chain conveyor work to designate that portion of the conveyor at the extreme opposite end from the delivery point. In either type of conveyor, it consists of a frame and either a sprocket or a drum on which the chain or belt travel, plus such other devices as may be required for adjusting belt or chain tension. *Jones.*

foot shoe. A special pipe or casing shoe equipped with a device, such as a float valve, used on the bottom end of casing or pipe to be floated into a borehole. *Long.*

foot tender. *See* bottomer. *D.O.T. 1.*

foot valve. a. A clack, or ball-and-seat-type valve placed at the bottom end of an upstanding liquid-piping system to allow liquid to enter but not escape from the system. *Long.* b. Nonreturn (check) valve at suction end of pump piping. *Pryor, 3.* c. A nonreturn valve immediately above the strainer in a centrifugal pumping installation. *B.S. 3618, 1963, sec. 4.* d. A check valve in the inlet end of a pump suction hose. *Nichols.*

footwall. a. The wall or rock under a vein. It is called the floor in bedded deposits. *Lewis, p. 21.* b. Opposite wall from hanging wall. *Ballard.* c. S. Afr. The wall on the lower side of a reef, lode, or fault. *Beerman.* d. Can. The underside of vein or lens in relation to dip of ore deposit. *Hoffman.* e. The wall rock underlying the lode. *Hoov, p. 94.* f. In metal mining, that part of the country rock which lies below the ore deposit. *Fraenkel.*

footwall drift. In the United States, a horizontal gallery driven in the footwall of a vein. *Nelson.*

footwall drive. A tunnel just below the ore body. *Pryor, 3, p. 177.*

footwall of a fault. The lower wall of an inclined fault plane. *Ballard.*

footwall shaft. *See* underlay shaft.

footway. System of ladders and solars by which men can enter or leave the mine. *Pryor, 3.*

foot-yard. In Pennsylvania, a miner's measurement of length, such as the distance a working face is advanced. With the heel of one foot on a mark a short step is taken and the tip of the forward toe marks the foot-yard. The next measurement is taken by placing the first foot against the toe of the second and repeating the first step and so on. The foreman checks measurements with a rule. *Hess.*

Foraky boring method. A percussive boring system comprising a closed-in derrick over the crown pulley of which a steel rope is passed from its containing drum. The boring tools are suspended from the end of the rope and are moved in the hole as required by means of the drum. A walking beam, operated by a driving mechanism, gives the boring tools a rapid vibrational motion. Improved methods of boring are now available. *Nelson.*

Foraky freezing process. One of the original freezing methods of shaft sinking through heavily watered sands. Although the principle is the same today, the process has been improved in many respects. *See also* freezing method. *Nelson.*

foralite. A marking in standstone and other sedimentary formations that possibly was caused by the burrowing of a worm. A boring in a stone. *Standard, 1964.*

foram. Abrbeviated term for foraminifer that is commonly used. *A.G.I. Supp.*

foraminifer; (plural) foraminifers. One of the foraminifera. *A.G.I. Supp.*

foraminifera. a. A subdivision of the phylum protozoa with skeletons known as tests which are usually microscopic in size, commonly made of calcium carbonate, more rarely of sand, foreign particles of chitin, and which consist of one or more chambers. *A.G.I.* b. A subclass of the sarcodina. Unicellular animals mostly of microscopic size that secrete tests, composed of calcium carbonate or build them of cemented sedimentary grains, that consist of one to many chambers arranged in a great variety of ways. Most of them are marine. They range from the Ordovician period to the Recent. *A.G.I. Supp.* c. They are important microfossils in well logging, because of their long range, their wide distribution, and their small size which permits their recovery as complete fossils from well cuttings. *Bureau of Mines Staff.*

forbesite. A dull, grayish-white, hydrous nickel-cobalt arsenate, $H_2(Ni,Co)_2As_2O_8+8H_2O$, having a fiibrocrystalline structure. From Atacama, Chile. *Fay.*

forble. Four lengths of drill rod or drill pipe connected to form a section, which is handled and stacked in a drill tripod or derrick as a single unit on borehole round trips. Also spelled fourble. *Long.*

forble board. A board or platform located in the upper part of the derrick at a suitable elevation so that a man can easily manipulate equipment used to raise or lower drill rods or pipe when same are being handled in stands of four joints each. Also spelled fourble board. *Long.*

force. Influence which, when brought to bear on a body, changes its rate of momentum. Attractive, accelerating, repulsive. Measured in dynes (centimeter, gram, second) or poundals.

$$\text{Force} = \frac{\text{Mass x velocity}}{\text{time}}$$

Pryor, 3.

force-aparts. A structure similar to ball-and-pillow structure. *See also* ball-and-pillow structure. *Pettijohn.*

forced auxiliary ventilation. A system in which the duct delivers the intake air to the face. The outstanding advantage of this system is that the air leaves the duct at considerable velocity and can be made to sweep the face without the duct being extended unduly close to it. The forcing system may be used with flexible ducting and simplifies arrangements for protecting the duct from blasting. For use in collieries the forcing system has the added advantage that the fan motor always works in intake air, and no special arrangements about fan drive are necessary. *Roberts, I. pp. 219-220.*

forced-caving system. A stoping system in which the ore is broken down by large blasts into the stopes that are kept partly full of broken ore. The large blasts break ore directly into the stopes and have the further effect of shattering additional ore, part of which then caves. *BuMines Bull. 419, 1939, p. 228.*

forced-cut meander. A meander in which deposition on the inside of the meander equals erosion on the outside of the meander. Consequently, the width of the channel remains constant. *A.G.I. Supp.*

forced draft. A draft produced by a fan or a similar device which blows air under moderate pressure into the combustion space of a furnace. *API Glossary.*

forced drop shaft. Method of sinking shaft through waterlogged ground by means of series of caissons forced down hydraulically. Developed in Germany and now superseded. *Pryor, 3.*

forced production. To work a mine so as to make it produce a greater output than can be maintained. *Fay.*

forced ventilation. A system of ventilation in which the fan forces air through the workings under pressure. *B.S. 3618, 1963, sec. 2.*

forced vibration. Vibration of a structure, generally caused by engines or machines, sometimes by wind. *See also* free vibration. *Ham.*

force fan. A blowing fan. *Fay.*

force lines. Stress fields can be represented by lines each of which represents a definite force, so that their distance apart is a measure of the intensity of stress. The conception is similar to that of a magnetic field represented by lines of force. *Spalding.*

force of blow. The effective diameter of the piston or hammer, its weight, distance of travel and the air pressure during the forward movement. The energy of the blow in foot-pounds is equal to:

$$\tfrac{1}{2}MV^2 = \frac{W \text{ x } V^2}{64.4}$$

where M = the mass; W = the weight in pounds; V = the velocity of the hammer in feet per second. *Lewis, p. 91.*

force of crystallization. The force by which a growing crystal tends to develop its own crystal form against the resistance of the surrounding solid mass. *Schieferdecker.*

force of friction. *See* friction. *Morris and Cooper, p. 187.*

force (or drive) oscillator. An instrument to determine the resonant frequency of a crystal. A slowly varying frequency is applied to the crystal from a signal generator and the resonant frequency voltage developed across the crystal is measured with a vacuum tube voltmeter. *AM, 1.*

force piece. Timber placed diagonally across a shaft or drift for securing the ground. *Fay.* b. *See* foreset. *Pryor, 3.*

force pump. a. A pump consisting of a plunger or ram, the up-stroke of which causes the suction valve to open and the water to rise in the suction pipe. On the down-stroke of the plunger, the suction valve closes and the contained water is forced through the delivery valve into the rising main or discharge pipe. *Nelson.* b. A pump in which the water is lifted by the force due to atmospheric pressure acting against a vacuum. *Crispin.* c. A pump that forces water above its valves. *Zern.*

forcer. a. A small hand pump used in Cornish mining. *Standard, 1964.* b. The solid piston of a force pump. *Standard, 1964.*

forcherite. An orange-yellow opal colored with orpiment. *Standard, 1964.*

forcing fan; blowing fan. A fan which blows or forces the intake air into the mine workings as opposed to the exhaust fan. A mine exhaust fan may become a forcing fan (with reduced efficiency) when the ventilation is reversed in an emergency. *Nelson.*

forcing lift; forcing set. Scot. A set of pumps raising water by a plunger; a ram pump. *Fay.*

forcing set. A pump for forcing water to a higher level or to the surface. *C.T.D.*

ford. A passage across a stream where the water is not too deep for wading or for the movement of land vehicles. *A.G.I.*

Ford cup. An orifice type viscometer. It has been used to a limited extent in the testing of the flow properties of ceramic suspensions. For Ford cup No. 4 (the commonest size) the following conversion applies:

$$\text{absolute viscosity in poises} = \frac{\text{time in seconds}}{27}$$

times specific gravity. *Dodd.*

förde. An elongated, comparatively narrow inlet typically formed by submergence of a subglacial channel in formerly glaciated area. *Schieferdecker.*

forebay. a. A reservoir or pond at the head of a penstock or pipeline. *Seelye, 1.* b. The water immediately up stream of any structure. *Seelye, 1.*

forebreast. Scot. The working face of a mine. *Fay.*

forechamber. An auxiliary combination for gas-fired boilers, that provides incandescent surface for lighting gas instantly when turned on after being shut off for any reason. Also called Dutch oven; doghouse. *Fay.*

foredeep. A long, narrow, crustal depression, or furrow, bordering a folded orogenic belt or island arc on the convex side, commonly on the oceanward side. *A.G.I.*

fore drift. The one of a pair of parallel headings which is kept a short distance in advance of the other. *C.T.D.*

foredune. a. A coastal dune or ridge, parallel to the shoreline, produced by offshore winds. *A.G.I.* b. A dune developed along the shoreward face of a beach ridge. *A.G.I. Supp.*

forefield. Newc. The face of the workings. The forefield end is the end of the workings farthest advanced. *Fay.*

forefield end. Derb. The farthest extremity of mine workings. *Fay.*

forehammer. Scot. A sledge hammer; commonly applied to the hammer used by a blacksmith's assistant. *Fay.*

forehand welding. Welding in which the palm of the principal hand (torch or electrode hand) of the welder faces the direction of travel. It has special significance in gas welding in that it provides preheating. Contrast with backhand welding. *ASM Gloss.*

forehead. Scot. The face of a mine or level. *Fay.*

foreheadway. Eng. *See* headway, a. *Fay.*

forehearth. a. A projecting bay in the front of a blast furnace hearth under the tymp. In open-front furnaces, it is from the forehearth that cinder is tapped. *See also* dam; tymp. *Fay.* b. An independent settling reservoir into which is discarded the molten material from the furnace and which is heated from an independent source. The heavy metal settles to the bottom and the light slag rises to the surface. *Fay.* c. A section of a furnace, in one of several forms, from which glass is taken for forming. *ASTM C162-66.*

foreign coal. Coal received at a preparation plant from a colliery other than that to which the plant is attached. *B.S. 3552, 1962.*

foreigners. *See* furreners. *Arkell.*

foreign inclusion. a. An inclusion in an igneous rock or in a magma derived strictly from the invaded country rock. *Stokes and Varnes, 1955.* b. A fragment of country rock enclosed in an igneous intrusion. *A.G.I. Supp.*

foreland. a. A promontory; a jutting of high land into the sea. *A.G.I.* b. At the beginning of an erosion cycle the waves attack the coast at all points, cutting or nipping back the initial form of the land into a cliff; while at a later stage transportation of material along the shore begins and the waste from the edge and bottom of the land, together with the river sediment, is built out at certain points in front of the older mainland in deposits of various shapes, which are appropriately grouped together under the general term forelands. *A.G.I.* c. In folded mountain ranges three zones may be distinguished: (1) the rigid, unyielding mass which is not folded, (2) the zone of folding, and (3) the zone of diminishing action, where the folding gradually dies out or ends in a fault. The side of the range toward which the overturned folds incline is called the foreland, and it may be either the unfolded mass or the zone of diminishing action. *A.G.I.* d. A promontory or cape; a point of land extending into the water some distance from the line of the shore; a headland. *A.G.I.* e. Land built out seaward by marine processes. *A.G.I.* f. The relatively stable area, lying in shallower water, represented by the continental platform. *A.G.I.* g. The resistant block towards which the geosynclinal sediments move when compressed. *A.G.I.* h. In its structural meaning, the region in front of a series of overthrust sheets. *A.G.I.*

foreland shelf. The part of the relatively stable continental region that extends inward from the hingebelt of a geosyncline. *A.G.I. Supp.*

forelimb. The steeper dipping side of an asymmetric anticline produced by lateral thrusting. *A.G.I. Supp.*

forelimb thrust. A thrust fault cutting strata on the steeply dipping flank of an asymmetric anticline. *A.G.I. Supp.*

forellenstein. A plutonic rock that has been described as an olivine gabbro with no pyroxene. Synonymous with troctolite. *A.G.I.*

forel scale. The basic scale for measuring seawater color. *Hy.*

foreman. The head man; chief man; especially, the overseer of a body of workmen. *Standard, 1964. See also* bank boss; mine foreman; boss.

Foreman series. A nonmarine formation of Upper Jurassic age occurring in the Cordilleran geosyncline, as in northern California. Marine invertebrates occur in certain beds. *C.T.D.*

foremine; foreset mine. Scot. A mine (entry or room) driven toward the rise of the strata. *Fay.*

foreoverman. a. Senior overman on a shift. *Mason.* b. N. of Eng. Official responsible for the working in a seam during the first (fore) shift of the day. Next in seniority to the undermanager. *Trist.*

forepole. A pointed board or steel strap with a sharp edge, which is driven ahead in loose ground for support purposes. *See also* spile; spill. *Nelson.*

forepoling. a. A system of timbering for a very weak roof. It is done by setting a bench of timbers and placing boards or long wedges above the header, and as the next bench of timbers is placed at the inbye end of the wedges, other like wedges are driven in under the first wedges and over the second header. This extends the wedges in advance of the header until the wedges can be driven far enough to permit the setting of another three-piece set of timbers. By its use coal has been worked from under clay and shale that amounts to almost dirt. *Kentucky, pp. 141-142.* b. The act of driving the poling boards beyond the last set of timbers, thus forming a roof for further advance. *Stauffer.* c. Small pieces of timber or round poles driven over collars or cross timbers or behind legs of timber sets in advance of the working place to support small pieces of loose rock in caved or broken ground. *Hudson.* d. No. of Eng. A method of roof support in which horizontal bars are supported by a cantilever arrangement in front of the foremost supports on the face or in a gate. *Trist.* e. A method of securing loose ground by driving poles, plank, etc., ahead of and on the top and sides of the timbers. *See also* spile. *Ballard.* f. The driving of poles or 2 inch boards above cap of last four-piece frame or set, to hold up weak roof until a permanent set can be put in. Used in weak, running, or watery ground. Also called spiling. *Pryor, 3.*

forepoling girders. Two or more heavy straight girders set over and in advance of the last permanent support in a tunnel. They provide protection to the workmen until there is space to erect another support. *See also* horsehead. *Nelson.*

forereef. The steeply dipping talus slope commonly found on the seaward side of an organic reef. *A.G.I.*

foreset. a. To set a prop under the fore or coal-face end of a bar. *TIME.* b. Timber set used at working face for roof support. Also called force piece. *Pryor, 3.* c. Temporary forward support; a middle prop under a bar. *Mason.*

foreset bed. a. One of the series of inclined layers formed as new sediment moves down the steep frontal slope of a delta. *See also* bottomset bed; topset bed. *Fay.* b. One of the inclined, internal, systematically arranged layers of a crossbedded unit. *Pettijohn.*

foreset bedding. Synonym for crossbedding. *Pettijohn.*

foreshaft sinking. The first 150 feet or so of shaft sinking from the surface, during which time the plant and services for the main shaft sinking are installed. Sometimes, the main sinking contract does not commence until the foreshaft has been completed. *Nelson.*

foreshift. a. In coal mining, first or morning shift. *Pryor, 3.* b. Eng. The first shift of hewers (miners) who go into the mine from 2 to 3 hours before the drivers and loaders. *Fay.*

foreshock. a. One of the initiating shocks preceding the principal earthquake. *Schieferdecker.* b. An earthquake which precedes a larger earthquake within a fairly short time interval (a few days or weeks), and which originates at or near the focus of the larger earthquake. *A.G.I.*

foreshore. The lower shore zone between ordinary low- and high-water levels. *Compare* backshore. *A.G.I. Supp.*

foresight. a. A sight on a new survey point, made in connection with its determination; or a sight on a previously established point, to close a circuit. *A.G.I.* b. In a transit traverse, a point set ahead on line to be used for reference when resetting the transit on line or when verifying the alinement. *Seelye, 2.* c. An observation of the distance and direction to the next instrument station. *Seelye, 2.* d. In leveling, the foresight is often called a minus sight because it is subtracted from the height of instrument to obtain the elevation of the point. It is not, however, essentially a negative quantity. *Seelye, 2. See also* leveling practice. e. To sight on a foresight hub; also incorrectly used as a synonym for foresight hub. *Long.* f. Any sight or bearing taken with a compass, transit, theodolite, or level in a forward direction. *Long.*

foresight hub. A stake or mark placed by a responsible individual at some distance in front of a drill to be used by a driller to point and line up a drill to drill a borehole in a specific direction. Also called front hub. *Compare* backsight hub. *Long.*

foreslope. The slope extending from the outer margin of an organic reef to an arbitrary depth of 6 fathoms (36 feet). *A.G.I. Supp.*

fore-spar plate. *See* bloomery. *Fay.*

forest marble. An argillaceous limestone or marble which when cut in certain directions shows dark coloring matter so arranged as to be imitative of woodlands and forests. Also called landscape marble. *Fay.*

forest moss peat. Peat formed in forested swamps. *Tomkeieff, 1954.*

forestop. Derb. To forepole. *Fay.*

forest peat. Peat consisting mainly of the remains of trees that grew in low wet areas. *Francis, p. 149.*

foretrench. *See* trench. *A.G.I.*

forewinning. Newc. The first working of a seam in distinction from pillar drawing. *Zern.* Advance workings. *Fay.*

forfeiture. a. Loss of some right, privilege, estate, honor, office, or effects in consequence of a crime, offense, breach of condition, or other act. *Webster 3d.* Forfeiture of a mining claim takes place by operation of the law without regard to the intention of the locator whenever he fails or neglects to preserve his right by complying with the conditions imposed by law, and is made effectual by one who enters upon the ground after the expiration of the time within which the annual labor may be done, and completes a location before resumption of work by the original locator. *Fay.* A forfeiture of a mining claim consists in the consequence attached by law to certain facts, and the intention of the claimant as to whether or not a forfeiture in fact exists is wholly immaterial, and in this respect a forfeiture differs from abandonment. *Compare* abandonment. *Fay.* b. Penalty incurred in accordance with governing laws and regulations when mining concessions, claims, leases, rights, are not adequately, safely, and consistently developed and exploited. *Pryor, 3.*

forge. a. An open fireplace or hearth with forced draft, for heating iron, steel, etc.; as, a blacksmith's forge. *Standard, 1964.* b. A hearth or furnace for making wrought iron direct from the ore; a bloomery. *Standard, 1964.* c. Eng. That part of an ironworks where balls are squeezed and hammered and then drawn out into puddle bars by grooved rolls. *Fay.* d. To form by heating in a forge and hammering; to beat into some particular shape, as a mass of metal. *Fay.* e. A plant where forging is carried out. *C.T.D.*

forge cinder. The dross or slag from a forge or bloomery. *Fay.*

forge iron. Pig iron used for the charge of a puddling furnace. *Mersereau, 4th, p. 443.*

forgemaster. The owner or superintendent of a forge or ironworks. *Fay.*

forge pigs. Pig iron suitable for the manufacture of wrought iron. *C.T.D.*

forge roll. One of the train of rolls by which a slab or bloom of metal is converted into puddled bars. *Fay.*

forge scale. A loose coating of oxide which forms on heated iron during the process of forging; hammer scale. *Standard, 1964.*

forge train. In iron puddling, the series of two pairs of rolls by means of which the slab or bloom is converted into bars. *Fay.*

forge welding. A group of welding processes in which the parts to be joined together are heated to a plastic condition in a forge or other furnace and are welded together by applying pressure or blows. *Ham.*

forging. Plastically deforming metal, usually hot, into desired shapes with compressive force, with or without dies. *ASM Gloss.*

forging press. A press, usually vertical, used to operate dies to deform metal plastically. Mechanical presses are used for smaller closed die forgings; hydraulic or steam hydraulic, for flat die forgings and larger closed die forgings. *ASM Gloss.*

forging range. Temperature range in which a metal can be forged successfully. *ASM Gloss.*

forging rolls. A machine used in roll forging. Also called gap rolls. *ASM Gloss.*

forging stock. A rod, bar, or other section used to make forgings. *ASM Gloss.*

fork. a. Corn. Bottom of drainage sump. *Pryor, 3.* b. Eng. In the Derbyshire coalfield, a piece of wood supporting the side of an excavation in soft ground. *Fay.* c. Scot. A tool used for changing buckets. *Fay.* d. A prop with a Y-shaped end. *Fay.* e. An appliance used in free-fall systems of drilling which serves to hold up the string of tools during connection and disconnection of the rods. *Fay.* f. Eng. To pump water out of a mine. A mine is said to be in fork, or a pump to have the water in fork, when all the water is drawn out of the mine. *Webster, 2d.* g. A tool with a long wooden handle and prongs for loading lump coal. *C.T.D.* h. A double-pronged clip on a tub or wagon for the haulage rope or chain. *C.T.D.* i. A two-pronged lever used to slide flat belt from power-drive over to idler pulley (loose pulley). *Pryor, 3, p. 43.* j. A two-pronged rod or yoke used to slide shifting collars along their shafts. *Nichols.* k. One of the major bifurcations of a stream; a branch. *A.G.I.* l. In seismic instruments, a tuning fork of precisely known frequency used to record time lines on seismograms. *A.G.I.* m. A strong fork of two or more prongs used to slip under a stack of brick to lift and transport the stack. *ACSG, 1963.*

forked center. A center with taper or straight shank and V-head for holding cylindrical objects in position during drilling and other operations. *Crispin.*

fork-filled. Aust. Coal filled into skips with a fork, having the prongs about 1¼ inches apart. This separates the bulk of the slack from the round coal, which should not contain more than 10 percent of fine coal. *Fay.*

forkhead. A wheel-guiding frame with a swivel connection to the machine or vehicle that rests on it. (A caster frame.) *Nichols.*

forklift truck. A power-driven truck having a forward-projecting steel fork. It is used to raise, transport, and lift heavy packages, sometimes contained on a pallet for stacking or loading at a height. *Ham.*

fork-the-hole. To drill a second hole from some point within a completed borehole by deflection methods and equipment. *Long.*

fork truck. An industrial truck provided with a brick fork for transporting brick. *ACSG, 1963.*

form. a. All the faces of a crystal that have a like position relative to the planes of symmetry, the axes of symmetry, etc. All those planes, the presence of which are required by the symmetry of crystal when one of them is present. *Fay; Standard, 1964.* b. Any container in which plaster is poured over a pattern to make a mold. *Crispin.* c. The retainer which gives required shape to the poured concrete and is removed after the concrete has set. *Crispin.*

formability. The relative ease with which a metal can be shaped through plastic deformation. *See also* drawability. *ASM Gloss.*

formaldehyde; oxymethylene; oxomethane; formic aldehyde; methanal. Colorless; gas; HCHO; suffocating pungent odor; poisonous; melting point, −92° C; boiling point, −21° C; specific gravity, 1.075 to 1.081; soluble in water, in alcohol, and in ether; and it polymerizes easily. Usually handled as an aqueous solution, with or without methanol, which acts as an inhibitor of the polymerization. Used as a hardening agent; a reducing agent, as in the recovery of gold and silver; and as a corrosion inhibitor in oil wells. *CCD 6d, 1961.*

formanite. A moderately radioactive, tetragonal mineral, $(U,Zr,Th,Ca)(Ta,Cb,Ti)O_4$, containing much more tantalum than columbium. It is an end-member of the isomorphous fergusonite-formanite series which occurs in granite pegmatites, especially those rich in rare earths, columbium, tantalum, and beryllium; it is frequently found as a detrital mineral in placer deposits. On fresh surfaces, it is brownish-black or velvety black. Alteration results in an externally gray, yellow, brown, or dark brown color. *Crosby, pp. 20-21.*

format. An informal rock stratigraphic unit bounded by marker horizons believed to be isochronous surfaces that can be traced across facies changes, particularly in the subsurface, and useful for correlations between areas where the stratigraphic section is divided into different formations that do not correspond in time value. *A.G.I. Supp.*

formation. a. As defined and used by the U.S. Geological Survey, the ordinary unit of geologic mapping consisting of a large and persistent stratum of some one kind of rock. Also, it is loosely employed for any local and more or less related group of rocks. *Fay.* b. In Dana's Geology, it is applied to the groups of related strata that were formed in a geologic period. *Fay.* c. Any assemblage of rocks which have some character in common, whether of origin, age, or composition. In chronological geology, formations constitute the units, and several formations may make up a system. Often, the word is loosely used to indicate anything that has been formed or brought into its present shape. *Fay.* d. A genetic unit formed under essentially uniform conditions, or under an alternation of conditions, and assumed to be limited in horizontal extent. *A.G.I.* e. A sedimentary formation is a lithologically distinctive product of essentially continuous sedimentation selected from a local succession of strata as a convenient unit for purpose of mapping, description, and reference. *A.G.I.* f. Something naturally formed, commonly differing conspicuously from adjacent objects or material, or being noteworthy for some other reason. *A.G.I. Supp.* g. In stratigraphy, the primary unit in lithostratigraphy consisting of a succession of strata useful for mapping or description. Most formations possess certain distinctive lithologic features that may indicate genetic relationships. Ordinarily, the upper and lower boundaries of a formation are determined lithologically but they may be unconformities or be determined by the occurrence of index or guide fossils. The age or time value of a formation is not necessarily the same wherever it is recognized. Formations may be combined in groups or subdivided into members. *A.G.I. Supp.* h. A secondary mineral deposit formed by the accumulation, dripping, or flowing of water in a cave. Also, the crystalline deposit formed from flowing, dripping, or standing water in a cave. A secondary cave deposit, such as a stalactite, stalagmite, etc. *A.G.I.; A.G.I. Supp.*

formation drilling. Boreholes drilled primarily to determine the structural, petrologic, and geologic characteristics of the overburden and rock strata penetrated. Also called formation testing. *Long.*

formation factor. The electrical resistance of a rock saturated with an electrolyte, divided by the resistivity of the electrolyte. There is an inverse linear relationship between the formation factor and the porosity and permeability of the rock. Also known as the formation resistivity factor. *A.G.I.*

formation fracturing; hydraulic fracturing. A technique to open up cracks in an oil reservoir rock, which involves the application of high hydraulic pressure and the injection of a propping agent, such as sand, into these cracks. The fractures increase the overall permeability of the rock. *Institute of Petroleum, 1961.*

formation level. Level of the ground surface after completion of excavation. *Ham.*

formation resistivity factor. The ratio of the resistivity of the saturated rock to the resistivity of the saturating water in a completely water-saturated clean rock. *Institute of Petroleum, 1961.*

formation room. A room in a cave where there is an unusual amount of cave formation or a room having dripstone in a cave that is otherwise barren of it. *A.G.I.*

formation striae. Color bands in synthetic corundum or spinel, which, since they are always distinctive and almost always curved, differ from the straight color zones in genuine. Also called formation striations. *Shipley.*

formation testing. a. Synonym for formation drilling. *Long.* b. Measurements made in a borehole to determine the porosity, oil production capabilities, etc., of a specific stratum or horizon through which the borehole has been drilled. *Long.*

formation water. Water naturally occurring in sedimentary strata. *Compare* connate water. *A.G.I. Supp.*

form contour. A topographic contour determined by stereoscopic study of aerial photographs without ground control or by other means not involving conventional surveying. *A.G.I. Supp.*

form energy. The potentiality of minerals to develop crystal form within a solid medium, such as a rock. *A.G.I. Supp.*

form factor. The term pertains to a beam section of given shape and means that ratio of the modulus of rupture of a beam having that particular section to the modulus of rupture of a beam otherwise similar but having a section adopted as standard. This standard section is usually taken as retcangular or square; for wood it is a 2- by 2-inch square with edges horizontal and vertical. The term is also used to mean the ratio, for a given maximum fiber stress within the elastic limit of the actual resisting moment of a wide-flanged beam to the resisting moment the beam would develop if the fiber stress were uniformly distributed across the entire width of the flanges. So used, the term expresses the strength-reducing effect of shear lag. *Ro.*

form grinding. Grinding with a wheel having a contour on its cutting face that is a mating fit to the desired form. *ASM Gloss.*

formic acid; methanoic acid; hydrogen carboxylic acid. Colorless; fuming; liquid; HCOOH; pungent penetrating odor; dangerously caustic; soluble in water, in alcohol, and in ether; specific gravity, 1.2201 (at 20° C, referred to water at 4° C); melting point, 8.3° C; and boiling point, 100.8° C. Used in electroplating; in silvering glass; and in ore flotation. *CCD 6d, 1961.*

formic aldehyde. *See* formaldehyde. *CCD 6d, 1961.*

forming. a. The shaping of hot glass. *ASTM C162-66.* b. The shaping or molding of ceramic ware. *ASTM C242-60T.*

forming hood. The chamber of the forming equipment in which glass fibers are formed and collected. *ASTM C162-66.*

forming-machine operator. *See* bottle-machine operator. *D.O.T. 1.*

forming rolls. Rolls used in forming flat glass. *ASTM C162-66.*

formkohle. German name for a variety of incoherent brown coal, apparently without any cementing material whatsoever. It is suggested that this coal was formed through the redeposition of the original coal. Same as feinkohle; klarkohle; rieselkohle. *Tomkeieff, 1954. See also* crumble coal.

form lining. Selected materials used to line the concreting face of formwork, in order to impart a smooth or a patterned finish to the concrete surface. *Ham.*

form oil. Oil or emulsion used to minimize the sticking of concrete to molds. *Institute of Petroleum, 1961.*

formosa marble. A high grade of marble of a dark gray and white color, variously mottled and blotched with yellow and red, from Nassau, Germany. *Fay.*

form stop. The end of a section of shuttering for concrete. *Ham.*

form stripper. In concrete products industry, a laborer who removes wooden or steel forms from concrete walls, beams, molded concrete products, or similar concrete work after the concrete has hardened. Also called crew stripper; form wrecker; rod puller. *D.O.T. 1.*

form tool. A single-edge nonrotating tool, circular or flat, that produces its inverse or reverse form counterpart upon a workpiece. *ASM Gloss.*

formula. The formula of a compound is arrived at by: (1) writing the symbols for the elements making up the compound; and (2) following the symbols with the appropriate figure, showing how many atoms of each element are in one molecule of the compound. Also called molecular formula. *Cooper.*

formulate. To reduce to or express in a formula; to state definitely. *Kinney.*

formulation; formulas. Statement of molecular weight of compound; percentage composition and atomic weight of each constituent element. Formula refers to smallest possible portion of compound concerned. Structural formulas show presumed linkage by valence bonds. Use of sign = shows either equilibrium or a possibility of reversible reaction. Sign $N+$ or $N-$ shows one positive or one negative charge on atom N (electronic formula). Formula weight is gram molecular weight, or mole. *Pryor, 3.*

formula weight. The weight, in grams, pounds, or other units, obtained by adding the atomic weights of all the elemental constituents in a chemical formula. *Lowenheim.*

formwork. Temporary casing erected to contain concrete during its placing and subsequent hardening. *See also* concretor; shuttering. *Ham.*

form wrecker. *See* form stripper. *D.O.T. 1.*

fornacite. An olive-green basic chromoarsenate of lead and copper. Small prismatic crystals on dioptase. Monoclinic (?). *English.*

Forrester machine. Pneumatic flotation cell, in which low-pressure air is blown down line of pipes into trough box, aerating the pulp and delivering a mineralized froth along the overflow, and tailings to an end weir. Variants are the Southwestern, and the Britannia. *Pryor, 3.*

forsterite. A magnesium silicate mineral, Mg_2SiO_4, occurring in white crystals at Vesuvius; in greenish or yellowish embedded grains at Bolton, Mass., as boltonite. Orthorhombic. *See also* olivine. *Dana 17.*

forsterite ceramic. Any ceramic ware in which forsterite, ($2MgO.SiO_2$), is the essential crystalline phase. *ACSB-4.*

forsterite marble. A characteristic product of the contact metamorphism of magnesian (dolomitic) limestones containing silica of organic or inorganic origin. The dolomite dissociates into magnesia, CO_2 and $CaCO_3$. The magnesia combines with the silica to form forsterite, while the calcium carbonate recrystallizes as marble. Also called ophicalcite. *C.M.D.*

forsterite porcelain. A vitreous ceramic whiteware for technical application in which forsterite, ($2MgO.SiO_2$), is the essential crystalline phase. *ASTM C242-60.*

forsterite whiteware. Any ceramic whiteware in which forsterite, ($2MgO.SiO_2$), is the essential crystalline phase. *ASTM C242-60.*

forstid; forstid ore. Derb. Light waste left after washing ore. *Arkell, p. 42.*

fortification agate. Agate with parallel zigzag lines which are heavier than in topographic agate. *Shipley.*

Fort Pierre shales. Marine shales containing shell banks of lamellibranchia (lucina) deposited during Cretaceous (montanan) times in the region of the Great Plains of the United States. *See also* Tepee Butte. *C.T.D.*

Fortschritt PIV/6 boring machine. A portable machine for boring from underground workings for firedamp drainage or for exploration. It weighs 6 hundredweights, consumes 250 cubic feet per minute of air, and its drilling rate varies from 30 feet per hour in sandstone to 80 feet per hour in shale. The machine is widely used in Germany. *Nelson.*

forward dealing. Purchase of stocks, notably metals, for delivery at agreed future date and price. *Pryor, 3.*

forward speed. *See* feed rate. *Long.*

foshagite. A hydrous calcium silicate, $H_2Ca_5(SiO_4)_3.2H_2O$, found as a white, compact, fibrous, orthorhombic mineral filling veins in idocrase; from Crestmore, Calif. Probably an altered hillebrandite. *Mineralogical Magazine, v. 20, No. 110, September 1925, p. 453.*

foshallassite; foshallasite. A white, basic hydrated calcium silicate, $3CaO.2SiO_2.3H_2O$; from the Kola peninsula, U.S.S.R. Related to foshagite and centrallassite and named from a combination of these names. *Spencer 15, M.M., 1940.*

foss. A sort of meandering furrow on the surface of rough diamonds. *Hess.*

fossa. An extensive geosyncline developed along the margin of a continent. *A.G.I. Supp.*

fosse. a. A depression or an unfilled area between the terraced ice contact of glacial sand plains and morainal mounds forming a belt within the ice-covered field. *A.G.I.* b. A ditch, a moat, or a trench between a glacier and a moraine or a rock wall. *A.G.I.*

fosse lake. A long, narrow depression that is sometimes found between a moraine and an outwash plain. It is a remnant of ground moraine upon which the ice stood when the outwash plain was being formed. *A.G.I.*

fossick. a. Aust. To work out the pillars of abandoned claims, or work over waste heaps in hope of finding gold. *Standard, 1964.* b. Eng. In gold mining to undermine another's digging. *Fay.* c. A troublesome person. *Fay.*

fossicker. a. One who searches for small amounts of mineral. *C.T.D.* b. One who picks over old mine workings. Fossicking is casual and unsystematic mining. *Pryor, 3.* c. Aust. A sort of mining gleaner who overhauls old workings and refuse heaps for gold that may be contained therein. *Fay.*

fossil. a. Originally, a rock, mineral, or other substance dug out of the earth. Now, any remains, impression, or trace of an animal or plant of past geologic ages that have been preserved in the earth's crust. *Webster 3d.* b. The remains or traces of animals or plants which have been preserved by natural causes in the earth's crust, and excluding organisms which have been buried since the beginning of historic time. *A.G.I.*

fossil assemblage. Fossils naturally associated in a stratum. Possibly they were derived from more than a single fossil community. *A.G.I. Supp.*

fossil butter. *See* bog butter.

fossil coal. Same as mineral coal or stone coal. Coal occurring in the form of layers or seams among stratified rocks. *Tomkeieff, 1954.*

fossil community. Fossils that in life were ecologically related among themselves. *A.G.I. Supp.*

fossil copal. *See* copalite. *Fay.*

fossil coral. Same as beekite. *Shipley.*

fossil erosion surface. An eroded surface covered by younger sediments, and again exposed by erosion at a later period. *A.G.I.*

fossil farina. *See* bergmehl, b. *Fay.*

fossil flour. Infusorial earth. *Fay.*

fossil fuels. Coal, petroleum, and natural gas. *Pearl, p. 18.*

fossil ice. a. Ice remaining from the geologic past. *A.G.I.* b. Underground lenses or seams of ice in permafrost regions. *A.G.I.* c. Crystal of selenite. *Arkell.*

fossiliferous. Containing organic remains. *Fay.*

fossilization. A term used to cover all the processes involved in the burial of a plant or animal in an accumulating sediment, and in the ultimate preservation of the whole, or part or trace of it. *Nelson.*

fossilize. To turn into a fossil. *Webster 3d.*

fossilized. Preserved by burial in rock or earthy deposits. *Shipley.*

fossilized wood. Same as petrified wood. *Shipley.*

fossil ore. Fossiliferous red hematite. *Fay.*

fossil paper. *See* mountain paper. *Fay.*

fossil peneplain. *See* fossil erosion surface; fossil plain. *A.G.I.*

fossil pineapple. Opal pseudomorph after glauberite, from New South Wales. *Schaller.*

fossil plain. A plain which, after coming into existence as a plain of erosion, has been buried by sediment and long afterward reexposed by renewed erosion. *See also* fossil erosion surface; fossil peneplain. *A.G.I.*

fossil resin. A resin found in a geologic deposit; for example, amber, copalin, posepnyte, and flagstaffite. *Fay.*

fossil salt. Same as rock salt. *Fay.*

fossil soil. a. Residuum on an unconformable rock contact which may have the character of a soil. *Schieferdecker.* b. A soil developed upon an old land surface and later covered by younger formations. *A.G.I.*

fossil trees. In the shale roof of certain coal seams are found prostrate fossil trunks of Sigillaria and other trees and sometimes the mud-filled stumps of the same trees in an upright position. *See also* pots. *Nelson.*

fossil turquoise. Same as odontolite. *Shipley.*

fossil water. a. Forest of Dean. Selenite filling joints in Coal Measure rocks. *Arkell.* b. *See* connate wate. *B.S. 3618, 1964, sec. 5.*

fossil wax. *See* ozocerite.

fosterite refractories. Refractories made from olivine and magnesia, and consisting essentially of fosterite, including about 50 percent magnesia, 39 percent silica, 6 percent ferrous oxide, and 5 percent of other oxides. They are semibasic. *Henderson, p. 265.*

Foster's formula. An empirical method of determining the radius of a shaft pillar. Foster's formula is: Radius (ft.) $= 3\sqrt{DT}$, where $D =$ depth in feet, and $T =$ thickness of lode in feet. *Higham, p. 110.*

fother. a. N. of Eng. A measure of coal (17⅔ hundredweight), being an ordinary cartload for one horse. *Fay.* b. Any of the various units of weight for lead; especially a modern unit equal to 19½ hundredweight. *Webster 3d.*

fotmal. Eng. A mass of lead weighing 70 pounds. *Standard, 1964. See* fother, b.

Fotoceram. Trademark for crystalline ceramic articles made by processing chemically sculptured glass. These products are utilized primarily for high-temperature electronic components such as circuit boards. *CCD 6d, 1961.*

Foucault current. In electricity, an eddy current. *Webster 3d.*

foul. a. A condition of the atmosphere of a mine, so contaminated by gases as to be unfit for respiration. Impure. *Fay.* b. In a coal seam, place where the seam was washed out during deposition, leaving barren area. *Pryor, 3.* c. In a cyanide process, a foul solution is one so contaminated (by soluble sulfides, ferrosalts, nickel, chromium, etc.) that it must either be discarded, or regenerated before return to circuit. *Pryor, 3.*

foul-air duct. A suction line in a tunnel ventilation system. *Nichols.*

foul coal. Eng. Faulty, or otherwise unmarketable coal. *Fay.*

foul gas. Coke-oven gas or natural gas containing appreciable amounts of hydrogen sulfide and similar contaminants. *CCD 6d, 1961.*

fouling. The assemblage of marine organisms that attach to and grow upon underwater objects. *Hy.*

fouling position. The point on any rail beyond which a wagon or mine car cannot proceed without becoming an obstruction to another wagon or car traveling on the intersecting rail. *Nelson.*

foulness. a. Scot. An impurity in a seam; an irregularity in the physical character of a seam, caused, for example, by numerous lypes or small hitches. *Fay.* b. Eng. Firedamp. *Fay.*

fouls. a. Eng. A condition in which seams of coal disappear for a certain space and are replaced by some foreign matter. *See also* fault. *Fay.* b. The cutting out of portions of the coal seam by wash outs or barren ground. *C.T.D.*

foul solution. In gas making, a solution of sodium carbonate or bicarbonate loaded with H_2S and other impurities absorbed in washing illuminating gas. *Hess.*

foulstone. Derb. Marl riddled with fibrous gypsum, into which the gypsum seams sometimes pass suddenly, Keuper marls. *Arkell.*

found. a. Eng. When sinking or driving to find or prove a coal seam, as soon as it is encountered it is said to have been found. *Fay.* b. To form in a mold, as articles of cast iron, by melting the metal and pouring; cast. *Standard, 1964.* c. The name for the melting operation which the raw materials undergo in a furnace. *C.T.D.*

foundation. a. Mid. The shafts, machinery, building, railways, workshop, etc., of a mine, commonly called a plant. *Fay.* b. The ground upon which a substructure is supported. *Taylor.* c. The lower part of a structure that transmits the load to the earth. *ASCE P1826.* d. The base and/or the underlying support, either natural or artificial, on which a building, dam, or other structure is constructed. *Long.* e. *See* base rock, a and b. *Long.*

foundation bolt. A fastener for connecting a structure or machine to a permanent base. *See also* anchor bolt. *ASA MH4.1-1958.*

foundation coefficient. Indicating how many times stronger the result of an earthquake is in a certain rock than would have been the case in undisturbed crystalline rock under equal circumstances. *Schieferdecker.*

foundation curb. A construction in a sinking shaft which will provide support for the concrete lining. It consists of a wedge-shaped excavation around the shaft in solid ground which is filled up completely with wet concrete. Steel shuttering is used and the concrete filled in behind. Also called foundation canch; foundation crib. *See also* curb; permanent shaft support. *Nelson.*

foundation investigation. A branch of soil mechanics involving the drilling and testing of the deposits underlying a proposed foundation. It includes the estimation of bearing capacities, settlements and the most suitable type of foundation for the prevailing soil conditions. *See also* depth of soil exploration. *Nelson.*

foundation plate. A plate to which a pump, an engine, or a motor, is bolted. A sole-plate. *Crispin.*

foundation sampling. Synonym for foundation testing. *Long.*

foundation soil. The upper part of the earth mass carrying the load of the structure. *ASCE P1826.*

foundation testing. Boreholes drilled for purpose of obtaining samples by means of which the characteristics of overburden and/or the rock on which the foundation of a structure will rest can be determined. Also called foundation sampling. *Long.*

foundation wall. That portion of a load-bearing wall below the level of the adjacent grade or below the first floor beams or joists. *ACSG.*

founder. a. Eng. The first shaft sunk upon a vein. From this the miner possesses, and layes out, his ground. *Fay.* b. One who founds or practices the business of founding; one who makes castings; as, an iron founder. *Standard, 1964.*

founder breccia. Where beds of soluble rocks have been in part or wholly removed by the chemical action of ground water, founder breccias of the superincumbent beds are produced on a scale commensurate with the extent of the ablation. Synonymous with collapse breccia. *A.G.I.*

foundermere. Derb. The first 32 yards of ground worked. *Fay.*

foundershaft. The first shaft sunk. *See also* founder, a. *Fay.*

founders shares. The few shares issued to the individuals organizing a stock company. In companies owned outright by other companies, founders shares are issued to as many individuals as are required to incorporate and hold the offices required for corporate management, as the laws do not permit a corporation, which is an artificial person, to form another corporation, or to serve as a director of another corporation. *Weed, 1922.*

founding. The act or process of casting metals. *Fay.*

foundling stones. Scot. Erratic boulders. *Compare* knurs and fundlers. *Arkell.*

foundry. A commercial establishment or building where metal castings are produced. *ASM Gloss.*

foundry clay. A plastic clay of varying resistance to heat but with good bonding quality, used for mixing with sand to make foundry molds. *ASCB, 1. See also* fire clay.

foundry coke. a. Coke strong enough to withstand the pressures in cupolas and blast furnaces. Also called metallurgical coke. *Hess.* b. Coke larger than 2.5 inches. *Bennett 2d, 1962.*

foundry facings. Finely pulverized materials used in foundries to give the surface of molds a smooth finish, so that castings may be removed easily after cooling. *BuMines Bull. 556, 1956, p. 329.*

foundry flask. Wooden or metallic container for sand of a casting mold. *Bennett 2d, 1962.*

foundry gate. Opening in a foundry mold, into which molten metal is poured in casting. *Bennett 2d, 1962.*

foundry salt. A German term for salt prepared at Heilbronn by fusing rock salt in a two-stage Siemens furnace. On the upper stage the fused salt runs away from most of the impurities. On the lower stage the melt is blown with compressed air, chemically treated, cooled in rotary pans with rakes, and screened to produce food-stuff-quality salt. *Kaufmann.*

foundry sand. Sand used by founders in making sand molds. Foundry sands may be classified broadly as follows: molding sand, core sand, racing sand, molding loam, gravel, high-silica steel molding sand, and parting sand. *Hess.*

fountain. a. A spring of water issuing from the earth. The point of origin or head of a stream or a river. *See also* gusher. *Webster 3d; Fay.* b. Usually a flow of water rising in a jet above the surrounding surface; a spring; the source of anything. *A.G.I.*

fourble. a. In rotary drilling, a unit of four drill pipes left coupled together. *Nichols.* b. Synonym for forble. *Long.*

fourble board. Synonym for forble board. *Long.*

four by four (4 x 4). A vehicle with four wheels or sets of wheels, all engine driven. *Nichols.*

Fourcault process. A method of forming window glass. The molten glass is drawn up from the melt tank in a ribbon, rolled flat, annealed, then cut to the desired size and shape. The rolling and annealing are done while the glass is in the vertical position. *CCD 6d, 1961.*

fourchite. An olivine-free monchiquite. *A.G.I.*

Four Corners Region. The general region where Utah, Colorado, Arizona, and New Mexico meet. This is the only place in the United States where four States have a common corner. *A.G.I. Supp.*

four-cut surface. Term used to describe the surface finish of building limestone that is made with a planer tool having four corrugations to the inch. *AIME, p. 330.*

four-cutter bit. *See* roller rock bit. *B.S. 3618, 1963, sec. 3.*

four-cycle engine. An engine in which four complete strokes of the piston are required to complete the cycle. In this engine the burned gases remaining in the cylinder after the exhaust value has been opened and part of the hot gases removed by expansion are expelled in part by a separate inward stroke of the piston, and a fresh charge is drawn into the cylinder through the inlet port by a separate outward stroke. Generally speaking, one event occurs during each of the four strokes of this cycle; that is, considering the stroke by which the charge is drawn into the cylinder as the first stroke, the mixture is compressed during the second stroke, ignited at the end of the second stroke, expands during the third stroke, and the exhaust gases are expelled during the fourth stroke, after which the conditions are the same as at first and the cycle is complete. *Zern, pp. 331-332.*

four-high mill. Contains four rolls arranged horizontally, one above the other, that is, two small-diameter working rolls supported by larger diameter back-up rolls above and below. *Osborne, p. 357.*

four-leg sling. A sling of chain, rope, or wire rope having four hooks suspended from one link. *Ham.*

fourling. A twinned crystal consisting of four individuals. *Standard, 1964.*

fourmarierite. A very rare, strongly radioactive, red to golden-red or brown, orthorhombic mineral, possibly $PbO.4UO_3.5H_2O$, found as an alteration product of uranite and associated with torbernite, kasolite, and curite. *Crosby, p. 22.*

fournetite. Apparently merely a mechanical mixture of tetrahedrite and galena. *Weed, 1918.*

four-part line. A single rope or cable reeved around pulleys so that four strands connect the fixed and the movable units. *Nichols.*

four-piece set. Squared timber frame used in underground driving to give all around support to weak ground. A cap is supported by two posts on a sill-piece or sill. *Pryor, 3.*

four-stage compression. Air compression in four stages with intercoolers between stages. *Ham.*

four-strand rope. *See* shroud laid rope. *Zern.*

four-stroke cycle. A cycle in which air or an explosive mixture is drawn into the cylinder of an internal-combustion engine on a suction stroke, is compressed and ignited on a compression stroke, burns and performs useful work on an expansion stroke, and expels the products of combustion on an exhaust or scavenging stroke. *Webster 3d.*

four-way dip. In seismic operations, a dip determined by spreads placed in four directions from a shot point. Three are essential, and the fourth serves as a check. *A.G.I.*

four-wheel jimmie. Penn. A four-wheel railroad car made of wood. It was the first type of car made for the transportation of anthracite. *Fay.*

fowlerite. A zinc-bearing variety of rhodonite. *Dana 17.*

foxbench. Eng. Iron pan. *Compare* sentur. *Arkell.*

foxes. Eng. A bed in the Wealden iron mines; probably red nodules. *Arkell.*

Fox Hills sandstone. An aeolian sandstone which succeeds the Fort Pierre shales in the Cretaceous succession of Wyoming. *C.T.D.*

fox mold. Eng. A provincial name for the reddish greensand colored by an oxide of iron. *Fay.*

foxtail. a. A grass, with sharp barbed seed, common in mining regions of California and other western States. *Fay.* b. S. Wales. The last cinder obtained in the Welsh process of refining iron in a charcoal forge. *Standard, 1964.*

fox wedge. Eng. A long wedge driven between two other wedges with their thick ends placed in the opposite directions. Also called stob-and-feather; plug-and-feathers. *Fay.*

foyaite. a. A widely distributed variety of nepheline syenite, which was described originally from the Foya Hills in Portugal. Typically, it contains about equal amounts of nepheline and potash feldspar, associated with a subordinate amount of a colored mineral, such as aegirine. *C.T.D.* b. Synonymous with, and perhaps a preferable name for, nepheline syenite. *A.G.I.*

fp Abbreviation for freezing point. *BuMin Style Guide, p. 59.*

fpm Abbreviation for feet per minute. *BuMin Style Guide, p. 59.*

fps a. Abbreviation for feet per second. *BuMin Style Guide, p. 59.* b. Abbreviation for foot-pound-second (system). *BuMin Style Guide, p. 59.*

fpsu Abbreviation for foot-pound-second unit. *BuMin Style Guide, p. 59.*

fqcy Abbreviation for frequency. *BuMin Style Guide, p. 59.*

Fr. Chemical symbol for francium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

fractile. Pertaining to cleavage or breakage, as in a rock. *Standard, 1964.*

fraction. a. A portion of an unconsolidated sediment (such as a recent marine mud), or of a crushed consolidated rock sample (such as a coal sample), or of a crushed ore or mineral sample. The fraction has been separated by some method, and is distinguished in some manner, from all the other portions (or fractions) comprising the whole sample being analyzed. A fraction is commonly defined by its particle size (grain size). The particle size or grain size of a fraction is given as below a maximum or an upper limit, or in a range between a maximum or an upper limit and a minimum or a lower limit, or above a minimum or a lower limit. For example: The submicron fraction, the minus-5-micron fraction, the 1-to-2 millimeter fraction, the plus-1-inch fraction, etc. The size limits of a fraction are not always expressed in units of linear measurement, but sometimes as sieve numbers in a standard sieve series; or in terms of the screen meshes of the sieves used (the minus-100-mesh fraction, for example); or in more general, descriptive size designations (such as the clay fraction, the silt fraction, or the sand fraction). Also a fraction may be separated and defined on the basis of its mineral content, its specific gravity or density, its magnetism or lack of magnetism, or its solubility or insolubility in acid. *Bureau of Mines Staff.* b. That portion of a powder sample which lies between two stated particle sizes. Synonymous with cut. *ASTM B243-65.* c. One of several portions (as of a distillate or precipitate) separable by fractionation and consisting either of mixtures or of pure chemical compounds. *Webster 3d.*

fractional crystallization. a. The formation, at successively lower temperatures, of the component minerals in a magma, coupled with the tendency for the components which crystallize at high temperatures to separate, on account of their high specific gravity, thus concentrating in the lower parts of the magma body. *C.M.D.* b. The separation of a magma into two phases, crystals and liquid, possibly followed by a gross separation of the two phases from each other by other processes, such as filter pressing, gravity settling, etc. *A.G.I.*

fractional crystallization of salts. a. Controlled crystallization of saline waters by means of which different salts are crystallized out at different temperatures. *Bateman.* b. In the evaporation of bodies of saline water, concentration of the soluble salts occurs, and when supersaturation of any salt is reached, that salt is precipitated. The least soluble salts are precipitated first, and the most soluble last. The solubility of a given salt, and therefore its deposition, is affected by temperature and by the presence of other salts in solution. *Bateman, 1950, p. 183.*

fractional distillation. A distallation process for the separation of the various components of liquid mixtures. An effective separation can only be achieved by the use of fractionating columns attached to the still. *C.T.D.*

fractional horsepower motor. An electric motor rated at less than one horsepower. *See also* universal motor. *Ham.*

fractional sampling. Mechanical sampling with equipment which selects samples of uniformly graded material without segregation. *Ham.*

fractional selection. A method of sampling ore when shoveled out of a railroad car in which every fifth or tenth shovelful may be taken for a sample. *Newton; p. 29.*

fractional shoveling. A method of sampling sometimes used at points where coal or mineral is loaded or unloaded by shoveling. Every tenth (or other number) shovelful is deposited separately as sampling material. *Nelson.*

fractionate. To separate (a mixture, as a liquid, by distillation) into fractions having more or less fixed properties but not necessarily definite compounds. Applied also to mixtures of rare earths. *Standard, 1964.*

fractionating column. A vertical tube or column attached to a still and usually filled with rings or intersected with bubble plates. An internal reflux takes place, resulting in a gradual separation between the high-boiling and low-boiling fractions inside the column, whereby the fractions with the lowest boiling point distill over. The efficiency of the column depends on its length and on the number of bubble plates used. *C.T.D.*

fractionation. a. The act or the process of fractionating (being separated or being divided into fractions), or the state of being fractionated. For example, the crystallization with falling temperature of successive minerals from a silicate magma. *Webster 3d.* b. The separation of a substance from a mixture. For example, the separation of one isotope from another of the same element. *A.G.I. Supp.* c. The separation of a particular mineral species from a crushed rock which is a mixture of minerals, or the separation of particles of a specific particle-size range from an unconsolidated sediment which is a mixture of particle sizes. *Bureau of Mines Staff.*

fractography. Descriptive treatment of fracture, especially in metals, with specific reference to photographs of the fracture surface. Macrofractography involves photographs at low magnification; microfractography, at high magnification. *ASM Gloss.*

fracture. a. The character or appearance of a freshly broken surface of a rock or a mineral. The peculiarities of the fracture afford one of the means of distinguishing minerals and rocks from one another. *Fay.* b. The manner of breaking and the appearance of a mineral when broken. The fracture is a distinguishing characteristic for certain minerals; the conchoidal fracture of chalcedony, for example. *A.G.I.* c. A break in a rock formation due to intense folding or to faulting. *A.G.I.* d. A break in the continuity of a body of rock not attended by a movement on one side or the other and not oriented in a regular system. *BuMines Bull. 587, 1960, p. 2.* e. A general term to include any kind of discontinuity in a body of rock if produced by mechanical failure, whether by shear stress or tensile stress. Fractures include faults, shears, joints, and planes of fracture cleavage. *McKinstry.* f. The nature of the broken surface of a solid substance when this does not follow a cleavage plane. The commonest type of fracture is conchoidal (shell-like), typical of glass, quartz, and to a lesser extent of several other gem stones. Fibrous minerals, such as jade, show a splintery fracture. *Anderson.* g. A break in the enamel surface with part of the enamel being removed. *Bryant.* h. Hard-rock explosive. *Pryor, 3.*

fracture capacity. A measure of the flow rate of fluids through a natural or artificially induced fissure. *American Petroleum Institute. Drilling and Production Practice, 1963, p. 139.*

fracture cleavage. a. The capacity to part along parallel planes, usually in intersecting sets, along which there has been either incipient fracturing or actual fracturing followed by cementation or welding. This structure is developed in shearing planes. It may or may not be accompanied by a parallel arrangement of minerals. *Compare* flow cleavage. *Fay.* b. The capacity to part along closely spaced, parallel surfaces of fracture or near-fracture, commonly in a single set, but occasionally in intersecting sets. The surfaces of breakage are independent of parallel arrangement of mineral particles. Also it does not pervade the entire mass and affect all particles as does flow cleavage. *A.G.I. See also* joint. *Lewis, p. 593.*

fractured. a. Broken by interconnecting cracks. A common structure in limestone oil reservoirs, and reported in some shale reservoirs. Synonymous with fissured. *A.G.I.* b. Rock cracked or broken into fragments along planes other than joints or bedding. *Long.*

fractured formation. *See* fractured ground. *Long.*

fractured ground. Rock formation shattered and crisscrossed with fissures and fractures. *Compare* broken ground. *Long.*

fracture dome. The fracture dome is the zone of loose or semiloose rock which exists in the immediate hanging or footwall of a stope. In some mines it may extend into the walls for a considerable distance. In a rock burst it becomes greatly extended. *Spalding. See also* doming.

fractured zone. A mass of rock cut by many small irregular fractures, the mass as a whole being more or less tabular. *Stokes and Varnes, 1955.*

fracture mesh. A regular meshwork of fractures in two planes developed by shearing. *G.S.A. Mem. 50, 1952, p. 29.*

fracture porosity. Porosity resulting from the presence of openings produced by the breaking or the shattering of an otherwise less pervious rock. *A.G.I.*

fracture spring. A spring, the water of which flows from relatively large openings consisting of joints or other fractures in rocks. *A.G.I.*

fracture stress. a. The maximum principal true stress at fracture. Usually refers to unnotched tensile specimens. *ASM Gloss.* b. The (hypothetical) true stress which will cause fracture without further deformation at any given strain. *ASM Gloss.*

fracture system. Group of fractures (faults, joints, or veins) consisting of one or more sets, usually intersecting or interconnected. System usually implies contemporaneous age for all of the sets, but vein system is sometimes used for all veins in a given mine or district regardless of age or origin. *McKinstry.*

fracture test. Breaking a specimen and examining the fractured surface with the unaided eye or with a low-power microscope to determine such things as composition, grain size, case depth, soundness, or presence of defects. *ASM Gloss.*

fracture wear. The wear of individual abrasive grains in a grinding wheel by fracture, as well as fracture of the bond posts holding the grains in place. *ASM Gloss.*

fracturing. a. The process of breaking a fluid-bearing strata by injecting a fluid under such pressure as to cause partings in the strata rock. *A.G.I.* b. The process of increasing the permeability of strata near a well by pumping in water and sand under high pressure. The hydraulic pressure opens cracks and bedding planes, and the sand introduced into them serves to keep them open when the pressure is reduced. *A.G.I. Supp.*

fragile. Brittle, easily broken or destroyed. *Hansen.*

fragment. A piece of a rock or of a mineral. A breccia is composed of angular rock fragments broken by an eruption, by faulting, or by folding. *von Bernewitz.*

fragmental. a. Formed from fragments of preexisting rocks; breccias, for example. Clastic is synonymous. *Fay.* b. Consisting of fragments of minerals, of rocks, or of both. *A.G.I.* c. Consisting of broken material, particularly that which has been moved from its place of origin. *A.G.I. Supp.*

fragmental deposit. A deposit that includes epiclastic and pyroclastic rocks. That is, a deposit which consists of fragments of rocks or minerals covering the whole range of grain size, and resulting from the normal disintegration of rocks, or from the shattering by volcanic action. *C.T.D.*

fragmental peat. Peat consisting of vegetable debris partly weathered and transported by water or wind to form a new deposit. *Tomkeieff, 1954.*

fragmental rock. Synonym for clastic. *A.G.I.*

fragmental texture. A general textural term applied to rocks composed of fine materials or of sandy, conglomeratic, bouldery, and brecciated materials. The texture of clastic rocks. *A.G.I.*

fragmentary. a. Applied to rock masses composed of the fragments or debris of other rocks; nearly synonymous with breccia or breccioconglomerate. *See also* breccia. *A.G.I.* b. Applied to rocks consisting of accumulations of particles which did not form together but which are fragments that have been broken off their parent masses and have been brought together by some external agency. The coherence of the particles is caused either by mechanical compression or by a cement of some other substance. *A.G.I.*

fragmentation. a. The breaking of coal, ore, or rock by blasting so that the bulk of the material is small enough to load, handle and transport. Fragmentation would be at its best when the debris is not smaller than necessary for handling and not so large as to require hand breaking or secondary blasting. *See also* degradation. *Nelson.* b. Index of the degree of breaking up of rock after blasting. *Fraenkel.* c. Sections or shards of glass fired together. *Kinney.*

fragmented bort. Low-grade industrial diamonds crushed into sized particles for use in impregnated bits, grinding wheels, and as a polishing medium. *See also* bort. *Long.*

framboidal texture. A texture in which pellets form spheroidal aggregates resembling a raspberry. *Schieferdecker.*

frame. a. In trench excavations requiring timbering, the struts separating the boards, together with the walings which they hold, form a frame. *Ham.* b. Eng. A table composed of boards slightly inclined, over which runs a small stream of water to wash off waste from slime tin; a buddle. Also called rack. *See also* tin frame. *Fay.*

frame and skid mounted. Drill machine mounted on a wood or steel framework base, the bottom member of which is a sled-runnerlike-shaped piece. *Long.*

frame dam. Eng. A solid, watertight stopping or dam in a mine to keep back and resist the pressure of a heavy head of water. *Fay.*

framed dam. A barrier, generally built of timber framed to form a water face, supported by struts. *Seelye, 1.*

frame ground. a. The connection of the frame or housing of an electrical machine to the ground. *Grove.* b. *See* grounding conductor. *ASA M2.1-1963.*

framemaker. One who makes wooden frames or gates to be used in packing sewer pipe securely in boxcars or trucks. Also called gatemaker. *D.O.T. 1.*

frame set. The legs and cap or crossbar arranged so as to support the roof of an underground passage. Also called framing; set. *Fay.*

framesite. A variety of black bort from South Africa showing minute brilliant points possibly due to included diamonds. *Tomkieff, 1954.*

framesite bort. *See* bort, c. *Hess.*

frame tubbing. Eng. Solid wood tubbing, entirely composed of rings or curbs of wood about 6 by 8 inches square built up in segments, and wedged to keep it watertight. *Fay.*

frame weir. A movable weir built up of timber and cast iron or steel. *See also* suspended-frame weir. *Ham.*

framework. Load-carrying frame of a structure, which may be of timber, structural steel, precast and prestressed concrete, or a combination of these. *Ham.*

framing-shop foreman. In metal mining, one who supervises workers engaged in cutting timber and lumber for use in underground and surface mine construction work and in treating timbers for fireproofing and preservation purposes. *D.O.T. Supp.*

framing table. An inclined table, used in separating ore slimes by running water; a miner's frame. *Standard, 1964.*

France screen. A traveling-belt screen in which the screen cloth is mounted on a series of separate pallets, thus avoiding bending the screen as it goes over the pulleys. *Liddell 2d, p. 391.*

francevillite. A hydrous vanadate, $(Ba,Pb)(UO_2)_2(VO_4)_2.5H_2O$; orthorhombic, as yellow impregnations in sandstone from Franceville, Gabon. Named from locality. *Spencer 21, M.M., 1958.*

francinite. A bleaching earth obtained from German deposits. Also known as silitonite; tonsil. *Hess.*

Franciscan formation. Jurassic rocks characteristic of the Pacific coastal ranges of California and composed of sandstones, cherts, serpentines, and glaucophane schists. *Sinkankas.*

Francisci furnace. A furnace for the treatment of roasted blende and other fine ore. It consists of a series of superimposed muffles formed by arches of magnesia brick and built into the walls of the furnace and communicating with a common condensation chamber. *Fay.*

Francis turbine. A water turbine operating on a low and medium head, often installed in large hydroelectric schemes. Water enters the turbine radially and leaves axially. *Ham.*

francium. An element, atomic number 87, the heaviest alkali metal, discovered in 1939 by Marguerite Perey and named for her country, France. She isolated francium 223 (actinium K) from its parent, actinium 227. At least eight other francium isotopes are known, possibly nineteen exist. Symbol, Fr; valence, 1; and the mass number of the most stable isotope, 223. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed. 1964, p. B-111.*

franckeite. A blackish-gray to black sulfostannate and sulfantimonate of lead, $5PbS.2SnS_2.Sb_2S_3$; hexagonal or orthorhombic (?). In imperfect, radiated folia. From Poopo, Bolivia. *English.*

Francois sinking process. The cementation sinking method. The process was introduced into Great Britain in 1911. *See also* cementation sinking. *Nelson.*

francolite. A colorless apatite. *Hess.*

Franconian. Middle Croixan. *A.G.I. Supp.*

frangibility. The degree of facility with which a rock can be broken, or yields to the hammer. *Fay.*

frangible. Capable of being broken; breakable; brittle; fragile. *Webster 3d.*

franja. Port. Pay streak. *Fay.*

Franki pile. Proprietary name for a driven cast in situ pile with a bulb foot, which has the advantage of giving additional load-bearing capacity in soft ground. *Ham.*

franklinite. A mineral resembling magnetite, $(Fe,Mn,Zn)(FeMn)_2O_4$; black color; metallic or dull luster; Mohs' hardness 6 to 6.5; slowly soluble in hydrochloric acid; only slightly magnetic; frequently associated with red zincite and yellow to green willemite; specific gravity, 5 to 5.2; found in New Jersey. Zinc is recovered as zinc white and the residue is smelted for spiegeleisen. Also has been ground for dark paints. *CCD 6d, 1961.*

Frasch process. a. A process for mining sulfur in which superheated water is forced into the sulfur deposit, for the purpose of melting the sulfur. The molten sulfur is then pumped to the surface. This method is used extensively in Louisiana and Texas. *Fay.* b. A desulfurizing process which consists of distilling oil over lead oxide, followed by refining with sulfuric acid. *Fay.*

Frasch sulfur. Native sulfur mined by the Frasch hot-water process. *BuMines Bull. 630, 1965, p. 903.*

Fraser's air-sand process. A dense-media process in which a dry, specific-gravity separation of coal from refuse is achieved by utilizing a flowing dense medium intermediate in density between coal and refuse. The dense medium is formed by bubbling air through a mass of dry sand, 30 to 80 mesh in size. The air dilates and fluidizes the sand mass, causing it to behave somewhat as a heavy liquid. The coal floats on the aerated sand mass and the refuse sinks. *Mitchell, p. 529.*

Frasnian. Lower Upper Devonian. *A.G.I. Supp.*

Fraunhofer lines. Dark absorption lines which can be seen crossing the bright continuous spectrum of light from the sun, due to the absorption of light by vapor of elements in the chromosphere. First observed by the German physicist Fraunhofer, who designated the principal lines by the letters of the alphabet. The principal lines are as follows (wavelengths in Angstrom units) A, 7,606; B, 6,870; C, 6,563; D, 5,893; E, 5,270; F, 4,861; G, 4,308; H, 3,969. *Anderson.*

frautschy bottles. This water-sampling device is messenger actuated. It is designed to allow free flow while in the cocked position on the downward traverse. When the desired sampling point has been reached, the closures are messenger actuated, resulting in isolation of the sample on the return traverse. Frautschy bottles may be attached to the hydrographic wire at intervals and in such a manner that release of a single messenger from the surface will actuate the entire series. In this way samples from several depths may be obtained in a single operation. *H&G.*

frazil ice. Fine spicules of ice and thin plates of ice formed in turbulent water, such as rapidly moving streams or turbulent seawater. It is always found in an open channel, where the current is flowing too swiftly for the border ice to meet over the surface. It is often called slush ice. It is surface-formed ice, which cannot remain attached and freeze into a surface sheet. It occurs in varying degrees of fineness, depending on the degree of agitation of the water. *A.G.I.*

freboldite. Cobalt selenide, CoSe; hexagonal; pyrrhotine group, artificial. *Spencer 21, M.M., 1958.*

Frederician cut. A style of cabochon cut with one or two rows of facets around the girdle, frequently applied to chrysoprase. *Shipley.*

fredericite. An argentiferous, plumbiferous, and stanniferous variety of tennantite; from Sweden. *Weed, 1918.*

Fredericksburgian. Upper Lower Cretaceous. *A.G.I. Supp.*

free. a. Native, uncombined with other elements, as free gold or free silver (native gold or native silver). *Fay.* b. Coal is said to be free when it is loose and easily mined, or when it will run without mining. *Fay.*

free acidity. Acidity to methyl red. Free acidity of mine water is considered to be that portion of the total acidity that exists in the form of acid, both ionized and un-ionized. It is a measure of the aggressiveness with which the water will enter into chemical reaction. It indicates the rate at which chemical reaction will occur but does not define the total capacity of the water to produce chemical change. *BuMines T.P. 710, 1948, p. 2.*

free admittance. The reciprocal of blocked impedance of a transducer. *H&G.*

free air. a. Air under conditions of atmospheric pressure and temperature. The condition of the air at the intake of the compressor, whatever the temperature and barometric pressure may be. *Lewis, pp. 662-663.* b. The total area of open space in a grille through which air can pass. *Strock, 10.*

free-air anomaly. The difference at any point on the earth between the measured gravity and the gravity calculated for the theoretical gravity at sea level and a free-air coefficient determined only by the elevation of the station with respect to sea level. Also called free-air correction. *A.G.I.*

free-air correction. See free-air anomaly. *A.G.I.*

free alkali. Uncombined alkali. *API Glossary.*

free ascent. When a diver or swimmer's air supply fails or runs out, an emergency ascent becomes necessary. The ideal method for making an emergency ascent is accomplished by floating to the surface by means of natural buoyancy or assisted buoyancy from a life jacket. While ascending with no life jacket, air is exhaled continuously at such a rate that buoyancy is maintained, but the exhalation is sufficient to prevent overexpansion of the lungs. Free ascent, as this procedure is termed, is difficult for the untrained individual. *H&G.*

free ash. Pieces of shale from bands in the seam and from the roof and floor, pyrites veins and nodules, mineral partings within the coal, etc., or all useless material inevitably broken down with the seam in the process of getting it. Most of the free ash or dirt can be removed by washing processes. *Mason, v.2, p. 644. Compare* inherent ash.

free-blown. *See* offhand glass. *ASTM C-162-66.*

freeboard. The vertical distance between normal water level and the crest of a dam or the top of a flume. *Ham.*

free-burning coal. a. A bituminous coal having so little fusibility that enough air for rapid combustion can flow between the lumps and high enough in volatiles and fixed carbon to burn readily. *Hess.* b. Coal which does not cake in the fuel bed and which has a high volatile matter. *B.S. 3323, 1960.*

free-burning gas coal. Good burning coal suitable for gas extraction. *Tomkeieff, 1954.*

free carbon. a. In coal analysis, the approximate percentage of carbon removed with the volatile matter as opposed to fixed carbon which is the carbon not removed with the volatile matter. *Bureau of Mines Staff.* b. The part of the total carbon in steel or cast iron that is present in the elemental form as graphite or temper carbon. *ASM Gloss.*

free carbon in tars. Organic matter which is insoluble in carbon disulfide. *Urquhart, Sec. 2, p. 81.*

free cementite. Iron carbide in cast iron or steel other than that associated with ferrite in pearlite. *C.T.D.*

free chalk. Eng. A variety of soft marly chalk, Sussex. *Arkell.*

free circulation. The circulation of a drilling fluid the flow of which is not restricted by obstructing materials in the borehole or inside the drill string. *Long.*

free cleek. Scot. The right of a miner to get hutches (cars) without waiting his turn. *Fay.*

free coal. a. Term in use among British miners for bright coal with a good fracture, as opposed to splint or gas coal. *Tomkeieff, 1954.* b. So. Wales. Free-burning coal, in composition midway between bituminous and anthracite. *Arkell.* c. Scot. Coal on which lordship or royalty is not paid. *Fay.* d. Scot. Coal easily broken or which burns freely. *See also* free-burning coal. *Fay.*

free crushing. Crushing under conditions of speed and feed such that there is plenty of room for the fine ore to drop away from the coarser part and thereby, escape further fine crushing. *See also* choke crushing. *Fay.*

free-cutting brass. Alpha-beta brass containing about 2 to 3 percent lead, to improve the machining properties; used for engraving and screw machine work. *C.T.D.*

free-cutting steel. Steel in which the phosphorus is increased to 0.15 percent and the sulfur to 0.2 percent, to induce a certain degree of brittleness which facilitates rapid machining. *C.T.D.*

free cyanide. The cyanide not combined in complex ions. *ASM Gloss.*

free-discharge washer operator. *See* coal washer, a. *D.O.T. Supp.*

freedom, degrees of. Variance—number of independent variables in a system which must be relatively fixed in order to define it clearly.

$$F = (C + 2) - P$$

where C is number of components and P number of phases. Equilibrium is defined in terms of the smallest number of independent variables in the system. *Pryor, 3.*

freedom to mine. The law by which anybody has the right to mine certain minerals when he has prospected for them, and filed an application for the right to mine them, in the prescribed way. This conception was originated in the Jihlava mining law dated 1249 at Jihlava, Bohemia, Czechoslovakia. *Stoces, v. 1, p. 31.*

free-drainage level. An adit. A level which drains through an adit. *Fay.*

free electron. An electron within a substance, not attached permanently to any atom, an electron liberated from an atom by, for example, ionization. *Gaynor.*

free end. *See* free face. *Zern, p. 668.*

free energy. (F) or thermodynamic potential F = H − TS where H is heat content, T, absolute temperature, and S, entropy. Not measurable directly, but its changes can be. Free energy decrease (−F) in chemical reaction measures driving force of reaction. This decrease is the maximum work obtainable as result of change in any system. It shows the energy which can be completely converted into work in a reversible change at constant temperature. *Pryor, 3.*

free face. a. A longwall face with no props between the conveyor and the coal. *See also* prop free front. *Nelson.* b. A surface in the vicinity of a shothole at which the rock is free to move under the force of the explosion. *B.S. 3618, 1964, sec. 6.* c. The exposed surface of a mass of rock, or of coal. Also called free end. *Zern, p. 668.*

free fall. a. An arrangement by which, in deep boring, the bit is allowed to fall freely to the bottom at each drop or downstroke. *Fay.* b. The process of operating the drill. Often called Russian, Canadian, and Galician free fall. *Fay.*

free-fall drill. Synonym for churn drill. *Long.*

free falling. a. In ball milling, the peripheral speed at which part of the crop load breaks clear on the ascending side, and falls clear to the toe of the charge. *Pryor, 3.* b. In sedimentation analysis, the free falling velocity of a particle is that at which its effective weight is balanced by the drag exerted by the still fluid through which it descends. *Pryor, 3.*

free-falling device. A sliding piece in percussive boring designed to reduce the vibration and jarring effects when the downward movement of the chisel is suddenly arrested by striking the bottom of the borehole. The lower portion (which is attached to the chisel) is free to slide up and down in a slot provided in the upper part of the joint. When the chisel strikes the bottom of the hole, the slot allows the rods to continue the downward movement without being jarred by the blow of the chisel. *Nelson.*

free fed. In comminution, rolls are said to be "free fed" when fed only enough material to keep a ribbon of ore between the rolls. This results in a remarkably uniform product. *Compare* choke fed. *Newton, p. 62.*

free ferrite. Ferrite in steel or cast iron other than that associated with cementite in pearlite. *C.T.D.*

free field stress. The stresses existing in rock before the excavation of any mine opening. In general, these stresses are known to be influenced primarily by the weight of the overlying material, the relation of the opening of the rock masses around it (depth of overburden, etc.), by the physical characteristics of the surrounding rock, and by tectonic forces. An hypothesis for stress fields existing in underground rock before a mine opening was proposed by R. D. Mindlin in 1939. This hypothesis assumes that stresses within the earth at different depths may be approximated by one of three stress fields. They are: (1) hydrostatic stresses acting on each unit of the solid, a state of materials at depth probably greater than those now mined; (2) lateral restraint accompanying the application of the gravitational field, an approximation of the forces acting at an intermediate depth within the earth; and (3) no appreciable lateral restraint on a unit of the solid, the state of some materials in the immediate vicinity of the surface. *Lewis, pp. 611-612.*

free flow. a. A condition of flow through or over a structure not affected by the tailwater level. *Seelye, 1.* b. *See* free circulation. *Long.*

free-flowing volcano. A volcano from which the flow of lava is moderately constant and with a minimum of violence. *Standard, 1964.*

free fluid index; FFI log. The FFI is essentially the true porosity of a formation if the formation is clean and highly permeable. As a formation becomes less permeable either because it becomes dirtier (contains more clays) or contains smaller pores the FFI diminishes. This occurs even though an electrical log would not show a resistivity increase or a neutron log a smaller porosity. *Wyllie, p. 157.*

free gold. Gold uncombined with other substances; placer gold. *Fay.*

freehand grinding; offhand grinding. The method of grinding in which the object to be ground is held by hand against an abrasive wheel. *Dodd.*

free haul. The distance every cubic yard is entitled to be moved without an additional charge for haul. *Nichols.*

freehold. S. Afr. Full ownership, as distinct from ownership of mineral rights or surface rights only. *Beerman.*

free impedance. The input impedance when its load terminals are short-circuited. *H&G.*

freeing a mear. Eng. The giving of the first dish of ore to the lord (owner) of the mine. *Fay.*

freeing of ore. Derb. Cutting out soft material from one side of the vein in order to make it easier to mine the ore. *Fay.* Also called resuing. *Hess.*

free instruments. A category of instruments that are designed to initially sink to the bottom, release their heavy ballast weights, and then float back to the surface where they can be retrieved with their acquired payload (for example, a sediment core). *H&G.*

free level. Eng. An adit. *Fay.*

Freeman-Nichols roaster. A unit involving flash roasting applicable primarily to pyrite flotation concentrates. *E.C.T., v. 15, p. 233.*

free-milling. Applied to ores which contain free gold or silver, and can be reduced by crushing and amalgamation, without roasting or other chemical treatment. *Fay.*

free-milling gold. Gold with so clean a surface that it readily amalgamates with mercury after liberation by comminution. *Pryor, 4.*

free-milling ore. Ore containing gold which can be caught with quicksilver. *Statistical Research Bureau.*

free miner. a. Can. A person or association holding a license and thereby authorized to prospect on unoccupied lands and to carry on mining operations subject to any other conditions imposed by the law. A licensed miner. *Webster 3d.* b. Forest of Dean. A man born within the Hundred of St. Briavels, in the county of Gloucester, who has worked a year and a day in a mine. *Fay.*

free moisture. a. Moisture in coal that can be removed by ordinary air drying. *Compare* combined moisture. *Cooper, p. 397.* b. The part of the total moisture which is lost by a coal in attaining approximate equilibrium with the atmosphere to which it is exposed. *B.S. 3323, 1960.* c. Moisture not retained or absorbed by aggregate. *Taylor.* d. *See* moisture content. *Nelson.* e. Moisture removable by air-drying under standard conditions. Also called surface moisture. *B.S. 3552, 1962.*

free needle survey. Traverse by magnetic compass and line measurement. *See also* fast needle survey. *Pryor, 3.*

free on board; f.o.b. a. Price of consignment to customer when delivered with all prior charges paid, onto a ship. *Pryor, 3.* b. Free on rail (f.o.r.) describes similar delivery to rail. *Pryor, 3.*

free particles. Particles of ore consisting of a single mineral. *Gaudin, p. 70.*

free period of a seismograph. The time for one complete swing of the seismograph mass when all damping is removed and the earth is quiet. *A.G.I.*

free-piston compressor. A compressor of modern design without any important rotating parts. *Ham.*

free-piston drive sampler. A drive-sample barrel in which a piston is free to move upward with the top of the sample during the actual dry-sampling operation. *Long.*

free retaining wall. A retaining wall which tilts slightly so that movement at the top is about one-half percent of the wall height. *Ham.*

free-running piston. A piston not connected with a rod, that does its work by hammer-like blows. *Nichols.*

free settling. As opposed to hindered settling in classification, free fall of particle through fluid media. *Pryor, 4.*

free share. Som. A certain proportion of a royalty on coal, paid to lessor by lesee. *Fay.*

free silica. Quartz occurring in granites. *Mason, v. 1, p. 11.*

free sound field. A field in a homogeneous, isotropic medium free from boundaries. In practice it is a field in which the effects of the boundaries are negligible over the region of interest. *Hy.*

free split. In parallel flow, the branch with the highest drop originally. *Hartman, pp. 131-132.*

freestone. a. Any rock, especially a sandstone, that may be cut freely in any direction without a tendency to split. *Fay.* b. A sandstone which breaks freely. *A.G.I.*

free streaming. A firedamp roof layer flowing under the action of buoyancy without ventilation. *B.S. 3618, 1963, sec. 2.*

free valence. Unsatisfied valence bond. *Pryor, 3.*

free vibration. Vibration occurring at the natural frequency of a structure, as distinct from forced vibration. *Ham.*

free wall. The wall of an ore vein filling scales off cleanly from the gouge. *Schieferdecker.*

free water. a. Water that is free to move through a soil mass under the influence of gravity. Also called gravitational water; ground water; phreatic water. *ASCE P1826.* b. Water in soil in excess of hygroscopic and capillary water; also termed gravity water. *Seelye, 1.* c. The quantity of water removed in drying a solid to its equibrium water content. *NRC-ASA N1.1-1957.* d. *See* held water. *Pryor, 3.*

free-water elevation; water table; ground water surface; ground water elevation. The elevation at which the pressure in the water is zero with respect to the atmospheric pressure. Also called free-water surface. *ASCE P1826.*

free-water level. The surface of a body of water in contact with the atmosphere, that is, at atmospheric pressure. *Nelson.*

free way. A direction of easy splitting in a rock. *Fay.*

free weir. A weir that is not submerged—that is, in which tail water is below the crest or the flow is in nowise affected by the elevation of the tail water. *Seelye, 1.*

free-wheeling clutches. Consists of a series of rollers or cams tending to roll free when rotated in one direction and to roll into positive driving contact when rotated in the other direction. The action is fully automatic. This type is used when the driven element must be rotated ahead of the driving member, as in two-speed drives, or where two independent sources of power are used. *Pit and Quarry, 53rd, Sec. D, p. 72.*

freeze; freezing; frozen. a. To permit drilling tools, casing, drivepipe, or drill rods to become lodged in a borehole by reason of caving walls, or impaction of sand, mud, or drill cuttings, to the extent that they cannot be pulled out. Also called bind; seize. *Long.* b. To burn in a bit. *See also* burn-in, a. *Long.* c. The premature setting of cement, especially when cement slurry hardens before it can be ejected fully from pumps or drill rods during a borehole-cementation operation. *Long.* d. The act or process of drilling a borehole utilizing a drill fluid chilled to minus —30° to —40° F, as a means of consolidating, by freezing, the borehole wall materials and/or core as the drill bit penetrates a water-saturated formation, such as sand, gravel, etc. *Long.* e. To solidify, as of a molten charge in a furnace. *Weed, 1922.*

freeze-and-thaw action. The weathering process caused by repeated cycles of freezing and thawing. Synonym for frost action. *A.G.I.*

freeze casting. A process for making intricate shapes of special ceramic material, for example, turbo-supercharger blades. Refractory powder, with a small proportion of binder, is made into a thick slip, which is cast into a mold and then frozen, the cast is then dried and sintered. *Dodd.*

freeze-in. a. Used in much the same sense as freeze, a and b. b. Applicable when drill rods become fastened by solidification or freezing of the drilling fluid in a borehole drilled in permafrost. *Long.* c. To become or be fixed in ice. *Long.* d. Synonym for freezeup. *Long.*

freeze proofing. A surface treatment, as with calcium chloride solution, to prevent or reduce cohesion of coal particles by ice formation during freezing weather. *B.S. 3552, 1962.*

freeze sinking. Use of circulating brine in system of pipes to freeze waterlogged strata so that shafts can be sunk through them, established and lined. *Pryor, 3.*

freeze-thaw tests. Tests performed on crushed stone in which sample specimens are put in a special refrigeration unit and exposed to repeated cycles of freezing and thawing to determine potential damage. These tests are widely used by highway departments and in private construction. *AIME, p. 289.*

freeze-up. a. The process and/or season of the year when surface waters become frozen with no prospect of thawing for the remainder of the winter. *Long.* b. Can. The descent of winter when waterways are frozen. *Hoffman.* c. In ball milling, the theoretical rate of revolution at which the contents of the mill are centrifugally held at the circumference. *Pryor, 3.*

freezing. Consolidation of fine-grained waterlogged soil, enabling excavation to proceed, can be effected by freezing. The process, which dates from 1862, is particularly suitable for shaft sinking. *See also* Dehottay process. *Ham.*

freezing-and-thawing test. A test intended to determine the resistance of a brick to the destructive forces of freezing cycles. *ACSG, 1963.*

freezing at depth. The adoption of the freezing method to sink a shaft through a water-bearing deposit known to occur at a certain depth. At a point about 20 feet above the water, the shaft is belled out to about twice the diameter, to accommodate a ring of holes to freeze the water-bearing rock. Normal sinking is then resumed. *Nelson.*

freezing index. The number of degree days between the highest and lowest points on the cumulative degree days-time curve for one freezing season. It is a measure of the combined duration and magnitude of below-freezing temperature occurring during any given freezing season. The index determined for air temperatures at 4.5 feet above the ground is commonly designated as the air freezing index, while that determined for temperatures immediately below a surface is known as the surface freezing index. *ASCE P1826.*

freezing interval. That temperature interval between the solidus and the liquidus for a given composition. Synonymous with crystallization interval. *A.G.I.*

freezing method. A method of shaft sinking through loose waterlogged sands, which are not suitable for the cementation sinking method. Rings of lined boreholes are put down outside the proposed shaft and in them a very cold solution, such as brine, is circulated until an ice wall has been formed sufficiently thick to enable sinking to proceed normally. The method consists of the following stages: (1) forming a protective wall of ice, with its base in an impervious deposit; (2) maintaining the ice wall until the sinking and lining of the shaft has been completed, and (3) thawing out the ground without damage to the shaft. The freezing method has been revived, largely due to the successful use of bulk concrete, backed by corrugated sheets in place of tubbing, for lining the shaft through the frozen ground. This is followed by wall grouting. Freezing was introduced originally in 1883 by F. H. Poetsch. *See also* chemical soil consolidation; silicatization process. *Nelson.*

freezing overburden. *See* freeze, d. *Long.*

freezing point. a. The temperature at which a liquid solidifies. Pure water has its freezing point at 0° C or 32° F under normal atmospheric pressure. *A.G.I.* b. The freezing point of sea water is that temperature where an infinitely small amount of ice is in equilibrium with the solution. This initial freezing point depends on the chlorinity of the sample. *Hy.*

freezing process. *See* freeze, d. *Long.*

freezing salt. Coarse rock salt, to be mixed with crushed ice as a refrigerant. *Kaufmann.*

Freiberg amalgamation. *See* barrel process. *Fay.*

freibergite. A variety of fahlore containing up to 18 percent silver; usually steel-gray, sometimes iron-black; streak reddish; specific gravity, 5.05. Found in Idaho, Colorado, Nevada; Germany. *CDD 6d, 1961.*

freieslebenite. A lead-silver sulfantimonide mineral, approximately $5(Pb,Ag_2)S.2Sb_2S_3$, containing 24.5 percent silver. *Stanford.*

freirinite. A lavender to turquoise-blue basic hydrous arsenate of copper, calcium, and sodium, $6(Cu,Ca)O.3Na_2O.2As_2O_5.6H_2O$. Probably tetragonal; fine flakes. Formerly called lavendulan, from which mineral it is distinct. Department of Freirini, Chile. *English.*

Fremont etching reagent. An etchant consisting of 10 grams of iodine and 20 grams of potassium iodide in 100 milliliters of water. *Osborne.*

fremontite. A white sodium montebrasite. A hydrofluophosphate of aluminum, sodium, and lithium, $(Na,Li)Al(OH,F)PO_4$; monoclinic or triclinic. Large rough crystals; cleavable masses. Originally called natramblygonite, and later natromontebrasite. From Canon City, Fremont County, Colo. *English.*

Fremont test. A type of impact test in which a beam specimen notched with a rectangular groove is broken by a falling weight. *C.T.D.*

French chalk. A variety of soapstone or steatite. *See also* talc. *CCD 6d, 1961.*

French cliff. A hard variety of chalk found in the Seine valley of France; used in England in the manufacture of bleaching powder. *Hess.*

French drain. A covered ditch containing a layer of fitted or loose stone or other pervious material. *Nichols.*

French process. A process in which zinc is distilled and the vapor burned to produce the oxide; the purity of the oxide is controlled by the purity of the metal. This process is used for making pharmaceutical-grade zinc oxide. *Newton, p. 362.*

French stones. A deceptive term for glass imitation stones. *Shipley.*

Frenier sand pump. Spiral ribbon of steel enclosed between two steel disks, mounted on horizontal hollow shaft into which pulp picked up perpherally is discharged during slow rotation. *Pryor, 3.*

Frenkel defect. Result of movement of an ion from its lattice position in a crystal to an interstitial place, under the influence of vacant lattice points in the crystal's interior. Should the ion migrate to the surface a Schottky defect results. *Pryor, 3.*

Frenkel mixer. A screw type, enforced order, mixer of much smaller pitch than the usual shaft mixer; it operates on the convergence-divergence (C-D) principle. *Dodd.*

frente. Mex. Breast of working or face of drift; f. de guia, main or haulage level in a mine. *Fay.*

frenzied. S. Staff. Said of coal crushed by the creep or subsidence of the cover. *Fay.*

freq. Abbreviation for frequency. *BuMin Style Guide, p. 59.*

frequency. a. The number of repetitions of a periodic process in a unit of time. *Webster 3d.* b The number of compelte waves which pass a given point per second, or the number of complete vibrations per second, or revolutions per second, made by a vibrating particle. *A.G.I.* c. In electricity, the number of cycles per second, and depends on the number of pairs of poles, that is, north and south, that a coil passes per second. This is therefore equal to the revolutions per second of the generator multiplied by the number of pairs of poles in the field. *Mason, v. 2, p. 419.* d. Rate of vibration or alternation of a steadily oscillating system. *Pryor, 3.*

frequency curve. The curve representing the form to which the frequency distribution tends as an increasing number of observations is obtained. *Ham.*

frequency diagram. A diagram showing the frequency distribution drawn in such a manner that the area under the curve corresponds to the frequency. *Ham.*

frequency distribution. The numerical or quantitative distribution of objects or material in a series of closely related classes generally selected on the basis of some progressively variable phyisical character. *A.G.I. Supp.*

frequency factor. In crystallography, the number of different families of planes having the same form. *Henderson.*

frequency rate. The rate of occurrence of accidents as determined by multiplying the actual number of injuries in any given period by one million and dividing the product by the number of man-hours exposure. *Bureau of Mines Staff.*

frequency response. The percentage response of a seismic amplifier for various frequencies at a given filter setting. *A.G.I.*

frequency table. One showing frequency of occurrence of various values in a series of observations, from which frequency distribution can be determined. Alternative is plot of group frequency against observed fact, called a histogram. Used in statistical research, a histogram can be smoothed to form a frequency curve. *Pryor, 3.*

fresh. An adjective applied to rocks and rock materials in a variety of ways. It usually designates a rock surface newly exposed by fracturing, and it means that the surface thus exposed has not been subjected to any surface weathering and is a more or less unaltered sample of the rock. A mineral in fresh condition means that it possesses its inherent properties in an unimpaired state. If the original or primary minerals are not altered by subsequent processes, they are considered to be fresh. A fresh rock is one in which the minerals that compose it are fresh. When a mineral in a rock is altered or is decomposed as the result of certain forces acting upon it, it breaks down usually into one or more new minerals, each one in its own way being as fresh as the original mineral. *Stokes and Varnes, 1955.*

fresh air. Air free from the presence of deleterious gases. Pure air. *Fay.*

fresh-air base. An underground station, located in the intake airway, which is used by rescue teams during underground fires and rescue operations. The base should be as close to the fire as safety will permit, should be adequately ventilated, and should be in constant touch with the surface by telephone. *Nelson.*

fresh-air breathing apparatus. *See* air-tube breathing apparatus. *McAdam, p. 71.*

freshet. A sudden rise in a stream or river, caused by heavy rains or melting snow in the mountains or highlands. *Fay.*

fresh ice. a. Ice formed from fresh water. *A.G.I.* b. Young ice. *A.G.I.* c. Ice that has been salty but now is fresh. *A.G.I.*

fresh water; freshwater. a. Water with less than 0.2 percent salinity. *A.G.I. Supp.* b. Water which contains little impurities and the taste of which is not appreciably affected by these impurities. Fresh waters often include certain river waters, springs and deep wells. Such water is usually safe to drink. *Cooper, p. 361.*

freshwater limestone. a. A limetsone formed by direct precipitation in fresh water. *A.G.I.* b. A thin, dense nodular, relatively unfossiliferous limestone underlying coalbeds. It is closely related to underclay, and Wilson suggested the term underclay limestone. *A.G.I.* c. Synonym for underclay limestone. *A.G.I.*

freshwater sediments. Include all the main types of sediments that accumulate in freshwater environments, and cover the whole range of grain size. Lacustrine deposits, fluviatile deposits, and fluvioglacial deposits fall into this category. *C.T.D.*

Fresnel ellipsoid. The ellipsoid, the lengths of the axes of which are proportional to the velocities of light vibrating parallel to X, Y, and Z. *A.G.I. Supp.*

fretted ice. Sharp ice ridges rising above the surface of a continental ice mass. *A.G.I.*

fretted upland. Continuation of the process removes all traces of the earlier upland, for the cirques intersect from opposite sides and yield palisades of sharp rock pinnacles which rise on precipitous walls from a terraced floor. This ultimate product of cirque sculpture by glaciers is called a fretted upland. *A.G.I.*

fretting; fretting corrosion. Action that results in surface damage, especially in a corrosive environment, when there is relative motion between solid surfaces in contact under pressure. *See also* chafing fatigue. *ASM Gloss.*

fretting bed. Eng. Loose, sandy limestone with green sand, Portland beds of Chicksgrove, Tisbury, Wiltshire. *Arkell.*

fretwork. A structure produced by honeycomb weathering consisting of small pits in a rock surface that become fewer as they grow larger and deeper. *A.G.I. Supp.*

freudenbergite. A mineral, $Na_2Fe_2Ti_7O_{18}$. Hexagonal, black crystals in the syenite of Katzenbuckel, Odenwald, Germany. *Hey, M.M., 1961.*

Freudenberg plates. Iron plates suspended in dust chambers for the purpose of settling dust and condensing fumes that escape from the furnace with the gases. *Fay.*

Freundlitsch adsorption isotherm. Empirical equation for fluid. $y = kc^n$ where y = weight or volume adsorbed by 1 gram of adsorbent; k and n are empirical constants; and c the concentration of adsorbed substance in external phase at equilibrium in interface. *Pryor, 3.*

freyalite. A rare radioactive silicate of thorium, the cerium metals, and other elements; found near Brevik, Norway. *Webster 2d; Crosby, p. 48.*

Frey Automatic Cutter. Trade name; a machine for cutting and extruding column of clay into bricks by one or more horizontal wires that cut downwards while the clay is moving forward. *Dodd.*

friability. a. Tendency for particles to break down in size (degrade) during storage and handling under the influence of light physical forces. *Pryor, 3.* b. An assessment of the ease with which a coal can be broken into smaller pieces. *B.S. 3323, 1960.*

friable. a. Easy to break, or crumbling naturally. Descriptive of certain rocks and minerals. *Fay.* b. A mineral is friable when it may be crumbled between the fingers. *Stokes and Varnes, 1955, p. 149.* c. Easily crumbled, as a rock that is poorly cemented. *A.G.I.*

friable alumina. A medium pure alumina which fractures more readily than regular alumina but not as readily as white alumina. *See also* regular alumina; white alumina. *ACSG, 1963.*

friable amber. Gedanite. *Shipley.*

friable formation. A rock that breaks easily or crumbles naturally, hence a formation from which good core cannot be obtained easily. *Long.*

friction. a. A widespread force which slows down movement and causes heat. *Mason, v. 1, p. 141.* b. A force which opposes the sliding of one surface over another surface. When two bodies move over each other so that rubbing occurs a resistance force is set up. This force is due to the friction and is called the force of friction or frictional resistance. *Morris & Cooper, p. 187.* c. A special rubber compound used to impregnate and bond together the plies of the belt carcass. Also used as a term to express as a measurement the strength of the ply bond; for example, 16-19 pound friction, which means the force necessary to separate the plies of a one-inch test strip. *See also* coefficient of friction. *ASA MH4.1-1958.* d. *See* hydraulic friction. *Seelye, 1.*

frictional electricity. Electricity developed by rubbing (with a cloth) amber, tourmaline, topaz, diamond, and some plastic imitations. *Shipley.*

frictional force. The force required to overcome friction when a set of tubs or a run of wagons is hauled along a level track at uniform speed. For ordinary pit tubs the frictional force is about 40 pounds per ton load, and for mine cars or wagons about 28 pounds per ton load. This resistance is sometimes called traction. *Morris and Cooper, p. 192.*

frictional grip. A mine locomotive relies for its tractive capacity on the frictional grip or adhesion between the wheels and the rails of the track, and its magnitude depends on locomotive weight and the coefficient of friction between the wheels and track only. In this context, the coefficient of friction between wheels and track is usually termed the coefficient of adhesion. *Nelson.*

frictional ignition. The ignition of firedamp in coal mines by frictional sparks, such as the rubbing of sandstone against sandstone or sandstone against roof bolts. *See also* gas ignition. *Nelson.*

frictional resistance. *See* friction. *Morris and Cooper, p. 187.*

frictional soil. Clean gravel, soil, or sand in which the shear strength is chiefly determined by the friction between the particles. *See also* Coulomb's equation. *Ham.*

friction brake. A brake operating by friction between two surfaces rotating or sliding on each other. *Nichols.*

friction breccia. Angular rock material produced by earth movements which crush and break the rock on the two sides of a fault. Synonymous with fault breccia. *Fay.*

friction clutch. a. A means for engaging the drive of a press to the crankshaft, the torque being transmitted through friction by forcing together two or more surfaces of unlike material. *ASM Gloss.* b. This clutch consists of four major parts: the driving hub, the driven hub, the friction or gripping elements, and the mechanism which controls the gripping action. The gripping element may be an expanding ring keyed to one hub and frictionally engaging the other as controlled by the lever and shifter arrangement; or the gripping elements may consist of one or more friction plates or disks gripped between alternate friction surfaces, one group rotating with the driving hub, the other with the driven hub. It is properly termed a clutch when used to allow the connection of a shaft to a sprocket or pulley mounted on the clutch hub, and a clutch coupling when used to connect two shafts. *Pit and Quarry, 53rd, sec. D, p. 71.*

friction coefficient. The ratio of the tangential force of sliding friction between two surfaces to the force, normal to the surfaces, which presses them together. *Hess. See also* coefficient of friction. *ASA MH-4.1-1958.*

friction conglomerate. *See* crush conglomerate. *A.G.I.*

friction disk. a. One of a pair of disks on either side of the gear driving the feed nut in a gear-feed swivel head. The disks are held against the gear by compression springs, the tension of which may be adjusted to vary the torque at which the disks will slip and acts similar to an overload throwout clutch preventing the bit from being subjected to more than the amount of torque determined by the preset compression applied to the disks by the compression springs. *Long.* b. One of the disks in a clutch used to engage or disengage a motor, at will, from the mechanism driven by the motor or engine. *Long.*

friction element. Some clutches and brakes for use in severe conditions are now lined with cermets. Among the materials used are corundum and sillimanite as the ceramic component, and molybdenum, chromium, iron, and copper alloys as the metallic bond. *Dodd.*

friction factor. The friction factor for an airway is found by determining the drop in total pressure over a measured length. Assume that the two cross-sectional areas at the ends of the test length are A and B and that air flows from A to B. If the two sections are of equal area, the mean velocity is the same at each section, and the drop in total pressure is equal to the drop in static pressure, which can be measured by connecting two pitot tubes, one at A and one at B, to the gage by equal lengths of tight rubber tubing. If the areas A and B are not equal, the differential static pressure must be corrected by the difference in velocity pressures. The quantity of air flowing is determined at the measuring station beyond the test length, and the respective velocities at A and B and their resultant pressures are calculated. If the velocity at B is the smaller, the difference in velocity pressures is added to the differential static pressure. If the velocity at B is the greater, the difference in velocity pressures is subtracted from the differential static pressure. *Lewis, pp. 720-721.*

friction feed. Longitudinal movements or advance of drill stem and bit accomplished by friction devices in a diamond-drill swivel head as opposed to a system consisting entirely of meshing gears. *See also* friction disk. *Long.*

friction head. a. The additional pressure that the pump must develop to overcome the frictional resistance offered by the pipe, by bends or turns in the pipeline, by changes in the pipe diameter, by valves, and by couplings. *Carson, p. 211.* b. Friction head in pipes is commonly calculated by the Hazen and Williams formula. *See also* Hazen and Williams formula. *Lewis, p. 647.* c. The head or energy lost as the result of the disturbances set up by the contact between a moving stream of water and its containing conduit. In laminar flow the friction head is approximately proportional to the first power of the velocity; in turbulent flow to a higher power—practically the square. For convenience, friction losses are best distinguished from losses due to bends, expansions, obstructions, impacts, etc., but there is no recognized line of demarcation between them, and all such losses are often included in the term friction losses. *Seelye, 1.* d. The pressure required to overcome the friction created by the flow of a confined liquid, such as the flow of a drill fluid through drill rods. *Long.* e. That part of the hydraulic-feed yoke on a diamond drill containing the bearings connected to and by means of which the thrust of the hydraulic-feed pistons is transmitted to the drive rod in the drill swivel head. Also called cage; collar. *Long.*

friction loss. a. Head loss in linear flow through ducts of constant area. *Hartman, p. 78.* b. For determining the loss of head by friction, Box's formula is probably the most practical one, expressed as follows:

$$\text{Friction head in feet} = \frac{G^2 \text{ X } L}{243 \text{ X } D^5},$$

G equals gallons per minute; L equals length of range in yards; D equals diameter of pipe in inches. To keep down frictional losses, bends should be properly shaped, have a radius of curvature as large as possible, and sudden changes of diameter, either increasing or decreasing, should be avoided. *Mason, v. 2, p. 629.*

friction pile. A bearing pile supported entirely by friction with the surrounding earth. *Ham.*

friction press; friction-screw press. A machine for dry pressing; a plunger is forced into the mold by a vertical screw, the screw shaft being driven by friction disks or rollers—downwards for pressing by one disk and upwards for release of pressure by a second disk on the opposite side of the driving wheel. This type of press is used for special shapes of tiles and sometimes for making silica refractories, etc. *Dodd.*

friction-screw press. *See* friction press. *Dodd.*

friction slope. The friction head or loss per unit length of conduit. For most conditions of flow the friction slope coincides with the energy gradient, but where a distinction is made between energy losses due to bends, expansions, impacts, etc., a distinction must also be made between the friction slope and the energy gradient. Friction slope is equal to the bed or surface slope only for uniform flow in uniform channels. *Seelye, 1.*

friction socket. A tubular-shaped or slightly inside-tapered fishing tool. The inside surface of the tool is nearly covered with circular pinged protuberances, which, when driven over the lost drill tools, wedge the tools in the socket. *Long.*

friction winder. *See* multiple friction winder. *Nelson.*

friction yielding prop. See mechanical yielding prop. *Nelson.*

friedelite. A massive, cleavable to closely compact, hydrated manganese silicate, $H_7(MnCl)Mn_4Si_4O_{16}$. *Fay.*

frig-bob saw. A long handsaw used in Bath stone quarries. *C.T.D.*

frigger. An ornament or glass object made as a test of skill, or as an experiment. Friggers are often unusual in shape. They include parasols, bellows, fountains, birds, groups of figures, a village pump and bucket, etc. *Haggar.*

frigidite. A variety of tetrahedrite. *Hey 2d, 1955.*

frijol. Mex. A miner's term for a red conglomerate. *Fay.*

fringe. A collective term for a thin sprinkling of isolated or grouped erratics in front of the extreme terminal moraine of a glacier. *Standard, 1964.*

fringing reef. a. A fringing reef or a shore reef, whether skirting an island or part of a continent, is generally narrower than a barrier reef. The absence of an interior deep-water channel and the close relation in horizontal extension with the probable slope beneath the sea of the adjoining land are essential points of difference between a fringing reef and a barrier reef. *A.G.I.* b. A reef which closely encircles or forms a fringe around the land. *A.G.I.* c. A coral reef around lands or islands that rests on the bottom along the shores is either a fringing reef or a barrier reef, according to its position. A fringing reef is attached directly to the shore, whereas a barrier reef is separated from the shore by a channel of water. *A.G.I.* d. A fringing coral reef is formed, the inner margin of which is composed of a belt of materials which have become subaerial through the actions of wind and waves. Its outer margin consists of submerged coral rock and living corals. *A.G.I.* e. A reef attached to an insular or a continental shore. *A.G.I.* f. In oceanography, a platform of coral formation extending out from the land. *See also* coral reef. *C.T.D.*

fringe water. a. Water occurring in the capillary fringe. *A.G.I.* b. Water in the zone immediately above the water table. It may consist solely of capillary water, or it may be combined with gravity water in transit to the water table. *Seelye, 1.*

Frisbie's feeder. A device whereby a bucket of coal is forced up into the eye of a pot furnace from below. *C.T.D.*

frischer ring. A type of ceramic ring for the packing of towers in the chemical industry. *Dodd.*

frisket. A stencil, usually of paper, stuck to the ware to protect it from slip or glaze. *ACSG, 1963.*

frit. a. A glass which contains fluxing material and is employed as a constitutent in a glaze body, or other ceramic composition. *ASTM C242-60.* b. Calcined flint, sand, or glass, ground finely after fusing, and used in body pastes or glazes so as to reduce, by chemical combination, any tendency of the ceramic materials to dissolve in water. *C.T.D. Supp.* c. A glassy material produced by fusing a mixture of some or all of the constituents of a glaze or enamel and quenching it in water. This process will render insoluble any soluble materials originally present, will insure greater homogeneity, and will make toxic compounds nonpoisonous. *Lee.* d. A term used in the ceramic industry and applied to a semifused mass, the constitutents of which originally were soluble or insoluble, fusible or infusible. By fritting, that is, preliminary fusing, the original properties of the constituents are changed; thus, the soluble materials become insoluble and the infusible materials fusible. Accordingly, the substances which could not otherwise be used in a glaze batch, but which are absolutely necessary for the best results, can be used. Other advantages offered by fritting are minimizing danger to health of workers when using lead salts, inducing better suspension of heavy products in the batch, more even distribution of constituents of the batch; ability to fire the glazed ware at a lower temperature. Most of the glazes used on dinnerware and sanitary ware contain frit. *See also* glazes. *CCD 6d, 1961.* e. As a noun, the material of which glass is composed. *A.G.I. Supp.* f. As a noun, a semifused stony mass. *A.G.I. Supp.* g. As a verb, to partly fuse. *A.G.I. Supp.*

frit basket. A skeleton or perforated container used to catch frit under water as it is discharged from a smelter. The frit basket is generally made of stainless steel or some other rustproof alloy. *Enam. Dict.*

frit brick. A lump of calcined glass materials brought to a pasty condition in a reverberatory furnace preliminary to the perfect vitrification in the melting pot. *Fay.*

frit, clear. *See* clear frit. *ASTM C286-65.*

frit, colored. *See* colored frit. *ASTM C286-65.*

frith. Another spelling of firth. Synonymous with firth. Also synonymous with estuary; fiord. *A.G.I.*

frit maker. *See* glaze maker. *D.O.T. 1.*

fritted glaze. A glaze in which a part or all of the fluxing constituents are prefused. *ASTM C242-60. See also* sintered glass.

fritted porcelain. Alternative name for soft paste. *See also* soft paste. *Dodd.*

fritting. a. In fire assay, heating the charge (powdered ore, flux, etc.), to near melting point, or pasty state. *Pryor, 3.* b. A type of contact metamorphism characterized by partial fusion carried to the point where the silica begins to act on the bases, forming an imperfectly melted or fritted mass. *A.G.I.* c. Sintering in the presence of a liquid phase. *ASTM B243-65.* d. The process of quenching and shattering molten glass into small frit particles. *Enam. Dict.*

fritting furnace. A furnace for melting glass-making materials. *Standard, 1964.*

fritting zone. *See* soaking area. *Dodd.*

frizzling. A fault liable to develop during the firing of pottery ware that has been decorated with lithographic transfers; if the varnishes are burned away too rapidly in the early stages of the enamel fire, the color is liable to crack and curl up. To prevent this fault, the layer of size should be thin and the rate of firing between 200° and 400° C should not greatly exceed 1° per minute. *Dodd.*

Frodingham ore. Stratified ironstone found in north Lincolnshire in the lower lias clays of the Jurassic strata; normal thickness of 32 feet with a low iron content of 18 to 25 percent. It is limey and is thus suitable for use with the siliceous Northampton sand ironstone and foreign ore of high iron content. *See also* marlstone ore. *Nelson.*

frog. a. The point of intersection of the inner rails, where a train or tram crosses from one set of rails to another. The frog is in the form of a V. *See also* turnout. *C.T.D.* b. A combination of rails so arranged that the broad tread of the wheel will always have a surface on which to roll, and that the flange of the wheel will have a channel through which to pass. *Zern, p. 472.* c. A shallow place for mortar in the upper face of a brick. *Webster 3d.* d. A depression in the bed surface of a brick; sometimes called a panel. *ACSG, 1963.*

frog rammer. A compacting hammer operated by a diesel piston and guided manually by a workman. *Ham.*

frog size. A track haulage term for any distance from the point of the frog to the spread divided by the width of the spread at the place where the measurement was taken. *Kentucky, p. 235.*

frohbergite. Iron telluride, $FeTe_2$, isomorphous with marcasite, found in polished sections of telluride ore from Montbray, Quebec, Canada. *Spencer 18, M.M., 1949.*

frolovite. Hydrous calcium borate, $CaB_2O_4.3\frac{1}{2}H_2O$, white with a grayish tint; luster, dull; with calciborite in limestone skarn from Novo-Frolov copper mine, Turinsk district, northern Urals. *Spencer 21, M.M., 1958.*

Froment process. A flotation process in which a sulfide ore is agitated in water with a little oil and sulfuric acid, the sulfide particles become oiled and attach themselves to, and are floated by, gas bubbles. Calcite is added to the ores when needed. Minerals Separation Ltd., bought this patent in 1903. *Liddell 2d, p. 407.*

frondelite. A dufrenitelike mineral, $Mn''Fe'''_4(PO_4)_3(OH)_5$, isomorphous with rockbridgeite with Mn″ in place of Fe″; orthorhombic, as radially fibrous masses from Brazil. *Spencer 19, M.M., 1952; Spencer 20, M.M., 1955.*

front. a. A designation for the mouth or collar of a borehole. *Fay.* b. *See* face, d. *Fay.* c. The working attachment of a shovel, as dragline, hoe, or dipper stick. *Nichols.* d. In connection with concepts of granitization, the limit to which diffusing ions of a given type are carried. The simatic front, for example, is the limit to which diffusing ions carried the calcium, iron, and magnesium which they removed from the rocks in their paths. The granitic front is the limit to which diffusing ions deposited granitic elements. *Leet.* e. A metamorphic zone of changing mineralization developed outward from a large expanding igneous intrusion. *Compare* basic front. *A.G.I. Supp.*

front abutment pressure. The release of energy in the superincumbent strata above the seam induced by the extraction of the seam. *Sinclair, II, p. 130.*

fronta apron. a. Same as apron; outwash plain. *Fay.* b. Farther from the former face of the ice lie sheets of sand so arranged as to afford a nearly horizontal surface to which I have given the name frontal aprons. *A.G.I.*

frontal geosyncline. The geosyncline closest to the continent in a composite mobile belt. *A.G.I. Supp.*

frontal getters. N. of Eng. Preparation-getting machines which shear off the coal in thin slices along the whole length of the face. *Trist.*

frontal hammer; frontal helve. Eng. A forge hammer lifted by a cam, acting upon a "tongue" immediately in front of the hammerhead. *Fay.*

frontal moraine. Synonym for terminal moraine. *A.G.I.*

frontal plain. A subaerial deposit that consists of material carried forward from the glacial moraine by streams and spread as a veneer or mantle over the older formations in front of the ice. *A.G.I.*

frontal terrace. A shelflike body of stratified drift associated with the kame aggregations of a valley. *A.G.I.*

front-and-back shift. Aust. A system in which one of a pair of miners comes to work 2 hours before the other, while the latter remains 2 hours after the first has gone home; the object being to keep the trammers going, who work 10 hours, against the miners' 8 hours. *Fay.*

front bay. A large irregular bay connected with the sea through passes between barrier islands. *A.G.I. Supp.*

frontdescent cast; cabbage leaf marking; deltoidal cast. The flat casts are usually several decimeters long, resembling certain shrubs or large cabbage leaves. The spreading foliage is always directed downcurrent. *Pettijohn.*

front-end equipment. Those attachments to a crane which enable it to work as an excavator, a skimmer, a backacter, or similar machine. Both the jib and its fittings are included as equipment. *Ham.*

front-end loader. a. A tractor loader with a digging bucket mounted and operated at the front end of the tractor. *Nichols.* b. A tractor loader that both digs and dumps in front. *Nichols. See also* tractor shovel.

front entry. *See* entry. *Fay.*

front hub. Synonym for foresight hub. *Long.*

front intermontane basin. An intermontane basin located continentward from the main belt of overthrusting in a mobile belt. *A.G.I. Supp.*

frontland. Synonym for foreland. *A.G.I. Supp.*

front pinacoid. Synonym for orthopinacoid. *See also* pinacoid. *A.G.I.*

front range. The outermost range of a mountain system. *A.G.I. Supp.*

front-to-back chankshaft press. A mechanical press in which the crankshaft and other drive shafts are positioned in a front-to-back direction. *ASM Gloss.*

froodite. A monoclinic palladium bismuthide. From the Frood mine, Sudbury, Ontario. Named from locality. *Hey, M.M., 1961.*

frost. a. A light, feathery deposit of ice caused by the condensation of water vapor, directly in the crystalline form, on terrestrial objects, the temperatures of which are below freezing. The process is the same as that by which dew is formed, except dew occurs only when the temperature of the object is above freezing. Frost is designated at light, heavy, and killing by the U.S. Weather Bureau. *A.G.I.* b. The occurrence of temperatures below freezing. *A.G.I.*

frost action. a. The alternate freezing and thawing of moisture in materials and the resultant effects on these materials and on the structures of which they are a part or with which they are in contact. *ASCE P1826.* b. The weathering process caused by repeated cycles of freezing and thawing. Synonymous with freeze-and-thaw action. *A.G.I.*

frost-active soil. Soil which undergoes changes in volume and bearing capacity as a result of freezing and thawing. In general, fine sand, silt, and some varieties of chalk are frost-active. *Nelson.*

frost agate. Gray chalcedony with white markings which resemble frost or snow. *See also* frost stone. *Shipley.*

frost boil. a. The softening of soil occurring during a thawing period due to the liberation of water from ice lenses or layers. *ASCE P1826.* b. A hole formed in flexible pavements by the extrusion of soft soil and melt waters under the action of wheel loads. *ASCE P1826.* c. The breaking of a highway or an airfield pavement under traffic and the ejection of subgrade soil in a soft and soupy condition caused by the melting of ice lenses formed by frost action. *ASCE P1826.*

frost circle. A circular crack developed by freezing in horizontal thin-bedded limestone cut by two sets of joints meeting at right angles. It is commonly 15 to 25 feet in diameter. *A.G.I. Supp.*

frost crack. An opening in soil produced by the development of an ice wedge. *A.G.I. Supp.*

frost-crack polygon. A nonsorted polygon produced by low-temperature contraction of frozen ground. *USGS PP 264-F, 1955, p. 138.*

frost creep. Soil creep resulting from frost action. *A.G.I. Supp.*

frosted. Surface-treated to scatter light or to simulate frost. *ASTM C162-66.*

frost glass. *See* glass frost. *Dodd.*

Frost gravimeter. An astatic balance-type gravity meter consisting of a mass at the end of a nearly vertical arm, supported by a mainspring inclined to the vertical at about 45°. The beam rises and falls with gravity variation, but it is restored to its normal position by a sensitive weighing spring tensioned by a micrometer screw. *A.G.I.*

frost heaving. a. The raising of a surface by the accumulation of ice in the underlying soil. *ASCE P1826.* b. The lifting of a surface by the internal action of frost. It generally occurs after a thaw, when the soil is filled with water droplets and when a sudden drop in temperature below freezing changes the droplets into ice crystals. This transformation involves expansion, and consequently, causes an upward movement of the soil. *A.G.I.*

frost hillock. The marked upward bulging sometimes present in the center of each polygon in cellular soils. *A.G.I.*

frosting. A lusterless, ground-glass, or mat surface imposed on the surface of rounded quartz grains because of innumerable close contacts with other similar grains. Generally believed to be caused by wind action. *A.G.I.*

frost line. The maximum depth to which the ground becomes frozen. It may be given for a particular winter, for the average of several winters, or for the extreme depth ever reached. In the United States, frost penetrates on the average to about 1 inch in the South and up to over 60 inches in Minnesota and Maine. *A.G.I.*

frost mound. A general term for knolls, hummocks, and hills associated with frozen ground. The term includes earth hummocks, falsen, and pinges. *A.G.I. Supp.*

frost pin. A short heavy iron pin used by surveyors to make a hole in frozen ground so that a wooden peg may be driven without breaking. *Fay.*

frost polygon. *See* polygon ground. *A.G.I.*

frost scar. A small patch of bare soil produced by frost action. *USGS Bull. 974-C, 1951, p. 66.*

Frost's cement. An early form of hydraulic cement patented in England in 1811 by James Frost; it was made from two parts chalk to one part clay. *Dodd.*

frost soil. A surface soil layer disturbed by freezing and thawing. *A.G.I. Supp.*

frost splitting. The breaking of rock by water freezing in the cracks in the rock. *A.G.I. Supp.*

frost stirring. Frost heaving and thrusting in the surface zone of annual freezing and thawing. It does not involve mass movement. *USGS PP 264-F, 1955, p. 138.*

frost stone. A local trade name for chalcedony found near Barstow, Calif., in 1912, which contained white inclusion thought to be opal. *Shipley.*

frost thrusting. Lateral soil movement resulting from freezing. *A.G.I. Supp.*

frost weathering. The mechanical disintegration of rocks and other earth materials brought about by frost action. Synonym for frost wedging. *A.G.I.*

frost wedging. Synonym for frost weathering. *A.G.I.*

froth; foam. In the flotation process, a collection of bubbles resulting from agitation, the bubbles being the agency for raising (floating) the particles of ore to the surface of the cell. *Hess.*

frother; frothers. a. Substances used in flotation processes to make air bubbles sufficiently permanent principally by reducing surface tension. *Hess.* Common frothers are pine oil and cresylic acid. *Newton, p. 98.* b. Chemical agent added to pulp before flotation, to promote transient froth in cell. *Pryor, 4.*

frothers. *See* frother.

froth flotation. a. A flotation process in which the minerals floated gather in and on the surface of bubbles of air or gas driven into or generated in the liquid in some convenient manner. *See also* film flotation. *Fay.* b. The separating of finely crushed minerals from one another by causing some to float in a froth and others to sink. Oils and various chemicals are used to activate, make floatable, or depress the minerals. *C.T.D.* c. A process for cleaning fine coal in which the coal, with the aid of a reagent, becomes attached to air bubbles in a liquid medium and floats as a froth. *B.S. 3552, 1962.*

frothing agent; frother. a. A reagent used to control the size and stability of the air bubbles in the flotation process. *B.S. 3552, 1962.* b. A chemical used in the flotation process to aid collector-coated mineral particles to cling to risen air bubbles. The froth thus formed is transient, and should persist only long enough to permit its removal from the flotation cell. Terpenes, pine oil, cresyls, amyl alcohol, and alcohol derivatives are among those used. The DuPont B-series are byproduct fractions from butyl alcohol manufacture, with high boiling points. The American Cyanamid frothers AC mix these with oils. The Dow Chemical Company markets polyproylene glycol methyl esters (Dowfroths) which are water soluble. *Pryor, 3.*

frothing collector. A collector which also produces a stable foam. *Bennett 2d, 1962.*

froth promoter. A chemical compound used with a frothing agent. Increases greatly the recovery of a mineral in a flotation process. *Bennett 2d, 1962.*

frothy amber. Same as foamy amber. *Shipley.*

Froude number. A ratio used in scale model analysis, which should be the same in the model as in the full-size project. It is the velocity squared divided by length multiplied by the acceleration of gravity. *See also* Reynolds number. *Ham.*

Froude's curve. In surveying a curve with offset y

$$y = \frac{x^3}{6\,l\,r}$$

x being the distance from the tangent point, l length of transition, and r radius of circular arc. *Pryor, 3.*

frozen. a. Congealed by cold; affected or crusted over by freezing. *Webster 3d.* b. Immovable by reason of expansion consequent upon imperfect lubrication; said of a journal and its bearing. *Standard, 1964.* c. Said of vein material which adheres closely to the inclosing walls. *Fay.*

frozen coal. Coal which adheres strongly to the rock above or below it. *See also* sticky coal. *Fay.*

frozen ground. Ground that has a temperature of 32° F or lower, or of 0° C or lower, and which generally contains a variable quantity of water in the form of ice. *Bureau of Mines Staff; A.G.I.*

frozen ore. *See* frozen, c. *Fay.*

frozen pipe. A pipe held immovable in a well by cavings which have settled around it. *Institute of Petroleum, 1961.*

frozen stocks. Stores, developments, stockpiled ore, etc., on which money has been spent but from which no financial realization can for the moment be obtained. *Pryor, 3.*

frozen up. To be in a solidified state; also, an article lodged inside a borehole so tightly that it cannot be pulled. *See also* freeze. *Long.*

frozen vein. A vein in which one wall grades into the country rock and the value of the mineral peters out on the frozen side. *Nelson.*

frozen wall. The boundary surface of a vein filling which adheres tenaciously to the wall. *Schieferdecker.*

fruchtshiefer. An argillaceous sediment which has undergone low-grade metamorphism so that the new minerals form spots suggestive of grains of wheat. *See also* fleckschiefer; knotted slate; knotenschiefer; maculose; spotted slate. *A.G.I.*

Frue vanner. An ore-dressing apparatus consisting essentially of a rubber belt traveling up a slight inclination. The material to be treated is washed by a constant flow of water while the entire belt is meanwhile shaken from side to side. Other vanners of the sideshake type are the Tulloch, Johnston, and Norbom. *Liddel 2d, p. 387.*

frush. Scot. Brittle; having unusually little tenacity; soft and easily broken up. *Fay.*

frustule. The siliceous shell of a diatom, consisting of two valves, one overlapping the other. *A.G.I.*

ft. Abbreviation for foot. *BuMin Style Guide, p. 59.*

ft L. Abbreviation for foot-Lambert. *BuMin Style Guide, p. 59.*

ft lb. Abbreviation for foot-pound. *BuMin Style Guide, p. 59.*

ft^2. Abbreviation for square foot. *BuMin Style Guide, p. 62.*

Fuch's gold purple. A tin gold color, produced by a wet method; it has been used in the decoration of porcelain. *Dodd.*

fuchsine dye. An analine-type dye which is used in alcohol solution to test the porosity of ceramic bodies. The material is also sometimes used as a dye for body identification prior to firing. *Lee.*

fuchsite. A bright green variety of muscovite with up to 5 percent Cr_2O_3. A member of the mica family. *Hey 2d, 1955.*

fucoid. Commonly applied in the past to any indefinite marking found on a sedimentary rock that could not be referred to a described fossil genus. It was derived from the marine alga, Fucus, which it was supposed might leave such a marking if buried under favorable conditions. *A.G.I.*

fucosite. Bitumen derived from the hydration of fucose pentosane and found among clays and sands in California. *Tomkeieff, 1954.*

fuel. a. Any combustible material which gives off heat. *Hansen.* b. A substance which can be economically burned to produce heat energy for domestic or industrial purposes. Fuels include compounds of carbon and hydrogen and exclude other substances which can be burned, such as magnesium and aluminum metals. Fuels can be subdivided into recent plant fuels, fossil fuels, such as peat and coal, and products of distillation of plant or fossil fuels. According to their state of aggregation, fuels can be subdivided into solid, liquid, and gaseous fuels. *Tomkeieff, 1954.*

fuel-briquettes machine operator. In the fuel briquettes industry, one who tends a machine that automatically molds ingredients into fuel briquettes. Also called briquette molder; fuel-briquettes press operator; molding machine operator; package-coal molding machine operator. *D.O.T. 1.*

fuel-briquettes press operator. *See* fuel-briquettes machine operator. *D.O.T. 1.*

fuel cell battery. A chemical battery, with perhaps sodium, chlorine, and mercury among ingredients, which will have self-generating tendencies. *Hy.*

fuel cycle. The series of steps involved in supplying fuel for nuclear power reactors. It includes original fabrication of fuel elements; their use in a reactor; chemical processing to recover the fissionable material remaining in the spent fuel; reenrichment of the fissionable material; and refabrication into new fuel elements. *L&L.*

fuel economizer. A feedwater heater consisting of pipes around which the gases of combustion from a furnace pass. *Standard, 1964.*

fuel efficiency. The ratio of the heat produced by a fuel for doing work to the available heat of the fuel. This efficiency is determined by the nonheat-forming materials in the fuel and the nonwork-producing heat which is developed by the fuel. *Brantly, 2.*

fuel element. A rod, tube, plate, or other geometric form into which nuclear fuel is fabricated for use in a reactor. *L&L.*

fuel feeder. A contrivance for supplying a furnace with fuel in graduated quantities. A mechanical stoker. *Fay.*

fuel gas. Gas used for heating or cooking, as distinguished from illuminating gas. *Standard, 1964.*

fuel oil. Any liquid or liquefiable petroleum product burned for the generation of heat in a furnace or firebox, or for the generation of power in an engine, exclusive of oils with a flash point below 100° F (38° C), tag closed tester, and oils burned in cotton or woolwick burners. *ASTM D288-57.*

fuel pump. A pump which supplies measured quantities of fuel injected into each cylinder of a combustion engine at the moment required for combustion. *Mason, v. 2, p. 447.*

fuel ratio. The ratio of fixed carbon to volatile matter in coal; the carbon ratio. *A.G.I. Supp.*

fuel reprocessing; reprocessing. The processing of reactor fuel to recover the unused fissionable material. *L&L.*

Fuel Research Board/National Coal Board classification. A coal classification system utilizing proximate analysis and based upon the volatile matter, expressed upon the dry, mineral-matter-free basis and coking power of clean material (containing not above 10 percent ash) as determined in the Gray-King assay. The volatile matter is calculated to the dry, mineral-matter-free basis after correcting the ash to mineral matter. *Francis, 1965, v. 1, pp. 34-36.*

fugacity. Change in chemical equilibrium of a system in response to altering conditions in a heterogeneous mixture. Quantitative measure of escaping tendency of a liquid or solid. *Pryor, 3.*

fugitive air. Applied to air moving through the fan that never reaches the working faces. It leaks through poor stoppings, around doors and so on, back into the returns without moving anywhere near the active sections. Surveys of some mines show that up to 80 percent of the air moving through the fan never reaches the working faces. *Coal Age, v. 71, No. 8, August 1966, p. 212.*

fugitive constituent. One of those substances which were present in the magma before crystallization set in, but were for the greater part lost during the process of crystallization, so that they do not commonly appear as rock constituents. *A.G.I.*

Fulbond. Proprietary varieties of fuller's earth supplied to foundries for use in green sand mixtures, for example, Fulbond No. 1 is a natural fuller's earth dried and ground under controlled conditions, while Fulbond No. 2 is modified to obtain greater strength. *Osborne.*

fulcrum. A pivot for a lever. *Nichols.*

fulcrum jack. *See* jack.

fulguration. A sudden glistening of molten gold or silver at the close of cuppellation. *Compare* blick. *Standard, 1964.*

fulgurite. A little tube of glassy rock that has been fused from all kinds of other rocks and unconsolidated sediments by lightning strokes. Fulgurites are especially common on exposed crags on mountain tops. The term is derived from the Latin for lightning. *Fay.*

full. An elevation of the foreshore parallel to the trend of the beach. *Schieferdecker.*

full-automatic plating. Electroplating in which the work is automatically conveyed through the complete cycle. *ASM Gloss.*

full-cell process. A pressure-preserving process in which timber is first subjected to a vacuum to extract all air and moisture before the preservative is introduced under pressure. The trade names processes known as Celcure or Tanalith, which use wood preservative salts, operate on this principle. *See also* empty-cell process. *Ham.*

full-cut brilliant. The term correctly used for a brilliant-cut diamond or colored stone with the usual total of 58 facets, which total consists of 32 facets and a table above the girdle and 24 facets and a culet below. On colored stones the girdle is usually polished, but not on diamonds. *See also* standard brilliant. *Shipley.*

full diameter. Synonym for full gage; full size. *Long.*

ful dip. The maximum angle which an inclined bed makes with the horizontal plane. *See also* true dip. *Nelson.*

fuller. a. A blacksmithing set hammer with a longitudinally half-round peen or a form of bottom tool with a similar working end sometimes used in conjunction with the first for grooving and spreading iron; also, a groove made by such a tool or any groove or fluting. *Standard, 1964.* b. In preliminary forging, the portion of a die that reduces the cross-sectional area between the ends of the stock and permits the metal to move outward. *ASM Gloss.*

fullering. The act of calking a riveted joint to make it steam tight. *Ham.*

fuller's earth. a. A fine earth resembling clay, but lacking plasticity. It is much the same chemically as clay, but it contains a higher percentage of water. It is high in magnesia, and it has the capability of decolorizing oils and fats by retaining the coloring matter. *Fay.* b. Any clay or claylike material which has adequate oil decolorizing and purifying properties in its natural state to be used for oil refining. *Bureau of Mines Staff.*

Fuller's grading curve. A method of graphical representation of particle size analysis; the grain size (in fractions of an inch) is shown on the abscissa and the cumulative percentage on the ordinate. Originally, the concept of ideal grading curves was introduced, these being selected to be ellipses with straight lines tangent to them; more strictly, the ideal curves are parabolas having the form $d = P^2D/10{,}000$, where d is any selected particle diameter, D is the diameter of the largest particles and P is the percentage finer than d. *Dodd.*

fullersite. A term used in Wales for pulverized slate used with asphalt for road construction. *Hess.*

full-face blasts. The standard type of heading blast consists of a straight in or main drive, at right angles to the rock face, and a back drive at right angles to the main drive and parallel to the face. The main drive is normally driven at quarry floor level to a depth of 0.6 times the height of rock above the back drive. Apart from exceptional circumstances, the maximum depth of the main drive should be 50 feet, so that with faces over 85 feet high the 0.6 ratio should not be used, but the main drive limited to 50 feet. *McAdam II, pp. 153-154.*

full-face driving. The English method of blasting used for adits, tunnels, and drifts. The full section is drilled and then blasted in one operation. *Fraenkel.*

full-face firing. With modern drilling equipment it is now possible, in suitable conditions, to drill small-diameter holes from top to bottom of the face, and where this can be done considerable advantages as to cost and efficiency can be obtained as compared with the bench method. In high faces of 50 feet and upwards it is not always easy to drill vertical holes to give small burdens because of the break-back of the rock at the crest of the quarry face. It is therefore recommended that larger burdens be taken and that the vertical holes be supplemented by breast holes at quarry floor level. These holes are intended to permit concentrated explosive charges to blow out the toe rock, while the explosive in the vertical holes brings down the rock from the face. *McAdam II, p. 147.*

full gage. a. A cylindrical or tubular object, such as a bit or reaming shell, the outside and/or inside diameters of which are the size specified. Also called full size. *Long.* b. A borehole the inside diameter of which is uniform enough to allow a new-condition bit to follow portions of the hole drilled by other bits cutting the same X-borehole size without reaming. Also called full size. *Long.* c. As applied to deflection drilling, the branch borehole is the same diameter as the parent hole. Also called full size. *Long.*

full gauge. Synonym for full gage. *Long.*

full-hole bit. Synonym for noncoring bit. *Long.*

full-hole size. a. Used by some diamond drillers as a synonym for full gage. *Long.* b. As used by petroleum field drillers, a bit having a minimum outside or cutting diameter of 7⅜ inches. Also called full size. *Long.*

full-radius bit. Synonym for double-round nose bit. *Long.*

full-radius crown. Synonym for double-round nose bit. *Long.*

full-round nose. Synonym for double-round nose. *Long.*

fulls. Full boxes, cars, tubs, wagons, or trams. *Mason.*

full-seam mining. A mining system, brought on by the advent of mechanical loading and mechanical coal cleaning, in which the entire section is dislodged together and the coal separated from the rock outside of the mine by the cleaning plant. *Kentucky, p. 180.*

full size. *See* full gage; full-hole size. *Long.*

full subsidence. The greatest amount of subsidence which can occur as a result of mine workings. *See also* percentage subsidence. *Nelson.*

full teeter(in). A condition of teeter in which the maximum degree of fluidization of the suspension is attained but without disruption of the bed. *B.S. 3552, 1962.*

full-tide cofferdam. A cofferdam which is sufficiently high to hold back tidal water from an excavation at all states of the tide. *Ham.*

full trailer. A towed vehicle whose weight rests entirely on its own wheels or crawlers. *Nichols, 2.*

full-trimmed mica. Rifted mica trimmed on all sides with all cracks and cross grains removed. *Skow.*

full trimmer. *See* rifter-trimmer. *D.O.T. Supp.*

full-wave rectifier. A rectifier which changes single-phase alternating current into pulsating unidirectional current, utilizing both halves of each cycle. *Coal Age, 1.*

fully developed mine. In coal mining, a mine when all development work has reached the boundaries and further extraction will be done on the retreat. *Bureau of Mines Staff.*

fully fixed. Applied to a member of a structural frame which has a fixed end. *Ham.*

fulminate. a. An explosure compound of mercury, $HgC_2N_2O_2$, which is employed for the caps or exploders, by means of which charges of gunpowder, dynamite, etc., are fired. *Fay.* b. To make a sudden loud noise; to detonate; to explode. *Webster 3d.* c. A salt of the highly explosive fulminic acid. *Sandstrom.*

fulminic acid; isocyanic acid; carbonyl oxime; carbyl oxime. $C{=}N.OH$; molecular weight, 43.02; unstable volatile compound; an unpleasant odor; and it polymerizes easily. The silver and mercury salts are used as explosives. *Bennett 2d, 1962; CCD 6d, 1961.*

fuloppite. Lead sulfantimonide, $2PbS.3Sb_2S_3$; monoclinic. A lead gray, bright metallic mineral sometimes with a bluish or bronzy tarnish; found in Romania and Hungary. *Mineralogical Magazine, v. 22, No. 134, September 1931, p. 620.*

fulvurite. Synonymous with brown coal or lignite. *A.G.I. Supp.*

fumarole. a. A hole in a volcanic region, from which gases and vapors issue at high temperature. *Webster 3d.* b. The exhalation from a fumarole consists of water vapor, nitrogen, hydrogen, free hydrochloric acid, hydrofluoric acid, and silicon fluoride. *Compare* solfatara; mofette; soffioni. *Fay.* c. A hole or a vent from which fumes or vapors issue; a spring or a geyser which emits steam or gaseous vapor. Usually found in volcanic areas. *A.G.I.*

fumarolic. Of or pertaining to fumaroles or vents near volcanoes from which volcanic gases escape. *Bateman.*

fume. a. The gas and smoke more especially the noxious or poisonous gases given off by the explosion or detonation of blasting powder or dynamite. The character of the fume is influenced largely by the completeness of detonation. The degree of confinement of the charge and the size of the detonator has a great influence on the character of the fumes produced. *Fay.* b. Consists of metals or metallic compounds that have been volatilized at the high temperatures of the furnaces, condensed at lower temperatures, and carried by furnace gases into the flues. Sulfur trioxide and elemental sulfur, driven off from furnaces and condensed, are also classed as fume. In general, all the volatile constituents of the ore charge are represented. The fume frequently contains appreciable amounts of silver, which is decidedly volatile under certain conditions. The particles of fume are very fine and are under the stress of certain physical forces, so they do not settle easily, as most of the flue dust does, but in large proportion, pass through the stack with the gases and spread over the surrounding country, unless special preventive methods are used, as is now generally done. *See also* metallurgical fume. *Fay.* c. Air carrying certain chemical contaminents of very small size ranging from one tenth to one micron in diameter. *Strock, 10.*

fume cloud. Used chiefly in Hawaii to denote a vapor cloud that rises from a lava fountain, a lava flow, or a lava lake. *USGS Bull. 996-B, 1953, pp. 50-51.*

fume cupboard. Synonym for fume hood. *Long.*

fumed silica; carbon white; silica white. Very finely divided silica. *Bennett 2d, 1962 Add.*

fume hood. A canopy or glass-door cabinet through which a strong draft of air is pulled to collect and carry away the noxious fumes or gases evolved in the process of salvaging worn diamond bits by dissolving the bit-crown metal with an acid or by an electrolytic method. Also called fume cupboard. *Long.*

fumes. Usually smoke from an explosion. *Nichols.*

functional depreciation. The replacement of plant or equipment because of (1) obsolescence through improvement in technology, (2) cessation of the demand the structure was designed to serve, or (3) inadequacy of the plant. *Hoov, p. 148.*

fundamental. A term applied to the oldest known rocks. *Gordon.*

fundamental complex. *See* basement complex. *Fay.*

fundamental fault zone. A zone of faulting within an orogene separating zones of different structural composition. *Schieferdecker.*

fundamental form. Synonym for unit form. *A.G.I Supp.*

fundamental frequency. The lowest component frequency of a periodic quantity. *ASM Gloss.*

fundamental jelly. Structureless colloidal jelly which forms the base of coals and assumed to have been produced by the decay of plant materials. *Tomkeieff, 1954.*

fundamental mode of vibration. That mode of a system having the lowest natural frequency. H&G.

fundamental particle. Synonym for elementary particle. *NRC-ASA N1.1-1957.*

fundamental rocks. Those rocks forming the foundation, substratum, basis, or the support of other rocks. Now not used. *Fay; Hess.*

fundamental strength. a. The maximum stress that a substance can withstand, regardless of time, under given physical conditions, without rupturing or plastically deforming continuously. *Billings, 1954, p. 24.* b. The load at which creep begins. *A.G.I.* c. In rock mechanics, it is generally considered to be equivalent to the yield point, for most rock materials. *Bureau of Mines Staff.*

fundamental substance. Same as fundamental jelly; carbohumin. *Tomkeieff, 1954.*

fungus. A plant not possessing roots, stems, or leaves, without chlorophyll, and typically growing on live or dead organic matter made by other plants. The group includes fungi that cause decay, fungi that cause diseases, and common molds. *I.C. 8075 1962, p. 63.*

fungus subterraneus. An old name for elaterite. *Tomkeieff, 1954.*

funicular railway. A railway which negotiates a steep gradient, and where the cars are operated by cables and winches. *Ham.*

funnel. The gate or pouring hole of a mold. *Standard, 1964.*

funnel box. A square funnel forming one of a series of gradually increasing size, for separating metal-bearing slimes according to fineness. *Standard, 1964. See also* spitzkasten. *Fay.*

funnel brick. Funnel shaped fire clay piece used in the bottom-pour ingot assembly to lead metal to the fountain brick. *See also* bottom-pour ingot assembly. *Bureau of Mines Staff.*

funnel intrusion. Synonym for lopolith. *A.G.I.*

funnel joint. A joint in a system of joints that are more or less concentrically arranged about some center and the joints dip toward the center. *A.G.I.*

funnel pluton. A pluton having the general shape of an inverted cone. Most funnel plutons consist of layered gabbroic rocks. *G.S.A. Mem. 5, 1937, p. 92.*

funnel sea. A gulf or bay, which is narrow at its head and wide at its mouth and which deepens rapidly from its head to its mouth. It resembles a funnel split lengthwise. For example, the Gulf of California, the Bay of Biscay, and the Bay of Fundy. *A.G.I.*

fun-tso-ka. Coolies cooperatively working tin mines or other projects, in Malaya. *Hess.*

fur; furring. Eng. A deposit of chemical salts and other material (sediment) upon the inner sides of pumps, boilers, etc. *Fay.*

furar. Port. To bore or drill for a blast. *Fay.*

furcate. Branching like a fork; forked. *Webster 3d.*

furfural; furfuraldehyde. When very pure, a colorless mobile liquid; C_4H_3OCHO or OCH:CHCH:CCHO, changes to reddish brown upon exposure to light and air; and has a penetrating odor somewhat similar to that of benzaldehyde. Furfural forms condensation products with many types of compounds; for example, phenol, amines, and urea; soluble in alcohol, in ether, and in benzene; 8.3 percent soluble in water at 20° C; specific gravity, 1.1598 (at 20° C, referred to water at 4° C); melting point, −38.7° C; and boiling point, 161.7° C (at 760 mm.) Used in bituminous or concrete road construction and in the refining of rare earths and metals. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-333.*

furfuraldehyde. *See* furfural. *CCD 6d, 1961.*

furgen. A round rod used for sounding a bloomery fire. *Fay.*

furious cross-lamination. Foreset beds which are themselves crossbedded. Also called doubly cross-laminated. *Pettijohn.*

furlong. a unit of distance that equals one-eighth statute mile; 40 rods; 220 yards; or 201.17 meters. *Webster 3d.*

furnace. a. A structure in which, with the aid of heat so produced, the operation of roasting, reduction, fusion, steam-generation, desiccation, etc., are carried on, or, as in some mines, the upcast air current is heated, to facilitate its ascent and thus aid ventilation. *Fay.* b. Eng. A large coal fire at or near the bottom of an upcast shaft, for producing a current of air for ventilating a mine. *Fay.* c. Anthracite mines formerly were ventilated by a furnace erected at the bottom of an air shaft. Being lighter, the heated column of air rose and the other air taking its place produced the necessary ventilation through the mine. *Korson.* d. Structure in which materials are exposed to high temperatures. Fuels used to maintain this include alcohols, paraffins, gas, coal, hydrogen, electricity, wood and sulfur. A furnace is batch type when its contents are treated in successive charges, and continuous when a stream of material passes through, being changed during transit. The main types are the arc, which uses the heat of an electric arc; the blast furnace, the crucible furnace, a laboratory appliance for heating small charges, or, if large, for melting metals held in bigger crucibles; the induction furnace, heated by electrically induced currents; the muffle, in which the material is placed in a sleeve not in direct contact with the heating atmosphere, so that close control of entering and departing gas is possible; the reverberatory, in which heat developed on the roof is reflected on to a horizontal bed below; the revolving furnace, a horizontal cylinder; a roasting furnace in which material is oxidized, kilned to drive off carbon dioxide or heated to remove moisture. *See also* cupola; converter. *Proyor, 3,* c. Either the combustion space in a fuel burning device or a direct fired air heater. In the latter case, not to be confused with a boiler. *Strock, 10.*

furnace, box. *See* box furnace. *ASTM C286-65.*

furnace brazing. Brazing in a furnace. *ASM Gloss.*

furnace bridge. A barrier of firebricks or an iron-plate chamber filled with water, thrown across the furnace at the extreme end of the fire bars to prevent fuel from being carried into the flues and to quicken the draft by contracting the section of the current of hot gas. *Fay.*

furnace burner unit. Warm air furnace sold integrally with the burner. *Strock, 10.*

furnace cadmia. *See* furnace cadmium. *Bennett 2d, 1962.*

furnace cadmium; furnace cadmia. The zinc-cadmium oxide which accumaltes in the chimneys of furnaces smelting zinciferous ores. *Fay.*

furnace charger. a. A weighing apparatus for feeding into a furnace mouth the proper proportions of ore, fuel, etc. *Standard, 1964.* b. In the iron and steel industry, a laborer who operates a compressed air-driven arm to push stock steel rails into a heating furnace. *See also* charging man. *D.O.T.1.; D.O.T. Supp.*

furnace chrome. A mortar material prepared from finely ground chrome ore, suitable for laying brick or for patching or daubing in furnaces. *HW.*

furnace coal. As applied to anthracite, a formerly used term for broken coal. *See also* anthracite sizes. *Hess.*

furnace, continuous. *See* continuous furnace. *ASTM C286-61T.*

furnace conveyor. The conveyor which moves material through a furnace. *ASA MH4.1-1958.*

furnace gases. *See* gases, furnace. *Hansen.*

furnace holding-the-iron. A condition of the furnace by reason of which it gives much less than normal amount of iron at casting although the feeding may have been regular. The taphole runs iron slowly, and the amount of cinder is somewhat scanty. *Compare* furnace losing-the-iron. *Fay.*

furnace linings. Refractory materials used to protect the walls of the furnace from reaction with its molten contents (abrasive, melting or chemical). Three divisions are (1) acid refractories rich in silica (flint, ganister, fire clay), which react with basic oxides; (2) neutral refractories (chromite, graphite) and, (3) basic refractories, rich in oxides of calcium and magnesium, and low in silica. *Pryor, 3.*

furnace losing-the-iron. Escape of iron from the hearth of a blast furnace into the foundation beneath, indicated by decreased quantity of iron at casting, and appearance of slag at tapping hole. *Fay.*

furnace magnesite. A mortar material prepared from finely ground dead-burned magnesite, suitable for use as a joint material in laying magnesite brick, and for patching or daubing furnace masonry. *HW.*

furnaceman. One whose sole occupation is to attend a furnace. *Fay. See also* teaser.

furnace, porcelain enameling. The types and capacities of enameling furnaces are numerous. Among those in use are the continuous, box, fullmuffle, and semimuffle furnaces. Fuels commonly used are coal, gas, oil, and electricity. Used for properly fusing enamel on enamel ware at the temperature specified and in the time required. *Hansen.*

furnace refining. Purification of molten metal by treatment in a reverberatory furnace; term is most commonly used in connection with the refining of copper. *Bennett 2d, 1962.*

furnace repairman. *See* bricklayer. *D.O.T.1.*

furnace run-out table. *See* run-out table. *ASA MH4.1-1958.*

furnaces. *See* box furnace; continuous furnace; continuous tank furnace; direct-fired furnace; end-fired furnace; end-port furnace; pot furnace; recuperative furnace; regenerative furnace; semimuffle furnace; side-fired furnace; side-port furnace; tube furnace; U-type furnace. *ACSG, 1963*.

furnace sand; fire sand. Sand used to line furnace bottoms or walls, particularly in open-hearth steel furnaces. *CCD 6d, 1961*.

furnace shaft. An upcast shaft used in mine ventilation where a furnace is employed. *Fay*.

furnace sprayer. In ore dressing, smelting, and refining, a laborer who sprays the inner surfaces of furnace walls and roof with slurry of silica, water, and fireclay to protect brick, using compressed-air gun. Also called slurry man; sprayer. *D.O.T. Supp*.

furnace stack. A chimney built over a furnace for increasing the draught. *Fay*.

furnace ventilation. A ventilation system of the earlier days of mining whereby a large coal fire was kept burning in a furnace near the bottom of the upcast shaft. The fire heated and thus reduced the density of the air with the result that the colder and heavier air column in the downcast shaft flowed downwards into the workings and thus a measure of ventilation was established. *Nelson*.

furnace volume. The cubic contents of the combustion space of a boiler bounded by the grates, direct heating surface, and tube sheet. *Strock, 10*.

furnacite. Same as fornacite. *English*.

furnisher. A man who furnishes money or machinery to a party of miners, and so becomes entitled to a share of the profits. *Fay*.

furreners; foreigners. Dark, ovoid inclusions of country rock in granite. Same as heathen. *Arkell*.

furring. A method of finishing the inside of a masonry wall so as to provide an air space for insulation, to prevent transmittance of moisture; and to level up irregularities in the wall surface. It may consist of wood or metal strips attached to wall to which lath is applied or clay tile units to which plaster is applied directly. *ACSG*.

furring brick. Hollow brick for lining or furring the inside of a wall. Usually of common brick size, with surface grooved to take plaster. *Fay*.

furring tile. Tile for lining the inside of walls and carrying no superimposed loads. *ASTM C43-65T*.

furrow. a. A marking made by glaciers or by faulting. A plowed depression of linear dimesions, but wider than a line, and hollowed out by the removal of material. *Stokes and Varnes, 1955*. b. A scratch or a groove resulting from the digging out of material, as on a fault surface. *A.G.I.* c. A relatively narrow but sharp downwarp. A true geosyncline, part of the welts and furrows or the geanticlinal-geosynclinal couples. *A.G.I.* d. An elongated depression in the earth's crust of a depth excessive in comparison to the ordinary, more or less equidimensional depressions of the ocean floors and the continental platforms. *A.G.I.* e. A depression between beach ridges. Also called a swale or a slash. *A.G.I.*

furrow cast. a. An impression on the underside of a sedimentary rock layer of a furrow in the surface of the underlying bed. *A.G.I. Supp.* b. Rill mark and load-casted longitudinal ripple mark according to some authors. *See also* furrow flute cast. *Pettijohn*.

furrowed. Having deep grooves or striations. *Shipley*.

furrow flute cast; delicate flute cast; sludge cast; rill mark. Cast of furrowlike depressions, with up current noses similar to flute casts, but differ in being much longer and separated from parallel, adjacent furrows by narrow septa which appear as grooves in the cast. If the up current terminations are missing, the structure is called a furrow cast. *Pettijohn*.

furtherance. a. In coal mining, extra payment in respect of abnormal working conditions, or made for performance of extra duties. *Pryor, 3*. b. Payment for dead work performed by coal miners. *Bureau of Mines Staff*. c. Newc. An extra price paid to miners when they also haul the coal. *Fay*.

fusain. a. This term was introduced by Grand'Eury in 1882. It is recognized macroscopically by its black or gray-black color, its silky luster, its fibrous structure and its extreme friability. It is the only constituent of coal which marks and blackens objects with which it comes in contact. Fusain may include a high proportion of mineral material, which strengthens it and reduces its friability; it retains, however, its silky luster. In macroscopic description of seams, only those bands having a thickness of several millimeters are recorded. Microscopic examination shows that fusain consists in the main of fusite. Fusain occurs as wide bands and lenses in almost all humic coals. It is widely distributed, but not abundant. *IHCP, 1963, part I*. b. The term was first used in the United States by J. J. Stevenson as a synonym for mineral charcoal. In the Thiessen-U.S. Bureau of Mines system, fusain is a component with a minimum band width of 37 microns. Microscopically, fusain closely resembles wood charcoal, usually being soft, friable, and black, and disintegrating readily into a black powder when roughly handled. A hard variety exists, impregnated with mineral matter. Examined microscopically in thin sections fusain is usually opaque (black) although in very thin sections it may be slightly translucent and dark red in color. It frequently shows well-preserved plant cell structure in which the lumens may be empty or may be filled with mineral matter. As by definition fusain must have a minimum thickness of 37 microns, fragments of fusinite less than 37 microns are counted as opaque attritus. Fusain occurs as microscopically fine inclusions, but also in much grosser form as bands and lenses up to 15 to 20 centimeters thick and 3 to 4 meters or more long (lenses). It is widely distributed in the humic coals of the Carboniferous but only in small quantities. *IHCP, 1963, part I*. c. Coal material having the appearance and structure of charcoal. It is friable, sooty, generally high in ash content, and consists mainly of fusite. *A.G.I. Supp.*

fusainization; fusainisation. The formation of fusain. *Tomkeieff, 1954*.

fuse. a. A core of black powder wrapped with hemp or cotton threads or tape, with various waterproofing compounds between each, or on the outside, to provide a uniform burning speed of the powder core for the firing of explosives, either with or without a blasting cap. *Fay*. b. Any of various devices, as a tube, casing, cord, or the like, filled or impregnated with combustible matter, or a kind of detonator, by means of which an explosive charge is ignited. *Webster 2d*. c. A tube containing a compound designed to burn at a regulated linear speed, and in so doing to convey heat into an explosive charge. The miner's safety fuse, invented by Bickford in 1831, is either slow or instantaneous. In it a fabric cover encloses a train of combustible material. The detonating fuse (Cordeau dentonant) is trinitrotoluene in a thin lead sheath, and has a burning speed of 17,000 feet per second. Cordtex and Primacord are wrapped in textile, and have a speed of 20,000 feet per second. These high speeds have special value in simultaneous firing right through the charge. Electric fuse is of wire, melting when excessive current passes through the circuit in which it is incorporated, thus cutting off the supply of electricity and preventing further damage through overload or overheating. *Pryor, 3*. d. A slow-burning train of powder used in blasting operations. *Hudson*. e. Can. Casing prepared with combustible materials by which dynamite is detonated. Fusing is term applied to lighting fuse. Also called spitting. *Hoffman*. f. *See* detonating fuse; safety fuse. *B.S. 3618, 1964, sec. 6*. g. An overcurrent protective device with a circuit-opening fusible member directly heated and destroyed by the passage of overcurrent through it. *U.S. Bu. Mines Fed. Mine Safety Code-Bit. Coal & Lignite Mines, Pt. I Underground Mines, Oct. 8, 1953*. h. To liquefy by means of heat; to melt. *Kinney*.

fuse auger. An instrument for regulating the time of burning of a fuse by removing a certain portion of the composition. It has a moveable graduated scale which regulates the depth to which the auger should penetrate. *Standard, 1964*.

fuse blasting cap. A small cylinder of copper, closed at one end and charged with a fulminate. The end of the fuse is inserted in this cap, for firing a charge. *Stauffer*. *See also* detonator.

fuse cutter. In metal mining, one who cuts blasting fuse to standard lengths; inserts fuse in open end of detonators or caps, and attaches it by squeezing the open ends with a pair of crimpers (special pilers). *D.O.T.1*.

fused alumina. Aluminum oxide, Al_2O_3. *Bureau of Mines Staff*.

fused-alumina brick. Refractories composed mainly of electrically fused alumina. *Bureau of Mines Staff*.

fused aluminas. Are usually produced by heating a mixture of calcined bauxite coke and iron borings to above 3,600° F in an electric arc furnace. Some TiO_2 may be added to increase grain toughness. Tabular and fused aluminas are available in grain sizes from one-half inch to minus 325 mesh. *Lee*.

fused bath electrolysis. Extraction of metals by electrolytic decomposition of their fused salts; extraction of metals from electrolytically decomposable compounds dissolved in substances inert under the conditions of electrolysis. *Bennett 2d, 1962*.

fused beryl. Same as beryl glass. *Shipley*.

fused-cast brick. Electrocast brick. *Bureau of Mines Staff*.

fused-cast refractories. Refractories formed by electrical fusion followed by casting and annealing. *HW.*

fused cement. *See* aluminous cement. *Hess.*

fused electrolyte. Molten compound which conducts and is decomposed by electricity; used in the manufacture of such metals as aluminum, magnesium, sodium, and calcium. *Bennett 2d, 1962.*

fused magnesia. Fused electric furnace magnesia, not subject to grain growth. *Bureau of Mines Staff.*

fused nip. A terminal connection, with a fuse, used on portable electrical mining machinery. *Grove.*

fused quartz; quartz glass. A term commonly used to denote the transparent form of silica glass made from clear pieces of quartz as contrasted to fused silica by which is ordinarily meant the translucent or nearly opaque forms made from quartz sand. *Hess.*

fused refractories. Refractories in which the constituents are held together by heating either to the point of fusion or coalescence. *Henderson, p. 265.*

fused-salt reactor. A type of reactor that uses molten salts of uranium for both fuel and coolant. *L&L.*

fused salts. Salts, that is, ionic compounds, in the molten state. High temperatures are usually involved in maintaining the molten state. Sodium chloride is the principal ingredient in many fused salts. Used in the production of alkali metals and other metals by electrolysis, aluminum, calcium, sodium, magnesium, titanium, zirconium, columbian (niobium), and tantalum; as a base for circulating liquid fuels in nuclear reactors; in fluxing and descaling metals; and as heat-transfer agents. *CCD 6d, 1961.*

fused silica. *See* silica glass. *VV.*

fused stone. a. Any gem substitute produced by means of fusion; especially synthetic stone or glass. *Shipley.* b. An assembled stone such as soldered emerald. *Shipley.*

fused trolley tap. A specially designed holder with enclosed fuse for connecting a conductor of a portable cable to the trolley system or other circuit supplying electric power to equipment in mines. *ASA C42.-85:1956.*

fuse gage. An instrument for cutting time fuses to length. *Standard, 1964.*

fusehead. That part of an electric detonator consisting of twin metal conductors, bridged by fine resistance wire, and surrounded by a bead of igniting compound which burns when the firing current is passed through the bridge wire. *B.S.3618, 1964, sec. 6.*

fuse lighter. A device for facilitating the ignition of the powder core of a fuse. One form is in the shape of a carpet tack covered with a powder composition; another form is in the shape of a cord, which when ignited burns and maintains a "coal of fire" in contact with the exposed powder in the fuse. *Fay. See also* cheese stick. *South Australia, p. 40.*

fuse lock. A friction lock by which a miner may fire the free end of a blasting fuse by a lanyard. *Standard, 1964.*

fuseplug. a. A plug fitted to the fuse hole of a military projectile to hold the fuse. *Webster 3d.* b. A fusible plug that screws into a receptacle, used as a fuse in electrical wiring. *Fay.* c. A plug of fusible metal inserted in a steam boiler so as to prevent any danger that might arise from overheating due to low water. *Fay.*

fusibility. The quality of being fusible or convertible from a solid to a liquid by heat. *MacCracken.*

fusibility, coal ash and coke ash. The characteristic points of fusibility of a specimen prepared and heated under standard conditions are deformation temperature, hemisphere temperature, and flow temperature. *B.S. 1016, 1961, Pt. 16.*

fusibility of clay. The temperature at which sufficient of its ingredients have fused to cause the whole mass to lose its shape. This is really the softening temperature. *Nelson.*

fusibility scale. A list of minerals arranged in the order of their fusibility. The fusibility scale of von Kobell is: (1) stibnite; (2) natrolite; (3) almandite; (4) actinolite; (5) orthoclase; and (6) bronzite. *Fay.*

fusible. Capable of being fused; especially, capable of being liquefied by heat. *Webster 3d.*

fusible alloys. Alloys which will melt at definite low temperatures. *Crispin.*

fusible metal. Any alloy, usually one containing bismuth, which melts at a comparatively low temperature. *Standard, 1964.*

fusible plug. An insert of metal with low melting point placed in boilers, sprinklers and other devices to melt when the temperature becomes dangerously high, so that the melting will relieve pressure, allow water flow, or otherwise tend to alleviate the dangerous condition. *Strock, 10.*

fusible porcelain. Same as cryolite glass. *Standard, 1964.* Also called hot-cast porcelain. *Fay.*

fusible quartz. Eng. A term occasionally applied by the older mineralogists to obsidian. *Fay.*

fusiform. Shaped like a spindle, tapering toward each end. *Webster, 3d.*

fusiform bomb. A type of rotational volcanic bomb shaped like a spindle and usually bearing an ear at each end. Synonym for spindle-shaped bomb. *A.G.I.*

fusing point. The degree of heat at which any substance begins to melt or liquefy. *Hansen. See* also melting point.

fusinite. a. A constituent showing well-defined cellular structure of wood or sclerenchyma. The cell cavities vary in size and shape—round, oval, or elongated. Bogen structure is common. Occurs as discrete lenses, thin partings or bands, and as small dispersed fragments; is widely distributed; common. The physical and chemical properties of fusinite vary only slightly in coals of different rank, and consequently its technological properties are fairly constant. *IHCP, 1963, part I.* b. The major maceral, or micropetrologic constituent of fusain. It consists of wood (xylem or lignified tissue) of which very little is left but woody tracheids or thick-walled elements so highly carbonized as to contain only traces of ulmins. A member of the inertite group. *A.G.I.; A.G.I. Supp.*

fusinito-collinite coal. This type of coal consists of more than 50 percent of material (micrinite) which is opaque or only semitranslucent in transmitted light. Gelified microcomponents are present in only small quantities. Components with recognizable form are mainly microspores and occasional megaspores. Fusinized tissue is rare. Hand specimens of this type of coal are black, homogeneous in appearance, and break with a block fracture. The coal has low ash. Fusinito-collinite coal occurs as thin bands in seams of different geological age, is noncaking, and is used, like other fusinitic types of coal, as fuel. *IHCP, 1963, part I.*

fusinito-posttelinite coal. This coal consists of more than 50 percent of relatively fine, more or less fusinized fragments of tissues exhibiting weakly defined cell structure or complete lack of structure. It may also contain subordinate microcomponents of the vitrinite and liptinite groups. Hand specimens are black and matt, very friable, and of fibrous structure. The ash is always low. Fusinito-posttelinite coal occurs in seams of different geological age, and is particularly common in the lower Jurassic in beds up to one meter or more thick. These coals are noncaking and are chiefly used as fuels in briquette form. *IHCP, 1963, part I.*

fusinito-precollinite coal. This coal consists of more than 50 percent of an accumulation of very fine, virtually structureless, fragments of tissue more or less fusinized which appear in transmitted light as a semitranslucent or opaque micrinite groundmass. Coarse fragments of tissue are rare. Because they are closely packed the more or less opaque microcomponents form a dark background when viewed in thin section. Numerous microspores and cuticles, as well as scattered resin bodies, platelike cells from cortical tissue, streaks of translucent collinite and fine inclusions of gelified structured components show up well against the dark background. Hand specimens of this type of coal are black and matt or semimatt, homogeneous, or finely striated with a fibrous structure; the ash is low. Fusinito-precollinite coal occurs in seams of different geological age and is particularly common in the lower Jurassic as beds up to 1 meter thick. It is a noncaking coal and is used chiefly as fuel in briquette form. *IHCP, 1963, part I.*

fusinito-telinite coal. This type coal consists of more than 50 percent of coarse stem and rhizome tissues which have been metamorphosed into fusinite and semifusinite, and show well-defined cell structure. By transmitted light it is reddish brown to dark brown or black. The fragments of stem tissue are generally closely packed forming, as it were, aggregates. In a number of instances fusinito-telinite is bounded by bands of vitrite; occasionally it is embedded in a homogeneous groundmass (collinite). Isolated microspores, cuticles and resin bodies also occur in this type of coal. The parent material of this type of coal was wood tissue. Hand specimens are black and matt, rather friable and soft, with a distinctive fibrous structure. Fusinito-telinite coals invariably have low ash and occur in seams of any geological age, being particularly common in the lower Jurassic in seams up to 100 meters thick. These coals are noncaking and are used chiefly as fuels in briquette form. *IHCP, 1963, part I.*

fusinization. The process in coalification which results in the formation of fusain. *See also* coalification. *Compare* incorporation; vitrinization. *A.G.I.*

fusinoid. Fusain and similar material in coal. *A.G.I. Supp.*

fusion. a. The act or the process of liquefying or rendering plastic by heat. The transition of a substance from the solid state to the liquid state. Synonym for melting. *Webster 3d.* b. The quality or state of flowing induced by this process. A union by melting. A combination of ingredients achieved by heating and mixing together. For example, cement is a fusion formed from exact proportions of shale and limestone. *Webster 3d.* c. The union of atomic nuclei to form heavier nuclei, resulting in the release of enormous quantities of energy when certain light elements unite, as in the combination of heavy-hydrogen nuclei to form helium nuclei that takes place in the sun or in a hydrogen bomb. Also called nuclear fusion. Contrasted with fission. *Webster 3d.*

fusion button test. *See* button test. *ACSB-3.*

fusion cast basalt. An abrasion resistant material made by fusing natural basalt and casting the molten material into molds to form blocks. Having a Mohs' hardness of 8 to 9 and a crushing strength of 70,000 pounds per square inch, these blocks can be used for industrial flooring and also, the lining of bunkers, chutes, and other equipment where abrasion is severe. *Dodd.*

fusion casting. A process for the manufacture of refractory blocks and shapes of low porosity and a high degree of crystallinity; the refractory batch is electrically fused and, while molten, is cast into a mold and carefully cooled. The usual types of fusion cast refractory are those consisting of mullite, corundum, and zirconia, in various proportions; such refractories find considerable use as tank blocks for glass-melting furnaces. *Dodd.*

fusion flow. The relative flow of various glasses or frits in the molten state. *ASTM* C286-65.

fusion flow test. A method for the evaluation of the fusion flow properties of a vitreous enamel or of a glaze. *Dodd.*

fusion method. A method used to remove certain impurities from diamond concentrate with a particle size of 0.5 to 1.0 millimeter. The material, mixed with 10 times its weight of flake caustic soda, is placed in crucibles and put in a furnace where a temperature of 650° C is maintained for 45 minutes. After furnacing, the material is rinsed to remove the caustic soda and boiled in a glass beaker containing a solution of 1 part hydrochloric acid and 4 parts water. After further rinsing, the diamond, free from satellites, is dried on a hotplate. *I.C. 8200, 1964, p. 75.*

fusion of clay. The stage on heating a clay when the material is changed from the solid to the liquid state, but complete liquefaction occurs so gradually with most clays that a fusion range and not a fusion point is obtained. *Nelson.*

fusion piercing. A method of producing vertical blastholes by virtually burning holes in rock. The burning device is essentially a long blowpipe consisting of three tubes equipped with jets at the bottom end. Two of the tubes carry kerosine and oxygen, which, when jetted together and ignited, generate a flame having a temperature of about 4,000° F. This flame is directed downward against the rock, superheating a circular area. A following jet of water cools the heated rocks causing it to contract and spall, or, if partially molten, to granulate. The resulting steam evacuates the spall from the hole and also keeps the burner from melting. Also commonly, although incorrectly, called jet piercing. *See also* Linde drill. *Long.*

fusion-piercing drill. A machine designed to use the fusion-piercing mode of producing holes in rock. Sometimes incorrectly called a jet drill. Also called Linde drill. *See also* fusion piercing. *Long.*

fusion point. The temperature at which melting takes place. Most refractory materials have no definite melting points, but soften gradually over a range of temperatures. *HW.*

fusion tectonite. Igneous rock consolidated from a flowing magma. *G.S.A. Mem. 6, 1938, p. 40.*

fusion test. *See* pyrometric cone equivalent; button test. *A.R.I.*

fusion test, button. *See* button test. *ASTM C286-65.*

fusion welding. Welding, without pressure, in which a portion of the base metal is melted. *ASM Gloss.*

fusion zone. The area of base metal melted as determined on the cross section of a weld. *ASM Gloss.*

fusite. a. In 1955 the Nomenclature Subcommittee of the International Committee for Coal Petrology resolved to use this term for the microlithotype consisting principally of the macerals fusinite, semifusinite and sclerotinite. Two varieties of fusite are distinguishable—a fragile and powdery fusite and hard consolidated fusite in which the cavities are filled by various minerals, carbonates, sulfides, kaolin, and other clay minerals. Widely distributed, but in general not abundant. Occurs in fine bands and lenses of varying thickness. The soft variety of fusite concentrates in the very fine particle sizes. Hard fusite distributes itself in various sizes (depending on the thickness of the original bands or lenticles in the seam), but not in the fines. This form of fusite is usually discarded in the middlings and refuse. *IHCP, 1963, part I.* b. A coal microlithotype containing 95 percent or more fusinite, plus semifusinite, plus sclerotinite. *Schieferdecker; A.G.I. Supp.* c. Synonym for fusain. *A.G.I. Supp.*

fusitoid. A fusitlike material found in dull coal in patches and streaks. *Tomkeieff, 1954.*

fusoclarain. A coal rock type consisting of the macerals fusinite and vitrinite, and it may contain all other macerals. Fusinite is present in a smaller quantity than in clarofusain. *Compare* clarofusain. *A.G.I.*

fusoclarite. A type of coal intermediate between fusite (predominating) and clarite. *Tomkeieff, 1954.*

fusodurain. a. Durain in which much of the microconglomeratic elements consist of fusain. *Compare* durofusain. *A.G.I.* b. Judged obsolete by the Heerlen Congress of 1935. *A.G.I.*

fusotelain. a. Coal consisting of a mixture of telain with minute inclusions of fusain. *Compare* telofusain. *A.G.I.* b. Accepted by the Heerlen Congress of 1935 to designate material transitional between telain and fusain with telain being predominant. *A.G.I.*

fusovitrain. a. Preferred. Coal consisting of material transitional between fusain and vitrain with vitrain being predominant (Heerlen Congress of 1935). *Compare* vitrofusain. *A.G.I.* b. Coal consisting of a mixture of vitrain with fusain fragments. *A.G.I.*

fusovitrite. A type of coal intermediate between fusite (predominating) and vitrite. *See also* fusoclarite. *Tomkeieff, 1954.*

fusuline; fusulinid. a. Any of an important group of extinct, marine, one-celled animals (class Sarcodina, phylum Protozoa) that have left an extensive fossil record for late Paleozoic time. Owing to their small size, they are easily recovered from well cuttings and have proved to be of great value in the correlation of sedimentary rocks. *Stokes and Varnes, 1955.* b. Any fossil belonging to one of the several genera of the Fusulinidae; a foraminifer shaped like a grain of wheat. Fusulinids are important index fossils, or guide fossils, in the Pennsylvanian and Permian systems. *A.G.I. Supp.*

Futuran. A trademark name for a phenol aldehyde plastic; used as imitation amber. *Shipley.*

future ore. *See* possible ore. *Forrester, p. 554.*

fuze. Pronounced as though spelled "fuzee." Originally the device used for exploding the charge in a projectile and later used as a designation for an electric blasting cap. Now known as an electric blasting cap. A variation of fuse. *Fay.*

fuzze. Eng. Straws, reeds, or hollow vegetal substances filled with powder. *See also* fuse, a. and b. *Fay.*

fuzzy texture. A defect characterized by a myriad of minute bubbles, broken bubbles, and dimples in the porcelain enamel surface. *ASTM C286-65.*

fv Abbreviation for fluid volume. *BuMin Style Guide, p. 59.*

Fyrite. A trade name for a portable instrument for measuring the carbon dioxide content of air. The air, particularly flue gas, is pumped into the instrument by a rubber bulb, is trapped, and the Fyrite is turned bottom-side up and back again. This causes a solution of caustic soda to mix with the gas sample and combine with the CO_2, causing a decrease of gas volume so that the fluid is drawn up into a graduated tube in a quantity proportionate to the CO_2 absorbed, and the percentage of CO_2 can be read directly from a scale. *Hess.*

G

g a. A unit of force applied to a body at rest equal to the force exerted on it by gravity. One of several such units applied to a body when accelerated; for example, when an airplane pulls out of a dive or makes a sharp turn. *Webster 3d.* b. (1) Abbreviation for gravity; acceleration due to gravity; acceleration of gravity. *GPO Style Manual, 1. 157; Zimmerman, pp. 51, 129.* (2) Designation for gravity in formulas. *A.G.I.* c. Abbreviation for gram. *BuMin Style Guide, p. 59.* d. Abbreviation for grain in weight. *Webster 3d.* e. Abbreviation for gage (or gauge). Also abbreviated G. *Zimmerman, p. 49.* f. Abbreviation for gauss. *Webster*

3d. g. Abbreviation for gilbert. *Zimmerman, p. 50*. h. Abbreviation for gilt, group. *Webster 3d*. i. As a subscript, the symbol for saturated vapor; dry saturated vapor. *Zimmerman, pp. 94, 115*. j. Symbol for radius of wire. *Zimmerman, p. 120*. k. Symbol for osmotic coefficient. *Zimmerman, p. 77*.

g a. Symbol for gravity; standard gravity of the atmosphere; gravitational acceleration; acceleration due to gravity; acceleration of gravity. The acceleration of gravity equals 980.665 centimeters per second per second, or per second squared ($cm\ sec^{-2}$). The acceleration of free fall is represented by the symbol $-g$ (minus g). *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99; Zimmerman, pp. 145, 150, 174*. b. Symbol for electric conductance. *Zimmerman, pp. 152, 154*. c. Symbol for Gibbs' function (or thermodynamic potential); Gibbs' function per atom; Gibbs' function per molecule; Gibbs' function per mole; Gibbs' function per unit mass. *Zimmerman, pp. 157, 174*.

G a. Symbol for gravity; acceleration due to gravity; gravitation constant; Newtonian gravitational constant. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-97; Zimmerman, pp. 197, 204*. b. Abbreviation for gram. *Zimmerman, p. 204*. c. Abbreviation for gas. *Zimmerman, p. 49*. d. Abbreviation for gold, but the chemical symbol Au is generally used. *Webster 3d*. e. Abbreviation for gravel. *Zimmerman, p. 51*. f. Symbol for conductance; electric conductance. *Zimmerman, p. 28*. g. Abbreviation for the prefix giga- which multiplies the basic unit that follows by 1 billion or by 10^9. *BuMin Style Guide, p. 62*. h. Abbreviation for Greenwich (England) time, which is the time at the Prime Meridian. *Zimmerman, pp. 51, 386*. i. Abbreviation for glass. *Zimmerman, p. 214*. j. Abbreviation for gulf; Gulf. Also abbreviated g. *Webster 3d*. k. Symbol for total sediment discharge. *Zimmerman, p. 36*. l. A phase designation in earthquake seismology and which is applied to Love waves of very long period (from 25 seconds to several minutes), which, when detectable, are the first (fastest) surface waves on seismograms of distant earthquakes. *A.G.I.* m. Symbol for modulus of elasticity in shear. *Zimmerman, pp. 40, 70*. n. Symbol for mass velocity. *Zimmerman, p. 115*. o. Abbreviation for generator. *Zimmerman, p. 50*. p. Symbol for diameter of wire. *Zimmerman, p. 120*. q. Abbreviation for grid, grid of a vacuum tube. *Zimmerman, pp. 51, 204*. r. Symbol for Gibbs' function (or thermodynamic potential). Also given as g. *Zimmerman, pp. 50, 108*.

G a. Symbol for gravitational constant; Newtonian gravitational constant. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99; Zimmerman, p. 157*. b. Symbol for specific gravity. *Zimmerman, p. 175*. c. As a subscript, the symbol for gas or vapor. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99; Zimmerman, p. 168*. d. Symbol for gravel. *Zimmerman, p. 340*. e. Symbol for conductance; electric conductance. *Zimmerman, pp. 152, 254*. f. Symbol for total sediment discharge. *Zimmerman, p. 185*. g. Symbol for rigidity; modulus of elasticity in shear; shear modulus of elasticity; shear modulus. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99; Zimmerman, pp. 154, 165, 183, 368*. h. Symbol for mass velocity; mass-flow per unit cross-sectional area per unit time. *Zimmerman, pp. 175, 367*. i. Symbol for Gibbs' free energy; Gibbs' function (or thermodynamic potential); Gibbs' function per mole; total value of Gibbs' function. Also the symbol for Gibbs' function per mole has the subscript *M*, as G_M. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-98; Zimmerman, pp. 145, 157, 170, 174*.

ga Abbreviation for gage (or gauge). *Webster 3d*.

Ga Chemical symbol for gallium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1*.

gab. A hook; specifically, in steam engines, the hook on an eccentric rod, catching on the rockshaft pin, in a valve motion. *Standard, 1964*.

gabbie. Scot. A hook on the end of a chain or rope; a coupling. *Fay*.

gabbro. a. A fine to coarse, dark-colored crystalline igneous rock composed mainly of calcic plagioclase (labradorite or anorthite), clinopyroxene, and sometimes olivine. Magnetite, ilmenite, or both, and apatite are accessory minerals. A gabbro containing an orthorhombic pyroxene is called a norite. *Fay*. b. A granular igneous rock composed of calcic plagioclase, pyroxene, and olivine, is an olivine gabbro. *Bateman*. c. A plutonic rock consisting of calcic plagioclase (commonly labradorite) and clinopyroxene, with or without orthopyroxene and olivine. Apatite and magnetite or ilmenite are common accessories. *A.G.I.*

gabbroid. The texture typical of basic plutonic rocks in which completely allotriomorphic grains dominate the fabric. *Schieferdecker*.

gabbro schist. A gabbroic rock that has been rendered schistose by cataclasis. *See also* flaser gabbro; zobtenite. *A.G.I.*

gabion. A bottomless wicker cylinder or basket, from 20 to 70 inches in diameter and from 33 to 72 inches high; used in engineering, when filled with stones, to form the foundation of a jetty. *Standard, 1964*.

gablack. Derb. *See* gavelock. *Fay*.

gable-bottom car. *See* mine cars. *Lewis, p. 222*.

gable-rake tile. The full-flanged tile used at the verge of open gables. *Fay*.

gable tile. A roofing tile that is half as wide again as the standard tile. Gable tiles are used to complete alternate courses at the verge of a tiled roof. *See also* verge. *Dodd*.

gab lever. A device for disengaging the gab, on the eccentric rod of a steam engine, from the rockshaft. *Standard, 1964*.

gable wall. The charging end wall of a glass-melting furnace. *ASTM C162-66*.

gabronite. A bluish-gray variety of altered wernerite. *Fay*.

gad. a. A steel wedge used in mining. *Gordon*. b. A small, steel wedge used for loosening seamy rock. *Stauffer*. c. A heavy piece of steel, 6 or 8 inches long, with a narrow chisel point for cutting samples, breaking out pieces of loose rock, etc. A moil is a gad with a round point. *Hess*. d. A small iron punch with a wooden handle used to break up ore. *Fay*. e. A metal spike. *Webster 2d*. f. To break or loosen with a gad, as rock. *Webster 3d*. g. A percussion drill; a jumper. *Standard, 1964*.

gadder. In quarrying, a small car or platform carrying a drilling machine, so as to make a straight line of holes along its course in getting out dimension stone. Also called gadding car; gadding machine. *Standard, 1964*.

gadding machine. *See* gadder. *Fay*.

gadget. A tool for holding the stem of a piece of ware which is in course of treatment. *C.T.D.*

gadolinite. A black, greenish-black, or brown, rare accessory mineral, $Y_2Fe''Be_2(SiO_4)_2O_2$. Crystals often prismatic, rough, and coarse; fracture conchoidal or splintery. Brittle; luster, vitreous to greasy. A complex silicate of glucinum, iron, and the yttrium and cerium rare-earth metals. Occurs in pegmatites. Monoclinic; weakly radioactive. *Sanford; Crosby, p. 101; Dana 17*.

gadolinium. A rare silvery-white metallic element; trivalent; and a member of the rare earth group. Only known in combination and obtained from the same sources as europium. Symbol, Gd; hexagonal; atomic number, 64; atomic weight, 157.25; specific gravity, 7.895 and 7.8, depending on form; melting point, 1,312° C; boiling point, about 3,000° C; insoluble in water or reacts slowly with water; soluble in dilute acids; and has the highest neutron absorption cross section of any known element, 46,000 barns. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-111, B-175*.

gadolinium oxide; gadolinia. White; isometric; Gd_2O_3; specific gravity, 7.407 (at 15° C); melting point, 2,330° C; slightly soluble in water; soluble in acids; hygroscopic; and it absorbs carbon dioxide from the air. Purities up to 99.8 percent gadolinium oxide are obtained. Used for nuclear-reactor control rods; neutron shields; catalysts; dielectric ceramics; and special glasses. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-175*.

gad steel. Flemish steel; so called because wrought in gads or wedges. *Fay*.

gae. Scot. A fault, slip, or dike. *See also* gaw, a. *Fay*.

gaffer. The head workman, foreman, or blower of a glass hand shop. *ASTM C162-66*.

gaffer hauler. a. S. Wales. A master hauler. *Nelson*. b. The man in charge of horse or or pony traffic between the face and the mechanical haulageway. *C.T.D.*

gag. a. Eng. An obstruction in the valve of a pump which prevents it from working. *Fay*. b. A fuller used to straighten railway rails. *Webster 3d*. c. Derb. Any piece of timber used temporarily to reinforce other timber until proper timbering can be done. *Fay*. d. Eng. Chips of wood in a shaft bottom, or sump. *Fay*. e. A metal spacer to be inserted, so as to render a floating tool or punch inoperative. *ASM Gloss.*

gagarinite. A hexagonal mineral, $Na_2Ca_2Y_3F_{15}.H_2O$ and $Na_2Ca_2Y_3(F,Cl)_{15}$ for the cryptocrystalline variety and the crystalline variety, respectively; color creamy, in some cases yellowish or rosy; dull to vitreous luster; occurs in albitized granites and associated quartz-microcline veins of one of the granitic massifs of Kazakhstan and in analogous rocks of other regions of the U.S.S.R. Alters easily and is replaced by aggregates of tengerite, synchisite and yttrofluorite. *American Mineralogist, v. 47, No. 5-6, May-June 1962, p. 805*.

gagat; gagath. German name for jet. *Tomkeieff, 1954*.

gagatite. Jetlike coalified plant material preserving cellular structures. *Tomkeieff, 1954*.

gagatization. a. The process of transforming wood into a dense and pitchlike material.

Tomkeieff, 1954. b. Sometimes applied to denote the impregnation, during coal formation, of wood fragments with dissolved products of plant decomposition. Applied, though not very correctly, because gagate or jet originates in a similar way by the saturation of wood with organic substances, primarily hydrocarbons. *Stutzer and Noe, 1940, p. 270.*

gage. a. Spacing of tracks or wheels. *Nichols.* b. The nominal size of an aggregate. It is the minimum size of sieve through which at least 95 percent of an aggregate will pass. *Taylor.* c. The thickness or diameter of sheet or wire. The various standards are arbitrary and differ, ferrous from nonferrous products and sheet from wire. *ASM Gloss.* d. Various instruments used for measuring, indicating, or regulating the capacity, quantity, dimensions, power, amount, proportions, etc., of anything; hence a standard of comparison. *Long.* e. The act or process of accurately measuring the diameter, length, thickness, etc., of an article. *Long.* f. The size, amount, pressure, etc., as determined by a gage. *Long.* g. A guide to determine the size of a thrown pot. *ACSG.*

gage cock. A small cock in a boiler at the waterline, to determine the water level. *Fay.*

gaged brick. a. A brick that has been ground or otherwise produced to accurate dimensions. *ACSG, 1963.* b. A tapered arch brick. *See also* arch brick. *ACSG, 1963.*

gage diameter. The diameter of an object as determined by measurement and/or size as compared to a standard. *Long.*

gage door. A wooden door fixed in an airway for regulating the supply of ventilation necessary for a certain district or number of men. Also called regulator. *Fay.*

gage factor. The percentage change of resistance divided by the percentage strain. For strain gages in common use this amounts to about 2.2. *Isaacson, p. 210.*

gage glass. The glass tube, or pair of flat glass plates, fitted to a water gage to provide a visual indication of the water level in the tank or boiler. *See also* water gage. *C.T.D.*

gage height. The elevation of a water surface above or below a datum corresponding to the zero of the staff or other type of gage by which the height is indicated. *Seelye, 1.*

gage length. The original length of that portion of the specimen over which strain, change of length, and other characteristics are measured. *ASM Gloss.*

gage loss. The diametrical reduction in the size of a bit or reaming shell caused by wear through use. *Long.*

gage pressure. a. Pressure as read on an ordinary spring- or Bourdon-type gage. It is usually expressed in pounds per square inch. It is the absolute pressure minus that exerted by the atmosphere. Its abbreviation is psig (pounds per square inch, gage). *Webster 3d.* b. The pressure at a point in a fluid above that of the atmosphere. *Compare* absolute pressure. *Webster 3d.*

gager. In the iron and steel industry, one who determines whether iron or steel bars, sheets, or wire are being rolled to plant specification, so that the rolls may be adjusted to reduce the metal the desired amount for each pass, using calipers to check the thickness (gage) of the various products. *D.O.T. 1.*

gage, railway. The distance between the inside edges of rails, which varies in different countries, but may be defined as broad, standard, and narrow. *Ham.*

gage ring. a. Scot. A standard ring for measuring buckets of coal or ore. *Fay.* b. A circular metal ring, the inside diameter of which is a specific standard size. Commonly produced in sizes corresponding to the standard outside set diameters of bits and reaming shells. Also called gaging ring. *Long.*

gage saver. *See* dampener, a. *Long.*

gage size. The width of a drill bit along the cutting edge. *Nichols.*

gage stone. Any one of several diamonds set in the crown of a diamond bit in a plane parallel with and projecting slightly beyond the inside and/or outside walls of the bit. *Long.*

gagger. An irregular-shaped piece of metal used for reinforcement and support in a sand mold for metal castings. *ASM Gloss.*

gaging. a. A heap of rubbish placed at the entrance of a disused roadway underground. *C.T.D.* b. S. Staff. A small embankment of slack or rubbish, at the entrance to a heading, to fence it off. *Fay.* c. A measurement of discharge corresponding to a certain stage. *Seelye, 1.* d. The recognized term in the building trade for the addition of an agent to a mix to modify its properties, notably its set. If cement or a gypsum plaster (normal or retarded calcium sulfate hemihydrate, for example) is added to a lime-sand mix to accelerate its set, the latter is known as a gaged lime-sand mix or, more specifically, as a lime-sand mix gaged with cement (or gypsum plaster). Conversely, if lime is added to a cement-sand mix to retard its rate of set, or improve its workability and other properties, the mixture is called a cement-sand mix gaged with lime. *Stowell.*

gaging of cement. The process of mixing cement with water. For the preparation of a cement paste of standard consistency prior to testing, British Standard 12 stipulated that the time of gaging shall be 3 to 5 minutes. *Dodd.*

gaging station. A selected section in a stream channel equipped wtih a gage and facilities for measuring the flow of water; a place on a stream where data is gathered by which continuous discharge records may be developed. *Seelye, 1.*'

gag press straightener. In the iron and steel industry, one who straightens steel rails by operating a gag press. *D.O.T. 1.*

gahnite. a. A green, zinc-bearing spinel, $ZnAl_2O_4$; isometric. *Fay.* b. Synonym for idocrase. *Hey 2d, 1955. See also* zinc aluminate.

gahnospinel. A blue magnesium-zinc spinel containing up to 18.2 percent zinc, approaching gahnite in composition; a gem from Ceylon. *English.*

gaillet; galet; gallet. Belg. A local name in the Borinage district for a coal closely resembling English cannel coal. *Bureau of Mines Staff.*

gailletins. Belg. Round coal. *Fay.*

gain. a. A cutting made in the side of a roadway underground to facilitate the construction of a dam or air stopping. *C.T.D.* b. A notch, mortise, or groove (as in a timber or wall) for a girder or joist. *Webster 3d.* c. A crosscut in coal mining. *Fay.* d. *See* closed joint. *BuMines Bull. 630, 1965, p. 877.* e. The ratio of the output power, voltage, or current to the input power, voltage, or current. *H&G.*

gainey coal; ganey coal. Shrop. A name of coal or coal seam. *Tomkeieff, 1954.*

gain gear. Scot. The movable machinery of a mill; going gear. *Standard, 1964.*

gaiola. Port. A hoisting cage. *Fay.*

gaist. Scot. *See* ghaist; ghost coal. *Fay.*

gaist coal. Scot. *See* ghost coal. *Tomkeieff, 1954.*

gait. a. Eng. A journey or trip. *Fay.* b. Eng. Two buckets of water carried by a yoke on the shoulders. *Webster 2d.*

gaite. Eng. Variation of gate; a road. *Fay.*

gaize. a. A siliceous rock, containing some clay, found in the Ardennes and Meuse Valley, France. It has been used as a pozzolana. *See also* pozzolana. *Dodd.* b. Fine-grained, porous, micaceous sandstone containing much soluble silica. The typical gaize is a variety of the malmstone in the Upper Greensand. *Arkell.*

gal. a. Corn. A hard, rusty gossan. *Fay.* b. A unit of acceleration that equals 1 centimeter per second per second. It is used especially to express values of gravity. The word is not an abbreviation and it should not be confused with the abbreviation for gallon. A milligal is 0.001 gal. *A.G.I.; Webster 3d.* c. Abbreviation for gallon. *BuMines Style Guide, p. 59.*

galactite. A variety of white natrolite occurring in Scotland in colorless acicular crystals. *Fay.*

galalith. A casein plastic of various colors, used in imitations of amber, coral, jet, ivory, and tortoise shell. *Shipley.*

Galatom. Trade name for diatomaceous earth. *Bureau of Mines Staff.*

galaxite. A black manganese aluminate, $MnAl_2O_4$; minute grains; isometric. A spinel. From Galax, Alleghany County, N.C. *English; Dana 17, p. 601.*

gal d^{-1} Abbreviation for gallons per day. *BuMin Style Guide, p. 59.*

gale. a. Forest of Dean. Land assigned by the Crown for coal mining; royalty paid for this assignment; license. The holder is a galee. *Pryor, 3.* b. The royalty paid in English law for the right to work a mine; also, the right itself. *Webster 3d.* c. A grant of land in English law; also, the land granted. *Webster 3d.*

galeage; galiage. Eng. Royalty from mineral land. *Fay.*

gale alidade. A lightweight compact alidade, with a low pillar and a reflecting prism through which the ocular may be viewed from above. As used by some geologists, it is commonly equipped with the Stebinger drum. *See also* Stebinger drum. Synonym for explorer's alidade. *A.G.I.*

galee. A coal miner having a gale in the Forest of Dean, England. *Standard, 1964.*

galeite. A mineral, $Na_2SO_4.Na(F,Cl)$, trigonal; the same as schairerite, but with a difference in the X-ray pattern, the two perhaps intergrown as a polycrystal. From Searles Lake, Calif. *Spencer 21, M.M., 1958.*

galena; galenite. A lead sulfide, PbS; the commonest ore of lead, containing 86.6 percent lead. Occurs as gray cubic crystals, often associated with zincblende, in mineralized veins. Argentite, silver sulfide, which is isomorphous with galena, may be present to the extent of two or three ounces per ton, but may rise to 1 percent. When freshly broken, galena has a bright silvery appearance, from which it has been called lead glance. Isometric. *Fay; Sanford; A.G.I.*

Galena limestone. A Silurian formation in

Illinois and adjoining states. Named from Galena, Ill. *Webster 2d.*

galenite. Synonym for galena. *Fay.*

galenobismutite. a. A lead bismuth sulfide, $PbS.Bi_2S_3$, containing 27.5 percent lead and 55.4 percent bismuth. It is indistinctly crystalline, also massive, foliated, or radiated. Mohs' hardness, 3 to 4; specific gravity, 6.88 to 7.145. A vein mineral from Nordmark, Sweden. An argentiferous variety from Colorado is known as alaskaite. A seleniferous variety known as selenbleiwismuthglanz, from Falun, Sweden, carries 12.43 to 13.61 percent selenium, and is perhaps $2PbS.Bi_2S.Bi_2Se_3$. *Hess.* b. A lead gray to tin white metallic mineral with a grayish-black streak; $PbS.Bi_3S_3$; Mohs' hardness, 3 to 4; specific gravity, 7.14 to 6.88. *Hess.*

galiage. Royalty. A variation of galeage. *Fay.*

Galitizin-type seismograph. A vertical seismograph consisting of a horizontal beam hinged at one end and weighted at the other, supported by a spring attached below the line connecting the hinge and the center of gravity of the weight in order to lengthen the period (increase the sensitivity) of the system. *A.G.I.*

gall. a. Eng. Rent to the Crown for an area of mineral property. *C.T.D.* b. Scot. A dike. *See also* gaw; gull. *Arkell.* c. Layer of molten sulfates floating upon molten glass in a tank. *Bennett 2d, 1962 Add.*

gallatin. The heavy oil of coal tar used in the Bethell process for the preservation of timber. Also called dead oil. *Standard, 1964.*

galleried cave. A cave in which passages occur at two or more distinct levels. *A.G.I.*

gallery. a. A horizontal or a nearly horizontal underground passage, either natural or artificial. *Stokes and Varnes, 1955.* b. A subsidiary passage in a cave at a higher level than the main passage. *A.G.I.* c. In mining, a level or drift. *Fay.* d. A tunnel or passage in a coal mine. *C.T.D.* e. A drift or adit. In France, it is another name for the heading of a tunnel, usually called advanced gallery. *Stauffer.* f. A subsurface collector for percolating water. *Seelye, 1.* g. A passageway, as in a dam. *Seelye, 1.* h. An underground conduit or reservoir. *Seelye, 1.* i. Underground road. *Mason.*

gallery furnace. A retort furnace used in the distillation of mercury. *Fay.*

gallery of efflux. Eng. A drainage tunnel or adit. *Fay.*

gallery testing. Gallery testing of explosives was developed from investigations which were carried out in the latter part of last century into the causes of colliery explosions. The testing conditions were designed to resemble those existing underground as closely as possible and so the tubular gallery was devised. The standard tests were also developed to reproduce what was considered to be the most dangerous condition, namely, a blownout shot discharging into the most easily ignited mixture of firedamp and air. It was felt that the maximum danger would occur if the flame and hot gases from the explosives were shot into the explosive mixture without having to do any useful work, as the gases from the explosive charge would then be at their maximum temperature and pressure. This test condition is achieved by firing light charges without any stemming and heavier charges with only 1 inch of stemming. *McAdam II, p. 34.*

gallery work. Pottery, especially of a coarse kind. *Standard, 1964.*

galleting. Small pieces of roofing tile bedded in the top course of single lap tiles to give a level bedding for the ridge tiles. *Dodd.*

galleyware; gallyware. Sixteenth century term for the early tin-glazed earthenware; the name derives either from the importation of the ware in Mediterranean galleys or from the use of the tin-glazed tiles in ships' galleys. *Dodd.*

galliard. Eng. Very hard, close-grained gritstone, of which the grains are nearly confluent. *Arkell.*

galliard balls. York. Large ironstone concretions found in sandstone. *Arkell.*

galling; seizing. a. Developing a condition on the rubbing surface of one or both mating parts where excessive friction between high spots results in localized welding with subsequent spalling and a further roughening of the surface. *ASM Gloss.* b. In powder metallurgy, the impairment of the surface of a compact and/or the die parts due to friction. *Rolfe.*

gallite. Grains and inclusions in germanite, renierite, blende, and other ore minerals from Tsumeb, Southwest Africa, contain copper, gallium, and sulfur, and are identical with artificial $CuGaS_2$; tetragonal, related to chalcopyrite. Also from the Kipushi mine, Katanga, Republic of the Congo. The name refers to its being the first mineral with gallium as an essential constituent. *Hey M.M., 1961.*

gallium. A rare metallic element that is widely distributed in nature but occurs only in tiny quantities in any of the minerals that contain it. It occurs in zinc ores, bauxite, and certain iron ores. Gallium is silvery, gray, or bluish-white; orthorhombic; and has the remarkable property for a metal of melting at about 30° C. Used as a backing for special optical mirrors; in high-temperature thermometers; and as a nonpoisonous substitute for mercury in dental alloys. Symbol, Ga; valences, 2 and 3; atomic number, 31; atomic weight, 69.72; specific gravity, 5.907 (at 20° C); melting point, 29.78° C; boiling point, 2,403° C; insoluble in water and in alkalies; and soluble in acids. Gallium, mercury, cesium, and rubidium are the only metals which can be liquid near room temperature. *Rolfe; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-112, B-175.*

gallium arsenide. Dark gray; GaAs; isometric; and melting point, 1,240° C. Used in microwave diodes and in high-temperature rectifiers and transistors. *Lee; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-175.*

gallium oxide. Ga_2O_3; melting point, 1,795° ± 15° C. *Dodd.*

gall of glass. A neutral salt skimmed off the surface of melted crown glass. Also called sandiver. *Fay.*

gallon. The standard gallon of the United States contains 231 cubic inches, or 8.3359 pounds avoirdupois of distilled water at its maximum density and at an air pressure of 30 inches of mercury. The English imperial gallon contains almost exactly 1.2 U.S. gallons. Abbreviation, gal. *Webster 3d.*

galloper. York. Small vein striking off from main vein; not a cross thing or a north vein. *Arkell.*

Galloway boiler. A steam boiler which differs from the Lancashire boiler only in the design of the furnace tubes. *Nelson.*

Galloway sinking and walling stage. *See* sinking and walling scaffold. *Nelson.*

Galloway stage. Multidecked platform suspended near bottom of shaft during sinking. It carries part of the equipment in use and can be raised or lowered as required during blasting, mucking, wall concreting, etc. *Pryor, 3.*

gallows. N. of Eng. A frame propping the roof of a mine consisting of two uprights and a crosspiece. *Standard, 1964.*

gallows frame. a. Eng. The frame supporting a pulley, over which the hoisting rope passes to the engine. *See also* headframe. *Fay.* b. The incorrect term for headframe. *von Bernewitz.*

gallows timber. A timber framework or set for roof support. *C.T.D.*

gallyware. *See* galleyware. *Dodd.*

galmei. Synonym for calamine. *Hey 2d, 1955.*

gal min^{-1} Abbreviation for gallons per minute. *BuMin Style Guide, p. 59.*

gal sec^{-1} Abbreviation for gallons per second. *BuMin Style Guide, p. 59.*

galt; gault; golt. a. Eng. *See* Folkstone marl. *Fay.* b. Firm compact clay; brick clay. *Hess.*

galvanic cell. A cell in which chemical change is the source of electrical energy. It usually consists of two dissimilar conductors in contact with each other and with an electrolyte, or of two similar conductors in contact with each other and with dissimilar electrolytes. *ASM Gloss.*

galvanic corrosion. a. Corrosion associated with the current of a galvanic cell consisting of two dissimilar conductors in an electrolyte or two similar conductors in dissimilar electrolytes. Where the two dissimilar metals are in contact, the resulting reaction is referred to as couple action. *ASM Gloss.* b. The corrosion above normal corrosion of a metal that is associated with the flow of current to a less active metal in the same solution and in contact with the more active metal. *H&G.* c. The corrosion of the anodic (Electronegative) member of the galvanic couple that is related to the galvanic current by Faraday's law. *BuMines Bull. 619, 1964, p. 206.*

galvanic couple. This usually consists of two dissimilar metals in electrical contact with each other and with an electrolyte. *BuMines Bull. 619, 1964, p. 206.*

galvanic electromagnetic methods. Electrical exploration methods in which electric current is introduced in the ground by means of contact electrodes and in which one determines the magnetic field that is associated with the current. *Schieferdecker.*

galvanic series. A series of metals and alloys arranged according to their relative electrode potentials in a specified environment. *Compare* electromotive series. *ASM Gloss.*

galvanize. To coat with zinc. *Fay.*

galvanized iron. Sheet iron with a coating of zinc. *Nelson.*

galvanized rope. Rope made of wires that have been galvanized or coated with zinc to protect them from corrosion. *Zern.*

galvanized sheets. Iron or steel coated with zinc. *Fay.*

galvanized wire. Zinc-coated wire. *Ham.*

galvanizing; hot dip galvanizing. Immersion of clean steel or iron in bath of molten zinc for purpose of forming a protective coating. This sacrificial coating causes the zinc to be preferentially corroded when the clad metal is in contact with an electrolyte. Sherardizing is process of heating iron articles with zinc duct to temperature where a strong adherent coating is formed. Electrolytic galvanizing is the electrodeposition of a suitable metal (for example, zinc, or tin) on the iron. *Pryor, 3.*

galvanometer. An instrument for measuring a small electric current or for detecting its presence or its direction by means of the movements of a magnetic needle or of a coil in a magnetic field that registers usually on a scale or by a moving beam of light reflected from a mirror attached to the needle or the coil. *Webster 3d.* String (wire) or mirror galvanometers are used in oscillographs and other instruments of applied geophysics. *A.G.I.*

galvanoscope. An instrument employed for detecting an electric current and showing its direction. It differs from a galvanometer in being only qualitative. *Standard, 1964.*

galvanothermometer. An instrument for measuring the heat generated by an electric current or for measuring the current by the heat that it generates. *Standard, 1964.*

Gamachian. Upper Cincinnatian. *A.G.I. Supp.*

gamagarite. A vanadate of barium, iron, and manganese, $Ba_4(Fe,Mn)_2V_4O_{15}(OH)_2$; dark-brown monoclinic needles in manganese ore; from Gamagara ridge, Postmasburg, Republic of South Africa. Named from locality. *Spencer 17, M.M., 1946.*

Gamal. Gamma alumina. Used in metallographic polishing. *Bennett 2d, 1962.*

gamella. Braz. A wooden bowl, about 2 feet wide at the mouth, and 5 or 6 inches deep, used for washing gold out of the auriferous material collected in sluices and in river sand. *Fay.*

gamma. The common unit of magnetic intensity. It equals 10^{-5} oersted. *A.G.I.*

gamma-gamma log. A borehole measurement of gamma rays originating in a gamma-ray source in the instrument and scattering back from the rock information to a detector shielded from the source. The amount of scattering is proportional to electron density and, therefore, proportional to mass concentration so that the measurement, after certain corrections, yields a density log of the formation penetrated. *A.G.I.*

gammagraphs. A radiograph produced by gamma rays. *ASM Gloss.*

gammagraphy. In the United States a term for inspection of gamma rays. *Osborne.*

gamma iron. The face-centered cubic form of pure iron, stable from 1,670° to 2,550° F. *ASM Gloss.*

gamma radiation. Emission by radioactive substances of quanta of energy corresponding to X-rays and visible light but with a much shorter wavelength than light. They may be detected by gamma-ray Geiger counters. *A.G.I.*

gamma-ray counter. An instrument capable of detecting and recording the intensity of gamma rays emitted by a radioactive substance. *Compare* Geiger-Mueller counter; scintillation counter. *Long.*

gamma-ray detector. An instrument on ships for identifying and measuring abnormal gamma ray concentrations in the ocean areas, as would result from nuclear powered vessel refuse and nuclear waste dumping. *Hy. See* gamma-ray counter. *Long.*

gamma-ray inspection. The method consists of placing a radioactive source at a given distance from one face of the part to be radiographed and a photographic film in a light-proof cassette between intensifying screens against the other face; the whole is left in position for a suitable exposure time, after which the film is developed. *Osborne.*

gamma-ray log. Strip recording of the intensity of natural radioactivity versus depth, obtained when a suitable detector is moved through a borehole. *Institute of Petroleum, 1961.*

gamma-ray logger. Synonym for gamma-ray probe. *Long.*

gamma-ray logging. a. The act or process of obtaining, by means of a gamma-ray probe, a record of the intensities of gamma rays emitted by the rock strata penetrated by a borehole. *Compare* electronic logging. *Long.* b. This type of logging can be carried out in either a cased or uncased hole, in any type of drilling fluid, or in dry holes. It can be used in a hole into which sea water has broken rendering the resistivity curves valueless. Shales, marine clay, and potash are generally more radioactive than sandstones, limestones, coal, and salt. Marine bands are generally, but not invariably, characterized by high gamma-ray counts. Though the rate of gamma-ray emission is erratic and recording must be carried out slowly, speeds of up to 1,000 feet per hour have been attained. *Sinclair, III, pp. 104-105.*

gamma-ray probe. A gamma-ray counter device built into a watertight case small enough in diameter to be lowered into a borehole. *Long.*

gamma rays. High-energy, short-wavelength, electromagnetic radiation emitted by a nucleus. Energies or gamma rays are usually between 0.010 and 10 million electron volts. X-rays also occur in this energy range but are of nonnuclear origin. Gamma radiation usually accompanies alpha and beta emissions and always accompanies fission. Gamma rays are very penetrating and are best attenuated by dense materials like lead and depleted uranium. *L&L.*

gamma-ray spectrometer. An instrument for determining the energy distribution of gamma rays. *NRC-ASA N1.1-1957.*

gamma-ray spectrometer log. A log which measures the relative quantities of potassium, thorium, and uranium present in the rocks penetrated by a borehole. *Wyllie, p. 154.*

gamma-ray well logging. A method of logging boreholes by observing the natural radioactivity of the rocks through which the hole passes. It was developed for logging holes which cannot be logged electrically because they are cased. *A.G.I.*

gamma structure. a. A thrust sheet with an underlying low-angle thrust plane steepening abruptly downward. *A.G.I. Supp.* b. overthrusting or overfolding in one direction only. *A.G.I. Supp.* c. A Hume-Rothery designation for structurally analogous phases or electron compounds that have ratios of 21 valence electrons to 13 atoms; generally, a large complex cubic structure. Not to be confused with gamma phase on a constitution diagram. *ASM Gloss.*

gamma sulfur. A third allotropic (monoclinic) form of sulfur. From the Island of Vulcano, Italy. *English.*

gamma uranium. The allotropic form of uranium that is stable above 775° C. It has a body-centered cubic (isometric) structure. Uranium is of importance as the ultimate source of the two slow-neutron fissionable nuclides, uranium 235 and plutonium 239. *See also* alpha uranium; beta uranium. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-143.*

gamma zircon. That type of zircon which possesses lower properties than the alpha and beta zircon. Amorphous or nearly so, due to deteriorated crystal structure; specific gravity, 4.0; refractive index (single), 1.79 to 1.84; birefringence approximately zero. Rarely fashioned as a gem. *Shipley.*

gang. a. Mid. To go; to move along. *Fay.* b. A train or set of mine cars or trams. *Fay.* c. A mine. *Fay.* d. A set of miners. *Fay.* e. Gangue. *Standard, 1964.*

gang art. Eng. The side of a mine. *Fay.*

Gang car. A car which may be loaded with a block of stone and placed beneath the blades of a gang saw. It is a modern substitute for the stationary saw bed. *Fay.*

gang drill. A set of drills in the same machine operated together. *Standard, 1964.*

ganger. a. Mid. One who is employed at conveying minerals along the gangways in or about a mine, the employment of which is known as ganging. *Fay.* b. A work gang foreman. *Webster 3d.*

gang filler. In the stonework industry, one who attaches and detaches crane slings or hooks to and from blocks or slabs of granite, marble, and stone in loading the stone on gang saw cars or trucks and pulling them under the gang saws. *D.O.T.1.*

ganggestein. In German mining terminology, the detached pieces of more or less altered country rock enclosed in ore veins. Not to be confused with the petrographic term ganggestein. *Schieferdecker.*

gang miner. In bituminous coal mining, one who works in a group which pools its earnings regardless of the type of work performed (drilling, undercutting, blasting, or loading coal). *D.O.T. 1.*

gang mold. Two or more molds in one frame, for forming several refractory brick in one operation. *Bureau of Mines Staff.*

gang rider. a. Eng. A lad who rides with or upon the trams of an underground engine plane, to give signals when necessary, and to operate any levers, clevises, couplings, etc. A trip rider. *Fay.* b. Guard; train attendant. *Mason. See* dukey; brakeman.

gang saw. Consists essentially of a series of soft steel blades set in a frame that has a backward and forward motion, and is used to cut granite, limestone, marble, and sandstone. This saw will make parallel cuts of any desired spacing. *AIME, p. 327.*

gang sawyer. In stonework, one who cuts large, rough blocks of limestone, marble, granite, slate, or sandstone into slabs or smaller blocks with a gang saw to produce stone of suitable size for succeeding milling operations. Also called gang saw operator; mill sawyer; power saw operator; stone saw operator; stone sawyer. *D.O.T. 1.*

gangsman. *See* ganger. *Fay.*

gangue. a. Undesired minerals associated with ore, mostly nonmetallic. *Bateman.* b. The nonmetalliferous or nonvaluable metalliferous minerals in the ore. The veinstone or the lode filling. *Fay.* c. The minerals associated with the ore in a vein. *Fay.* d. The fraction of ore rejected as tailing in a separating process. It is usually the valueless portion, but may have some secondary commercial use. *Pryor, 4.* e. Can. Waste. Rock associated with ore but having no mineral content or value. *Hoffman.*

gangue mineral. A nonmetallic, or a worthless metallic, mineral associated with ore minerals. *Schieferdecker.*

gangway. a. A main haulage road underground. *Hudson.* Frequently called entry. *Fay.* b. A passageway or avenue into or out of any enclosed place, as in a mine. *Fay.* c. A passageway driven in the coal at a slight grade forming the base from which the other workings of the mine are begun.

Korson. d. Penna. Generally confined to anthracite mines. *Jones.* e. An elevated roadway. *C.T.D.* f. Eng. A wooden bridge, Newcastle coalfield. *Fay.*

gangway cable. A cable designed to be installed horizontally (or nearly so) for power circuits in mine gangways and entries. *ASA C42.85: 1956.*

ganil. Eng. A brittle limestone. *Standard, 1964.*

ganister; gannister. a. A mixture of ground quartz and fire clay used in lining Bessemer converters. *Standard, 1964.* b. A highly refractory siliceous sedimentary rock used for the manufacture of refractory brick. A typical analysis: 98.20 percent SiO_2, 0.30 percent Fe_2O_3, 0.90 percent Al_2O_3, 0.15 percent CaO, and 0.10 percent MgO. Found in Pennsylvania, Virginia, Wisconsin, Ohio, and in Great Britain. *CCD 6d, 1961.* c. A fine-grained quartzite used in the manufacture of silica brick. *Webster 3d.* d. A local name for a fine close-grained siliceous clay that occurs under certain coalbeds in Derbyshire, Yorkshire, and North of England. *Fay.*

gank. Derb. A red or yellow vein filling extending through joints or fissures. Considered as a sign of ore nearby. *Fay.*

gannen. N. of Eng. A road (heading) down which coal is conveyed in cars running upon rails. *Fay.* An inclined gangway in a coal mine. *Standard, 1964.*

gantlet; gauntlet. A narrowing of two single railway tracks almost into the space of one, as on a bridge or in a tunnel, without breaking the continuity of either track by a switch, the two tracks overlapping each other. *Standard, 1964.*

gantry; gauntry; gauntree. a. A frame erected on a gold dredge for supporting different parts of the machinery. *Fay.* b. A bridge or platform carrying a traveling crane or winch and supported by a pair of towers, trestles, or side frames running on parallel tracks. *Webster 3d.* c. A structure supporting a number of railroad signals for several tracks. *Webster 3d.* d. An overhead structure that supports machines or operating parts. *Nichols.* e. An upward extension of a shovel revolving frame that holds the boom line sheaves. *Nichols.* f. A temporary erection having a working platform used as a base for building operations or for the support of cranes, scaffolding, or materials. *C.T.D.*

gantry crane. *See* portal crane. *Ham.*

Gantt chart. Construction program for major engineering works, set out in graphic form. Down the vertical axis in sequence are set out the items concerned. The abscissa shows the period covered in days, or weeks, and the period allowed for each item marked by a horizontal line. The chart displays the inter-relation between the items, and aids in ensuring that no item is so delayed as to impede progress on a later one which depends on it. *Pryor, 3.*

gap. a. Any deep notch, ravine, or opening in a ridge or in a mountain chain, or between ridges or between mountains. *A.G.I.* b. Any deep, sharp notch in a mountain ridge. A water gap is a notch or a pass which penetrates to the base of the ridge and affords a passage or valley for a large stream or river. *A.G.I.* c. *See* wind gap. d. The root opening in a weld joint. *ASM Gloss.*

gape. Maximum aperture at entry to a coarse crushing machine at which the largest piece of rock fed to it can be gripped and acted on by the breaking system. *Pryor, 3.*

gap-graded aggregate. Aggregate which contains particles of both large and small sizes, but in which particles of certain intermediate sizes are wholly or substantially absent. *Taylor.*

gap-grading. An aggregate grading in which certain intermediate sizes of particles are wholly or substantially absent. *Taylor.*

gap of the outcrop of a bed. The gap between the two outcropping parts of a faulted bedding plane, measured in the strike of that bedding plane. *See also* fault gap; fault-line gap. *Schieferdecker.*

gap packing. A method of packing for road maintenance which consists of gate side packs of 3 to 5 yards wide, next a gap of at least the width of the road, and finally a large pack 5 to 7 yards wide. The waste packs are made at least 2 yards wide and not less in width than twice the thickness of the seam. The gaps provided in strip packing are kept clear of supports and allow the roof to break up and flow towards them. This puts the strata in tension over the roads and reduces fracture and crush. *Mason, v. 1, p. 93.*

gap test. The gap is the greatest distance at which, under certain given conditions, a priming cartridge is capable of initiating a receiving cartridge (receptor). The same explosive is usually used both as primer and receptor, although the gap distance in such a case will also be affected by any change in strength which may occur in the explosive. The gap test can be carried out with the cartridges unconfined or confined. for example, in tubes, in air, or in water. The test gives, for example, information about changes in the explosive due to aging, moisture, temperature, etc. *Fraenkel, v. 3, Art. 16:01, p. 17.*

garbenschiefer. a. A slate characterized by concretionary spots suggestive of caraway seeds. *A.G.I.* b. Hornblende garbenschiefer is characterized by hornblende porphyroblasts in a granoblastic groundmass of quartz and feldspar. *See also* amphibolite; feather amphibolite; fleckschiefer; fruchtschiefer; knotenschiefer; knotted slate. maculose; spotted schist; spotted slate. *A.G.I.*

gard. Eng. Gravelly sand; a variation of garde. *Fay.*

garde. Corn. Tailings, composed of clay and sand, from tin dressing works. *Fay.*

garden tile. Structural units made in molds and placed as stepping stones through a garden or patio. *ACSG, 1963.*

garden wall bond. Any bond particularly suited to a wall two tiers of brick thick. A bond consisting of one header to three stretchers alternately in every course. *A.I.S.I. No. 24.*

Gardner crusher. A swing and hammer crusher, the hammers being flat U-shaped pieces hung from trunnions between two disks keyed to a shaft. When revolved, centrifugal force throws the hammers out against the feed and a heavy anvil inside the crusher housing. *Liddell 2d, p. 356.*

Gardner mobilometer. An instrument for the evaluation of the flow properties of vitreous-enamel slips. It consists of a plunger ending in a disk, which may be solid or may have a standardized system of perforations; the plunger is inserted in a tall cylinder containing slip and is loaded so that it descends through the slip; the time taken to fall through a specified distance is a measure of the mobility of the slip. *Dodd.*

Gareis-Endell plastometer. Consists of two disks between which a cylinder of clay is squeezed; the upper disk is rotated while the lower disk is slowly raised by a revolving drum; a stress/deformation curve is recorded. *Dodd.*

garganite. Suggested by Viola and de Stefani for a dike rock in the Itailan province of Foggia, which in the middle, with prevailing alkali feldspar, contains both augite and amphibole, that is vogesite; on the edges it contains biotite, hornblende, olivine, and remembles kersanite. *Fay.*

Gargasian. Upper Aptian. *A.G.I. Supp.*

gargulho. Braz. A comparatively coarse, clay-cemented, ferruginous conglomerate in which diamonds and carbonados are found in the plateau region of Bahia. *Hess.*

garing klip. S. Afr. A native term applied to any type of crocidolite yielding commercial fiber. Literal translation, cotton stone. *Bureau of Mines Staff.*

garland. a. A channel fixed around the lining within a shaft in order to catch the water draining down the shaft walls and conduct it by pipes or water boxes to a lower level. Also called water curb; water ring; water garland. *B.S. 3618, 1963, sec. 4.* b. Eng. A wooden, rectangular frame, strengthened with iron cornerplates, for keeping the coal upon the top of a car. *Fay.* c. A frame to heighten and increase content of a truck. *C.T.D.*

garnet. A group of silicate minerals including several species with related chemical structure. Isometric. Garnets are not always pure but may contain the molecules of two species giving rise to intermediate types, as the gem rhodolite. Several principal garnets are: almandine (iron aluminum), abrasive and gem, precious garnet; pyrope (manganese aluminum), gems, Arizona ruby, Cape ruby, etc.; spessartite (manganese aluminum), used as a gem, sometimes called hyacinth; grossularite (calcium aluminum); andradite (calcium iron); uvarovite (calcium chromium); essonite, gem variety of grossularite; rhodolite, isomorphous mixture of two molecules of pyrope and one molecule of almandine. Garnet from contact metamorphosed limestones is usually grossularite andradite, from pegmatites, usually spessartite, from schists, usually almandine pyrope, from kimberlites, usually pyrope. *Fay; A.G.I.*

garnet blende. Synonym for sphalerite, commonly called blende. *Fay.*

garnet doublet. a. A term correctly applied to the most common doublet, that with a very thin top of red garnet, regardless of the color of the doublet. *Shipley.* b. Any doublet of dark red color regardless of whether any portion of it is garnet. This is more correctly called a garnet-top doublet. *Shipley.*

garnetite. A contact metamorphic rock consisting chiefly of garnet. *Stokes and Varnes, 1955.*

garnetization. The introduction of garnet into a rock, or the formation of garnet in a rock from other minerals in the rock. A process commonly associated with contact metamorphism. *A.G.I.*

garnet jade. A jadelike variety of grossularite, from Transvaal, Republic of South Africa. Also called Transvaal jade; South African jade. *English.*

garnetoid. Substances (silicates, phosphates, etc.) which have structures similar to garnet, including hydrogarnet, grossularoid, plazolite, griphite, and berzeliite. *Spencer 16, M.M., 1943.*

garnet rock. A rock composed essentially of garnet. Synonymous with garnetite. *Fay.*

garnet shell. *See* shell (cutting). *Shipley.*

garnierite. A green, hydrous nickel-magnesium silicate, $(Ni,Mg)SiO_3.nH_2O$, amorphous. A variety of genthite. *Sanford; Dana 17.*

garrelsite. Borosilicate, $(Ba,Ca,Mg)_4B_4(BO_4)_2(SiO_4)_2(OH)_2.2H_2C$. Small monoclinic crystals related to datolite, from an oil boring at Onray, Utah. *Spencer 21, M.M., 1958.*

garronite. A tentative name for a zeolite related to phillipsite, occurring in the basalts of the Garron plateau, County Antrim, Ire. Named from locality. *Hey, M.M., 1961.*

garspar. A mixture of finely ground glass and quartz, produced in the grinding of plate glass. Used as a substitute for feldspar in ceramics. *CCD 6d, 1961.*

gas. a. In mining, a mixture of atmospheric air with firedamp. *Standard, 1964.* b. The term normally used by miners to designate any impure air, especially explosive combinations. *B.C.I.* c. The term generally applied to denote firedamp. *B.S. 3618, 1963, sec. 2.* d. The mixture of natural explosive gases met with in most coal mines. *C.T.D.* e. Any aeriform liquid other than atmospheric air, such as gaseous carbon dioxide (blackdamp), carbon monoxide (whitedamp), methane (firedamp), and the common combustible petroleum-product gases. *Compare* acetylene; bottle gas. *Long.* f. Abbreviation for gasoline. *Long. See also* manufactured gas; natural gas. g. A fluid (as air) that has neither independent shape nor volume but tends to expand indefinitely. A substance at a temperature above its critical temperature and therefore not liquefiable by pressure alone. *Webster 3d.* h. A fluid of low density and of high compressibility. The specific recognition of a gas as distinct from a liquid of the same composition requires the simultaneous presence of both phases at equilibrium. *See also* fluid; liquid; vapor. *A.G.I.* i. As a verb, to affect or to treat with gas. To subject to the action of gas. *Webster 3d.*

gas adsorption method. A technique for the determination of specific surface; variants of the method include the Brunauer, Emmett and Teller method and the Harkins and Jura method. *See also* specific surface; Brunauer, Emmett and Teller method; Harkins and Jura method. *Dodd.*

gas alarm. Device or signal system which warns underground workers of dangerous concentration of firedamp. *Pryor, 3.*

gas analysis. An analysis of mine air to give information regarding the oxygen content of the air, the presence of explosive or otherwise undesirable gas or gases. It is a valuable aid in following the changes in mine air during fires and after explosions. *Lewis, p. 731. See also* Burrell apparatus.

gas and mist sampler. This instrument is designed primarily for the automatic collection over a 24-hour period of one sample per hour of airborne material such as sulfur dioxide, ammonia, fluorides, and some acids; it can be adapted to the collection of many other air contaminants. A fixed volume of air is drawn through a special impinger. At the end of the period, the collecting fluid is discharged into a tube and is analyzed later. *Bests, p. 578.*

gas barren. A barren tract of ground, devoid of vegetation, up to several acres in extent, characterized by escaping volcanic gases and deposits of sulfur, and underlain by rocks (usually acid volcanic rocks) in an advanced state of decomposition. It occurs in regions of hot spring activity and is formed through a process of acid leaching of the surface rocks. *A.G.I.*

gas black; carbon black; channel black. Finely divided carbon made by the incomplete combustion or the thermal decomposition of natural gas. Used as a reinforcing agent in rubber products. *CCD 6d, 1961.*

gas boss. *See* fire boss. *D.O.T. 1.*

gas bubbles. Bubbles seen as inclusions in glass, synthetic corundum, and synthetic spinel, which reveal their difference from genuine corundum, spinel, and most other genuine gems, in which inclusions are more angular. *Shipley.*

gas cap. a. The faint bluish flame that appears over the testing flame of a miner's oil safety lamp when a percentage of firedamp is present in the mine air. *McAdam, p. 151. See also* cap, e. b. The free gas occurring above the oil in a reservoir. It occurs whenever more gas is available than will dissolve in the associated oil under the existing pressure and temperature in the reservoir. *A.G.I.*

gas-cap drive. The force exerted by the energy of expanding gas of a gas cap. It is used to produce oil from the reservoir. *A.G.I.*

gas carbon. Hard form of carbon obtained as a byproduct in the manufacture of coal gas; used to make graphitic crucibles and carbon electrodes. *Bennett 2d. 1962.*

gas carburizing. The introduction of carbon into the surface layers of mild steel by heating in a current of gas high in carbon—usually hydrocarbons or hydrocarbons and carbon monoxide. *C.T.D.*

gas centrifuge process. A method of isotope separation in which heavy atoms are separated from light atoms by centrifugal force. *L&L.*

gas classification. The separation of powder into particle size fractions by means of a gas stream of controlled velocity. *ASTM B243-65.*

gas coal. a. Any coal that yields a large quantity of illuminating gas as on distillation. It should be free from sulfur and other impurities. *Fay. See also* fat coal; bottle coal. b. Good gas coals for use in coal-gas retorts and commercial byproduct plants range from 33 to 38 percent in volatile matter. They should be low in sulfur because one-fourth to one-half of the sulfur of the coal passes off as hydrogen sulfide with the gas, and city regulations commonly prescribe 30 grains per 100 cubic feet as the maximum proportion of this constituent allowable. *Mitchell, p. 120.* c. A bituminous coal, such as cannel or parrot coal, used in gas making. *Gordon.* d. A coal suitable for the manufacture of town gas and coke. *B.S. 3323, 1960.*

gas coke. Coke formed in gas retorts as distinguished from that made in a coke oven. *Webster 3d.*

gas concrete. *See* aerated concrete. *Dodd.*

gas conductor. A pipe for leading combustion gases from the mouth of a blast furnace to a hot-blast stove. *Fay.*

gas constant. The constant R in the perfect gas equation, $PV = RT$. *Strock, 10.*

gas-cooled reactor. A nuclear reactor in which gas is the coolant. *L&L.*

gas-cut. Term used to describe the fluffy mixture of gas-bearing drilling mud recovered in testing. *Wheeler.*

gas-cut mud. In oil-well drilling, mud introduced into the hole which has been lowered in effective density by natural gas rising from the strata traversed. *Pryor, 3.*

gas cutting. a. The retention by drilling fluid of gas entrained during drilling. Unless a drilling fluid is able to release entrained gas before returning to the well, that fluid will become gas cut and the hydrostatic head of the fluid column will be reduced. A thick drilling fluid will gas cut more easily than a thin one. *Brantly, 1.* b. *See* roof cutting. *Kentucky, p. 145.*

gas cyaniding. A misnomer for carbonitriding. *ASM Gloss.*

gas cycling (recycling). A secondary-recovery process involving injection into the reservoir of the gas or a portion of the gas produced with the oil from that reservoir. When pressure is maintained, gas cycling may be one of the means employed. *A.G.I.*

gas detector. A device to show the presence of firedamp, etc., in a mine. *Standard, 1964. See also* safety lamp; Burrell gas detector; Methanometer; eudiometer. *Fay.*

gas drain. a. Eng. A heading driven in a mine for the special purpose of carrying off firedamp from any working. *Fay.* b. A tunnel or borehole for conducting gas away from old workings. *C.T.D.*

gas emission. The release of gas from the strata into the mine workings. *B.S. 3618, 1963, sec. 2.*

gas-emission rate. The quantity of firedamp discharged, from the strata and coal seams, into the ventilating air of a coal mine. The rate may be expressed on a time or tonnage basis. Gas emission varies with (1) the rate of advance of the workings; (2) the face operation such as cutting, blasting, loading, etc.; and (3) the barometric reading. *Nelson.*

gas enclosure. A gas inclusion in a stone, such as can be found in all synthetic corundum. *Shipley.*

gas engine. An internal-combustion engine similar to a gasoline engine but using natural or manufactured gas instead of gasoline vapor; broadly, an internal-combustion engine. *Webster 3d.*

gaseous. a. Having the form of or being gas; of or relating to gases. *Webster 3d.* b. Lacking substance or solidity. *Webster 3d.*

gaseous diffusion. A method of isotope separation based on the fact that atoms or molecules of different masses will diffuse through a porous barrier at different rates. The method is used to enrich uranium with the uranium 235 isotope. *L&L.*

gaseous dispersion pattern. A dispersion pattern that may be detected by analysis of either of soil air, of gas dissolved in underground water, or of gas condensed in the rocks and soil. *Hawkes, 2, p. 70.* Gaseous dispersion patterns of interest include those of hydrocarbons and some noble gases resulting from nuclear decay of radioactive elements. *Lewis, p. 301.*

gaseous fuel. Includes natural gas and the prepared varieties, such as coal gas, oil gas, iron blast furnace gas, as well as producer gas, etc. *Newton, p. 248.*

gaseous place. A place that is likely to be dangerous from the presence of flammable gas. *Fay.*

gaseous reduction. The reduction of metallic compounds to metallic particles using a reducing gas. *Henderson.*

gaseous transfer. a. The process in which selective transport of magmatic substances is accomplished by gases rising from lower to higher levels. It has been suggested as an important process in the formation of certain mineral deposits described as pneumatolytic. *Schieferdecker.* b. The process by which a magma differentiates by the separation of a gaseous phase which then moves relative to the magma. *A.G.I.*

gas evolution. The liberation of gas in the form of bubbles during the solidification of metals. It may be due to the fact that the solubility of a gas is less in the solid and liquid metal respectively, as when hydrogen is evolved by aluminum and its alloys, or to the promotion of a gas-forming reaction, as when iron oxide and carbon in molten steel react to form carbon monoxide. *See also* blowholes; unsoundness. *C.T.D.*

gas explosion. A major or minor explosion of firedamp in a coal mine, in which coal dust apparently did not play a significant part. *See also* coal-dust explosion. *Nelson.*

gas field. A district where natural gas is produced in commercial quantities. *Webster 3d.*

gas fire radiant. The radiants for gas fires are made of refractory material having good resistance to thermal shock. The usual composition is a mixture of clay and crushed fused silica; this is shaped and then fired at about 1,000° C. *Dodd.*

gas firing. The combustion of coal effected by burning in such a way as to produce a combustible gas, which is then burned secondarily in the laboratory of the furnace. *Fay.*

gas flame coal. Coal containing 35 to 40 percent volatiles (dry, ashless basis). *Tomkeieff, 1959.*

gas flotation. *See* crystal flotation. *A.G.I.*

gas fluxing. a. A process in which the addition of gaseous materials acts as a flux to promote melting. *A.G.I.* b. A rapid upstreaming of free, juvenile gas through a column of molten magma in the conduit or pipe of a volcano, the gas acting as a flux to promote the melting of the wall rocks. Synonymous with volcanic blowpiping. *A.G.I.*

gas generator. Chemical plant for producing gas from coal, for example, water gas by alternating combustion of coal and reduction of steam. *C.T.D.*

gas grooves. Hills and valleys in electrolytic deposits caused by streams of hydrogen or other gas rising continuously along the surface of the deposit while it is forming. *Henderson.*

gash. A vein, wide above, narrow below, and terminating in depth, within the formation it traverses. *See also* gash vein. *Fay.*

gash fracture. One of the open gashes diagonal to a fault or to a fault zone. It is a tension fracture. *A.G.I.*

gashouse coal tar. Coal tar produced in gashouse retorts in the manufacture of illuminating gas from bituminous coal. *Urquhart, Sec. 2, p. 81.*

gash vein. a. A mineralized fissure that extends only a short distance vertically. It may be confined to a single stratum of rock, and it is a comparatively shallow vein. *See also* gash. *Fay.* b. A deposit filling a nonpersistent opening that has fair width but which soon ends when followed along its strike or dip. *A.G.I.* c. The term is frequently erroneously employed to designate small wedge-shaped fissures in stressed, brittle rocks. The term originally applied by Whitney, however, designates vertical solution joints in limestone. Solution is essential, or they are not gash veins. They are confined to single formations, seldom reach 200 feet in depth, and widen and narrow conspicuously. In some respects, they resemble fissure veins. They are common in limestone regions. Those in the Upper Mississippi Valley were the first described. The fillings are characterized by crustification, large vugs, and beautiful crystals; and they consist of lead, zinc, silver-lead, copper, fluorspar, and barite. *Bateman, 1950, p. 135.* d. A simple fissure across the bedding of the rocks, without any throw or slide of the rocks. *Gordon.*

gasification. Conversion of coal to gaseous fuel without leaving a combustible residue. *B.S. 3323, 1960.*

gasification of coal, underground. *See* underground gasification.

gas ignition. The setting on fire of a small or large accumulation of firedamp in a coal mine. The ignition may be caused by a safety lamp, electrical machinery, explosives, frictional sparking, etc. *Nelson.*

gas indicator. A pocket device for the rapid determination of the percentage of carbon dioxide in the atmosphere of mines, boilerrooms, blast furnaces, etc. *Fay, p. 55.*

gas inspector. a. In the coke products industry, one who maintains gas pressure within prescribed limits in collecting main to minimize leakage of gas or air through oven walls by adjusting governors. He also supervises such operations as weighing and charging coal, and cleaning area and equipment on top of battery. *D.O.T. Supp.* b. *See* coal mine inspector. *D.O.T. 1.*

gasket. a. A flat sheet of asbestos compound, sometimes sandwiched between thin copper sheets. Used for making gastight joints between engine cylinders and heads, etc. *C.T.D.* b. Jointing or packing material, such as cotton rope impregnated with graphite grease. Used for packing stuffed boxes on pumps, etc. *C.T.D.*

gas laws. Those of Gay-Lussac, Boyle, and Charles are combined in the equation $PV = RT$, where P is pressure, V is volume, R is the gas constant, and T is the absolute temperature. These laws apply only to a perfect gas and are modified by Van der Waals effects. *Pryor, 3. See also* Boyle's law; Charles's law; Gay-Lussac's law.

gas lift engineer. In petroleum production, one who controls the operation of a gas recovery system and compressors to retain natural gas that separates from petroleum and force it back into wells to flow (force) oil artifically to surface. Also called compressor engineer; compressor operator, field; gas plant booster; gas plant engineer; gas plant operator; pressure plant engineer. *D.O.T. 1.*

gas lime. Slaked lime; used to take the carbon dioxide, carbon disulfide, and hydrogen sulfide out of gas. *Bennett, 2d, 1962.*

gas locking. A condition occurring in pumps where the trapped fluid is compressed and then expands without letting any additional fluid into the pump barrel. Gas locking increases the temperature which decreases pump efficiency. *American Petroleum Institute. Drilling and Production Practice, 1963, p. 150.*

gas-logged strata. Rock formations, usually in coal mines, which contain a relatively high proportion of methane. When descensional ventilation is practiced, the buoyancy pressure of the firedamp opposes the ventilating pressure across the district with a tendency for bed separation cavities to become gas-logged or contain firedamp of high concentrations. The same may apply to waste cavities with no natural exit to the return. *Nelson.*

gasman. An underground official who examines the mine for firedamp and has charge of its removal. *See also* fire boss; fire viewer. *Hess.*

gas mask. An air-purifying device which by such processes as oxidation, chemical combination, or absorption removes toxic gases from the inspired air of the wearer. Its use is limited to conditions where there is sufficient oxygen to support life, and where, by the standards set by the U. S. Bureau of Mines, the total toxic contamination is not over 2 percent by volume for most gases. According to the chemical canister used it is adapted to protection against acid gases, organic vapors, ammonia, phosphine, and carbon monoxide, either singly or in various combinations, and by adding special filters provides protection against dusts, fumes, mists, fogs, and smokes. *Bests, p. 100. See also* mining gas mask; M.S.A. all-service gas mask; Puretha gas mask.

gas, natural. *See* natural gas. *Fay.*

gasoclastic. Applied to fine sediments moved by gas pressure in mud volcanoes. *A.G.I.*

gasogene; gazogene; gasogen. A portable contrivance for producing gas by the action of acid on a carbonate. The gas is used for aerating water. *Hess.*

gas oil; diesel oil; solar oil. A petroleum distillate obtained after kerosine; flash point, 168° F. Used for carbureting water gas in gas plants and for driving road and stationary diesel engines. *C.T.D.*

gas-oil ratio. The number of cubic feet of gas produced with each barrel of oil. *A.G.I.*

gas-oil ratio, reservoir. The number of cubic feet of gas per barrel of oil originally in the reservoir. *A.G.I.*

gas-oil surface. A surface that forms the boundary between a body of petroleum and an overlying body of natural gas. *A.G.I.*

gasol. A product condensed from casinghead gas by applying a pressure of 850 to 900 pounds per square inch at ordinary temperature. Specific gravity, 0.5; and 1 pound of the liquid produces 7 cubic feet of gas. *Fay.*

gasoline. a. A refined petroleum naphtha which, by its composition, is suitable for use as a carburant in internal-combustion engines. *ASTM D288-57.* b. A volatile flammable liquid obtained from petroleum which has a boiling range of approximately 85° to 420° F, and is used as fuel for spark ignition internal-combustion engines. *Shell Oil Co.* c. In Great Britain, spelled gasolene; in the United States and Canada, commonly abbreviated to gas. *Hess.*

gasoline locomotive. A mine locomotive that is comparable to the steam locomotive in radius of travel, and which has a speed of 3 to 12 miles per hour when used in mines. It is far safer than the steam locomotive in gassy mines because it has no open fire. Normally 4 to 6 percent of the exhaust gases is CO, and under very bad conditions of carburation, this fraction can rise up to 13.5 percent. For continued breathing, the concentration of CO should be less than 1:20,000 and should never exceed 0.01 percent. Precautions should be taken against leakage at the carburetor and when charging tanks. *Stoces, v. 1, pp. 180-181.*

gasoline plant engineer. In petroleum production, one who compresses natural gas to high pressure for extraction of natural gasoline or for loading into gas cylinders for use as fuel. *D.O.T. 1.*

gasometers. Tall metal chambers (gas holders) fitted with a roof which rises or falls wth the entry or removal of gas. The roof is weighted so that the gas is compressed, thus enabling it to pass along gas mains and pipes at a suitable pressure (about 8 inch water gage) for efficient combustion. *Cooper, pp. 391-392.*

gasoscope. An apparatus for detecting the presence of dangerous gas escaping into a coal mine or a dwelling house. *Fay.*

gas phase. Any chemical substance in the form of gas, as contrasted with the liquid or solid form, is in the gas phase. *A.G.I.*

gas pickling. A method of preparing sheet steel for vitreous enameling by treatment, while hot, with gaseous HCl. *Dodd.*

gas pipe. Mid. A short wooden pipe about 4 by 4 inches inside, having its upper end open to the roof, and the lower end opening into the bratticing so that any gas given off in the roof may be carried away as formed. Any pipe for conveying gas. *Fay.*

gas pit. A small circular pit with a surrounding mud mound formed by the escape of gas bubbles (of methane generated during the decomposition of organic debris) from the surface of a mud bar. Large craterlike pits are formed in submerged mud and silt bars as the result of erosion in the vicinity of active gas bubble agitation. *A.G.I.*

gas plant booster. *See* gas lift engineer. *D.O.T. 1.*

gas plant engineer. *See* gas lift engineer. *D.O.T. 1.*

gas plant operator. *See* gas lift engineer. *D.O.T. 1.*

gas plating. The same as vapor plating. *ASM Gloss.*

gas pocket. a. A cavity in the rocks containing gas, generally above an oil pocket. *Mersereau, 4th, p. 198.* b. In metallurgy, a cavity caused by entrapped gas. *ASM Gloss.* c. In cast iron will cause enameling difficulties, but this condition may be overcome by first properly annealing the casting. *Hansen.*

gas pool. A connected, natural underground accumulation of natural gas under one pressure system in the pore spaces or other voids in the rock. *A.G.I.*

gas pore. A gas bubble in a mineral. *Standard, 1964.*

gas pressure. The pressure exerted by the explosive gases after an explosion. *Streefkerk, p. 42.*

gas producer. A furnace in which coal is burned for the manufacture of producer gas. There are two types, namely: (1) The step-grate, natural-draught generator, which is but a development of the ordinary firebox and (2) the shaft furnace, with or without a grate and worked by a natural or forced draft. The latter type is identical in many respects with a blast smelting furnace. The principal producers are Boetius, Dawson, Dowson, Duff, Hegeler, Mond, Siemens, Smythe, Swindell, Talbott, Taylor, Wellman, and Wilson. *Fay.*

gas ratio. The ratio of the volume at atmospheric pressure of the gas developed by an explosive to the volume of the solid from which it was formed is called the gas ratio of an explosive. Many commercial explosives have a gas ratio of about 8. Ammonium nitrate plus fuel oil has a ratio of about 20. *Leet, 2, p. 10.*

gas retort. A refractory structure used for the conversion of coal into coke with the simultaneous distillation of town gas. There are two types—continuous vertical retort and horizontal retort. In the United Kingdom, the refractories used must meet the specifications issued by the Gas Council in collaboration with the Society of British Gas Industries and the British Coking Industry Association. *See also* continuous vertical retort; horizontal retort. *Dodd.*

gas reverser. In the iron and steel industry, one who reverses gas valves by manipulating levers to throw hot combustion gases from one side of the furnace to the other, to keep the furnace heat evenly distributed, and to prevent burning out on one side. *D.O.T. 1.*

gas rig. A borehole drill, either rotary or churn-drill type, driven by a combustion-type engine using a combustible liquid, such as gasoline, or a combustible gas, such as bottle gas, as the source of the motivating energy. *Long.*

gas sand. a. A sandstone or other rock containing natural gas. *Webster 3d.* b. The reservoir rock, or that portion of such rock, in which gas is contained. *A.G.I.*

gassed. *See* gassing, f.

gas separator. *See* gas trap. *Fay.*

gasser. A well that yields gas, including an oil well that produces much gas. *Webster 3d.*

gas shale. Bituminous shale yielding gas on dry distillation. *Tomkeieff, 1954.*

gas-shielded arc welding. Arc welding in which the arc and molten metal are shielded from the atmosphere by a stream of gas, such as argon, helium, argon-hydrogen mixtures, or carbon dioxide. *ASM Gloss.*

gas show. a. A gas cap over the flame of a miners' flame safety lamp—usually a small gas percentage. *Nelson.* b. A surface indication of the escape of natural gas from underground reservoirs; of importance in oilfield exploration. *C.T.D.*

gassing. a. Absorption of gas by a metal. *ASM Gloss.* b. Evolution of gas from a metal during melting operations or on solidification. *ASM Gloss.* c. The evolution of gas from an electrode during electrolysis. *ASM Gloss.* d. The evolution of gas which takes place in an accumulator towards the end of its charging period. *C.T.D.* e. Act or process of causing something to interact with gas. *Webster 3d.* f. The deliberate or inadvertent poisoning of persons exposed to noxious gases or fumes. *Webster 3d.* g. The formation of gas bubbles in the milled porcelain enamel slip. *ASTM C286-65.* h. The occurrence of certain surface imperfections on enamelware, such as poor gloss or blisters, as a result of a gassy furnace. *ACSB-3.*

gassing of copper. A process which denotes the brittleness produced when copper containing oxide is heated in an atmosphere containing hydrogen. The hydrogen diffuses into the metal and combines with oxygen, forming steam which cannot diffuse out. A high steam pressure is built up at the crystal boundaries and the cohesion is diminished. *C.T.D.*

gas spectrum. a. The spectrum, consisting of bright lines or bands, obtained by dispersing the light from a glowing gas or vapor. *Webster 2d.* b. An absorption spectrum obtained by passing light through a gas or vapor. *Webster 2d.*

gas spurt. One of the little heaps that occur on the surface of certain strata containing organic matter. Gas spurts are believed to have been caused by the escape of gas during the early formative stages of the strata. *Webster 3d.*

gas streaming. A process of differentiation in which the formation of a gas phase at a late stage in the crystallization results in partial expulsion, by the escaping gas bubbles, of residual liquid from among the network of crystals. *A.G.I.*

gassy. a. A coal mine is rated gassy by the U. S. Bureau of Mines if an ignition occurs or if a methane content exceeding 0.25 percent can be detected, and work must be halted if the methane exceeds 1.5 percent in a return airway. *Hartman, p. 23.* b. A mine is said to be gassy when it gives off methane or other gas in quantities which must be diluted with pure air to prevent occurrence of explosive mixtures. *B.C.I.* c. A gassy furnace is a serious hindrance to the production of good enamelware. A furnace may become gassy through leaks in the muffle, which allow gaseous products of incomplete combustion to enter the burning chamber. Blisters or a smoky, fogged appearance on the ware may result, if this avoidable condition is encountered. *Hansen.*

gassy mine; fiery mine. A coal mine where the gas emission rate is high; a safety lamp mine. *Nelson.*

gassy surface. A defect characterized by poor gloss and fuzzy surface texture. *ASTM C286-65.*

gas tank. a. A large tank for holding supplies of gas. *Hess.* b. A gas trap. *Fay.*

gas tar. Coal tar condensed from coal gas, consisting mainly of hydrocarbons. Distillaton of tar provides many substances, for example, ammoniacal liquor, benzole, maphtha, and creosote oils, with a residue of pitch. Dehydrated, it is known as road tar, and used as a binder in road making. *C.T.D.*

gas tracers. Slowly moving air currents can be directly observed by using smokes. These may range from simple dust clouds, through various chemical smokes, to more refined techniques employing gas and radioactive tracers. Various chemicals have been used, including stannic chloride, titanium tetrachloride, and pyrosulfuric acid. These materials give off white fumes when their vapors come into contact with atmospheric moisture. The method of common use is to carry the chemical in sealed glass phials which can be smashed when an observation is to be made. *Roberts, I, p. 230.*

gas trap. One of many devices for separating and saving the gas from the flow and lead lines of producing oil wells. The mixture of oil and gas is allowed to flow through a chamber large enough to reduce the velocity of the mixture to the point at which the oil and gas tend to separate. The gas seeking the top of the chamber, is drawn off free of oil, while the oil is discharged at the bottom. Also called gas separator; gas tank. *BuMines T. P. No. 209, 1919, pp. 5-6.*

gastrolith. Highly polished, well-rounded pebbles associated with saurian skeletons. They are believed to have been stomach stones. Synonym for stomach stone. *A.G.I.*

gastropod. a. A member of the phylum Mollusca, class Gastropoda. Usually it has a calcareous exoskeleton or shell, which is coiled asymmetrically and has no internal partitions. *A.G.I.* b. Any member of a large and important class of mollusks that typically possesses a coiled, single-chambered shell. Marine, freshwater, and terrestrial forms exist, and the group has fossil representatives in the Cambrian system and in all younger rocks. The gastropods are extremely numerous at the present, and they have been important throughout the Cenozoic era. Snails are the commonest gastropods. *Stokes and Varnes, 1955.*

gastunite. The names gastunite 1, gastunite 1a, gastunite 1b were given by H. Haberlandt and A. Schiener (1951) to three imperfectly characterized uranium minerals. Gastunite 1b proves to be betauranotile, while gastunite 1a has since been described under the name of haiweeite; gastunite 1 appears to be a lower hydrate of haiweeite, but is not identical with the dehydrated haiweeite named metahaiweeite. Unfortunately, R. M. Honea has described another mineral, distinct from any of the three named by Haberlandt and Schiener, under the name of gastunite; this fourth gastunite proves to be identical with weeksite. In view of the prior uses of gastunite, the name weeksite is to be preferred. Honea also describes artificial analogues, ammonium-, hydronium-, potassium-, and sodium-gastunites. *Hey, M.M., 1961.*

gas turbine. A device for the conversion of the energy of hot gases, derived from internal combustion, into rotary motion of a machine element. The efficiency increases with operating temperature and is at present limited by the safe temperature at which heat-resisting alloys can be used. There has been much research on the possible use of cermets and other special ceramics in these turbines, particularly in the blades. *Dodd.*

gas turf. Same as candle turf. *Tomkeieff, 1954.*

gas watchman. In bituminous coal mining, one who makes morning examinations for gas before men enter mine. *D.O.T. 1. See also* fireman; fire boss; fire viewer; gasman.

gas water. Water through which coal gas has been passed, and which has absorbed the impurities of the gas. *Fay.*

gas-water surface. A surface that forms the boundary between a body of ground water and an overlying body of natural gas. *A.G.I.*

gas welding. Welding with heat from a gas flame. *ASM Gloss.*

gas well. a. A well that produces chiefly natural gas. *Webster 3d.* b. A deep boring from which natural gas is discharged. *Fay.* c. A well having such a pressure and volume of gas and close enough to a market that the gas can be produced commercially. *Fay.*

gas well plugger. In petrolum production, one who in addition to pulling out and recovering casing in old wells, plugs the entire depth or the lower portion of abandoned wells with concrete to prevent the draining of surrounding gas-bearing strata, and to prevent water entering the gas sands. *D.O.T. 1.*

gasworks. A plant for manufacturing gas. *Webster 3d.*

gas zone. A formation which contains capillary or supercapillary voids, or both, that are full of natural gas under pressure considerably exceeding the atmospheric pressure. *Fay.*

gatch. A plaster used especially in Persian architectural ornamentation. *Webster 3d.*

gatchers. Corn. The final sludge or leavings from a tin-ore concentration plant. *Fay.*

gate. a. Eng. Gateway or gate road. A road or way underground for air, water, or general passage; a gangway. *Fay.* b. Eng. A road packed out in longwall goaf. When ripped in the waste to provide packing material on a conveyor face, it is called a dummy gate. Also called gateroad; gateway; main brow; trail road. *SMRB, Paper No. 61.* c. The apparatus at the bottom of an ore chute for filling cars. Also called a chute. *Spalding, p. 159.* d. Synonym for swivel head. Also, the swivel ring of the swivel head of a diamond drill. *Long.* e. An opening cut into the cope through which the molten metal is poured into the mold. *Freeman.* f. The closing piece in a stop valve. *Standard, 1964.* g. A valve controlling the admission of water to a waterwheel or conduit. *Standard, 1964.* h. The portion of the runner in a mold through which molten metal enters the mold cavity. Sometimes the generic term is applied to the entire network of connecting channels which conduct metal into the mold cavity. *ASM Gloss.* i. A refractory slab lowered in the forehearth channel for shutting off the flow of glass. *ASTM C162-66.*

gate belt conveyors. Conveyors usually from 26 to 30 inches wide and troughed so as to centralize the load and minimize spillage. A scraper feeder, consisting of an elevating chain conveyor driven by the gate belt, is often used to transfer the coal from the face belt to the gate belt. *Mason, v. 1, p. 117.*

gate chamber. The recess formed in a lock wall to house a ship caisson or other lock gate when open. *Ham.*

gate conveyor. A gate road conveyor which carries coal from one source or face only, that is, from a single-unit or double-unit face. *See also* face conveyor; gathering conveyor. *Nelson.*

gated. Describes that part of the molding process wherein the floating slag is separated from the molten metal. Castings to be enameled should be gated, at a point where any roughness will be least prominent in the finished article. *Hansen.*

gated pattern. A pattern designed to include gating in the mold. *ASM Gloss.*

gate end. The coal face or inby end of a gate. *See also* gate, a. *Fay.*

gate-end box; gate-end unit. A flameproof enclosure primarily for use at or near the coalface and designed to line up with similar boxes to form a control board. A gate-end box may contain bus bars, isolators, switches, contactors, transformers and protective devices, for the control of motors, lighting and other equipment. *See also* gate-end section switch. *B.S. 3618, 1965, sec. 7.*

gate-end feeder. A short conveyor which feeds the coal from the face conveyor on to the gate conveyor. *See also* feeder conveyor. *Nelson.*

gate-end loader. A short conveyor designed to receive the coal from the face conveyors and elevate it to such a height as to be convenient for delivery into mine cars. *Nelson.*

gate-end plate. Mid. A large sheet-iron plate about 4 feet 6 inches square and one-half inch thick, upon which trams (mine cars) are turned around upon coming from the working face to be taken along the gate or roadway. A kind of turntable; a turnsheet. *Fay.*

gate-end section switch. A form of gate-end box incorporating a circuit breaker to control and/or isolate part of an electric system. *B.S. 3618, 1965, sec. 7.*

gate-end switch. A flameproof motor-starting contactor for use with coal-face machinery. The essential features are a flameproof casing divided into two separate compartments, the smaller of which contains a hand-operated isolating switch and the main busbars. The isolating switch is interlocked with the cover of the main compartment so that it cannot be removed unless the switch is in the off position; or it may be fitted with contacts enabling the mechanism to be earthed before work is undertaken on it. *Mason, v. 2, p. 438.*

gate-end unit. *See* gate-end box. *B.S. 3618, 1965, sec. 7.*

gate interlock. A system designed to prevent shaft conveyances from being moved, or action signals being transmitted, unless all shaft gates are closed. *B.S. 3618, 1965, sec. 7.*

gate maker. *See* framemaker. *D.O.T. 1.*

gateman. *See* chute puller; doorman. *D.O.T. 1.*

Gater Hall device. *See* Barratt-Halsall firemouth. *Dodd.*

gate road. a. Eng. A road connecting a stall with a main road. *Standard. See also* gate, a and b. *Fay.* b. A road through the goaf used for haulage of coal from longwall working. *Pryor, 3.*

gate road bunker. An appliance for the storage of coal from the face conveyors during peaks of production or during a stoppage of the outbye transport. It may consist of a length of conveyor chain running in high-capacity pans arranged under the delivery end of the gate conveyor. When the trunk conveyor cannot handle the coal from the gate conveyor, the bunker chain is slowly drawn back carrying about 1 ton of coal per yard of chain. The bunker is later discharged by reversing the process. *See also* bunker, underground. *Nelson.*

Gates canvas table. A large form of inclined canvas table in which the pulp is first classified, then distributed along the upper edge of the table. The concentrates are caught in the warp of the canvas and after this is full, treatment must be stopped while the concentrates are swept or sluiced off. *Liddell 2d, p. 387.*

gate shutter. A paddlelike implement used to shut off the flow of metal from a mold and divert it to other molds. *Standard, 1964.*

gate side pack. A pillar consisting of tightly rammed material enclosed in walls of stone, built on each side of the gate road. *See also* double packing. *Nelson.*

gate valve. A valve with a sliding disk or stop gate, which when opened allows the flow to move straight through the valve mechanism. Also called stop-gate valve; straightway valve. *Long.*

gateway. a. A road through the worked-out area (goaf) for haulage in longwall working of coal. Also called gate road. *C.T.D.* b. Mid. *See* gate, a and b. *Fay.*

gateway longwall. N. of Eng. A continuous coal face served by gateways (in Durham about 12 yards apart). A small group works in each gateway down which the coal is removed by tubs. *Trist.*

gather. a. To assemble loaded cars from several production points and deliver them to main haulage for transport to the surface or pit bottom. *B.C.I.* b. Derb. To drive a heading through disturbed or faulty ground in such a way as to meet the seam of coal, at a convenient level or point on the opposite side. *See also* eat out. *Fay.* c. To take molten glass from a furnace for shaping; the amount of glass so taken (gathered) is called a gather also. *Dodd.*

gatherer. One who dips iron rod into molten glass, removing a specified amount on the end of the rod. Blows on pipe to begin inflation of glass and then hands pipe to glassblower for completion of blowing. *D.O.T. 1.*

gathering area. The area, usually down the regional dip from a hydrocarbon trap, from which the oil or gas may have migrated updip into the trap. *A.G.I.*

gathering arm loader. A machine for loading loose rock or coal. It has a tractor-mounted chassis, carrying a chain conveyor the front end of which is built into a wedge-shaped blade. Mounted on this blade are two arms, one on either side of the chain conveyor, which gather the material from the muckpile and feed it on to the loader conveyor. The tail or back end of the conveyor is designed to swivel and elevate hydraulically so that the coal or stone can be loaded into a car or on to another conveyor. *See also* loader. *Nelson.*

gathering coal. Scot. *See* gathering peat. *Fay.*

gathering conveyor. a. Any conveyor which is used to gather coal from other conveyors and deliver it either into mine cars or onto another conveyor. The term is frequently used with belt conveyors placed in entries where a number of room conveyors deliver coal onto the belt. *Jones.* b. Generally 500 feet or greater in length. It receives material from rooms or entries and transports it to a car loading point or to another conveyor. Sometimes known as a mother conveyor or an entry conveyor. *NEMA MB1-1961.* c. A gate conveyor which carries coal from more than one source or face. *See also* steel plate conveyor; truck conveyor. *Nelson.*

gathering ground. *See* catchment area.

gathering haulage. That portion of the haulage system immediately adjacent to the face. In longwall mining, the face belt or tubs and track along the face constitute the gathering haulage system. *Wheeler, H.R., p. 1.*

gathering hole. An opening in the working end of a glass tank furnace, or in the wall of a pot furnace, to permit the gathering of molten glass. *Dodd.*

gathering iron. The iron used in taking viscid glass from the melting pot. *Standard, 1964.*

gathering locomotive. *See* gathering motor; electric gathering mine locomotive.

gathering mine locomotive. *See* gathering motor; electric gathering mine locomotive.

gathering motor. A lightweight type of electric locomotive used to haul loaded cars from the working places to the main haulage road, and to replace them with empties. *Fay.* Also called gathering locomotive. *See also* electric gathering locomotive.

gathering motorman. In bituminous coal mining, one who operates a mine locomotive to haul loaded mine cars from working places to sidings, for the formation of larger trips (trains) to be handled by a haulage cable or a main-line locomotive. Also called relay motorman. *D.O.T. 1.*

gathering mule. The mule used to collect the loaded cars from the separate working places, and to return empties. *Fay.*

gathering peat. Scot. A peat used to maintain a fire all night, hot embers being gathered about it. *Standard, 1964.*

gathering pumps. Portable or semiportable pumps that are required when water is encountered while opening a new mine, for extending headings or entries in an operating mine, for pumprooms or rib sections lying in the dip, for collecting water from local pools, or for sinking a shaft. They should discharge water at a point high enough for it to flow into a station pumping plant or into a drainage ditch or tunnel carrying water outside a mine. They may also discharge directly on the surface. Either reciprocating or self-priming centrifugal pumps may be employed as gathering pumps. *BuMines Bull. 570, 1957, p. 1.*

gathering rod. *See* gathering iron. *Fay.*

gathering zone. Suggested by Finch for the space above the ground water level. *See also* zone of discharge; static zone. *Fay.*

gatton. Scot. *See* gauton. *Fay.*

gaudefroyite. Black hexagonal prisms, $Ca_4M^{+3}n_{3-x}[(BO_3)_3(CO_3)(O_{1-x}(OH)_x)_3]$; from Tachgagalt, Morocco. *Hey, MM, 1964; Fleischer.*

Gaudin's equation. An equation for the particle size distribution that can be exepected when a material is crushed in a ball mill or rod mill; it is of the form $P = 100(x/D)^m$, where P is the percentage passing a sieve of aperture x, D is the maximum size of particle, and m is a constant which is a measure of dispersion. The equation holds good only if the ratio of size of feed to size of balls is below a critical value which, for quartz, is 1:12. *Dodd.*

gauge. *See* gage. *Fay.*

gaul. An old Irish name for coal. *Tomkeieff, 1954.*

gault. a. To cover (soil) with clay obtained from the subsoil. *Webster 2d.* b. Eng. *See* folkstone marl. *Fay.* c. Eng. Clay. Applied to the Albian formation between the Lower and Upper Greensand which underlies parts of the Fens. Also, the name is used for watercourses cut in the clays, for example, Sutton Gault, and the Gault, near Chatteris. *Arkell.*

gault clay. A calcareous clay with a short vitrification range used for making building bricks in southeast England. Bricks made from this clay are generally porous and cream colored, but in a few localities red bricks are made from it. *Dodd.*

gauntree; ganntry. *See* gantry. *Fay.*

gauslinite. A local name for burkeite. From Searles Lake, Calif. *English.*

gauss. The unit of magnetic field intensity equal to 1 dyne per unit pole. The preferred term for this unit is oersted. One oersted equals 10^5 gammas. Gauss was used before the official adoption of the oersted in 1932. *See also* gamma; oersted. *A.G.I.; Webster 3d.*

gaussbergite. An igneous rock similar to orendite but carrying augite and olivine in place of phlogopite and having a glass base. *Johannsen, v. 4, 1938, p. 262.*

gauteite. A name derived from the Gaute Valley, central Bohemia, and given by Hibsch to a leucocratic dike rock of porphyritic texture and trachytic habit. The phenocrysts are hornblende, augite, and abundant plagioclase. The groundmass is about 80 percent feldspar rods, with the remainder, magnetite grains, small grains of hornblende, augite, biotite, and a small quantity of colorless glass. Gauteite is regarded as a complementary dike rock to neighboring camptonites, and it is believed to correspond to deep-seated monzonite. *Fay.*

gauton. Scot. A watercourse cut in the floor of a mine or working. *Fay.*

gauze. The wire mesh used to prevent the passage of flame from a flame safety lamp to the external atmosphere. *B.S. 3618, 1963, sec. 2.*

gauze lamp. Scot. A (so-called) safety lamp, formerly used in the Scotch coal mines. It is a kind of Davy lamp, with a gauze top about 3 inches in diameter, and has no brass frame to strengthen it and no glass. *Fay.*

gavel. A mason's setting maul. *Standard, 1964.*

gavelock. Eng. An iron poker or lever; a crowbar. Also spelled gablack. *Fay.*

gavia. A term used in Spain for a primitive method of carrying ore in baskets on men's shoulders up inclined shafts in which steps were cut. *Fay.*

gaw. a. Scot. A narrow vein of igneous rock intersecting the strata. *Fay.* b. A small channel cut for drainage purposes; furrow; trench. *Webster 3d.*

gawl. An irregular or uneven line of coal face. *C.T.D.*

gayet. French name for sapropelic coal, such as torbanite or cannel. *Tomkeieff, 1954.*

gayeterie. Belg. Second quality coal remaining after the large pieces have been removed. *See also* gayette. *Fay.*

gayette. Belg. Large picked coal. A variation of the French, gaillette. *Fay.*

Gayley process. The process for the removal of moisture from the blast of an iron blast furnace by reducing the temperature of the blast current so that the moisture is deposited as snow. *Webster 2d.* The use of the dehydrated blast effects great fuel economy, and promotes regularity in iron-smelting operations. *Fay.*

Gay-Lussac's law. When gases react, they do so in volumes which bear a simple ratio to one another, and to the volumes of their products if these are gaseous, temperature and pressure remaining constant. Also called law of gaseous volumes. *Cooper.*

Gay-Lussac's tower. a. In sulfuric-acid making, a tower filled with pieces of coke over which concentrated sulfuric acid trickles down, and meeting the gas issuing from the lead chambers, absorbs its nitrous anhydride, which otherwise would be lost. *Standard, 1964.* b. *Compare* Glover's tower. *Fay.*

gaylussite. A hydrous carbonate of sodium and calcium mineral, $Na_2Ca(CO_3)_2.5H_2O$; monoclinic. *Dana 17.*

GCT Abbreviation for Greenwich civil time; Greenwich conservatory time. *Zimmerman, pp. 51-441.*

Gd Chemical symbol for gadolinium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Ge Chemical symbol for germanium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

geanticline. a. A broad uplift, generally referring to the landmass from which sediments in a geosyncline are derived. *A.G.I.* b. A major uplifted area from which sediments are eroded. *Ballard.*

gear. a. Eng. In the Derbyshire coalfield, a general name for all deads when cut out of the wholes. Formerly called work. *Arkell.* b. Eng. A set of workmen's tools. *SMRB, Paper No. 61.* c. The moving parts or appliances collectively that constitute some mechanical whole or set, linked meshing, and fitted together, and serving to transmit motion or change its rate or direction. Commonly used in the plural. *Hess.* d. A gear wheel. *Hess.* e. Synonym for feed gear. *Long.* f. The accessory tools and equipment required to operate a drill. *Long.* g. A set of enmeshing-toothed rotating parts or cogwheels designed to transmit motion. *Long.* h. A toothed wheel, cone, or bar. *Nichols.*

geared coupling. Consists in effect of two hubs with external gear teeth which mesh with a two-piece cover sleeve with internal teeth. The sleeve retains the lubricant. *Pit and Quarry, 53rd, Sec. D, p. 66.*

geared press. A press whose main crank or eccentric shaft is connected by gears to the driving source. *ASM Gloss.*

gear feed. Synonym for screwfeed. *Long.*

gear-feed head. Synonym for screwfeed swivel head. *Long.*

gear-feed swivel head. Synonym for screwfeed swivel head. *Long.*

gearhead. N. of Eng. The motor drive, switch gear, and unloading device of a conveyor belt. Face conveyor gearheads may stand in the mothergate or in a caunch at the side of the gateway. *Trist.*

gearman. One who rides on a donkey. *C.T.D.*

gearman, head. In ore dressing, smelting, and refining, one who tends a coarse or primary crusher that breaks large lumps of ore into a smaller size so that it may be run through smaller crushers or shipped to a plant for extraction of the valuable metal or minerals. *D.O.T. 1.*

gear motors. Consisting of a preassembled motor and geared speed reducer, gear motors have a single mounting and provide a highly efficient means of obtaining practically any speed below 1,550 revolutions per minute for motors up to 75 horsepower. The motors may be alternating current or direct current, either open or enclosed, and the units are adaptable to most operating conditions. These units are suitable for any application where slow speeds are required. *Pit and Quarry, 53rd, Sec. D, p. 13.*

gear pump. A type of positive-displacement pump consisting of two tightly enmeshing gears within a close-fitted shell. When the gears are rotated at high speed the pump is capable of delivering a liquid under high pressure, as the pressurized oil delivered to the hydraulic-feed cylinders on a hydraulic-feed drill. *Long.*

gear ratio. The relationship between the speeds of the first and last shafts, respectively, of a train of gears. If a certain force drives a machine at a given speed and the output shaft runs at one-tenth of the speed of the input shaft, then the output force will be 10 times the input. If the gear ratio of a motor-driven machine be 10 to 1, then the turning force of the last shaft will be 10 times that of the motor, apart from force used up in friction. *Mason, v. 2, p. 353.*

gears; pair of gears. a. Two props and a plank, the plank being supported by the props at either end. *Zern.* b. Toothed wheels for transmitting motion. *Zern.* c. Staging and rails erected at quays over coal chutes. *See also* double timber. *Fay.* d. Eng. A plank supported by a prop at each end. *SMRB, Paper No. 61.*

Geary sampler. *See* Geco sampler. *Pryor, 3.*

Gebhardt survey instrument. A borehole surveying instrument often used to test the verticality of the freezing holes in shaft sinking. A vernier scale is used to determine the positions of the pendulum points at successive points and by summating the results an accurate plan of the course of the borehole can be prepared. An accuracy of within 3 inches may be expected in a freezing hole of about 600 feet. *Nelson.*

Geco sampler. Straight-line cutter designed to traverse a falling stream of ore or pulp at regular intervals, so as to divert a representative sample to a holding vessel. A moving chute or other deflecting device is driven across the stream of mineral by means of motor and chain. The cutter of the Geary-Jannings sampler is carried on a sturdy traversing screw. Driving gear is controlled by a timing mechanism and is automatically reversed after each cut and left ready for the next (return) cut. *Pryor, 3.*

gedanite. A brittle fossil resin sometimes classed as amber, but not by those who specify the presence of succinic acid as a requirement, although Schlossmacher mentions a trace of it in gedanite. It lacks toughness and ability to take as high of a polish as succinite. Rarely used as a gem except for beads. Mohs' hardness, 1.5 to 2; specific gravity, 1.06 to 1.07. *See also* fossil resin; Baltic amber. *Shipley.*

Gedinnian. Lower Lower Devonian. *A.G.I. Supp.*

gedrite. A variety of anthophyllite in which aluminum is present in a considerable amount. *Dana 17, p. 444.*

gees. York. Miner's term for coal made of alternating hard and soft laminae with smut partings. *Tomkeieff, 1954.*

geest. a. High, gravelly land; gravel. *Standard, 1964.* b. A name proposed by DeLuc in 1816 for the immediate products of rock decay in situ. It is a provincial word for earth in Holland and northern Germany. *Compare* laterite; saprolite. *Fay.*

gefarht. Ger. The course or direction of a lode. *Fay.*

geg; gag. Scot. A piece of stone or other obstruction preventing the proper closing of a pump valve. The valve is said to be gegged when so obstructed. *Fay.*

gegen ions. Those produced by dissociation of a colloidal electrolyte; of opposite sign to the colloidal ions. *Pryor, 3.*

gehlenite. A tetragonal silicate of calcium and aluminum; an end-member of an isomorphous series collectively known as melilite. *C.M.D.*

Geiger counter; Geiger-Müller counter. a. An ionization chamber that records the number of radioactive particles impinging upon it per minute, thus detecting radioactive substances. *Bateman.* b. An instrument that detects gamma rays given off by radioactive substances. It consists of a discharge tube which responds to the ionization produced by the rays in a gas which fills the tube. *A.G.I.* c. An ionization chamber with its vacuum and its applied potential so adjusted that a gamma ray or other ionizing particle through it causes a momentary current to flow. The surge of current can be amplified and counted so as to measure the intensity of radioactivity in the vicinity of the chamber. *A.G.I.*

Geiger-Müller counter tube; Geiger-Müller tube. A gas-filled chamber usually consisting of a hollow cylindrical cathode and a fine wire anode along its axis. It is operated with a voltage high enough so that a discharge triggered by a primary ionizing event will spread over the entire anode until stopped by the reduction of the field by space charge. *NRC-ASA N1.1-1957.*

Geiger-Müller probe. A Geiger-Müller counter encased in a watertight container, which can be lowered into a borehole and used to log the intensity of the gamma rays emitted by the radioactive substances in the rock formations traversed. Also called electronic logger; Geiger probe. *Long.*

Geiger-Müller survey meter. Designed for general survey work and locating low intensities of contamination, this battery-powered detector will respond to beta and gamma. The Geiger tube is mounted in a hand probe or is built into the instrument itself. Has headphones as well as a visual scale. Removable shielding devices permit the counting of gamma alone. Applications include mineralogical surveys, checking clothing and apparatus, locating small spills, following tracer elements, etc. *Bests, p. 606.*

Geiger probe. *See* Geiger-Müller probe. *Long.*

Geiger test; Geiger testing. The act or process of using a Geiger-Müller probe or counter to measure the intensity of the gamma rays emitted by the radioactive substance contained in rocks traversed by a borehole. *Long.*

geikielite. A bluish- to brownish-black titanate of magnesium and iron, $(Mg,Fe)TiO_3$; hexagonal; rhombohedral; usually in rolled pebbles. From Belangoda and Rakwana districts, Ceylon. *English.*

geine; gein. An old name for the soil humus. *Tomkeieff, 1954.*

geisotherm; geisothermal. Same as isogeotherm. *Standard, 1964.*

Geissler tube. a. A sealed and partly evacuated glass tube containing electrodes. Used for the study of electric discharges through gases. *Standard, 1963.* b. A gas-filled discharge tube having various shapes and usually a narrowly constricted portion in which the luminosity is intensified. *Webster 3d.*

gel. a. A form of matter in a colloidal state that does not dissolve but remains suspended in a solvent from which it fails to precipitate without the intervention of heat or of an electrolyte. *Fay.* A gel offers little resistance to liquid diffusion and may contain as little as 0.5 percent of solid matter. Some gels (for example, gelatin) may contain as much as 90 percent water, yet in their properties are more like solids than liquids. *C.T.D.* b. Colloidal solution in which the dispersed phase is absorbed by the solvent so as to form a meshwork of micelles, having the viscous structure of a jelly. Three types of gel are (1) the unstable, typified by thixotropic systems with very labile meshworks, (2) the meta stable (for example, gelatins with elastic recovery), and (3) stable (such as silica gels which are irreversible between liquid and solid form). *Pryor, 3.* c. A colloidal suspension in such a state that shearing stresses below a certain finite value fail to produce permanent deformation. The minimum shearing stress which will produce permanent deformation is known as the shear or gel strength of the gel. Gels commonly occur when the dispersed colloidal particles have a great affinity for the dispersing medium, that is, are lyophilic. Therefore, gels commonly occur with bentonite in water. *Brantly, 1.* d. A colloid in a more solid form than a sol. As a semisolid, apparently homogeneous substance that may be elastic and jellylike (as gelatin) or more or less rigid (as silica gel) and that is formed by coagulation of a sol in various ways (as by cooling, by evaporation, or by precipitation with an electrolyte). Or as a nonhomogeneous gelatinous precipitate. *Webster 3d.* e. As a verb, to change into or take on the form of a gel; to become more solid; to set. *Webster 3d.*

Gelamite. Trademark for a semigelatin high explosive of relatively high weight strength of 65 percent; very good water resistance. Used in underground mining, in quarrying, in construction, and in general blasting. *CCD 6d, 1961.*

gelatin; gelatine. a. A hard, transparent, tasteless colloid obtained from animal connective tissues, such as skin, hoof, and horns. The dried material swells on contact with cold water to a jellylike mass or dissolves in hot water to form a firm jellylike mass on cooling. Gelatin dissolved in hot water is used commonly in borehole surveying with a Maas compass. *Compare* agar. *Long.* b. Commonly used as a synonym for gelatin dynamite. *Long.*

gelatin borehole tube. A device used in borehole surveying. A tube, containing a compass floating in molten gelatin, is lowered to the point in the borehole at which its verticality is required. It is left in position until the gelatin sets and is then withdrawn. The compass indicates the direction and a small plumb bob shows the angle of dip *Nelson.*

gelatin dynamite. A high explosive which varies in composition; consists mainly of nitroglycerin, with sodium nitrate, meal, collodion cotton, and sodium carbonate. *Pryor, 3.* It is dense, plastic, and more water-resistant than straight or extra dynamite. Its relatively high velocity makes it ideal for hard, tough rock, for wet conditions, or for actual underwater blasting. *Carson, p. 308.* Commonly used by drillers to shatter boulders encountered in driving pipe through overburden, especially in water-filled or saturated ground. Also commonly called gelatin. *Long.*

gelatin extras. Explosives in which a portion of the nitroglycerin is replaced with ammonium nitrate. The explosive velocity is reduced but the substantial resistance to water is retained. Less expensive than gelatin dynamites. *Carson, p. 308.*

gelatinization. Solubility with the formation of jellylike silica. *Fay.*

gelatin-pad printing. *See* Murray curvex machine. *Dodd.*

gelatins. A general term relating to explosives in which a principal constituent, nitroglycerin, is given a gelatinous consistency by mixing it with nitrocotton. *B.S. 3618, 1964, sec. 6.*

gelation. The formation of a gel from a sol. *Webster 3d.*

gel cement. Cement to which a small percentage of bentonite has been added either dry or mixed with water. Such an addition particularly adapts the slurry for use in cementing casing and recovering lost circulation because. it reduces loss of slurry to the formation, makes for a more homogeneous mixture, increases the water-cement ratio, reduces loss of water to the formation, and sets in substantially the same volume as occupied when placed. *Brantly, 1.*

gel coalite. High explosive; used in mines. *Bennett 2d, 1962.*

Gelex dynamite. A semigelatin explosive. Used in gypsum, limestone, and metallic ore mines. *Bennett 2d, 1962.*

gelignite. A general term relating to explosives of the gelatin type in which there is a proportion of wood, metal, and oxygen-containing salts. *B.S. 3618, 1964, sec. 6.*

Gelignite. Explosive consisting of nitroglycerin, ammonium nitrate and nitrocotton; used for blasting and initiating less sensitive explosives. *Bennett 2d, 1962.*

Gelite I.L.F. High explosive; used in mines. *Bennett 2d, 1962.*

gelitocollinite coal. This type coal is characterized by a predominance (over 50 percent) of a groundmass (collinite) translucent in thin sections, resulting from complete decomposition in the process of gelification of the original plant material. As a rule, the collinite material occurs as homogeneous floccular masses. Gelified components showing structure are only rarely represented in the form of lenses and thin strips of vitrinized wood fibers, gelified fragments of bark, and leaf parenchyme tissue. Fusinized inclusions are rare. There may be occasional concentrations of homogeneous, opaque particles and fine fragments of fusinized tissue, sometimes also coarse lenses of semifusinite and fusinite. The proportion of lipoid microcomponents varies from a single inclusion to the maximum concentration permitted in these gelitocoals. Occasionally this type of coal may contain algae of the pila type. Hand specimens are generally semilustrous with a uniform coarsely banded structure, and break with a typical, slightly conchoidal fracture. This coal may have low or high ash, and occurs in seams of different geological age as distinctive bands within a seam or as entire seams of varying thickness. Medium rank gelitocollinite coals are valuable for coking. *IHCP, 1963, part I.*

gelitoposttelinite coal. This coal is characterized by a preponderance (more than 50 percent) of fragments of gelified tissue less than 0.2 millimeter in size. The individual fragments take different forms such as lenticular, ribbonlike, angularly round and round. Their outline may also occur in gelitoposttelinite coals in minor amounts. All the structured components are distinct by reason of their somewhat darker coloring and are embedded in a transparent groundmass, varying in amount in different cases. Gelitoposttelinite coal is distinguished from gelitotelinite coal by more marked fragmentation of the plant material and a higher degree of gelification. In hard coals, gelitoposttelinite coal is generally lustrous or semilustrous and in brown coals semimatt or sometimes even matt. It is usually finely striated. This coal may have high or low ash. It occurs in seams of different geological age as bands within seams or as entire seams several meters thick; gelitoposttelinite coals of medium rank are valuable for coking. *IHCP, 1963, part I.*

gelitoprecollinite coal. This coal consists of more than 50 percent of very fine gelified fragments of tissue, which, although having lost their original cell structure, have more or less retained their shape. The outline of the fragments is rather indistinct, and where decomposition has been sufficiently marked, individual fragments overlap and form a gelified mass with honeycomb structure. Minor amounts of lipoid and fusinized microcomponents as well as some opaque matter also occur in this type of coal. Gelitoprecollinite coal is lustrous or semilustrous in hard coals and semimatt to matt in brown coals. It is finely striated or homogeneous to the unaided eye and breaks with a slightly conchoidal fracture. It may have high or low ash and occurs in seams of different geological age as bands within seams or as entire seams several meters thick. Medium rank gelitoprecollinite coals are valuable for coking. *IHCP, 1963, part I.*

gelitotelinite coal. This coal contains 50 percent or more of gelified, vitrinitic components. The size of the constituent entities generally varies between 0.2 and 1.0 millimeter although coarser forms (1.5 to 2.0 millimeters) are also seen. Fusinized tissue is not common and liptinite is insignificant. Gelitocollinitic material is present in greater or lesser amounts. Wood gelitotelinite coals and parenchyme gelitotelinite coals are distinguished according to the preponderance of the type of original plant tissue. Wood gelitotelinite coal consists largely of individual fragments of stems and rhizomes, wood tissue predominating. They are invariably low in ash. Parenchyme gelitotelinite coals consist chiefly of cuticle-bordered leafy material; the parenchyme tissue is markedly gelified. Here and there the leafy material may be closely packed forming aggregates; at other times it is found in varying quantities embedded in a transparent groundmass. Parenchyme gelitotelinite coals may have high or low ash. In hand specimens gelitotelinite coal is black and in hard coals, lustrous or semilustrous; in brown coal it is matt or semimatt. Gelitotelinite coal shows sharp-edged, stepped fracture and occurs in seams of different geological age, both as bands within seams or as entire seams up to several meters thick. Compared with other gelitic types of coal, gelitotelinite coals of medium rank are characterized by very high caking power and because of this are valued for coke making. *IHCP, 1963, part I.*

Gelobel. Trademark for gelatin-type permissible explosives that have high density and high water-resistance ratings. Used for coal mining where high strength, high velocity, concentration of charge, and water resistance are desired. *CCD 6d, 1961.*

gélose. The colloidal product of plant decay that becomes the principal constituent of coal. *Tomkeieff, 1954.*

gélosic coal. Coal rich in gélose; for example, algal coal. *Tomkeieff, 1954.*

gélosite. Constituent of torbanite, consisting of birefringent pale yellow microscopic crushed spheres. *Tomkeieff, 1954.*

gel strength. The ability or the measure of the ability of a colloid to form gels. *Brantly, 1.*

gem. a. A general term including any precious or semiprecious stone, as diamond, ruby, topaz, etc., especially when cut or polished for ornamental purposes. *Fay.* b. Archaeologically, the term is restricted to an engraved stone, for example, an intaglio or a cameo. *Fay.* c. Mineralogically, one of the orders of minerals used by Mohs that are distinguished by their hardness (enough to scratch quartz), transparency, nonmetallic luster. They are generally brilliant and beautiful. *Fay.* d. As used by drillers and bit setters, a small, virtually flawless, lustrous, nearly spherical, industrial-grade diamond, which on rare occasions may be used as a drill diamond. Also called bullet; gem grade. e. A diamond free of flaws—as far as can be determined by a trained observer with the aid of a 10-power magnifying glass—and having a color and other characteristics that do not deleteriously affect its value for use as a faceted ornamental (gem) diamond. *Long.*

gem color. The most desirable color for a stone of its particular variety. Perfection color. *Shipley.*

gem crystal. A crystal from which a gem can be cut. *Shipley.*

gem grade. *See* gem, a and b. *Long.*

gem gravel. A sediment of gravel grade containing appreciable amounts of gem minerals. It was formed by the disintegration and transportation of preexisting rocks, in which the gem minerals originated. They are placers of a special type, in which the heavy minerals are not native gold or cassiterite (SnO_2), but such gem minerals as garnets, rubies, sapphires, etc. As most of the gem minerals are heavy and chemically stable, they remain near the point of origin, while the lighter constituents of the parent rocks are washed away, resulting in a natural concentration of the valuable components. *C.T.D.*

gemmary. a. The science of gems. *Standard, 1964.* b. A house or receptacle for gems or jewels; also, gems collectively. *Standard, 1964.* c. An engraver of gems. *Standard, 1964.*

gem material. A term used particularly to mean (1) any synthetic or other important substitute for a gemstone, or (2) any rough mineral from which a gemstone can be fashioned, such as a piece of uncut jade. *Shipley.*

gem mineral. Any mineral species which yields either a gem variety or individual specimens which meet the qualifications of a gem. *Shipley.*

gemmological polariscope. *See* Shipley polariscope. *Shipley.*

gemmologist. One who has mastered gemmology. *Shipley.*

gemmology (U.S.); gemology (Eng.). The study of gems. *A.G.I.*

Gemolite. A trademark for an illuminator designed especially to illuminate inclusions (in gemstones) more effectively. Employs either monocular or binocular microscope. *Shipley.*

gem pearl. a. A term often used for those better qualities of fine pearls, which possess a rose or other particularly desirable orient. Does not include white pearl. *Shipley.* b. A term more specially used to mean an iridescent pearl, really spherical, with maximum luster of even intensity, free from all visible blemishes and of a decided and desirable orient, such as pink rose. *Shipley.*

gem quality. Possessing the qualifications of a gem. *Shipley.*

gem species. A gem-bearing mineral species. *Shipley.*

gem stick. A stick on the end of which a gem is cemented while being cut. *Standard, 1964.*

gem stone. A term that includes pearl, amber, coral, jet, or any stone of any variety of a gem mineral, which is of sufficient beauty and durability for use as a personal ornament. *See also* decorative stone; ornamental stone; gem material. *Shipley.*

gem variety. That variety of a mineral species which yields gemstones. *Shipley.*

general-crusher foreman. In ore dressing, smelting and refining, one who directs and coordinates all operations concerned with reducing ore to designated size. *D.O.T. Supp.*

general drawing. A drawing showing elevation plan, and cross section of the structure, also the borings for substructure and the main dimensions, etc. *Nichols.*

general geology. The branch of geology treating of the problems of dynamic geology in relation to the geologic history of the earth. *Schieferdecker.*

generalized section. A drawing showing characteristics of various distinct areas grouped together in one section. *Schieferdecker.*

general manager. Imports general authority to perform all reasonable things in conducting the usual and customary business of his principal. *Ricketts, I.*

general shear failure. Failure in which the ultimate strength of the soil is mobilized along the entire potential surface of sliding before the structure supported by the soil is impaired by excessive movement. *ASCE P1826.*

general soil survey. A general investigation of superficial deposits. The sampling procedure may include augers, boreholes, and trial pits, and tests are made to cover soil identification. This type of survey aims at establishing soil profiles and locating areas requiring special investigation. *See also* detailed soil survey; preliminary soil survey. *Nelson.*

generated heat. Heat resulting from the grinding operation. *ACSG, 1963.*

generating station. A station in which electric generators are operated by prime movers. *Fay.*

generation. In petrology, all those crystals, of one or several species, that form at the same period of the cooling and solidification of an igneous rock. The same species may have one, two, or very rarely, three generations. *Fay.*

generator. a. A source of electricity, especially one that transforms heat or mechanical work directly into electric energy, as opposed to a voltaic battery. *See also* dynamo. *Standard, 1964.* b. A vessel, chamber or machine in which the generation of a gas is effected, as by chemical action. *Standard, 1964.* c. In a water-gas plant, the refractory-lined chamber in which fuel is gasified by blowing in steam and air alternately. *Dodd.*

generator gas. Producer gas. *Webster 2d.*

genesis. In gemmology, the origin or formation of a natural gem mineral. *Shipley.*

genetic classification. Any classification based on manner of origin or line of descent. Genetic classifications are set up to deal with fossils, rocks, and minerals. *Stokes and Varnes, 1955.*

genetic halo. A geochemical anomaly resulting from primary dispersion. *Hawkes.*

Geneva ruby. An artificial ruby. *Fay.*

geniculate. A term meaning knee-shaped and applied to certain types of crystal. In minerals, for example, rutile TiO_2 crystals may sometimes be twinned on the second order pyramid (101) so that they are bent at a sharp angle. Such twinned crystals are said to be geniculate twins. *Merriman.*

Genite A. Nongelatinous permissible explosive; used in mining. *Bennett 2d, 1962.*

Genter filter. A filter utilized in coal-washing plants for the recovery of fine coal particles. *Bureau of Mines Staff.*

Genter thickener. Cylindrical tank with obtuse conical base around which raking gear moves slowly, pushing settled sludge to a central discharge. In the body of the tank hang radially mounted tube frames covered with filter cloths (socks). These are connected with a central valve and timing mechanism, so set that vacuum is applied for from one to ten minutes to remove filtrate, after which the gathered solids are displaced by a brief flush-back so that they fall to the raking zone. *Pryor, 3.*

genthelvite. The zinc end-member, $Zn_4Be_3Si_3O_{12}S$, of the helvine group. Named from helvine and after Professor William Genth of Philadelphia, who in 1892 described, under the name danalite, a single crystal containing 85 percent of this component. *Spencer 17, M.M., 1946.*

genthite. A hydrous, nickel-magnesium silicate mineral, theoretically TNiO.2MgO.$3SiO_26H_2O$, but the nickel content is variable. *Sanford.*

gently inclined. Said of deposits and coal seams with a dip of from 5° to 25°. *Stoces, v. 1, p. 56.*

genuine doublet. *See* doublet. *Shipley.*

genuine pearl. A natural pearl in contrast to a cultured pearl. *Shipley.*

genuine triplet. *See* triplet. *Shipley.*

genus. A group of two or more species of animals or plants; plural, genera. *Shipley.*

geo. In Iceland, a narrow inlet walled in by steep cliffs. *Fay.*

geo-. Prefix from the Greek ge, meaning land, of the land, or earth. *Pryor, 3.*

geobotanical indicators. Some plants develop peculiar diagnostic symptoms that can be interpreted directly in terms of probable excesses of a particular element in the soil. Geobotanical indicators are either plant species or characteristic variations in the growth habits of plants that are restricted in their distribution to rocks or soils of definite physical or chemical properties. They have been used in locating and mapping ground water, saline deposits, hydrocarbons and rock types, as well as ores. *Hawkes, 2, pp. 305-306.*

geobotanical prospecting. Prospecting in which visual observation of plants is used as a guide to finding buried ore. Whereas biogeochemical methods require chemical analysis of plant organs, the geobotanical methods depend on direct observations of plant morphology and the distribution of plant species. *Hawkes, 2, p. 290.*

geobotany. a. The use of vegetation as a guide to ore deposits. Metals and other elements may modify the appearance of foliage. Also, it has been shown that collecting and analyzing selected parts from growing plants disclose measurable amounts of chemical elements whose quantity is too small for direct detection. The expert interpretation of the data and trends may prove of value to the prospector. *Nelson.* b. The study of plants as related specifically to their geologic environment. *Hawkes, 2, p. 305.*

geocerain. *See* geocerite. *Fay.*

geocerellite. A white, brittle, alcohol-soluble oxygenated hydrocarbon which melts at 82° C. *Fay.*

geocerin. *See* geocerite. *Tomkeieff, 1954.*

geocerite; geocerain; geocerin. A flaky wax-like hydrocarbon, approximately $C_{27}H_{53}O_2$, occurring in brown coal. Identical with leucopetrite. *See also* geomyricite. *Tomkeieff, 1954; Fay.*

geochemical anomaly. A concentration of one or more elements in rock, soil, sediment, vegetation, or water markedly different from the normal concentration in the surroundings. Sometimes applied also to abnormal concentrations of hydrocarbons in soils. *A.G.I.* Geochemical anomalies originating at depth are called primary anomalies while those originating on the surface are called secondary anomalies. *Lewis, p. 296.*

geochemical balance. Term relating, for instance, to the ratios of distribution of the total amount of a chemical element liberated by rock weathering, and transported to the ocean, between sea water and sea-bottom sediments. *Schieferdecker.*

geochemical classification. The division of chemical elements into associations as they are found in nature. *Schieferdecker.*

geochemical coherence. The phenomenon of the intimate occurring together of certain chemical elements in nature, as, for example, the group of the lanthanides, zirconium-hafnium, niobium-tantalum, etc. *Schieferdecker.*

geochemical cycle. The sequence of stages in the migration of elements during geologic changes. Rankama and Sahama distinguish a major cycle, proceeding from magma to igneous rocks to sediments to sedimentary rocks to metamorphic rocks and possibly through migmatites back to magma, and a minor or exogenic cycle proceeding from sediments to sedimentary rocks to weathered material and back to sediments again. *A.G.I.*

geochemical environment. Pressure, temperature, and the availability of the most abundant chemical components are the parameters of the geochemical environment that determine which mineral phases are stable at any given point. On the basis of these variables, it is possible to classify all the natural environments of the earth into two major groups—primary and secondary. The primary environment extends downward from the lower levels of circulating meteoric water to the deepest level at which normal rocks can be formed. It is an environment of high temperature and pressure, restricted circulation of fluids, and relatively low free-oxygen content. The secondary environment is the environment of weathering, erosion, and sedimentation at the surface of the earth. It is characterized by low temperatures, nearly constant low pressure, free movement of solutions, and abundant free oxygen, water, and CO_2. *Hawkes, 2, pp. 10-11.*

geochemical exploration. Exploration or prospecting methods depending on chemical analysis of the rocks or soil, or of soil gas, or of plants. *A.G.I.*

geochemical landscape. The pattern, in any given area, in which the net effect of all the dynamic forces concerned in the movement of earth materials will be reflected in the overall pattern of distribution of the elements. *Hawkes 2, p. 22.*

geochemical mapping. The systematic collection and processing of a very large number of samples accompanied by the proper presentation and interpretation of the resulting analytical data. *Hawkes 2, p. 351.*

geochemical prospecting. a. The search for concealed deposits of metallic ores by analyzing soils, surface waters, and/or organisms for abnormal concentrations of metals. *A.G.I.* b. The search for petroleum accumulations by analyzing soil gases for hydrocarbons. *A.G.I.* c. Any method of mineral exploration based on a systematic measurement of the chemical properties of a naturally occurring material. *Lewis, p. 296.*

geochemical prospection method. A prospection method consisting in the determination of the tenor of a trace element or trace elements in natural vegetation, soil, surface waters, etc., as an aid in mineral prospecting. *Schieferdecker.*

geochemical province. a. A segment of the earth's crust whose chemical composition is significantly different from the average, and is identified by comparison of the composition of igneous rocks. *Lewis, p. 300.* b. An apparent local variation in the original composition of the earth's crust. *Hawkes.*

geochemical relief. Relief determined by geographical variations in the levels of concentration of the elements. Geochemical relief is defined not only by the contrast between high and low values but also by the homogeneity of their distribution. *Hawkes, 2, p. 22.*

geochemical survey. A survey involving the chemical analysis of systematically collected samples or rock, soil, plants, or water; this expression may be further modified by indicating specifically the material sampled, as, for example, geochemical soil survey. *Hawkes.*

geochemistry. a. The study of the relative and absolute abundances of the elements and of the atomic species (isotopes) in the earth; the distribution and migration of the individual elements in the various parts of the earth (the atmosphere, hydrosphere, crust, etc.), and in minerals and rocks, with the object of discovering principles governing this distribution and migration. Geochemistry may be defined very broadly to include all parts of geology that involve chemical changes, or it may be focused more narrowly on the distribution of the elements, as in Mason's definition; the latter is commonly understood if the term is used without qualification. *A.G.I.* b. A prospecting method which seeks to locate mineral deposits by the detection, in the overlying soil, of very small quantities or traces of the metals concerned. *Compare* microgas survey. *Nelson.*

geochronic. Of or pertaining to geological time. *Standard, 1964.*

geochronologic unit. A unit of geologic time, for example, period and epoch. *A.G.I. Supp.*

geochronology. The study of time in relationship to the history of the earth, or a system of dating developed for this purpose. Absolute chronology (sometimes called absolute age) involves dating of geologic events in years. Relative chronology involves the system of successive eras, periods, and epochs used in geology and paleontology. Literally, the science of earth time. *A.G.I.*

geochronometry. The measurement of geologic time. *A.G.I. Supp.*

geochrony. Geologic chronology; the system of time divisions used in geology. *Webster 3d.*

geocronite. A mineral, $Pb_5(Sb,As)_2S_8$, consisting of a usually massive lead-gray lead antimony arsenic sulfide. *Webster 3d; Dana 17.* Orthorhombic.

geode. a. A hollow nodule or concretion, the cavity of which is commonly lined with crystals of calcite or quartz; some are lined with smooth chalcedony or limonite. Most are formed of crystalline silica which may or may not have a shell of chalcedony, others are composed of limonite, colemanite, celestite, barite, or other minerals, and most have been formed in shales or other soft rocks. Distinguished from vugs which are residual or solution cavities in veins or rocks, and may be crystal-lined. *Fay; Hess.* b. The cavity in a geode. *Webster 3d.*

geodepression. A long, narrow depression, not necessarily filled by sediments. *A.G.I.*

geodesist. One who employs surveying and geodetic instruments, such as transits, theodolites, and other engineering instruments, in setting up and improving network of triangulation over the earth's surface, in order to provide fixed points for use in making maps. *D.O.T. 1.*

geodesy. a. A branch of applied mathematics that determines by observation and measurement the exact positions of points and the figures and areas of large portions of the earth's surface, the shape and size of the earth, and the variations of terrestrial gravity and magnetism. *Webster 3d.* Also called geodetics. b. Survey which includes corrections for the surface curvature of the globe. *Pryor, 3.*

geodetic coordinates. Latitude and longitude as calculated on the spheroid. *Seelye, 2.*

geodetics. *See* geodesy. *Fay.*

geodetic surveying. That very accurate method of surveying which takes into consideration the spheroidal form of the earth's surface. Used in topographic and hydrographic work. *Crispin.*

geodimeter. An instrument which employs an electronic method of measuring distance by measuring the time it takes a modulated light wave to travel from the master unit to a mirror and to return. *H&G.*

geodynamic. Of, pertaining to, or noting the forces or processes within the earth. *Stokes and Varnes, 1955.*

geofault. A large fault directly affecting the relief of the earth's surface, on land or beneath the sea. *Challinor.*

geoflexure. A large flexure directly affecting the relief of the earth's surface. *Challinor.*

geofraction. A fracture passing through the entire thickness of the solid crust. *Schieferdecker.*

geognosy. a. A branch of geology that deals with the materials of the earth and its general interior and exterior constitution. *Webster 3d.* b. An old term for absolute knowledge of the earth, as distinct from geology, which includes various theoretical aspects. *C.T.D.*

geogony. A science or a theory of the formation of the earth. *Webster 3d.*

geographical concentration. The ratio of face length in yards (X) to length of main haulage roads in yards (L), that is $\frac{X}{L}$. *See also* concentration of output. *Nelson.*

geographical cycle. Every landform passes through a comparatively systematic series of changes from its youth, when its form is defined chiefly by constructional processes, past its maturity, when the processes of subaerial sculpture have carved a great variety of moldings and channelings, toward its old age, in which the accomplishment of the full measure of denudation reduces the mass essentially to baselevel, however high it may have been originally. It has become accustomed to call this unmeasured time a geographical cycle. Synonym for cycle of erosion. *See also* geomorphic cycle. *A.G.I.*

geographic or true north. The northerly direction of the geographic meridian at any terrestrial point. *B.S. 3618, 1963, sec. 1.*

geography. The science that treats of the surface of the earth, including its form and development, the phenomena that take place thereon, and the plants, animals, and peoples that inhabit it, considered in relation to the earth's surface; also, a book or treatise on the above subject. *Fay.*

geohydrology. The science dealing with the character, source, and mode of occurrence of underground water. *Schieferdecker.*

geoid. The figure of the earth considered as a mean sea-level surface extended continuously through the continents. *A.G.I.*

geolith. A rock stratigraphic unit. *A.G.I. Supp.*

geologian. An old term for geologist. *Fay.*

geologic; geological. The generally preferred usage is as follows: geologic data; geologic investigation or survey; geological organization, survey, or society; geological era; and geological time. *A.G.I.*

geologic age. The time of existence of a fossil organism or the occurrence or duration of a particular event as stated in terms of the conventional geological time scale. Any event not datable in terms of years is usually given a relative geologic age. *Stokes and Varnes, 1955.*

geological agent. A force or instrument by means of which a geological process operates. *Challinor.*

geological formations. Groups of rocks of similar character and age. *Fay.*

geological horizon. A particular bed of rock or its equivalent, generally used as referring to the bed containing a fauna or flora under consideration. Less often, used to mean igneous rocks of a particular period of time. *Hess.*

geological ore. Ore that, so far as geological conditions show, may be present. *Hess.*

geological province. An area throughout which geological history has been essentially the same or which is characterized by particular structural or physiographic features. *Schieferdecker.*

geological section. a. A natural rock cut. *Schieferdecker.* b. The representation of such on paper. *Schieferdecker.*

geological survey. A systematic investigation of an area determining the distribution, structure, composition, history, and interrelations of rock units. Its purpose may be either purely scientific or economic with special attention to the distribution, reserves, and potential recovery of mineral resources. *Stokes and Varnes, 1955.*

Geological Survey. A Federal or State governmental organization that undertakes such investigations. *Stokes and Varnes, 1955.*

geological time. The time extending from the end of the Formative period of earth history to the beginning of the Historical period. It is conveniently divided into several periods, each being the time of formation of one of the systems into which the stratigraphical column is divided. Thus, the Carboniferous period is the interval of time during which the rocks including the Carboniferous limestone, Millstone Grit, and Coal Measures in Britain, and the Mississippian and Pennsylvanian strata in the United States, were in the process of formation. The complete list of periods from the oldest to the youngest is: Precambrian, Cambrian, Silurian, Devonian, Carboniferous, Permian, Triassic, Jurassic, Cretaceous, Tertiary, and Quaternary. The position of any rock in this time seequence is fixed by the fossils it contains. The absolute measurement of geological time is a baffling problem, but the ages of igneous rocks can be measured by highly specialized chemical methods, one being based on the estimation of the minute quantities of helium spontaneously generated in certain radioactive minerals (*see* pleochroic halos). Baron G. de Geer has used the examination of the laminations in varve clays to measure the time which has elapsed since the Pleistocene glaciation. *C.T.D.*

geologic chronology. The system of time divisions used in geology. Synonym for geochrony. *Schieferdecker.*

geologic column. A diagram showing the subdivisions of part or all of geologic time or the rock formations of a particular locality. *Stokes and Varnes, 1955.*

geologic drilling. Drilling done primarily to obtain information from which the geology of the formations penetrated can be determined. *See also* geology. *Compare* formation testing. *Long.*

geologic formation. *See* formation. *Stokes and Varnes, 1955.*

geologic high. Sometimes used in oilfields to indicate a later geological formation regardless of elevation; opposite of geologic low, which refers to earlier formations. *Compare* topographic high. *Fay.*

geologic legend. Attached to geological maps is a legend which shows the correct sequence of formations. The oldest formation is shown at the bottom, the youngest at the top. This constitutes a geological column. Any symbols and any colors may be used to represent rocks of different geological periods. Nevertheless, certain standard colors have been adopted by the U.S. Geological Survey and other national surveys. The U.S. Geological Survey prefers explanation to legend. *Stokes and Varnes, 1955.*

geologic low. *See* geologic high. *Fay.*

geologic map. A map upon which geologic information is plotted. The distribution of the formations is shown by means of symbols, patterns, or colors. The surficial deposits may or may not be mapped separately. Folds, faults, mineral deposits, etc., are indicated by appropriate symbols. *Stokes and Varnes, 1955.*

geologic mineralizer. Substance that promotes mineral concentration and crystallization during solidification of rock-forming material, particularly in pegmatite dikes. *Bennett 2d, 1962 Add.*

geologic section. A graphic representation, made from actual observations or inferred from other evidence, of underground geologic conditions along a given line or plane of the earth's crust. *Stokes and Varnes, 1955.*

geologic structure. *See* structure, b. *Nelson.*

geologic survey. A survey or investigation of the character and structure of the earth, of the physical changes which the earth's crust has undergone or is undergoing, and of the causes producing those changes. *A.G.I.*

geologic thermometer. A term applied to known temperature limits within which certain minerals or mineral aggregates must have formed; based on the thermal data relating to the fusion points of rocks and minerals, and the inversion or transition points of allotropic modifications of rock-forming compounds, and in general, to the equilibrium conditions and stability ranges under different conditions of pressure for various minerals, allotropes, solid solutions, eutectics, and other mineral aggregates. *Holmes, 1928.*

geologic time unit. The time unit corresponding with a time-stratigraphic unit; for example, period, epoch, or age. *A.G.I. Supp.*

geologist. a. One who studies the constitution, structure, and history of the earth's crust, conducting research into the formation and dissolution of rock layers, analyzing fossil and mineral content of layers, and endeavoring to fix historical sequence of development by relating characteristics to known geological influences (historical geology). *D.O.T. 1.* b. One versed in the science of geology or engaged in a geological study or investigation. Also called by drillers core snatcher; rock hound; sample grabber; sniffer. *Long.*

geologist, petroleum. One who explores and charts stratigraphic arrangement and composition of earth in order to locate gas and oil deposits. Identifies strata encountered in well drillings by studying well logs, analyzing cores and cuttings, and interpreting data obtained by electrical or radioactive well logging or other subsurface surveying operations. Evaluates results of geophysical prospecting and prepares surface and subsurface maps and diagrams to show stratigraphic arrangement and composition of earth, and probable deposits of gas and oil. *D.O.T. 1.*

geologize. To study geology or make geological investigations; to discourse as a geologist. *Stokes and Varnes, 1955.*

geology. A science that deals with the history of the earth and its life, especially as recorded in the rocks. Three principal branches or phases are usually distinguished: (1) structural, or geotectonic, geology, treating of the form, arrangement, and internal structure of the rocks; (2) dynamic geology, dealing with the causes and processes of geological change; and (3) historical geology, aiming to give a chronological account of the events in the earth's history. *Webster 2d.* Other subdivisions are: (1) economic geology, which deals with the applications of the science in industrial relations and operations; (2) legal geology, the application in litigation of the facts and principles of geology, particularly its subdivisions, mineralogy, economic geology, and mining geology; (3) mining geology, a subdivision of economic geology concerned with the application of geologic facts and principles to mining; and (4) stratigraphic geology, a study of the succession of the beds of rock laid down during the progress of geologic ages. *Fay.*

geomagnetic electrokinetograph. A current measuring device dependent upon the principle that an electrolyte moving through magnetic field (the earth's) will generate an electric current. Abbreviation, GEK. *Hy.*

geomagnetician. One who sets up magnetic observatories and stations in order to chart the earth's magnetic field, and applies data obtained to problems in the fields of telephony, telegraphy, radio broadcasting, navigation, mapping, and geophysical prospecting. Also called terrestrial magnetician. *D.O.T. 1.*

geomagnetic meridian. *See* magnetic meridian. *H&G.*

geomagnetic pole. Pole of the earth's magnetic field located about 4,000 miles above its surface, does not correspond to the surface magnetic pole; one is at 78½° north, 69° west and the other at 78½° south, 111° east. *A.G.I. Supp.*

geometrical effects. A term to describe the effects of bed thickness and borehole diameter on the magnitude of S.P. deflections. *Wyllie, p. 41.*

geometric mean diameter. The diameter equivalent of the arithmetic mean of the logarithm frequency distribution. In the analysis of beach sands it is taken as that grain diameter determined graphically by the intersection of a straight line through selected boundary sizes (generally points on the distribution curve where 16 and 84 percent of the sample by weight is coarser) and a vertical line through the median diameter of the sample. *H&G.*

geometric progression. Series of numbers increasing by multiplication, which uses a constant factor. *Pryor, 3.*

geometry. That branch of mathematics that deals with the relations of points, lines, angles, shapes, areas of surfaces, and volume of solids. *Jones, 2, p. 80.*

geomorphic. Of or relating to the form of the earth or its surface features; resembling the earth. *Webster 3d.*

geomorphic cycle. The term geomorphic cycle is used here instead of the old term geographical cycle which is less accurate. Synonym for geographical cycle; cycle of erosion. *A.G.I.*

geomorphogeny. That part of geomorphology which treats of the origin and development of the earth's surface features. *Fay.*

geomorphologist. A specialist in the study of the origin and development of the earth's surface features. *Hess.*

geomorphology. A science that deals with the land and submarine relief features of the earth's surface and seeks a genetic interpretation of them through using the principles of phyisography in its descriptive aspects and of dynamic and structural geology in its exploratory phases. *Webster 3d.*

geomyricin. *See* geomyricite. *Fay.*

geomyricite. A waxlike, white mineral, melting at about 80° C, and soluble in hot absolute alcohol and ether; its composition ($C_{34}H_{68}O_2$) is near that of certain vegetal waxes. *Fay.*

geonomy. The science of the physical laws of the structure and development of the earth. *Standard, 1964.*

geophone. A detector, placed on or in the ground in seismic work, which responds to the ground motion at the point of its location. Synonym for seismometer; seismograph; geotector; pickup; jug; tortuga. *A.G.I.*

geophysical. Relating to the physics of the earth. *Fay.*

geophysical logging. The lowering of equipment into a borehole and recording continuously or intermittently various types of physical information. Numerous types of geophysical logs can be recorded, the more common being rate of penetration, temperature, gamma-ray, electric, and caliper (for hole diameter). *Nelson.*

geophysical prospecting. Prospecting for minerals, mineral fuels, or the nature of earth materials by measuring the various physical properties of the rocks, and interpreting the results in terms of geologic feature or the economic deposits sought. Physical measurements are taken at the surface of differences in the density, electrical resistance, or magnetic properties of the rocks. There are four main methods employed in geophysical prospecting, namely, gravitational, magnetic, electrical, and seismic with several modifications of each. *Nelson.*

geophysical prospector. One who studies structure of subsurface rock formations in order to locate petroleum deposits, using such physical and electrical testing instruments as seismograph, gravimeter, torsion balance, magnetometer, pendulum devices, and electrical-resistivity apparatus to measure various characteristics of the earth. May be designated according to type of equipment used, as electrical prospector, gravity prospector, magnetic prospector, and seismic prospector. *D.O.T. 1.*

geophysical site investigation. The measurement of the various physical properties of rocks at a site and interpreting the information in terms of geologic structure and nature of deposits. Of the various established geophysical methods of investigating sites, the electrical resistivity method is the best known. It may be used to contour concealed rock surfaces and detect discontinuities. The geophysical method is particularly useful for making a rapid survey of a large site, especially when used in conjunction with boreholes or trial pits. *Nelson.*

geophysical survey. The exploration of an area in which geophysical properties and relationships unique to the area are mapped by one or more geophysical methods. *A.G.I.*

geophysicist. One who studies seismic, gravitational, electrical, thermal, and magnetic phenomena to determine structure and composition of earth, and forces causing movement and warping of surface. Investigates origin and activity of glaciers and volcanoes, and the course and phenomena of earthquakes; charts ocean currents and tides; takes measurements concerning shape and movements of earth, and acoustic, optical, and electrical phenomena in the atmosphere; and locates petroleum and mineral deposits. May specialize in a particular phase of the work, as exploration, administration, research, consulting, design, or teaching. *D.O.T. 1.*

geophysics. The science of the earth with respect to its structure, composition, and development. It is a branch of experimental physics dealing with the earth, including its atmosphere and hydrosphere. It includes the sciences of dynamical geology and physical geography, and makes use of geodesy, geology, seismology, meteorology, oceanography, magnetism, and other earth sciences in collecting and interpreting earth data. Geophysical methods have been applied successfully to the identification of underground structures in the earth and to the search for structures of a particular type, as, for example, those associated with oil-bearing sands. *A.G.I.*

geordie. a. Scot. A coal miner. *Webster 3d.* b. Scot. A coal miner's safety lamp. *Webster 3d.*

geordie turnout. Aust. A turnout (switch), from a heading to a bord, made of iron bars of square cross section instead of ordinary T-rails, so that the same turnouts can be used to the right or left by simply reversing them. *Fay.*

georgiadesite. A white, brownish-yellow, chloroarsenate of lead, $Pb_3(AsO_4)_2.3PbCl_2$; orthorhombic. Small hexagonal crystals. Occurs on lead slags. From Laurium, Greece. *English.*

Georgian. Lower Cambrian. *A.G.I. Supp.*

Georgian glass. Reinforced fire-resisting building glass. *Bennett 2d, 1962.*

geosphere. The solid portion of the earth, including water masses; the lithosphere plus the hydrosphere. Above the geosphere lies the atmosphere and at the interface between these two regions is found almost all of the biosphere, or zone of life. *H&G.*

geostatic. Capable of sustaining the pressure of superincumbent earth. *Fay.*

geostrophic motion. Motion which is unaccelerated and frictionless is geostrophic or earth-tuned. The direction of geostrophic flow is along the isobaric lines and is proportional in speed to the spacing of the isobars, closer lines indicating greater speed. *Hy.*

geosutures. Large mobile zones between more rigid blocks formed in the course of early geologic time. *Schieferdecker.*

geosyncline. a. A large, generally linear trough that subsided deeply throughout a long period of time in which a thick succession of stratified sediments and possibly extrusive volcanic rocks commonly accumulated. The strata of many geosynclines have been folded into mountains. Many different kinds have been differentiated and named. *A.G.I. Supp.* b. The area of such a trough. *A.G.I. Supp.* c. A stratigraphic surface that subsided in such a trough. *A.G.I. Supp.*

geotechnical processes. The name given to those processes which change the properties of soils, and which include compaction, electro-osmosis, freezing, ground-water lowering, and injection. *Ham.*

geotechnics. a. The engineering behavior of all cuttings and slopes in the ground. This term is gradually replacing the term "soil mechanics". *Institution of Mining and Metallurgy. Symposium on Opencast Mining, Quarrying, and Alluvial Mining. London, 16-19 November, 1964. Paper 17, pp. 1-2.* b. A science of making the earth more habitable. *Webster 3d.*

geotechnology. A term including earth sciences, mineral economics, mineral engineering, and mineral technology. *Bennett 2d, 1962.*

geotectonic. Of or relating to the form, arrangement, and structure of the rock masses of the earth's crust. Synonym for structural. *Webster 3d.*

geotector. Synonym for geophone. *A.G.I.*

geothermal; geothermic. Of or relating to the heat of the earth's interior. *Webster 3d.*

geothermal gradient. The change in temperature of the earth with depth, expressed either in degrees per unit depth, or in units of depth per degree. *A.G.I.*

geothermal steam. Steam drawn from deep within the earth. There are currently about 90 known places in the continental United States where geothermal steam could be harnessed for power, and these are in California, Idaho, Nevada, and Oregon. *Bureau of Mines Staff.*

geothermic degree. The average distance into the earth equivalent to an increase of one degree in temperature. *Standard, 1964.*

geothermic gradient. *See* strata temperature. *Roberts, I.*

geothermometer. A thermometer designed to measure temperatures in deep-sea deposits or in boreholes deep below the surface of the earth; a geologic thermometer. *Webster 3d.*

geotumor. A major updoming of the surface of the earth's crust due to physicochemical reactions occurring at depth. *Schieferdecker.*

gerasimovskite. The niobium analogue of belyankinite, occurring in an ussingite pegmatite from the Lovozero massif, Kola Peninsula, U.S.S.R. *Hey, M.M., 1961.*

gerhardite. A basic copper nitrate containing 52.9 percent copper. Crystallization, orthorhombic. Cleavage, yields flexible laminae. Tenacity, fragile and sectile. Mohs' hardness, 2; specific gravity, 3.426; luster, vitreous, brilliant; color, deep emerald-green; streak, light green; transparent; soluble in dilute acids. From Jerome, Ariz. *Weed, 1918.*

german. A straw tube filled with gunpowder and used as a fuse. Not used in coal mines. *C.T.D.*

germanate-pyromorphite. Artificial $Pb_5(PO_4)_2$-GeO_4; apatite family. *Hey, M.M., 1964.*

German cupellation. A method using a large reverberatory furnace with a fixed bed and a movable roof. The bullion to be cupelled is all charged at once and the silver is not refined in the same furnace where the cupellation is carried on. *Fay.*

German cut. *See* pyramid cut. *Fraenkel, v. 1, Art. 6:02 p. 27.*

German gold. Amber. *Shipley.*

germanite. A dark, reddish-gray sulfarsenite of copper, iron, and germanium, $5Cu_2S.12(Cu,Fe)S.As_2S_3.2GeS_2$; isometric; usually massive. From Tsumeb, Southwest Africa. *English.*

germanium. A grayish-white, rare metallic element occurring in a few minerals and in coal. One source is the mineral argyrodite, a double sulfide of germanium and silver. The main use of the metal, which has exceptional properties as a semiconductor, is in the manufacture of solid rectifiers or diodes in microwave detectors and, in a highly pure state, in transistors. Symbol, Ge; valences, 2 and 4; isometric; atomic number, 32; atomic weight, 72.59; specific gravity, 5.323 (at 25° C); melting point, 937.4° C; boiling point, 2,830° C; insoluble in water and in alkalies; and soluble in hot sulfuric acid and in aqua regia. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-112, B-176.*

germanium dioxide (insoluble). GeO_2; tetragonal; molecular weight, 104.59; specific gravity, 6.239; melting point, 1,086° ± 5° C; insoluble in water and in hydrochloric acid; and slightly soluble in ammonium hydroxide. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-177.*

germanium dioxide (soluble). GeO_2; melting point, 1,115° C. This oxide is a glass former and provides some unique properties; for example, greater dispersion; lower melting temperature; and higher transmissivity for infrared radiation. Some germanium oxide complexes and solid solutions have ferroelectric properties. *Lee.* Colorless; specific gravity, 4.228 (at 25° C); hexagonal; soluble in alkalies; and slightly soluble in acids and in water. Used as an ingredient of special glass mixtures. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-177.*

germanium nitride. Ge_3N_4; decomposes at 800° C. A special electroceramic of high resistivity. *Dodd.*

German lapiz. *See* Swiss lapiz. *C.M.D.*

German process. *See* Continental process.

German reduction process. This process consists in: (1) roasting the ore; (2) melting and obtaining a matte with 30 to 40 percent copper called coarse metal; (3) roasting the coarse metal; (4) melting and obtaining a matte with 60 to 70 percent copper called fine metal; (5) roasting the fine metal; and (6) melting and obtaining black copper. *Fay.*

German silver. An alloy of copper, zinc, and nickel. *Crispin.*

German steel. A metal made from charcoal iron obtained from bog iron or from sparry carbonate of iron. *Fay.*

German tubbing. A form of tubbing, with internal flanges and bolts, for lining circular shafts sunk through heavily watered strata. Where conditions are favorable, concrete is replacing tubbing as a shaft lining. *See also* English tubbing. *Nelson.*

germination. *See* grain growth. *ASM Gloss.*

gersdorffite. A sulfarsenide of nickel mineral, NiAsS or $NiS_2.NiAs_2$; isometric. Iron and sometimes cobalt replaces more or less of the nickel. It is usually massive and has a silver-white to steel-gray color. *Dana 17.*

Gerstenhofer furnace. A shaft furnace, filled with terraces or shelves, through which crushed ore is caused to fall for roasting. *Fay.*

gerstleyite. Sodium sulfantimonite and sulfarsenite, $Na_4As_2Sb_8S_{17}.6H_2O$, as red spherules, monoclinic (?) with borates in clay from Kramer, Calif. *Spencer 21, M.M., 1958.*

get. a. Eng. To work away or excavate by mining either under or above ground. *Fay.* b. The produce or output, in tons, of a colliery or mine during a certain period. *Fay.*

get cleanup. Ark. To have an opportunity to load out all the coal a miner has loosened. *Fay.*

getter. a. Eng. A miner who gets out coal or ore. *Standard, 1964.* b. Substance used to combine with the residual oxygen in an electric bulb or tube. Its use is called gettering. *Pryor, 3.*

getting. a. Eng. Cutting, mining, and loading coal, etc., in a mine. *Fay.* b. The actual process of digging clay, by hand or by excavator; getting and transporting form the successive stages of winning. *Dodd.*

getting-in-the-top. Eng. Cutting out and timbering the crown of the excavation for the tunnel. *Fay.*

getting rock. S. Staff. Clay ironstone in the roof of a coal seam, which is worked in conjunction with the coal. *Fay.*

geversite. A mineral, $PtSb_2$, cubic with pyrite-type structure, intergrown with native platinum at the Dreikop mine, Transvaal, Republic of South Africa. *Hey, M.M., 1961.*

geyes. Same as jays. *Tomkeieff, 1954.*

geyser; gusher. A volcano in miniature, from which hot water and steam are erupted periodically instead of lava and ashes during the waning phase of volcanic activity. Named from the Great Geyser in Iceland, though the most familiar example is probably Old Faithful in Yellowstone Park, Wyo. The eruptive force is the sudden expansion which takes place when locally heated water, raised to a temperature above boiling point, flashes into steam. Until the moment of eruption, this had been prevented by the pressure of the superincumbent column of water in the pipe of the geyser, which is usually terminated upwards by a sinter crater. *C.T.D.*

geyser basin. An area in which geysers are grouped. *Standard, 1964.*

geyserite. A hydrated form of silica, a variety of opal, deposited around some hot springs or geysers. *Fay.*

ggor Abbreviation for gross gas-oil ratio. Also abbreviated GGOR. *BuMin Style Guide, p. 59.*

ggpd Abbreviation for gross gas produced. Also abbreviated GGPD. *BuMin Style Guide, p. 59.*

ghaist. Scot. The white ash or cinder of shale of shaly coal. *Fay.*

ghaist coal. Scot. A coal which burns with a fixed, white, incandescent light. *Arkell.*

G.H.H. cappel. A type of rope cappel used with the Koepe winder, particularly in Germany. It consists mainly of two plates held together by bolts, incorporating a dead eye and wedge block. The rope is laced around this wedge and is self-tightening as the load increases. *See also* Demag cappel. *Nelson.*

ghizite. A glassy variety of an analcite and olivine-bearing basalt. *A.G.I.*

ghost. a. S. Staff. A blue cap on a candle or lamp. *Fay.* b. Scot. *See* veal. *Fay.*

ghost coal. Scot. An incandescent coal which, in burning, yields a fixed white light. *Standard, 1964.* Also called gaist. *Fay.*

ghost crystal. A crystal within which may be seen an early stage of growth, outlined by a thin deposit of dust or other mineral deposit. *C.M.D.*

ghost reflection. In the seismic reflection method, a special type of multiple reflection. This is the reflection which takes place when the energy traveling upward from the shot is reflected downward by the base of the weathered zone or by the earth's surface. The reflected pulse follows the primary downgoing pulse by a time interval determined by the depth of the shot below the weathering (or the free surface) and the velocity of the material above the shot. For normal shooting depths this interval will range from 0.010 to 0.020 seconds. *Dobrin, p. 143.*

ghost town. Deserted mining camp, or one in which only a few people remain after closing down of a once busy community. *Pryor, 3.*

ghoul. *See* grave robber. *Hoov, p. 275.*

ghurr. a. A term used by alchemists for the mineral substance which in time is supposed to ripen and become real ore. Glauber, the alchemist (from whom we get Glauber's salts, sulfate of soda) tells us that in Germany, the miners know when the ores are not grown to perfection, and usually say they have come too soon; they then shut up the mine again for some years until it is ripened and grown to perfection. Also called thurr; mother of metals. *Fay.* b. Gouge clay in a vein. *Arkell.*

giallo antico marble. A yellow marble used by the ancient Greeks and Romans; hence the name giallo antico or antique yellow. The source is Algeria. *Fay.*

giant. The nozzle of a pipe used to convey water for hydraulic mining and for the purpose of distributing or properly applying and increasing the force of the water. *Ricketts, I. See* hydraulic monitor. *Bureau of Mines Staff.*

giant granite. *See* pegmatite. *Fay.*

giant kettle. One of the numerous very large potholes (moulins) on the coast of Norway, probably formed by englacial waterfalls. *Standard, 1964.*

giant powder. a. A blasting powder consisting of nitroglycerin, sodium nitrate, sulfur, rosin, and sometimes kieselguhr. *Webster 3d.* b. Nitroglycerin absorbed by an inert filler such as kieselguhr. *Pryor, 3.*

Giant's Causeway. A sheet of columnar basalt covering large areas where the structure is finely displayed in the close-fitting hexagonal pillars distinctly marked, and varying in diameter from 15 to 20 inches, with a height of 20 feet in some places. It forms a prominent cliff on the north coast of Ireland. *Fay.*

giant tender. *See* nozzleman. *D.O.T. 1.*

gib. a. A temporary support at the face to prevent coal from falling before the cut is complete, either by hand or by machine. *B.C.I.* b. Scot. A sprag; a prop put in the holing of a seam while being undercut. *Fay.* c. A piece of metal often used in the same hole with a wedge-shaped key for holding pieces together. *Zern.*

gib and key. Scot. A two-part tightening wedge, one part, the gib, being fixed while the other part, the key or cotter, is adjustable lengthwise. *Standard, 1964.*

gibber. In geology, a faceted pebble or glyptolith; a dreikanter. *Fay.*

gibbers. S. Aust. Float fragments of rock. The surface of the tableland is strewn with the mantle of hard siliceous stones or gibbers characteristic of the terrain. *Hess.*

Gibbs adsorption theorem. A solute which lowers the surface tension of its solvent tends to concentrate at the air/liquid interphase, and vice versa. *Pryor, 3.*

Gibbs apparatus. A compressed-oxygen breathing apparatus used widely in the United States. The capacity of the oxygen bottle is 270 liters at a pressure of 135 atmospheres. The oxygen supply is sufficient for a minimum time of 2 hours and the flow is automatic. Caustic soda is used in the regenerator. The apparatus, which weighs about 35 pounds, is carried by a harness strapped to the wearer. *Nelson.*

gibbsite. The monoclinic hydroxide of aluminum material, $Al(OH)_3$. This mineral is a principal constituent of many bauxites. Specific gravity, 2.3 to 2.4; Mohs' hardness, 2.5 to 3.5. *Dana 17, pp. 603, 317.*

Gibbs' phase rule. *See* phase rule.

Gibraltar stone. A light-colored onyx marble found at Gibraltar. *See also* Mexican onyx. *Shipley.*

gibs. *See* sprags. *C.T.D.*

gibsonite. Scot. A fibrous, pink thomsonite from Renfrewshire and Dumbartonshire. *English.*

gieseckite. An aluminosilicate of magnesium and potassium, sometimes with appreciable FeO. *Hey 2d, 1955.*

gieseckite porphyry. A nephelite porphyry from Greenland, whose nephelite phenocrysts are altered to the aggregate of muscovite scales, which was called gieseckite under the impression that it was a new mineral. Liebenerite porphyry is the same thing from Predazzo, in the Tirol. *Fay.*

giessenite. Fine orthorhombic needles, $Pb_9CuBi_6Sb_{1.5}S_{30}$, occur in dolomite near Giessen in the Binn valley, Valais, Switzerland. Named from the locality. *Hey, M.M., 1964; Fleischer.*

gig. a. Scot. A winding engine. *Fay.* b. Eng. A small sump. *See also* sump. *Fay.* c. Eng. A two-storied box or cage for use in a mine shaft; also, a kibble. *Webster 2d.* d. A mine cage or skip. *C.T.D.* e. Gravity or self-acting haulage. Also called ginney. *Mason.*

gig house. Scot. A winding-engine house. *Fay.*

Gilard and Dubrul factors. *See* thermal expansion factors for glass. *Dodd.*

gilbert. Magnetomotive force at a given point is definable as work required to bring a positive unit pole to that point from an infinite distance. The gilbert is the magnetic potential against which an erg of work is done when the unit pole is thus transferred. Obsolete. *Pryor, 3.*

gilbertite. A variety of muscovite. A secondary mica. *Hey 2d, 1955.*

gild. To wash over or overlay thinly with gold; coat with gold, either in leaf or powder, or by electroplating; as, to gild a chandelier. To overlay with any other substance for the purpose of giving the appearance of gold. *Standard, 1964.*

gilder. *See* liner. *D.O.T. 1.*

gilder's white; gilder's whiting. Coarser grades of whiting or natural chalk. *Bennett 2d, 1962.*

gilding. Depositing a layer of gold by electroplating, or coating with gold leaf or powder by hand. The term is often applied to coating with bronze powder or liquid. *Crispin.*

gilding metal. High-copper red brass, with 90 to 97 percent copper and zinc as the remainder; used for jewelry and cartridge cap fabrication. *Bennett 2d, 1962.*

gillespite. A red silicate of iron and barium, $FeO.BaO.4SiO_2$. Tetragonal. From Dry Delta, Alaska; Mariposa County, Calif. *English.*

Gillie's process. A flotation process based upon the principles of the Potter-Delprat process but embodying some unique apparatus. The process never had any commercial success. *Fay.*

gill net. In oceanography, a fixed vertical net, having the headrope buoyed and the bottom rope weighted, in the meshes of which fish become entangled by their gill covers. *C.T.D.*

Gilman heat-treating machine. An automatic heat-treating machine used for tempering and hardening of drill bits at the mine. *Lewis, p. 97.*

Gilmore needle. Apparatus for the determination of the initial and final set of portland cement. It consists of two loaded rods which slide vertically in a frame; the rod (needle) for the determination of initial set is one-twelfth inch in diameter and weighs one-fourth pound; the needle for the final set is one-twenty-fourth inch in diameter and weighs 1 pound. *Compare* Vicat needle. *Dodd.*

Gilpin County table. *See* end-bump table. *Fay.*

gilsonite; uintaite; uintahite. a. An asphaltite or solidified hydrocarbons; found only in the United States, in Utah and Colorado. One of the purest (99.9 percent) natural bitumens. Mixes well with the fatty acid pitches in all proportions. Color in mass, black; conchoidal fracture; bright to fairly bright luster; brown streak. Specific gravity 1.05 to 1.10 (77° F); hardness (Mohs' scale) 2; penetration 0 (77° F). On heating in flame, softens and flows; trace to 1 percent mineral matter. Soluble in all proportions of carbon disulfide. (Usually melted in a varnish kettle, but also soluble in a lukewarm bath of naphtha under mechanical agitation.) Used in acid, alkali and waterproof coatings; lacquers, and japans; wire-insulation compounds; mineral wax; paving; waterproofing; also used as a source of petro-chemicals in some refineries. *CCD 6d, 1961.* b. A solid asphaltum found in place, in a vein, lode, or rock. *Fay.*

gime. Eng. A hole washed in an embankment by a rush of water through a leak. *Standard, 1964.*

gim peg. A cranked iron support in a lapidary's mill for the block into which the gem stick is struck. Also called gem peg. *Webster 3d.*

gin. a. Eng. A drum and framework carrying pulleys, by which the ore and waste are raised from a shallow pit; a whim. Also called horse gin. A contraction of engine. *Fay.* b. A pump worked by a windlass. *Standard, 1964.* c. A pile-driving machine. *Standard, 1964.* d. A small, hand-cranked hoist. *Long.* e. A drum framework and pulleys for hoisting mineral from a shallow shaft. *C.T.D.* f. Horse gear for hoisting through mine shaft. *Pryor, 3.* g. An old form of hoisting engine. *Mason.*

gin beam. S. Staff. A timber crossbar carrying the pulley wheels over the top of a headframe. *Fay.*

gin block. A simple form of tackle block attached to a gin. *Standard, 1964.*

ginging. The process of lining a shaft with bricks or masonry; the lining itself. *C.T.D.*

gingoni. Derb. Walling up a shaft, instead of timbering, to keep the loose earth from falling. *Fay.*

gin hand. One who assists pressman I by performing unskilled duties entailed in the feeding and unloading of a brick press, such as shoveling silica mud in path of bucket conveyor that feeds press, pushing empty rack cars in position for off-bearer who removes formed bricks from press, and pushing away filled rack cars. *D.O.T. 1.*

gin horse. A horse working a gin or mill. *Standard, 1964. See* gin, a. *Fay.*

ginnel(s). a. Cumb. Unshapely guts fringing the more irregular iron-ore bodies. *Arkell.* b. Cumb. An opening or crack in the rocks. *Arkell.*

ginneter. N. Staff. a. A term used in the potteries for a woman whose job it is to grind from china ware, after it has been taken from the glost kiln, any adhering particles of refractory material from the kiln furniture. *Compare* sorting. *Dodd.* b. From Ginnet, an old term for a tool used by carpenters to remove excrescences from wood. *Dodd.*

ginney. a. A journey set or train of tubs, trams, or trucks, or a self-acting incline, in a coal mine. *C.T.D.* b. In Nova Scotia, a prop. *Fay.*

ginney tender. A man working on an endless chain haulage. *C.T.D.*

ginny carriage. Eng. A small railway truck for transporting constructive materials. *Standard, 1964.*

ginny rails. Eng. Track rails for ginny carriages. *Fay.*

ginorite. A white hydrous calcium borate, $Ca_2B_{14}O_{23}.8H_20$ (?). Monoclinic. Minute lozenge-shaped plates aggregated into masses. From Tuscany, Italy. *English.*

gin pit. A shallow mine, the hoisting from which is done by a gin. *Fay.*

gin pole. a. The center pole of a drill tripod. *Long.* b. A pole used to support hoisting tackle. *Long.* c. The pole or bar on the top of a drill derrick to which a pulley tackle is fastened and used to hoist and place the crown block on top of a drill derrick. *Long.* d. Any one of the three poles of a hoisting gin. *Webster 3d.* e. A single pole held in a nearly vertical position by guys that support a block and tackle used for lifting loads. *Webster 3d.* f. A vertical, wooden, or steel mast rigged with block and tackle, together with rope or steel cable, by which mechanical power is employed to raise heavy weights to a desired position. Used in place of a crane. *Crispin.*

gin race. a. Eng. A wide excavation near the top of an underground inclined plane in which a gin is fixed. *Fay.* b. The circular path which a gin horse travels. *Standard, 1964.* Also called gin ring. *Fay.*

gin ring. *See* gin race.

gin tackle. A tackle arranged for use with a gin; especially, a combination of a double with a triple pulley block which multiplies by five the power exerted. *Standard, 1964.*

gin wheel. The cylinder of a gin or winch. *Standard, 1964.*

giobertite. *See* breunnerite. *Bennett 2d, 1962.*

Gipsy winch. A small winch that may be attached to a post, working either by a rotary motion or by the reciprocating action of a handle having a pair of pawls and a ratchet. *Standard, 1964.*

giraffe. a. A cagelike mine car especially adapted for inclines, having the frame higher at one end than at the other. *Standard, 1964.* b. A mechanical appliance for receiving and tripping a car of ore, etc., when it arrives at the surface. *Fay.* c. A multiple-deck skip. *Fay.*

girasol. a. A name which has been applied to moonstone, fire opal, and an almost transparent opal with a bluish floating light. *Shipley.* b. Describes any gem variety which exhibits a billowy, gleaming, round, or elongated area of light which floats, that is, moves about as the stone is turned or as the light source is moved. When the elongated light forms an uneven or indistinct band the stone is said to have a chatoyant effect. Only when the band is sharp and distinct is it a cat's-eye. *Shipley.* c. A name for glass spheres used in the manufacture of imitation pearls. *Shipley.*

girasol chrysoberyl. Cymophane with girasol effect but lacking true chatoyancy. *Shipley.*

girasol opal. An opal with blue to white body color and a red play of color as well. *Shipley.*

girasol pearl. An imitation pearl with a glass base. *Shipley.*

girasol sapphire. A sapphire with a floating cloud of light or with a wide indistinct light band. Often incorrectly called sapphire cat's-eye. *Shipley.*

Girbotol process. A wet scrubbing process for removing hydrogen sulfide from fuel gases in which aqueous solutions of aliphatic amines dissolve H_2S and CO_2, from gases. The dissolved gases may be recovered by boiling. Ethanolamines are the amines used in the Girbotol process, and diethanolamine is the preferred reagent, since monoethanolamine reacts irreversibly with COS and triethanolamine has low adsorptive capacity (though H_2S is absorbed preferentially). The solution used contains 15 to 30 percent diethanolamine. Absorption takes place in packed towers and regeneration is by steam in a bubble-cap tower. *Francis, 1965, v. 2, p. 429.*

girder. A main beam, usually of steel or reinforced concrete but may also be of timber. *Ham.*

girdle. a. N. of Eng. A thin bed of stone exposed in a shaft or borehole. *Fay.* b. Eng. A thin stratum of coal, Newcastle coalfield. *Fay.* c. A thin sandstone stratum. *Standard, 1964.* d. Flattened lenticles or nodules of any hard stone in softer beds. Sometimes extended also to beds. *Arkell.* e. The outer edge or periphery of a fashioned stone; that portion which is usually grasped by the setting or mounting; the dividing line between the crown and pavilion. In most diamonds it is left unpolished. On emerald-cut diamonds, on almost all colored stones, and on some brilliant-cut diamonds, polished girdles are placed. On the latter these often consist of a series or more or less flat polished surfaces which are more or less accurately termed girdle facets. *Shipley.* f. The line which encompasses a cut gem parallel to the horizon; or which determines the greatest horizontal expansion of the stone. *Hess.*

girdle facets. a. In a brilliant-cut stone, (1) in traditional trade usage, the same as break facets, or (2) a term more or less correctly applied to the polished or partly polished flat surfaces which often are placed on a polished girdle. *Shipley.* b. In other styles of cutting, especially emerald cut, the girdle is usually polished, producing well-defined rectangles or other parallelograms in contrast to the outline of those on brilliants, which are usually uneven and unsymmetrical in comparison. *Shipley.*

Girond process. In this process, fluorspar, soda ash, carbon, lime, and mill scale were thrown on to the bottom of a hot ladle, and thus sintered. On tapping the steel from the open hearth furnace into the ladle, the resulting boil removed part of the phosphorus. *Osborne.*

girth; girt. a. A brace member running horizontally between the legs of a drill tripod or derrick. *Long.* b. In square-set timbering, a horizontal brace running parallel to the drift. *Long.* c. A small girder. *Standard, 1964.*

Gish-Rooney method. An artificial-current conductive direct-current method of measuring ground resistivity which avoids polarization by continually reversing the current with a set of commutators. *A.G.I.*

gismondite. A mineral, $CaAl_2Si_4O_{12}+4H_2O$. *In pyramidal crystals, pseudotetragonal.* Colorless or white, bluish-white, grayish, reddish. *Fay.*

giumarrite. A variety of amphibole monchiquite. *Holmes, 1928.*

Giuetian. Upper Middle Devonian. *A.G.I. Supp.*

Gjer's soaking pit. A cavity lined with refractory material used in metal working to enclose large ingots, in order to preserve them at a high temperature, and thus avoid the necessity of reheating. *Fay.*

glaceramic. Term that has been used for devitrified glass products of the type most commonly known as pyroceram. *See also* pyroceram. *Dodd.*

glacial. In geology, pertaining to, characteristic of, produced, deposited by, or derived from a glacier. *Fay.*

glacial action. The grinding, scouring, plucking, and polishing effected by the ice, armed with rock fragments frozen into it; and the accumulation of the rock debris resulting from these processes. The extent to which meltwaters derived from the ice are responsible for both aspects of glacial action is an open question. *C.T.D.*

glacial boundary. The boundary line of the utmost extension of the lower margin of glacier land ice in any region, often extending beyond the outer terminal moraine. *Standard, 1964.*

glacial denudation. Disintegration of rocks consequent upon glacial conditions. The extent to which the enormous amount of erosion in the Pleistocene period was directly the work of ice is a disputed question, some believing that ice affords a protective covering, and that the erosion is effected by meltwaters, chiefly during the retreat of the ice sheets. *C.T.D.*

glacial-deposition coast. A coast consisting of glacial deposits. *Schieferdecker.*

glacial deposits. Synonym for glacial drift. *A.G.I.*

glacial drift. Boulders, till, gravel, sand, or clay transported by a glacier or its meltwater. *Mather. See also* drift.

Glacial epoch. The Pleistocene epoch, the earlier of two epochs comprised in the Quaternary period; characterized by the extensive glaciation of regions now free from ice. *Fay.*

glacial erosion. The erosion of earth and rocks produced by glacier ice charged with detritus, and assisted by glacial streams. *See also* glaciation. *Standard, 1964; Fay.*

glacial geology. The study of features resulting from glacial erosion and deposition. Opposite of glaciology, the study of the physics, form, and regimens of glaciers. *A.G.I.*

glacial groove. A large furrow cut by the abrading action of rock fragments contained in a glacier. *A.G.I.*

glacialism. The study of glacial action and history, especially with reference to the theory of a past continental glacier. *Standard, 1964.*

Glacialite. Trade name for a white clay from Enid, Okla., marketed as a fuller's earth. *English.*

glacialized. Subjected to the action of ice. *Standard, 1964.*

glacial overburden. Glacial-drift materials overlying bedrock. *See also* glacial drift. *Long.*

Glacial period. The time during which glacial ice flowed southward over a considerable part of the northern hemisphere. The Pleistocene time. *Hess.*

glacial planing and polishing. The leveling and smoothing of rock surfaces by ice erosion. *Standard, 1964.*

glacial sands. These are really of fluvioglacial origin and appear to have been formed by the action of water derived from the melting of ice upon the material brought down as a direct result of ice action. Glacial sands are generally rather coarse and irregularly graded. Boswell found range from .1-25 millimeters. The grains are fairly angular—much less regular than those formed by running water. *A.G.I.*

glacial scoring. The scratching and grooving of a rock surface by glacial erosion. *Fay.*

glacial scratches. *See* glacial striate. *Fay.*

glacial soil. Soil composed of boulder clays, moraines, etc., which were formed by the action of ice during the Pleistocene age. *Institution of Mining and Metallurgy. Symposium on Opencast Mining, Quarrying, and Alluvial Mining. London, 16-19 November 1964, Paper 17, p. 2.*

glacial stream. Applied to a stream of water flowing from a glacier. *A.G.I.*

glacial striae. a. Usually straight, more or less regular, scratches, commonly parallel in sets, on smoothed surfaces of rocks, due to glacial abrasion; synonym for glacial scratches. *Fay.* b. Curved, crooked, and intermittent gouges, of irregular depth and width, and rough definition, on certain rock surfaces, sometimes due to abrasion by icebergs. *Fay.*

glacial terrace. A glacial deposit rearranged in terrace form by water. *Standard, 1964.*

glacial till (till). Material deposited by glaciation, usually composed of a wide range of particle sizes, which has not been subjected to the sorting action of water. *ASCE P1826.*

glaciate. To overspread with glacial ice, or to produce the phenomena of planation, rock scoring, drift, etc. *Standard, 1964.*

glaciated. Covered by and subjected to the action of a glacier. *Fay.*

glaciated coast. Coast the features of which have been modeled by glacial influences. *Schieferdecker.*

glaciation. Effect on surface of land over which glacier has moved. Includes erosion, deposition, planing, polishing of rocks, releveling, change of drainage system, and lakes. *Pryor, 3.*

glacic. Same as glacial. *Fay.*

glacier. A stream or sheet of ice, formed by the compacting and recrystallization of great thicknesses of snow. If sufficiently large, glaciers flow down mountain valleys or outward across country in all directions from a center of accumulation, as in Greenland. When glaciers reach the sea, they break off and form icebergs, the size of which are proportional to the thickness of the glaciers. *Fay; Hess.*

glacier burst. The sudden release of a reservoir of water which has been impounded within or by a glacier. *Fay.*

glacier cataract. The passage of a glacier over a declivity in its bed. *Stokes and Varnes, 1955.*

glaciere. Fr. An artificial or natural cavity, in a temperate climate, in which a mass of ice remains unthawed throughout the year; an ice glen. *Standard, 1964.*

glacier grain. a. [illegible] granular texture of glacier ice. *Fay.* b. One of the grains of ice in a glacier. *Fay.*

glacier ice. If the body of ice developed from snow becomes great enough, it begins to spread or creep out from its place of accumulation. Ice thus moving is glacier ice. *A.G.I.*

glacierized. Pertains to terrain covered by glacier ice. This is a British usage. Most American writers prefer glacier covered. *A.G.I.*

glacier meal. *See* rock flour. *Fay.*

glacier milk. The milk-white water, charged with fine white sediment, that issues from beneath glaciers. *Standard, 1964.*

glacier mud. The pulverulent material, produced by glacial erosion, that is washed out from beneath a glacier and deposited at lower levels by glacial streams. Also called glacier silt. *Standard, 1964.*

glacier snow. The compacted mountain snow that is in the intermediate stage between ordinary snow and glacier ice; névé. *Standard, 1964.*

glacier table. A block of stone supported above the surface of a glacier on a pedestal of ice. *Webster 3d.*

glacier theory. The theory that large elevated portions of the temperate and frigid zones were covered during the early Quaternary, and perhaps during some earlier epochs, by slowly moving ice sheets and glaciers, that transported vast masses of drift to lower latitudes, assisted by icebergs drifting along the coast. No longer a theory, but accepted as fact. *Standard, 1964; Fay.*

glacio. A combining form frequently used with other words to denote formation by or relationship to glaciers. The usage is self-evident in such words as glacioaqueous, glaciofluvial, glaciomarine, and glaciolacustrine. *Stokes and Varnes, 1955.*

glacioaqueous. Pertaining to or resulting from the combined action of ice and water. *Standard, 1964.*

glaciofluvial. Of, pertaining to, produced by, or resulting from combined glacier action and river action. *Standard, 1964.*

glaciolacustrine. Of, relating to, or coming from lakes deriving much or all of their water from the melting of a glacier. *Webster 3d.*

glaciology. That branch of geology which treats of glaciers, the deposits formed by them, and the results of their action in modifying topography. *Fay.*

glaciomarine. Of, or relating to, processes or deposits which involve the action of glaciers and the sea, or the action of glaciers in the sea. *Fay.*

glacon. A fragment of sea ice ranging in size from brash to a medium floe. *Hy.*

glacure. Fr. A thin glazing on fine pottery. *Standard, 1964.*

gladite. A lead-gray sulfobismuthite of lead and copper, $2PBS,Cu_2S.5Bi_2S_3$. Prismatic crystals. From Gladhammar, Sweden. *English.*

gladkaite. A quartz lamprophyre containing andesine and hornblende and in smaller quantities both micas and epidote, has been called quartz spessartite. From Gladkaia Sopka, Northern Urals, U.S.S.R. *Hess.*

glady; gladii. Dev. Variegated black and white clay often associated with stoneware clays. *Arkell.*

glance. A term used to designate various minerals having a splendent luster, as silver glance, lead glance, etc. *Fay.*

glance coal. a. A term for anthracite. *Fay.* b. A compact black variety of brown coal (pitch coal). *Tomkeieff, 1954.* c. Bright coal. *Tomkeieff, 1954.*

glance cobalt. Same as cobaltite. *Standard, 1964.*

glance copper. Same as chalcocite. *Standard, 1964.*

glance pitch. A black asphaltite with a black streak and brilliant conchoidal fracture appears to be intermediate between the native asphalts and grahamite; considered to have been derived from a different character of petroleum than gilsonite. *See also* manjak. *Abraham, v. 1, 6d, 1960, p. 230.*

gland. a. Scot. A malleable iron band surrounding a pipe or log and tightened by means of bolts. *Fay.* b. The outer portion of a stuffing box, having a tubular projection embracing the rod, extending into the bore of the box, and bearing against the packing. *Standard, 1964.* c. The fixed engaging part of a positive-driven clutch. *Standard, 1964.* d. A bar hooked at both ends for clamping the parts of a molder's flask. *Standard, 1964.*

gland bridge. Scot. A bar or strip of iron to which a gland is sometimes bolted. *See also* gland, a. *Fay.*

glangey grays. Som. Hard sandstone mixed or striped with coal. *Arkell.*

glanzkohle. German name for bright coal or pitch coal. *Tomkeieff, 1954.*

glare. One of the major factors in the visual environment is the existence of glare. The range of brightness which the eye can discern at any given time is determined by the eye adaptation level, and is bounded by the upper extremes of glare and the lower extreme of a minimum discernible brightness, or brightness threshold. *Roberts, II, p. 92.*

glarimeter. *See* Ingersoll glarimeter. *Dodd.*

glasbachite. Zorgite. *Weed, 1918.*

glass. a. A product of fusion which has cooled to a rigid condition without crystallizing. By general definition, glass is inorganic. The most common (but not exclusive) glass-forming compound is SiO_2, which may dissolve a considerable quantity of other oxides within its structure. The most typical structural characteristic of glass is the presence of short-range atomic order, and the absence of long-range order. *See also* optical crown glass; enamel; flint optical glass; frit; glaze; plate glass; pyrex; silica glass; tempered glass. *VV.* b. A term sometimes used for porcelain enamel or frit. *ASTM C286-65.* c. The amorphous result of the quick chill of a fused lava. *See also* obsidian; volcanic glass. *Fay.* d. Eng. A collier's word for a dial. *Fay.*

glass agate. A name applied to transparent, to semitransparent, slightly gray chalcedony; also, even less correctly to obsidian. *Shipley.*

glass block. Building blocks made of glass for use in walls. *Mersereau, 4th, p. 328.*

glassblower. One who dips end of blowpipe into molten glass, gathering the exact amount for the given article on the end of the pipe, and blows through pipe to elongate glass and slightly inflate it with air. Swings blowpipe and attached glass into a mold of proper shape. May be designated according to article blown, as bottle blower. Also called blower. *D.O.T. 1.*

glass-bonded mica. *See* mica, glass-bonded. *Dodd.*

glassblowing. The shaping of hot glass by air pressure. *ASTM C162-66.*

glass-bonded mica. A material consisting of fine particles of mica embedded in a glass binder. *Skow.*

glass, borosilicate. *See* borosilicate glass. *Bennett 2d, 1962 Add.*

glass breaker. One who breaks off sheets of window glass at top of glass-drawing machine, trimming uneven borders with steel cutter. *D.O.T. 1.*

glass buffer. *See* glass polisher. *D.O.T. 1.*

glass, cased. *See* cased glass. *Bennett 2d, 1962 Add.*

glass, cellular. *See* cellular glass. *Bennett 2d, 1962 Add.*

glass ceramic. A material melted and formed as a glass, then converted largely to a crystalline form by controlled divitrification. *Phillips.*

glass-cloth screens. A device of clothlike material woven from glass fibers which is attached to a metal frame to form a box- or basin-shaped receptacle. The device, which takes the place of a metal screen in a distributing basin, is for filtering out impurities from the incoming stream of molten aluminum before the metal reaches the molds. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

glass-cloth skim pans. A device consisting of glass cloth attached to a metal frame which replaces the birdbath in casting of sheet ingot. The glass-cloth material is the same as that described under glass-cloth screens. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

glass-coated steel; glass-lined steel; glassed steel. Designations generally applied to a class of porcelain enamels which have high resistance to chemical attack at elevated temperatures and pressures. *ASTM C286-65.*

glass colors. This term is applied to chemicals or mixtures used to confer special properties on glass. *CCD 6d, 1961.*

glass container. A general term applied to glass bottles and jars. *ASTM C162-66.*

glass, Crookes. *See* Crookes glass. *Bennett 2d, 1962 Add.*

glass cutter-down. *See* cutter-down. *D.O.T. 1.*

glass cutter, machine. One who cuts glass into oval or circular shapes by machine. Adjusts machine to produce desired shape and manually guides cutting tool suspended by a steel rod over the glass. *D.O.T. 1.*

glass, document. *See* document glass. *Bennett 2d, 1962 Add.*

glass driller. One who, using an electric drill, drills holes in glass lamp shades to permit the attachment of metal frames or fixtures. *D.O.T. 1.*

glassed steel. A trade name used by segments of the chemical industry for porcelain enameled steel. *ACSG, 1963.*

glass electrode. A glass membrane electrode used to measure pH or hydrogen-ion activity. *ASM Gloss.*

glassen. To coat with or as with a glaze. *Standard, 1964.*

glass enamels. A series of finely ground fluxes, basically lead borosilicate, intimately blended with colored ceramic pigments. Different grades give characteristics of acid resistance, alkali resistance, sulfide resistance, or low lead release to meet requirements for various uses. Firing range 1,000° to 1,400° F (537.8° to 760° C). Used for fired-on labels and decorations on glassware, glass containers, illuminating ware, architectural glass, and signs. *CCD 6d, 1961.*

glass etcher. One who mixes baths of hydrofluoric acid, and dips glass into them so that portion of the glass not covered with wax will be eaten away (etched). *D.O.T. 1.*

glass eye. A defect consisting of a large bubble or blister with clear glass over the top. *Bryant.*

glass fiber. Generic name for a manufactured fiber in which the fiber-forming substance is glass. A continuous filament or staple fiber having unusual resistance to heat and chemicals. It is the strongest fiber known and is perfectly elastic up to its ultimate strength. It is attacked by hydrofluoric acid and alkalies; resistant to most other chemicals and solvents. Colored by resin-bonded pigments or by dyeing an applied protein film. Nonflammable. Is used for electrical insulation; plastic laminates. *CCD 6d, 1961.*

glass formers. *See* network formers. *VV.*

glass frost. Very thin glass that has been crushed for use as a decorative material. *Compare* tinsel. *Dodd.*

glass furnace. A furnace for fusing together the materials of which glass is made, or one for remelting glass frit and making it ready for working. *Standard, 1964.*

glass gall. A saline whitish scum sometimes cast up from glass in fusion. *Webster 3d.*

glass grinder. One who grinds and bevels the edges of automobile window glass to a smooth finish, holding the glass against a revolving grinding wheel and moving the glass about as needed to remove roughness and sharp edges from portions to be left exposed in the finished car, producing a much finer finish than glass rougher. *D.O.T. 1.*

glass, heat-strengthened. *See* heat-strengthened glass. *Bennett 2d, 1962 Add.*

glassies. Octahedral diamond crystals (transparent). *Hess.*

glass inclusion. In crystals of igneous rocks, an inclusion of glass or some lithoid substance. *Standard, 1964.*

glass lava. An undesirable name for obsidian. *Shipley.*

glassmakers soap. A decolorizing agent for glass, such as manganese dioxide or white arsenic. *Hess.*

glass metal. The fused and refined material of which glass is made. *Fay.*

glass meteorite. An undesirable name for moldavite. *Shipley.*

glass opal. Hyalite. *Shipley.*

glass, phosphorus. *See* phosphorus glass. *Bennett 2d, 1962 Add.*

glass polisher. One who inspects glass for flaws, after it has been cut to the desired shape, and repairs small defects. Repairs glass by grinding and buffing, using power-driven sand and pumice grinding wheels and cloth or felt buffing wheels. Also called glass buffer; glass smoother. *D.O.T. 1.*

glass pot. A fire clay and grog, or sillimanite crucible, used in melting glass. *Bureau of Mines Staff.*

glass products inspector. One who visually examines finished glassware, such as dishes and automobile light lenses, for blisters, cracks, strains, and other obvious defects. *D.O.T. 1.*

glass pull. Quantity of glass delivered by a furnace in a given time. *Bennett 2d, 1962 Add.*

glass quartz. A little-used name for rock crystal. *Shipley.*

glass ream. Smear or gob of nonhomogeneous glass within a glass sheet. *Bennett 2d, 1962 Add.*

glass rock. A pure cryptocrystalline Trenton limestone in northern Illinois and southern Wisconsin. *Fay.*

glass rougher. One who grinds the edges of glass for automobile windshields, rear windows, and other glass that does not need perfect edges, to a rough finish, holding, pressing, and turning piece against rotating wheel on a stationary base or using a portable grinding tool. Also called glass sealer. *D.O.T. 1.*

glass sand. A sand suitable for making glass. The principal component is quartz. A typical analysis is 99.41 percent SiO_2, 0.21 percent Al_2O_3, 0.07 percent Fe_2O_3, 0.07 percent CaO, 0.68 percent MgO. Found in New Jersey, Pennsylvania, West Virginia, Missouri, Illinois, and Maryland. *CCD 6d, 1961.*

glass schorl. Axinite. *Shipley.*

glass sealer. *See* glass rougher. *D.O.T. 1.*

glass seam. A joint plane in a rock that has been recemented by deposition of calcite or silica in the crack. *Fay.*

glass, silica. *See* silica glass. *Bennett 2d, 1962 Add.*

glass smoother. *See* glass polisher. *D.O.T. 1.*

glass spar 20-mesh. A feldspar produced for the flat glass manufacturing industry; (milk bottles, mason jars, etc.). *AIME, p. 341.*

glass spar 40-mesh. A feldspar produced for the flat glass manufacturing industry. *AIME, p. 341.*

glass stone. A glass imitation stone; also, a term applied to axinite. *Shipley.*

glass technologist. *See* chemist, glass. *D.O.T. 1.*

glass, textile. *See* textile glass. *Bennett 2d, 1962 Add.*

glass tiff. Calcite. *Fay.*

glass tile. Tile made of glass, designed to transmit light through an otherwise opaque structure. *ACSG, 1963.*

glass-to-metal seal. Metal components varying in size from fine wires to heavy flanges are sealed to glass for many purposes, for example, electric lamp bulbs and radio valves. Metals that have been used for this purpose include platinum, copper, wolfram, molybdenum, and alloys such as iron-chromium, nickel-iron, and nickel-iron-cobalt. *Dodd.*

glass transformation. The transition from a supercooled liquid to a true glass. *VV.*

glass-transformation temperature. Temperature below which the relaxation time for some degree of freedom is long compared with the duration of an experiment. *Bennett 2d, 1962 Add.*

glass tube. Synonym for acid bottle. *Long.*

glass vial. Synonym for acid bottle. *Long.*

glassware finisher. *See* ware finisher. *D.O.T. 1.*

glass wool. A fibrous woollike material composed of fine filaments of glass intermingled like ordinary wool. Used in chemical laboratories; also in some producer-gas plants as a dust-filtering agent, and widely used in insulation and air filters. *CCD 6d, 1961.*

glassy. Applied to diamonds which lack brilliancy. *Hess.*

glassy feldspar. Two varieties of potash feldspar occur as transparent colorless crystals, sanidine and adularia. Transparent yellow orthoclase also occurs but is very rare. *C.M.D.*

glassy texture. The texture of natural glass or slag in which crystal structure is absent or weakly developed. *Stokes and Varnes, 1955.*

glauberite. A sodium-calcium sufate mineral, $Na_2SO_4.CaSO_4$. *Sanford.*

Glauber's salt. *See* mirabilite. *Fay.*

glaucocerinite. A sky-blue ultrabasic hydrous sulfate of zinc, aluminum, and copper, $Zn_{13}Al_8Cu_7(SO_4)_2O_{30}.34H_2O$. A fibrous-botryoidal coating on adamite. From Laurium, Greece. Near zincaluminite. *English.*

glaucochroite. A delicate bluish-green, violet, pale pink silicate of calcium and manganese, $CaMnSiO_4$. In embedded, prismastic crystals. Orthorhombic. From Franklin, N.J. *English.*

glaucodot. Sulfarsenide of cobalt and iron, (Co,Fe)AsS. In orthorhombic crystals. Also massive. Luster metallic. A grayish tin-white mineral. *Fay.*

glaucolite. A variety of wernerite having a blue or green tint. *Standard, 1964.*

glauconite; greensand. Essentially a hydrous silicate of iron and potassium, but the material is usually a mixture and consequently varies much in composition, $K_2(Mg,Fe)_2\text{-}Al_6(Si_4O_{10})_3(OH)_{12}$; monoclinic. The potash ranges from 2.2 to 7.9 percent. *See also* marl. *Sanford; Dana 17.*

glauconitic sandstone. A quartz sandstone or an arkosic sandstone rich in glauconite grains. *A.G.I.*

glaucophane. A silicate of sodium, aluminum, iron, and magensium, essentially $Na_2Mg_3\text{-}Al_2(Si_8O_{22})(OH,F)_2$; monoclinic. One of the monoclinic amphiboles. *Dana 17; Fay.*

glaucophane schist. An amphibole schist in which glaucophane is abundant along with some epidote, quartz, and mica. *Sinkankas.*

glaucopyrite. A variety of lollingite containing cobalt. *Standard, 1964.*

glaze. a. Term for a glaze made essentially from a fusible clay. *Dodd.* b. A term used in the ceramic industry. According to the sense in which it is used it may mean: (1) A vitreous coating on finished pottery or enamelware, (2) the mixed and powdered dry materials of the batch to be used for producing the vitreous coating, or (3) an emulsion of these materials suspended in water (wet glaze). Glazes may consist of common salt or feldspar but are more usually mixtures of native silicates such as feldspar, kaolin, or Cornish stone with flint, sand, cullet, chalk, borax, soda, white lead, red lead, or litharge. *CCD 6d, 1961. See also* bright glaze; clear glaze; crystalline glaze; fritted glaze; mat glaze; opaque glaze; raw glaze; semimat glaze; slip glaze; vellum glaze; frit. *ASTM C242-60.* c. The rounded and polished surfaces produced on the exposed portion of diamonds inset in a bit when the bit is rotated at a high speed and subjected to a feed pressure much too low to make the bit cut at its optimum penetration rate. The bit is prematurely dulled and made unfit for additional use in that specific rock formation. Also called polish. *Long.*

glazed. a. Diamonds inset in a bit, the exposed surfaces of which have been rounded and polished by underfeeding at a high rotational speed. *See also* glaze; polish. *Long.* b. Containing considerable silica; said of pig iron, which is thus made brittle and difficult to puddle. *Standard, 1964.*

glazed bricks. Bricks coated with a glossy surface made by fusing on a glazing material. *Mersereau, 4th, p. 261.*

glazed ceramic mosaic tile. Ceramic mosaic tile with glazed faces. *ASTM C242-60T.*

glazed extra-duty tile. Tile with a durable glaze that is suitable for light-duty floors and all other surfaces on interiors where there is no excessive abrasion or impact. *ACSG.*

glazed interior tile. A glazed tile with a body that is suitable for interior use and which is usually nonvitreous, and is not required or expected to withstand excessive impact or be subject to freezing and thawing conditions. *ASTM C242-60T.*

glaze dipper. One who applies a thin coat of glaze to bisque tile by dipping the tile into a glazing vat with a pair of hand tongs. Also called glazer. *D.O.T.1.*

glazed pot. Generally a new pot coated inside with a thin layer of glass to protect it from the raw batch. *ASTM C162-66.*

glazed tile. Tile with a fused impervious facial finish composed of ceramic materials, fused into the body of the tile which may be a nonvitreous, semivitreous, vitreous, or impervious body. The glazed surface may be clear, white, or colored. *ASTM C242-60T.*

glaze fit. The stress relationship between the glaze and body of a fired ceramic product. *ASTM C242-60T.*

glaze grinder. *See* glaze maker. *D.O.T. 1.*

glaze handler. One who filters, tests, stores, and issues glaze mixtures used as finish coating for ceramic ware. *D.O.T. 1.*

glaze kiln. A kiln for firing glazed ceramic ware. *Standard, 1964.*

glaze maker. a. One who operates mills for mixing and grinding glaze and sagger washes and prepares frit for firing. Also called disintegrator man; frit maker; glaze grinder; glaze mixer; pulverizer; slip-room foreman. *D.O.T. 1.* b. One who mixes and grinds ceramic tile-glazing materials in proportions according to specific chemical formulas. *D.O.T. 1.*

glaze mixer. *See* glaze maker. *D.O.T. 1.*

glazer. *See* glaze dipper. *D.O.T. 1.*

glaze stains. Finely ground calcined oxides of cobalt, copper, iron, and manganese used for coloring ceramic glazes. *CCD 6d, 1961.*

glazier. a. A general term applied to a worker who cuts, smooths, and polishes glass. Also called glass cutter-down; glass grinder; glass polisher. *D.O.T. 1.* b. One who applies glaze to pottery. *Standard, 1964.*

glazing. Dulling the abrasive grains in the cutting face of a wheel during grinding. *ASM Gloss.*

glazing barrel. A rotating barrel in which gunpowder is glazed with graphite. *Standard, 1964.*

glazing-machine operator. One who removes rough spots, air bubbles, and other blemishes from glass kitchen utensils. Places utensils on a disk which rotates through a gas flame, and by manipulating valves, regulates color and intensity of flame. Also called beveler; finisher; smoother. *D.O.T. 1.*

glazing stone. A smooth, hard stone composed mostly of flint, used by polishers to glaze the face of a finishing wheel when iron or steel articles, not plated, such as carpenters' chisels, drawshaves, etc., require a high finish. *Hess.*

glazy. Vitreous; glassy; dull. Having a glazed appearance as the fractured surface of some kinds of pig iron. *Fay.*

glebe. a. Gr. Brit. A tract of land containing mineral ore. *Standard, 1964.* b. Obsolete term for a clod of earth, an ore, or an earthy mineral. *Arkell.*

Gleeds. A glowing coal or small coke such as that used in nailmaking. *C.T.D.*

gleet; glet. Slime, ooze, slimy alluvial deposits. *Arkell.*

gleg parting. a. Scot. The easy parting of one stratum from another. *Fay.* b. Sharp; smooth or slippery. *Webster.*

glei; gley. A soil horizon in which the material is bluish-gray or blue-gray, more or less sticky, compact, and often structureless. It is developed under the influence of excessive moisture. *Stokes and Varnes, 1955.*

glen. A small valley; a secluded hollow among hills; a dale. *Standard, 1964.*

Glenboig fire clay. A fire clay occurring in the Millstone grit in the region of Glenboig, Lanarkshire, Scotland. A typical analysis (raw) is 50 to 51 percent SiO_2; 33 percent Al_2O_3; 2.5 percent Fe_2O_3; 0.5 percent alkalies. The pyrometric cone equivalent is 32 to 33. *Dodd.*

glenmuirite. An igneous rock occurring as a sill consisting of orthoclase-bearing mesocratic teschenite. *Johannsen, v. 4, 1938, p. 194.*

Glen Rose limestone. The calcareous member of the Trinity succession in the United States, reaching 650 feet in Arizona. *C.T.D.*

glessite. A brown resin occurring with succinite on the shores of the Baltic Sea; specific gravity, 1.015 to 1.027. *Fay.*

glesson. An obsolete name for feather, a type of imperfection in gems. *Hess.*

gley. *See* glei.

glide. a. The same as slip. *ASM Gloss.* b. A noncrystallographic shearing movement, as one grain over another. *ASM Gloss.*

glide direction. The direction of gliding along glide planes in a mineral. *A.G.I.*

glide line. In single-crystal deformation, the possible direction, or directions, of movement in a glide plane; in a tectonite, the direction of movement in an s-surface indicated either from field observation or from interpretation of preferred orientation of the fabric. *See also* structural petrology. *A.G.I.*

glide plane. a. In single-crystal deformation, a lattice plane on which translation- or twin-gliding takes place; in a tectonite, an s-surface characterized (in a statistical sense) by a preferred orientation of one or more fabric elements which indicate movement in the s-surface. Synonym for slip plane. *See also* structural geology. *A.G.I.* b. The common plane of the two axes of a twin crystal. *Hess.* c. Slip plane or parting of mineral specimen. Direction along which slip may occur under suitably directed pressure; due to weakness of bond in crystalline structure along one of the three axes. *Pryor, 3.*

gliding. a. A change of form by differential movements along definite planes in crystals without fracture. *Fay.* b. The formation of twin crystals. *Hess.*

gliding planes. Directions parallel to which a slipping of the molecules may take place under the application of mechanical force, as by pressure. Also called glide planes; slip planes. *Fay.*

glimmer. German for mica. *See also* glist, a. *A.G.I.*

glimmering. As applied to the degree of luster of minerals, means those that afford an imperfect reflection, and apparently from points over the surface, as flint or chalcedony. *Compare* glistening. *Fay.*

glimmerite. An igneous rock consisting essentially of biotite. *Johannsen, v. 4, 1938, p. 441.*

glimmerton. A micaceous clay. Synonym for illite. *Spencer 19, M.M., 1952.*

glinite. A group name for clay minerals from clay. *Compare* clayite. *See also* chasovrite. *Spencer 21, M.M., 1958.*

glist. a. Corn. mica. *Fay.* b. A gleam; sparkle. *Fay.* c. Eng. A dark, shining mineral resembling black tourmaline. *Standard, 1964.*

glistening. As applied to the degree of luster of a mineral means those minerals affording a general reflection from the surface, but no image, as talc or chalcopyrite. *Compare* glimmering. *Fay.*

glister. To increase the heat of (a brickkiln) by stirring the fire and supplying fuel. *Standard, 1964.*

glit. Scot. The slime of a riverbed. *Standard, 1964.*

glo. An ancient British name for coal. *Tomkeieff, 1964.*

globe thermometer. A thermometer in a hollow spherical black globe, the readings from which show a higher value, due to radiation, than a conventional thermometer so that the globe device measures the effectual radiation temperature. *Strock 10.*

globe valve. A valve with an approximately spherical chamber inside of which a bevel disk is pressed against a bevel-ring seat to close the valve. *Long.*

globigerina ooze. A widespread, deep-sea deposit largely composed of the shells of foramnifera, among which globigerina is especially abundant. Other calcareous remains are present (about 10 percent), together with an inorganic residue (about 3 or 4 percent) having the composition of red clay. *Holmes, 1928.*

globosphaerite. Proposed by Vogelsang for a spherulite composed of radially arranged globulites. *Johannsen, v. 1, 2d, 1939, p. 178.*

globular. In petrology, a textural term synonymous with spherulitic. *A.G.I.*

globular pearlite. *See* granular pearlite. *C.T.D.*

globular powder. Particles having approximately spherical shape. *Osborne.*

globular transfer. The term describes the transfer of metal as relatively large drops or globules during consumable-electrode arc welding. Also known as drop transfer, or more specifically as large-drop transfer. *BuMines Bull. 625, 1965, p. VII.*

globulite. a. A tiny globular body of mineral crystallite. *Webster 3d.* b. A tiny, rounded, incipient crystal form visible in some volcanic glasses when they are examined in thin sections under a microscope. *Fay.*

glockerite. A mineral, $2Fe_2O_3.SO_3.6H_2O$. Massive, sparry, earthy, or stalactitic. Color, brown to ocher-yellow to pitch black; dull green. *Fay.*

Glomax. Brand name for purified koilinite; used as pigment extender. *Bennett 2d, 1962 Add.*

glomerophyric. A term suggested for the texture of cumulophyric rocks in which the clusters or irregular groups of crystals consist of equant individuals. *Schieferdecker.*

glomeroplasmatic. A term applied to the texture of granites or gneissose rocks in which the individuals of a certain mineral, such as biotite, are locally concentrated into conspicuous open clusters, and not into closed groups as in glomeroporphyritic texture. *Holmes, 1928.*

glomeroporphyritic. A term applied to igneous rocks in which the phenocrysts are gathered into distinct clusters or clots. Synonym for cumulophyric. *A.G.I.*

glomerule. Aggregation of minute particles in aqueous suspension due to the formation of flocs. *See also* flocculation. *Pryor, 3.*

glomming. Another name for high grading. *Hoov, p. 490.*

gloom. A stove for drying gunpowder; drying oven. *Standard, 1964.*

glory hole. a. A funnel-shaped excavation the bottom of which is connected to a raise driven from an underground haulage level. The ore is broken by drilling and blasting in benches around the periphery cf the funnel. This process is also called milling, and the excavation termed a mill hole or simply a mill. *Lewis, p. 403.* b. A vertical pit, material from which is fed by gravity to hauling units in a shaft under the pit bottom. *Nichols* c. A combination of opencast with underground mining system, in which quarried material gravitates or is moved to a short shaft, from the bottom of which it is delivered to an underground transport system. *Pryor, 3.* d. Can. Large open-pit excavation. *Hoffman.* e. An opening through which to observe the interior of a furnace. *Standard, 1964.* f. A subsidiary furnace, in which articles may be reheated during manufacture. *C.T.D.*

glory-hole system. A method of mining using a system of haulageways beneath the block of ore, which has had its top surface exposed by the removal of the overburden. Over the haulageways are chutes that extend up to the surface, and are spaced at intervals of 50 feet or at any other convenient distance. The excavation of the ore begins at the top of the chute, and broken ore is removed by loading it out from the chutes into cars on the haulage level. The ore block is worked from the top down. The method is similar in principle to underhand stoping. Also called milling system; chute system. *Fay.*

gloss. A glazed surface which has a shiny, lustrous finish. *Crispin.*

gloss coal. A variety of brown coal, compact, deep black, with conchoidal fracture well developed, possessing a resinous to glossy and metallic luster. It is the hardest and most compact of the lignites; its specific gravity varies from 1.2 to 1.5. *Fay.*

gloss point. When a layer of glaze powder is heated, a temperature is reached at which the surface changes its appearance from dull to bright; this temperature has been termed the gloss point. *Dodd.*

gloss white. A suspension in water of coprecipitated aluminum hydroxide and barium sulfate. Used as a pigment or an extender. *Bennett 2d, 1962.*

glost. In ceramics, lead glaze used in the manufacture of pottery. *Standard, 1964.*

gloster-getter. A cutter loader designed for continuous mining taking a medium web of 2 feet 6 inches. It consists of a cutter section with horizontal and vertical jibs and gummer to which is attached a loading chute or plough which turns the cut coal onto the conveyor alongside. To reverse the direction of cutting, the vertical shearing jibs are swung around from one side of the horizontal jibs to the other, and reversal of the horizontal cutter chain is by means of the reversible motor—the chains being provided with double-pointed picks. The minimum height at which the machine can cut is 2 feet 8 inches. The yield of small coal is rather high. *Nelson.*

glost firing. Kiln firing of bisque ware after glazing. *VV.*

glost-kiln drawer. *See* bisque-kiln drawer. *D.O.T.1.*

glost-kiln placer. One who sets glazed ware in saggers and stacks saggers in glost kiln for firing. Also called glost-kiln setter; kiln hand. *D.O.T. 1.*

glost oven. a. A furnace in which biscuit, after being dipped in slip, is fired and so glazed. *C.T.D.* b. In ceramics, a glazing kiln. *Standard, 1964.*

glost-ware carrier. One who carries finished whiteware from glost warehouse to decorating room. Also called ware carrier; ware stripper. *D.O.T.1.*

glove box. A sealed box in which workers, using gloves attached to and passing through openings in the box, can handle certain radioactive materials safely. *L&L.*

Glover's tower. In sulfuric-acid works, a tower through which the acid from the Gay-Lussac tower trickles and yields nitrous anhydride to the gases entering the lead chambers, at the same time cooling them. *Standard, 1964.*

glow. a. The incandescence of a heated substance, or the light from such a substance; white or red heat; as, the glow of melted iron or the glow of embers. *Standard, 1964.* b. The light of phosphorescent mineral. *Hess.*

glow stone. Chalcedony. *Shipley.*

glucine. $CaBe_4(PO_4)_2(OH)_4.\frac{1}{2}H_2O$, massive and encrusting, with moraesite from a locality in the Urals. Named from the alternative name of beryllium-glucinum *Hey, MM, 1964; Fleischer.*

gluconic acid; glyconic acid; dextronic aci glycogenic acid. Colorless or nearly colo less or light brown; needles or a syrup liquid; $CH_2OH(CHOH)_4COOH$; mil acidic taste; melting point, 125° to 126 C; soluble in water; and insoluble in alcohol and in ether. Used in cleaning an pickling metals. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed 1964, p. C-336.*

glue. A gelatinous substance extracted from animal carcasses, organs, hides, and bones Used in mineral processing as a coagulan after acid leach of uranium-bearing or pulps. Glues are also derived from othe sources, but these have no direct use i mineral treatment. *Pryor, 3.*

gluing rock. A ferruginous clay lying abov a coal stratus, and which may be mined at the same time as the coal. *Standard 1964.*

glum. N. Staff. Carbonaceous underclay Also, a name for one of the local bands o clay band ironstone. *Arkell.*

glum metal. A soft-weathering stone. *Arkell.*

glushinskite. Oxalate of Magnesium, as orthorhombic plates in chalky clay in an unspecified Arctic locality. *Hey, M.M., 1964.*

glut. a. Newc. A piece of wood, used to fill up behind cribbing or tubbing. *Fay.* b. A wooden wedge used to hole open a cleft in splitting logs. *Standard, 1964.* c. A small brick or block to fill up a course; also, an unburned pressed brick. *Standard, 1964.*

glut arch. A brick arch below the firemouth of a pottery bottle oven for the admission of primary air and the removal of clinker. *See* also bottle oven. *Dodd.*

glyceride. A compound ether of triatomic alcohol glycerin. *Shell Oil Co.*

glycerin D; diglycerin. Used in manufacturing low-freezing dynamite. *Bennett 2d, 1962.*

glycerol; glycerin; glycerine; glycyl alcohol. Clear; colorless or pale yellow; syrupy liquid; $C_3H_5(OH)_3$; sweet, warm taste; molecular weight, 92.10; hydroscopic; specific gravity (anhydrous), 1.2653; melting point, 18.6° C; boiling point, 290° C with decomposition; flash point, 177° C; soluble in water and in alcohol (aqueous solutions are neutral); and insoluble in benzene. Used in explosives, as a binder for cements and mixes, and as a lubricant and a softener. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-338.* Obtained as a byproduct in the manufacture of soap and candles. Used in the manufacture of munitions and as an antifreeze liquid. *Crispin.* Sometimes added to clay to increase and to maintain the pliability and workability of the mass. On firing, glycerol volatilizes without leaving a resdue. It is added to the soluble metallic salt solution to control its density and its slipperiness. Glycerol has other ceramic uses, such as in glass-etching pastes and cements, as a bonding agent in abrasives, and in the preparation of ceramic decalcomania. *Lee.*

glycerol monoacetate; monoacetin; acetin. $CH_2OHCHOHCH_2OOCCH_3$; molecular weight, 134.13; colorless oil; specific gravity, 1.206 (at 20° C, referred to water at 4° C); boiling point, 158° C (at 165 mm); and soluble in water and in ethyl alcohol. Used in manufacturing dynamite.

Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-339.

glycerol trinitrate. *See* nitroglycerin.

glycogenic acid. *See* gluconic acid. *CCD 6d, 1961.*

glycol; 1,2-ethanediol; dihydroxyethane; ethylene glycol; ethylene alcohol; glycol alcohol; glycohol alcohol. CH_2OHCH_2OH; molecular weight, 62.07; colorless liquid; specific gravity, 1.1176 (at 15° C, referred to water at 15° C); melting point, −13.2° C; boiling point, 197.2° C; and soluble in water and in ethyl alcohol. Used as an explosive; as an antifreeze liquid; and as a solvent for waxes and resins. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-309.*

glyconic acid. *See* gluconic acid. *CCD 6d, 1961.*

glycyl alcohol. *See* glycerol. *CCD 6d, 1961.*

glyptic. In mineralogy, exhibiting figures. *Standard, 1964.*

glyptogenesis. The process of sculpturing of the lithosphere through the agency of the atmosphere, hydrosphere, biosphere, and pyrosphere. *Schieferdecker.*

glyptography. a. The art, process, or operation of engraving on precious stones or the like. *Standard, 1964.* b. A description of or treatise on gem engraving; the knowledge or study of engraved gems. *Standard, 1964.*

glyptolith. A faceted pebble polished by wind action. *Fay.*

G.M.B. Eng. Good merchantable brand, as applied to copper by the Metal Exchange. *Fay.*

gmelinite. A white pesudohexagonal zeolite closely related chemically to chabazite but rarer in occurrence, $(Na,Ca)_6Al_6(Al,Si)Si_{13}O_{40}.20H_2O$. *Dana 17.*

GMT. Abbreviation for Greenwich mean time. *Zimmerman, p. 51.*

gmv. Abbreviation for gram-molecular-volume. *Zimmerman, p. 51.*

gnamma hole. Shallow and deep holes in the interior of western Australia formed in rocks, the chief of which is granite. They frequently contain water, and form almost the only natural surface supplies. *A.G.I.*

gnarly bedding. Synonym for disturbed bedding. *See also* curly bedding; convolute bedding. *Pettijohn.*

gnat stone. Dendritic quartz (moss agate or mocha stone) with small black inclusions. *Shipley.*

gneiss. A metamorphic rock of coarse grain size, characterized by a mineral banding, in which the light minerals (quartz and feldspar) are separated from the dark ones (mica and/or hornblende). The layers of dark minerals are foliated, while the light bands are granulitic. *C.T.D.*

gneissic; gneissoid. Having the appearance or character of gneiss. *Fay.*

gneissic cleavage. Rock cleavage in which the surfaces of easy breaking, if developed at all, are from a few hundredths of an inch to half an inch or more apart. *Leet.*

gneissic quartzite. A metamorphic rock intermediate between gneiss and quartzite. *A.G.I.*

gneissose. a. Resembling gneiss. *A.G.I. Supp.* b. Having composite structure of alternating schistose and granulose bands and lenses which differ in mineral composition and texture. *A.G.I. Supp.*

gneissose granite. A general term for granitic rocks with gneissose structure, due, not to metamorphism, but to the constrained movements of a viscous magma during crystallization. *Holmes, 1928.*

gneissose structure. A composite structure due to the alternation of schistose and granulose bands and lenticles, which are dissimilar both in mineral composition and in texture. The foliation is interrupted; and while a gneiss may split along a plane of schistosity, it does so less readily than a schist, and exposes a much rougher fracture surface. There can be all transitions between schistose, granulose, and gneissose structure. *Schieferdecker.*

gnomonic projection. An azimuthal projection of a part of a hemisphere showing the earth's grid as projected by radials from a point at the center of the sphere onto a tangent plane so that all straight lines represent arcs of great circles, thereby making this projection valuable for navigation when used in conjunction with the Mercator projection. *Webster 3d.*

goaf; gob. a. That part of a mine from which the coal has been worked away and the space more or less filled up. *Fay.* b. The refuse or waste left in the mine. *Fay.*

goafing. Same as goaf, f. *Fay.*

goaves. Old workings. *Fay.*

gob. a. A common term for goaf. *Fay.* b. To leave coal and other minerals that are not marketable in the mine. *Fay.* c. To stow or pack any useless underground roadway with rubbish. *Fay.* d. To store underground, as along one side of a working place, the rock and refuse encountered in mining. *Hudson.* e. The material so packed or stored underground. *Hudson.* f. The space left by the extraction of a coal seam into which waste is packed. Also called goaf. *C.T.D.* g. A pile of loose waste in a mine, or backfill waste packed in stopes to support the roof. *Ballard.* h. Coal refuse left on the mine floor. *Korson.* i. To fill with goaf, or gob; to choke; as a furnace is gobbed, or gobs up. *Webster, 2d.* j. A portion of hot glass delivered by a feeder. *ASTM C162-66.* k. A portion of hot glass gathered on a punty or pipe. *ASTM C162-66.*

gobber. a. Any device used for gobbing waste material. *Jones.* b. A man employed to pack rubbish or waste into the gob. *C.T.D.*

Gobber. Trade name for a cutting machine provided with a conveyor for gobbing the unusable cuttings formed during the cutting operation. *Jones.*

gobbet. A block of stone. *Standard, 1964.*

gobbin. Leic. A contraction of gobbing. *See also* goaf; gob. *Fay.*

gobbing. The act of stowing waste in a mine. *Jones.* Synonymous with gobbing-up. *See also* gob. *Fay.*

gobbing slate. A thick layer of slate between two seams of coal. The lower seam is mined and the upper seam and the slate shot down, the coal loaded out and then the slate gobbed. *Fay.*

gobbing the bone. Cleaning up slate. *Korson.*

gob dump. *See* gob pile. *Grove.*

gob entry. A wide entry with a heap of refuse or gob along one side. *Fay.*

gob fire. a. Fire originating spontaneously from the heat of decomposing gob. Also called breeding fire. *Fay.* b. A fire occurring in a worked-out area, due to ignition of timber or broken coal left in the gob. *C.T.D.* c. Fire caused by spontaneous heating of the coal itself, and which may be wholly or partly concealed. *Mason, v. 1, p. 283.*

gob heading; gob road. A roadway driven through the gob after the filling has settled. *C.T.D.*

gob pile; gob dump. a. A pile or heap of mine refuse on the surface. *Grove.* b. An accumulation of waste material such as rock or bone. *B.C.I.*

gob-pile orator. A more or less unflattering term applied to a talkative miner, used much in the same sense as "soapbox orator." *B.C.I.*

gob process. Glass delivered to a forming unit in gob form. *ASTM C162-66.*

gob road. Eng. A gallery or road extended through goaf or gob. *Fay.*

gob-road system. Eng. A form of the longwall system of working coal, in which all the main and branch roadways are made and maintained in the goaves. *Fay.*

gob room. Space left for stowing gob. *Fay.*

gobs. Measured portions of molten glass fed to machines making glass articles (bottles, jars, etc.). *C.T.D. Supp.*

gob stink. a. Aust. The odor from the burning coal given off by an underground fire. *Fay.* b. The odor given off by the spontaneous heating of coal, not necessarily in the gob. Also called stink. *B.S. 3618, 1963, sec. 2.* c. A smell indicating spontaneous combustion or a fire in the goaf or gob. *C.T.D.* d. Used among British miners for gases accumulating in the gob or goaf—space in mines in which coal has been extracted. *Tomkeieff, 1954.*

gob-up. Eng. *See* gob c, d, and i. *Fay.*

gob wall. A rough wall of flat stones built to prevent the piles of gob from obstructing the passage of air. *Fay.*

go-devil. a. A device used to scrape and descale pipes carrying solids, pulps, sludges, slurries and other deposit-forming liquors. Typically, a torpedo-shaped body equipped with scraper vanes or wire bristles, forced through the piping by compressed air or water pressure. May carry radioactive isotopes to aid in its location if jammed. Variations include hooked scrapers pulled through by rope; inflatable balls enclosed by chains, the ball being prodded and punctured if it lodges, and then flushed out; wooden balls with projecting spikes. *Pryor, 3.* b. An apparatus or cutter used for removing scale from the inside of pipes. Where the deposit is soft, such as ocher, it may be removed periodically by using such a cutter or go-devil in the pipes. *Sinclair, IV, p. 32.* c. A special spiral apparatus that is sent through a pipeline to clean out the sediment. *Mersereau, 4th, p. 198.* d. An iron rod dropped down a well to explode a charge of nitroglycerin. *Mersereau, 4th, p. 198.* e. A rude sledge upon which one end of a log is borne, the other end trailing on the ground; tieboy; also, a rough, strong wagon used in the woods and about quarries. *Standard, 1964.* f. *See* bullet, b, c, d. *Long.*

go-devil plane. In the United States, a term for gravity haulage. *Nelson.*

Godfrey furnace. A furnace with an annular hearth for roasting sulfide ores; used in Wales. *Fay.*

goethite; gothite. An orthorhombic hydrated oxide of iron, FeO(OH), externally resembling limonite. One of the commonest minerals, typically formed as a weathering product of iron-bearing minerals. *Dana 17.*

goffan; goffen. a. Corn. A surface working in which the material is thrown from one platform to another. *Hess.* b. Corn. A long narrow surface working. *See also* coffin. *Fay.*

gog. Eng. A bog. *Standard, 1964.*

gogo. A term used in the Philippines for a plant whose juice is said to catch fine gold. *Fay.*

Gohi iron. Copper-bearing iron, very low in impurities and in carbon (0.02 percent maximum), containing about 0.25 percent copper. *Bennett 2d, 1962.*

going. Scot. Working, for example, a going place. A room in course of being worked. *Fay.*

going bord. a. A roadway to the coal face in bord and pillar working. *C.T.D.* b. Eng. The bord or headway used as a main road for conveying the tubs to and from the face to a flat. *See also* flat, a. Also called going headway. *SMRB, Paper No. 61.* c. N. of Eng. A bord (room) down which coal is trammed, or one along which the coal from several working places is conveyed into the main haulage. *Fay.*

going concern. One that continues to transact its ordinary business. *Ricketts, I.*

going headway. A headway or bord laid with rails, and used for conveying the coal cars to and from the face. *Zern.*

going in. The act or process of lowering the drill string, a string of pipe, or casing into a borehole. *Long.*

going off. A borehole, the course of which is deviating from that intended. Also called drifting; walking; wandering. *Long.*

going road. A working place in a coal mine which is being pushed forward, as distinct from an old or disused place. *C.T.D.*

Golconda. An ancient and famous group of diamond mines on the Kistna River, India, where the Koh-i-noor and other world famous diamonds were found. *Hess.*

golcondas. Diamonds from India. *Hess.*

gold. a. A heavy, soft, yellow, ductile, malleable metallic element in group I of the periodic system. Symbol, Au; valences, 1 and 3; isometric; atomic number, 79; atomic weight, 196.967; specific gravity, 19.32 (at 20° C); melting point, 1,063° C; boiling point, 2,966° C; specific electrical resistivity, 2.42 microhms per cubic centimeter; insoluble in water and in acids; and soluble in aqua regia, in potassium cyanide solutions, and in hot sulfuric acid. Most of the metal is retained in gold reserves but some is used in jewelry. Gold is commonly alloyed with varying percentages of copper and silver. White gold is usually an alloy with nickel, but in dentistry this alloy contains platinum or palladium. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-112, B-177.* b. Occurs as native gold and in tellurides. Used in gold plating; amalgams; gilding; anodes; and in laboratory ware. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-112.*

gold amalgam. a. A variety of native gold containing mercury. *Standard, 1964.* b. *See* amalgam, c. *Fay.*

gold-and-silver assayer. *See* assayer. *D.O.T. Supp.*

gold argentide. Synonym for electrum. *Spencer 20, M.M., 1955.*

gold-bag washer. In ore dressing, smelting, and refining, a laborer who recovers black mud from bags in which silver anodes were suspended during electrolytic refining process by washing and brushing them in series of tanks. *D.O.T. Supp.*

goldbeater. One who makes goldleaf. *Standard, 1964.*

goldbeaters' mold. A pack composed of several hundred goldbeaters' skins, having between them partly beaten goldfoil to be hammered out into goldleaf. *Standard, 1964.*

goldbeaters' skin. The prepared outside membrane of the large intestine of cattle used for separating the leaves of metal in goldbeating and sometimes as the moisture-sensitive element in hygrometers. *Webster 3d.*

goldbeating. Process of converting gold sheet into fine goldfoil by hammering; the gold sheets are separated by vellum or goldbeaters' skin during the hammering operations. *See also* goldbeaters' mold. *Bennett 2d, 1962.*

goldbrick. a. A worthless brick that appears to be made of gold. *Webster 3d.* b. Something that appears to be valuable but is actually worthless. *Webster 3d.*

gold, ceramic decorating. Gold in the form of powder, paste, or liquid for application on ceramic materials. Combined with suitable fluxes and vehicles for particular application. *CCD 6d, 1961.*

gold chloride; gold trichloride; auric chloride. Red crystals; $AuCl_3$; decomposes at 254° C; sublimes at 265° C; specific gravity, 3.9; soluble in water, in alcohol, and in ether; slightly soluble in ammonia; and insoluble in carbon disulfide. Used in gold plating; in ceramics (enamels, gilding, and painting porcelain); in glass (gilding, ruby glass); and in the manufacture of finely divided gold and purple of Cassius. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-177.*

gold cupride. Synonym for cuproauride; auricupride. *Spencer 20, M.M., 1955.*

golddigger. One who digs for or mines gold. This word is almost exclusively used to designate placer miners. Those engaged in mining in solid rock are called quartz miners. *Fay.*

golddiggings. A region where gold is found mixed with sand or gravel. *Standard, 1964. See* diggings. *Fay.*

gold dust. Particles and sometimes pellets and flakes of gold, obtained in placer mining. *Webster 3d.* An impure dust is sometimes called commercial dust. *Webster 2d.*

golden beryl. A clear, yellow variety of beryl, prized as a gem stone. Heliodor is a variety from Southwest Africa. *C.M.D.*

Golden Gate table. *See* end-bump table. *Fay.*

golden ocher. a. A native ocher. *Standard, 1964.* b. A mixture of light yellow ocher, chrome yellow, and whiting. *Standard, 1964.*

golden reef. Altered nonfibrous form of amosite. *Sinclair, W.E., p. 484.*

golden sapphire. Yellow to greenish-yellow sapphire. *Shipley.*

golden stone. Greenish-yellow peridot. *Shipley.*

gold fever. A mania for seeking gold; applied specifically to the excitement caused by the discovery of gold in California in 1848-49. *Standard, 1964.*

goldfield. A region where gold is found. *Standard, 1964.*

goldfieldite. A dark lead-gray copper sulfantimonite in which part of the antimony is replaced by bismuth (and arsenic) and part of the sulfur by tellurium (17 percent), $5CuS.(Sb,Bi,As)_2(S,Te)_3$. Crusts; massive. From Goldfield, Nev. A tellurian tetrahedrite. *American Mineralogist, v. 32, No. 3-4, March-April 1947, p. 254; English.*

gold-filled. Covered on one or more surfaces with a layer of gold alloy to form a clad metal. By commercial agreement, a quality mark showing the quantity and fineness of gold alloy may be affixed which shows the actual proportional weight and karat fineness of the gold alloy cladding. For example, one-tenth 12K gold-filled means that the article consists of base metal covered on one or more surfaces with a gold alloy of 12-karat fineness comprising one-tenth part by weight of the entire metal in the article. No article having a gold alloy coating of less than 10-karat fineness may have any quality mark affixed. No article having a gold alloy portion of less than one-twentieth by weight may be marked gold-filled but may be marked rolled gold plate provided the proportional fraction and fineness designation precede. These stands do not necessarily apply to watch cases. *ASM Gloss.*

gold-film glass. Glass incorporating a thin gold film which can be electrically heated for demisting and deicing. *C.T.D. Supp.*

goldfoil. Gold beaten or rolled out very thin; gold in sheets thicker than goldleaf. *Webster 3d.*

gold glass. A term sometimes applied to goldstone. *Shipley.*

gold hydrate. *See* gold hydroxide. *CCD 6d, 1961.*

gold hydroxide; gold hydrate; auric hydroxide. Brown; $Au(OH)_3$; sensitive to light; soluble in hydrochloric acid, in solutions of sodium cyanide, and in alkali hydroxides; and insoluble in water. The hydroxide is probably a hydrated trioxide of gold, Au_2O_3, and it loses water easily. Used in gilding liquids; in porcelain; and in gold plating. *CCD 6d, 1961.*

goldichite. Hydrous potassium ferric sulfate, $KFe(SO_4)_2.4H_2O$, as pale-green monoclinic crystals from the decomposition of pyrite. From Utah. *Spencer 20, M.M., 1955.*

Goldich's stability series. Mineral species differ widely in their resistance to weathering processes. This series summarizes the relative resistance to weathering of the common rock-forming silicates, and indicates that the minerals crystallized at the highest temperatures, under the most anhydrous conditions, are more readily weathered than those that crystallized last from the lower temperature, more aqueous magmas. As a general rule, the closer the conditions of crystallization approximate those now prevailing at the earth's surface, the more resistant is the mineral in the weathering environment. The Goldich stability series also applies to the same minerals when they are of metamorphic origin. *Hawkes, 2, pp. 80-81.*

gold jewelry. Jewelry made wholly or principally of solid gold; also designates gold-filled or gold-plated jewelry. *Shipley.*

gold latten. a. Very thin sheet gold. *Fay.* b. Any thin sheet brass or other metal gilded. *Fay.*

goldleaf. Extremely fine layers of gold formed by beating or rolling between layers of goldbeaters' skin; used for gilding works of art, fabrics, and books. *Bennett 2d, 1962.*

goldleaf electroscope. An electroscope consisting of two narrow strips of goldleaf suspended from the lower end of a brass rod, at the top of which a brass disk is fixed. The leaves are supported in a metal case by a plug of ebonite or some other good insulating material. Whenever the leaves have acquired a potential, they separate. *Morris and Cooper, p. 230.*

goldmanite. A garnet, $(Ca_3V,Al,Fe)_2(SiO_4)_3$, from the Laguna uranium mining district, Albuquerque, N. Mex. *Hey, M.M., 1964; Fleischer.*

gold matrix. Gold in a matrix of milky quartz. Same as gold quartz. *Shipley.*

gold milling. A general term applied to the treating of ore to recover gold and silver therefrom. *Bureau of Mines Staff.*

gold mine. a. A mine containing or yielding gold. It may be either in solid rock (quartz mine) or in alluvial deposits (placer mine). *Fay.* b. Any investment yielding or furnishing great profit. *Fay.*

gold 198. Radioactive gold of mass number 198. Half-life, 64.8 hours; radiation, beta and gamma; and radiotoxicity, moderately hazardous. Available in gold metal, colloidal gold, and gold-sodium thiosulfate. Used to locate the solidification boundary in continuously cast aluminum and to determine metallic silver in photographic materials. The decay product of gold 198 is stable mercury, mercury 198, which may be distilled from aged, neutron-irradiated gold for the fabrication of monoisotopic mercury arc light sources. *See also* radiogold. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-72.*

gold opal. Opal which exhibits only an overall color of golden yellow. *Shipley.*

gold oxide; gold trioxide; auric oxide; auric trioxide. Brownish-black; Au_2O_3; decomposed by heat, losing one oxygen at 160° C and three oxygens at 250° C; soluble in hydrochloric acid; and insoluble in water. Used in gilding liquids and in porcelain. *CCD 6d, 1961.*

gold paint. Paint pigmented with gold powder; really a bronze powder. *Bennett 2d. 1962.*

gold pan. *See* pan, c., d. and i.

gold panning. *See* panning. *Nelson.*

gold poachers. Roving and enterprising freelance miners and prospectors. *Hoov, p. 495.*

gold point. The melting point of pure gold, 1,063° C. Used as one of the fixed reference points on the temperature scale. *Bennett 2d, 1962.*

gold-potassium chloride; potassium aurichloride; potassium chloroaurate dihydrate. Yellow; orthorhombic; $AuCl_3.KCl.2H_2O$ or $K[AuCl_4].2H_2O$; and soluble in water, in alcohol, and in ether. Used for painting porcelain and glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-206.*

gold premium. S. Afr. The excess of the price of gold in a given market over the value fixed by statute or calculated over the exchange rate of money. *Beerman.*

gold purple. The purple of Cassius. *Webster 2d.*

gold quartz. Milky quartz containing inclusions of gold. Same as gold matrix. *Shipley.*

gold-quartz ores; siliceous ores. Gold-bearing ores from which the sulfides have been removed by the leaching of groundwaters so that the ore consists almost entirely of quartz gangue, some iron oxides, and free gold. *Newton, p. 19.*

gold ruby glass. *See* ruby glass. *Dodd.*

gold sapphire. Lapis lazuli containing flecks of pyrite. *See also* golden sapphire. *Shipley.*

gold saving table. This table consists of a series of narrow sluices from 2 to 3 feet wide set side by side on grades of from 1-1/8 to 1-1/2 inches per foot. These tables extend first transversely from beneath the trommel and then are turned at right angles to extend longitudinally to the rear of the dredge where they empty into tail sluices that carry the material some distance back of the dredge before discharging it into the pond. *Lewis, p. 393.*

Goldschmidt's law. The structure of a crystal is determined by the ratio of the numbers and sizes, and the properties of polarization of its structural units. *Pryor, 3.*

Goldschmidt's mineralogical phase rule. Under natural rock-forming conditions, the probability of finding a system with a variance (degrees of freedom) of less than two (temperature and pressure) is small. Any given natural mineral assemblage, igneous or metamorphic, seems to be the stable one over a range of temperature and pressure. Thus, with a variance of two, the phase rule is reduced to a special case, $P = C$, in which the maximum number of phases possible is equal to the number of components. *A.G.I.*

Goldschmidt's process. a. The thermite process of welding. *See also* thermite. *Fay.* b. Aluminothermy. *Webster 3d.* c. The removal of tin from scrap tinplate by dry chlorine. *Hess.*

gold scouring. Alternative term for burnishing. *Dodd.*

gold shell. *See* Abyssinian gold. *Bennett 2d, 1962.*

goldsmith. a. An artisan who makes vessels, jewelry, or other articles of gold. *Webster 3d.* b. A manufacturer of and dealer in articles of gold. *Webster 3d.*

goldsmith's window. Aust. A slang term for a rich mining claim. *Standard, 1964.*

gold-sodium chloride; sodium-gold chloride; sodium aurichloride; sodium chloroaurate. Yellow; orthorhombic; $NaAuCl_4.2H_2O$; decomposes at 100° C; and soluble in water, in alcohol, and in ether. Used in staining fine glass and in decorating porcelain. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-221.*

gold solder. A solder usually composed of gold, silver, copper, zinc, or brass. *CCD 6d, 1961.*

gold standard. S. Afr. A fixed price relation between gold and the currency of a country, with only narrow margins between the buying and selling prices of gold. *Beerman.*

goldstone. Aventurine spangled close and fine with particles of gold-colored material. *Webster 3d. See also* aventurine. *Fay.*

goldstone glaze. An aventurine glaze; a quoted composition is: 198.7 parts white lead; 83.4 parts feldspar; 8.0 parts whiting; 11.2 parts ferric oxide; and 41.4 parts flint. This glaze matures at cone 04. *Dodd.*

gold telluride. Minerals containing tellurium forming tellurides of gold and silver, for example, sylvanite, calaverite, and petzite. *Statistical Research Bureau.*

gold-tin precipitate. *See* gold-tin purple. *CCD 6d, 1961.*

gold-tin purple; purple of Cassius; gold-tin precipitate. Brown; insoluble in water; and soluble in ammonia. Used in the manufacture of ruby glass; in coloring enamels; and in painting porcelain. *CCD 6d, 1961.*

gold topaz. a. Heat-treated topaz quartz. *Shipley.* b. Naturally colored citrine. *Shipley.*

gold trichloride. *See* gold chloride. *CCD 6d, 1961.*

gold trichloride, acid. Yellow to red; crystals; $AuCl_3.HCl.4H_2O$ or $HAuCl_4.4H_2O$; decomposed by heat; and soluble in water, in alcohol, and in ether. Used in gold plating; in ceramics (enamels, gilding, and painting porcelain); in glass (gilding, ruby glass); and in the manufacture of finely divided gold and purple of Cassius. *CCD 6d, 1961.*

gold trioxide. *See* gold oxide. *CCD 6d, 1961.*

gold wash. A place where gold is washed; used chiefly in the plural. *Standard, 1964.*

gold washer. a. A sweater of gold coin. *Fay.* b. One who recovers gold by washing (as in a cradle); also, an apparatus for this purpose. *Webster 3d.*

gold washing. Act or process of washing auriferous soil for gold; also a place where this is carried on. *Webster 2d. See also* diggings. *Fay.*

gold work. a. The act or art of working in gold. *Webster 3d.* b. A place where gold is mined, washed, or worked. *Fay.*

gole. a. A ditch. *Standard, 1964.* b. A hollow between hills; a vale. *Fay.* c. A sluice or floodgate. *Standard, 1964.*

goliath crane. A portal type of crane having a lifting capacity of 50 tons or more, with the crab traveling along the horizontal beam. *See also* portal crane. *Ham.*

Gommesson method. A specialized method of surveying a borehole, utilized when a magnetic compass cannot be used because of local magnetism. The instrument used is essentially a rigid tube, up to 30 feet long, which is lowered into a borehole. The tube fits the borehole closely and contains a fine wire under tension. The difference between the arc of the tube, when bent at a crook in the borehole, and the chord of the wire is indicated by a stylus marking, which can be measured. The dip is read by etch tubes, and a directional orientation taken at the surface is carried down the hole by precise alinement of the tube and rods as they are lowered into the borehole. *Long.*

gompholite. *See* nagelfluh. *Fay.*

gondite. A metamorphic rock consisting of garnet (spessartite) and quartz. *See also* collobrierite; eulysite. *A.G.I.*

Gondite. A spessartite-quartz rock, probably produced by the metamorphism of manganiferous sediments, and named after the Gonds of the Central Provinces of India, where the Gondite series occurs. *Holmes, 1928.*

Gondite series. A series of manganiferous metamorphic rocks belong to the Dharwar system of India, and characterized by the presence of spessartite, rhodonite, and quartz. *Holmes, 1928.*

gondola. a. A large flat-bottomed riverboat of light build. *Standard, 1964.* b. A railroad car with no top, flat bottom, fixed sides, and sometimes demountable ends that is used chiefly for hauling steel, rock, or heavy bulk commodities. *Webster, 3d.*

gondola car. Type of open freight truck used in the United States for mineral transport. *Pryor, 3.*

Gonell air elutriator. A down-blast type of elutriator designed by H. W. Gonell and which has found considerable use in Europe for assessing the fineness of portland cement. *Dodd.*

gone off. A borehole that has deviated from the intended course. *Long.*

gong metal. An alloy from which Oriental gongs are made, as one of 78 parts copper and 22 parts tin. *Fay.*

goniometer. a. An instrument for measuring the angles between crystal faces. The contact goniometer, accurate to 0.5°, is used for elementary purposes; but for more precise work, a reflecting goniometer is necessary. It utilizes the reflection of light by crystal faces, arranged vertically and successively brought into alinement by rotating the crystal on the turntable of the instrument, the angle of rotation being accurately measurable by appropriate scales. *C.T.D.* b. An instrument used to measure the angle of the etch line on an acid-dip-survey acid bottle or the angle of bedding planes relative to the long axis of a drill core. *See also* protractor. *Long.*

gonnardite. A white hydrous silicate of calcium, sodium, and aluminum, $Ca_2Na_4Al_8Si_{12}O_{40}.14H_2O$. Finely fibrous, radiating spherules. Orthorhombic. Probably identical with metathomsonite. From Puy-de-Dome, France. *English.*

gonyerite. A chlorite rich in manganese (MnO 33.83 percent) and poor in aluminum (Al_2O_3O.58 percent), from Langban, Sweden. *Spencer 21, M.M., 1958.*

Gooch crucible. A porcelain crucible, the bottom of which is perforated with numerous small holes, used as a filter in chemical laboratories, the bottom being packed with washed asbestos wool. It is used to increase the speed of filtering, generally in conjunction with a filter pump. *Osborne.*

good. A term sometimes used to designate medium-quality drill diamonds. *Long.*

good clean hole. As applied to oil-well drilling, a hole free from those things the presence of which would render the well incapable of use as a well. *Ricketts, II.*

good delivery. Under metal exchange rulings, description of metal delivered at an agreed purity or of a defined quality. *Pryor, 3.*

gooderite. An igneous rock containing 79 percent sodaclase, 11 percent biotite, 3 percent nephelite, 3 percent microperthite, and 2 percent calcite. *Johannsen, v. 4, 1938, p. 57.*

goodletite. Aust. The matrix rock in which rubies are found embedded. *Standard, 1964.*

good levels. Corn. Levels nearly horizontal. *Fay.*

Goodman duckbill loader. The duckbill assembly consists of six major units: a shovel trough to which is attached the shovel head fitting inside the feeder trough; an operating carrier which controls the connection or coupling between the feeder and shovel troughs; a sliding shoe which moves to and fro on the floor of the seam; a swivel trough and a pendulum jack. The function of the duckbill is to gather the coal and load it into the shaker conveyor pan column. The shovel is forced into the prepared coal by the forward motion of the pan column. As the shovel is propelled forward, the coal is conveyed back along the shovel trough and then to the pan column. *Mason, v. 2, p. 544.*

Goodman loaders. a. The Goodman electro-hydraulic power shovel is designed for loading coal where the seams are 6 feet or more in thickness. It is moved from place to place by its own power on chain threads and will pass through crosscuts 5½ feet wide and 5 feet high. The scoop, which holds half a ton of coal, may be swung around a vertical axis, for a complete circle, thrust radially forward and back, raised and lowered, and made to discharge its load into a car. *Kiser, 1, p. 36.* b. The Goodman entry loader is especially adapted for use in thin seams. From its position in the neck or entry of a room, a telescoping, fan-shaped apron extends into the room and rests on the bottom. A box scraper is slid to the working face where it is made to gather at one time as much as 1,500 pounds of coal, and move it onto the apron and back through an inclined trough into a car. The scraper is operated by means of wire ropes and can be drawn on to the chute, which can then be telescoped for changing its location. *Kiser, 1, p. 37.*

Goodman miner. A continuous miner designed for driving coal headings in medium to thick seams. It has a rated capacity of 7 tons per minute. The machine is crawler-mounted and equipped with two triple-arm rotating cutting units and a chain conveyor. The cut coal is discharged on to the chain conveyor which delivers into shuttle or mine cars. A 100-horsepower motor drives the cutting units, while a 50-horsepower motor powers the hydraulic system that controls all other movements. Also called Goodman-type 500 miner. *Nelson.*

good merchantable brand; G.M.B. Metal exchange classification of copper metal. *Pryor, 3.*

good roasting. Complete roasting of an ore to the limit of its oxidizability. *Bennett 2d, 1962.*

goods. A trade term for a lot, parcel, or shipment of diamonds without regard to quality, composition, or quantity. *I.C. 8200, 1964, p. 149.*

good-shooting coal. Ark. Coal that can be shot "off the solid" with a large proportion of lump coal and little slack. *Fay.*

goongarrite. a. A sulfobismuthite of lead, $4PbS.Bi_2S_3$. Fibrous to platy masses. Probably monoclinic. From Lake Goongarrie, West Australia. *English.* b. A discredited mineral term since it is a mixture consisting of cosalite and galena. *American Mineralogist, v. 35, No. 3-4, March-April 1950, p. 336.*

goose. a. Forest of Dean. A water barrel or tub. *Fay.* b. Scot. A platform carrier for handling coal autos or cars on steeply inclined roads. *Fay.*

gooseberry stone. A pale, yellowish variety of garnet included under the term grossularite. *Fay.*

goose brae. Scot. *See* cuddy brae. *Fay.*

goose dung ore. An inferior grade of iron sinter containing silver. Also called goose silver ore. *Fay.*

gooseneck. a. The bent-tube part of a water swivel to which the water hose is connected. *Long.* b. A T-shaped connection for supplying water to the top end of wash rods in penetrating overburden. It is fitted with pipe handles by means of which the wash rods may be turned. *Long.* c. A bent pipe or tube having a swivel joint, so that its outer end may be revolved. *Standard, 1964.* d. A delivery pipe for underflow (spigot discharge) of spitzkasten, desliming cone, etc. Swivel-jointed so that pressure differential between overflow plane and underflow discharge height (the hydrostatic head) can be adjusted to give desired degree of classification of feed. *Pryor, 3.* e. A bend in a pipe such that the sides are approximately parallel. *Hess.* f. An arched connection, usually between a tractor and a trailer. *Nichols, 2.* g. *See* bustle pipe. *Dodd.*

goose silver ore. *See* goose dung ore. *Fay.*

goosing. In hydraulic mining, driving the gravel forward with the stream from the giant. Opposite of drawing. *Fay.*

go-out. A sluice built into a tidal embankment for impounding tidal water. *Ham.*

gopher; gopher drift. An irregular prospecting drift following or seeking the ore without regard to maintenance of a regular grade or section. *Fay.*

gopher hole; coyote hole. Horizontal opening in wall of quarry, perhaps chambered or tee-headed in preparation for blasting. Also, an irregular pitting hole made when prospecting. Gophering is random prospecting by such pits or by gopher drift. *Pryor, 3.*

gopher hole blasting; tunnel blasting; coyote blasting. Terms applied to the method of blasting in which large charges are fired in small adits driven into the face of the quarry at the level of the floor. Similar to snakehole blasting on a large scale. A crosscut is commonly driven at the end of the adit, and one or two intermediate crosscuts may also be used to hold the powder. Coyote blasting is best adapted to faces from 80 to 175 feet high, where the surface is irregular and where a large tonnage of rock is to be broken at one blast. *Lewis, pp. 160-161.*

gophering. a. A method of breaking up a sandy medium-hard overburden where blastholes tend to cave in. A series of shallow holes are made by a bar and an explosive charge fired in each. The debris is removed and the holes deepened and further charges fired until the holes are deep enough to take sufficient explosives to break the entire deposit. *Nelson.* b. The haphazard working of the easiest and richest portions of an ore deposit by miners with little or no capital. *Nelson.* c. Prospecting in any and every way, without any apparent definite object, or searching for float in surface soil, or for ore underground. *von Bernewitz.* d. Prospecting work confined to digging shallow pits or starting adits. Term used from similarity of this work to the crooked little holes dug in the soil by gophers. *Weed, 1922.* e. Can. Digging small holes to locate or extract ore. *Hoffman.*

gopherman. In metal mining, one who extracts ore located in pockets or other parts not accessible for machine drilling in an open-pit mine. *D.O.T. 1.*

gor Abbreviation for gas-oil ratio. Also abbreviated GOR. *BuMin Style Guide, p. 59.*

gor; gore. York. Sticky, dirty clay. *Arkell.*

gorceixite. A brown basic phosphate of barium and aluminum (with small amounts of calcium, cerium, and iron), $BaAl_3(OH)_7P_2O_7$ (?). Microcrystalline; in rolled pebbles (favas). Belongs to the hamlinite group. From diamond-bearing sand of Minas Geraes, Brazil. *English.*

gordonite. A hydrous phosphate of magnesium and aluminum, $MgO.Al_2O_3.P_2O_5.9H_2O$; monoclinic; glassy, lath-shaped crystals, forming crusts; colorless; Found near Fairfield, Utah. *English.*

Gordon's formula. An empirical formula giving the collapsing load for a given column. *C.T.D.*

Gordon's rule. A rule by which the capacity of hydraulic elevators is computed. It is as follows:

$$M = \frac{H \times N}{C}$$

where M = cubic yards of material lifted per hour
H = available head of water in feet
N = units of flow of water of 1 cubic foot per second
C = the efficient working height of the elevator, taken as head H in hundreds of feet multiplied by 15.

Lewis, pp. 387-388.

gordunite. A variety of peridotite consisting essentially of olivine and subordinate pyroxene with minor pyrope, picotite, and opaque oxides. A garnet-bearing wehrlite. *A.G.I.*

gorge. a. A narrow passage between hills; a ravine. *Standard, 1964.* b. A jam; as, an ice gorge. *Standard, 1964.*

gorgeyite. Hydrated sulfate, $K_2SO_4.5CaSO_4.$-1-1½ H_2O, small tabular monoclinic crystals with glauberite, and etc., in salt deposits at Ischl, Upper Austria. *Spencer 20, M.M., 1955.*

gorgulho. A diamond-bearing quartz and clay gravel of Brazil. *Hess.*

gor sand. Eng. Sharp yellow sand, Lincolnshire. *Arkell.*

gorse. A barrel or tub for carrying water underground. *C.T.D.*

goruchy slanetz. Russian name for oil shale or bituminous shale. *Tomkeieff, 1954.*

goshenite. A colorless, white, or bluish beryl from Goshen, Mass. *Schaller.*

Goskar dryer. A chamber dryer for bricks and tiles designed by T. A. Goskar. Each chamber has a false floor and a false roof; air enters the chamber via the space above the false roof and is withdrawn via the corresponding space below the false floor. *Dodd.*

goslarite. Native white vitriol or zinc sulfate, $ZnSO_4 7H_2O$. *Fay.*

go slow. *See* ca'canny. *Nelson.*

gossan. A ferruginous deposit filling the upper parts of mineral veins or forming a superficial cover on masses of pyrite. It consists principally of hydrated oxide of iron, and has resulted from the oxidation and removal of the sulfur as well as the copper, etc. Also spelled gozzan. Synonym for iron hat. *Fay.*

gossaniferous. Containing or producing gossan. *Fay.*

gossany lode. A lode filled with gossan. *Fay.*

goth. Staff. Sudden bursting of coal from the face, owing to tension caused by unequal pressure. *Zern.*

Gothic groove. A groove of Gothic-arch section in a roll. *Fay.*

gothic pitch. *See* pitch. *Dodd.*

göthite; goethite. A hydrous oxide mineral of iron, $Fe_2O_3H_2O$. *Fay.*

goths. Staff. Sudden burstings of coal from the face, owing to tension caused by unequal pressure. *Zern.* The term "airblast" is sometimes used in metal mines, especially in South Africa. *Fay.*

got-on-knobs. S. Staff. A system of working thick coal, being a kind of bord-and-pillar plan, the main roadways being first driven to the boundary. *Fay.*

gotten. a. An abandoned or exhausted mine. *C.T.D.* b. Coal ready to be filled underground into tubs or trains. *C.T.D.* c. Eng. Said of a worked out or exhausted mine, Midland coalfield. *Fay.* A term used in the quarrying industry from time immemorial. Getting (or winning) is the act of obtaining limestone in the form of discrete, handleable lumps or fragments from the massive, continuous deposit, and the resulting material is known as stone-gotten. *Stowell.*

Gottifnies kiln. The original electric multipassage kiln; it was introduced in 1938 by two Belgians, R. Gottignies and L. Gottignies. *See also* multipassage kiln. *Dodd.*

gotzenite. A mineral, $(Ca,Na,Al)_7(Si,Ti)_5O_{15}$-$F_{3.5}$; triclinic; rinkite group. In nephelinite from Kivu, Republic of the Congo. *Spencer 21, M.M., 1958.*

gouffre. A large hole opening downward into a cavern in a limestone region. *Mather.*

gouge. a. A layer of soft material along the wall of a vein, favoring the miner, by enabling him after gouging it out with a pick, to attack the solid vein from the side. *See also* selvage; flucan. *Fay.* b. Can. A narrow band of gold-bearing slate next to the vein, which can be extracted by a thin, long-pointed stick, Nova Scotia. *Fay.* c. To work a mine without plan or system. *Fay.* d. To contract the face of (a mine working) by neglecting to keep the sides cut away. *Standard, 1964.* e. The clay or clayey material in a fault zone. Also called clay gouge. *Nelson.* f. Parting layer of soft material between the true lode and the enclosing host rock. Crushed rock along a fault slip. *See also* gut. *Pryor, 3.* g. A chisel. *Arkell.* h. To gouge, to cut with a chisel. *Arkell.* i. *See* salvage. *C.T.D.*

gouge angle. The angle at which the surface of a cutting edge is inclined in relation to the surface of the material being cut. *See also* negative rake; positive rake. *Long.*

gouge channel. *See* channel cast. *Pettijohn.*

gouge clay. Clay infillings in a mineral vein. *Compare* gouge. *Arkell.*

gouge marks; crescentic gouge. Crescentic marks concave up-current formed by glacial plucking on bedrock surface. *Pettijohn.*

gouge rake. Synonym for positive rake. *Long.*

gouge slip. A shaped piece of oilstone on which the concave side of the cutting edge of a gouge may be rubbed for sharpening purposes. *C.T.D.*

gouging. In placer mining, an operation similar to ground sluicing. Also called booming. *Fay.*

gouging shot. A gripping shot or opening shot used to make the first opening in a straight-room face, or to start a breakthrough. *See also* shot, e. *Fay.*

gouging test. A procedure for the evaluation of the resistance of a vitreous enameled surface to mechanical wear. In the procedure laid down in a Special Bulletin issued by the Porcelain Enamel Institute (Washington, D. C.), a small steel ball is rolled on the enamel surface under various loads. *Dodd.*

gounce. Corn. A frame made of boards in which small tin ore is washed in a stream of water. A strake. *Fay.*

gouttes d'eau. Literally 'drops of water'; pingos d'agoa; an old term applied to the whitest of the Brazilian topaz crystal, which when cut and polished rival diamond in brilliancy, but lack the fire of the latter gem. *C.M.D.*

goutwater. Forest of Dean. Mine water containing hydrogen sulfide, H_2S. *Fay.*

Gouy layer. Modification of the Helmholtz concept of the electrical double layer which surrounds a particle immersed in an electrolyte. In Gouy's view there is only one diffuse layer. The ionic atmosphere near the surface of the particle is highly charged, but this ionization diminishes gradually outward into the ambient liquid. *See also* Debye-Huckel theory. *Pryor, 3.*

government ownership. The statutes asserting paramount title in the United States to mineral lands are in harmony with the laws of practice of other countries on the same subject. *Ricketts, I.*

governor. a. A device for regulating the speed of an engine or motor under varying conditions of load and pressure. *Standard, 1964.* b. A device for regulating the flow or pressure of a fluid, as gas or water. *Standard, 1964.*

governor, engine. A device that holds the engine speed constant regardless of load. *Shell Oil Co.*

gow. Scot. A blacksmith. *Standard, 1964.*

gowan. Decomposed granite. *Standard, 1964.*

gow caisson. A device for sinking shafts of small diameter through silt or clay without excessive loss of ground. *Ham.*

gowerite. A mineral, $CaB_6O_{10}.5H_2O$, monoclinic, from Furnace Creek, Death Valley, Calif. *Hey, M.M., 1961.*

gowk. Northumb. Rider. *Arkell.*

gowl. Derb. To break down, as the roof and sides are said to gowl or gowl out when they fall. *Fay.*

goyazite. Perhaps $Ca_3Al_{10}P_2O_{23}.9H_2O$. In small rounded grains. A yellowish-white mineral from Brazil. *Fay.*

Goyder and Laughton process. A flotation process (1905) that was a variation of the Potter-Delprat process. It was used at Broken Hill, New South Wales. *Liddel, 2d, p. 407.*

gozzan. Eng. *See* gossan. *Fay.*

gpd Abbreviation for gallons per day. *BuMin Style Guide, p. 59.*

gph Abbreviation for gallons per hour. *Pit and Quarry, 53rd, sec. E, p. 82.*

gpm Abbreviation for gallons per minute. *BuMine Style Guide, p. 59.*

gpr Abbreviation for gas production rate. Also abbreviated GPR. *BuMin Style Guide, p. 59.*

gps Abbreviation for gallons per second. *BuMin Style Guide, p. 59.*

gr Abbreviation for grain. *BuMin Style Guide, p. 59.*

grab. An instrument for extricating broken boring tools from a borehole. *Fay.*

Grabau process. A method of obtaining aluminum from cryolite. *Fay.*

grabbing crane. An excavator consisting of a crane carrying a large grab or bucket in the form of a pair of half-scoops, so hinged as to scoop or dig into the earth as they are lifted. *C.T.D.*

grab buckets. Consists of a digging device which in closing, bites into the sediment and contains it inside the closed shell. The bucket and load are then hoisted to the surface where the shell is opened to dump the load. Includes clamshells, orangepeels, and other variations. *Mero, p. 245. See also* grabbing crane; grab dredger.

grab-camera. An ocean floor sampling system incorporating a large sediment grab with a deep-sea camera. *H&G.*

grab dredger. A dredging appliance consisting of a grab or grab bucket suspended from the jib head of a crane, which does the necessary raising and lowering. Also called a grapple dredger. *C.T.D.*

graben. A depressed segment of the earth's crust bounded on at least two sides by faults and generally of considerable length as compared with its width. *Webster, 3d. See also* trough fault.

grab equipment. A clamshell bucket fitted with teeth to assist digging. *Nelson.*

grabhooks. Hooks used in lifting blocks of stone. They are used in pairs connected with a chain, and are so constructed that the tension of the chain causes them to adhere firmly to the rock. *Fay.*

grab iron. *See* grab. *Fay.*

grabman. *See* clipper, b. *D.O.T. 1.*

grab sample. a. A rough and random mode of sampling. The samples may be taken from the pile broken in the process of mining. It is often used to estimate the approximate value of material lying broken in stopes or headings or of material coming from the mine. All portions of the ore exposure are not equitably represented by grab sampling. *See also* chip sampling. *Nelson.* b. A sample taken at random from a pile, truck, or car of ore or coal. *Ballard.*

grab sampling. Collection of specimens of ore more or less at random from a heap, scatter pile or passing load. Used in connection with examination of the characteristic minerals in the deposit rather than for valuation. *Pryor, 3.*

gradall. Essentially a hydraulic backhoe equipped with an extensible boom that performs the three separate functions of excavation, backfill, and grading. *Carson, p. 161.*

gradation. a. In geology, the bringing of a surface or a stream bed to grade, through erosion, transportation, and deposition by running water. *See also* aggradation; degradation. *Fay.* b. The proportion of material of each grain size present in a given soil. *ASCE P1826.*

grade. a. The classification of an ore according to the desired or worthless material in it or according to value, for example, a gold ore that contains 1 ounce gold per ton would be a high-grade ore, while one containing 4 pennyweights per ton would be a low-grade ore. *Nelson.* b. See rank. *Nelson.* c. A particular class of workman in a mine, namely, collier, engineman, timberman, repairer, and laborer. *Nelson.* d. To prepare a roadway of more uniform slope. *Fay.* e. An ore which carries a great or comparatively small amount of valuable metal is called a high- or low-grade ore. *Fay.* f. The degree of strength of a high explosive. Those above 40 percent nitroglycerin are arbitrarily designated as high-grade dynamites and those below 40 percent strength as low-grade dynamites. *Fay.* g. In assaying, the percentage of the sought value or of each valuable species in the ore. *Pryor, 3.* h. In surveying, the gradient of a traveling way, slope, sluice, etc. *Pryor, 3.* i. Of gravels and road metal, the graded aggregate states the percentage weight of material of each particle size specified. *Pryor, 3.* j. The average assay of a tonnage of ore. The percent rise or fall of roads, ditches, tunnels, drifts, etc. *Ballard.* k. To sort and classify diamonds, such as drill diamonds, into quality groupings, each group containing diamonds having somewhat similar characteristics deemed to affect their fitness for use in a specific manner; the least fit are considered as constituting the lowest quality or grade. *Long.* l. The quality group into which diamonds are sorted, such as poor, good, or excellent. *Long.* m. The rate of incline or decline in terms of degrees from the horizontal, percent of rise to the horizontal distance, or in inches of vertical projection per foot of horizontal projection. *See also* gradeline. *ASA MH4.1-1958.* n. The size of trimmed sheet mica based on the maximum usable rectangle that can be punched or stamped from the piece. *Skow.* o. The slope of a road, channel, or natural ground. *Seelye, 1.* p. The finished surface of a canal bed, road bed, top of embankment, or bottom of excavation. *Seelye, 1.* q. Any surface prepared for the support of a conduit, paving, ties, rails, etc. *Seelye, 1.* r. Elevation of finished surface of an engineering project. *Seelye, 2.* s. Actual elevation, as crown of road at grade 59.50; or, sewer line, grade 21.19 (at station 1 + 50.00. *Seelye, 2.* t. Rate of slope or degree of inclination, as, a 2 percent grade. *See also* gradient. *Seelye, 2.* u. Usually the elevation of a real or planned surface or structure. *Nichols.* v. In geology, that slope of the bed of a stream, or of a surface over which water flows, upon which the current can just transport its load, without either eroding or depositing. *Fay.* w. A term used to designate the extent to which metamorphism has advanced. Found in such combinations as high- or low-grade metamorphism. *Compare* rank. *Leet.* x. The strength of bonding of a grinding wheel; frequently referred to as hardness. *ACSG, 1963.* y. Index of friability of bonded abrasive products. *VV.*

graded. In geology, brought to or established at grade, through the action of running water carrying a load of sediment by eroding or degrading at some places and depositing or aggrading in other places. *Fay.*

graded aggregates. Aggregates in which there is a continuous grading in the sizes of mineral fragments from coarse to fine. *A.P.I. Glossary.*

graded bedding. A type of stratification, each stratum of which displays a gradation in grain size from coarse below to fine above. Synonym for diadactic structure. *A.G.I. See also* sorted bedding.

graded coal. One of the three main size groups by which coal is sold by the National Coal Board in Great Britain. It consists of coal screened between two screens—with an upper and lower limit varying from a top size of 2 or 1½ inches to a bottom size of ¾ to ⅛ inch. *See also* large coal; smalls. *Nelson.*

graded filter. Superimposed layers of coarse gravel, fine gravel, coarse and fine sand arranged so that the gravel will not be clogged by the action of water flowing through the sand. *Ham.*

graded profile. *See* profile of equilibrium. *A.G.I.*

graded sand. A sand containing some coarse, fine, and medium particle sizes. It is not a uniform sand. *Ham.*

graded sediment. a. In geology, a sediment consisting chiefly of grains of the same size range. *Stokes and Varnes, 1955.* b. In engineering, a sediment having a uniform or equable distribution of particles from coarse to fine. *Stokes and Varnes, 1955.* c. A general term for loose or cemented detrital sediments in which the allogenic grains lie mainly within the limits of a single grade. *Hess.*

graded shoreline; smooth shoreline; straight shoreline. A shoreline showing no promontories or bays; typical of an advanced shoreline development. *Schieferdecker.*

graded shore profile. Shore profile which has reached its profile of equilibrium, typical of the stages of maturity and old age of the shoreline cycle. *Schieferdecker.*

graded stream. A stream having a smooth gradient, without cascades or rapids. *Mather.*

graded unconformity. A nonconformity as between granite and a basal arkose where no sharp plane of contact can be recognized. *Pettijohn, 2d, 1957, p. 325.*

gradeline. a. The baseline from which elevations are measured. *ASA MH4.1-1958.* b. A line that defines the intended grade of a roadway that is being driven. Such a line is used to control the gradient of a roadway. *B.S. 3618, 1963, sec. 1.*

grade of coal. A term to indicate the nature of coal mainly as determined by the amount and nature of the ash and the sulfur content. The term grade is sometimes used as a synonym for rank. *Tomkeieff, 1954.*

grader. a. A self-propelled or towed machine provided with a row of cutting or digging teeth and (behind) a blade to spread and level the material. It is used for cutting topsoil at opencast pits and for leveling spoil. *Nelson.* b. A machine with a centrally located blade that can be angled to cast to either side, with independent hoist control on each side. *Nichols.* c. One who or that which grades; a person, implement, or apparatus employed in grading streets, etc., as, a road grader. *Standard, 1964.* d. A trommel-type airswept circular screen used in asbestos milling where the fine rock and fibre dust are eliminated through medium size perforated plates. *Arbiter, p. 69.*

grade resistance. The force, due to gravity, that resists the movement of a vehicle up a slope. *Carson, p. 72.*

grade scale. A subdivision of an essentially continous scale of particle sizes into a series of size classes. *See also* Wentworth scale. *A.G.I.*

grade scale, Atterberg. *See* Atterberg scale.

grade scale, Phi. A logarithmic transformatino of the Wentworth grade scale based on the negative logarithm to the base 2 of the particle diameter. *A.G.I.*

grade scale, Tyler standard. *See* Tyler standard scale.

grade scale, Udden. *See* Udden scale.

grade scale, Wentworth. *See* Wentworth scale.

grade stake. A stake indicating the amount of cut or fill required to bring the ground to a specified level. *Nichols.*

gradient. *a.* The inclination of the rate of regular or graded ascent or descent (as of a slope, roadway, or pipeline. *Webster 3d.* b. A part (as of a road or pipeline) that slopes upward or downward; a portion of the way that is not level; slope, grade, ramp. *Webster 3d.* c. The rate of increase or decrease of a variable magnitude, or the curve that represents it. *Webster 2d.* d. The rate of change of a quantity with distance; for example, the temperature gradient in a metal bar is the rate of change of temperature along the bar. *C.T.D.* e. The space rate of decrease of a function. The gradient of a function in three space dimensions is the vector normal to surfaces of constant value of the function and directed toward decreasing values, with magnitude equal to the rate of decrease of the function in this direction. The ascendent is the negative of the gradient. *H&G.* f. Often loosely used to denote the magnitude of the gradient or ascendant (that is, without regard to sign) of a horizontal pressure field. *See also* slope. *H&G.*

gradienter. A surveyor's instrument consisting of a small telescope mounted on a tripod and fitted with a spirit level and a graduated vertical arc; used for determining grades, etc. *Standard, 1964.* Also called grading instrument. Sometimes spelled gradientor. *Fay.*

gradient hydrophone. *See* pressure gradient hydrophone. *H&G.*

gradient of equal traction. The gradient at which the tractive force required to pull an empty tram inby (slightly uphill) is equal to that required to pull a loaded tram outby. This was formerly termed horse haulage gradient. In general, haulage roads are graded about 0.5 percent in favor of the loaded trams. *Nelson.*

gradient of gravity. Partial derivative with respect to distance in a horizontal direction of the acceleration of gravity, for which purpose the acceleration of gravity is considered as a scalar. *Schieferdecker.*

gradient post. A post or stake indicating by its height or by marks on it the grade of a railroad, highway, or embankment, etc., at that spot. *Webster 2d.* A grade stake. *Fay.*

grading. a. The degree of mixing of size classes in sedimentary material; well graded implies more or less uniform distribution from coarse to fine, poorly graded implies uniformity in size or lack of continuous distribution. *Compare* sorting. *A.G.I. Supp.* b. The relative proportions of the variously sized particles in a batch, or the process of screening and mixing to produce a batch with particle sizes correctly proportioned. A batch with a grading for low porosity will contain high proportions of coarse and fine particles and a low proportion of intermediate size; if a particular particle size, for example, the medium size, is excluded from the batch, this is said to be a gap grading. *Dodd.* c. In the abrasives industry, the process of testing to determine the grade of a wheel; testing machines are available for this purpose. *See also* grade. *Dodd.* d. The commercial operation of sorting coke between two screens such that the ratio of the larger to the smaller screen aperture does not exceed 2.5 to 1; the coke which has been so sorted. *B.S. 1017, 1960, Pt. II.*

grading curve. A curve giving the grain size of a sample of soil plotted to a logarithmic scale horizontally, with percentages plotted vertically to an arithmetic scale. Any point on the curve reveals percentage by weight of particles in the sample of a size smaller than the given point. *Ham.*

grading instrument. A surveying level with a telescope which can be raised or lowered to set out a required gradient accurately. *Ham.*

grading test. *See* screen analysis. *Fay.*

graduate. A glass flask marked with lines indicating the volume of its contents in milliliters (cubic centimeters); 1 milliliter (or 1 cubic centimeter) of water weighs 1 gram, or nearly 15½ grains; 1,000 grams of water weigh as much as 1 liter of water. Graduates range in capacity from 25 to 2,000 milliliters (cubic centimeters). *von Bernewitz.*

graduated glassware. Glassware that is marked with one or more graduations for volumetric measuring purposes. *ASTM C162-66.*

graduated tile. Roofing tile for covering curved surfaces, such as a round tower, circular bays, and other circular roofs. *Fay.*

graduation. The method or system of dividing a graduated scale; also, one of the equal divisions or one of the dividing lines in such a scale. *Standard, 1964.*

graduator. a. An apparatus for evaporating a liquid by causing it to flow over large surfaces while exposed to a current of air. *Standard, 1964.* b. A dividing engine. *Standard, 1964.*

Graf sea gravimeter. A balance-type gravity meter (heavily overdamped to attentuate shipboard vertical accelerations) which consists of a mass at the end of a horizontal arm that is supported by a torsion spring rotational axis. The mass rises and falls with gravity variation but is restored to near its null position by a horizontal reading spring, tensioned with a micrometer screw. Difference between actual beam position and null position gives an indication of gravity value after micrometer screw position has been taken into account. *H&G.*

grafting spade. Eng. A long narrow spade for digging clay. *Fay.*

grafting tool. A very strong curved spade used in canal digging. *Standard, 1964.*

graftonite. A salmon-pink, usually dark from alteration, phosphate of iron, manganese, and calcium, $(Fe,Mn,Ca)_3P_2O_8$. Rough composite crystals, interlaminated with triphylite. Monoclinic. Near Grafton and North Groton, N.H.; near Greenwood, Me. *English.*

grahamite. A hydrocarbon resembling albertite in its jet-black luster; occurring in veinlike masses. It is soluble in carbon disulfide and chloroform but not in alcohol, and is fusible. Has a conchoidal fracture and is brittle. Specific gravity, 1.145. *Sanford.*

Graham pressure surveying apparatus. A barometric surveying instrument which is free from the many defects of the aneroid barometer. The apparatus records the change in pressure of a constant volume of air maintained at a constant temperature. The instrument includes a sealed brass vessel which is immersed in a quart-sized vacuum flask filled with crushed ice. This vessel is connected by a small-bore capillary tube, via a two-way tap, to one side of a manometer. The other side of the manometer is open to atmosphere while the two-way tap allows the vessel itself to be open to atmosphere, to equalize the pressure at the beginning of a survey. A side tube containing a closely-fitting plunger connects with the bottom of the U-tube, so that, by moving the plunger up or down, the left-hand leg of the U-tube may be brought to the zero line. This brings the air in the sealed vessel to constant volume. Changes in pressure are thus recorded by restoring the constant volume by means of the plunger and measuring the change in pressure on the manometer. *Roberts, I, p. 233-234.*

Graham ratio. The amount of carbon monoxide produced, when expressed as a ratio over the oxygen absorbed, varies with the temperature of oxidation of coal and also with the time of exposure to oxidation. This ratio (CO produced/O_2 absorbed) can therefore be used as an index of the rate of oxidation in a mine. *Roberts, I, p. 102.*

Graham's law of diffusion. The relative rates of diffusion of two gases are inversely proportional to the square roots of their densities. *Cooper.*

grail. Gravel or sand; anything in fine particles. *Standard, 1964.*

grain. a. A second direction of splitting, less pronounced than the rift and usually at right angles to it. *Fay.* b. In petrology, that factor of the texture of a rock composed of distinct particles or crystals which depends upon their absolute size. *Fay.* c. (Eng.) Of coal, the lines of structure or parting parallel with the main gangways and hence crossing the breasts. *Fay.* d. A unit of weight that equals 0.0648 gram; 0.000143 avoirdupois pound; and 0.04167 pennyweight. Abbreviation, gr. *Fay.* e. In troy weight there are 480 grains to the ounce. Not to be confused with the pearl grain, which is one quarter of a metric carat. *Anderson.* f. A cleaned and screened anthracite product 3/8 inch by 1/8 inch. *See also* anthracite fines. *Nelson.*

grainer. A shallow tank for the evaporation of of brine. The usual form of grainer is a steel trough, 150 feet long, 12 to 15 feet wide, and 22 inches deep. In it are hung steam pipes, and brine is evaporated without boiling. *Bureau of Mines Staff.*

grainer medium salt. Grainer salt screened to give a mixture of coarse and medium sized flakes, excluding very coarse and very fine. *Kaufmann.*

grainers. Diamonds which in weight will correspond to fourths of a carat; a diamond weighing one-half carat is a two-grainer; one weighing three quarters is a three-grainer; a diamond of one carat in weight is a four-grainer. *Hess.*

grainer salt. Salt produced by the grainer process of surface evaporation from brine. Product has a characteristic flaky shape consisting of hoppers and hopper fragments. *Kaufmann.*

grain fineness number. A weighted average grain size of a granular material. The American Foundrymen's Society grain fineness number is calculated with prescribed weighting factors from the standard screen analysis. *ASM Gloss.*

grain gliding. The movement between individual mineral grains. *G.S.A. Mem. 6, 1938, p. 128.*

grain gold. Gold that has become granular in the process of heating. *Fay.*

grain growth. The solid state enlargement of some crystals at the expense of others producing a coarser texture in an essentially monomineralic rock like limestone; commonly termed recrystallization. *A.G.I.*

graining. A process for producing a decorative finish by transferring a pattern to the porcelain enamel surface by means of rolls. *ASTM C286-65.*

graining board. A specially constructed board used in the graining process. *Hansen.*

graining paste. A mixture of color oxides, fluxes, and oils. *ASTM C286-65.*

graining paste thinner. A mixture of oils used to thin out graining paste. *Hansen.*

graining roll. A specialized type of roll used for transferring the grain pattern to the porcelain enamel. *ASTM C286-65.*

grain magnesite. Granular magnesium oxide obtained by dead-burning magnesium carbonate or hydroxide. *A.R.I. See also* dead-burned magnesite.

grain marks. Lines on the facet surfaces, the result of imperfect polishing. *Hess.*

grain size. a. A term relating to the size of mineral particles that make up a rock or sediment. *A.G.I.* b. For metals, a measure of the areas or volumes of grains in a polycrystalline material, usually expressed as an average when the individual sizes are fairly uniform. Grain sizes are reported in terms of number of grains per unit area or volume, average diameter, or as a grain-size number derived from area measurements. *ASM Gloss.* c. For grinding wheels, see grit size. *ASM Gloss.* d. The size or size distribution of refractory particles determined usually by sieve analysis. *A.R.I.*

grain-size analysis; mechanical analysis. The process of determining graduation. *ASCE P1826.*

grain-size classification. A scheme of rock classification based upon the average size of certain chosen components; thus, each clan comprises coarse-, medium-, and fine-grained members. *C.T.D.*

grain spacing. The relative position of the abrasive particles in a grinding wheel. *See also* structure number. *ASM Gloss.*

grain tin. a. The granular or nodular form of cassiterite, tin oxide, SnO_2; also known as stream tin. *Henderson.* b. Metallic tin of high grade obtained by charcoal reduction. *Henderson.*

graith. a. N. of Eng. To replace, repair, dress, or put in order. Probably a variation of grade. Also called grathe. *Fay.* b. A set of tools, picks, shovels, wedges, hammers, etc., used for work underground. *C.T.D.*

gram; gramme. The unit of mass in the metric system. Originally intended to be the mass of 1 cubic centimeter of water at 4° C, but it is defined as one-thousandth of the mass of the International Prototype Kilogramme, a cylinder of platinum-iridium kept at Sèvres, France. Abbreviation, g. *C.T.D.*

gram-atom. a. The atomic weight of an element expressed in grams. *Hackh's Chem. Dict.* b. The quantity of an element, the mass of which in grams is equal to its atomic weight. *C.T.D.*

gram-centimeter. A unit of work; the work done in raising the weight of 1 gram vertically 1 centimeter; 981 ergs. Abbreviation, gcm. *Standard, 1964.*

gram-degree. Same as calorie. *Standard, 1964.*

gram equivalent. The gram equivalent of an element is the weight in grams of that element which combines with, or displaces 1 gram of hydrogen (or 8 grams of oxygen). *See also* equivalent weight. *Cooper.*

gram-molecular volume. The volume of any gas occupied at normal temperature and pressure by its gram-molecular weight. It is 22.4 liters at normal temperature and pressure. Abbreviation, g.m.v. *Cooper.*

gram-molecular weight. The molecular weight of a substance expressed in grams. One gram-molecular weight of a gas measures 22.4 liters in volume under standard conditions. *Crispin.*

gram-molecule; mole; mol. Molecular weight of a compound in grams, derived from that of hydrogen which, though 2.016, is expressed as the whole number 2. The gram-molecule, for example, of H_2SO_4 is $2 + 32 + (4 \times 16) = 98$. *Pryor, 3.*

grampus. The tongs with which bloomery loups and billets are handled. *Fay.*

gram weight. Pull of gravitation on a mass of one gram. This varies slightly with the acceleration (g) due to gravity differences in various localities, but is approximately 981 dynes. *Pryor, 3.*

granat. Ir. Coarse quartzose grit. Presumably obsolete variant of granite. Also an obsolete form of garnet. *Arkell.*

granate. a. Sp. Garnet. *Fay.* b. Mex. Crystallized cinnabar. *Fay.*

Granby cars. A popular type of automatically dumped car for hand or power-shovel loading. In this type car, a wheel attached to the side of the car body engages an inclined track at the dumping point. As the side wheel rides up and over the inclined track, the car body is automatically raised and lowered, activating a side-door operating mechanism which raises the door, permitting the car to shed its load. *Pit and Quarry, 53rd, Sec. A, p. 112. See also* mine cars.

Grand Canyon series. The Precambrian rocks exposed in the lowest parts of the Grand Canyon, Colo. *C.T.D.*

grandidierite. A bluish-green basic silicate of aluminum, ferric, and ferrous iron, magnesium, etc., $7SiO_2.11(A1,Fe)_2O_3.7(Mg,Fe,Ca)0.2(Na,K,H)_2O$. Large elongated crystals; orthorhombic. Resembles sapphirine. From Andrahomana, Malagasy Republic. *English.*

grandite. A name suggested for garnets, the chemical composition of which is between grossularite and andradite. *Shipley.*

grand slam technique. The technique of multiple log interpretation. *See also* shallow investigation laterolog. *Wyllie, p. 192.*

graniform. Formed like a grain; composed of grains or granules. *Standard, 1964.*

granilite. A crystalline igneous rock composed of more than three ingredients. Obsolete. *A.G.I.*

granite. a. A coarse-grained igneous rock containing megascopic quartz, averaging 25 percent, much feldspar (orthoclase, microcline, sodic plagioclase), and mica or other colored minerals. In a wide sense, granite includes alkali granites, adamellites, and granodiorites, while the granite clan includes the medium- and fine-grained equivalents of these rock types. Because of its extreme hardness, granite is used largely for heavy engineering, building works, and road metalling. *C.T.D.* b. A light-colored crystalline rock composed chiefly of quartz and feldspar; generally produces a light-colored soil; called by some drillers white granite and by others sand rock. *Legrand.* c. Loosely used for any light-colored, coarse-grained igneous rock. *A.G.I. Supp.* d. A German definition limits the term granite to one composed essentially of quartz with equal parts of biotite and muscovite mica, but quarrymen customarily include with the granites, quartz-diorites, syenites, quartz-porphyrites, gabbros, schists, and gneisses. *BuMines Bull. 630, 1965, p. 876.*

granite aplite. *See* aplite. *C.T.D.*

granite carver. *See* stone carver. *D.O.T. 1.*

granite family. The group of crystalline, homogeneous, or nonfoliated rocks resembling granite, such as syenite, quartz syenite, granitite, and all varieties of granite itself. *Fay.*

granite gneiss. a. A coarsely crystalline, banded metamorphic rock of granitic composition. *A.G.I.* b. A primary igneous gneiss of granitic composition. *See also* augen gneiss; flaser granite; gneiss; orthogneiss. *A.G.I.*

granitelle. A granite with comparatively little mica, so that it consists almost entirely of quartz and feldspar; same as binary granite. It has also been used by Irving for augite granite. *Fay.*

granite pegmatite. *See* pegmatite. *Stokes and Varnes, 1955.*

granite polisher. In the stonework industry, one who polishes the flat, rough-sawed surfaces of blocks and slabs of granite to a lustrous finish by machine. Also called polishing machine operator; stone grinder. *D.O.T. 1.*

granite porphyry. Practically, a quartz porphyry with a coarsely crystalline groundmass and preponderating phenocrysts. The chief phenocrysts are, however, feldspar. *Fay.*

granite tectonics. The structural features of plutons and the relationship between them. *A.G.I.*

graniteware. a. A fine, very hard pottery resembling ironstone china. *Standard, 1964.* b. Pottery having a variegated surface resembling or suggesting the markings of granite. *Standard, 1964.* c. A kind of ironware, coated with an enamel suggestive of granite. *Webster 3d.* d. A one-coat porcelain-enameled article with a mottled pattern produced by controlled corrosion of the metal base prior to firing. *ASTM C286-65.*

graniteware, white. *See* ironstone ware. *ACSG, 1963.*

granite wash. The material eroded from outcrops of granites, syenites, diorites, granodiorites, monzonites and their fine-grained or aphanitic equivalents and redeposited, forming a rock having approximately the same major mineral constituents as the original rock. *A.G.I.*

granitic. Characteristic of, composed of, pertaining to, or resembling granite. *Fay.*

graniticoline. Growing upon or attached to granite, as lichens. *Fay.*

granitic rock. A name generally applied to rocks resembling granite in appearance and composition, but also (not recommended) to mafic or even ultramafic rocks. *A.G.I. Supp.*

granitification. Synonym for granitization. *A.G.I.*

granitite. Biotitic granite. It is the commonest of the granites. *Fay.*

granitization. A term used in somewhat different connotations by different authors, but in general, referring to the production of a granitic rock from sediments by an unspecified process. Some would limit the term to the production of granite in place, without the formation of a notable amount of liquids; others would include all granitic rocks formed from sediments by any process, regardless of the amount of liquid formed or any evidence of movement. The precise mechanism, frequency, and magnitude of the process are still in dispute. Also spelled granitisation. *A.G.I.*

granitoid. A term applied to the texture of holocrystalline igneous or metasomatic rocks, such as granites, in which the constituents are mostly anhedral or xenomorphic and of uniform size. *A.G.I.*

granitoid arkose. Grains of quartz, lamellar feldspar, and mica, more or less disposed as in granite; feldspar dominant. This rock does not differ from granite except that it is evidently formed by aggregation. *A.G.I. Supp.*

granny bonnet. Term sometimes used for a bonnet hip tile. *See also* hip tile. *Dodd.*

granoblastic. a. The texture of metamorphic rocks composed of equidimensional elements. *A.G.I.* b. A term applied to secondary texture due to diagenetic change either by crystallization or recrystallization in the solid state, in which the grains are of equal size (equigranular). *A.G.I.*

granodiorite. A plutonic rock consisting of quartz, calcic oligoclase or andesine, and orthoclase, with biotite, hornblende, or pyroxene as mafic constituents. Granodiorite is intermediate between quartz monzonite, and quartz diorite, and contains at least twice as much plagioclase as orthoclase. *A.G.I.*

granofels. A field name for a medium- to coarse-grained granoblastic metamorphic rock with little or no foliation or lineation. *A.G.I. Supp.*

granolith. An artificial stone of crushed granite and cement. *Webster 3d.*

granolithic concrete. Concrete suitable for use as a wearing surface finish to floors, made with specially selected aggregate of a suitable hardness, surface texture, and particle shape. *Taylor.*

granophyre. A quartz porphyry or fine-grained porphyritic granite characterized by a groundmass with micrographic (granophyric) texture. *A.G.I.*

granophyric. A texture in igneous rocks characterized by the irregular intergrowth of blebs, patches, and threads of quartz in a base of feldspar. It is similar to graphic and micrographic but differs from these textures in that the intergrowth of quartz and feldspar is more irregular. *A.G.I.*

grant. Eng. A tract of land leased or ceded for mining purposes. *Fay.*

grantsite. A dark olive-green to greenish-black mineral, $2Na_2O.CaO.V_2O_4.5V_2O_5.8H_2O$: monoclinic; luster silky, pearly, to subadamantine; occurs as fibrous aggregates that coat fractures or form thin seams in sandstone or limestone; found near Grants, Valencia County, N. Mex., and in Montrose County, Colo. *American Mineralogist, v. 47, No. 3-4, March-April 1962, p. 414.*

granular. Composed of, like, or containing grains or granules; specifically, in igneous rocks, composed of grains of constituent minerals, all of which were formed during one definite stage of the crystallization. Opposite of porphyritic. *Standard, 1964.*

granular chert. One of the main types of chert. Compact, homogeneous, composed of distinguishable relatively uniform-sized grains, granules, or druses, uneven or rough fracture surface, dull to glimmering luster, hard to soft, may appear saccharoidal. Formerly referred to as crystalline chert. Synonym for crystalline chert. *A.G.I.*

granular fracture. A type of irregular surface produced when metal is broken, that is characterized by a rough, grainlike appearance as differentiated from a smooth silky, or fibrous, type. It can be subclassified into transgranular and intergranular forms. This type of fracture is frequently called crystalline fracture, but the inference that the metal has crystallized is not justified. *ASM Gloss.*

granularity. In petrology, the feature of rock texture relating to the size of the constituent grains or crystals. Expressed by such terms as fine-, medium-, or coarse-grained; phanerocrystalline, microcrystalline, etc. Essentially synonymous with grain size. *A.G.I.*

granular pearlite; globular pearlite. Pearlite in which the cementite occurs as globules instead of as lamellae. Produced by very slow cooling through the critical range, or by subsequent heating just below the critical range. *C.T.D.*

granular powder. In powder metallurgy, particles having approximately equidimensional, nonspherical shapes. *ASM Gloss.*

granular quartz. Same as quartzite. *Fay.*

granular structure. Exhibited by a mineral showing crystalline grains, but not external crystal faces; for example, marble. *C.M.D.*

granular texture. A texture due to the aggregation of mineral grains of approximately equal size, whether in clastic, igneous, or recrystallized rocks. *Stokes and Varnes, 1955.*

granular tonstein; Graupen tonstein. This type of tonstein consists predominately of kaolinite grains of lighter or darker shades, often surrounded by collinite. These grains show a cryptocrystalline to finely crystalline structure; the cryptocrystalline material is isotropic. *IHCP, 1963, part. I.*

granulate. To form into grains or small particles, as gunpowder or zinc. *Standard, 1964.*

granulated. In ceramics, stippled with a brush in imitation of granules; spotted; mottled. *Standard, 1964.*

granulated aluminum. Aluminum powder which has not been coated with a lubricant; relatively large masses of aluminum, such as are used in alloying with other metals. *Bennett 2d, 1962.*

granulated blast furnace slag. The glassy, granular material formed when molten blast furnace slag is rapidly chilled, as by immersion in water. *ASTM C125-66.*

granulated chert. A type of granular chert composed of rough, irregular grains or granules of chert tightly or loosely held together in small irregular masses or fragments. *A.G.I.*

granulated metal. Small pellets produced by putting liquid metal through a screen or by dropping it onto a revolving disk and, in both cases, chilling with water. *ASM Gloss.*

granulated salt. Vacuum pan salt, of characteristic cubic shape. Also a name given to Southern mined rock salt of the same or slightly coarser size. *Kaufmann.*

granulated slag. Molten slag broken up into granules and quick quenches. Three general methods of granulation are: (1) running the molten slag into a pit of water; (2) using a jet of high-pressure water to breakup the stream of molten slag as it falls into the pit; and (3) using a mechanical revolving device with relatively small amounts of water. *Camp. 6d, 1951, p. 279.*

granulated steel. Steel made from pig iron by a process in which the first step is the granulation of the iron, *Fay.*

granulating machine. a. An apparatus for reducing a powder cake to gunpowder. *Fay.* b. A device for reducing metal or slag in a liquid form to fine grain. In a common method, the hot metal is dropped on the face of a rapidly revolving disk, which scatters it centrifugally in minute particles. *Fay.*

granulating mill. Old name for ball mill, particularly the Hardinge type when operated to produce sharply granulated sands. *Pryor, 3.*

granulation. a. In metallurgy, the state or process of being formed into grains or small particles. *Fay.* b. The process of separating into various sizes the particles of blasting powder. *Fay.* c. The crushing of a rock under such conditions that no visible openings result. *Kemp, 6d, p. 217.* d. The production of coarse metal particles by pouring the molten metal through a screen into water, or by violent agitation of the molten metal while solidifying. *ASTM B243-65.* e. *See* kerosine flotation. *Mitchell, p. 572.*

granulator. a. A rock breaker which converts large stone into small aggregate. *Ham.* b. A machine that produces body raw material in the form of grains with a minimum of fines. *ACSG, 1963.*

granule. a. A little grain; a small particle. *Webster 3d.* b. Granular mineral products used primarily to form a protective and decorative coating on composition roofing. *A.G.I.*

granule gravel. Deposit of uncemented granules. *A.G.I. Supp.*

granules, roofing. *See* roofing granules. *ACSG, 1963.*

granule texture. Generally oval or rounded grains in a matrix but grains are not of clastic origin and lack internal structure. Used especially for the round or oval grains in iron formations. *A.G.I.*

granulite. a. A metamorphic rock composed of even-sized, interlocking, granular minerals. *A.G.I.* b. A metamorphic rock belonging to a high-temperature facies characterized by the presence of mica and hornblende. Coarse and fine bands alternate and produce a regular planar schistosity. *A.G.I.* c. In French literature, the term has been used as a synonym of muscovite granite. *See also* charnockite; gneiss; kinzigite; leptite; leptynite; quartzite. *A.G.I.*

granulitic. a. A textural term applied by Judd (1886) to basaltic or doleritic rocks in which discrete crystals of augite and/or olivine fill the interstices between a network of plagioclase laths. In this sense, the term is synonymous with intergranular. *A.G.I.* b. A term proposed by Michel-Levy (1874, 1889) and applied to igneous rocks with a holocrystalline-granular texture in which there is a xenomorphic development of most of the constituents. In this sense, the term is synonymous with panidiomorphic granular. *A.G.I.* c. A structure due to the production of granular fragments in a rock by crushing. *Holmes, 1920.*

granulitic texture. The texture of a granulite, sometimes referred to as granulose or granoblastic, is an arrangement of shapeless interlocking mineral grains resembling the granitic texture but developed in metamorphic rocks. *C.T.D.*

granulitization. a. The process is regional metamorphism of reducing the components of a solid rock to grains. If the reduction of the size of the particles goes farther, rock flour or mylonite is produced. *C.T.D.* b. This results from crushing at a stage when recrystallization was still possible, and the process is therefore, in some sense, intermediate between the protoclastic and the cataclastic. All the minerals are broken down; but while the feldspar (and quartz if present) makes a simple mosaic, the hornblende, with a superior force of crystallization, forms little imperfect prisms or fibrous patches. Harker applies the term to gneisses. *A.G.I.*

grape formation. Clusters of smooth, nodular, calcareous deposits on cavern walls. Synonym of botryoid; clusterite. *A.G.I.*

grapevine drainage. *See* trellised drainage. *A.G.I.*

graph. Diagram which shows as a line the relation between two variables, at their point of intersection from a vertical (ordinate) scale and a horizontal (abscissa). Other graphic systems give multidimensional information regarding such relations, by use of more than two axes as in nomograms and triangular graphs. *Pryor, 3.*

Graphalloy. Composition consisting of graphite impregnated at high pressure with a metal, such as copper, lead, silver, or cadmium; used for bearings and similar purposes. *Bennett 2d, 1962.*

graphic. An intergrowth of two minerals in such a manner, that in certain cross sections, one has a form suggesting cuneiform writing, hence the name; quartz in feldspar is the commonest graphic intergrowth and known as graphic granite; quartz in garnet and tourmaline are similar. *Hess.*

graphic formula. In chemistry, a structural formula in which the bonds connecting the constituents of a molecule are depicted. *Pryor, 3.*

graphic gold; graphic tellurium. Crystals of naturally occurring sylvanite ore; a mixed gold-silver telluride, occurring in regularity so as to give the appearance of written symbols. *Bennett 2d, 1962.*

graphic granite. A variety of binary granite in which the quartz is disposed in the feldspar in such a way, that in cross section, it has some resemblance to Hebrew and cuneiform writing, and from this circumstance derives its name. *Fay. See also* corduroy spar.

graphic intergrowths. *See* graphic granite.

graphic ore. Same as sylvanite. *Standard, 1964.*

graphic section. A drawing which shows the sequence of strata. *B.S. 3618, 1963, sec. 1.*

graphic tellurium. *See* graphic gold. *Fay.*

graphic texture. A rock texture in which one mineral intimately intergrown with another occurs in a form simulating ancient writing, especially runic characters; produced by simultaneous crystallization of two minerals present in eutectic proportions. *See also* runite, *C.T.D.*

graphite; plumbago; black lead. a. C; molecular weight, 12.01; black, dark gray, or steel-gray; hexagonal; greasy feel; specific gravity, 1.9 to 2.3; Mohs' hardness, 1 to 2; sublimes at 3,652° to 3,697° C; boiling point, 4,200° C; insoluble in water, in acids, and in alkalies: and soluble in molten iron. One of the allotropic forms of carbon found in nature. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-105, B-163, B-243.* b. A very pure form of carbon. Used as a moderator in nuclear reactors. *L&L.*

graphite base carbon refractory. A manufactured refractory comprised substantially of graphite. *ASTM C71-64.*

graphite bisulfate; blue graphite. A substance resulting from the suspension of graphite in strong sulfuric acid. *Bennett 2d, 1962.*

graphite brick. A ceramic material normally made from mixtures of coke and pitch that is formed and heat-treated to develop a graphitic crystal structure. *See also* carbon refractory. *ACSG, 1963.*

graphite paint. A mixture of graphite, boiled linseed oil, and a small amount of drier. A very good paint for ironwork. *Crispin.*

graphitic. Containing graphite or carbon. *von Bernewitz.*

graphitic carbon. The portion of the carbon in iron or steel that is present as graphite; distinguished from combined carbon. *Webster 3d.*

graphitic steel. Alloy steel made so that part of the carbon is present as graphite. *ASM Gloss.*

graphitite. A variety of shungite or graphite rock which does not give the so-called, nitric acid reaction. *Tomkeieff, 1954.*

graphitization. Formation of graphite in iron or steel. Where graphite is formed during solidification, the phenomenon is called primary graphitization; where formed later by heat treatment, secondary graphitization. *ASM Gloss.*

graphitizing. Annealing a ferrous alloy in such a way that some or all of the carbon is precipitated as graphite. *ASM Gloss.*

graphitoid. Variety of shungite which will burn in the Bunsen flame. *Tomkeieff, 1954.*

grapholite. A variety of slate suitable for writing on. *Standard, 1964.*

graplin. *See* grapnel, b. *Fay.*

grapnel. a. An implement used to recover lost core, drill fittings, or junk from a borehole. Also called grappel. *Long.* b. A small anchor with four or five flukes or claws used in dragging or grappling operations. *Webster 3d.* c. A heavy tongs used in handling large logs, stones, etc. *Standard, 1964.*

grappel. *See* grapnel, a.

grapple. A clamshell-type bucket having three or more jaws. *Nichols.*

grapple dredge. a. A dredge using an orange-peel bucket and operating on the clamshell principle. *Carson, p. 353.* b. *See* grab dredger. *C.T.D.*

grappling iron. A fishing tool consisting of several iron or steel claws for grasping and holding an object fast. *See also* grapnel. *Long.*

graptolite. Graptolites are the greatest value to stratigraphers for dating the Ordovician and Silurian systems. A graptolite is an animal of lowly organization, extinct since the Silurian period, belonging to a class Graptolithina, of the phylum Coelenterata. *C.T.D.*

grass. Corn. The surface over a mine. Bringing ores to grass is taking them out of the mine. *Fay.*

grass captain. Eng. An overseer of the workmen above ground. A surface foreman. *Fay.*

grass crop. Scot. The outcrop of a vein. *Fay.*

Grassellis. High explosive; used in mines. *Bennett 2d, 1962.*

grasshopper. A tool used to aline and butt pipes preparatory to welding. *Long.*

grasshopper conveyor. *See* oscillating conveyor. *ASA MH4.1-1958.*

grasshopper engine. Scot. A beam engine having one end of the beam supported on a rocking fulcrum. *Fay.*

grass roots. A miner's term equivalent to the surface. From grass roots down is from the grass roots to the bedrock. *Fay.*

grass-roots deposit. The old fabulous deposit, discovered in surface croppings, easy of exploitation, and capable of financing its own development as it went along. *Hoov. p. 5.*

grass-roots mining. Inadequately financed operation, depending on hand-to-mouth existence. Mining from surface down to bedrock. At grass; at surface. Also known as mining on a shoestring. *Pryor, 3.*

grate. a. A screen or sieve for use with stamp mortars for grading ore. *Webster 3d.* b. A frame, bed, or a kind of basket of iron bars for holding fuel while burning. *Webster 3d.*

grate bar. a. A bar forming part of a fire grate. *Standard, 1964.* b. One of the bars forming a coarse screen or grizzley. *Fay.*

grate coal. Formerly, coal passing through bars 3¼ to 4¼ inches apart and over 2¼-inch round holes. In Arkansas the bars are 7 inches apart and the holes are 3 to 3¼ inches in diameter. *Fay.*

grater. A laborer who replaces grates on conveyors after roasted lead ore has been dumped into cars, using hooks. Lead ore is loaded on grates and conveyed through a furnace in which the sulfur is driven off by roasting prior to the ore being melted to separate and recover the lead in another furnace. *D.O.T. 1.*

grate room. A compartment of a glass furnace, with grated bottom for holding the fire. *Standard, 1964.*

grate surface. The area of the surface of the grate of a steam boiler, or any part of it. *Standard, 1964.*

grathe. To repair, or put in order, the plant in a coal mine. *C.T.D.*

grather. *See* changer and grather. *Hess.*

graticule. a. A network of lines representing geographic parallels and meridians forming a map projection. *A.G.I.* b. A template, divided into appropriately designed blocks or cells, for graphically integrating a quantity such as gravity. Graticules are much used in computing terrain corrections and the gravitational or magnetic attraction of irregular masses. *A.G.I.* c. System of lines ruled on plane glass, photographically fixed, or of hairs stretched across it, by means of which a telescope can be aligned on its target in surveying, or in optical work with a microscope, the plan area dimensions of material under scrutiny can be measured. For particle count several types of graticule exist, with rectangles or circles for comparison purposes with the grains resting above them. *Pryor, 3.*

grating. a. A coarse screen made of parallel or crossed bars to prevent passing of oversized material. *ASA MH4.1-1958.* b. A series of parallel and crossed bars used as platform or walkway floors or as coverings for pits and trenches over which traffic can pass. Generally are removable to permit access to conveying equipment for servicing. *ASA MH4-1.1958.* c. A series of parallel and/or crossed bar units fastened to or propelled by the conveying medium, used for carrying large lump-size bulk material or objects. Usually used to permit passage of air for cooling or heat to maintain temperature. *ASA MH-4.1-1958.* d. The plate of perforated metal, or wire sieve, fixed in the openings in mortar of stamp mills; a heavy screen. *Fay.* e. The act of sorting ores by passing them through grates. *Standard, 1964.*

gratonite. A sulfarsenate of lead, $Pb_9As_4S_{15}$, as rhombohedral crystals from Peru. *Spencer, M.M., 1940.*

Graupen tonstein. *See* granular tonstein. *IHCP, 1963, part I.*

gravel. a. Small stones and pebbles or a mixture of sand and small stones; more specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. *Fay.* b. Rounded or semirounded particles of rock that will pass a 3-inch and be retained on a No. 4 U.S. standard sieve. *ASCE P1826.* c. Loose, rounded fragments of rock, between 1 and 2 millimeters in diameter. *A.G.I.* d. Consists of rock grains or fragments with a diameter range from 76 millimeters (3 inches) to 4.76 millimeters (retention on a No. 4 sieve). The individual grains are usually more or less rounded. *A.G.I.* e. Accumulation of uncemented pebbles; synonym for pebble gravel. *Compare* boulder; cobble; granule gravel; may or may not include interstitial sand ranging from 50 percent (Willman, 1942) to 70 percent (Folk, 1954) of total mass. *A.G.I. Supp.*

gravel bank. A natural mound or exposed face of gravel, particularly such a place from which gravel is dug; a gravel pit. *Hess.*

gravel deposits. *See* alluvial deposits. *Nelson.*

gravel mine. S. Afr. A mine extracting gold from sand or gravel; also called placer mine. *Beerman. See also* gravel pit. *Fay.*

gravel pit. A pit from which gravel is obtained. *Standard, 1964.*

gravel plain (tundra) placers. Placers along the coastal plain of the Seward Peninsula, Alaska. *Fay.*

gravel powder. Very coarse gunpowder. *Standard, 1964.*

gravel pump. A centrifugal pump with renewable impellers and lining, suitable for pumping a mixture of gravel and water. Rubber is sometimes used as lining to the pump and pipes owing to its high resistance to abrasion. *Ham. See also* sand pump.

gravel pumping. This method of alluvial mining consists of (1) excavating and breaking up the gravel bank by using giants or monitors, (2) washing the disintegrated material into a sump, excavated in the bedrock, (3) elevating the mixture from the sump to an elevated line of sluices by means of a gravel pump, and (4) sluicing the gravel for the recovery of its mineral content. *Griffith, S.V., p. 104.*

gravel rampart. *See* gravel ridge. *Schieferdecker.*

gravel ridge; boulder ridge; gravel rampart; boulder rampart; shingle rampart. Loosely compacted rampart of reef rubble. *Schieferdecker.*

gravel stone. A pebble; a calculus. *Webster 2d.*

gravel trains. Deposits leading away from the front of a glacier and deposited by streams fed by the melting ice. *Stokes and Varnes, 1955.*

gravel wall. War. The junction of a coal seam with overlapping, or unconformable, rocks. *Fay.*

grave robber; ghoul; doctor of sick mines. Various terms applied to the new engineer called in to rehabilitate a wrecked mine. *Hoov. p. 275.*

grave wax. *See* hatchettite. *Fay.*

graveyard shift. A term used in the Western States for the night shift, usually beginning at 11 or 12 p.m. and relieved by the day shift. *See also* dying shift; dogwatch. *Fay.*

gravimeter; gravity meter. a. An instrument to measure the value of gravity or for measuring variations in the magnitude of the earth's gravitational field. Measurements of gravity are accomplished generally by one of three methods; dropped ball, pendulum or spring gravimeter. The latter type of gravimeter based upon the principle of the weighted spring and where the length or measured variations in the length of this spring are a function of the gravitational field at different locations are the type widely used today. *See also* Graf sea gravimeter. *H&G.* b. An instrument for determining specific gravities, particularly of liquids. *See also* hydrometer. *Standard, 1964.* c. An instrument which measures variations in the density of underlying rocks. *B.S. 3618, 1963, sec. 3.*

gravimetric. Measured by weight. *ASTM STP No. 148-D.*

gravimetric analysis. Chemical analysis in which the amounts of the constituents are determined by weighing. *Webster 3d.*

gravimetric soundings. Measurements made by the use of gravimeters which measure gravity differences of relatively small areas. *MacCracken.*

gravimetry. The measurement of gravity or gravitational acceleration, especially as used in geophysics and applied geophysics. *A.G.I.*

gravitation. *See* law of gravitation. *Fay.*

gravitational constant. The constant γ in the law of universal gravitation. Its weight is $6.673 \pm .003$ x 10^{-8}cm^3/gm. sec. ^{2}. *A.G.I.*

gravitational differentiation. The production of igneous rocks of contrasted types by the early separation of crystals, such as olivine, pyroxenes, etc., which, sinking on account of their high specific gravity, become concentrated in the basal parts of instrusions. The ultramafic rocks, such as peridotites and picrites originate in this way. *C.T.D.*

gravitational method. A geophysical prospecting method which measures irregularities or anomalies in gravity attraction produced by differences in the densities of rock formations, and interpreting the results in terms of lithology and structure. *Nelson.*

gravitational prospecting. A method of geophysical prospecting, which embraces the mapping of variations in the earth's gravitational field. *See also* gravimeter. *Ham.*

gravitational separation. The separation of oil, gas, and water in a reservoir rock in accordance with their relative gravities. *A.G.I.*

gravitational theory. One of the migration theories which assume oil and gas to move because of their buoyancy or lower specific gravities relative to that of the associated water. *A.G.I.*

gravitational water. *See* free water. *ASCE P1826.*

gravitometer; gravity meter. Instrument for measuring variations in earth's gravitational field. *Wheeler.*

gravity. The force by which substances are attracted to each other, or fall to earth. *See also* law of gravitation. *von Bernewitz.*

gravity anomaly. The difference between the gravity calculated for any given station and the value (corrected for topography, elevation, etc.) actually measured for that station. The anomalies reflect variations in density of the underlying rocks, and hence, may be used for estimating the location of some mineral deposits and geologic structures, such as anticlines, buried ridges, or salt domes. *Stokes and Varnes, 1955.*

gravity API. The gravity scale developed by the American Petroleum Institute to express the density of liquid petroleum products. In this scale, water has a gravity of 10° API; and liquids lighter than water (such as petroleum oils) have API gravities numerically greater than 10. *Shell Oil Co.*

gravity-arch dam. A dam which derives its resistance to the pressure of water from both an arching effect and its own weight. *See also* gravity dam. *Ham.*

gravity balance. Sensitive weighing system in which a beam rides on a fulcrum, and supports a load of unknown weight at one end which is counterbalanced by weights at the other. *Pryor, 3, p. 35.*

gravity bar. A 5-foot length of heavy half-round rod forming the link between the wedge-orienting coupling and the drill-rod swivel coupling on an assembled Thompson retrievable borehole-deflecting wedge. *Long.*

gravity-bar screen. *See* bar screen. *Mitchell, p. 129.*

gravity battery. A two-fluid battery in which there is no porous cup and in which the fluids are separated by their different specific gravities. *Standard, 1964.*

gravity classifying. The grading of ores into different sorts and the separation of waste from coal by the difference in the specific gravity of the minerals to be separated. *Stoces, v. 1, p. 584.*

gravity-collapse structure. A structure, in stratified rocks, produced on the limbs of simple folds as a result of collapse under the force of gravity. *Challinor.*

gravity concentration. Separating grains of minerals by a concentration method operating by virtue of the differences in density of various minerals; the greater the difference in density between two minerals, the more easily they can be separated by gravity methods. The laws of free and hindered settling are important in the theory of gravity concentration. *Newton, p. 88.*

gravity conveyor. Continuous belt, system of rollers, or inclined chute down which loaded material gravitates without the application of power. *Pryor, 3.* See also roller conveyor; wheel conveyor. *ASA MH-4.1-1958.*

gravity correction. The tape correction which must be made to a tape for which weights are used to apply tension. This correction is necessary only for the most precise work. *Ham.*

gravity dam. A dam depending solely on its weight to resist the water load. *Seelye, 1.*

gravity-discharge conveyor elevator. A type of conveyor using gravity-discharge buckets attached between two endless chains and which operate in suitable troughs and casings in horizontal, inclined and vertical paths over suitable drive, corner, and takeup terminals. *ASA MH4.1-1958.*

gravity-discharge conveyor-elevator bucket. An elevator bucket designed to contain material on vertical lifts and scrape material along a trough on horizontal runs. Discharge is effected by gravity. *ASA MH-4.1-1958.*

gravity fault. a. A fault along which the hanging wall has moved down relative to the footwall. *See also* normal fault. *Billings, 1954, p. 143.* b. Sometimes restricted to those faults that are the result of withdrawal of support, either below or on the side. *Billings, 1954, p. 143.*

gravity feed. Applicable when the weight of the drill rods is great enough to impose an adequate pressure on a bit to make it cut properly. *Long.*

gravity-feed containers. Arc metal buckets containing liquid enamel and suspended above the spray booth, from which the enamel slip will flow, by gravity, to the spray gun. *Hansen.*

gravity gradiometer. An instrument for measuring the gradient of gravity. *A.G.I.*

gravity ground water. The water that would drain from a given soil zone if the zone were subject to the unimpeded action of gravity. The term is indefinite as the quantity is dependent upon period for draining, temperature, and other factors. *Seelye, 1.*

gravity haulage; self-acting incline. A system of haulage in which the set of full cars is lowered at the end of a rope, and gravity force pulls up the empty cars, the rope being passed around a sheave at the top of the incline. The speed of the haulage is controlled by a band brake on the sheave. Many forms of this type of haulage are in use, but difficulties arise when derailments occur as no power is available for rerailing the set. *Nelson.*

gravity inclines. Openings made in the direction of the dip of the deposit. The gradient of the gravity incline is determined by the dip of the deposit. The ore mined is transported through them, usually to the next lower level drive. *Stoces, v. 1, p. 233.*

gravity instruments. Devices for measuring the differences in the gravity force or acceleration at two or more points. They are of two principal types: (1) a static type in which a linear or angular displacement is observed or nulled by an opposing force; (2) a dynamic type in which the period of oscillation is a function of gravity and is the quantity directly observed; or (3) a gradient measuring type, for example, Eotvos torsion balance. *A.G.I.*

gravity main. A pipeline through which water from a reservoir flows downhill by gravity. *Ham.*

gravity meter. Sensitive electrical device for measuring gravitational variations through different geologic formations; used in oil prospecting. *Bennett 2d, 1962.*

gravity plane. A tramline laid at such an angle that full skips running down hill will pull up the empties. *Fay.*

gravity plane rope haulage. *See* self-acting rope haulage.

gravity potential. The work required or gained in moving a unit mass from sea level to a point above or below sea level. The unit in m.t.s. system is one dynamic decimeter. *H&G.*

gravity process. *See* gob process. *Dodd.*

gravity prospecting. Mapping the force of gravity at different places with a gravimeter (gravity meter) to determine differences in specific gravity of rock masses, and, through this, the distribution of masses of different specific gravity. *Leet.*

gravity railroad. A railroad in which the cars descend by their own weight; and inclined railroad. *Standard, 1964.*

gravity retaining wall. In similar manner to a gravity dam, this is prevented from overturning by its own weight. *See also* crib dam. *Ham.*

gravity road. Any road on which cars will descend by gravity. *Jones.*

gravity roller conveyor. *See* roller conveyor. *ASA MH4.1-1958.*

gravity screen. A perforated steel plate, set at an angle, over which large coal or other material slides by gravity to effect a primary classification. *Nelson.*

gravity segregation. Variable composition of a casting or ingot caused by the settling out of the heavier or rising of lighter constituents before or during solidification. *ASM Gloss.*

gravity separation. Treatment of mineral particles which exploits differences between their specific gravities, their sizes and shapes also playing a minor part in separation. Performed by means of jigs, classifiers, hydrocyclones, dense media, shaking tables, Humphreys spirals, sluices, vanners, buddles. Gravitational force also plays a smaller part in most other methods of separation. *Pryor, 3.*

gravity solution. A solution used to separate the different mineral constituents of rocks by their specific gravities, as the solution of mercuric iodide in potassium iodide having a maximum specific gravity of 3.19. *Standard, 1964.*

gravity, specific. The ratio of the weight, per unit of volume, of a given substance to the weight of the same unit volume of water. The specific gravity of water is 1 and of substances lighter than water, it is less than 1. *Shell Oil Co.*

gravity stamp. Unit in stamp battery which directs a heavy falling weight on to a die on which rock is exposed for crushing. *Pryor, 3.*

gravity stowing. A method of stowing in inclined conveyor faces, in which the material is brought into the upper gate (usually the tailgate) and arranged to slide down on trays which are moved forward as each track is filled. *Nelson.*

gravity takeup. *See* tensioning device—belts. *Nelson.*

gravity tube. An instrument used to measure the specific gravity of drilling mud. *Long.*

gravity water. a. Water that moves through soil under the influence of gravity. *Seelye, 1.* b. A gravity supply of water as distinguished from a pumped supply. *Seelye, 1.*

gravity wheel conveyor. *See* wheel conveyor. *ASA MH4.1-1958.*

gray antimony. *See* antimony trisulfide; stibnite.

grayback. a. Aust. A local name for minor cleats that cross the main cleat. *Fay.* b. Corn. A rock with large grains of quartz in a compact black matrix of tourmaline. Also known as black granite. *Hess.*

grayband. A variety of sandstone for sidewalks; flagstone. *Standard, 1964.*

gray beds. N. of Eng. A stratum formed by a mixture of shale and sand. *Fay.*

gray cast iron. A cast iron that gives a gray fracture due to the presence of flake graphite; often called gray iron. *ASM Gloss.*

gray chondrite. A firm gray chondritic meteorite composed of bronzite and olivine with chondrules of various shapes which break with the matrix. *Hess.*

gray cobalt. Smaltite. *Fay.*

gray copper. *See* tetrahedrite. *Fay.*

gray copper ore. *See* tennantite; tetrahedrite; fahlore.

gray dogs. York. Laminated rock with coaly streaks. *Arkell, p. 51.*

gray durain. Durain relatively deficient in spores, but contains high proportions of fusinite and material intermediate in composition between fusain and vitrain (micrinite). Has a low oil yield. *Francis, 1965, v. 1, p. 42.*

gray granite. Eng. Quartzite; from Nuneaton. *Arkell, p. 51.*

grayheads. Aust. Joints in the rolling country of the Southern Coalfield of New South Wales, which run parallel with the longer axis of a roll; these joints are generally coated with a whitish substance. *Fay.*

gray hematite. *See* specularite. *Fay.*

gray iron. Pig iron or cast iron in which nearly all the carbon not included in pearlite is present as graphitic carbon. *See also* mottled iron; white iron. *C.T.D.*

grayite. A thorium phosphate containing a little lead, calcium, and minor uranium and rare earths; gives an X-ray pattern like that of rhabdophane, and when heated above 850° C, a monazite-type pattern. *American Mineralogist, v. 47, No. 3-4, March-April 1962, pp. 419-420.*

Gray-King coke type. The type of coke or carbon residue obtained under the prescribed conditions of the Gray-King carbonization assay. *B.S. 3323, 1960.*

Gray-King test. Method of assessing the coking property of coal; 20 grams are heated in a silica tube to 600° C and the residual product is compared with a standard series ranging from noncoking (type A) to highly coking (G), all of which have the same volume as the original. Cokes which expand (swell) on coking receive a subscript indicating the degree of swelling. *Pryor, 3.*

gray maggie. Scot. Miner's term for coal altered by an igneous intrusion. *Tomkieff, 1954.*

gray manganese. *See* manganite.

gray manganese ore. *See* manganite.

gray metal. Shale of a grayish color. *Fay.*

gray ore. Corn. Copper glance. *See also* tetrahedrite. *Fay.*

gray post. Eng. Sandstone of a gray color. *Fay.*

gray sapphire. The gray variety of sapphire popular as a gem only if asteriated. *Shipley.*

Gray's tester. An instrument used for determining the flashing point of heavy oils. *Fay.*

gray stock. A clamp-fired stock brick that is offcolor. *See also* stock brick. *Dodd.*

graystone. A gray to green compact rock, similar to basalt, consisting of feldspar and augite. *Standard, 1964.*

graywacke; grauwacke. A term applied to indurated sedimentary rocks, chiefly Paleozoic, consisting of unsorted detritus of the grain size of sandstone but containing fragments of feldspars and ferromagnesian minerals. *C.T.D.*

graywacke quartzite. A metamorphosed graywacke whose origin is still clearly discernible. *A.G.I.*

graywacke slate. Micaceous and sandy, fine-grained, slaty, or shaly rocks: formerly so called. *Standard, 1964.*

grayware. One-coat mottled enamelware. *Hansen.*

graywether. One of numerous fragments or blocks of sandstone and conglomerate, covering large tracts in Dorsetshire and Wiltshire, England, supposed to be remnants of decomposed Tertiary strata and superstitiously regarded by the unlearned. *Standard, 1964.* Also called druidical stone; sarsen stone; saracen stone. *Fay.*

gray zone. A typical gray section of used silica brick, composed principally of large crystobalite crystals. *Bureau of Mines Staff.*

graze burrs. Eng. Good blue building stone, Lower Lias, Axminster. *Arkell.*

grease. a. This term should be applied only to fatty or oily matter of animal origin; but mixtures of mineral oil with lime and soda soaps constitute well-known lubricating greases. *Fay.* b. Animal fat when soft; also, anything oily or unctuous. From the French term, graisse. *Fay.* c. Term used in the flotation process. *Fay.* d. As used in engineering for lubrication or protection of metal surfaces, is an emulsified oil or saturated fatty acid combined with a suitable alkaline base to form a soap. Additives may be incorporated for special purposes, for example, colloidal graphite. *Pryor, 3.* e. A semisolid form of lubricant, composed of emulsified mineral lubricating oil and soda or lime soap. Greases are known as: cup grease, railway wagon axle grease, rolling mill grease, block grease, etc.; largely used in industrial plants, especially where leakage of lubricants must be prevented, and for lubrication under water. *C.T.D.* f. Thick oil. *Nichols.* g. A solid or semisolid mixture of oil with soap or other fillers. *Nichols.*

grease box. A journal box or axle box in which grease is used as a lubricator. *Standard, 1964.*

greased-deck concentration. A process in which separation is based on selective adhesion of some grains (diamonds) to quasi-solid grease with adhesion of other grains to water. *Gaudin, p. 334.*

grease-monkey. Synonym for oiler. *See also* oiler, f. *Long.*

grease pot. The third of a series of vats used in tinning sheet iron or steel. *Standard, 1964.*

greaser. a. A person who oils or greases the mine cars. *Fay.* b. An automatic apparatus which greases the axles of skips as they pass. *Fay.* c. A slang name for a Latin American, especially, a Mexican. *Webster 3d.*

grease-spot photometer. A simple means of comparing the intensities of two light sources. A screen of white paper, rendered partially translucent by a spot of grease, is illuminated normally by the two sources, one on each side. The position of the screen is adjusted until the grease spot is indistinguishable from its surroundings, when the illuminations on the two sides may be assumed to be equal. Also called Bunsen photometer. *C.T.D.*

grease stone. A name for steatite. *Shipley.*

grease table. a. A concentration device used in a process based on the fact that diamond surfaces are preferentially oil wettable. *E.C.T., v. 8, p. 935.* b. An apparatus for concentrating minerals, such as diamonds, which adhere to grease. It usually is a shaking table coated with grease or wax over which an aqueous pulp is flowed. *Bureau of Mines Staff.*

grease wheeler. In the iron and steel industry, a laborer who transports prepared grease in a wheelbarrow from grease house and distributes it through the rolling department. *D.O.T. 1.*

greasing truck. An electrically driven service vehicle to transport greases and oil for servicing the underground mine machinery. It may include a compressor, air storage tank, and fittings to place lubricant at the proper points in the mining machinery. *ASA C42.85:1956.*

greasy. Applied to the luster of minerals. Having the luster of oily glass, as elaeolite. *Fay.*

greasy blaes. Scot. *See* creeshy. *Fay.*

greasy clods. Scot. Term in use in Aberdeenshire for mud peat. *Tomkeieff, 1954.*

greasy feel. Some minerals are greasy or soapy to the touch; for example, talc, sometimes called soapstone. *C.M.D.*

greasy gold. Fine gold. *Fay.*

greasy luster. As if smeared with oil or grease; occasionally observed in quartz and some varieties of serpentine. *Nelson.*

greasy quartz. Milky quartz. *Fay.*

great circle. Circle described upon a sphere, the plane of which passes through its center. *Pryor, 3.*

great coal. Scot. Large pieces of selected coal. In the East of Scotland, the coal was formerly divided into four grades; great coal, chews, lime coal, and panwood. *Fay.*

Great Coal Age. Another name for the Coal Measures or the Pennsylvanian. So called because the greatest coal deposits of the world are found in formations of this age. *Kentucky, p. 5.*

Great Diurnal Range. The difference in height between mean higher high water and mean lower low water over a 19-year period. Also called Diurnal Range. *Hy.*

Great Falls converter. A pear-shaped vessel that resembles the Bessemer converter. It has been largely supplanted by the cylindrical (Peirce-Smith) type converter. *Newton, p. 348.*

Greathead shield. A tunneling device invented by J. H. Greathead, first used in London in 1869, and still widely used today. His invention included a circular cutting edge forced through the ground by hydraulic jacks, a cast-iron lining assembled by bolts, and grouting behind the lining with the aid of compressed air and a special mixer. *Ham.*

Great Ice age. *See* Pleistocene period. *C.T.D.*

great salt. Salt in large lumps or crystals. *Kaufmann.*

Great Tropic Range. The difference in height between tropic higher high water and tropic lower low water. Also called Tropic Range. *Hy.*

greave. A ditch. *Fay.*

greek. a. Scot. Grit; the texture of a hard rock; coarse sandstone. *Fay.* b. Any coarse-grained hard rock, such as coarse sandstone. *Arkell.*

greek masonry. A style of masonry in which each alternate stone is of the full thickness of the wall. *Standard, 1964.*

green. a. In powder metallurgy, unsintered. *ASM Gloss.* b. Not fully processed or treated. *Webster 3d.* c. Ceramic ware in the condition after it has been shaped but before it has been dried and fired. *Dodd.*

green acids. Mixed sulfonation products from oil refinery cracking processes; used in detergency and as main constituent of a series of flotation agents chiefly concerned with the concentration of iron minerals. *Pryor, 3.*

green agate. Zonochlorite. *Schaller.*

greenalite. a. A green hydrated ferrous silicate, $2H_2O.3FeO.4SiO_2$, found as granules in the cherty rock associated with iron ores of the Mesabi Range, Minn. Resembles glauconite but contains no potash. *Stokes and Varnes, 1955.* b. Synonym for eisenchrysotile. *Hey, M.M., 1961.*

greenalite rock. A dull, dark green rock of uniform fine-grain and conchoidal fracture, containing grains of greenalite in a matrix of chert, carbonate minerals, and ferruginous amphiboles. *Stokes and Varnes, 1955.*

Greenawalt process. A system of sintering powdery metalliferous ores. *Osborne.*

Greenawalt sintering machine. An intermittent or batch-type machine used for concentrating iron ore for use in blast furnaces. It follows the same principles as the Dwight-Lloyd sintering machine for making sinter, the major difference being that the Dwight-Lloyd machine is a continuous operating machine. *Mitchell, p. 114.*

green beryl. A term applied to the lighter green varieties of beryl as distinguished from the full green emerald and the light blue-green aquamarine. *Shipley.*

green brick. Brick which have not received the kiln burn to which they will be subjected. *A.R.I.* Unfired bricks.

green briquette. *See* green compact. *Bennett 2d, 1962.*

Greenburg-Smith impinger. A dust sampling apparatus evolved by the U.S. Bureau of Mines which makes use of the principle of impingement of the dust-laden air at high velocity on a wetted glass surface, together with that of bubbling the air through a liquid medium. This apparatus consists essentially of a hand pump or electrically driven blower, a flowmeter, or other suitable means of measuring the air passed through the instrument, and the dust-collecting device. *See also* midget impinger. *R.I. 2392, Sept. 1922, p. 2.*

green carbonate of copper. *See* malachite.

green chalcedony. Usually some cryptocrystalline variety of quartz stained green. Also may be chalcedony of natural green color. *Shipley.*

green charge. A mixture of ingredients for gunpowder before the intimate mixing in the incorporating mill. *Webster 3d.*

green cinnabar. A green pigment consisting of the fired oxides of cobalt and zinc. *Webster 3d.*

green coal. Aust. Freshly mined coal. *Fay.*

green compact; green briquette. Compressed powdered metal prior to sintering, in powder metallurgy. *Bennett 2d, 1962.*

green concrete. Concrete which has set but not appreciably hardened. *Taylor.*

green copperas; green vitriol. The mineral melanterite, hydrous ferrous sulfate, $FeSO_4+7H_2O$. *Fay.*

green copper carbonate. Same as malachite, $Cu_2CO_3(OH)_2$. *Dana 17, p. 602.*

green earth. a. Green sedimentary material, generally glauconite. *A.G.I. Supp.* b. Chlorite; a variety of talc. *Fay*

green earth of Verona. *See* celadonite.

greener. A very strongly marked cleavage plane in the coal seam which is specially utilized in the working of the coal. *Arkell.*

green feldspar. Synonym for amazonstone; microcline. *Fay.*

green garnet. The demantoid variety of andradite garnet. The green grossularite garnet is usually known as gooseberry garnet. Also a misnomer for enstatite. *Shipley.*

green glass. A chromium compound is used with ordinary glass. Cupric oxide gives blue green. *CCD 6d, 1961.*

green gold. An alloy of 25 percent silver and 75 percent gold. *Crispin.*

green hole. A furnace taphole in which clay is not properly set, and through which the drill may break and let iron out unexpectedly. *Fay.*

greenhouse. In ceramics, a moderately warmed building for partly drying green pottery. *Standard, 1964.*

green iron ore. The mineral dufrenite, approximately, $FePO_4Fe(OH)_3$. *Fay.*

green john. Green fluorite. Named from analogy to "blue john." *English.*

Greenland spar. *See* cryolite. *C.M.D.*

green lead ore. *See* pyromorphite. *Fay.*

green marble. A commercial term for serpentine. *Fay.*

green mineral. Same as green carbonate of copper; malachite. *Fay.*

Green Mountains disturbance. Synonym for Vermontian orogeny. *A.G.I. Supp.*

green mud. A deep-sea terrigenous deposit characterized by the presence of a considerable proportion of glauconite and $CaCO_3$ in variable amounts up to 50 percent. *Holmes, 1920.*

green ocher. A yellow ocher mixed with potassium ferrocyanide. *Standard, 1964.*

greenockite. *See* cadmium sulfide. *CCD 6d, 1961.*

green oil. In the Scottish shale-oil industry, the once-run crude oil after chemical treatment. It is distilled in the first-stage oil stills and is fractioned into naphtha, light oil, heavy oil, and heavy oil and wax. *Fay.*

green onyx. A widely accepted, but otherwise incorrect term for artificially colored green chalcedony. Not as light green as chrysoprase. *Shipley.*

greenovite. A rose-colored variety of sphene with up to perhaps 3 percent, MnO. *Hey 2d, 1955.*

green-pipe inspector. *See* press-pipe inspector. *D.O.T. 1.*

green-pipe off-bearer. *See* off-bearer. *D.O.T. 1.*

green quartz. A name sometimes used for green transparent fluorite. *Shipley.*

green rock. Staff. Basalt. *Arkell, p. 51.*

green roof. A miner's term for a roof which has not broken down or shows no sign of taking weight. *Fay.*

greenroom. A chamber for the reception of unburned and undried pottery or newly made cloth. *Standard, 1964.*

green rouge. Chromium oxide and used chiefly as a polishing agent for platinum and stainless steels. *AIME, p. 20.*

green salt. a. Uranium tetrafluoride. *L&L.* b. A wood preservative consisting of copper, arsenic, and chromium compounds. *Bennett 2d, 1962.*

greensand. a. A sedimentary deposit that consists largely of dark greenish grains of glauconite often mingled with clay or sand, occurs abundantly in the Cretaceous often little or not at all cemented, and is used as a water softener and as a source of potash. *Webster 3d.* b. A highly siliceous sand that contains a little magnesia and alumina mixed with about one-twelfth of its bulk of powdered coal or charcoal and is used when dampened for making foundry molds. *Webster 3d.*

Greensand beds. In general, any beds of Cretaceous or Tertiary containing a green iron-potassium silicate; specifically, the Lower Cretaceous of England, whether containing the green silicate or not. *Standard, 1964.*

greensand casting. Metal cast in sand mold which has not been subjected to baking or drying. *Bennett 2d, 1962.*

greensand core. In metal casting technique, a a sand core which has not been subjected to drying. *Bennett 2d, 1962.*

greensand marl. Sand or marl containing glauconite. *See also* greensand; marl. *Fay.*

greensand mold. *See* greensand casting. *Bennett 2d, 1962.*

greensand of Peru. An early synonym for atacamite, because found there in the form of sand. *Fay.*

greensands. Zeolites. *Bennett 2d, 1962.*

greenschist. A metamorphosed basic igneous rock which owes its color and schistosity to abundant chlorite. *See also* basic schist; cucalite; epidiorite; greenstone; metabasite; ophiolite; ophite; prasinite. *A.G.I.*

Green's economizer. An apparatus for preheating the feedwater before it enters the boiler, consisting of a number of vertical iron pipes through which the feedwater is pumped very slowly and around which circulates the hot gases before leaving the boiler flues. The tubes are fitted with scrapers outside; these travel slowly up and down and remove soot deposited by the flue gases. *Mason, V.2, p. 356.*

green silicon carbide. *See* silicon carbide. *ACSG, 1963.*

green spot. A fault that occasionally becomes serious in the manufacture of sanitary fireclay and glazed bricks. The green spots are comparatively large and frequently of an intense color. The usual causes are the presence of chalcopyrite ($CuFeS_2$) in the raw clay or accidental contamination by a particle of copper or copper alloy, for example, a chip off a bronze bearing. *Dodd.*

green starstone. Chlorastrolite. *Shipley.*

greenstone. a. An old field name for those compact, igneous rocks that have developed enough chlorite in alteration to give them a green cast. They are mostly diabases and diorites. Greenstone is partially synonymous with trap. It is often used as a prefix to other rock names. The term is used frequently when no accurate determination is possible. *Fay.* b. Includes rocks that have been metamorphosed or otherwise so altered that they have assumed a distinctive greenish color owing to the presence of one or more of the following minerals: chlorite, epidote, or actinolite. *ASTM C119-50.* c. Freshly quarried stone containing quarry water. *Arkell.* d. Can. Generalized name given to Precambrian lavas. *Hoffman.*

green strength. The mechanical strength (usually measured by a transverse test) of ceramic ware in the green state. *See also* green.

green tar. *See* Barbados tar. *Bennett 2d, 1962.*

green top. Freshly exposed roof which is unknown in quality. *Kentucky, p. 137.*

green truer. One who reduces green (unbaked) clay blocks to standard size by chipping and stoning flat surfaces. Also called block truer. *D.O.T. 1.*

green verditer. *See* verditer, b. *Fay.*

green vitriol. A ferrous sulfate; copperas, melanterite. Also called martial vitriol. *Standard, 1964.*

greenware. Damp, recently made, unburned pottery, requiring to be dried before firing. *Standard, 1959.*

greenware carrier. One who sets greenware on board and carries it on head or shoulder to kiln shed for firing, or to liner or ceramic sprayer. Also called emptier; hustler; jigger helper; mold runner; ware carrier; ware stripper. *D.O.T. 1.*

green washing. A cleaning process that is finding increased usage, instead of the usual whitewashing of underground stables. The use of green washing has been found to be more restful, to reduce eye strain, and to keep nervous ponies in better condition. *Sinclair, V. p. 350.*

Greenwell formula. A formula used for calculating the thickness of tubbing:

$$T = 0.03 + \frac{HD}{50{,}000},$$

where T is the required thickness of tubbing in feet, H is the vertical depth in feet, D is the diameter of the shaft in feet, and 0.03 is an allowance for possible flaws or corrosion. *Sinclair, II, p. 317.*

Greenwich Mean Time; G.M.T. The time related to zero at midnight at Greenwich or to twelve noon, the latter being the moment (zero + 12) at which the sun crosses the meridian of longitude at that geographical point (longitude 0). For Great Britain, Greenwich Mean Time is local mean time when British summer time is not in operation. *Pryor, 3.*

greet. Sand and grit. *See also* grit. *Arkell.*

greet stone. a. Eng. Coarse or gritty sandstone, Yorkshire coalfield. *Arkell.* b. Eng. Soft beds of the Lincolnshire limestone. *Arkell.*

greigite. Thiospinel of iron, Fe_3S_4; cubic; minute grains and crystals in clays from the Kramer-Four-Corners area, San Bernardino County, Calif. *Hey, M.M., 1964; Fleischer.*

greillade. Fr. Iron ore in coarse powder mixed with charcoal dust for reduction by the Catalan process. *Webster 2d.*

greisen. a. A granitoid but often cellular rock composed of quartz and muscovite or some related mica, rich in fluorine. It is the characteristic mother rock of the ore of tin, cassiterite, and is, in most cases, a result of the contact action of granite and its evolved mineralizers. *Fay.* b. A pneumatolytically altered granitic rock composed largely of quartz, mica, and topaz. The mica is usually muscovite or lithium mica, and tourmaline, fluorite, rutile, cassiterite, and wolframite are common accessories. *A.G.I.* c. A coarse-grained, tin-bearing rock containing muscovite, quartz, topaz, or tourmaline. *A.G.I.*

greisenization. The process by which other rocks are converted into greisen. *A.G.I.*

grena. Uncleaned coal or ore. *C.T.D.*

grenate. Garnet. *Standard, 1964.*

Grenville series. Enormous sheets of limestone, marble, and dolomite with interbedded quartzites, sometimes graphitic, and hornblende schists; over 90,000 feet in thickness; occurring in Ontario and Quebec, Canada, and in the Adirondacks, and is considered to be the equivalents of the Huronian series. *C.T.D.*

grenz. Horizons in coalbeds resulting from temporary halting of the accumulation of vegetal material. They are frequently marked by a bed of clay or sand. *Raistrick and Marshall, p. 54.*

greon. Eng. Gravel or sand. Occurs in the Isle of Grain, Kent. *Arkell.*

gres cerame; grass de flandres. Fr. A fine German stoneware usually with a salt glaze, not made specially in Flanders but in Coblenz and Cologne. *Standard, 1964.*

gres de flandres. Fr. *See* gres cerame. *Standard, 1964.*

Gresham's law. When two or more coins are equal for the purpose of discharging a debt, but unequal in intrinsic value, the one with the lowest intrinsic value will be circulated and the other's hoarded. Similarly, cheap imitations tend to replace goods held to standard of quality which are costly to maintain. *Pryor, 3.*

greve. A ditch or trench. *Fay.*

grew coal; grewn coal. Staff. Miner's term for a coal seam which passes gradually into the roof rock or the floor rock. *Tomkeieff, 1954.*

grewt. An earth of different color from that of the main deposit, found in searching for mines on the banks of rivers. *Standard, 1964.* Also spelled greut. A variation of groot, meaning soil. *Fay.*

Grey Billy. N.S.W. Local name for a hard capping of quartzite overlying the opal-bearing deposits. *New South Wales, p. 93.*

grey wether. Eng. *See* gray wether. *Fay.*

grib. A recantangular layout of straight lines drawn at regular intervals, useful in locating points on a plan. *Ham.*

grib bearing. The angle between a grid line, usually a line running in a north-south direction, and some particular direction. *Ham.*

gribble. A marine borer of the class Crustacea. *Ham.*

grid. a. A wire bottomed mining sieve. *Standard, 1964.* b. Electrodes which are placed in the arc stream and to which a control voltage may be applied. *Coal Age, 1.* c. The imaginary lines by means of which the surface of an area is divided into squares when a checkerboard placement of boreholes is followed. *See also* checkerboarded. *Long.* d. A grated opening. *Zern.* e. A section of electrical resistance, usually made of cast iron. *Zern.* f. A battery plate somewhat like a grating; specifically, a zinc plate in a primary battery, or a lead plate, either perforated or furnished with depressions, for retaining the active material in a storage battery. *Standard, 1964.* g. In surveying, a triangulation scheme which covers its area with accessible fixed stations located at prominent points, preferably in such a relationship that a network of acute-angled triangles can be drawn between points which must be mutually visible. A theodolite is mounted at each such point and the angles of these triangles are accurately measured. Scalar relationship is obtained by connecting the triangulation with an accurately measured base line set out on the flattest available ground. *Pryor, 3.* h. In alluvial sampling, a rectangular or other regular pattern of pits or boreholes. *Pryor, 3.* i. A system of vertical and horizontal lines by means of which (map reference) a point can readily be located. *Pryor, 3.* j. Other forms of grid are electrical power, gas grid, etc., used to interconnect sources of main supply. *Pryor,* 3. k. A set of surveyor's closely spaced reference lines laid out at right angles, with elevations taken at line intersections. *Nichols.* l. A system of rectangular coordinate lines, usually superimposed on the projection lines of a topographic map, the Y-axis coinciding with some selected geographical meridian. It is much used for military purposes. *Seelye, 2.*

gridaw. The framing at the top of a shaft for the pulley wheels or sheaves for the hoisting rope. *C.T.D.*

grid azimuth. The angle that any given line makes with a north-and-south grid line. It differs from the true azimuth (except at the central or initial meridian) by the amount of the convergence of the meridians. *Seelye, 2.*

grid distance. The plane distance between two points, as determined from the grid (x, y) coordinates. It may be greater or less than the corresponding ground distance. *Seelye, 2.*

griddle; riddle. a. Corn. A miner's sieve to separate ore from halvans. *Fay.* b. To screen ore with a griddle. *Fay.*

gridiron twinning. *See* crossed twinning. *Fay.*

gridiron valve. A slide valve having many ports corresponding to ports in the seat. *Standard, 1964.*

grief joint. Synonym for kelly, b. *Long.*

grief stem. Synonym for kelly, a. *Long.*

grieve. a. Scot. A weigher; a pit headman; a hill salesman. *Fay.* b. A manager; an overseer. *Webster 3d.*

griff. Eng. A steep, rocky glen. *Standard, 1964.*

Griffin mill. A grinding mill in which a vertically suspended rolling disk rotates, and under the influence of centrifugal force bears on ore passing between it and a stationary bowl, crushing the passing ore on its way to a peripheral discharge. *Pryor, 3.*

Griffith's theory. Griffith's theory of failure is based on the assumption that the low order of tensile strength in common materials is due to the presence of small cracks or flaws. Actual stresses may occur around these flaws which are of the order of magnitude of molecular cohesion values, while the average tensile strength may be quite low. Mohr's theory predicts that failure of materials is due to failure in shear, whereas Griffith's theory postulates that it is due to failure at crack tips. *Lewis, pp. 610-611.*

grikes. a. Joint fractures widened by solution, occurring in limestone terranes, of which they are characteristic, the surface in some cases resembling a much-crevassed glacier. *C.T.D.* b. Vertical fissure developed by solution along a joint. *A.G.I.*

grillage foundation. A type of foundation suitable for sustaining heavy concentrated loads from columns, comprising two layers of rolled steel joists laid at right angles to one another. The concentrated loads are thereby spread over a large area of base foundation. *Hamm.*

grille. A covering over an inlet or outlet with openings through which fluid passes. *Bureau of Mines Staff.*

Grillo furnace. A mechanically fed muffle furnace. *Fay.*

grimes. a. A series of fractures in a seam, accompanied by pulverization of the coal. *C.T.D.* b. S. Wales. *See* bell mold. *Fay.*

grind. a. The act or process of continuing to drill after the bit or core barrel is blocked, thereby crushing and destroying any core that might have been produced. Also called grinding. *Long.* b. To reduce to a powder by friction as in a mill. *Webster 3d.* c. To polish or sharpen by friction. *Webster 3d.* d. The size of particles obtained by grinding. *Webster 3d.*

grindability. a. The effect produced on representative pieces of ore by applying standard methods of comminution, assessed comparatively in terms of size reduction and power used. *Pryor, 4.* b. Grindability of coal, or the ease with which it may be ground fine enough for use as pulverized fuel, is a composite physical property embracing other specific properties, such as hardness, strength, tenacity, and fracture. *Mitchell, p. 42.* c. Relative ease of grinding, analogous to machinability. *ASM Gloss.*

grindability index. A measure of the grindability of a material under specified grinding conditions, expressed in terms of volume of material removed per unit volume of wheel wear. *ASM Gloss.*

grinder. One who or that which grinds, as a worker who crushes or pulverizes materials (as stone, clay) usually by machine or a worker who shapes, smooths, or cleans roughly finished articles by means of abrasives or grinding wheels. *Webster 3d.*

grinder-mill operator. a. In ore dressing, smelting, and refining, one who mixes raw materials, such as bauxite, lime, soda ash, and starch, entering the alumina-extraction process to produce a slurry of proper chemical composition, using a ball mill. Also called ball mill operator. *D.O.T. 1.* b. In ore dressing, smelting, and refining, one who grinds ore and separates fine particles from coarse particles in a ball mill and classifier arranged in continuous series. *D.O.T. Supp.*

grinders' asthma, rot, or phthisis. Disease of the lungs consequent upon inhaling the metallic dust produced in grinding operations. *Standard, 1964.*

grinder, tubes. In metallurgy, one who removes scratches, pits, and other defects from nonferrous tubing, using a pneumatic belt grinder. Also called belt grinder; tube grinder. *D.O.T. Supp.*

grinding. a. Size reduction into relatively fine particles. *B.S. 3552, 1962. See also* comminution. b. Arbitrarily divided into dry grinding performed on mineral containing only moisture as mined and wet grinding, usually done in rod, ball or pebble mills with added water. *Pryor, 3.* c. Removing material from work with a grinding wheel. *ASM Gloss.* d. A defect caused by the removal of a sliver of metal from the bar during rolling. *Osborne.*

grinding aid. An additive to the charge in a ball mill or rod mill to accelerate the grinding process; the additive has surface-active or lubricating properties. Grinding aids find particular use in the grinding of portland cement clinker, but in the United Kingdom, their use is precluded by the conditions laid down in British Standard 12. *Dodd.*

grinding bed. A machine for grinding stone slabs, consisting of a laterally moving table on which the slab is placed, and a heavy rotating iron disk, whose lower surface abrades or polishes the upper surface of the stone. *Standard, 1964.*

grinding bench. A stone slab on which to fasten by plaster of Paris, in a level position, a plate of glass the upper surface of which is to be ground or polished. *Standard, 1964.*

grinding coolant. A liquid, usually water, but often emulsions of oil and water, used to prevent excessive temperature rise due to friction between the grinding wheel and the work. *Henderson.*

grinding cracks. Shallow cracks formed in the surface of relatively hard materials because of excessive grinding heat or the high sensitivity of the material. *See also* grinding sensitivity. *ASM Gloss.*

grinding cycle. The sequence of operations in grinding a material, including, for example, the screening of the primary product and the recirculation of the screen overflow. *B.S. 3552, 1962.*

grinding fluid. Cutting fluid used in grinding. *ASM Gloss.*

grinding lathe. A lathe of special construction in which the work revolves on dead centers while acted on by an emery wheel. *Standard, 1964.*

grinding lubricant. A liquid, usually an emulsion of oil and water, used in fine grinding to float off or otherwise aid in the removal of both spent abrasive particles from the grinding wheel and the material removed from the work surface. Such material, if permitted to remain at the working surface, tends to ball up and reduce the cutting speed and impair the quality of the work. *Henderson.*

grinding machine. Any machine on which a grinding wheel is operatively mounted. *ACSG, 1963.*

grinding media. The balls (generally porcelain) or other materials such as flint pebbles, used in a ball mill to grind frit into porcelain enamel. *Bryant.*

grinding mill. A machine for the wet or dry fine crushing of ore or other material. The three main types are the ball, rod, and tube mills. The mill consists of a rotating cylindrical drum and the ore enters one hollow trunnion and the finished product leaves the other. Modern practice indicates ball mill feeds of one-half inch, three-fourths inch, and 1 inch for hard, medium, and soft ores respectively and the products range from 35 to 200 mesh and finer. *See also* open-circuit mill. *Nelson.*

grinding pan. Arrangement in which a heavy steel disk (the muller) bears as it rotates horizontally above a fixed wearing plate in a shallow cylindrical pan. Ore is fed centrally and discharged peripherally. Obsolescent, the main use being to amalgamate auriferous concentrates. *Pryor, 3. See also* dry pan.

grinding pebbles. Pebbles, usually of chert or quartz, used for grinding in mills, etc., where contamination with iron must be avoided. *A.G.I.*

grinding plate. a. A piece of steel or iron by the medium of which ore is ground against another hard surface. *Fay.* b. A heavy cast-iron disk rotating on a vertical axis, used to grind or polish plate glass. *Standard, 1964.*

grinding ratio. The ratio of the volumes of metal removed from the work and from the grinding wheel. *ASM Gloss.*

grinding relief. A groove or recess located at the boundary of a metal surface to permit the corner of the wheel to overhang during grinding. *ASM Gloss.*

grindings. Synonym for cuttings. *Long.*

grinding sensitivity. Susceptibility of a metallic material to form grinding cracks; it can be affected by such factors as hardness, microstructure, hydrogen content, and residual stress. *ASM Gloss.*

grinding slip. a. A free-cutting oilstone or whetstone; a hone. *Standard, 1964.* b. A shaped piece of oilstone on which the curved sides of the cutting edges of tools may be rubbed for sharpening purposes. *C.T.D.*

grinding stress. Residual stress, generated by grinding, in the surface layer of a metallic material. It may be tensile, compressive, or a combination of both. *ASM Gloss.*

grinding vat. A mill for grinding flints or clay used in making porcelain. It is a form of the arrastre. *Fay.*

grinding wheel. A disk, or comparable symmetrical shape, of bonded abrasive material. The abrasive is either alumina or silicon carbide; the bond may be of the vitrified ceramic type, or it may consist of sodium silicate (here called a silicate bond), resin, rubber, or shellac. A standard marking system for grinding wheels was adopted many years ago by the Grinding Wheel Manufacturers' Association of America; in 1952, this system was also adopted in the United Kingdom as British Standard 1814. *Dodd.*

grindlet. A little ditch or drain. *Standard, 1964.*

grindstone. A large, circular, revolving stone used for sharpening tools and instruments. It is made from a tough sandstone of fine and even grain, composed almost entirely of quartz, mostly in angular grains which must have sufficient cementing material to hold the grains together but not enough to fill the pores and cause the surface to wear smooth. *Sanford.*

grindstone grit. A kind of gritty rock from which grindstones are made. *Standard, 1964.*

gringo. In Spanish America, any one of English blood or speech; a contemptuous epithet. *Standard, 1964.*

griotte marble. A French marble of a beautiful red color and often variegated with small dashes of purple and spots or streaks of white, as in the variety locally known as griotte oeil de perdrix from the French Pyrenees. *Fay.*

grip. a. A small, narrow cavity. *Fay.* b. To turn into the side of a working place. *Fay.* c. A notch cut into the side of a mass of stone, into which a wedge may be driven to separate the mass. Also called side shear. *Fay.* d. Scot. A pick. *Fay.* e. An apparatus attached to a car for clutching a traction cable. *Webster 3d.* f. A gripsack or valise. *Webster 2d.* g. Eng. To dig trenches or drains in. *Standard, 1964.* h. A grappling tool for drawing up well-boring rods. *Standard, 1964.*

grip length. The length of straight reinforcement bar, given in bar diameters, which is required to anchor a bar effectively in the concrete surrounding it. *See also* lap. *Ham.*

gripe. A strap brake or ribbon brake on a hoisting apparatus. *Standard, 1964.*

griper. Eng. A Thames coal barge or collier. *Fay.*

gripman. *See* clipper, b. *D.O.T. 1.*

gripper. a. A claw of a submarine dredger. *Standard, 1964.* b. *See* clipper, b. *D.O.T. 1.*

gripping hole. One whose direction is inclined away from the adjacent free face, or may be defined as one whose width at the toe is greater than at the heel *Zern, p. 669.*

gripping shot. A shot so placed that the point or inner end of the hole is considerably farther from the face of the coal to be broken than is the heel or outer end of the hole. *See also* shot, c. *Fay.*

grip the rib. When a cut is so made by a mining machine or a shot is so placed by a miner that the cut or shot enters the coal beyond the proper line of the rib, it is said to grip the rib. *Zern.*

grip wheel. A wheel, the periphery of which is fitted with a series of toggle-jointed, cast-steel jaws that grip the rope automatically. *Zern.*

griqualandite. A mineralogical name for the yellow silicified crocidolite which appears in parallel layers in tigereye. *Shipley.*

grisaille. From the French word meaning gray shading, a method of decorating, at one time used on pottery vases, etc., in which different shades of gray were used to produce the effect of low relief. *Dodd.*

grisley. *See* grizzle. *Tomkeieff, 1954.*

grison stone. A gray freestone. *Fay.*

grisou. Fr. Firedamp. *Fay.*

grist. S. Wales. A black, coaly stratum, indicating a probable bed of coal not far off. *Fay.*

grit. a. Sand, especially coarse sand. *A.G.I. Supp.* b. Coarse-grained sandstone. *A.G.I. Supp.* c. Sandstone with angular grains. *A.G.I. Supp.* d. Sandstone with grains of varying size producing a rough surface. *A.G.I. Supp.* e. Sandstone suitable for grindstones. *A.G.I. Supp.* f. In archeology, a noncommittal term for tempering material when the archeologist is unable to identify the material used or finds it essentially fine gravel. Sometimes referred to as aplastic or by its French term, degraissant. *ACSG, 1963.*

grit chamber. A small tank for collecting detritus. *Ham.*

grit collector. An adaptation of any of several types of conveyors used for removing heavy solids from settling tanks or basins. *See also* bucket elevator; flight conveyor; reciprocating flight conveyor; screw conveyor; V-bucket conveyor elevator. *ASA MH4.1-1958.*

grit number. *See* mesh number. *ACSG, 1963.*

grit size. Nominal size of abrasive particles in a grinding wheel corresponding to the number of openings per linear inch in a screen through which the particles can just pass. Sometimes called grain size. *ASM Gloss.*

gritter. a. An implement for spreading surface dressing or nonslip grit over a road surface. *Ham.* b. In the stonework industry, one who smooths the rough-sawed or bed-rubbed surfaces of marble slabs or blocks on a gritting machine preparatory to polishing. Also called gritting machine operator. *D.O.T. 1.*

gritting. a. The process of forming a smooth surface on blocks of marble, or other natural stones, by means of abrasive blocks known as rubbing blocks. *Dodd.* b. In quarrying, a process that gives a smoother surface than rubbing. It is accomplished with silicon carbide or aluminum oxide abrasive bricks attached to revolving buffer heads. *AIME, p. 332.*

gritting machine operator. *See* gritter. *D.O.T. 1.*

grizzle. a. Eng. Inferior coal with an admixture of iron pyrite. *Fay.* b. A second-rate brick that is underburned, gray in color, and deficient in strength. *Webster 3d.*

grizzlies. Iron or steel bars used to sort or separate the rock ore as it falls into the ore chutes. *Ricketts.*

grizzly. a. Guardrails or covering to protect chutes, manways, winzes, etc., in mines. *Fay.* b. A device for the coarse screening or scalping of bulk materials. *See also* bar grizzly; grizzly chute; live roll grizzly. *ASA MH4.1-1958.* c. A rugged screen for rough sizing at a comparatively large size (for example, 6 inches or 150 millimeters); it can comprise fixed or moving bars, disks, or shaped tumblers or rollers. *B.S. 3552, 1962.*

grizzly chute. A chute with a bar grizzly which separates the fine from the coarse material as it passes through the chute. *ASA MH4.1-1958.*

grizzly, live roll. *See* live roll grizzly. *ASA MH4.1-1958.*

grizzly man. *See* grizzly worker. *D.O.T. 1.*

grizzly worker. In metal mining, a laborer who works underground at a grizzly (a grating constructed of heavy iron beams or timbers) over a chute or raise heading to a storage bin or haulage level, dumping ore from cars through grizzly, and breaking oversized lumps with a sledge hammer so that they will pass through grizzly. Also called draw man; grizzly man; monkey; screen ape. *D.O.T. 1.*

Groenwall process. A method of electric production of steel directly from iron ore in which the ore is ground to pea size and roasted in a rotary kiln. The roasted ore is treated in another kiln, where it is mixed with finely ground coal. The temperature of this kiln is kept at 800° to 900° by means of nichrome resistors placed in the brick lining. From this kiln the materials are charged into an electric shaft furnace and smelted to steel or soft iron. The metal is then refined in an ordinary electric steel furnace, where the composition and quality can be regulated. *Osborne.*

grog. Burned clay. It is used to reduce the shrinkage of plastic clays and to give additional porosity. Grog enables refractory goods to withstand sudden changes of temperature. It is often obtained by grinding old firebricks, or by burning a high-grade fire clay in a shaft kiln out of contact with fuel and grinding the product to a coarse powder and removing the dust. *Nelson.*

grog fire clay mortar. Raw fire clay mixed with calcined fire clay, or with broken fire clay brick, or both, all ground to suitable fineness. *ASTM C71-64.*

groin. Eng. A structure of piling, sometimes with a stone apron at the end, to accumulate sand and shingle on a beach, and to act as a breakwater. *Standard, 1964.*

groining-in. The cutting and fitting of brick to fill into the volume common to two intersecting cylinders. *Bureau of Mines Staff.*

gromet. Eng. Lincolnshire term for a jetty coal. *Tomkeieff, 1954.*

grommet. a. An endless wire rope or strand, made up without increasing its mean diameter at any point. *Ham.* b. Circular washer made of hemp and red lead, used to make a tunnel lining watertight. Also applied to a coil of rope placed on top of a dolly used for pile driving. *Ham.*

Gröndal flotation cell. Early type of pneumatic flotation cell, obsolete. *Pryor, 3.*

Gröndal separator. Early wet magnetic separator. Horizontal drum rotated, lightly submerged, in flowing pool of pulp. Strip magnets on drum's periphery lifted out the magnetic material. *Pryor, 3.*

grönlandite. An igneous rock consisting of enstatite hornblendite with 73 to 90 percent hornblende and 5 to 20 percent enstatite. *Johannsen, v. 4, 1938, p. 447.*

groove. a. Derb. The place where a miner is working. Miners are (1747) called groovers. *Fay.* b. A mine, from the German, grube. *Fay.* c. The long, tapered, half-round slot in the deflection wedge that acts as a guide in directing the bit to follow a new course in deflecting a borehole. Any of the spiral depressions on a cylindrical object, such as the spiral depression on the surface of fluted core or the rifling in a gun barrel. *Long.*

groove angle. The total included angle of the groove between parts to be joined. Thus, the sum of two bevel angles, either or both of which may be 0°. *ASM Gloss.*

groove cast. Rounded or sharp-crested rectilinear ridges produced by filling of grooves. Also called mud furrow. *See also* drag mark; striation cast. *Pettijohn.*

grooved drum. Drum having a grooved surface to support and guide a rope. *Ham.*

groove face. The portion of a surface or surfaces of a member included in a groove. *ASM Gloss.*

groover. N. of Eng. A miner. *Standard, 1964.*

groove ruffling. *See* ruffled groove cast. *Pettijohn.*

grooves. A term applied to any straight linear depression which, unlike most channels, has a uniform cross section and depth and great length. Grooves include drag marks and slide marks. Applied also to glacial grooves in bedrock. *See also* groove cast; drag mark; slide mark. *Pettijohn.*

groove sample; channel sample. A sample of coal or ore obtained by cutting appropriate grooves along or across the road exposures. The groove itself is generally cut by means of a hammer and a pointed steel termed a moil. The groove cut is something like 4 inches wide by 1 inch deep or smaller. *Truscott, pp. 10-11.*

groove weld. A weld made in the groove between two members. The standard types are: square, single-bevel, single flare-bevel, single flare-V, single-J, single-U, single-V, double-bevel, double flare-bevel, double flare-V, double-J, double-U, and double-V. *ASM Gloss.*

groove yellow. N. of Eng. A mate or fellow workman in a mine. *Standard, 1964.*

groroilite. A nearly black earthy manganese or wad, streaked with dark red markings, occurring in parts of Europe. *Standard, 1964.*

grorudite. A hypabyssal rock with trachytoid texture containing phenocrysts of alkalic feldspar and aegirine and much quartz. A hypabyssal variety of aegirine-rich sodic granite. *A.G.I.*

gros morceaux. Belg. Coal in very large lumps. *Fay.*

Grossalmerode clay. A refractory clay from Grossalmerode, about 10 miles east southeast of Kassel, West Germany. These clays are of tertiary origin. They have been used for making glass pots for five centuries. Aluminous clays are worked in the district but, typically, the Grossalmerode clay contains (raw) 70 percent SiO_2, and 18 percent Al_2O_3; pyrometric cone equivalent 28 to 29. *Dodd.*

gross calorific value. a. In the case of solid fuels and liquid fuels of low volatility, the heat produced by combustion of unit quantity, at constant volume, in an oxygen-bomb colorimeter under specified conditions. *ASTM D407-44.* b. The amount of heat liberated by the complete combustion of unit weight of coal under specified conditions; the water vapor produced during combustion is assumed to be completely condensed. *B.S. 3323, 1960.* c. At constant pressure, the number of heat units which would be liberated if unit quantity of coal or coke was burned in oxygen at constant pressure in such a way that the heat release was equal to the sum of the gross calorific value at constant volume and the heat equivalent of the work which would have been done by the atmosphere under isothermal conditions had the pressure remained constant. *B.S. 1016, 1961, Pt. 16.* d. At constant volume, the number of heat units measured as being liberated per unit quantity of coal or coke burned in oxygen saturated with water vapor in a bomb under standard conditions, the residual materials in the bomb being taken (suitable corrections having been made) as gaseous oxygen, carbon dioxide, sulfur dioxide and nitrogen, liquid water in equilibrium with its vapor and saturated with carbon dioxide, and ash. *B.S. 1016, 1961, Pt. 16.*

gross cut. The total amount of excavation in a road or a road section, without regard to fill requirements. *Nichols.*

gross heat of combustion. Same as gross calorific value. *A.G.I.*

gross porosity. In weld metal or in a casting, pores, gas holes, or globular voids that are larger and in greater number than obtained in good practice. *ASM Gloss.*

gross recoverable value. The part of the total metal recovered multiplied by the price. The proportion recovered varies with the ore and the method used. *See also* net unit value. *Nelson.*

gross ton. The long ton of 2,240 avoirdupois pounds. *Webster 3d.*

grossularite. A green, calcium-aluminum garnet, $Ca_3Al_2(SiO_4)_3$; isometric. Same as cinnamon stone. *Dana 17.* Also called gooseberry stone. *C.T.D.*

grossularoid. Group name for hibschite and plazolite, $3CaO.Al_2O_3.2SiO_2.2H_2O$, related to and associated with grossular, in which $2H_2O$ replaces SiO_2. *Compare* garnetoid; hydrogarnet. *Spencer 16, M.M., 1943.*

gross unit value. The weight of metal per ton (long or short ton) as determined by assay or analysis, multiplied by the market price of the metal. *Nelson.*

gross wt Abbreviation for gross weight. *BuMin Style Guide, p. 59.*

grothite. A variety of titanite. *Crosby, p. 112.*

grotto. A small cavern or a cavernlike apartment or retreat, natural or artificial; especially, a cavern having some attractive features, as beautiful stalactite formations, or rockwork. *Standard, 1964.*

grouan. Corn. Gravel, rough sand. Also called gowan. Hard grouan is granite or moorstone; soft grouan, the same material in a lax and sandy state. A grouan lode is any tin lode which abounds with this gravel. *Fay.*

grouder. Corn. A mixture of grouan and clay, used for scouring woodwork. *Fay.*

ground. a. Any rock or rock material. *Long.* b. As used by miners, any specific part of a mineral deposit, or the rock in which a mineral deposit occurs. *Long.* c. The mineralized deposit and the rocks in which it occurs, for example, payground, payable reef; barren ground, rock without value. *C.T.D.* d. Rock at the side of a lode; country. *Gordon.* e. Commonly used in the United States to denote earth. *C.T.D.* f. A ground is a conducting connection, whether intentional or accidental, between an electrical circuit or equipment and either earth or some conducting body, serving in place of the earth. Also called earth. *ASA M2.1-1963.* g. The earth, particularly its surface or upper part. *A.G.I.* Supp. h. Land, particularly a region or area. *A.G.I. Supp.*

ground air. The air contained in the upper layers of the subsoil; it has a variable composition, including carbon dioxide, ammonia, and other gases resulting from oxidation of organic matters, and may be noxious. *C.T.D.*

ground bailiff. Eng. An inspector or superintendent of a mine. *Standard, 1964.*

ground beam. A reinforced concrete beam, usually at ground level, which forms a foundation for the walls of a superstructure. *Ham.*

ground block; ground crab. Eng. A species of capstan used for lowering the sinking pumps. *Fay.*

ground boss. a. A mine foreman. *Hess.* b. *See* mine captain. *D.O.T. 1.*

ground burnt lime. Refers to ground quicklime used for agricultural liming. *Boynton.*

ground circuit. An electric circuit completed by the ground; an earth circuit. *Standard, 1964.*

ground clamp. A clamp on the negative cable terminal of portable electrical equipment used to make connection with the return rail circuit. *Grove.*

ground coal; grounds. Scot. The bottom of a coal seam. *Fay.*

ground coat. The initial coat of a porcelain enamel. *VV.*

ground-coat boiling. *See* boiling. *ASTM C286-65.*

ground-coat reboiling. Evolution of gas during refiring of the ground coat. *ACSB-3.*

ground conductor. *See* grounding conductor. *ASA M2.1-1963.*

ground connection. Connection of the work lead to the work. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.*

ground control. a. The regulation and final arresting of the closure of the walls of a stoped area. *Spalding.* b. In photogrammetry, correlation of photographs taken from an airplane with points on the ground accurately fixed for latitude and longitude. *Pryor, 3.* c. *See* control. *Seelye, 2.*

ground crab. *See* ground block. *Fay.*

ground detector. A device, as in a central power station, to indicate where a ground connection, entailing loss of electricity, has taken place. *Standard, 1964.*

grounded. a. Means that the system, circuit, or apparatus referred to is provided with a ground. Also called earthed. *ASA M2.1-1963.* b. Connected to earth or to some conducting body which serves in place of the earth. *U.S. BuMines Federal Mine Safety Code—Bitumnious Coal and Lignite Mines, Pt. I Underground Mines, October 8, 1953.*

grounded circuit. Electrical system earthed at key points to insure a common potential and eliminate danger to personnel. *Pryor, 3.*

grounded power conductor. An insulated or bare cable that constitutes one side of a power circuit and normally is connected to ground. It differs from a ground wire in that a grounded power conductor normally carries the load current while the equipment it serves is in operation. *BuMines. Coal-Mine Inspectors' Manual, June 1966, pt. 3-18e, p. 53.*

ground fire clay. Fire clay or a mixture of fire clays that have been subjected to no treatment other than grinding or weathering, or both. *ASTM C71-64.*

ground fire clay mortar. Ground fire clay for use as a refractory mortar in laying fire clay brick. *A.R.I.*

ground form. The crystalline form of any crystal system which is bounded by natural faces, all of which intersect the crystal axes. The ground form of the isometric system is the octahedron. *Hess.*

ground geophysical anomaly. A geophysical anomaly related to ore that is mapped instrumentally at the surface of the ground. *Hawkes, 2, p. 320.*

groundhog. *See* barney. *Fay.*

groundhog kiln. Term for an art potter's kiln (usually fired with solid fuel) partly buried in a convenient hillside to support the roof and conserve heat. *Dodd.*

ground ice. Spongy ice which sometimes forms on the bottom of either running or still waters. *Webster 2d.* It often has stone and mud attached to its bottom. Also called anchor ice. *Fay.*

grounding. a. In marble working, the act or process of polishing marble with emery. *Standard, 1964.* b. Ground laying. *Standard, 1964.* c. *See* ground, f. *Fay.*

grounding conductor. In mining, a grounding conductor is a metallic conductor used to connect the metal frame or enclosure of an equipment, device, or wiring system with a mine track or other effective grounding medium. (The mine track is considered to be an effective grounding medium for direct current only.) Also called ground conductor; safety ground; frame ground. *ASA M2.1-1963.*

grounding transformer. *See* zigzag transformer. *I.C. 7962, 1960, p. 23.*

ground layer. One who applies solid colors over glaze by dusting color on ware covered with a varnish. *D.O.T. 1.*

ground laying. a. In ceramics, the process of applying a coat of boiled oil to procelain ware, to receive the colored enamel; bossing; grounding. *Standard, 1964.* b. Covering a surface with an even coat of color, usually by dusting powder over an oiled surface. *C.T.D.* c. Application of a uniform background color. *ACSG, 1963.*

ground lime. Som. Black lias as opposed to building lime or blue lias. *Arkell.*

ground log. A device for determining the course and speed made good over the ground in shallow water, consisting of a lead or weight attached to a line. The lead is thrown overboard and allowed to rest on the bottom. The course being made good is indicated by the direction the line tends and the speed by the amount of line paid out in unit time. *H&G.*

ground magnetometer. A magnetometer primarily suitable for making observations of magnetic field intensity on the surface of the earth. *A.G.I.*

groundman. a. A man employed to work on the ground, as in digging or excavating; in mining, a mucker. *Webster 2d.* b. In bituminous coal mining, a laborer who moves overburden (dirt) and coal in a strip mine within reach of power shovel, using a pick and shovel. Also called dirtman; sod hog. *D.O.T. 1.* c. *See* bottom digger. *D.O.T. 1.*

groundmass. The relatively fine, crystalline or glassy portion of a porphyritic rock as contrasted with its phenocrysts. Not to be confounded with basis, as will be seen by referring to the latter. *Fay.*

ground moraine. In geology, the irregular sheet of till deposited partly beneath the advancing glacier and partly directly from the ice when it melts away. *Fay.*

ground movement. Subsidence due to the caving or collapse of underground workings. *Pryor, 3.*

ground noise. Seismic disturbance of the ground not caused by the shot. *Schieferdecker.*

ground plate. a. A groundsill. *Standard, 1964.* b. A bedplate supporting railroad sleepers or ties. *Standard, 1964.* c. In electricity, a metal plate in the ground forming the earth connection of a metallic circuit. *Standard, 1964.*

ground pressure. a. The pressure to which a rock formation is subjected by the weight of the superimposed rock and rock material or by diastrophic forces created by movements in the rocks forming the earth's crust. Such pressures may be great enough to cause rocks having a low compressional strength to deform and be squeezed into and close a borehole or other underground opening not adequately strengthened by an artificial support, such as casing or timber. Also called rock pressure. *Compare* bottom-hole pressure, c. *Long.* b. The weight of a machine divided by the area in square inches of the ground directly supporting it. *Nichols.*

ground prop. The puncheon between the lowest frame and a foot block in a timbered excavation, used to support the weight of the timbering. *Ham.*

ground rent. Eng. Rent paid for the surface occupied by a colliery plant. *Fay.*

ground return. That part of an electric circuit as the earth, or metallic conductors intimately associated with the earth, and which is practically at earth potential at all points. *Fay. See also* earth return circuit. *C.T.D.*

ground roll. a. Low-frequency, low-velocity inteface waves encountered in seismic prospecting commonly arising from the ground air interface in which case they are known as Rayleigh waves. They often more or less completely mask desired signals and means to minimize them must be used. *A.G.I.* b. Seismic surface wave generated by the shot. Also called ground wave. *Schieferdecker.*

ground rope. Scot. The rope connecting hanging pumps to a ground crab. *Fay.*

grounds. a. Ground coal. *A.G.I.* b. Nailing strips, usually wood, placed in masonry walls to which trim or furring is attached. *ACSG.*

ground sand and sandstone. A form of silica used for pottery, porcelain and tile manufacture, and as an abrasive. Produced in Illinois, New Jersey, and Ohio. *Barger.*

groundsel. A bed piece or foundation timber supporting a timber superstructure (as a wooden house or a set of mine timbers).

Also spelled groundsill. *Webster 3d.*

groundsill. *See* groundsel.

ground sluice. a. A channel or trough in the ground through which auriferous earth is sluiced for placer mining. *Webster 3d.* b. To wash down a bank of earth with a stream of water. *Fay.*

ground sluicing. To strip ground downslope by means of a directed stream of water to excavate placer material and transport it to a riffled trough in which the valuable mineral is recovered. *Compare* hydraulicking. *Bureau of Mines Staff.*

ground spears. Wooden rods (one on each side of the pump) by which a sinking pump is suspended. *Fay.*

ground state. Condition of an atom with its orbital electrons at minimum energy, or unexcited. Lowest possible energy level of a system. *Pryor, 3.*

groundstone. A foundation; groundwork. *Fay.*

ground water. a. The water which permeates, in an unbroken sheet, the rock masses of the earth, filling their pores and fissures. *Fay.* b. That water of atmospheric origin which saturates rock openings beneath the water table. *Bateman.* c. *See* free water. *ASCE P1826.* d. Water at, and below, the water table; basal or bottom water; phreatic water. Used also in a broad sense to mean all water below the ground surface. *Seelye, 1.* e. Water derived from wells or springs, not surface water from lakes or streams. *ASTM STP No. 148-D.*

ground-water discharge. The return of ground water to the surface. *Fay.*

ground-water divide. The crestline of a water table. On the opposite sides of this line, the water table slopes in opposite directions. *Compare* watershed. *Fay.*

ground-water elevation. Water free to move in response to gravity. *Bureau of Mines Staff. See also* free-water elevation. *ASCE P1826.*

ground-water hydrology. The branch of the science of hydrology that treats of ground water, its occurrence and motions, its relationships and depletion; the properties of rocks that control ground water movement and storage; and methods of investigation and utilization of ground water. *Stokes and Varnes, 1955.*

ground-water level. The level below which the rock and subsoil, down to unknown depths, are full of water. *Fay.* Also called ground-water table; water table. *Long.*

ground-water lowering. The process of lowering the water table so that an excavation can be carried out in the dry. This is done by means of well points. *Ham.*

ground-water province. An area characterized by the similarity of the principal occurrences of ground water within it. *Leet.*

ground-water soil. *See* hydromorphic soil. *Hawkes, 2, p. 109.*

ground-water surface. *See* free-water elevation. *ASCE P1826.*

ground-water table. *See* ground-water level.

ground-water tracers. The water seeping into shallow workings or shafts may be traced to the surface source by means of tracer dyes or salts. These substances, however, may be leached out of the water by the soil or strata. Some radioactive isotopes are better tracers because of the high sensitivity with which they can be detected. Tritium, an isotope of hydrogen, is unique because it can be used to label the actual water molecule to be traced and is not chemically removed by the strata. *Nelson.*

ground waves. Vibrations of soil or rock. *Nichols. See also* ground roll.

ground wire. A bare or insulated cable used to connect the metal frame of a piece of equipment to the mine track or other effective grounding medium. *BuMines. Coal-Mine Inspectors' Manual, June 1966, pt. 3-18e, p. 53.*

groundwork. The foundation work of a structure. *Standard, 1964.*

ground zero. The point on the surface of land or water vertically below or above the center of a burst of a nuclear weapon. *L&L.*

group. a. In general, an association of any kind based upon some feature of similiarity or relationship. *A.G.I. Supp.* b. In stratigraphy, a lithostratigraphic unit consisting of two or more formations. *A.G.I. Supp.* c. A more or less informally recognized succession of strata too thick or inclusive to be considered a formation. *A.G.I. Supp.* d. A subdivision of a series; *compare* stage. Obsolete. *A.G.I. Supp.* e. A number of shots sufficiently close together to be treated in common in respect to preparation for firing. *B.S. 3618, 1964, sec. 6.* f. An integrated grouping of ranges of diamond-drill fittings wherein boreholes drilled with one range can be cased and continued with the next smaller range. The second letter in two- and three-letter names is called the group letter because in combination with the range letter it establishes specific dimensions for all diameters affecting the nesting of casings. The group characteristics established are: set reaming-shell outside diameter, casing outside diameter, and casing-coupling inside diameter. In two-letter names the group letter also may establish the design characteristics affecting core size and interchangeability of parts. *Compare* range, e. *Long.* g. A vertical column of the periodic system, containing elements having similar properties. *C.T.D.* h. Metallic radicals which are precipitated together during the initial separation in qualitative analysis. *C.T.D.* i. A number of atoms which occur together in several compounds. *C.T.D.*

group level; subdeposit level. A main haulageway drive built in the solid rock underlying the group of seams which it has to serve, or in the floor of a thick deposit. It is preferable to construct the main haulageway as a subdeposit drive, because drives in the deposit suffer from pressure as soon as mining has progressed a certain distance. *Stoces, v. 1, p. 228.*

group phenomena. Properties of the crystalline state which apparently cannot be considered as properties of single atoms, but arise from the agglomeration of atoms into groups, each consisting of a definite number of atoms (10^7 to 10^0). The stability of the atoms thus arrayed is greater than that among groups. *Hess.*

grouse. Eng. Alternative name for grout. *See also* grozzle. *Arkell.*

grouser. a. A temporary pile or heavy ironshod pole driven into the bottom of a stream to hold a drilling or dredging boat or other floating object in position. *Fay.* b. A ridge or cleat across a track shoe, which improves its grip on the ground. *Nichols, 2.*

grout. a Applied to waste material of all sizes obtained in quarrying stone. *Fay.* b. A coarse kind of plaster or cement usually studded with small stones after application, sometimes used for coating walls of a building. *Webster 3d.* c. A pumpable slurry of neat cement or a mixture of neat cement and fine sand, commonly forced into a borehole to seal crevices in a rock to prevent ground water from seeping or flowing into an excavation, to seal crevices in a dam foundation, or to consolidate and cement together rock fragments in a brecciated or fragmented formation. Also called cement grout. *Long.* d. The act or process of injecting a grout into a rock formation through a borehole. *Long.* e. A cementitious component of high water-cement ratio, permitting it to be poured into spaces within masonry walls. It consists of portland cement, lime, and aggregate, and is often formed by adding water to mortar. *ACSG, 1963.*

grout box. A conical box formed of expanded metal, cast into concrete, and having an anchor plate at its foot to receive a foundation bolt. *Ham.*

grout core. Core obtained by drilling into and through formations into which grout has been injected and allowed to set. *Long.*

grout curtain. An area into which grout has been injected to form a barrier around an excavation or under a dam through which ground water cannot seep or flow. *Long.*

grouted macadam. A road constructed of coarse aggregate, having the voids filled with bituminous or cement grout. *See also* Colcrete. *Ham.*

grouter. a. In the stonework industry, a laborer who maintains the floors, equipment, machinery, and yard in a clean and unobstructed condition, using shovels, brooms, buckets, and wheelbarrows to collect and remove stone scraps, dirt, and debris to dump for disposal or to remove steel shot from under gangsaws and store it in suitable containers to be washed and reused. Also called mucker. *D.O.T. 1.* b. *See* box loader. *D.O.T. 1.*

grout hole. A borehole drilled for the express purpose of using it as a means by which grout may be injected into the rock surrounding the borehole. *Compare* consolidation hole. *Long.*

grout-hole drilling. The act or process of drilling holes into which grout is to be injected. *Long.*

grouting. The act or process of injecting grout into crevices of a rock, usually through a borehole drilled into the rock to be grouted; also, the grout thus injected. *Long.*

grout injection. An act or process of forcing grout into crevices in rock formations, usually through a borehole, by pressure pumps. *Long.*

grout injector. a. Synonym for cement injector. *Long.* b. A machine that mixes the dry ingredients for a grout with water and injects it, under pressure, into a grout hole. *Compare* grout machine. *Long.*

groutite. A jet-black mineral, $HMnO_2$, a member of the diaspore-goethite group; from the Cuyana range, Minn., where it occurs associated with iron ores; brilliant submetallic to adamantine luster; orthorhombic, wedge-shaped crystals; exhibits strong pleochroism. *American Mineralogist, v. 32, No. 11-12, November-December 1947, pp. 654-659.*

grout machine; grouting machine. A mechanism by which grout may be pressure-injected into a grout hole. The machine is essentially a closable cylindrical container large enough to hold the neat cement slurry made with one bag of cement. The slurry is placed inside the container and compressed air or steam allowed to enter the top of the container forcing the slurry out of the bottom of the container through a quick-opening plug valve into the grout pipe and grout hole. The process is intermittent, requiring the refilling of the container after each batch of slurry has been ejected. *Compare* grout injector, b. *Long.*

grout off. To seal off flow of water by grout injections. *Long.*

grout pipe. A tube or pipe firmly anchored in the collar of a grout hole through which grout is injected into the hole. *Long.*

grout-pipe drill mounting. A drill mounted on a framework clamped or attached to a grout pipe. *Long.*

grove; groove. a. Eng. A drift or adit driven into a hillside from which coal is worked. *See also* groove, a, b. *Fay.* b. Corn. Mine; bal. *Hess.*

grovesite. A chloritelike mineral from the Benallt manganese mines, Wales. $(Mn,Mg,Al)_3(Si,Al)_2(O,OH)_9$, near pennantite, but with X-ray pattern similar to berthierine and cronstedtite, suggesting a kaolin- rather than a chlorite-type structure. *Spencer 20, M.M., 1955.*

growan. Corn. A term in the china clay industry for incompletely and unevenly decomposed granite. *Dodd.*

growan stone. a. Corn. Moorstone. *Arkell.* b. Granite or any coarse grit or sandstone. *See also* growder. *Arkell.*

growder. Corn. Decomposed granite. *Arkell.*

growl. a. The noise heard when strata is being subjected to great pressure. *C.T.D.* b. Mid. Coal pillars are said to growl when they are undergoing a crushing weight. *Fay.*

growler board. A notched or fingered plank or light timber used to aline ends of pipe being screwed together, as when laying a waterline. *Long.*

grow-on. Quarrymen's term to designate the place where the sheet structure dies out, or the place where two sheets appear to grow onto one another. *Fay.*

growth. a. Scot. The rate of entrance of water into a pit or mine working. *Fay.* b. An increase in dimensions of a compact which may occur during sintering (converse of shrinkage). *ASTM B243-65.* c. As applied to cast iron, the tendency to increase in volume when repeatedly heated and cooled. *C.T.D.* d. *See* make of water. *B.S. 3618, 1963, sec. 4.*

growth factor. A compound having a stimulatory effect on the growth of an organism. *I.C. 8075, 1962, p. 63.*

growth of faults. The present considerable displacement of large faults probably represents the accumulated results of countless small intermittent slippages along the fault plane. This is why geologists refer to the growth of faults. *See also* fault. *Nelson.*

groze. Scot. To turn a chisel in the bottom of a borehole, by which means the borer, from a sense of feeling and hearing, knows when a change of strata occurs. *Fay.*

grozing iron. a. A steel tool for cutting glass. *Webster 3d.* b. A bulbous tool for smoothing the soldered joints of lead pipe. *Webster 2d.*

grozzle. Leic.; Derb. Alternative name for grouse or grout, breccia or conglomerate. *Arkell.*

grubbin. *See* gubbin. *Fay.*

grubbing. The removal of the root system incident to the surface growth. *Carson, p. 88.*

grube. Ger. A mine. *Fay.*

grub saw. A saw made from a coarsely notched blade of soft iron, provided with a wooden back; used, with sand, for sawing stone by hand power. *Standard, 1964.*

grubstake. In the Western United States, supplies or funds furnished to a mining prospector on promise of a share in his discoveries. So called because the lender stakes or risks provisions so furnished. *Webster 3d.*

grubstake contract. An agreement between two or more persons to locate mines upon the public domain by their joint aid, effort, labor, or expense, and each is to acquire by virtue of the act of location such an interest in the mine as agreed upon in the contract. *Fay.*

gruell. Ir. Coal. *Standard, 1964.*

grueso. Sp. Lump ore. The term is in use at the quicksilver mines of California. *Fay.*

gruff. Eng. A pit or shaft. *Fay.*

grummel. Mid. Clay or marl. *Arkell.*

grunauite. An impure nickel sulfide (polydimite) carrying copper, lead, cobalt, iron, and bismuth, copper ranging 1.69 to 11.56 percent in tenor in published assays. *Weed, 1918.*

grunching. a. Blasting coal out of the solid face as opposed to blasting coal which has been undercut by hand or by coal cutter. *Nelson.* b. Aust. Shooting fast, that is, shooting in the solid. *Fay.*

Grundite. A trade name for an illite-type clay used for bonding foundry sands, produced in Grundy County, Ill. *Bureau of Mines Staff.*

grundy. Granulated pig iron used in making granulated steel. *Webster 2d.*

grunerite. A silicate mineral belonging to the inosilicate group and a major constituent of amosite, $(Mg,Fe)_7Si_8O_{22}(OH)_2$. *E.C.T., v. 12, p. 278; v. 2, p. 136.*

grunstane. Scot. A grindstone. *Standard, 1964.*

grunter. a. A hooked rod to aid in supporting a crucible. *Standard, 1964.* b. A founder's term. *Fay.*

grupiara. Brazil. A diamond and carbonado bearing deposit above the present high water level. *Hess.*

grus. An accumulation of fragmental products derived from the weathering of granite in its passage from solid rock to soil. *Compare* arkose; saprolite. *Stokes and Varnes, 1955.*

grush. Finely crumbled rock. A term usually applied to disintegrated granite. *Arkell.*

G.S.A. Abbreviation for Geological Society of America. *Williams.*

Gshelian. Upper Upper Carboniferous below Uralian. *A.G.I. Supp.*

G stone. A name that has been used for pyrophyllite. *See also* pyrophyllite. *Dodd.*

g-t. Abbreviation for gross ton. *Zimmerman, p. 51.*

guadalcazarite. Sp. A variety of cinnabar containing zinc. *Standard, 1964.*

Guadaloupian; (Guadeloupe) group. Strata, referring to the Permian, occurring in Texas and New Mexico; they comprise the Delaware Mountain series below and the Capitan limestone above. *C.T.D.*

guag. Corn. A place from which the ore has been extracted. A variation of gwag. *Fay.* Also called gunis. *C.T.D.*

guairona. Peru. Guardrails at mouth of a shaft. *Fay.*

guanapite. A variety of oxammite found in guano. From Guanape Islands, Peru. *Tomkeieff, 1954.*

guanidine nitrate. White; granules; $H_2NC(NH)NH_2.HNO_3$; soluble in water and alcohol; slightly soluble in acetone; and melting point range, 206° to 212° C. Used in the manufacture of explosives and as an ingredient of explosive mixtures. Guanidine nitrate itself is not explosive. *CCD 6d, 1961.*

guanidines. Group of compounds derived from CH_5N_3. *Pryor, 3.*

guano. A substance that is found on some coasts or islands frequented by sea fowl, is composed chiefly of their partially decomposed excement, is rich in phosphates, nitrogenous matter, and other material for plant growth, and has been used extensively as a fertilizer. *Webster 3d.*

guard. a. A support in front of a roll train to guide the bar into the groove, sometimes called a side guide. *Fay.* b. A fixture or attachment designed to protect or secure against injury. *Webster 3d.* c. To protect from danger; to shield; to defend. *Webster 3d.* d. In a compressor check valve, a backing or retaining plate for the movable part. *Nichols.*

guard board. A board placed along a trolley wire or other uninsulated wire carrying an electric current to prevent accidental contact with the wire. *Grove.*

guarded. Guarded means covered, shielded, fenced, enclosed, or otherwise protected by suitable covers or casings, barrier rails or screens, or mats or platforms to remove the likelihood of either dangerous contact or approach by persons or objects to a point of danger. *ASA M2.1-1963.*

guard electrode log; shielded monoelectrode. A resistivity log obtained in borehole surveying by means of an instrument having a focused current system. A ring-shaped central current electrode is shielded by two long metal bars on either side, these bars being maintained at an equal potential. The current is thereby made to flow from the central electrode into the formations in a direction perpendicular to the borehole, thus insuring deeper current penetration in the bed at the level of the electrode and minimizing the influence of adjacent beds and of the borehole itself on the measurement. *A.G.I.*

guard lock. A lock separating a dock from tidal water. *Ham.*

guard magnet. Permanent, or electromagnet used in crushing system to arrest or remove tramp iron ahead of the crushing machinery. *Pryor, 3.*

guardplate. A plate in front of an iron furnace, covering the taphole through which the slag is drawn out. *Standard, 1964.*

guardrail. a. An additional rail placed beside the rail in service, to compel the flange of the wheels to run close to the latter in crossing over frog points or entering switches. *Fay.* b. A safeguard to prevent accidental injury to persons who may come near working machines or too near the edge of an elevated work platform. Guardrails generally are two rails made of 1¼-inch pipe, one set at 42 inches and the other at 21 inches above the floor. The two rails, with supporting posts, constitute the guardrail. *Compare* bellybuster. *Long.*

guard ring. An arrangement in thermal conductivity apparatus designed to insure that heat shall flow, through the sample actually under test, in a direction perpendicular to the hot and cold faces, that is, no heat flows through the sides of the test piece. *Dodd.*

guards. *See* hoods. *ACSG, 1963.*

guard tube. In chemical analysis one containing a suitable reagent for removing moisture, gas, etc., from a gas which is being drawn into or is emanating from a reacting vessel. *Pryor, 3.*

guarinite. *See* orthoguarinite; clinoguarinite. *Hey 2d, 1955.*

guarnaccine garnet. A trade term for yellowish-red garnet. Same as vermeille garnet. *Shipley.*

guayaquillite. A pale yellow, amorphous, nonresinous, oxygenated hydrocarbon, from near Guayaquil, Ecuador; it has the specific gravity 1.092, begins to fuse at 70° C, and is soluble in alcohol. *Fay.*

gubbin. Clunch or clod with ironstone nodules. *Arkell.*

gubble stone; gub. Eng. A rough, round stone which will not lie evenly in a wall or building. Variant of cobblestone. *Arkell.*

gublin bat. A black, fissible substance, an iron ore, in which a bituminous shivery earth abounds. *Arkell.*

gublin ironstone. Staff. An iron ore, hard, blackish, and spotted with white, Coal Measures, Dudley. *Arkell.*

gudgeon. a. An iron pin for fastening together blocks of stone. *Webster 3d.* b. Eng. A bit of wood used for roofing a mine. *Fay.* c. The bearing of a shaft, especially when made of a separate piece. *Standard, 1964.* d. A metallic journal piece set into the end of a wooden shaft. *Standard, 1964.* e. A reinforced bushing or a thrust absorbing block. *Nichols.*

gudmundite. A silver-white to steel-gray sulfantimonide of iron, FeSbS. Isomorphous with arsenopyrite; elongated crystals; orthorhombic. From Gudmundstrop, Sweden. *English.*

guejarite. Synonym for chalcostibite. *Hey 2d, 1955.*

guerinite. $CA_5H_2(AsO_4)_4.9H_2O$ in spherulites and rosettes on a specimen labeled wapplerite from Daniel mine, Schneeberg, Saxony, and one labeled pharmacolite from Richelsdorf, Hesse, southwestern Germany. *Hey, M.M., 1964; Fleischer.*

guest element. A trace element substituting a common element in a rock mineral. *Schieferdecker.*

gueulette. In glassmaking, the back door of an annealing oven. *Standard, 1964.*

gug. Som. A self-acting inclined plane underground; sometimes called a dip incline. *Fay.*

Guggenheim process. A process for the manufacture of sodium nitrate from the Chilean nitrate ore, caliche, in which heat is efficiently utilized and handling costs are kept to a minimum. *CCD 6d, 1961.* Also called Cappelin Smith process.

gugiaite. A mineral, $Ca_2BeSi_2O_7$, tetragonal, in skarn rocks near Gugia (presumably in China). A member of the melilite family near meliphane but containing little sodium or fluorine; an unnecessary name. Named from the locality. *Hey, M.M., 1964; Fleischer.*

guhr. *See* kieselguhr. *Fay.*

guhr dynamite. An explosive prepared by usually mixing 3 parts nitroglycerin and 1 part kieselguhr. Other proportions may be used. *Fay.*

Guibal fan. A centrifugal fan, introduced about 1860, with 8 or 10 straight blades which are not set radially. An important feature developed by Guibal and since copied by others, is the expanding chimney, which gradually reduces the velocity of the air as it leaves the fan. *Nelson.*

guide. a. *See* guide coupling. *Long.* b. A pulley to lead a driving belt or rope in a new direction or to keep it from leaving its desired direction. *Long.* c. The tracts that support and determine the path of a skip bucket and skip bucket bail. *ASA MH4.1-1958.* d. The tracts that guide the chain or buckets of a bucket elevator. *ASA MH4.1-1958.* e. The runway or members paralleling the path of the conveyor which limits the conveyor or parts of a conveyor to movement in a defined path. *ASA MH4.1-1958.*

guide bracket. A steel or iron bracket fixed to a bunton to secure rigid guides in a shaft. *See also* fixed guides. *Nelson.*

guide core. *See* dummy. *Long.*

guide coupling. A short coupling with a projecting reamer guide or pup to which is attached a reaming bit. A guide coupling serves to couple a reaming bit to a reaming barrel. *Long.*

guided bend test. A test in which the specimen is bent to a definite shape by means of a jig. *ASM Gloss.*

guide fossil. Any type of organic remains that is sufficiently widespread and abundant, in a more or less restricted thickness of beds, to have value as an indicator of geologic horizon and age. Synonym for index fossil. *A.G.I.*

guide frame. A frame designed to be held rigidly in place by roof jacks or timbers, and with provisions for attaching a shaker conveyor panline to the movable portion of the frame, which can be used to prevent jumping or side movement of the panline. *Jones.*

guide idler. An idler roll with its supporting structure so designed that when it is mounted on the conveyor frame it guides the belt in a defined horizontal path usually by contact with the edge of the belt. *NEMA MB1-1956.*

guide mill. A small hand mill with several stands in a train and with guides for the work at the entrance to the rolls. *ASM Gloss.*

guide pile. A heavy square timber driven down vertically to guide steel sheet piling. *Ham.*

guide plate. Scot. A cast-iron plate containing grooves or ridges to guide hutches or cars onto rails. *Fay.*

guide pulley. A loose pulley used to guide a driving belt past an obstruction or to divert its direction. *C.T.D.*

guide ring. A longitudinally grooved annular ring made almost full borehole size, which is fitted to an extension coupling between the core barrel and the first drill rod. Also called ferrule. *Long.*

guide-ring coupling. Synonym for extension coupling. *Long.*

guide rod. A heavy drill rod coupled to and having the same diameter as a core barrel on which it is used. It gives additional rigidity to the core barrel and helps to prevent deflection of the borehole. Also called core-barrel rod; oversize rod. *Compare* drill collar. *Long.*

guide roll. The front or steering wheel of a roller. *Nichols.*

guide rope. A cage guide. *Standard, 1964.*

guide runner. A runner driven ahead of other runners to guide them. *Ham.*

guides. a. Wood, steel, or steel wire rope conductors in a mine shaft to guide the movement of the cages. *See also* cage guides; winding guides. *Nelson.* b. Timber or metal tracks in a hoisting shaft, which are engaged by shoes on the cage or skip so as to steady it in transit. In collieries rope guides are sometimes used. *Pryor, 3.* c. The holes in a crossbeam through which the stems of the stamps in a stamp mill rise and fall. *Fay.* d. Corn. Crossveins in the St. Just district. *Fay.* e. A boring rod having an enlargement or wings fitted to it to suit the size of the borehole for steadying the rods when a considerable depth has been attained. *Fay.* f. In a steam engine, a crosshead guide. *Standard, 1964.* g. A pulley to lead a driving belt or rope in a new direction, or to keep it from leaving its desired direction. *Standard, 1964.* h. A curved plate directing a sheet of water against the buckets of a waterwheel. *Standard, 1964.* i. In a rolling mill, a wedge-shaped piece held in the groove of a roll to prevent the sticking of the bar by peeling it out of the groove. When the guide is held by a hanger or counterweight against the underside of the roll, it is called a hanging guide. *Fay.*

guide tube. a. A tube for grinding a bit or drill. *Standard, 1964.* b. A fire clay tube having a spigot and socket, for use in the trumpet assembly in the bottom pouring of molten steel. *Dodd.*

guiding bed. A thin layer of coal or carbonaceous shale which continues into the barren ground where a fault or nip-out has occurred in a coal seam. The layer may be a guide to the position of the displaced seam. *See also* coal leads. *Nelson.*

guildite. A dark chestnut-brown hydrous sulfate of copper, iron, and aluminum, $3(Cu,Fe)0.2(Fe,Al)_2O_3.7SO_3.17H_2O$. Habit, cubic; monoclinic. From Jerome, Ariz. *English.*

guillies. *Corn.* Worked-out cavities in a mine. *Fay.*

guillotine. A machine for breaking iron with a falling weight. *Fay.*

guincho. Port. A winch or drum. *Fay.*

guinea bed. War. The shelly, conglomeratic basement limestone bed of the Lower Lias. So called because the stones, if dry, ring when struck. *Arkell.*

guinea gold. Twenty-two carat gold, of which guineas were coined. *Standard, 1964.*

gulch. a. A ravine or a small, narrow valley. *Hess.* b. A deep or precipitious cleft in a hillside. *Webster 3d.*

gulch claim. a. One laid upon and along the bed of an unnavigable stream winding through a canyon, with precipitous, nonmineral, and uncultivable banks, wherein have accumulated placer deposits, which are embraced within the location. *Ricketts, pp. 145-146.* b. A location upon surveyed land upon and along the bed of a stream, whose banks are enclosed or surrounded by precipitous cliffs, barren of mineral, the boundaries of the location embracing and following the opposite shores. *Ricketts, pp. 145-146.* c. A location laid upon and along the bed of an old river channel or gravel deposit lying beneath the surface of the earth. As, under the circumstances, a gulch claim cannot practicably be conformed to legal subdivisions, it is sufficient if it conforms as near as is reasonably practicable. *Ricketts, pp. 145-146.*

gulching. a. N. Staff. The moving and cracking noise underground due to the settling of the mine roof. *Fay.* b. The noise which generally precedes a fall or settlement of overlying strata in a coal mine. *C.T.D.*

gulf. a. A large deposit of ore in a lode. *Fay.* b. A profound depth (in river or ocean); the deep. *A.G.I.* c. A relatively large portion of sea, partly enclosed by land. *A.G.I.*

Gulf airborne magnetometer. *See* Gulf-type (Vacquier) magnetometer.

gulfe joints. Eng. Wide vertical fissures, often widening towards the surface, and up to 100 feet wide, encountered in the Oolite quarries in Northamptonshire. Also called gulls; gullies; gutters. *Arkell.*

Gulfian. Upper Cretaceous. *A.G.I. Supp.*

Gulf-type (Hoyt) gravimeter. A meter consisting of a mass suspended at the end of a spring, the latter so designed that its extension will cause the mass to rotate. By this means the linear displacement of the spring is converted into an angular deflection which is more easily measured. The design also minimizes the sensitivity to seismic disturbances and the basic instrument is therefore well suited for underwater observations. *A.G.I.*

Gulf-type (Vacquier) magnetometer. A flux gate or saturable reactor type of recording magnetometer. Used primarily in aircraft and there includes means for keeping the measuring element aligned in the direction of maximum intensity (that is, total field). In this case it records variations in the total field regardless of variations in its direction. Sometimes used in the sense of including the equipment for establishing the position of the aircraft as well as the magnetometer itself. *A.G.I.*

gull. Eng. A large fissure or chasm in strata, especially limestone, generally filled with earth or higher strata. They are called gulls, gullies, or gulfe joints in Northamptonshire and Oxfordshire; gullies in Portland, and gullets in the coal mines of Northumberland. *Compare* guts. *Arkell.*

gullet. a. An opening in the strata. *Fay.* b. A narrow working cutting used for a dirt-car track. *Sstandard, 1964.*

gully. a. A small watercourse with steep sides, usually cut out of clay or earth. *Fay.* b. A small ravine. *A.G.I.* c. A metal tramrail or tram plate. *Fay.*

gully sucker. A tanker lorry equipped with apparatus for sucking silt out of road gullies. *Ham.*

gully trap. The water seal provided in a gully to prevent the escape of foul gases from the drain. *Ham.*

gulph of ore. A large concentration of ore in the lode. A variation of gulf. *Fay.*

gum. a. *See* gummings. *Nelson.* b. Small coal broken out by a coal cutter. Also called gummings. *See also* duff. *Pryor, 3.* c. Small coal, slack, or duff. *C.T.D.* d. Scot. Very small coal, for example, that which will pass through a screen having a mesh of one-fourth inch or less; slack; screenings. *Fay.* e. N. Z. *See* kauri resin. *Fay.* f. A group of substances generally of plant origin which are gelatinous when moist, hardening when dry, and which may or may not be soluble in water. Gums are widely used in the manufacture of varnishes, lacquers, and similar products. *API Glossary.*

gum anime. A recent fossil resin, often containing insects; sometimes mistaken for amber. *Shipley.*

gum arabic; acacia; senegal gum. Yellow or white; powder or lumps; derived from the dried juice exudate of species of acacia; and soluble in water. Used in adhesives, in polishes, and in ceramics. *Bennett 2d, 1962.*

gum asphaltum. A natural brown-black amorphous solid. Used as a general waterproofing agent and in making tanks watertight. *Bennett 2d, 1962.*

gumbed. American name for ozocerite. *Tomkeieff, 1954.*

gumbelite. A variety of hydromuscovite. *Dana 6d, p. 692.*

gumbo. a. A name current in the Western and Southern States for those soils that yield a sticky mud when wet. *Fay.* b. In southwest Missouri, a puttylike clay associated with lead and zinc deposits. *Fay.* c. In Texas, a clay encountered in drilling for oil and sulfur. *Fay.* d. The stratified portion of the lower till of the Mississippi Valley. *Fay.*

gumbo clay. a. Fine-grained clays which are extremely sticky in the plastic state and very tough when partially dry. They show excessive shrinkage when dried or fired and have little ceramic value. Gumbo clays are often colored with carbonaceous material. *Bureau of Mines Staff.* b. A series of fine-grained highly plastic and tough clays which are chiefly used in the manufacture of railroad ballast. They cannot be used for brickmaking due to their high shrinkage on burning. Found in the west-central states of the United States. *CCD 6d, 1961.*

gum boot brigade. Itinerant miners who bartered gum boots for liquor. *Korson.*

gumbotil. Leached deoxidized clay containing siliceous stones; the product of thorough chemical decomposition of clay-rich till. It is gray to dark-colored, thoroughly leached, nonlaminated, deoxidized clay, very sticky and breaking with starchlike fracture when wet, very hard and tenacious when dry, and is chiefly the result of weathering of drift. *A.G.I.*

gumbrine. Same as fuller's earth, and similar to floridine from Gumbri, near Kutais, Georgia, Transcaucasia, U.S.S.R. *Spencer 17, M.M., 1946.*

gumdigger. N.Z. One that digs fossil kauri resin. *Webster 3d.*

gum dynamite. Explosive gelatin. *Standard, 1964.*

gummed-in. *See* stuck. *Long.*

gummer. a. A man who clears the fine coal, gum, or dirt from the undercut made by a coal-cutting machine. *C.T.D.* b. N. of Eng. *See* scuffler. *Trist.*

gummer bar. A T-shaped bar attached to a coal cutter by a bracket in such a way that it is carried along the floor cut a few inches clear of the cutter chain. The bar keeps the gummings in contact with the chain and thus increases the quantity brought out of the cut. *See also* gum stower. *Nelson.*

gummings. a. The small coal or dirt produced by the picks of a coal cutter. Also called gum. *Nelson.* b. N. of Eng. *See* kirvings. *Trist. See also* buggy.

gumming spade. A long-handled shovel used by a gummer. *C.T.D.*

gummite. a. A strongly radioactive mineral, $UO_3.nH_2O$; probably orthorhombic; yellow, orange, reddish-yellow to orange red or hyacinth red, reddish-brown to brownish-black and black; the dark material apparently represents an early stage in the alteration of uraninite. Found in pegmatites and veins, it is an alteration product of uraninite, which is widespread. *Crosby, p. 23.* b. Hydrated oxide of uranium and lead, or thorium, calcium, or two or all of these; other constituents (Fe,Al,Mn,-Cu,P,Si) are probably unessential. The name is to be regarded as an indefinite generic term; much of the material is probably mixtures or amorphous gels, but some contain or consist of curite. *Hey 2d, 1955.* c. Synonym for halloysite. *Hey 2d, 1955.*

gummy. Applicable when rock or formation being drilled produces cuttings and sludge, which tend to fill the waterways of a bit or to adhere massively to the borehole walls or drill-stem equipment. *Compare* sticky. *Long.*

gums. A general term applied to a large group of substances of vegetable origin, usually exuded from trees and bushes; used in oil-well mud flush to reduce loss of fluid. *Nelson.*

gum stower; gum flinger. A device, consisting of rotating paddles, attached to a chain coal cutter to fling or stow the dirt gummings over the conveyor into the waste. The device is often used in thin seams where a floor cut is made and as a result the coal loaded out is much cleaner. *Nelson.*

gum tragacanth. A vegetable gum used in powder form as a binder and suspending agent in brick glazes, etc. Also used for the same purpose in porcelain enamel sign work, etc. *Hansen.*

gun. a. A borehole in which the charge of explosive has been fired with no other effect than to blast off a small amount of material at the mouth of the borehole; also called a bootleg or John 'Odges. *See also* blown-out shot. *Fay.* b. Applied to the explosion of a charge in a borehole, which simply enlarges the hole without rending or splitting the rock. *Stauffer.* c. A bent bar of iron for connecting a horse's shaft to a tub or train. *C.T.D.*

gunboat. A self-dumping box on wheels, used for raising (or lowering) coal in slopes; a moniter, a skip. *Fay.*

guncotton. A nitrocotton of the highest nitration or containing the greatest possible percentage of nitrogen. Sometimes called insoluble cotton. It is used as a bursting charge for submarine mines and for demolishing bridges and other structures in warfare. *Fay.*

gun drill. A drill, usually with one or more flutes and with coolant passages through the drill body, used for deep-hole drilling. *ASM Gloss.*

gunis. *See* guag. *C.T.D.*

gunite. a. Cement sprayed onto mine timbers to make them fire-resisting. *von Bernewitz.* b. A mixture of sand and cement, sprayed with a pressure gun onto roofs and ribs to act as a sealing agent to prevent erosion by air and moisture. *B.C.I.* c. To cement with a cement gun. *Fay.*

gunite gun. *See* cement gun, c. *Long.*

guniting. a. Pneumatically applied portland cement mortar, or gunite. The spraying of mine roadways with concrete to give a measure of support, present a smooth surface to the air current, and prevent weathering. The loose material is first removed and the fresh surface then sprayed by means of a cement gun. A wire netting reinforcement is sometimes placed against the ground which becomes embedded in the concrete. *See also* Aliva concrete sprayer. *Nelson.* b. The treatment of timber with portland cement and sand sprayed from a cement gun. Expanded metal lath or chicken wire is first nailed to the timber before the coating of cement is applied. As a protection against decay, guniting is effective only as long as the coating of cement remains unbroken and covers the entire surface of the timber. *Lewis, p. 71.*

gunk. a. Used by some drillers as a synonym for rod dope; rod grease. *Long.* b. Any gummy substance that collects inside the working parts and hinders the operation of a machine or other mechanical apparatus. *Long.* c. A slang term denoting an undesirable nondescript material usually semisolid. *NRC-ASA N1.1-1957.*

gunmetal. A copper-tin alloy (that is, bronze) containing 88 percent copper, 10 percent tin, and 2 percent zinc (admiralty gunmetal); or 88 percent copper, 8 percent tin, and 4 percent zinc. Lead and nickel are frequently added, and the alloys are used as cast where resistance to corrosion or wear is required; for example, in bearings, steampipe fittings, etc. *C.T.D.*

gunmetal pearl. a. The variety of so-called black pearl; the color and luster of which resembles polished gunmetal. *Shipley.* b. A gunmetal imitation of such a pearl. A misnomer. *Shipley.*

gunnbjarnite. a. A mineral, $(Fe^{\prime\prime\prime},Al)_2O_3.3(Mg,Ca,Fe^{\prime\prime})0.6SiO_2 3H_2O$, orthorhombic, as black micaceous plates in basalt; from east Greenland. *Spencer 19, M.M., 1952.* b. A ferrian variety of meerschaum. *American Mineralogist, v. 42, No. 11-12, November-December 1957, p. 920.*

gunned shot. Scot. *See* blown-out shot. *Fay.*

gunner. A Kansas term for a blown-out shot. *Fay.*

gunnice. *See* gunnies, b.

gunnies. a. Corn. In mining, measure of breadth or width, a single gunnie being 3 feet wide. *Standard, 1964.* b. Corn. The vacant space left where the lode has been removed; a crevice. Also spelled gunniss; gunnice. *Fay.*

gunning. The application of monolith-forming refractories by means of air-placement guns. *HW.*

gunningite. The zinc member of the kieserite family $(Zn,Mn)(SO_4).H_2O$, as efflorescences on blende from the Keno Hill and Galena Hill area, Central Yukon, Canada. *Hey, M.M., 1964; Fleischer.*

gunning the pits. Agitation of the drilling fluid in a pit by forcing a portion of the fluid under pressure through a constricted tube or gun, jetting it into the main body of fluid. *Brantly, 1.*

Gunnison granite. A type of granite found at Gunnison, Colo. *Sandstrom.*

gunniss. Corn. *See* gunnies, b. *Fay.*

gun of wood. Derb. A hollow plug. *Fay.*

gun perforator. A device used to perforate casing and cement in a well by shooting steel bullets or shaped charges through them. *Institute of Petroleum, 1961.*

gun-perforator loader. In petroleum production, one who loads explosive powder into gun perforators used in shooting holes through tubings, casings, and earth formations of oil or gas wells to aid in well drilling or producing operations, working either in shop or at well site. Also called loader; perforator loader. *D.O.T.1.*

gunpowder, black; blackpowder. A mixture of potassium nitrate (saltpeter), sulfur, and charcoal in varying proportions. A typical composition: 70 to 75 percent saltpeter, 10 to 14 percent sulfur, and 14 to 16 percent charcoal. It is designated according to grain size: Mealed; superfine grain (FFG); fine grain (FG); large or coarse grain (LG); large grain for rifles (RLG); and mammoth. *CCD 6d, 1961.*

gunpowder paper. Paper spread with an explosive compound. It is rolled up for use in loading. *Standard, 1964.*

gunpowder press. A press for compacting meal powder before granulating into gunpowder. *Standard, 1964.*

gunpowder, white; white powder. A mixture of 2 parts potassium chlorate, 1 part potassium ferrocyanide, and 1 part sugar. *CCD 6d, 1961.*

gun sampling. *See* pipe sampling. *Truscott, p. 149.*

Gunter's chain. A chain that is 66 feet in length and divided into 100 links, each 7.92 inches long. It is built up of 100 lengths of iron or steel wire (Nos. 8-12 standard wire gage), each looped at both ends and joined together by three oval rings. This gives flexibility to the chain. Swivels are introduced at the brass handles and sometimes in the middle to eliminate twisting. The chain is convenient to handle, and its length is a basic unit for the following measurements of length and area: 1 chain equals 22 yards; 10 chains equal 1 furlong; 80 chains equal 1 mile; and 10 square chains equal 1 acre. *Mason, v. 2, p. 712.*

gur. A potable white liquor found in ironstone. *Arkell.*

gur coal. Eng. A name of coal found in Shropshire. *Tomkeieff, 1954.*

gurdy. Scot. An arrangement of three pulleys with brake for self-acting inclines. *Fay.*

gurhofite. A snow-white variety of dolomite, containing a large proportion of calcium. *Standard, 1964.*

gurlet. a. A mason's pickax having one cutting edge and a point. *Standard, 1964.* b. A pickax having a sharply pointed peen and a bladed peen for cutting. *C.T.D.*

gurmy. A mine level; working. *Standard, 1964.*

gusher. Oil well with a strong natural outflow; a geyser. *Pryor, 3.*

guss. a. A rope used for drawing a basket of coal in a thin seam. *C.T.D.* b. Brist. A short piece of rope by which a boy draws a tram or sled in a mine. *Fay.*

gusset. A V-shaped cut in the face of a heading. *Stauffer.*

Gusto multiplough. A number of small ploughs attached to a rope or chain which cut backward and forward on the face. They operate in conjunction with an armored conveyor. *See also* multiplough. *Nelson.*

Gusto scraper box. An arrangement of scraper boxes with cutting knives attached to the face side. *See also* scraper box plough. *Nelson.*

gut. To rob, or extract, only the rich ore of a mine. *Weed, 1922.*

Guthrie kiln. A variant of the Belgian kiln, a trough replacing the transverse grate; the design was patented by H. Guthrie in 1877. *See also* Belgian kiln. *Dodd.*

guts. Cumb. Narrow to broad more or less upright bands of iron ore of fairly regular shape and often in parallel series, following the major joints of the country rock. *Compare* gull. *Arkell.*

gutta-percha clay. A very sticky, fine-grained clay. *A.G.I. Supp.*

gutter. a. A gob heading. *Nelson.* b. A drainage trench. *Nelson.* c. A small airway made through a goaf or gob. *C.T.D.* d. Candles or dips, when subjected to the warm air of a mine, waste away very rapidly, and are said to gutter. *Fay.* e. In deep lead mining, the lowest portion of a deep lead filled with auriferous wash dirt. *Engineering and Mining Journal, v. 139, No. 4, April 1938, p. 55.* f. Lowest and usually the richest portion of an alluvial deposit. *Statistical Research Bureau.* g. Aust. The dry bed of a river of Tertiary age containing alluvial gold; also called bottom. *Webster 3d.* h. A channel or gully worn by running water. *Webster 3d.*

gutter coal. Eng. Miner's term in North Staffordshire for a soft variety of coal which can be cut with a sough or gutter. *Tomkeieff, 1954.*

guttering. a. The formation of more or less vertical breaks at or toward the centerline of a roadway, as a consequence of which falls occur along the groove or gutter. *TIME.* b. A channel cut along the side of a mine shaft to conduct the water back into a lodge or sump. *Fay.* c. A process of quarrying stone in which channels, several inches wide, are cut by hand tools, and the stone block detached from the bed by pinch bars. *Fay.*

gutters. Eng. Wide vertical fissures in the Oolite quarries, Northamptonshire; also called gulls; gullies; gulfe joints. *Arkell.*

gutter stone. Stone for gutters. *Arkell.*

gutter-up. Mid. A roof fall which extends to an excessive height. *See also* cut-up. *Fay.*

gutty flat. Eng. A sheetlike ore body, Cumberland ironstone field. *Arkell.*

Gutzkow's process. A modification of the sulfuric-acid parting process for bullion containing large amounts of copper. A large excess of acid is used; the silver sulfate is then reduced with charcoal, or, in the original process, ferrous sulfate. *Liddell 2d, p. 493.*

guy. A wire line or rope attached to the top of a drill derrick or pole and extending obliquely to the ground, where it is fastened to a deadman or guy anchor. *Long.* b. A rope that holds the end of a boom or spar in place. *Long.*

guy anchor. The object to which the lower end of a guy is attached. Also called deadman. *Long.*

guyaquillite. A soft pale yellow bituminous substance soluble in alcohol and alkalis. *Tomkeieff, 1954.*

guyed. Held upright and steadied by one or more guys. *Long.*

guy line; guy lines. A guy or several guys. *See also* guy. *Long.*

guyot. A flat-topped submarine mountain rising from the floor of the ocean like a volcano but planed off on top and covered by an appreciable depth of water. *Leet.*

guy ring. A ring on the head block or top of a drill pole, derrick, or tripod to which guys are attached. *Long.*

guy rope. a. Galvanized rope consisting of 6 strands, 7 wires each, and a hemp core. *H&G, p. 130.* b. A rope holding a structure in a desired position. *C.T.D.* c. *See* guy. *Long.*

guy strand rope. Galvanized 7-wire strand. *H&G, p. 130.*

guy wire. *See* guy. *Long.*

guy-wire slide. A mechanism attached to a guy that a drillman, tripodman, or derrickman can grasp and slide to safety in an emergency. *Long.*

G-value. The basis of a method of calculation for compounding slips and glazes, the V-value being the grams of suspended solids per cubic meter of suspension. G = SP/100, where S is the specific gravity, of the suspension, and P is the percentage of solids in the suspension. *Dodd.*

GVC Abbreviation for glazed vitrified clay; term applied to glazed clay pipes. *Dodd.*

gwag. a. Corn. Rubbish. *Webster 2d.* b. An old mine working. *Webster 2d.*

gweeon. Aust. Aboriginal stone hatchet. *Webster 2d.*

gwythyen. S. Wales. A mineral vein or seam. *Fay.*

gymnite. Synonym for deweylite. *Fay.*

gympie. *See* single-jack. *Hess.*

gyprock. a. A driller's term for a rock of any kind in which he has trouble in making a hole. *A.G.I.* b. A rock composed chiefly of gypsum. *A.G.I.*

gypseous; gypsiferous. Resembling, containing, or consisting of gypsum. *Webster 3d.*

gypsification. Alteration of anhydrite to gypsum. *A.G.I. Supp.*

gypsite. *See* gypsum.

Gypsophila patrini. A copper flower or copper indicator plant associated with copper in the Rudny Altay deposits of central Asia. Gypsophila patrini, or kachim, grows so selectively on copper-bearing rocks that even small copper bearing dikes may be marked by a strong growth of this copper indicator. *Hawkes, 2, p. 312.*

gypsum. A natural hydrated calcium sulfate, $CaSO_4.2H_2O$; white or colorless, sometimes tinted grayish, reddish, yellowish, bluish, or brownish. White streak; pearly, silky, or vitreous luster; specific gravity, 2.31 to 2.33; Mohs' hardness, 1.5 to 2; loses 1½ H_2O at 128° C; and $2H_2O$ at 163° C. Insoluble in water; soluble in ammonium salts, acids, and sodium chloride. About one-fourth of the total is sold uncalcined, chiefly for portland cement retarder and agricultural use. Calcined material is used on a large scale for tile and plasters, including special plasters, such as plate glass and pottery. Also used in metallurgy and paints. *See also* gypsum cements. *CCD 6d, 1961.*

gypsum backing board. A sheet or slab having an incombustible core, essentially gypsum, surfaced with paper on both sides and designed to be used as a base layer, or a backing material, in multilayer construction. *ASTM C11-60.*

gypsum cave. A cave formed by the solution of gypsum or containing incrustation of gypsum. *A.G.I.*

gypsum cements; plaster of Paris; Keene's cement; Parian cement; Martin's cement; Mack's cement. A group of cements which consist essentially of calcium sulfate and are produced by the complete or partial dehydraion of gypsum. $CaSO_4.2H_2O$. They usually contain additions of various sorts, these additions causing the differentiation by special names. For example, Keene's cement contains alum or aluminum sulfate. Mack's cement contains sodium or potassium sulfate. Martin's cement contains borax. *CCD 6d, 1961.*

gypsum concrete. A combination of aggregate or aggregates with calcined gypsum as a binding medium, which after mixing with water sets into a conglomerate mass. *ATSM C11-60.*

gypsum fiber concrete. Gypsum concrete in which the aggregate consist of shavings, fiber, or chips of wood. *ASTM C11-60.*

gypsum flower. Curved; twisted crystal growths of gypsum resembling flowers. *A.G.I.*

gypsum formboard. A sheet or slab having an incombustible core, essentially gypsum, surfaced on the exposed side with a fungus-resistant paper and on the reverse side with paper suitable to receive poured-in-place gypsum concrete. *ASTM C11-60. See also* gypsum wallboard.

gypsum lath. A sheet or slab having an incombustible core, essentially gypsum, surfaced with paper suitable to receive gypsum plaster. *ASTM C11-60.*

gypsum molding plaster. A material consisting essentially of calcined gypsum for use in making interior embellishments, cornices, as gauging plaster, etc. *ASTM C11-60.*

gypsum partition tile or block. A gypsum building unit in form of tile or block for use in nonbearing construction in the interior of buildings and for the protection of columns, elevator shafts, etc., against fire. *ASTM C11-60.*

gypsum plaster. *See* gypsum cements. *CCD 6d, 1961*

gypsum plate. In microscopic examination with polarized light, a transparent plate used to produce a purple interference effect. *Pryor, 3.*

gypsum sheathing board. A sheet or slab having an incombustible core, essentially gypsum, surfaced with water-repellent paper. *ASTM C11-60.*

gypsum wallboard. A sheet or slab having an incombustible core, essentially gypsum, surfaced with paper suitable to receive decoration. *ASTM C11-60. See also* gypsum formboard.

gypsum wedge. A thin, wedge-shaped piece of selenite. *Fay.*

gypsy spool; cathead. A capstan winch. *Nichols.*

gyrasphere crusher. Heavy-duty fixed path cone crusher; a variant from the standard cone crusher. *See also* Symons crusher. *Pryor, 3.*

gyratory. a. More or less eccentric, as in certain rock crushers. *von Bernewitz.* b. A widely used form of rock breaker in which an inner cone gyrates in a larger outer hollow cone. *C.T.D.*

gyratory breaker; gyratory crusher. A primary crusher built on the principle of the old-fashioned coffee mill. It consists of a vertical spindle, the foot of which is mounted in an eccentric bearing within a conical shell. The top carries a conical crushing head revolving eccentrically in a conical maw. There are three types of gyratories —those which have the greatest movement on the smallest lump, those that have equal movement for all lumps, and those that have greatest movement on the largest lump. *Liddell 2d, p. 356.*

gyratory crusher. *See* gyratory breaker.

gyrocompass. a. A compass that is actuated by a rapidly spinning rotor which tends to place its axis of rotation parallel to the earth's axis of rotation. It indicates direction relative to the true north. *H&G.* b. In underground surveying a specialized form of this compass is used to transfer an azimuth bearing from the surface to the underground workings and survey lines; also, for a survey or for boreholes larger in diameter than 6 inches. *Pryor, 3.* Also called meridian indicator.

gyrolite. A white, usually fibrous member of the zeolite group of minerals, with a micaceous cleavage, $4CaO.6SiO_2.5(H,Na,K)_2O$. *Larsen, p. 80.*

gyroscopic-clinograph method. A method for measuring borehole deviation which photographs time, temperature and inclination from the vertical on 16 millimeter film and can take one thousand readings descending then ascending the hole as a check. The gyroscope maintains the casing on a fixed bearing. *Sinclair, II, p. 243.*

gyroscopic compass; meridian indicator. An instrument which indicates the direction of geographic (or true) north, using the properties of a rapidly rotating mass, one of whose axes is constrained by the earth's gravitational field. This instrument has been developed in its most precise form for application to mine orientation and borehole surveying. *B.S. 3618, 1953, sec. 1.*

gyttja. a. A Swedish name for black or brown sapropel (organic ooze). *Tomkeieff, 1954.* b. A sapropelic black mud in which the organic matter is more or less determinable, characteristic of eutrophic and oligotrophic lakes. *A.G.I.* c. A natural solid hydrocarbon, tasmanite. *A.G.I. Supp.*

H

h a. Abbreviation for hot; heat. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-97.* b. Symbol for enthalpy (heat content) per unit weight; heat content for unit weight; total heat. *Zimmerman, pp. 42, 53.* c. Symbol for coefficient of heat transfer for an individual surface; individual coefficient of heat transfer; surface coefficient of heat transfer. *Zimmerman, pp. 26, 53, 57, 104, 111.* d. Abbreviation for henry. *BuMin Style Guide, p. 59.* e. Abbreviation for height; high. *Webster 3d; Zimmerman, p. 53.* f. Symbol for depth. *Zimmerman, p. 34.* g. Abbreviation for hundred. *Zimmerman, p. 55.* h. Abbreviation for the prefixes hect- and hecto-, which multiply the basic unit by 100 or by 10^2. *Zimmerman, pp. 53, 127.* i. Symbol for one of the Miller indexes (h, k, l). *Zimmerman, p. 151.* j. With the subscripts 1, 2, and 3, the symbols for the Bragg reflection indexes (h_1, h_2, h_3), which expressed in terms of the Miller indexes (h, k, l) are $h_1 = nh$, $h_2 = nk$,. and $h_3 = nl$. *Zimmerman, p. 151.* k. Symbol for Planck's constant. *Zimmerman, p. 82.* l. Abbreviation for head; with subscripts, the symbol for head in hydraulics. *Zimmerman, p. 52.* m. Abbreviation for hour. *Zimmerman, p. 130.* n. Abbreviation for half, horizon. *Webster 3d.* o. Abbreviation for hail. *Zimmerman, p. 52.* p. Abbreviation for harbor. *Zimmerman, p. 52.*

h a. Symbol for heat content; total heat. *Zimmerman, p. 173.* b. Symbol for enthalpy (heat content); specific enthalpy; enthalpy per atom; enthalpy per molecule; enthalpy per unit mass; enthalpy per unit weight. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99; Zimmerman, pp. 145, 155, 173, 368.* c. Symbol for individual coefficient of heat transfer; surface coefficient of heat transfer; heat-flow rate per unit area, per degree, across a boundary surface. *Zimmerman, pp. 147, 173, 366.* d. As a subscript, the symbol for heater. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99.* e. Symbol for altitude. *Zimmerman, pp. 150, 365.* f. Symbol for height. *Zimmerman, pp. 157, 183.* g. Symbol for depth. *Zimmerman, p. 183.* h. Symbol for thickness. *Zimmerman, p. 184.* i. Symbol for one of the Miller indexes (h, k, l). *Zimmerman, p. 158.* j. With subscripts 1, 2, and 3, the symbols for the Bragg reflection indexes (h_1, h_2, h_3), which expressed in terms of the the Miller indexes, (h, k, l) are $h_1=nh$, $h_2=nk$, and $h_3=nl$. *Zimmerman, p. 158.* k. Symbol for Planck's constant. *Zimmerman, p. 161.* l. Symbol for the degree of hydrolysis of a solution. *Zimmerman, pp. 153, 158.* m. Symbol for head in hydrodynamics; with various subscripts, the symbol for various kinds of head in hydraulics. *Zimmerman, p. 157.*

H a. Chemical symbol for hydrogen; symbol for the atomic mass of hydrogen. The symbols for hydrogen 2 (deuterium) are H^2 and ^2H, and for hydrogen 3 (tritium) are H^3 and ^3H. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-95; Webster 3d; Zimmerman, pp. 55, 144.* b. Symbol for magnetic force; magnetizing force; magnetic intensity; magnetic field intensity; magnetic field strength. *Zimmerman, pp. 65, 66, 156, 159, 259.* c. Symbol for enthalpy. *Zimmerman, p. 41.* d. Abbreviation for heat content for any weight; total heat. *Zimmerman, p. 53.* e. Abbreviation for hard; hardness. *Webster 3d; Zimmerman, p. 52.* f. Abbreviation for henry; symbol for Henry's law constant (the ratio of specific heat to pressure, c/p). *Zimmerman, p. 54.* g. Abbreviation for humidity. *Zimmerman, p. 55.* h. Symbol for weight of water vapor per unit weight of dry air and with subscript S as H_s, the symbol for the saturation weight of water vapor per unit weight of dry air. *Zimmerman, pp. 94, 118.* i. Abbreviation for head; symbol for total head in hydraulics. *Zimmerman, pp. 52, 53.* j. Abbreviation for heavy. *Zimmerman, p. 214.* k. Abbreviation for horizontal. Also abbreviated h. *Webster 3d; Zimmerman, p. 470.* l. Symbol for irradiancy. *Zimmerman, p. 59.* m. Abbreviation for haze. *Zimmerman, p. 52.* n. Abbreviation for Hawaiian standard time. *Zimmerman, p. 387.*

H a. Symbol for magnetic force; magnetizing force; magnetic intensity; magnetic field strength. *Zimmerman, pp. 171, 254.* b. Symbol for enthalpy (heat content); enthalpy per mole; total heat; total enthalpy; total value of enthalpy. Also with subscript *M*, as H_M, the symbol for enthalpy per mole. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99; Zimmerman, pp. 145, 155, 173, 366. c.* With subscript*o*, as H_o, the symbol for the solvent present in crystallization. *Zimmerman, p. 148.* d. Symbol for angular momentum. *Zimmerman, pp. 365, 367.* e. Symbol for Henry's law constant (the ratio of specific heat to pressure, *c/p. Zimmerman, p. 147.* f. Symbol for humidity and with the subscript *R*, as H_R, the symbol for relative humidity. *Zimmerman, p. 147.* g. Symbol for total head in hydraulics. *Zimmerman, p. 185.* h. Symbol for irradiance; irradiancy; radiant flux density. *Zimmerman, pp. 158, 190.*

ha Abbreviation for hectare (100 ares). *Zimmerman, p. 53.*

HA Abbreviation for high-angle; hot air; hour angle. *Webster 3d.*

Haanel depth rule. A rule of thumb for estimating the depth of a magnetic body, valid if the body may be regarded as magnetically equivalent to a single pole. The depth of such a pole is equal to the horizontal distance from the point of maximum vertical magnetic intensity to the points where the intensity is one-third of the maximum value. *A.G.I.*

Haarmann plough. *See* scraper box plough. *Nelson.*

Haase system. A system of shaft sinking through loose ground or quicksand by piles in the form of iron tubes connected together by webs. Their downward movement is facilitated by water under pressure which is forced down the tubes to wash away the loose material from underneath their points. *Nelson.*

Haase furnace. A muffle furnace of the McDougall type, the hearths being separated by suitable flues through which the products of combustion from the fireplace are made to pass. *Fay.*

Haas tester. An instrument for obtaining the flashing point of petroleum. *Fay.*

Haber process. Production of ammonia by direct combination of nitrogen and hydrogen at 600° C and under 200 to 300 atmospheres pressure in the presence of catalysts. *Bennett 2d, 1962.*

habit. a. In crystallography, the characteristic form, as determined by the faces developed and their shapes and relative proportions, of the crystals of a given mineral from the same general region of geologic association. *Fay.* b. In the crystals of a given species there is constancy of angle between like faces, but the forms of the crystals may be many. As the relative size of a crystal changes, the habit may vary indefiintely. *See also* form. *Fay.* c. In petrology, a term connoting the sum of the external characteristics or a mineral or rock. In its application to rocks, the terms implies more than structure or texture, including also, other features which control the outward appearance, such as luster, degree of alteration, and fracture. Habit may be described broadly by general terms, such as cenotypal and paleotypal; or particularly by terms referring to the appearance of well-known types, for example, tinguaitic habit, aplitic habit, permatoid habit, etc. *Holmes, 1928.*

habit plane. The plane or system of planes of a crystalline phase along which some phenomenon, such as twinning or transformation, occurs. *A.S.M. Gloss.*

Habla kiln. A zigzag kiln (designed by A. Habla, a Czechoslovakian) that may be archless or with a permanent flat roof; top fired with fine slack; output 25,000 to 50,000 bricks per week. *Dodd.*

hachure. A shading made of short lines used in map making to indicate hills or changes in elevation. *Hess.*

hachure map. One that represents the relief by means of hachures or small straight lines which run directly down the slopes and, therefore, transverse to the direction of the contour lines. The use of hachures alone does not permit portraying the relief as accurately as does the use of contours, but hachures perhaps convey to the average person a little better idea of what the country looks like. *Stokes and Varnes, 1955.*

hack. a. N. of Eng. A pick or tool with which colliers cut or mine the coal. *Fay.* b. A set of bars in a tailrace. *Standard, 1964.* c. To pile up edgewise for the purpose of drying, as green molded bricks. *Standard, 1964.* d. A place where bricks are set to dry; also, a pile of green bricks. *Standard, 1964.* e. A sharp blade on a long handle used for cutting billets in two. *Fay.*

hackbarrow. A barrow for taking bricks from the molders to the hacks. *Webster 3d.*

hacker. *See* hacker. *D.O.T. 1.*

hack hammer. A hammer resembling an adz, used in dressing stone. *Webster 3d.*

hacking. a. The operation of picking a grindstone or an abrading wheel to remove the glaze. *Standard, 1964.* b. The use of two thin masonry courses instead of one as thick as both of them. *Standard, 1964.* c. In gem cutting, a series of cuts in a metal lap to serve as receptacles for the abrasive powder. *Standard, 1964.* d. The procedure of stacking brick in a kiln or on a kiln car. *ACSG, 1963.* e. Laying brick with the bottom edge set-in from the plane surface of the wall. *ACSG, 1963.*

hacking board. A board on which to pile unburned dried bricks. *Standard, 1959.*

hackiron. A miner's pickax or hack. A chisel or similar tool for cutting metal, as wire, into nails. *Fay.*

hackle marks. Fine ridges on the fracture surface of glass, parallel to the direction of propagation of the fracture. *ASTM C162-66.*

hackly. Applied to metals, rocks, or minerals that fracture with sharp, jagged points. *Stokes and Varnes, 1955.*

hackly fracture. A mineral's habit of breaking along jagged, irregular surfaces with sharp edges. *Leet.*

hacksaw. A hand- or power-driven, fine-tooth saw with blade under tension in a bow-shaped frame for cutting metal or other hard materials. *Webster 3d.*

hacksaw structure. Irregular, saw-shaped terminations of crystals or grains due to intrastratal solution. *A.G.I.*

hade. a. The angle of inclination of a vein measured from the vertical; dip is measured from the horizontal. *Fay.* b. To deviate from the vertical (as of a vein, fault, or lode). *Webster 3d. See also* fault hade.

Hadfield's manganese steel. See managanese steel. *C.T.D.*

hading. The direction of a slip or fault. *Arkell.*

hading side. Derb. The wall under a vein; opposite of hanging side. *Arkell.*

Hadsel mill. Early form of autogenous grinding mill, in which comminution resulted from the fall of ore on ore during the rotation of a large-diameter horizontal cylinder. *Pryor, 3.*

haematite. *See* hematite.

haematoconite. A marble stained red by hematite, rosso antico. *Hess.*

Haenisch and Schroeder process. A method for the recovery of sulfur as liquid sulfuraous anhydride from furnace gases. *Fay.*

hafnium. Element of atomic number 72 in group IVb of the periodic table; a silvery metal resembling zirconium; symbol, Hf; valence, 4; hexagonal; atomic weight, 178.49; specific gravity, 13.31 (at 20° C); melting point, 2,150° C; boiling point, 5,400° C; insoluble in water; and soluble in hydrofluoric acid. Found in most zirconium ores. It differs from zirconium in that it has a high thermal neutron cross section (115 barns). Used in the manufacture of tungsen filaments, and primarily as a control element in nuclear reactors. *CCD 6d, 1961; Handbook of Chemistry* *and Physics, 45th ed., 1964, pp. B-113, B-178.*

hafnium carbide. HfC; isometric; specific gravity, 12.20; and insoluble in water. Has a high thermal neutron absorption cross section and a very high melting point, 3,890° C. It is the most refractory binary composition known. Used for nuclear-reactor control rods. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-178.*

hafnium nitride. Yellow to brown; isometric; HfN; molecular weight, 192.50; and melting point, 3,305° C. It is the most refractory of all known metal nitrides. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-113, B-178.*

hafnium oxide; hafnium dioxide; hafnia. White; isometric; HfO_2; molecular weight, 210.49; specific gravity, 9.68 (at 20° C); melting point, 2,812° C; boiling point, about 5,400° C?; and insoluble in water. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-178.* In commercial ZrO_2 refractories, a small quantity of hafnium oxide is beneficial because of its lower thermal expansion, its higher inversion temperature, and its smaller volume change during inversion. *Lee.*

hafnium silicate. A compound analogous to zircon, therefore, the suggested name hafnon. It can be synthesized from the oxides at 1,550° C. Thermal expansion (150° to 1,300° C), 3.6×10^{-6}. *Dodd.*

hafnium titanate. Special refractory compositions have been made by sintering mixtures of HfO_2 and TiO_2 in various proportions. The melting point of these sintered bodies was approximately 2,200° C; there appeared to be a phase change at about 1,850° C. Some of the compositions had negative thermal expansions. *Dodd.*

hafnon. *See* hafnium silicate. *Dodd.*

hag. a. Scot. A cut; a notch. *Fay.* b. To cut as with an ax; to cut down the coal with the pick. *Fay.* c. N. of Eng. A quagmire or pit in mossy ground; any broken ground in a bog. *Fay.*

hagendorfite. A mineral, $(Na,Ca)(Fe,Mn)_2(PO_4)_2$; triclinic (?); greenish-black. Close to varulite and huhnerkobelite, with iron greater than manganese or sodium greater than calcium. From Hagendorf, Bavaria, Germany. Named from locality. *Spencer 20, M.M., 1955.*

hagger. *See* hewer. *C.T.D.*

häggite. Vanadium hydroxide, $V_2O_3.V_2O_4.3H_2O = V_2O_2(OH)_3$, as black monoclinic crystals in sandstone from Wyoming. *Spencer 21, M.M., 1958.*

hag principle. The system under which the skilled miner employs an unskilled helper. Hagging implies sweating. *C.T.D.*

Hahner furnace. A continuously working shaft furnace for roasting quicksilver ores. The fuel is charcoal, charged in alternate layers with the ore. The Vall' Alta furnace is a modification, having the iron tubes of the Alberti. *Fay.*

haiarn. In Wales, a term for iron. *Fay.*

haidingerite. A colorless mineral forming crusts with 1 highly perfect cleavage, $2CaO.As_2O_5.3H_2O$; Mohs' hardness, 1.5 to 2.5; specific gravity, 2.85; from Joachimstal and Wittichen. *Larsen, p. 110.*

Haigh kiln. A type of chamber kiln designed by H. Haigh; it is U-shaped with an open space between the two lines of chambers, permitting the chambers to be fired from both sides. In one such kiln, as used at a brickworks, the chambers are 12 to 15 feet wide, 16 feet long, and 10 feet high; this particular kiln is gas-fired at 1,150° C. *Dodd.*

hail imprints. Larger but otherwise similar to raindrop impressions. Also called hailstone imprints; hail pits. *Pettijohn.*

hailstone bort. Variety of bort built of concentric shells of clouded diamond and cementlike material. *Tomkeieff, 1954. See also* bort, c. *Hess.*

Haimanta. One of a series of beds of great thickness and varying lithological character, overlying the crystalline schists, and underlying the Lower Silurian, in the Himalayan Mountains. *Fay.*

hair amethyst. Sagenitic amethyst. *Shipley.*

hair copper. *See* chalcotrichite.

hair crystal. Same as hairstone. *Shipley.*

hairline. a. Fine cord on the surface of glassware. *See also* air line. *Dodd.* b. A fault sometimes seen in vitreous enamelware. The hairlines are a series of fine cracks that have healed in the later firings (therefore differing from crazing). The cause is excessive stress in the enamel. *Dodd.* c. A line of separation sometimes found near the center of thick ceramic ware that has been shaped by solid casting. *Dodd.*

hairline cracks. Minute, irregular cracks that are barely noticeable until mica is split into films, resulting in production of torn films. *Skow.*

hair mica. The accumulation of slivers of mica formed by ruling into very narrow ribbons. *Skow.*

hairpin furnace. U-type furnace. The work enters, makes a 180° turn and leaves the furnace in a position parallel to the entrance. *Enam. Dict.*

hair plate. *See* bloomery. *Fay.*

hair pyrites. Same as millerite. *Standard, 1964.*

hair salt. a. Epsomite when in silky fibers. *Webster 3d.* b. Synonym for alunogen. *Webster 3d.*

hairstone. Quartz thickly penetrated with hairlike crystals of rutile, actinolite, or some other mineral. *Webster 3d.*

hair zeolite. Synonym for fibrous zeolite, which may be natrolite, scolecite, or mesolite. *Fay.*

haiweeite. A mineral, probably monoclinic, pale yellow. Appears to be identical with gastunite. From above the Haiwee reservoir, Coso Mountains, Calif. Named from locality. *See also* gastunite. *Hey, M.M., 1961.*

hake. A hack built to dry tiles in the course of their manufacture. *C.T.D.*

halbfusit. The German term for semifusain or vitrifusain. *Tomkeieff, 1954.*

halbopal. Common or nonprecious opal. *Hess.*

half-and-half. Solder made of equal parts of lead and tin. *Webster 3d.*

half-and-half plane; half-end half-plane. Scot. In a direction midway between plane course and end course. *See also* half-course. *Fay.*

half balk. Eng. A mine prop cut into halves longitudinally. *See also* balk, b. *Fay.*

half-bat. A building brick of half the normal length; also called a snap-header. *Dodd.*

half bearings. Bearings such as are used on railway cars where the load is constantly in one direction and sufficiently heavy to hold the journal against the bearing. *Crispin.*

half blinded. Scot. Two ends driven off a plane, one on each side and not opposite each other by half their width. *Fay.*

half-bloom. A round mass of puddled iron before squeezing; a half-made bloom. *Standard, 1964.*

half bound Co_2. Carbon dioxide contained in bicarbonate ions in solution. *A.G.I. Supp.*

half-briliant. Shaped like a single-cut briliant. *Standard, 1964.*

half carnelian. Yellow carnelian. *Shipley.*

half-cell. An electrode immersed in a suitable electrolyte, designed for measurements of electrode potential. *ASM Gloss.*

half-course. A drift or opening driven at an angle of about 45° to the strike and in the plane of the seam. *Fay.*

half-edge seams. Scot. Highly inclined seams; seams lying at the inclination of 1 in 1. *Fay.*

half end. York. *See* horn coal, a. *Fay.*

half facets. Same as break facets; cross facets. *See also* girdle facets. *Shipley.*

half-finish. The first cover coat of enamel in a two cover coat system. *Bryant.*

half headers. Term applied to material that amounts to a large cap piece. They are used by sawing a header in two and placing one or more timbers under the half header on the same side of the track. Two timbers are generally placed under the half header and the end allowed to extend out over the haulage. The term half header should not be applied to regular cap pieces. *Kentucky, p. 140.*

half-lattice girder. *See* Warren girder. *Ham.*

half-life; radioactive half-life. a. The time in which one-half of the atoms in a radioactive substance disintegrate. Half-lives range from millionths of a second to billions of years. *L&L.* b. The time in which the quantity of a particular radioactive isotope is reduced to one-half of its initial value. *NRC-ASA N1.1-1957.*

half-life, biological. The time required for a biological system, such as a man or an animal, to eliminate by natural processes one-half the quantity of a substance which has entered it. *L&L.*

half-marrow. Newc. Young boys, of whom two do the work of one loader. *Fay.*

half mask. The part of a mine rescue, or oxygen-breathing apparatus which covers the nose and mouth only, and through which the wearer breathes the oxygen furnished by the apparatus. *Fay.*

half moon. Eng. A scaffold filled up nearly one-half the sectional area of a shaft. *Fay.*

half-period. *See* half-life. *Pryor, 3.*

half-pillar wall. Eng. *See* split wall. *SMRB, Paper No. 61.*

half-pitch. Dipping or rising 18 inches to the yard. *Fay.*

half-round nose. *See* medium-round nose. *Long.*

half set. In mine timbering one leg piece and a collar. *Fay.*

half-socket pipe. A subsoil drain of which only the lower half is socketed. *Ham.*

half-thickness; half-value thickness. The thickness of a specified substance which, when introduced into the path of a given beam of radiation, reduces the observed effect to one half. *NCB.*

half-tide cofferdam. A cofferdam in the sea or in a tidal estuary which must be dewatered after every full tide. *Ham.*

half tide level; mean tide level. A plane midway between mean high-water level and mean low-water level. *Schieferdecker.*

halftrack. A heavy truck with high speed crawler track drive in the rear and driving wheels in front. *Nichols.*

half-trimmed mica. Rifted mica trimmed on two sides, with at least two-thirds of the pieces trimmed on two adjacent sides, the balance of the pieces trimmed on the two parallel long sides, and no cracks extending into the area by which the piece is graded. The foregoing does not apply to sizes 6 and 5½, on which at least one of any two trimmed sides must be free of cracks and no cracks may extent into the area by which the piece is graded. The mica shall be capable of permitting the cutting of rectangles of accepted size and quality with a weight loss not to exceed 60 percent based on the total inspection sample. *Skow.*

half tube. A trace of a tube remaining in a roof or wall. *A.G.I.*

half-turn socket. A borehole fishing tool having jaws bent in a half circle to engage lost tools that lean to one side in a borehole. *Long.*

half-value distance. The horizontal distance between the points of maximum and half-maximum values in a symmetrical anomaly, usually either gravity or magnetic. It is useful in estimating the depth of the geologic feature which causes the anomaly. *A.G.I.*

half-value layer. In radiation, the thickness of absorber that will reduce the intensity of radiation to one-half; it is useful in estimating radiographic exposure. *ASM Gloss.*

half-wave rectifier. A rectifier which changes single-phase alternating current into pulsating unidirectional current, utilizing only one-half of each cycle. *Coal Age, 1.*

half width. Twice the half-value distance. *See also* half-value distance. *A.G.I.*

half work; half wark. Eng. When the day's work is half over, or when by reason of poor trade conditions, half time is worked. *Fay.*

halides. Fluorides, chlorides, bromides, and iodides. *C.T.D.*

Halifax hard bed. A siliceous fire clay of the lower coal measures extensively worked in Yorkshire, England. It contains (fired) 68 to 74 percent SiO_2, 20 to 25 percent Al_2O_3, 2.5 to 3.0 percent Fe_2O_3, and 1.0 to 1.5 percent alkalies. *Dodd.*

Haliotidae. A family of gastropods, with deep oval shell with a row of perforations and a flat lip; ormers or ear shells. *Shipley.*

Haliotis. A genus typical of Haliotidae; an ear shell. *Shipley.*

halite. Impure common salt, NaCl; cubic crystals; Mohs' hardness, 2 to 2.5; white streak; specific gravity, 2.2. Also called rock salt. *Pryor, 3.* Occurs widely disseminated, or in extensive beds and irregular masses, precipitated from sea water and interstratified with rocks of other types as a true sedimentary rock. *Leet.*

halitic. Composed partly or wholly of halite. *A.G.I. Supp.*

Halkyn jig. Moving-screen jig, first used at Halkyn, in North Wales, to treat galena ore. Similar in principle to Hancock jig. *Pryor, 3.*

hall. A large room or section of a passageway. Synonym for chamber. *A.G.I.*

hälleflinta. Sw. A dense, compact, metamorphic rock consisting of microscopic quartz and feldspar crystals, with occasional phenocrysts and sometimes horneblende, chlorite, magnetite, and hematite. It is associated with gneisses, but is of obscure origin. *Fay.*

hälleflintgneiss. a. An old term for leptite or granulite. *A.G.I.* b. A term formerly used in Sweden for rocks that are now called leptites. *Holmes, 1928.*

hallenflintoid. Of or resembling halleflinta. *Fay.*

Hallett table. A table of the Wilfley type, except that the tops of the riffles are in the same plane as the cleaning planes and the riffles are sloped toward the wash-water side. *Liddell 2d, p. 387.*

Hall furnace. A modification of the Wethey furnace for roasting sulfide ore. *Fay.*

Hallian. Pleistocene. *A.G.I. Supp.*

Halimond tube. Miniature pneumatic flotation cell, operated by hand. Widely used in ore testing, for examination of small samples under closely controllable conditions of flotation. *Pryor, 3.*

Hallinger shield. A tunneling shield of Hungarian design, successfully employed for tunneling at Dortmund and under the Danube. It is valuable for working in very soft ground, it incorporates a mechanical excavator and does not entail the use of timbering to protect the miners. *Ham.*

hallite. A yellow to green variety of mica, $H_{24}Mg_{12}(Al.Fe)_4Si_9O_{48}$, that crystallizes in the monoclinic system. *Standard, 1964.*

halloysite. A claylike aluminum silicate, $Al_4(Si_4O_{10})\ (OH)_8$, resembling kaolinite but amorphous, and containing more water. Mohs' hardness, 1 to 2; specific gravity, 2.0 to 2.2. Used to some extent in whitewares (translucent china) and in refractories. *Dana, 17, p. 602; CCD, 6d, 1961.*

Hall process. Standard method for manufacturing aluminum; the purified oxide is dissolved in fused cryolite and then electrolyzed. *Bennett 2d, 1962.*

Hall-Rowe wedge. A tapered concave metal plug or wedge that can be set in a drill hole at a predetermined depth and bearing to deflect or straighten an off-course borehole. *Long.*

Hall's factors. For calculating the thermal expansion of a glass. *See also* thermal expansion factors for glass. *Dodd.*

halls kiln. An annular kiln designed by G. Zehner of Wiesbaden, Germany, with permanent walls dividing the chambers; there are openings at the ends of these partition walls to give a zigzag fire travel, but there are also large trace holes through these walls. The name derives from the halllike appearance of the long narrow chambers. *Dodd.*

halmrolysis. a. A group name for the processes by which ions are removed from solution in sea water. *A.G.I.* b. The chemical rearrangements and replacements that occur while the sediment is still on the sea floor. *A.G.I.*

halo. In geochemical prospecting, diffiusion into surrounding ground or rocks of a sufficiently high concentration of the sought mineral to aid in its location by chemical methods. *Pryor, 3. See also* pleochroic halo.

halocline. A steep ascendent of salinity. This has an effect on refraction of sound waves, since sound velocity increases with increasing salinity. *Hy.*

halogenation. The process of chemically combining with a halogen (bromine, chlorine, fluorine, and iodine). *API Glossary.*

halogenpyromorphite. A group name for the artificial compounds $Pb_5(XO_4)_3Z$, where Z is a halogen and X is P, As, or V. *Hey, M.M., 1964.*

halogens. a. Members of the family of very active chemical elements consisting of bromine, chlorine, fluorine, and iodine. Chemically, the halogens resemble each other closely, all being monovalent, nonmetallic, and capable of forming negative ions. *API Glossary.* b. Elements that react with metals to form salts. *Hurlbut.*

haloid. a. In chemistry, of, pertaining to, containing, or resembling sea salt (sodium chloride). *Fay.* b. Pertaining to, containing, or derived from one of the halogens. *Fay.* c. A compound of one of the halogens with a metal; in this sense, more properly spelled halide. *Fay.*

haloidite. Wadsworth's name for rock salt. *Fay.*

halophilic bacteria. Solt-tolerant bacteria, invariably present in solar salt, which has not been kiln-dried, and in salt exposed to air or to unsanitary conditions for long periods. *Kaufmann.*

halophyte. A plant which grows in alkali soils or salt marshes. *A.G.I.*

halotrichite. A hydrous sulfate of iron and aluminum, $FeSO_4Al_2(SO_4)_3+24H_2O$, occurring in yellowish, silky fibrous forms. *Fay.* Also called iron alum; butter rock. *C.M.D.*

haloxylin. A mixture of yellow prussiate of potash, niter, and charcoal used as an explosive. *Fay.*

halter. N.Z. A miner working on his own account. *Fay.*

halurgite. A new mineral accompanying strontioborite, without any description. *Hey, M.M., 1961.*

halvanner. Corn. A dresser of impure or inferior ore. *Fay.*

halvan ore; halvans. Corn. Term for ores much mixed with impurities. Upgraded by the halvanner, a man who treats inferior ores. *Pryor, 3.*

halvans. *See* halvan ore. *Pryor, 3.*

ham. A hard mass or knot of quartzitic siltstone ranging in size from 1 foot or less to 10 feet or more occurring in the axis of a tight fold. *A.G.I. Supp.*

hambergite. A grayish-white or colorless mineral, $Be_2(OH)BO_3$; Mohs' hardness, 7.5; specific gravity, 2.35; refractive index, 1.55 to 1.62; birefringence, .072; orthorhombic. The colorless variety is from the Malagasy Republic, and is cut as gems for collectors only. Looks like rock crystal. *Shipley.*

hame. One of the two curved wood or metal pieces which together fit around the padded collar of a draft horse or mule to which the trace or draft chains are attached. *Zern.*

Hamilton group. The highest division of the Middle Devonian rocks of North America, consisting of marine sandy shales and sandstones succeeded by deltaic flagstones (Hudson River bluestone). *C.T.D.*

hamlinite. A vitreous, colorless glucinium-aluminum fluophosphate, crystallizing in the hexagonal system. *Standard, 1964.*

hammada. A desert surface developed on bedrock, or bedrock covered by a thin veneer of pebbles, the sand and dust having been swept away by the wind. *Stokes and Varnes, 1955.*

hammarite. A reddish steel-gray sulfobismuthite of lead and copper, $2PbS.Cu_2S.$-$2Bi_2S_3$ (?). Short needles. Monoclinic (?). From Gladhammar, Sweden. *English.*

hammer. a. Synonym for drive hammer. *Long.* b. To pound or drive with pile-hammerlike blows delivered by a drive hammer. *Long.* c. The sharp, pulsating noises in a pipe caused by fluctuating flows of liquid or gas through the pipe or by the rapid expansion or contraction of the pipe from sudden changes of temperature of the liquid or gas flowing through a pipe system. *Long.*

hammer and plate. A signaling apparatus. A gong. *Fay.*

hammer beam. a. A short beam projecting laterally from the inside of a wall, and serving as a tie beam. *Standard, 1964.* b. A short cantilever beam projecting into a room or hall from the springing level of the roof, strengthened by a curved strut underneath, and carrying a hammer-beam roof. *C.T.D.*

hammer breaker. An impact type of breaker consisting of a number of swinging bars or steel hammers hinged to a horizontal shaft which rotates at high speed. *See also* impact breaker. *Nelson.*

hammerdress. To dress or face (stone) with a hammer. *Webster 3d.*

hammer drill. a. A light, mobile, and fast-cutting drill in which the bit does not reciprocate but remains against the rock in the bottom of the hole, rebounding slightly at each blow. There are three types of hammer drills; drifter, sinker, and stoper. *Lewis, pp. 86-87.* b. A development of the piston drill in which the drill steel is not attached to the piston but remains in the hole, the piston delivering a rapid succession of light hammer blows. The drill steel is frequently hollow so that air or water may be driven through to cool the bit and clean the hole. Rotation of the bit is automatic. Also known as jackhammer. *Barger.* c. A percussive drill. *B.S. 3618, 1964, sec. 6.* d. A rock drill powered by compressed air which reciprocates a free piston, causing it to strke the shank of the drill steel. When of light construction, a hand hammer drill, otherwise supported on a tripod or bar. *Pryor, 3.*

hammer drop. The measured distance a drive hammer is dropped when driving a dry or drive-sample barrel in soil or foundation-testing operations. *Long.*

hammer forging. Forging in which the work is deformed by repeated blows. *Compare* press forging. *ASM Gloss.*

hammer-harden. To harden, as a metal, by hammering it while cold. *Webster 2d.*

hammering. Beating metal sheet into a desired shape either over a form or on a high-speed mechanical hammer and a similar anvil to produce the required dishing or thinning. *ASM Gloss.*

hammerman. a. One who strikes with a hammer in hand drilling of holes for blasting. *Fay.* b. One who uses a hammer constantly in any metalworking trade. *Standard, 1964.* c. *See* quarryman. *D.O.T. 1.*

hammer mill. a. An impact mill consisting of a rotor, fitted with movable hammers, that is revolved rapidly in a vertical plane within a closely fitting steel casing. Hammer mills are sometimes used for the size reduction of clay shales, glass cullet, and some of the minerals used in the ceramic industry. *Compare* disintegrator; impact mill. *Dodd.* b. Machine used to break softish rocks. The hammers, steel plates or rings are hung loosely from a horizontal shaft which rotates swiftly in a sturdy lined casing. The hammers hit falling rock which is fractured by this, by collision with other rocks, or by impact with the casing through grids in which it escapes when sufficiently reduced in size. Also known as disintegrator; whizzer mill; beater mill. *Pryor, 3.* c. Coal crushers in which the blow is induced with the aid of centrifugal force. The coal is broken with the impact and usually dragged across grate bars in the bottom of the unit. Their special advantage is in reducing run-of-mine to small sizes, for example, they break and crush coal from 24 to 28 inches down to 1½ inches to 0 without difficulty. Also called ring crusher. *Mitchell, p. 198.*

hammerpick. A compressed-air-operated hand machine used by miners to break up the harder rocks in a mine. It consists mainly of a pick and a hammer operated by compressed air. The hammer driving the pick is set in a cylinder, where the compressed air enters and presses the hammer, which in turn drives the wedge-shaped edge of the pick into the rock in short sufficient shocks of from 1,500 to 2,000 blows per minute. *Stoces, v. 1, p. 94. See also* poll pick.

hammer-refined. Designating steel, the grain of which has been made finer and closer by heavy hammering followed by lighter and quicker blows at the finish. *Fay.*

hammer scale. A scale that forms on heated metal when it is hammered. *Webster 3d.*

hammer slag. Anvil dross. *Webster 2d.*

hammersmith. One who shapes or works metal with a hammer. *Fay.*

hammer tongs. Blacksmith's tongs having projecting lugs for engaging the holes of hammerheads during forging. *Webster 3d.*

hammer weight. The weight of a drive hammer, in pounds, used in driving a dry- or drive-sample barrel in sampling formations in soil- and foundation-testing work. *Long.*

hammer welding. Forge welding by hammering. *ASM Gloss.*

hammer-wrought. Wrought with a hammer; said of ornamental ironwork. *Standard, 1964.*

hammochrysos. A stone, the appearance of which suggested sand-veined with gold, perhaps mottled jasper. *Webster 2d.*

hammock structure. A structure relating to two systems of veins intersecting at an acute angle. *Schieferdecker.*

hampshirite. Serpentine pseudomorphs after olivine found at Chester, Mass. The original crystals have been described as quartz and humite, and the replacement mineral as stetite. *Hess.*

hamrongite. A fine-grained, lamprophyric igneous dike rock that is dark violet-gray, with prominent black phenocrysts of mica in a groundmass of mica, feldspar laths, and a little quartz. *Johannsen, v. 1, 2d, 1939, p. 255.*

han coal. Term used in South Wales for a variety of cannel coal. *Tomkeieff, 1954.*

Hancock jig. Moving screen jig developed in the United States to treat lead-zinc ores of tristate. Bed is jigged in tank of water, with some forward throw and the heavy layer settling down is withdrawn through transverse slots. *Pryor, 3.*

hand. a. Measurement of height of mine haulage animals equivalent to 4 inches. *Bureau of Mines Staff.* b. Eng. To work a winding, pumping, hauling, or other engine. *Fay.*

hand auger. A screwlike tool much like a large carpenters' bit or a short cylindrical container with cutting lips attached to a rod and operated by hand and used to bore shallow holes and obtain samples of soil and other relatively unconsolidated near-surface materials. *A.G.I. Supp.*

handbarrow. A barrow with handles at both ends that is carried by two persons. *Compare* wheelbarrow. *Webster 3d.*

hand boring. The drilling of holes by hand for site investigations or for the exploration of shallow mineral deposits. The hand drill is used for depths of about 50 feet and where the ground is loose or not too hard. *Nelson.*

handbrace. A tool used in boring by hand. *Standard, 1964.*

hand cable. A flexible cable used principally in making electrical connections between a mining machine and a truck carrying a reel of portable cable. Also called head cable; butt cable. *ASA C42.85:1956.*

hand cleaning. The removal by hand of impurities from coal, or vice versa. *B.S. 3552, 1962.*

hand-cobbed mica. The usable rough sheet mica that remains after all adhering rock, dirt, and defective mica have been removed from the books. Also known as cobbed mica. *Skow.*

hand dog. Eng. A kind of spanner or wrench for screwing up, or disconnecting, the joints of boring rods at the surface. *Fay.*

hand-dug wells. The earliest known method of extracting petroleum was by means of pits dug by hand labor. The usual method was to dig a few feet and then allow the oil to collect at the bottom, whence it was subsequently collected by means of a suitable vessel. The deepest of these wells rarely exceeded 50 feet. *Fay.*

hand electric lamp. A hand lamp, with battery and fitments similar to a cap lamp except that it forms a self-contained unit. *Nelson.*

handfarht. Ger. The descent into a mine by ladders. *Fay.*

hand feed. A drill machine in which the rate at which the bit is made to penetrate the rock is controlled by a hand-operated ratchet and lever or a hand-turned wheel meshing with a screw mechanism. *Long.*

hand-fill. Eng. To separate the small from the large coal in the mine, the latter being filled by the hand into the car, and the former thrown to the side of the working place, or filled separately as required. *Fay.*

hand-filled coal. Scot. Lump coal which the miner loads by hand. *Fay.*

hand filling. a. Scot. Loading coal from face by hand. *Pryor, 3.* b. Eng. Loading coal from face by hand, but small coals are loaded separately from large lumps. *Pryor, 3.*

hand finisher. A screed rail or similar tool used to form the surface of compected concrete, and which may be fitted with a vibrator. *Ham.*

hand frame. An iron barrow used in a foundry. *Fay.*

handful. Brist.; Som. A length of 4 inches. *Fay.*

hand gear. a. Eng. A small hand cylinder for winding or hoisting from shallow work. A windlass. *Fay.* b. The mechanism for opening the valves of a steam engine by hand in starting. *Standard, 1964.*

hand hammer. Any hammer wielded by hand. A blacksmith's (or miner's) hammer used with one hand as distinguished from a heavier hammer or sledge. *Fay.*

hand hammer drill. An ordinary rock drill held in the hand and not mounted on a bar or column. The air leg support is now widely used in tunnels and rock drilling generally. *Nelson.*

hand hoisting. To lift drill rods and core-barrel assembly out of a borehole by hand. *Long.*

handhole. A small hole, closed by a removable cover, in the side of a pressure vessel or tank; it provides means of access for the hand to the inside of the vessel. *C.T.D.*

hand hook. An implement for twisting iron bars. *Standard, 1964.*

hand jig. Manually operated moving-screen jig used to treat small batches of ore. The jig box is fixed to a rocking beam and moved up and down in a tank of water. *Pryor, 3.*

hand lamp, electric. A portable battery-operated lamp incorporating a tungsten filament light source within a glass of the dome or well-glass type and providing maximum illumination in the horizontal plane. *B.S. 3618, 1965, sec. 7.*

hand lamp, miner's. *See* miner's hand lamp.

handle; stick. In a dipper shovel or hoe, the arm that connects the bucket with the boom. *Nichols.*

hand lead. A lead weight attached to a lead line of up to 100 fathoms, used in hydrographic surveying. *Ham.*

handlebars. Part of a soil—or foundation—testing apparatus having bars extending horizontally outward from rods connected to a vane tester. A spring scale is attached to the extended bars and the reading of the amount of pull required to turn the rod and vane tester through each 30° segment of a 90° arc is registered on the spring scale and recorded by the operator. *Long.*

handle finisher. One who breaks excess or scrap clay from handles, pares or trims them with sharp knife, particularly each end, and smooths with wet sponge. *D.O.T. 1.*

handle maker. One who forms cup handles of properly prepared clay by one of two methods: (1) Pours slip (semiliquid) from container into mold. Sets filled mold on drying rack until moisture absorption by mold dries handle. Opens mold and removes handle. Scrapes and trims back and hole of handle with knife. (2) Rolls pliable clay in hands into rod form. Presses a piece of this into one-half of mold, fitting other half over it. Presses mold together by hand to obtain exact thickness and allows it to dry. Opens mold, breaks off excess clay, punches out hole of handle with finger, and sets handle on board to dry. Trims handle with knife. Also called handle caster. *D.O.T. 1.*

handler. One who fixes knobs on dishes or handles on cups or large ware, and finishes them. Also called cup handler; sticker-up. *See also* tosser. *D.O.T. 1.*

hand level. A surveyor's level designed to be held in the hand and consisting of a telescope with a bubble tube and horizontal line so attached that the position of the bubble can be seen when looking through the telescope. *Webster 3d.* Used to determine the vertical distance between two points.

hand leveler. In the coke products industry, one who levels coke in a beehive oven with a long iron rod (scraper) so that all lumps will be uniformly processed. Also called coke leveler. *D.O.T. 1.*

handling. Mid. Reloading coal underground from one car to another. *Fay.*

handling plant. Equipment for the mechanical movement of dirt, ore, coal, or other material either horizontally or up an incline, by some form of conveyor, bucket, chain, or rope. *Nelson.*

hand loader. A miner who loads coal by shovel rather than by machine. *B.C.I.*

hand loupe. *See* loupe. *Shipley.*

handmade brick. Brick shaped in wooden molds from a soft plastic mix; (that is, the mix used has more water, is much softer, and takes less pressure to form as compared to extruded brick). *See also* soft-mud process. *Bureau of Mines Staff.*

hand method. Molding bricks by hand. *Mesereau, 4th, p. 261.*

hand miner. *See* pick miner. *D.O.T. 1.*

hand mining. The working and winning of coal or mineral by hand and not by machines. Broadly, hand coal mining would imply hand holing, shot firing, and hand filling. *Nelson.*

hand mold brick. Refractory brick usually made in a wood mold. *Bureau of Mines Staff.*

hand molding. The art of making molds by manual operation. *Freeman.*

handpicked coal. Coal from which all stones and inferior coal have been picked out by hand; large lumps. *Fay.*

handpicker. A person employed either for hand cleaning or for hand selection. *B.S. 3552, 1962.*

handpicking; sorting. Manual removal of selected fraction of coarse run-of-mine ore, usually performed on picking belts (belt conveyors) after screening away small material, perhaps washing off obscure dirt, and crushing pieces too large for the worker to handle. Hard sorting (Rand) describes picking of banket when up to 30 percent of waste rock is removed. *Pryor, 3.*

hand pick miner. *See* pick miner. *D.O.T. 1.*

hand pulled. *See* hand hoisting. *Long.*

hand putting. The pushing of tubs or trams by hand. This practice is now obsolete except in small mines or in an emergency. *See also* tramming. *Nelson.*

hand repressed brick. Hand mold brick which are partially dried after molding, then pressed in a hand operated press. *Bureau of Mines Staff.*

hand rope. Flexible rope consisting of 6 ropes, each composed of 6 strands, 7 wires each, and 7 hemp cores. *H&G, p. 130.*

hand sampling. a. In prospecting, valuation and control, use of manual methods for detaching and reducing to an appropriate size representative samples of ore. *Pryor, 3.* b. One of the major breakdowns in ore sampling that includes grab sampling, trench or channel sampling, fractional selection, coning and quartering, and pipe sampling. These methods are used in sampling small batches of ore, etc. *Compare* mechanical sampling. *Newton, p. 28-29.*

handsaw. An ordinary one-handed saw, either rip or cross-cut, used by woodworkers. *Crispin.*

hand screw. A jackscrew. *Standard, 1964.*

hand selection. The selection by hand of pieces of coal with certain specific qualities according to surface appearance. *B.S. 3552, 1962.*

handset. A bit in which the diamonds are set into holes drilled into a malleable-steel bit blank and shaped to fit the diamonds; the diamonds are placed in the prepared holes and securely cinched into place by pulling or drawing the metal toward and tightly calking it around each diamond by peening. The entire operation is by hand and rapidly is becoming a seldom-practiced art, as the hand method has been almost completely superseded by so-called mechanical setting methods. *Long.*

hand specimen. a. A piece of rock trimmed to a size, usually 1 by 3 by 4 inches, for megascopic study and preservation in a working collection. *Fay.* b. Selected piece of mineral chosen for study or for collection of minerals, but not representative of the grade of the parent ore body. *Pryor, 3.*

handspike. a. A wooden lever for working a capstan or windlass. *Zern.* b. A bar used as a lever in lifting weights or overcoming resistance; a heaver. *Standard, 1964.*

hand sprayer. A manually directed sprayer for spreading road binder, working under pressure produced by hand or power-operated pump. *Ham.*

hand spraying. A method of dust prevention used in hand-won faces, or in conjunction with wet cutting in thick seams. The sprays are controlled by the colliers who wet the face and the broken coal before loading. Sprays must be connected with the pipeline through the face by means of flexible hoses and one spray for every 20 yards of face is usually sufficient. *Mason, v. 1, p. 300.*

handsteel. Can. Short steel bits used in surface rock work largely. *Hoffman.*

hand tipping. An old method of dirt disposal in which the tubs full of dirt were brought to the tipping site by horse or rope haulage, and hand-tipped from railway wagons. *Sinclair, V, p. 358.*

hand tramming. Pushing of cars by manpower. It is limited to mines of small output, to prospects and to work where mechanical haulage would not be justified. *Lewis, p. 197. See also* manual haulage.

hand whip. A counterpoised sweep for raising water from shallow pits. A shadoof. *Fay.*

handyman. At small plants, a jack-of-all-trades, as a rigger, millwright, and machinist combined. A man employed to do various kinds of work. *Fay.*

hang. a. To suspend drill string or other downhole equipment in the drill derrick or tripod either on the hoisting line or on hooks provided in the crown block for that purpose. *Long.* b. To suspend casing or pipe in a borehole in a clamp resting on blocks at the collar of the hole. *Long.* c. Eng. Props under a balk are said to be set with a hang or a lean or to be splayed when they are set wider apart at the foot than at the top. *SMRB, Paper No. 61.* d. Brist. The hade of a fault. *Fay.* e. To have the charge stuck or arched in one part while the part underneath falls away so as to leave a gap; said especially of a blast furnace for iron. *Webster 3d.*

hang bench. Eng. A support for a windless. *Fay.*

hanger. a. Scot. The hook of a miner's lamp. *Fay.* b. Corn. The hanging wall. *Fay.* c. Something that hangs, overhangs, or is suspended. *Webster 3d.* d. *See* hanging bolts. *Fay.* e. A frame containing a bearing for a shafting. *Standard, 1964.*

hanger brick. A brick having a cut-out to fit over a hanger, in a suspended roof, or sectionally supported wall. *Bureau of Mines Staff.*

hanger-on. a. A man who attaches or detaches the tubs or trams on an endless-rope haulage in a coal mine. A hitcher performs a similar task at the shaft bottom. *See also* clipper. *C.T.D.* b. Eng. The man who runs the full trams upon the cages and gives the signals to hoist. *See also* cager. *Fay.* c. Onsetter. *Mason.*

hanger steel. Angle iron or rods by which a conveyor is hung from supports above. *ASA MH4.1-1958.*

hangfire. In blasting, failure of a charge to explode when expected. When ordinary safety fuse has been used, a period must now elapse before the place affected can safely be visited, after which precautions to deal with a misfire must be taken. Hangfires are always dangerous. *Pryor, 3.*

hanging. a. The hanging wall; the rock on the upper side of a mineral vein or deposit. *Weed, 1922.* b. Sticking or wedging of part of the charge in a blast furnace. *See also* hang. *Fay.*

hanging bolts. Rods of round iron, used in shaft construction to suspend wallplates. In concrete-lined shafts hanging rods give reinforcement, the top set being concreted into the shaft collar and others hooked on below, with periodic consolidation in strong rock strata as the shaft is deepened. *Pryor, 3.* Sometimes called hangers. *Fay.*

hanging coal. A portion of the coal seam which, by under cutting, has had its natural support removed. *Fay.*

hanging core. Core supported by a wire hanger that is imbedded in the core. Hanging cores are used to avoid a deep lift for the cope. *Crispin.*

hanging deal. Aust. Planks used to suspend a lower curb from the one above it, in cases where backing deals are necessary. *Fay.*

hanging glacier. A glacier of small size on so steep a slope that the ice breaks off and falls from its lower end. *Fay.*

hanging guide. *See* guides, i. *Fay.*

hanging its water. Scot. The bucket failing to pump on account of a faulty valve, or air between the bucket and the valve, the column of water above the bucket being sufficient to prevent the opening of the bucket lids, is said to hang its water. *Fay.*

hanging leaders. A steel frame suspended from the pivot at the top of the crane or excavator jib, used to guide a driven pile. *See also* false leaders. *Ham.*

hanging load. a. The weight that can be suspended on a hoist line or hook device in a drill tripod or derrick without causing the members of the derrick or tripod to buckle. *Long.* b. The weight suspended or supported by a bearing, as the weight of the inner tube and contained core suspended by the bearing in the core-barrel head. *Long.*

hanging-on. Eng. The pit bottom, level, or inset, at which the cages are loaded. *Fay.*

hanging pulley. A small fenced pulley hung from the roof or side of a haulage road in which the tail rope of a main-and-tail haulage is suspended. It keeps the rope (which is not used for direct haulage of cars) clear of the roadway and minimizes friction while in motion. The swinging of hanging pulleys and ropes is a hazard to men traveling on the roadway. *Nelson.*

hanging scaffold. Scot. A movable platform in a shaft attached to a winding rope. *Fay.*

hanging sets. Scot. Timbers from which cribs are suspended in working through soft strata. *Fay.*

hanging sheave. The sheave or pulley wheel hooked to and suspended from the drill tripod clevis and over which the drill hoist line runs. *Long.*

hanging side; hanging wall; hanger. The wall or side above the ore body. *Fay.*

hanging spear rods. Eng. Adjustable wooden pump rods, by which a sinking pump is suspended in a shaft. *Fay.*

hanging tie. a. A tie, as in a floor, the end of which is upheld by a strap, connecting it with a beam above. *Standard, 1964.* b. A tie which is supported by some kind of antisag bar to prevent sagging under its own weight. *C.T.D.*

hanging valley. a. A valley that has a greater elevation than the valley to which it is tributary, at the point of their junction. Often (but not always) created by a deepening of the main valley by a glacier. The hanging valley may or may not be glaciated. *Leet.* b. A valley debouching on a (usually cliffed) seacoast, well above sea level. Also called valleuse. *Schieferdecker.*

hanging valve. a. A rotary-engine valve which is hinged and falls by gravity so as to form an abutment, but is lifted by the passing piston. *Standard, 1964.* b. A clack valve or flap valve. *Standard, 1964.*

hanging wall. a. The wall or rock on the upper side of an inclined vein. It is called the roof in bedded deposits. *Lewis, p. 21.* b. Country rock above a lode or vein, or above the ore being removed. Also called hanging side; the hanging. *Pryor, 3.* c. The wall of a lode vein or reef which overhangs as one walks along the strike in a drive or stope. *C.T.D.* d. The junction of the ore body and the country rock on the upper side of a lode. *Nelson.* e. Can. Upper side of vein or lens in relation to dip of ore deposit. *Hoffman.*

hanging wall drift. In the United States, a horizontal gallery driven in the hanging wall of a vein. *Nelson.*

hanging wall of a fault. The upper wall of an inclined fault plane. *Ballard.*

hangklip. S. Afr. An overhanging cliff. *Standard, 1964.*

hang-up. a. Underground, blockage of ore pass or chute by rock. *Pryor, 3.* b. In a stamp mill, **jacking up** of the stamps. *Pryor, 3.*

hanksite. A mineral, $9Na_2SO_4.2Na_2CO_3KCl$, occurring in hexagonal prisms, short prismatic to tabular; also in quartzoids; white to yellow, color. Obtained from California. *Fay.*

hannayite. A hydrous ammonium magnesium phosphate, $(NH_4)_2O.3MgO.2P_2O_5.10H_2O$; found in slender yellowish crystals in bat guano. Rare. *Dana 6d, p. 832.*

Hanovia lamp. Mercury vapor lamp which emits ultraviolet light; used to detect mineral fluorescence. *Pryor, 3.*

Hansgirg process. The production of magnesuim from magnesium oxide by carbon reduction. Magnesium oxide is fed into an electric arc furnace lined with carbon where it is vaporized at a temperature of 2,100° C. The mixture of magnesium vapor and carbon monoxide is withdrawn from the furnace and cooled to 200° C. by diluting with natural gas (so the carbon monoxide will not oxidize the magnesium). A fine dust, containing 65 percent magnesium mixed with the oxide and carbon, is collected with electrostatic precipitators and sublimed at 750° C, in electric retorts using high vacuum. The product thus obtained is better than 99 percent pure magnesium. *CCD 6d, 1961.*

haplite. A name proposed by Fletcher for that variety of granite which consists of quartz and potash feldspar. The name is derived from the Greek for simple. *Compare* binary granite; aplite; alaskite. *Fay; Hess.*

haplo. A combining form meaning single or simple, as haplogranite, etc. *A.G.I.*

haplome. Aplome. *Hey 2d, 1955.*

haplophyre. A granite of the Alps with a mortar structure between large quartz and feldspar grains. *Hess.*

Harbide. Trade name for a silicon carbide brick, formed by impact pressing, having low permeability, dense impervious surfaces, and a high resistance to oxidation. Used in ceramic kiln furniture, in boiler furnace settings, and in radiant tubes. *CCD 6d, 1961.*

harbor. In glassmaking, a large chest for holding materials before fusion. *Standard, 1964.*

harbor models. Scale models of harbors are very useful for planning and design. They are generally made to scales ranging from 1 in 50 to 1 in 180, with outside waves about three-fourths of an inch high. Such models can also solve problems of scour and silting. *Ham.*

hard. a. Containing certain mineral salts in solution, especially calcium carbonate; said of water having more than 8 or 10 grains of such matter to the gallon. *Standard, 1964.* b. Solid; compact; difficult to break or scratch. *See also* hardness scale. *A.G.I. Supp.* c. In ceramics, requiring great heat; said of muffle-colors in porcelain decoration. *Standard, 1964.*

hard alloys for drilling. Rotary drills with steel cutting edges are so rapidly dulled in use that numerous efforts have been made to lengthen the time of wearing by the use of hard substances welded or set into the cutting edges. Among these are the alloys castite, tungsten carbide (known also as a carboloy, volomite, triamant, sulamite, thoran, etc.) stellite, hastellite, stoodite, durium, etc. These alloys are also used in place of diamonds on core drills in the softer rocks. *Hess.*

hardarses. Derb. Masses of hard marl. *Arkell.*

hard asphalt. a. Solid asphalt which has a normal penetration of less than ten. *API Glossary.* b. Alternative name for asphaltene. *Institute of Petroleum, 1961.*

hard bottom. A condition encountered in some open-cut mines wherein the rock occasionally will not be broken down to grade because of an extra-hard streak of ground or because not enough powder is used. This is called a "hard bottom"; it interferes with work and puts undue strain on a shovel. Such unbroken ores usually are drilled with a jackhammer and blasted. *BuMines Bull. 433, 1941, p. 129.*

hard brass. Brass which has not been annealed after drawing or rolling; used for springs, etc. *Crispin.*

hard burned lime. A quicklime that is calcined at high temperature and is generally characterized by relatively high density and moderate to low chemical reactivity. *Boynton.*

hard chromium. Chromium deposited for engineering purposes, such as increasing the wear resistance of sliding metal surfaces, rather than as a decorative coating. It is usually applied directly to basis metal and is customarily thicker than a decorative deposit. *ASM Gloss.*

hard coal. All coal of higher rank than lignite. In the United States, the term is restricted to anthracite. *B.S. 3323, 1960.*

hard-coal plough; Westfalia plough. A plough type of cutter loader for cutting the harder coal seams. It consists of stepped kerving bits which precut the coal, leaving the unstressed coal to be cut by the following bits. The kerving bits may be either rigid or swiveling. *See also* rapid plough. *Nelson.*

hardcore. Broken hard stone, brick, clinker, concrete, or similar hard material, used for filling in soft ground and for consolidating to specific thicknesses as a base to concrete flooring or a road. *Ham.*

hard-drawn. a. Temper of copper or copper-alloy tubing drawn in excess of 25 percent reduction in area. *ASM Gloss.* b. Drawn while cold; said of wire. *Fay.*

hard-drawn wire. Wire which is cold-drawn from mild steel, and which has a tensile strength of 37 to 42 tons per square inch. *Taylor.*

hardebank. A phase or type of unaltered kimberlite which occurs occasionally in the blue ground. It resists disintegration even when exposed to the atmosphere for as long as 50 years, whereas normal blue ground disintegrates in 12 months. *I.C. 8200, 1964, p. 31.*

hardenability. As applicable to a ferrous alloy, the property that determines the depth and distribution of hardness that may be induced by quenching. The standard test for hardenability is the Jominy test. *Henderson.*

hardened steel. Steel that has been hardened by quenching from or above the hardening temperature. *Fay.*

hardener. a. An alloy, rich in one or more alloying elements, added to a melt to permit closer composition control than possible by addition of pure metals or to introduce refractory elements not readily alloyed with the base metal. *ASM Gloss.* b. In heat treating, one who increases hardness of carbon steel objects by heating them to a predetermined temperature and cooling them quickly by quenching them in a suitable bath of oil, water, or the like. May be designated according to the article hardened or quenching solution used, as gear hardener or waterman. Also called heat-treater; heat-treat operator. *D.O.T. 1.*

hardening. Metallurgical process in which iron or suitable alloy is quenched by abrupt cooling from or through a critical temperature range. Precipitation-hardening. *Pryor, 3. See also* air-hardening steel; curing; hardening period; tempering.

hardening kiln. A kiln in which, in the transfer printing process, unfinished pottery is exposed to a low heat to drive away superfluous oil. *Fay.*

hardening media. Liquids into which steel is plunged in hardening. They include cold water, various oils, and water containing sodium chloride or hydroxide to increase the cooling power. *C.T.D.*

hardening on. Heating of underglaze-decorated ware at 600° C to burn off the organic matter in the colors. *ACSG.*

hardening period; maturing period. The time during which concrete or cement mortar continues to increase in hardness and strength. *Nelson.*

hardenite. Synonym for martensite. *Hey 2d, 1955.*

hard face. a. A layer of hard, abrasion-resistant metal applied to a less abrasion-resistant metal part by plating, welding, or other techniques. *See also* dress, b; face, r. *Long.* b. The crystal face of a diamond lying parallel or nearly so with a hard vector plane of the crystal. *Long.*

hard facing. Depositing filler metal on a surface by welding, spraying, or braze welding for the purpose of resisting abrasion, erosion, wear, galling, and impact. *ASM Gloss.*

hard fired. A term applied to clay products which have been fired at high temperatures to near vitrification, producing relatively low absorptions and high compressive strengths. *ACSG.*

hard glass. a. A glass of exceptionally high viscosity at elevated temperatures. *ASTM C162-66.* b. A glass of high softening point. *ASTM C162-66.* c. Commonly refers to a glass difficult to melt. *ASTM C162-66.* d. A glass hard to scratch. *ASTM C162-66.*

hard glaze. A glaze having a high melting point owing to its high silica content. It is mechanically harder than glazes fired at lower temperatures, and more resistant to chemical attack. *Rosenthal.*

Hardgrave sandstone. A marine sandstone of Upper Liassic age, marking the commencement of the marine transgression in Jurassic times in the Cordilleran geosyncline. Succeeds the nonmarine Trail group. *C.T.D.*

hard ground. a. Parts of sea bottoms not receiving sediments. *Schieferdecker.* b. In mining, it generally denotes ground that is difficult to work. *Bureau of Mines Staff.*

Hardgrove number. Empirical index of grindability of ores or minerals, reached as result of comminution of a test sample under stated conditions of control. *Pryor, 3.*

Hardgrove test. This test utilizes a special grindability mill of the ring-and-ball type, in which a 50-gram portion of closely sized coal is ground for 60 revolutions. This method is of the constant-work type; that is, a fixed amount of work is expended on each coal and a grindability value determined from the size composition of the ground material. *Mitchell, p. 42.*

hardhat. Slang term for a safety hat. *B.C.I.*

hardhead. a. A hard knob or knot formed by extreme cementation of sandstone in certain spots. *Fay.* b. A large, smooth, rounded stone found especially in coarse gravel. A niggerhead. *Fay.* c. In mining, a tunnel in a coal mine driven through rock (hard heading). *Pryor, 3.* d. A hard, brittle, white residue obtained in refining tin by liquation, containing, among other things, tin, iron, arsenic, and copper. Also, a refractory lump or ore only partly smelted. *ASM Gloss.*

hard heading. A heading driven in rock. In S. Wales and elsewhere, men employed in hard headings have suffered greatly from silicosis. *Nelson.*

hard-heading man; tunnel miner. A miner experienced in the driving of hard headings or tunnels. He is usually paid per yard advance of heading of an agreed width and height. When in charge of the work, he becomes a contractor and employs other men to assist him. *Nelson.*

hard horse. Derb. A ball of pale calcareous marl full of fibrous gypsum and enclosed in red gypsiferous marl. *Arkell, p. 61.*

Hardinge mill. Cylindroconical ball mill, made in three sections—a flattish cone at feed end followed by a cylindrical drum, and finishing with a steep cone leading to the discharge trunnion. The tricone mill has wedge-shaped liners in the drum section which turn this into a gentle conic frustrum widest at the feed end. *Pryor, 3.*

Hardinge thickener. A machine for removing the maximum amount of liquid from a mixture of liquid and finally divided solids. The solids settle out on the bottom of the thickener tank as a sludge and the clear liquid overflows at the top of the tank. It is used for processing chemical, metallurgical, and coal-washing slurries. *Nelson.*

hard kiln. A muffle kiln fired at a temperature between that of the enamel and gloss kilns. *C.T.D.*

hard lead. Metal in which the high degree of malleability characteristic of pure lead is destroyed by the presence of impurities, of which antimony is the most common. *C.T.D.*

hard mass. a. A term generally applied to an unusual glass, over 6 inches in hardness; also occasionally, but inaccurately, to synthetic corundum or spinel. *Shipley.* b. A term sometimes used to mean any green glass imitation of emerald, especially those containing imitations of jardins. Also spelled hard masse. *Shipley.*

hard metal. a. A metal or an alloy that is harder and usually more resistant to abrasion than the hardest of steels. *Long.* b. Sintered tungsten carbide; used for the working tip of high-speed cutting tools. *See also* sintered carbides. *C.T.D. Supp.*

hard mica. Mica which, when slightly flexed or distorted with thumb pressure, generally does not show any tendency to delaminate. Such mica, in thick pieces, will give an almost metallic sound when tapped or dropped on a hard surface. *Skow.*

hard needles (or inclusions). A term applied in the grading of quartz crystals to fairly large needlelike inclusions or imperfections which have the appearance of being hard. *AM, 1.*

hardness. a. Resistance of metal to plastic deformation usually being indentation. However, the term may also refer to stiffness or temper, or to resistance to scratching, abrasion, or cutting. Indentation hardness may be measured by various hardness tests, such as Brinell, Rockwell, and Vickers. *ASM Gloss.* b. For grinding wheels, the same as grade. *ASM Gloss.* c. Of minerals, measurement on Mohs' scale according to whether the specimen under test scratches or is scratched by other minerals in a series ranging from talc to diamond. *Pryor, 2.* d. As used by individuals associated with the drilling and bit-setting industry, the relative ability of a mineral to scratch another mineral or to be penetrated by a Knoop indenter. *Long.* e. In digging, the resistance to penetration. *Nichols, 3, pp. 3-4.* f. The relative refractoriness of a porcelain enamel or frit. *ASTM C286-65.* g. Relative resistance of the enamel surface to deformation from pressure or abrasion. *ACSB, 3.* h. Resistance to scratching or abrasion. The brittle hardness of the mineralogist differs from the penetration (ductile) hardness of the metallurgist. *A.G.I. See also* hardness scale; Mohs' scale; Brinell scale; Rockwell scale; scleroscope. *Hess.* i. Quality of water that prevents lathering because of the presence of calcium and magnesium salts which form insoluble soaps. *A.G.I. Supp.*

hardness gage. Same as hardness points. *Shipley.*

hardness pencils. Same as hardness points. *Shipley.*

hardness plates. A series of small pieces of minerals of differing hardness, polished flat, and set side by side in cement, for testing hardness of another mineral which is drawn across one after another piece, beginning with the hardest, until it scratches one. *Shipley.*

hardness points. Small pieces of minerals of differing hardness, with one end pointed and affixed to small handles of wood, metal, or plastic, to be held in hand and used for testing hardness of another mineral, by ascertaining which points will scratch it. Minerals of hardness 10 to 6 are usually used as points for testing gem stones. *Shipley.*

hardness scale. a. The scale by which the hardness of a mineral is determined as compared with a standard. The Mohs' scale is as follows: talc, gypsum, calcite, fluorite, apatite, orthoclase, quartz, topaz, corundum, and diamond. *Fay.* b. Quantitative units by means of which the relative hardness of minerals and metals can be determined, which for convenience is expressed in Mohs', Knoop, or scleroscope units for minerals and Vickers, Binell, or Rockwell units for metals. *Long.*

hardness table. Any listing of substances as to their comparative hardness. *Shipley.*

hardness test. A determination of the relative hardness of a mineral, as made on a specimen, using appropriate hardness-testing apparatus and techniques. *See also* hardness; hardness scale. *Long.*

hardness wheel. A hand instrument in which hardness points are set as equidistant spokes of a rimless wheel, permitting a more rapid selection of points in testing hardness. *Shipley.*

hardometer. This machine works on the same principles as that of the Brinell tester, in which a hard steel ball is pressed under a known load, into the specimen under test, the hardness being determined by measurement of the impression. For testing materials harder than the steel ball, a pyramid diamond indenter is used. The hardness numbers are obtained by dividing the load in kilograms by the area of the impression in square millimeters, which applies to the steel ball and to the diamond. In the latter case, the numbers are diamond hardness numbers. The scale of ball impression diameters and Brinell hardness numbers corresponds exactly to that used with the 10-millimeter ball Brinell machine, provided that both machines are used with the same ratio of load to square of ball diameter. *Ham.*

hardpan. a. A name specially developed in the digging of auriferous placers, and applied to the layers of gravel which are usually present a few feet below the surface and cemented by limonite or some similar bond, therefore, they are resistant. It is also used to describe boulder clay, which is likewise difficult to excavate. *Fay.* b. A hard, impervious layer composed chiefly of clay, cemented by relatively insoluble materials, does not become plastic when mixed with water, and definitely limits the downward movement of water and roots. It can be shattered by explosives. *A.G.I.* c. Hard, tight soil. *Nichols.* d. A hard layer that may form just below plow depth on cultivated land. *Nichols.*

hard paste. *See* pâte dure.

hard plating. Chromium plating deposited in appreciable thickness directly onto the base metal; that is, without a preliminary deposit of copper or nickel. The coating is porous, but offers resistance to corrosion and wear owing to the hardness of the coating. *C.T.D.*

hard porcelain; true porcelain. Made of china clay, feldspar, and silica, fired at 1,300° C or more and covered with a hard glaze. *Rosenthal.*

hard pottery. Pottery which cannot be scratched by a sharp-pointed piece of iron. *Standard, 1964.*

hard radiation. Ionizing radiation of short wavelength and high penetration. *NCB.*

hard rays. Beta rays or gamma rays of great penetration. *Hess.*

hard rock. a. Loosely used to distinguish igneous and metamorphic from sedimentary rock. *A.G.I. Supp.* b. A term used to distinguish between material which can be excavated without blasting (as clays, sands, gravels, earth, and sedimentary soft rocks) and rock having a strong bonded structure. *Pryor, 3.*

hard-rock driller. a. A driller who alibis for the low amount of footage of borehole drilled by claiming that the rock penetrated during his tour or shift was unusually hard. *Long.* b. A miner employed to operate a drill in a mine in which the rocks are generally igneous or metamorphosed and considered hard as compared with softer sedimentary rocks, such as those in which coal and salt generally occur. *Long.*

hard-rock drilling. Drilling done in dense and solid igneous or highly silicified rocks, which can be penetrated economically only by diamond bits, as opposed to that done in softer rocks easily cut by roller or wing-type rotary bits. *Long.*

hard-rock geology. Geology of igneous and metamorphic rocks. *A.G.I. Supp.*

hard rock minerals. Solid minerals, as distinguished from oil and gas, especially those solid minerals found in hard rocks. *Williams.*

hard-rock phosphate. A term used in Florida to designate a hard, massive, close-textured, homogeneous, light-gray phosphate, showing larger or smaller irregular cavities, that are usually lined with secondary mammillary incrustations of phosphate of lime. *Fay.*

hard-rock mine. A mine in hard rock; especially one difficult to drill, blast, and square up. *Hess.*

hard-rock miner. A workman competent to mine in hard rock. Usually used to indicate an expert miner as compared with one fit only to mine in soft rocks. *Hess.*

hard-rock tunnel boring. A comparatively recent technique in which early experiments utilizing a machine called the "Mole" cut out 7-foot-diameter drifts in hard jasperite at an average rate of 5 feet per hour, and the raise borer approached the goal of a 200-foot 40-inch-diameter raise in 48 hours. *Encyclopaedia Britannica. Britannica Book of the Year, 1965, pp. 550-551.*

hards. a. A commercial term for the larger sizes of dull, hard coal, in contrast to brights. *B.S. 3323, 1960.* b. Eng. In the Midland coalfield, a hard and close-grained coal. *Fay.* c. Durain. *Tomkeieff, 1954.* d. In the United States, this term is used for anthracite. *Tomkeieff, 1954.*

hard seat. *See* seat rock. *A.G.I.*

hard solder. Any solder that melts only at a red heat; used in soldering silver, etc. *Fay.*

hard soldering. Formerly referred to a process using materials now called brazing alloys. *ASM Gloss.*

hard sorting. *See* handpicking. *Pryor, 3.*

hard spar. A name applied both to corundum and andalusite. *Fay.*

hard standing. A hard surface onto which vehicles may be driven and parked. *Ham.*

hard steel. Steel containing over 0.3 percent carbon. *Pryor, 3.*

hard-stone rag. Eng. A hard building stone, Northamptonshire. *Arkell.*

hard structure coal. *See* soft structure coal.

hard surfacing. a. Application of a hard, wear-resistant alloy to the surface of a softer metal by an arc or gas-welding process. *Ham.* b. The same as hard facing. *ASM Gloss.*

hard tube; hard valve. High-vacuum X-ray discharge tube emitting penetrating rays. *Pryor, 3.*

hard valve. *See* hard tube. *Pryor, 3.*

hard vector. Due to the arrangement of the molecules within some mineral crystals, such as diamond, the substance is found to be harder in certain planes or directions in relation to the axes of the mineral crystals. These hard planes are referred to as hard vectors. *Long.*

hard water. Water characterized by the presence of dissolved mineral salts, especially those of magnesium and calcium. *Stokes and Varnes, 1955.*

hard way. a. A term used in slate quarrying to describe the third direction at right angles to both slaty cleavage and rift, in which there is no tendency to split. It is known as the hard way and designated locally as the sculp. *BuMines Bull. 630, 1965, p. 883.* b. In granite quarrying, the direction at right angles to both rift and run is called the hard way or head grain. *AIME, p. 326.* Sometimes called cut-off. *Fay.*

hard white ore. Georgia bauxite containing less than one percent ferric oxide. *Fay.*

Hardwick conveyor loader head. A dust collector for belt conveyors used at the loading station. The delivery pulley of the main gate conveyor is used to drive a scraper chain. The latter is arranged to run at half the belt speed by means of chains and sprockets, and the scraper chain runs at the bottom of a long hopper to the point where the coal is delivered into the trams. The underbelt fines are collected on the scraper chain after having been released from the belt by means of a snub pulley. The whole arrangement is housed in a sheet-steel cover to which rubber flaps are attached. Side spillage and the escape of dust over the side of the trams is prevented by means of rubber flaps. *Mason, v. 1, pp. 302-303.*

hardy. A square-shanked chisel or fuller for insertion in a hardy hole. *Standard, 1964.*

Hardy Cross method. A method of moment distribution in continuous beams proposed by Professor Hardy Cross in 1936. *See also* column analogy. *Ham.*

hardy hole. A hole in a blacksmith's anvil for the insertion of a calking tool or other piece. *Standard, 1964.*

hardypick drifting machine. A heavy electric rotary drilling machine for blasting work in mine tunneling. It consists of a chassis, mounted on caterpillar tracks, turntable, boom, drilling machines, and various controls, and can be operated by two men. *Nelson.*

hardystonite. A white mineral of the melilite group with one good and two rare cleavages, $2CaO.ZnO.2SiO_2$; from Franklin, N.J. *Larsen, p. 86.*

haricot. Red copper oxide, (CuO), used as a background in ceramic decoration. *Standard, 1964.* Also spelled harrico.

Haring cell. A four-electrode cell for measurement of electrolyte resistance and electrode polarization during electrolysis. *ASM Gloss.*

harkerite. A colorless, vitreous lustered mineral, occurs typically as simple octahedra; $20CaCO_3.Ca_{88}(Mg,Al,etc.)_{20}(B,Si)_{24}(O,OH,Cl)_{90}$; found in a skarn containing monticellite, calcite, and accessory bornite, chalcocite, magnetite, and diopside, at the contact of dolomitic limestones with Tertiary granite, Isle of Skye. *American Mineralogist, v. 37, No. 3-4, March-April 1952, p. 359.*

Harkins and Jura method. A gas adsorption method for the determination of the specific surface of a powder. The sample is first evacuated and then exposed to a vapor near to its saturation pressure; the wetted powder is then immersed in the liquid itself and the rise in temperature is measured. From this, the surface energy change, and thus, the surface area is calculated. *Dodd.*

Harkort test. A test piece is heated to 120° C and then plunged into cold water; the cycle is repeated, with successive increases of 10° C in temperature, until crazing can be detected after the quenching. The criteria are: no cracks after quenching from 150°, crazing at room temperature likely after 3 to 4 months; 160° C, 15 months; 170° to 180° C, no crazing after 2½ years (with a few exceptions); 190° C, no crazing after 2½ years without exception. It is now known that crazing may result from moisture expansion as well as from thermal shock as in the Harkort test. Although H. Harkort was a German, details of his so-called crazing test for pottery ware were first published in the United States. *Dodd.*

Harlechian. Lower Cambrian. *A.G.I. Supp.*

Harlequin. The Oriental opal. *Fay.*

Harman process. A method for producing direct from ore an iron in the form of either sinter or pig which is suitable for charging in steel furnaces. Ore, limestone and carbon in the form of coal, coke, or oil coke in the proportions of 40/8/5 are dried, crushed to about one-sixteenth inch, intimately mixed, and fed into the upper end of a sloping rotary kiln. *Osborne.*

harmful dust. A harmful dust (for example, silica) must be present in concentrations exceeding 5 million particles per cubic foot of air to produce pulmonary damage. Certain toxic and radioactive dusts, however, can cause harm in smaller amounts (less than 1 million particles per cubic foot of air). These are the lower limits. *Hartman, p. 47.*

harmless depth theory. A hypothesis advanced by Fayol, and based largely on his dome theory. He considered that there was a certain harmless depth below which mining could be carried on without risk of damage to the surface. Subsidence observations at present working depths do not support this theory. *See also* limiting depth. *Nelson.*

harmonic. A sinusoidal quantity having a frequency which is an integral multiple of the frequency of a periodic quantity to which it is related. *Hy.*

harmonic crystal. A crystal designed to oscillate at an integral multiple of its fundamental frequency. *AM, 1.*

harmonic folding. Folding of geologic structures in which, with depth, there are no sudden changes in the form of the folds. Opposite of disharmonic folding. *A.G.I.*

harmonic oscillation. Motion of pendulum whereby the backdrive exerted is directly proportional to the swing from the position of equilibrium. All pendulums fulfill this condition at moderate swings. *Schieferdecker.*

harmotome. A monoclinic zeolite in the stilbite group with complex and variable composition. Its formula is $Ba(Al_2Si_6O_{16}).6H_2O$. Mohs' hardness, 4½; specific gravity, 2.45. The crystals are white and translucent. *Dana 17.*

harp. a. Scot. A sparred shovel used in the east of Scotland for filling coal. *Fay.* b. Scot. To fill a hutch with coal at the face. *Fay.*

harpolith. A cross-cutting (igneous) body of sickle shape. A harpolith is assumed to have been injected into previously deformed beds of rocks and then with the latter to have been stretched horizontally in the direction of maximum (mountain-making) displacement. Thus, the feeding channel is typically situated beneath one edge of the sickle after this has been exposed by erosion. *Stokes and Varnes, 1955.*

harpoon log. A log which consists essentially of a rotator and distance registering device combined in a single unit, which is towed through the water. It has been largely replaced by the taffrail log, which is similar except that the registering device is located at the taffrail, with only the rotator in the water. *H&G.*

harrie; herrie. Scot. To rob; to take all the coal that can conveniently be mined without attempting to systematically remove the whole. A variation of harry; to strip; despoil; to rob. *Fay.*

harriers. Trammers, putters, or drawers employed to convey trucks or tubs from the working face. They may help load the trucks. *C.T.D.*

harrisite. a. Chalcocite pseudomorphous after galena. *Holmes, 1928.* b. A phanerocrystalline rock composed essentially of black, lustrous, cleavable olivine with anorthite and a little augite. *Holmes, 1928.*

Harris process. Process for the removal of arsenic, antimony, tin, and zinc from virgin or secondary lead by agitating the molten metal with molten caustic soda and salt. All undesirable metals are oxidized and the oxides dissolved in the caustic with exception of silver which is removed in a subsequent desilvering operation. *CCD 6d, 1961.*

harrock. Hard chalk. *Arkell.*

Harrop kiln. One of the variety of tunnel kilns built to the designs of Harrop Ceramic Service Co., Columbus, Ohio. The early examples of Harrop kilns in the N. Staffordshire potteries were of the large open flame type. *Dodd.*

harrots. York. Miners' term for dirty fusain bands in coal. *Tomkeieff, 1954.*

harrow. a. Aust. An apparatus used for mixing gold-bearing clays. *Fay.* b. A pole with teeth in it, which revolves in a puddling trough, to puddle auriferous clay. *Gordon.* c. An agricultural tool that loosens and works the ground surface. *Nichols.* d. *See* wash mill. *Dodd.*

harsh feel. Or unpleasantly rough, as actinolite. *Nelson.*

harsh mix. A concrete mix which is difficult to place and work because of the grading, shape, and texture of the aggregate and the proportions of cement and water. *Taylor.*

harstigite. An acid orthosilicate of manganese and calcium; occurs in small, colorless, prismatic crystals. From Sweden. *Fay.*

hartine. Same as hartite. *Tomkeieff, 1954.*

hartite. Hydrocarbon occurring in brown coal as transparent masses or small, waxy triclinic crystals. *Tomkeieff, 1954.*

Hartley gravimeter. An early form (1932) of gravimeter of the stable type consisting of a weight suspended from a spiral spring, a hinged lever, and a compensating spring for restoring the system to a null position. *A.G.I.*

hartleyite. A variety of oil shale from Hartley, New South Wales. *Tomkeieff, 1954.*

Hartmann lines. The same as Lüders lines. *ASM Gloss.*

hartsalz. Hard salt, a mixture of sylvinite and kieserite, with some anhydrite, found in the Stassfürt salt deposits. *Kaufmann.*

hartschiefer. A strongly banded and partly schistose rock; associated with other rocks of mylonitic habit, in which the alternating bands have been produced from ultramylonite by recrystallization and metamorphic differentiation. *Holmes, 1928.*

harvard brick. A term originally applied to clear, red, common brick, which were overburned, and especially so on one end or side, so that these harder burned parts were bluish-black. The name is more loosely used nowadays. *Fay.*

Harveyize. To subject the face of a steel plate to a process of cementation which increases the carbon in that portion of the plate, producing a plate with a comparatively soft body and a very hard face. *Fay.*

Harvey process. Method of carburizing the surface layers of low-carbon steel, followed up by rapid chilling. *Pryor, 3.*

harzburgite. A variety of peridotite that consists essentially of olivine and enstatite or bronzite. Saxonite was earlier proposed by Wadsworth (1884) for the same rock, and has priority. *Fay.*

Harz cat's-eye. A name sometimes used to mean any quartz cat's-eye, but more especially a variety from the Harz Mountains, Germany. It is usually inferior to the better qualities of Bavarian and Ceylonese quartz cat's-eye. *Shipley.*

Harz jig; plain eccentric jig. A jig in which pulsion is given intermittently with suction; the periods devoted to them are about equal. *Liddell 2d, p. 387.*

Hasenclever furnace. a. A vertical shaft furnace for calcining sulfide ore. *Fay.* b. A simple, efficient muffle furnace for roasting zinc ores in Upper Silesia, Poland. *Fay.*

Hasenclever-Helbig furnace. A roasting furnace having a hearth inclined at an angle of 43°. The ore descends over the hearth by gravity. *Fay.*

Hasenclever turntable. This type turntable is used as an alternative to the shunt-back or the traverser for changing the direction of mine cars or tubs, either on the surface or underground. A pulley driven by a creeper chain bringing along the cars is on the same vertical axis as the turntable and so disposed that when a car is on the table two of its wheels rest on its central pulley while the other two rest on the outer edge of the turntable. The friction between the table, the car and the positively driven pulley causes the table to rotate. The table remains motionless when there is no car upon it, even though the creeper chain is running; it only rotates when the chain pulls a car on to it and so provides the necessary friction. *Sinclair, V., p. 87.*

Hassall joint. A type of joint for glazed pipes designed by William Hassall in the late 19th century. Bitumen rings are attached to the outside of the spigot and the inside of the socket of the fired pipe; a thin smear of cement is rubbed around these rings just before the pipes are laid, the spigot of one pipe then being pushed into the socket of the next. Liquid cement is finally poured through holes in the socket to complete the joint. *Dodd.*

hassing. *See* hasson. *Fay.*

hassock. Eng. Soft calcareous sandstone. *Arkell.*

hassock bedding; hassock structure. *See* convolute bedding. *Pettijohn.*

hassock structure. *See* hassock bedding. *Pettijohn.*

hasson; hassing. Scot. A vertical gutter between water rings in a shaft. *See also* gauton. *Fay.*

hasson deal. Scot. A cover for a hasson. *Fay.*

hastelloys. Group of nickel alloys with good resistance to corrosion, endurance at high temperatures, and resistance to creep. *Pryor, 3.* Used in oilfield pump and valve parts to resist wear. *Bureau of Mines Staff.*

Hastings beds. A series of clay and sand deposits in the Lower Cretaceous of southeast England; the Fairlight Clays at the base of these deposits have been used for brickmaking near Hastings and Bexhill. *Dodd.*

hastingsite. A member of the hornblende series, $Ca_2NaMg_4Al_3Si_6O_{22}(OH,F)_2$; monoclinic. *Dana 17.*

hastite. Cobalt selenide, $CoSe_2$, orthorhombic (marcasite group). From Trogtal, Harz, Germany. *Spencer 21, M.M., 1958.*

hatch. a. Brist. A door or gate. *Webster 2d.* b. A stroke or line used in engraving or drawing to give the effect of shading. *Webster 3d.*

hatch conveyor. Any of several types of conveyors adapted to loading or unloading bulk materials, packages, or objects to or from ships or barges. *See also* belt conveyor; slat conveyor; portable conveyor. *ASA MH4.1-1958.*

hatchet stake. A small anvil on which to bend sheet metal. *Standard, 1964.*

hatchet stone. Nephrite. *Shipley.*

hatchettine. Synonym for hatchettite. *Fay.*

hatchettite; hatchettine. A yellowish-white, wax-yellow or greenish-yellow hydrocarbon with the approximate composition, C_nH_{2n}, usually found inside septarian nodules and geodes. It melts at 46° C, is sparingly soluble in boiling alcohol and cold ether, and is decomposed by concentrated sulfuric acid. *Fay; Tomkeieff, 1954.*

hatchettolite. A brown, uranium-rich pyrochlore occurring with samarskite in the pegmatites of Mitchell County, N.C. *Crosby, p. 78.*

hatching. Brist. An underground way or self-acting inclined plane, in a thin seam of coal, extending from 60 to 80 yards to the rise. *Fay.*

hatchite. A sulfarsenite of lead; triclinic; lead gray, minute crystals; from Binenthal, Switzerland. *English.*

hatch service system. In the hatch service system the miner does not enter the lamp room, but receives his lamp, before the start of the shift, from an issue hatch at one side of the service station. At the end of the shift he returns his lamp at a corresponding reception hatch at the opposite side of the lamp room. *Roberts II, p. 268.*

Hatfield process. Dielectric separation process. *Pryor, 3.*

Hatfield time yield. A short time criterion of creep test. A specimen placed under the time-yield stress should not show an extension exceeding 0.5 percent of the gage length in the first 24 hours, and during the next 48 hours should show no further extension, within a sensitivity of measurement of one ten-thousandths of an inch on a 2-inch gage length. This approximates a rate of creep of one-millionth of an inch per hour during this period. *Ham.*

hatherlite. A name proposed by Henderson for a syenite from South Africa which has for its feldspar, anorthoclase instead of orthoclase. Pilandite is a porphyritic phase of the same. *Fay.*

hat rollers. Hat-shaped metal guides for ropeways around bends. *Pryor, 3.*

hatter. Aust. A miner who works "under his own hat," that is, without a partner. *Standard, 1964.*

hatter blocks. Shrop. Cauldron bottoms. *Arkell.*

hatting. Aust. The labor of a miner who works alone. *Standard, 1964.*

haud off; hold off. Scot. Keep back. Called by a laborer pushing a full car to another meeting him with an empty one, the latter being obligated to get out of the way. *Fay.*

hauerite. Manganese disulfide, MnS_2. In octahedral of pyritohedral crystals; also massive. Color, reddish-brown or brownish-black. *Fay.*

haughtonite. A black variety of biotite rich in ferrous iron. A member of the mica group. *Hey 2d, 1955.*

haul. a. The distance from the coal face to pit bottom or surface, in drift mining; the distance quarry or opencast products must be moved to the treatment plant or construction site; the distance from the shaft or opencast pit to spoil dump. *Nelson.* b. To pull along the level by animals or mechanical means. *C.T.D.* c. Average haul—the average distance a grading material is moved from cut to fill. *Nichols.* d. In the construction of an embankment by depositing material from a cutting, the haul is the sum of the products of each load by its haul distance. *C.T.D.* e. To transport by pulling or drawing, as cars. *Standard, 1964.* f. The distance over which anything is hauled; as, a long or a short haul. *Standard, 1964.*

haulabout. A steel barge with large hatchways and coal transporters used for coaling ships. *Webster 3d.*

haulage. a. The drawing or conveying, in cars or otherwise, or movement of men, supplies, ore and waste both underground and on the surface. *Lewis, p. 196.* b. In dividing the transportation system according to the area served there is: (1) primary or face haulage; (2) secondary haulage; and (3) main-line haulage. *Kentucky, p. 210. See also* intermediate haulage; relay haulage; locomotive haulage; underground haulage. c. Applied generally to track mining as opposed to conveyor mining, although belt conveyor systems are sometimes referred to as belt haulage. *B.C.I.* d. The system of hauling coal out of a mine. *Korson.* e. S. Afr. A drive used for mechanical transport. *Beerman.*

haulage boss. In bituminous coal mining, a foreman who supervises mine haulage operations underground or at the surface. *D.O.T. 1.*

haulage brake. *See* brake. *Nelson.*

haulage cars. Rail haulage cars for surface or mine shaft operations are used to carry ore and equipment to and from the digging site. They may be of the trailer type or self-propelled, and include dump cars, flat cars, personnel cars, etc. *Bests, p. 372.*

haulage chain. In the early days chains were used in haulage in and around mines. Wire rope has displaced them. *Korson.*

haulage clip. a. A device to effect a secure attachment of tub to the haulage top, chiefly with endless rope haulage. The usual type attains the grip on the rope by two jaws which may be tightened by either a screw or a lever movement. The connection of the clip to the tub is usually made to the drawbar by a hook or link. The clip must maintain a sure grip on the rope and be capable of easy and quick manipulation. *Nelson.* b. Eng. Levers, jaws, wedges, etc., by which trams, singly or in trains, are connected to the haulage ropes. *Fay.*

haulage conveyor. Generally 500 to 3,000 feet in length. It is used to transport material between the gathering conveyor and the outside. Haulage conveyors are commonly classified as either intermediate or main haulage conveyors. *NEMA MB1-1961. See also* underground mine conveyors.

haulage curve. A bend in a haulage road, which may be horizontal, vertical or both. On main haulage roads, curves may be 100 feet radius or more. With a good rail track and smooth curves, haulage speeds up to 20 miles per hour can be maintained. A useful rule for determining the minimum radius of curvature for tramming is $R = 12$ to $15 \times W$; for locomotive haulage $R = 20$ to $25 \times W$, where W is the maximum wheel base of the rolling stock or locomotive. *Nelson.*

haulage drum. A large cylinder on to which the steel haulage rope is coiled. The rope is attached to the drum by passing it inside and looping it about the drum shaft, and securing the loose end to the rope by rope clamps. The excess length of rope is coiled around the drum to provide for recapping during its useful life. *Nelson.*

haulage hand. A workman fully employed on the haulage system in a mine. *Nelson.*

haulage level. Underground level either along and inside the ore body or closely parallel to it, usually in the footwall. In this level the mineral gravitated or drawn (slushed) down from overhand stopes or raised from underhand stopes is loaded into trams (tubs, trucks, cocopans) and sent out to the hoisting shaft. Haulageways include levels and connecting passages (crosscuts), and are also used to transport supplies, waste rock, and for movement of miners. *Pryor, 3.*

haulage mine locomotive. *See* electric haulage mine locomotive.

haulage plant. A mechanical installation for the tramming of rock, ore, or coal, operated by ropes, compressed air, or electricity. *Weed, 1922.*

haulage rope. a. A rope used for haulage purposes. *Zern.* b. A wire rope composed of 6 strands of 7 wires each. *Lewis, p. 248.*

haulage stage. A mine roadway along which a load is moved by a single form of haulage without coupling or uncoupling of cars and without transfer from one form of haulage to another. *Nelson.*

haulageway. The gangway, entry, or tunnel through which loaded or empty mine cars are hauled by animal or mechanical power. *Fay.*

haulaway. An excavation method which involves hauling the spoil away from the hole. *Nichols.*

haul-cycle time. The time it takes the scraper to haul a load to the dumping area and return to position in the loading area. *Carson, p. 84.*

haul distance. The distance measured along the center line or most direct practical route between the center of the mass of excavation and the center of mass of the fill as finally placed. It is the distance material is moved. *Nichols.*

hauler. Same as driver. *Fay.*

haulier. A mine worker who drives a horse pulling loaded coal trams from the face to the rope haulage or pit bottom and returns with the empty trams. Also called pony driver. *Nelson.*

hauling. The drawing or conveying of the product of the mine from the working places to the bottom of the hoisting shaft, or slope. *Zern.*

hauling engine. An engine employed to move tubs on an underground engine plane. *Peel.*

haul road. A road built to carry heavily loaded trucks at a good speed. The grade is limited on this type of road and usually kept to less than 17 percent of climb in direction of load movement. *Bureau of Mines Staff.*

haunch. a. That portion of an arch which is midway between the skewback and the crown. *A.R.I.* b. In pipe, the sides of the lower third of the circumference. *Nichols.*

haunt. Coal sold at the pithead. *See also* land sale. *Nelson.*

Haupt furnace. A gas-fired Silesian furnace with recuperative chambers for preheating the air for secondary combustion. *Fay.*

haurl. Scot. A claut; a scraper. *Fay.*

Hausherr DK9/51 drilling machine. A machine developed for underground drilling either for firedamp drainage or exploration. The DK9/51 is a compressed-air rotary drill with a 9 horsepower motor which provides a rotational speed of 160 revolutions per minute. Traversing is performed by a 4 horsepower motor driving a central feed spindle. A forward thrust of 6 tons is available. *See also* Nusse and Grafer PIV/6 drilling machine. *Nelson.*

hausmannite. A mineral, Mn_3O_4 or $MnO.Mn_2O_3$. In tetragonal octahedrons and twins; also granular massive, particles strongly coherent. Luster submetallic. Color, brownish-black. *Fay.*

Hauterivian. Lower Cretaceous between Valanginian and Barremian. *A.G.I. Supp.*

hauyne. *See* hauynite.

hauynite; hauyne. A blue feldspathoid, crystallizing in the cubic system, consisting essentially of silicate of aluminum and sodium with sodium sulfate, $(Na,Ca)_{4-8}Al_6Si_6O_{24}.(SO_4)_{1-2}$. *Dana 17.*

haüynitite. An intrusive or hypabyssal rock composed primarily of pyroxene (usually titaniferous augite) and haüyne. Minor minerals may be nepheline, leucite or other feldspathoids, and sometimes plagioclase or olivine, or both. Accessory apatie, sphene, and opaque oxides. With an increase of plagioclase, the rock passes into haüyne basalt (haüyne tephrite) and with an increase of olivine, it passes into olivine haüynitite. With an increase of both olivine and plagioclase, the rock becomes a haüyne olivine basalt (haüyne basanite). *A.G.I.*

haüynophyre. Synonymous in part with haüynitite, however, some rocks are called haüynophyre when haüyne is a conspicuous mineral, but not necessarily a major constituent. *A.G.I.*

Hauy's law. Every crystal of precise chemical structure and purity has a specific and characteristic shape. *Pryor, 3.*

Hauzeur furnace. A double furnace for the distillation of zinc wherein waste heat from one set of retorts is utilized for heating the second set. *Fay.*

hav Abbreviation for haversine. *BuMin Style Guide, p. 59.*

Hawaiian diamonds. Rock crystal. *Shipley.*

Hawaiian golden yellow topaz. Clear plagioclase feldspar. *Shipley.*

Hawaiian peridot. Peridot from near Hilo, Hawaii, in cut stones, sizes averaging about one-half carat. Same as hawaiite. *Shipley.*

hawaiite. a. A gem variety of olivine from the lavas of the Hawaiian Islands. It contains but little iron and is pale green. *English.* b. An obsolete name for andesine basalt and olivine-rich basalt. *A.G.I.*

hawaii type. In volcanology, an activity characterized by a fountaining lava lake in the crater. *Hess.*

Hawk pug. Trade name; a de-airing pug having two barrels in tandem, the first rotating around a fixed bladed shaft, whereas the second is fixed while the bladed internal shaft rotates. Each shaft is set slightly off center. *Dodd.*

hawk's-eye. A transparent colorless quartz containing closely packed, parallel fibers of crocidolite which impart to it a blue color. In form and sheen, it resembles tigereye to which it alters geologically. Differs from sapphire quartz, in which fibers are not parallel. Also spelled hawkeye. *Shipley.*

hawleyite. A mineral, cubic, CdS, dimorphous with greenockite, as a yellow powder on blende. *Compare* xanthochroite. *Spencer 21, M.M., 1958.*

hawse clay. A local English term for a clay that is crumbly but becomes plastic when worked up with water. *Dodd.*

hawser. a. Any wire rope used for towing on lake or sea. A fiber hawser consists of three strands laid up right-handed. *Zern.* b. A large rope, varying from 5 to 24 inches in circumference, of 6 to 9 strands and left-handed twist. *Standard, 1964.*

hawser laid. a. Of fiber rope, one with three strands of yarn twisted left-handed, these strands being laid up right-handed. *Pryor, 3.* b. If wire rope, it is called cable laid. *Pryor, 3.*

hawser rope. Wire rope usually consisting of 6 strands, 37 wires, and a hemp core, or 6 strands, 24 wires, and 7 hemp cores. *H&G, p. 130.*

haydenite. A variety of chabazite. *Hey 2d, 1955.*

Hayden process. A series method of electrolytic refining. Unrefined copper anodes are suspended in an acid electrolyte, one side of each then acts as an anode and the other as a cathode. *Pryor, 3.*

Haydite. Trade name; a lightweight expanded clay aggregate named after inventor, S. J. Hayde. *Dodd.*

haymake or haymaker. A term to describe the rehandling operation, or the machine used thereon, when such involves either the pulling back, or complete recasting of the waste, usually above and behind the excavator which itself is located on the spoil pile. *Austin.*

Hay mist projector. This projector can be made at any colliery workshop from a few short pieces of piping and an old oil drum. It may be fixed in the drum or in an open tank of larger capacity placed 12 to 15 yards back from the face of the hard heading. To the water in the drum, powdered washing soda is added at the rate of 4 ounces to 5 gallons of water. About 2 minutes before firing, compressed air is turned on and ejections of water in the form of a coarse mist fill the heading. This continues for a period of 6 minutes after the firing. In this manner, the heading is filled with a mist of droplets which outnumber the dust particles; the latter are effectively wetted or become attached to the droplets, with the result that the dust rapidly settles out of the air. This mist projector has a high efficiency, particularly where the ventilation current is low. *Mason, v. 1, pp. 305-306.*

hay rope. A rope made of hay, used in the making of foundry cores. The rope is wrapped around a core bar, then covered with loam, the hay forming a porous mass through which the gases may be carried off. *Crispin.*

Hayters clay. Eng. Tobacco-pipe clay, Isle of Wight. *Arkell.*

hazardous helper. Commonly used as a synonym for cathead. *Long.*

hazards. Eng. Ironstone nodules worked for iron in the Weald. Also called balls. *Arkell.*

haze. *See* dust. *Pryor, 3.*

hazel. a. Eng. Beds of fine-grained sandstone, lead measures; Carboniferous, Durham and Northumberland. *Arkell.* b. Eng. A hard condensed gritstone, which varies to freestone, flagstone, and chert, according to the locality. The term is peculiar to the North of England. *Arkell.* c. Hazel earth; hazel ground. Dry and loamy. *See also* dunstone. Also spelled hazle. *Arkell.* d. N. of Eng. In coal mining, a tough mixture of sandstone and shale. Also spelled hazle. *Fay.*

Hazelett process. A method for casting liquid metal or steel continuously into rolls for sheet or plate. The steel is poured on to the outer surface of a broad steel cylinder of very large diameter (up to 6 meters) which is supported and revolved by a roller turning inside it. The molten steel is carried a short distance to a roller revolving above the ring, which rolls the almost solidified steel into a thin plate or strip. *Osborne.*

Hazen and Williams formula. Friction head in pipes is commonly calculated by the formula:

$$H = \left[\frac{147.85}{C} \text{ X } \frac{Q}{D^{2.63}} \right]^{1.852}$$

where H = friction head in feet per 1,000 feet of pipe
Q = gallons per minute
D = diameter in inches

C is 100 for pipe of 15 years' service handling clear water and is the value generally used; 120 for smooth, new, wrought-iron pipe; 90 for 25-year old ordinary pipe. *Lewis, pp. 647-648.*

Hazen's law. A law relating to the permeability of soils, based on their effective grain size. *See also* effective size. *Ham.*

H-beam. *See* I-beam. *Ham.*

H bit. A core bit manufactured and used in Canada having set inside and outside diameters of 2.875 and 3.875 inches, respectively. The matching reaming shell has a set outside diameter of 3.906 inches. *Long.*

H casing. Flush-coupled and/or flush-joint casing, made and used in Canada, having a minimum inside diameter of 3-15/16 inches and an outside diameter of 4½ inches. *Long.*

H drill rod. A Canadian outside-flush-coupled drill rod having an outside diameter of 3½ inches, the couplings of which have an inside diameter of 1¼ inches. *Long.*

He Chemical symbol for helium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

HE Abbreviation for high explosive. *BuMin Style Guide, p. 59.*

head. a. Development openings in a coal seam. *Pryor, 3.* b. An advance main roadway driven in solid coal. *C.T.D.* c. The top portion of a seam in the coal face. *C.T.D.* d. Any road, level, or other subterraneous passage driven or formed in the solid coal, etc., for the purpose of proving and working the mine. *Fay.* e. Som. Any length of working faces. *Fay.* f. So. Staff. A shift or day's work by the stint in heading-out, or driving of dead work. *Fay.* g. The top end of the boring rods above the surface. *Fay.* h. To cut or otherwise form a narrow passage or head. *Fay.* i. A lift. *Fay.* j. In the plural, the purest ore obtained by washing; distinguished from middling, tailing, and slime, that are also used in the plural form. *Fay.* k. *See* sluice head. *Fay.* l. The attitude or direction of the set of parallel planes in a massive crystalline rock along which fracture is most difficult. It is normal to the direction of the strongest cohesion. *Fay.* m. A rammer for crushing gold quartz. *Fay.* n. Eng. An earthy deposit from rock decay. *Fay.* o. A layer of angular debris of adjacent strata, which generally overlies the raised beaches of England. *Standard, 1964.* p. As applied to rock, natural planes of cleavage at right angles to the grain and the rift of the rock. *Stauffer.* q. Rubble drift on the cliffs of southern England. *Standard, 1964.* r. Eng. *See* balk. *SMRB, Paper No. 61.* s. The circular plate that forms the end of a cylinder of a steam engine. *Fay.* t. *See* motive column. *Fay.* u. The difference in air pressure producing ventilation. *C.T.D.* v. The whole falling unit in a stamp battery, or merely the weight at the end of the stem. *C.T.D.* w. In hydraulics, pressure of water in terms of its effective height above a working level; equivalent pressure which must be overcome by a pumping system. *Pryor, 3.* x. In mineral processing, the mill head, or ore accepted by the mill for treatment. *Pryor, 3.* y. In gravity separation of a feed, the heads are the concentrates. Opposite of tail. *Pryor, 3.* z. Variously used as a synonym for core-barrel head; drill head; swivel head. *Long.* aa. Same as hydraulic head, a and b. *Long.* bb. The vertical distance the water must be raised from where it is picked up to where it is discharged. It is figured in feet. *Kentucky, p. 116.* cc. The back pressure against a pump from a high outlet. *Nichols, 2.* dd. The height of water above any point or plane of reference. Used also in various compounds, such as energy head, entrance head, friction head, static head, pressure head, lost head, etc. *Seelye, 1.* ee. A unit of pressure intensity usually given in inches or feet of a column of the fluid under consideration. Thus, 1 foot of water head is the pressure from a column of water 1 foot high. *Strock, 10.* ff. Head of water converted to pressure 2.307 feet of water will exert a pressure of one pound per square inch. As generally considered, 2½ feet of water develops a pressure of 1 pound. *Brantly, 2.* gg. Difference in elevation between intake and discharge points for a liquid. In geology, most commonly of interest in connection with the movement of underground water. *Leet.* hh. *See* promontory. *Schieferdecker.* ii. Total head (th). Also called head on pump. *Pit and Quarry, 53rd, Sec. E, p. 82.*

headache post. A timber set under the walking beam to prevent it from falling on members of the drilling crew when it is disconnected. *Williams.*

head bay. The water space immediately above the lock in a canal. *Fay.*

headblock. a. A stop at the head of a slope or shaft to stop cars from going down the shaft or slope. *Fay.* b. A cap piece *Fay.* c. A heavy obstruction placed endon across the rail to prevent the passage of a runaway mine car. *Hudson.* d. The crosstie that supports the toes of the switch. *Zern. p. 471.* e. Commonly used as a synonym for crown; block; derrick pulley; sheave wheel. *Long.*

headboard. a. A wedge of wood placed against the hanging wall, and against which one end of the stull is jammed. *Zern.* b. A horizontal board in the roof of a heading, touching the earth above and supported by a head tree at each side. *Ham.*

headbox. A device for distributing a suspension of solids in water to a machine, or for retarding the rate of flow, as to a top-feed filter or for eliminating by overflow some of the finest particles. *B.S. 3552, 1962.*

head cable. *See* hand cable.

head coal. Scot. Formerly, the stratum of a coal next the roof. More usually now, the top portion of a coal seam when left unworked, either permanently or to be afterwards taken down; the top coal on a loaded wagon. *Fay.*

head end. a. Usually the ultimate delivery end of a conveyor. *ASA MH4.1-1958.* b. That part of a mining belt conveyor which includes the head section, a power unit and, if required, the connecting section and a belt takeup. *NEMA MB1-1961.*

header. a. An entry-boring machine that bores the entire section of the entry in one operation. *Fay.* b. Brick or stone laid with the narrow end towards the face of a wall. *Mason.* c. The man in charge of driving a heading. Also called heading man. *C.T.D.* d. Pieces of plank—longer than a cap—extending over more of the roof and supported by two props, one at each end. *Ricketts, I.* e. A rock that heads off or delays progress. *Fay.* f. A blasthole at or above the head. *Fay.* g. A brick laid in a wall on its largest face with its longest dimension at right angles to the face of the wall. *A.R.I.* h. A masonry unit laid flat and with its greatest dimension perpendicular to the face of the wall; generally used to tie two wythes of masonry together. *ACSG after SCPI-52.* i. A large pipe into which one set of boilers is connected by suitable nozzles or tees, or similar large pipes from which a number of smaller ones lead to consuming points. Headers are often used for other purposes, as for heaters or in refrigeration work. Headers are essentially branch pipes with many outlets, which are usually parallel. Largely used for tubes of water-tube boilers. *Strock, 3.*

header tile. Tile designed to provide recesses for header units in masonry-faced walls. *ASTM C43-65T.*

headframe. a. The steel or timber frame at the top of a shaft, which carries the sheave or pulley for the hoisting rope, and serves various other purposes. *C.T.D.* Also called gallows frame; hoist frame; head stocks. *Hess.* b. The shaft frame, sheaves, hoisting arrangements, dumping gear, and connected works at the top of a shaft or pit. Also called headgear. *Pryor, 3.* c. Includes all the raised structure around the shaft which is used for loading and unloading cages. *Mason.* d. Can. Gallows over shaft to which cable for hoisting is attached. *Hoffman.*

headgate. A watergate or floodgate of any race or sluice. *Standard, 1964.*

headgear. a. That portion of the winding machinery attached to the headframe, or the headframe and its auxiliary machinery. *Fay.* b. The frame which supports pulleys over a shaft. *Hudson.* c. The headframe of a mine shaft. *Mason.* d. The part of a drilling machine or apparatus that remains on the surface at the collar of a borehole. The term is seldom so used by drill operators in the United States, as they apply it to protective head coverings worn by miners, aviators, and soldiers—similar to head coverings referred to as tin hats or safety hats by drillers. *Long.* e. See headframe. *Pryor, 3.*

head grain. *See* hard way. *AIME, p. 326.*

head hitcher. The man in charge of signals, loading, and unloading at shaft bottom in a mine. *C.T.D.*

headhouse. a. A covered timber framing at the top of a shaft, into which the shaft guides are continued that carry the cage or elevator. The term is sometimes applied to the structure containing the hoisting engine, boilers, and other machinery, in addition to the actual hoisting cage, etc. *Stauffer.* b. The house or building that encloses the headframe. *See also* gallows frame. *Fay.* c. Also, the structure on a hillside to control the lowering of coal to the tipple. *B.C.I.*

heading. a. A passage leading from the gangway. The main entry in a coal mine is laid out with the precision of a main avenue in a city. From it at right angles headings run like cross streets, lined on each side with breasts, or chambers. *Korson.* b. A smaller excavation driven in advance of the full-size section; it may also be driven laterally, and is then called a cross heading or side drift. A heading may be driven at the top or the bottom of the full-size face; it is then a top or a bottom heading as the case may be. *Stauffer.* c. The vein above a drift. *See also* back, a. *Fay.* d. An interior level or airway driven in a mine. *Fay.* e. In longwall workings, a narrow passage driven upward from a gangway in starting a working in order to give loose end. *Fay.* f. A continuous passage between two rooms, breasts or other working places. *Fay.* g. Ark. The narrow part of an entry near the working face. *Fay.* h. The operation of driving a head. *Fay.* i. Scot. The top portion of the load above the tub (car) sides. *Fay.* j. A collection of close joints. *Fay.* k. Sometimes applied to the preliminary drift or pioneer bench in tunnel driving. *Fay.* l. A road in the solid strata but also in the seam; a road in solid coal. *Mason.* m. A rising road. *Mason.* n. In a tunnel, a digging face and its work area. *Nichols.* o. The end of a drift, gallery, or tunnel. *Sandstrom.* p. N. of Eng. A roadway being driven, generally in the coal seam, in a headways direction. *Trist.* q. Can. Underground passage in mine, drift, or crosscut, being driven toward a definite objective. *Hoffman.* r. Eng. A leading place driven to open out a district. Also called narrow winning; winning. *SMRB, Paper No. 61.* s. A gangway, entry, or airway. *Hudson.* t. The gravel bank above a sluice in a placer. *Standard, 1964.* u. Passageway through solid coal. *C.T.D.* v. A term applied to the face that is being advanced by the mining operation. *Bureau of Mines Staff.*

heading-and-bench. A method of tunneling in hard rock. The heading is in the upper part of the section and is driven only a round or two in advance of the lower part or bench. *Fraenkel.*

heading-and-bench mining. A stoping method used in thicker ore where it is customary first to take out a slice or heading 7 or 8 feet high directly under the top of the ore and then to bench or stope down the ore between the bottom of the heading and the bottom of the ore or floor of the level. The heading is kept a short distance in advance of the bench or stope. This system is termed heading-and-bench or heading-and-stope mining. *BuMines Bull. 390, 1936, pp. 41-42.*

heading-and-drifting system. *See* rearer workings.

heading and stall. *See* room-and-pillar. *Fay.*

heading-and-stope mining. See heading-and-bench mining. *BuMines Bull. 390, 1936, p. 42.*

heading blast; coyote-hole blasting. A method of quarry blasting in which the explosive is confined in small tunnel chambers inside the quarry face. The charges are placed at suitable intervals according to the burden to be blasted. In large blasts, several tunnels and cross tunnels may be employed. Heading blasts have been superseded largely by well-hole blasts. *Nelson.*

heading bond. The laying of all courses of brick in a wall as headers with broken vertical joints. *A.R.I.*

heading course. A continuous bonding course of header brick; also called header course. *ACSG.*

heading driver; entryman. A miner who drives a heading, entry, drift, or adit. *Fay.*

heading man. *See* header, c. *C.T.D.*

heading-overhand bench; inverted heading and bench. The heading is the lower part of the section and is driven at least a round or two in advance of the upper part, which is taken out by overhand excavating. *Fraenkel.*

headings. a. Coarse gravel or drift overlying placer deposits. *Fay.* b. That portion of a vein which is above a level. *Fay.* c. Highly jointed parts of granite. *Arkell.* d. In ore dressing, the heavier portions collecting at the upper end of a buddle or sluice as opposed to the tailings, which escape at the other end, and the middlings, which receive further treatment. Also called concentrates. *See also* heads. *Fay.*

heading seam. *See* joint, a. *Fay.*

heading side. The underside of a lode. *See also* heading wall. *Fay.*

heading tool. A tool for swaging boltheads, or for forming boltheads, etc., in hand forging. *C.T.D.*

heading wall. The footwall or lower wall of a lode along which the heading is run. *Fay.*

head joint. The vertical mortar joint between ends of masonry units; sometimes called the cross joint. *ACSG.*

headland. A portion of land jutting into a body of water. *Hy.*

headline. In dredging, the line which holds the dredge up to its digging front. This line is anchored well ahead of the dredgepond or paddock and attached to a winch on the dredge. Lateral movement is controlled by sidelines similarly led from winches to land anchorages, usually two on each side. *Pryor, 3. See also* sideline, a. *Fay.*

headman. a. One who works at top of haulage slope of plane, engaging or disengaging clips or grips by means of which mine cars are attached to a cable for haulage along the incline. Also called head tender; top slopeman. *D.O.T. 1.* b. *See* cager, a. *D.O.T. 1.* c. N. of England. In a colliery, one who brings coal from the workings to the tramway. *Webster 2d.* d. *See* pusher, a. *D.O.T. 1.*

head mast. In a cable excavator, the tower that carries the working lines. *Nichols.*

head motion. Vibrator of shaking table which imparts reciprocating motion to the deck. *Pryor, 3.*

head on pump. *See* head. *Pit and Quarry, 53rd, Sec. E, p. 82.*

head picker. In bituminous coal mining, a foreman who supervises removal of slate and other impurities from coal. Operates picking tables (power-driven endless belts or shaker conveyors) on which coal is run to be picked free from impurities by slate pickers. *D.O.T. 1.*

headpiece. A cap; a collar. *Fay.*

head piles. The top poling boards in a heading. *Stauffer.*

head pulley. a. The discharge pulley of the conveyor. It may be either an idler pulley or a drive pulley. A head pulley which is mounted on a boom is termed an extended head pulley; a head pulley which is separately mounted is termed a detached head pulley. *NEMA MB1-1961.* b. The crowned pulley or idler mounted at the extreme front end or delivery point of a belt conveyor. The belt, after passing around this pulley, begins its travel toward the tail end or foot section of the conveyor. *Jones.*

head-pulley-drive conveyor. A conveyor in which the belt is driven by the head pulley without a snub pulley. *NEMA MB1-1961.*

head-pulley-snub-drive conveyor. A conveyor in which the belt is driven by the head pulley with a snub pulley. *NEMA MB1-1961.*

headrace. a. Sluice, leat, or launder which leads water to head of operation or to waterwheel. *Pryor, 3.* b. A forebay. *Seelye, 1.* c. An aqueduct for bringing water. *Gordon.*

head rights. A term which has been employed to describe undivided interests in minerals. *Williams.*

headroom. a. Distance between the drill platform and the bottom of the sheave wheel. *Long.* b. Height between the floor and the roof in a mine opening. *Long.*

headrope. In any system of rope haulage, that rope which is used to pull the loaded transportation device toward the discharge point. In scraper loader work, the headrope pulls the loaded scoop from the face to the dumping point. *Jones.*

heads. a. In New York and Pennsylvania, a local term applied by bluestone quarrymen to the open joints that run north and south. *Fay.* b. Eng. *See* headings, d. *Fay.* c. Scot. Large top coal on a loaded hutch. *Fay.* d. Aust. Small faults. *Fay.* e. Low-grade wash overlying the wash proper. *Nelson.* f. Can. Material taken from ore in treatment plant and containing the valuable metallic constituents. Opposite of tails. *Hoffman.* g. In ore dressing, the feed to a concentrating system is called the heads. *Newton, p. 84. See also* head, j. *Fay.*

head section. a. That part of a mining belt conveyor which consists of a drive pulley or pulleys, a head pulley which may or may not be a drive pulley, belt idlers if included, and the framing necessary to support these parts. The head pulley may be integral or detached. *NEMA MB1-1961.* b. A term used in both belt and chain conveyor work to designate that portion of the conveyor used for discharging the coal. *Jones.*

head shaft. The shaft mounted at the delivery end of a chain conveyor, on which is mounted a sprocket which drives the drag chain. The shaft, in turn, is driven by means of a drive chain from the speed reducer of the power unit through a sprocket mounted on the shaft end. *Jones.*

head sheave. Pulley in headgear of winding shaft over which the hoisting rope runs. *Pryor, 3. See also* winding sheave.

head side. N. Staff. The rise side of a heading driven on the strike. *Fay.*

head space. The unfilled space in a glass container fitted with a closure device. *ASTM C162-66.*

headsticks; headtree; heapstead. Headgear; headframe. *Mason.*

headstocks. Gallows frame; headframe. *Fay.*

headsword. Corn. Water discharged through the adit level. *Fay.*

head tank. Any tank or vessel in the water circuit which is used to control the delivery pressure of the water to the washing units. *B.S. 3552, 1962.*

head tender. *See* headman. *D.O.T. 1.*

head tin. *See* headings. *Pryor, 3.*

headtree. a. The horizontal timber at each side of a rectangular heading which supports the headboard. *See also* side trees. *Ham.* b. Eng. A piece of wood, on top of a prop, to support the roof, Newcastle coalfield. *Fay.* c. The cap piece of a heading set. *Stauffer.* d. Eng. A piece of wood set on a prop. The term cap is sometimes used to indicate the piece of timber placed between the top of a prop and a balk or girder on a roadway. Also called cap; lid. *SMRB, Paper No. 61.*

head value. The assay value of the heads or mill feed. *Nelson.*

headwall. a. Retaining wall at both ends of a culvert or similar structure. *Ham.* b. A culvert sidewall; sometimes only the upstream wall. *Nichols.*

headwater. a. The water up stream from a structure. *Seelye, 1.* b. The source of a stream. *See also* forebay. *Seelye, 1.*

headwater erosion. As the tributaries of the main stream eat back, and as secondary tributaries develop from these, and still others from these, the flat-topped divides are narrowed and more and more of the surface has slopes down which the runoff can flow. This extension of the tributaries is accomplished by gnawing back at the upper portion, a process that may be called headwater erosion. *A.G.I.*

headway. a. Eng. The second set of excavations in post-and-stall work. *See also* crossheading. *Fay.* b. N. of Eng. The direction of the cleat or a place driven parallel with the cleat, that is, end-on. *Fay.* c. The principal cleat in coal. *Arkell.* d. Primarily a road or gallery in a coal mine parallel to the principal cleat. Also called headway course. *Arkell.* e. N. of Eng. Parallel with the main cleavage plane or cleat of the coal. In Durham, this runs north and south. *Trist.* f. Eng. A place advancing parallel to the main cleavage planes of the coal. In Cumberland, it is called an end when winning out, and a pointing when driven to connect two bords to form a pillar. Also called end; end on; (face of coal) on end. *SMRB, Paper No. 61.*

headwork. a. The headframe with the headgear. *Webster 2d.* b. Ark. The cutting and other work done at the face of an entry. *Fay.*

healing. a. Eng. Fissile sandstone used for roofing slates, Wealden beds, Horsham, Sussex. *Arkell.* b. The ability of a glaze to cover any areas of the ware that may have been damaged before the glaze has been fired on; this depends on a correct combination of surface tension and viscosity at the glost-firing temperature. *Dodd.*

healing power. The ability of a glaze to heal surface blemishes during firing. *ASTM C242-60T.*

healing stone. *A* slate or tile for roofing. *Fay.*

health hazards. The danger to health arising from exposure to ionizing radiation. It may be due to external irradiation or to radiation from radioactive materials within the body. *NCB.*

health physics. That branch of radiological physics dealing with the protection of personnel from the harmful effects of ionizing radiation. It includes the routine procedures of radiation protection surveys; area and personnel monitoring; recommendation of appropriate protective equipment and procedures; determination of acceptable standards of operation; and solution of problems incident to the effective and practical protection of all persons from the harmful effects of radiation. Out of this last phase has grown the study of environmental hazards, including the accumulation of radioactive material by plants and animals, and possible injury to humans ultimately utilizing these in food. *NRC-ASA N1.1-1957.*

Heady-Sullivan process. *See* hydrogen-treating process. *Dodd.*

heap. a. Newc. The refuse at the pit's mouth. *Fay.* b. Scot. To load up a tub (car) above the top of the sides. *Fay.* c. The soil carried above the sides of a body or bucket. *Nichols.*

heaped capacity. In scraper loading, a term used to describe the volume of material the scraper will hold when the material is heaped. Frequently, sideboards are added to increase the heaped capacity. Heaped capacity will exceed struck capacity by approximately one-third, depending upon the heaping condition assumed. *Carson, p. 78.*

heap keeper. a. N. of Eng. A man who looks after the sorting and cleaning of the coal at the surface, and keeps things in order about the shaft. *Fay.* b. In bituminous coal mining, a laborer who sorts and cleans slate and other impurities from heaps of coal at the mine surface. *D.O.T. 1.*

heap leaching. A process used for the recovery of copper from weathered ore and material from mine dumps. The material is laid in beds alternately fine and coarse until the thickness is roughly twenty feet. It is treated with water or the spent liqour from a previous operation. Intervals are allowed between watering to allow oxidation to occur, and the beds are provided with ventilating flues to assist the oxidation of the sulfides to sulfate. The liquor seeping through the beds is led to tanks, where it is treated with scrap iron to precipitate the copper from solution. This process can also be applied to the sodium sulfide leaching of mercury ores. *Bureau of Mines Staff.*

heap matte. Matte produced by heap roasting. *Fay.*

heap roasting. Removal of sulfur from pyritic ore by burning in heaps, perhaps with aid of fuel. *Pryor, 3.*

heap sampling. Method of reducing a large sample of ore to yield from the fraction retained a representative sample. A conical heap is made by shoveling the material accurately on to the apex so that it runs down equally all around. The heap can then be flattened somewhat by rubbing with a spade, and is shoveled into four equal heaps, the same amount being taken from the base of the cone each time as the worker goes around. Of the four smaller heaps thus formed, two are discarded and two retained. These may now be crushed to improve the ease of thorough mixing, and are then formed into another cone in the same way as the first. The process is repeated, with periodic size reduction of the retained portions, until the required small sample has been produced. *Pryor, 3.*

heapstead. The buildings and surfaced works around a colliery shaft. *C.T.D.*

hearth. a. That part of the furnace in which heat is developed for the purpose of melting glass. *C.T.D.* b. The bottom portion of certain furnaces, such as the blast furnace, air furnace, and other reverberatory furnaces, in which the molten metal is collected or held. *ASM Gloss.* c. A plate or table upon which cylinder glass is flattened. *Standard, 1964.*

hearth accretions. *See* sow, d. *Fay.*

hearth and bosh brick. Fire clay brick for use in lining the hearth walls and bosh sections of a blast furnace. *A.R.I.*

hearth bottom. A furnace bottom soaked to some depth with metal. *Fay.*

hearth cinder. Slag produced in refining metals. *Fay.*

hearth ends. Particles of unreduced lead ore expelled by the blast from a furnace. *Fay.*

hearth furnaces. Furnaces in which the charge rests on the hearth or kiln wall and is heated by hot gases passing over it. Even though hearth furnaces such as the multiple-hearth roasting furnace and rotary kilns operate on the same basis as reverberatory furnaces, they bear little resemblance to them. *Newton, p. 280.*

hearthplate. A cast-iron plate serving as a sole for a refiner's furnace. *Standard, 1964.*

hearth roasting. A roasting process in which the ore or concentrate enters at the top of a multiple hearth roaster and drops from hearth to hearth in succession until it is discharged at the bottom. In the downward progress of the ore, the sulfide particles are roasted as they come in contact with the heated air. *Newton, p. 289.*

heart joint. Scot. A particular form of attachment joint between the bucket rod and the foot rod of a pump. *Fay.*

heart shake. A defective condition of timber shown by cracks extending from the heart outward. *Standard, 1964.*

heart-shaped brilliant. A heart-shaped variation of the pendeloque; usually with a large table and a shallow crown. *Shipley.*

heart wall. A wall hearted with filling of concrete or other material. *Standard, 1964.*

heat. a. The material heated, melted, etc., at one time; as, the foundry runs three heats a day. *Standard, 1964.* b. One operation in a heating furnace, Bessemer converter, puddling furnace, or other furnace not operating continuously. *Fay.* Each batch of steel made in a furnace is known as a heat. *Newton, p. 311.* c. Eng. The elevated temperature produced by spontaneous combustion in a mine. *Fay.* d. Form of energy generated or transferred by combustion, chemical reaction, mechanical means or passage of electricity, and measurable by its thermal effects. *Pryor, 3.* e. The energy which a body possesses because of the motion of its molecules. *Jones, 2, p. 58.*

heat-absorbing glass. Glass having the property of absorbing a substantial percentage of radiant energy in the near infrared of the spectrum. *ASTM C162-66.*

heat-affected zone. That portion of the base metal which was not melted during brazing, cutting, or welding, but whose microstructure and physical properties were altered by the heat. *ASM Gloss.*

heat balance. a. In furnaces, heat engines, etc., the distribution of the known input of energy (as heat); also, the method of determining, or the graphical or tabular record of, such distribution. *Bureau of Mines Staff.* b. In fluidization roasting, the thermodynamic calculation used to control addition or removal of heat in order to maintain the desired temperature in the reacting vessel. *Pryor, 3.*

heat budget. The total amount of the sun's heat received on the earth during any one year must exactly equal the total amount which is lost from the earth by reflection and radiation into space. The portion reflected by the atmosphere does not affect the earth's heat budget. The portion absorbed must balance the long-range radiation into space from the earth's entire system. That portion absorbed into the oceans causes the surface warming critical to the phenomenon of layer depth. Transport by currents further extends the distribution of heat. *See also* heat transport. *Hy.*

heat capacity. a. Of a substance, heat per unit of mass, per degree of rise, required to produce a very small rise in temperature. *Bureau of Mines Staff.* b. Of a body, heat, per degree of rise, required to heat the body. *Bureau of Mines Staff.* c. The quantity of heat necessary to raise the temperature of a system or a substance by 1 degree of temperature, usually express in calories per degree centigrade. *Compare* specific heat. *Lowenheim.*

heat check. A pattern of parallel surface cracks that are formed by alternate rapid heating and cooling of the extreme surface metal, sometimes found on forging dies and piercing punches. There may be two sets of parallel cracks, one set perpendicular to the other. *ASM Gloss.*

heat conduction. The oceans receive heat by conduction through the sea bottom. Since the amount is very small, 50 to 80 gram calaries per square centimeter per year, it is neglected when considering the heat budget. This amount of heat coming from the bottom does not affect sound propagation. *Hy.*

heat content, rate of change in. Rate of change in heat content or enthalpy of air per unit time. May be sensible, latent, or total. Measured in British thermal units per hour. *Hartman, p. 8.*

heat cramps. Painful spasms of the muscles, especially those of the abdomen and limbs, after prolonged exposure to high temperature while engaged in strenuous labor. The cramps may be slight or may be severe enough to cause convulsions. *Kentucky, p. 380.*

heated stone. A stone that has been artificially heated to the proper temperature with the intention of improving or completely altering its color. The induced color is permanent in varieties, such as hyacinth, burnt amethyst, etc.; less permanent in blue zircon. *See also* stained stone. *Shipley.*

heat energy. Energy in the form of heat. *Standard, 1964.*

heat engine. A mechanism (as an external-combustion or an internal-combustion engine) for converting heat energy into mechanical energy. *Webster 3d.*

heater. a. One of the workmen who assists in the operation of rolling large, steel armor plates. *Standard, 1964.* b. In the coke products industry, one who regulates the temperature of heating flues and combustion of fuel gas used to heat coal in a byproduct coke oven. *D.O.T. Supp.*

heater drain pump. Self-regulating pumps capable of dealing with water at fairly high temperatures and pressures. They are used to return heater condensate to the feed line instead of to waste. *Sinclair, IV, p. 125.*

heat exchanger. Any device that transfers heat from one fluid to another or to the environment. *L&L.*

heat exhaustion. Collapse from the effect of heat, from the sun, or from other sources. It occurs more often when the humidity is high. The patient is seldom unconscious but may feel weak. The face appears pale and is usually covered with cold perspiration. *Kentucky, p. 380.*

heath. Eng. Sand of firm consistence, Purbeck beds, Whitchurch and Quainton, Buckinghamshire. *Arkell.*

heat-hardening finish. *See* stoving finish. *Bennett 2d, 1962.*

heath coal. Heath or tough coal. *Arkell.*

heathen. a. Eng. Applied to a bed of coal immediately below the 10 yard coal, Staffordshire. *Fay. See also* heath coal. *Tomkeieff, 1954.* b. S. Staff. The bottom coal seam. *Compare* sarsen. *Arkell.* c. Dark inclusions in granite. Same as furreners. *Arkell.*

heathing. *See* heath coal. *Tomkeieff, 1954.*

heath peat. Peat derived chiefly from decomposed heather. *Standard, 1964.*

heath stone. a. Som. A 5-inch limestone bed used for curbs, Lower Lias, Keinton Mandeville. *Arkell.* b. Eng. Ferruginous sandstone in the Bagshot sands, scattered over the Dorset heaths (for example, the agglestone and puckstone). *Arkell.* c. *Compare* moorstone; carstone. *Arkell.*

heating back. A chamber back of a forge in which the air intended for the blast is heated. *Standard, 1964.*

heating curve. A rising temperature curve. *Bureau of Mines Staff.*

heating furnace. The furnace in which blooms or piles are heated before hammering or rolling. *Fay.*

heating medium. A fluid used for conveying heat from a heat source to heat dissipating devices; includes air, water, and steam. *Strock, 10.*

heatings. The heat generated before an actual fire occurs. Heatings, or incipient fires, are detected in mines by smell and by analysis of air samples. In mines liable to spontaneous combustion, trained officials and workmen are employed to detect and deal with heatings and fires and they become expert in these duties. *Sinclair, I, pp. 285-286.*

heating surface. a That surface in a steam boiler or similar apparatus from which heat passes to the liquid to be evaporated or heated; the fire surface. *Standard, 1964.* b. Broadly, the area intended for transferring heat. *Strock, 10.*

heating tendency. The ability of a coal to fire spontaneously. This phenomenon can occur whenever the heat generated from oxidation reactions in a coal exceeds the heat dissipated. This characteristic varies for different types of coals and even for coals of the same classification but of different origin. *R. I. 6221, 1963, p. 2.*

heating tube. A water tube exposed to the fire in a steam boiler. *Standard, 1964.*

heat intolerant. *See* acclimatization. *Roberts, I, p. 132.*

heat of adsorption. Quantity of heat evolved in adsorption of a definite quantity of gas on a bare surface. *Osborne.*

heat of combustion. The heat of reaction resulting from the complete burning of a substance and expressed variously (as in calories per gram or per mole, or especially for fuels in British thermal units per pound or per cubic foot). *Webster 3d.*

heat of compression. As air passes down shafts and along inclined workings it is compressed. Heat is always generated when air is compressed, and although the reverse process of decompression and cooling takes place as the air ascends the upcast shaft, the net effect is to raise the air temperature underground. *Mason, v. 1, p. 191.*

heat of crystallization. Heat evolved when unit weight of a salt crystallizes from a large amount of a saturated solution. *Osborne.*

heat of dilution. The quantity of heat absorbed or evolved upon diluting a solution with water, or upon mixing a strong solution with a weaker solution of the same substance. It is usually expressed as British thermal units per pound, or calories per kilogram. *Osborne.*

heat of formation. The number of calories absorbed when 1 gram-molecular weight of a compound is formed from its elements. *Newton, p. 123.*

heat of fusion. The latent heat required to change a solid to a liquid. *MacCracken.*

heat of hydration. The quantity of heat liberated or consumed when a substance takes up water. *Osborne.*

heat of ionization. The quantity of heat that is absorbed when 1 gram equivalent of a substance is broken up completely into positive and negative ions. *Osborne.*

heat of linkage. The energy necessary to break a chemical bond. *Osborne.*

heat of liquid. The heat necessary to raise the temperature of the liquid, as distinguished from the heat of vaporization. *Strock, 10.*

heat of mixture. That quantity of heat evolved when two liquids which do not react together are mixed. It is calculated from the temperature change and the specific heat of the mixture, and expressed in gram-calories per gram of mixture. *Osborne.*

heat of neutralization. Amount of heat evolved when 1 gram equivalent of an acid is neutralized by a base. *Osborne.*

heat of reaction. a. The quantity of heat consumed or liberated in a chemical reaction, as heat of combustion, heat of neutrtlization, or heat of formation. *Hackh's Chem. Dict.* b. The number of calories of heat absorbed when 1 gram-atomic weight of carbon reacts with 1 gram-molecular weight of oxygen to form 1 gram-molecular weight of carbon dioxide. *Newton, p. 123.*

heat of solution. The quantity of heat liberated or consumed when a solid is dissolved in a liquid. *Osborne.*

heat of transformation. The quantity of heat accompanying a constitutional change in a solid chemical compound or metal, for example, the change from gamma to alpha iron. The temperature at which one crystalline form of a substance is converted into another solid modification is known as the transition point or transition temperature. *Osborne.*

heat of vaporization. The latent heat required to change a liquid to a gas. *MacCracken.*

heat of wetting. Heat evolved or absorbed when a liquid and a solid surface are placed in contact. *Osborne.*

heat pump. A mechanical refrigerating system used for air cooling in the summer and which, when the evaporator and condenser effects are reversed, absorbs heat from the outside air or (water) in winter and raises it to a higher potential so that it also can be used for winter heating. *Strock, 10.*

heat recuperation. The recovery of heat from waste gases. *Fay.*

heat-resisting glass. Glass able to withstand high thermal shock, generally because of low-expansion coefficient. *ASTM C162-66.*

heat-resisting steel. A steel with high resistance to oxidation and moderate strength at high temperatures; that is, above 500° C. Alloy steels, of a wide variety of compositions, which usually contain large amounts of one or more of the elements chromium, nickel, or tungsten, are used. *C.T.D.*

heat-setting fire clay mortar. A refractory mortar consisting substantially of clays and grog but incorporating ingredients which develop a bond at a lower temperature than would occur otherwise. *A.R.I.*

heat-setting refractories. Compositions of ground refractory materials which require relatively high temperatures for the development of an adequate bond, commonly called the ceramic bond. *HW*.

heat-shock test. Designed to indicate comparative resistance of enamelware to rapid temperature fluctuations. *ACSB-3*.

heat sink. Anything that absorbs heat; usually part of the environment, such as the air, a river, or outer space. *L&L*.

heat-strengthened glass. Sheet glass, cut to size, heated to softening point then quickly and uniformly chilled by blast of cold air. *Bennett 2d, 1962 Add*.

heat tablets; heat-sickness tablets. Ten-grain compressed vacuum-pan salt tablets, sometimes with dextrose, starch, or other additives to aid in disintegration, for relief of thermoplegia, heat sickness. *Kaufmann*.

heat tinting. Coloration of a metal surface through oxidation by heating to reveal details of the microstructure. *ASM Gloss*.

heat tolerant. Applied to individuals whose bodies are constitutionally capable of adapting to sudden changes in heat conditions. *Spalding, p. 261*.

heat transmission coefficient. *See* coefficient of heat transmission. *Strock, 10*.

heat transport. Meteorological phenomena account for most heat transport. Ocean currents, however, are considered of major importance. The transport of heat by a unit volume of ocean water is a function of the specific heat, density, the temperature and the north-south component of the velocity, if the transport of heat from the equator toward the poles is being considered. *Hy*.

heat-treatable alloy. An alloy hardenable by heat treatment. *ASM Gloss*.

heat-treated. A term sometimes used for tempered glass. *See also* tempered glass. *ASTM C162-66*.

heat-treated stone. Same as heated stone. *Shipley*.

heat-treating machine, automatic. *See* Gilman heat-treating machine. *Lewis, p. 97*.

heat treatment. Heating and cooling a solid metal or alloy in such a way as to obtain desired conditions or properties. Heating for the sole purpose of hot working is excluded from the meaning of this definition. *ASM Gloss*.

heat unit. A unit of quantity of heat; the heat required to raise the unit mass of water through 1 degree of temperature. *Standard, 1964*. *Compare* calorie; British thermal unit. *Fay*.

heat value. The amount of heat obtainable from a fuel and expressed, for example, in British thermal units per pound. *Shell Oil Co*.

heat work. An imprecise term denoting the combined effect of time and temperature on a ceramic process. For example, prolonged heating at a lower temperature may result in the same degree of vitrification in a ceramic body as a shorter period at a high temperature; a similar amount of heat work is said to have been expended in the two cases. *Dodd*.

heave. a. The horizontal component of the slip, measured at right angles to the strike of the fault. Used by J. E. Spurr and A. Geikie for offset. Used by Jukes Brown for strike slip. *Fay*. b. A rising of the floor of a mine caused by its being too soft to resist the weight on the pillars. *Fay*. c. Horizontal displacement of strata or other rocks along a fault, as opposed to the throw or vertical displacement. *Arkell*. d. Upthrow. *Arkell*. e. Displacement of mineral vein by faulting. Lifting of floor of underground working through rock pressure. *Pryor, 3*. f. Fault or throw in a lode. *Gordon*. g. Eng. *See* creep. *SMRB, Paper No. 61*. h. Upward movement of soil caused by expansion or displacement resulting from phenomena, such as moisture absorption, removal of overburden, driving of piles, and frost action. *ASCE P1826*.

heave fault. A fault in which there has been horizontal movement along a fault plane that is steeply inclined. *Stokes and Varnes, 1955*.

heaven stone. Benitoite. *Shipley*.

heavily watered. Scot. Said of a colliery when the escape of water from the strata into the shaft or workings is abundant, requiring powerful pumping machinery. *Fay*.

heaving. Applied to the rising of the bottom after removal of the coal. *Jones*. *See also* creep.

heaving earth. Shrop. Clay which swells on absorbing water. *Arkell*.

heaving shale. a. A condition in which shale squeezes into a drill hole. This often occurs adjacent to faulted traps where the shale is under considerable pressure, though gas pressure within the formation and the nature of clay minerals in the shale have an important contributing effect. *A.G.I.* b. Drillers name for incompetent shale. *See also* incompetent, b. *BuMines R.I. 3618, 1942, p. 5*.

heavy. The hollow sound produced when knocking on a mine roof, which is loose. *Fay*.

heavy burden. *See* burden, j.

heavy chemical. A chemical produced and handled in large lots (as 1 ton or more per day) and often more or less in a crude state. Applied especially to acids (sulfuric acid, for example), alkalies, and salts (aluminum sulfate, for example). *Webster 3d*

heavy concrete. Concrete made with specially selected heavy aggregate for radiation screening purposes. *Taylor*.

heavy crop. In the systematic examination of a sediment, the small quantity of accessory minerals it contains is separated from the predominant quartz by passing the whole through bromoform. Quartz and feldspar are lighter than the latter and, therefore, float on its surface; but the accessory minerals, such as zircon, rutile, anatase, brookite, kyanite, and iron ores, sink to the bottom of the container and may be speared for detailed examination. The grains heavier than bromoform constitute the heavy crop, which provides valuable evidence of the provenance of the sediment. *C.T.D*.

heavy fire. N. of Eng. An extensive and severe explosion. *Fay*.

heavy fuel. A very viscous oil used for fuel. *API Glossary*.

heavy gold. When gold is found in large particles. *Gordon*.

heavy ground. Dangerous hanging wall, which needs special vigilance through possibility of fall of rock. Sounds hollow when rapped. *Pryor, 3*.

heavy hydrogen. *See* deuterium. *L&L*.

heavy joist. Timber over 4 inches and less than 6 inches in thickness and 8 inches or over in width. *Crispin*.

heavy liquid separation. Separation of ore particles by allowing them to settle through, or float above, a fluid of intermediate density. Important laboratory technique, but now obsolescent in production practice. *Pryor, 3*.

heavy loader. Powdered minerals having a high specific gravity, as barite, iron oxide, litharge, or galena; such minerals added to drill-mud and liquids increase the specific gravity or weight of the mud. *Long*.

heavy-media separation. A series of patented processes originally developed for the concentration of ore, but are finding increased usage in coal cleaning. Suspension of magnetite (specific gravity, 5.0) and ferrosilicon (specific gravity, 6.7) are usually used for ore concentration; suspensions of magnetite for coal. The basic features of these processes as applied to coal are in the methods used for handling the magnetic medium. Specifications for magnetite should be somewhat as follows: 100 percent minus 100 mesh, 65 to 75 percent minus 325 mesh, 85 percent magnetics, and wet-ground in a ball or rod mill. *Mitchell, p. 504*. *See also* dense-media separation.

heavy metals. Metals that react readily with dithizone, principally zinc, copper, cobalt, and lead, but under special conditions including one or more of the following metals: bismuth, cadmium, gold, indium, iron, manganese, mercury, nickel, palladium, platinum, silver, thallium, and tin. *Hawkes*. *See also* high-density metals.

heavy-mineral prospecting. Consists in determining the relative amounts of an economic mineral in stream sediments, and in tracing the drainage upstream to the source by following the pattern of increasing concentrations. *Hawkes, p. 304*.

heavy minerals. a. The accessory detrital minerals of a sedimentary rock, of high specific gravity, which are separated in the laboratory from minerals of lesser specific gravity by means of liquids of high density, such as bromoform. *Compare* light mineral. *A.G.I.* b. In igneous petrology, a mafic mineral. *A.G.I. Supp*. c. Minerals having a high specific gravity, the cuttings of which are washed out of a borehole only by a very strong, rapidly flowing stream of drill-circulation fluid. *Long*. b. A synonym for heavy loader. *Long*.

heavy mud. A drilling mud having a high specific gravity, usually attained by adding minerals such as ground barite or other heavy loaders to the usual ingredients making up a drill mud. *Long*.

heavy oils. Oils distilled from coal tar between 230° and 330° C, the exact range is not definite. *CCD 6d, 1961*.

heavy soil. A fine-grained soil, made up largely of clay or silt. *Nichols*

heavy spar. Synonym for barite. *Fay*.

heavy tiff. Barite in southeast Missouri. *Fay*.

heavy water. Deuterium oxide, D_2O, in which D is the symbol for deuterium (heavy hydrogen or hydrogen 2). Water in which ordinary hydrogen atoms have been replaced by deuterium atoms. Natural water contains 1 heavy-water molecule per 6,500 ordinary water molecules. Deuterium oxide has a low neutron absorption cross section; hence, it is used as a moderator in some nuclear reactors. *L&L*.

heavy-water-moderated reactor. A nuclear reactor that uses heavy water as its moderator. Heavy water is an excellent moderator and permits the use of inexpensive natural (unenriched) uranium as a fuel. *L&L*.

Hebrew granite. Eng. A graphic granite in which the crystals of quartz imbedded in the body of the feldspar resemble Hebrew characters. *Fay.*

hebronite. A misnomer for amblygonite. *Hess.*

hecatolite. Moonstone (orthoclase). *Hey 2d, 1955.*

Hecht cones. A variety of Seger cones. *Hess.*

Hecht's porcelain. A German refractory porcelain similar to Marquardt porcelain. *See also* Marquardt porcelain. *Dodd.*

hectare. A metric unit of land measure equal to 10,000 square meters or 2.471 acres. *A.G.I. Supp.*

hecto-. A prefix used to denote one hundred times. *Ham.*

hectorite. a. Magnesium-bearing bentonite (montmorillonite), $(Mg,Li)_6Si_8O_{20}(OH)_4$, from Hector, Calif. Monoclinic. Synonym for magnesium-bentonite. *Spencer 16, M.M., 1943; Dana 17.* b. An altered pyroxene, near $(Mg,Fe)_2Si_3O_8.\frac{1}{2}H_2O$, with Mg:Fe approximately equal to 3:2. *Hey 2d, 1955.*

hedenbergite. A calcium-iron variety of pyroxene, $CaFe(Si_2O_6)$, monoclinic. *Dana 17.*

hedgehog. a. Scot. A broken strand or single wire of rope torn out while the rope is in motion, and drawn up into a knot or bundle on the rope. *Fay.* b. A dredger consisting of a roller with protruding spikes or spades which is dragged over the bottom of a river, etc., to remove silt, mud, or the like. *Webster 2d.*

hedgehog stone. Quartz crystals containing needles of göthite or some other iron oxide. *Compare* hairstone. *Fay.*

hedleyite. Bismuth-tellurium allow Bi_7Te_3, a solid solution of Bi_5 in Bi_2Te_3, as rhombohedral cleavage flakes, from Hedley, British Columbia. Named from the locality. *Spencer 17, M.M., 1946.*

hedrumite. A name proposed by Brögger for certain syenitic rocks that are poor or lacking in nephelite but that have a trachytic texture. *Fay.*

hedyphane; hegyphane. A white mineral with 2 cleavages crystallizing in the hexagonal system, $4\frac{1}{2}PbO.4\frac{1}{2}(Ca,Ba)O.3P_2O_5.PbCl_2$; Mohs' hardness, 4; specific gravity, 5.7; from Franklin, N.J.; Langban, Sweden. *Larsen, pp. 75, 91.*

heel. a. The mouth or collar of a borehole. *Fay.* b. A small body of coal left under a larger body as a support. Known also as heel of coal. *B.C.I.* c. The fixed jaw on an adjustable-wrench safety clamp or on a rock crusher. *See also* anvil. *Long.* d. A floor brace or socket for wall-bracing timbers. *Nichols.* e. The trailing edge of an angled blade. *Nichols.* f. In chemical engineering, commonly the residue remaining after a batch distillation has been carried through to completion; still bottoms. *NRC-ASA N1.1-1957.* g. In chemical engineering, any material remaining in a vessel after removal of the main portion of the contents. *NRC-ASA N1.1-1957.* h. Synonym for base. *ASM Gloss.*

heeling in. Temporary planting of trees and shrubs. *Nichols.*

heel of a shot. a. In blasting, the face of a shot farthest away from the charge. *Stauffer.* b. The distance from the mouth of the drill hole to the corner of the nearest free face; or that portion of the hole which is filled with the tamping; or that portion of the coal to be broken which is entirely outside the powder. *Zern, p. 668.* c. In blasting, the front of a shot. *Zern.* Same as heel. *Fay.*

heel of coal. A small body of coal left under a larger body as a support. *Fay.*

heel tap. An imperfection in which the base or bottom of a bottle is very thick in one area and very thin in another. *ASTM C162-66. See also* slugged bottom.

heep stead. The entire surface plant of a mine. *Gordon.*

heft. An old English term, now current in the United States, which is useful in expressing the weightiness in the hand of a stone or other solid, by which one can roughly estimate its density. *Anderson.*

Hegeler furnace. A muffle furnace seven hearths high. The lower hearths are heated by gas burned in the flues beneath them. This was the first mechanical furnace to be employed successfully for blende roasting in the United States at La Salle, Ill. *Fay.*

Hegeler producer. A furnace for the manufacture of producer gas. *Fay.*

Hegeler roaster. One who supervises roasting of zinc ore for removal of sulfur in a Hegeler roaster; the roasted ore is later smelted in a zinc furnace to recover the zinc. *D.O.T.1.*

heidornite. Borate, sulfate, and chloride, $Na_2Ca_3Cl(SO_4)_2B_5O_8(OH)_2$, monoclinic, as transparent spearlike crystals (up to 7 centimeters) with glauberite from a deep boring in anhydrite at Nordhorn., Hannover, Germany. *Spencer 21, M.M., 1958.*

height. In tides, the vertical distance, either positive or negative, of any tide stage with reference to the datum of soundings of the largest scale charts of the locality; usually in feet above chart datum. *See also* wave height. *Hy.*

height of capillary rise. *See* capillary rise. *ASCE P1826.*

height of collimation. a. Obtained by adding the staff reading of the backsight to the reduced level at that station. *Mason, v. 2, p. 736.* b. *See* height of instrument. *Pryor, 3.*

height of instrument; H. I. a. In survey leveling, the vertical height of the line of collimation of the instrument over the station above which it is centered, or above a specified datum level. In the collimation method of leveling a horizontal collimation line is transferred from a reading on the back station (backsight) to a foresight by reading on leveling staff. *Pryor, 3.* b. In spirit leveling, vertical distance from datum to line of sight of instrument. *Seelye, 2.* c. In stadia leveling, height of center of transit (axis) above the station stake, or the ground beneath whichever is used as rod point. *Seelye, 2.* d. In differential leveling, the elevation of the line of sight of the telescope when the instrument is leveled. *Urquhart, sec. 1, p. 15.*

height of land. *See* watershed. *Fay.*

height-period combination. Waves with specified height and period. *Hy.*

heinrichite. The arsenic analogue of uranocircite, $Ba(UO_2)_2(AsO_4)_2.10\text{-}12H_2O$ and its dehydration product with $8H_2O$ (metaheinrichite; occur near Lakeview, Oregon, and in the Black Forest, Germany. *See also* arsenuranocircite. *Hey, M.M., 1961.*

heintzite; hintzeite; kaliborite. A hydrous borate of magnesium and potassium, colorless to white. Occurs in small crystals sometimes aggregated. From Stassfurt, Germany. *Fay.*

Heisenberg uncertainty principle. It is not possible to make simultaneously an exact determination of the velocity, momentum or the energy of a particle and of its position. The more precisely the one is measured, the greater will be the error in the other, owing to the duality of particulate existence in wave mechanics. *Pryor, 3.*

held. A condition of support at the ends of a beam or edges of a plate which prevents displacement of the edge of the neutral surface, but permits rotation in the plane of bending. *Compare* fixed; supported. *Ro.*

Helderbergian. Lower Lower Devonian. *A.G.I. Supp.*

held in common. The phrase held in common means a claim whereof there are more owners of a claim than one, while the use of the words claims held in common on which work done upon one of such claims so held shall be sufficient means that there must be more than one claim so held in order to make a case where work upon one of them shall answer the statutory requirement as to all of them. *Ricketts, I.*

held water; capillary water. a. Water held above the level of the water table of ground by capillary action. *See also* free water. *Pryor, 3.* b. Water retained within a soil mass as liquid or vapor. *See also* ground water. *Nelson.*

helenite. A wax near ozocerite but elastic like caoutchouc; it is yellow and has a specific gravity of 0.915. It occurs at Ropa in Galicia. *Fay.*

helical. Spiral. *Nichols.*

helical bag conveyor. *See* double helical bag conveyor. *ASA MH4.1-1958.*

helical conveyor. A conveyor for handling coal, grain, cement, or similar bulk materials. It comprises a horiozntal shaft, with helical paddles or ribbons, which turn on its center line inside a stationary tube filled with the material. *Ham.*

helical gear. A tooth gear in which the wheel teeth, instead of being at right angles with their faces, are set at some other angle therewith. Often incorrectly called spiral gear. It may be used to transmit power between (1) parallel shafts, (2) shafts at right angles and not intersecting, (3) shafts inclined at any angle and not intersecting. It gives greater strength and smoother operation, but develops considerable end thrust. *Crispin.*

helical reinforcement. Steel reinforcing rods twisted into the form of a spiral. *Ham.*

helical steel support. A continuous screw-shaped steel joist lining for staple shafts. The lining is fixed to the ground by strata bolts rigidly fished every 120° without any yielding device. Developed in Germany and its use is claimed to effect considerable overall savings. *Nelson.*

helicitic. A relict structure in metamorphic rocks due to the presence of strings of oriented inclusions, often forming curved or contorted lines, which are preserved in porphyroblasts. The strings of inclusions are inherited from a parallel fabric, either sedimentary or metamorphic, that existed prior to growth of porphyroblasts. In true helictic structure, corrugation of the strings of inclusions preceded static crystallization of the inclosing crystals, so that not only the linear arrangement but also its curved or contorted pattern is relict. *Schieferdecker.*

helicitic structure. Curved or contorted lines of inclusions preserved within coarse crystals of minerals. The strings of inclusions are interpreted as relict structures inherited from a parallel fabric, either sedimentary or metamorphic that existed prior to growth of the porphyroblasts. *A.G.I.*

helictite. A distorted twiglike lateral projection of calcium carbonate, found in caves, etc. *Compare* stalactite; stalagmite. *Standard, 1964.*

heligmite. A stalagmite, usually small, exhibiting one or more changes in the direction of its axis of growth. *A.G.I.*

heliodor; helidor. A beautiful variety of clear yellow beryl, $Be_3(Al,Fe)_2(SiO_3)_6$, occurring near Rossing in southwest Africa; much prized as a gemstone. *C.M.D.; English.*

heliograph. An instrument designed to reflect sunlight in flashes so that a survey station can become visible from a distance. *Ham.*

heliolite. a. A whitish to reddish-gray aventurine oligoclase with internal yellowish or reddish firelike reflections. *Hess.* b. Synonym for sunstone. *Shipley.*

heliotrope. A variety of chalcedony (cryptocrystalline quartz); deep green, color with small spots of red. Used as a cheap gem. Also called bloodstone. *Hess.*

helium. An inert, monatomic (He), colorless, odorless element, the lightest of the rare gases, occurring in the atmosphere of the sun and stars, and constituting about 1 part in 200,000 parts by volume of the earth's atmosphere. Also found in several minerals and in certain mineral waters. Extracted from various natural gases by liquefaction processes. Symbol, He; valency, O; atomic number, 2; atomic weight, 4.0026. *C.T.D.* Its chief source is the natural gas of the southwestern United States. *Crispin.*

helium age. The age of a rock as calculated by substituting into the age equation radioactivity data and a value for all the radiogenic helium formed since crystallization, computed from helium analyses and helium retentivities. *American Journal of Science, v. 239, Aug. 1941, p. 609.*

helium diving bell. A diving bell in which the occupants breathe a mixture of oxygen and helium, which enables them to work at greater depths. *Ham.*

helium index. The value obtained by substituting helium and radioactivity values into the age equation as used in the determination of the age of a rock. *American Journal of Science, v. 239, Aug. 1941, p. 609.*

helix angle. Generally, the angle which a helix makes with a plane containing the axis about which the helix is developed. An exception is the case of hobs, worms, and threads where the helix angle is taken from a diametral reference plane rather than an axial plane. *ASM Gloss.*

helizitic. Refers to metamorphic structure characterized by metacrysts containing oriented inclusions of earlier schist minerals. *A.G.I. Supp.*

helks. *a.* Large detached crags; a confused pile or range of rocks. *Arkell.* b. Bare tracts of limestone. *Arkell.*

hellandite. A very rare, weakly radioactive, monoclinic mineral, $Ca(Al,Y,Er,Fe.OH)_3$-Si_2O_8, occurring in pegmatites with tourmaline, allanite, and thorite; brown or red in color. *Crosby, pp. 102-103.*

hellyerite. Normal nickel carbonate, $NiCO_3.6H_2O$, occurring with zaratite at the Lord Brassey nickel mine, Heazlewood, Tasmania. *Hey, M.M., 1961.*

helmet. a. A hard hat worn for protection from falling objects. *Jones.* b. A masklike piece of headgear worn by the operator to avoid inhallation of injurious dust particles during sandblasting operations. *Enam. Dict.*

helmet man. See rescue man. *D.O.T. 1.*

Helmholtz coil. A pair of similar coaxial coils with their distance apart equal to their radium, which permits an accurate calculation of the magetic field between the coils. Used in calibration of magnetometers. *A.G.I.*

helper. A miner's assistant who is not especially trained but who is learning mining work, such as miner's helper, track layer's helper, etc. *Fay; B.C.I.*

helper grades; pusher grades. Grades on which helper engines are needed to assist road locomotives; for economical operation, a helper grade should be steep enough to utilize the combined capacity of road and helper engines, which may be taken as 90 percent of the sum of the individual locomotive capacities. *Urquhart, Sec. 2, p. 26.*

helper spring. On a truck rear axle, an upper spring that carries no weight until the regular spring changes shape under load. *Nichols*

helper-up. a. Aust. An assistant to a trammer when the roads are bad. *Fay.* b. *See* pig tailer. *D.O.T.1.*

helsinkite. An igneous dike rock consisting essentially of albite and epidote considered primary by some petrologists. *Johannsen, v. 3, 1937, p. 142.*

helve. a. Eng. The handle of a pick or maundrill. Sometimes called helver. *Fay.* b. A lift hammer for forging blooms. *Fay.*

helve hammer. A form of a mechanically driven trip hammer, formerly used in forging and toolmaking. *Osborne.*

Helvetian. Lower middle Miocene. *A.G.I. Supp.*

helvite. A mineral, complex silicate of beryllium, manganese, and iron. It is the most plentiful potential ore of beryllium but is of low grade. *NRC-ASA N1.1-1957.*

hem. Scot. Grain; second way; quartering way; bate; sheeting plane. *Arkell.*

hemachate. A light-colored agate spotted with red jaspar. Also called blood agate. *Standard, 1964.*

hemafibrite; aimafibrite. A brownish-red to garnet-red, transparent to translucent, hydrous manganese arsenate, $6MnO.As_2O_5.$-$5H_2O$; soon turns black; Mohs' hardness, 3; specific gravity, 3.50 to 3.65; rare; from Nordmark, Sweden. *Larsen, p. 141.*

hematine. A copyrighted, confusing name for an imitation of hematite. Usually in the form of an imitation cuvette. Apparently an artificially processed friable mineral or other substance. Breaks easily. Mohs' hardness, about 6.5; specific gravity, 4.8; streak, black. *Shipley.*

hematinon. A dark red glass, known to the ancients, to which metal filings are added to produce aventurine glass. Same as purpurin. Also spelled haematinon. *Shipley.*

hematite; haematite. One of the most common ores of iron, Fe_2O_3, which when pure contains about 70 percent metallic iron and 30 percent oxygen. It may be readily distinguished from magnetic and titaniferous iron ore by its red streak and powder, the others giving a black streak. Hematite is sometimes mixed with sufficient magnetite to cause it to adhere to the magnet. The hydrated variety of this ore is called limonite or brown hematite. *Fay.* It crystallizes in the trigonal system. It occurs in a number of different forms: kidney iron ore massive, as found in the iron mines in Lancashire and Cumberland Counties, England; specular iron ore in groups of beautiful, lustrous rhombohedral crystals as, for example, from the Island of Elba, Italy; bedded ores of sedimentary origin, as in the Carboniferous Limestone of South Wales; and as a cement and pigment in sandstones. The Clinton ore is the most important oölitic hematite in the United States. The Wabana ore in Newfoundland is also hematitic in part, but most of the iron produced in North America comes from the iron ranges of the Lake Superior District, especially the Mesabi Range, Minn. *See also* Clinton limestones. *C.M.D.*

hematite, brown. *See* limonite. *CCD 6d, 1961.*

hematitic. Pertaining to, containing, or resembling hematite. *Fay.*

hematolite. A mineral found in various shades of brown to red having 1 perfect cleavage, $8MnO.(Al,Mn)_2O_3.As_2O_3.8H_2O$; Mohs' hardness, 3.5; specific gravity, 3.416; from Moss mine, Nordmark, Sweden. *Larsen, p. 88.*

hematophanite. Another spelling of haematophanite; hamatophanite. *Spencer 17, M.M., 1946.*

hemi-. In Greek compounds, signifying half. *A.G.I.*

hemicrystalline. a. Those rocks of igneous origin which contain some interstitial glass, in addition to crystalline minerals. Synonymous with holocrystalline. *C.M.D.* b. Partly crystalline; characterized by crystals embedded in an amorphous groundmass. *Webster 3d.*

hemidome. That form in a crystal composed of two parallel domatic planes in the triclinic, or of two parallel orthodomatic planes in the monoclinic system of crystallization. *Standard, 1964.*

hemihedral. a. In crystallography, having a lower grade of symmetry than, and only half as many faces as, the corresponding form of full or normal symmetry for the system. *Fay.* b. Having different properties in opposite direction or on opposite crystal faces. *Hess.*

hemiholohedral. Of, pertaining to, or denoting hemihedrons in which all the octants contain half the whole number of similar planes. *Standard, 1964.*

hemimorphic. In crystallography, having no transverse plane of symmetry and no center of symmetry, and composed of forms belonging to only one end of the axis of symmetry. *Fay.*

hemimorphism. The development of polar symmetry in minerals, in consequence of which different forms are exhibited at the ends of biterminated crystals. Hemimorphite shows this character in a marked degree. *C.M.D.*

hemimorphite. A hydrous zinc silicate, Zn_4-$(Si_2O_7)(OH)_2.H_2O$; orthorhombic. *Compare* calamine. *Dana 17.*

Hemingfordian. Middle Miocene. *A.G.I. Supp.*

hemiopal. Same as semiopal. *English.*

hemipelagic. Sharing neritic and pelagic qualities. *A.G.I. Supp.*

hemipelagic-abyssal. Refers to sediments of the deep sea that contain terrestrial detritus. *A.G.I. Supp.*

hemiprism. A form produced by two parallel planes cutting the two lateral axes in the triclinic system of crystallization. *Standard, 1964.*

hemipyramid. A form consisting of two pairs of similar parallel planes cutting all three axes in the monoclinic system of crystallization. *Standard, 1964.*

hemisphere temperature. The temperature at which the height of the specimen is equal to half the base, its shape being approximately hemispherical. *B.S. 1016, 1961, Pt. 16.*

hemithrene. Brogniart's name, current among the French, for certain dioritic rocks that contain a large amount of calcite, presumably an alteration product. *Fay.*

hemitropic. Crystals that appear as if composed of two halves of a crystal turned partly round and united. Examples of this structure may often be found in feldspar and cassiterite crystals. *Fay.*

hemming machines. Machines used for grinding flat surfaces, such as knife blades and skates. *ACSG, 1963.*

hemoglobin. An iron-containing protein pigment occurring in the red blood cells and functioning primarily in the transport of oxygen from the lungs to the tissues of the body. *Webster 3d.*

hemp. Vegetable fiber used in the manufacture of fiber ropes or for the oil-absorbent cores of steel ropes. *Ham.*

Hemphillian. Middle Pliocene. *A.G.I. Supp.*

hemp rope. *See* fiber rope. *Nelson.*

hen chalk. Eng. A kind of gypsum, Lincolnshire. *Arkell.*

hendersonite. A black fibrous mineral, Ca^2H_x-$V^{+4}{}_{1}{}^{+}{}_{x}V^{+5}8_{-x}O_{24}.8H_2O$; from the J.J. mine, Paradox Valley, Montrose County, Colo., and the Eastside mine, San Juan County, New Mex. *Hey, M.M., 1964; Fleischer.*

Henderson process. The treatment of copper sulfide ores by roasting with salt to form chlorides, which are then leached out and precipitated. Henderson originally proposed to volatilize the chlorides, and the leaching and precipitation are not original with him. Longmaid and many other metallurgists have proposed them in various modifications. *Fay.*

hengleinite. A steel-gray iron sulfide with about 20 percent cobalt and nickel, $(Co,Ni,Fe)S_2$. Minute pyritohedral crystals; isometric. Probably a mixture of siegenite and pyrite. Formerly called cobaltnickelpyrite. From Musen, Westphalia, Germany. *English.*

Hennig Purifier. Soda ash briquette; used to remove oxides and nonmetallic inclusions in steel manufacturing. *Bennett 2d, 1962.*

Henry. Unit of electrical induction. With electromotive force of 1 volt and current of 1 ampere/s. One Henry (H) $= 10^9$ electromagnetic unit. Symbol H. *Pryor, 3.*

Henry's Law. The mass of a gas dissolved by a given volume of liquid at a given temperature is proportional to the pressure. The volume dissolved is independent of pressure. *Pryor, 3.*

hen stones. York. Groups of stones on the ridge of high moors. *Arkell.*

hepatic cinnabar. A liver-colored cinnabar. *Standard, 1964.*

hepatic mercurial ore. *See* hepatic cinnabar. *Fay.*

hepatic pyrite. a. Same as marcasite. *Fay.* b. A variety of pyrite. *Hey 2d, 1955.*

hepatin. An amorphous limonite, of a liver-brown color, and containing a small percentage of copper. *Fay.*

hepatite. A variety of barite, so called from the fetid odor it exhales when heated. *Standard, 1964.*

Hepplewhite-Gray lamp. This lamp drew its air from the top, the air passing down four tubular pillars into the base, where it was admitted to the flame through a gauze ring. The outlet was through a metal chimney closed by a gauze disc. In the modified design an ordinary gauze was introduced above the conical glass. The lamp was exceptionally safe in high-velocity air currents. *Mason, v. 1, p. 234.*

hepta-; septa-. Having seven reacting atoms or groups. Heptavalence is the ability to combine with seven H-atoms or with their equivalent hydroxyls. *Pryor, 3.*

heptagon. A figure with seven sides and angles. *Gordon.*

heptahydrate. A compound with seven molecules of water. *Webster 3d.*

heptane. A paraffin hydrocarbon; C_7H_{16}; colorless; liquid; boiling point, 98° C; and specific gravity, 0.68. There are nine paraffins having this formula. The foregoing properties relate to normal heptane, which is a constituent of gasoline and resembles hexane in its chemical behavior. *C.T.D.*

3-heptanol. A liquid; $CH_3CH_2CH(OH)C_4H_9$; specific gravity, 0.8224 (at 20° C); melting point, −70° C; boiling point, 156.2° C; flash point, 140° F; and slightly soluble in water. Used as a flotation frother, a solvent and a diluent in coatings, and as intermediates. *CCD 6d, 1961.*

heptaphyllite. Dioctahedral clay mineral. *A.G.I. Supp.*

heptavalent. a. Having a valence of 7. Also called septavalent; septivalent. *Webster 3d.* b. *See* septavalent. *Pryor, 3.*

heptorite. A melanocratic haüyne basanite containing phenocrysts of barkevikite, titanaugite, and haüyne in a glassy or analcitic groundmass containing microlites of labradorite. *Holmes, 1928.*

Heraclean stone; Heraklean stone. *See* Hercules stone.

Herbert's duplex sand mixer. A machine used in the foundry for the preparation of sand. The sand is thrown into a hopper and falls between circular discs rotating rapidly in opposite directions. The sand, thrown out by centrifugal force, passes between moving pegs, and is broken up, thoroughly aerated and mixed. *Osborne.*

Hercoal F. High explosive; used in mines. *Bennett 2d, 1962.*

Hercogel. High explosive; used in mines. *Bennett 2d, 1962.*

Hercomite. High-count ammonia-type dynamite. *Bennett 2d, 1962.*

herculare lining. A German method of lining roadways subjected to heavy pressures. It consists of a closed circular arch of specially shaped precast concrete blocks. The blocks, which are wedge-shaped, are made in two sizes for each lining and erected in such a way that alternate blocks offer their wedge action in opposite direction—the larger blocks towards the center of the roadway and the smaller outwards. This arrangement gives a double-wedge effect so that part of the lateral pressure exerted by the strata on the lining is diverted axially along the roadway. *Nelson.*

Hercules coal powder 2. High explosive; used in mines. *Bennett 2d, 1962.*

Hercules powder. Weak form of dynamite, based on nitroglycerin and a semiactive carrying dope. *Pryor, 3.*

Hercules Press. Trade name; a semidry brickmaking machine of the rotary table type. *Dodd.*

Hercules stone. The lodestone. Also called Heraclean stone; Heraklean stone. *Standard, 1964.*

Hercynian orogeny. Synonym for Variscan diastrophism. *A.G.I. Supp.*

hercynite. a. Iron spinel, $FeAl_2O_4$, isometric; a massive, fine granular black mineral. *Dana 17.* b. Synonym for harmotome. *Hey 2d, 1955.*

herderite. A basic phosphate of calcium and beryllium, $CaBe(PO_4)(F,OH)$, monoclinic; colorless to pale yellow or greenish-white color; luster, vitreous or subvitreous. *Dana 7, v. 2, pp. 820-821.*

Herkimer diamond. Rock crystal, from Herkimer County, N.Y. *Shipley.*

Hermansen furnace. A recuperative pot furnace for melting glass; the first furnace of this type was built in Sweden in 1907 and was soon afterwards introduced into England and elsewhere. *Dodd.*

hermesite. An imperfectly established variety of schwatzite. *Weed, 1918.*

hermetic. Made impervious to air and other fluids by fusion. Originally applied to the closing of glass vessels by fusing the ends and by extension applied to any mode of airtight closure. *Standard, 1964.*

hermetic casing. *See* screw casing. *Fay.*

heronite. A dike rock consisting of spheroidal groups of orthoclase in a base of analcite containing radiating bundles of labradorite and, in smaller quantity, aegirine; since shown to be an altered tinguaite from Heron Bay, Ontario, Canada. *Holmes, 1928.*

Héroult. A Frenchman who invented the electric-arc furnace with the electrodes suspended from the roof. *Mersereau, 4th, p. 458.*

Heroult furnace. Direct arc furnace commonly of the three-phase current type with the electrodes spaced sufficiently far apart to prevent arcing between them. *Bennett 2d, 1962.*

Heroult process. *See* Hall process.

Herrenschmidt process. Roasting of antimony ore with coal to the oxide in a cupola or blast furnace, the volatile trioxide being condensed after leaving the furnace. *Bennett 2d, 1962.*

herrerite. Copper-stained blue and green smithsonite from Albarradon, Mexico. *Shipley.*

Herreshoff furnace. a. A rectangular-shaft blast furnace for smelting copper ore. *Fay.* b. A mechanical, cylindrical, multiple-deck muffle furnace of the McDougall type. *Fay.*

herringbone. a. A pattern resembling the lateral skeletal configuration of a herring; specifically a pattern (as on a fabric) made up of adjacent rows of parallel lines where any two adjacent rows slope slightly in reverse directions. *Webster 3d.* b. Two series of reeves that intersect at about 120° along a central line or strip of reeves to produce a herringbone or feathered structure. *Skow.* c. Cockering. *Mason.*

herringbone bond. A zigzag arrangement of bricks or tile, in which the end of one brick is laid at right angles against the side of a second brick. *Crispin.*

herringbone crossbedding. *See* chevron crossbedding. *Pettijohn.*

herringbone gear. A gear in which the teeth slope both ways from the center line of the gear face, as would be the case if two spiral gears, one left hand and one right hand were fastened together; used for heavy work on mining machinery, etc. *Crispin.*

herringbone marking. *See* vibration mark; ruffled groove; chevron mark. *Pettijohn.*

herringbone roller conveyor. A roller conveyor consisting of two parallel series of rolls having one or both series skewed. *See also* roller conveyor. *ASA MH4.1-1958.*

herringbone stoping. Method used in flattish Rand stope panels 500 feet to 1,000 feet long for breaking and moving ore. Stope is divided into 20 foot panels, each worked by its own gang. A light tramming system delivers severed rock to a central scraper system. *Pryor, 3.*

herringbone table. *See* herringbone roller conveyor. *ASA MH4.1-1958.*

herringbone texture. A texture showing rows of parallel patterns, which in any two successive rows slope in reverse directions. *Schieferdecker.*

herringbone timbering. A method of setting timber supports in a roadway with a weak roof and strong sides. Arms or side uprights are not used. The crossbar is notched into the sides and additional support is given at its center by a bar set under it and parallel with the roadway. The bar is supported by struts notched into the sides at about half height. *Nelson.*

herringbone work. a. Masonry in which the stones are laid slanting in opposite directions in alternate courses. *Standard, 1964.* b. An arrangement of diagonal struts in X forms between joists. *Standard, 1964.*

herschelite. A variety of chabazite. *Dana 6d, p. 589.*

Hertfordshire puddingstone. *See* puddingstone. *C.T.D.*

herzenbergite. A rare decomposition product of tin ores, having the composition, tin sulfide, SnS. *C.M.D.* The name was proposed to replace the name kolbeckine. Orthorhombic; resembles teallite. Obtained from Bolivia and Southwest Africa. *See also* kolbeckine. *English.*

hess. S. Staff. Clinker from furnace boilers. *Fay.*

hessian. Strong coarsely woven cloth of hemp or jute; used as sandbags for packing and filling roof cavities. *Nelson.*

hessite. A silver telluride mineral, Ag_2Te, contains 63.3 percent silver; isometric. *Sanford; Dana 17.*

hessonite. A transparent to translucent variety of grossularite. The yellow to red-orange varieties are known as hyacinth garnet, and the yellow-brown to reddish-brown as cinnamon stone. Usually has a loupe-visible granular structure unlike true hyacinth (zircon). *Shipley.*

hessonite glass. An orange-colored glass, used for imitations. *Shipley.*

hetaerolite; heterolite. *a.* A very rare double oxide of zinc and manganese, $4[ZnMn_2O_4]$, occurring in ore deposits as black tetragonal and fibrous crystals; hausmannite family. *C.M.D.; Hey 2d, 1955.* b. Synonym for hydrohetaerolite. *Hey 2d, 1955.*

hetero-. In Greek composition, signifying various, or of more than one kind or form; as heterophyllous with more than one kind or form of leaf. *A.G.I.*

heteroblastic. The texture of crystalloblastic rocks in which the essential constituents are of two or more distinct orders of magnitude. *Schieferdecker.*

heteroblastic structure. A metamorphic texture in which the constituent minerals are of two distinct orders of magnitude in size. *A.G.I.*

heterocline. An impure braunite from St. Marcel, Piedmont, Italy; marceline. *Hey 2d, 1955; Hess.*

heterocyclic compounds. Organic compounds with rings which contain additional elements to carbon, for example, pyridine. *Pryor, 3.*

heterodyne. The action between two alternating currents of different frequencies in the same circuit; they are alternately additive and substractive, thus producing two beat frequencies which are the sum of, and difference between, the two original frequencies. *Hy.*

heterogeneity. Different properties in different directions. *BuMines Bull. 587, 1960, p. 2.*

heterogeneous. a. Having more than one constituent or phase, thus exhibiting different properties in different portions. *Pryor, 3.* b. A term describing metals and alloys with structures composed of more than one constituent. *Rolfe.* c. Unlike in character or quality, structure or composition; consisting of dissimilar elements or ingredients of different kinds; not homogeneous. *Standard, 1964.*

heterogeneous reactor. A nuclear reactor in which the fuel is separate from the moderator and is arranged in discrete bodies, such as fuel elements. Most reactors are heterogeneous. *L&L.*

heterogeneous substance. A substance out of which any portion taken at random may not have the same composition and properties as every other portion; for example, mixtures. *Cooper.*

heterogenite. a. A cobalt mineral, CoO.OH, containing up to 4 percent CuO. *Hey 2d, 1955.* b. Name suggested for all cobaltocobaltic hydroxides of varying purity. *English.*

heteromesical. Relates to deposits, not necessarily synchronous, laid down in different media as, for example, limnic and marine. *Schieferdecker.*

heteromorphic. Applied by Lacroix to rocks of similar chemical composition, but of different mineral composition; as, for example, where leucite and olivine in one rock may be represented by biotite in another. *Holmes, 1928.*

heteromorphic rocks. Rocks with identical or similar chemical composition and a different mineral composition. *Schieferdecker.*

heteromorphism. The phenomenon by which two magmas of identical chemical composition may crystallize into two different mineral aggregates as a result of different cooling histories. *A.G.I.*

heteropic. Said of two formations deposited contemporaneously, but of different facies. *Compare* isopic. *C.T.D.*

heteropical. Relates to synchronous deposits showing different facies. *Schieferdecker.*

heteropolar. Of molecule, having unequal distribution of bonded electrical charges, so that the constituent atoms differ in their polarity. *Pryor, 3.*

heterosite. An alteration mineral formed from triphylite or lithiophylite; a hydrous iron manganese phosphate, $(Fe,Mn)_2O_3.P_2O_5.-H_2O$. *Hess.*

heterotactic. Refers to mineral fabric whose elements do not all show the same symmetry. *G.S.A. Mem. 6, 1938, p. 62.*

heterotactous. Irregular; lacking uniformity in stratification or arrangement of parts; heterogeneously arranged. *Standard, 1964.*

heterotaxial. Relates to strata more or less widely separated, that are not equivalent as to their relative position in the geological series. *Schieferdecker.*

heterothrausmatic. A term applied to a type of orbicular rock in which orbicules are formed around different kinds of nuclei. *Schieferdecker.*

heterotomous. Having a cleavage unlike that which is characteristic of the mineral in its ordinary form, as a variety of feldspar. *Standard, 1964.*

heterotopical. Relates to synchronous deposits of different geological provinces. *Schieferdecker.*

hethstone. *See* heath. *Arkell.*

Hettangian. Lowermost Lower Jurassic. *A.G.I. Supp.*

heugh; heuch. a. Scot. A place where coal or other mineral is worked; a pit or shaft. *Fay.* b. A glen with rugged sides; a crag. *Standard, 1964.* c. An old English term for coal seams or coal workings. *Tomkeieff, 1954.* d. The steep face of a quarry or other excavation (quarry heugh); an excavation for coal, originally open; a coal pit; coal seams. *Arkell.*

heulandite. A hydrous silicate of calcium and aluminum, $Ca(Al_2Si_7O_{18}).6H_2O$, monoclinic. A mineral of the zeolite family. *Dana 17.*

heumite. A name proposed by Brögger for a dike rock composed of minerals too small to be recognized with the eye alone, but which under the microscope, prove to be natron orthoclase, natron microcline, barkevikite, biotite, and in small amount, nepheline, sodalite, and diopside. The accessories are apatite, magnetite, pyrite, and titanite. The silica in two dikes was found to be respectively 47.10 and 48.46. The name was derived from Heum, a small town on Lake Farris, Norway. *Fay.*

heuvel. S. Afr. A height or elevation, generally small. *Hess.*

hewer. a. Eng. In the Newcastle coalfield, one who undercuts the coal with a pick. A coal miner. *Fay.* b. Eng. A workman employed in getting coal by hand. *SMRB, Paper No. 61.* c. N. of Eng. One who may use a hand pick but usually a pneumatic (windy) pick to win coal. Task consists of breaking in or making a nicking, digging out the coal, and filling onto a conveyor belt or into tubs. *Trist.*

hewettite. a. A very rare hydroxide of vanadium and calcium, $CaV_6O_{16}.9H_2O$, occurring as slender, orthorhombic crystals in the vanadium deposits of Peru. *C.M.D.* Hewettite is a deep red, weakly radioactive mineral. *Crosby, p. 124.* b. Hewettite, $CaO.-3V_2O_5.nH_2O$, (comprising both the hewettite and the metahewettite of Hillebrand, Merwin, and Wright), exists in at least three hydrate forms with n=3, 6 (probably, and 9. *American Mineralogist, v. 40, No. 7-8, July-Aug., 1955, p. 691.* Also spelled hewetite.

hewing. a. Eng. In the Newcastle coalfield, undercutting or mining the coal. *Fay.* b. The dressing of timber by chopping or by blows from an edged tool. *Crispin.*

hewing double. Eng. *See* double working. *Fay.*

hewing rate. Aust. The rate of pay given miners for mining coal. *Fay.*

hewns. Eng. The sides of a calciner or roasting furnace, from their being formerly built with hewn stone. *Fay.*

hexa-. Having 6 atoms or groups. A hexavalent substance can combine with 6 H-atoms or their equivalent. *Pryor 3.*

hexaboron silicide. B_6Si; molecular weight, 92.95; black; crystals; specific gravity, 2.47; insoluble in water and in potassium hydroxide; and soluble in nitric acid. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-158.*

hexachloroethane; perchloroethane. Colorless; crystals; Cl_3CCCl_3; camphorlike odor; specific gravity, 2.091; melting point, 185° C; sublimes at 185° C; soluble in alcohol and in ether; insoluble in water; and purified by crystallization. Used as a solvent and in explosives. *CCD 6d, 1961.*

hexachloroplatinic acid. Red-brown; crystals; $H_2PtCl_6.6H_2O$; soluble in water, in alcohol, and in ether; specific gravity, 2.431; and melting point, 60° C. Used in ceramics for producing fine color effects on high-grade porcelain; in electroplating; and for platinizing pumice and similar materials for catalysts. *CCD 6d, 1961.*

hexagon. A polygon having six sides. *Jones, 2, p. 109.*

hexagonal. a. A system of solids which have one long axis intersecting three others at right angles, but these latter intersect each other at an angle of 60°. *Gordon.* b. The crystal system in which crystals have a sixfold symmetry axis. *Hurlbut.*

hexagonal close-packed crystals. Crystals having atoms at the corners of the hexagonal unit cells that are right prisms with rhombic bases, and at the corners of those (isosceles) triangular prisms that are similarly located halves of the hexagonal unit cells. The two sets of atoms are not crystallographically equivalent. *Henderson.*

hexagonal interference ripples. Interference ripples with hexagonal pattern. *Pettijohn.*

hexagonal system. In crystallography, that system of crystals in which the faces are referred to four axes—a principal or vertical axis and three lateral axes perpendicular to the vertical axis and intersecting at mutual angles of 60°. *Fay.*

hexagon cut. Any style of cut, the outline of the girdle of which is six-sided, that is, hexagonal. Called square hexagon if all sides are of equal length; pointed hexagon if two parallel and equal-length sides are much longer than others; called oblong hexagon if those sides are but slightly longer. *Shipley.*

hexagonite. Pink tremolite; contains a little manganese. *Hess.*

hexahedrite. A group name for those iron meteorites which have a cubic cleavage and which, on being etched, reveal a system of fine lines (Naumann lines) due to twinning parallel to the octahedral faces. *Holmes, 1928.*

hexahedron. In crystallography, a form in the isometric system enclosed by six faces each perpendicular to an axis; a cube. *Fay.*

hexahydrate. A chemical compound with 6 molecules of water. *Webster 3d.*

hexahydrite. A white or greenish-white hydrous sulfate of magnesium, $MgSO_4.6H_2O$, differing from epsomite in containing six molecules of water instead of seven. Thick tabular crystals; also, columnar and fibrous. Monoclinic. From Oroville, Wash.; Lillooet District, British Columbia; Crimea, U.S.S.R. *English.*

hexamethylene; cyclohexane. The bivalent radical; $-CH_2(CH_2)_4CH_2$; derived from normal hexane by the removal of one hydrogen atom from each end carbon atom. *Webster 3d.*

hexane. C_6H_{14}; five compounds have this formula. Normal hexane; colorless; liquid; ethereal odor; boiling point, 69° C; and specific gravity, 0.66. An important constituent of gasoline and of solvent petroleum ether or ligroin. *C.T.D.*

hexanitrodiphenyl sulfone. $(NO_2)_3C_6H_2SO_2-C_6H_2(NO_2)_3$; molecular weight, 488.26; yellowish; crystals; and melting point, 307° C. A powerful explosive used in detonating compositions. *Bennett 2d, 1962.*

hexastannite. A mineral, $Cu_3Fe_2SnS_6$, to replace the name stannite-I. *Hey, M.M., 1964.*

hexavalent. a. Having a valence of 6. *Webster 3d.* b. Having six valences; for example, manganese with valences of 1, 2, 3, 4, 6, and 7. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-119.*

Hexhlet sampler. A selective mine dust-sampling instrument. It collects the airborne dust sample in two components. The fraction larger than 5 microns in size is separated from the total cloud in a size selector. The instrument collects some grams of respirable dust by filtration of the mine air through a fine pore ceramic thimble. *See also* thermal precipitator. *Nelson.*

hexite-pentite theory. A theory (long since discarded) for the atomic structure of clays proposed by W. Asch and D. Asch. The theory was based on the hypothesis that silicates are built up of hexagonal and pentagonal rings of hydrated silica and hydrated alumina. *Dodd.*

hexoctahedron. In crystallography, a form in the isometric system enclosed by 48 similar faces with unequal intercepts on all three axes. *Fay.*

Hexonit. Mixture of trimethylene trinitramine, nitroglycerin, and Penthrite; used as powerful explosive. *Bennett 2d, 1962.*

hextetrahedron; hexatetrahedron. In crystallography, a form in the isometeric system of tetrahedral symmetry enclosed by 24 similar faces with unequal intercepts on all three axes. *Fay.*

Heyn's reagent. An etching reagent containing 10 percent copper ammonium chloride in water. *Osborne.*

Hf Chemical symbol for hafnium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

H.F.W. An abbreviation signifying hole full of water, and used in drilling reports and on well logs. *A.G.I.*

hg Abbreviation for hectogram. *BuMin Style Guide, p. 59.*

Hg Chemical symbol for mercury. Derived from the Latin hydrargyrum meaning liquid silver. *Webster 3d.*

H.I. *See* height of instrument. *Pryor, 3.*

hiatal. A rock fabric in which the variation in size of the crystals is not in continuous series, but in a broken series with hiatuses. *Fay.*

hiatal fabric. An inequigranular texture in which the sizes of the crystals do not vary gradually, but form a broken series, with hiatuses, or where two or more sizes are noticeably different from one another as in porphyritic and poikilitic textures. *Schieferdecker.*

hiatus. a. A chasm; a gap; a space where something is wanting. *Webster 2d.* b. An interruption or lapse in or as if in time or continuity. *Webster 3d.*

hibonite. Mixed oxides of aluminum, etc., $(Al,Fe''',Ti,Si,Mg,Fe'')_{12}(Ca, \text{rare earths})O_{19}$, dark brown, hexagonal crystals in metamorphic limestone with plagioclase, corundum, spinel, and thorianite. From Southern Malagasy Republic. *Spencer 21, M.M., 1958.*

hick joint. A system of masonry pointing in which the mortar between the courses is flush with the face of the wall. *Standard, 1964.*

Hicks' hydrometer. An instrument consisting of a series of colored glass beads of different densities contained in a glass tube. It is used for testing the specific gravity of electrolytes. *Osborne.*

hidalgoite. Basic sulfate arsenate, $PbAl_3(AsO_4)(SO_4)(OH)_6$, as white, fine-grained masses, hexagonal; from Zimapan, Hidalgo state, Mexico. Named from locality. *Spencer 20, M.M., 1955.*

hiddenite. Green spodumene found only in small crystals in North Carolina. It has an intense but pale yellowish-green to yellow-green color. *See also* spodumene. *Shipley.*

hide salt. Coarse sizes of rock salt, usually No. 2 or No. 1, used for curing hides; any salt used for curing hides or skins. *Kaufmann.*

hiding power. The power of a coating to obscure or hide completely the surface over which it is applied. *ACSB-3.*

hieroglyph. A term adopted and applied to any markings found on bedding planes, generally applied to sole markings regardless of origin. *Pettijohn.*

high. a. The high point or area of a structure, such as a dome or an anticline. *A.G.I.* b. An area of high atmospheric pressure; an anticyclone. *A.G.I.* c. A miner's name for the coal of a thick seam. *Fay.* d. Sometimes used to designate the best quality of industrial diamonds normally used as drills. *Long.*

high-alumina brick. *See* brick, alumina.

high-alumina cement. a. A cement with higher alumina content than portland cement manufactured by burning chalk with bauxite. Although the cost may be double that of rapid-hardening cement, its use is invaluable where high resistance to sulfates, acids, and high temperatures is required. *Ham.* In oilfields, referred to as sulfate-resistant cement. *Bureau of Mines Staff.* b. A refractory cement (not hydraulic) of high alumina content. *Dodd.*

high-alumina ceramics. Fired ceramic compositions in which the major crystal phase is alpha alumina or corundum. The aluminum oxide content is usually 75 to 100 percent and the parts are fired at temperatures ranging from 2,600° to 3,200° F, or higher, on a commercial scale. Material is available in both the vitrified and porous forms, with the 100 percent (or nearly 100 percent) aluminum oxide compositions most commonly being used in the porous form. Alumina ceramics can be glazed when maintenance of surface cleanliness is a requirement, and are readily metallized. Compared to other ceramic materials, alumina ceramics are superior mainly in regard to strength, impact resistance, and hardness, which makes them suitable for abrasion-resistant applications, for cutting tools, metal grinding, and for polishing chrome plate and stainless steels. Some of the mechanical uses for high-alumina bodies are seal surfaces for mechanical rotary seals for pumps and similar equipment, plungers or liners in reciprocating pumps, nozzles, rock bits, cutting tools, and nonlubricating high-temperature roller bearings.. *Lee.*

high-alumina mortar. One having an alumina content of 47.5 percent or more. *Bureau of Mines Staff.*

high-alumina refractories. Alumina-silica refractories containing 45 percent or more alumina. The materials used in their production include diaspore, bauxite, gibbsite, kyanite, sillimanite, andalusite, and fused alumina (artificial corundum). *HW.*

high-angle fault. A fault with a dip greater than 45°. *Billings, 1954, p. 143.*

high brass. A copper-zinc alloy containing 34 percent zinc and possessing high tensile strength. Used for springs, screws, rivets, etc. *C.T.D.*

high-calcic. Of, or pertaining to, a material of which 90 percent or more of the total content of calcium and magnesium oxides consists of calcium oxide. *Bennett 2d, 1962 Add.*

high-calcium hydraulic hydrated lime. A hydraulic hydrated lime that contains not more than 5 percent magnesium oxide (nonvolatile basis). *ASTM C51-47.*

high-calcium lime. Lime with a high content of calcium oxide. It is known also as fat lime. *Taylor.*

high-carbon steel. Carbon steel which contains more than 0.5 percent carbon. It is used for springs and similar components stronger and more easily tempered but less ductile than mild steel. *Ham.*

high-conductivity copper. Metal of high purity, having an electrical conductivity not much below that of the international standard, which is a resistance of 0.15328 ohms for a wire 1 meter long and weighing 1 gram. *C.T.D.*

high-current metallic arc. An electric arc between metal terminals and at a high enough current to cause appreciable melting of at least one terminal. *BuMines Bull. 625, 1965, p. VII.*

high-density metals. The heaviest of the alloy-forming metals, in descending order of their densities, are osmium, iridium, platinum, gold, tungsten, uranium, and tantalum. *See also* low-density metals. *Henderson.*

high doors. Scot. An upper landing in a shaft. *Fay.*

high-duty cast iron; semisteel. Cast iron which incorporates steel scrap, with tensile strength over 17 tons per square inch. Ladle and cupola additives are also used to produce alloyed irons of this class, for example, Ni-hard, iron with a nickel additive. *Pryor, 3.*

high-duty fire clay brick. Fire clay brick which have a pyrometic cone equivalent not lower than cone 31⅓ or above 32½ to 33. *HW.*

high early strength cement; cement, H.E.S. A variety of portland cement made from raw materials having a high lime-to-silica ratio. Contains a higher proportion of tricalcium silicate and hardens more quickly and with the evolution of more heat than regular portland cement. *CCD 6d, 1961.*

higher high water. The higher of the two high waters of any tidal day or the single high water when a semidiurnal tide becomes diurnal. Abbreviation, hhw. *Hy.*

higher low water. The higher of the two low waters of any tidal day. Abbreviation. hlw. *Hy.*

high-expansion foam. A method of fighting underground fires recently developed in the United States, and somewhat similar to the British foam plug. It involves the formation of a high-expansion noncombustible foam. Large volumes of the foam are drawn or blown over and around the fire until it can no longer be sustained due to lack of oxygen. The foam is made from ammonium lauryl sulfate and 1 gallon of solution is used for each 250 to 300 cubic feet per minute of air passing through the net. *Nelson.*

high explosive. An explosive with a nitroglycerin base and requires the use of a detonator to initiate the explosion which is violent and practically instantaneous. High explosives may be divided into gelatins and dynamites and also a special type known as permitteds (or permitted explosives) for use in gassy or dusty coal mines. They possess much greater concentrated strength than low explosives such as black powder. *See also* blasting. *Nelson.*

high feed. *See* fast gear, a. *Long.*

high-feed gear. *See* fast gear, a. *Long.*

high flashing point. When oil will ignite only at a very high temperature, it is said to have a high flashing point. *Crispin.*

high frequency. Electrically, rapid reciprocation as with alternating current or an oscillating circuit. In metallurgy, a high frequency induction furnace melts its charge of metal by means of eddy currents, which are induced at frequencies of 500 cycles per second or more. *Pryor, 3.*

high-frequency heating. *See* induction heating. *Dodd.*

high furnace. The ordinary blast furnace. *Fay.*

high gear. a. *See* fast gear, b. *Long.* b. Drilling and/or mining operations conducted at peak efficiency with output per man or piece of equipment used being near or exceeding the theoretical capacity. *Long.*

high-grade. a. An arbitrary designation for dynamite of 40 percent strength or over. *See also* grade, e. *Fay.* b. To steal or pilfer ore or gold, as from a mine by a miner. *See also* high-grading. *Fay.* c. Sometimes used to designate the best quality of industrials normally used as drill diamonds. *Long.* d. To steal or pilfer interesting pieces or core, containing a valuable mineral, such as gold. *Long.* e. A rich ore. *Long.*

high-grade granulated salt. Purified vacuum pan salt. *Kaufmann.*

high-grade mill. A plant for treating high-grade ores. *Fay.*

high-grade ore. Rich ore. *Compare* low-grade ore. *Fay.*

high-grader. One who steals and sells, or otherwise disposes of high-grade or specimen ores. A common practice in the early days of gold mining. *Fay.*

high-grading. Theft of valuable pieces of ore. *Pryor, 4.*

high-heat duty fire clay brick. Having a pyrometric cone equivalent of at least 32½. There are additional American Society for Testing and Materials reequirements. *VV.*

high-intensity arc. Similar to a high-current metallic arc, except not necessarily between metal terminals. The term originally was used to describe arcs of several hundred amperes between carbon electrodes in air. *BuMines Bull. 625, 1965, p. VII.*

high-lead bronze. An alloy containing about 75 percent copper and varying percentages of tin and lead. Its principal use is for bearings operating under high speeds. *Crispin.*

high-level placers. A placer on an alluvial terrace. *A.G.I.*

high line. a. A high tension electric line. *Nichols.* b. Electric power supplied by a utility. *Nichols.*

high-low alarm. A device on a steam boiler which acts as a second safety valve in the event of excess pressure developing, and also blows off to warn the stoker if the water level falls too low, being controlled by an internal float. *Mason, v. 2, p. 359.*

high-magnesia products. Materials in which more than 10 percent of the total calcium oxide and magnesium oxide consists of magnesium oxide. *Bennett 2d, 1962 Add.*

high-magnesium hydraulic hydrated lime. A hydraulic hydrated lime that contains more than 5 percent magnesium oxide (nonvolatile basis). *ASTM C51-47.*

high marsh. *See* salt marsh. *Schieferdecker.*

high mica. Mica which is higher than the copper commutator bars of the armature due to slower wear. *Crispin.*

highmoor bog. A bog, the surface of which is covered largely by sphagnum mosses and because of the exceptional capacity for water retention by those mosses, it is not dependent upon the ground water table for the accumulation and preservation of sphagnum (peat moss) peat. Often in a domed (raised bog) or slope-mantling (blanket bog) form. From the German hochmoor. *A.G.I.*

highmoor peat. a. Peat formed on high moors. It is subdivided into moor peat; forest peat. Chemically it is characterized by a high cellulose and hemicellulose content, high acidity, and low ash and low nitrogen content. *Tomkeieff, 1954.* b. Consists of Sphagnum moss and other plants containing highly acid water derived only from rain. *A.G.I. Supp. See also* lowmoor peat; forest peat; sedimentary peat; lake peat.

high moors. Moors which develop above lowland moors, occasionally even directly upon leached soils, and characterized by plants requiring little food but high rainfall. Called high moors because the central part is characteristically higher than the edges. *Stutzer and Noe, 1940, p. 135.*

high nitrate barren. In the uranium acid-leach extraction process, the first flowing solution in the ion-exchange column effluent on load cycle. It is high in nitrate and low in uranium and is used as a tailings wash. *Pryor, 3.*

high-pass filter. A wave filter having a single transmission band extending from some critical or cutoff frequency, not zero, up to very large or infinite frequencies. *Hy.*

high pH mud. A drilling fluid with a pH range above 11.0—a high alkalinity mud. *Brantly, 1.*

high-phosphorus ores. Ores containing from 0.18 to 1.0 percent phosphorus. *Newton, p. 11.*

high pillar. *See* shaft pillar. *Fay.*

high potential. As applied in the U.S. Bureau of Mines Federal Mine Safety Code, means voltages in excess of 650 volts. *U.S. BuMines Federal Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. 1, Underground Mines, October 8, 1953.*

high pressure. A liquid or aeriform gas pressurized to more than 150 pounds per square inch. *Long.*

high-pressure hose. A flexible hose reinforced with coiled or woven metal wires forming a tube capable of containing a liquid or gas under high pressure without bursting. *Long.*

high-pressure line. A pipe or hose acting as a conductor through which a high-pressure stream of liquid or gas flows. *Long.*

high-pressure pump. A pump capable of discharging a liquid or gas pressurized to a minimum of 150 pounds per square inch.

Discharge pressures of as much as 2,500 pounds per square inch may be attained by specially designed pumps. *Long.*

high-pressure valve. A valve designed to operate and withstand high pressures without jamming or bursting. *Long.*

high quality. *See* high-grade, c. *Long.*

high quartz; beta quartz. Phase of quartz stable from 867° to 1,470° C. *Bennett 2d, 1962 Add.*

high-raise miner. *See* miner, i. *D.O.T. Supp.*

high-rank coals. Are defined as coals containing less than 4 percent of moisture in the air-dried coal or more than 84 percent of carbon (dry ash-free coal). All other coals are considered as low-rank coals. *B.C.I.*

high-rank graywacke. Synonym for feldspathic graywacke. *A.G.I. Supp.*

high-rank metamorphism. Metamorphism accomplished under conditions of high temperature and pressure. *See also* metamorphic grade. *A.G.I. Supp.*

high-ratio resistance controller. This controller gives a high ratio of maximum to minimum resistance, 6,000 to 1. A high resistance is thus available for reverse-current braking but the design ensures that there is an ample volume of electrolyte between the electrodes when starting at twice full-load torque. It is similar to the swinging-electrode controller. *Sinclair, V, p. 115.*

high reef. a. A bedrock which frequently rises more abruptly on one side of a channel or watercourse than on the other. *Fay.* b. The bedrock or reef rising from the gutter and forming the slopes of the ancient valley. Also called rim rock. *Engineering and Mining Journal, v. 139, No. 4, April 1938, p. 55.*

high-reef wash. A term usually applied to deposits of wash dirt upon the high reef. *Fay.*

high-residual phosphorus copper. Deoxodized copper with residual phosphorus present in amounts (usually 0.013 to 0.040 percent) generally sufficient to decrease appreciably the conductivity of the copper. *ASM Gloss.*

high-resolution technique. A seismic prospecting technique in which a special recording system yields readable reflections from layers less than 10 feet thick at depths as little as 100 feet. *Dobrin, p. 63.*

high seas. That part of the ocean not included in the territorial waters or in the internal waters of a state. *Mero, p. 285.*

high side. a. A deep coal-mine car, that is one with high sides. *Compare* gondola, b. *Fay.* b. That portion of mechanical refrigerating system under relatively high pressure from the compressor to the expansion valve, including the condenser. *Strock, 10.*

high-silica steel molding sand. A pure quartz and runs from coarse to fine grades. It must be very infusible and is always artificially bonded. *Hess.*

high sintering. Synonymous with advanced sintering at high temperatures, usually the final sintering close to the melting point of the material. *Osborne.*

high-speed machine. A diamond drill capable of rotating a drill string at a minimum of 2,500 revolutions per minute as contrasted with the normal maximum speed of 1,600 to 1,800 revolutions per minute attained by the average diamond drill. *Long.*

high-speed relays. These differ from instantaneous relays in that they operate at frequencies of within three cycles or less. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

high-speed steel. Alloy with approximately 0.6 percent carbon, 15 percent tungsten, 3½ percent chromium and some vanadium and molybdenum. Retains its cutting hardness when used as a lathe tool up to 700° C. *Pryor, 3.*

high steel. Steel containing a large proportion of carbon. *Fay.*

high-strength brass. A type of brass based on the 60 percent copper to 40 percent zinc composition, to which manganese, iron, and aluminum are added to increase the strength. The names delta metal and manganese bronze denote varieties in which iron and manganese are the principal additions, but most varieties now contain all three elements. *C.T.D.*

high-strength reinforcement. Steel reinforcement which has a tensile strength of 38 to 45 (or more) tons per square inch. *Taylor.*

high, structural. A term applied to the upper or higher part of a dome or other anticlinal structure. *See also* structure. *A.G.I.*

high-temperature bonding mortar. A mixture of refractory materials, either raw or calcined, to which other materials not classified as refractory materials have been added for the purpose of increasing the plasticity, giving air-setting properties, and lowering the temperature at which the bond develops. *Henderson.*

high-temperature carbonization. *See* carbonization of coal. *Mitchell, p. 49.*

high-temperature incineration method. This method can be used for analyzing mine roadway dusts containing shale dust, gypsum dust, or limestone (carbonate) dust. To obtain the incombustible matter in roadway dusts containing shale dust or gypsum it is necessary only to obtain the moisture content and the incombustible residue after incineration. However, if the dust contains carbonates it is necessary also to make an additional test to determine the amount of carbon dioxide in the carbonates, as this amount of carbon dioxide is given off and lost when the sample is incinerated, but has to be included as part of the total incombustibles. *Cooper, p. 411.*

high-tensile steel. A type of structural steel having a maximum yield point of 23 tons per square inch as compared with 15.25 tons per square inch for mild steel. *Ham.*

high-tension detonator. A detonator requiring an electrical potential of about 50 volts for firing. *B.S. 3618, 1964, sec. 6.*

high-tension line. A high-voltage transmission line. *Grove.*

high-tension separation. In mineral processing, the use of high-voltage direct current at between 18,000 and 80,000 volts to charge small particles of dry ore as they fall through its field (emanating as a spray or a point discharge). These are then sorted into relatively charge-retaining and charge-losing minerals in accordance with their conducting power. Also called electrostatic separation. *Pryor, 3.*

high-test cast iron. *See* high-duty cast iron. *C.T.D.*

high tide. The maximum height reached by each rising tide. Synonym for high water. *Schieferdecker.*

high-tide level. *See* high-water level. *Schieferdecker.*

high-tide line. *See* high-water line. *Schieferdecker.*

high-transmission glass. Glass which transmits an exceptionally high percentage of the visible light. *ASTM C162-66.*

high values. Trans. Ore having a high assay value. *Fay.*

high velocity. *See* velocity. *Kentucky, p. 167.*

high-velocity thermocouple. *See* suction pyrometer. *Dodd.*

high-volatile A bituminous coal. Nonagglomerating bituminous coal having less than 69 percent of fixed carbon (dry, mineral-matter-free) and more than 31 percent of volatile matter (dry, mineral-matter-free) and 14,000 or more British thermal units (moist, mineral-matter-free). *ASTM D388-38.*

high-volatile B bituminous coal. Nonagglomerating bituminous coal having 13,000 or more, and less than 14,000 British thermal units (moist, mineral-matter-free). *ASTM D388-38.*

high-volatile C bituminous coal. Either agglomerating or nonweathering bituminous coal having 11,000 or more, and less than 13,000, British thermal units (moist, mineral-matter-free). *ASTM D388-38.*

high-volatile coals. Coals containing over 32 percent of volatile matter with a coal rank code no. 400 to 900. *National Coal Board, Great Britain. See also* coal classification. *Nelson.*

high voltage. a. A high electrical pressure or electromotive force. *Grove.* b. That which is greater than 650 volts. Also called high potential. *ASA M2.1-1963.*

highwall. The unexcavated face of exposed overburden and coal or ore in an opencast mine or the face or bank on the uphill side of a contour strip mine excavation. *Bureau of Mines Staff.*

high water. *See* high tide. *A.G.I.*

high-water level; high-tide level. The plane of high water. *Schieferdecker.*

high-water line; high-tide line. The intersection of the plane of high water with the shore. *Schieferdecker.*

highway. A public road along which traffic and persons have a right to pass and to which the owners of adjacent property have access. *Ham.*

highwoodite. A dark-colored intrusive rock consisting of sodic orthoclase, intermediate plagioclase, pyroxene, biotite, opaque oxides, and apatite. A variety of monzonite with alkaline affinities. *A.G.I.*

hilairite. A deep-seated igneous rock consisting of nepheline-sodalite syenite. *Johannsen, v. 4, 1938, p. 289.*

Hiley's formula. A pile-driving formula which takes account of dynamic factors. The ultimate driving resistance of a pile in tons is:

$$\frac{Whn}{S + \frac{c}{2}}$$

in which W is the weight of the drop hammer in tons, h is the height of free drop in inches, n is the efficiency of the blow, S is the penetration of the pile per blow of the hammer, and C is the temporary elastic compression in inches of the soil, the pile, the packing, and the dolly. Safe load on a pile is considered to be half the ultimate driving resistance. *See also* dynamic pile formula. *Ham.*

hilgardite. Hydrated chloroborate of calcium, $Ca_8(B_6O_{11})_3Cl_4.4H_2O$, as colorless monoclinic-domatic crystals in the rock salt of Louisiana. *Compare* parahilgardite. *Spencer 15, M.M., 1940.*

hill. a. An arch or high place in a mine. *Fay.* b. Scot. The surface at a mine. *Fay.* c. N. of Eng.; Mid. An underground inclined plane. *Fay.* d. A natural elevation of land of local area and well-defined outline. *Webster 3d.*

hill-and-dale formation. Applied to the ridges and hollows along the surface of dumped material (usually overburden) at an opencast mine. The undulations are leveled out when the land is restored. *Nelson.*

hill clerk. Scot. The person who weighs mineral, whether at the mine or depot connected therewith. *Fay.*

hill diggings. Placers on hills. *Fay.*

hillebrandite. A white hydrous silicate of calcium, $CaO.Ca(OH)_2.SiO_2$. Radiating fibrous; orthorhombic. From Durango, Mexico. *English.*

hiller. In pottery, a vessel used in making the glaze. *Standard, 1964.*

Hillhouse basalt. A type of the Scottish Carboniferous basalts; characterized by numerous microphenocrysts of olivine and fewer of augite, in a fine groundmass in which augite predominates. *Holmes, 1928.*

hillman; hillsman. a. Scot. A pit headman; a hill clerk. *Fay.* b. A coal salesman. *Fay.*

hillock. a. Eng. A heap of sterile veinstuff or stone. *Fay.* b. A small hill. *A.G.I.* c. A mound. *Webster 3d.*

hill peat. Peat formed in mountainous districts and characterized by the presence of Sphagnum, Andromeda, heath, pine trees, etc. *Tomkeieff, 1954.*

hillsale. a. Scot. Sale of coal at the mine in carts, as distinguished from shipment in railway cars. *Fay.* b. *See* land sale, b. *BS 3323, 1960.*

hillside. Used to describe quarries when located in high slopes. *Compare* terrain slope. *Streefkerk, p. 14.*

hillside placers. Gravel deposits intermediate between the creek and bench gravels; their bedrock is slightly above the creek bed and the surface topography shows no indication of benching. *BuMines Bull. 419, 1939, p. 326.*

hillside quarry. A quarry cut into and along the hillside and may comprise a single face or a series of benches. If the depth of face is not more than about 30 feet it can be worked in one cut but deeper faces are usually worked in two or more benches. *See also* pit quarry. *Nelson.*

hills, origin of. In the general lowering of ground level by denudation, rivers work quickly downward in grading themselves to the existing baselevel. Between the river valleys, higher ground is left upstanding as hills. Again, some areas may be afforded protection by a capping of rock which is resistant to denudation; such areas will form hills as the surrounding ground is more rapidly lowered. Some hills are directly of volcanic origin, formed by the eruption of lava and ash. Even when the volcanic rocks of an area have been completely covered up by the sediments of a later geological period, in the process of re-excavation, the igneous rocks tend to form hills on account of their durability, as in the Lake District and North Wales. *C.T.D.*

Hilt's law. A generalization which states that, in a vertical sequence at any given point in the coalfield, the rank of the coal of the successive seams rises with increasing depth. *Tomkeieff, 1954.* Although this statement is generally true, there are numerous departures from it. *Nelson.*

Hind effect. The porosity of a dried cast (deflocculated) pottery body is less than that of the same body, dried, if made by the plastic (flocculated) process; the observation was first made by S. R. Hind. *Dodd.*

hindered contraction. Contraction where the geometry will not permit a casting to contract in certain regions in keeping with the coefficient of expansion. *ASM Gloss.*

hindered settling. a. The settling of crushed ore in a suspension of such ore (or of sand) and water. *C.T.D.* b. In classification, when the minerals settle in a thick pulp as opposed to free settling in which the free particles fall through fluid media. *Newton, p. 79.* c. Settlement of particles through a crowded zone, usually in a hydraulic column through which their fall is opposed by rising water. *Pryor, 2.*

hindered-settling ratio. The ratio of the apparent specific gravities of the mineral against the suspension (not against the liquid) raised to a power between one-half and unity. *Gaudin, p. 192.*

hindostan. A fine-grained sandstone used extensively in the manufacture of very cheap sharpening stones, especially axstones. Found in Indiana. *Fay.*

hindsight hub. Synonym for backsight hub. *Long.*

hinge. A line, or narrow strip, along a folded bedding surface, where the curvature is at a maximum. *Challinor.*

hinged apron. *See* apron conveyor. ASA *MH4.1-1958.*

hinged apron pan. An apron pan which is made with a hinge construction along each edge so that it may be joined to companion pans by a hinge pin, or through rod. *ASA MH4.1-1958.*

hinged bar; link bar. Steel bars placed in contact with the roof and at right angles to the longwall face. They are usually supported by yielding steel props. The bar can be extended to support newly exposed roof by adding another bar, which can be locked onto it by a simple wedge or pin arrangement. The hinged bar is widely used on conveyor faces in continuous mining. *Nelson.*

hinged-hammer crusher. *See* Williams' hinged-hammer crusher. *Fay.*

hinge fault. a. A fault in which the movement is an angular or rotational one on one side of an axis normal to the fault plane. *A.G.I.* b. A fault along one side of which the wall rocks have rotated as a block with respect to the rocks on the other wall. *Stokes and Varnes, 1955.* c. A fault whose displacement is greater at one place than another and diminishes to zero at some point. *Ballard.* d. See rotational fault. *Nelson.*

hinging coal. Scot. Coal lying at a moderately high inclination. *Fay.*

Hinjosa topaz. Brownish-red citrine from Hinjosa del Duero, District of Cordova, Spain. Heat-treated to a fiery red-orange color as distinguished from the Madeira wine color of the so-called Madeira topaz. *See also* Spanish topaz. *Shipley.*

hinsdalite. A dark gray or greenish hydrous sulfate and phosphate of lead, aluminum, and strontium, $2(Pb,Sr)O.3Al_2O_3.2SO_2.$-$P_2O_5.6H_2O$, coarse, dull crystals and granular. Pseudorhombohedral. From Hinsdale County, Colo. *English.*

hinterland. a. That zone containing the beack flanks and the area inland from the coastline to a distance of 5 miles. *A.G.I.* b. A region behind a coast or other usually specified place. *Webster 3d.* c. A subjective term referring to the relatively undisturbed terrain on the back of a folded mountain range, that is, the side away from which the thrusting and recumbent folding appears to have taken place. *A.G.I.* d. The actively moving block which forces the geosynclinal sediments toward the foreland. If both blocks move equally, the distinction between foreland and hinterland breaks down. *A.G.I.* e. The land which lies behind a seaport or seaboard and supplies the bulk of the exports and in which are distributed the bulk of the imports of that seaport or seaboard. *A.G.I.*

hintzeite. *See* heintzite. *Fay.*

hiortdahlite. A silicate and fluoride of sodium, calcium, and zirconium, containing nearly 44 percent zirconium. Crystalizes in the triclinic system. *Hey 2d, 1955.*

hip-and-ridge angle. A piece of roofing tile required where a hip starts from a ridge. *Fay.*

hip-lift back-pressure method. An artificial respiration method in which the patient is laid face downwards on a smooth surface. The operator places one knee at one side of the patient and his other foot near the patient's opposite hip. He then places his hands under the patient's pelvis and raises it from 4 to 6 inches off the ground. This causes inhalation due to the movement of the diaphragm and the hyperextension of the spine. Exhalation is then induced by replacing the hips on the ground, and completed by exerting back pressure on the patient's mid thorax. *McAdam, pp. 90-91.*

Hippurite limestone. A massive limestone of Cretaceous age, stretching from Southern France into Italy and Greece, and linking up with the Nubian sandstone of North Africa; characterized by the presence of Hippurites, and aberrant lamellibranch. *C.T.D.*

hip roll. A tile used for covering the hips on roofs, and which in cross section may show either roll or an angle. *Fay.*

hip-roll back-pressure method. An artificial respiration method in which the position of both the patient and the operator are similar to those in the hip-lift back-pressure method, but in this method, the operator grasps the patient's hips and rolls him onto one knee or thigh, thereby raising the patient and inducing inhalation. During the rolling movements, the operator's arms are straight and his body is rocked in the same direction in which the patient is being rolled. The patient is then returned to a face-downward position, and pressure is put on his back to expel air from the lungs. *McAdam, pp. 91-92.*

hip-roll starter. A closed hip piece of roofing tile used at the lower end of a hip roll. *Fay.*

hip tile. A specially shaped roofing tile for use on a descending ridge that forms the junction of two faces of a roof. Hip tiles are available in a number of patterns varying from the close fitting hip of angular section to the broadly curved types known as bonnet hips and cone hips. *Dodd.*

hircine. A fossil amorphous resin, the composition of which has not been determined. *Fay.*

hircite. A yellowish-brown, amorphous hydrocarbon found in Burma, which emits a bad smell on burning. *Tomkeieff, 1954.*

hirnantite. A variety of albite keratophyre, or albitized tholeiite, containing laths of sodic plagioclase embedded in an interstitial base of chlorite, with smaller amounts of calcite, quartz, leucoxene, and haematite. *Holmes, 1928.*

Hirschback method. A method for draining firedamp from coal seams in which superjacent entries are developed over the coal seam being mined. The entries are located from about 80 to 138 feet above the seams to be mined and are often supplemented with up or down boreholes drilled perpendicular to the walls of the entries. Also known as the superjacent roadway system. *Virginia Polytechnic Institute. Mineral Industries Journal, v. 7, No. 1, March 1960, p. 3.*

hirst. A bank of sand in or along a river. *Standard, 1964.*

hisingerite. A brownish-black to black, hydrated ferric silicate of uncertain composition with the suggested formula, $MgFe''{}'Si_9O_{28}.17H_2O$; of cryptocrystalline structure like chalcedony. *Hess; Hey 2d, 1955.*

hislopite. A grass-green variety of calcite in which the color is due to admixed glauconite. *Fay.*

histogram. A bar diagram representing graphically the mechanical size grade analysis of a sediment, drawn so that the area of the bars is proportional to the quantity of material in each class. The width of the bars is determined by the class limits. *Pettijohn, 2d, 1957, p. 30.*

historical cost. Original cost of a piece of equipment, building, etc., as distinct from the cost of replacement at current prices. *Pryor, 3.*

historical gemmology. The history of the discovery and production of gemstones and their substitutes and of their use as personal and other ornaments. *Shipley.*

historical geology. *See* geology. *Fay.*

hit. Eng. To find, prove, or cut into a coal seam or fault. *Fay.*

hitch. a. A fault. Fractures and dislocations of strata common in coal measures, accompanied by more or less displacement. *Raistrick and Marshall, p. 102.* b. Step cut in rock face to hold timber support in underground working. *Pryor, 3.* c. N. of Eng. A minor geological fault or roll in the coal seam. *Trist.* d. A connection between two machines. *Nichols.* e. Scot.; Eng. A minor dislocation of a vein or stratum not exceeding in extent the thickness of the vein or stratum. *Fay.* f. A hole cut in the side rock, when this is solid enough to hold the cap of a set of timbers permitting the leg to be dispensed with. *Fay.* g. To attach trams to hauling ropes by short chains. *Fay.* h. A sudden stoppage of pumping machinery. *Standard, 1964.* i. To dig or pick holes or places to receive the ends (of timbers). *Standard, 1964.*

hitch-and-step. a. S. Wales. A system of regulating the distance between the faces of stalls in longwall work. *Fay.* b. *See* stepped longwall. *Nelson.*

hitch cutter. A miner who cuts places in the coal, ore, or wall in which to rest or place timbers to prevent rock from falling. *Fay.*

hitcher. a. The man who runs trams into or out of the cages, gives the signals, and attends at the shaft when men are riding in the cage. *See also* cager. *Fay.* b. One who works at the bottom of a haulage slope or plane engaging the clips or grips by means of which mine cars are attached to a hoisting cable or chain used for haulage up a steep incline to the mine surface. Also called hitcher-on. *D.O.T.1.* c. *See* hanger-on. *C.T.D.*

hitcher-on. The person employed at the bottom of a shaft or slope to put loaded cars on, and take empty cars off the cage. *Fay.*

hitch feed. Feed performed by a reciprocating head or slide carrying a gripper shoe that clamps the stock during the feeding movement and releases it on the return stroke. *ASM Gloss.*

hitch timbering. Installing bars in hitches either cut or drilled in the rib, thereby eliminating the need for legs. Hitch holes may be provided for each individual bar. *Coal Age, v. 71, No. 8, August 1966, p. 199.*

hitch wheels. S. Staff. Drums upon which winding bands (chains) coil. *Fay.*

Hittorr number. *See* transport number.

Hi-Velocity gelatin. Explosive containing low density gelatin; used for submarine blasting. *Bennett 2d, 1962.*

Hi-White Clay. Proprietary brand name for a group of hydrous aluminum silicates (sedimentary kaolins); specific gravity 2.60. Found in Georgia. Used in certain ceramic applications, and in roofing granules. *CCD 6d, 1961.*

hl. Abbreviation for hectoliter. *BuMin Style Guide, p. 59.*

hm. Abbreviation for hectometer. *BuMin Style Guide, p. 59.*

hm^2. Abbreviation for square hectometer. *BuMin Style Guide, p. 62.*

Ho. Chemical symbol for holmium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

hoarding; board. A close-boarded fence of temporary character erected around a building site on which erection, demolition, or repair work is in hand. *C.T.D.*

hoarfrost formation. A thin plastering with needle-shaped crystals of calcite. *Schieferdecker.*

hoarstone. A stone set up to mark a boundary line; a landmark; specifically, a prehistoric monolith. *Standard, 1964.*

hoastman. Eng. A member of the principal civil corporation of Newcastle-on-Tyne; formerly, a member of a merchant gild of that place which received strangers that came to buy coal and certain other commodities, conducted the purchases, and levied upon them a certain duty. In later times the gild controlled the selling and exportation of coal. *Standard, 1964.*

hob. a. A rotary cutting tool with its teeth arranged along a helical thread, used for generating gear teeth or other evenly spaced forms on the periphery of a cylindrical workpiece. The hob and the workpiece are rotated in timed relationship to each other while the hob is fed axially or tangentially across or radially into the workpiece. Hobs should not be confused with multiple-thread milling cutters, rack cutters, and similar tools, where the teeth are not arranged along a helical thread. *ASM Gloss.* b. York. The slaty adherent of inferior coal. *Arkell.* c. York. A thick sod pared off before cutting peat. Also called hub. *Arkell.*

hob-mouthed oven. A pottery bottle oven in which the firemouths projected 18 to 24 inches outwards, coal being fed to the fire from the top. *See also* bottle oven. *Dodd.*

hobo connection. Same as parallel connection, as used in blasting. *Fay.*

hod. a. Forest of Dean. A cart or sled for conveying coal in the stalls of thin seams. *Fay.* b. A tray or trough with a pole handle that is borne on the shoulder, for carrying mortar, brick, or similar load. *Webster 3d.*

hod boy; hodder. *See* carting boy. *C.T.D.*

hodge jig. Variation on Harz jig in which the plunger (piston) has differential motion. *See also* Harz jig. *Pryor, 3.*

hodgkinsonite. A bright pink to reddish-brown hydrous silicate of zinc and manganese, $3(Zn,Mn)O.SiO_2.H_2O$, acute, pyramidal, or prismatic crystals. Monoclinic. From Franklin, N.J. *English.*

Hodgson's micromanometer. A very sensitive inclined-tube manometer with a large cylindrical reservoir, termed a displacer chamber, containing a cylindrical displacer so positioned in the manometric fluid that when the instrument is leveled and both limbs are open to atmosphere the oil meniscus in the inclined tube is at its datum mark. When a pressure difference is applied to the micromanometer the meniscus will move. It is then returned to its former position by moving the displacer in a vertical direction by means of a micrometer screw. The pressure difference is therefore obtained directly from the initial and final readings on the micrometer scale. *Roberts, I, p. 36.*

hoe; backhoe; pullshovel. A shovel that digs by pulling a boom-and-stick-mounted bucket toward itself. *Nichols.*

hoedown. The same as breakdown. *Korson.*

hoegbomite. Same as högbomite. *English.*

hoeing. Working a mixture of soot and lime in an iron pan with a perforated bottom. *Newton, p. 365.*

hoelite. Yellow, orthorhombic needles identical with anthraquinon, $(C_{14}H_2O)$, formed by the burning of a coal seam in Spitzbergen, Germany. *Tomkeieff, 1954.*

Hoepfner process. Recovering copper from its sulfide ores by leaching with cupric and sodium or calcium chloride solutions and electrolyzing the resulting cuprous chloride liquor in cells with impure copper anodes protected by diaphragms; the electrolytic byproduct, cupric chloride, is returned for further leaching. *Bennett 2d, 1962.*

hoernesite; hornesite. A hydrous magnesium arsenate, $3MgO.As_2O_5+8H_2O$; contains 46.6 percent As_2O_5; in white flexible foliae and in crystals like gypsum; Mohs' hardness, 1; specific gravity, 2.474; very rare. *Dana 6d, p. 817.*

Hoesch process. A method of working the open-hearth furnace in the duplex process so as to reduce as much as possible the amount of manganese lost in the slag in the production of manganese steels. *Osborne.*

hoe scraper. In mining, scraper-loader used to gather and transport severed rock. Cables pull a box-sided hoe over the loose ore, which is gathered and dragged (slushed) to the delivery point. *Pryor, 3.*

hoe shovel; dragshovel. A revolving shovel having a pull-type bucket rigidly attached to a stick hinged on the end of a live boom. Also called pullshovel; ditching shovel; backhoe. *Nichols.*

Hoffmann kiln. An efficient periodic, multichamber kiln (common in Europe) in which the chambers are so connected that combustion gases and cooling air can be used to dry and preheat the ware to prevent wasting heat. *ACSG, 1963.*

hofmannite. A crystalline, colorless, tasteless, and odorless mineral, $C_{20}H_{36}O$, possessing a specific gravity of 1.0565; it melts at 71° C; rhombic crystals. It forms a white crystalline efflorescence on lignite in the vicinity of Sienna. Possibly same as hartite. *Fay; A.G.I. Supp.*

Hofmeister series. Cations arranged in order of decreasing flocculating power for clay slips: H^+, Al^{3+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+}, NH_4^+, K^+, Na^+, Li^+. *Dodd.*

hog. a. The upward bending or camber of a beam. Prestressed concrete beams are frequently cast with a hog to counteract any downward sag. *Ham.* b. In a wall one in which for any given height at both ends, there is a different number of courses, necessitating adjustment of mortar bed joints or the use of supplementary height units in the field. *ACSG.*

Hoganas process. A method for the production of sponge iron which consists of charging fireclay pots, about 5 feet high, with flat briquettes of a concentrate containing 71.5 percent of iron ore interspersed with layers of carbon, prepared by mixing coal with coke breeze; the pots are charged in batches in a long pit furnace where they are heated to about 1,200° C, the total time in the furnace being about 12 days. The pots are emptied by manual labor and put on a conveyor which takes them to tumbling machines where the ash and dirt are removed. *Osborne.*

hogback. a. The name given by geologists to the ridgy structure of certain districts, which consist of alternate ridges and ravines, occasioned either by the sharp undulations of the subjacent rocks, or more frequently by the erosive action of mountain torrents that cut out the ravines and leave the ridges or hog's-backs standing between. This structure occurs most abundantly on the lower slopes and flanks of mountain ranges. *A.G.I.* b. A sharp anticlinal, decreasing in height at both ends until it runs out. *A.G.I.* c. A ridge produced by highly tilted strata. *A.G.I.* d. Where uplift has given it (Dakota sandstone) a steep dip, it rises above the weaker rocks by which it is surrounded in a bold ridge, ordinarily called a hogback, and the Dakota hogbacks are among the most important features of the foothill belt along the base of the Rocky Mountains. *A.G.I.* e. Local term for drumlins in western Massachusetts. *A.G.I.* f. A name applied in the Rocky Mountain Region to a sharp-crested ridge formed by a hard bed of rock that dips rather steeply downward. *USGS Bull. 707, 1922, p. 8.* g. Worcester considers that there is no fundamental difference between cuestas and hogbacks and proposes that the term hogback be abandoned. *A.G.I.* h. A ridge or line of high hills with sharp summits and steeply sloping sides. *Long.* i. Eng. A sharp rise in the floor of a coal seam. *Fay.*

hogbomite; hoegbomite. A black oxide of aluminum, magnesium, and ferric iron, with some titanium replacing iron, $RO.2R_2O_3$ with Al_2O_3, Fe_2O_3, MgO, TiO_2. Rhombohedral. From Swedish Lapland; Whittles, Va. *English.*

högbomitite. *See* magnetite högbomitite. *Holmes, 1928.*

hog box. A concrete box in which water and dirt are mixed to be pumped to a fill. *Nichols.*

hoggan. Corn. The food carried by the miner to the mine. *Fay.*

hogger. a. Scot. A leather or canvas delivery pipe at the top of a sinking set of pumps. *Fay.* b. N. of Eng. Stockings without feet, worn by coal miners. *Fay.*

hogger pipe. N. of Eng. The upper terminal pipe with delivery hose from the mining pump. *Fay.*

hogger pump. The topmost pump in a shaft. *Fay.*

hoggin. A material composed of screenings or siftings of gravel or a mixture of loam, coarse sand, and fine gravel, used in making filter beds, as a binder, etc. *Webster 2d.*

hogging moment. A bending moment which tends to cause hog. *See also* sagging moment. *Ham.*

hoggs. War. Limestone. *Arkell.*

hog's-back. A type of ridge tile. *See also* ridge tile. *Dodd.*

hogshead. Fifty-two and one-half imperial gallons. *Pryor, 3.*

hog-tooth spar. Like a dog-tooth spar, a name for calcite, occurring in acute scalenohedrons. *Fay.*

Hohenlohehutte furnace. A retort furnace for the distillation of zinc. *Fay.*

hohmannite. Probably amarantite. *Larsen, p. 260.*

Hoimester. Trade name; a device for controlling the softness of an extruded column of clay; two small sensing rollers run on the clay column, their axial positions changing with any change in softness of the clay; this change can be made to adjust the rate of water addition to the mixer and so bring the consistency of the clay back to normal. *Dodd.*

hoist. a. A drum on which hoisting rope is wound in the engine house, as the cage or skip is raised in the hoisting shaft. *Pryor, 3.* b. An engine with a drum, used for winding up a load from a shaft. *See also* winding engine. *C.T.D.* c. The windlass mechanism incorporated as an integral part of a power-driven drilling machine used to handle, hoist, and lower drill-string equipment, casing, pipe, etc., while drilling, or to snake the drill from place to place. *Long.* d. The act or process of lifting drill string, casing, or pipe out of a borehole. *Long.* e. A power-driven windlass for raising ore, rock, or other material from a mine and for lowering or raising men and material. *Long.* Also called hoister. *Fay.* f. The mechanism by which a bucket or blade is lifted, or the process of lifting it. *Nichols.* g. The amount of ore, coal, etc., hoisted during a shift. *Fay.* h. *See* draw works. *B.S. 3618, 1963, sec. 3.*

hoist back-out switch. A switch that permits operation of the hoist only in the reverse direction in case of overwind. *ASA C42. 85:1956.*

hoist boy. In bituminous coal mining for Arkansas and Oklahoma, a general term applied to a hoisting engineer who operates a small hoisting engine, or an oiler who lubricates and cleans the engine. *D.O.T. 1.*

hoist engineer. *See* hoistman. *D.O.T. 1.*

hoist engineman. *See* hoistman. *D.O.T. 1.*

hoister. A machine used in hoisting the product. It may be operated by steampower or horsepower. *Zern.*

hoisting. a. Winding in a metal mine. *Nelson.* b. In power-shovel nomenclature, hoisting is a term applied to two operations; (1) the raising or lowering of the boom, and (2) the lifting or dropping of the dipper stick in relation to the boom. *Carson, p. 38.*

hoisting block. a. The lower block of a block and fall, bearing the hoisting hook. *Standard,* 1964. b. Used incorrectly as a synonym for sheave wheel. *Long.* c. A traveling block or sheave. *Long.*

hoisting compartment. The section of a mine shaft used for hoisting the mineral to the surface. *Stoces, v. 1, p. 508.*

hoisting crab. A crab, winch, or windlass for hoisting. *Standard, 1964.*

hoisting cycle. The periods of acceleration, uniform speed, retardation and of rest. The deeper the shaft the greater is the ratio of the time of full-speed hoisting to the total hoisting cycle. For shallow shafts there may be very little time at full speed, retardation beginning almost at the end of the accelerating period. *Lewis, p. 259.*

hoisting drum. The flanged cylindrical part of a windlass around and on which the hoist rope or cable is wound. Also called spool. *Long.*

hoisting engineer; hoistman. One who operates a hoisting engine, especially at a mine or quarry. Also called engineman. *Fay. See also* hoistman. *D.O.T. 1.*

hoisting jack. A device for applying hand power to lift an object by means of a screw or lever, or by hydraulic power. *Fay.*

hoisting plug. A pin-thread heavy-bodied coupling provided with a swivel-mounted eye in the end opposite the pin-thread end. When attached to the hook on the drill-hoist line, the pin-thread end can be screwed into the rods to hoist and otherwise handle drill-string equipment when making borehole round trips. Also called plug; screwplug; swivel plug. *Long.*

hoisting power. The capacity of the hoisting mechanism on a drill machine. May be expressed in terms of the number of lineal feet of a specific-size drill rod a hoist can lift on a single line or in terms of the total weight it can handle, figured in pounds or tons. *Compare* capacity. a. *Long.*

hoisting rope. A rope composed of a sufficient number of wires and strands to insure strength and flexibility. Such ropes are used in shafts, elevators, quarries, etc. *Zern. See* cable a and c.

hoisting sheave. *See* winding sheave. *Nelson.*

hoistman. In mining, one who operates steam or electric hoisting machinery used to lower cages (elevators) and skips (large, metal, boxlike containers) into a mine and to raise them to the surface from different levels. May be designed according to type of power used, as electric-hoist man; steam-hoist man. Also called cageman; cage runner; hoist engineer; hoist engineman; hoisting engineer; hoisting engineman; hoist operator; operating engineer; shaft driver; shaft engineer; shaft-hoist engineer; shaft hoistman. *D.O.T. 1.*

hoist, mine. *See* mine hoist.

hoist operator. a. In petroleum production, one who lowers and raises surveying, servicing, or testing instruments in and out of oil or gas wells on electrical conductor cables, using truck mounted hoisting equipment. Also called winch operator. *D.O.T. 1.* b. *See* hoistman. *D.O.T. 1.*

hoist overspeed device. A device which can be set to prevent the operation of a mine hoist at speeds greater than predetermined values and usually causes an emergency brake application when the predetermined speed is exceeded. *ASA C42.85:1956.*

hoist overwind device. A device which can be set to cause an emergency brake application when a cage or skip travels beyond a predetermined point into a danger zone. *ASA C42.85:1956.*

hoist signal code. Prescribed signals for indicating to the hoist operator the desired direction of travel and whether men or materials are to be hoisted or lowered in mines. *ASA C42.85:1956.*

hoist signal system. A system whereby signals can be transmitted to the hoist operator (and in some instances by him to the cager) for control of mine hoisting operations. *ASA C42.85:1956.*

hoist slack brake switch. A device for automatically cutting off the power from the hoist motor and causing the brake to be set in case the links in the brake rigging require tightening or the brakes require relining. *ASA C42.85: 1956.*

hoist speed; hoisting speed. *See* cable speed. *Long.*

hoist trip recorder. A device which graphically records information such as the time and number of hoists made as well as the delays of idle periods between hoists. *ASA C42.85: 1956.*

holdback. On an inclined belt conveyor system, a brake which comes automatically into use in the event of power failure, thus preventing the loaded belt from running downward and piling up rock. *Pryor, 3.*

Holdcroft bars. Pressed and prefired ceramic bars (2¼ by 5/16 by ¼ inches) made of blended materials so proportioned that, when placed horizontally with only their ends supported, and when heated under suitable conditions, they will sag at a stated temperature. The bars are numbered from 1 (bending at 600° C) to 40 (1,550° C). These bars were introduced in 1898 by Holdcroft & Co., and are now available from Harrison & Sons, Ltd., Stoke-on-Trent, England. *Dodd.*

Holdcroft thermoscope bars. Temperature indicators which consist of a series of small bars placed horizontally on a refractory stand. On heating, some bars are bent to varying degrees, others are unaffected. The temperature is indicated by the bar that is just beginning to sag. The bars are numbered 1 to 40; the temperature range being 600° to 1,550° C. *Osborne.*

holdenite. A red basic hydrous arsenate of manganese and zinc, $8MnO.4ZnO.As_2O_5.5H_2O$. Tabular crystals; orthorhombic. From Franklin, N. J. *English.*

holder-up. Skilled man who inserts hot rivets into rivet holes and drives them home. He then presses a dolly against the rivet head while the other projecting end is upset by the riveter. *Ham.*

holdfast. Temporary anchorage for guy ropes. *Ham.*

holding. *See* take. *B.S. 3618, 1963, sec. 1.*

holding-down bolt. *See* anchor bolt. *Ham.*

holding line. The hoist cable for a clamshell bucket. *Nichols, 2.*

holding ring. A bead in the finish of a glass bottle for use when the parison is transferred to the blow mold; sometimes known as the back ring or transfer ring. *See also* bead. *Dodd.*

holding rope. Support rope for suspension of a grab used for excavating or handling bulk material. *Ham.*

hold out! Derb. An exclamation by the banksman; down a shaft to the bottomer, when men are about to descend the shaft, to let him know that he is not to send up a load of coal, but merely the empty rope or chain. *Fay.*

hold time. In resistance welding, the time during which pressure is applied to the work after the current ceases. *ASM Gloss.*

holdup. Any breakdown or delay that results in loss of drilling time. *Long.*

hole. a. To undercut a seam of coal by hand or machine. *Fay.* b. To make a communication from one part of a mine to another. *Fay.* c. In Joplin, Mo., a local term for a mine shaft. *Fay.* d. A drill hole, borehole, or well. *Long.* e. To pick out the soft clay beneath a lode or seam of coal preparatory to wedging or blasting the mass out. *Gordon.* f. A perforation through the laminae. *Skow.*

hole curvature. The amount, expressed in degrees, that a borehole has diverged from its intended course in a distance of 100 feet. *Long.*

hole deviation. a. Sometimes used synonymously for hole curvature. *Long.* b. The change in the course or direction a borehole follows. The change may be the result of operational characteristics of the equipment used, of rock structures encountered, or of intentional deflection through the use of deflection wedges, whipstocks, etc. *Long.*

hole director. In underground tunneling, a light steel framework used to set the angle at which the holes for a blasting round are to be drilled. Frames are either hand held or strong enough to support the drill. *Pryor, 3.* Also called burden gage. *Higham, p. 79.*

hole face. *See* bottom, i. *Long.*

hole-in. To start drilling a borehole. Also called collar; spud; spud-in. *Long.*

hole layout. In quarrying, an arrangement consisting of a combination of vertical and horizontal holes. *Streefkerk, p. 15.*

holeman. Penn. One who loads holes with explosives; a charger. *Fay.*

holer. *See* machineman. *D.O.T. 1.*

holers. The men employed in the operation of holing the coal. *Peel.*

holes. N. of Eng. The different stages or floors from which the cages are loaded at the shaft bottom. *Fay.*

hole system. A system of contract work underground by which the pointing of the holes and blasting are done by company men and the rest of the work by the miner. *Fay.*

hole through. Successful meeting of two approaching tunnel heads, or of winze and raise. *Pryor, 3.*

holey boy. A type of perforated floor in intermittent down draft kilns firing salt glazed pipes. *Dodd.*

Holger-Nielsen method. An artificial respiration method in which the patient is laid face downwards on a flat surface with the head resting on his folded hands. One knee is placed at the patient's head and one foot close to the patient's elbow. The patient is slapped two or three times between the shoulder blades to ensure the tongue falling forward. Exhalation is induced by placing the hands on the patient's back just below the scapula, with the body swung forward, keeping the arms straight, to exert pressure on the patient's lungs. Inhalation is then brought on by grasping the patient's elbows, swinging backwards and lifting the patient's elbows upwards until his chest walls are expanded. *McAdam, p. 86.*

holiday. a. A day appointed in the contract between miners and operators as a day during which mines must be idle. *Zern.* b. A euphemism for an unlawful strike. *Zern.*

holing. a. Cutting. *Mason.* b. The working of a lower part of a bed of coal for bringing down the upper mass. *Fay.* c. The final act of connecting two workings underground. *Fay.* d. The meeting of two roadways driven expressly to intersect each other. Also called thirling. *B.S. 3618, 1963, sec. 1.* e. Eng. Shale partings in which the first charges were inserted for blasting, Wenlock limestone, Dudley. *Arkell.* f. Undercutting. *Arkell.* g. Eng. *See* kirving. *SMRB, Paper No. 61.*

holing about. Eng. The operation of establishing an air current between the downcast and upcast shafts. *Fay.*

holing coal; holing dirt. Eng. Term used among Lancashire miners for inferior coal bands which have to be removed by pick in working seams. *Tomkeieff, 1954.*

holing nog. A kerf wedge. *See also* nog. *Nelson.*

holing pick. A pick used in holing coal. *Standard, 1964.*

holings; cuttings. Eng. Holing dirt or small coal made by kirving with a coal-cutting machine. Also called scuffings. *SMRB, Paper No. 61.*

holing shovel. S. Staff. A short-handled, round-bladed shovel. *Fay.*

holing-through. Driving a passage through to make connection with another part of the same workings, or with those in an adjacent mine. *See also* holing, c. *Fay.*

hollandite. a. A silvery-gray to black manganate of manganese, barium, and ferric iron. $m(Ba,Mn)_2MnO_5 + nFe_4(MnO_5)_3$. Prismatic; tetragonal. Considered to be the crystalline form of psilomelane. From Balaghat, Central India. *English.* b. Possibly BaR_8O_{16}, with $R=Mn^4$ chiefly, also Mn^2, Co, Zn, Fe^3. *American Mineralogist, v. 28, No. 11–12, November-December 1943, p. 615.*

Holloway process. Copper or iron sulfides fused and blown with air to burn out the sulfur content. *Bennett 2d, 1962.*

hollow blocks. Hollow tiles, larger than common bricks, usually of rectangular form, and having some cross webs. Used in exterior walls and also partitions. *Fay. See also* hollow clay blocks; hollow masonry unit.

hollow brick. Brick molded with hollow spaces in them. They are usually strengthened by crosswebs. *Fay.*

hollow brick clay. Includes a variety of clays that have fair tensile strength, sufficient plasticity to flow smoothly through a die, will burn to a hard though not vitrified body at a comparatively low temperature, but the chief value of such a clay is its proximity to manufacturing and marketing points. *CCD 3d, 1942, p. 195.*

hollow casting. *See* drain casting. *ASTM C242-60T.*

hollow clay blocks. Fired clay building blocks, usually of comparatively large size, with cells (air spaces)within the block; they are used for wall construction and, with metal reinforcement, for floors and prefabricated panels. *Compare* perforated brick. *Dodd.*

hollow dam. A dam built of reinforced concrete, mass concrete, or masonry in which the water pressure is resisted by a sloping slab or vault carried by buttresses. *Ham.*

hollow doublet. A doublet which contains a colored liquid in a concave depression hollowed out of the lower surface of its top section or the upper surface of its bottom section, or both. *Shipley.*

hollow drill; hollow rod; hollow stem. A drill rod or stem having an axial hole for the passage of flushing water or compressed air to remove cuttings from a drill hole. *B.S. 3618, 1964, sec. 6.*

hollowed cabochon. A cabochon-cut stone with a concave depression in its under surface, to lighten its color. *Shipley.*

hollow fire. Eng. A kind of hearth with blast, used for reheating the blooms produced in the South Welsh process of fining or the bars of blister steel in the manufacture of shear steel. *Fay.*

hollowing. To hollow out a ball of clay on the wheel. *ACSG, 1963.*

hollow lode. Aust. A lode filled with vugs. *Fay.*

hollow masonry unit. A masonry unit whose net cross-section area in any plane parallel to the bearing surface is less than 75 percent of the gross. *ACSG, 1963.*

hollow neck. A fault in the neck of a bottle resulting from an insufficiency of glass in the gob from which the bottle was made; if the bottle is of the screw-necked type, the faulty neck is said to be blown away. *Dodd.*

hollow-plunger pump. A pump used for mining and quarrying, as in muddy and gritty water. *Standard, 1964.*

hollow quoin. Recessed masonry which carries the heel post of a lock gate. *Ham.*

hollow reamer. A tool or bit used to correct the curvature in a crooked borehole. *Compare* reaming bit. *Long.*

hollow-rod churn drill. A churn drill in which hollow rods replace the steel wire rope. The drilling fluid is pumped down the inside of the rods and the chippings and fluid return to the surface on the outside. *Nelson.*

hollows. Eng. Old abandoned workings. *Fay.*

hollow spar. Andalusite. *Fay.*

hollow tile. A hollow block of concrete or clay forming an integral part of a suspended concrete floor or roof. This type of block is nearly always reinforced and may be of prestressed construction. *See also* topping. *Ham.*

hollow wall. A wall built of masonry units so arranged as to provide an air space within the wall and in which the facing and backing are bonded together with masonry units. *ACSG, 1963.*

hollowware. A class of utensils, such as pots, pans, and kettles. *ASTM C286-65. Compare* flatware.

hollowware enamel. A porcelain enamel adapted for application to hollowware. *ACSB, 3.*

hollowware presser. a. One who makes hollow vessels such as bowls and pitchers by pressing pliable clay into mold and applying hand pressure, using pieces of leather, double flannel, or soft sponge, until clay conforms to mold. This operation has been superseded in mold establishments by casting (caster). Also called ware presser. *D.O.T.1.* b. A machine for shaping bowls, cups, and other hollowware. *C.T.D.*

Holman Airleg. A drill support consisting of a cylinder of about 2-inch bore in which the piston is actuated by compressed air controlled by a twist-grip control valve. This valve is also used to release the air pressure to allow the piston to be lowered. The control valve also regulates the feeding pressure on the drill. The length of feed of the Holman Airleg is 39 inches, overall length 57 inches, and weight 25 pounds. A vent hole near the top of the cylinder allows the air to escape when the piston travels past it, so as to warn the operator that the limit of feed has been reached. The leg is then readjusted for drilling to be resumed. The leg gives good support to the drill at all heights within reasonable limits and one man can comfortably handle a drill when mounted in this way. *Mason, v. 2, pp. 600-601.*

Holman counterbalanced drill rig. A drill rig consisting of a rail-track carriage on which is mounted a counterbalanced boom 10 feet in length. For two-drill mounting, a cross bar is attached to the boom and drill cradles can be fixed over or under the bar by swinging it through 180°. For a four-drill mounting, two additional vertical columns are used; these are jacked to the floor and the drill carriage clamped to the track. The cross bars can be clamped to any required position on the vertical columns. *Mason, v. 2, p. 604.*

Holman dust extractor. A dust trap in which the dust and chippings created during percussive drilling are drawn back through the hollow drill rod and out through the rear of the machine and along a hose to a metal container with filter elements. The appliance requires a special type of drilling machine, rods, and bits. *Nelson.*

Holman stamp. Crushing stamp lifted by a crank mechanism and accelerated in its fall by compressed air. *Pryor, 3.*

Holmberg system. A method of sintering iron ore. Sintering is carried out in a series of pans, 11 feet 6 inches square, with robust chromium vanadium steel grate bars, which have a life of 5 to 6 years. Advantages include low fuel consumption and absence of moving parts in the sintering zones. *Osborne.*

Holme mud sampler. With this device the sample is taken by a scoop rotating on an axle mounted on a heavy frame that rests firmly on the bottom. The device is lowered open with the entire weight being taken by a shackle on a balanced arm. Closure is not effected on touching bottom. On hoisting, the pressure of water on a vane attached to the balanced arm tips a lever and allows a pin to slip out and release the shackle. The weight is then transferred to a rope rotating around a large drum. This in turn rotates a small pulley and drags the sampling hemisphere through the bottom via a second pulley to which it is attached by a light wire. The maximum volume of the sample is 5½ liters, and in practice, usually about 3 to 4 liters are collected. *H&G.*

Holmes' classification. A classification of igneous rocks based primarily upon the degree of saturation and secondarily on other aspects of the mineralogical composition. *A.G.I.*

Holme suction grab. In this device the force required to suck in a sample of the sediment is provided by a vacuum chamber (containing air at atmospheric pressure) which is mounted above the collecting tube. On striking the bottom, the chamber is put into communication with the outside and the water pressure forces the sample into the collecting tube. The pressure chamber itself is a strong brass tube closed at the upper end by a lid and held firmly in position by a clamp. A sampling tube is fixed below the chamber and extends upwards into it. Between the upper and lower parts of the central tube is a plug held in position by retaining hooks through slots in the wall of the lower tube. When the device strikes the bottom a mouth tube rises, disengaging the plug, which flies up the tube. The water then forces material up into the collecting tube. *H&G.*

holmia. *See* holmium oxide. *CCD 6d, 1961.*

holmium. Metallic element of atomic number 67 in group II of the periodic table. Bright silvery; metallic luster; hexagonal; specific gravity, 8.803; melting point, 1,461° C; boiling point, 2,600° C; reacts slowly with water; and soluble in dilute acids. One of the rare earth elements of the yttrium subgroup. Symbol, Ho; valence, 3; and atomic weight, 164.93 *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-114, B-178.*

holmium oxide; holmia. Light yellow; isometric; Ho_2O_3; slightly hygroscopic; insoluble in water; and soluble in acids. Used in refractories and as a special catalyst. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-178.* Melting point, above 1,500° C. *Lee.*

holmquistite. A bluish-black silicate of lithium, magnesium, iron, and aluminum with fluorine and hydroxyl, $Li_2(Mg,Fe)_3Al_2Si_8O_{22}(OH,F)_2$. A lithium-bearing variety of glaucophane (or amphibole). Monoclinic. Prismatic. From Uto, Sweden; Hiddenite, N.C. *English.*

holo-. A combining form from the Greek holos meaning complete, whole, or entire. *Webster 2d.*

holoblast. Newly grown minerals. *A.G.I.*

Holocene. Synonym for Recent. *A.G.I. Supp.*

holocrystalline. A term applied to rocks consisting entirely of crystallized minerals and no glass. The minerals may or may not have crystal boundaries, and the rocks may be granular or porphyritic. *Johannsen, v. 1, 2d, 1939, p. 216.*

holocrystalline porphyritic. A term originated by Rosenbusch for the texture of porphyritic rocks with a holocrystalline groundmass. *Johannsen, v. 1, 2d, 1939, p. 217.*

holofelsic. Refers to igneous rocks consisting entirely or almost entirely of felsic minerals, color index less than 10. *A.G.I. Supp.*

holohedral. a. In crystallography, belonging to the highest symmetry class of its crystal system. *A.G.I.* b. In crystallography, possessing all the faces that have equivalent intercepts required by the symmetry of the group to which the form belongs. *Fay.*

holohedron. A form having the full number of symmetrically arranged planes crystallographically possible. *Standard, 1964.*

holohemihedral. Denoting hemihedrons in which all the sectants have half instead of the whole number of similar planes. *Standard, 1964.*

holohyaline. Completely glassy. *Fay.*

hololeims. Coalified remains of entire plants. *Tomkeieff, 1954.*

hololeucocratic; holomelanocratic. Terms applied to facies of igneous rocks, or to a series of related rocks, which are almost completely composed of light or dark minerals, respectively. *Holmes, 1928.*

hololith ring. An entire finger ring made from a single piece of gem material. *Shipley.*

holomafic. Refers to igneous rocks consisting entirely or almost entirely of mafic minerals. *A.G.I. Supp.*

holomelanocratic. Synonym for holomafic. *A.G.I. Supp.*

holomorphic. Denoting likeness of form at the ends; a form of holosymmetric crystals. *Standard, 1964.*

Holophane lumeter. In this instrument the object is viewed directly through the eyepiece and occupies the center of the field of view, while the comparison surface forms a surround illuminated by light from the internal standard. Light from the lamp inside the instrument on to the comparison surface is diffused by an opal glass window which is partly covered by a rotable disc in which a sector-shaped opening has been cut. As the disc is rotated, the exposed area of the opal glass window is changed from zero to fully open, and accordingly the brightness of the comparison surface is changed from zero to a maximum. Color filters are used to permit work in yellow or in blue-green light, and neutral filters are interposed between the comparison surface and the object to extend the range. The lamp is operated at a fixed light output, controlled by a resistance and voltmeter. *Roberts, II, pp. 51, 52.*

holosiderite. A meteorite consisting of metallic iron without stony matter. Same as meteoric iron. *Webster 3d.*

holte. S. Afr. A hollow or depression. *Hess.*

Holtzmann mechanical generator. A device for the production of ultrasonic waves. *Osborne.*

Holweck-Lejay inverted pendulum. An instrument for measuring differences in gravity in which a mass is suspended from below by a weak flat-leaf spring. The instrument is used near its instability configuration and, as used, its period of oscillation varies with changes in gravity by a much greater percentage than is the case in the gravity pendulum. *A.G.I.*

holyokeite. A variety of albite diabase containing 70 percent albite, 9 percent orthoclase, and 16 percent calcite, with smaller amounts of accessory minerals; from Holyoke, Mass. *Holmes, 1928.*

holystone. a. A soft sandstone used to scrub a ship's decks. *Webster 3d.* b. To scrub with a holystone. *Webster 3d.* c. Eng. Limestone full of holes, white limestones of the Great Oolite near Minchinhampton, Gloucestershire, used for megalithic monuments. *Arkell.*

Homberg's phosphorus. A phosphorescent material produced by heating together 1 part of ammonium chloride with 2 parts quicklime. *Osborne.*

home. N. of Eng. In the direction of, or toward the shaft, as in an underground mine. Outby. *Fay.*

homeoblastic. a. The texture of crystalloblastic rocks in which the essential constituents are approximately of equal size. Dependent on the habit of the essential minerals, homeoblastic rocks may be called granoblastic, lepidoblastic, nematoblastic, or fibroblastic. *Schieferdecker.* b. A term used instead of equigranular and applied to metamorphic rocks to indicate that the texture so described is due to recrystallization. *Holmes, 1928.*

homeoblastic structure. A metamorphic texture in which the constituent minerals are all of the same order of magnitude in size. *A.G.I.*

homeothrausmatic. Said of orbicular rocks in which the composition of the cores of the orbs resembles that of the groundmass in which they are embedded. Allothrausmatic is the term applied to those rocks in which the two compositions are different. *See also* isothrausmatic. *C.T.D.*

Homestead Act. An act of Congress authorizing the sale of public lands in parcels of 160 acres each, to settlers. *Fay.*

homestead entry. An entry under the statute enacted to secure homesteads to actual settlers on the public lands. *Fay.*

homichlin. A variety of chalcopyrite that is partly altered to bornite. *Standard, 1964.*

homichlinite. A copper and iron sulfide carrying about 43.8 percent copper. Apparently is chalcopyrite partly altered to bornite, and close to barnhardtite. Chemical formula uncertain. Crystallization, tetragonal; also occurs massive; Mohs' hardness, 4 to 5; specific gravity, 4.48; color, brassy bronze; streak, black. Found in Chile, Germany, and Japan. *Weed, 1918.*

homilite. A black, blackish-brown borosilicate of calcium and iron, $2CaO.FeO.B_2O_3.2SiO_2$; contains 18.7 percent B_2O_3; Mohs' hardness, 5; specific gravity, 3.38. From Norway. *Hess.*

Hommelaya Process. Trade name; a procedure in which cobalt is deposited on sheet steel before it is enameled, the purpose being to eliminate the need for a ground coat. *Dodd.*

Hommel's classification. A chemicomineralogical classification of igneous rocks proposed by Hommel (1919). *A.G.I.*

homo-. A combining form from the Greek homos denoting one and the same, common, joint, or like. Often, the opposite of hetero-. *Webster 2d.*

homocline. In geology, a group of inclined beds of the same dip, which may be either monoclinal, one limb of a fold, or isoclinal, but whose actual relations are not determinate. Used in a more restricted sense than a monocline in that it applies to small or fragmentary areas. *Fay.*

homoeomorphism. A near similarity of crystalline forms between unlike chemical compounds. *Fay.*

homogeneity. In geochemical prospecting, the homogeneity of a geochemical anomaly is a measure of the smoothness, or absence of strong local variations, in the distribution of the indicator element. *Hawkes, p. 235.*

homogeneous. Made up of similar parts or elements; of the same composition or structure throughout; uniform. Opposite of heterogeneous. *Standard, 1964.*

homogeneous, isotropic formation. Any massive formation of similar rock that approximates a homogeneous, isotropic medium having a limited number of mechanical defects. *BuMines Bull. 587, 1960, p. 2.*

homogeneous mass. A mass that exhibits essentially the same physical properties at every point throughout the mass. *ASCE P1826.*

homogeneous metal. A variety of ingot metal produced by the open-hearth process, for example, steel. *Fay.*

homogeneous reactor. A reactor in which the fuel is mixed with the moderator or coolant; for example, a fused-salt reactor. *L&L.*

homogeneous steel. Cast steel without blowholes. *Standard.*

homogeneous substance. A substance out of which any portion removed at random has the same composition and properties as every other portion; for example, compounds. *Cooper.*

homogenizing. Holding at high temperature to eliminate or decrease chemical segregation by diffusion. *ASM Gloss.*

homogenizing treatment. A heat treatment of an alloy intended to make it uniform in composition by eliminating coring and concentration gradients. *ASM Gloss.*

homolite. *See* homilite. *Hess.*

homologous series. In chemistry, a series of compounds, such as alcohols, which change in structure by the addition of a definite group of atoms, for example, CH_2. Such a series has a regular gradation in its change of physical properties. *Pryor, 3.*

homopolar bond. One in which two atoms contribute equally to produce an electron pair; a covalent bond. *Pryor, 3.*

homopolar crystal. A crystal characterized by covalent bonding, the type of atomic bonding resulting from the sharing of electrons by neighboring atoms. *ASM Gloss.*

homoseism. Lines drawn through all points on the surface simultaneously affected by an earthquake shock. *A.G.I.*

homoseismal line. Line on the earth's surface connecting points where the seismic wave arrives at the same time. *Schieferdecker.*

homotactic. Refers to mineral fabrics in which all elements show the same symmetry. *G.S.A. Mem. 6, 1938, p. 62.*

homotaxial. A term proposed by Huxley designating those strata, in regions more or less widely separated, that have apparently the same relative position in the geological series. *A.G.I.*

homotropal ventilation. a. Ventilation by a current of air travelling in the same direction as the flow of mineral out of the mine. *B.S. 3618, 1963, sec. 2.* b. *See* descensional ventilation. *Roberts, I, p. 261.*

Honan jade. Same as Soochow jade. *Shipley.*

hones. Northumb. Miner's term for an oil shale. *Tomkeieff, 1954.*

hondurasite. A blackish-gray, metallic-lustered substance, (Se,Te), with Te:Se nearly 3:2; probably an isomorphous mixture. To replace the name selentellurium of E. S. Dana and H. L. Wells, which has been given in Spanish as teluroselenio. Named from locality, Honduras. *Hey 2d, 1955; Dana 7, v. 1, p. 137; Spencer 19, M.M., 1952.*

hone. A block of fine abrasive, generally SiC; the block is appreciably longer than it is broad or wide. Hones are used for fine grinding, particularly of internal bores. *Dodd.*

honestone. A stone suitable for making hones for sharpening; also, a hone made from such a stone. *Webster 3d.*

honeycomb. Any substance, as cast iron, worm-eaten wood, etc., having cells suggesting a honeycomb; also, applied to certain rock structures. *Webster 2d; Fay.*

honeycomb dun. Eng. A Devonshire name for a vesicular; schistose; trappean rock. *Fay.*

honeycombing. Local roughness on the face of a concrete wall owing to segregation. *Ham.*

honeycomb stones. Fossil compound corals. *Arkell.*

honeycomb structure. An arrangement of soil particles having a comparatively loose, stable structure resembling a honeycomb. *ASCE P1826.*

honeycomb texture. A texture marked by the occurrence of many holes or cavities, often lined with crystals or stalactites. *Schieferdecker.*

honeycomb weathering. Weathering which produces the superficial appearance of an enlarged honeycomb. *Challinor.*

honey stone. A mellate of aluminum, $Al_2C_{12}O_{12} + 18H_2O$, of yellowish or reddish color, and a resinous aspect, crystallizing in octahedrons with a square base. Synonym of mellite. *Fay; Tomkeieff, 1954.*

Honigmann process. A continental method of shaft sinking through sand which is water-bearing. The shaft is formed by boring in stages, increasing in size from the pilot hole of about 4 feet in diameter to the final excavation size. Once the shaft is bored, mud flush circulation continues while the lining is lowered. The lining consists of two steel cylinders, one within the other, and the annular space is filled with concrete. The cylinders are lowered into the shaft and 10-foot lengths are added and welded in position at the shaft top. It is doubtful whether there are any deposits in Great Britain which would be favorable for its application. *Nelson.*

honing. Removing stock generally on the internal cylindrical surface of a workpiece with an abrasive stick mounted in a holder. *ASM Gloss.*

hoo; hoo cannel. Argillaceous cannel coal. *Arkell.*

hoo cannel. Eng. Impure earthy cannel coal. *Fay.*

hood. a. A casing on the end of a suction line that causes it to pick up material from the bottom only. *Nichols.* b. A curved baffle that prevents scattering and separation of material discharged by a conveyor belt. *Nichols.* c. A protective casing, with an exhaust system, for use in the carrying out of dusty operations (for example, towing) in pottery manufacture. *See also* towing. *Dodd.* d. Alternative name for potette. *Dodd.* e. Guard used around a wheel for protection against wheel breakage, dust, and sparks. *ACSG, 1963.* f. *See* bonnet, a. *Fay.* g. The top of a pump. *Standard, 1964.*

hooded pot. *See* pot. *Dodd.*

hoodoos. a. Erodes into fantastic pinnacles, towers, and grotesque forms often called hoodoos. *A.G.I.* b. Pillars developed by erosion of horizontal strata of varying hardness in regions where most rainfall is concentrated during a short period of the year. *See also* earth pillars; pillar. *A.G.I.*

hook. a. The end of a spit is frequently turned toward the shore, owing to a deflection of the current that built it, or to the opposing action of two or more currents, and becomes a hook. *See also* recurved spit. *A.G.I.* b. Concavity in a tooth face giving a variation in rake at different points along the tooth face. *ASM Gloss.*

hookah. A free diving apparatus consisting of a demand regulator worn by the diver and a hose connected to a compressed air supply at the surface. *H&G.*

hook block. The lower sheave or block, on a crane hoist, to which a swivel hook is attached. *Fay.*

hooked spit. *See* recurved spit. *A.G.I.*

hooker. a. In the Tri-State zinc and lead district, a worker whose duty it is to detach empty downcoming buckets and hook-loaded buckets or "cans" onto the hoisting rope. *BuMines Bull. 419, 1939, p. 203.* b. *See* coupler, a. *D.O.T.1.*

hooker-on. Same as hook-on; hanger-on, b. *Fay.*

Hooker process. A method for making tubing and other shapes from pierced slugs or cups by punching the metal through a die. *ASM Gloss.*

Hooke's law. a. Within the elastic limit, the deformation produced is proportional to the stress. *Crispin.* b. Within the elastic limit of any body, the ratio of the stress to the strain produced is constant. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-45.*

hook forward method. A method of lashing on to the rope in which the chain after lapping two to five times round the rope, depending on the load and the inclination, is brought forward across the laps and threaded through the hook at the front. This method keeps the last lap tight and prevents the laps from spreading. *Sinclair, V, p. 335.*

hook gage. A pointed hook attached to a graduated staff or vernier scale for measuring, accurately, the elevation of the surface of still water. The hook is submerged, and then raised until the point makes a pimple on the water surface. *Seelye, 1.*

hook handles. Corn. The handles by which a windlass is worked. *Fay.*

hook load. The total weight of equipment or drilling tools suspended on a hoisting hook. *Long.*

hook-on. The man who adjusts cables or chains about objects to be lifted; places hook of crain block in bucket bails, and hooks of winches to objects to be moved, etc. *Fay.*

hook roller. In a revolving shovel, a roller attached by a bracket to the revolving section, and contacting the lower face of a circular track on the travel unit. *Nichols.*

hook speed. Same as cable speed; hoist speed. *Long.*

hook tender. a. In bituminous coal mining, a laborer who attaches the hook at the end of a hoisting cable to the link of the leading or near car of a trip of cars to be hauled up or lowered down an incline in the mine or at the surface. Also called rope cutter. *D.O.T.1.* b. A laborer who disassembles retorts containing magnesium crystals preparatory to unloading and cleaning. *D.O.T. Supp.*

hookup. A colloquial term designating any temporary electric or electronic circuit. *NCB.*

hookup man. *See* cable hooker. *D.O.T.1.*

hookworm. *See* ancylostomiasis. *Fay.*

Hoolamite indicator. A carbon monoxide detector consisting essentially of a small glass tube filled with a powdered chemical and when air is drawn through it, if any of the gas is present, the powder will change color, its degree of change depending upon the amount of carbon monoxide present. This device is very sensitive and will detect as low as one-hundredth of 1 percent. *Kentucky, p. 72.*

Hoolamite test. *See* iodine pentoxide test. *Sinclair, I, p. 31.*

hooper. A box having a funnel-shaped bottom, or a bottom reduced in size, narrowed, or necked to receive material and direct it to a conveyor, feeder, or chute. *ASA MH4.1-1958.*

Hooper jig. Pneumatic jig, used in regions where water is scarce, or where the ore must be kept dry, to concentrate values from sands. *Pryor, 3.*

Hoope's aluminum. *See* Hoope's process. *Bennett 2d, 1962.*

Hoope's process. An electrolytic process of aluminum refining that utilizes three liquid layers in the reduction cell. An anode of aluminum-copper alloy is used in a fused fluoride bath. The lighter aluminum, about 99.99 percent purity, collects at the cathode above the fused bath. *Henderson.*

hooping. Curved reinforcement such as that used in constructing a circular concrete tank to resist ring tension. *Ham.*

hooster coal; ooster coal. Staff. Term for an inferior coal. *Tomkeieff, 1954.*

Hopcalite. Catalytic granules consisting of finely divided manganese dioxide mixed with copper oxide and a small quantity of silver oxide, and used in gas mask cannisters to remove carbon monoxide by oxidizing it to carbon dioxide. With the development of Hopcalite, the problem of providing adequate protection against carbon monoxide poisoning was solved. *McAdam, p. 60.*

hopeite. A hydrous phosphate of zinc, $Zn_3P_2O_8.4H_2O$, occurring rarely in zinc mines as orthorhombic gray crystals. It is an important zinc ore worked in northern Rhodesia. *C.M.D.*

hopes. N. of Eng. Valleys formed by denudation of the coal measures of the County of Durham. *Fay.*

hope sapphire. A synthetic stone having the composition of spinel and a blue color which turns purple in artificial light. First produced in the attempts to synthesize sapphire. *C.T.D.*

Hope's Nose limestone. A massive, well-bedded, richly fossiliferous limestone of Middle Devonian Age. *C.T.D.*

Hopfner process. A process for the recovery of copper in which a solution of cuprous chloride in sodium or calcium chloride is used to dissolve copper sulfides. The solution is then electrolyzed in tanks with diaphragms. The anodes are impure copper; the cathodes, pure copper. Copper is deposited from the cuprous chloride solution, and cupric chloride regenerated. *Liddell 2d, p. 494.*

Hopkinson chain machine. An electrically driven chain coal cutter designed and manufactured by Mather and Platt in 1901 with provision for slewing the jib. A large number of these machines were built and for many years the Hopkinson was the only chain coal cutter built in the United Kingdom. *See also* Walker disk machine. *Nelson.*

hopper. a. A vessel into which materials are fed, usually constructed in the form of an inverted pyramid or cone terminating in an opening through which the materials are discharged (not primarily intended for storage). *B.S. 3552, 1962.* b. Surge bin placed at discharge end of intermittent transporting system which handles dry ore or rock; used to smooth out and regulate delivery from that point. A hopper car is one with bottom discharge gear and insloping side walls. *Pryor, 3.* c. A storage bin or a funnel that is loaded from the top and discharges through a door or chute in the bottom. *Nichols.* d. A container or bin for broken ore. *C.T.D.* e. A trap at the foot of a chute for regulating the contents of a wagon. *Fay.* f. A place of deposit for coal or ore. *Fay.* g. Eng. In the Derbyshire coalfield, a dish used by miners to measure ore. It varies from 14 to 16 pints in different localities. *Fay.*

hopper barge. A barge which is towed by a tug, and which is used to transport dredged material to a dumping ground. *Ham.*

hopper car. A car for coal, gravel, etc., shaped like a hopper, with an opening to discharge the contents. *Standard, 1964.*

hopper car unloader. *See* car unloader. *ASA MH4.1-1958.*

hopper dredge, self-propelled. A dredge designed as a ship for mobility on the high seas. The dredging equipment sits high above the water on the top deck. The remainder of the vessel consists of bulkheaded hoppers, into which dredged material is fed, and from which the water is then drained off. *Carson, p. 354.*

hopperings. In gold washing, gravel retained in the hopper of a cradle. *Fay.*

hoppers. Pockets at the bottom of a breaker through which the processed coal falls as it is loaded into railroad cars; also the cars. *Korson.*

hopper salt. Grainer or solar salt produced in characteristic hollow-faced cubes by surface evaporation. *Kaufmann.*

hopper table. Early type of pneumatic table used in ore treatment. *Pryor, 3.*

hopper tender. *See* dust-box tender. *D.O.T.1.*

hopper truck. Aust. *See* hopper car. *Fay.*

hoppet. a. Eng. A basket; a bucket. *Webster 3d.* b. A vessel for measuring ore. *Standard, 1964.*

hoppit; sinking bucket; bowk; kibble. A large bucket used in shaft sinking for hoisting men, rock, materials, and tools. Since about 1955, hoppit sizes have increased to about 80 cubic feet and in some cases to 110 cubic feet and surface tipping facilities have been brought to a high degree of efficiency to cope with large diameter shafts and fast sinking rates. *See also* cactus grab. *Nelson.*

horadiam. a. The drilling of a number of horizontal boreholes radiating outward from a common center; a single drill site or drill setup. *Long.* b. Synonym for horizontal-ring drilling. *Long.*

Horatio diamond. Rock crystal from Arkansas. *Shipley.*

horbachite. A metallic, dark-yellow, iron-nickel sulfide that is closely related to pyrrhotite, and is found massive. *Standard, 1964.*

horh. Mud; dirt. *Compare* hurr. *Arkell.*

horizon. a. In geology, any given definite position or interval in the stratigraphic column or the scheme of stratigraphic classification; generally used in a relative sense. *Fay.* b. As used by some British geologists, one or several consecutive beds characterized by a certain fossil or fossils; a zone. *Fay.* c. One of the layers of the soil profile, distinguished principally by its texture, color, structure, and chemical content. *See also* A-horizon; B-horizon; C-horizon. *ASCE P1826.* d. An identifiable rock stratum regionally known to contain or be associated with rock containing valuable minerals. *Compare* marker, a. *Long.* e. An imaginary horizontal line or plane. *Long.* f. A horizontal layer. *Nichols.* g. S. Afr. Level of a geological formation observed at different places. *Beerman.* h. In surveying, a plane normal to a plumbline at the observer's station. An artificial horizon is a reflecting level surface, such as a bath of mercury. *Pryor, 3.*

horizon glass. A glass which is half silvered and half clear, forming part of a sextant. *Ham.*

horizon mining. A system of mine development which is suitable for inclined, and perhaps faulted, coal seams. Main stone headings are driven, at predetermined levels, from the winding shaft to intersect and gain access to the seams to be developed. The stone headings, or horizons, are from 100 to 200 yards vertically apart, depending on the seams available and their inclination. The life of each horizon varies from 10 to 30 years. Connections between horizons at inbye points are by staple shafts or drivages in the coal. Also called horizontal mining; continental mining. *See also* lateral. *Nelson.*

horizontal auger. A rotary drill usually powered by a petrol engine, for drilling horizontal blasting holes in quarries and opencast pits. *See also* auger. *Nelson.*

horizontal balance. Much less commonly used than the vertical type. It is quite similar to it in construction except that the magnet points approximately vertically instead of horizontally. *Dobrin, p. 282.*

horizontal bedded formation. Any bedded formation of rock where the dip of the bedding planes is less than 10°. *BuMines, Bull. 587, 1960, p. 2.*

horizontal borer. A machine, making holes from 2 to 6 inches in diameter, used for drilling overburden at open cut coal mines. Bits are of the auger or winged types. *Lewis, p. 88.*

horizontal cell tile. A structural masonry tile having cells whose axis is horizontal when placed in the wall. *ACSG, 1963.*

horizontal circle. The circular horizontal plate of a theodolite, accurately divided so that horizontal angles can be precisely measured. *Ham.*

horizontal crosscut. *See* horizontal drive. *Stoces, v. 1, p. 210.*

horizontal cut. *See* drag cut. *Nelson.*

horizontal-cut underhand. *See* underhand stoping, a. *Fay.*

horizontal departure. The amount, expressed in feet or degrees, a borehole has digressed horizontally from the intended target. *Long.*

horizontal displacement. a. A term used by Tolman to designate strike slip. *A.G.I.* b. The distance two formerly adjacent points moved horizontally. *Bureau of Mines Staff.*

horizontal drive; horizontal crosscut. An opening with a small inclination (about 2 to 4 millimeters for one meter in length) in the direction towards the shaft for draining the water and to facilitate hauling of the full cars to the shaft. *Stoces, v. 1, p. 210.*

horizontal fault. A fault in the earth's crust with no vertical displacement. *Webster 3d.*

horizontal intensity. The intensity of the horizontal component of the magnetic field in the plane of the magnetic meridian. *Hy.*

horizontal line. A straight line that is parallel to the horizon or water level. *Jones, 2, p. 82.*

horizontal load-bearing test. *See* load-bearing test. *Lewis, p. 576.*

horizontal-loop methods. Inductive methods in which the coil, that causes the current flow in the earth, is laid horizontally on the ground surface. *Schieferdecker.*

horizontal magnetometer. Instrument to measure changes in the horizontal component of the magnetic field intensity. *Schieferdecker.*

horizontal pendulum. Having a mass moving horizontally. *Schieferdecker.*

horizontal retort. a. An intermittent unit for the production of town gas from coal; it is constructed of segments of silica or siliceous refractory material. *Compare* continuous vertical retort. *Dodd.* b. An intermittent unit formerly used for the production of zinc. Horizontal zinc retorts were generally made from a siliceous fireclay, suitably grogged. *Dodd.*

horizontal-ring drilling. *See* horadiam. *Long.*

horizontal screens. Shaking screens with the plates supported in a substantially horizontal position that have been developed to obtain the advantages of low lead room requirement. *Mitchell, p. 135.*

horizontal seismograph. Registering one or both the horizontal components of the earthquake. *Schieferdecker.*

horizontal separation in faultline strike. The distance measured in the strike of the fault line between the two outcropping parts of the faulted bedding plane. *Schieferdecker.*

horizontal slicing (ascending). *See* overhand stoping, b. *Fay.*

horizontal slicing (descending). *See* top slicing and cover caving. *Fay.*

horizontal slip. In faulting, the horizontal component of the net slip. *A.G.I.*

horizontal takeup. A mechanism in which the takeup or movable pulley travels in an approximately horizontal plane. *NEMA MB1-1961.*

horizontal throw. The heave of a fault. *Hess.*

horley-sedgley water finder. An instrument used for ascertaining the amount of water in a tank containing oil. *Fay.*

horn. a. Derb. A line at an angle of 45° with the face of the coal. *Fay.* b. *See* spoon, b. *Fay.* c. Main cleavage. *Mason.* d. A spire of bedrock left where cirques have eaten into a mountain from more than two sides around a central area; for example, Matterhorn of the Swiss Alps. *Leet.*

hornblende. A monoclinic amphibole, $Ca_2Na(Mg,Fe'')_4(Al,Fe''',Ti)_3Si_8O_{22}(O,OH)_2$, color between black and white, through various shades of green, inclining to blackish-green; also dark brown; rarely yellow pink, rose-red. In part a normal metasilicate of calcium and magnesium, $RSiO_3$, usually with iron, also manganese, and thus in general analogous to the pyroxenes. The alkali metals, sodium and potassium, also present, and more commonly so than with pyroxene. The name of the mineral is prefixed to many rock names. *Dana 17; A.G.I.*

hornblende gneiss. A coarse-grained metamorphic rock containing hornblende as the dominant colored constituent, together with feldspar and quartz, the texture being typical of the gneisses. Differs from hornblende schist in grain size and texture only. *C.M.D.*

hornblende granite. A type of granite, usually adamellite or granodiorite, containing hornblende as an essential constituent; with decreasing quartz, grades through tonalite into normal diorite. *C.M.D.*

hornblende jade. A term sometimes used for smaragdite. *Shipley.*

hornblende schist. a. A type of green schist formed from basic igneous rocks by regional metamorphism, and consisting essentially of sodic plagioclase, hornblende, and sphene, frequently with magnetite and epidote. *C.T.D.* b. A schist in which hornblende is the dominant mineral; plagioclase and sometimes quartz being the chief felsic constituents. With loss of schistose structure, the rock passes into hornblende gneiss and amphibolite. *Holmes, 1928.*

hornblendite. A granitoid igneous rock consisting essentially of hornblende and analogous to pyroxenite. *Fay.*

horn coal. a. Eng. Coal worked partly end-on and partly face-on. *Fay.* b. A variety of cannel coal from South Wales. *Fay.* c. A coal that emits when burning, an odor like that of burnt horn. *Fay.* d. Term in use in Saxony, Germany, for a variety of pitch coal similar to cannel coal. *Tomkeieff, 1954.*

horn coral. *See* black coral. *Shipley.*

hornfels. a. A fine-grained, nonschistose metamorphic rock resulting from contact metamorphism. Large crystals may be present and may represent either porphyroblasts or relic phenocrysts. *A.G.I.* b. A dense compact rock produced from slate by the contact action of some igneous intrusion, especially granite. Various microscopic minerals are developed in it. *Fay.*

hornito. a. A gas-emitting vent on and originating in a lava flow. *Fay.* b. A low, oven-shaped mound common in the volcanic districts of South America, usually emitting from its sides and summit hot smoke and other vapors. *Fay.*

horn lead. Lead chlorite. *Fay.*

horno. Sp. An oven or kiln. *Fay, p. 284.*

horn quicksilver. Mercurous chloride, Hg_2Cl_2; calomel. *Fay.*

horns. Eng. Guides on the winding drum to keep the rope in place. *Fay.*

Hornsey process. A method for the low temperature reduction of iron ore by means of a series of rotary kilns. The kilns are each about 5 feet in diameter and 30 feet in length. The first is used for preheating, the second for reduction, and the third for cooling the product. Pulverized coal is used which makes it possible readily to control the combustion and to maintain constant temperature. At no point in the process does the temperature rise above 1,050° C. *Osborne.*

horn silver. Cerargyrite. *Pryor, 3.*

hornslate. A compact slate. *Arkell.*

horn socket. A fishing tool especially designed to recover lost collared drill rods or drill pipe. It consists of a smooth-wall, tapered socket, the larger end down, equipped with a spring latch, which grips the drill rod under the collar when it is slid down over the top of the lost drill rod. When the socket is equipped with a flaring (bell-shaped) mouth it is called a bell-mouth socket. *Long.*

horn spoon. An arctuate longitudinal section cut from a cow horn and scraped thin; used for washing auriferous gravel and pulp where delicate tests are required. *Hess.*

hornstone; hornstein. An impure brittle flint or chalcedony with splinterey fracture, chert. It may be veined or banded. *Hess.*

horn tiff. In Missouri, calcite stained with carbonaceous material; sometimes dark enough to be mistaken for sphalerite. *Fay.*

horny. Scot. An inferior kind of gas coal, the pieces of which rattle with a sound suggestive of horns. *Fay.*

horse. a. Waste inclusions within ore deposits. *BuMines Bull. 390, 1936, p. 29.* b. Any irregularity cutting out a portion of the vein. *See also* dirt fault; rock fault. *Fay.* c. To take horse. *Fay.* d. To split into branches, as a vein of ore in a mine. *Standard, 1964.* e. Scot. A seat suspended from a crane rope in a shaft. *See also* D-link. *Fay.* f. Eng. In saltmaking, to set the lumps of salt upon the top of each other in the hothouse. *Fay.* g. To move or raise a heavy piece of machinery or timber by using a pinchbar as a lever. Also called pinch. *Long.* h. A saw horse or other simple frame or support. *Nichols.* i. A large block of unmineralized rock included in a vein. *A.G.I. Supp.* j. Rock occupying a channel cut into a coalbed. *A.G.I. Supp.* k. A body of sandstone or shale occupying a channel in a coal seam. *A.G.I.* l. A ridge of limestone rising from beneath residual phosphate deposits in Tennessee. *A.G.I. Supp.* m. In structure, a large block of displaced wall rock caught along a fault, particularly a high-angle normal fault. *A.G.I. Supp.* n. A mass of country rock lying within a vein. *Fay.*

horse arm. Eng. The part of a whim to which the horses are attached. *Fay.*

horseback. a. A name applied by some writers to floor rolls in coal mines. *A.G.I.* b. Applied in some areas to clay veins, that is, intrusions of clay into coalbeds. *See also* clay vein; sandstone dike. *A.G.I.* c. Eng. A mass of stone with a slippery surface in the roof. In shape, it resembles a horse's back. *SMRB, Paper No. 61.* d. Natural channels cut or washed away by water in a coal seam and filled up with shale and sandstone. Sometimes, a bank or ridge of foreign matter in a coal seam. *Fay.* e. A portion of the roof or floor which bulges or intrudes into the coal. *Fay.* f. A mass of country rock lying within a vein or bed. *See also* horse, n. *Fay.* g. A piece of slate, flat underneath, thick in the middle, and running out to a thin edge upon each side. *See also* kettle bottom. *Fay.* h. Eng. A tree branch that has been horizontally embedded, carbonized, and compressed into lenticular shape in shale immediately above a coalbed. *Chemistry & Industry, v. 58, March 18, 1939, p. 238.* i. A term used in Maine for a low and somewhat sharp ridge of sand or gravel; also, but not generally, a ridge of rock which rises for a short distance with a sharp edge. A hogback. *Fay.*

horseback excavator. In bituminous coal mining, one who excavates horsebacks (banks or ridges of dirt or rock in the coal seam) in a strip mine with a power shovel. *D.O.T. 1.*

horse beans. Ches. A stratum of a granular rock immediately overlying salt beds, in which brine occurs. Also called shaggy metal. *Fay.*

horse block; horsing block. A frame of timber on which to rest the raised end of an excavator's wheeling plank. *Webster 2d.*

horse engine; horse gin. Scot. A winding drum driven by horsepower for raising mineral. *Fay.*

horse fettler. S. Staff. A man who looks after the underground horses and ponies. *Fay.*

horseflesh. Fibrous carbonate of lime. *Arkell.*

horseflesh ore. Bornite. *Fay.*

horse gear; bullock gear; whim gin. Bar pulled around by draft animal to actuate a winding capstan. *Pryor, 3.*

horse gin. a. Gearing for hoisting by horsepower. *Fay.* b. A whim. *Hess.*

horse gold. Eng. Pyrites found in Chalk, Cherry Hinton, near Cambridge. Also called gold ore. *Arkell.*

horsehead. a. In tunneling through loose ground, two heavy timbers or light steel joists extended beyond the timbering, across which planks can be placed for protection. *Pryor, 3.* b. A forepole. *Mason.* c. Eng. A wooden box used for mine ventilation. *Fay.* d. Eng. A heading frame, of a cap and two posts. *Stauffer.* e. A temporary support for forepoles used in tunneling soft ground. Also called false set. *Nichols.*

horse height. Mid. Sufficient distance between the floor and the roof, for a horse to travel without knocking his head. *Fay.*

horse-in-the-lode. Eng. A dead or worthless part in the lode; generally composed of fragments of the strata through which the lode passes, which invariably divides the lode. *See also* horse, n. *Fay.*

horseload. Eng. A measure of weight used in some parts of east Lancashire. One horseload equals 4 hundredweight; 5 horseloads equal 1 ton. *Fay.*

horse platform. Scot. The switch and crossing used on (including the rails) a horse-haulage road. *Fay.*

horseplay. Rough or boisterous play. *Webster 3d.* Often results in serious accidents at mines and industrial plants. *Fay.*

horsepower. A standard unit of power equal to 746 watts in the United States and nearly equivalent to the English gravitational unit of the same name that equals 550 foot-pounds of work per second. Abbreviation, hp. *Webster 3d.*

horsepower applied. *See* power upon the air. *Kentucky, p. 81.*

horsepower-hour. The work performed or the energy consumed by working at the rate of 1 horsepower for 1 hour, being equal to 1,980,000 foot-pounds. Abbreviation, hp hr. *Webster 3d.*

horsepower of ventilation. The work done in ventilating a mine or part of a mine is measured by the quantity circulated multiplied by the ventilating pressure required, the quantity being measured in cubic feet per minute and the pressure in pounds per square feet. The horsepower required is, therefore, this product divided by 33,000. *Sinclair, I, p. 82.*

horsepower pull. The effort necessary to maintain the normal operating speed of a conveyor under a rated capacity load. To this must be added the effort of acceleration, drive losses, etc., to arrive at a final driving effort. Horsepower pull may be referred to in terms such as effective tension, chain pull, turning effort, gear tooth pressure, etc. *See also* effective belt tension. *ASA MH4.1-1958.*

horse pump. An ordinary lifting pump worked by horsepower. *Fay.*

horse road. An underground way for horse haulage. *Fay.*

horse run. A device by means of which horses draw loaded vehicles up and incline from excavations. *Standard, 1964.*

horse scraper. A scraper hauled by horses, for gathering placer gravel into sluices in ground sluicing. The gravel is first broken by ploughing. *Nelson.*

horseshoe curve. A curve slightly greater

horseshoe flute casts. Horseshoe-shaped flute than a semicircle. *Ham.*

cast; same as current crescent. *Pettijohn.*

horse shovel. A road scraper. *Fay.*

horses' teeth. Corn. A quarryman's term for white elongated crystals of feldspar, which gives the granite its porphyritic character *Fay.*

horsetail ore. Ore in fractures which diverge from a major fracture. *A.G.I.*

horsetails. The continuation of a shear that dies out. *Hess.*

horsetail structure. An arrangement in the shape of a horsetail, of closely spaced mineralized fissures emanating from major veins and forming together a stockwork. *Schieferdecker.*

horse tramming. The use of horses for inbye haulage where workings are moderately level. The horses haul the loaded trams from the faces to an inbye gathering point and return with the empty trams. *Nelson.*

horse transport. An old method of transportation in mines in which horses were used to pull the mine cars along the roadways. Stables were installed underground in order for the horses to be kept permanently in the mine. Horse transportation has been replaced today to an increasing extent by mechanical transport. *Stoces, v. 1, pp. 169-170.*

horsetree. Eng. A strong timber beam for supporting pumps. *Fay.*

horseway. A road fit for travel with a horse. *Webster 2d.*

horse whim. A device used for raising ore or water from mines, provided with radiating beams to which horses, oxen, or camels may be yoked. *Sandstrom.*

horsfordite. A silver-white, massive copper antimonide, probably Cu_6Sb, occurring in Turkey. *Fay.*

horsing. Eng. Drawing trams underground by horses and ponies. *Fay.*

horst. A tract or block of the earth's crust separated by faults from the adjacent tracts or blocks that have been relatively depressed. *Compare* graben. *Webster 3d.*

hortite. A hybrid rock probably derived from gabbro by the assimilation of limestone and similar in composition to melasyenite. *Johannsen, v. 3, 1937, p. 66.*

hortonolite. A variety of olivine containing some manganese. *Hess.*

Horwood process. Obsolete method of preconditioning mixed sulfides of copper, lead, iron, and zinc by partial roasting before oil flotation to recover the relatively unaltered zinc sulfide. *Pryor, 3.*

hose. a. A strong, flexible pipe, generally made of spirally wound, rubber-impregnated, fabric strips; used to convey liquids or gases under pressure. *Compare* high-pressure hose. *Long.* b. Scot. A rope shackle; an iron clasp at the end of a rope. *Fay.*

hose coupling. A joint between a hose and a steel pipe, or between two lengths of hose. *Ham.*

Hoskold formula. Two-rate valuation formula, once much used to determine present value (Vp) of mining properties or shares, with redemption of capital invested. Now largely replaced by Morkill's formula. *Pryor, 3.*

hospital. In a vitreous enamel factory, the department in which ware that has faults, not too serious for remedy, is repaired. *Dodd.*

host. a. The essential crystal, the base material, or the matrix of a luminescent material. *C.T.D. Supp.* b. The larger crystal that contains the inclusions of smaller crystals of a different mineral species. *Bureau of Mines Staff. Compare* hairstone.

host element. A common element which is substituted by a trace element in a rock mineral. *Schieferdecker.*

host rock. The wall rock of an epigenetic ore deposit. *A.G.I.*

hot. Applied to a mine or part of a mine that generates methane in considerable quantities. *Fay.*

hotbed. An area adjacent to the runout table where hot rolled metal is placed to cool. Sometimes called the cooling table. *ASM Gloss.*

hot blast. Air forced into a furnace after having been heated. *Fay.*

hot-blast circulating duct. *See* bustle pipe. *Dodd.*

hot-blast main. A duct, lined with refactory material, through which hot air passes from a hot-blast stove to the bustle pipe of a blast furnace. *See also* hot-blast stove; bustle pipe. *Dodd.*

hot-blast man. A stove tender at blast furnaces. *Fay.*

hot-blast stove; Cowper stove. A unit for heating the air delivered to the tuyéres of a blast furnace. It is a cylindrical furnace, about 80 feet high and 20 feet in diameter, lined with fire clay refractories. There is a combustion chamber up one side; fire clay checker bricks (usually special shapes known as stove fillings), fill the remainder of the space. The checker bricks are heated by the combustion of blast furnace gas in the combustion chamber and then, on reversal of the direction of gas flow, they deliver heat to incoming air which then passes to the blast furnace tuyéres. *See also* stove fillings. *Dodd.*

hot-blast system. The plenum system of ventilation. *Webster 2d.*

hot-carbonate process. A process developed by the U.S. Bureau of Mines in which a hot solution of potassium carbonate is used to absorb impurities from gases and is then regenerated for reuse in a continuous cycle with maximum efficiency and minimum wasted heat. Also called hot-potash process; Benfield process. *Bureau of Mines Staff.*

hot-cast procelain. *See* opaline.

hot-cell. A heavily shielded enclosure in which radioactive materials can be handled remotely through the use of manipulators and viewed through shielded windows so that there is no danger to personnel. *L&L.*

hot cement. Cement which retains some of the heat generated during grinding. *Taylor.*

hot channel. The coolant channel in a nuclear-reactor core with the highest temperature. *L&L.*

hotching. Eng. Jigging, as of lead ore. *Fay.*

hot chisel. A chisel for cutting hot metal; distinguished from a cold chisel. *Standard, 1964.*

Hotchkiss superdip. Is much more sensitive than the common dip needle. It consists of a magnetic needle free to rotate about a horizontal axis and a nonmagnetic bar with a counterweight at the end which is attached to the needle at its pivot, the two axes making an angle that can be varied. It measures changes in the total field and can be used to measure variations in vertical field if its plane is oriented in a direction perpendicular to the magnetic meridian. *Dobrin, pp. 278-279. See also* dip needle.

hot crushing strength. Compressive strength of brick at high temperature. *Bureau of Mines Staff.*

hot-dip coating. The process of dipping metal components in molten tin or zinc to protect them against corrosion. *See also* galvanizing. *Ham.*

hot-dip galvanizing. Immersion of iron or steel articles in bath of melted spelter, to produce a zinc coating. *Pryor, 3.*

hot-drawn. Elongation of metal wire, tube or rod by drawing it while heated through a constricting orifice. Opposite of cold drawn. *Pryor, 3.*

hotel china. *See* American hotel china. *ACSG, 1963.*

hot end. Those manufacturing operations concerned with hot glass, that is, melting, forming, annealing. *ASTM C162-66.*

hot face insulation. An alternative name for insulating refractory. It generally consists of a refractory base containing a voluminous powder, such as exfoliated vermiculite, or diatomaceous earth. *Francis, 1965, v. 2, p. 653.*

hot floor. A heated floor, usually concrete with imbedded steam pipes, for use in drying refractory brick and shapes. *A.R.I.*

hot-floor drier. A heated floor, usually concrete, for use in drying ware. *ACSG, 1963.*

hot forming. Working operations such as bending, drawing, forging, piercing, pressing, and heading performed above the recrystallization temperature of the metal. *ASM Gloss.*

hothouse. A heated building or chamber for drying pottery or other wares; drying room. *Standard, 1964.*

hot laboratory. A laboratory designed for the safe handling of radioactive materials. Usually contains one or more hot cells. *L&L.*

hot-laid mixtures. Plant mixes which must be spread and compacted while in a heated condition. Asphaltic concrete is included in this type. *API Glossary.*

hot-laid type. A bituminous pavement which is mixed and laid at relatively high temperatures, generally above 250° F. This type is the highest type pavement that can be laid. It has greater durability and lower maintenance than any other type. *Pit and Quarry, 53rd, Sec. E, p. 70.*

hot-metal ladle. A ladle for the transfer of molten iron from a blast furnace to a mixer furnace and from there to a steel furnace; alternatively, the ladle may transfer molten pig iron direct from blast furnace to steel furnace. Such ladles are generally lined with fire clay refractories but for severe conditions high-alumina and basic refractories have been tried with some success. *Dodd.*

hot-metal mixer. A large holding furnace for molten pig iron. The capacity of these furnaces, which are of the tilting type, is up to 1,400 tons. Hot metal mixers may be active (that is, the pig iron is partially refined while in the furnace) or inactive (that is, the pig iron is merely kept molten until it is required for transfer to a steelmaking furnace). In either case, the bottom and walls of the furnace are made of magnesite refractories and the roof of silica refractories. *Dodd.*

hot mill. To heat metal, then shape it. *Nichols.*

hot miller. A tool operated by compressed air, fitted with cutting wheels which mill the hot cutting edges or rock drill bits to the required angle. *See also* detachable bit. *Ham.*

hot mold. The process of forming glassware in hot, uncoated molds. *ASTM C162-66.*

hot patching. The repair of the refractory lining of a furnace while it is still hot; this is most commonly done by spraying a refrectory slurry through a cement gun. *See also* airborne sealing; spray welding. *Dodd.*

hotplate spalling test. A spalling test designed specifically for the testing of silica refractories. *Dodd.*

hot-potash process. *See* hot-carbonate process.

hot preparation. *See* steam tempering. *Dodd.*

hot-pressed products. Abrasive bonded products formed by pressing while the mixture is at a temperature considerably above normal room temperature. *ACSG, 1963.*

hot-pressing. a. In powder metallurgy, forming a compact at a temperature high enough to have sintering. *ASM Gloss.* b. The subjection of the powder-metal material in a bit mold or die to pressure the instant the mass reaches the incipient melting point or while the mass is still hot. Also called coining. *Long.* c. A jiggering process wherein a heated profile tool or plunger is employed. *ASTM C242-60T.* d. The technique of forming ceramic shapes from finely ground materials by the application of pressure and heat simultaneously. *Bureau of Mines Staff.*

hot-quenching. Quenching in a medium at an elevated temperature. *ASM Gloss.*

hot roll. To roll (metal) while hot or with the application of heat. *Compare* cold roll. *Webster 3d.*

hot rolling. The passing of hot steel bars through pairs of steel rolls to form rolled-steel sections. The final dimension of the product is approached in stages by adjusting the height of the rolls. This height is controlled by the mill operator. The trend towards automatic control is increasing. The completely automatic mill, in which every operation is performed without human aid, appears to be fast approaching. *See also* steelworks. *Nelson.*

hot saw. A circular saw for cutting hot bar iron in small pieces. *Fay.*

hot-short; red-short. Said of metals that tend to be brittle at temperatures at which hot-working operations are performed, and which can only be worked with difficulty, if at all. *C.T.D.*

hot-shortness. Embrittlement of steel or wrought-iron when hot, usually due to excessive sulfur content. *Pryor, 3.*

hot spot. a. A small portion of the furnace shell that is warmer than the rest. It indicates a thin lining. *Fay.* b. The zone of highest temperature within a glassmelting furnace. *ASTM C162-66.* c. A surface area of higher-than-average radioactivity. Also, a part of a fuel-element surface that has become overheated. *L&L.*

Hot Springs diamond. Rock crystal. *Shipley.*

hot top. a. A reservoir, thermally insulated or heated, to hold molten metal on top of a mold to feed the ingot or casting as it contracts on solidifying to avoid having pipe or voids. *ASM Gloss.* b. A refractory-lined steel or iron casting which is inserted into the tip of the mold and is supported at various heights to feed the ingot as it solidifies. *ASM Gloss.*

hot-wire anemometer. This instrument is particularly suited to the measurement of very low air velocities and the fluctuating velocities that occur in turbulent flow. Basically, it consists of a wire or wires, usually platinum, supported in a frame and heated electrically. When exposed to an air current the heated wire cools, and as a result its electrical resistance alters. The heated wire forms one arm of a Wheatstone-bridge-type circuit, and measurements of resistance change may be correlated with the velocity of airflow which caused that change. *Roberts, I. P. 55.*

hot working. Deforming metal plastically at such a temperature and rate that strain hardening does not occur. The low limit of temperature is the recrystallization temperature. *ASM Gloss.*

hot zone. The area of a continuous furnace where the major amount of heat is supplied. *Bryant.*

houille. Fr. Fossil coal. *Tomkeieff, 1954.*

houille de cutine. Fr. A variety of coal composed mainly out of cuticles and spores and consequently rich in volatiles. *Tomkeieff, 1954.*

houille grasse. Fr. Bituminous coal. *Holmes, 1928.*

houille lignocellulosique. Fr. A variety of coal composed mainly of lignocellulosic material and consequently having an average amount of volatiles (normal humic coal). *Tomkeieff, 1954.*

houille lignocellulosique gélifiée. Fr. A variety of lignocellulosic coal rich in colloidal matrix (subanthracitic and anthracitic coal). *Tomkeieff, 1954.*

houille maigre. Fr. Steam coal. *Holmes, 1928.*

houiller. The French equivalent for coal measures. *Fay.*

houille seche. Fr. Cannel coal. *Hess.*

houillite. Anthracite. *Tomkeieff, 1954.*

houppes. Absorption figures resembling interference figures to some extent, shown only by minerals of strong absorption. Epoptic figures. *Hess.*

hour angle. In celestial measurement, the spherical angle at the pole, contained between the observer's meridian and that of the observed body as measured westward from observer. *Pryor, 3.*

Hourdis. Fr. Term for a large hollow clay building block (name derives from the inventor). *Dodd.*

hourglass structure. A structure resembling the shape of an hourglass seen in thin sections of certain minerals and due to differences of molecular attractions in different directions in a crystal. *Fay.*

house. a. Corn. A large mass of rich tin ore. Also called a carbona. *Arkell.* b. Eng. *See* gunnies; turnhouse, b. *Fay.*

house coal. a. Coal for use around colliery in miners' houses and for local sale. *B.C.I.* b. Sized coal for use in houses. *B.C.I.*

house of water. Corn. A cavity or space filled with water. *Fay.*

house-stone veneer. A type of building stone consisting of rough-surfaced blocks or strips broken in irregular lengths and used extensively as a facing or veneer on residences. *AIME, p. 330.*

housing. a. The casing for a machine or part thereof. *Fay.* b. A heavy case or enclosure for rotating parts. *Nichols.* c. A cover, usually of sheet metal, such as is placed over the wheel of a car which sets down so low that the upper part of the wheel has to be passed through the car bottom. *Zern.*

hove. a. Scot. Past particles of heave. The floor of a mine working is said to heave or rise. *Fay.* b. A lode is hove or thrown in a certain direction by a fault. *Gordon.*

hovel. A large conical or conoidal brick structure within which a firing kiln is built. *Webster 3d.*

howdenite. A local name for the large crystals of chiastolite from Mt. Howden, south Australia. *English.*

howdie horse. N. of Eng. A pit horse kept on the surface for use in cases of emergency. *Fay.*

howell. The upper stage in a porcelain furnace. *Standard, 1964.*

Howell furnace. A form of revolving roasting furnace. *Fay.*

howk. Scot. To dig; scoop; make a hollow; to burrow. *Fay.*

howlite. A hydrated calcium silicoborate. In basic arc furnace practice, howlite has been added before shutdown periods, to treat the final white falling slag and hearth. It is claimed that this stabilizes the banks and hearth, thereby preventing deterioration during the shutdown period. The howlite addition (36 pounds to a slag bulk of about 10 hundredweights, giving about 0.7 percent of boric oxide in the final slag) is made to the last three or four casts before shutdown. *Osborne.*

how way! N. of Eng. A signal to lower the cage. *Fay.*

hp Abbreviation for horsepower. *BuMin Style Guide, p. 59.*

hp hr Abbreviation for horsepower-hour. *BuMin Style Guide, p. 59.*

H-piece. That part of a plunger lift in which the valves or clacks are fixed. *Fay.*

hr Abbreviation for hour. *BuMin Style Guide, p. 59.*

HR Abbreviation for relative humidity. *Zimmerman, p. 55.*

HREX. Symbol for a special shape of wall tile (round edge external corner, left hand). *Dodd.*

H rod. A drill rod having an outside diameter of 3½ inches. *See also* H drill rod. *Long.*

hsianghualite; hsianghuashih. A cubic mineral, possibly $Ca_3Be_3Li_2Si_2O_{10}F_2$ or $Ca_3Be_3Li_2Si_3O_{12}F_2$, occurring with taaffeite in metamorphosed limestone in Hunan Province, China. *Hey, M.M., 1961; American Mineralogist, v. 46, No. 1-2, January-February 1961, p. 244.*

HTI Abbreviation for high-temperature insulating refractory. *See also* insulating refractory. *Dodd.*

huanghoite. The barium analogue of synchysite, $BaCe(CO_3)_2F$, in hexagonal platy masses from hydrothermal deposits near the Huang-Ho river, China. Named for the locality. *Hey, M.M., 1964; Fleischer.*

huantajayite. An argentiferous variety of halite, $20NaCl+AgCl$, occurring in cubic crystals and as an incrustation. *Fay.*

huascolite. A variety of galena in which part of the lead is replaced by zinc. *Standard, 1964.*

hub. a. York. Miner's term for an impure cannel coal or bituminous shale. Also spelled hubb. *Tomkeieff, 1954.* b. A survey point marked with a stake or metal pin and used as a reference point by means of which a drill operator may set and line up a drill machine to drill a borehole at a specific spot in a predetermined direction. *Long.* c. The strengthened inner part or mounting of a wheel or gear. *Nichols.*

d. A pipe end which is sufficiently enlarged to receive and enclose the spigot end of another pipe so as to form a joint. *Hess.*

hub-and-groove diameter. The outside diameter of the hub, or the diameter at the base of a groove cut in the hub to provide clearance for the link plates. *J&M.*

hubb. York. *See* hub, a.

Hubbard distributor. A continuous distributor consisting of a steel open-topped box filled with stone dust. Resting on the surface of the stone dust is a steel plate one-fourth inch in thickness fitting loosely into the box and perforated with 3/16-inch-diameter holes. The plate is connected by a series of chains and levers to a lever between the rails on either the loaded or empty side of the roadway. Each tub passing along depresses the lever and causes the steel plate to be lifted. A counterweight restores the track lever to vertical and the plate falls causing a puff of stone dust to be ejected through each hole into the ventilating current. Thus stone dusting keeps pace with output. *Sinclair, I., p. 260.*

Hübl number. *See* iodine value. *Pryor, 3.*

hubnerite. *See* huebnerite. *C.M.D.*

huckle joint. A joint formed at the apex of an anticline. *Arkell.*

hudge. a. Som. *See* bowk, a. Also a small box or tram without wheels, running on timber slides, drawn by a boy, in thin and steep seams. *Fay.* b. An iron bucket for hoisting ore or coal. *See* bowk, b. *Fay.*

hudsonite. A variety of cortlandtite. *Fay.*

Hudson River bluestone; flagstone. Well-bedded flags of nonmarine deltaic origin occurring in the Hamilton Division of the Middle Devonian of North America. *C.T.D.*

hue. The principal attribute by which a color is distinguished from black, white, or neutral gray. The attribute by which colors, when they are arranged in their orderly spectrum sequence, are perceived as differing from one another. Thus, technically, each wavelength in the visible spectrum propagates a different hue. Thus, red, yellow, and green, as well as greenish-yellow, green-yellow, and yellowish-green, are different hues, while pink (light red), maroon (dark red), and brownish-red, are colors which have the same hue but which differ in other attributes. *See also* tone; intensity. *Shipley.*

huebnerite; hubnerite. A brownish-red tunstate of manganese, $MnO.WO_3$, one of the end-members of a variable series, commonly known as wolfram or wolframite, $MnWO_4$; monoclinic. *C.M.D.*

huel. *Corn.* A mine; a variant of wheal. *Fay.*

huevo. A large boulder of granite or other hard rock in soft country rock. *Fay.*

Huff separator. Type of electrostatic separator used in ore treatment. *Pryor, 3.*

hügelite. Described by Dürrfeld (1913). Monoclinic, brown to orange-yellow crystals. The formula is proposed as $Pb_2(UO_2)_3(AsO_4)_2(OH)_4.3H_2O$. This requires 23.5 percent PbO; Dürrfeld reported 32.6 percent. Occurs rarely, filling cavities in hornstone breccia at Reichenbach near Lahr, Baden, Germany. *American Mineralogist, v. 47, No. 3-4, March-April 1962, pp. 418-419.*

hugger. a. N. of Eng. In coal mining, a back or cleat. *Fay.* b. Northumb. The principal cleat in coal. *Arkell.*

hugger belt conveyor. Two belt conveyors whose conveying surfaces combine to convey loads up steep inclines or vertically. *ASA MH4.1-1958.*

hugger drive. A drive employing an auxiliary belt which bears against the surface of the conveying belt as it passes around the drive pulley to increase the pressure between the conveyor belt and the drive pulley. *ASA MH4.1-1958.*

Hugoniot curve. A pressure-volume curve which obeys the Hugonoit equation, $(\triangle E = \frac{1}{2}(p_1 + p_2)(v_1 - v_2))$. *I.C. 8137, 1963, p. 76.*

hühnerkobelite. Partly oxidized material with the composition $(Na_2,Ca)0.2(Fe,Mn)O.P_2O_5$, from Hühnerkobel, Bavaria, and Norrö, Sweden, previously referred to arrojadite, but differing from this in the X-ray pattern. Named from the locality. *Spencer 19, M.M., 1952.*

hulk. a. Corn. To take down and remove the softer part of a lode, before removing the harder part. *See also* gouge, a; dzhu. *Fay.* b. The removal of the soft gouge. *Fay.* c. The excavation made by this operation. *Fay.*

hull. The substructure and deck of a ship or dredge. *Nichols.*

Hull cell. A special electrodeposition cell giving a range of known current densities for test work. *ASM Gloss.*

hullite. a. A black, waxy-appearing material lining vesicular cavities in basalt at Kinkell, Fifeshire, Scotland. It is not a mineral. *Holmes, 1928.* b. A soft, dark substance occurring as interstitial matter and amygdaloidal infillings in Antrim basalts. It is of the same nature as palagonite, but differs from the latter in having a low specific gravity, namely 1.76; from Carnmoney Hill, near Belfast, Ireland. *Holmes, 1928.*

Hulo system. A system for the handling of building bricks from setting in the kiln to delivery at the building site. (Trade name, Van-Huet, Pannerden, Holland.) *Dodd.*

hulsite. A black hydrous borate of ferrous and ferric iron, magnesium, and tin, $12(Fe,Mg)O.2Fe_2O_3.SnO_2 3B_2O_3.2H_2O$. Small crystals, or tabular masses. Orthorhombic (?). From Brooks Mountains, Seward Peninsula, Alaska. *English.*

humacite. A group name for bitumens which vary from gelatinous to hard resinous or elastic. Believed to represent an emulsion of highly acidic (humic acids) hydrocarbons with a varying amount of water (as high as 90 percent). Insoluble in organic solvents. *Tomkeieff, 1954.*

humanthracite. Humic coal of anthracite rank. *Tomkeieff, 1954.*

humanthrakon. Humic coal of bituminous coal rank. *Tomkeieff, 1954.*

humates. Salts of humic acids. *Tomkeieff, 1954.*

Humble detaching hook. An early type of detaching hook consisting of plates and a rivet. In the event of an overwind, the rivet is sheared and two catches are thrown out to hold the cage. *Nelson.*

Humble (Truman) gravimeter. Consists of a mass, a hinged lever, and several springs. The gravity force is therefore balanced by an elastic force. The instrument depends for its sensitivity on proximity to an instability configuration. *A.G.I.*

humboldtilite. A silicate of aluminum and iron belonging to the melilite group. *Fay.*

humboldtine; humboltite. A hydrous ferrous oxalate, $2FeC_2O_4.3H_2O$, occurring in capillary or botryoidal forms in brown coal and black shale. *Tomkeieff, 1954.*

Humboldt jig. Movable-screen type of ore jig. *Pryor, 3.*

Humboldt rotary kiln. A kiln designed for burning cement; the batch is fed to the kiln as a suspension in hot gases with consequent economy in fuel consumption. *Dodd.*

humectant. A term denoting affinity for water, with stabilizing action on the water content of an article; thus, a humectant keeps within a narrow range of the moisture content fluctuations caused by wide-range humidity fluctuations. *CCD 6d, 1961.*

humic. Derived from plants, carbonaceous. *Compare* bituminous. *A.G.I. Supp.*

humic acids. a. A name first suggested by Dobereiner and used by Sprengel as applied to the brown gelatinous material precipitated by mineral acids from an alkali extract from peat, soil, or other decayed plant materials. Many formulas for problematic humic acids have been proposed. *Tomkeieff, 1954.* b. Any of various complex organic acids supposedly formed by the partial decay of organic matter. An indefinite term of widely varying usage. Humic acid is generally agreed to be an effective adsorbent, but regarding its acid properties and its role in weathering and soil formation, opinions differ widely. *See also* ulmins. *A.G.I.*

humic cannel coal. *See* pseudocannel coal. *A.G.I.*

humic coals. a. A group of coals, including the ordinary bituminous varieties, which have been formed from accumulation of vegetable debris that have maintained their morphological organization with little decay. The majority of them are banded and have a tendency to develop jointing or cleat. Chemically, humic coals are characterized by hydrogen varying between 4 and 6 percent. *Tomkeieff, 1954.* b. Coals in which the attritus may be composed predominately of transparent humic degradation matter. *A.G.I.* c. Introduced in 1906 by H. Potonie to describe coals, the original organic matter of which underwent change chiefly by humification, that is, through the process of peat formation in the presence of oxygen. Most seams of coal consist principally of humic coal and the technological properties vary with their rank, with their petrographic composition, and with the manner of distribution of mineral inclusions. *IHCP, 1963, part I.*

humic degradation matter. Finely comminuted degradation matter in coal largely but not altogether derived from the woody tissues of plants, and like anthraxylon, largely derived from lignin. The pure humic degradation matter possesses many of the properties of anthraxylon. When considered as to origin, a number of classes are distinguishable and shown to be derived from cell walls of woody tissues, cortex, pith, bark, cork, leaf parendyma, and wood parenchyma; certain cell contents, such as gums, starch, tannins, phlobophenes, and opaque matter; and from mosses, lichen, and liverworts. *A.G.I.*

humid heat. Ratio of the increase in total heat per pound of dry air to the rise in temperature, with constant pressure and humidity ratio. *Strock, 10.*

humidifier. A device for maintaining the correct degree of moisture in the atmosphere. *Hansen.*

humidifying effect. The quantity of water evaporated per unit of time (usually 1 hour) times the latent heat of vaporization at the evaporating temperature. *Strock, 10.*

humidity. a. Moisture or dampness; the quantity of moisture in the air. *Crispin.* b. The condition of the atmosphere with respect to water vapor. When the word humidity is used without a qualifying adjective the relative humidity is usually meant. Humidity may be expressed in many different ways; for example, absolute humidity, mixing ratio, saturation deficit, and specific humidity. *A.G.I. See also* absolute humidity; relative humidity.

humidity drier. A drier in which the humidity is controlled. *ACSG, 1963.*

humidity drying. Process of heating in a moisture-saturated atmosphere and then drying after the product is hot and the water viscosity is lower. *VV.*

humidity of air. *See* absolute humidity. *Nelson.*

humidity ratio. *See* specific humidity. *Strock, 10.*

humidity test. A test involving exposure of specimens at controlled levels of humidity and temperature. *ASM Gloss.*

humidostat. An instrument for regulating the humidity in the atmosphere. *Standard, 1964.*

humidification. As part of coal formation, growth of peat beds first as bogs with plants at surface, next after these have sunk to the bottom of the swamp and been converted to peat by biological agencies. Peat, lignite and coal are sometimes classified as humoliths, in distinction from sapropelites. *Pryor, 3.*

huminite. Oxidized bitumen resembling brown coal occurring in a Swedish pegmatite vein. *Tomkeieff, 1954.*

humins. In coal, amorphous brown to black substances formed by natural decomposition from vegetable substances, insoluble in alkali carbonates, water, and benzol. *Hess.*

humite. a. A basic fluosilicate of magnesium, $Mg_7(SiO_4)_3(F,OH)_2$, orthorhombic; fracture subconchoidal to uneven; brittle; luster, vitreous to resinous; white, light yellow, honey-yellow to chestnut-brown and garnet, or hyacinth-red, color. *Dana 17.* b. A term applied by R. Potonie in 1924 to coals derived from humic material. *C.T.D.*

humite group. A group of isomorphous minerals consisting of olivine, chondrodite, humite, and clinohumite, and closely resembling one another in chemical composition, physical properties, and crystallization. *Webster 3d.*

hummer screen. Ore screen used to size moderately small material, vibrated electrically by solenoid action. *Pryor, 3.*

hummer stones. Eng. Quartz pebbles or stones from the Millstone grit, Yorkshire lead mines. *Arkell.*

hummock. a. A small elevation; a hillock. *Standard, 1964.* b. A pile or ridge of ice on an ice field. *Standard, 1964.*

hummocked ice. Ice piled in the forms of mounds or hillocks. *Hy.*

hummocky. Lumpy, or in small uneven knolls. *Fay.*

humocoll. Peat derived from humic material and in rank corresponding to saprocoll. *Tomkeieff, 1954.*

humodil. Humic coal of lignitic rank. *A.G.I. Supp.*

humodite. Humic coal of subbituminous rank. *Tomkeieff, 1954.*

humodurite. Translucent attritus or bright clarain. *Tomkeieff, 1954.*

humogelite. A collective name for humic gels occurring in peat and brown coal, such as dopplerite, zittavite, etc. *Tomkeieff, 1954.*

humolite. Humic coal. *Tomkeieff, 1954.*

humolith. Synonym for humite. *Tomkeieff, 1954.*

humolith series. Humic material and coal in order of increasing rank: humopel, humocoll, humodil, humodite, humanthracon, and humanthracite. *See also* sapropelite series. *Tomkeieff, 1954.*

humonigritite. A black bituminous coloring matter found in sediments, such as black chalk, etc. *Tomkeieff, 1954.*

humopel. An organic mud composed of humic material in corresponding rank to sapropel. *Tomkeieff, 1954.*

humosapropelic series. Series of organic and coally material intermediate between humolith (predominating) and the sapropelite series. *Tomkeieff, 1954.*

humosite. A microscopical constituent of torbanite; translucent; dark brownish-red; isotropic. *Tomkeieff, 1954. See also* gelosite; matrosite; retinosite.

humovitrinite. Vitrain of humic coals. *Tomkeieff, 1954.*

hump. a. The crest of an anticline. *Arkell.* b. A large ball of clay centered on the wheel from which several smaller pots are thrown and cut off. *ACSG, 1963.*

humper. *See* booster conveyor. *ASA MH4.1-1958.*

humphed coal; humph coal. a. Scot. Coal altered by an igneous intrusion. *Arkell.* b. Coal that approaches the surface and becomes useless. *Arkell.*

Humphrey's spiral. A concentrating device which exploits differential densities of mixed sands by a combination of sluicing and centrifugal action. The ore pulp gravitates down through a stationary spiral trough with 5 turns (6 for coal treatment) of mean radius 8 inches with a fall per turn of 13 inches. Heavy particles stay on the inside and the lightest ones climb to the outside, and the resulting bands are separated at convenient points. *Pryor, 3.*

humulith. A combustible organic rock derived from humus including all peat and coal deposits but containing less fat and protein than sapropelites. *A.G.I.*

humus. Dark-colored, organic, well-decomposed soil material consisting of the residues of plant and animal materials together with synthesized cell substances of soil organisms and various inorganic elements. *Stokes and Varnes, 1955.*

humus coal. a. Coal composed of anthraxylon in varying proportions and of varying thicknesses, associated with transparent attritus. *A.G.I.* b. Amorphous brown to black coal formed from vegetable matter and insoluble under continuous boiling in caustic alkalies, also insoluble in water and benzol. *Hess.*

humus layer. The top portion of the soil that owes its characteristic features to its content of humus, which may be incorporated or unincorporated in the mineral soil. *A.G.I.*

humus tank. The final settling tank from which sewage effluent is taken to flow either to the land or into a stream. *Ham.*

hundredweight. A weight commonly reckoned in the United States, and for many articles in England, at 100 avoirdupois pounds, but commonly in England, and formerly in the United States, at 112 avoirdupois pounds. There is also an older hundredweight, called the long hundredweight, of 120 avoirdupois pounds. Abbreviation, cwt. *Standard, 1964.*

Hungarian cat's-eye. An inferior greenish cat's eye obtained in the Fichtelgebirge in Bavaria. No such stone occurs in Hungary. *C.M.D.*

Hungarian mill. A rotating, grinding mill used in Hungary for removing small portions of gold from quartz by mixing with mercury; one of the many forms of pan amalgamators. *Fay.*

Hungarian opal. a. A white opal with a fine play of color, found in former Hungary—now Czechoslovakia. *Shipley.* b. A name widely used by the importing trade for any white opal regardless of where it was found. *Shipley.*

Hungarian riffles; transverse riffles. Riffles used in undercurrents that are small angle irons or pieces of wood shod with iron. *Lewis, p. 386.*

hungarite. A hornblende andesite. *Johannsen, v. 3, 1937, p. 169.*

hunger. a. Cumb. Dirty mottled clay, formed from the weathering of shale. b. Cumb. Crystalline calcium carbonate found in the joints of coal seams. *Arkell.*

hung fire. Delay in a blasting explosion caused by dampness of the powder or by too slow combustion of the fuse. *Korson.*

hungry. a. Said of barren or very low-grade lode mineral. *Pryor, 3.* b. Can. Barren of mineral or geological indications of ore. *Hoffman.* c. Hard, barren vein matter, as white quartz. *Compare* likely. *Fay.* d. Nonmetalliferous lodes or belts of country are said to be hungry-looking. *Gordon.*

hung shot. a. A shot which does not explode immediately upon detonation or ignition. *Zern. See also* hangfire. *Fay.* b. A delayed shot. *Hudson.*

hunker. a. Eng. To sit with the balls of the feet upon the ground and the knees bent, so that the thighs rest on the calves of the legs. This position no doubt became habitual with miners from the nature of their underground work. *Fay.* b. A term used in India for yellowish clay containing concretionary nodules. *Fay.*

Hunt and Douglas process. Consists in roasting matte carrying cooper, lead, gold, and silver at a very low temperature, forming copper sulfate and oxide, but not silver sulfate. This product is leached with dilute sulfuric acid for copper. The resulting solution is treated with calcium chloride and the copper precipitated as subchloride by passing SO_2 through the solution. The cuprous chloride is then reduced to cuprous oxide by milk of lime, regenerating calcium chloride, and the cuprous oxide is smelted. *Liddell 2d, p. 494.*

Hunt continuous filter. A horizontally revolving continuous-vacuum filter. It consists of an annular filter bed, usually of triangular wooden slats filled with coarse sands. The vacuum withdraws part of the pulp moisture as soon as the bed is formed. A spray then washes it after which the vacuum dries it, and the material is then scraped off. *Liddell 2d, p. 391.*

huntilite. A silver arsenide occurring with native silver at Silver Islet, Lake Superior, Mich. *Fay.*

hunting. a. Unstable conditions occur with all fans when they are working against too high a resistance, and with forward-bladed radial-flow fans over most of their range, including the point of maximum efficiency. In these a drop in volume causes only a slight rise in fan pressure and conditions are only slowly restored to normal. This leads to continual and heavy fluctuations in load, a phenomenon known as "hunting". In extreme cases a fan may hunt to the point where there is no rise in pressure with decreasing volume. It can then lose its load entirely and never recover it. *Roberts, I, pp. 211-212.* b. Abnormal time lag in automatic control system, in which a corrective change is so much exceeded that over-modulation ensues, the result being oscillation above and below the desired norm. Also called cycling; oscillation. *See also* automatic control; integral control. *Pryor, 3.*

hunting coal. York. Ribs and posts of coal left for second working. *Fay.*

Huntington dresser; Star dresser. A tool using rotatable star-shaped metal cutters for truing and dressing grinding wheels. *ACSG, 1963.*

Huntington-Heberlein process. A sink-float process employing a galena medium and utilizing froth flotation as the means of medium recovery. *Chemical Engineering, v. 56, No. 1, January 1949, p. 107.*

Huntington-Heberlein roasting process. Roasting lead sulfide ores, with burnt lime added to prevent premature melting of the sulfide. *Bennett 2d, 1962.*

Huntington mill. A cylindrical vertical tub from 3½ to 6 feet in diameter, with screen-guarded peripheral apertures through which ore pulp can be discharged after passing through the comminuting zone. Grinding is done by four rolling mullers which hang inside from a yoke, and which press outward when rotating, thus bearing an ore caught between them and the inner wall of the tub. *Pryor, 3.*

hunting tooth. Extra tooth designed for driven wheel so that its total number of teeth is not a multiple of those of the driving pinion. *Pryor, 3.*

huntite. A mineral, $Mg_3Ca(CO_3)_4$, orthorhombic, as a fine-grained white powder in magnesite deposits in Nevada. *Spencer 20, M.M., 1955.*

Hunt's process. Originated by Bertram Hunt for treating precious metal ores containing copper or zinc, using an ammoniacal cyanide solution and recovering ammonia by boiling. The process may be said more truly to have been devised and perfected by Mosher. *Liddell 2d, p. 494.*

hurdle. A temporary screen or curtain to deflect the air upwards against the roof to disperse gas. *B.S. 3618, 1963, sec. 2.*

hurdled ore. Ore passed through a coarse screen, like a mortar screen. *Fay.*

hurdle screen. Scot. a. A temporary screen or curtain for clearing gas out of a pit. Used especially where gas has collected in potholes or caves in the roof. *Fay.* b. A screen used in underground firefighting which pushes the smoke back towards the fire and allows the firefighting team to advance within striking distance of the fire. *McAdam, p. 133.*

hurdle sheet. A screen of brattice cloth erected across a roadway below a roof cavity or at the ripping lip to divert the air current upwards to dilute and remove an accumulation of firedamp. *Nelson.*

hurdle work. Osiers interwoven with vertical sticks, used for forming a low fence on a riverbank to stimulate silting and eliminate scour. *Ham.*

hurdy-gurdy. a. *See* hurdy-gurdy wheel. *Fay.* b. A dance house in a mining camp. *Standard, 1964.*

hurdy-gurdy drill. A hand auger used to drill boreholes in soft rock or rock material, such as soil, clay, coal, etc. *Long.*

hurdy-gurdy wheel. A water wheel operated by the direct impact of a stream upon its radially placed paddles. *Fay.*

hureaulite. A monoclinic hydrated acid phosphate of manganese, $(Mn,Fe'')_5H_2(PO_4)_4.4H_2O$, from Hureaux, St. Sylvestre and Vilate near Chanteloube, France; orange, orange-red, brownish-orange, reddish- to yellowish-brown, violet-rose, pale rose, red, amber, also gray to nearly colorless; luster, vitreous, somewhat greasy, bright; prismatic, sometimes tabular crystals. *Dana 7, v. 2, pp. 700-702.*

hurl. To haul. *Mason.*

hurlbarrow. Scot. A wheel barrow. *Standard, 1964.*

hurlbutite. a. The 4H polymorph, Zn_4S_4 of wurtzite. *Spencer 19, M.M., 1952.* b. Calcium beryllium phosphate, $CaBe_2(PO_4)_2$; orthorhombic; found in pegmatite from Newport, N. H. *Spencer 19, M.M., 1952.*

hurler. Scot. One who wheels bricks or heavy material in a wheelbarrow. *Standard, 1964.*

hurley. Scot. A box on wheels; a hutch. *Fay.*

hurlock. a. A hard kind of chalk, especially the Chalk rock, beds and herts. *Arkell.* b. Eng. Occasional bands of limestone in the Oxford and Ampthill clays, Husborne Crawley, Cambridgeshire. *Arkell.* c. Eng. A field name in Hampshire. *Arkell.*

hurricane air stemmer. A mechanical device for the rapid stemming of shotholes. It consists of a sand funnel connected by a T-piece to the charge tube, one end of which is provided with a valve and fittings to the compressed air column. The funnel is filled with sand, which is held uppermost, and the charge tube is inserted into the shothole. The sand is injected by the compressed air and the tube is gradually withdrawn as the hole is being filled. *Nelson.*

hurrier. a. *See* putter, a. *Nelson.* b. Generally a small boy who trams coal. *See also* haulier. *Fay.*

hurry. a. To haul, pull, or push cars of coal in a mine. *Fay.* b. Scot. A screen or sieve. *Fay.* c. A chute, slide, or pass as for ore in a mine, or for coal discharged from cars into vessels. *Webster 2d.* d. Gr. Brit. A wooden staging on a navigable river from which to load vessels with coal. *Standard, 1964.*

hurry gum. Scot. The fine material that passes through a screen or sieve. *Fay.*

hurrying. York. Term used for tramming. *Nelson.*

husebyite. An igneous rock consisting of plagioclase-bearing nepheline syenite. *Johannsen, v. 4, 1938, p. 165.*

hush. Eng. To clear away (soil) from ore with a rush of water. *Standard, 1964.*

hushing. The discovery of veins by the accumulation and sudden discharge of water, which washes away the surface soil and lays bare the rock. *See also* booming. *Fay.*

hussle. a. S. Staff; York. Soft clay in the Coal Measures. *Arkell.* b. Staff. Contorted carbonaceous shale immediately below a coal seam, Potteries coalfield. *Arkell.*

hustler. *See* greenware carrier. *D.O.T.1.*

hutch. a. A car on low wheels in which coal is drawn and hoisted out of a mine pit. *Webster 3d.* b. To wash ore in a box or jig. *Webster 3d.* c. An old and varying English measure, as (for coal) 2 Winchester bushels (70.5 liters). *Webster 2d.* d. A small train or wagon. *C.T.D.* e. Corn. A cistern or box for washing ore. *See also* jig, f. *Fay.* f. Scot. A basket for coal. *Standard, 1964.* g. A car for conveying ore from a mine. *Standard, 1964.* h. Scot. Two hundredweight of pyrites. *Standard, 1964.* i. The bottom compartment of an ore-dressing jig. *Webster 3d.* j. The mineral product that collects there. *Webster 3d.* k. The part of a washbox situated below the screenplate in which the controlled pulsating movement of the water takes place. *B.S. 3552, 1962.*

hutch cleading. The boards that form the sides, bottom, and ends of a mine car, or hutch. *Standard, 1964.*

hutcher. One who runs hutches. *Webster 2d.*

hutching. N. of Eng. Term used for tramming. *Nelson.*

hutchinsonite. A rare, scarlet vermilion to deep cherry-red sulfarsenite of lead, silver, and thallium, $PbS.(Tl,Ag)_2S.2As_2S_3$; small, complex, flattened prisms; orthorhombic; from Binnenthal, Switzerland. *English.*

hutch mender. A repairer of tubs or hutches broken in a mine. *C.T.D.*

hutch mounting. Scot. The ironwork on the frame and box of a wooden hutch. *Fay.*

hutch product. It consists of the fine, heavy minerals that pass through the meshes of the screen in a jig. *Newton, p. 89.*

hutch road. a. A road through a mine. *Standard, 1964.* b. Scot. A hutch tramway. *Fay.*

hutch runner. a. *See* putter, a. *Nelson.* b. Scot. A boy who draws hutches. *Fay.*

hutchwork. In mineral processing, the concentrates passing down through the ore jig into the hutch. This material is the hutchwork. *Pryor, 3, p. 211.*

huttonite. A very rare, strongly radioactive, colorless to pale cream, monoclinic mineral, $ThSiO_4$, found in sands and gravels with scheelite, cassiterite, uranothorite, zircon, ilmenite, and gold. *Crosby, p. 24.*

huttrill. Derb. A hard panel in a vein or pipe which forces the miner to sink, rise, or turn aside to avoid it. *Arkell.*

Huwood loader. This machine comprises a number of horizontal rotating flight bars working near the floor of the seam and driven through gearing by an electric motor. These bars push into the coal in their extended position and are almost completely concealed inside the loader casing in their retracted position. They push prepared coal up a ramp on to a low, bottom-loaded conveyor belt. The machine is hauled along the face by means of two steel ropes wound on separate drums on the loader; one rope passes up the front of the coal and is held by means of an anchor prop; the other rope is threaded under the cut coal by means of a threader pipe attached to the rear of the coal cutter. Lengths of rope equal to the drum capacity are joined by figure 8 links and are detached and unwound from the drum as the loader proceeds along the face. *Mason, V.1, p. 125.*

Huwood slicer; activated plough. A cutter-loader based on the plough principle and designed to cut coal which is too hard for the ordinary plough. Two vertical blades, fitted one at each end of the machine, carry cutting picks which shear the coal from the face by an oscillating motion.

The machine is hauled backward and forward along the face by a chain haulage mounted on the tail end of the conveyor. The conveyor and slicer are held up to the coal by pneumatic rams spaced along the goaf side of the conveyor. The sheared coal is forced from the face by the wedge shape of the machine and is loaded on to the armored conveyor by means of specially shaped ramps. The machine has been designed for seams with a minimum thickness of 4 feet and has a maximum cutting depth of 14 inches. *Nelson.*

Huygen's principle. A very general principle applying to all forms of wave motion which states that every point on the instantaneous position of an advancing phase front (wave front) may be regarded as a source of secondary spherical wavelets. The position of the phase front a moment later is then determined as the envelope of all of the secondary wavelets (ad infinitum). This principle, stated by the Dutch physicist, Christian Huygens (1629-1695), is extremely useful in understanding effects due to refraction, reflection, diffraction, and scattering, of all types radiation, including sonic radiation as well as electromagnetic radiation and applying even to ocean wave propagation. *H&G.*

hvab Abbreviation for high-volatile A bituminous. *BuMin Style Guide, p. 59.*

hvbb Abbreviation for high-volatile B bituminous. *BuMin Style Guide, p. 59.*

hvcb Abbreviation for high-volatile C bituminous. *BuMin Style Guide, p. 59.*

hverlera. a. A white or reddish claylike substance resulting from the action of sulfuric and carbonic acids on the iron clays of Krisuvig, Iceland. *Hess.* b. An aluminosilivate of magnesium and iron; a clay. *Hey 2d, 1955.*

H-wave. Synonym for hydrodynamic wave. *A.G.I.*

hyacinth. A transparent red, or brownish variety of zircon, sometimes used as a gem. *Dana 17. See also* garnet; jacinth. *C.M.D.; Hess.*

hyacinth garnet. Hessonite. *Shipley.*

hyacinth of Compostella. Red ferruginous quartz from gypsum beds of Santiago de Compostella in northern Spain. The red color is attributed to inclusions of hematite. The term is sometimes applied, through error, to reddish gypsum, and also sometimes referred to as brownish citrine. *Shipley.*

hyacinth of Vesuvius. Brown or honey-yellow vesuvianite from Mt. Vesuvius, Italy. *Shipley.*

hyacinthozontes. Sapphire-blue beryl. *Schaller.*

hyacinth quartz. Red to reddish-brown citrine. *Shipley.*

hyacinth sapphire. Reddish- to red-orange sapphire. *Shipley.*

hyacinth topaz. An incorrect name for hyacinth (a zircon). *Shipley.*

hyaline. Transparent or translucent, like glass; often prefixed as hyalo- to the name of a volcanic rock to signify a glassy development, for example, hyalorhyolite. *A.G.I.*

hyaline quartz. Quartz having a bluish, opalescent cast caused by the presence of chalcedony; used as a gem. *Standard, 1964.*

hyalinocrystalline. A porphyritic rock texture in which the phenocrysts lie in a glassy groundmass. Also the groundmass of porthyritic rocks or of aphyric rocks in which small crystals are surrounded by a glass base. *A.G.I.*

hyalite. A variety of opal (hydrous silica) which occurs in clear globular or botryoidal forms resembling drops of melted glass. *Sanford; Dana 17.*

hyalithe. An opaque variety of glass, frequently black, green, brown, red, etc., resembling porcelain, and valuable owing to its strength. *Standard, 1964.*

hyalo-. A prefix added to certain rock names to signify a glassy rock of corresponding chemical composition, for example, hyalobasalt. *Holmes, 1928.*

hyalocrystalline. A textural term applied to porphyritic rocks in which the phenocrysts and groundmass are equal or nearly equal in quantity; the ratio of crystals to groundmass being between 5 to 3 and 3 to 5. *Johannsen, v. 1, 2d, 1939, p. 217.*

hyalography. The art of engraving on glass, either with a diamond, emery, or hydrofluoric acid. *Standard, 1964.*

hyalomelane. A basaltic glass. Derived from the Greek meaning black glass. *Fay.*

hyalo-ophitic. a. A texture resembling an ophitic texture, in which the spaces of an open network of feldspar laths are occupied by glass; it also resembles intersertal texture, however, the glassy groundmass is more abundant and continuous. *Schieferdecker.* b. A limiting case of intersertal texture. *Holmes, 1928.*

hyalophane. A rare barium feldspar, $(K,Ba)(Al,Si)_2Si_2O_8$; monoclinic. In crystals, also massive. From Switzerland; Sweden. *Dana 17.*

hyalopilitic. Composed of or characterized by innumerable slender microlites embedded in glass. *Webster 3d.*

hyalosiderite. A highly ferruginous variety of olivine. *Fay.*

hyalotekite. A fluoborosilicate of lead, barium, and calcium, approximately $16(Pb,Ba,Ca)O.2B_2O_3.24SiO_2.F$; it also contains a little BeO,K_2O, etc.; 25.11 percent PbO, 3.73 percent B_2O_3, 0.99 percent F; vitreous white or gray; Mohs' hardness, 5 to 5.5; specific gravity, 3.81; from Langban, Sweden. *Dana 6d, p. 422.*

Hybinette process. A process used for refining of crude nickel anodes. These are placed in reinforced concrete tanks lined with asphalt. The nickel anodes are dissolved electrochemically and the impurities such as copper and iron, pass into a solution. The cathodes are surrounded by bags of closely woven canvas duck, fastened on wooden frames, and pure nickel electrolyte is passed continuously into them in order to maintain a higher solution level inside the cathode compartment than outside. By this means, the pure solution flows through the pores of the bags, thus preventing the ions of copper, etc., in the solution in the anode compartment from migrating into the cathode compartment, depositing on the cathode and preventing the refining process from taking place. The electrolyte in the anode compartments is drawn off continuously and is purified in the copper cementation and iron precipitation departments before being returned to the cathode compartments of the nickel deposition tanks. *Osborne.*

hybrid. Originally applied to intermediate rocks at a time when they were regarded as the products of composite magmas derived from the mixture of the trachytic and pyroxenic magmas of Bunsen. The term was adopted by Harker (1904) for abnormal igneous rocks, of which marscoite is an example, formed by the mixture of two magmas, or by the assimilation of a rock already consolidated by the magma of a later intrusion. *Holmes, 1928.*

hybridization. The process by which rocks of composition different from the parent magma are formed by the assimilation of wall-rock material. *A.G.I.*

hybrid porcelain. A ware originally made in imitation of Oriental porcelain containing some kaolin; essentially an artificial soft porcelain represented by the early Italian and French porcelains. *Standard, 1964.*

hybrid rock. A rock of supposed heterogeneous origin. Originally it referred to an igneous rock formed by the mixing of two compositionally contrasting primary worldwide magmas; now it is used more generally to include all igneous rocks formed through the mixing of materials from several sources, as by assimilation of solid igneous rocks by later intrusions from the same source, or by assimilation of country rocks. Synonymous with contaminated rocks in this latter sense. *See also* hybridization. *A.G.I.*

hydrato-. A prefix to lithologic terms to indicate an origin through aqueous processes. *Fay.*

hydatogenesis. The process by which mineral deposits are formed from magmatic solutions high in water content. Also used for all deposits formed from aqueous solutions whether the waters were magmatic, vadose, or phreatic. *Holmes, 1920. See also* mineralization.

hydatogenetic. Geological term for mineral deposited from aqueous magmatic solution. Carrying waters may be strongly acidic. Term sometimes applied indiscriminately to deposits from aqueous solution. *Pryor, 3.*

hydatogenetic mineral. One of the hydroxyl-containing minerals of igneous rocks, such as amphibole and mica. *A.G.I.*

hydatogenic. Derived from or modified by substances in a liquid condition; said of the genesis of ores and other minerals; opposite of pneumatogenic. *Standard, 1964.*

hydatogenous. Applied to mineral deposits of aqueous origin, including vein deposits. *Schieferdecker.*

hydatopneumatolytic; hydatopneumatic. Of ore deposits, formed by the joint agency of water and vapor. *Webster 3d.*

Hyde process. Obsolete flotation process for improving sulfide flotation by conditioning with copperas and a little sulfuric acid. *Pryor, 3.*

hydrabrake retarder. A mine car retarder based on the principle of the dashpot and consists of individual braking units which can be fastened to the rails at spacings according to need over any desired distance. The unit offers no resistance to motion at very low car speeds, but as the speed increases the braking force exerted upon it increases accordingly following the usual oil dashpot characteristic. *Nelson.*

hydrafrac treatment. A method of inducing fractures in reservoir rock about producing wells by means of high pressures and the introduction of sand into the fractures, preventing their closing after pressure is released. *Williams.*

Hydralime. Slaked lime. *Bennett 2d, 1962.*

hydrargillite. Synonym for gibbsite. *Fay.*

hydrargillutite. Pure clay beds and varieties containing small quantities of silica, lime, iron, or carbon. *A.G.I.*

hydrargyrism. Chronic mercurial poisoning. *Webster 2d.*

hydrargyrum. Latin for mercury. The chemical symbol Hg for mercury was derived from hydrargyrum. *Webster 3d.*

hydrate. a. A compound or complex ion formed by the union of water with some other substance and represented as actually containing water. *Webster 3d.* b. Also denotes a hydroxide, such as calcium hydrate (hydrated lime). *Webster 3d.*

hydrated. Containing combined water (as in a hydrate); hydrous. *Webster 3d.*

hydrated aluminum oxide. *See* alumina trihydrate. *CCD 6d, 1961.*

hydrated crystals. Many substances have the power of combining directly with water to form compounds in which the water is more or less loosely held. These compounds are called hydrates, and, on heating, generally give up their water of hydration or water of crystallization. *Cooper.*

hydrated halloysite. *See* hydrohalloysite.

hydrated ion. One surrounded by oriented molecules of water. *Pryor, 3.*

hydrated lime. A dry powder obtained by hydrating quicklime with enough water to satisfy its chemical affinity, forming a hydroxide due to its chemically combined water. It may be high calcium, magnesian, dolomitic, or hydraulic. *Boynton.* Also called slaked burned lime.

hydration. a. The chemical combination of water with another substance. *A.G.I.* b. The process of adding water, or the elements of water (oxygen and hydrogen combined in the hydroxyl radical), to any substance. *Bureau of Mines Staff.*

hydraulic. a. Strictly, having to do with water in motion, but term is extended to cover all liquids which convey, store, or transfer pressure energy to reactants. *Pryor, 3.* b. To move material—either pay or waste by means of water. *Austin.* c. Hardening or setting under water, as hydraulic cement. *Webster 3d.*

hydraulic action. The mechanical loosening and removal of materials by the action of water alone. Flowing water can sweep away loose deposits and wash out particles from weakly resistant sediment. *Stokes and Varnes, 1955.*

hydraulic air compressor. One in which water falls down a pipe or shaft, entraining air which is released at the bottom and returned under compression to do useful work; the water leaves the system after rising to a lower escape level. Such air is appreciably lower in oxygen than is ordinary compressed air. *Pryor, 3.*

hydraulic blasting. Fracture using a hydraulic cartridge, a ram-operated device used to split coal. *Pryor, 3.*

hydraulic cartridge. a. A device used in mining to split coal, rock, etc., having 8 to 12 small hydraulic rams in the sides of a steel cylinder. *Fay.* b. *See* coal burster. *Nelson.*

hydraulic cement. A cement which is capable of binding suitable aggregate into a concrete that can set and harden underwater. *Taylor.*

hydraulic cementing. A borehole-cementing operation using a downhole cement injector. *See also* cement injector. *Long.*

hydraulic chock. A steel face support structure consisting of one up to four hydraulic legs or uprights. The four-leg chock is mounted in a strong fabricated steel frame with a large head and base plate. In one type, the chock can be set to a load of 11.2 tons at 1,000 pounds per square inch to yield at 120 tons. It is controlled by a central valve system which operates either on the four legs simultaneously or on the front and rear pairs separately. *See also* self-advancing supports. *Nelson.*

hydraulic chuck. A diamond-drill rod chuck having jaws with clamping and unclamping movements actuated hydraulically instead of by hand-turned setscrews. Also called automatic chuck. *Long.*

hydraulic circulating system. A method used to drill a borehole wherein water or a mud-laden liquid is circulated through the drill string during drilling. *See also* diamond drill. *Long.*

hydraulic classifier. Tank into which ore pulp is fed steadily and subjected to the sorting effect of a stream of hydraulic water which rises at controlled rate. Heavier or coarser equal settling particles gravitate down and away via a bottom discharge, while lighter ones are carried up and out. *Pryor, 3.*

hydraulic conveyor. A type of conveyor in which water jets form the conveying medium for bulk materials through pipes or troughs. This is often a specialized form of conveyor for the handling of ashes. *ASA MH4.1-1958.*

hydraulic cylinder. As applied to a diamond drill, a synonym for feed cylinder. *See also* feed cylinder. *Long.*

hydraulic discharge. The discharge of ground water in the liquid state directly from the zone of saturation upon the land or into a body of surface water. Hydraulic discharge may be divided into discharge through springs, well, infiltration ditches and infiltration tunnels. *Stokes and Varnes, 1955.*

hydraulic dredge. a. A dredge that consists of a hull on which is mounted a suction pipe and support, pump with motors and controls, and a discharge line. Commonly used in dredging canals and in providing fill for the creation of land in near shore or low-lying areas. Have been used to mine sodium-sulfate deposits in Canada. Presently, these dredges are operating at depths of about 200 feet below the water level. *Mero, pp. 249-251.* b. A floating pump that sucks up a mixture of water and soil, and usually discharges it on land through pipes. *Nichols.*

hydraulic dredger. A suction dredger. *C.T.D.*

hydraulic drill. A hand-held or machine-mounted rotary drill for boring shot-firing holes in coal or rock and operated by hydraulic fluid. The drill outfit includes a skid-mounted powerpack comprising a 5-horsepower flameproof electric motor, pump, and tank. The coal drill weighs about 32 pounds. *Nelson.*

hydraulic ejector. A pipe by means of which excavated material is removed from a pneumatic caisson. It operates on an ejection principle. *Ham.*

hydraulic elements. The depth, area, perimeter, mean depth, hydraulic radius, velocity, energy, and other quantities pertaining to a particular stage of flowing water. *Seelye, 1.*

hydraulic elevator. An arrangement for lifting gravel and sand up to the drainage level. A jet of water is used to create a powerful suction in a hopper and the water and gravel are carried up a pipeline and then run down the sluice boxes. This appliance was widely used in various goldfields towards the end of the 19th century. *Nelson.*

hydraulic engineer. One who handles the engineering work of design, erection, and construction of sewage-disposal plants, waterworks, dams, water-operated powerplants, etc. *Crispin.*

hydraulic engineering. That branch of engineering chiefly concerned in the design and production of hydraulic machinery, pumping plants, pipe lines, etc. *C.T.D.*

hydraulic excavation. Excavation by means of a high pressure jet of water, the resulting waterborne excavated material being conducted through flumes to the desired dumping point. *Ham.*

hydraulic extraction. A term which has been given to the processes of excavating and transporting coal or other material by water energy. Also called hydroextraction. *Nelson.*

hydraulic feed. A method of imparting longitudinal movement to the drill rods on a diamond or other rotary-type drill by a hydraulic mechanism instead of mechanically by gearing. *See also* feed cylinder. *Long.*

hydraulic fill; mine fill. Waste material transported underground and flushed into place by use of water. *Pryor, 3.*

hydraulic-fill dam. A dam composed of earth, sand, gravel, etc., sluiced into place; generally the fines are washed toward the center for greater imperviousness. *Seelye, 1.*

hydraulic filling. Washing waste material, such as mill tailings and ground waste rock, into stopes with water in order to prevent failure of rock walls and subsidence. Problems involved in its use are stope preparation, choice and mixing of material, its particle size distribution, wear on pipe, and removal of water which transports the material into the mine. Compressed air may be used to force the filling through pipes. *Lewis, p. 70.*

hydraulic fluid. A fluid supplied for use in hydraulic systems. Low viscosity, low rate of change of viscosity with temperature, and low pour point are desirable characteristics. Hydraulic fluids may be of petroleum or nonpetroleum origin. *Ham.*

hydraulic flume transport. The transport of coal, pulp, or mineral by the energy of flowing water in semicircular or rectangular channels. The gradient should not be less than 3°. Coal movement in flumes commences at a water velocity of about 3 feet per second, but in practice a velocity of at least 6 feet per second is arranged. *Nelson.*

hydraulic flushing. Synonym for hydraulic stowing. Also called hydraulic slushing; hydraulic silting. *Nelson.*

hydraulic fracturing. a. Method in which sand-water mixtures are forced into underground wells under pressure. This pressure splits the petroleum-bearing sandstone, thereby allowing the oil to move towards the wells more freely. *Bureau of Mines Staff.* b. A general term, for which there are numerous trade or service names, for the fracturing of rock in an oil or gas reservoir by pumping a fluid under high pressure into the well. The purpose is to produce artificial openings in the rock in order to increase permeability. *A.G.I. See also* formation fracturing.

hydraulic-fracturing sand. A sound, rounded, light-colored quartz sand free of aggregated particles and possessing high uniformity in specified size ranges which, when immersed in a suitable carrier and pumped under great pressure into a formation, increases fluid production by generating greater effective permeability. Commonly referred to as Sandrac. *AIME, p. 771.*

hydraulic friction. A force-resisting flow which is exerted on contact surface between a stream and its containing channel. It usually includes the normal eddies and crosscurrents attendant upon turbulent flow occasioned by the roughness characteristic of the boundary surface, moderate curvature, and normal channel variations. Wherever possible, the effects of excessive curvature, eddies, impact, obstructions, and pronounced channel changes are segregated from the effects of hydraulic friction. *Seelye, 1.*

hydraulic giants. Used for working large placer deposits. They are made in various sizes with nozzles ranging from 2 to 10 inches in diameter. The smaller sizes have a single joint of the universal type; larger sizes have double joints and are ball bearing to lessen the frictional resistance to turning. The upper and lower parts are held together by a bolt called the king bolt. As a safety measure in case the king bolt should break, four hooks hold the two flanges together. When water is under pressure the giants are fitted with special tips or deflectors. By turning these slightly the reaction of the stream of water moves the giant in the opposite direction. *Lewis, p. 386.* Also called hydraulic monitor.

hydraulic gradeline. In a closed conduit, a line joining the elevations to which water could stand in risers. In an open conduit, the hydraulic gradeline is the water surface. *Seelye, 1.*

hydraulic gradient. a. A line joining the points of highest elevation of water in a series of vertical, open pipes rising from a pipeline in which water flows under pressure. *Webster 3d.* b. Loss of hydraulic head per unit distance of flow. *See also* critical hydraulic gradient. *ASCE P1826.* c. The slope of the hydraulic gradeline. The slope of the surface of water flowing in an open conduit. *Seelye, 1.*

hydraulic gravel-pump mining. Consists of the use of high-pressure water jets to disintegrate ore-bearing ground, together with gravel pumps to elevate the spoil to a treatment plant. Initial mining operations consist of the establishment of the mine hole or paddock. This is achieved by sinking or cutting downwards with monitors and removing the spoil by pumping, the pump being lowered as the hole deepens. *Institution of Mining and Metallurgy. Symposium on Opencast Mining, Quarrying, and Alluvial Mining, London, 16-19 November 1964, Paper 6, p. 5.*

hydraulic head. a. Synonym for hydraulic swivel head. *Long.* b. The height of a fluid column, usually considered as water, which maintains a pressure on a surface, the amount of pressure being directly proportional to the depth of the fluid standing above the point at which the pressure is taken. This pressure may be given in pounds per unit area, or simply as the height of the water column in feet or inches. Pure water at 60° F exerts a pressure of 0.4331 pound per square inch for each foot of depth. *Long.*

hydraulic hoisting. See hydraulic transport.

hydraulic hose. The flexible hose used to direct a stream of water against a wall or face of drift. *Fay.*

hydraulic hydrated lime. A chemically impure form of lime with hydraulic properties of varying extent that possesses appreciable amounts of silica, alumina, and usually some iron, chemically combined with much of the lime. It is employed solely for structural purposes. *Boynton.*

hydraulic index. Ratio of amount of silica plus alumina times 100 to lime and magnesia in portland cement. *Bennett 2d, 1962.*

hydraulicity. The property of a lime, cement, or mortar which enables it to set under water or in situations where access of air is not possible. *C.T.D.*

hydraulic jack. A jack in which the lifting head is carried on a plunger working in a cylinder, to which oil or water is supplied under pressure from a small hand-operated pump. *C.T.D.*

hydraulic jack operator. *See* track moving machine operator. *D.O.T.1.*

hydraulic jump. The sudden and usually turbulent passage of water from low stage below critical depth to high stage above critical depth during which the velocity passes from supercritical to subcritical. It represents the limiting condition of the surface curve wherein it tends to become perpendicular to the stream bed. *Seelye, 1.*

hydraulicking. Excavating alluvial or other mineral deposits by means of high-pressure water jets. *Bureau of Mines Staff. See also* hydraulic mining; hydromechanization; monitor.

hydraulic lime. Lime in which a high proportion of the calcium oxide is combined with silica, alumina, and iron oxide. It is made from linestone or chalk, which contains calcareous matter, and it will set and harden underwater. *Taylor.*

hydraulic limestone. A limestone which contains some silica and alumina (usually as clay) and upon calcination yields a hydraulic cement that will set to form a strong, solidified mass underwater. *Fay.*

hydraulic load cell. A safety device developed by the U.S. Bureau of Mines for sensing pressure changes, thereby warning in advance of bumps. The cells are embedded in the walls and roofs of coal mines. *Bureau of Mines Staff.*

hydraulic loading. The flushing or slicing of coal or other material broken down by water jets along the floor and into flumes. Coal will flow back towards the flume if sufficient water is available and the gradient is not less than 6° to 7° in favor of the flow. Flexible low-pressure hoses (150 to 200 pounds per square inch) are sometimes used to assist in the flushing operations. *Nelson.*

hydraulic machine. a. A borehole-drilling machine on which the bit-feeding mechanism is hydraulically actuated. *Long.* b. A machine powered by a motor activated by the confined flow of a stream of liquid, such as oil or water under pressure. *Long.*

hydraulic main. A main (pipe) for collecting and condensing the volatile matter given off in carbonization of coal in the coking process. *Mersereau, 4th, p. 364.*

hydraulic mean depth. The cross section of water flowing through a channel or pipe divided by the wetted perimeter of the conduit. *See also* Barnes' formula. *Ham.*

hydraulic mine. A placer mine worked by means of a stream of water directed against a bank of sand, gravel, or talus; soft rock similarly worked. *Hess.*

hydraulic mine-filling. Filling a mine with material transported by water. *Fay.*

hydraulic miner. In metal mining, one who tends riffles, sluices, and does other work in connection with the hydraulic placer mining of gold. In this type of mining, gold bearing gravel, usually in a bank, is excavated by the erosive action of a high-pressure stream of water being directed at the bank through a nozzle. The gravel is then forced into sluices where the gold particles sink and are caught by riffles (cleats) along the sluice bottom. *D.O.T. 1.*

hydraulic mining. a. Mining by washing sand and dirt away with water which leaves the desired mineral. *MacCraken.* b. The processs by which a bank of gold-bearing earth and rock is excavated by a jet of water, discharged through the converging nozzle of a pipe under a great pressure, the earth or debris being carried away by the same water, through sluices, and discharged on lower levels into the natural streams and watercourses below; where the gravel or other material of the bank is cemented, or where the bank is composed of masses of pipe clay, it is shattered by blasting with powder. *Ricketts, I.* Also used for other ores, earth, anthracite culm, etc. Made unlawful and prohibited in certain river systems where it obstructs navigation and injures adjoining landowners. *Fay.* c. In underground hydraulic mining, the extraction of coal by high-velocity water jets, directed at the seam from a monitor or powerful jet, which can withstand high water pressures. The jets are also used to impel the broken coal along the floor to the point of collection. *Nelson.*

hydraulic monitor; giant; monitor. A device for directing a high-pressure jet of water in hydraulicking. It is essentially a swivel-mounted, counter-weighted nozzle attached to a tripod or other type of stand and so designed that one man can easily control and direct the vertical and lateral movements of the nozzle. *Bureau of Mines Staff.*

hydraulic mortar. Mortar that will harden under water. *Standard, 1964. Compare* hydraulic cement. *Fay.*

hydraulic motor. A multicylinder reciprocating engine, generally of radial type, driven by water under pressure. *C.T.D.*

hydraulic mule. A hydraulic appliance for controlling the movement of mine cars, for example, at a loading point. It consists of a carriage running on a separate rail track laid inside the standard mine-car track. It is fitted with two pivoted horns arranged in opposition to engage with dummy axles of the mine cars. The horns ensure that movement of the car in both directions is completely controlled at the loading or any other point. Once it is set in motion, the operation of the mule is entirely automatic. *Nelson.*

hydraulic oil. A light, nonviscous, neutral, flame-resistant oil used as an actuating fluid in hydraulic cylinders or systems. *Long.*

hydraulic or fluid couplings. A fluid coupling transmits power from the driving member to the driven member through oil. A rotating impeller attached to the drive shaft throws oil directly against a turbine conengine or motor produces. Fluid couplings always delivers the same torque as the engine or motor produces. Fluid couplings are particularly advantageous in starting heavy loads since the motor or engine is permitted to run at high efficient speeds while the coupling output shaft gradually accelerates the load to running speed. *Pit and Quarry, 53rd, Sec. D, p. 68.*

hydraulic permeability. With respect to water, it is the capacity of a rock or a soil to transmit water under pressure. In some rocks and soils, it varies in different directions. *Stokes and Varnes, 1955.*

hydraulic pipe transport. The conveyance of coal by means of water flowing in pipes. Coal may be pumped to the surface in shallow mines, but beyond 150 feet or so of depth, there are technical difficulties. Solids handling pumps rarely deliver against heads exceeding about 200 feet. Two such pumps, placed in series, have been used in Trelewis Drift, Wales, to pump out slurry. Pipe transport of materials is in the experimental stage. *Nelson.*

hydraulic positioner. A device having a hydraulic mechanism that permits the change of spacing (distance) between the drilling machines. *Institution of Mining and Metallurgy. Symposium on Opencast Mining, Quarrying, and Alluvial Mining, London, 16-19 November 1964, Paper 10, p. 4.*

hydraulic power. The use of pressure oil or soluble oil and water for operating face machines and steel supports. The fluid is supplied by rotary pumps driven by electricity located at points near the face. Hydraulic power has the advantage that the space required is considerably less than that for conventional drives. *See also* power pack. *Nelson.*

hydraulic press. A press in which fluid pressure is used to actuate and control the ram. *ASM Gloss.*

hydraulic pressure. *a.* The total thrust, expressed in pounds or tons, that the hydraulic-feed mechanism on a drill can impose on a drill string; also, the pressure of the fluid within the hydraulic cylinders, generally expressed in pounds per square inch. *Long.* b. Synonym for hydraulic head. *See also* hydraulic head, b. *Long.*

hydraulic profile. A term applied to the vertical section of the piezometric surface of an aquifer. *A.G.I.*

hydraulic prop. A prop consisting of two telescoping steel cylinders which are extended by hydraulic pressure which may be provided by a hand-operated pump built into the prop. The prop holds about half a gallon of mineral oil and is fitted with a yield valve which relieves the pressure when the load exceeds that for which the prop is set. An hydraulic prop enables quicker setting, uniform initial loading, and it can be withdrawn from a remote, safe position. The first hydraulic prop was first used in a British coal mine in 1947; today there are more than one million in use. *Nelson.*

hydraulic prospecting. *See* costean; hushing. *Nelson.*

hydraulic radius. A measure of water depth in a channel defined as cross-sectional area of flowing water divided by the length of wetted perimeter; approximates mean depth in a wide channel. *A.G.I. See also* hydraulic mean depth.

hydraulic ram. a. A pump that forces running water to a higher level by utilizing the kinetic energy of flow, only a small portion of the water being so lifted by the velocity head of a much larger portion when the latter is suddenly checked by the closing of a valve. *Webster 3d.* b. A device for lifting water by the water hammer produced by checking the flow periodically. *Seelye, 1.* c. The plunger of a hydraulic press. *C.T.D.* d. A device whereby the pressure head produced when a moving column of water is brought to rest is caused to deliver some of the water under pressure. *C.T.D.*

hydraulic ratio. The weight of a heavy mineral multiplied by 100 and divided by the weight of a hydraulically equivalent light mineral. *A.G.I. Supp.*

hydraulic refractory cement. A refractory cement containing aluminous hydraulic cement, for example, ciment fondu, so that it sets at room temperature. *See also* refractory cement. *Dodd.*

hydraulic rotary drilling. Method of drilling that uses rotating bits lubricated by a stream of mud. *Mersereau, 4th, p. 199.*

hydraulics. A branch of science that deals with practical applications (as the transmission of energy or the effects of flow) of water or other liquid in motion. *Webster 3d.*

hydraulic set. The set obtained by the addition of water to hydraulic setting materials. *Bureau of Mines Staff.*

hydraulic-setting refractories. Compositions of ground refractory materials in which some of the components react chemically with water to form a strong hydraulic bond. These refractories are commonly known as castables. *HW.*

hydraulic shovel. A revolving shovel in which drums and cables are replaced by hydraulic rams and/or motors. *Nichols.*

hydraulic sluicing. The process of moving materials by water; colloquially, hydraulicking. *Seelye, 1.*

hydraulic stowing. The filling of the waste in mines by waterborne material by pipeline. *See also* pneumatic stowing. *Nelson.*

hydraulic stowing pipe. A steel or iron pipe used for transporting the material in hydraulic stowing. Ordinary pipes wear very rapidly due to the chippings in the water, therefore they are lined with about ¼ inch thick rubber. This lining gives a very much longer life to the pipe. *Nelson.*

hydraulic stripping. The excavation and removal of overburden by hydraulicking. *Nelson.*

hydraulic swivel. *See* hydraulic swivel head. *Long.*

hydraulic swivel head. The swivel head of a drill machine equipped with hydraulically actuated cylinders and pistons to exert pressure on and move the drill rod string longitudinally. *See also* swivel head. *Long.*

hydraulic theory. A theory of oil and gas migration that suggests that migration is caused by the movement of underground water which carries along oil and gas. *A.G.I.*

hydraulic transport. Movement of ore by water, flowing through pipe lines. Includes hydraulic hoisting. *Pryor, 3. See also* pipeine transport.

hydraulic underreamer. An underreamer with cutting lugs that can be expanded or retracted by a hydraulically actuated device. *See also* underreamer. *Long.*

hydraulic valve. A valve for regulating the distribution of water in the cylinders of hydraulic elevators, cranes, etc. *Crispin.*

hydrazine sulfate; diamine sulfate; diamidogen sulfate. White; crystalline; $NH_2NH_2.H_2SO_4$; very soluble in hot water; soluble 1 part in 33 parts of cold water; insoluble in alcohol; stable in storage but contact with alkalies and oxidizing agents should be avoided; specific gravity, 1.37; and melting point, 254° C. Used in the analysis of minerals, slags, and fluxes; in the determination of arsenic in metals; and in the separation of polonium from tellurium. *CCD 6d, 1961.*

hydride. A compound of an element with hydrogen, for example, CaH_2 (hydrolith). *Pryor, 3.*

Hydrik process. A commercial process for the production of hydrogen by reaction of caustic soda on aluminum. *Osborne.*

hydrion. Hydrogen ions. *Bennett 2d, 1962.*

hydrite. The term was proposed by K. Asai at the 1955 meeting of the International Committee for Coal Petrology to denote a very common microlithotype in Japanese Tertiary coal. It consists of macerals vitrinite, degradinite and exinite. The proportions of these macerals may vary very considerably. The greater part of the exinite is generally resinite, associated with sporinite and cutinite in varying amounts. Sclerotinite may be present in small amounts: micrinite, semifusinite, and fusinite are extremely rare. On the basis of the maceral content it is possible to distinquish between degradinite-rich hydrite (hydrite D) and exinite-rich hydrite (hydrite E). In microscopic analysis only bands having a width of more than 50 microns are recorded as hydrite. The density increases with increasing coalification. In hydrites of more than 25 percent volatile matter, the specific gravity is lower, the higher the exinite content. The density of hydrite is only slightly different from that of vitrite; that of pure hydrite is somewhat lower than that of the corresponding vitrite. However, because of high ash content hydrite is commonly heavier that vitrite. The strength varies according to the rank, and is generally higher than that of vitrite (26 to 85 kilograms per square millimeter). The dull bands of many Japanese Tertiary humic coals consist largely of hydrite and generally occurs alternating with vitrite as microfine bands, one or the other predominating. *IHCP, 1963, part I.*

hydro-. From the Greek hydor. A prefix meaning water or the presence of hydrogen. *Webster 3d.*

hydroamphibole. An amphibole containing double the amount of water (5.78 percent) required by Warren's formula, $H_4R''_7$ Si,Al$)_8O_{24}$. Colorless, acicular, resembling tremolite. From Salcombe, Devon County, England. *English.*

hydroapatite. A milk-white hydrous variety of apatite. *Standard, 1964.*

hydroazoic acid; azoimide. HN_3; molecular weight, 43.03; colorless; liquid; specific gravity, 1.09 (at 25° C, referred to water at 4° C); melting point, —80° C; boiling point, 37° C; and soluble in water, in alkalies, in ethyl alcohol, and in ether. Used in manufacturing detonators. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-178.*

hydrobarometer. An instrument for determining the depth of sea water by its pressure. *Crispin.*

hydrobasaluminite. A fully hydrated variety of basaluminite. *American Mineralogist, v. 33, No. 11-12, November-December 1948, p. 787.*

Hydrobel. An explosive developed for use with pulsed-infusion shot firing or in wet conditions. It is a permitted explosive of the gelatinous type, and is highly water-resistant and capable of propagation under the high hydrostatic pressures associated with pulsed-infusion shot firing. *Nelson.*

hydrobiotite. A clay mineral composed of mixed layers of biotite and vermiculite. *A.G.I.*

hydroboracite. A hydrous borate of calcium and magnesium, $CaO.MgO.3B_2O_3.6H_2O$; containing 50.7 percent B_2O_3; color, white. *Dana 6d, p. 889.*

hydrobraunite. A member of the psilomelane-wad group. *English.*

hydrocalumite. A colorless to light green drous calcium aluminate, $4CaO.Al_2O_3$.-12(or 14)H_2O. Aggregrates of cleavages; in fillings in larnite rock. Pseudohexagonal. Monoclinic. From Scawt Hill, County Antrim, Ireland. *English.*

hydrocarbon. Any of a large class of organic compounds containing only carbon and hydrogen, comprising paraffins, olefins, members of the acetylene series, alicyclic hydrocarbons (such as cyclic terpenes and steroid hydrocarbons), and aromatic hydrocarbons (such as benzene, nephthalene, and biphenyl), and occurring in many cases in petroleum, natural gas, coal, and bitumens. *Webster 3d.*

hydrocarbon anomaly. Very weak oil or gas seeps, so weak that the deposition of material at the surface cannot be recognized without chemical analysis. *Hawkes, 2, p. 70.*

hydrocarbon black. Synonym for lampblack. *Fay.*

hydroceramic. Porous unglazed pottery, used for filters and for cooling vessels. *C.T.D.*

hydrocerussite. A basic carbonate of lead, $Pb_3(CO_3)_2(OH)_2$. It occurs as a secondary mineral found associated with leadhillite, matlockite, cerussite, mendipite, and paralaurionite. *Dana 7, v. 2, pp. 270-271.*

hydrochemical anomaly. Anomalous patterns of elements contained in ground and surface water. *Hawkes, 2, p. 227.*

hydrochemical prospecting. Prospecting guided by the trace-element content of ground water and surface water. *A.G.I. Supp.*

hydrocloric acid; hydrogen chloride; muriatic acid. Clear; colorless; poisonous; fuming; pungent; gas or liquid; HCl; a strong, highly corrosive acid; and soluble in water, in alcohol, in ether, and in benzene. Used in the acidizing (activation) of petroleum wells, in ore reduction (manganese, radium, vanadium, tantalum, tin, tugsten), and in pickling and in metal cleaning. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964. p. B-179.*

hydroclastic. Clastic through the agency of water; a fragmental rock deposited by the agency of water. *Compare* pyroclastic. *Webster 3d.*

hydrocyanic acid; hydrogen cyanide; prussic acid. Unstable; volatile; colorless; extremely poisonous; gas or liquid; HCN; soluble in water, in alcohol, and in ether; only slightly dissociated with water; and an odor resembling that of bitter almonds. Formed by decomposing metallic cyanides with hydrochloric acid. *Standard, 1964; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-179.*

hydrocyanic gas indicator. Depression of an aspirator bulb allows an air sample to enter a graduated tester tube filled with a chemical reagent. The presence of hydrocyanic gas changes the reagent from white to blue in color, and the length of discoloration is directly proportional to the percentage of the toxic gas present. *Bests, p. 586.*

hydrocyclone. A cyclone separator in which a spray of water is used. *ASM Gloss.*

hydrodesulfurization. A method of desulfurizing that is applicable to all types of surfur compounds. *Bureau of Mines Staff.*

hydrodolomite. Probably a mixture of hydromagnesite and calcite. *Dana 6d, p. 306.*

hydrodynamic. Of, or pertaining to, hydrodynamics; relating to the force or pressure of water or of other fluids. *Standard, 1964.*

hydrodynamics. a. The branch of science that deals with the cause and effect of regional subsurface fluid migration. *Williams.* b. That branch of hydraulics which relates to the flow of liquids over weirs, or through pipes, channels, and openings. *Ham.*

hydrodynamic wave. A surface seismic wave recognized by Leet similar to a Rayleigh wave but moving in an opposite or counterclockwise sense, so that the wave is moving forward at its maximum up position. *Synonym* for H-wave. *A.G.I.*

hydrodynamometer. An instrument for determining the velocity of a fluid in motion by its pressure. *Standard, 1964.*

hydroelectric. Describes a system in which the potential energy of natural water is used, after harnessing it by impounding in dams, by releasing it through turbogenerators. *Pryor, 3.*

hydroelectric power. Electrical energy derived from natural or artificial waterfalls. *Ham.*

hydroelectric power station. A power station in which electricity is generated by the energy of falling water. *Ham.*

hydroelectric scheme. A complete project for water power development which will include the design and construction of a dam, tunnels, spillways, power station intakes, and many other constructional works over a wide area. *Ham.*

hydroextraction. *See* hydraulic extraction. *Nelson.*

hydroextractor. *See* centrifuge. *Bennett 2d, 1962.*

Hydroflo. Trademark for a trinitrotoluene base explosive with free-flowing characteristics. Used for seismic prospecting and for open-pit mining. *CCD 6d, 1961.*

hydrofluoric acid; hydrogen fluoride. Colorless; fuming; corrosive; gas or liquid; HF; soluble in water; and only a moderately strong acid. Unlike other acids, it will attack glass and any silica-containing material. Used in polishing, etching, and frosting of glass; pickling copper, brass, stainless steel, and other alloy steels; cleaning stone and brick; purification of graphite; electropolishing of metals; acidizing oil wells; and dissolving ores. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-179.* The liquid and gas consist of associated molecules; the vapor density corresponds to hydrogen fluoride only at high temperatures. Freezing point, —83° C; boiling point, 19.5° C; and specific gravity of the liquid, 0.988. Used in refining uranium. *CCD 6d, 1961.*

hydrofluoric acid test. *See* acid-dip survey. *Long.*

hydrofluosilicic acid. *See* fluosilicic acid. *CDD 6d, 1961.*

hydrofranklinite. *See* chalcophanite.

hydrofuge. *See* suspensoid.

hydrogarnet. Hydrous calcium alminate, $3CaO.Al_2O_3.6H_2O$, and calcium ferrite, $3CaO.Fe_2O_3.6H_2O$, present in hydrated portland cement. They are cubic and form a complete series of mixed crystals with grossular, $3CaO.Al_2O_3.3SiO_2$, and andradite, $3CaO.Fe_2O_3.3SiO_2$, plazolite, $3CaO.$-$Al_2O_3.2SiO_2.2H_2O$, is an intermediate member. *Compare* grossularoid; garnetoid. *Spencer 16, M.M., 1943.*

hydrogen. a. A diatomic (H_2) gaseous element; colorless; odorless; tasteless; flammable; and lighter than any other known substance. Has both nonmetallic and metallic properties and a valence of 1. Widely distributed on earth as water, in many minerals, in petroleum, and in living matter. Manufactured by heating water with iron at 100 atmospheres pressure, from water gas, and by the electrolysis of caustic soda solution. Used in the oxyhydrogen blowpipe, for filling balloons, in the Haber process for the fixation of nitrogen, and in the hardening of fats (for example, in the manufacture of margarine). Symbol, H; atomic number, 1; atomic weight, 1.008; and density of gas, 0.0899 gram per liter. *Fay; C.T.D.* b. H_2; lightest of all gases; isometric when solid; molecular weight, 2.0159; melting point, —259.14° C; boiling point, —252.8° C; specific gravity of liquid, 0.070 (at —252° C); and soluble in water and in alcohol. Occurs uncombined in the earth's atmosphere only to the extent of less than one part per million by volume. Hydrogen is the most abundant of all elements in the universe; constitutes more than 90 percent of all atoms; and about 75 percent of the mass of the universe. All the heavier elements may have been formed from hydrogen and helium and perhaps are still being formed from these two lightest elements. The two rare isotopes of hydrogen are hydrogen 2 (deuterium) and hydrogen 3 (tritium). Deuterium occurs naturally as 0.015 percent of all hydrogen, and tritium is radioactive with a half-life of 12.26 years. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-6, B-114, B-178.*

hydrogenation. Form of reduction in which hydrogen, in its gaseous form, is caused to react with a substance in the presence of a catalyst at high pressure. *Bennett 2d, 1962.*

hydrogenation of coal. *See* coal liquefaction.

hydrogen autunite. Artificial base-exchange product, $HUO_2PO_4.4H_2O$; tetragonal. *Spencer 21, M.M., 1958.*

hydrogen bomb. A nuclear weapon that derives its energy largely from nuclear fusion. *L&L.*

hydrogen bond. Type of bond formed when an H-atom can move from its attachment to an atom of one molecule to that of another under the influence of resonance energy only between two electrons. The loose linkage thus produced, typically occurring in water, does not require marked ionization. *Pryor, 3.*

hydrogen brazing. Brazing in a hydrogen atmosphere, usually in a furnace. *ASM Gloss.*

hydrogen carboxylic acid. *See* formic acid. *CCD 6d, 1961.*

hydrogen chloride. *See* hydrochloric acid. *CCD 6d, 1961.*

hydrogen embrittlement. A condition of low ductility in metals resulting from the absorption of hydrogen. *ASM Gloss.*

hydrogen equivalent. Acidity of an acid as defined by the number of reacting H-atoms per molecule; alkalinity of a base in terms of reacting hydroxyls per molecule. *Pryor, 3.*

hydrogen fluoride indicator. This instrument utilizes an aspirator bulb to draw air across a filter paper which is impregnated with a chemical reagent. The hydrogen fluoride-reagent reaction produces a pink color which can be compared with color standards. Concentrations can be determined in the range of from 0.5 to 5 parts per million (ppm). *Bests, p. 586.*

hydrogenic deposits. Precipitates from solution in water. *A.G.I.*

hydrogen ion. The stripped (naked) proton of hydrogen, H^+, or the proton combined with 1 or more molecules of water, as H_3O^+ or $H(H_2O)^+$. The latter is sometimes called oxonium, hydroxonium, or hydronium ion. H^+ is usually spoken of as the proton. H-ion concentration is the pH value. *Pryor, 3.*

hydrogen-ion concentration. A measure of the degree of acidity or alkalinity of a solution, commonly expressed in terms of pH; pH being the negative logarithm (to the base 10) of the hydrogen-ion concentration expressed in mols per liter. A perfectly neutral solution will have a pH of approximately 7.0. Basic solutions have pH values ranging from slightly more than 7 for slight basicity to above 14 for the strongest basicity. Acid solutions range from slightly less than 7 for slight acidity to around 0 for the strongest acidity. *Brantly, 1.*

hydrogen loss. In powder metallurgy, the loss in weight of metal powder or of a compact caused by heating a representative sample for a specified time and temperature in a hydrogen atmsophere. Broadly, a measure of the oxygen content of the sample, when applied to materials containing only such oxides as are reducible with hydrogen and no hydride-forming element. *ASM Gloss.*

hydrogen monitor. A device that offers continuous and automatic analysis of hydrogen concentrations in mixtures with air or hydrocarbons. The hydrogen and air sample is catalytically oxidized in a thermally isolated reaction chamber. The heat of the oxidation produces a temperature differential which is converted to a reading of the hydrogen concentration in the sample. *Bests, p. 586.*

hydrogenous. Formed or produced by water; applied to rocks formed by the action of water, in contradistinction to pyrogenous rocks, or rocks formed by the action of heat. *Fay.*

hydrogenous coal. a. Coal high in volatile matter, for example, gas coal or sapropelic coal. *Tomkeieff, 1954.* b. Aust. Coals containing a large quantity of moisture, for example, brown coal. *Fay.*

hydrogen-reduced powder. In powder metallurgy, powder produced by the hydrogen reduction of a compound. *ASM Gloss.*

hydrogen sulfide. Colorless; flammable; gas; H_2S; molecular weight, 34.08; density, 1.539 grams per liter (at 0° C); melting point, −85.5° C; boiling point, −60.7° C; and soluble in water, in alcohol, and in carbon disulfide. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-179.* May be prepared by the direct combination of the two elements, hydrogen and sulfur, or by the action of dilute hydrochloric or sulfuric acid on iron sulfide. It is readily decomposed. Reacts with bases forming sulfides and with some metals to produce metal sulfides and to liberate hydrogen. Poisonous. *C.T.D.*

hydrogen sulfide indicator. Portable equipment, manual or automatic, for the detection of highly toxic hydrogen sulfide is necessary for the safety of workmen in mining and industrial processes involving natural gas, gypsum, or sulfur, in iron and steel mills, sewage disposal, etc. The manual unit consists of chemical-filled detector tubes and a frame holder with aspirator bulb or pump. The length of tube discoloation indicates the amount of hydrogen sulfide in the atmosphere. The automatic detector utilizes lead acetate sensitized material and provides a permanent record that is read with a photoelectric instrument. *Bests, p. 586.*

hydrogen treating process. A method, (introduced by J. H. Healy and J. D. Sullivan) for the preparation of sheet steel for vitreous enameling by first driving hydrogen into the surface of the steel (this is effected electrolytically) and then removing the hydrogen by immersion of the steel in boiling water. *Dodd.*

hydrogen uranospinite. A secondary uranium mineral, $H_2(UO_2)(AsO_4)_2.8H_2O$. *American Mineralogist, v. 41, No. 9-10, September-October 1956, p. 816.*

hydrogeochemical prospecting. Synonymous with geochemical water survey. *Hawkes.*

hydrograph. A graph to show the level, flow, or velocity of water in a river or channel at all seasons of the year, essential when designing a hydroelectric scheme. It is usual to make a 10-year study for this. *Ham.*

hydrographer. A person in charge of the measurements of discharge, precipitation, runoff, etc. *Seelye, 1.*

hydrography. In water surveys, the art of measuring, recording, and analyzing the flow of water; also, measuring and mapping watercourses, shorelines, and navigable waters. *See also* hydrometry. *Seelye, 1.*

hydrogrossular. For members of the series $3CaO.A1_2O_3.3SiO_2 3CaO.A1_2O_3.6H_2O$ between grossular and hibschite (= plazolite, $3CaO.A1_2O_3.2SiO_2.2H_2O$). *Compare* garnetoid; grossularoid; hydrogarnet. *Spencer 17, M.M., 1946.*

hydrohalite. A well-defined hydrate, $NaCl.2H_2O$, that occurs naturally and is stable at or below 0° C. Synonym for maakite. *Hey 2d, 1955.*

hydrohalloysite. A hydrated halloysite, $A1_2O_3.2SiO_2.4H_2O$. *S. B. Hendricks, 1938. Spencer 15, M.M., 1940.*

hydrohematite. A mineral, $Fe_2O_3.nH_2O$, probably a mixture of the two minerals, haematite and goethite, the former being in excess. It is fibrous and red in mass, with an orange tint when powdered. Also called turgite. *C.M.D.*

hydroherderite. Herderite containing hydroxyl in place of fluorine, $Ca[Be(OH)]PO_4$. From Paris, France; Hebron, Me. *English.*

hydrohetaerolite. A black hydrous oxide of zinc and manganese, $2ZnO.2Mn_2O_3.H_2O$. Tetragonal. Botryoidal. From Ogdensburg, N.J.; Leadville, Colo. Also called wolftonite. *English.*

Hydroids. Slender-stalked marine Coelenterates which attach to submerged surfaces and superficially resemble plants. They range from tropic to northern waters. *Hy.*

hydrokaolin. A fibrous form of kaolinite from Saglik, Transcaucasia, U.S.S.R. *English.*

Hydrolin. Trademark for an ammonium nitrate base blasting agent which requires specially constructed primers for detonation. Used for seismic prospecting at sea. *CCD 6d, 1961.*

hydrolite. Same as enhydros. *Shipley.*

hydrolith. Proposed by Grabau for an aqueochemically precipitated rock (rock salt, gypsum, etc.). *A.G.I.*

hydrologic cycle. The complete cycle of phenomena through which water passes, commencing as atmospheric water vapor, passing into liquid and solid form as precipitation, thence along or into the ground surface, and finally again returning to the form of atmospheric water vapor through evaporation and transpiration. Also called the water cycle. *A.G.I.*

hydrologist. One who studies distribution, development, and disposition of the waters of land areas, including the form and intensity of precipitation and the modes of return to the ocean and the atmosphere; maps and charts water flow and the disposition of sediment; measures the changes in water volume caused by the evaporation and melting of snow; studies storm occurrences, the nature and movement of glaciers, and determines the rate of ground absorption and the ultimate disposition of water. *D.O.T. 1.*

hydrology. The science dealing with water standing or flowing on or beneath the surface of the earth. *Fay.*

hydrolysate; hydrolyzate. A sediment consisting partly of chemically undecomposed, finely ground rock powder and partly of insoluble matter derived from hydrolytic decomposition during weathering. It includes bauxites, clays, shales, etc. *A.G.I.*

hydrolysis. a. The formation of an acid and a base from a salt by interaction with water. It is caused by the ionic dissociation of water. *C.T.D.* b. The decomposition of organic compounds by interaction with water; either cold, or on heating alone, or in the presence of acids or alkalies. *C.T.D.*

hydrolyze. To subject to or undergo hydrolysis. *Webster 3d.*

hydromagnesite. A white, hydrous, magnesium carbonate that is earthy and chalklike. *Fay.*

hydromechanics. The mechanics of fluids, including hydrostatics, hydrodynamics, hydrokinetics, and pneumatics. *Standard, 1964.*

hydromechanization. A term applied to hydraulic methods of excavating and transporting coal and other products underground. *See also* hydraulic extraction; hydraulic flume transport; hydraulic loading; hydraulic mining; hydraulic pipe transport; hydraulicking. *Nelson.*

hydrometallurgy. The treatment of ores, concentrates, and other metal-bearing materials by wet processes, usually involving the solution of some component, and its subsequent recovery from the solution. *E.C.T., v. 8, p. 937.*

hydrometamorphism. a. Metamorphism of rocks produced by water and heat at low pressure and temperature. Contrasted with pyrometamorphism. *Standard, 1964.* b. The alteration of rocks by the addition, subtraction, or exchange of material brought or carried in solution by water without the influence of high temperature or pressure. *A.G.I.*

hydrometasomation. Metasomatic alteration of rocks through hydrothermal agencies. *Schieferdecker.*

hydrometer. An instrument used for determining the density or specific gravity of fluids, such as drilling mud or oil, by the principle of buoyancy. The instrument is in the form of a glass tube, which is floated in the fluid and sinks to a greater or lesser depth depending on the density of the fluid, the amount of submergence being indicated by gradations or divisions on the stem of the instrument. These divisions vary according to various systems, and may be marked according to the Baumé or Twaddell specific-gravity system or measurements. *See also* Marsh funnel; specific-gravity hydrometer; Twaddell hydrometer. *Long.*

hydrometer method. The method employed by the U.S. Bureau of Mines for the determination of the apparent specific gravity of coal and coke. The apparatus employed consists of a brass hydrometer immersed in a galvanized iron cylinder filled with water to a waterline. There are two copper pans on the top of the hydrometer, the upper one being used for weights and the lower pan for the sample. Suspended from the lower pan is an airtight copper buoy, and below this is a well-perforated brass cage which allows the air to escape freely. This cage carries the sample when it is weighted in water. *Kentucky, p. 401.*

hydrometrograph. An instrument for determining and recording the quantity of water discharged from a pipe, orifice, etc., in a given time. *Osborne.*

hydrometry. The measurement and analysis of the flow of water. *Seelye, 1.*

hydromica. *See* illite.

hydromica schist. A field term that has been used extensively in the Eastern United States for finely micaceous schists in which the micaceous mineral is sericite, paragonite, or some other mineral of similiar appearance. *Hess.*

hydrominium ion. Solvated H-ion, $(H_2O)H^+$ or H_3O^+. *Pryor, 3.*

hydromorphic anomaly. An anomaly where the dynamic agents are aqueous solutions. *Hawkes, 2, p. 144.*

hydromorphic soil; ground-water soil. An intrazonal soil resulting from impeded drainage. The common distinguishing features are: a grayish to black surface horizon grading sharply into a pale, bluish-gray subsoil often with rusty streaks, mottling, or concretions. *Hawkes, 2, p. 109.*

hydromuscovite. A variety of muscovite with a higher OH, lower potassium, or potassium and aluminum than muscovite. A member of the mica family. *Hey 2d, 1955.*

hydronauts. Name applied to the sea pioneers of today. Particularly those who go in for deep-sea exploration. *Hy.*

hydronium jarosite. A mineral of the jarosite family from Staszic mine, Holy Cross Mountain, Poland; contains only 0.21 percent sodium and potassium to 3 percent iron. The author considers the name carphosiderite inappropriate since A. A. Moss has shown that the original carphosiderate and many occurrences subsequently described as carphosiderite are in fact jarosite or natrojarosite. On the other hand, the name carphosiderite is widely accepted for the artificial material. *Hey, M.M., 1961.*

hydroparagonite. An unnecessary new name for brammallite. *Hey, M.M., 1961.*

hydrophane. A variety of common opal which becomes more translucent or transparent in water. *Fay.*

hydrophilic. *a.* Of, relating to, having, or denoting a strong affinity for water. *Webster 3d.* b. Applied to such easily dispersed colloidal clay minerals as montmorillonite that swell in water as the result of water attraction and hydration and which are not easily coagulated. *Bureau of Mines Staff.* c. Substance which is attracted to a water phase rather than to air in an air-water interphase. A group tending to bind water is hydrophilic (opposite of hydrophobic). The hydroxyl (OH) groups in hydroxides are typical and their hydrophilic solutions in water are hydrosols. *See also* lyophilic. *Pryor, 3.*

hydrophilite. Calcium chloride, $CaCl_2$, in white cubic crystals, or as an incrustation at Vesuvius, Italy. Same as chlorocalcite. *Fay.*

hydrophlogopite. A phlogopite containing less alkalies and more loosely combined water than normal phlogopite. From Ceylon. *English.*

hydrophobe. *See* suspensoid. *Bennett 2d, 1962.*

hydrophobic. a. Lacking a strong affinity for water. Opposite of hydrophilic. *Webster 3d.* b. Applied to water-repelling substances and surfaces and to easily coagulated colloids. *Bureau of Mines Staff.*

hydrophone. An underwater microphone. *Hy.*

hydrophone loss. The hydrophone loss of a sonar transducer, used at a specified frequency for the reception of acoustic energy, may be defined as the transmission loss measured by the ratio of (1) the source power of the free-field acoustic energy available as plane sinusoidal waves from a water surface having an area of one square centimeter and lying perpendicular to the direction of the maximum response reference axis of the transducer at the point to be occupied by its effective center to (2) the resulting output power of the electric energy available from the transducer. *Hy.*

hydrophore. An instrument for obtaining specimens of water from any desired depth, as in a river, lake, or ocean. *Osborne.*

hydrophotometer. A sensitive instrument used in water transparency and light absorption measurements at sea. The instrument, which contains its own light source, can measure fine graduations of transparency of an individual water mass. *H&G.*

hydroplutonic; aqueoigneous. Relating to or produced by the joint action of heat and water, resulting in fusion or in crystallization at a lower temperature than by heat alone. *Standard, 1964.*

hydropneumatic. Relating to or produced or worked by the combined action of water and air or gas. *Standard, 1964.*

hydropneumatic riveter. A squeeze riveter operated by compressed air and having a piston of two different diameters. *Ham.*

hydroscarbroite. A more highly hydrated phase than scarbroite, $Al_2(CO_3)_3.12Al(OH)_3$, occurring along with scarbroite at South Bay, Scarborough, and dehydrating irreversibly on exposure to air. *Hey, M.M., 1961.*

hydroscope. An instrument for detecting moisture, especially in the air. *Standard, 1964.*

hydroseparator. Essentially, a shallow tank, usually cylindrical, which is kept agitated by hydraulic water and/or stirring devices. Pulp fed to the tank is separately discharged as a free-settling fraction containing the coarser and heavier particles and an overflowing fraction containing the finer, lighter material. *Pryor, 3.*

hydroserpentine. A mineral, $Mg_6Si_4O_{10}(OH)_8.nH_2O$; a swelling serpentine. *Hey, M.M., 1961.*

hydrosilicarenyte. A water-laid deposit of pure quartz sandstone with varieties caused by simple admixtures. *A.G.I.*

hydrosizer; elutriator. Hydraulic classifier. *Pryor, 3.*

hydrosol. A colloidal solution in water. *Bateman.*

hydrosphere. The aqueous envelope of the earth, including the ocean, all lakes, streams, and underground waters, and the water vapor in the atmosphere. *Schieferdecker.*

hydrostat. A contrivance or apparatus to prevent the explosion of steam boilers. *Webster 2d.*

hydrostatic. Relating to pressure or equilibrium of fluids. *Nichols.*

hydrostatic balance. A balance for weighing a substance in water to ascertain its specific gravity. *Webster 3d.*

hydrostatic head. The pressure exerted by a column of fluid usually expressed in pounds per square inch. *Brantly, 1.*

hydrostatic joint. Used in large water mains, in which sheet lead is forced tightly into the bell of a pipe by means of the hydrostatic pressure of a liquid. *Strock, 3.*

hydrostatic press. A large ram, the surface of which is acted on by liquid in contact with a small ram. *See also* hydraulic jack. *Ham.*

hydrostatic pressure. a. The pressure of, or corresponding to, the weight of a column of water at rest. *Bateman.* b. The pressure in a liquid under static conditions; the product of the unit weight of the liquid and the difference in elevation between the given point and the free-water elevation. *See also* excess hydrostatic pressure; hydrostatic excess pressure. *ASCE P1826.* c. The pressure developed by a liquid within a liquid-saturated, porous, or crevassed rock. The hydrostatic pressure of the liquid in a saturated porous rock, as measured at the bottom of a borehole, generally is approximately equal to the hydraulic head developed by a vertical column of water as high as the depth of the borehole measured downward from the water table. *See also* hydraulic head, b. *Long.*

hydrostatic roller conveyor. A section of roller conveyor having rolls suitably weighted with liqiud to control the velocity of the moving objects. *See also* roller conveyor. *ASA MH4.1-1958.*

hydrostatics. A branch of physics that deals with the characteristics of fluids at rest and especially with the pressure in a fluid or exerted by a fluid on an immersed body. *Compare* hydrodynamics. *Webster 3d.*

hydrostatic stress. A state of fluidity or semifluidity wherein the stresses at a point are equal because the material lacks shear strength. *Woodruff, v. 1, p. 94.*

hydrostatic tension. Three equal and mutually perpendicular tensile stresses. *ASM Gloss.*

hydrostatic test. On a boiler, the closing of all openings and pumping water into the boiler at a pressure (such as 50 percent) greater than the normal operating pressure. The purpose is to locate leaks or prove that there are no leaks. *Strock, 10.*

hydrostatic weighing. Weighing of a substance first in air, then in water. The specific gravity is then obtained by dividing the weight in air by the difference between the weights. *Shipley.*

hydrosulfides. Sulfhydrates, thiocompounds which contain a sulfur-hydrogen (SH^-) radical. *Pryor, 3.*

hydrosulfuric acid. Hydrogen sulfide. *Webster 3d.*

hydrotalcite. A carbonate of aluminum, $3[Mg_6Al_2CO_3(OH)_{16}.4H_2O]$. *Hey 2d, 1955.*

hydrotasimeter. An electrically operated apparatus showing at a distance the exact level of water, as in a reservoir; an electric high- and low-water indicator. *Standard, 1964.*

hydrotator. A coal washer of the classifier type whose agitator or rotator consists of hollow arms radiating from a central distributing manifold or center head. There may be four or more of these radiating arms, each with one or more downwardly inclined nozzles. When water is discharged from these nozzles, the impulse has the effect of rotating the agitator in a manner similar to the well-known lawn sprinkler. This agitator is suspended in a cylindrical tank and water is pumped through it under pressure, thereby creating a controlled upward current uniform over the entire area of the tank. *Mitchell, pp. 301-302.*

hydrothermal. Applied to magmatic emanations high in water content; the processes in which they are concerned; and the rocks or ore deposits, alteration products, and springs produced by them. *Holmes, 1928.*

hydrothermal alteration. The mineralogical changes resulting from the interaction of hydrothermal-stage fluids (hydrothermal solutions) with preexisting minerals, such as the kaolinization of feldspars, etc. Also changes in rocks resulting from the addition or removal of minerals by means of hydrothermal fluids, for example, silicification. *A.G.I.*

hydrothermal deposit. A mineral deposit that originated from hot, ascending solutions derived from a magma. *Schieferdecker.*

hydrothermal ore deposits. Those deposited from aqueous solution during the final consolidation of an ore magma. *Pryor, 3.*

hydrothermal solution. A hot-water solution originating within the earth and carrying dissolved mineral substances. *Bateman.*

hydrothermal stage. One of the successive stages of consolidations of magma during which equilibrium exists between crystals, aqueous solutions, and aqueous gases. *Schieferdecker.*

hydrothermal synthesis. Mineral synthesis in the presence of water at elevated temperatures. *A.G.I. Supp.*

hydrotungstite. A hydrous tungstic oxide, $WO_3.2H_2O$, similar in appearance but distinct from tungstite ($WO_3.H_2O$); from Oruro, Bolivia. *Spencer 16, M.M., 1943.*

hydrous. a. Containing water; watery; specifically, hydrated. *Webster 3d.* b. Minerals which contain water chemically combined. *Gordon.*

hydrous aluminum oxide. *See* aluminum hydroxide, gelatinous. *CCD 6d, 1961.*

hydrous oxide. An oxide of a metal containing combined water. *Bateman.*

hydrous salts. Salts containing water of crystallization. *Fay.*

Hydrox. A permitted device, used in some English coal mines, that resembles Cardox in that a steel cylinder with a thin shearing disk is used. However, the charge is not liquid carbon dioxide but a powder composed chiefly of ammonium chloride and sodium nitrate. It is proportioned to give water, nitrogen, and salt as the products of combustion. On being ignited this powder is gasified and shears the steel disk, the gas escaping into the hole. *Lewis, p. 115.*

hydroxide. A compound of an element with the radical or anion, OH; for example, sodium hydroxide, NaOH. *Fay.*

hydroxonium ion. *See* hydrominium ion. *Pryor, 3.*

Hydrox steel tube. An alternative to explosives for breaking down coal in safety lamp mines. The gasification of the Hydrox charge generates sufficient pressure within the shothole to break down the coal. The original plastic disc attached to the charge has been replaced by a metal disc separately seated. The gaseous products from the Hydrox charge are mainly carbon dioxide, nitrogen, and water vapor. The tubes can be recharged underground. The method gives a high yield of +2 inches in size of coal. *Nelson.*

hydroxy amphibole. An amphibole with the formula, $(OH)_2R''_7(Si_4O_{11})_2$. *English.*

hydroxyl. OH; the characteristic radical of bases, consisting of one atom of hydrogen and one atom of oxygen. The valence of this radical or anion is —1. *Crispin.*

hydroxylannite. Normal annite, but so named to call attention to the difference between it and fluorannite. *English.*

hydroxylapatite. A variant of hydroxyapatite, $3Ca_3P_2O_8.Ca(OH)_2$. *Spencer 15, M.M., 1940.*

hydroxyl herderite. The same as hydroherderite of S. L. Penfield, 1894. *Spencer 19, M.M., 1952.*

hydroxyl ion. Monovalent group, OH^-, negatively ionized, which occurs in excess in basic (alkaline) solution and is complementary to the concentration of hydrogen ion in acid solutions. *Pryor, 3.*

hydrozincite; zinc bloom. A natural basic carbonate of zinc, $Zn_5(OH)_6(CO_3)_2$; found in the upper zones of zinc deposits; color, white to gray or yellowish; luster, dull to silky; fluorescent in ultraviolet light; specific gravity, 3.5 to 4.0; and Mohs' hardness, 2.0 to 2.5. Found in Missouri, Pennsylvania, Utah, California, Nevada; and in Europe. An ore of zinc. *CCD 6d, 1961.*

hygrometer. Any of several instruments for measuring the humidity of the atmosphere. *See also* psychrometer. *Webster 3d.*

hygrometry. Measurement of atmospheric humidity. *Pryor, 3.*

hygroscopic. Having the property of readily absorbing moisture from the atmosphere. *Fay.* For example, calcium chloride crystals possess this property to a high degree. *Bureau of Mines Staff.*

hygroscopic coefficient; hygroscopic capacity. The ratio, at a given temperature, of the weight of water which at that temperature the soil will absorb if, after complete drying, it is placed in free contact with a saturated atmosphere until equilibrium is established, to the weight of the soil when dry. This ratio is expressed as a percentage. *A.G.I.*

hygroscopic moisture. Water held in the soil in equilibrium with atmospheric water vapor at the ground surface. *Stokes and Varnes, 1955.*

hygroscopic water. Moisture in a brick which comes from the humidity of the air and which may be removed by simple drying. *ACSG, 1963.*

hygroscopic water content. The water content of an air-dried soil. *ASCE P1826.*

hygrostat. A device sensitive to humidity changes and arranged to actuate other equipments when a predetermined humidity is attained. *Strock, 10.*

Hymag. Short-fiber asbestos. *Bennett 2d, 1962.*

hypabyssal. Applied to minor intrusions, such as sills and dikes and to the rocks that compose them, that crystallized at intermediate depths between the plutonic and extrusive rocks, being distinguishable from these types in some instances by texture and in other instances only by the mode of occurrence. *A.G.I.*

hypabyssal rock. An igneous rock that has risen from the depths as magma but solidified mainly as such minor intrusions as dikes and sills beneath the surface. *A.G.I. Supp.*

hypautochthony. This term applies to remains of plants which no longer occur in the exact place but still lie within the same general region of their growth (for instance in a peat bog, lying within the limits of a wider territory in which they grew). *IHCP, 1963, part I.*

hypautomorphic. Same as hypidiomorhphic; subhedral. *Fay.*

hyper-. A prefix from the Greek meaning over, above, or abnormally great. *A.G.I. Supp.*

hypereutectic alloy. Any binary alloy whose composition lies to the right of the eutectic on an equilibrium diagram, and which contains some eutectic structure. *ASM Gloss.*

hypereutectoid. Analogous to hypereutectic. *ASM Gloss.*

hypereutectoid steel. Steel with more carbon than is contained in pearlite. In carbon steels, a steel containing more than 0.9 percent carbon. *C.T.D.*

hyperfusible. Proposed by Bowen to apply to those materials found in end-stage magmatic fluids that aid in lowering the melting-point range. The term hyperfusible components is usually shortened to hyperfusibles, and is used more or less synonymously with fugitive constituents. *A.G.I.*

hyperglyph. A hieroglyph formed during weathering. *Pettijohn.*

hypergolic ignition. Autoignition at ambient temperature and pressure. *I.C. 8137, 1963, p. 76.*

hyperite. A plutonic igneous rock composed essentially of calcic plagioclase, augite, hypersthene, and olivine. An olivine-bearing norite. *A.G.I.*

hypermelanic. Applied to igneous rocks consisting entirely, or almost entirely, of mafic minerals; color index—90 to 100. *A.G.I. Supp.*

hypernik. An iron-nickel magnetic alloy of the Permalloy type containing 50 percent of each metal; it is melted and annealed in hydrogen, which increases the initial and maximum permeabilities. *C.T.D.*

hyperon. A class of short-lived elementary nuclear particles with masses greater than that of the neutron. *L&L.*

hyperphoric. The change in a rock by the introduction of a new mineral into, or the removal wholly or in part of an old mineral from the original rock mass, for example, dolomitization of limestone. *Fay.*

hypersthene. A translucent to opaque, dark green or brown to black mineral, $(FeMg)SiO_3$, often exhibiting a metallic schiller. Orthorhombic. Mohs' hardness, 5 to 6; specific gravity, 3.3 to 3.5 refractive index, 1.67 to 1.68 and 1.72 to 1.73; birefringence, 0.010 to 0.016. *Shipley.*

hypersthenite. a. A rock composed entirely, or almost entirely, of hypersthene. *Holmes, 1920.* b. A feldspar-free rock composed essentially of hypersthene. *A.G.I. Supp.*

hyperventilation. A term applied to breathing more than is necessary to keep the body's carbon dioxide tensions at the proper level. If carried to an extreme, hyperventilation can be as undesirable and dangerous as conditions involving interference with breathing. *H&G.*

hypidiomorphic. Same as subhedral. *Fay.*

hypidiomorphic granular. The texture of igneous rocks in which some of the constituents are euhedral, some are subhedral, and the rest are anhedral. This texture is well exemplified by most granites and is also called granitic. *Schieferdecker.*

hypidiomorphic texture. A texture of igneous rocks in which the greater proportion of the crystallized minerals have subhedral forms. *Hess.*

hypnum peat. Peat composed mostly of disintegrated plants of hypnum, often associated with other mosses and with intermingled rootlets of sedges and other flowing plants. It is formed chiefly in areas where the ground is only slightly acid, neutral, or slightly alkaline; it is brownish or drab, light, spongy, and matted, and often laminated and porous. *BuMines Bull. 556, 1956, p. 446.*

hypo-. A prefix from the Greek hypo meaning under, beneath, down, less than normal or normally. *Webster, 3d.*

hypobatholithic. Pertaining to the sixth (and final) stage in the erosion of a batholith; practically all the roof pendants have been eroded away. *See also* cryptobatholithic. *A.G.I.*

hypobatholithic deposit. A mineral deposit found in a deeply eroded mass of eruptive rock with few roof pendants remaining. *Schieferdecker.*

hypocenter. The subterranean source of the earthquake, also the center of the subterranean area in which the energy of the earthquake is supposed to be concentrated. Comparable to the center of gravity of a mass. *Schieferdecker.*

hypochlorite of lime. *See* calcium hypochlorite. *Bennett 2d, 1962.*

hypocrystalline. Partly crystalline; the texture of some igneous rocks which consists partly of crystallized minerals and partly of glass; same as hypohyaline. *Fay.*

hypocrystalline porphyritic. Originated by Rosenbusch for the texture of porphyritic rocks having a hypocrystalline groundmass. *Johannsen, v. 1, 2d, 1939, p. 218.*

hypoeutectic alloy. Any binary alloy whose composition lies to the left of the eutectic on an equilibrium diagram, and which contains some eutectic structure. *ASM Gloss.*

hypoeutectoid. Analogous to hypoeutectic. *ASM Gloss.*

hypoeutectoid steel. Steel with less carbon than is contained in pearlite, that is, the iron-cementite eutectoid. In carbon steels, a steel containing less than 0.9 percent carbon. *C.T.D.*

hypogeic. Pertaining to or derived from crustal and interior movements in the earth; for example, the hypogeic work of mountain making. *Standard, 1964.*

hypogene. a. Used by Lyell as a group name for plutonic and metamorphic classes of rocks. *A.G.I.* b. Used by Geikie for geologic processes originating within the earth. *A.G.I.* c. Applied to mineral deposits or ore deposits formed by ascending hot waters. Contrasted with supergene. *A.G.I.*

hypogene ore. Ore deposited from ascending hydrothermal solutions of magmatic origin. *Schieferdecker.*

hypogene relief. Includes the major and many minor landforms of the continental platforms and ocean basins, such as certain types of plains and plateaus; the great mountain ranges, chains, and systems; many isolated mountains and hills; and the great foredeeps or troughs of the suboceanic floor. Deformation of the crust and igenous activity, called hypogene agents, working below the surface of the earth, are the only or the dominant agents responsible for the development of the features. *Stokes and Varnes, 1955.*

hypogene rock. A rock that was formed deep within the earth under the influence of heat and pressure. *Hess.*

hypogene water. Hot water rising from considerable depth and which is genetically associated with a congealing magma. *Schieferdecker.*

hypogene zone. The zone of primary ore beneath the shallow zones affected by the weathering processes. *Bateman.*

hypoglyphs. A hieroglyph on base of bed. *Pettijohn.*

hypohyaline. Partly glassy. *See also* hyprocrystalline. *Fay.*

hypoid. A pinion-and-ring gear set transmitting rotation through a right angle by means of teeth having structure intermediate between a bevel and a worn set. *Nichols.*

hypothermal deposit. a. A hydrothermal deposit formed at high temperatures and pressures. *Bateman.* b. A deposit originating at relatively high temperatures (300° to 500° C). *A.G.I.* c. A deposit formed at high temperatures and pressures in and along openings in rocks by deposition from fluids derived from consolidating igneous rocks. *A.G.I.*

hypothermal ore deposit. Deposit formed by hot ascending solutions at great depth or at high temperature and pressure. *McKinstry.*

hypothesis. When an idea is first put forward, and is still in the argument and objection stage, it is called a hypothesis; later, if proved or generally accepted, it becomes a theory of law. *Cooper.*

hypses. Hydrographic precision scanning echo sounder. An improved instrument for conducting bathymetric surveys in deep oceanic areas. *Hy.*

hypsometer. An instrument for measuring the elevation above sea level by determining the atmospheric pressure through observing the boiling point of water. *Standard, 1964.*

hypsometric map. Any map showing the elevation above sea level and the topographic relief by means of contours, hachures, or shading. *Stokes and Varnes, 1955.*

hypsometric tints. Colors on maps to indicate various elevations. *Bureau of Mines Staff.*

hypsometry. The art of determining, by any method, surface elevations on the earth with reference to sea level. *A.G.I.*

hysil. A borosilicate glass of high thermal endurance and chemical resistance used for chemical ware. *Dodd.*

Hyslop plasticity diagram. A diagram relating the extensibility (E) of a clay, as determined by a penetration method, to its softness (S); the relationship is of the form $E=KS^n$, where K and n are constants. *Dodd.*

hysteresis. a. A lag in the return of an elastically deformed specimen to its original shape after the load has been released. *A.G.I.* b. An effect, involving energy loss, found to varying degrees in magnetic, electric, and elastic media when they are subjected to variation by a cyclical applied force. In such media the polarization or stress is not a single valued function of the applied force or, stated in another way, the state of the medium depends on its previous history as well as the instantaneous value of the applied force. May be visualized as resulting from some kind of internal friction. *A.G.I.*

hysteresis loop. Entire pattern of magnetization showing how a body with magnetic susceptibility can remain polarized after the disappearance of the original magnetizing force. *Bureau of Mines Staff.*

hysteretic repulsion. Separation by alternating current which depends on magnetic properties of coersive force and remanence. *Bureau of Mines Staff.*

hysterobase. Applied by Lassen to the rock of a series of dikes related to the diabases but differing from them in often having quartz, brown biotite, and brown hornblende, the last mineral sometimes replacing the augite. There may also be some glass. *Fay.*

hysterocrystalline. Proposed by Naumann and applied to minerals in igneous rocks that are the product of secondary crystallization. Obsolete. *A.G.I.*

hysterogenite. Posepny's term for a mineral deposit derived from the debris of other rocks. The term means of secondary or later formation. *Compare* idiogenite; xenogenite. *Fay.*

hysteromorphous. Applied to secondary deposits due to surface agencies. *Fay.*

I

i a. Symbol for the instantaneous value of electric current in amperes. *Zimmerman, p. 32.* b. Symbol for enthalpy (heat content) per unit weight. *Zimmerman, p. 42.* c. Symbol for typical ionic species. *Zimmerman, p. 172.* d. Symbol for vapor pressure constant. *Zimmerman, p. 115.* e. Abbreviation for iron. *Zimmerman, p. 59.* f. As subscript symbol for inner. *Zimmerman, p. 193.* g. Abbreviation for internal. *Webster 3d.* h. As a subscript, the symbol for initial; initial value. *Zimmerman, p. 378.* i. Abbreviation for insoluble. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-74.* j. Abbreviation for instantaneous. *Webster 3d.* k. As a subscript, the symbol for induced. *Zimmerman, pp. 57, 378.* l. Symbol for optically inactive. *Zimmerman, p. 77.* m. Abbreviation for incendiary, incomplete, independent, industrial, institution, institute, instrumental, international. *Webster 3d.* n. Symbol for Van't Hoff factor. *Zimmerman, p. 115.* o. Symbol for a unit vector in the x direction or parallel to the x axis. *Zimmerman, p. 166.* p. Abbreviation for inclination. *Zimmerman, p. 501.*

i a. Symbol for instantaneous electric current; instantaneous value of electric current in amperes. *Zimmerman, pp. 153, 255.* b. Symbol for enthalpy (heat content) per unit weight. *Zimmerman, p. 145.* c. Symbol for the angle of incidence or the angle between the ray and the normal in the first medium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99.* d. Symbol for vapor pressure constant. *Zimmerman, p. 166.* e. Symbol for the square root of −1 (minus 1), which is variously designated the imaginary number, the imaginary unit; the right-angle turning operator; vector turning operator. *Zimmerman, pp. 158, 164, 165.* f. Symbol for mole factor; for Van't Hoff factor; Van't Hoff coefficient. *Zimmerman, p. 160.*

***i*-** a. Abbreviated prefix meaning inactive and optically inactive; for example, *i*-inositol is an optically inactive inositol isomer. *CCD 6d, 1961.* b. Abbreviated prefix for the combining forms is- and iso-, either of which denotes an isomer of a compound and specifically an isomer having a single, simple branching at the end of a straight chain. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-74.*

I a. Chemical symbol for iodine. *Zimmerman, p. 144.* b. Symbol for the intensity of light; luminous intensity; luminous intensity in candlepower; candlepower. *Zimmerman, pp. 58, 65, 190.* c. Symbol for electric current in amperes. *Zimmerman, p. 32.* d. Symbol for moment of inertia; rectangular moment of inertia. *Zimmerman, pp. 57, 90.* e. Symbol for imaginary unit. *Webster 3d.* f. Symbol for ionic strength. *Zimmerman, p. 59.* g. Symbol for sound intensity; sound-energy flux density; level of intensity in acoustics. *Zimmerman, pp. 58, 99.* h. Abbreviation for intensity. Also abbreviated i. *Bureau of Mines Staff.* i. Roman numeral 1. *Zimmerman, p. 128.* j. Abbreviation for iron. *Zimmerman, p. 205.* k. Abbreviation for inside. *Zimmerman, p. 193.* l. Abbreviation for island; Island. *Zimmerman, p. 339.* m. Abbreviation for imperial; Imperial; Inspector. *Webster 3d.*

I a. Symbol for intensity of light; luminous intensity; candlepower. *Zimmerman, pp. 151, 158, 171.* b. Symbol for current; convection current; conduction current; electric current in amperes; instantaneous current; steady direct current; peak current; effective current, or rms (root-mean-square) current; effective displacement current. *Zimmerman, pp. 152, 154, 164, 255, 258.* c. Symbol for impulse. *Zimmerman, p. 366.* d. Symbol for moment of inertia; rectangular moment of inertia; areal moment of inertia; rectangular areal moment of inertia. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99; Zimmerman, p. 146.* e. Symbol for ionic strength, *Zimmerman, p. 171.* f. Symbol for sound intensity; acoustic intensity. *Zimmerman, pp. 150, 189.* g. Symbol for activity (in radioactivity) at time *t*. With subscript O, as I_0, the symbol for initial activity in radioactivity. *Zimmerman, p. 150.* h. Symbol for nuclear spin; nuclear-spin quantum number. *Zimmerman, pp. 163, 165.* i. Symbol for strength of magnetic shell. *Zimmerman, p. 159.*

IA Abbreviation for international angstrom. *BuMin Style Guide, p. 60.*

I. and A. Term used in the marketing of phosphate, meaning combined iron and alumina or $Fe_2O_3+Al_2O_3$. *Bureau of Mines Staff.*

ianthinite. a. A rare, strongly radioactive, orthorhombic mineral, $2UO_2.7H_2O$; an alteration product of uraninite, found associated with schoepite, becquerelite, kasolite, parsonsite, dewindtite, and fourmarierite at Kasolo, Republic of the Congo; also found at Wolsendorf, Bavaria, Germany. It is violent-black (alters to yellow on edges; acicular crystals). *Crosby, pp. 24-25; Larsen, p. 205; English.* b. Previously thought to be $2UO_2.7H_2O$; reexamination shows it to be $3CaO.UO_2.6UO_3.2CO_2.10H_2O$. Bignand (1955) gives $UO_{2.84}.xH_2O$ as the synthetic formula of a violet hydrate, closely resembling ianthinite. Guiliemin and Protas state that the formula is $UO_2.5UO_3.10.56H_2O$. *American Mineralogist, v. 40, No. 9-10, September-October 1955, pp. 943-944; v. 44, No. 9-10, September-October 1959, pp. 1103-1104.*

IB Abbreviation for incendiary bomb. *Zimmerman, p. 453.*

I-beam. A rolled steel joist. Also called H-beam. *See also* broad-flanged beam. *Ham.*

IBP Abbreviation for initial boiling point. *CCD 6d, 1961.*

IC Abbreviation for information circular; information center. *Zimmerman, p. 57.* Abbreviation for internal combustion. *Webster 3d.*

icc Abbreviation for ignition control compound. *CCD 6d, 1961.*

ICC Interstate Commerce Commission. *Nichols.*

ice. The solid state of water, the solid substance formed by the freezing of liquid water or by the recrystallization of fallen snow. Ice formed by the sublimation of water vapor is usually known as snow or hoar. *See also* glacier ice; sea ice; ground ice. *A.G.I.*

Ice Age. The Glacial epoch. *Webster 3d.*

ice apron. A ramp constructed on the upstream side of a bridge pier, sloping upwards from below water level. This simple device breaks the ice and protects the pier. *Ham.*

ice barrier. a. A barrier of shelf ice. *Schieferdecker.* b. The outer margain of the Antarctic ice sheet. *Webster 3d.*

iceberg. A large floating mass of ice in the ocean detached from an ice sheet or a glacier at sea level and set adrift. *Schieferdecker.*

iceblink. a. A cliff of ice on a coast, as of Greenland. *See also* ice cliff. *Webster 3d.* b. A white streak on the horizon, caused by the reflection of light from ice not yet in sight. *Schieferdecker.*

ice boulder. A boulder transported and deposited through glacial action. *Standard, 1964.*

ice cake. A single, flat unbroken fragment of sea ice of no specific size. *A.G.I.*

ice-cake texture. Rounded and corroded remnants of an earlier mineral in a later mineral. *Schieferdecker.*

ice cap. A cover of perennial ice and snow; specifically, a glacier forming on an extensive area of relatively level land, and flowing outward from its center. *Webster 3d.*

ice cave. a. A pit at the bottom of which snow accumulates and forms ice. *Schieferdecker.* b. A cavern in which underground glaciers are formed. *Schieferdecker.* c. A cave so protected from summer heat that ice remains in it throughout the year or nearly so. *Webster 3d.*

ice cliff. An abrupt shore of arctic ice, more or less interstratified and covered by earth and vegetation. *Standard, 1964. See also* iceblink. *Fay.*

ice concentration. The precentage of ice cover in a given area of water, usually expressed in tenths. *Hy.*

ice concrete. A dense frozen mixture of sand, broken aggregate, and water. *A.G.I.*

ice-contact form. A stratified glacial drift form, such as a kame, a kame terrace, or an esker, deposited in contact with melting glacier ice. *A.G.I.*

ice-contact slope. The fosse. This depression is suposed to mark the resting place of the ice, and the steep slope rising to the head of the sand plain marks the position of the ice front during the building of the frontal plain. This escarpment at the head of the sand plain has been called the ice-contact slope. *A.G.I.*

ice creeper. A creeper for use in walking on ice. *Webster 2d.*

ice crystal casts. *See* ice crystal marks. *Pettijohn.*

ice crystal marks; ice crystal casts. Cracks left by sublimation of ice crystals. Commonly sand-filled and appearing as straight, slightly raised ridges on base of sandstone beds. *Pettijohn.*

ice drift. Loose floating ice. *Standard, 1964.*

icefall. a. A frozen waterfall or similar mass of ice. *Webster 3d.* b. A falling of ice, as from an iceberg or glacier. *Webster 3d.*

ice field. A large flat sheet of floating ice. *See also* ice float. *Standard, 1964.*

ice floe. A flat free mass of floating ice of usually visible extent larger than a pan and smaller than an ice field; broadly, a large floating fragment of sheet ice. *Webster 3d.*

ice foot. a. A wall of ice formed by sea water and frozen snow along the shore in polar regions. Also called an ice ledge. *Standard, 1964.* b. An ice step which is attached to the coast and is not moved by tides. *Schieferdecker.*

ice-free port. A port in which ice formations sufficient to interfere with navigation in the harbor or the terminals have not been recorded. *Hy.*

Iceland agate lava. Obsidian. *Schaller.*

Iceland crystal. *See* Iceland spar.

Iceland spar. Transparent calcite which, when cleaved along its natural crystal faces, exhibits strong double refraction. Has limited but important application in optical instruments. *Pryor, 3.*

ice ledge. *See* ice foot. *Fay.*

ice mark. Any mark or indication left by moving ice or glacial action. *Standard, 1964.*

ice mill. A place where a glacier abrades the underlying rock through the action of rubble. *Standard, 1964.*

ice mountain. An iceberg. *Standard, 1964.*

ice pack. A large area of floating ice floes. *MacCracken.*

ice pedestal. A glacier table. *A.G.I.*

ice period. The time between first apearance and final clearance of ice during any year. *Hy.*

ice pillar. A pedestal of ice on a glacier, supporting a broader piece of rock, which has protected the ice beneath it from solar heat. *Standard, 1964.*

ice plug. An ice obstruction formed by a circulation medium freezing inside the drill-rod couplings while the rods are racked up or standing in the drill derrick or tripod in extremely cold weather. Such plugs may loosen when rods are lowered into the borehole and may be ejected from the open end of the rod with enough force to injure drill crewmen severely. *Long.*

ice-push ridge. One of a group of ridges of somewhat similar appearance (similar to old beach embankments) on the Deerwood and Wealthwood (Minnesota) sheets, along the north shore of Mille Lacs Lake, and which may be beach ridges or ice-push ridges, produced by the expansive effect causing lake ice to override the shore. *A.G.I.*

ice pyramid. A mound of ice on a glacier, having a stone or earthy debris lying against its foot. *Standard, 1964.*

icequake. The concussion attending the breaking up of masses of ice. *Webster 3d.*

ice river. A glaicer. *Standard, 1964. See also* ice stream. *Fay.*

ice sheet. a. Inland ice is a vague geographic term. For strict accuracy, the terms ice sheet and glacier convey a more definite meaning. An ice sheet is a complete covering of ice, radiating from a watershed composed of snow and ice, and not confined or directed by visible barriers of rock, whereas a glacier, though it may originate in an ice sheet, occupies a definite valley. *A.G.I.* b. A form of glacier moving radially outward from a region of abundant snowfall and usually covering all but the highest mountains in its path. *A.G.I.* c. A glacier forming a continuous cover over a land surface, with the ice moving outwards in many directions. Continental glaciers, ice caps, and some highland glaciers are examples of ice sheets. *A.G.I.*

ice spar. A white transparent variety of orthoclase. Same as sanidine. *Fay.*

ice stone. *See* cryolite. *Bennett 2d, 1962.*

ice stream. A glacier; also, a collection of floes moving in a certain course. *Webster 2d.* An ice river. *Fay.*

ice system. A system of glaciers diverging from a common center. *Standard, 1964.*

ice table. A mass of level ice. *Standard, 1964.*

ice ton. The theoretical number of heat units required to melt one ton of ice at 32° F. It is 284,000 British thermal units, taking the ton at 2,000 pounds, or 318,080 British thermal unit for a ton of 2,240 pounds. *Webster 2d.*

ice tongue. A steep, narrow cliff of ice rising high above glacial névé, and extending upwards toward the higher mountain peaks. *Standard, 1964.*

ice wall. *See* ice foot. *Fay.*

ice worn. Abraded by ice; specifically, rubbed, scratched, or channeled by glacial action. *Standard, 1964.*

ichnite. A fossil footprint. Synonym for ichnolite. *Standard, 1964.*

ichnofossil; organic hieroglyph. General term for fossil trails, tracks, and burrows. *Pettijohn.*

ichnolite. *See* ichnite.

ichnology. The science which treats of the footprints of extinct animals. *Fay.*

ichor. Proposed by Sederholm (1933) for a granitic juice or liquor capable of granitizing rocks and derived from a granitic magma. Synonym for mineralizer; residual magma. *A.G.I.*

ichthyophthalmite. Apophyllite. *Schaller.*

icosinene. A liquid hydrocarbon; $C_{20}H_{38}$; contained in ozocerite. *Standard, 1964.*

IC silicon carbide Abbreviation for impregnated-carbon silicon carbide; it contains free carbon and silicon and the bulk density is comparatively low (2.60). *Dodd.*

ICT Abbreviation for International Critical Tables. *BuMin Style Guide, p. 60.*

icy flakes. A seldom used trade name for small cracks along cleavage planes sometimes caused by overheating stones during polishing. *Shipley.*

id Abbreviation for inside diameter. Also abbreviated ID. *BuMin Style Guide, p. 60.*

idaite. A sulfide mineral, Cu_5FeS_6, hexagonal and related to covellite, occurring with bornite at the Ida mine, Khan, Southwest Africa; named from locality. Perhaps a ferroan covellite. *Hey, M.M., 1961.* Metallic luster; color similar to that of bornite, but not tarnished; a lamellar decomposition product of bornite; apparently the first product of weathering. *American Mineralogist, v. 43, No. 11-12, November-December 1958, p. 1219.*

Iddings' classification. A classification of igneous rocks by Iddings (1913) that attempts to correlate the mineralogical classifications of Rosenbusch and Zirkel with the chemicomineralogical C.I.P.W. or norm classification system. *A.G.I.*

iddingsite. A reddish-brown hydrous silicate of magnesium and iron, $MgO.Fe_2O_3.3SiO_2.4H_2O$; orthorhombic; foliated. An alteration product of olivine. From Carmelo Bay, Calif.; Colorado. *See also* ferroantigorite. *English.*

ideal form. A crystal form in which like faces are the same size and shape. *Fay.*

ideal gas. Gas whose molecules are all identical and interact only by collisions, moving in straight lines between collisions. *Bureau of Mines Staff.*

ideal sea level. The theoretical sea surface which is everywhere normal to the plumb-line. Reference of all depth soundings to this level would make them all comparable. *Hy.*

ideal section. A section showing, in addition to factual data, the hypothetic stratigraphical or structural conditions, as interpreted by the author. *Schieferdecker.*

ideal transducer. An ideal transducer for connecting a specified source to a specified load is a hypothetical passive transducer that transfers the maximum possible power from the source to the load. *Hy.*

identification (of a gem stone). The testing of the physical properties of a stone to determine whether genuine or not and, if genuine, its species; as distinguished from the former method of rendering of opinions based on the appearance of the stone to the eye. *See also* determinative gemmology. *Shipley.*

identification, soil. Description of the visual characteristics of soil, such as strength, particle size, texture, and color. The work is generally carried out by an engineer and a geologist in close collaboration. *Ham.*

identity period. The distance between like points in a crystal lattice measured along a crystallographic axis. *Hurlbut.*

ID gage stone. *See* inside-gage stone. *Long.*

idioblast. Proposed by Becke (1903) for mineral grains (in metamorphic rocks) that are bounded by their own crystal facies. *A.G.I.*

idioblastic. Applied to a mineral which presents crystal faces against an adjacent mineral. *A.G.I.*

idiochromatic minerals. Minerals in which the color is due to some essential constitutent of the stone, for example, malachite, peridot, and almandine. In contrast to allochromatic minerals, those which are idiochromatic have a limited range of color. *See also* allochromatic minerals. *Anderson.*

idiochromatic stone. A stone in which the substance producing the color is an inherent constituent of the mineral. It is limited to such stones as chrysocolla, malachite, diopside, azurite, turquoise, and peridot. *Shipley.*

idiogenite. Suggested by Posepny for those ore deposits which are contemporaneous in origin with the wall rock. The word means of the same origin. *Compare* xenogenite; hysterogenite. *Fay.*

idiogenous. Applied to a mineral deposit that is contemporaneous in origin with the rock in which it occurs, that is, a primary mineral deposit which is a constituent of the rock in which it occurs. *Fay.*

idiomorphic. Applied to an igneous rock mineral which is completely bounded by its characteristic crystal faces. Synonym for euhedral; automorphic. *Holmes, 1928.*

idiomorphic crystal. An individual crystal that has grown without restraint so that the habit planes are clearly developed. *Compare* allotriomorphic crystal. *ASM Gloss.*

idiophanous. Exhibiting interference figures in crystals without the aid of the polariscope. *Webster 3d.*

idle component; wattless component. In inductive circuits where reactance is not cancelled out by capacity reactance or otherwise, the current flowing when the electromotive force is zero. Since power is a product of electromotive force and current, it will be zero at that instant. *Mason, V.2, p. 419.*

idler. a. A sheave or pulley running loose on a shaft to guide or support a rope, cable, drive belt, or drive chain. *Long.* b. An assembly of an idler roll or rolls with a supporting structure that makes a unit suitable for mounting on the conveyor frame, so that it will support or guide a portion of the conveyor belt. *NEMA MB1-1956.* c. A wheel or gear which changes the direction of rotation of shafts, or the direction of movement of a chain or belt. *Nichols.*

idler disk. A device used for holding the belt in proper position on certain types of boxcar loaders. *See also* boxcar loader. *ASA MH4.1-1958.*

idler gear. a. A gear meshed with two other gears that does not transmit power to its shaft; used to reverse direction of rotation in a transmission. *Nichols.* b. Same as neutral gear. *Long.*

idler hanger. A support for the roll or rolls in which the shaft center is below the base or the point at which the hanger is attached to the conveyor frame. The hanger includes a bearing if this is not a part of the roll or rolls. *NEMA MB1-1956.*

idler pulley. A pulley which does not transmit power. *NEMA MB1-1961.*

idler roll. A roll that does not transmit power. *NEMA MB1-1956.*

idler shaft. A shaft that carries a gear that reverses direction of rotation in a transmission. *Nichols.*

idler spacing. Customary to place idlers at uniform spacing on both top and return run, based on averages of tension and material weight for various belt width. Has important influence on conveyor friction. *Bureau of Mines Staff.*

idler stand. A unit structure for supporting the idler roll or rolls in which the shaft center or centers are above the base or the point at which it is attached to the conveyor frame. The idler stand includes bearings if these are not a part of the roll or rolls. *NEMA MB1-1956.*

idle time money. *See* lying money. *Nelson.*

idle wheel. a. A wheel interposed in a gear train, either to reverse rotation or to obtain the required spacing of centers, without affecting the ratio of the drive. Also called idler. *C.T.D.* b. A pulley to guide a driving belt, to increase its tension, or to increase its arc of contact on one of the working pulleys. *Standard, 1964.*

idocrase. *See* vesuvianite. *Fay.*

Idria furnace. *See* Leopoldi furnace. *Fay.*

idrialite. A dark, earthy variety of bituminous substance, approximately C_3H_2, found in nature mixed with cinnabar, clay, etc. In a purified state it is white and crystalline. From Idria, Carniola, Yugoslavia. *Tomkeieff, 1954.*

idryl. A black material obtained from the mercury condensation chambers at Idria, which Bodeker considered as the radical of idrialite. *Fay.*

IE Abbreviation for industrial engineer. *Webster 3d.*

IF Abbreviation for intermediate frequency. *GPO Style Manual, p. 158.*

i gal Abbreviation for Imperial gallon. *Zimmerman, p. 56.*

igdloite. An imperfectly described mineral of perovskite type from Igdlunguaq, Greenland, formed during the alteration of eudialyte; spectroscopic analysis shows major amounts of Ti, Nb, Na, Ca, and Al. Perhaps essentially $NaNbO_3$, but with some SiO_2, differing in this and in its mode of formation from lueshite. The differences seem hardly adequate to justify separate names. *Hey, M.M., 1961.*

Igewsky's reagent. A solution consisting of 5 percent picric acid in absolute alcohol used as an etching reagent for carbon steels. *Osborne.*

igneoaqueous. Formed by the joint action of heat and water; for example, ashes thrown from a volcano into water and deposited there in stratified form. *Fay.*

igneous. Formed by solidification from a molten state; the rocks of one of the two great classes (metamorphic being the other class) into which all rocks are divided and contrasted with sedimentary. Rocks of this class have also been called plutonic rocks and are often divided into plutonic and volcanic rocks for convenience, but there is no sharp boundary between the two. *Fay.*

igneous breccia. a. Breccia consisting of igneous rock. *A.G.I. Supp.* b. Breccia produced by igneous action, and includes pyroclastic breccia, flow breccia, and contact breccia.. *A.G.I. Supp.*

igneous complex. Composed of intimately associated and approximately contemporaneous igneous rocks. *A.G.I. Supp.*

igneous cycle. The sequence of events usually followed in igneous activity; it consists of an eruptive phase, a plutonic phase, and a phase of minor intrusion. *C.T.D.*

igneous fusion. Fusion by heat alone unassisted by solution in the water of crystallization. *Webster 3d.*

igneous intrusion; igneous intrusive. a. Any of the several forms of emplacement of igneous rocks. *See also* batholith; dike; laccolith; lopolith; phacolith; sill; stock. *C.T.D.* b. All intrusive masses fall into one of two categories. They are either concordant and parallel the bedding or foliation of the country rock or they are discordant and cut across the bedding or foliation of the country rock. Among the concordant igneous intrusions are laccoliths, lopoliths, phacoliths, and sills, and the discordant igneous intrusions include batholiths, dikes, and stocks. *Bureau of Mines Staff.*

igneous magma. A high-temperature, mobile mass of plastic solids, liquids, and gases that was generated within the depths of the earth and from which igneous rocks are derived by crystallization. *C.T.D.*

igneous metamorphism. The high-temperature process that includes the effects of magmas on adjacent rocks. It is nearly the same as contact metamorphism but it also includes the effects of igneous injection and pegmatitization. *Stokes and Varnes, 1955.*

igneous ore. Ore formed by cooling and solidifying from the molten state. *Mersereau, 4th, p. 382.*

igneous rock. Rock formed by the solidification of molten material that originated within the earth. *Bateman.*

igneous rock series. Originated by Brögger (1904) for an assemblage of igneous rocks in a single district, belonging to a single period of igneous activity, and characterized by a certain community of chemical, mineralogical, and occasionally, textural properties. *See also* consanquinity. *A.G.I.*

ignescent. Applied to a stone or mineral that sparks when struck with steel or iron. *Standard, 1964.*

ignimbrite. A silicic volcanic rock forming thick, massive, compact sheets that cover a wide area in the central part of the North Island, New Zealand. The rock is chiefly a fine-grained rhyolitic tuff formed mainly of glass particles (shards) in which crystals of feldspar, quartz, and occasionally hypersthene or hornblende are embedded. The glass particles are firmly welded, bend around the crystals, and evidently were of a viscous nature when they were deposited. The deposits are believed to have been produced by the eruption of dense clouds of incandescent volcanic glass in a semimolten or viscous state from groups of fissures. Welded tuff is synonymous. *A.G.I.*

ignitability. An assessment of the ease with which a coal can be ignited. *B.S. 3323, 1960.*

ignite. a. To heat a gaseous mixture to the temperature at which combustion takes place. *C.T.D.* b. To set fire to. *Mason.*

igniter. a. A blasting fuse or other contrivance used to fire an explosive charge. *C.T.D.* b. In mining, a metal cylinder which connects a main fuse with separate fuses which are only limited by the number of blasts to be fired. *Standard, 1964.* c. A device to relight safety lamps internally by friction. One type uses a waxed strip with igniting matches at intervals, while another type has a small burred wheel operating against a piece of cerium or something of a similar nature. Electrical devices are sometimes employed. *Fay.* d. One that ignites: as (1) a charge usually of black gunpowder used to facilitate the ignition of a propelling charge and sometimes of a bursting charge; (2) a device for igniting fuel mixture (as in an internal-combustion engine, a jet engine, or a rocket engine); (3) a separately energized electrode used for restriking the arc in an ignitron. *Webster 3d.*

igniter cord. a. A cord which passes an intense flame along its length at a uniform rate to light safety fuses in succession. *B.S. 3618, 1964, sec. 6.* b. Two types are manufactured, a fast cord having a nominal burning speed of 1 second per foot and a slow cord having a nominal burning speed of 10 seconds per foot. Both cords possess excellent water resistance and good storage properties and they will withstand a reasonable amount of rough handling. The burning speeds are reliable and consistent even under adverse conditions, as, for example, when burning underwater or in a direction opposite to a strong wind. *McAdam II, p. 61.*

ignites. Used by M. E. Wadsworth to include all pyrotechnic minerals. *Fay.*

ignitability (dust cloud). The relative ignitability of a dust cloud may be defined as the degree of ease with which it can be ignited. *Sinclair, I, p. 250.*

ignition. a. The act of igniting, or the state of being ignited; specifically, in mechanics, the act of exploding the charge of gases in the cylinder of an internal-combustion engine. *Standard, 1964.* b. Percussion material or detonating powder. *Standard, 1964.* c. The firing of an explosive mixture of gases, vapors, or other substances by means of an electric spark. *C.T.D.* d. An outburst or fire or an explosion. *Mason.*

ignition arch. A flat or curved refractory roof over a furnace at the point of fuel entrance which promotes ignition by reflection of heat. *AISI, No. 24.*

ignition charge. A small charge usually of black powder used to facilitate the ignition of the main charge. *Webster 3d.*

ignition delay. Time interval between contact of an oxidant and a combustible and ignition. *I.C. 8137, 1963, p. 76.*

ignition of firedamp. *See* gas ignition. *Nelson.*

ignition point. a. Of solids and liquids, the minimum temperature at which combustion can occur, but at which it is not necessarily continuous. *Pryor, 3.* b. Of combustible gases, the flashpoint. *Pryor, 3.*

ignition temperature. a. The ignition temperature of a substance is the temperature at which that substance starts to burn. The temperature of ignition varies greatly with different substances. *Morris and Cooper,* *p. 28*. All solid fuels must be heated to their ignition temperature before they will burn continuously by the process known as combustion. *Nelson*. b. The temperature required to effect ignition of a combustible-oxidant system at a specified pressure; in general, the minimum temperature is implied. *I.C. 8137, 1963, p. 76*.

ignition test. *See* standard ignition test. *Rice, George S.*

ignition tube. A heavy-walled test tube of hard glass for examining the behavior of heated substances. *Webster 3d.*

IGY Abbreviation for International Geophysical Year. *Webster 3d.*

ihp Abbreviation for indicated horsepower. *BuMin Style Guide, p. 60.*

ihp hr Abbreviation for indicated horsepower-hour. *BuMin Style Guide, p. 60.*

ijolite. A plutonic igneous rock composed of nepheline and sodic pyroxene (aegirine-augite) with accessory apatite, sphene, calcite, and titaniferous garnet. The rock is transitional into urtite with increasing nepheline, and transitional into melteigite with increasing aegirine-augite. *A.G.I.*

ikaite. Chalky material, $CaCO_3.6H_2O$, from skerries in Ika Fjord, Ivigtut, Greenland. Named from the locality. *Hey, M.M., 1961; Fleischer.*

ikunolite. A mineral, $Bi_4(S,Se)_3$, with S:Se near 12; rhombohedral; from the Ikuno mine, Hyogo prefecture, Japan; very similar to joseite but contains no tellurium. Named from locality. *Compare* laitakarite. *Hey, M.M., 1961.*

IL Abbreviation for including loading. *Webster 3d.*

ilesite. A hydrous sulfate of manganese, zinc, and iron, $(Mn,Zn,Fe)SO_4.4H_2O$, found in friable crystalline aggregate in Park County, Colo. *Fay; Hey, 2d, 1955.*

Ilgner flywheel. A heavy flywheel used in the Ward-Leonard control of winding engines in mine hoists. It is mounted on the shaft of a motor generator, which draws on this source of energy as the hoist starts to move. *Pryor, 3.*

Ilgner system. A modification of the Ward-Leonard system of speed control, in which a heavy flywheel is carried on the motor-generator shaft to smooth out peak loads, which would otherwise be taken from the power supply. The system is used on mine winding engines, etc. *Nelson.*

ill air. Scot. Noxious gas, as from underground fires or chokedamp; a stagnant state of the atmosphere underground. *Fay.*

illam. A gem-bearing gravel occurring in Ceylon and worked extensively for gem corundums, spinels, zircons, etc., which it contains; these have been derived from white pegmatite veins. *C.T.D.*

illidromica. A member of the illite-hydromica series, $K_2Mg_2Al_{12}Si_{20}O_{55}(OH)_{12}.4H_2O$; contains mixed illite and montmorillonite layers. *American Mineralogist, v. 35, No. 3-4, March-April 1950, p. 334.*

illinition. A thin extraneous crust formed on minerals. *Standard, 1964.*

Illinoisan. The third Pleistocene glaciation. *A.G.I. Supp.*

illiquation. a. Melting or infusing. *Webster 2d*. b. Mixture of metallic and earthen substances. *Webster 2d.*

illite. A silicate of potassium, aluminum, iron, and magnesium with water, $2K_2O.3(Mg,Fe)0.8(Al,Fe)_2O_3.24SiO_2.12H_2O$; gray, light green, or yellowish-brown color. A general term for the clay-mineral constituent of argillaceous sediments belonging to the mica group. The relation of illite to similar or identical material known variously as hydromica, hydrous micas, hydromuscovite, and hydrated mica group is not clearly established. Occurs in micaceous particles less than one micron. Obtained from clays and shales in Illinois. *Compare* pholidoide; phyllite. *English; Stokes and Varnes*. b. A discredited term equal to bravaisite. *American Mineralogist, v. 28, No. 3, March 1943, p. 214.*

illuminating gas. (1) Coal and carbureted water gases and their various mixture. (2) The different classes of oil gas. (3) Acetylene, gasoline gas, and producer gas. The first is the most important for illuminating purposes. Producer gas is the most important for fuel and power gas. *Crispin.*

illuminating oil. Certain oils obtained by special distillation of crude petroleum. *Crispin.*

illuvial horizon. A soil horizon into which material has been carried chemically or mechanically. *Stokes and Varnes, 1955. Compare* eluvial; alluvial.

illuviation. Deposition in an underlying layer of soil (soil horizon B) of colloids, soluble salts, and small mineral particles which have been leached out of an overlying soil layer (soil horizon A). The action occurs in humid climates. *A.G.I.*

ilmenite; menaccanite; titanic iron ore. An iron-black mineral, $FeO.TiO_2$; streak, black to brownish-red; submetallic luster; sometimes with some replacement of iron by magnesium or manganese. Resembles magnetite in appearance but is readily distinguished by feeble magnetic character. Specific gravity, 4.5 to 5; Mohs' hardness, 5 to 6. Found in the United States (New York, Florida, North Carolina, Virginia, California, Wyoming, and Arkansas), Canada, Sweden, U.S.S.R., and India. Also made synthetically. Used in ceramics. *CCD 6d, 1961.*

ilmenite norite. A norite (an igneous rock composed mainly of hypersthene and labradorite) containing a high percentage of ilmenite, ranging from 20 to 80 percent in different parts of the rock mass. *Holmes, 1928.*

ilmenitite. A rock composed almost entirely of ilmenite. *Stokes and Varnes, 1955.*

ilmenorutile. A black titanium oxide containing iron in the form of ferrous titanate, niobate, and tantalate; crystallizes in the tetragonal system. *C.M.D.* A variety of rutile with colubium in greater quantity than tantalum. *Crosby, p. 132.*

ilsemannite. Described as a blue-black to black cryptocrystalline, water-soluble mineral, $MoO_2.4MoO_2$. *Dana 6d, p. 202.*

ilvaite; lievrite; yenite. A mineral, $CaAl_2(Si_2O_7)(OH)_2.H_2O$, occurring in prisms, with prismatic faces vertically striated; orthorhombic; columnar or compact massive; fracture uneven; brittle; luster, submetallic; iron-black or dark grayish-black color; streak, black inclining to green or brown; opaque. *Dana 17.*

IM Abbreviation for Imperial measure. *Webster 3d.*

image furnace. Apparatus for the production of a very high temperature in a small space by focusing the radiation from the sun (solar furnace) or from an electric arc (arc-image furnace) by means of mirrors and/or lenses. Such furnaces have been used for the preparation and study of some special ceramics. *Dodd.*

image point. In photographic mapping, an image on a photograph corresponding to a definite object on the ground. *Seelye, 2.*

image stone. Agalmatolite. *Shipley.*

imandrite. A rock composed of quartz and albite, formed by interaction between a nepheline-syenite magma and graywacke. *Holmes, 1928.*

imbibition. The particular case of absorbtion or adsorption of a liquid by a solid in which the solid increases in volume. A typical example is the swelling of Na-bentonite when it takes up water. *Dodd.*

imbrex. a. A curved tile; a pantile. *Standard, 1964*. b. One of the scales or partitions of overlapping tilework or of other imbrication. *Standard, 1964.*

imbricate structure. The shingle structure displayed by a series of rock slices, either thick or thin, separated by high-angle reverse faults or thrust faults. The faults dip toward the source of stress and the strata usually dip in the same direction as the faults and at similar angles. A zone of imbricate faulting is probably always underlain by a sole fault, making it a decollement; and it may be overlain by a low-angle thrust. The terms schuppenstructure, distributive faulting, and shingle-block structure have been applied to the same feature. *Stokes and Varnes, 1955.*

Imhoff tank. A two-storied tank in which sewage is subjected to fermentation, forming methane gas. The sludge settles and is drawn off to be dried, having become inoffensive. *Ham.*

-imide; -imine. Suffix describing the radical greater than nitrogen-hydrogen. The -imide has replaced two hydroxyls, and the -imine two hydrogens. *Pryor, 3.*

-imine. *See* -imide. *Pryor, 3.*

imitation cameo. *See* cameo. *Shipley* .

imitation doublet. *See* doublet. *Shipley.*

imitation Foil back. *See* Foil back. *Shipley.*

imitation lacquer back. *See* lacquer back. *Shipley.*

imitations; imitation stones. a. In the broadest sense, any material other than genuine gem material. A genuine stone that imitates a more desirable one is sometimes called its imitation; preferably its substitute. *Shipley*. b. Specifically, glass, plastic, or other amorphous substitutes or reproductions as distinguished from synthetic and reconstructed stones (which are crystalline) and from genuine assembled stones (portions of which are crystalline). *See also* reproduction; simulated stone. *Shipley.*

imitation star sapphire. *See* star doublet. *Shipley.*

imitation stones. Materials such as glass or the plastics which may resemble genuine stones in color and appearance, but differ from them in composition and physical properties. *Anderson.*

imitation triplet. *See* triplet. *Shipley.*

Imlay table. *See* end-bump table. *Fay.*

I.M.M. *See* Institution of Mining and Metallurgy. *Pryor, 3.*

immature conglomerate. A conglomerate composed of unsorted or poorly sorted debris and much unstable material. *A.G.I.*

immature lignite. A more or less descriptive term commonly, and to some extent indiscriminately, used in coal literature to apply to low rank types of lignite. *A.G.I.*

immature soil. A soil in which erosion exceeds the rate at which the soil develops downward. *A.G.I.*

immature topography. *See* youth. *Stokes and Varnes, 1955.*

immediate roof. Lowest layer or layers of rock immediately above an underground opening. *BuMines Bull. 587, 1960, p. 2. See also* roof; nether roof.

immersed bog. A bog which increases by various plant accumulations and growths under water. *Compare* emerged bog. *Standard, 1964.*

immersion cup. An accessory for a gemmological microscope containing a liquid of high refractive index and designed to eliminate reflections from highly polished facets and thus to expedite the observation of determinative inclusions. *Shipley.*

immersion method. A term applied by mineralogists to the method of determining the refractive index of a substance by observing it in various liquids. *See also* Becke method. *Shipley.*

immersion objective. Oil-immersion lens used in microscopy to concentrate more light on the object under examination. *Pryor, 3.*

immiscible. Pertaining to substances that do not mix; for example, oil and water. *Bateman.*

immiscibility. Separation into two phases (specifically two liquid phases). *VV.*

I.M.M. screen scale. See Institution of Mining and Metallurgy screen scale. *Pryor, 3.*

imp. A tremendous impulse of energy shot through the sea for ocean floor mining purposes. The wave shock can be as powerful as a good-sized block of TNT. *Hy.*

impact. Collision between bodies, the velocity of one or both being changed. In direct impact, the velocity of the moving bodies is perpendicular to the bodies at the point of contact. The impact coefficient, known as the coefficient of restriction, is the ratio between the differences of velocities of the two bodies after impact to the same differences before impact. *Ham.*

impact breakers. The impact breaker or double impeller breaker uses the energy contained in falling stone, plus the power imparted by the massive impellers for complete stone reduction. Rock fed into the breaker falls directly onto the impellers, which weigh up to 6½ tons, and rotate away from each other, turning up and outward, at speeds from 250 to 1,000 revolutions per minute, depending on the desired size of finished product. The stone, driven against breaker bars for further reduction, is shattered in midair, and tremendous force imparted to the fragments. These pieces are sent crashing against steel breaker bars mounted in specific positions around the breaking chamber or other rocks hurtling through the chamber, for further reduction, without the use of extra horsepower. The stone falls again onto the impellers to repeat the cycle until reduction is complete. Size is controlled by impeller speeds and the vertical and horizontal spacing of impeller bars. *Pit and Quarry, 53rd, Sec. B, p. 25.*

impact cast. Cast of marking produced by object striking the mud bottom. The steeply raised end of impact casts are always oriented downcurrent. Essentially same as prod cast. *See also* bounce cast; skip cast. *Pettijohn.*

impact crusher. Machine in which ore is broken by sharp blows. *See also* hammer mill. *Pryor, 3.*

impact energy; impact value. The amount of energy required to fracture a material, usually measured by means of an Izod or Charpy test. The type of specimen and testing conditions affect the values and therefore should be specified. *ASM Gloss.*

impact factor. The factor of from 1 to 2 by which the weight of a moving load is multiplied in order to calculate its full effect on the structural design of a floor or bridge. *Ham.*

impact grinding. Shattering of particles by direct fall upon them of crushing bodies. *Pryor, 4.*

impact idler. A carrying idler in which the rolls and/or its mounting are designed to reduce the impact shock on the conveyor belting due to the loading of material. *NEMA MB1-1961.*

impactite. Vesicular, glassy to finely crystalline material produced where a meteor has struck the earth; it consists of meteoric material and slag. *A.G.I. Supp.*

impact load. A force delivered by a blow as opposed to a force applied gradually and maintained over a long period. *Long.*

impact loss. The head lost as a result of the impact of particles of water; included in and scarcely distinguishable from eddy loss. *Seelye, 1.*

impact mill. A crushing unit in which a rapidly moving rotor projects the charged material against steel plates; impact mills find use in the size-reduction of such materials as feldspar, perlite, etc. *Compare* disintegrator; hammer mill. *Dodd.*

impact pressing. A process for forming refractory shapes, in which the ground particles of refractory material are packed closely together by rapid vibration. *HW.*

impact resistance. A measure of the capacity of a substance to withstand shock or impact. The unit of measurement is frequently given by the Izod number. *See also* Izod test. *Miall.*

impact roll. An idler roll covered with a resilient material or pneumatic tire to absorb the shock of loading material onto the conveyor belt and so minimize damage to belt and belt idlers. *NEMA MB1-1956.*

impact screen. One in which the loaded screen is so suspended that it can be caused to swing or rock forward until it is abruptly checked on hitting a stop. *Pryor, 3.*

impact slag. Glassy material produced mainly by the melting of local sediment or rock where a meteorite has struck the earth. *A.G.I. Supp.*

impact strength. Same as impact energy. *ASM Gloss.*

impact test. a. A test to determine the behavior of materials when subjected to high rates of loading, usually in bending, tension, or torsion. The quantity measured is the energy absorbed in breaking the specimen by a single blow, as in the Charpy or Izod tests. *ASM Gloss.* b. An efficiency test made to determine the resistance of a ceramic surface to chipping when a steel weight is dropped on the object one or more times, from known heights, until breakage to the base metal occurs. *Enam. Dict.* c. A method of determining the resistance of a ceramic article to fracture upon the application of a dynamic physical shock. *ACSG, 1963.*

impact toughness test. This method involves determining the impact toughness of a rock by dropping a weight from successively greater heights until such a height is reached that the specimen is fractured. *Lewis, p. 574.*

impalpable. Extremely fine, so that no grains or grit can be felt. *Webster, 3d.*

impastation. a. In ceramics, the act or process of converting into paste. *Standard, 1964.* b. A combination of different materials baked together or united by a cement; said of porcelain, etc. *Standard, 1964.*

impasto. Color thickened with an appropriate vehicle applied in relief on the raw clay before firing. *C.T.D.*

impedance. The total opposition offered to the flow of an alternating current. It may consist of any combination of resistance, inductive reactance or capacitive reactance. It is expressed in ohms, and its symbol is Z. *Hy.*

impeller. Rotating member of centrifugal pump, which receives inflowing water or ore pulp at or near its center and accelerates it radially to the periphery, where it is discharged with the kinetic energy (initial + added) needed to carry it through the pumping system. An open impeller is a disc with projecting vanes which grip the pulp sufficiently to urge it along. A closed impeller has hollow compartments formed by vanes between side plates. Impellers are also used to aerate and mix pulps in flotation cells, leach tanks and mixing vats. *Pryor, 3.*

impeller diameter. This dimension usually determines the size rating of similar fans. The diameter varies the quantity as the square but has no effect on head. *Hartman, p. 177.*

impenetrable substance. A stratum that cannot be drilled through. *Williams.*

imperfect combustion. A term meaning that not all of the fuel is oxidized to its highest degree; for example, if carbon monoxide is formed instead of carbon dioxide. *Newton, p. 246.*

imperfect frame. A structural frame with fewer members than are required to make it stable. *Ham.*

imperfection. A trade term used to refer to an inclusion or faulty structure of any kind which is visible to the eye whether observed with or without the aid of a magnifier. *Shipley.*

imperfection detector. An instrument designed especially for the detection of imperfections in fashioned diamonds, but equally useful in observing the nature of inclusions in fashioned, transparent, colored stones. *Shipley.*

Imperial jade. A semitransparent variety of jadeite closely approximating gem emerald in color. Also called gem jade. *Hess.*

imperial Mexican jade. Green-dyed calcite. *Shipley.*

Imperial screen. An oscillating or vibrating screen on which the ore is thrown upward, as well as moved forward on the screen. *Liddell 2d, p. 301.*

Imperial yellow porcelain. A Chinese hard porcelain having a uniform yellow glaze, originally made exclusively for the Imperial family and others connected with the court. *Standard, 1964.*

imperial yu-stone. Green aventurine quartz. *Shipley.*

impermeability factor. The ratio between the amount of rain which runs off a surface and that which falls upon it. This ratio enables runoff to be calculated. *See also* Lloyd Davies formula. *Ham.*

impermeable. a. Having a texture that does not permit water to move through it perceptibly under the head differences ordinarily found in subsurface water. Synonym for impervious. *A.G.I.* b. A pottery body (paste) becomes impermeable by application of sufficient heat, which melts the fluxes contained in the body, thus closing the pores, and transforming a porous permeable body into a vitrified nonporous body. *Rosenthal.*

impermeable rocks. Those which bar further descent of surface water. *Pryor, 3.*

impervious. a. Impassable; applied to impermeable strata, such as clays, shales, etc., which will not permit the penetration of water, petroleum, or natural gas. *Fay.* b. Applied to a bed or a stratum through which water will not move under ordinary hydrostatic pressure. *Fay.* c. In hydrology, it is applied to a rock that does not admit the passage of water or other liquid under the pressures and conditions usually found in subsurface water. Impervious rock may be of two kinds: porous, like clay, or nonporous, like massive unbroken granite. In the first case, the pores are too small to admit water to pass except by very slow capillary creep. Although pores are necessary for permeability, they must be of fairly large size and be interconnected to allow free and continuous passage of solutions. *Stokes and Varnes, 1955.* d. That degree of vitrification evidenced visually by complete resistance to dye penetration. *ASTM C242-60. See also* nonvitreous; semivitreous; vitreous.

impervious bed. Geologically, one which prevents infiltration downward of meteoric water, or alternatively, which caps pervious rocks, therefore, preventing uprise of water, crude oil or gas. *Pryor, 3.*

imperviousness. That quality or condition of a material that minimizes percolation. *Seelye, 1.*

impervious rock. As the term is used in hydrology, an impervious rock is one that does not admit the passage of water or other liquid under the pressures and conditions usually found in subsurface water. Impervious rocks may be of two kinds: porous, like clay or nonporous, like massive unbroken granite. In the first case, the pores are too small to admit water to pass except by very slow capillary creep. Although pores are necessary for permeability, they must be of fairly large size and be interconnected so as to allow free and continuous passage for solutions. *Stokes and Varnes, 1955.*

impinge. To strike upon a surface, to press against. *Mersereau, 4th, p. 414.*

impinger. Dust sampling apparatus into which a measured volume of dusty mine air is drawn through a jet in such a way as to strike a wetted glass plate, to which dust particles adhere. *Pryor, 3.*

implosion. A bursting inward; sudden collapse; opposite of explosion. *Standard, 1964.*

implosion weapon. A device in which a quantity of fissionable material, less than a critical mass at ordinary pressure, has its volume suddenly reduced by compression (this is accomplished by using conventional explosives) so that it becomes supercritical and a nuclear explosion can take place. *L&L.*

imported coal. Coal coming from a foreign country. *B.S. 3552, 1962.*

impound. a. To collect (water) as by damming a stream for irrigation purposes, or the like. *Fay.* b. A reservoir for impounding. *Webster 3d.* Used in connection with the storage of tailings from ore-dressing plants and hydraulic mines. *Fay.* c. To collect in a reservoir or sump provided near a borehole the water, drill cuttings, etc., ejected therefrom. *Long.*

impounding dam. One in which tailings are collected and settled; also, a water-storage dam. *Pryor, 3.*

impounding reservoir. A reservoir which stores water from a wet season to a dry one, as distinct from a service reservoir. *Ham.*

impregnated. a. Timber impregnated with various fluids to enable it better to resist the decomposing influences of the atmosphere. *Crispin.* b. A metallic material in which fragments of diamond or other hard substances (in unflocculated distribution) are intermixed and embedded. *See also* impregnated bit. *Long.* c. Said of rock, fabrics, or other bodies, the pores of which are more or less filled with extraneous materials, such as oil, tar, resins, rubber, etc. *Long.* d. Containing metallic minerals scattered or diffused throughout the mass. Properly used in referring to the country rock containing a disseminated metallic mineral, or minerals, similar to those in the vein. *Weed, 1922.*

impregnated bit. A sintered, powder-metal matrix bit with fragmented bort or whole diamonds of selected screen sizes uniformly distributed throughout the entire crown section. As the matrix wears down, new, sharp diamond points are exposed; hence, the bit is used until the crown is consumed entirely. *Long.*

impregnated-tape metal-arc welding. An arc-welding process wherein coalescence is produced by heating with an electric arc between a metal electrode and the work. Shielding is obtained from decomposition of an impregnated tape wrapped around the electrode as it is fed to the arc. Pressure is not used and filler metal is obtained from the electrode. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.*

impregnated timber. Timber which has been treated to make it either flame-resistant or to protect it from destruction by fungi and insects. Cover boards used with steel arches are often vacuum/pressure impregnated with a flame-retardant preservative for safety and to comply with the flameproofing requirements of the Coal Mines Act covering escape roadways. *Nelson.*

impregnation. a. The treatment of porous castings with a sealing medium to stop pressure leaks. *ASM Gloss.* b. The process of filling the cores of a sintered compact, usually with a liquid such as a lubricant. *ASM Gloss.* c. The process of mixing particles of a nonmetallic substance in a matrix of metal powder, as in diamond-impregnated tools. *ASM Gloss.* d. An ore deposit consisting of the country rock impregnated with ore and usually without definite boundaries. *Fay.* e. Preservation of mine timber by soaking it in creosote, zinc chloride, or other chemicals. *Pryor, 3.*

impression block. A bell-shaped or hollow, tubular device filled with wax or other water-resistant plastic materials, which is lowered onto an article resting on the bottom of a borehole. The plastic material molds itself about the lost article, and by inspecting the impression so formed the driller can determine which fishing tool is best fitted to recover the lost article. *Long.*

imprest account. One in which payments are made from a sum set aside to deal with a specified matter, the exact amount therefore, disbursed being periodically returned to the imprest. *Pryor, 3.*

improved dial; telescopic dial. A miner's dial in which a telescope replaces the usual sighting vanes. *B.S. 3618, 1963, sec. 1.*

Improved paragon. Trade name for nonrotating wire rope of 18 x 4 over 3 x 24 construction. *Ham.*

improvement. An artificial change of the physical condition of the earth in, upon, or so reasonably near the mining claim as to evidence a desire to discover mineral therein or to facilitate its extraction, and in all cases the alteration must be permanent in character. *Ricketts, I.*

improving. *See* softening. *C.T.D.*

impsonite. A variety of asphaltic pyrobitumen, similar to albertite; black in color, with a black streak; specific gravity, 1.10 to 1.25 and fixed carbon 50 to 90 percent. Found in Oklahoma, Arkansas, Michigan, Nevada; South America. *CCD 6d, 1961.*

impulse. a. A force communicated suddenly; the effect of an impelling force; a thrust; a push. *Fay.* b. A unidirectional flow of current of nonrepeated wave form, that is, it consists of a transient and a component of 0 frequency which is greater than 0. *C.T.D.* c. An electrical disturbance whose duration is short in relation to the time scale of interest, and whose initial and final values are the same. *NCB.*

impulse turbine. a. A water turbine, such as the Pelton wheel, in which the driving force is provided more by the speed of the water than by a fall in its pressure. *See also* reaction turbine. *Ham.* b. A turbine in which the steam is expanded in a series of stationary nozzles which it leaves at a very high velocity, perhaps 4,000 feet per second, and then gives up its kinetic energy to blades or buckets attached to the revolving disk that furnishes the power. *Mason, v. 2, p. 369.*

impurities. Elements or compounds, the presence of which is undesired in a material. *ASM Gloss.*

impurity; contaminant. Any undesirable substance not normally present in air or present in an excessive amount. Impurities which find their way into the air can produce either chemical or physical vitiation of the air. *Hartman, p. 15.*

in Abbreviation for inch. *BuMin Style Guide, p. 60.*

in Eng. When a stall or other working place in a mine is blocked up with fallen roof, etc., it is said to be in, or to have come in. *Fay.*

In Chemical symbol for indium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

inalterable. Unaffected by the action of light or air; applied to painted porcelain, faience, or enamel, the colors of which have been fired. *Standard, 1964.*

inaurate. a. Having a golden luster. *Standard, 1964.* b. Covered with gold, gilded. *Standard, 1964.*

inbond. Laid with its length across the thickness of a wall; said of a brick or of a long stone. *Standard, 1964.*

inby. a. Eng. Toward the working face, or interior, of the mine; away from the shaft or entrance; from Newcastle coalfield. Also called in-over; inbye; inbyeside. *Fay.* b. In a direction toward the face of the entry from the point indicated as the base or starting point. *Rice, George S.* c. The direction from a haulage way to a working face. *C.T.D.* d. Opposite of outby. *B.C.I.*

incandescent. Made luminous by heat; white or glowing with heat. *Standard, 1964.*

incarbonization. Same as coalification. *Tomkeieff, 1954.*

Inca rose. Rhodochrosite. *Shipley.*

Inca stone. Pyrite. *Shipley.*

incendive spark. An incendive spark is an electric spark of sufficient intensity to ignite flammable material. *ASA M2.1-1963.*

ince peat. Eng. Term used in Lancashire for mud peat. *Tomkeieff, 1954.*

inch. Twelve inches = 1 foot; 2.54001 centimeters. Symbol, ". *Pryor, 3.*

inches of pressure. The height in inches of a column of water or of mercury as a measure of hydrostatic pressure. *Standard, 1964.*

inching. *See* jogging. *Pit and Quarry, 53rd, Sec. D, p. 13.*

inching starter. In one form, electrical gear which allows power to be applied gently to a stationary ball mill so as to avoid a high starting strain. The mill is said to be inched over as it begins slowly to rotate. *Pryor, 3.*

inch, miner's. *See* miner's inch. *C.T.D.*

inch of water. A unit of pressure equivalent to 0.036136 pound per square inch. *Strock, 10.*

inch pennyweights. In valuation of gold lodes, the product of the width of the exposure of ore, measured normal to the containing host rock, and the assay value in pennyweights of a true sample of the ore, cut evenly along the measured line. In evaluation of ore tonnages in base-metal mining, the equivalent measurement is the assay-foot or similar convenient combination across the exposed lode. Abbreviation, in. dwt. *Pryor, 3.*

inch-pound. The work done in raising 1 pound 1 inch; a unit of work or of energy. Abbreviation, in lb. *Standard, 1964.*

inch ton. A unit of energy equal to that required to lift 1 ton 1 inch high. *Osborne.*

incidental vein. *See* secondary vein. *Nelson.*

incident light; incident ray. That which strikes the surface or enters a stone, as distinguished from the light which has subsequently entered the stone and, in most cases, been refracted or reflected. *Shipley.*

incident ray. *See* incident light.

incinerate. To cause to burn to ashes; to consume by or as if by fire; to be or become completely burned. *Webster 3d.*

incineration. Burning; ignition; reduction to ashes. *Bennett 2d, 1962.*

incinerator. A furnace for the destruction of refuse. It may be fired by electricity, gas, oil, or solid fuel. *Ham.*

incinerator, radioactive waste. *See* BOMAEC-30.

incipient fires. *See* heatings.

incipient fusion. The beginnings of fusion. *Mersereau, 4th, p. 235.*

incipient joint. *See* closed joint.

incipient vitrification. Initial formation of glass within a ceramic body. *VV.*

incise. To cut lines or characters into the surface of; to engrave. *Kinney.*

incised. Decorated by cutting or indenting the ware surface. *ASTM C242-60T.*

incised meander. An intrenched winding or bend of a river, which results from renewed downcutting in a period of rejuvenation. Synonym for entrenched meander. *C.T.D.*

incised ware. Pottery decorated with scratches; graffito. *Standard, 1964.*

inclination. a. The angular dip of a vein, a bed, etc., measured in degrees from the horizontal plane. *Fay.* b. Angle between the direction of the magnetic field and the horizontal plane. *Schieferdecker.*

inclinator. Instrument to determine the inclination of the magnetic field. *Schieferdecker.*

incline. a. A shaft not vertical; usually on the dip of a vein. *See also* slope. *Fay.* b. Any inclined plane, whether above or beneath the surface; usually applied to self-acting planes above ground, as in the bituminous coalfields. *Fay.* c. A sloping tunnel along which rails are laid from one level to another; a mechanically worked inclined haulageway in a coal mine. *C.T.D.* d. A slanting shaft. *Gordon.* e. In mines, an inclined drift driven upwards at an angle from the horizontal. *Fraenkel.* f. An opening driven up or down the pitch. *Hudson.*

incline bogie. Scot. A wheeled carriage for inclines, constructed with a horizontal platform so that cars can be run on it and be conveyed up and down the incline or slope. *Fay.*

inclined bedded formation. Any bedded formation of rock where the dip of the bedding planes is greater than 10°. *BuMines Bull. 587, 1960, p. 2.*

inclined bedding. A type of bedding appearing commonly in sandy deposits; the strata, essentially intraformational, dip in the direction of the current flow. Synonym for crossbedding; cross lamination; current bedding. *A.G.I.*

inclined borehole. A borehole drilled at an angle from the vertical not exceeding 45°. *Nelson.*

inclined cableway. A monocable cableway in which the track cable has a slope of about 1 in 4 over its whole length, sufficiently steep to allow the carrier to run down under its own weight. *Ham.*

inclined drilling. Drilling blastholes at an angle from the vertical. *Woodruff, v. 3, p. 487.* Also called angle drilling.

inclined fold. A fold, the axial plane of which is not vertical. *A.G.I. Supp.*

inclined gage. A common type of gage used with the pitot tube. A straight glass tube with connections at each end is mounted in an inclined position on an aluminum frame and a scale is placed under the tube. In place of water, a colored oil is used, and the scale is graduated to read directly in inches of water. *Lewis, pp. 717-718.*

inclined magnetic polarization. Only at magnetic poles, is earth's field vertical. At other places it makes an angle with the vertical that increases with distance from the poles until it becomes 90° at the magnetic equator. In United States and Canada inclination is never less than 60°, but even this small departure from the vertical may have to be taken into account in the interpretation of magnetic profiles. *Bureau of Mines Staff.*

inclined plane. a. A natural or artificial slope used for facilitating the ascent, descent, or transfer from one level to another of vehicles or other objects. *Standard, 1964. See also* incline, b. *Fay.* b. A slope used to change the direction and speed-power ratio of a force. *Nichols.*

inclined polarization. Polarization which is inclined to the linear dimensions of a magnetized body, or to the plumb line or the horizon. *A.G.I.*

inclined railroad operator. *See* inclined railway operator. *D.O.T. 1.*

inclined railway operator. In metal mining, one who operates the machinery which drives the haulage cable along a power incline railway used for hauling cars, supplies, men, and materials to and from one level to another on a steep slope. Also called inclined railroad operator; tramway operator. *D.O.T. 1.*

inclined-rock-dump hoistman. *See* dump hoistman. *D.O.T. 1.*

inclined shaft. *See* incline, a. *Fay.*

inclined traverser. A traverser which moves mine cars laterally and vertically by traveling on an inclined plane. It is sometimes used at the pit bottom for the transfer of cars from a higher decking level to a lower decking level on the opposite side rail track. The cars are held upright in a frame, and can handle loaded or empty cars to annd from the two levels. *Nelson.*

inclined tube manometer. A manometer in which one of the limbs (the reservoir) of the U-gage is many times larger than the cross-sectional area of the other limb (the inclined tube). This causes the movement of the fluid, when a small differential pressure is applied, to take place mainly along the tube. Inclined gages usually have a range of up to 2 inches water gage and can be read to 0.01 or 0.001 inch dependent upon scale graduation. *Roberts, I, p. 26.*

inclined U-gage. When a gage of the U-type is set at an incline, a change of level is associated with a larger travel of liquid in the tube. The inclined U-tube gage using paraffin oil as the gaging liquid is the most suitable form of manometer for use in ventilation pressure investigations at a mine. It consists of an ordinary U-gage fixed to a plate of known inclination to the horizontal. Sometimes the gage is mounted on a hinged plate so that the angle of inclination may be varied. These gages are fitted with attachments so that they can easily be mounted on tripods. *Roberts, I, pp. 25-26.*

inclined water gage. A sensitive form of water gage, giving readings of greater accuracy. It consists of a glass U-tube of uniform ¼-inch-diameter bore with limbs about 20 inches in length, the ends being bent over for attachment to rubber tubing. The U-tube is mounted on a wooden base and a graduated scale in inches and tenths or centimeters and millimeters fixed underneath the two limbs. The wooden base carrying the U-tube is inclined at a small angle to the horizontal. An angle of 1 in 10 gives a ten-to-one magnification of the readings. The water gage is fixed on the leveling stage of a theodolite or dumpy tripod. It is used mainly for ventilation surveys. *Nelson.*

incline engine. A stationary haulage engine at the top of an incline. *C.T.D.*

incline hole; inclined hole. Same as angle hole. *Long.*

incline man. In anthracite coal mining, bituminous coal mining, metal mining, a laborer who controls the movement of cars on a self-acting incline (loaded car going down one track pulls empty cars up on other), hooking cable to loaded or empty cars, starting them down the incline, and applying brake to cable drum by a lever to control their speed of descent. Also called dilly boy; drum runner; monitor operator; plane man; wheel runner. *D.O.T. 1.* Also called jinnier.

incline repairman. In anthracite coal mining, bituminous coal mining, one who oils, greases, repairs, and replaces pulleys or rollers which support the cable on a haulage slope or plane (incline) underground and at the mine surface. Also called incline trackman; rolley man. *D.O.T. 1.*

incline shaft. A shaft sunk at an inclination from the vertical usually following the dip of a lode. It canot use cages, but a skip or carriage traveling on rails. *See also* turned vertical shaft; underlay shaft. *Nelson.*

incline trackman. See incline repairman. *D.O.T. 1.*

inclinometer. a. A dipping compass. *Standard, 1964.* b. An instrument for measuring the inclination or slope, as of the ground; synonym for clinometer. *Standard, 1964.* c. An instrument for measuring the dip of a drill hole, vein, etc. *Compare* clinometer. d. Sometimes used as a synonym for Thompson clinometer. *Long.*

included angle. a. Either of the two angles formed at the station by the intersection of the two survey lines. *Mason, v. 2, pp. 744-745.* b. The angle formed between the inward-sloping faces of a concave face noncoring bit. *Long.* c. For silent chains, the angle included between the outer surfaces of the link plate contours. This angle affects the layout of the sprocket tooth form. *J&M.*

inclusion. a. A crystal, a fragment of another substance, or a minute cavity filled with gas or liquid enclosed in a crystal. *Fay.* b. Any size fragment of another rock enclosed in an igneous rock; a xenolith. *Fay.* c. Specifically, a particle of nonmetallic material retained in a solid metal. Such inclusions are generally oxides, sulfides, or silicates of one or the other of the component metals of the alloy, but may also be particles of refractory materials picked up from the furnaces or ladle lining. *C.T.D.*

inclusion, fluid. During the crystallization of minerals, or during recrystallization following fracturing, small portions of the fluids present may become trapped within the mineral grains. Most of these fluid inclusions are small (0.001 to 0.01 millimeter in diameter) and frequently contain a small bubble of a gaseous phase in addition to the liquid (usually hydrous) phase. *A.G.I.*

inclusions. a. A term applied to crystals and anhedra of one mineral involved in another; and to fragments of one rock inclosed in another, as when a volcanic flow picks up portions of its conduit. *Bureau of Mines Staff.* b. Particles of foreign matter, solid, liquid, or gaseous, enclosed within a gem stone. The nature of such inclusions provides a powerful clue to the origin of a stone, and enables natural stones to be distinguished from their synthetic counterparts. *Anderson.*

incoalation. a. The process of coal formation which begins after peat formation is completed without there being any sharp boundary between the two processes. From the German inkohlung. *A.G.I.* b. Same as coalification. *Tomkeieff, 1954.*

incoherent. Loose, unconsolidated; commonly applied to recent sediments. *Stokes and Varnes, 1955.*

incombustible. a. Applies to substances that will not burn. *Mersereau, 4th, p. 210.* b. Any building material which contains no matter subject to rapid oxidation within the temperature limits of a standard fire test of not less than 2½ hours duration. Materials which continue to burn after this time period are termed combustible. *ACSG.* c. *See* noncombustible.*ACSG, 1963.*

incombustible matter in dust. The material in dust which will not burn under any condition. In analysis this is usually reported as moisture and ash. *Rice, George S.*

incompatible minerals. Two or more minerals which, under the specified conditions, would, at equilibrium, react together to form a new phase or phases until one or more of the original minerals were eliminated, for example, quartz and any unsaturated minerals, such as nepheline, olivine, etc. *A.G.I.*

incompetent. a. Applied to strata, a formation, a rock, or a rock structure not combining sufficient firmness and flexibility to transmit a thrust and to lift a load by bending; consequently, admitting only the deformation of flowage. *See also* competent, a. *Standard, 1964.* b. Soft or fragmented rocks in which an opening, such as a borehole or an underground working place, cannot be maintained unless artificially supported by casing, cementing, or timbering. *Long.*

incompetent bed. A bed that, in a particular case of folding, has yielded to the lateral pressure by plastic adjustment and flow. This may result in the bedding being thrown into complex structures or in the development of more regular internal structures, particularly drag folds and fracture cleavage. The bed tends to thicken towards the hinges, and to thin in the limbs, of the folds. *Challinor. See also* competent bed.

incompetent folding. *See* flow folding. *A.G.I.*

incomplete combustion. A term applied to combustion in which all of the fuel is not burned; for example, leaving unburned carbon in ashes. *Newton, p. 246.*

incomplete ripples. A term used to describe isolated crests of ripple mark. Also called starved ripples. *Pettijohn.*

incongruent melting. Dissociation of a compound upon heating, with the formation of another compound and a liquid of different composition from the original compound. *HW.*

incongruent melting point. The temperature at which a solid phase changes into another solid phase plus a liquid, both having a composition that differs from the original solid. Also called the peritectic point. *A.G.I.*

inconsequent stream. A stream whose drainage system does not appear to have any direct relation to the structure of the underlying rocks but is quite independent of it. *A.G.I.*

incorporation. A process by which material contributing to coal formation responds to diagenetic and metamorphic agencies of coalification and becomes a part of the coal without undergoing any material modification. *See also* coalification. *Compare* vitrinization; fusinization. *A.G.I.*

increment. The quantity of coal or coke taken by a single operation of the sampling instrument. *B.S. 1017, 1960, Pt. 1.*

incrop. A former outcrop concealed by younger unconformable deposits. *B.S. 3618, 1964, sec. 5.*

incrustate. To coat various objects with calcium carbonate or another precipitate. *Schieferdecker.*

incrustation. a. A crust or a coating on a rock, such as carnotite forms on sandstone. *Von Bernewitz.* b. A crust or hard coating of anything upon or within a body, as a deposit of lime inside a steam boiler. *Webster 3d.* c. A coating of foreign matter. *Gordon.* d. A method of ornament that consists in applying or in inlaying one (usually a finer) material upon another, as colored marbles, mosaics, lacquers, or enamels upon wood, stone, or metal; also the material so applied. *Standard, 1964.*

indented bars. A special type of steel reinforcing bars for concrete, having a series of indentations and ridges which increase the mechanical bond with the concrete. *See also* helical reinforcement. *Ham.*

indented bolt. An anchor bolt with indentations forged upon it to ensure a better grip in concrete or grout. *Ham.*

indented shoreline. *See* crenulate shoreline. *Schieferdecker.*

indenting. In structural brickwork, the omission of a suitable series of bricks so that recesses are left into which any future work can be bonded. *Dodd.*

indenting roller. A roller having a raised pattern cast on its surface which, when rolled over hot asphalt, produces a nonslip texture. *Ham.*

indention hardness. The resistance of a material to indentation. This is the usual type of hardness test, in which a pointed or rounded indenter is pressed into a surface under a substantially static load. *ASM Gloss.*

Independent. Nongelatinous permissible explosive; used in mining. *Bennett 2d, 1962.*

independent contractor. In mining operations, one who exercises independent control over the mode and method by which he produces the results demanded by the contract. *Ricketts, I.*

Independent-Gel. Gelatinous permissible explosive; used in mining. *Bennett 2d, 1962.*

independent subsidence. The condition in sedimentation in which each floc or particle settles freely; that is, its movement is not influenced in any way by other flocs or particles in suspension. *Mitchell, p. 610.*

independent wire rope core. This core may be 6 by 7, 7 by 7, 6 by 19, or 7 by 19 construction and the individual wires shall be of an appropriate grade of steel in accordance with the best practice and design, either bright (uncoated) galvanized, or drawn galvanized wire. *ASA M11.1-1960, p. 8.*

inderborite. Hydrous calcium and magnesium borate mineral, $CaMgB_6O_{11}.11H_2O$, as monoclinic crystals from the Inder borate deposits, Kazakhstan. Named from locality. *See also* metahydroboracite. *Spencer 16, M.M., 1943.*

inderite. Hydrated magnesium borate, $2MgO.3B_2O_3.15H_2O$, as nodular aggregates of acicular crystals; pseudoorthorhombic. Named from locality, Inder, Kazahkhstan, southwest Siberia, U.S.S.R. *Spencer 15, M.M., 1940.*

indestructibility of matter. *See* conservation of matter. *Cooper.*

indestructibility of matter law. *See* law of indestructibility of matter.

index. To divide into equal marked parts, such as quadrants or degrees of a circle. *Long.*

index contour. Certain contour lines (usually every fifth contour) accentuated by a heavier line than the intervening contour lines and the elevation of which, or other value, is indicated by figures along its course. *A.G.I.*

index error. The error in an observed angle due to: (1) lack of parallelism between the line of sight and the axis of the telescope level; (2) displacement (lack of adjustment) of the vertical vernier; and/or (3) for a transit having a fixed vertical vernier, inclination of the vertical axis. *Urquhart, Sec. 1, p. 27.*

index feed (cylindrical grinding). An arrangement by which the mount of infeed is indicated on a dial. On most machines, the reference is to the diameter of the work; sometimes to the radius. *ACSG, 1963.*

index fossil. A fossil which, because of its wide geographic distribution and restricted time range, can be used to identify and to date the strata or the succession of strata in which it occurs. Synonym for guide fossil. *A.G.I.*

index glass. *See* sextant. *Ham.*

index level. The level which a sound would have at a point one yard from the point of its apparent origin, assuming such a point to exist, if it were generated at this apparent source point but produced the same effect at distant points as the effects it actually does produce. *Hy.*

index mark. a. A mark carried from the clinometer to each successive drill rod when the bearing of an inclined borehole is required, where a Maas or other magnetic compass device cannot be used because of local magnetism. *Long.* b. The mark on a Hall-Rowe wedge by means of which the wedge may be oriented in a specific compass direction. *Long.*

index mineral. A mineral, the first appearance of which in passing from lower to higher grades of metamorphism, or the reverse, marks the outer limit of the zone in question. *A.G.I.*

index of face concentration. *See* face concentration. *Nelson.*

index of geographical concentration. *See* geographical concentration. *Nelson.*

index of liquidity. This is found by the formula:

$$\frac{\text{Water content of test sample—Water content at plastic limit}}{\text{Index of plasticity}}$$

This gives a value of 100 percent for clay at the liquid limit, and zero at the plastic limit, and is the reverse of the consistency index. *Ham.*

index of overall concentration. *See* overall concentration. *Nelson.*

index of physiological effect. A method which is based on heart rate for relating the heat stress of a body to its environment. *Roberts, 1, p. 136.*

index of plasticity. The difference between the water content of clay at its liquid and plastic limits showing the range of water contents over which the clay is plastic. *Ham.*

index of refraction; refractive index. The ratio of the velocity of light, or of other radiation, in the first of two media to its velocity in the second as it passes from one medium into the other, the first medium usually being taken to be a vacuum or air. Symbol, n. *Webster 3d.*

index plane. The surface of any bed, dike, or vein that may be regarded as a plane and used as a base for measuring fault movements. *Fay.*

index properties. Properties which can be used to identify the soil type. The properties are of two kinds: (1) soil grain properties, and (2) soil aggregate properties. *See also* soil classification. *Nelson.*

index property tests. Tests to determine index properties which in turn serve to identify the soil type and indicate its consistency. *Nelson.*

India. A remarkably fast-cutting, long-wearing oilstone made from alundum. *Fay.*

India cut. In lapidary work, a cut approximately in the form of a brilliant, but done in such a way as to retain as much weight as possible. Cut in India. *Webster 2d.* India-cut stones are clumsy and are usually recut for Western markets. *Fay.*

indialite. A mineral, artificial $Mg_2Al_4Si_5O_{18}$, hexagonal, distinct from orthorhombic cordierite. Also found in sediments fused by a burning coal seam in India. Named from locality. *See also* osumilite. *Spencer 20, M.M., 1955.*

Indiana furnace. A simple Belgian zinc furnace in which the gas is fired under the lowest row of retorts. *Fay.*

Indian agate. A name for mocha stone or moss agate. Same as dendritic agate. *Shipley.*

indianaite. A white clay from Lawrence County, Ind., composed largely of metahalloysite; a small amount is used in making porcelain to increase translucency. *Bureau of Mines Staff.*

Indian cat's-eye. Cymophane. Same as chrysoberyl cat's-eye; Ceylon cat's-eye. *Shipley.*

Indian-cut. A style of diamond cutting usually of Indian or other Oriental origin in which the table is usually double the size of the culet; such stones are generally recut for European or American requirements. *Hess.*

Indian emerald. Crackled quartz. *Shipley.*

Indian garnet. Almandite. *Shipley.*

indianite. A variety of anorthite occurring as the gangue of corundum at the Carnatic, India. *Fay.*

Indian jade. Aventurine quartz. *Shipley.*

Indian kyanite. Naturally occurring aluminum orthosilicate imported from India. *Bennett 2d, 1962.*

Indian pipestone. *See* catlinite. *Fay.*

Indian Pond stone. Sharpening stones from Indian Pond, N. H. *Mersereau, 4th, p. 285.*

Indian red; iron saffron. A red (maroon) pigment, formerly consisting of a variety of hematite imported from the East, but now made artificially by calcining copperas to obtain the red ferric oxide pigment. There is no pigment, with possibly the exception of lithopone and artificial barium sulfate, which will approach Indian red in fineness of grain. Also used for polishing gold, silver, and other metals. *CCD 6d, 1961.*

Indian title. An Indian's right to occupancy of land, and that right recognized by the United States, constitutes Indian title. *Ricketts, I.*

Indian topaz. *See* citrine. *C.M.D.*

India oilstone. *See* India.

India steel. A fine natural steel from southern India made direct from the ore; wootz. *Fay.*

India stone. *See* India.

indicated horsepower. a. That horsepower developed in the cylinder or cylinders of steam, gas, or petrol engine, which is calculated from indicator diagrams, as distinguished both from that which is measured by a dynamometer and from nominal horsepower. It is calculated from (1) the average pressure of the working fluid, as shown by the indicator diagrams; (2) the area of the piston; (3) the stroke; (4) the number of working strokes per minute. *Standard, 1964.* b. The theoretical power output of an engine. It is determined by the mean effective pressure of the medium acting on the net area of the piston through the distance the piston travels as the engine rotates. *Brantly, 2.* c. The horsepower developed in the cylinders, that is determined by use of an indicator gage. It does not include engine friction losses. *Nichols.*

indicated ore. Ore for which tonnage and grade are computed partly from specific measurements, samples, or production data and partly from projection for a reasonable distance on geologic evidence. The sites available for inspection, measurement, and sampling are too widely or otherwise inappropriately spaced to outline the ore completely or to establish its grade throughout. *Forrester, p. 553.*

indicated power. *See* indicated horsepower, a. *Fay.*

indicator. a. An instrument for showing at any moment the position of the cage in the shaft. *Fay.* b. An apparatus for showing the presence of firedamp in mines, the temperature of goaves, the speed of ventilator. *Fay.* c. Aust. One of a group of narrow pyritiferous seams, the intersections of which with auriferous quartz veins of the district are usually characterized by rich accumulations of gold. *Fay.* d. An instrument used to show the pressure and action of the steam in an engine cylinder. *Crispin.* e. A substance (as dye) used to show visually, usually by its capacity for color change, the condition of a solution with respect to the presence of free acid, alkali, or other substance (as in detecting the end point of a titration. *Webster 3d.* f. The registering pointer of the seismograph. *Schieferdecker.* g. Synonym for marker bed. *See also* marker, a; marker bed. *Long.* h. Any instrument used to record continuously and visually revolutions per minute, pressure, rate of flow, weight, rate of penetration, depth, temperature, etc. *Long.*

indicator card. a. A diagram showing the variation of steam pressure in the cylinder of an engine during an entire stroke or revolution. *Zern.* b. A specially prepared paper on which the diagram is drawn by a metallic style in the piston type of indicator. *C.T.D.*

indicator, chemical. A substance that changes color in the presence of an acid (H^+ ion) or a base (OH^- ion). *API Glossary.*

indicator diagram. A graphical representation of the pressure and volume changes undergone by a fluid, while performing a work cycle in the cylinder of an engine or compressor, the area representing, to scale, the work done during the cycle. *C.T.D.*

indicator gage. An instrument used to record or visually indicate quantities, etc. *See also* indicator, h. *Long.*

indicator length. Length of mathematical pendulum that would yield pulses equal to those of the indicator. *Schieferdecker.*

indicator plant. a. A plant that indicates by its presence the occurrence of an element in the soil upon which it grows. *Hawkes. See also* local plant indicators; universal plant indicators. *Hawkes, 2, pp. 309-310.* b. A plant whose metabolism requires certain elements to sustain life (for example, Astragalus as a selenium indicator. *Ballard.*

indicator, universal. Mixture of organic dyes chosen to provide a continuous and distinctive change of color over a wide band of pH values. Consists of a solution of methyl orange (0.1 gram, methyl red (0.4 gram), bromothymol blue (4.0 gram), nephtholphthalein (0.32 gram), phenol phthalein (0.5 gram), and cresolphthalein (1.6 gram) in 100 cubic centimeters of 70 percent alcohol. One drop of this in 10 cubic centimeters clear aqueous liquid gives a color range through pH 3 to 12. Red is 3; orange-red, 4; orange, 5; yellow, 6.5; green, 8.0; bluish, 8.5; blue, 10.0; violet, 11.0; and red-violet, 12.0. *Pryor, 3.*

indicator vein. A vein which is not metalliferous itself, but, if followed, leads to ore deposits. *See also* indicator, c. *Fay.*

indices of a crystal face. The numbers or letters that define the position of a crystal face in space with reference to a set of chosen axes. In the Miller system of notation, the indices are the reciprocals of the intercepts the crystal face makes with the axes, and the reciprocals have been cleared of fractions. *C.T.D.; McGraw-Hill Encyclopedia of Science and Technology, v. 8, 1960, p. 464.*

indicolite. An indigo-blue variety of tourmaline. *Dana 17.*

indigenous. a. Originating in a specific place; in situ. *A.G.I.* b. Designating rocks, minerals, or ores originating in place, as opposed to those transported from a distance. *Webster 2d.*

indigenous coal. Autochthonous coal. *Tomkeieff, 1954.*

indigenous limonite. Limonite precipitated within the same cavity, or group of cavities, in which the sulfide source of the iron formerly existed. *A.G.I.*

indigo copper. Same as covellite. *Fay.*

indigo sapphire. Very dark blue sapphire. *Shipley.*

indirect-arc furnace. *See* electric furnaces for melting and refining metals. *Dodd.*

indirect-cycle reactor system. A nuclear reactor system in which a heat exchanger transfers heat from the reactor coolant to a second fluid which then drives a turbine. *L&L.*

indirect flushing. Flushing in which the water enters the borehole around the rod and issues upwards through the rod. *Stoces, v. 1, p. 79.*

indirect heating surface. Any type of heating surface which does not come in direct contact with the original source of heat. *Strock, 10.*

indirect initiation. *See* inverse initiation. *B.S. 3618, 1964, sec. 6.*

indirect priming. Placement of the blasting cap in the first cartridge going into the borehole with the business end pointing toward the collar. Recommended method of priming charges of permissible dynamite. *Bureau of Mines Staff.*

indirect stratification. Stratification develooped when sediments already deposited are thrown into suspension and redeposited. *See also* secondary stratification. *A.G.I.*

indirect test. *See* Brazilian test. *Lewis, pp. 570-571.*

indite. Minute iron-black isotropic grains in cassiterite, $FeIn_2S_4$, from the Dzhalind deposit, Little Khingan ridge, U.S.S.R. Named from the composition. *Hey, M.M., 1964; Fleischer.*

indium. A soft, malleable, easily fusible, silvery-white metallic element that is resistant to tarnishing and resembles aluminum and gallium in being chiefly trivalent. Occurs in very small quantities in sphalerite and other ores. Used chiefly as a plating for lead-coated silver bearings for airplanes. Symbol, In; valences, 1, 2 ?, and 3; tetragonal; atomic number, 49; atomic weight, 114.82; specific gravity, 7.31 (at 20° C); melting point, 156.61° C; boiling point, 1,450° C; insoluble in water; very slightly soluble in sodium hydroxide; and soluble in acids. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-115, B-179; CCD 6d, 1961.*

indium antimonide. InSb; molecular weight, 236.57; isometric; and melting point, 535° C. Used experimentally in semiconductor electronics. *Bennett 2d, 1962 Add.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-179.*

indium arsenide. InAs; molecular weight, 189.74; metallic appearance; melting point, 943° C; and insoluble in acids. Used experimentally in semiconductor electronics. *Bennett 2d, 1962 Add.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-179.*

indium trichloride. $InCl_3$; molecular weight, 221.18; white to yellow; deliquescent; crystals; melting point, 586° C; and soluble in water. Used in electroplating. *Bennett 2d, 1962 Add. Handbook of Chemistry and Physics, 45th ed., 1964, p. B-180.* Specific gravity, 3.46 (at 25° C, referred to water at 4° C); sublimes, 300° C; volatilizes, 600° C; and slightly soluble in alcohol and in ether. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-180.*

individual coal car. One owned or leased by a coal operator, and not by the transportation company. These cars have painted on their sides the names, initials, or some chosen trademark or emblem of their owners, and are run for their exclusive benefit. They are generally used between the mines and the coastwise shipping ports of the various railroads. *Fay.*

individually screened trailing cable. A trailing cable with a screen of metallic covering over each power conductor. This is the type now adopted in British coal mines. *Nelson.*

individual reduction ratio. In crushing practice this term may be expressed as:

$$\frac{\text{Size most abundant in feed}}{\text{Mean size of grading band concerned}}$$

South Australia, p. 103.

indoor. Eng. Toward the inside of a cylinder; as, the indoor stroke of a piston. *See also* indoor stroke. *Fay.*

indoor catches. Beams which catch the walking beam of the Cornish pump or engine on its down piston stroke if the string of tools being moved should break. The indoor stroke is the lifting stroke of such a pump. *Pryor, 3.*

indoor stroke. Eng. That stroke of a Cornish pump which lifts the water at the bottom or drawing lift. *Fay.*

indosmine. Osmiridium. *Pryor, 3.*

indra. A casein resin (plastic). *Shipley.*

indraft; indraught. The act of drawing in, or that which is drawn in; an inward flow; as, an indraft of air. *Standard, 1964.*

induced breaks; induced fractures. The fine breaks or cracks that occur in the nether roof of a coal seam following the holing of the coal or its removal, and having the same general direction as that of the coal face itself. *TIME.*

induced bursts. Rock bursts caused by stoping operations to distinguish them from development bursts which are called inherent. *Spalding, p. 67.*

induced cleavage. Same as induced fractures. *Woodruff, v. 1, p. ix.*

induced current. *See* induction. *Crispin.*

induced draught. Suction applied at the outlet of the appliance produced by a mechanical fan or a steam jet to supplement the chimney draught. *See also* balanced draught. *Nelson.*

induced fractures. Fractures formed in the roof beds as a result of mining operations. For example, on longwall faces fractures are formed in a shale roof parallel to and along successive lines of face. They are induced after coal cutting and become intensified at the end of the loading shift. The distance between the fractures coincides, roughly, with the depth of cut. *Nelson.*

induced magnetization. Part of the magnetization of a body that is caused by an external magnetic field and that disappears when the external field disappears. *Schieferdecker.*

induced polarization. When an electric current passing into the earth through ground electrodes is suddenly interrupted, a potential can be measured between these or nearby electrodes for some time after the current stops. This potential decays exponentially with time after the interruption. The effect was first observed by Schlumberger as early as 1912 and it was ascribed by him to polarization of earth material by the current. Known as induced polarization; this effect is associated with electrochemical reactions in the earth. *Dobrin, p. 370.*

induced radioactivity. Radioactivity that is created by bombarding a substance with neutrons in a reactor or with charged particles produced by particle accelerators. *L&L.*

induction. The production of magnetization or electrification in a body by the mere proximity of magnetized or electrified bodies, or of an electric current in a conductor by the variation of the magnetic field in its vicinity. *Crispin.*

induction balance. An apparatus for measuring changes of conductivity detecting the proximity of metallic bodies, etc., by noting extremely minute changes in an electric current. *Standard, 1964.*

induction brazing. Brazing with induction heat. *ASM Gloss.*

induction coil. a. An apparatus for generating currents by electromagnetic induction. It consists usually of two concentric cylindrical coils of insulated wire enclosing an iron core. One of the coils is called the primary and the other the secondary. Ordinarily, the primary is short and of thick wire, and the secondary is long and of thin wire. An alternating current of high tension is induced in the secondary coil by rapid automatic making and breaking of the circuit in the primary. *Standard, 1964.* b. Commonly used by bit setters as a means of melting and/or sintering metals used in producing bit crowns by casting or other mechanical methods. *Compare* induction furnace; induction pot. *Long.*

induction furnace. An alternating-current electric furnace in which the primary conductor is coiled and generates, by electromagnetic induction, a secondary current which develops heat within the metal charge. *ASM Gloss.*

induction hardening. Quench hardening in which the heat is generated by electrical induction. *ASM Gloss.*

induction heating. Heating by electrical induction. *ASM Gloss.*

induction log. A continuous record of the conductivity of strata traversed by a borehole as a function of depth and made as follows: a primary generating coil in the hole is fed with 20-kilocycle alternating current. The periodically changing magnetic field of this coil induces in the formations circular currents concentric with the borehole. These currents are, at this frequency, proportional to the conductivity of the rock. They are detected and measured by the current which their changing magnetic field in turn induces in a secondary measuring coil. By its nature the induction-log arrangement belongs to the current focusing systems. Additional coils are used to compensate for the direct effect of the primary magnetic field on the secondary coil and to improve further the degree of focusing. No conductive contact between the logging tool and the formations is necessary so that it can be run in holes drilled with oil-base muds or air. *See also* guard electrode; log; laterolog. *A.G.I.*

induction melting. Melting in an induction furnace. *ASM Gloss.*

induction meter. An instrument for measuring a.c. circuits, that will measure both power and energy (kilowatt hours). It is the type used for household and other consumer electricity meters. *Mason, V. 2, p. 420.*

induction period. A term used with reference to instantaneous caps to describe the time between the bridge break and the detonation of the base charge. *Streefkerk, p. 44.*

induction pipe. The pipe, port, or valve through which the live steam, other motive fluid, or gas passes into the cylinder of an engine. *Long.*

induction port. *See* induction pipe. *Long.*

induction pot. A refractory bowl or container in which metals are melted by induction currents. *See also* induction coil. *Long.*

induction time. The interval between the bursting and lag times of a detonator. *B.S. 3618, 1964, sec. 6.*

induction valve. *See* induction pipe. *Long.*

induction welding. A welding process wherein coalescence is produced by the heat obtained from resistance of the work to the flow of induced electric current, with or without the application of pressure. *Coal Age, v. 66, No. 3, Mar. 1961, p. 91.*

inductive method. Electrical exploration method in which electric current is introduced in the ground by means of induction and in which one determines the magnetic field that is associated with the current. *Schieferdecker.*

indurated. a. Hardened; applied to rocks hardened by heat, pressure, or by the addition of a cementing ingredient, for example, a marl indurated by the addition of calcite as a cement. *Fay.* b. Applied to consolidated sediments; or incoherent sediments that have been cemented, or lithified, or otherwise changed into sedimentary rock. *Bureau of Mines Staff.*

indurated talc. An impure, hard, slaty variety of talc. Also called talc slate. *Standard, 1964.*

induration. The process of hardening sediments or other rock aggregates through cementation, pressure, heat, or some other agency. *A.G.I.*

industrial air conditioning. Air conditioning in industrial plants where (usually) the objective is the furtherance of a manufacturing process rather than the comfort of human beings. *Strock, 10.*

industrial calorific value. The calorific value obtained when coal is burned under a boiler. *Kentucky, p. 411.*

industrial degree-day. A degree-day unit based on a (usually) 45° F or 55° F mean daily temperature so as to be applicable to industrial buildings maintained at relatively low temperatures. *Strock, 10.*

industrial diamonds. a. Crystalline and/or cryptocrystalline diamonds having color, shape, size, crystal form, imperfections, or other physical characteristics that make them unfit for use as gems. Industrial diamonds usually are grouped as toolstones, drill diamonds, fragmented bort, ballas, and carbons. Also called industrials; industrial stones. *See also* diamond. *Long.* b. Impure diamond used in borehole drilling and the grinding industry. Also called black diamond; bort; boart; carbonado. *Pryor, 3.*

industrial floor brick. *See* floor brick. *Dodd.*

industrial grouping. Where the units comprising an organization produce like products, the grouping is a horizontal combination. Where they produce and market products of increasing finish or concentration, the grouping is a vertical combination. A grouping of collieries producing and marketing coal would be a horizontal combination, but where a number of collieries are linked with end products such as coke or gas or steel, the grouping would be vertical or a combination of vertical and horizontal. *Nelson.*

industrial minerals. Rocks and minerals not produced as sources of the metals but excluding mineral fuels. *Bureau of Mines Staff.*

industrials. Synonym for industrial diamonds. *Long.*

industrial stones. Synonym for industrial diamonds. *Long.*

industrial waste. The waste resulting from the processes employed in industrial establishments. *Crispin.*

inequigranular. A textural term applied to rocks, the essential minerals of which are of different orders of size; for example, porphyries. *A.G.I.*

inequilibrium. Uranium is soluble in acid waters and tends to be removed in solution, but radium is much less soluble and its compounds tend to remain behind in the leached outcrop. Therefore, the outcrop may be radioactive due to the presence of the gamma-emitting elements RaC and RaD, even though much of the uranium has been lost in solution. In this case a radiometric assay may indicate a high counter reading, but the uranium content may be low. Uranium minerals deposited less than a million years ago may be in inequilibrium because daughter products have not accumulated in their equilibrium amounts. Hence, counter readings may indicate less uranium than is actually present. *Ballard.*

inert anode. An anode which is insoluble in the electrolyte under the conditions obtained in the electrolysis. *Lowenheim.*

inert dust. a. Any dust which contains only a small amount of combustible material. *Rice, George S.* b. Dust which has no harmful effect. *Hartman, p. 41.*

inert gas. a. A gas (such as nitrogen or carbon dioxide) that is normally chemically inactive especially in not burning or in not supporting combustion. *Webster 3d.* b. One of the helium group of gases comprising helium, neon, argon, krypton, xenon, and sometimes radon. Also called a noble gas; a rare gas. *Webster 3d.*

inert-gas carbon-arc welding. An arc-welding process wherein coalescence is produced by heating with an electric arc between a carbon electrode and the work. Shielding is obtained from an inert gas such as helium or argon. Pressure may or may not be used and filler metal may or may not be used. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.*

inert-gas metal-arc welding. An arc-welding process wherein coalescence is produced by heating with an electric arc between a metal electrode and the work. Shielding is obtained from an inert gas such as helium or argon. Pressure may or may not be used and filler metal may or may not be used. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.*

inert-gas shielded arc cutting. Metal cutting with the heat of an arc in an inert gas, such as argon or helium. *ASM Gloss.*

inert-gas shielded arc welding. Arc welding in an inert gas, such as argon or helium. *ASM Gloss.*

inertia. The reluctance of a body to change its state of rest or of uniform velocity in a straight line. Inertia is measured by mass when linear velocities and accelerations are considered and by moment of inertia for angular motions (that is, rotations about an axis). *C.T.D.*

inertinite. This term was proposed to simplify the nomenclature of coal petrography by combining, in a single term, the group of the following macerals: micrinite, semifusinite, fusinite, sclerotinite. This grouping is based on certain similarities in the technological properties of the four macerals. The term inertinite does not imply that the constituents are totally inert, but only that they are more inert than the macerals of the other two groups, particularly in carbonization processes in which they behave as diluents. *IHCP, 1963, part I.*

inert primer. A cylinder of inert material which enshrouds a detonator, but which does not interfere with the detonation of the explosive charge. *B.S. 3618, 1964, sec. 6.*

inerts. Constituents of a coal which decrease its efficiency in use, for example, mineral matter (ash) and moisture in fuel for combustion or fusain in coal for carbonization. *B.S. 3552, 1962.*

inesite. A rose- to flesh-red prismatic mineral with 1 perfect and 1 less perfect cleavage, $2(Mn,Ca)O.2SiO_2.H_2O$; X-ray study gives formula $Mn_7Ca_2Si_{10}O_{28}(OH)_2.5H_2O$, indicating a hydrous rhodonite. *Larsen, p. 173.*

infection. Communication of disease, as by entrance of pathogenic germs into an organism in any manner; distinguished from contagion, in which direct or indirect contact with a disease is implied. *Standard, 1964.*

infective jaundice. Men working in mines served by drifts and adits are subject to occasional attacks of this disease which is often fatal. It is caused by a micro-organism, the principal carrier of which is the sewer rat. If the skin is scratched, the germ can enter the bloodstream of the miner. Preventive measures include clearing up of all stores, food and other waste to deprive the rats of food and of a systematic extermination by a pest control officer. Also known as Weil's disease. *Sinclair, I, p. 195.*

inferior coal. Usually middlings obtained by hand-cleaning which, though of high ash, may be converted by crushing and washing into clean coal and discard. *B.S. 3552, 1962.*

inferred ore. a. Ore for which quantitative estimates are based largely on broad knowledge of the geologic character of the deposit and for which there are few, if any, samples or measurements. The estimates are based on an assumed continuity or repetition for which there is geologic evidence; this evidence may include comparison with deposits of similar type. Bodies that are completely concealed may be included if there is specific geologic evidence of their presence. Estimates of inferred ore should include a statement of the special limits within which the inferred ore may lie. *Forrester, p. 553.* b. Used essentially in the same sense as possible ore and extension ore. *A.G.I.*

infilling. a. Material used for filling in; filling. *Standard, 1964.* b. Material, such as hardcore, used for making up levels; for example, under floors. *C.T.D.*

infiltration. a. The deposition of a mineral among the mineral grains or in the pores of a rock by the permeation of the percolation of water carrying it in solution. *Fay.* b. The filling of a vein with a mineral deposited from an aqueous solution. *Standard, 1964.* c. In powder metallurgy, the process of filling the pores of a sintered or unsintered compact with a metal or alloy of lower melting point. *ASM Gloss.* d. Leaking inward. In heat transmission, applies to the air entering the space through cracks around windows, doors, etc. The opposite of exfiltration. *Strock, 10.*

infiltration theory. The theory that a vein was filled by the infiltration of mineral solutions. *Fay.*

infiltration vein. A vein in which the minerals have been deposited from solution. *Standard, 1964.*

inflammable cinnabar. A mixture of cinnabar, idrialite, and clay. *Hey 2d, 1955.*

inflatable seal. A seal made from polyvinyl chloride reinforced with glass fiber. It is inflated by compressed air and can cover or seal roadways up to 12 feet wide and 10½ feet in height. It is used to isolate a fire, or heating, and reduce the volume of smoke and gases so that erection of stoppings can proceed in respirable air without workmen being hampered by breathing apparatus. *Nelson.*

inflation method. *See* direct method. *McAdam, p. 92.*

inflow. Water, other liquid, or gas seeping or flowing from rocks into a borehole or other underground opening. *Long.*

influence line. An influence line usually pertains to a particular section of a beam, and is a curve so drawn that its ordinate at any point represents the value of the reaction, vertical shear, bending moment or deflection produced at the particular section by a unit load applied at the point where the ordinate is measured. An influence line may be used to show the effect load position on any quantity dependent thereon, such as the stress in a given truss member, the deflection of a truss, the twisting moment in a shaft, etc. *Ro.*

influent seepage. a. Seepage into the lithosphere. *A.G.I.* b. Seepage of water into the ground. *Legrand.*

influent stream. A stream, or the reach of a stream, is influent with respect to ground water if it contributes water to the zone of saturation. *A.G.I.*

in fork. a. Eng. When pumps are working after the water has receded below some of the holes of the windbore, they are said to be in fork. *Fay.* b. Of mine pumps, sucking air and water. *Pryor, 3.*

infracrustal rock. Rock that originated at great depth either by consolidation from magma or by granitization. *Schieferdecker.*

infraglacial. Pertaining to, derived from, or caused by processes taking place under or at the bottom of glaciers or glacial sheets; subglacial. *Standard, 1964.*

infragranitic. Situated or derived from sources below granitic masses; as, an infragranitic origin. *Fay.*

infralias. Same as Rhaetic beds. *Standard, 1964.*

infralittoral. Situated to seaward of the region of littoral deposits. *Webster 3d.*

inframundane. Situated below the surface of the earth. *Standard, 1964.*

infraneritic environment. The marine bottoms at depths of from 20 to 100 fathoms (120 to 600 feet). *Schieferdecker.*

infrared. Heat rays radiated at wavelengths exceeding 7,600 angstroms and not visible to the human eye. Sunlight contains some 60 percent of such rays, and the emanation from resistance wire and the infrared lamp is practically all in this part of the light spectrum. *Pryor, 3.*

infrared drier. A drier in which the source of heat is infrared radiation. *ACSG, 1963.*

infrared drying. Drying by exposure to infrared radiation from specially designed electric lamps or gas burners. The process has found some application in the vitreous enamel industry and in the pottery industry. *Dodd.*

infrared gas analyzer. An extensively used instrument for routine gas analysis for the determination of methane and other gases. It is a considerable timesaver and the results are accurate to 0.1 percent. *Sinclair, I, p. 45.*

infrared glass. A glass used for invisible signaling with infrared rays. It appears black in thicknesses of 2 mm or more, but reddish amber in very thin sheets. Iron oxide in glass is the effective bar to the passage of infrared rays. Quartz glass transmits infrared rays to a wavelength of about 5 microns. *Nature, v. 127, Feb. 28, 1931, pp. 311-312.*

infrared photography. This technique is employed in air survey during misty weather, using special film which is more sensitive to infrared rays than to light rays. *See also* photogrammetry. *Ham.*

infrasizer. An apparatus for air elutriation of very fine particles. *Osborne.*

infrastructure. The deformed lower part of the crust. *Schieferdecker.*

Infrax. Trademark for a refractory insulation, available only in brick form. Suitable for use at temperatures up to 2,700° F. Used in primary lining of electric furnaces and kilns. *CCD 6d, 1961.*

infusible. Not transformable by heating from solid to liquid state under specified conditions of pressure, temperature and time. *Pryor, 3.*

infusion gun. *See* water infusion gun. *Nelson.*

infusion shot firing. A technique of shot firing in which an explosive charge is fired in a shothole which is filled with water under pressure and in which the strata around the shothole have been infused with water. *B.S. 3618, 1964, sec. 6.*

infusorial earth. Synonym for tripolite. *Hey 2d, 1955.*

ingate. The point of entrance from a shaft to a level in a coal mine. *Standard, 1964. See also* inset.

ingaun e'e (ingoing eye). Scot. A drift or mine starting from the surface of the ground; also, the end of the mine at the surface. *Fay.*

ingenite. A general term for igneous rocks created within or below. The term was extended to include metamorphic rocks as well as igneous rocks. *Holmes, 1920.*

Ingersoll glarimeter. An instrument, designed by L. R. Ingersoll, primarily to measure the gloss of paper; it has been used to evaluate the abrasion resistance of a glaze in terms of loss of gloss after a specified degree of abrasion. *Dodd.*

Ingersoll-Rand jumbo columns. Columns consisting of vertical cylinders to which are attached the arms on which the drills are mounted. The carrying arms can be racked up and down the columns or swung around as required. An air-operated piston inside the column is forced up to and held against the roof. A nonreturn valve is provided in case of failure of the air pressure. *Mason, V. 2, p. 601.*

ingoing. That which is going inby. *Fay.*

ingot. a. A mass of cast metal as it comes from the mold or crucible; specifically, a bar of gold or silver for assaying, coining, or export. *Standard, 1964.* b. A mold in which an ingot may be cast. *Standard, 1964.* c. A casting suitable for working or remelting. *ASM Gloss.* d. The word carries the sense of being metal cast for convenient handling, storage, or further working, and not a final form. *Hess.*

ingot header. In ore dressing, smelting, and refining, one who pours molten aluminum, copper, or other nonferrous metals into solidifying ingots to compensate for shrinkage that occurs when ingots cool in their molds. Also called billet header; casting header; header; ingot pipe filler; pipe-out man. *D.O.T. 1.*

ingot iron. Iron of comparatively high purity, produced, in the same way as steel, in the open-hearth furnace, but under conditions that keep down the carbon, manganese, and silicon content. *C.T.D.*

ingotism. A defect common to almost all metal ingots in which metal crystals (dendrites) tend to grow at right angles to the walls of the mold and form planes of weakness at their junctions; these make the ingot tender and it tends to tear apart when rolled. *Newton, p. 495.*

ingot metal. Any metal which, while molten, is poured into molds, giving it thus a temporary massive shape suitable for further working by rolling or forging. *Standard, 1964.*

ingot mold. The mold or container in which molten metal is cast and allowed to solidify in order to form an ingot. *C.T.D.*

ingot pitch. The chemical condition in which metal is fit to be cast into ingots. *Standard, 1964.*

ingot saw. A saw, run at a high rate of speed and having at its cutting edge a fusing action; employed in cutting hot ingots. *Standard, 1964.*

ingot structure. The general arrangement of crystals in an ingot, which consists typically of chill, columnar, and equiaxed crystals. According to the relations between the mass and the temperature of the molten metal and mold respectively, one or two types of crystals may be absent. *C.T.D.*

ingotten. Eng. A blue marl, Upper Lias, Yeovil. Probably ungotten. *Arkell.*

ingrain. Eng. A portion of coal given above the quantity purchased for good measure; usually a quarter-chaldron added to five chaldrons. *Fay.*

ingredient. The primary and higher order reactants of the resins and the chemical constituents of the molding compound, such as plasticizer, lubricant, solvent, catalyst, stabilizer, fire retardant, hardener, and coloring material. *BuMines R.I. 5971, 1962, p. 3.*

ingress. a. A place for entering; a way of entrance. *Webster 2d.* b. In underground bituminous mining there are three methods of ingress—by drift, shaft, or slope. Drift mines are opened by driving horizontally from the side of an elevation into the seam; shaft mines by sinking a vertical shaft through the overlying strata into the seam; and slope mines by driving an inclined entry through the overlying strata through the surface into the seam. *B.C.I.*

ingression. The entering of the sea at a given place. *Schieferdecker.*

ingression coast. Coast, the lower parts of which have been invaded by the sea (drowned valleys, bays, etc.). *Schieferdecker.*

ingrown meander. A meander deepened as a result of the rejuvenation of a stream course, as from downvalley tilting. *A.G.I. Supp.*

inhaler. Something from or through which one inhales; specifically, an appliance or apparatus of different forms and uses; such as, (1) for taking the chill from the air before it reaches the lungs, (2) for filtering out irondust or other injurious substances from the air breathed through it, (3) for administering medicaments or anesthetics by inhalation, or (4) for permitting the supply of fresh air to a diver or miner. *Standard, 1964.*

inhaul. The line or mechanism by which a cable excavator bucket is pulled toward the dump point. *Nichols.*

inhaul cable; digging line. In a cable excavator, the line that pulls the bucket to dig and bring in soil. *Nichols.*

inherent ash. a. The minerals or inorganic substances in coal which were present in the original plants that ultimately formed the coal seam. The inherent ash is not visible and cannot be removed by cleaning and usually amounts to about 1 percent. Also called constitutional ash. *Nelson.* b. Widely used to designate the part of the ash content of a coal that is structurally part of the coal itself and cannot be separated from it by any mechanical means. Also referred to as fixed ash. *Mitchell, p. 60.* Called dirt. Opposite of free ash. *Pryor, 3.*

inherent bursts. Rock bursts that occur in development. They may be divided into two classes—those due to violent arching and those occasioned by the influence of fissures or adjacent excavations on the stress distribution. *Spalding, pp. 39-40.*

inherent floatability. Property considered by some physicists to be possessed by certain naturally occurring minerals, which readily respond without pretreatment to levitation by the froth-flotation process; by other workers considered due to slight surficial contamination during mining and transport. *Pryor, 3.*

inherent mineral matter. That portion of the mineral matter of coal organically combined with the coal. It contains elements that have been assimilated by the living plant, such as iron, phosphorus, sulfur, calcium, potassium, and magnesium. *A.G.I.*

inherent moisture. a. In general, the moisture that is present in the coal in the bed. *Mitchell, p. 648.* b. Of coal, that remaining after natural drying in air. *Pryor, 3.* c. Maximum moisture which a sample of coal will hold at 100 percent humidity and atmospheric pressure. *Bennett 2d, 1962 Add.* d. *See* moisture in the air-dried sample. *B.S. 3323, 1960.* e. *See* moisture content. *Nelson.*

inherent settlement. The sinking of a foundation caused by the loads it superimposes on the soil below it, rather than by the loads on any adjacent foundation. *See also* interference settlement. *Ham.*

inherited characteristic (of soil). Any characteristic of a soil that is directly attributable to the nature of the parent material as contrasted to those characteristics partly or wholly attributable to the processes of soil formation. Example, the red color of a soil is inherited if it is caused entirely by the fact that the parent material was red. *Stokes and Varnes, 1955.*

inherited drainage. *See* superposed. *Stokes and Varnes, 1955.*

inherited stream. Proposed by Shaler for the type now known as a superposed stream. Obsolete. *A.G.I.*

inherited structure. An original structural feature of the country rock that has been faithfully preserved after its replacement by ore. *Schieferdecker.*

inhibiting pigment. Certain pigments, such as zinc chromate, which are added to paints, normally in relatively high proportions, and help by chemical action to retard the corrosion of metals. *Taylor.*

inhibitor. a. A substance which, when added to cement, has the capacity to slow down or lengthen the normal time required for that specific cement to set; also, a substance added to drilling mud to check or slow down organic or chemical deterioration or change in the physical characteristics of the drilling mud. *Long.* b. A substance which when present in an environment substantially decreases corrosion. *BuMines Bull. 619, 1964, p. 206.*

initial consolidation. A comparatively sudden reduction in the volume of a soil mass under an applied load due principally to the expulsion and the compression of gas in the soil voids preceding primary consolidation. Also called initial compression. *ASCE P1826.*

initial depression. The total water gage actually produced by a mine fan. *See also* theoretical depression. *Nelson.*

initial dip. The angle of slope of bedding surfaces at the time of deposition. The contacts between layers are usually approximately parallel with the surface of deposition unless subsequently altered by differential compaction or some other deformational processes. *A.G.I.*

initial drying shrinkage. The difference between the length of a specimen (molded and cured under special conditions) and its length when dried to constant length, expressed as a percentage of the dry length. *Taylor.*

initial face. In quarrying, the face formed by the blasting of the slope. *Streefkerk, p. 14.*

initial fault scarp. A scarp created directly by faulting. *Compare* faultline scarp. *Stokes and Varnes, 1955.*

initial impulse. *See* first arrival. *Schieferdecker.*

initial kick. *See* first arrival. *Schieferdecker.*

initial pressure. In a process, the temperature of the fluid entering the process. Final pressure is that of fluid leaving process. *Strock, 10.*

initial rate of absorption. *See* absorption rate.

initial set. The beginning of the setting action of mortar. *A.R.I.*

initial setting time. The time which must elapse before a concrete mix is able to support a small load without sinking. For general purposes this may be taken as being about 1 hour for wet concrete in warm weather. *See also* final setting time. *Ham.*

initiating explosive. *See* primary explosive. *Bennett 2d, 1962.*

initiation. The process of causing a high explosive to detonate. The initiation of an explosive charge requires an initiating point, which is usually a primer and electric detonator, or a primer and a detonating cord or fuse. *Nelson.*

inject. To introduce, under pressure, a liquid or plastic material into cracks, cavities, or pores in a rock formation. *See also* grout. *Long.*

injected. Describing the relationship of an intrusive igneous rock, or other mobile rock material, that has been erupted between rock walls so that, at the time of formation, there were older rocks adjacent to it. *Stokes and Varnes, 1955.*

injected hole. A borehole into which a cement slurry or grout has been forced by high-pressure pumps and allowed to harden. *Long.*

injected igneous body. An intrusive igneous body that is entirely enclosed by the invaded formations (or country rock), except along the relatively narrow feeding channel. Examples are dikes, laccoliths, phacoliths, sills, etc. Contrasted with subjacent igneous body. *A.G.I.*

injection. The intrusion of an ore-bearing magma into the host rock or into surrounding rocks; the ore liquid may have resulted from gravitative crystallization differentiation and the remelting of the accumulated crystals, the formation of a residual ore magma, the separation of an immiscible liquid, or by the selective remelting (anatexis) of the ore substance in a pre-existent rock. *Schieferdecker.*

injection gneiss. A gneiss, the banding of which is wholly or partly due to lit-par-lit injection of granitic magma. *See also* composite gneiss; gneiss; migmatite. *A.G.I.*

injection metamorphism. Metamorphism caused by intimate injection of sheets and streaks of liquid magma into zones bordering plutonic igneous rocks. *A.G.I.*

injection molding. A process sometimes adopted for the shaping of nonplastic ceramics, for example, alumina. A plasticizer such as polystyrene or phenol-formaldehyde composition is mixed with the ceramic powder and the batch is then warmed and injected into the die. *Dodd.*

injection pressure. The total amount of pressure required to force a liquid or grout into cracks, cavities, and pores in rocks or other substance. *Long.*

injection theory. The theory that a vein was filled first with molten mineral. *Fay.*

injection well. *See* input well.

injector. a. Any apparatus used to force, under pressure, material into an opening in another material. *Compare* cement injector. *Long.* b. A device used to force feed water into a boiler by the direct action of steam. *Long.* c. Mechanism used for spraying fuel oil into the combustion-type engine or to spray a fine oil mist into a stream of air or steam. *See also* line oiler. *Long.*

injunction. A judicial order or process, operating upon the person requiring the party to whom it is directed to do or (usually) refrain from doing some designated thing. *Standard, 1964.*

injury. In mining, personal damage resulting from accident. *Grove.*

ink, ceramic. An inorganic coloring material suspended in a suitable oil vehicle. Also known as stamping; printing ink. *ACSB-3.*

inkstone. a. Native copperas (melanterite), or a stone containing it. Used in inkmaking. *Webster 2d.* b. A stone slab used in preparing India ink for use. *Webster 2d.*

inky sapphire. Very dark blue sapphire. *Shipley.*

inland earthquake. An earthquake, the origin of which lies below a continent. *Schieferdecker.*

in lb Abbreviation for inch-pound. *BuMin Style Guide, p. 60.*

inlet. A bay or a recess in the shoreline of a sea, lake, or river; a narrow body of water running into the land or between islands. *Webster 3d.*

inlier. a. A more or less circular or elliptical area of older rocks surrounded by younger strata. Often the result of erosion of the crest of an anticline. Opposite of outlier. *A.G.I.* b. An underlying formation exposed by the removal of part of an overlying formation, which surrounds the exposure of the underlying formation. Ordinarily, the inlier is older, underlying strata, which is surrounded by younger, overlying strata; but the reverse may be true where the overlying rock is part of an overthrust sheet. *Bureau of Mines Staff.*

in line. a. To be over the center of a borehole and parallel with its long axis. *Compare* aline. *Long.* b. A drill motor mounted in such a manner that its drive shaft and the drive rod in the drill swivel head are parallel; also, a drill motor mounted in such a manner that the shaft driving the drill-swivel-head bevel gear and the drill-motor drive shaft are centered in a direct line and parallel with each other. *Long.* c. Similar units mounted together in a line. *See also* bank, o. *Long.*

in-line valve. A valve which proves the cage in the correct position relative to the decking level. *Sinclair, V, p. 79.*

in min^{-1} Abbreviation for inches per minute. *BuMin Style Guide, p. 60.*

inmost. Being at a point, place, or position farthest from the exterior; deepest within; innermost; as, the inmost depths of a mine. *Standard, 1964.*

innelite. A barium silicate from a pegmatite from the Inagli massif, Aldan, U.S.S.R., containing about 40 percent BaO, to be described by Kravchenko. Status doubtful pending full description. *Hey, M.M., 1961.*

inner barrel. Synonym for inner tube. *Long.*

inner core. The center of the earth which geologists believe is solid, dense material. *MacCracken.*

inner depression; central depression. Low inner portion of reef islands, between seaward rise and lagoonward rise, locally with shallow standing water at high tide. *Schieferdecker.*

inner fault face. The side of the fault plane facing the downfaulted block. *Schieferdecker.*

inner-gage stone. *See* inside-gage stone. *Long.*

inner mantle. The lower part of the mantle. *Schieferdecker.*

innermost isoseismal. The isoseismal line surrounding the area hit the strongest by an earthquake. *Schieferdecker.*

innerseal inserter. Positions rubber sealers in caps and can lids by hand. *D.O.T. 1.*

inner shoreline. The mainland shoreline. *Schieferdecker.*

inner space. A term used more and more frequently in connection with the seas, especially in underwater exploration. *Hy.*

inner stone. A diamond inset on the inside wall of a bit crown. *Long.*

inner tube. The inside tube, which acts as the core container of a double-tube core barrel. *Long.*

inner-tube adaptor. A tubular part that can be attached to the inner tube of EXT- and AXT-letter-name core barrels to adapt them for use with EXK- and AXK-letter-name bits and shells; also, sometimes incorrectly used as a synonym for lifter case. *Long.*

inner-tube core lifter. A core lifter designed to fit and work inside a tubular container fitted to the lower end of the inner tube of a double-tube core barrel. *Long.*

inner-tube extension. A tubular part attachable to the lower end of the inner tube of a double-tube core barrel to lengthen the inner tube; also, sometimes incorrectly used as a synonym for lifter case. *Long.*

inner-tube shoe. The replaceable lower end of an inner tube of a double-tube core barrel. *Long.*

innings. Land which has been reclaimed from the sea or from a marsh. *Ham.*

inninmorite. a. A rhyodacite having phenocrysts of highly calcic plagioclase. Similar to cumbraite. *A.G.I.* b. A glassy dike containing large phenocrysts of plagioclase and pyroxene in a groundmass of sodic plagioclase, augite, and glass. *Webster 2d.*

innocent salting. Although this is not a fraudulent practice, it should be guarded against. An honest but careless assayer may salt a poor ore by using a crucible in which rich ores have been melted. The remedy for this is to use new crucibles. Particles of rich ore may also remain in sieves, mortars, or on bucking boards if they are not properly cleaned between runs. *Hoov, p. 79.*

inoculation. The addition of a material to molten metal to form nuclei for crystallization. *ASM Gloss.*

inorganic. Applied to all substances that do not contain carbon as a constituent, also to a few others in which carbon is present in an unimportant sense, for example, metallic carbonates. Metals, rocks, minerals and a variety of earths are all inorganic. *Hansen.*

inorganic chemistry. That which deals with compounds not containing carbon (cyanides and carbonates excepted). *Pryor, 3.*

inorganic silt. *See* silt. *ASCE P1826.*

inosilicate. A silicate structure in which the SiO_4 tetrahedra are joined together to produce chains of indefinite length, the ends of which are at the surfaces of the crystal. The amphiboles are an example. Synonym for metasilicate. *A.G.I.*

in-over; in-o'er. Same as inby. *Fay.*

in-pile. Used to designate experiments or equipment inside a reactor. *L&L.*

in-pile loop. *See* loop. *L&L.*

in place. Rock occupying the position, relative to surrounding rock, that it had when it was formed. If an ore body is continuous to the extent that it maintains the character it had when it was formed, then it is in place. *See also* in situ. *Fay.*

input. Ore fed into a mill as opposed to output. *Sinclair, W. E., p. 484.*

input shaft. The shaft that delivers engine power to a transmission or clutch. *Nichols.*

input well; injection well. A well used for injecting fluids into an underground stratum. *Institute of Petroleum, 1961.*

inquartation; quartation. In bullion assay, dissolution of silver from associated gold by use of nitric acid. For this to succeed, the silver/gold ratio must be at least 3 to 1. *Pryor, 3.*

inrush of gas. *See* afterblast. *Cooper, p. 195.*

inrush of water. A sudden and often overwhelming flow of water into mine workings. Inrushes of water may be caused by striking unsuspected waterlogged old workings which possibly were shown inaccurately on the mine plans. Faults have also been responsible for serious inflows of water. A fault may retain large volumes of water above or at the same level as workings approaching it. It is usual to drive exploring headings in the direction of the suspected water danger. *See also* inundation. *Nelson.*

in sec^{-1} Abbreviation for inches per second. *BuMin Style Guide, p. 60.*

inselberg. a. A prominent steep-sided residual hill or mountain rising abruptly from a plain, a type of landscape common in Africa. The residuals are generally bare and rocky, large and small, isolated, and in hill and mountain groups. They are surrounded by lowland surfaces of erosion that are generally true plains (distinguished from peneplains). *A.G.I.* b. An isolated mountain partly buried by the debris derived from and overlapping its slopes. *Webster 3d.*

insensible perspiration. The normal condition of the skin in which only slight perspiration or sweating takes place. No moisture is perceptible because it evaporates as it is formed. *Spalding, p. 257.*

insequent. Developed on the present surface but not consequent on nor controlled by the structure; descriptive of a certain type of streams, drainage, and dissection. A type of drainage in which young streams flowing on a nearly level plain wander irregularly. *Fay.*

insequent stream. a. Sometimes no guiding weak structures are revealed on the consequent valley sides. Such is the case when the rocks are either homogeneous or horizontally stratified. Then a lateral tributary stream growing headwards is accidentally located. Insequent may be applied to such a stream. *A.G.I.* b. A stream, the course of which is not due to, or consequent upon, determinable factors. *A.G.I.*

insert. a. A part formed from a second material, usually a metal, which is placed in the mold and appears as an integral structural part of the final casting. *ASM Gloss.* b. A removable portion of a die or mold. *ASM Gloss.* c. Formed pieces of sintered cobalt-tungsten carbide mixture (in which diamonds may be inset), brazed into slots or holes in bits or into grooves on the outside surface of a reaming shell to act as cutting points, reaming surfaces, or wear-resistant pads or surfaces of reaming shells or outside surfaces of other pieces of drilling equipment or fittings. Also called inserts. *Compare* slug. *Long.* d. Anything placed in a hole, groove, or slot prepared for it. *Long.*

insert bit. A bit into which inset cutting points of various preshaped pieces of hard metal (usually a sintered, tungsten carbide-cobalt powder alloy) are brazed or hand-peened into slots or holes cut or drilled into a blank bit. Hard-metal inserts may or may not contain diamonds. Also called slug bit. *See also* insert. *Long.*

inserted-blade cutters. Cutters having replaceable blades that are either solid or tipped and usually adjustable. *ASM Gloss.*

inserted-joint casing. Casing, the box-thread ends of which are belled or swaged outward to receive the pin-thread portion of another piece of casing when coupled together; also, sometimes incorrectly used as a synonym for flush-coupled casing. *Long.*

inserted nut. A term designating disk, segment, or cylinder wheels with nuts imbedded in the back to facilitate mounting on the grinding machine. *ACSG, 1963.*

inserted rod-type pick. *See* sintered carbide-tipped pick. *Nelson.*

insertion loss. The insertion loss of a transducer connecting an energy source and an energy load is the transmission loss measured by the ratio of (1) the load power which would be measured if the load were connected directly to the source, to (2) the actual load power when source and load are connected by the transducer in question. *Hy.*

insert reaming shell. A reaming shell the reaming diamonds of which are inset in shaped, hard, metal plates brazed into grooves cut into the outside surface of the shell. *Long.*

insert set. Bits or reaming shells set with inserts. *See also* insert. *Long.*

insert-type bit. *See* insert bit. *Long.*

inset. a. Eng. The entrance to a mine at the bottom or part way down a shaft where the cages are loaded. A landing. *Fay.* b. The entrance to underground roads from the shaft. *Mason.* c. The opening from the mine shaft to a seam of coal. *C.T.D.* d. A surface into which diamonds or other cutting points are embedded or set; also, the act or process of embedding such materials in a surface. *Long.* e. *See* phenocryst. *A.G.I.*

inset tee box. A junction box designed to be mounted in an inset to enable a connection to be taken from a shaft cable. *B.S. 3618, 1965, Sec. 7.*

inshore. The region shoreward of a certain depth of water, the 3- or the 5-fathom isobath. *Hy.*

inshore currents. The movement of water inside the surf zone, including longshore and rip currents. *Hy.*

inshore water. Water contiguous to land in which the physical properties are considerably influenced by continental conditions. *Hy.*

inside. A term often used to designate the interior of a mine. *Fay.*

inside angling. *See* angling. *Sinclair, V, p. 33.*

inside clearance. The difference between the outside diameter of a core and the inside diameter of the core-barrel parts through which the core passes or enters; also, the annular space between the inner and outer tubes in a double-tube core barrel. *See also* clearance. *Long.*

inside coupled. Coupled in the same manner as flush-coupled casing. *See also* flush-coupled casing. *Long.*

inside-coupled casing. Synonym for flush-coupled casing. *Long.*

inside face. That part of the bit crown nearest to and/or parallel with the inside wall of an annular or coring bit. *Long.*

inside foreman; inside superintendent. An underground foreman or superintendent. *Fay. See also* pit boss; shift boss.

inside gage. The inside diameter of a bit as measured between the cutting points, such as between inset diamonds on the inside-wall surface of a core bit. *Long.*

inside-gage stone. A diamond set in the inside-wall surface of the crown of a diamond core bit so that it cuts sufficient inside clearance to permit the core to pass through the bit shank and into the core barrel without binding. Also called inner stone; inside kicker; inside reamer; inside stone. *Long.*

inside-haulage engineer. In bituminous coal mining, one who operates a mine locomotive to haul trains of cars along underground haulageways in a mine. *D.O.T. 1.*

inside kicker. Same as inside-gage stone. *Long.*

inside parting A side track or parting some distance from the beginning of a long entry, at which cars are left by a gathering driver. Also called a swing parting. *Fay.*

inside reamer. Same as inside-gage stone. *Long.*

inside slope a. A slope on which coal is raised from a lower to a higher entry, but not to the surface. *Fay.* b. An inside slope is a passage in the mine driven through the seam by which coal is brought up from a lower level. *Korson.*

inside stone. Same as inside-gage stone. *Long.*

inside tap. A tapered, externally threaded fishing tool, which is inserted inside the open ends of tubular drill fittings lost in a borehole and, when turned, grips and holds them so that they may be lifted and recovered. *Long.*

inside thread. Synonym for box thread. *Long.*

inside upset. A tubular piece having ends that are thickened for a short distance on the inside. *Long.*

inside work. a. The drilling of boreholes in underground workplaces; also applied to work done on the surface with the drill machine and tripod completely housed. *Long.* b. Any work in the mines. Most commonly used in bituminous coal mining. *Bureau of Mines Staff.*

in situ. In the natural or original position. *Webster* 3d. Applied to a rock, soil, or fossil when occurring in the situation in which it was originally formed or deposited. *See also* in place. *Fay.*

in situ coal. Autochthonous coal. *Tomkeieff, 1954.*

in situ combustion. An experimental means of recovery of oil of low gravity and high viscosity which is unrecoverable by other methods. The essence of the method is to heat the oil in the horizon to increase its mobility by decreasing its viscosity. Heat is applied by igniting the oil sand and keeping the fire alive by the injection of air. The heat breaks the oil down into coke and lighter oils and the coke catches fire. As the combustion front advances, the lighter oils move ahead of the fire into the bore of a producing well. *Williams.*

in situ concrete. Concrete which is deposited in the place where it is required to harden as part of the structure, as opposed to precast concrete. *Taylor.*

in situ concrete piles. Concrete piles formed by pouring concrete into holes bored or driven into the ground, as distinct from precast concrete piles driven or jacked into the ground. *See also* bored pile. *Ham.*

in situ origin theory. The theory of the origin of coal that holds that a coal was formed at the place where the plants from which it was derived grew. *See also* autochthonous coal; swamp theory. *A.G.I.*

in situ soil tests. Tests carried out on the ground, in a borehole, trial pit, or tunnel, as opposed to a laboratory test. An in-situ soil test may be a vane test, dynamic penetration test, etc. *Nelson.*

insol Abbreviation for insoluble. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-97.*

insolation. The absorption of solar energy by the surface of the earth. *Hy.*

insoluble. a. Incapable of being dissolved in a particular liquid. *Shell Oil Co.* b. Term used of solid which does not dissolve under specified attack. No known substance is completely insoluble, so the term refers to systems characterized by very low solubility. *Pryor, 3.* c. As used in smelter contracts, the terms insoluble and silica are often used interchangeably, but they are different things. Silica is determined by a special fusion assay. Insoluble is the residue left after the ore has been digested with acid in the course of assaying for some of the metals. The insoluble is generally silica plus something else, often alumina, since this substance is not always dissolved by acids. *Lewis, p. 366.*

insoluble anode. An anode that does not dissolve during electrolysis. *ASM Gloss.*

inspection bath; inspectoscope. An immersion tank containing an index oil having an index of refraction (n), approximately equal to 1.544, and fitted to examine quartz in polarized light and in an arc light. *AM, 1.*

inspector. One employed to make examinations of and to report upon mines and surface plants relative to compliance with mining laws, rules and regulations, safety methods, etc. State inspectors have authority to enforce State laws regulating the working of the mines. *Fay.* Federal inspectors have authority to enforce Federal laws in coal mines. *Bureau of Mines Staff. See also* mine inspector.

inspirator. a. A kind of injector for forcing water by steam. *Webster 2d.* b. Synonym for injector. *See also* injector, b. *Long.*

inspiratory reserve volume. The amount of air that can be brought in by forcible inspiration after completion of a normal inspiration. It averages about 2½ liters at rest and becomes smaller as the tidal volume increases. *H&G.*

inspissated. Thickened as by evaporation and oxidation, as, for example, the pitch or gum resulting from petroleum after long exposure. *Fay.*

inspissation. Drying up. An inspissated oil deposit is one from which the gases and lighter fractions have escaped, and only the heavier oils and asphalt remain. *A.G.I.*

installment bond. An interest-bearing bond payable, principal and interest, in equal annual installments. *Fay.*

instantaneous cuts. Cuts characterized by the drilling and ignition being done so that all the holes can cooperate and break smaller top angles. They are called instantaneous cuts as they are preferably ignited by instantaneous detonators to ensure a simultaneous detonation of all the charges in the cut. Some examples are: blasjo-cut; WP-cut; presplit cut. *Langefors, pp. 193-194.*

instantaneous detonator. A detonator in which there is no designed delay period between the passage of an electric current through the detonator and its explosion. *B.S. 3618, 1964, sec. 6.*

instantaneous fuse. Term used to distinguish rapid-burning from slow fuse. Ignition rate is several thousand feet per minute, but slower than that of detonating fuse. *Pryor, 3.* Example: PETN.

instantaneous relays. These relays, as their name implies, operate within a few cycles after faults are detected. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

Institution of Mining and Metallurgy; I.M.M. The London Institution of Mining and Metallurgy is the central British organization for regulating the professional affairs of suitably qualified mining engineers engaged in production and treatment of nonferrous metals and rare earths. Related bodies are those of Canada (Can. I.M.M.), Australia (Aust. I.M.M.), and Republic of South Africa (Rep. S. Af. I.M.M.). *Pryor, 3.*

Institution of Mining and Metallurgy screen scale; I.M.M. screen scale. Laboratory screens of usual 8 inch round size, in which the diameter of each new wire is equal to the distance between successive parallel wires. Therefore, in a 60-mesh screen (having 60 wires per linear inch measured along either the warp or the woof) the aperture is a square measuring 1/120th inch on the side. The meshes used are 5, 8, 10, 12, 16, 20, 30, 40, 50, 60, 70, 80, 90, 100, 120, 150 and 200. *Pryor, 3.*

instratified. Interstratified. *Standard, 1964.*

instroke. The right to raise or take ore from a leased mine through the shaft or tunnel of an adjoining mine. *Ricketts, p. 34.*

instrument. A telescopic level, such as a transit or a builders' level. *Nichols.*

instrumentalities of mining. The true meaning of such expressions as shafts, tunnels, levels, uprises, cross cuts, inclines, sump, etc. when applied to mines signifies instrumentalities whereby and through which such mines are opened, developed, prospected and worked. *Ricketts, I.*

instrumentation. Control by servo-mechanisms. Use of signaling devices originating with the process to indicate, vary or regulate performance. *Pryor, 3.*

instrument transformers. Their purpose is to insulate the relays from line voltage and to reduce line current and voltage to values that can be applied to the sensitive mechanisms common to relays. These devices are classified with respect to the rate of speed at which they operate. Basically, these classifications are: (1) instantaneous; (2) high-speed; (3) time delay; and (4) combinations of the three. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

insufflator. An injector for forcing air into a furnace. *Webster 3d.*

insular shelf. The zone surrounding an island extending from the line of permanent immersion to about 100 fathoms (600 feet) depth where a marked or rather steep descent toward the great depths occurs. *A.G.I.*

insular shoulder. *See* insular talus. *H&G.*

insular slope. The declivity from the offshore border of the insular shelf at depths of from 50 to 100 fathoms (300 to 600 feet) to oceanic depths. It is characterized by a marked increase in gradient. *Compare* island slope. *A.G.I.*

insular talus; insular shoulder; insular slope. The slope from the lower edge of an insular shelf into deeper water. A similar slope from the lower edge of a continental shelf is called continental talus. *H&G.*

insulate. To separate or to shield (a conductor) from conducting bodies by means of nonconductors, so as to prevent transfer of electricity, heat, or sound. *Webster 3d.*

insulated stream. A stream or reach of a stream is insulated with respect to ground water if it neither contributes water to the zone of saturation nor receives water from it. It is separated from the zone of saturation by an impermeable bed. *A.G.I.*

insulated-wire system. A mine signaling system in which pull wires are arranged along the road to operate contact makers from any point. This system is common on rope-hauled man-riding installations. *Mason, v. 2, p. 539.*

insulating backup material. Nonrefractory material of high thermal insulating value for use on the outside of furnace walls to reduce the heat loss. *A.R.I.*

insulating brick. A brick placed between the refractory brick of a firebox and the furnace walls in order to prevent the escape of heat. Some types of insulating brick can also be used as firebrick. *API Glossary.*

insulating concrete. A mixture of diatomaceous earth, and Portland cement. *Bureau of Mines Staff.*

insulating firebrick. A firebrick having a low thermal conductivity and suitable for use in the insulation of industrial furnaces. *HW.*

insulating materials. Materials which offer a relatively high resistance to the passage of an electric current, including practically all the nonmetallic substances and compounds, such as wood, porcelain, paper, asbestos, rubber, glass, silk, cotton, oil, etc. *Mason, V. 2, p. 393.*

insulating refractory. A refractory material with low thermal conductivity, for use as a furnace lining at temperatures higher than those permissible for other insulating materials. *Francis, 1965, v. 2, p. 653.*

insulating sleeves. *See* jointing sleeves. *B.S. 3618, 1964, sec. 6.*

insulating water bottle. In oceanography, an instrument used for the accurate determination of the temperature of the sea at moderate depths. Also called Nansen-Pettersson water bottle. *C.T.D.*

insulation. a. If electric, separation of a conductor or charged body from earth or from other conductors by means of a nonconducting barrier. *Pryor, 3.* b. If thermal, prevention of passage to or from a body of external heat, by use of nonconducting envelope. *Pryor, 3.* c. *See* capacity insulation. *ACSG, 1963.*

insulation resistance. a. The alternating-current resistance between two electrical conductors or between two systems of conductors separated by an insulating material. *Webster 3d.* b. All insulators carry a certain small leakage current; they act as an extremely high resistance which is called the insulation resistance of the system. The value of the insulation resistance of a cable or of an electric motor is very high; but it is inversely proportional to the length of the cable, since each section of the cable forms an additional parallel path for any leakage current. *Mason, v. 2, p. 394.*

insulator. a. A supporting device made of porcelain, glass, or the equivalent. Insulated J hooks are acceptable for suspending insulated cables in temporary installations. *BuMines Coal-Mine Inspectors' Manual, June 1966, Pt. 3-18e, p. 53.* b. That which insulates, especially: (1) a substance that is a nonconductor of electricity, heat, or sound, as cotton, gutta percha, silk, and rubber, the dielectrics most commonly used for covering wires conveying electric currents; or (2) a device made of an insulating substance for preventing the passage of electricity, heat, or sound. *Standard, 1964.*

insulator-tube header. One who forms heads on porcelain tube insulators by means of hand capping press, inserting clay tube in machine and pulling lever to form the head. *D.O.T. 1.*

insweep. Term applied to the lower part of a glass container if the sides curve inward or taper towards the base. *Dodd.*

intact clay. A clay without visible fissures. *See also* fissured clay. *Ham.*

intaglio. Decoration which is incised or sunken, in contrast to ornament in relief. *Haggar.*

intake. a. The passage by which the ventilating current enters a mine. *See also* downcast, which is more appropriate for a shaft; intake for an adit or entry. *Fay.* b. Scot. One who works underground at odd work. *Fay.* c. In underground mining, ventilating passage through which fresh air is conducted via an adit, drill hole, or downcast shaft to the workings. *Pryor, 3.* d. N. of Eng. Any roadway underground through which fresh air is conducted to the working face. *Trist.* e. The passage and/or the current of ventilating air moving toward the interior of a mine. *Long.* f. The suction pipe or hose for a pump. *Long.* g. In hydraulics, the point at which the water or other liquid is received into a pipe, channel, or pump. *Long.* h. The headworks of a conduit; the place of diversion. *Seelye, 1.*

intake area. That part of the surface of the lithosphere where water passes into the lithosphere on its way to the zone of saturation. *Fay.*

integral action. Regulating movement proportional to the magnitude and duration of the error under scrutiny. *Pryor, 3, p. 31.*

integral control. In automation, progressive restoration of a correct running condition after deviation has occurred, so that overmodulation (hunting) is avoided. *Pryor, 3.*

integral pilot. A pilot-type noncoring bit having a pilot section that is an integral, nonreplaceable part of the bit. *Long.*

integral plot. In particle sizing, Schumann plot. *See also* Schumann plot. *Pryor, 3.*

integral steel. *See* stem, a and b. *B.S. 3618, 1964, sec. 6.*

integrated flux. Flux multiplied by time, usually expressed in nvt, where n equals the number of particles per cubic centimeter, v equals their velocity, and t equals time. *See also* flux. *L&L.*

integrated train. A long string of cars, permanently coupled together, that shuttles endlessly back and forth between one mine and one generating plant, not even stopping to load and unload, since rotary couplers permit each car to be flipped over and dumped as the train moves slowly across a trestle. *Bureau of Mines Staff.*

integrating meter. A meter which records the total quantity of liquid or electricity passing through it. *Ham.*

integration. The development of large crystals from small ones by recrystallization. *G.S.A. Mem. 50, 1952, p. 11.*

integrator. A circuit whose output is substantially proportional to the time integral of the input. *NCB.*

intense. Term used to describe an anomaly whose metal values rise sharply to well-defined peaks. *Hawkes, 2, p. 154.*

intensitometer. A device for determining relative X-ray intensities during radiography in order to control exposure time. *NRC-ASA N1.1-1957.*

intensity. a. As applied to color, the comparative brightness (vividness) or dullness or brownishness of a color; its comparative possession or lack of brilliance; therefore, the variation of a hue on a vivid-to-dull scale. *See also* hue; tone. *Shipley.* b. As applied to earthquakes, a number related to the effects of earthquake waves on man, structures, and the earth's surface at a particular place. *Compare* magnitude, b. *Leet.*

intensity level (sound energy flux density level). The intensity level, in decibels, of a sound is 10 times the logarithm to the base 10 of the ratio of the intensity of this sound to the reference intensity. The reference intensity must be stated explicitly. *Hy.*

intensity of magnetization. The magnetic moment per unit volume. *A.G.I.*

intensity of pressure. The pressure per unit area. *Seelye, 1.*

intensity of radiation. At a given place, the energy per unit time entering a sphere of unit cross-sectional area centered at that place. The unit of intensity is the erg per square centimeter second or the watt per square centimeter. *NCB.*

intensity of rainfall. Rainfall observations have proved that a period of rainfalling in a summer month will produce only about two-thirds of the runoff of a similar period of rain falling in a winter month. The difference is due to absorption by growing vegetation. *Ham.*

intensity scale. A scale for objectively measuring the relative intensities of earthquakes. *Schieferdecker.*

interbedded. Occurring between beds, or lying in a bed parallel to other beds of a different material; same as interstratified. *Fay.*

intercalary. Inserted or coming between others; introduced or existing interstitially; as, intercalary beds. *Fay.*

intercalate. Applied generally to a body of one kind of material interlaminated with another and particularly to lamellar inclusions of one mineral in another, the former being oriented more or less exactly in planes related to the crystal structure of the latter, for example, in a perthite, the intercalates of plagioclase in orthoclase, and in certain minerals characterized by schiller structure. *Holmes, 1920.*

intercalated. Descriptive of a body of rock interbedded or interlaminated with another body of different rock. Also, descriptive of a mineral interbedded or interlaminated with another mineral. *A.G.I.*

intercept. The length of a crystallographic axis of reference between the origin of the crystallographic axes and the intersection of the crystallographic axis with the crystal face. The ratio of the intercepts a crystal face makes with all the crystallographic axes constitutes a parameter that defines the crystal face. *Bureau of Mines Staff.*

intercepting channel. A channel excavated at the top of earth cuts, or at the foot of slopes, or at other critical places to intercept surface flow; a catch drain. *Seelye, 1.*

intercepting drain; curtain drain. A drain that intercepts and diverts ground water before it reaches the area to be protected. *Nichols.*

intercept method. A method of determining grain size by counting the number of grains per unit length intersected by straight lines. *ASM Gloss.*

intercepts. a. That portion included between two points in a borehole as between the point where the hole first encounters a specific rock or mineral body and where the hole enters a different or underlying rock formation. *Long.* b. Crystallography, the distances cut off on axes of reference by planes. *Fay.*

intercept time. *See* delay time. *A.G.I.*

interchange. The mixing of a tracer and an added isotopic carrier so that the two participate to the same degree in any chemical reaction, showing that mixing has occurred in whatever chemical forms the tracer may have originally been distributed. *NRC-ASA N1.1-1957.*

intercolline. Placed between hills; specifically applied to depressions between the cols and crateriform hillocks of volcanic regions. *Standard, 1964. See also* col. *Fay.*

intercommunicating porosity. In powder metallurgy, in a sintered compact, the type of porosity that connects the pores in such a way that a fluid may pass from one to another through the entire compact. *ASM Gloss.*

intercooler. a. A common form of intercooler is a horizontal cylindrical chamber containing a number of thin, wrought-iron or brass tubes, like a condenser for a steam engine, through which the cooling water circulates. Air passes between the tubes, and baffle plates direct the air to all parts of the intercooling chamber. Well-designed intercoolers through which a proper amount of water is circulated will cool the air to within 15° to 20° F of atmospheric temperature. *Lewis, p. 670.* b. A radiator in which air is cooled while moving from low pressure to high pressure cylinders of a two stage compressor. *Nichols.* c. In multistage compression of air, cooling arrangement between stages. *Pryor, 3.*

intercooling. Extraction of heat from a compressed gas between two stages of compression in order to improve the efficiency of compression. *Strock, 10.*

intercrystalline. Between the crystals, or grains, of a metal. *ASM Gloss.*

interdosal rock. Means close in rock. *Lewis, p. 561.*

interest. Payment for the use of money or for the forbearance of a debt. *Hoov, p. 156.*

interested persons. Members of the mine safety committee and other duly authorized representatives of the mine workers' organization; Federal, State, and County coal-mine inspectors; and, to the extent required by Federal and State law, any other person. *U.S. BuMines Federal mine safety code—Bituminous Coal and Lignite Mines, Pt. I Underground Mines, October 8, 1953.*

interestuarine. Situated between two estuaries. *Standard, 1964.*

interface. a. Contact boundary either between two solids or between two immiscible phases (one solid and one liquid) or between two fluids (aqueous/oily or liquid/gas). When, as is usual, boundary transition is not abrupt, the terms interphase, zeta zone, zone of shear, are preferable in connection with dispersions of solids in liquids, notably with respect to the surface chemistry of finely ground ore pulps. *Pryor, 3.* b. *See* boundary plane. *Schieferdecker.*

interfacial angle. The internal or dihedral angle between any two adjacent faces of a crystal. *Fay.*

interfacial energy. Tension at interfaces between the various phases of a system which may include solid, liquid and gas interfaces, varying in their combinations and qualities. *Pryor, 3.*

interfacial tension. The contractile force of an interface between two phases. *ASM Gloss.*

interfelted. Intimately interlocked along contiguous surfaces. Descriptive of certain rock contacts and of certain mineral textures and mineral relationships. *Bureau of Mines Staff.*

interference color. One of the spectral colors produced by the strengthening or the weakening of certain wavelengths of a composite beam of light in consequence of interference. This is an important characteristic in determining minerals in thin section or in fragments under the polarizing microscope. *Webster 3d.*

interference figure. An optical figure composed of a series of spectrally colored rings combined with a blank cross (if uniaxial) or a series of spectrally colored curves or rings with two black parabolic curves called isogyres (if biaxial). The figure is observed when a properly oriented thin section or fragment of a mineral is examined in convergent light through the polarizing microscope. The interference figure, which is caused by the birefringence of the mineral and by the orientation of the mineral so that it presents an optic axis in the field of the microscope, is one of the most valuable optical aids in identifying minerals. *Bureau of Mines Staff.* Also called the direction image.

interference methanometer; refractometer. A firedamp detector based on the velocity of light. A beam of light is split into two parts which pass respectively through chambers containing pure air and the test air at velocities characteristic of the gases. When methane is present the light beams are out of step and this movement becomes a measure of the methane concentration. *Nelson.*

interference of light. Rays of light pursuing the same path, in which the waves are out of phase, suffer interference and tend to destroy one another, while waves which are in phase (crest corresponding to crest) reinforce each other. The colors seen reflected from opal and labradorite are due to interference. *Anderson.*

interference ripple marks. A special form of compound rippling consisting of polygonal pits arranged side by side forming a cell-like structure. Also called tadpole nests; dimpled current mark; cross-ripple. *Pettijohn.*

interference settlement. The sinking of a foundation caused by the loads on adjacent foundations. *See also* inherent settlement. *Ham.*

interferometer. a. An instrument used to determine the wave length of light by the production of interference with waves of known lengths. The interferometer has been used to determine coefficient of expansion of enamels and glasses. *Enam. Dict.* b. An instrument that measures the change in the refractive index of air conatining varying amounts of methane. *Roberts, I. p. 88.*

interfluent. Applied to magmas which are discharged from a volcano by way of subsurface cavities within the cone. *See also* superfluent; effluent. *Fay.*

interfluve. The area between two rivers. *Standard, 1964.*

interformational. Between formations; as, interformational conglomerate or interformational unconformity. Contrasted with intraformational. *Stokes and Varnes, 1955.*

interformational conglomerate. Those gravels and their indurated equivalents that are often present within a formation of which the constituents have a source external to the formation. *A.G.I.*

interformational sheet. An igneous body, similar to a sill, but intruded along a plane of unconformity and parallel to the bedding of one of the invaded formations. *Stokes and Varnes, 1955.*

interglacial. a. An age or time of comparatively warm or dry climate between times of glaciation. *Webster 3d.* b. Occurring or formed between two glacial epochs. *Webster 3d.*

intergranular. A textural term proposed by Evans (1916) and applied to volcanic rocks in which there is an aggregation of augite grains, not in parallel optical continuity (as in subophitic texture), between a network of feldspar laths, which may be diverse, subradial, or subparallel. Distinguished from an intersertal texture by the absence of interstitial glass, or other substances which may fill the interstices between the feldspar laths. Characteristic of certain basaltic and doleritic rocks. *Compare* granulitic. *A.G.I.*

intergranular corrosion. Corrosion which occurs preferentially at grain boundaries of a metal or alloy. *BuMines Bull. 619, 1964, p. 206.*

intergranular pressure. a. The effective pressure in a soil. *Ham.* b. *See* effective stress. *ASCE P1826.*

intergranular texture. A texture characteristic of holocrystalline basalts and doleritic rocks, resulting from the aggregation of augite grains between feldspar laths arranged in a network. *C.M.D.*

intergrown. a. Of coal and mineral matter, naturally associated and separable only by crushing or grinding. *B.S. 3552, 1962.* b. In crystallography, descriptive term for mineral species which have crystallized simultaneously and therefore become intertwined or interlocked. *Pryor, 3.*

intergrowth. An interlocking of two or more minerals that resulted from their simultaneous crystallization. Perthite is an example of intergrowth. Certain rock textures, such as graphic, micrographic, and granophyric, are intergrowth textures. *A.G.I.*

interior angle. Horizontal angle between adjacent sides of a polygon, measured within the polygon. *Seelye, 2.*

interior coalfields. U.S. Includes: Eastern interior field, Illinois, Indiana, and Kentucky; Western interior field, Great Plains States from Iowa to Arkansas; Southwestern field, Texas; and Northern field, Michigan. *Bateman, 1950, p. 647.*

interior salt dome. One of the salt domes in eastern Texas, northern Louisiana, southern Arkansas, and Mississippi located at some distance in the interior from the Gulf Coast salt domes. The three general groupings are (1) in the Tyler basin, northeastern Texas; (2) on the eastern flank of the Sabine arch in northern Louisiana; and (3) in southern Alabama, eastern Louisiana, and south-central Mississippi. *See also* salt dome; piercement dome. *A.G.I.*

interior span. A continuous beam or slab, both supports of which are continuous with adjacent spans. *Ham.*

interjointal. Situated or occurring between the joint planes of a rock. *Standard, 1964.*

interlaced; interwoven. Confusedly intertwined, as are fibers or slender crystals in some minerals. *Shipley.*

interlayer water. Water which is held between the layers of three-layer montmorillonite-type minerals (and hydrated halloysite). Because the binding between the layers in montmorillonite minerals is weak, water can enter and may cause swelling. The water is relatively easily removed (100° to 300° C). *ACSG, 1963.*

interleaved. Lying in beds between layers of rock. *Fay.*

interlobate. Situated between lobes; applied to deposits lying between adjacent glacial lobes. *Fay.*

interlock. The clutch in steel sheet piles. *Ham.*

interlocking controls. A system of electrical controls for a system of conveyors which maintains a controlled relationship between the units of the system. Sometimes applied to sequence starting controls. *ASA MH4.1-1958.*

interlocking piles. *See* steel sheet piling. *Ham.*

interlocking tile. Roofing tile having ridges and grooves which interlock when the tile are laid on the roof. *Fay.*

interlocking wedge-type capping. This type of wire rope capping is simple to apply. The sleeves are first threaded on the rope, a white metal bob is then formed on the end of the rope by untwisting the wires and cutting out the hemp core, if present, and white metal is run into a mold round the wires. The bob is allowed to cool. Two tapered interlocking steel wedges are then fitted on to the rope clear of the bob so that wedges can move forward towards the bob and grip the rope as the load is applied to the capping. The rope is cleaned of lubricant where the wedges will grip, and the groove in the wedges must be of such a size that a gap is left between the wedges so that they can grip the rope firmly. The edges of the wedges should come opposite a valley between the strands of the rope. The outer socket is now placed over the wedges and the sleeves are lightly tapped into position to hold the parts together. *Sinclair, V, pp. 26-28.*

intermediate. A secondary or auxiliary horizontal passage driven between levels in a mine, which may extend from a raise or stope and, depending upon its orientation, may be either an intermediate drift or a crosscut. *Forrester, p. 342.* Synonym for sublevel.

intermediate annealing. Annealing wrought metals at one or more stages during manufacture and before final treatment. *ASM Gloss.*

intermediate belt. Subdivision of zone of aeration. The belt that lies between the belt of soil moisture and the capillary fringe. *Leet.*

intermediate coal. A banded coal containing from 40 to 60 percent of pure, bright ingredients (vitrain, clarain, and fusain), the remainder consisting of clarodurain and durain. *Compare* bright coal, d; semibright coal; semidull coal; dull coal. *A.G.I.*

intermediate constituent. A constituent of alloys that is formed when atoms of two metals combine in certain proportions to form crystals with a different structure from that of either of the metals. The proportions of the two kinds of atoms may be indicated by formula, for example, CuZn; hence, these constituents are also known as intermetallic compounds. *C.T.D.*

intermediate cooler. In a blast furnace, a water-cooled casting, usually of copper, that is installed inside the cinder cooler. *Henderson.*

intermediate coat. The ground coat which is applied directly on the iron or steel base or the coat of enamel applied over the ground coat but over which a final coat is applied. *Enam. Dict.*

intermediate crusher. A machine of a type suitable for size reduction from about 8 to 20 mesh, for example, a pan mill or ball mill; (note, however, that a ball mill can more properly be used as a fine grinder). *Dodd.*

intermediate cut. *See* middle cut. *Nelson.*

intermediate drivage. An auxiliary horizontal passage driven between levels in a mine, which may extend from a raise or stope and may be either an intermediate drift or a crosscut. *Nelson.*

intermediate duty fire clay brick. A fire clay refractory having a pyrometric cone equivalent not lower than No. 29, or having a refractoriness of not more than 3.0 percent deformation as measured by the load test at 2,460° F (ASTM requirements). *A.R.I.*

intermediate electrode. Same as bipolar electrode. *ASM Gloss.*

intermediate gate. A gate between the central gate and the end gates particularly in double-double unit layouts. *Nelson.*

intermediate haulage. a. The transportation of mined coal or ore from the face haulage to that point where it is accessible to the main line. It is accomplished by conveyors, belts, or locomotives and mine cars. *Woodruff, v. 3, p. 51.* b. Mine haulage used to collect loads and deliver empties from and to the sections. These are taken to and from central sidetracks served by the main line motor. Locomotives and track are frequently lighter than those on the main line. *Kentucky, pp. 222-223.*

intermediate haulage conveyor. Generally 500 to 3,000 feet in length. It is used to transport material between the gathering conveyor and the main haulage conveyor. *NEMA MB1-1961.*

intermediate igneous rock. a. An igneous rock containing between 52 and 66 percent SiO_2. *Holmes, 1928.* b. An igneous rock containing between 55 and 66 prcent SiO_2, and essentially intermediate in composition between the acid (granitic) and basic (gabbroic or basaltic) rocks; for example, syenite and diorite. *C.M.D.*

intermediate loading station. *See* loading station. *NEMA MB1-1961.*

intermediate (epithermal) neutron. A neutron having greater energy than that of a thermal neutron but less than that of a fast neutron. The range is between 0.5 electron volt and 100,000 electron volts. *L&L.*

intermediate oxides. As used in the manufacture of vitreous enamels are frequently Al_2O_3, aluminum oxide or alumina, and

B_2O_3, boron trioxide. *Hansen.*

intermediate packs. Packs built between gates with wastes on each side and usually supported by packwalls. *TIME.*

intermediate phase. In an alloy or a chemical system, a distinguishable homogeneous phase whose composition ranges does not extend to any of the pure components of the system. *ASM Gloss.*

intermediate piece. *See* matching piece. *Dodd.*

intermediate principal plane. The plane normal to the direction of the intermediate principal stress. *ASCE P1826.*

intermediate principal stress. The principal stress whose value is neither the largest nor the smallest (with regard to sign) of the three. *ASCE P1826.*

intermediate (epithermal) reactor. A reactor in which the chain reaction is sustained mainly by intermediate neutrons. *L&L.*

intermediates. Oxides whose structural behavior in glass falls between the network formers and network modifiers. *VV.*

intermediate section. That part of a mining belt conveyor which consists of the framing and the belt idlers supported by the framing, both of which guide and support the belts between the head end and the tail end. There are two general types of intermediate sections: (1) rigid side framed and (2) wire-rope side framed. *NEMA MB1-1961.*

intermediate shaft. A shaft which is driven by one shaft, and drives another. *Nichols.*

intermediate sight. In survey-leveling, reading on the staff at a point which is not to be occupied by the level, and is not to be used either as a back or foresight. *Pryor, 3. See also* leveling practice.

intermediate transfer point. The point along a conveyor which may already be carrying a load, at which coal is delivered from another panel conveyor. *Nelson.*

intermediate vein zone deposits. These deposits are thought to have been formed at depths ranging from 4,000 to 12,000 feet below the surface and at a temperature between 175° and 300° C. Such a deposit may take the form of a fissure vein, a series of parallel fissures called a sheeted zone, a replacement of the wall rock of fissures or of a large disseminated deposit. Much of the gold, silver, copper, lead, and zinc of the Western United States comes from these deposits. *Lewis, p. 274.*

intermediate water. The upper layers of water in the oceanic hydrosphere. This water originates in the arctic or in the antarctic convergence. *Schieferdecker.*

intermetallic compound. An intermediate phase in an alloy system, having a narrow range of homogeneity and relatively simple stoichiometric proportions, in which the nature of the atomic binding can vary from metallic to ionic. *ASM Gloss. See also* intermediate constituent.

intermine. To intersect or penetrate with mines. *Webster 2d.*

intermittent cutters. Coal-cutting machines of the pick machine and breast machine type. They are called intermittent cutters because they must be frequently reset, while with continuous cutters a continuous cut can be made the full width of the face without stopping the machine. *Kiser, 1, p. 2.*

intermittent filters. These usually consist of a number of filtering leaves which are simply rectangular frames carrying filter cloth on the outer surface. A number of these leaves are mounted in a suitable tank, and the clear liquid passes through the filter cloth and out through pipes leading from the interior of each filter leaf. The solid material forms a cake on the outside of the leaf. *Newton, pp. 104-105.*

intermittent filtration. Percolating filter treatment of sewage is more widely used in Great Britain than any other system. Such a filter comprises a bed of coke, clinker, broken stones, or similar material which will not disintegrate under weather action or attack by corrosive sewage. *See also* sewage. *Ham.*

intermittent kiln; periodic kiln. A batch type kiln in which goods are set, fired, cooled, and then drawn. The principal types in the ceramic industry are round kilns (or beehive kilns), rectangular kilns, bottle ovens, bogie kilns, and top-hat kilns. *Dodd.*

intermittent sampling. Sampling carried out on one unit of coal and then stopped for some time until another unit selected for sampling arrives. *See also* random sample. *Nelson.*

intermittent stream. a. A stream which flows part of the time, as after a rainstorm, during wet weather, or during part of the year. *A.G.I.* b. A stream which flows only at certain times when it receives water from springs (spring-fed) or from some surface source (surface-fed), such as melting snow in mountainous areas. *A.G.I.* c. *See* perennial stream. *A.G.I.*

intermontane. Lying between mountains. *Fay.*

internal combustion. Of or pertaining to an engine whose pressure energy is produced by burning or exploding in its cylinder a mixture of air and fuel. *Standard, 1964.*

internal-combustion engine. An engine in which power is generated by burning within the cylinder a mixture of air and gas or air and alcohol, kerosine, gasoline, or other liquid fuel. The burning of the fuel results in the production of gases of high temperature and pressure, which act directly on a piston that moves back and forth in a cylinder into which the air and fuel are admitted and from which the burned gases are discharged through suitable valves. *Zern, p. 331.*

internal-combustion locomotives. Locomotives powered by internal-combustion engines, either gasoline or diesel, are made in sizes from 3-ton to 70-ton, and the smaller sizes are especially suited to the average pit and quarry haulage problems. Diesel locomotives, because of their use of cheaper fuels are in widest use. *Pit and Quarry, 53rd, Sec. A, p. 114.*

internal discharge bucket elevator. A type of bucket elevator having continuous buckets abutting, hinged, or overelapping and designed for loading and discharging along the inner boundary of the closed path of the buckets. *See also* bucket elevator. *ASA MH4.1-1958.*

internal drainage. Drainage that does not reach the ocean by surface streams. *Stokes and Varnes, 1955.*

internal elevator. *See* internal discharge bucket elevator. *ASA MH4.1-1958.*

internal energy. Of a gas, the total heat energy stored in a unit mass of a gas due to the motion and position of the molecules of the gas. This energy is measured by a thermometer. *Lewis, p. 662.*

internal friction. The conversion of energy into heat by a material subjected to fluctuating stress. In free vibration, the internal friction is measured by the logarithmic decrement. *ASM Gloss.*

internal grinding. Grinding an internal surface, such as that inside a cylinder or hole. *ASM Gloss.*

internal ribbon conveyor. A trunnion-supported revolving cylinder the inner surface of which is fitted with continuous or interrupted ribbon flighting. *ASA MH4.1-1958.*

internal stress. Residual stress existing between different parts of metal products, as as a result of the differential effects of heating, cooling, or working operations, or of constitutional changes in the solid metal. *C.T.D.*

internal vibrator. A cylinder containing vibrating mechanism inserted into wet concrete to ensure that it is properly compacted. *See also* external vibrator. *Ham.*

internal waste. Barren rock between two or more bands (veins) or reef which are mined simultaneously. *Beerman.*

international ampere. The current which, when passed through a solution of silver nitrate in water, will deposit silver at the rate of 0.001118000 gram per second. The unit of current in common use. *C.T.D.*

International Ellipsoid of 1930. Equation relating variation of gravity with latitude, adopted by an international commission as best expressing the normal gravity field of the earth to the approximation of an ellipsoid of revolution. *Bureau of Mines Staff.*

international low water. A plane of reference below mean sea level (msl) by the following amount: half the range between mean lower low water (mllw) and mean higher high water (mhhw) multiplied by 1.5. Abbreviation, ilw. *Hy.*

international metric carat. a. A unit of weight equal to 200 milligrams. *Long.* b. *See* carat, a. *Fay.*

interparticle water. *See* interlayer water. *VV.*

interpenetration twin. Two or more individual crystals twinned into such a position that they penetrate one another. *Fay.*

interphase. In physical chemistry, the transition layer, zone of change, zone of shear or zeta layer, through which the characteristic qualities of each contacting phase diffuse outward with diminishing strength toward the adjoining phase. Not an interface, since the division is not sharp. *Pryor, 3.*

interpolation. Assumption of a statistical value from its mathematical or graphical position intermediate in a series of determined points. *Pryor, 3.*

interpolation of contours. The process of drawing contour lines by inferring their plan position and trend from spot levels or from other contours, assuming the intervening ground to have uniform slope. Where the spot levels are sparse, the process requires knowledge of the land or lie of the seams. *See also* contour plan. *Nelson.*

interpole. An auxiliary pole placed between the main poles of a commutating machine. *Lowenheim.*

interrupted-current plating. Plating in which the flow of current is discontinued for periodic short intervals to decrease anode polarization and elevate the critical current density. It is most commonly used in cyanide copper plating. *ASM Gloss.*

interrupter. A device, usually automatic, for rapidly and frequently breaking and making an electric circuit, as in an induction coil. *Standard, 1964.*

interruptions. Secondary cutters in auger drills. *Nichols.*

intersect. a. To cut across or meet, as a borehole cuts through a stratum of rock or encounters a vein. *Long.* b. In mining, to cut across or meet a vein or lode with a passageway; also, the point at which a vein or lode cuts across an earlier formation. *Long.*

intersecting lines. Two lines that cross or cut each other. *Jones, 2, p. 81.*

intersecting vein. A vein which cuts across an earlier vein. *Fay.*

intersection. a. The point at which a deliberate deflection of the trend of a borehole is made. *Long.* b. The point at which a drill hole enters a specific ore body, fault, or rock material. *Long.* c. Meeting of two ore bodies or veins, or the point at which a vein or ore body meets a fault, dike or rock strata. *Long.* d. The point at which two underground workings connect. *Long.*

intersection angle. The angle of deflection, as measured at the intersection point between the straights of a railway or highway curve. *C.T.D.*

intersection point. That point at which two straights or tangents to a railway or road curve would meet if produced. *See also* tangent distance. *Ham.*

intersection shoot. A mineral deposit localized along vein intersections or cross fissures; they are among the oldest known and the commonest types. *Stokes and Varnes, 1955.*

intersertal. A texture characterized by the insertion, between divergent feldspar laths, of glass, palagonite, chlorite, or other primary or secondary minerals that take the form of the interstitial spaces. In intersertal basalt, the grains of augite rarely occupy the wedge-shaped spaces completely, continuity being established by a groundmass of glass or its alteration products. *Holmes, 1920.*

interspersed carbide. Small-size (one-eighth of an inch and larger), irregular-shaped fragments of tungsten carbide slugs mixed with a suitable matrix metal and applied to cutting faces of bits or other cutting tools, as a weldment. Also called clustered carbide. *Long.*

interstice. a. An opening in anything or between things; especially, a narrow space between the parts of a body or things close together; a crack, a crevice, a chink, or a cranny. *Standard, 1964.* b. A space between mineral granules. *Bateman.*

interstitial. Descriptive of void spaces; interstitial or connate water occupies part of the void spaces in the reservoir rock. *Wheeler.*

interstitial compounds. Those formed when transition metals admit small atoms (such as those of hydrogen, boron, carbon or nitrogen) into the interstices of their lattices. Also, interstitial deposits formed subsequently to the rock formations whose pores they have filled by impregnation. *Pryor, 3.*

interstitialcy. Crystal imperfection involving an atom in an interstitial position. *VV.*

interstitial deposit. A deposit that fills the pores in a rock; frequently used instead of impregnation deposit. *Fay.*

interstitial solid solution. A solid solution in which the solute atoms occupy positions within the lattice of the solvent. *See also* substitutional solid solution. *ASM Gloss.*

interstitial water. Water contained in the minute pores or spaces between the small-mineral grains or other units of rock. *A.G.I.*

interstratification. The state of lying between other strata; the condition of a bed, stratum, or member of a sedimentary deposit with reference to the overlying and underlying beds. *Fay.*

interstratified. a. Interbedded; strata deposited between or alternatingly with other strata. *Fay.* b. Of coal and mineral matter, associated in random horizontal layers, usually with a natural cleavage. *B.S. 3552, 1962.*

interstrial. Between striae. *Fay.*

intertidal zone. Generally considered to be the zone between mean high-water and mean low-water levels. *Hy. See also* littoral zone.

intertrappean. Lying between beds of trap. *Standard, 1964.*

interval. a. The vertical distance between strata or units of reference. *A.G.I.* b. The contour interval is the vertical distance between two successive contour lines on a topographic, structural, or other contour map. *A.G.I.* c. The flood plain is about 10 feet above low water, being annually overflowed by the floods of spring. This would be called bottomland in the Western United States. In New England, it is commonly termed interval; but along the Connecticut River, it is frequently known as meadow. *A.G.I.* d. The space between the river and the hills or mountains by which the level portion of the river valley is bounded. Obsolete. *A.G.I.* e. The distance between two points or depths in a borehole. *Compare* core intersection. *Long.* f. The perpendicular distance between two parallel lines; for example, the elevation differential between contour lines. *Long.*

interveined. Intersected with veins, or as if with veins. *Standard, 1964.*

interwoven. *See* interlaced.

interwoven conveyor belt. A construction of conveyor belt similar to the solid woven type of belt and having the plies interwoven to the extent that it is impossible to separate the plies. *ASA MH4.1-1958.*

in-the-seam mining. The conventional system of mining in which the development headings are driven in the coal seam. *Compare* horizon mining. *Nelson.*

into the house. Newc. The upstroke of a pump engine. *Fay.*

into the solid; on the solid. Said of a shot which goes into the coal beyond the point to which the coal can be broken by the blast. *Fay.*

intra-. A prefix from the Latin intra meaning within, inside, into, and intro-. *Webster 3d.*

intracrystalline. Within or across the crystals or grains of a metal. Same as transcrystalline; transgranular. *ASM Gloss.*

intrados. The interior curve of an arch, as of a tunnel lining. *Sandstrom.*

intradosal. The fractured ground within the fracture zone. *Lewis, p. 624. Compare* extradosal.

intraformational. Formed or existing within a geologic formation. *Standard, 1964.*

intraformational breccia. A rudaceous deposit formed by penecontemporaneous erosion and deposition of the strata in which it occurs. *See also* intraformational conglomerate. *A.G.I.*

intraformational conglomerate. A conglomerate developed by the breaking up of a partially consolidated bed and the incorporation of the fragments in new strata nearly contemporaneous with the original bed. Where the rounding is slight, these conglomerates grade into breccias. *A.G.I.*

intraformational contortion. Folding that is confined to a stratum between two nonfolded strata; applied especially to deformation resulting from the sliding of unconsolidated sediments under the influence of gravity. Also called intraformational corrugation. *A.G.I.*

intraformational corrugation. A term applied to small-scale intraformational folding. *Pettijohn.*

intraformational folds. Folding confined to a stratum lying between undeformed beds which is attributed to processes syngenetic with those responsible for the bed iteslf; may be due to sliding or slump but also produced by other means. *Pettijohn.*

intragranular movement. In rock deformation, a displacement that takes place within the individual crystals by movement along glide planes. *A.G.I.*

intramagmatic deposit. A mineral deposit that occurs inside its eruptive parent rock. *Schieferdecker.*

intramicrite. A limestone similar to intrasparite, except that there is more microcrystalline matrix than calcite cement. *A.G.I. Supp.*

intramicrudite. Intramicrite with intraclasts larger than 1 millimeter. *A.G.I. Supp.*

intramontane. Being within a mountainous region. *Webster 3d.*

intra-Pacific province. *See* Atlantic series. *A.G.I.*

intrasparite. Limestone composed of 25 percent or more of intraclasts and more calcite cement than microcrystalline matrix. *A.G.I. Supp.*

intrasparrudite. Intrasparite with intraclasts larger than 1 millimeter. *A.G.I. Supp.*

intrastratal contortions. *See* convolute bedding. *Pettijohn.*

intrastratal flowage. *See* ball-and-pillow structure. *Pettijohn.*

intrastratal flow structure. A type of convolute bedding. *Pettijohn.*

intratelluric. a. Formed or occurring within the earth; said of the constituents of an effusive rock formed before its appearance on the surface, or of the period of their formation. Also called intratellural. *Standard, 1964.* b. Of, relating to, or constituting the period or stage of crystallization of igneous rocks prior to eruption. *Webster 3d.*

intrazonal soil. One of the great group of soils with more or less well-developed soil characteristics that reflect the dominating influence of some local factor of relief, parent material, or age over the normal effect of climate and vegetation. *Stokes and Varnes, 1955.*

intrenched meander. *See* entrenched meander. *A.G.I.*

intrinsically safe apparatus. Apparatus that is so constructed that, when installed and operated under the conditions specified by the certifying authority, any electrical sparking that may occur in normal working, either in the apparatus or in the circuit associated therewith, is incapable of causing an ignition of the prescribed flammable gas or vapor. *B.S. 3618, 1965, Sec. 7.*

intrinsically safe circuit. A circuit in which any electrical sparking that may occur in normal working under the conditions specified by the certifying authority, and with the prescribed components, is incapable of causing an ignition of the prescribed flammable gas or vapor. *B.S. 3618, 1965, Sec. 7.*

intrinsically safe machine. A machine which is safe in itself, without having to be placed inside a flameproof enclosure. It implies that the machine cannot produce any spark which is capable of igniting firedamp air mixtures in mines. *Nelson.*

intrinsic ash. Constitutional ash in coal. *Tomkeieff, 1954.* Synonymous with inherent ash. *A.G.I. Supp.*

intrinsic safety. In a circuit; safety such that any sparking that may occur in that circuit in normal working, or in reasonable fault conditions, is incapable of causing an explosion of the prescribed inflammable gas. *NCB.*

introductory column. In casing a borehole, the highest and first column that is inserted. *Stoces, v. 1, p. 85.*

intrusion. a. In geology, a mass of igneous rock which, while molten, was forced into or between other rocks. *Fay.* b. A mass of sedimentary rock occurring in a coal seam. *B.S. 3618, 1964, sec. 5.*

intrusion breccia. Breccia created during the process of intrusion of igneous material. *Stokes and Varnes, 1955.*

intrusion displacement. Faulting coincident with the intrusion of an igneous rock. *Fay.*

intrusion grouting. A method of placing concrete by intruding the mortar component in position and is then converted to concrete by intruding the mortar component into its voids. One of the chief advantages of the method is that it permits the placing of concrete underwater. *Carson, 2, p. 112.*

intrusive. In petrology, having, while molten, penetrated into or between other rocks, but solidifying before reaching the surface; said of certain igneous rocks; nearly the same as plutonic and contrasted with effusive or extrusive. *Fay.*

intrusive contact. A contact between an igneous rock and some other rock indicating that the igneous rock is the younger. The younger rock may send dikes into the older rock, have inclusions of the older rock, or be chilled against the older rock. *A.G.I.*

intrusive rock. A rock that consolidated from magma beneath the surface of the earth. *See also* plutonic igneous rock. *A.G.I.*

intrusive veins. When the injected mass has arisen along an open fissure, and solidified there as a wall-like intrusion, it is called a dike. When its path has been less regularly defined and penetrates the surrounding rocks in a wavy threadlike fashion, this irregular protrusion is called a vein. *Stokes and Varnes, 1955.*

intumesce. To enlarge, to expand, to swell, or to bubble up (as from being heated). *Webster 3d.*

intumescence. The property of some silicates, notably of perlite, of expanding permanently, when heated, to form a completely vesicular structure. *Compare* bloating; exfoliation. *Dodd.*

inundation. An inrush of water on a large scale which floods the entire mine or a large section of the workings. *See also* tapping old workings. *Nelson.*

invaded zone. The zone in a permeable rock around a well bore into which filtrate (normally water) from the drilling mud has passed, with the consequent partial or total displacement of the fluids originally present in that zone. *Institute of Petroleum, 1961.*

invar. Nickel-iron alloy with negligible thermal expansion in the climatic temperature range. Used in manufacture of surveyor's steel tapes, chronometer balance wheels, etc. *Pryor, 3.*

invariant equilibrium. A phase assemblage having 0 degree of freedom, that is, neither temperature, pressure, nor composition may be varied without loss of one or more phases. *A.G.I.*

invariant point. Temperature with the maximum number of phases as defined by phase rule. *See also* variance. *VV.*

invasion. Mex. A mining trespass. *Fay.*

invasive dike. A dike that has been forced more or less slowly into cavities formed by the extra hydrostatic pressure of the invading magma; contacts irregular and often close welded. *J. Geol., v. 30, No. 2, Feb.-Mar., 1922, p. 165.*

invasive magma. Synonym for aggressive magma. *A.G.I.*

invelite. A plastic similar to bakelite. *Shipley.*

inventory rundown; inventory shrinkage. a. Rundown is a reduction of stocks and stores. *Pryor, 3.* b. Shrinkage is a shortfall discovered on checking. *Pryor, 3.*

inventory shrinkage. *See* inventory rundown. *Pryor, 3.*

Inverell sapphire. Blue sapphire from New South Wales, marketed through Inverell. Lighter blue than typical Anakie sapphire. *Shipley.*

invernite. A holocrystalline intrusive rock of granite aspect containing phenocrysts of orthoclase and fewer of plagioclase in a groundmass consisting of stumpy idiomorphic feldspars (mostly orthoclase, but in part plagioclase), sparsely distributed hornblende or mica, and interstitial quartz. *Holmes, 1928.*

inverse initiation; indirect initiation. The placing of the detonator at the back of the shothole. This is the usual practice when using delay detonators in order to minimize the danger of cutoff holes. *See also* direct initiation. *Nelson.* Also known as indirect priming. *Bureau of Mines Staff.*

inverse spinel. Spinel with the divalent cations in 6-fold (octahedral) sites, and the trivalent cations in 6-fold and 4-fold (tetrahedral) sites. *VV.*

Inverse Square Law. Law which governs such matters as intensity-effects of light, magnetism, gravitational force. The effect at a point R due to an emitting source E varies as the square of the distance, ER^2. *Pryor, 3.*

inversion. a. A folding back of rock strata upon themselves by which their sequence seems reversed. *Webster 3d.* b. An increase of air temperature with increased elevation rather than the usual decrease. *Bureau of Mines Staff.* c. A change in the crystalline form brought about by change in temperature as the inversion from beta quartz to alpha quartz at 575° C or from beta quartz to beta cristobalite at about 800° C. *Bureau of Mines Staff.*

inversion point. A change in the internal structure of a mineral at a given temperature. *Bateman.*

invert. a. The floor, bottom, or lowest part of the internal cross section of a conduit. *Seelye, 1.* b. The curved floor of a tunnel. *Sandstrom.* c. A flat, inverted arch of masonry used for the floor of the tunnel lining. *Stauffer* d. The inside bottom of a pipe or tunnel. *Nichols.*

inverted fold. *See* overfold.

inverted heading and bench. *See* heading-overhand bench. *Fraenkel.*

inverted pendulum. An instrument in which the acceleration of gravity is determined by measuring the swinging period of a mass that is supported on a spring. *Schieferdecker.*

inverted plunge. A plunge of a fold such that the younger rocks plunge beneath the older rocks. *A.G.I.*

inverted relief. A topographic configuration of valleys and ridges in which the former occupy the sites of anticlinal folds and the latter, the sites of synclinal folds. The topography is thus the inverse of the geologic structure. *Stokes and Varnes, 1955.*

inverted siphon. a. A pipeline crossing over a depression or under a highway, railroad, canal, etc. The term is common but inappropriate, as no siphonic action is involved. The term sag pipe is suggested as a substitute. *Seelye, 1.* b. A pipe or tube in the shape of a siphon, but inverted, as for carrying water across the depression of a ravine to a lower level. *Standard, 1964.* c. *See* drowned level. *B.S. 3618, 1963, sec. 4.*

inverted strata. Strata that have been bent right over due to intense and long-continued lateral pressure. A shaft or borehole put down in such ground may intersect the same seam several times. *Nelson.*

invert level. The datum level of the lowest part of an invert. *Ham.*

invert strut. Flat strut that sometimes is used instead of an arch on bottom of tunnel cross section. *Bureau of Mines Staff.*

investment. The outlay of capital for a period in the expectation of receiving back this capital at the end of the period, meanwhile receiving a regular income from it. *Hoov, p. 322.*

investment casting. A process for the casting of small metal components to a close tolerance. In the usual process a wax replica of the part to be cast is coated (invested) with refractory powder, suitably bonded, and the whole is then warmed (150° C) to melt out the wax, thus, the alternative name lost-wax process; the refractory mold is then fired at 1,000° to 1,100° C. The refractory use may be powdered sillimanite or alumina, or specially prepared cristobalite; the latter is particularly used in the application of the process in dentistry. *Dodd.*

investment compound. A mixture of a graded refractory filler, a binder, and a liquid vehicle, used to make molds for investment casting. *ASM Gloss.*

investment mold. The refractory mold used in precision molding. *Osborne.*

invisible light. A term used to refer to certain radiations of light traveling in wavelengths too short or too long to be distinguished by the human eye, such as ultraviolet light and infrared light. *See also* visible light. *Shipley.*

inwall. a. The refractory lining of the stack of a blast furnace. *See also* stack, c. *Dodd.* b. The interior walls or lining of a shaft furnace. *Fay.*

inwall brick. Fire clay brick for use in lining the inwall section of a blast furnace. *A.R.I.*

inwan. Scot. Inward. *Fay.*

inyoite. A colorless hydrous borate of calcium, $2Ca0.3B_2O_3.13H_2O$. Monoclinic. Large tabular crystals commonly altered to meyerhofferite. From Inyo County, Calif.; Hillsborough, New Brunswick. *English.*

iodargyrite. *See* iodyrite. *Fay.*

iodatacamite. The artificial compound $CuI(OH)_3$, subsequently shown to be an analogue of botallackite and is renamed accordingly. *Hey, M.M., 1964.*

iodate. A salt or ester of iodic acid; a compound containing the radical, IO_3. *A.G.I.*

iodembolite. A name to replace iodobromite whose composition is not definite. Used to designate minerals of the cerargyrite group containing chlorine, bromine, and iodine, Ag(Cl,Br,I). *English.*

iodide. A compound of iodine with one other more positive element or radical. *A.G.I.*

iodide metal. Hafnium produced by the van Arkel and de Boer process. *Thomas.*

iodide process. The process developed by van Arkel and de Boer; is used for refining zirconium and hafnium by the decomposition of the iodide on a hot wire. Also known as van Arkel and de Boer process; crystal bar process. *Thomas.*

iodide process for producing titanium. This involves the reaction of impure titanium metal with iodine to form the volatile tetraiodide, which is then decomposed on a hot wire at temperatures between 2,000° and 2,730° F to form high-purity titanium and iodine. *BuMines Bull. 619, 1964, p. 206.*

iodimetry; iodometry. Volumetric analysis involving either titration with a standardized solution of iodine, or the release by a substance under examination of iodine in soluble form, so that its concentration can be determined by titration, using starch as an indicator. The method is used with substances which can oxidize potassium iodide to release free iodine, or conversely with substances which combine with free iodine. The basis of reaction is

$$I_2 + 2Na_2S_2O_3 \qquad 2NaI + Na_2S_4O_6.$$

Pryor, 3.

iodine. A nonmetallic element belonging to the halogens. Obtained usually as heavy, shining, violet-black to blackish-gray orthorhombic crystals subliming to an irritating violet gas. Occurs naturally only in combination in small quantities, especially in sea water, rocks, soils, and underground brines, and in marine plants and animals. Essential for the normal functioning of the thyroid gland of all vertebrates. Usually extracted from the branches of seaweeds, from Chile saltpeter, or from oil well brines. Used chiefly in medicine, photography, and analysis. Symbol I; valences, 1, 3, 5, and 7; atomic number, 53; atomic weight, 126.904; specific gravity, 4.93 (at 20° C); melting point, 113.7° C; and boiling point, 184.35° C. Diatomic; molecular weight, 253.809; I_2; metallic luster; slightly soluble in water; and soluble in ethyl alcohol, in benzene, in ether, in chloroform, in carbon tetrachloride, in glycerol, in potassium iodide solutions, in methanol, and in carbon disulfide. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-116, B-180.*

iodine pentoxide method. Accurate determinations of very low concentrations of carbon monoxide are required of samples from pits troubled with spontaneous combustion and those in which diesel locomotives are operating. This method involves the passage of a known volume of the sample first through a train of reagents for purifying and drying and then through a heated tube of iodine pentoxide when, if carbon monoxide is present, proportional amounts of iodine and CO_2 are formed, either of which may be determined. *Sinclair, 1, p. 43.*

iodine pentoxide test. An iodine pentoxide (Hoolamite) test consists of a glass tube filled with the reagent mixed with fuming sulfuric acid and carried by crushed pumice through which a known volume of the air to be sampled is discharged from a rubber bulb after preliminary drying. The bulb is squeezed ten times, the carbon monoxide present changes the color of the reagent from grey to green and the concentration is obtained by reference to a color chart supplied with the instrument. The instrument reads to about 0.07 percent carbon monoxide. *Sinclair, 1, p. 31.*

iodine value; Hübl number. The percentage by weight of iodine absorbed by an unsaturated fat or wax. *Pryor, 3.*

iodite. Same as iodyrite. *Standard, 1964.*

iodized salt. a. Table salt and animal-feed salt containing 0.01 percent of potassium iodide plus a stabilizing mixture. *Kaufmann.* b. Iodized sodium chloride or table salt is a means of supplying iodine to the body; lack of iodine is the cause of goiter. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-116.*

iodobromite. A chloride, iodine, and bromide of silver related to cerargyrite, Ag(Cl,Br,I); sectile; isometric. *See also* iodembolite. *Dana 17.*

Iodoeosin test; Mylius test. For determining the durability of optical glass. The amount of free alkali in a freshly fractured surface is determined by means of iodoeosin; the surface is then exposed to moist air at 18° C for 7 days and the free alkali is again determined. Any increase in free alkali is taken as a measure of lack of durability; a decrease indicates stability. The test is not valid for many modern optical glasses. *Dodd.*

iodomimetite. The artificial compound $Pb_5(AsO_4)_3I$; apatite family. *Hey, M.M., 1964.*

iodovanadinite. The artificial compound $Pb_5(VO_4)_3I$; apatite family. *Hey, M.M., 1964.*

iodyrite. A silver iodide mineral, AgI, containing 46 percent silver; sectile; hexagonal. *Sanford; Dana 17.*

Iola furnace. A natural gas-fired furnace used at Iola, Kans., for the distillation of zinc. It is a direct adaptation of the Hegeler furnace. *Fay.*

Iolanthite. Trade name for a jasperlike mineral used as a gem; from Crook County, Ore. *English.*

iolite. *See* cordierite. *Dana 17, p. 426.*

ion. An atom or a group of atoms when combined in a radical or molecule that carries a positive or a negative electric charge as a result of having lost or gained one or more electrons. It may exist in solution usually in combination with molecules of the solvent or out of solution; it may be formed during electrolysis and migrate to the electrode of opposite charge, or it may be formed in a gas and be capable of carrying an electric current through the gas. *Webster 3d.*

ion exchange. Reversible exchange of ions contained in a crystal for different ions in solution without destruction of crystal structure of disturbance of electrical neutrality. The process is accomplished by diffusion and occurs typically in crystals possessing one or two dimensional channelways where ions are relatively weakly bonded. Also occurs in resins consisting of three dimensional hydrocarbon networks to which are attached many ionizable groups. Synonym for base exchange. *A.G.I. Supp.*

ion-exchange column. One packed with particles or beads of resin chosen for its ability to capture specific ions from aqueous solution as this is flushed through the ion-exchange column. *Pryor, 3.*

ionic activity measurement. Use of an electrode reversible to the ion under test to form a half cell. This is connected by a salt bridge to a reference electrode and the resulting electromotive force is measured. *Pryor, 3.*

ionic bond. a. Electrostatic force holding ions together in a crystal. *Hurlbut.* b. A chemical bond between atoms one of which is an electron donor and the other an electron acceptor. *Gaudin, 2, p. 12.* c. Interatomic bond arising from coulombic attractions. *VV.*

ionic compound. One in which the structure is due to electrocoupling through movement of one or more electrons from the basic to the acid element (for example, sodium chloride). Such compounds readily dissolve, or ionize, in water and are then conductors of electricity by ion transport. *Pryor, 3.*

ionic crystal. A crystal in which atomic bonding results from the electrostatic attractive forces between positively and negatively charged ions, such as sodium chloride. This type of atomic linkage, also known as (hetero) polar bonding, is characteristic of many compuonds. *ASM Gloss.*

ionic equilibrium. The situation when, for a prescribed temperature, pressure, concentration of reactants and pH, the rate of dissociation of molecules into ions is approximately in balance with that of their recombination. *Pryor, 3.*

ionic exchange. The replacement of ions on the surface, or sometimes within the lattice, of materials such as clay. The ions become adsorbed to balance a deficiency of charge in the clay structure, for example, in a montmorillonite in which some Mg^{2+} has been replaced by Al^{3+}, or to satisfy broken bonds at the edges of the clay crystals. Ionic exchange capacity is generally expressed in milli-equivalents per 100 gram; typical values are: 1 to 3, kaolinite; 10 to 20 ball clay; 80 to 100 bentonite. *Dodd.*

ionic migration. Movement of a charged particle through an electrolyte toward an electrode of opposite charge-sign. The losses in a neutral salt around two electrodes during the passage of electric current are in ratio to velocities of ions migrating from these electrodes. Ionic velocities are stated in centimeter per second for a potential gradient of 1 volt per centimeter. *Pryor, 3.*

ionic mobility. Velocity in a dilute solution of an ion where the potential difference across this is 1 volt per centimeter. For hydrogen ions this is 0.00326 centimeter per second. *Pryor, 3.*

ionic radius. The radius of an ion (in angstrom units). *Hurlbut.*

ionic theory. The theory that has been put forward to explain the facts of electrolysis, supposes that an electrolyte, when dissolved in water, is split up into at least two parts, known as ions. These ions are electrically charged. *Cooper.*

ionic transport number. Fraction of total current carried by one ion during electrolysis (ion migration). *Pryor, 3.*

ionite. a. A hydrous aluminum silicate, $5H_2O.2Al_2O_3.6SiO_2$; monoclinic; scales. From the Ione formation, Calif. Identical with anauxite. *English.* b. A fossil hydrocarbon found in a more or less impure condition in the lignite of Ione Valley, Amador County, Calif. It has a brownish-yellow color and, while only slightly soluble in alcohol, it is completely dissolved by chloroform; it yields a brown, tarry oil on destructive distillation. *Fay.*

ionium. Thorium 230, a product of the radioactive decay of uranium with a half-life period of about 8.3 x 10^4 years. *A.G.I. Supp.*

ionization. The process of adding electrons to, or knocking electrons from, atoms or molecules, thereby creating ions. High temperatures, electrical discharges, and nuclear radiation can cause ionization. *L&L.*

ionization anemometer. Consists of a central electrode around which is positioned the collecting electrode, made up of three wire rings set concentric to the central electrode and mutually at right angles to one another. The central electrode is a steel ball forming the core of a radium source which is enclosed between layers of goldleaf backed by silver foil. The central electrode ionizes the space which separates it from the surrounding collecting electrode. Both the central and collecting electrodes are placed within a spherical wire cage of 6 inch diameter which is electrically earthed. The whole assembly is mounted on a short handle. *Roberts, I, p. 56.*

ionization chamber. An instrument that detects and measures ionizing radiation by observing the electrical current created when radiation ionizes gas in the chamber, making it a conductor of electricity. *L&L.*

ionization constant. The ratio of the product of the activities of the ions produced from a given substance to the activity of the undissociated molecules of that substance. *See also* activity. *C.T.D.*

ionization potential. Energy in volts needed to remove an electron from a normal atom and to leave it positively charged. To ionize is to dissociate a molecule or a compound into ions of opposite charge. *Pryor, 3, p. 225.*

ionizing radiation. Any radiation that directly or indirectly displaces electrons from the outer domains of atoms; for example, alpha radiation, beta radiation, or gamma radiation. *L&L.*

ionizing solvent. ~~Since~~ the force between two charges separated by a distance d in a medium of dielectric constant, ϵ is $e_1.e_2/\epsilon d^2$, the binding ionic force varies inversely as ϵ. Good ionizing solvents include water, hydrated hydrocyanic acid, hydrated hydrofluoric acid; medium ones include the alcohols. Liquid ammonia, sulfur dioxide, and benzene are poor. *Pryor, 3.*

ionosphere. *See* atmosphere. *Hess.*

ion sieve separation. Separation of ions by filtering them through the intermediately sized lattice of a suitable aluminosilicate zeolite, chosen to permit passage only of undersized ions through its rigid structure. *Pryor, 3.*

ions, replacement series. Cations vary in their affinity for the resins used in ion exchange (IX) treatment. The order of ease of replacement is Li^+ greater than H^+ greater than Na^+ greater than K^+ greater than Mg^{++} greater than Ca^{++} greater than Al^{+++} greater than Fe^{+++} on strongly acidic cationic resins, with H^+ moving to the end of the line for weakly acid ones. For anionic resins the order is $SO_4^=$ greater than Br^- greater than Cl^- greater than F^- greater than $CH_3.COO^-$. *Pryor, 3.*

Iowan. Early Wisconsin glaciation. *A.G.I. Supp.*

i-p Abbreviation for intermediate-pressure. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-105.*

IPAA Abbreviation for Independent Petroleum Association of America. *BuMin Style Guide, p. 66.*

IPCEA Abbreviation for Insulated Power Cable Engineers Association. *I.C. 7962, 1960, p. 22.*

ipm Abbreviation for inches per minute. *BuMin Style Guide, p. 60.*

IPM Abbreviation for interruptions per minute. *Zimmerman, p. 59.*

Ipro brick. An I-shaped clay paving brick designed for use in roadmaking, particularly on soils of poor bearing capacity, as in Holland. *Dodd.*

ips Abbreviation for inches per second. *BuMin Style Guide, p. 60.*

IPS Abbreviation for iron pipe size; interruptions per second. *Zimmerman, p. 59.*

ir Abbreviation for internal resistance. *Zimmerman, p. 58.*

Ir Chemical symbol for iridium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B–1.*

iranite. A mineral, $PbCrO_4.H_2O$; saffron yellow; anorthic. Found in a very small amount at the Sebarz mine, northeast of Anarak, Iran. Named for the country. *Hey, M.M., 1964; Fleischer.*

ir a pena. Colom. To find the pay streak; to touch bottom. *Fay.*

irestone. a. Hard clay slate, hornstone, or hornblende. *Fay.* b. A hard, basic crystalline rock. *See also* traprock; greenstone. *C.T.D.*

iridescence. The exhibition of prismatic colors in the interior or on the surface of a mineral; a play of rainbow colors. Labradorite and some other feldspars show it. The tarnish on the surface of coal, copper pyrites, etc., is sometimes iridescent. *Fay.*

iridescent. Having a play of colors on the surface. *Gordon.*

iridescent cat's-eye. Unsatisfactory term sometimes used for chrysoberyl cat's-eye to distinguish it from quartz cat's-eye. *Shipley.*

iridescent glass. Glass having a variety of colors. *Mersereau, 4th, p. 328.*

iridescent stain. Applied to a multicolored sheen which sometimes appears on lead-bearing enamels several months after the enamel has been applied. *Enam. Dict.*

iridic gold. Said to be a native alloy of gold and iridium carrying 62.1 percent gold, 30.4 percent iridium, 3.8 percent platinum, and 2.1 percent silver. *Hess.*

iridioplatinum. An alloy usually containing 90 percent or more of platinum. The remaining percentage is of iridium which is necessary to produce an alloy sufficiently stiff for use in gem mountings. *Shipley.*

iridium. A silvery-white, hard, brittle, very heavy metallic element of the platinum group and group VIII that occurs usually as a native alloy with platinum or with osmium in iridosmine. It is resistant to chemical attack at ordinary temperatures. Used especially in hardening platinum for alloys suitable for surgical instruments, electrical and other scientific apparatus, jewelry, and the points of gold pens. Symbol, Ir; valences, 3 and 4; isometric; atomic number, 77; atomic weight, 192.2; and specific gravity, 22.42 (at 17° C). Hardness, cast, 218 Brinell; melting point, either, 2,410° C or 2,454° C; boiling point, either 4,527° ± 100° C or above 4,800° C; insoluble in water; slightly soluble in aqua regia; insoluble in acids and in alkalies; and slowly soluble in fused alkalies. Either iridium or osmium is the densest or the heaviest element known. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–116; CCD 6d, 1961.*

iridium 192. Radioactive iridium of mass number 192. Half-life, 74 days and radiation, beta and gamma. Used in the radiography of light castings. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–70.*

iridium-potassium chloride; potassium-iridium chloride; potassium chloroiridate; potassium hexachloroiridate. Black; isometric; $IrCl_4.2KCl$ or K_2IrCl_6; and soluble in hot water. Used as a black pigment in porcelain decoration. Molecular weight, 483.22; specific gravity, 3.546; decomposes on heating; soluble in water; and insoluble in alcohol, in potassium chloride, and in ammonium hydroxide. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–206.*

iridium sesquioxide. Black; Ir_2O_3; slightly soluble in concentrated hydrochloric acid; and insoluble in water. Used in ceramics in porcelain decoration. *CCD 6d, 1961.* Molecular weight, 432.40; dissociates, losing one oxygen at 400° C; and soluble in sulfuric acid and in hot hydrochloric acid. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B–181.*

iridosmine. A natural alloy of iridium and osmium, Ir,Os. Analyses show 43 to 77 percent iridium, 17 to 49 percent osmium, and a little rhodium, ruthenium, platinum, iron, and copper. Rhombohedral. *Sanford; Dana 17.*

iriginite; priguinite. A canary-yellow mineral, $UO_3.2MoO_3.4H_2O$; luster, vitreous; uneven fracture; does not fluoresce. *American Mineralogist, v. 45, No. 1–2, January-February 1960, pp. 257–258.*

iris. a. A transparent rock crystal, especially when it exhibits the colors of the rainbow. *Fay.* b. Iridescent quartz; also applied to other iridescent minerals; California iris is lilac or purple transparent spodumene *Hess.*

iris agate. Banded agate which in thinly fashioned sections displays iridescence. Of almost no gem importance. *Shipley.*

Irish buggy. A wheelbarrow. *Fay.*

Irish coal. Slate, shale, or rock loaded out from colliery as coal. *Pryor, 3.*

Irish diamond. Quartz that is transparent or nearly so and that is either colorless or only slightly tinged; also, a piece of this material. Also called rock crystal. *Webster 3d. See also* Bristol diamond. *Fay.*

Irish dividend. An assessment on mining stock. *Fay.*

Irish touchstone. Basalt, the stone which composes the Giant's Causeway in Ireland. *Webster 2d.*

irising. A surface fault, in the form of stained patches, sometimes found on flat glass that has been stacked with surfaces in contact. The term originates from the interference colors that often accompany the fault. It is caused by moisture. If the glass is annealed in an acid atmosphere and adequately washed, irising is unlikely to occur; separation of the stacked sheets by paper also prevents this trouble. *Dodd.*

iris quartz. Rock crystal containing thin air-filled cracks which produce iridescence. Same as rainbow quartz. *Shipley.*

irium. Sodium lauryl sulfate. *Pryor, 3.*

iron. a. A metallic element having atomic number 26 and in group VIII of the periodic system, the average atomic weight of the naturally occurring isotopes is 55.85. *ASM Gloss.* b. The cheapest, most abundant, most useful, and most important of all metals. The fourth most abundant element, by weight, composing the earth's crust. Symbol, Fe; silvery or silvery-white metal; isometric; valences, 2, 3, 4, and 6; specific gravity, 7.874 (at 20° C); melting point, 1,535° C; boiling point, 3,000° C; insoluble in water, in alkalies, in alcohol, and in ether; and soluble in acids. There are four allotropic forms, or ferrites, which are all isometric and which are according to ascending order of temperature: Alpha iron; beta iron; gamma iron; and delta iron. The transition temperatures are 770° C between alpha iron and beta iron; 928° C between beta iron and gamma iron; and 1,530° C between gamma iron and delta iron. Alpha iron is body-centered cubic and magnetic; beta iron is body-centered cubic and nonmagnetic; gamma iron is face-centered cubic; and delta iron is body-centered cubic. Hematite is the most common ore and iron is obtained from it by reduction with carbon. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-116, B–181.* c. Tenacious; lustrous; malleable; ductile metal; and rarely found native except in meteorites. The only metal that can be tempered, that is, hardened by heating and sudden cooling. Very brittle at very low temperatures; softens at red heat; and can be welded at white heat. Other minerals beside hematite that are ores of iron include magnetite, siderite, and limonite. The siliceous rock taconite is an important ore of iron. *CCD 6d, 1961.* d. Iron-base materials not falling into the steel classifications. *See also* gray cast iron; ingot iron; malleable cast iron; nodular cast iron; white cast iron; wrought iron. *ASM Gloss.* e. Colloquially, all derrick and drilling equipment above the heads of the men working on the drill platform. *Long.* f. Any ferrous metal tool or part that must be fished from a borehole. Also called junk. *Long.*

iron alum. A double sulfate of iron and potassium that occurs native and is then called halotrichite. Also called alum feather. *Standard, 1964.*

iron-aluminum garnet. Same as almandine. *Shipley.*

iron-ammonium sulfate. See ferrous ammonium sulfate. *CCD 6d, 1961.*

iron andradite. A silicate of ferrous and ferric iron, $3FeO.Fe_2O_3.3SiO_2$. Isometric. A garnet. Identical with skiagite. From Glen Skiag, Scotland; India. *English.*

iron and steel sheet piling. A method of shaft sinking through loose wet ground near the surface. Iron or steel sheet piling is used in place of wood piling. The piles are forced down by piledrivers before the shaft is excavated. As the enclosed material is removed, the sheet piling is braced by rings, frames, or dividers as required to resist the lateral pressure. *Nelson.*

iron antigorite. Identical with ferroantigorite. *English.*

iron balls. Eng. Ironstone nodules, Lancashire. *Arkell.*

iron beidellite. A ferriferous variety of beidellite, containing 18.54 percent Fe_2O_3. *English.*

iron black. Finely divided antimony. *Standard, 1964.*

iron brucite. A partially decomposed brucite containing iron. *Standard, 1964.* Also called eisenbrucite. *Fay.*

iron by hydrogen. *See* reduced iron. *Fay.*

iron carbonate. *See* siderite, a. *C.M.D.*

iron castings. Iron shapes which are cast in suitable molds in the iron foundry. *Hansen.*

iron chamber. The reverberatory or charge chamber of a puddling furnace where the metal is heated. *Fay.*

iron chloride. *See* ferric chloride. *CCD 6d, 1961.*

iron chlorite. A group name including various chloritic minerals rich in iron. Eisenchlorit (of C. F. Naumann, 1850) was applied only to delessite. *Spencer 15, MM., 1940.*

iron chromate. *See* ferric chromate. *CCD 6d, 1961.*

ironclad. A kind of furnace for roasting mercury ore. *Webster 2d.*

iron clay. Same as clay ironstone. *Standard, 1964.*

iron cordierite. A violet cordierite in which magnesium is largely replaced by ferrous iron. *English.*

iron-cross law. Isometric crystal system penetration twinning in which a plane parallel to a face of the rhombic dodecahedron is the twinning plane. *Hess.*

iron diarsenide; arsenoferrite. $FeAs_2$; molecular weight, 205.69; silvery-gray; isometric; specific gravity, 7.4; melting point, 990° C; insoluble in water and in hydrochloric acid; and slightly soluble in nitric acid. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-181.*

iron earth. Eng. A black pulverulent compound of peroxide of iron and protoxide of manganese, occurring in veins of ironstone in the crystalline schists. *Fay.*

iron earth, blue. Synonym for vivianite. *Dana 6d, p. 814.*

iron ferrocyanide; ferric ferrocyanide; Prussian blue. $Fe_4[Fe(CN)_6]_3$; molecular weight, 859.25; dark blue; crystals; decomposes on heating; insoluble in water; and soluble in hydrochloric acid and in sulfuric acid. Used as a pigment. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-182.*

iron flint. Brown or red varieties of ferruginous quartz. *Standard, 1964.*

iron fluoride. *See* ferric fluoride. *CCD 6d, 1961.*

iron formation. Sedimentary, low-grade, iron ore bodies consisting mainly of chert or fine-grained quartz and ferric oxide segregated in bands or sheets irregularly mingled. *Bureau of Mines Staff. Compare* taconite.

iron froth. A fine spongy variety of hematite. *Fay.*

iron furnace. A furnace in which iron is smelted or worked in any way. *Standard, 1964.*

iron glance. A variety of hematite; specular-iron. *Fay.*

iron gymnite. a. A red variety of deweylite containing iron. *Standard, 1964.* Also called eisengymnite. *Fay.* b. Synonym for hydrophite. *Hey 2d, 1955.*

iron hat. a. Synonym for tin hat; safety hat. *Long.* b. A weathered ironstone outcrop. *See also* gossan. *Pryor, 3.*

iron hypersthene. A metasilicate of magnesium and iron, $MgSiO_3.3FeSiO_3$. An iron-rich hypersthene (42 percent FeO). Identical with ferrosilite. *English.*

ironing. a. A polishing process in which granite blocks are boxed in and all cracks are filled with plaster of Paris and then a power-driven rotary head known as a scroll is guided over the surface wearing it smooth. *AIME, p. 328.* b. Thinning the walls of deep-drawn articles by reducing the clearance between punch and die. *ASM Gloss.*

iron jack. A flinty rock, found in Missouri associated with lead ore, carrying specks of sphalerite. *Standard, 1964.*

iron man. a. Eng. A collier's term for a coal-cutting machine. *Fay.* b. Eng. A kind of iron ore. *Webster 2d.* c. A railroad worker who handles the rails in tracklaying. *Webster 3d.* d. An iron worker; a manufacturer of iron; especially one engaged in the processing of iron. *Webster 3d.* e. A cement worker who weighs out ground iron ore and adds it to slurry or dry-ground rock as it goes into the kiln. *Webster 3d.* f. An apparatus on wheels for supporting a glass-blower's pontil while he is blowing large cylinders, as for window glass. *Standard, 1964.*

ironmaster. One that conducts or manages the founding or manufacture of iron especially on a large scale. *Webster 3d.*

iron metavanadate. *See* ferric vanadate. *CCD 6d, 1961.*

iron meteorite. A meteorite consisting of iron and nickel. *A.G.I. Supp.*

iron mica. A micaceous hematite. *Fay.*

iron minerals. Iron is the second most abundant metal in the earth's crust. Its various oxides are mainly responsible for rock colors. Magnetite, Fe_3O_4 is black; hematite, Fe_2O_3 red; limonite, $2Fe_2O_3.3H_2O$, yellow to brown; siderite, $FeCO_3$, gray to brown. Other colored iron ores include chamosite, greenolite, laterite, and micaceous hematite. *Pryor, 3.*

iron modulus. The Al_2O_3 to Fe_2O_3 ratio in a hydraulic cement. In portland cement, this modulus usually lies between 2 and 3. *Dodd.*

iron mold. Eng. A small chunk of iron ore occasionally found in chalk beds. *Standard, 1964.*

iron molybdate. *See* ferrimolybdite.

iron monarch. An important iron ore (chiefly hematite) deposit in the Middleback Ranges area of South Australia. *Nelson.*

iron monosulfide. *See* ferrous sulfide.

iron, native. Native iron is very rare, as it oxidizes; the nickel iron of meteorites is more common. *C.M.D.*

iron notch. Alternative name for the taphole of a blast furnace. *Dodd.*

iron ocher. Oxides of iron generally impure. Red ocher may be hematite, turgite, or mixtures of both, and possibly oxides of greater hydration; yellow ocher is limonite mixed with clay and other impurities. *Hess.*

iron olivine. *See* fayalite. *C.M.D.*

iron opal. Same as jasper opal. *Shipley.*

iron ore. Rocks or deposits containing iron-rich compounds in workable amounts; they may be primary or secondary; they may occur as irregular masses, lodes, or veins, or interbedded with sedimentary strata. *See also* chalybite; chamosite; goethite; hematite; siderite; limonite; magnetite. *C.M.D.*

iron ore. bog. *See* limonite; bog iron ore.

iron ore, brown. *See* limonite.

iron-ore cement. A cement in which ferric oxide replaces a large part of the alumina but some alumina must be present. Iron-ore cement is rather slow setting and hardening, but it is more resistant to sea water than is Portland cement. It is light to chocolate-brown and has a specific gravity of about 3.31, or higher than that of Portland cement. *CCD 6d, 1961.*

iron ore, kidney. Red hematite exhibiting a fibrous or columnar structure and a nodular surface. *CCD 6d, 1961.*

iron ore, magnetic. *See* magnetite.

iron-ore pellets, prereduced. *See* prereduced iron-ore pellets.

iron ore, spathic. *See* siderite.

iron ore, specular. *See* hematite.

iron ore, titanic. *See* ilmenite.

iron oxide. a. A common ore of iron, sometimes prepared as a fine powder for use by drillers as a drill-mud heavy loader. *Long.* b. A common compound of iron and oxygen; for example, rust. *Long.*

iron oxides. The basic constituent of the ferromagnetic spinels or ferrites. FeO, Fe_2O_3, and Fe_3O_4 have melting points from that of FeO at 1,420° to that of Fe_2O_3 at 1,565° C. Used extensively for producing colors in glasses, glazes, and enamels. *Lee; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-183.* Iron and iron oxides produce brown or reddish colors in ceramic mixtures if they are fired in an oxidizing atmosphere, and greenish or bluish colors if fired in a reducing atmosphere. Iron oxides are fluxing and coloring materials. Larger particles produce brown or black spots, which, particularly in whiteware, are undesirable. Much care is taken to remove iron and iron oxides from the raw materials and from the bodies used for whiteware manufacture. *Rosenthal.*

iron pan. In marshy and peaty soils, as well as in the alluvium of semiarid regions, it is common to find a hard layer of iron oxides a foot or so beneath the surface. This iron pan is formed by the oxidation of ferriferous solutions drawn up by capillarity. *Stokes and Varnes, 1955.* Also called hard pan.

iron paving. A road surface of cast-iron slabs studded to prevent skidding. *Ham.*

iron phosphate. *See* vivianite.

iron piler. A laborer who removes iron from cars, sometimes breaks it, and piles and classifies it according to grade. *Fay.*

iron pitch. At Lake Trinidad, asphalt that has overflowed the land and weathered to asphaltite. *Abraham, v. 1, 6d, 1960, p. 177.*

iron platinum. *See* ferroplatinum.

iron portland cement. Mixture of portland cement and granulated blast furnace slag. *Bennett 2d, 1962.*

iron powder. Iron in finely divided form, most commonly made by hydrogen reduction of finely ground oxide. *Bennett 2d, 1962.*

iron-powder electrode. A welding electrode with a covering containing up to about 50 percent iron powder some of which becomes a part of the deposit. *ASM Gloss.*

iron protosulfide. *See* ferrous sulfide. *CCD 6d, 1961.*

iron putty. An acid-resistant putty prepared from ferric oxide and boiled linseed oil. *Webster 3d.*

iron pyrite; pyrite; brasses. Iron sulfide, Fe_2S; contains 46.6 percent iron. Cubic crystals; color, bronze to brass; streak, greenish-black; Mohs' hardness, 6 to 6.5; specific gravity, 4.8 to 5.1. An important source of sulfuric acid. *Pryor, 3.*

iron-reduction process. A process used in the treatment of lead ores. *See also* precipitation process. *Bureau of Mines Staff.*

iron refining. The reduction of prepared ores of iron to metallic iron, as in the blast furnace. The reduction and purification of semirefined iron, such as pig iron, or a mixture of pig iron, scrap iron, and scrap steel, to form substantially pure iron or steel, as in the electric furnace, openhearth furnace, puddling furnace, or Bessemer converter. *Henderson.*

iron runner. The spout by which iron flows from the taphole of a blast furnace. *Fay.*

iron saffron. *See* Indian red. *CCD 6d, 1961.*

iron sampler. In the iron and steel industry, a laborer who obtains samples of iron ore as it is brought into the plant, or samples from semifinished or finished metal products, such as iron and steel sheets, rails, rods, or bars, and carries them to the laboratory sampler for routine tests. Also called sampler; test carrier. *D.O.T. 1.*

iron sand. Sand containing particles of iron ore, usually magnetite. *Fay.*

iron saw. A circular saw for cutting iron. *Standard, 1964.*

iron scale. A film of oxide formed on steel or iron in heating, rolling, or hammering. *Hess.*

iron schefferite. *See* pyroxene. *Hess.*

iron scurf. A glazing material usually used for blue bricks. It consists of a mixture of stone and iron particles produced when gun barrels are ground by means of siliceous grindstones. *CCD 3d, 1942.*

iron sesquioxide. *See* ferric oxide. *CCD 6d, 1961.*

iron shears. a. A machine for cutting iron plates or bars. *Standard, 1964.* b. A pair of hand shears for cutting sheet iron or iron wire. *Standard, 1964.*

ironshot. a. Of a certain mineral, streaked or speckled with iron or an iron ore. *Webster 3d.* b. Containing small nodules or oölitelike bodies of limonite or hematite. *A.G.I. Supp.*

iron silicates. *See* augite; bronzite; crocidolite; diopside; hypersthene. *C.M.D.*

ironsmith. A worker in iron, as a blacksmith. *Standard, 1964.*

iron spar. Same as siderite; chalybite. *Fay.*

iron sponge. Finely divided porous form of iron made by reducing an iron oxide at such low temperatures that melting does not occur, usually by mixing iron oxide and coke and applying limited increase in temperature. Used for precipitating copper or lead from solutions of their salts; removing sulfur compounds from coke-oven gas; and in electric-furnace steel operations. *CCD 6d, 1961.*

iron spot. A dark, sometimes slaggy, spot on or in a refractory brick, resulting from a localized concentration of ferruginous impurities; such spots can cause carbon deposition, or even disintegration of the brick, if the latter is exposed to CO attack at 400° to 500° C or to hydrocarbons at 800° to 900° C. *Dodd.*

iron stains. Strongly colored yellowish, reddish, or brownish deposits of iron oxides. *Skow.*

iron steel. A material formed of iron between steel surfaces, or of steel-located iron. *Standard, 1964.*

ironstone. Any ore of iron from which the metal may be smelted commercially but usually restricted to stratified ores, especially to clay ironstone, the ore from which most of the iron of Great Britain is made. *Fay.*

ironstone blow. Aust. A ferruginous gossan. *See also* gossan. *Fay.*

ironstone cap. A thick sheet or cap of iron concretion. *Schieferdecker.*

ironstone casing. Aust. The casing of ferruginous matter, usually auriferous, found abutting on quartz reefs. *Fay.*

ironstone china. A body compounded of china stone and clay, and flint and ironstone slag. *C.T.D.*

ironstone clay. *See* argillaceous hematite; hematite, red.

ironstone clay, brown. *See* limonite.

ironstone ware; stone china; white graniteware. Historic terms for durable English earthenware. *ASTM C242-60T.*

iron sulfides. *See* chalcopyrite; pyrite; marcasite; pyrrhotite. *C.M.D.*

iron sulfuret. *See* ferrous sulfide. *CCD 6d, 1961.*

iron talc. *See* minnesotaite. *Spencer 17, M.M., 1946.*

iron tungstate. a. $Fe_2(WO_4)_3$; molecular weight, 835.44; brown; insoluble in water; and soluble in acids. Used in metallurgy. *Bennett 2d, 1962.* b. $FeWO_4$; molecular weight, 303.69; brown to black; monoclinic; specific gravity, 6.64 to 7.109; and Mohs' hardness, 4.0 to 4.5. Occurs as the mineral ferberite. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-184, B-243.*

ironworker. One engaged in manufacturing iron or ironwork. *Standard, 1964.*

ironworks. An establishment for the manufacture of iron or of heavy ironwork. *Standard, 1964.*

iron-zirconium pink. *See* zirconium-iron pink. *Dodd.*

irradiate, to. To expose to radiation. *NCB.*

irradiation. Exposure to radiation, as in a nuclear reactor. *L&L.*

irreducible minimum saturation. The proportion of the pore space occupied by immobile interstitial water at levels well above the oil/water or gas/water transition zones. *Institute of Petroleum, 1961.*

irregular. A term descriptive of particles of mineral that lack a characteristic symmetry. *Pryor, 3.*

irregular polygon. One in which neither the sides nor the angles are equal. *Jones, 2, p. 109.*

irregular powder. Particles lacking symmetry. *ASTM B243-65.*

irrespirable. Not resepirable; not fit to be breathed. *Standard, 1964.* Said of mine gases. *Fay.*

irrespirable atmospheres. In coal mines, those atmospheres containing poisonous gases or a lack of sufficient oxygen as a result of firedamp explosions, coal-dust explosions, combined gas and dust explosions, or mine fires, and which can only be entered by men wearing breathing apparatus. *McAdam, p. 1.*

irreversible process. Thermodynamically, one not completely reversible. An irreversible reaction takes place (in one direction only) and proceeds to completion. *Pryor, 3.*

irrigable area. The extent of arable land sufficiently low for irrigation. *Ham.*

irrigating head. The flow of water used to irrigate a particular area. *Ham.*

irrotational wave. Synonym for P-wave; compressional wave. *A.G.I.; A.G.I. Supp.*

irruption. In geology, the movement of molten rock from a magmatic reservoir to the place where it solidifies; if the molten rock reaches the surface, the process becomes eruption, but that term commonly includes other phenomena as well. *Fay.*

irruptive rock. An igneous rock which was forced into or invaded other rocks as molten magma. An intrusive rock. The distinction between irruptive and eruptive is often disregarded. ***Compare*** effusive. *Fay.*

Irvingtonian. Lower Pleistocene. *A.G.I. Supp.*

Irwin consistometer. A simple capillary-flow viscometer designed by J. T. Irwin for testing vitreous enamel slips. Two capillaries are placed in the lower end of a long wide-bore tube; both capillaries have the same bore but one is twice as long as the other. The wide outer tube is filled with the slip to be tested and is then allowed to discharge through the two capillaries into separate measuring cylinders. The rate of flow through each capillary can therefore be calculated and a curve can be drawn from which both the yield value and mobility can be read. *Dodd.*

Irwin slump test. A work's test for assessing the setting-up of vitreous enamel slips for spraying. It was first described by J. T. Irwin in the following words: a ground-coated plate is placed on a table and a steel cylinder, $1\frac{13}{16}$ inches in internal diameter and $2\frac{1}{2}$ inches high, is placed on the plate. The cylinder is filled with enamel to be tested. The cylinder is then lifted vertically, with a rapid motion, by means of a hook and cord attached to the top of the cylinder and passing over a pulley to a weight. When the weight is released, the cylinder is raised vertically. This action results in a pancake of enamel on the test plate. The diameter of this pancake is the function of the set or stiffness of the enamel slip. *Dodd.*

isabnormal. A line connecting points having the same difference from normal, usually temperature, or indicating the same difference between actual and calculated values at different parallels. *H&G.*

isallobar. A line connecting points having the same change of atmospheric pressure in a specified period. *H&G.*

isallotherm. A line connecting points having the same change of temperature in a specified period. *H&G.*

isanomal. A line connecting points having the same anomalies of temperature, pressure, etc. *H&G.*

isanomalic line. Line of equal magnetic anomaly. *Schieferdecker.*

Isbell table. Obsolete type of shaking table. *Pryor, 3.*

ISCC-NBS color system. A system for the designation of colors drawn up by the Inter-Society Color Council and the National Bureau of Standards. *Dodd.*

isenite. A feldspathoid-bearing variety of hornblende trachyandesite, having phenocrysts of andesine, soda microline, hornblende, and biotite in a groundmass of oligoclase, orthoclase, and nosean, with small amounts of augite, apatite, and iron ores. *Holmes, 1928.*

iserine. A supposed isometric form of $FeTiO_3$. Found as rounded octahedral crystals and grains in the sands of the Iserwiese, Bohemia, associated with detrital grains of ilmenite, corundum and ferroan (?) rutile (iserite). Probably magnetite with intergrown ilmenite, or simply ilmenite if the octahedra reported are regarded as a combination of a rhombohedron with basal truncations. Also spelled iserin. *Dana 7, v. 1, p. 541.*

ishiganeite. A manganese oxide from the Ishigane mine, Aichi prefecture, Japan. *Hey, M.M., 1964.*

ishikawaite. A variety of samarskite having a composition that is very close to typical samarskite except for an abnormally high UO_2 content. *Crosby, p. 40.*

isinglass. Mica; so named because of its superficial resemblance to some kinds of gelatin. Also known as isinglass stone. *Standard, 1964.*

island. A body of land extending above, and completely surrounded by water at the mean high-water stage. *Schieferdecker.*

island arc. A group of islands having a curving arclike pattern. Most island arcs lie near the continental masses, but inasmuch as they rise from the deep ocean floors they are not a part of the continents proper. *Stokes and Varnes, 1955.*

island shelf. The zone around an island or island group extending from the low-water line to the depths at which there is a marked increase of slope to greater depths. Conventionally its edge is taken at 100 fathoms (or 200 meters). *A.G.I.*

island slope. The declivity from the outer edge of an island shelf into great depths. *A.G.I.*

Isle of Wight diamond. A fine, transparent variety of quartz. *Fay.*

Isle Royal greenstone. Chlorastrolite. *Shipley.*

islet. A small or minor island. *Schieferdecker.*

ISO. International Standards Organization, 1 Rue de Varembé, Geneva. *Dodd.*

isoanthracite lines. a. A term suggested, but not published, by Marcel Bertrand, for lines of equal volatile content (now called isovols) drawn on the map or on the diagram. *Tomkeieff, 1954.* b. Lines of equal C/H ratio in coal drawn on the map or on the diagram. *Tomkeieff, 1954.*

isobar. An imaginary line or a line on a map or chart connecting or marking places on the surface of the earth where the height of the barometer reduced to sea level is the same either at a given time or for a certain period. *Webster 3d.*

isobaric surface. A three-dimensional surface in the ocean where the pressure is everywhere the same. This is not a horizontal surface. If several parallel equally spaced plane surfaces are used to cut an isobaric surface into horizontal sections a pattern of isobaric lines is formed. If the lines are closely spaced the pressure gradient is strong, less close spacing indicates a weaker gradient. *Hy.*

isobars; isobares. Atoms of different chemical elements but of identical atomic mass; for example, both titanium and chromium have an isotope of atomic mass 50. *See also* isotope. *C.T.D.*

isobase. In geology, a topographic or imaginary contour line in a map, drawn through a series of points of equal elevation in a topographic surface or line, formerly level, but at present deformed. *Standard, 1964.*

isobath. a. A line on a marine map or chart joining points of equal depth usually in fathoms below mean sea level. *A.G.I.* b. A line on a land surface all points of which are the same vertical distance above the upper or lower surface of an aquifer may be called an isobath of the specified surface, or merely a line of equal depth to the surface. *A.G.I.*

isobathic. Having equal depth. *H&G.*

isobathytherm. A line connecting points on the earth's surface where a certain temperature is found at the same depth. *Webster 3d.*

isocals. Lines of equal calorific value in coal drawn on the map or on a diagram. *Tomkeieff, 1954.*

isocarb. a. A line constructed on a map, somewhat similar to a contour line, but connecting points of equal content of fixed carbon of coal in the bed. The fixed carbon is computed on an ash-free and moisture-free basis. *A.G.I.* b. A line passing through points whose carbon ratios are equal. *A.G.I.*

isocarb lines. Lines on a map connecting points having equal carbon ratios. *See also* carbon ratio. *A.G.I.*

isocarbon map. A map showing, by contours, the areas having an equal quantity of carbon within an assumed interval of stratigraphic section. *Ballard.*

isochasm. A line connecting points having the same average frequency of auroras. *H&G.*

isochemical. Having or keeping the same chemical composition; for a process, a set or series of minerals or rocks, a case of metamorphism. A rock changing its mineral composition isochemically remains a closed system. *Challinor.*

isochemic lines. Planes or lines of equal content of phosphorus in any single layer of iron ore. *Fay.*

isochore. Graphic representation of variation in fluid pressure with change of temperature, at constant volume. *Pryor, 3.*

isochore map. a. A map indicating by means of isochores the varying interval convergence between two designated stratigraphic planes. Differs from isopach map in that it may express the variations in many units and the effects of one or more unconformities, whereas the isopach map expresses variation within a single unit. Current usage shows little distinction between the terms. Synonym for convergence map. *A.G.I.* b. A map showing, by contours, the thickness of a pay section in a pool. The map is a basis for estimating reservoir content. *A.G.I.*

isochromatic. Possessing the same color. *Shipley.*

isochromatic lines. In stress analysis by the photoelastic method, these appear as colored streaks which are lines of equal difference of principal stress. *See also* photoelasticity. *Ham.*

isochrome map. A map showing, by contours, the continuity and extent of color stains on formations. *Ballard.*

isochrone. a. A curve showing the distribution of the excess hydrostatic pressure at a given time during a process of consolidation. *ASCE P1826.* b. Line of equal travel time. *Schieferdecker.*

isochrone lines. Lines connecting points of equal times. When the relative seismic velocities are known the isochrones can be translated into depth contours. *See also* refraction shooting. *Nelson.*

isoclasite. A white acicular mineral with a perfect clinodiagonal cleavage, $4CaO.P_2O_5.\text{-}5H_2O$; Mohs' hardness, 1.5; specific gravity, 2.92; from Joachimstal. *Larsen, p. 106.*

isoclinal. In geology, (1) folded strata dipping at the same angle in the same direction, and (2) an isocline. *Standard, 1964.*

isoclinal fold. In geology, a stratigraphic fold whose sides have parallel dips; it may be an anticline or a syncline, and either vertical, overturned, that is, forced over into an oblique position, or recumbent, that is, pushed over into nearly or quite a horizontal position. Also called called carinate fold. *Fay.*

isocline. An anticline or syncline so closely folded that the rock beds of the two sides or limbs have the same dip. *Webster 3d.* Also called an overturn, or overturned anticlinal. *See also* monoclinal, c; isoclinal fold. *Fay.*

isoclinic. A line (in a stressed body) at all points on which the corresponding principal stresses have the same direction. *Ro.*

isoclinic line. A line drawn through all points on the earth's surface having the same magnetic inclination. The particular isoclinic line drawn through points of zero inclination is given the special name of aclinic line. *H&G.*

isoclinic map. One showing lines of equal inclination, hence dip, in the area mapped. *Bureau of Mines Staff.*

isodee. A line connecting points of equal difference between pressure altitude and absolute altitude above sea level. *H&G.*

isodiametric. In crystallography, having the lateral crystal axes equal; said of crystals of the hexagonal and tetragonal systems. *Fay.*

isodimorphous. In mineralogy, both isomorphous and dimorphous; said of certain groups of minerals. *Fay.*

isodynamic line. Any line joining points of equal magnetic intensity. Applicable to the total intensity or the vertical, horizontal, north-south, or east-west components. So used in terrestrial magnetism literature, especially in British and Canadian writings. *A.G.I.*

isodynamic map. One showing lines of equal magnetic intensity of the area mapped. *Bureau of Mines Staff.*

isoelectric point. Zero potential or point of electrical neutrality; the hydrogen-ion exponent at which particles in aqueous suspension are neutral, and best able to flocculate. *Pryor, 4.*

isofacial; isograde. Said of all rocks belonging to the same facies. *A.G.I.*

isogal. In gravity prospecting, a contour line of equal gravity values. *A.G.I.*

isogam. In magnetic prospecting, a contour line of equal magnetic values. *A.G.I.*

isogam map. A chart showing contour lines of equal gravity, and employed in the gravitational method of geophysical prospecting. Also called isogal map. *Nelson.*

isogeotherm; isogeothermal. An imaginary line or curved surface beneath the earth's surface through points having the same mean temperature. *Webster 3d.*

isogeothermal line. The same as isogeotherm. *A.G.I.*

isogonic line. An imaginary line or a line on a map joining places on the earth's surface at which magnetic declination is the same. *Compare* agonic line. *Webster 3d.*

isograd. a. A line connecting those rocks comprising the same facies. *A.G.I.* b. A line connecting similar temperature-pressure values. *A.G.I.* c. A line marking the boundary between two facies. *A.G.I.* d. A line of equal grade of metamorphism drawn on a map to distinguish metamorphic zones defined by index minerals. *A.G.I.*

isograde. Synonym for isofacial. *A.G.I.*

isograde rocks. Rocks which were metamorphosed under similar physical conditions, for example, in the same metamorphic (sub)facies. *Schieferdecker.*

isogram. a. A line connecting points equal in weight or importance in some other respect, such as an isotherm, an isobar, a contour line, etc. *Hess.* b. Isontic was later proposed and withdrawn for the same meaning. *Hess.*

isohaline. Having no change in salt content along a given reference plane. Also, a line connecting points of equal salinity. *Hy.*

isohel. A line connecting points having the same amount of sunshine during any specified period. *H&G.*

isohume. A line constructed on a map, somewhat similar to a contour line, but connecting points of equal moisture content of coal in the bed. *A.G.I.*

isohyet. A line connecting points having the same amount of precipitation for any specified period. *H&G.*

isohyetal. Marking equality of rainfall. *Fay.*

isokite. A monoclinic mineral, $CaMgPO_4F$, isomorphous with tilasite with phosphorus in place of arsenic. White spherulites from a carbonate plug near Isoka, Northern Rhodesia. Named from locality. *Spencer 20, M.M., 1955.*

isolate. A culture of an organism isolated by selection procedures. *I.C. 8075, 1962, p. 63.*

isolated consignment. A particular case of a single consignment where the sampling is to be carried out without prior knowledge of a coal's sampling characteristics other than its presumed ash content and size. *Nelson.*

isolator. Part of a circuit which can be removed from it in order to break the circuit when there is no current flowing. *Ham.*

isolator switch. Electric cut out, used to break power supply over a distribution line. *Pryor, 3.*

isolith. An imaginary line connecting points at which the thickness of a particular class of material within a formation or other stratigraphic interval is equal. Thus, a limestone isolith of the A formation connects, like a contour, all points at which the total thickness of all limestones within the A formation is a certain numerical value. *Stokes and Varnes, 1955.*

isolithic boundary. A zone separating rocks of different grain size classification. They are somewhat indefinite and differ in position with time. *A.G.I.*

isolith map. One which portrays (by isolith lines) variations in aggregate thickness of a given lithologic facies as measured perpendicular to the bedding at selected points. These may be outcrops or drill holes. *A.G.I.*

isomagnetic. Of, relating to, or marked by points of equal magnetic intensity or points of equal value of a component of such intensity. *Webster 3d.*

isomagnetic line; isomagnetic contour; isogam. A line on a map or a chart of the earth's surface connecting points of equal magnetic intensity or points of equal value of a component of such intensity. *Webster 3d.* Commonly expressed in gammas (1 gamma equals 10^{-5} oersted); hence the name isogram. *Bureau of Mines Staff.*

isomer. a. One of two or more substances composed of molecules having the same kind of atoms and in the same proportions, but which, by reason of some difference in the number or arrangement of those atoms, have entirely different physical and chemical properties. *Hess.* b. In nuclear science, one of two or more nuclides with the same numbers of neutrons and protons in the nucleus, but having different energy. *L&L.*

isomeric. Of, relating to, or exhibiting isomerism. *Webster 3d.*

isomerism. a. Compounds possessing the same percentage composition and the same molecular weight, but differing in at least one of their physical or chemical properties, are said to be isometric and each is an isomer or isomeride of the others. *Miall.* b. The existence of more than one substance having a given molecular composition and molecular weight. This phenomenon frequently occurs among organic compounds and among complex inorganic salts. *C.T.D.*

isomerization. Converting a straight chain saturated hydrocarbon to a corresponding branched chain; for example, n-butane may be catalytically converted to isobutane. *Shell Oil Co.*

isomeromorphism. Isomorphism between substances having the same atomic proportions. *Fay.*

isomers. Substances composed of equal amounts of the same elements but differing in properties due to variation in structure. *API Glossary.*

isomesical. Relates to deposits, not necessarily synchronous, laid down in identical media as, for example, two or more river deposits. *Schieferdecker.*

isometric. a. A system of crystallization with three axes at right angles and of equal length; nine planes of symmetry; singly refracting. *Hess.* b. Characterized by equality of measure. *Fay.*

isometric projection. In technical drawing, a three-dimensional view of an object can be drawn to scale with three perpendicular edges at 120° to each other, and with the vertical edges vertical. *See also* axonometric projection. *Ham.*

isomorphism. a. The name given to the phenomenon whereby two or more minerals, which are closely similar in their chemical constitution, crystallize in the same class of the same system of symmetry, and develop very similar forms. *C.M.D.* b. The property, possessed by various groups of compounds, of being identical in crystalline form, and having the same numbers of atoms, similarly arranged. *Hess.*

isomorphous. Originally defined (Mitscherlich, 1819) as having similar crystalline form, but now generally restricted to compounds that form solid solutions by isomorphous substitution, that is, by the replacement of one ion for another in a crystal structure without alteration in the crystal form. *Compare* isotypic. *A.G.I.*

isomorphous mixture. a. A solid solution of two or more isomorphous substances. *Fay.* b. A type of solid solution, in which mineral compounds of analogous chemical composition and closely related crystal habit crystallize together in various proportions. *HW.* c. *See* mixed crystal. *C.T.D.*

isomorphous replacement. Replacement of one element by another of the same valency in the chemical composition of a mineral, as in tourmaline, where iron, lithium, and magnesium, etc., replace each other with resulting wide ranges of colors but little variation in other properties, iron producing no gem qualities. In other cases of isomorphic replacements, wide variations in physical properties result. *Shipley.*

isomudstone map. A map showing, by contours, the areas having an equal quantity of mudstone within an assumed interval of stratigraphic section. *Ballard.*

isopach. A line, on a map, drawn through points of equal thickness of a designated unit. Synonym for isopachous line; isopachyte. *A.G.I.*

isopach map. A map indicating, usually by means of contour lines, the varying thickness of a designated stratigraphic unit. Also called isopachous map. *A.G.I.*

isopachous. Of equal thickness; said (1) of maps, charts, etc., in which the shape of a body is indicated by lines drawn through points of equal thickness as projected onto any particular plane, and (2) of the lines as drawn. Analogous to contour lines, but represent thickness. *See also* isopach. *Webster 2d.*

isopachous line. Synonym for isopach. *A.G.I.*

isopachous map. Synonym for isopach map. *A.G.I.*

isopachyte. Term used by British writers for isopach and isopachous line. *A.G.I.*

isopag. A line connecting points where ice is present for the same number of days per year. *H&G.*

isopectic. A line connecting points at which ice begins to form at the same time of the winter. A line connecting points at which ice melts at the same time of the spring is called an isotac. *H&G.*

isoperthite. Regular intergrowth of two kinds of feldspar belonging to the same isomorphous series. *A.G.I. Supp.*

isophysical series. A series comprising rocks of different chemical composition which were metamorphosed under identical physical conditions. *Schieferdecker.*

isopic. Said of two formations deposited contemporaneously and of the same facies. *Compare* heteropic. *C.T.D.*

isopical. Relates to synchronous deposits which exhibit the same facies. *Schieferdecker.*

isopiestic. When the pressure on a surface of the sea is constant. *Hy.*

isopiestic line. A contour of the piezometric surface of an aquifer. It is an imaginary line, all points along which have the same static level. *A.G.I.*

isopleth. a. A line, on a map or chart, drawn through points of equal size or abundance. *A.G.I.* b. A line of constant composition, as in a binary temperature v. composition plot. *A.G.I.* c. An isogram indicating the variation of an element with respect to two variables, one of which is usually the time of year. The other may be time of day, altitude, or some other variable. *H&G.*

isopor. *See* isoporic line. *A.G.I.*

isoporic line. A line drawn through points whose annual change in magnetic declination is equal. *A.G.I.*

isopropyl alcohol. Alcohol with formula C_3H_7OH, and a boiling point of 207° F, manufactured from the unsaturated hydrocarbon propylene. Its acetate is widely used as a solvent in the lacquer industry. *Shell Oil Co.*

isopycnic; isopycnic line. A line connecting points of equal density, particularly of ocean water. A line connecting points of equal atmospheric density may be called an isostere. *H&G.*

isopyre. a. Apparently an impure opal, carrying about 1.6 percent copper, found at St. Just, Cornwall, England. *Weed, 1918.* b. An aluminosilicate of calcium, iron, and a little copper. *Hey 2d, 1955.*

isorad map. A map with contours connecting points of equal radiation and showing anomalous radioactive highs. *Ballard.*

isorads. Lines joining points of equal radioactivity, drawn from geiger- or scintillation-counter data to form an isorad map. *A.G.I.*

isoresistivity plan. A plan showing lines of equal resistivity at a certain selected depth. It is prepared from data obtained by the resistivity method of geophysical prospecting. *Nelson.*

isoseism. Synonym for homoseism. *A.G.I.*

isoseismal. A line on the surface of the earth joining points of equal seismic disturbance due to any single earthquake. *A.G.I.*

isoseismal line. The line on the earth's surface connecting points of equal earthquake intensity. The macroseismic area lies inside the isoseism II (according to Mercalli-Cancani), the microseismic area outside the same. Synonym for isoseism. *Schieferdecker.*

isoseismic line. An imaginary line connecting all points on the surface of the earth where an earthquake shock is of the same intensity. *Fay.*

isostasy. A supposed equality existing in vertical sections of the earth, whereby the weight of any column from the surface of the earth to a constant depth is approximately the same as that of any other column of equal area, the equilibrium being maintained by plastic flow of material from one part of the earth to another. *H&G.*

isostatic. Subjected to equal pressure from every side; being in hydrostatic equilibrium; relating to or characterized by isostasy. *Webster 3d.*

isostatic adjustment. The condition in which forces tending to elevate the earth's crust balance those tending to depress the earth's crust. *MacCracken.*

isostatic anomaly. a. The difference between the observed value of gravity at a point after applying to it the isostatic correction and the normal value of gravity at the point. *A.G.I.* b. Anomaly on a map of observed gravity anomalies after applying the isostatic correction. Negative isostatic anomalies indicate undercompensation, implying a tendency to rise; positive isostatic anomalies connote overcompensation and a tendency to sink. *A.G.I.*

isostatic compensation. a. An equilibrium condition in which elevated masses such as continents and mounatins are compensated by a mass deficiency in the crust beneath them. The compensation for depressed areas is by a mass excess. *A.G.I.* b. The process in which lateral transport at the earth's surface by processes such as erosion and deposition is compensated by lateral movements in a subcrustal layer. *A.G.I.*

isostatic correction. The adjustment made to values of gravity or to deflections of the vertical observed at a point to take account of the assumed mass deficiency under topographic features for which a topographic correction is also made. *A.G.I.*

isostatic equilibrium. The shifting of the rock beneath the earth's crust in response to the shifting in the weight above the earth's crust. *MacCracken.*

isostatic pressing. A process sometimes used for the shaping of ceramic components, for example, vacuum tube enclosures and envelopes, sparking plugs, and similar items from Al_2O_3, BeO, or other special ceramics. The powder to be pressed is put in a rubber or plastic bag (often called the tooling) which is then placed in a container and subjected to hydrostatic pressure, generally 10,000 to 20,000 pounds per square inch. The merit of this process is the uniform manner in which pressure is applied over the whole surface, resulting in uniform density in the shaped component. *Dodd.*

isostatic readjustment. The process whereby isostasy is restored after having been disturbed by erosion or other causes. *Stokes and Varnes, 1955.*

isostatic settling. Gradual widespread settling of a region where sediments have accumulated to great depth. *Stokes and Varnes, 1955.*

isostructural. Refers to minerals that are closely similar in crystallographic, physical, and chemical properties but have little tendency for isomorphous substitution; same as isotypic. *A.G.I. Supp.*

isotach. A line connecting points of equal current velocity. *Hy.*

isotherm. A line on a map or chart of the earth's surface connecting points having the same temperature at a given time or the same mean temperature for a given period. *Webster 3d.*

isothermal. A change taking place at a constant temperature. *Strock, 10.*

isothermal annealing. a. Austenitizing a ferrous alloy and then cooling to, and holding at, a temperature at which austenite transforms to a relatively soft, ferrite-carbide aggregate. *ASM Gloss.* b. Annealing at constant temperature. *Bureau of Mines Staff.*

isothermal compression. a. Reduction in the volume of a fluid without any change in its temperature. *Standard, 1964.* b. Compression in which there is no change in the temperature of the air; used as a standard against which the conditions of actual compression may be checked. *Lewis, p. 665.*

isothermal expansion. The expansion of air under constant temperature. Since the air does work on expanding, it loses heat; consequently heat must be added to the air in order to maintain it at constant temperature. *Lewis, p. 665.*

isothermal layer. A water column through which a constant temperature exists. *Hy.*

isothermal transformation. A change in phase at any constant temperature. *ASM Gloss.*

isotherm follower. An instrument developed by Navy Electronic Laboratory to study the movement of subsurface layers of oceanic water. It consists of an immersible transducer, an electronic unit, an underwater winch and two recorders. *Hy.*

isothrausmatic. Said of orbicular igneous rocks in which the composition of the cores of the orbs is identical with that of the groundmass in which they are embedded. *Compare* homeothrausmatic. *C.T.D.*

isotime curve. *See* isochrone. *Schieferdecker.*

isotope. An atom having the same atomic number as another atom (same chemical element) but having a different atomic weight (or a different mass number). The nuclei of the atoms have the same number of protons but different numbers of neutrons. Thus, carbon 12 ($_6C^{12}$), carbon 13 ($_6C^{13}$), and carbon 14 ($_6C^{14}$) are isotopes of the element carbon, the subscripts denote their common atomic number and the superscripts denote their different atomic weights. *L&L.*

isotopical. Relates to synchronous deposits of the same geological province. *Schieferdecker.*

isotopic enrichment. A process by which the relative abundance of the isotopes of a given element are altered in a batch, thus producing a form of the element enriched in a particular isotope; for example, enriching uranium in the uranium 235 isotope. *See also* enriched uranium. *L&L.*

isotron. A device for isotope separation based on the electrical sorting of ions. Ions of different mass accelerated to a given energy have different velocities. By synchronizing the field on a deflector grid to pulses in the ion source, ions of different velocities (hence different masses) may be collected. *NRC-ASA N1.1-1957.*

isotropic. a. Having the same properties in all directions; said of a medium with respect to elasticity, conduction of heat or electricity, or radiation of heat or light. *Compare* anisotropic. *Fay.* b. In crystallography, transparent or reflecting crystals which show no color change when rotated between crossed nicols, and which therefore have the same optical properties in all directions. *Pryor, 3.*

isotropic mass. A mass having the same property (or properties) in all directions. *ASCE P1826.*

isotropic stress. The condition of equal horizontal and vertical stresses in material which is in the "elastic state" of stress. *Woodruff, v. 1, p. 94.*

isotropy. The behavior of a medium having the same properties in all directions. *Taylor.*

isotypic. Having analogous composition and closely similar crystal structure, but not capable of intercrystallizing to form solid solutions. Examples are calcite and soda niter; galena and NaBr. *Compare* isomorphous. *A.G.I.*

isovelocity. The phenomenon of sound being the same in all parts of a given water column. *Hy.*

isovol. Lines constructed on a map of a coalbed connecting points of equal volatile matter delineating the distribution of volatile matter of the coal. *A.G.I.*

issite. A melanocratic dike rock containing hornblende, with a smaller quantity of green pyroxene and a variable but always subsidiary amount of labradorite. *Holmes, 1928.*

isthmus. A narrow strip of land, bordered on both sides by water, connecting two large bodies of land. *Schieferdecker.*

Istra. Trade name for a high-alumina cement made in Yugoslavia. *Dodd.*

Istrian stone. A marble near Trieste, Italy, from which Venice is largely built. *Fay.*

ISWG Abbreviation for Imperial Standard Wire Gage (gauge). *Zimmerman, p. 56.*

ita. A Japanese gold-washing board. *Fay.*

itabirite. a. A metamorphic rock of schistose structure and composed essentially of quartz grains and scales of specular hematite. Some muscovite is also present. It is a close relative of itacolumite. Named from Itabira, Brazil. When it crumbles to powder, it is called jacutinga. *Fay.* b. A specular iron ore. *Fay.*

itacolumite; flexible sandstone. a. A variety of metamorphosed sandstone, slabs of which will bend noticeably without breaking. *Sanford.* b. A schistose and flexible quartzite containing mica, chlorite, and talc. Synonym for articulite. *See also* quartzite. *A.G.I.*

Italian asbestos. A name often given to tremolite asbestos to distinguish it from Canadian or chrysotile asbestos. It is extensively quarried in Piedmont and Lombardy, Italy. *C.M.D.*

Italian chrysolite. Vesuvianite. *Shipley.*

Italian lapis. Same as Swiss lapis. *Shipley.*

Italian tiles. Roofing tiles, of a type common in Italy, designed for use in pairs; a flat undertile (the tegula) being laid adjacent to a rounded overtile (the imbrex). *Compare* Spanish tile. *Dodd.*

italite. A rock composed almost wholly of leucite with small amounts of aegirine augite, haüyne, melilite, biotite, apatite, and opaque oxides. The most leucite-rich rock known, italite has been recognized only as ejected blocks in volcanic agglomerates in the Alban Hills near Rome, Italy. *A.G.I.*

itambamba. Braz. A plant whose juice is said to help catch fine gold. *Fay.*

itatli. Mex. An Aztec name for obsidian. *Fay.*

Ithaca group. A subdivision of the Senecan series as exposed in the gorge of Fall Creek, Ithaca, N.Y. *C.T.D.*

itoite. An orthorhombic mineral, $Pb_3[GeO_2(OH)_2](SO_4)_2$, isostructural with anglesite; from Tsumeb, Southwest Africa. *Hey, M.M., 1961.*

itsindrite. An igneous dike rock composed of microcline and nepheline graphically intergrown, biotite, aegirite, and zoned melanite ranging from coarse- to fine-grain. *Johannsen, v. 4, 1938, p. 145.*

ivory. A hard, white, close-grained substance which constitutes the greater part of the tusks of the elephant, mammoth, hippopotamus, narwhal, and walrus. The best grades are obtained from the elephant. *CCD 6d, 1961.*

ivory, artificial. A substance, resembling natural ivory, made by mixing gypsum and stearic acid. *CCD 6d, 1961.*

ivory black. An animal black produced from ivory. Sometimes the term is erroneously applied to other animal blacks. Used chiefly as a pigment. *CCD 6d, 1961.*

ivory porcelain. A ware having a surface resembling ivory, produced by depolishing the vitreous glaze. *Fay.*

ivory turquoise. Odontolite. *Shipley.*

Iwan auger shoe. A replaceable cutting head on a dry sampler. It is barrel-shaped, like the cutting members on a common posthole digger. *Long.*

Iwan earth auger. Synonym for Iwan-pattern earth auger. *Long.*

Iwan-pattern earth auger. A dry sampler equipped with an Iwan auger shoe or cutterhead. Also called posthole digger. *See also* Iwan auger shoe. *Long.*

IX. Ion exchange. *Pryor, 4.*

ixolyte; ixolite. An amorphous, hyacinth-red, greasy hydrocarbon mineral which softens at 76° C, and resembles hartite; it is found in Oberhart, near Gloggnitz, Austria. *Fay.*

Izod test. A pendulum type, single-blow impact test in which the specimen, usually notched, is fixed at one end and broken by a falling pendulum. The energy absorbed, as measured by the subsequent rise of the pendulum, is a measure of impact strength or notch toughness. *ASM Gloss.*

iztac chalchihuitl. White or green Mexican onyx. *See also* Mexican onyx. *Shipley.*

iztli. Mex. A variety of obsidian used by Mexican Indians for arrowheads, implements, etc. *Standard, 1964.*

J

j a. Abbreviation for joule. Also abbreviated J. *BuMin Style Guide, p. 60; Zimmerman, p. 60.* b. Symbol for heat-transfer factor. *Zimmerman, p. 53.* c. Symbol used for electric circuits; square root of —1 (minus 1), which is variously designated the imaginary number; imaginary unit; right-angle turning operator; vector turning operator. *Zimmerman, p. 101.* d. Symbol for a unit vector in the y direction or parallel to the y axis. *Zimmerman, p. 166.* e. Abbreviation for join. *Webster 3d.* f. Abbreviation for jack. *Zimmerman, p. 59.*

j a. Symbol for inner quantum number. *Zimmerman, p. 163.* b. Symbol used for electric circuits, instead of *i*, for the square root of —1 (minus 1), which is variously designated the imaginary number; the imaginary unit; the right-angle turning operator; the vector turning operator. *Zimmerman, pp. 158, 164, 165.*

J a. Symbol for Jurassic. *USGS Sugg., p. 86.* b. Symbol for mechanical equivalent of heat. *Zimmerman, p. 53.* c. Symbol for gram-equivalent weight. *Zimmerman, p. 51.* d. Symbol for electric-current density. *Zimmerman, p. 152.* e. Symbol for intensity of magnetization. *Zimmerman, p. 58.* f. Symbol for intensity of radiation; radiant intensity; radiant intensity of any body. *Zimmerman, p. 87.* g. Symbol for polar moment of inertia. *Zimmerman, p. 57.* h. Symbol for sound-energy flux. *Zimmerman, p. 99.* i. Abbreviation for Journal. *BuMin Style Guide, p. 63.* j. Abbreviation for jack. *Zimmerman, p. 205.*

J a. Symbol for electric equivalent of heat; mechanical equivalent of heat; Joule constant; Joule equivalent. *Zimmerman, pp. 146, 155, 157, 158.* b. Symbol for gram-equivalent weight; number of equivalents. *Zimmerman, pp. 155, 169.* c. Symbol for variable action. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99.* d. Symbol for radiant intensity; total emissive power. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99.* e. Symbol for moment of inertia; rectangular moment of inertia; polar moment of inertia; polar areal moment of inertia. Also, the symbol for moment of inertia, when enclosed in parentheses, as (*J*). *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99; Zimmerman, p. 163.* f. Symbol for total inner quantum number. *Zimmerman, p. 163.* g. Symbol for sound-energy flux. *Zimmerman, p. 189.*

jabez. York. Term used for carbonaceous shale or mudstone. *Tomkeieff, 1954.*

jaboncillo. Mex. Decomposed talcose rock, or hardened clay, generally found in a vein, and sometimes indicating the proximity of rich ore. *Fay.*

jaca. Brazilian term for carbon or other dark-colored spots or inclusions in a diamond. Sometimes used as a synonym for carbon spot or carbon fleck by the older handsetters experienced in setting Brazilian diamond, and by drillers who have worked in Portuguese-speaking countries. *Long.*

jacinta garnet. A trade term for yellowish garnet. *Shipley.*

jacinth; hyacinth. The aurora-red variety of transparent zircon, used as a gem stone. A cinnamon-colored variety of grossularite from Ceylon, is also called hyacinth. *C.M.D.*

jack. a. A name given to zinc ores. *Barger.* b. Cannel coal interstratified with shale. *Tomkeieff, 1954.* c. Coaly shale, often canneloid. *Tomkeieff, 1954.* d. A tin bucket with pouring spout in which powder in quantities of 5 to 12½ pounds is carried into the mine. *Fay.* e. N. of Eng. A lantern-shaped case made of tin in which safety lamps are carried in strong currents of ventilation. *Fay.* f. Scot. One who works underground at odd work. *Fay.* g. Scot. A narrow dike usually of igneous rock. *Fay.* h. A wooden wedge for separating rocks rent by blasting. *Fay.* i. A rod or post set up in the working room of a mine to which a rope is fastened for the purpose of moving the cutting machine from place to place. *Fay.* j. N. of Eng. A large fissure or crack in the mine roof. *Fay.* k. Eng. *See* back. *SMRB, Paper No. 61.* l. A portable device used for exerting great pressure or for lifting a heavy body through a small distance. The true ratchet jack is used for lifting. In conveyor work there are a number of varieties of the jackscrew used for holding down various pieces of equipment, and each is given a different name. Ratchet jacks for this type of service get their name from the ratchet device used with the nut which forces the screw up or down. Drive jacks are used for holding down the drives for shaker conveyors; anchor jacks are used for the same purpose. The term roof jack denotes any type of jackscrew used to hold down objects. Fulcrum jacks are used as pivot points for angle troughs, turns, and swivels. Timber jacks are used in place of props as temporary supports for cap pieces and bars intended to hold up mine roof. Pipe jacks may either be jackscrews fashioned from pipes or they may be pipes pointed at both eneds so as to be wedged against the roof and bottom to secure the ends of mining machine ropes, sheaves used in scraper loader work, etc. *Jones.* m. A mechanical device for the purpose of lifting a heavy load; it may be either a screw or hydraulic type. Also called hydraulic jack; jackscrew; screwjack. *Long.* n. A hydraulic ram or cylinder. *Nichols.* o. *See* zinc blende; sphalerite. *Fay.*

jackanapes. Eng. The small guide pulleys of a whim. *Fay.*

jack and circle. The apparatus consisting of a powerful jack and a steel-toothed circle on which the jack moves. The circle is attached to the drill floor, centered on the borehole collar, and used to tighten or loosen the joints in a string of drill tools. *Long.*

jack arch. An arch having horizontal or nearly horizontal upper and lower surfaces; may be called flat arch or straight arch. The term is also used for any arch roughly built. *ACSG.*

jackass pick. A pick with a support for the helve, enabling it to be used as a lever. *Standard, 1964.*

jackbit; ripbit. Detachable drilling bit screwed or taper-fitted to length of drill steel and used in rock drilling to provide cutting end. *Pryor, 3.*

jar block. Synonym for drive hammer. *Long.*

jack board. A brace used as a support for a pipe jack. *Long.*

jack boom. a. A boom which supports sheaves between the hoist drum and the main boom in a pull shovel or a dredge. *Nichols.* b. A boom whose function is to support sheaves that carry lines to a working boom. *Nichols.*

jack bricks. Refractory bricks for the glass industry; they are perforated to accommodate the prongs of a fork truck and used beneath a newly set pot. *Dodd.*

jack catch. Safety catch in the rail track to stop running back of tubs on inclines. *Mason.*

jack engine. Eng. A donkey engine; a small engine employed in sinking a shallow shaft. *Fay.*

jacket. An outer casing or cover constructed around a cylinder or pipe, the annular space being filled with a fluid for either cooling, heating, or maintaining the cylinder contents at constant temperature; for example, the water jackets of an internal-combustion engine. *C.T.D.*

jacket, mold. A wood or metal form that is slipped over a sand mold for support during pouring. *ASM Gloss.*

jacket set. a. Set of timbers used in shaft outside the regular shaft set, as extra protection in heavy ground. *Pryor, 3.* b. Set like the larger shaft set with dividers omitted, except that the wall and end plates are broken at all joints to facilitate renewing. Used in heavy ground to protect the regular shaft timbers. The jacket set is placed outside the regular timbers, from which it is separated by short blocks, and is blocked and wedged against the rock. *Lewis, p. 47.*

jackhammer. A percussive type of automatically rotated rock drill that is worked by compressed air. It is light enought to be used without a tripod and to be hand held. *Pryor, 3.*

jackhammer operator. In metal mining, nonmetal mining, and quarrying, one who operates an unmounted, compressed-air, percussion-type rock drilling machine, known as a jackhammer, to drill holes in ore or rock in mines or quarries in which explosives are inserted and set off to break up the solid mass or in which plugs and feathers are driven to break off the rock in blocks. Also called air-drill operator; airhammer operator; blockholder; machineman; plug-drill operator; rock driller. *D.O.T. 1.*

jackhead. *See* delivery drift. *B.S. 3618, 1963, sec. 4.*

jackhead pit. a. A small pit without hoisting appliances, frequently serving as a ventilating shaft. *Standard, 1964.* b. A small shaft sunk within a mine. A winze. *Fay.*

jackhead pump. A subordinate pump in the bottom of a shaft, worked by an attachment to the main pump rod. *Fay.*

jackhead set. Newc. The set of pumps in the jackhead staple. *Fay.*

jackhead staple. Eng. A small mine for the supply of coal for the boilers. *Fay.*

jack hole. Eng. In coal mining, a bolthole. *Standard, 1964. See also* cut-through. *Fay.*

jacking pressure. The amount of pressure exerted by a jack to force a cone penetrometer into a soil being tested. *Long.*

jacking up. The raising up of masses of machinery and heavy structures by means of jacks. *Crispin.*

jackknife. a. The collapse of a drill tripod or derrick. *Long.* b. Sometimes incorrectly used as a synonym for telescope. *Long.* c. A tractor and trailer assuming such an angle to each other that the tractor cannot move forward. *Nichols.*

jackknife rig. A truck-mounted diamond or small rotary drill equipped with a hinged derrick. *See also* seismograph drill. *Long.*

jackknifing. A collapsing of square-set timbers by wall pressure or through imperfect erection. *Fay.*

jack lamp. Eng. A Davy lamp, with the addition of a glass cylinder outside the gauze. *Fay.*

jack latch. A fishing tool. *Long.*

jackleg. a. Light supporting bar for use with jackhammer. *Pryor, 3.* b. An outrigger post. *Nichols.*

jackline man. In petroleum production, one who pumps several oil wells from a central powerplant (jack plant), engaging or disengaging rods or cables by which power is transmitted to separate wells. *D.O.T. 1.*

jack pile. A pile which is forced into the ground by jacking against the building above it. *Ham.*

jackpipe. A hollow iron pipe large enough to slip over the end of the front jack of a cutting machine so as to make it hold more firmly against the coal. *Fay.*

jack pit. N. of Eng. A shallow shaft in a mine communicating with an overcast. *Fay.*

jack post. This timber is used where the coal seam is separated by a rock band and one bench is loaded out before the other. If the top bench is worked off first, the jack posts are set between the bottom bench of the coal and the roof. If the bottom bench is cleaned up first, the jack posts are set between the bottom and the top bench. At least two jack posts should be used and as many more as is necessary to keep the top bench of coal or the roof from coming while the coal is being loaded out. *Kentucky, pp. 143-144.*

jack prop. Derrick, warwick, anchor prop; foreset. *Mason.*

jackroll. A windlass worked by hand. *Fay.*

jacks. a. Wales. Large nodules of inferior ironstone, Coal Measures, Pembrokeshire. *Arkell.* b. Leic. Bands crowded with Terebratula punctata and Rhynchonella tetrahedra in the Marlstone, Middle Lias, near Tilton. *Arkell.* c. *See* jack, b and c. *Tomkeieff, 1954.*

jackscrew. a. A jack in which a screw is used for lifting or exerting pressure; also, the helical-screw part of a jackscrew. Also called screwjack. *Long.* b. A heavy screw set in the base or frame of a drill machine for the purpose of leveling the drill. *Long.* c. Small screw jacks for leveling work in jigs. *Crispin.*

jack setter. A miner who assists in the operation of a coal-cutting machine, one of whose duties is to see that the roof of the mine at or near the machine is in a reasonably safe condition. *Fay. See also* machine helper. *D.O.T. 1.*

jackshaft. a. An intermediate driving shaft. *Standard, 1964. See also* jack pit. *Fay.* b. Supporting bar used with screwjacks to support a rock drill. *See also* winze. *Pryor, 3.* c. A short drive shaft, usually connecting a clutch and transmission. *Nichols.*

jack spools. Special bobbins used in asbestos textile factories. *Sinclair, W. E., p. 484.*

jackstone. A Wales term for calcareous ironstone with cone-in-cone structure. *Arkell.*

jacky pit. *See* jack pit. *Fay.*

Jacobs process. A method in which bauxite is fused in an electric furnace to form a synthetic corundum. *BuMines Bull. 556, 1956, p. 23.*

Jacob's stones. Shrop. Calcareous sandstones burnt for lime, Caradoc sandstone. *Arkell.*

Jacob staff. A straight rod or staff pointed and shod with iron at the bottom for insertion in the ground, having a socket joint at the top, and used instead of a tripod for supporting a compass. *Webster 3d.*

Jacquet's method. Use of electrolytic polishing to complete the finish on metal surfaces. After mechanical polishing they are made the anodes in a suitable electrolyte. The finished surface is free from distortion. *Pryor, 3.*

Jacumba hessonite. Hessonite from near Jacumba Hot Springs, San Diego County, Calif. *Shipley.*

jacupirangite. A name applied by Derby in 1891 to a type of nepheline gabbro consisting of titanaugite, biotite, iron ores, and nepheline, the last being subordinate to the mafic minerals. *C.T.D.*

jacutinga; jacutings. Braz. The various-colored iron ores associated with and often forming the matrix of the gold in the Brazilian mines. So called from their resemblance to the colors of the plumage of the Brazilian bird, Pipile jacutinga. *Compare* itabirite. *Fay.*

jad. a. Som. A long and deep holing, cutting, or jud, made for the purpose of detaching large blocks of stone from their natural beds. *Fay.* b. Prov. Eng. To undercut (coal or rock). *Standard, 1964.*

jadder. a. A stonecutter. *Webster 2d.* b. A jad is a cutting in a natural rock face, made for the purpose of detaching shaped stone blocks. *Pryor, 3.*

jadding. The operation of forming a jad. *See also* holing; jad, a. *Fay.*

jadding pick. The tool employed to cut a jad. *Fay.*

jade; jadeite; nephrite. A hard and extremely tough material of varying composition, greenish-white to deep green in color, used in making carved ornaments. Part of the so-called jade is jadeite, a variety of pyroxene, essentially a metasilicate of sodium and aluminum. Part is nephrite, a variety of amphibole, and essentially a metasilicate of iron, calcium, and magnesium; and part is a variety of saussurite, which is commonly a complex alteration product of plagioclase feldspar. Williamsite, a variety of serpentine, is sometimes mistaken for jade. *Sanford.*

jade glass. A green translucent to opaque glass, usually a lead (flint) glass; specific gravity about 3.73. *Shipley.*

jadeite. A monoclinic mineral, $NaAlSi_2O_6$, found chiefly in Burma that consists of a sodium aluminum silicate and when cut constitutes a valuable variety of jade. *Webster 3d. See also* jade. *Fay.*

jadeitite. A metamorphic rock consisting essentially of jadeite. *A.G.I.*

jadeolite. A deep-green chromiferous syenite cut as a gemstone and resembling jade in appearance, from the jadeite mine at Bhamo, Burma. Possibly the same as pseudojadeite. *Shipley.*

jade tenace. Saussurite. *Shipley.*

Jaeger converter. Catalytic system for conversion of SO_2 to SO_3 in the contact process. *Pryor, 3.*

jag bolt. An anchor bolt with a barbed flaring shank which resists retraction when leaded into stone or set in concrete; also called hacked bolt; rag bolt. *Webster 3d.*

jager. A bluish-white diamond of modern cut. *Schaller.*

jaggers. Derb. Both men and horses employed to carry ore from the mine to the smelter. Also called jagger lads; jagger horses. *Fay.*

jagging. a. A mode of carrying ore to the reduction works in bags on horses, mules, etc. *Fay.* b. Up-and-down motion of a mass of particles in water by means of pulsion. *Pryor, 3.*

jagging board. An inclined board on which ore slimes are washed, as in a buddle. *Standard, 1964.*

jagoite. A mineral, $(Pb,Ca)_3Fe'''Si_3O_{10}(Cl,OH)$; analysis, SiO_2, 22.35 percent; Pb, 64.26 percent; and fractional percentages of Al,Be,K,Mg,Mn,Na,Ti. Trigonal, yellow-green micaceous plates with melanotekite in iron ore. This is the tenth lead silicate from Langban Sweden. *Spencer 21, M.M., 1958.*

jailer. Som. A small tub or box in which water is carried in a mine. *Fay.*

jalpaite. A lead-gray, cupriferous argentite, $(AgCu)_2S$, that crystallizes in the isometric system. *Standard, 1964.*

jam. a. The blocking of a core barrel or core bit with core, sometimes deliberately. *Long.* b. *See* jamb, b. *Fay.*

Jamaica auger. Synonym of Jamaica open-spiral auger. *Long.*

Jamaica open-spiral auger. A corkscrewlike spiral tool used in sampling loosely compacted soil deposits. *Long.*

jamb. a. A vein or bed of earth or stone, which prevents the miners from following a vein of ore; a large block. *Fay.* b. A projecting columnar part (as of a masonry wall) or mass (as of ore). *Webster 3d.* c. A vertical structural member forming the side of an opening in a furnace wall. *HW.* d. A type of brick shapes, intended for use in the sides of wall openings. *HW.* e. The sidewall of the port of a furnace superstructure carrying port crown load. *ASTM C162-66.*

jamb brick. A brick so modified that the corner of one end and side is rounded with a radius approximately equal to the width of the brick. *A.R.I.*

jamb cutter. In the coke products industry, a laborer who chips carbon and mud from the edges of coke-oven doors with a steel bar prior to the discharge of the coke. *D.O.T. 1.*

jamb wall. *See* breast wall. *Dodd.*

James concentrator. A concentration table, the deck of which is divided into two sections, flexibly joined together on a line oblique to the line of motion of the table. One section contains riffles for the coarse material, while the other section is smooth to allow settling of the fine particles which will not settle on a riffled surface. By means of the joint, the slope of the sections can be varied independently. *Liddell 2d, p. 388.*

James jig. Movable sieve box supported on a rubber diaphragm and jigged mechanically up and down. *Pryor, 3.*

jamesonite; feather ore. A natural sulfantimonide of lead and iron, $Pb_4FeSb_6S_{14}$; sometimes containing small amounts of copper and zinc. Color and streak, lead gray to gray black; luster, metallic; Mohs' hardness, 2 to 3; specific gravity, 5.5 to 6.0. A minor ore of lead. *CCD 6d, 1961.*

James table. Shaking table used in concentration of ground ores by gravity. *Pryor, 3.*

jamnut; jambnut. a. An extra nut used to secure a principal nut. *Standard, 1964.* b. Synonym for locknut. *Long.*

jam out. S. Staff. To cut or knock away the coal between holes. *Fay.*

jam riveter. A riveting hammer provided with an air-operated telescopic casing to hold the hammer against the work. *Ham.*

jam socket machine. A machine for shaping the sockets in clay sewer pipes. The pipes are extruded plain, cut to length and fed to the jam socket machine in which a ram, having the internal profile of the socket, is forced into the end of the pipe. The machine was introduced by Pacific Clay Products Co., Los Angeles, Calif. *Dodd.*

jam weld. A weld in which the heated ends or edges of the parts are square-butted against each other and welded. *Fay.*

Janney flotation cell. A pioneer type of flotation cell. *Pryor, 3.*

jap. *See* rock drill, b. *Fay.*

Japanese acid clay. An amorphous mixture of hydrated aluminum silicate and silica. *CCD 3d, 1942, p. 195.*

Japanese twin. An uncommon type of quartz twinning in which the two portions are symmetrical with respect to a trigonal bipyramid of second order. *Hess.*

japanning. A method of finishing wood or metal with baking varnish or baking japan, usually applied by dipping, after which it is baked at varying temperatures, on wood at low heat, but on metal at from 300° to 400° F. *Crispin.*

jar. a. An appliance to permit relative movement between the rope and rods in a cable drill. It reduces shocks and the risk of rod or chisel breakages. *See also* free-falling device. *Nelson.* b. To drill by impact, as a rock; to use a drill jar upon. *Standard, 1964.* c. *See* jars. *Fay.* d. To loosen or free stuck drill-stem equipment or tools by impacts delivered by quick, sharp, upward-traveling blows delivered by a drive hammer or jars. *Long.*

jar collar. A swell coupling attached to the upper exposed end of a drill rod or casing string to act as an anvil against which the impact blows of a drive hammer are delivered and transmitted to the rod or casing string; also, sometimes used as a synonym for drive hammer. Also called bell jar; drive collar; jar head. *Long.*

jar coupling. A set of sliding links in a drill stem by means of which sudden impacts can be delivered to a string of stuck drill tools. *Long.*

jardiniere glaze. A former type of unfritted lead glaze containing PbO, K_2O, CaO, ZnO, Al_2O_3, and SiO_2. There were soft (cone 02) and hard (cone 4) types. *Dodd.*

jargon. a. A smoky variety of jacynth; when of gemstone quality, jargoon. The phrase technical jargon, sometimes used derisively by those who fail to appreciate the need for specialized terminology in expert discussion, refers to words on the border between research and common usage, and should be used sparingly. *Pryor, 3.* b. An inferior diamond having a yellowish color. *Fay.*

jar hammer. *See* casing jar hammer. *B.S. 3618, 1963, sec. 3.*

jar head. a. Synonym for jar collar; drivehead. *Long.* b. That part of a wire-line core barrel that slides up and down on the core-barrel jar staff. *Long.*

jar length. Synonym for jar rod. *Long.*

jarlite. A colorless, brownish fluoride of sodium, strontium, and aluminum, $NaSr_3Al_3F_{16}$; monoclinic. Crystals and spherulites. From Ivigtut, Greenland. *English.*

jar mill. a. A small batch mill of ceramic material, used in ore-testing laboratories in investigation of grinding problems. *Pryor, 3.* b. Any of the stoneware-lined pebble mills used in milling enamels on a small scale. *Enam. Dict.* c. A small ball mill. *See also* ball mill. *ACSG, 1963.*

Jarno taper. This taper of 0.6 inch per foot is used by a number of manufacturers for taper pins, sockets, and shanks used on machine tools. *Crispin.*

jarosite. a. A yellow-brown hydrous sulfate of iron and potassium, $KFe_3(OH)_6(SO_4)_2$; rhombohedral; from Jaroso, Spain. *Dana 17.* b. A variety of melanterite containing 5.55 percent MgO, from Slovakia, Czechoslovakia. Not to be confused with jarosite from the Jaroso Ravine, Spain. *See also* cuprojarosite; kirovite. *Spencer 15, M.M., 1940.*

jar piece; jarring piece. A piece of pipe used for the same purpose and in lieu of either a drive hammer or a jar rod. *Long.*

jar rod. An extra heavy wall drill rod to which drive collars may be attached when using a drive hammer to jar or loosen drill-string equipment stuck in a borehole. Also called drive rod; jar length; jar piece. *Long.*

jars. a. A sliding linklike device connecting a churn drill rope socket to the drill stem during drilling operations or as a coupling connecting a fishing tool to the drill-rod string when fishing. Also called jar coupling. *Long.* b. In percussive deep drilling, the links which connect the drill cables to the drilling bit, and which set up a jerking action on the upstroke that helps to free the strings of tools. *Pryor, 3.* c. Steel links in a string of drilling tools whose leeway permits jerking or jarring of the tools. *Wheeler.* d. A tool in the churn drill string which contains slack to allow hammering upward to free a stuck bit. *Nichols.*

jar sleeve. *See* drive hammer; jar piece. *Long.*

jar staff. A heavy bolt that forms a sliding connection between the jar and overshot heads of a wire-line core barrel. *Long.*

jar tube. A threaded tubelike part that connects the wire-line socket to the jar head in a wire-line-core-barrel overshot assembly. *Long.*

jar weight. Synonym for drive hammer. *Long.*

jaspachate; jaspagate. Agate jasper. *Webster 3d.*

jaspe. Mex. Jasper; j. negro, Lydian stone, touchstone. *Fay.*

jasper. a. A finely crystalline form of quartz containing up to 20 percent impurities (iron oxide, iron hydroxide, clay, etc.). Usually red, yellow, dark green, grayish-blue. Similar to flint and chert. Used in ornamental stone. *CCD 6d, 1961.* b. A fine, unglazed stoneware invented by Josiah Wedgwood and made by adding barium carbonate to a mixture used for semiporcelain ware. *Hess.*

jasperated. Mixed with jasper; made to resemble jasper; as, jasperated agate or jasperated glass. *Standard, 1964.*

jasperine. Banded jasper of varying colors. *Shipley.*

jasperite. An impure, opaque, colored variety of cryptocrystalline quartz, admitting of a high polish and used for snuff-boxes, seals, vases, and other articles. The color is usually red, brown, or yellow, and is due to the admixture of iron oxide. *Standard, 1964.*

jasperization. The alteration of rocks, igneous or sedimentary, into banded jaspilitelike rocks by metasomatic processes in which iron oxides and silica are successively introduced. *Hess.*

jasperize. To convert into a form of silica like jasper; agatized. *Fay.*

jasperoid. a. A rock consisting essentially of cryptocrystalline, chalcedonic, or phenocrystalline silica, which has formed by the replacement of some other material, ordinarily calcite or dolomite. *A.G.I.* b. Silicified limestone. *A.G.I.*

jasper opal. An almost opaque common opal, most commonly yellow-brown; almost reddish brown to red, due to iron oxides. Resembles jasper in appearance. *Shipley.*

jasper ware. A vitreous, opaque, colored unglazed ceramic ware having white or contrasted relief decorations and containing a substantial amount of barite. Originally developed by Josiah Wedgwood. *ASTM C242-60T.* Also called cameo ware; Wedgwood ware.

jasper wash. A dip invented by Josiah Wedgwood in 1777 and used by him to produce the effect of jasper on pottery. *Standard, 1964.*

jaspery iron ore. Impure hematite with a jaspery fracture. *Hess.*

jaspidean. Consisting of or containing jasper; like jasper. *Standard, 1964.*

jaspilite. A term used around Lake Superior for the jasper associated with the iron ores. It is made up of bands of bright red jasper alternating with bands of black, commonly specular hematite. *Sanford.*

jaspoid. Resembling jasper. *Standard, 1964.*

jasponyx. An onyx, part or all of whose layers consist of jasper. *Webster 3d.*

jaspopal. *See* jasper opal. *Fay.*

jaspure. Marbling in imitation of jasper. *Standard, 1964.*

jaulingite. A resin found in the Jauling, near St. Viet, lower Austria; it resembles succinite. *Fay.*

jaum. Derb. A clay-filled joint extending diagonally across a vein. *Fay.*

jaw. a. One or a set of two or more serrate-faced members between which an object may be grasped and held firmly, as in a vise, drill chuck, foot clamp, or pipe wrench. Also called jaws. *Long.* b. In a clutch, one of a pair of toothed rings, the teeth of which face each other. *Nichols.* c. In a crusher, one of a pair of nearly flat faces separated by a wedge-shaped opening. *Nichols.*

jaw breaker. *See* jaw crusher.

jaw clutch. A clutch consisting of two toothed jaws, one of which slides along its shaft to engage or disengage from the other. *Nichols.*

jaw crusher. a. A primary crusher designed to reduce large rocks or ores to sizes capable of being handled by any of the secondary crushers. *Enam. Dict.* b. A crushing machine consisting of a moving jaw, hinged at one end, which swings toward and away from a stationary jaw in a regular oscillatory cycle. *ACSG, 1963.* c. A machine for reducing the size of materials by impact or crushing between a fixed plate and an oscillating plate, or between two oscillating plates, forming a tapered jaw. *B.S. 3552, 1962.*

jay. a. Derb. Roof coal. *Fay.* b. York. Miner's term for an inferior cannel coal. Also called geyes. *Tomkeieff, 1954.*

Jedburgh basalt. A type of the Scottish Carboniferous basalts; characterized by inconspicuous phenocrysts of olivine and plagioclase in an ophitic to microlitic groundmass, to which augite is almost always restricted. *Holmes, 1928.*

jedding ax. A stonecutter's ax with a flat face and a pointed peen. *Webster 3d.*

jeep. Used in the United States for cross-country motor vehicles for rough pioneer work. *Pryor. See also* mine jeep.

Jeffcott tachometer. *See* direct-reading tachometer. *Ham.*

jeffersite. A kind of vermiculite from West Chester, Chester, Pa. *Fay.*

jeffersonite. A manganese and zinc-bearing monoclinic pyroxene with Mn:Zn:Fe about 1:1:1. *Dana 6d, p. 352.*

Jeffrey crusher; whizzer mill. Crusher used to break softish minerals, for example, limestone. *See also* swing-hammer crusher. *Pryor, 3.*

Jeffrey diaphragm jig. A plunger-type jig with the plunger beneath the screen. May be either single or multiple compartments. Its distinguishing features are: (1) the stroke is produced with a cam operated by a lever and rocker-arm mechanism; (2) the weight of the column of water above the plunger is balanced by means of compressed air; (3) automatic operation is obtained by means of a submerged float that measures the specific gravity of the mass of coal, refuse, and water at the peak of the pulsion stroke; (4) refuse is withdrawn through a star gate extending the full width of the overflow lip; and (5) the slope of the screen plate is readily adjustable by means of heavy screws at the feed end. It is widely used on bituminous coal on sizes ranging up to a 6-inch maximum. *Mitchell pp. 424-426.*

Jeffrey molveyor. An arrangement to keep a continuous miner in full operation at all times. It consists of a series of short conveyors, each mounted on driven wheels and coupled into a train to run alongside the heading or room conveyor. *Nelson.*

Jeffrey-Robinson cone. A cone for coal washing; similar to the Callow and Caldecott cones. *Hess.*

Jeffrey single-roll crusher. A simple type crusher for coal, with a drum to which are bolted toothed segments designed to grip the coal forcing it down into the crushing opening. *Bureau of Mines Staff.*

Jeffrey swing-hammer crusher. A crusher enclosed in an iron casing in which a revolving shaft carries swinging arms having a free arc movement of 120°. The rotation of the driving shaft causes the arms to swing out and strike the coal, ore, or other material, which, when sufficiently fine, passes through the grated bottom. *Liddell 2d, p. 357.*

Jeffrey-Traylor vibrating feeder. A feed chute vibrated electromagnetically in a direction oblique to its surface. Rate of movement of rock depends on amplitude and frequency of vibration. *Bureau of Mines Staff.*

Jeffrey-Traylor vibrating screen. An electric vibrating screen operated by action on an oscillating armature and a stationary coil. *Gaudin, pp. 160-161.*

jelinite. Applied to a fossil resin originally named kansasite. *Tomkeieff, 1954.*

jell; jells. a. The thickening of a cement-slurry mixture that has started to set. *Compare* gel. *Long.* b. The thickening of a hot solution of gelatin and water, as used in a Maas compass, upon cooling; also, the jellylike substance so formed. *Long.*

jelled. a. A cement-slurry mixture in which the incipient set has progressed far enough so that the mixture is no longer pumpable or pourable. *Long.* b. Applicable when a hot solution of gelatin and water has cooled and solidified. *Long.*

jellettite; jelletite. A green variety of andradite garnet. *Standard, 1964.*

jelling. a. The time required for a cement slurry to thicken and take on a jellylike consistency. *Long.* b. The time required for a hot solution of gelatin and water to thicken and become jellylike. *Long.* c. The act of thickening. *Long.*

jelly. *See* fundamental jelly; carbohumin; vegetable jelly. *Tomkeieff, 1954.*

jellyfish. Common name for medusoid Coelenterates; semitransparent, pelagic, tentacled invertebrates. Some species have venom cells in their tentacles; some are capable of producing a glowing-ball type of bioluminescence. *Hy.*

jelly strength. A measure of the strength of glues and similar adhesives; in one form of test, the load required to produce a 4 millimeter depression in the gel is determined. *Lowenheim.*

Jena glass. An early variety of glass of improved resistance to heat and shock, named from the location of its manufacture in Europe. *CCD 6d, 1961.*

jenkin. a. A drivage at right angles to the main cleat. *Mason, v. 1, p. 105.* b. Eng. A road driven bordways in a pillar of coal. A jud driven bordways along a pillar of coal with goaf or an old bord on one side is called a loose end jenkin. *SMRB, Paper No. 61.* c. N. of Eng. A variation of junking. *Fay.*

Jeppe's tables. A series of tables especially compiled for mining work that includes tables of density, vapor pressure and absolute humidity. *Roberts, I, p. 127.*

Jeppestown shales. S. Afr. Part of the Jeppestown series forming the footwall of the Main reef on the Central and East Rand. *Beerman.*

jeremejevite. Synonym for eremeyevite. *Hey 2d, 1955.*

jerking table; bumping table. *See* shaking table.

jeroboam. A 4-quart wine bottle. *Dodd.*

jerries. Term used by miners of the English Midlands for bright coal or canneloid coal. *Tomkeieff, 1954.*

jerry. Aust. A carbonaceous shale found in coal seams. *Fay.*

jerry faces. Aust. A local name at Lambton B. colliery for main cleats in coal. *Fay.*

jerry man. An employee in a mine whose duty it is to clean up falls or refuse, or to make a miner's working place safe. *Fay. See also* wasteman. *D.O.T. 1.*

Jersey fire clay brick. A highly siliceous clay brick, semisilica brick. *AISI, No. 24.*

Jersey stone. A partly decomposed granitic rock quarried on the Island of Jersey and used in pottery making; it is similar to Cornish stone. *Hess.*

jeso. Beds of decomposed gypsum. *Standard, 1964.*

jet. a. A black marble. *Webster 2.* b. A hard black mineral formerly cut and polished to make beads, buttons, and costume jewelry. Usually a form of coal. *Bureau of Mines Staff.* c. A forceful stream of fluid or air used to flush cuttings or soft, unconsolidated materials from a borehole. *Long.* d. The act or process of sinking a borehole by means of a jetted fluid or air. *Compare* jet piercing. *Long.* e. A nozzle or orifice arranged for a directed and rapid efflux of a fluid or gas. *Long.* f. A sudden rush or gush of liquid or gas through a narrow opening or a nozzle. A nozzle for a jet of gas, water, or other fluid. *Enam. Dict.*

jetair flotation machine. A multiple-cell machine of the mechanical agitation type. *Bureau of Mines Staff.*

jet coal. Same as cannel coal. *Fay.*

jet condensers. Condensers in which cold water is sprayed into a chamber into which the steam passes, creating a partial vaccum. The objection to this type is that the condensing water and steam mix and cannot be used over again unless the former is pure. *Mason, v. 2, p. 367.*

jet corer. Consists of a length of pipe which is lowered from a vessel in order to obtain samples High-velocity water is pumped through the pipe and the jetting action of this water issuing from the lower end of the pipe very effectively cuts a hole in the unconsolidated overburden sediments. Once at bedrock, the pipe is rammed into the rock with sufficient force to obtain a plug several inches in length. *Mero, p. 22.*

jet drier. A drier in which humidity and temperature are controlled by injected jets of air and steam. *ACSG, 1963.*

jet drilling. Piercing of rock strata by use of high-temperature flame to fuse the rock, together with jet of water to cause decrepitation and to flush the fragments out. *Pryor, 3.*

jet-enameled ware. A type of 18th century porcelain decorated with black on-glaze transfers. *Compare* jet ware. *Dodd.*

jet flow; shooting flow. A type of flow, related to turbulent flow, occurring when a stream reaches high velocity along a sharply inclined stretch, or over a waterfall, and the water moves in plunging, jetlike surges. *Leet.*

jet glass. Crystal glass of pure black, used in cheap jewelry. *Fay.*

jet grinding mills. Enclosed chambers of relatively small cross section in which gas, at substantially atmospheric pressures, is circulated at high speed, 400 to 700 feet per second. Earliest form is the micronizer. *Bureau of Mines Staff.*

jet hole. a. A borehole drilled by use of a directed, forceful stream of fluid or air. *See also* jet. c. b. A small hole in a nozzle. *See also* jet, d. *Long.*

jet hydraulic. Stream of water used in alluvial mining. A 10 inch diameter jet at 900 foot pressure head delivers a thrust of over 27 tons.

$$\text{Horse power} = \frac{A\,v^3}{550\,g}$$

v being velocity at point of emergence from an orifice of area A (in square feet) under a head of h feet, when

$$v = \sqrt{2\,gh}\ \text{ft./sec.}$$

Pryor, 3.

jet impact mill. *See* fluid-energy mill. *Dodd.*

jetloader. A powder loader for loading horizontal drill holes with a diameter of more than 2 inches. It is intended for AN-prills and oil, and is also employed to blow sand into the holes for stemming. *Langefors, p. 104.*

jet man. In the minerals and earths industry, one who processes molten rock into mineral wool, using a cupola furnace. *D.O.T. Supp.*

jet mixer. An apparatus that utilizes the mixing action of a water stream jetted into dry drill-mud ingredients to form a mudladen fluid. *Compare* atomizer; mud mixer. *Long.*

jetonized wood. A name given to vitrain lamellae in coal. *Tomkeieff, 1954.* Synonymous with vitrain. *A.G.I.*

jet piercing. The use of high velocity jet flames to drill holes in hard rocks, as taconite, and to cut channels in granite quarries. It involves combustion of oxygen and a fuel oil fed under pressure through a nozzle to produce a jet flame generating a temperature of over 5,000° F. A stream of water joins the flame, and the combined effect is a thermodynamic spalling and disintegration of the rock into fragments which are blown from the hole or cut. *Bureau of Mines Staff.* Synonym for fusion-piercing.

jet-piercing drill. Synonym for fusion-piercing drill. *Long.*

jet pump. Consists of a centrifugal pump and motor at the ground surface and a jet down in the well below the water level, discharging at high velocity, through a contracted section into the lift pipe. The centrifugal pump has two discharge pipes; one leads down to the jet, the other carries the water into the distribution system or into a storage tank. *Urquhart, Sec. 10, p. 34.*

jet rock. A coallike shale containing jet. *Standard, 1964.*

jet shales. Shales containing jet rock, found in the Upper Lias of the Whitby District and belonging to the Jurassic system. *C.T.D.*

jetstone. N.S.W. A black tourmaline. *Fay.*

jet tappers. A brand name for shaped charges. *Dupont, 1966, 81.*

jetters. Corn. The horizontal rods or poles connecting the water wheel and the pumps. *Fay.*

jetting. a. The process of sinking a borehole or the removal of cuttings or loosely consolidated materials from a borehole by using directed, forceful streams of a fluid or air. The term is also applied commonly and improperly to the act or process of drilling by fusion piercing. *Long.* b. Injection of gas into a stratum for purpose of pressure maintenance, secondary recovery, etc. *Williams.*

jetting drill. A percussive drill for prospecting through superficial deposits. The drill is given a short stroke, 5 to 8 inches, and rotated by hand. Water is pumped down through the hollow steel rods and escapes through openings in the chopping bit. Casing is used and the drilling rate is from 20 to 40 feet per shift. *Nelson.*

jetting pump. A water pump that develops very high discharge pressure. *Nichols.*

jetty. A dike built of piles, rock, or other material, extending into a stream or into the sea at the mouths of rivers to induce scouring or bank building, or for protection. *Seelye, 1.*

jet ware. Pottery ware, chiefly teapots, having a red clay body and a black, managanese-type glaze. *Compare* jet enameled ware. *Dodd.*

jew bed. *See* dew bed. *Arkell.*

jewel. a. A precious stone; especially, a stone cut and polished for use as an ornament. *Webster 3d.* b. A bearing for a pivot in a watch or a delicate instrument (as a compass) made of a crystal or a precious stone (as a ruby or sapphire) or of glass. *Webster 3d.* c. Natural ruby or sapphire, or synthetic stone, used for pivot bearings, also for the pallets and impulse pin. Owing to the high polish that can be obtained with such stones, combined with a hardness of surface, they provide wearing surfaces which have a long life and which cause little friction. *C.T.D.* d. An exceptionally fine or high-grade drill diamond. *Long.*

jewelers' enamel. A special type of porcelain enamel used in the manufacture of jewelry, insignia, and art objects. *ASTM C286-65.*

jewelers' putty. *See* putty, a.

jeweler's rouge. Calcinated ferrous sulfate, Fe_2O_3. When more strongly calcined, giving it a bluish tinge, crocus powder. *Pryor, 3.*

jeweler's shop. a. Corn. Miner's expression for a rich section of ore. *Pryor, 3.* b. Aust. A very rich patch of gold in either a reef or an alluvial formation. *Fay.*

jeweler's topaz. Citrine or topaz quartz. *Shipley.*

jewel jade. Same as emerald jade. *Shipley.*

Jews' houses. Eng. Remains of ancient tinsmelting furnaces and miners' houses in Cornwall and Devonshire. *Webster 3d.*

Jews' pitch. A name given to a semisolid form of bitumen formerly used for medicinal purposes. *Fay.*

jews' tin. Ancient slabs of tin found in Cornwall, England; so called from the belief that they were made by Jewish merchants and miners from Asia Minor before the present era of mining. *Hess.*

jewstone. a. Eng. A hard rock of uneven fracture; applied locally to certain basalts, limestone, etc. *Webster 2d.* b. Same as marcasite, b. *Webster 2d.*

jezekite. A colorless to white basic fluophosphate of aluminum, calcium, and sodium, with a little lithium $Na_4CaAl(AlO)P_2O_8F_2(OH)_2$; monoclinic. From Ehrenfriedersdorf, Saxony, Germany. *English.*

jhama. Indian vernacular name for coal altered to coke by an igneous intrusion. *Tomkeieff, 1954.*

jib. The lifting arm of a crane or derrick having a pulley at its outer end over which the hoisting rope passes. *See also* front-end equipment. *Ham.*

jibbing-in. The operation of gradually working the jib of a shortwall coal cutter into the cutting position in the coal seam. Jibbing-in is the first operation before starting the cutting run across the face. *Nelson.*

jib boom. An extension piece hinged to the upper end of a crane boom. *Nichols, 2.*

jib crane. A crane having a swinging boom or jib. *Crispin.*

jib end. In conveyor systems, the delivery end when a jib is fitted to deliver the load in advance of and remote from the drive. *Nelson.*

jib holeman. A man whose work it is to make recesses for the cutting disk at the end of coal-cutting machine faces. *C.T.D.*

jib in. To perform the operating of starting a cut by swinging the jib of the coal cutter (while the chain is cutting) from the front of the face to the full cutting position. *Mason.*

jig. a. A device which separates coal from foreign matter by a means of their difference in specific gravity in a water medium. *B.C.I. See also* Hancock jig; Harz jig. *C.T.D.* b. A coupling or link for connecting tubs or wagons. *C.T.D.* c. Another name for incline man. Also called jigger. *C.T.D.* d. Gig. *Mason.* e. A kind of shaker conveyor. *Mason.* f. A machine in which the feed is stratified in water by means of a pulsating motion and from which the stratified products are separately removed, the pulsating motion being usually obtained by alternate upward and downward currents of the water. Also called washbox. *B.S. 3552, 1962.* g. Eng. A self-acting incline. A jinny road. *Fay.* h. In well boring, to drill with a spring pole. *Fay.* i. A reciprocating screening device used to remove large drill cuttings from a borehole circulation fluid. Also called shaker. *Long.* j. To drill a borehole with a jig-pole drill. *Long.* k. A guide used in shaping pieces of wood or metal. *Nichols.* l. *See* shackle, c. *Nelson.* m. To separate (as ore from gangue or coal from slate) by a rapid up-and-down motion usually in water. *Webster 3d.*

jig attendant. *See* jig runner, c. *D.O.T. 1.*

jig-back; to-and-fro ropeway; reversible tramway. An aerial ropeway comprising a pair of buckets or carriers that travel in reverse directions and are loaded or brought to rest alternately at the opposite stations, but which do not pass around the terminals. The intermittent action tends to limit the capacity of the installation. *Nelson.*

jig bed. a. The agent used in a jig which consists of the heavy minerals in the ore that behaves in some respects like a dense fluid. The pulsation of the water or the motion of the screen keeps the bed open or in suspension during part of the cycle so that heavy minerals entering the jig can settle into the bed. Lighter minerals cannot penetrate the jig bed, and so are forced to remain in the upper part of the jig and eventually discharge over the top. *Newton, pp. 89-90.* Other agents in use: lead shot, iron punchings, iron shot, pyrite, and magnetite. *Bureau of Mines Staff.* b. The whole of the material on the washbox screenplate. *B.S. 3552, 1962.*

jig boring. Boring with a single-point tool where the work is positioned upon a table that can be located so as to bring any desired part of the work under the tool, thus, holes can be accurately spaced. This type of boring can be done on milling machines or jig borers. *ASM Gloss.*

jig brow. Self-acting inclined track used to lower filled coal tubs and raise empty ones. *Pryor, 3.*

jig bushing. Hardened-steel bushing inserted in the face of a jig to serve as a guide for drills. *Crispin.*

jig chain. S. Staff. A chain hooked to the back of a skip and running around a post, to prevent its too rapid descent on an inclined plane. *Compare* snub, b. *Fay.*

jig dips. Cross gates, North Staffordshire, England. *Mason, V.1, p. 135.*

jigger. a. A series of steel troughs suspended from roof of stope, or laid on rollers on its floor, and given reciprocating motion mechanically, in order to move mineral. Also called chute conveyor; pan conveyor. *Pryor, 3.* b. Scot. An apparatus for attaching hutches to a haulage rope, which holds by twisting or biting the rope. *Fay.* c. Aust. A boy who attends to the brake of a jig. *Fay.* d. Eng. A coupling hook used between coal cars in Leicestershire coal mines. *Standard, 1964.* e. *See* jig runner. *D.O.T. 1.* f. A mechanism which operates with quick up-and-down motion; a jolting device. *Crispin. See also* jig. *C.T.D.* g. One that concentrates ore by jigging. *Webster 3d.* h. A machine for dressing small ore in which a sieve is dipped or moved about under water. *Fay.* i. A template for forming a vessel on a potter's wheel. *C.T.D.*

jigger boss. a. A company official who dispensed whiskey rations at Mauch Chunk, Pa., in the 1820's. *Korson.* b. A first-line supervisor in some western mines. *Bureau of Mines Staff.*

jiggering. Forming ceramic ware from a plastic body by differential rotation of a profile tool and mold, the mold having the contour of one surface of the ware and the profile tool that of the other surface. *ASTM C242-60T.*

jiggerman. One who forms ware, such as cups, plates, and saucers, by pressure of tool against plastic clay on revolving wheel of jigger. Also called jigger operator; pot maker; potter. *D.O.T. 1.*

jiggerman helper. One who assists jiggerman in forming such pottery and porcelain ware as cups, dishes, plates, and saucers by pulling scrap clay from mold as jiggerman forms the ware on potter's wheel, and setting mold with ware on rack for drying. Also called pot-maker helper; potter helper. *D.O.T. 1.*

jigger work. Eng. Dressed or partly dressed ore obtained from jigging. *Fay.*

jigging. a. The separation of the heavy fractions of an ore from the light fractions by means of a jig. *Bureau of Mines Staff.* b. Up-and-down motion of a mass of particles in water by means of pulsion. *Pryor, 4.*

jigging conveyor. A series of steel troughs suspended from roof of stope, or laid on rollers on its floor, and given reciprocating motion mechanically, in order to move mineral. Also called jigger; chute conveyor; pan conveyor. *Pryor, 3.*

jigging machine. A machine with which to jig ore. *Fay. See also* jig.

jigging screen. a. A screen or pair of screens to which a combined horizontal and vertical motion is imparted, normally by a crankshaft and connecting rod, the screen decks being horizontal or inclined at a small angle. *B.S. 3552, 1962.* b. *See* shaking screen, a. *Nelson.*

jiggle. Can. Stimulated activity in stock, induced by broker promoter. *Hoffman.*

jiggling in. Slang for coplaning. *Bureau of Mines Staff.*

jig grinding. Analogous to jig boring where the holes are ground rather than machined. *ASM Gloss.*

jig haulage. *See* gravity haulage. *Nelson.*

jig indicator. An apparatus resembling a steam engine indicator; used for drawing curved lines illustrating the action of jigs in ore dressing. *Webster 2d.*

jigman. *See* jig runner.

jig, mineral. Appliance in which a vertically pulsed column of water is so manipulated as to stratify crushed ore with lighter particles above and heavier below. A fixed-bed jig is a box, the bottom of which is a screen through which water is pulsed. If the ore fed to the box is smaller than the screen openings, the strata finding their way down are removed through the screen by successive pulsing and suction of the vertically oscillating column of water (English jigging). If the ore is larger than the screen, the bottom portion is removed via a submerged gate above the screen (German jigging). In the moving-bed screen the jig box is pulsed up and down in a tank of water, a throwing motion working it toward the discharge end and the lowest stratum being dropped through slots in the screen. The jig bed, or ragging, is a layer of suitably dense oversized material lying on the screen and obstructing the downward passage of the heavy mineral. The jigging cycle consists of a pulsion stroke during which water is forced up through the jig box, followed by the suction (return) stroke. Either can be modified by mechanical means or by varying the amount of hydraulic water available in the hutch (the part of the jig in which the box sits). Among the most used fixed-bed types are the Baum, Bendelari, Collum, Conset, Cooley, Crangle, Denver, Harz, Pan-American, and Willoughby. The moving-bed jigs include the Halkyn and Hancock, and homemade hand jigs. *Pryor, 3.*

jig pin. A pin used to prevent the turning of the turn beams. *Standard, 1964.*

jig runner. a. York. The man who works a jig (a self-acting incline). *Fay.* b. In ore dressing, smelting, and refining, one who tends a battery of jigs used to concentrate ore by separating the valuable minerals from the gangue (waste minerals); regulates pulsating flow of water through screens in bottom of jigs or regulates speed of reciprocation motion of screens, so that the heavier (valuable) minerals will separate and collect in a layer on the screen and the gangue collect in a layer above; and regulates flow of pulp (ground ore and water) into jigs so that they do not become overloaded. Also called jigger; jig tender. *D.O.T. 1.* c. In anthracite coal mining, one who tends a battery of jigs used to separate slate from small-size coal, and regulates pulsating flow of water through screens in bottom of jigs or regulates speed of reciprocation (up-and-down motion) of screens, so that the slate will separate and collect in a layer on the screen and the coal collect in a layer above. Also called jig attendant; jigger; jigman; jig tender. Becoming obsolete. *D.O.T. 1.*

jig tender. *See* jig runner, b and c. *D.O.T. 1.*

jig washer. A coal or mineral washer for relatively coarse material. The broken ore, supported on a screen, is pulsed vertically in water, the heavy (valuable) portion passing through the screen into a conical receptacle (hutch) and the gangue goes over the side. In coal washing, the heavy (worthless) shale passes downwards, and the lighter coal on top. *See also* Baum washer; plunger jig washer; jig. *Nelson.*

Jihlava mining law. The first modern mining law that originated in a document dated 1249 at Jihlava, Bohemia, Czechoslovakia. The most important conceptions originating from this document are those of reserved minerals and the freedom to mine. The freedom to mine is the law by which anybody has the right to mine certain minerals when he has prospected for them, and filed an application for the right to mine them, in the prescribed way. *Stoces, v. 1, p. 31.*

jim-around. A term used in West Virginia for a man who does miscellaneous work at mines. *Fay.*

jimboite. A mineral, $Mn_3B_2O_6$, occurring with other managnese minerals at the Kaso mine, Kanuma city, Tochigi prefecture, Japan. Orthorhombic, and the manganese analogue of kotoite. *Hey, M.M., 1964; Fleischer.*

Jim Crow. A portable hand-operated appliance for bending or curving rails. It incorporates a strong buttress screw thread. *Nelson.*

jimmy. a. A short crowbar. *Crispin.* b. A small railroad car in which anthracite was hauled in early days. *Korson.*

jink. A coupling between two mine tubs or trains in a set or journey. *C.T.D.*

jink carrier. A lad employed to carry the loose couplings or jinks from one train of mine tubs to another. *C.T.D.*

jinnier. *See* incline man. *C.T.D.*

jinny. a. A stationary engine for hauling on a jinny road, when not operated by gravity. *Webster 2d.* b. A jinny road. *Webster 2d.*

jinny road. Underground gravity plane. *Pryor, 3.*

jinny tenter. *See* jig runner, a; jinny. *Fay.*

jitty. Leic. A short heading along which empties, horses, or workmen travel. *Fay.*

Joachimstal process. The extraction of silver from sulfide ores by converting into chloride, leaching with sodium hyposulfite, and precipitating the silver as sulfide with sodium sulfide. *Fay.*

joaquinite. A titano-silicate of iron, sodium, and barium, $NaBa(Ti,Fe)_3Si_4O_{15}$; orthorhombic; honey-yellow; minute crystals. Occurs with benitoite and neptunite in San Benito county, Calif. *English.*

jobbing backward. Mourning over mistaken action, in the light of subsequent developments. *Pryor.*

job shop. An enameling plant doing custom work and enameling of various sheet iron and cast iron parts for other manufactures. *Hansen.*

Job's-tears. Rounded grains of chrysolite (olivine) found associated with garnet in certain localities. *C.M.D.*

jock. Scot. An iron rod, usually pronged, attached to the rear end of a train of hutches or cars being drawn up an incline, to stop their descent in the event of the rope breaking. *Fay.*

jocketan. Hydrated carbonate of iron occurring as concentrations on limonite; from Jocketa, Saxony, Germany. *Hey 2d, 1955.*

jockey. a. Aust. A Y-shaped grip placed in sockets at the end of a skip. It is on this that the endless rope rests when used above the skip. *Fay.* b. Mid. A self-acting apparatus on the front of a car for releasing it from the hauling rope at a certain point. *Fay.*

jockey pot. A pot of small size that is set on top of another pot, for the purpose of melting special glasses not needed in great quantity. Several such pots may be set in the space of one full-sized pot. Also called monkey pot. *C.T.D.*

Joel stone; old Joe. Eng. Semicemented sandstone in the Lower Cretaceous, Surrey. *Arkell.*

joey. Mid. A man specially appointed to set timber in a stall during the shift. *Fay.*

jogging; inching. In general, jogging and inching duty are synonymous when referring to industrial control equipment. The National Electrical Manufacturers' Association definition of "jogging" (inching) is "the quickly repeated closure of the circuit to start a motor from rest for the purpose of accomplishing small movements of the driven machine." *Pit and Quarry, 53rd, Sec. D, p. 13.*

joggle. a. A joint of trusses or sets of timber for receiving pressure at right angles or nearly so. *Zern.* b. Notches cut in round timbers set above other round pieces in underground timbering. *Pryor, 3.* c. An offset in a flat plane consisting of two parallel bends in opposite directions by the same angle. *ASM Gloss.* d. A slight step-shaped offset formed into a flat piece of metal (as for providing a flange). *Webster 3d.* e. *See* natch, d. *ACSG, 1963.*

joggling table. An inclined board, which moves with a sudden and quick motion, used in washing ore. *Fay.*

jog-log. A towed electrode that can detect ocean electric current induced by magnetic disturbances. *Hy.*

johachidolite. A hydrous fluoborate of sodium, calcium, and aluminum; found as grains and lamellar masses in nepheline dikes cutting limestone in the Johachido district, Kenkyohokudo prefecture, Korea; colorless and transparent. It fluoresces an intense blue in ultraviolet light owing to traces of rare earths. *Dana 7, v. 2, p. 384.*

johannite. A very rare, strongly radioactive, triclinic mineral, $Cu(UO_2)_2(SO_4)_2(OH)_2 \cdot 6H_2O$, found associated with gypsum; it is yellow, greenish, or black; a secondary mineral formed by the alteration of uraninite. *Crosby, pp. 25-26.*

johannsenite. A pyroxene; the manganese analogue of diopside and hedenbergite, $MnCaSi_2O_6$; monoclinic; forms columnar, radiating, and spherulitic aggregates of fibers and prisms, generally of a clove-brown, grayish, or greenish color. From Puebla and Hidalgo, Mexico; Lane County, Oreg.; Franklin, N.J.; Schio, Venetia, Italy. *American Mineralogist, v. 23, No. 9, September 1938, p. 575.*

Johannsen number. *See* Johannsen's classification. *A.G.I.*

Johannsen's classification. A mineralogical classification of igneous rocks in which a rock is characterized by a number, the Johannsen number, consisting of three or four digits, each of which has a specific mineralogical significance. *A.G.I.*

John Bull. Eng. A hand driller's drill stand. *Hess.*

johnite. Synonym for turquoise. *Dana 6d, p. 844.*

johnnies. *See* jonnies. *Tomkeieff, 1954.*

Johnny Mitchell trains. Jocularly applied to freight trains on which striking miners traveled in search of temporary work in the cities outside the region during the famous strike of 1902. Named for John Mitchell, the strike leader. *Korson.*

John Odges. *See* gun, a. *Fay.*

John O'Groats sandstone. A local group of red and yellow sandstones found in the Middle Old Red Sandstones in the Orcadian Region of Northern Scotland. *C.T.D.*

Johnson concentrator. Cylindrical shell lined with rubber grooved set parallel to axis, which is inclined, peripheral riffles thus being formed. Used to arrest heavy particles such as metallic gold as auriferous pulp flow gently through while the cylinder revolves slowly and the arrested material rises and drops on to a separate discharge launder. *Pryor, 3.*

Johnston vanner. Modified form of Frue vanner. *Pryor, 3.*

johnstrupite. A silicate of the cerium metals, calcium and sodium chiefly, with titanium and fluorine; is very rare, weakly radioactive, monoclinic, brownish-green; a vein mineral found associated with wohlerite, rosenbuschite, eucolite, aegirite, fluorite, elaeolite, and sodalite; from Barkevid, Norway. M. Fleischer states that the name can be dropped in favor of mosandrite. *Fay; Crosby, p. 73; American Mineralogist, v. 43, No. 7-8, July-August 1958, pp. 795-796.*

joiner. One who secures sheets of glass onto flat tables preparatory to grinding and polishing. Guides sheets of glass lowered by overhead crane onto plaster-covered table, arranging glass sheets end-to-end. Places small wooden blocks (stubs) between sheets to prevent chipping the glass, and drives wooden pegs up through holes along edge of table to prevent glass from sliding off table. Spreads plaster over individual glass surfaces to fill in spaces between the sheets and provide a continuous smooth surface for grinding and polishing. *D.O.T. 1.*

joint. a. A line of cleavage in a coal seam. *Fay.* b. A divisional plane or surface that divides a rock and along which there has been no visible movmement parallel to the plane or surface. *Ballard.* c. A standard length of drill rod, casing, or pipe equipped with threaded ends by which two or more pieces may be coupled together; also, two or more standard lengths of drill rods or pipe coupled together and handled as a single piece in round trips. *Long.* d. A fracture or parting that cuts through and abruptly interrupts the physical continuity of a rock mass. Not to be confused with bedding or cleavage. *Long.* e. The location where two or more members are to be or have been fastened together mechanically or by brazing or welding. *ASM Gloss.* f. The interstice between masonry units. *ACSG, 1963.*

joint blocks. The blocks between adjacent joints, or blocks bounded by joints. *Bureau of Mines Staff.*

joint box. A cast-iron box surrounding an electric cable joint, often filled with insulation after the joint between cables has been made. *Ham.*

joint efficiency. The strength of a welded joint expressed as a percentage of the strength of the unwelded base metal. *ASM Gloss.*

jointer. a. A flat steel tool used for making the various types of joints between bricks upon the face of a wall, as the V, the concave, beaded, square, etc. *Crispin.* b. *See* joint sawyer. *D.O.T. 1.*

joint filler. Strips of compressible material used to separate and seal abutting edges of road slabs along the expansion joints. *Ham.*

jointing. a. In quarrying, the process of cutting true to specified sizes and shapes, and with smooth unchipped edges. Silicon carbide wheels are commonly used for jointing. *AIME, p. 332.* b. The occurrence of joints. *See also* joint, b.; joint plane. *Long.* c. The finishing of the exterior surface of mortar joints. *Crispin.*

jointing sleeves. Insulating thimbles placed over the connected ends of detonator leads coupled in large rounds of shots, and also over the connections between the detonator leads and the shot-firing cable. *B.S. 3618, 1964, sec. 6.*

jointing yard. Sometimes called middle yard. A place between the grinding and polishing operations in the continuous manufacture of plate glass where the plaster joints are remade. *ASTM C162-66.*

joint line. A visible line on imperfect glassware reproducing the line between separate parts of the mold in which the glass was made. Also known as parting line; match mark; miter seam; mold mark; mold seam. *Dodd.*

joint penetration. The distance weld metal and fusion extend into a joint. *ASM Gloss.*

joint plane. A plane along a joint fracture or parting. Not to be confused with bedding and/or cleavage. *See also* joint, d. *Long.*

joint rose; joint rosette. On geologic maps, presents diagrammatically the direction and intensity of jointing in the area. *Bureau of Mines Staff.*

joints. Natural cracks or fractures in rocks. They tend to occur in more or less parallel systems, and when quarry walls are maintained parallel and at right angles to them, they may be utilized as natural partings in the process of block removal. *AIME, p. 792.*

joint sawyer. In the stonework industry, one who operates an abrasive saw or wheel to cut marble slabs into two or more pieces with square and true edges so that they will form tight and even joints when installed for building purposes. Also called jointer. *D.O.T. 1.*

joint-sealing material. Bituminous or rubbery mastic used for filling expansion joints, and which may be applied by a pressure gun. *Ham.*

joint set. A group of more or less parallel joints. *Billings, 1954, p. 108.*

joint-stock company. An association of individuals legally incorporated and registered for the purpose of engaging in a joint undertaking, trade, or business. *Truscott, p. 250.*

joint system. Consists of two or more joint sets or any group of joints with a characteristic pattern, such as a radiating pattern, a concentric pattern, etc. *Billings, 1954, p. 108.*

joint veins. Small veins confined to one bed of rocks that give no signs of displacement, or at least so slight that they cannot be noticed. *Fay.*

jointy. Full of joints; specifically, in mining, full of minute cracks or crevices, as rock. *Standard, 1964.*

jointy bass. Shale possessing the same vertical joints (cleat) as the underlying coal seam. *Arkell.*

jokul. a. A glacier. *Standard, 1964.* b. An Icelandic mountain, a large portion of which is above the snowline. Also spelled jökull. *Standard, 1964.*

jolite. Iolite. *Shipley.*

jolley. A machine for molding hollowware. *C.T.D.*

jollier. *See* cup maker. *D.O.T. 1.*

Jolly balance. A delicate spring balance. Used especially for the determination of specific gravity by the method of weighing in water and in air. *Webster 3d.*

jolt molding. A process sometimes used for the shaping of refractory blocks. A mold is charged with prepared batch which is then consolidated by jolting the mold mechanically; top pressure may simultaneously be applied via a mold plate. *Compare* tamping. *Dodd.*

Jominy test. A hardenability test in which a standard test piece, 4 inches long and 1 inch in diameter, is heated to a predetermined temperature, rapidly transferred to a jig fixture and quenched, under standard conditions, by a jet of water impinging at one end. When the specimen is cool, determinations of hardness are made along the specimen from the quenched end. The diagram relating hardness to distance from the quenched end of the specimen is known as a hardenability curve. *Ham.*

Jones riffle. An apparatus used for cutting the size of a sample. It consists of a hopper above a series of open-bottom pockets, usually one-half or three-fourths of an inch wide, which are so constructed as to discharge alternately, first into a pan to the right, and then into another pan to the left. Each time the sample is passed through the riffle, it is divided into two equal parts; the next pass of one of those parts will give a quarter of the original sample, and so on, until the sample is reduced to the desired weight. *Pearl, p. 78.*

Jones splitter. A device used to reduce the volume of a sample consisting of a belled, rectangular container, the bottom of which is fitted with a series of narrow slots or alternating chutes designed to cast material in equal quantities to opposite sides of the device. Also called sample splitter. *Compare* riffle. *Long.*

jonnies; johnnies. York. Miner's term for impure cannel coal. *Tomkeieff, 1954.*

Joosten process. Method of soil consolidation used in tunneling through sands and gravels. Solutions of calcium chloride and sodium silicate are forced into the ground, where they mingle and produce a watertight gel. *Pryor, 3.*

Joplin jig. A device used for jigging the shaker products of the diamond washer. The products are fed to the jigs, one at a time, and jigged, with frequent stoppages for scraping off the top layer of tailings; more sand is added and the process repeated until a product is obtained which consists entirely of concentrates. *Griffith, S. V., p. 10.*

jordanite. A sulfarsenite of lead, $4PbS.As_2S_3$. Monoclinic; often pseudohexagonal by twinning. A lead gray mineral. *Fay.*

joren. A scoop-shaped bamboo basket used in Japan for carrying auriferous gravel. *Fay.*

josefite. An altered microgranular dike rock consisting of augite and olivine, with abundant serpentine and calcite. *Holmes, 1928.*

joseite. A bismuth-telluride mineral found in Brazil. *Fay.*

josen. A variety of hydrocarbon of an approximate composition, $C_{18}H_{34}$, extracted from lignite from Koflach, Styria, Austria, and which recrystallizes as triclinic crystals. According to Soltys it is identical with hartite. *Tomkeieff, 1954.*

josephinite. A gray, nickeliferous iron, Fe_2Ni_5 or $FeNi_3$. Massive, granular, and forms the metallic portion of rolled pebbles. From Josephine County, Ore. *English.*

jostling loss. In logging, movement of the sand grains at their contacts with each other. These losses are caused by the relative movement of the grains at their points of contact and the resulting friction between them. The energy lost by the waves as a result of this jostling between grains appears as a very small increase in the temperature of the grains. *Wyllie, pp. 147, 171.*

jougs; juggs. Scot. An iron collar fastened by a short chain to a wall and said to have been put round the neck of disobedient miners in old times as a punishment. *Fay.*

joule. a. The absolute meter-kilogram-second (mks) unit of work or energy that equals 10^7 ergs or approximately 0.7375 foot-pound or 0.2390 gram calorie; the standard in the United States. *Webster 3d.* b. The gram-degree centigrade thermal unit; the small calorie. Abbreviation, j. *Standard, 1964.*

Joule's law. Either of two statements: (1) The rate at which heat is produced by a steady current in any part of an electric circuit is jointly proportional to the resistance and to the square of the current, or (2) the internal energy of an ideal gas depends only upon its temperature irrespective of volume and pressure. *Webster 3d.*

jouph holes. Derb. Hollows in a vein. *Fay.*

Jourado diamond. A colorless imitation stone. *Shipley.*

journal. a. Scot. A record of strata passed through in a borehole. A logbook. *Fay.* b. A shaft rotating in its bearing. *Pryor, 3.* c. That part of a rotating shaft resting in a bearing. *Long.*

journal book. Synonym for logbook. *Long.*

journey. a. Welsh term for train of mine cars moved mechanically. Also called gang; set; rake. *Pryor, 3.* b. A cycle of work done in glass manufacturing in converting a quantity of material into glass or glass products. *Webster 3d.*

journeyman (or rider). A dukey rider, that is, a man working on a dukey. *C.T.D.*

Jovite. Trademark for a high explosive of sodium nitrate and nitra compounds, formerly used in armor-piercing shells. *Webster 2d.*

jowl. a. Newc. A noise made as a signal, by hammering at the faces of two levels expected to meet. *Fay.* b. Eng. To sound the roof or side to ascertain whether or not it is safe. Also called knock. *SMRB, Paper No. 61.*

jowling. Same as sounding the roof. *See* roof testing. *Nelson.*

Joy double-ended miner. A cutter loader for continuous mining on a longwall face. It consists of two cutting heads fixed at each end of a caterpillar-mounted chassis. The heads are pivoted and controlled hydraulically for vertical movement. Each head comprises two bores and a frame or loop cutter that trims the bottom, face side, and top. A cross conveyor delivers the coal to the adjacent face conveyor. The machine cuts a web of 5 feet in seams from 37½ inches to 5 feet high. With an overall length of 18 feet it weighs 15 tons. *Nelson.*

Joy extensible conveyor. A belt conveyor to serve between a loader or continuous miner and the main transport. It consists of two main units—a head and a tail section—each mounted on crawler tracks and independently driven. In operation, the tail unit, that is, the receiving end, moves forward with the loading machine, and belting is automatically released from a loop takeup. Fifty feet advance is possible before additional belting has to be inserted into the conveyor run. Capacity equals 280 tons per hour with a 30-inch belt. *Nelson.*

Joy extensible steel band. An arrangement to provide a link between a continuous miner and the main transport. The equipment is hydraulically driven and the steel band is coiled on the drivehead. *Nelson.*

Joy loader. Loading machine for coal or ore, which uses mechanical arms to gather mineral on to an apron pressed into the severed material. A built-in conveyor then lifts it into tubs or on to a conveyor. *Pryor, 3.*

Joy longwall loading machine. A modified Joy loader 10 feet long, 5 feet 3 inches wide and 2 feet 8 inches high, comprising a hydraulically elevated loading head fitted with Joy gathering arms. The elevating conveyor delivers coal into a horizontally troughed cross conveyor 5 feet 3 inches long by 10½ inches wide. The cross conveyor has a speed of 240 feet per minute and delivers on to the face conveyor; it is extensible up to 1 foot 6 inches on either side by means of ropes attached to hydraulic jacks on the underside. The machine is propelled by caterpillar tractors 5 feet 6 inches long by 7 inches high and all controls are conveniently grouped at the rear. The machine loads at the buttock of the prepared coal. It has a loading capacity of 50 to 60 tons an hour. *Mason, v. 2, pp. 552-553.*

Joy microdyne. A wet-type dust collector for use at the return end of tunnels or hard headings. It may be either 6,000 or 12,000 cubic feet per minute capacity. It wets and traps dust as it passes through the appliance, and releases it in the form of a slurry which is removed by a pump. The microdyne is bolted to the outbye end of the exhaust pipe, and the auxiliary fan is bolted to the outbye end of the dust collector. *Nelson.*

Joy miner. A continuous miner mainly for use in coal headings and extraction of coal pillars. It weighs about 15 tons and comprises (1) turntable mounted on caterpillars, (2) ripper bar, and (3) discharge boom conveyor. The ripper bar has six cutter chains with picks running vertically to the plane of the seam. An intermediate conveyor behind the ripper bar delivers the coal into a small hopper and a discharge conveyor takes it to the outbye end of the machine. The latter conveyor can be swung 45° to right or left to facilitate cornering. *Nelson.*

Joy-Sullivan hydrodrill rig. A drill rig in which the drill is mounted on a jib or boom which can be moved to and locked in any required position by hydraulic power controlled from the drill carriage. Vertical movement of the jib is obtained from a manually operated hydraulic pump, and controlled lowering is effected by a small valve lever. A cone-type grip fixes the horizontal swing of the jib. Attached to the forward end of the jib is a saddle carrying the drill traverse or feed. This can be fixed in any position, horizontal or vertical, by two locking nuts. By loosening one nut the drilling machine and saddle are free to pivot around the jib to any position, and the feed, which is 8 feet long, enables a 7-foot 6-inch hole to be drilled. *Mason, V. 2, p. 602.*

Joy transloader. A rubber-tired self-propelled loading, transporting, and dumping machine. A successor to the Gismo. *Bureau of Mines Staff.*

Joy walking miner. A continuous miner with a walking mechanism instead of caterpillar tracks. The walking mechanism was adopted to make the machine suitable for thin seams. The lowest caterpillar-mounted machine can operate in a minimum seam height of 4 feet, whereas the walking type can work in a 2-foot 6-inch seam. *Nelson.*

Juan jade. A mixture of fine white and red jade. *Shipley.*

jubilee wagon. A small wagon, running on rails, which side-tips. *Ham.*

jubs. Eng. Top jubs and bottom jubs, soft marly limestone, coarsely oölitic in places, in the Great Oölite at Kingsthorpe, Northamptonshire; also in the same formation at Bedford. *Arkell.*

jud; judd. a. N. of Eng. A block of coal about 4 yards square holed and cut ready for breaking down. *Fay.* b. Som. *See* jad, a. *Fay.* c. In whole working, a portion of the coal laid out and ready for extraction; in pillar working (that is, the drawing or extraction of pillars), the yet unremoved portion of a pillar. *Fay.* d. Applied to a working place, usually 6 to 8 yards wide, driven in a pillar of coal. When a jud has been driven the distance required, the timber and rails are removed, and this is termed drawing a jud. *Zern.*

judge. a. Derb.; Newc. A measuring stick to measure coal work underground. *Fay.* b. Eng. Formerly a boy who proved the holing. *Fay.*

judge rapper. The upper end of the vertical arm of a judge. *See also* judge. *Fay.*

Judson powder. A blasting explosive containing sodium nitrate, sulfur, coal, and a little nitroglycerin. *Webster 2d.*

jug. A colloquial equivalent of detector, geophone, etc. *A.G.I.*

jugglers. Timbers set obliquely against pillars of coal, to carry a plank partition, making a triangular air passage or manway. *Fay.*

jug hustlers. *See* linemen. *Dobrin, p. 57.*

julgars. An Indian caste whose employment is gold washing. *Fay.*

julienite. A mineral; tetragonal; crusts of minute needles; color blue. Resembles connellite and buttgenbachite and was assumed to be a hydrous chloronitrate of cobalt, but later shown to contain neither chlorine nor nitrogen. From Chamibumba, Katanga, Republic of the Congo. *English.*

jumble. Derb. The place where veins intersect. *Fay.*

jumbler; jumbles. a. Eng. Big Jumbler, a bed of limestone in the Lower Lias at Rugby. *Arkell.* b. Shrop. Jumbles, the thickest oolitic bed in the Carboniferous limestone of the Clee Hills. *Arkell.*

jumbo. a. In mining, a drill carriage on which several drills of drifter type are mounted. Any outsized machine. *Pryor, 3.* b. A mobile scaffold to assist drilling in large headings. *B.S. 3618, 1964, sec. 6.* c. A number of drills mounted on a mobile carriage, and used in tunnels. *Nichols.* d. Drilling platform used in tunneling. *Sandstrom.* e. An asbestos fiberizing machine consisting of a horizontal steel cylinder, about 36 inches in diameter by 72 inches long, lined with corrugated liners in which is mounted a shaft that has steel arms with beater tips attached. The shaft rotates at 600 revolutions per minute. The ore is fed at the top of the cylinders at one end and is discharged at the bottom of the other end. This machine is effective for moderately soft ore where actual crushing or breaking is not required. *Sinclair, W. E., p. 192.* f. A type of transfer ladle for the conveyance of molten iron. *See also* transfer ladle. *Dodd.* g. A hollow clay building block. Its size is 11½ by 7½ by 3½ inches and it had two large cells and a 1½-inch shell; the weight is 15 to 16 pounds. *See also* cell, b. *Dodd.*

jumbo brick. A generic term indicating a brick larger than the standard; some producers use this term to describe an oversize-brick unit of specific dimensions. *ACSG, 1963.*

jumillite. A fine-grained porphyritic rock containing phenocrysts of orthoclase (with poikilitic inclusions of olivine), phlogopite, soda pyroxenes, and amphiboles in a matrix of soda amphibole and leucite, with accessory apatite and titanoferrite. *Holmes, 1928.*

jump. a. To take possession of a claim, the property of others, on legal grounds. *Gordon.* b. Eng. A sudden rise in the dip of a coal seam. *Arkell.* c. Can. Staking or otherwise trying to acquire claims already staked or owned by others. *Hoffman.* d. Pac. *See* jumping a claim. *Fay.* e. A dislocation of a vein. *Fay.* f. Eng. To drill a hole for blasting with a jumper. *Fay.* g. Hurdle sheet. *Mason.* h. To shorten and thicken a piece of metal as by hammering on the end of a bar. To upset. *Crispin.* i. *See* hydraulic jump. *Seelye, 1.*

jump correlation. Procedure in reflection shooting in which seismograms are taken at isolated locations and the reflections are correlated across the gaps between these locations. *Schieferdecker.*

jump drilling. *See* rope drilling. *Pryor, 3.*

jumper. a. Eng. A drill or boring tool, consisting of a bar, which is jumped up and down in the borehole; from Cornwall and the Newcastle coalfield. *See also* churn drill. *Fay.* b. The borer, steel, or bit for a compressed-air rock drill. *C.T.D.* c. A long steel bar, or light aluminum tube with steel end, used to dress rock faces, pry off loose rock, etc. *Pryor, 3.* d. One who jumps a claim, that is, takes possession of another's mining property. *Pryor, 3.* e. Can. A sled with wooden runners used in summer hauling. *Hoffman.* f. A steel bar used in manual drilling. *Sandstrom.* g. A long iron drill, with a steel cutting edge, worked by blows from a heavy hammer. *Stauffer.* h. A long drill with which a hole is made by letting it fall, instead of striking it with a hammer. *Gordon.* i. A bar of steel once used as a rock drill. *Korson.*

jumper bar. A weighted steel bar with a cutting edge, raised and dropped by hand. *C.T.D.*

jumper dirt; jumper muck. York. Dirt bands between the black bands and the lime coal in the Stanley Main. Dirt beds drilled or jumped for blasting. *Arkell.*

jumpers. *See* poppers. *ASTM C286-65.*

jumping. The chipping off of pieces of the first enamel coat during subsequent heating to fire cover coats. Caused by foreign material on the iron or in the enamel. *ACSB-3.*

jumping a claim. a. Taking possession of a mining claim which has been abandoned. *Fay.* b. Taking possession of a mining claim liable to forfeiture owing to the requirements of the law being unfulfilled. *Fay.* c. Taking possession of a mine or claim by stealth, fraud, or force. *Fay.* d. The location of a mining claim on supposed excess ground within staked boundaries of an existing claim on the theory that the law governing the manner of making the original location had not been complied with. *Fay.*

jumping-off place. Can. Point on railroad nearest prospector's bush objective. *Hoffman.*

jumping switch. Scot. A self-acting switch, so arranged that the hutches jump through a small vertical distance. *Fay.*

jump joint. a. Butt joint. *Webster 3d.* b. A flush joint (as of plank or masonry). *Webster 3d.*

jump sheet. A flat metal plate used as a turnsheet on which to turn the empty cars. *Lewis, p. 239.*

jump-up; jump-down. a. To raise boring rods and allow them to fall by their own weight. *Fay.* b. A short rise dug in the roof of a drive. *See also* monkey shaft. *Fay.* c. An upthrow or downthrow fault. *Fay.*

jump weld. A butt weld in which one member is welded at right angles to a relatively larger part. *Webster 3d.*

junckerite; junkerite. Same as siderite. a. *Fay.*

junction. a. The point where two or more passageways intersect horizontally or vertically. *A.G.I.* b. In ventilation surveys, where three or more roads meet. *Roberts, I, p. 296. c.* The union of two lodes. *Gordon.*

junction box. a. A junction box has a blank cover that serves to join different runs of raceway or cable and that provides space for connecting and branching enclosed conductors. *ASA M2.1-1963.* b. A mine-type junction box is a stationary piece of apparatus with enclosure by which one or more electric circuits for supplying mining equipment are connected through overcurrent protective devices to an incoming feeder circuit. *ASA M2.1-1963.*

junction maker. One who joins sections of unbaked sewer pipe at various angles. Also called branch maker; fitting maker; junction sticker. *D.O.T. 1.*

junction point. The common meeting point on a curve between the circular part and a noncircular part, the latter being either a transition curve or straight. *Ham.*

junction sticker. *See* junction maker. *D.O.T. 1.*

junk. a. Any foreign metallic material accidentally introduced into a borehole. *Long.* b. Very poor or low-grade drill diamond. *Long.*

junk basket. A fishing tool used to pick up and remove small pieces of metal from a borehole. *See also* junk. *Long.*

junket. a. Eng. A bucket used for raising rock or ore in a shaft. *Hess.* b. Eng. *See* kibble. *Fay.*

junking. a. The process of cutting a passage through a pillar of coal. *C.T.D.* b. N. of Eng. An opening cut into, or a narrow slice taken off, a pillar in the room-and-pillar system of working coal. A fast junking is a narrow place driven lengthwise in a pillar of coal, but unholed into the room on either side of the pillar. A loose junking is a similar place driven along the side of the pillar and open to the room along that side. *Fay.*

junk iron. Synonym for junk. *See also* junk, a. *Long.*

junk mill. A bit designed to grind or cut foreign metallic material or junk in a borehole into pieces small enough to be washed out of the hole or recovered by a basket. *Compare* milling bit; rose bit. *Long.*

junks. a. Dev. Limestone concretions in slate. *Arkell.* b. Corn. Joints in rocks. *Arkell.*

Jupiter process. A patented process for making cast steel by melting wrought-steel scrap with about 2.0 percent ferrosilicon, up to about 0.5 percent ferromanganese, and about 3.0 percent aluminum, then casting in molds of a special composition. *Fay.*

Jupiter steel. A steel produced by the Jupiter process; it is about as strong and as ductile as forged steel. *Fay.*

Jura. Synonym for Jurassic. *A.G.I. Supp.*

Jurassic system. The middle division of the Mesozoic era, named after the Jura Mountains, where rocks of this age are found. *C.T.D.*

jury rig. Any temporary or makeshift device, rig, or piece of equipment. *H&G.*

justiceman. Scot. One who checks, on behalf of the miners, the weight of mineral sent by them out of the mine. *See also* checkweigher. *Fay.*

jute fiber. The woody fiber of a plant native to India. The plant grows to a height of from 10 to 15 feet and the prepared fibers are from 4 to 8 feet long. Burlap webbing and rope are made from the fibers. *Crispin.*

jutty. A small tub or truck used for gathering coal in thin seams. *C.T.D.*

juvenile. Applied to water and other volatile materials that are known to be magmatic emanations of primary endogenetic origin. Those of secondary endogenetic origin, occurring as emanations derived from country rock, are distinguished by Daly as resurgent. *Holmes, 1928.*

juvenile water. Water from the interior of the earth which is new or has never been a part of the general system of ground water circulation. *See also* magmatic water. *Fay.*

juxtaposition twins. Two (or more) crystals united regularly, in accordance with a twin law, on a plane (the composition plane) which is a possible crystal face of the mineral. *Compare* interpenetration twins. *C.T.D.*

K

k a. Abbreviation for the prefix kilo-, which indicates that the basic unit the follows is multiplied by 1,000 or by 10^3. *Zimmerman, p. 60.* b. Symbol for one of the Miller indexes, (h, k, l). *Zimmerman, p. 151.* c. Symbol for velocity constant of chemical reaction. *Zimmerman, p. 115.* d. Symbol for Boltzmann's constant. *Zimmerman, p. 18.* e. Symbol for thermal conductivity. *Zimmerman, p. 28.* f. Symbol for cold. Symbol derived from German kalt. *Zimmerman, p. 26.* g. Symbol for the ratio of specific heats; ratio of specific heat at constant pressure (c_p) to specific heat at constant volume (c_v), or c_p/c_v; ratio of molecular specific heat at constant pressure (C_p) to molecular specific heat at constant volume (C_v), or C_p/C_v. *Zimmerman, pp. 53, 100.* h. Abbreviation for knot. *Zimmerman, p. 61.* i. Abbreviation for kip (1,000 pounds). *Zimmerman, p. 60.* j. Abbreviation for key. *Zimmerman, p. 60.* k. Symbol for the individual mass transfer coefficient. *Zimmerman, p. 26.* l. Symbol for a unit vector in the z direction or parallel to the z axis. *Zimmerman, p. 166.* m. Symbol for spring constant or load per unit deflection. *Zimmerman, p. 101.* n. Symbol for radius of gyration. *Zimmerman, p. 52.*

k a. Symbol for one of the Miller indexes (*h, k, l*). *Zimmerman, p. 158.* b. Symbol for specific reaction velocity; specific reaction rate; reaction velocity constant; velocity constant of chemical reaction. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99; Zimmerman, pp. 164, 167, 170.* c. Symbol for Boltzmann's constant or the molecular gas constant. *Zimmerman, p. 157.* d. Symbol for thermal conductivity. *Zimmerman, p. 146.* e. Symbol for the ratio of specific heats, c_p/c_v, or the ratio of the specific heat at constant pressure (c_p) to the specific heat at constant volume (c_v). *Zimmerman, p. 146.* f. Symbol for the individual mass transfer coefficient. *Zimmerman, p. 147.* g. Symbol for force constant. *Zimmerman, p. 156.* h. Symbol for spring constant; load per unit deflection; load per unit displacement; restoring force per unit displacement. *Zimmerman, pp. 159, 164.* i. Symbol for compressibility factor; coefficient of compressibility; reciprocal of volume modulus of elasticity. *Zimmerman, p. 152.* j. Symbol for wavelength constant. *Zimmerman, p. 167.* k. Symbol for magnetic susceptibility; volume magnetic susceptibility. *Zimmerman, pp. 159, 167.* l. Symbol for torsion constant or torque per unit twist. *Zimmerman, p. 166.* m. Symbol for acoustic period. *Zimmerman, p. 189.* n. Symbol for coupling coefficient. *Zimmerman, p. 258.* o. Symbol for radius of gyration. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99.*

K a. Chemical symbol for potassium. Symbol derived from the Latin kalium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.* b. Abbreviation for Kelvin. The Kelvin temperature scale is the fundamental temperature scale; it is also called the absolute scale and the thermodynamic scale. Absolute zero is 0° Kelvin (0° K), which equals −273.16° Centigrade (−273.16° C) and −459.72° Fahrenheit (−459.72° F). *BuMines Style Guide, p. 60; Handbook of Chemistry and Physics, 45th ed., 1964, p. F-59.* c. Symbol for Cretaceous. *USGS Sugg., p. 86.* d. Symbol for constant and a common symbol for a numerical constant. Symbol derived from the German Konstant. *Webster 3d; Zimmerman, p. 75.* e. Abbreviation for the unattached word kilo, which is the shortened word for kilogram; kilometer. Accordingly, K is also an abbreviation for kilogram; kilometer. *Zimmerman, p. 205.* f. Abbreviation for carat. Abbreviation derived from the German Karat. *Zimmerman, p. 60.* g.

Abbreviation for cathode; symbol for the cathode of a vacuum tube. The abbreviation and symbol were derived from the German Kathode. *Zimmerman, p. 22.* h. Symbol for electric intensity. *Zimmerman, p. 258.* i. Symbol for equilibrium constant. *Zimmerman, p. 29.* j. Symbol for dissociation constant; ionization constant. *Webster 3d.* k. Abbreviation for keg. *Zimmerman, p. 60.* l. Abbreviation for kip (1,000 pounds). *Zimmerman, p. 206.* m. Abbreviation for key. *Zimmerman, p. 205.* n. Symbol for smoke. *Zimmerman, p. 442.* o. Symbol for the overall mass transfer coefficient. *Zimmerman, p. 26.* p. Symbol for stress concentration factor. *Zimmerman, p. 103.* q. Symbol for elasticity in hydraulics or the bulk modulus of liquids. *Zimmerman, p. 40.* r. Symbol for luminosity factor. *Zimmerman, p. 65.*

K a. Common symbol for a numerical constant. *Zimmerman, p. 255.* b. Symbol for equilibrium constant; chemical equilibrium constant; ratio of the products to the reactants. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-99; Zimmerman, pp. 148, 169.* c. Symbol for the overall mass transfer coefficient. *Zimmerman, p. 147.* d. Symbol for cold. Symbol derived from the German kalt. *Zimmerman, p. 423.* e. Symbol for compressibility. *Zimmerman, p. 169.* f. Symbol for elasticity in hydraulics. *Zimmerman, p. 185.* g. Symbol for curvature. *Zimmerman, p. 153.* h. Symbol for luminosity factor; luminous efficiency. *Zimmerman, pp. 159, 190.*

ka Abbreviation for cathode. *Webster 3d.*

kabaite. A hydrocarbon related to ozocerite or scheererite, found in meteorites. *Fay.*

kachim. *See* Gypsophila patrini. *Hawkes, 2, p. 312.*

kackle-meckle. Corn. The poorest kind of lead ore. A variation of keckle-meckle. *Fay.*

Kady Mill. Trade name; a high speed dispersion unit consisting principally of a bottom-feeding propeller, a main dispersion head containing a rotor and a stator, and an upper shroud and propeller. *Dodd.*

kaersutite. A black member of the amphibole group of minerals; a titanium hornblende; from Kaersut, Greenland. *Larsen, p. 187.*

kahlerite. A hydrous arsenate of uranyl and iron, $Fe(UO_2)(AsO_4).8H_2O$; as yellow rectangular plates probably monoclinic. From Huttenberg, Carinthia, Austria. *Spencer 20, M.M., 1955.*

kaildo; caylowe. *See* calyou. *Arkell.*

kain coal. Scot. Produce of the mine by way of whole or part payment of rent. *Fay.*

kainite. A natural salt containing when pure 35.1 percent potassium sulfate, 24.2 percent magnesium sulfate, 18.9 percent magnesium chloride, and 21.8 percent water of hydration; $MgSO_4.KC1.3H_2O$; monoclinic. *Dana 17; Fay.*

kainosite. *See* cenosite. *Crosby, p. 98.*

Kainozoic. Synonym for Cenozoic. *A.G.I. Supp.*

kaiwekite. A plagioclase and olivine-bearing alkalic trachyte. *A.G.I.*

kakirite. A sheared and brecciated cataclastic rock in which fragments of the original material are surrounded by innumerable gliding surfaces in which intense granulation and some recrystallization have taken place. *Holmes, 1928. See also* augen schist; cataclasite; flaser gneiss; hartschiefer; mylonite gneiss; phyllonite. *A.G.I.*

kakortokite. A banded form of the igneous rock nepheline syenite, with light-colored layers rich in feldspar, nepheline, and eudialyte, and dark layers rich in aegirite and arfvedsonite. *Holmes, 1928.*

kal. Eng. A coarse kind of iron. *Fay.*

kalamein. a. An anticorrosive alloy of lead, tin, antimony, bismuth, and nickel for coating iron. *Fay.* b. To coat in a manner similar to galvanizing, but using kalamein. *Fay.*

kalamin. *See* calamine.

Kaldo steel process. A steelmaking process in which oxygen is fed into a large inclined rotating vessel through watercooled lances, but at velocities somewhat lower that in the L.D. process, so that the jet does not completely or continuously pentrate the slag layer. In some respects, it is like a continuously rotating open hearth. It gives better heat utilization than the L.D. but is slower. It was developed under Prof. B. Kalling at Domnarfvet in Sweden. *Nelson.*

kale; keale. Eng. Surface-weathered ironstone or oölite, rottenstone, in Northamptonshire, Rutland, and Lincolnshire; usually on the Northampton Sands, Lincolnshire Limestone, or Cornbrash, often reddish. *Arkell.*

kaliborite. *See* heintzite.

kalicine. A colorless to white or yellowish potassium bicarbonate with the formula, $4[KHCO_3]$. Synonym for kalicinite; kalicite. *Dana 7, v. 2, p. 136; Hey 2d, 1955.*

kalicinite; kalicite. Same as kalicine. *English.*

kaliliparite. An igneous rock used for low-alkali glass. Its aproximate chemical composition is 68 percent SiO_2, 16 percent Al_2O_3, 1 percent CaO, 1 percent MgO, 1 percent Fe_2O_3, 11 percent K_2O, and 2 percent Na_2O. *Am. Ceram. Soc. J., v. 35, No. 7, July 1952, p. 168.*

kalinite; potash alum. Hydrous sulfate of potassium and aluminum, which probably crystallizes in the monoclinic system. It has the same composition as potash alum. They both occur as an efflorescence upon argillaceous minerals and in connection with volcanoes. *C.T.D.*

kaliophilite. A silicate of potassium and aluminum, $K(AlSiO_4)$, crystallizing in the hexagonal system. It commonly contains small amounts of nepheline. Also called phacellite; facellite. *Dana 17.*

kaliphite. A mixture of limonite, with oxides of manganese, and silicates of zinc and lime. *Osborne.*

kalistrontite. Prismatic crystals and hexagonal tablets of $K_2Sr(SO_4)_2$; from Alshtan, Bashkiria, U.S.S.R. Isostructural with palmierite. Named from the composition. *Hey, MM, 1964; Fleischer.*

kalkowskite; kalkowskyn. A very rare, weakly radioactive, light brown, dark brown, or black mineral, possibly $Fe_2Ti_3O_9$, found in schistose muscovite layer in quartzite associated with ziron, monazite, and almandite. *Crosby, p. 125.*

kallainite. Same as callainite. *Shipley.*

kallait. Turquoise. *Fay.*

kallen. See callen. *Fay.*

Kalling's solution. An etching reagent for developing the microstructure of chromium steels with more than 5 percent of chromium. It contains 5 grams copper chloride, 100 milliliters hydrochloric acid, 100 milliliters alcohol, and 100 milliliters water. *Osborne.*

kalsilite. $K_2O.Al_2O_3.2SiO_2$ together with a small amount of Na_2O. This mineral is sometimes formed when alkali vapor attacks fire clay refractories. *Dodd.*

kaluszite. *See* calcium potassium sulfate. *Bennett 2d, 1962.*

kamacite. A variety of nickeliferous iron found in meteorites. *C.M.D.*

kamarezite. A grass-green, hydrated, basic copper hydrate and sulfate, $Cu_3(OH)_4SO_2$. $6H_4O$. *Standard, 1964.*

kame. a. Scot. A rounded hill or oblong ridge terminating abruptly in a high mound. Composed of gravel and sand, and having its major axis transverse to the drift movement. *Fay.* b. One of the hills or ridges formed of detritus by glaciers, or even any small conical hill; used interchangeably with osar and esker. *Standard, 1964.*

kame-and-kettle topography. Surface formed by a kame complex interspersed with kettles. Obsolete. *A.G.I.*

kamenny ugol'. Russian name for stone coal. *Tomkeieff, 1954.*

kame plain. A broad, low, massive kame, composed only of coarse sediment. *Standard, 1964.*

kame terrace. A terracelike body of stratified drift deposited between a glacier and an adjacent valley wall. A terrace of glacial sand and gravel deposited between a valley ice lobe (generally stagnant) and the bounding rock slope of the valley. *A.G.I.*

kammerling furnace. A modification of the Belgian zinc smelting furnace wherein there are two combustion chambers separated by a central longitudinal wall. In principle, the furnace is similar to the Hauzeur, a compound. *Fay.*

kammgranite. A porphyritic hornblende granite. *Hess.*

kamperite. A dark, fine-grained orthoclase-biotite rock related to biotite juvite. *Hess.*

kanase. Burma. A local custom in the gem mines at Mogok which permits women to work without licenses in streambeds, tailraces, and dumps from mines and washeries and to keep any gems they may find. *Hess.*

Kanawhan. Upper Lower Pennsylvanian. *A.G.I. Supp.*

Kanawha series. A group of productive coal measures occurring in the Pennsylvanian of the Appalachian Region, and completely developed in Virginia. Sometimes known as the Upper Pottsville series. *C.T.D.*

kanch; kench. Canch; brushing; ripping. *Mason.*

kand; cand. Corn. Fluorspar. *Fay.*

K & K machine. Early flotation cell, in which a revolving slotted cylinder, mounted horizontally, provided agitation and aeration. *Pryor 3.*

K & S. Designers of the K and S double tube core barrel, designated as K. *Cumming.*

kank. a. Eng. A twist in a rope, from the Midland coalfield. A variation of kink. *Fay.* b. *See* cank. *Nelson.*

kankar. A vernacular Indian term for stone; now restricted to concretionary masses of calcium carbonate occurring in alluvium. *Holmes, 1928.*

kann. *See* cand. *Fay.*

kannel-durit. Ger. Name for the durain of the cannel coal. *Tomkeieff, 1954.*

Kansan. Second Pleistocene glaciation. *A.G.I. Supp.*

kansasite. A variety of fossil resin afterwards named jelinite. Found in shale associated with coal. *Tomkeieff, 1954.*

kansite. Cubic Fe_7S_8, found as a corrosion product on iron pipes in Kansas and in Texas. Named from the locality. *Hey, M.M., 1964.*

kanthals. Group of alloys having high electrical resistivity; contain about 25 percent chromium, 5 percent aluminum, 3 percent cobalt, and 67 percent iron. *Pryor, 3.*

kaoleen. A term used locally in part of south-central Missouri to refer to a chalky, white to tan or buff, porous, weathered chert. It is a corruption of kaolin to which the material bears a slight resemblance and should be abandoned. *A.G.I.*

Kaolex Clay. Proprietary brand name for a series of hydrous aluminum silicates (sedimentary kaolins) from Georgia and South Carolina for ceramics and refractories. *CCD 6d, 1961.*

kaolin. a. A clay, mainly hydrous aluminum silicate, from which porcelain may be made. Also called China clay; porcelain clay. *See also* kaolinite. *Sanford.* b. A refractory clay consisting essentially of minerals of the kaolin group and which fires to a white or nearly white color. *ASTM C242-60.* c. A white or nearly white clay resulting from the decomposition of feldspar. *B.S. 3618, 1964, sec. 5.*

kaolin-coal tonstein. Kaolin-coal tonstein is difficult to distinguish with the unaided eye from ordinary dirt bands occurring in hard coal. Its color ranges from a yellowish-white to black. The lighter colored varieties generally occur as the immediate roof, or floor of seams or in the associated strata, whereas tonstein bands occurring within the coal are generally dark gray to black. Kaolin-coal tonstein has a dense, fine-grained texture, and is not generally stratified. It occurs almost invariably within coal seams, usually close to the roof or floor; more rarely it is associated with different forms of carbonaceous shale and black band ironstone. In isolated instances it is also found in pure shale or sandstone. The frequency and thickness of tonstein bands vary in different coalfields and different parts of the sequence of seams. The thickness is generally only one to a few centimeters and their lateral persistance is often considerable. *IHCP, 1963, part I.*

kaolinic. Of, relating to, or resembling kaolin. *Webster 3d.*

kaolinite. A common clay mineral. A two-layer hydrous aluminum silicate, $Al_4(Si_4O_{10})(OH)_8$. It consists of sheets of tetrahedrally coordinated silicon joined by an oxygen shared with octahedrally coordinated aluminum. Essentially, there is no isomorphous substitution. Monoclinic. The mineral characteristic of the rock kaolin. The kaolin group of minerals includes also the recently recognized isomers, dickite and nacrite. *A.G.I.; Dana 17.*

kaolinization. a. Formation of kaolin by the weathering of aluminum silicate minerals or the alteration of other clays. *A.G.I. Supp.* b. Less commonly, the formation of kaolin by hydrothermal action. *A.G.I. Supp.* c. A process which occurs as a result of either hydrothermal alteration, or by weathering, alteration of rocks, ores, and minerals by atmospheric waters. It is typically a result of surface agencies, but may also occur where hydrothermal solutions are acid in character. This process involves the decomposition and solution of hard feldspars and other minerals and the formation of kaolin, which is soft and friable in character. Rocks and ores which have been subject to kaolinization are likely to be structurally weak and will not stand pressure long, especially when exposed to air. *Lewis, p. 606.*

kapel. *See* capel, a and b. *Fay.*

Kaplan turbine. A water turbine, of propeller type, having blades of variable pitch automatically adjustable to accord with the load. *Ham.*

kappa carbide. A carbide of iron ($Fe_{23}C_3$) in which all or part of the iron may be replaced by chromium, molybdenum, and/or tungsten, $(Fe,Cr,Mo,W)_{23}C_6$. *Osborne.*

karang. Term used in the Malay States for the pay streaks of cassiterite. *Lewis, p. 395.*

karat; carat. One-twenty-fourth part. Used to designate the fineness of gold; thus, 18 karat gold is 18/24 (or 75 percent) pure gold and 6/24 (or 25 percent) other alloying metal or metals. Abbreviations, K; Kt; c; ct; and car. *ASM Gloss; Lowenheim.*

karcite. A material similar to kemite but with another grog instead of artificial cordierite. *Industrial and Engineering Chemistry, v. 29, May 1937, p. 547.*

karelianite. Black grains, V_2O_3, in boulders from the Outokumpu ore body, Karelia, Finland. Named from the locality. *Hey, MM, 1964; Fleischer.*

karite. A variety of the igneous rock grorudite, containing about 50 percent quartz. *Holmes, 1928.*

Karlsbad law; Carlsbad law. Monoclinic crystal system twinning of the penetration type in which the c axis is the twinning axis. *Hess.*

Karlsbad twin. *See* Carlsbad twin.

karn; cairn. Corn. A pile or heap of rocks, as for a monument; sometimes the solid rock. *Fay.*

karnasurtite. A metamict mineral from Mt. Karnasurt, Lovozero massif, Kola peninsula, U.S.S.R., approximates to $(Ln,Th)(Ti,Nb)(Al,Fe)(Si,P)_2O_7(OH)_4 . 3H_2O$. Named from locality. It had previously been named kozhanovite without a description. *Hey, M.M., 1961.*

karpatite. Russian name for carpathite. *Spencer 21, M.M., 1958.*

karpinskite. A mineral, $(Ni,Mg)_2Si_2O_5(OH)_2$, containing 21.12 percent NiO, and 17.56 percent MgO; compact, greenish-blue, with cerolite minerals in crevices in serpentine. From the Urals, U.S.S.R. Not to be confused with karpinskyite. *Spencer 21, M.M., 1958.*

karpinskyite. Radial aggregates of white hexagonal needles in pegmatite from Kola peninsula, U.S.S.R., $Na_2(Be,Zn,Mg)Al_2Si_6O_{16}(OH)_2$. *Spencer 21, M.M., 1958.*

karst. Limestone region with many sinkholes, abrupt ridges, caverns, and underground streams. Named for Karst district in Yugoslavia. *Mather.*

karstenite. Ger. Anhydrite rock. *Holmes, 1928.*

Karst topography. In Karst, on the eastern side of the Adriatic Sea, the limestone rocks are so honeycombed by tunnels and openings dissolved out by ground waters, that much of the drainage is underground. Large sinks abound, some of them 500 or 600 feet deep. Streamless valleys are common, and valleys containing streams often end abruptly where the latter plunge into underground tunnels and caverns, sometimes to reappear as great springs elsewhere. Irregular topography of this kind, developed by the solution of surface and ground waters, is known as Karst topography. *A.G.I.*

kasenite. A rock similar to hallaite but which differs from it by a slight content of silicate minerals. *Hess.*

kasolite. A very rare, strongly radioactive, yellow to brown, monoclinic mineral, $Pb(UO_2)SiO_4.H_2O$, found in ore deposits associated with curite, soddyite, uranophane, and schoepite. Named from locality Kasolo, Katanga, Republic of the Congo. *Crosby, pp. 26-27.*

kassaite. A microlithic igneous dike rock containing phenocrysts of haüynite, barkevikite, augite, and labradorite in a groundmass of hornblende and felsic minerals. *Holmes, 1928.*

Kassel kiln. An old type (it originated in the Kassel district of Germany), of intermittent, rectangular, fuel fired kiln which diminished in cross section towards the end leading to the chimney. *Dodd.*

kassianite; cassianite. A variety of sapropelic coal composed mainly of structureless sapropel with a few indefinite remains of algae. From Kassianovka, Irkutsk, Siberia, U.S.S.R. *Tomkeieff, 1954.*

Kast furnace. A small, circular shaft furnace with three or four tuyeres, for lead smelting. *Fay.*

kata-. a. A variant of cata-. *A.G.I.* b. A prefix used with metamorphic names to indicate an origin in the deepest zone of metamorphism. *Compare* epi-; meso-. *Hess.*

katabothron. A Greek term for an underground passage cut by water. *Standard, 1964.*

kataclastic. *See* cataclastic. *Hess.*

kata cooling power. A measure of the cooling effect of the ambient air as determined by the kata thermometer. This instrument may be used wet or dry. *B.S. 3618, 1963, sec. 2.*

kataglyph. A hieroglyph formed during katagenesis, that is, under a cover set of beds. *Pettijohn.*

katagneiss. Applied to gneisses, amphibolites, etc., considered to have been formed in the deepest zone of metamorphism, where high temperature is a controlling factor and high hydrostatic pressure dominates over shearing stress. *Holmes, 1928.*

kataklastic structures. Structures produced in a rock by the action of severe mechanical stress, during dynamic metamorphism. The constituent minerals generally show deformation and granulation. *C.T.D.*

katamorphic zone. The zone of katamorphism corresponds to the zone of rock fracture and is a zone of breaking down. It is especially characterized by solution, decrease of volume and softening of the materials; the processes are destructive, resulting in degeneration. The zone is divided into the belt of weathering and of cementation. *See also* anamorphic zone. *Fay.*

katamorphism. a. The breaking down processes of metamorphism, as contrasted with the building up processes of anamorphism. *C.T.D.* b. The alteration of rocks by weathering and cementation, the characteristic changes involving the production of simpler, less dense minerals from more complex silicates. *Compare* anamorphism. *Hess.*

kata thermometer. A type of alcohol thermometer used to determine the cooling power of the ambient air and sometimes to measure low air velocities. *B.S. 3618, 1963, sec. 2.*

katazone. *See* katamorphic zone. *Hess.*

Kater's pendulum. An instrument for measuring gravity based on the theorem that any system of parallel forces, such as gravity, acting on a rigid body can be resolved into a single force acting at the center of mass. *Bureau of Mines Staff.*

katoptrite. Same as catoptrite. *English.*

katouti. A gold-washring trough of the northwest provinces, India. *Fay.*

katran; kitran. Local Tartar name in the Baku region for impure asphalt. *Tomkeieff, 1954.*

katungite. A volcanic rock composed of melilite, subordinate olivine and magnetite, and minor leucite and perovskite. A pyroxene-free melilitite. *A.G.I.*

katzenbuckelite. A porphyritic igneous rock similar to tinguaite having phenocrysts of nepheline, noselite, biotite, and olivine in a glassy or cryptocrystalline groundmass containing minute crystals of nepheline, leucite, orthoclase, biotite, soda pyroxene, and soda-amphibole. *Holmes, 1928.*

kauaiite. A coarse-grained igneous rock consisting of an olivine-augite diorite with zoned feldspars ranging from labradorite in inner zones to alkali feldspar in outer zones; from the Hawaiian Islands. *Holmes, 1928.*

kauk. Derb. A very heavy substance, common in the mines. Variant of cauk. *Arkell.*

kauri resin; kauri gum. A light-colored to brown copal from the kauri tree found usually as a fossil in the ground but also collected by tapping living trees and used chiefly in making varnishes and linoleum. From New Zealand. Also called kauri copal. *Webstr 3d. See also* copal.

Kautschol. Brown coal tar. *Bennett 2d, 1962.*

Kavalier glass. An early type of chemically resistant glass characterized by its high potash content; it was first made by F. Kavalier at Sazava, Czechoslovakia, in 1837, and the Kavalier Glassworks still operates on the same site. *Dodd.*

kavels. Eng. Lots cast by miners for the working places. *Fay.*

kavkazite. A variety of petroleum found in the Baku region, Azerbaidzhan, S.S.R., U.S.S.R. *Tomkeieff, 1954.*

kawang. A Malay magician who claims to be able to make mining and other ventures successful *Hess.*

Kawishiwin. Can. The iron-bearing belt of the Keewatin. The greenstone, or dioritic (upper), part of the Keewatin. *Fay.*

kawk. Corn. Fluorspar. *Fay.*

kayserite. An aluminum hydroxide, A10-(OH); monoclinic. A micaceous alteration product of corundum. A dimorphous form of this compound, the orthorhombic form of which is diaspore. From Redondo, Uruguay. *English.*

Kazanian. Upper Permian. *A.G.I. Supp.*

kazen. Corn. A sieve. *Fay.*

kazer. *See* kazen. *Fay.*

K-bentonite. Metabentonite with potassium occupying about 80 percent of exchangeable cation positions of the mica portion. *A.G.I. Supp.*

kc. Abbreviation for kilocycle. *BuMin Style Guide,* p. 60.

kcal. Abbreviation for kilocalorie. *BuMin Style Guide, p. 60.*

K-capture. The capture by the nucleus of an atom of an orbital electron from the first (nearest) or K-shell surrounding the nucleus. *L&L.*

kearsutite. A black member of the amphibole group of minerals; Mg:Fe 5.7; Al:Fe 1.7. *Larsen, p. 224.*

keatite. A high-pressure tetragonal form of silica prepared hydrothermally. *Spencer 20, M.M., 1955.*

keazoglyph. Small transverse displacements along cracks. *Pettijohn.*

kebble. Eng. An opaque, calcareous spar. *Fay.*

keckle-meckle. Eng. Lead minerals of the poorest quality. *See also* kackle-meckle. *Fay.*

kedabekite. A name given by von Federow to a dike rock from the Kedabek mines, in the province of Elizabethpol, Transcaucasia, U S.S.R. The rock is finely granular, dark gray in color, and consists of basic plagioclase, lime-iron garnet, and a pleochroic pyroxene called violaite. *Fay.*

Keebush. A plastic constructional material which will withstand the action of both sulfuric acid, of up to 50 percent concentration, and hydrochloric acid. It is used for the construction of pickling tanks. *Osborne.*

keeker. N. of Eng. An inspector of underground mining. *Fay.*

keel. a. Eng. A flat-bottomed ship; especially, a barge used on the Tyne to carry coal from Newcastle. *Webster 3d.* b. A barge load of coal. *Webster 3d.* c. A British unit of weight for coal based on the amount one keel can hold now equal to 21.2 long tons. *Webster 3d.* d. A red ocher used for marking something (as lumber or sheep). *Webster 3d.* e. A lumberman's marking crayon, used by drillers to temporarily mark core boxes or the drill bit advance on a drill string. *Long.* f. Eng. Same as reddle or red clay. Also spelled keil. *Fay.*

keel block. A test coupon for metal castings forming a keel on the bottom of a large riser or sinkhead. *ASM Gloss.*

Keele series. A local group of red and purple sandstones and marls, which constitutes the highest division of the Coal Measures in the North Staffordshire coalfield, England. They are barren red measures, deposited under semidesert conditions. *C.T.D.*

keel wedge. A long iron wedge for driving over the top of a pick hilt. *Fay.*

Keene's cement. Anhydrous calcined gypsum, the set of which is accelerated by the addition of other materials. *ASTM C11-60. See also* gypsum cements. *CCD 6d, 1961.*

keen sand. Forest of Dean. Sand forming poor rye soil. *Arkell.*

keeper. a. One in charge of opening and closing the taphole of a blast furnace, and who runs iron at cast. *Fay.* b. Eng. An engine keeper; a horse keeper, etc. Also a brakeman. *Fay.*

keeps; keps. Wings, catches, or rests, to hold the cage when it is brought to rest at the top, bottom or at an intermediate landing. Also called shuts; fans; chairs; dogs. *See also* cage shuts. *Fay.*

keeve. See kieves; cauf.

keeving. *See* kieving; tossing.

Keewatin. According to the U.S. Geological Survey, the oldest Precambrian series of rocks in the Lake Superior region. In the future, these will be placed in Early Precambrian. *A.G.I.*

keg. A cylindrical container made of steel or some other substance, which contains 25 pounds of blasting powder or gunpowder. Any small cask or barrel having a capacity of 5 to 10 gallons. *Fay.*

kehoeite. A basic hydrous phosphate of aluminum, zinc, etc., $4Al_2O_3.(Zn,Ca)O.5P_2O_5.9H_2O$. Amorphous, massive. From Galena, S. Dak. *English.*

Keil furnace. A gas-fired furnace containing one or more vertical retorts for the distillation of zinc. *Fay.*

Keith process. An electrolytic process for refining lead. The electrolyte is composed of a solution of lead acetate or lead chloride. Impure lead forms the anode plates, which are enclosed in bags of coarse muslin. The cathodes are made of thin metal plates. The deposit obtained is in crystalline form and falls to the bottom of the vessel, which may be made of plate iron or wood. *Fay.*

Kek Mill. Trade name; (1) a pin-disk mill depending for its action on high speed centrifugal force, and (2) a beater mill in which a four-armed beater revolves horizontally at high speed between upper and lower serrated disks. *Dodd.*

keldyshite. Irregular grains, optically biaxial, $(Na,H)_2ZrSi_2O_7$, from the Lovozero massif, Kola peninsula, U.S.S.R. *Hey, M. M., 1964; Fleischer.*

K-electron. One of the innermost pair which surrounds the nucleus of the atom. It spins in the K-orbit, in the K-shell. *Pryor, 3.*

kelf. Derb.; Leic. The vertical height of the face of the undercut at any time during the operation of undercutting. *Fay.*

kell. A variation of kiln. *Fay.*

kellastone. A stucco with crushed finish. *Crispin.*

Kellaways rock. A calcareous sandstone, richly fossiliferous, which forms a basement bed to the Oxford clay, resting directly on the Cornbrash, or separated from it by a variable thickness of clay, the Kellaways clay. *C.T.D.*

keller. Corn. Hard smooth slate on each side of the lode. *Arkell.*

Keller automatic roaster. A six-deck horizontal furnace for calcining sulfide ores. *Fay.*

Keller furnace. A multiple-deck roasting furnace for sulfide ore. It is a modification of the Spence furnace. *Fay.*

kellering. A shop term. *See also* tracer milling. *ASM Gloss.*

kellerite. A mineral, $(Mg,Cu)SO_4.5H_2O$, containing 11.36 percent MgO, 12.46 percent CuO, 38.31 percent H_2O, as bluish-white earthy masses apparently pseudomorphous after chalcanthite, from Copaquire, Chile. *Spencer 19, M.M., 1952.*

Keller System. A method of handling bricks to and from a chamber dryer; the bricks are placed on stillages which are lifted by a finger-car carried into the dryer and set down on ledges projecting from the walls of the drying chamber; when dry the bricks are carried in the same manner to the kiln. The system was patented by Carl Keller of Laggenbeck, Westphalia, Germany, in 1894. Since that date, the firm has introduced additional equipment to advance the degree of mechanization in the heavy clay industry. *See also* finger-car; stillage. *Dodd.*

kellow. Cumb. Black lead or wad. *Arkell.*

kelly. a. The rod attached to the top of the drill column in rotary drilling. It passes through the rotary table and is turned by it, but is free to slide down through it as the borehole deepens. Also called grief stem. *B.S. 3618, 1963, sec. 3.* b. A heavy wall square or hexagonal tube or pipe, 10 to 20 feet long, which works inside the matching center hole in the rotary table on a diamond-drill machine equipped with a rotary table or bushing or on a petroleum-type rotary drill. As the table is rotated, the grief stem turns and drives the drilling string assembly to which it is coupled. Also called grief joint; kelly joint; kelly stem. *Long.* c. A mold overlying clay; surface earth. *Standard, 1964.* d. In brickmaking, to cover with mold or soil. *Standard, 1964.*

Kelly ball test. An on site method for assessing the consistency of freshly mixed concrete in terms of the depth of penetration, under its own weight of 30 pounds, of a metal hemisphere, 6 inches in diameter. *Dodd.*

kelly drive. The mechanism that encircles a kelly and by means of which it is rotated. *Long.*

Kelly filter. An intermittent, movable pressure filter. The leaves are vertical and are set parallel with the axis of the tank. Pulp is introduced into the tank (a boilerlike affair) under pressure and the cake is formed. The head then is unlocked and the leaves run out of the tank chamber, by means of a small track, and the cake is dropped. The carriage and leaves are then run back into the tank and the cycle begun again. *Liddell 2d, p. 391.*

kelly joint. Synonym for kelly. *Long.*

Kelly sedimentation tube. A device for measuring the rate of settling of particles from a suspension, and hence for particle size analysis. To the lower part of a sedimentation vessel, a capillary tube is joined and is bent through 90° so that it is vertical to a level a little above that of the suspension in the sedimentation vessel; above this level the capillary tube is inclined at a small angle to the horizontal. As particles settle in the main vessel the position of the meniscus in the capillary tube moves downward, affording a means of assessing the rate of settling of the particles. This apparatus, designed by W. J. Kelly, has been used for the particle size determination of clays. *Dodd.*

kelly stem. Synonym for kelly. *Long.*

kelp. a. Large seaweeds such as are used in producing the manufactured kelp. *Fay.* b. The ashes of seaweeds, formerly the source of soda as used in glassmaking and soapmaking, now a source of potash, iodine, and char. *Standard, 1964.*

kelve. a. Corn. Fluorspar. *Fay.* b. Ire. A carbonaceous shale. Also called kilve. *Tomkeieff, 1954.*

kelvin. Board of Trade unit of energy (1 kilowatt-hour). Also, Kelvin thermodynamic temperature scale commences at absolute zero (−273°C). *Pryor, 3.*

Kelvin's law. A rule laid down by Lord Kelvin that the optimum size of an electric cable is a function of the cost of electric current. If the combined charges are calculated for any assumed conditions with various diameters, it will be found that a certain size of cable will give the minimum combined charges and this size of cable will therefore be the most economical. Applied to ventilation, the actual size of the most economical shaft is found by balancing the cost of construction or the sinking of shafts of various sizes against the cost of power for the mine fan. *Roberts, I. p. 287.*

Kelvin temperature scale. The absolute temperature scale in which the temperature measure is based on the average kinetic energy per molecule of a perfect gas. The zero of the Kelvin scale is −273.16°C. The temperature scale adopted by the International Bureau of Weights and Measures is that of the constant volume hydrogen gas thermometer. The magnitude of the degree in both these scales is defined as one one-hundredths the difference between the temperature of melting ice and that of boiling water at 760 millimeter pressure. *Handbook of Chemistry & Physics, 45th ed., 1964, p. F–59.*

kelyphite. *See* corona.

kelyphite rim. A name applied by Schrauf to rims of pyroxene, hornblende, and spinel that sometimes surround the garents of peridotites. It is of microscopic application. *Fay.*

kelyphitic. A term applied to the rims or borders consisting of microcrystalline aggregates of pyroxene or amphibole occurring around olivine where it would otherwise be in contact with plagioclase, or around garnet between olivine or other magnesium-rich minerals. *Holmes, 1928.*

Kema plough. A scraper box type of plough for use on longwall faces. *See also* scraper box plough. *Nelson.*

Kemble beds. A local division of the Great Oölite of Gloucester, England, and the adjacent counties. *C.T.D.*

Kemite. Trade name for a ceramic material containing artificial cordierite and a little silicon carbide as grog and carbon to fill pore spaces. *Industrial and Engineering Chemistry, v. 29, May 1937, pp. 541–547.*

kempite. An emerald-green hydrous oxychloride of manganese, $MnCl_2.3MnO_2.3H_2O$. Orthorhombic. Minute, prismatic crystals. From Alum Rock Park, Calif. *English.*

Kennedy. *See* critical velocity. *Seelye, 1.*

kennedyite. A mineral, $Fe_2MgTi_3O_{10}$, isostructural with pseudobrookite, occurring in the Mateke Hills, Southern Rhodesia. *Hey, M.M., 1961.*

kennel. a. Mid. A collier's term for cannel coal. *Fay.* b. Also called channel; little canal; gutter. *Fay.* c. Scot. A hard sandstone often with calcareous cement. Same as kingle. *Arkell.*

kennel coal. a. A coal that can be ignited with a match to burn with a bright flame. It is also known as candle coal, and this latter name is probably the origin of the term cannel coal. *Merriman.* b. Term used by British miners for cannel coal. Also called kennel. *Tomkeieff, 1954.* c. Shrop. A coal seam at Donnington. *Arkell.*

kennelkohle. Ger. Name for cannel coal. *Tomkeieff, 1954.*

kenner. N. of Eng. An expression meaning time to leave off work. *Fay.*

kentallenite. A dark monzonite composed of approximately equal amounts of augite, olivine, orthoclase, and plagioclase, with biotite, apatite, and opaque oxides. *A.G.I.*

Kentish rag. Eng. A provincial term for the hard, gray, arenaceous limestone of the greensand formation, much used for building in Kent and Sussex. *Fay.*

kentledge. Scrap iron, rails, heavy stones, etc., used as loading on a structure (for example, upon the top section in sinking a cylinder caisson), or as a counterbalance for a crane. *C.T.D.*

kentrolite. A dark reddish-brown mineral, $Pb_2Mn'''_2Si_2O_9$, occurring massive or as minute prismatic crystals often in sheaflike forms. *Dana 6d, p. 544; Hey 2d, 1955.*

Kent roller mill. A revolving steel ring with three rolls pressing against its inner face. The rolls are supported on springs, and the rings support the roll, so that there is some freedom of motion. The material to be crushed is held against the ring by centrifugal force. *Liddell 2d, p. 356.*

kentsmithite. A local name for a black vanadium-bearing sandstone from the Paradox Valley, Colo. *See also* vanoxite. *Hess.*

kenyte. A fine-grained igneous rock, occurring as lava flows on Mount Kenya, East Africa, and in the Antarctic; essentially an olivine-bearing phonolite with phenocrysts of anorthoclase. *C.T.D.*

Keokuk limestone. A marine limestone with a rich fauna, notably of crinoids occurring at the top of the Lower Mississippian of the Mississippi Valley. *C.T.D.*

kepel. Corn. Spar or hard stone on each side of the lode. *Arkell.*

kep interlock. A system designed to prevent a shaft conveyance being lowered before all keps are fully withdrawn, and to indicate the position of the keps. *B.S. 3618, 1965, sec. 7.*

keps. a. Steel supports on which the cage rests at the pithead during unloading or loading so that the rail track is always at the proper level. During this period the rope is released from the weight of the cage. The ordinary type of kep gear consists of four steel arms, two for each end of the cage, carried on shafts which are connected to and operated by levers. Normally, the cage must be raised from the kep arms before the latter can be withdrawn to allow the cage to descend the shaft. *See also* Beien kep gear; cage stops. *Nelson.* b. Retractable rests on which the mine cage is supported during its stop at a shaft landing. Also called catches; chairs; keeps; landing chairs; stops. *Pryor, 3.* c. Bearing-up stops for supporting a cage or load at the beginning or end of hoisting in a shaft. *C.T.D.* d. Scot. Shuts. *Fay.*

kep switch. A switch associated with kep interlocks. *B.S. 3618, 1965, Sec. 7.*

kerabitumen. Insoluble, noncoaly organic matter of oil shales, oil source rocks, recent sediments, etc. *Schieferdecker.*

keralite. A variety of the metamorphic rock hornfels, having quartz and biotite as essential minerals. *Holmes, 1928.*

keramics. Same as ceramics. *Fay.*

Keramzit. Trade name used in U.S.S.R. for an expanded clay aggregate. *Dodd.*

kerargyrite. Same as cerargyrite. *Fay.*

keratin. The protein in hair. An extract obtained by the treatment of hair with caustic soda is used, under the name keratin, as a retarder to control the rate of setting of plaster—in making pottery molds for example. *Dodd.*

keratophyre. A fine-grained igneous rock intermediate between porphyries and porphyrites. It is essentially a soda trachyte, containing albite oligoclase or anorthoclase in a cryptocrystalline groundmass. The pyroxenes, when present, are often altered to chlorite or epidote. *C.T.D.*

kerb. In the United Kingdom wall tile industry, the accepted spelling is curb. *See also* curb bend. *Dodd.*

kerf. a. The undercut usually made in the coal to facilitate its fall. *B.C.I.* b. A horizontal cut in a block of coal, as opposed to a shearing which is a vertical cut. *B.C.I.* c. Undercut in a coal seam from 3 to 7 inches thick and entering the face to a depth of up to 4 feet, made by a mechanical cutter. Also called kirve. *Pryor, 3.* d. The undercut made in a coalbed to assist the action of explosives in blasting. *Hudson.* e. The thickness of the wall of the diamond-insert part of the crown of a core bit. *Long.* f. Sometimes incorrectly used as a synonym for nose, as applied to a diamond core bit. *Long.* g. The annular groove cut into a rock formation by a core bit. *Long. See also* kerve. *Fay.* h. The space which was occupied by the material removed during cutting. *ASM Gloss.*

kerf stone. One of the diamonds inset in the kerf of the crown of a diamond bit. Also called face stone. *Long.*

kermesite. A monoclinic, cherry-red mineral, Sb_2S_2O, resulting from the alteration of stibnite. Also called kermes mineral. *Fay.*

kermes mineral. A soft brown-red powder consisting essentially of antimony trisulfide and antimony trioxide and used formerly as an alterative, diaphoretic, and emetic. *Webster 3d.*

kern; kernel. Reference is to some particular section of a member. The kern is that area in the plane of the section through which the line of action of a force must pass if that force is to produce, at all points in the given section, the same kind of normal stress, that is, tension throughout or compression throughout. *Ro.*

kerned. Corn. Said of certain ore hardened by exposure to the sun. *Fay.*

kerned stone. Corn. Sand, driven off the seashore by the winds up into the country, and concreted there. *Arkell.*

kernel. a. Atom which has lost the valence electrons of its outermost shell. *Pryor, 3.* b. *See* kern. *Ro.*

kernel roasting. *See* roasting. *Fay.*

kernite. A natural sodium borate, $Na_2B_4O_7 \cdot 4H_2O$; colorless to white; two good cleavages; luster, vitreous to pearly; Mohs' hardness, 3; specific gravity, 1.95. Found in Kern County, Calif. Used as a major source of borax and boron compounds. *CCD 6d, 1961; English.*

kernon. An old name for Cornwall. *Fay.*

kern stone. Eng. A coarse granular sandstone. *Standard, 1964.*

kerogen. a. A term generally used for organic matter or parts of it in oil shales and similar material. *Schieferdecker.* b. The solid, bituminous mineraloid substance in oil shales which yields oil when the shales undergo destructive distillation. *AGI.*

kerogen shale. Another name for oil shale. *Tomkeieff, 1954.*

keronigritite. Nigritite derived from kerogen. *Tomkeieff, 1954.*

kerosine; kerosene. A flammable hydrocarbon oil that is less volatile than gasoline. Usually obtained from the distillation of petroleum. Used for burning in lamps and heaters or furnaces, as a fuel or a fuel component for jet engines, and as a solvent or a thinner. *Webster 3d.*

kerosine coal. Another name for oil shale. *Tomkeieff, 1954.*

kerosine flotation. As sometimes practiced, it is a combination of bulk oil flotation and froth flotation. By adding large quantities of kerosine to a pulp plus a small amount of frother and agitating vigorously, surfaces of the amenable mineral (coal) are attracted to both the oil and air bubbles, forming heavy flocs. This type of concentrate is more readily dewatered than ordinary froth and therein lies its advantage, plus the fact that coarser particles (6 to 10 mesh) can be handled than in ordinary froth flotation. Also called agglomeration; granulation. *Mitchell, p. 572.*

kerosine shale. a. A term applied to boghead coal in New South Wales. *See also* boghead coal; torbanite. *A.G.I.* b. Substance originally described as a variety of oil shale but later proved to be similar to torbanite. *Tomkeieff, 1954.* c. Speaking broadly, any bituminous shale from which illuminating oil has been or may be obtained. *Fay.*

Kerr constant. *See* Kerr effect. *Dodd.*

Kerr effect; Kerr constant. The birefringence produced in glass, or other isotropic material, by an electric field. The effect was discovered in 1875 by J. Kerr, a British physicist. The absolute Kerr constant has been defined as the birefringence produced by unit potential difference. *Dodd.*

kerrite. A pearly, yellowish-green variety of mica that is closely related to jefferisite. It occurs as fine scales. *Standard, 1964.*

kersantite. a. A very old name of somewhat varying application, but formerly used for rocks that are intermediate between diorites or their corresponding porphyrites and gabbros or diabases. Mica diabase was used as a synonym. *Fay.* b. A mica lamprophyre consisting essentially of biotite and plagioclase feldspar. *C.T.D.*

kerstenite. Described as a sulfur-yellow mineral with 1 distinct cleavage; oxides of selenium, lead, and copper; in small spheres and botryoidal masses; from Friedrichsgluck mine, Germany. *Dana 6d, p. 981.*

kerve. N. of Eng. In coal mining, to cut under. *Zern.*

Kervit Tiles. Trade name derived from the words keramik and vitrum, denoting the mixed nature of the material which is made by casting a ceramic slip containing about 30 percent of ground glass. The slip is poured on to a refractory former that is coated with a separating material, for example, a mixture of bentonite and limestone; the tiles, while on the formers, are fired at 950° to 1,000° C, then trimmed. The process was first used in Italy and introduced into England in 1960. *Dodd.*

kerzinite. A variety of lignite impregnated with hydrated nickel silicate and mined as a nickel ore in the Ural Mountains, U.S.S.R. *Tomkeieff, 1954.*

Kessler abrasion tester. Apparatus designed by the National Bureau of Standards in the United States for the determination of the abrasion resistance of floor tiles and quarries. A notched steel wheel is mounted on an overhanging frame so that a definite and constant weight bears on the test piece as the wheel revolves; No. 60 artificial corundum is fed at a specified rate between the wheel and the test piece, which is mounted in an inclined position. *Dodd.*

kesterite. A mineral, (Cu,Sn,Zn)S, containing 30.56 percent copper, 25.25 percent tin, 11.16 percent zinc, and 23.40 percent sulfur. In quartz sulfide ore from Kester, Magadan, Yakutia, northeast Siberia, U.S.S.R. Named from locality. *Spencer 21, M.M., 1958.*

ketches. S. Wales. Same as backstay. *Fay.*

kettle. a. Scot. A cylindrical or barrel-shaped iron or wooden vessel used to raise men or materials in shaft sinking. *Fay.* b. *See* kettle hole. *Fay.* c. Hoppit. *Mason.* d. A depression in the ground surface formed by the melting of a block of ice buried or partially buried by glacial drift, either outwash or till. *Leet.* e. An open-top vessel used in carrying out metallurgical operations on low melting-point metals; for example, in drossing and desilverizing lead. *C.T.D.*

kettleback. Same as horseback. *Fay.*

kettle bottom. a. A smooth, rounded piece of rock, cylindrical in shape which may drop out of the roof of a mine without warning and sometimes causing serious injuries to miners. The surface usually has a scratched, striated, or slickensided appearance and frequently has a slick, soapy, unctuous feel. The origin of this feature is thought to be the remains of the stump of a tree which has been replaced by sediments so that the original form has been rather well preserved. The terms bell, pot, camelback, and tortoise are also applied. *Kentucky, p. 25.* b. Same as horseback. *Fay.* c. Eng. *See* caldron bottom, b. *SMRB, Paper No. 61.*

kettled. In geology, hollowed out like a kettle, as rock surfaces by glacial scouring. *Standard, 1964.*

kettle dross. Skimmings resulting from the desilverization of lead bullion. It consists principally of lead oxides mixed with metallic lead. *Fay.*

kettle hole. A steep-sided hollow without surface drainage, especially in a deposit of glacial drift and often containing a lake or swamp. Synonym for pothole. *Webster 3d.*

kettleman. In ore dressing, smelting, and refining: (1) one who refines lead in a series of oil-fired kettles, and (2) one who removes silver and copper from black mud in a gas-fired kettle, preparatory to the separation of gold. *D.O.T. Supp.*

kettleman, gold. In ore dressing, smelting, and refining, one who recovers gold from black mud remaining after the extraction of silver and copper by kettleman. *D.O.T. Supp.*

kettle moraine. A terminal moraine, the surface of which is marked by many kettle holes. *Webster 2d.*

kettle operator. In ore dressing, smelting, and refining, one who melts and fumes antimony in oil-fired kettles to make antimony oxide. *D.O.T. Supp.*

kettnerite. A mineral, $CaF(BiO)CO_3$; tetragonal, brown to yellow crystals with bismuth, fluorite, etc., in pegmatite from Krupka, Bohemia, Czechoslovakia. *Spencer 21, M.M., 1958.* The mineral is closely related to bismutite and beyerite. *American Mineralogist, v. 43, No. 3-4, March-April 1958, p. 385.*

ketton stone. A limestone resembling oölite, found at Ketton, England. *Standard, 1964.*

Keuper. Of, or relating to, the upper division of the German Trias. *Webster, 3d.*

Keuper marl. A Triassic clay much used for brickmaking. This type of brick clay usually contains a considerable amount of lime and iron oxide; magnesium carbonate and gypsum may also be present in significant quantities. Keuper marl is of variegated color, hence the name, from the German köper (spotted). *Dodd.*

kev. Abbreviation for thousand electron volts. *BuMin Style Guide, p. 62.*

kevel. Derb. A variation of kevil. *Fay.*

kevell. Eng. Calc spar, Derbyshire lead mines. The same as kebble. *Arkell.*

kevil. a. Derb. A veinstone, consisting of a mixture of calcium carbonate and other minerals. *Fay.* b. N. of Eng. The amount of coal sent out by the various miners during a certain period. *Fay.*

Kewanee union. A patented pipe union having one pipe end of brass and the other of malleable iron, with a ring or nut of malleable iron, in which the arrangement and finish of the several parts is such, as to provide a noncorrosive ball-and-socket joint at the junction of the pipe ends, and a noncorrosive connection between the ring and brass pipe end. *Strock, 3.*

Kewatinian. a. Synonym for Archean. *A.G.I. Supp.* b. Precambrian system older than

Tamiskamian. *A.G.I. Supp.*

Keweenawan. Younger of two Precambrian systems constituting the Proterozoic restricted. *A.G.I. Supp.*

Kew-type barometer; fixed-cistern barometer. A mercury-column-type barometer with a fixed cistern. As it has no mercury level adjusting device the cistern may be cast in one piece with the result that it is a more robust instrument than the Fortin type. It can be used to measure pressures other than atmospheric because the cistern is easily connected via a nozzle and valve to a vacuum system. This means that the Kew type is a more suitable instrument to use as the standard against which various aneroid barometers may be calibrated. *Roberts, I. pp. 19-20.*

key. a. An iron rectangle of suitable size and taper to fill the keyways of a shaft and pulley so as to lock both together. *Long.* b. The pieces of core causing a block in a core barrel, the removal of which allows the rest of the core in the core barrel to slide out. *Long.* c. Eng. A kind of wrench used for screwing and unscrewing drill rods. Also used to support the rods by resting on top of the casing and allowing the rods to hang by the enlarged joint coming in contact with key. *Fay.* d. A hard steel strip inserted in matching grooves (keyways) in a shaft and a hub to make them turn as a unit. *Nichols.* e. A wedge between two feathers to break a stone. *Webster, 3d.* f. A keystone in an arch. *Webster, 3d.* g. A wedge-shaped strip of iron or steel used for preventing wheels from slipping around upon their axles. Keys are of various kinds and shapes. *Crispin.* h. Of an arch, the top closing voussoir or ring stone. The key may also be a closing section of brick masonry. *Stauffer.* i. In furnace construction, the uppermost or the closing brick of a curved arch. *HW.* j. A rectangular depression, in one or both flat sides of a brick, sometimes called frog or panel. *Fay.*

key bed. a. A bed with sufficiently distinctive characteristics to make it easily identifiable in correlation. *A.G.I.* b. A bed, the top or bottom of which is used as a datum in making structure contour maps. *See also* marker bed, a and b. *A.G.I.*

key blocks. The first blocks which are removed in opening up a new quarry floor. *Fay.*

key brick. A brick with opposite side faces inclined towards each other so that it fits the apex of an arch. In furnace construction such bricks are also sometimes referred to as bullheads, cupola bricks, or crown bricks. *Dodd.*

key cut. a. In stripping operations, the section excavated adjacent to the new highwall in order to form a suitable batter. This cut is normally taken with the dragline centered above the highwall to be formed. *Austin.* b. In alluvial diamond mining, consists of excavating a cut or paddock in the overburden, 12 to 15 feet wide, for the full length of the area, thus exposing the gravel. All overburden is thrown to one side of the cut and the walls are kept vertical. *Griffith, S. V., p. 133.*

keyed structure. A term sometimes applied to the sutured mosaic of quartz grains closely interlocking in some metamorphic quartzites. *C.T.D.*

keyhole notch. *See* Charpy test. *Ham.*

keyhole slot. A slot enlarged at one end to allow entrance of a chain or bolt that can then be held by the narrow end. *Nichols.*

keyhole specimen. A type of specimen containing a hole-and-slot notch, shaped like a keyhole, usually used in impact bend tests. *See also* Charpy and Izod tests. *ASM Gloss.*

keying interval. Elapsed time between successive pings of an echo-ranging sonar. *Hy.*

key rock. *See* marker, a. *Long.*

keyseat. a. The pocket in the driving element to retain the key. *ASM Gloss.* b. *See* keyway. *Fay.*

Keyseran. Upper Upper Silurian. *A.G.I. Supp.*

keystone. a. A symmetrically tapered piece at the center or crown of an arch. *Bureau of Mines Staff.* b. A filling-in block of cast iron used in some lead smelting furnaces. *Webster 2d.*

keystone faulting. Development of a graben along an uparched zone or anticline. *A.G.I. Supp.*

keystoneite. Blue chrysocolla or chalcedony colored by copper silicate. *Shipley.*

keyway. a. The pocket in the driven element to provide a driving surface for the key. *ASM Gloss.* b. A groove or channel for a key, as in a shaft or in the hub of a pulley. Also called keyseat. *Webster, 2d.*

k-factor. The thermal conductivity of a material, expressed in standard units. *HW.*

K-factor. The strength constant in the formula for radial crushing strength of a plain sleeve specimen of sintered metal. *See also* radial crushing strength. *ASTM B243-65.*

K-feldspar. Potassium-bearing feldspar, orthoclase, or microcline. *A.G.I. Supp.*

kg a. Abbreviation for kilogram. *BuMin Style Guide, p. 60.* b. Abbreviation for keg. *Zimmerman, p. 60.*

kgps Abbreviation for kilograms per second. *BuMin Style Guide, p. 60.*

kg sec^{-1} Abbreviation for kilograms per second. *BuMin Style Guide, p. 60.*

khagiarite. A black vitreous variety of pantellerite containing phenocrysts of soda microcline, diopside, aegirine augite, and cossyrite in a groundmass of brown glass having a flow texture due to the arrangement of microlites or crystallites. *Holmes, 1928.*

Khari salt. A native mineral salt of India, predominantly sodium chloride with large amounts of sodium sulfate, the composition varying greatly with locality where obtained. Synthetic Khari salt has 40 percent anhydrous sodium sulfate. *Kaufmann.*

khibinite. Chibinite. *A.G.I. Supp.*

khinganite. Synonym for kesterite. Named from the locality. *Hey, MM, 1964.*

khlopinite. Similar to euxenite, but containing less TiO_2 than the ordinary variety. Also spelled chlopinite; hlopinite. *Crosby, p. 19.*

khondalite. A dark, reddish-gray metamorphic rock composed of almandine, sillimanite, and quartz with accessory orthoclase, rutile, apatite, and iron oxide. From Ceylon; India. *Hess.*

khondalite series. A series of metamorphic rocks consisting of garnet-quartz sillimanite rocks with garnetiferous quartzites, graphite schists, and calciphyres. *Holmes, 1928.*

Kiamitia shales. *See* Kiowa shales. *C.T.D.*

kibbal. *See* kibble.

kibble. a. Steel bucket used during shaft sinking. *Pryor, 3.* b. To carry in a hoisting bucket, as ore. *Standard, 1964.* c. Hoppit. *Mason.* d. Corn.; Wales. An iron bucket for raising ore. Also called kibbal. *Fay.*

kibble filler. In bituminous coal mining, one who loads kibbles (iron buckets) with coal or rock, used principally in shaft sinking. A colloquialism of English origin. *D.O.T. 1.*

kibbler. See putter. *Nelson.*

kibble rope; kibble chain. Eng. A rope or chain for hoisting a kibble or bucket. *Standard, 1964.*

kibbler rolls. Toothed steel rolls of a type frequently used in the crushing and grinding of brick clays; from an old word kibble, to grind. *Dodd.*

kick. a. Can. Assay with metal values. Also, a geophysical indication of ore. *Hoffman.* b. A quick snap of the drill stem caused by the core breaking in a blocked core barrel or sudden release of a momentary bind. *Long.* c. A small sidewise displacement or offset in a borehole caused by the sidewise deviation of a bit when entering a hard, tilted rock stratum underlying a softer stratum. *Long.* d. In brickmaking, a wooden block on the upper face of a stockboard to make a key or depression in the bottom of a slop-molded brick. *Standard, 1964.* e. A die for molding brick. *Standard, 1964.*

kick back. a. Ark. To break the coal on both sides of the auger hole which contains the powder, usually along a joint in the coal. *Fay.* b. A track arrangement for reversing the direction of travel of cars moving by gravity. *Fay.*

kicker. a. Ground left in first cutting a vein, for support of its sides. *Fay.* b. Scot. The reversing gear of some direct-acting steam and hydraulic pumps. *Fay.* c. Eng. A liberating catch made in the form of a bell-crank lever rocking on a horizontal axis. *Fay.* d. Synonym for gage stone; also, a gage stone handset in the outside surface or wall of the metal shank of a diamond bit. *Long.* e. Can. Outboard motor. *Hoffman.*

kicker stone. See gage stone; kicker, d. *Long.*

kicking pieces. Short struts to prevent a sill or other member from being pushed out of place. *Stauffer.*

kickoff point. The place in a borehole where the first intentional deviation starts. Sometimes abbreviated KOP. *Long.*

Kick's law. The amount of energy required to crush a given quantity of material to a specified fraction of its original size is the same no matter what the original size. *CCD 6d, 1961.*

kickup. a. Aust. An end tippler. *Fay.* b. N. of Eng. *See* tipper, b and c. *Fay.*

kick wheel. A potter's wheel impelled by kicking with the foot. *ACSG, 1963.*

kid. A faggot of brushwood used on occasions to form a groin. *See also* fascines. Ham.

Kidlaw basalt. An analcite-rich igneous rock characterized by numerous microphenocrysts of olivine and augite in a groundmass notable for the relative abundance of orthoclase and biotite and the large poikilitic crystals of analcite. *Holmes, 1928.*

kidney. See Potter's horn. *Dodd.*

kidney iron ore. A reinform, kidney-shaped structural variety of an iron ore mineral aggregate, generally hematite. The internal structure of the kidney-shaped nodules is usually concentric or radiating. *Bureau of Mines Staff.*

kidneys. a. Boulderlike nodules of phosphate rock, separate or connected. *Bureau of Mines Staff.* b. A term applied by miners to a mineral zone which narrows down until very thin and then suddenly expands and again suddenly contracts. *Fay.*

kidney stone. a. A nodule of iron stone common in the Oxford clay (Middle Oölite) of England. b. A tough, compact, fine-grained greenish or bluish amphibole; same as nephrite. *Standard, 1964.* c. A kidney-shaped pebble. *Webster, 3d.*

kidney sulfur. *See* lenses. *Mitchell, p. 67.*

kies. A general term for the sulfide ores, now adopted into English from the original German. *Fay.*

kieselguhr. *See* diatomite. *BuMines Bull. 630, 1965, p. 314.*

kieserite. A natural magnesium sulfate, $MgSO_4.H_2O$; occuring in enormous quantities in the Stassfurt salt beds, Germany. Found also in Austria and India. *See also* epsomite; magnesium sulfate. *CCD 6d, 1961; A.G.I.*

kieves. Strong tubs with sides flaring upward, in which separation is effected by mechanical agitation in a deep mass of thick pulp. Stirring paddles are used for preliminary mixing, and hammers or heavy striking bars for the final separation. They are used to finish the concentration of fine products that are nearly rich enough to ship. *Liddell 2d, p. 388. See also* dolly tub.

kieving. The concentration of fine ore or slime in a kieve. *Hess.*

kilchoanite. A mineral, $Ca_3Si_2O_7$, a polymorph of rankinite, replacing rankinite at Kilchoan, Ardnamurchan, Scotland. Named from locality. *Hey, M.M., 1961.*

kiles. Eng. Leather strings. *Fay.*

kilkenny coal. Anthracite. *Fay.*

kill. a. As applied to an oil or gas well means to shut off the flow of oil or gas temporarily or to destroy the well entirely so that neither oil nor gas can flow. *Ricketts, II.* b. To mix atmospheric air with firedamp or other gases so as to make them harmless. *Fay.* c. To bring within control a gas or oil well that has blown wild, that is, become unmanageable. *Hess.* d. Creek. *Hess.* e. Cut off electric current from a circuit. *Nichols.* f. Stop an engine. *Nichols.* g. To produce deadmelting of; said of steel. *Hess.*

Killarneyan orogeny. Post-Proterozoic diastrophism. *A.G.I. Supp.*

killas. Corn. a. Miner's term for the slates or schists that form the country rock of the Cornish tin veins. *Fay.* b. Term used in the china-clay mines for the altered schistose or hornfelsic rocks in contact with the granite and often considerably modified by emanations from the latter. *Dodd.*

killed spirits of salts. A solution of zinc chloride, $ZnCl_2$, made by dissolving zinc in hydrochloric acid, and used in soldering. *Osborne.*

killed steel. Steel deoxidized with a strong deoxidizing agent, such as silicon or aluminum, in order to reduce the oxygen content to such a level that no reaction occurs between carbon and oxygen during solidification. *ASM Gloss.*

killing. a. Allowing the molten steel to remain in the crucible for about forty-five minutes after steeling for the escape of the gases. *Mersereau, 4th, p. 459.* b. In metallurgy, especially in foundry terminology, a term for deoxidation. *Gaynor.*

killman. Scot. A kilnman. *Standard, 1964.*

killogie. Scot. The space before the fire in a kiln. *Standard, 1964.*

killow. Eng. A deep blue or blackish earth. *Standard, 1964.*

kiln. a. A large furnace used for baking, drying, or burning firebrick or refractories, or for calcining ores or other substances. *ASM Gloss.* b. A furnace or oven which is usually made from refractory brick, used to dry and fire various types of ceramic ware. *Bureau of Mines Staff. See also* biscuit oven; glost oven; enamel kiln.

kiln block. Rotary kiln block. *Bureau of Mines Staff.*

kiln burner. A workman who is responsible for firing kilns to produce ceramic products. Type of product produced is often attached to the term as, brick kiln burner, tile burner, pipe burner, etc. Also called kiln fireman; kiln operator; baker; kiln tender; kiln firer, etc. *Bureau of Mines Staff.*

kiln-burner helper. One who assists kiln burner in firing kiln, supplying coal and wood to fireboxes, and cleaning ashes from ashpits. *D.O.T. 1.*

kiln car. A movable carriage with a refractory top on which ware is placed for firing in a tunnel kiln. *ACSG, 1963.*

kiln-car unloader. A workman who removes fired ceramic ware from kiln cars. *Bureau of Mines Staff.*

kiln cleaner. One who prepares kilns for burning. *D.O.T. 1.*

kiln drawer. a. One who picks up burned brick, pipe, or tile arranged in stacks in kiln and hands products to other worker for removal. Also called drawer; pickup man. *D.O.T. 1.* b. *See* bisque-kiln drawer. *D.O.T. 1.*

kiln-dried. Term applied to staves and heading which have been artificially dried in a kiln. *Bennett 2d, 1962.*

kiln-dry. To dry in a kiln. *Webster 3d.*

kilneye. An opening for removal of lime from a vertical lime kiln. *Bureau of Mines Staff.*

kiln furniture. General term for the pieces of refractory material used for the support of pottery ware during kiln firing; since the use of clean fuels and electricity has made possible the open setting of ware, a multiplicity of refractory shapes have been introduced for this purpose. *See also* crank; dot; pin; post; saddle; thimble. *Dodd.*

kiln loader. *See* setter. *D.O.T. 1.*

kilnman. a. A man who tends a kiln. *Standard, 1964.* b. *See* pipe passer. *D.O.T. 1.*

kiln marks. Slight deformations of a brick resulting from the slumping of the brick under load during firing. *A.I.S.I. No. 24.*

kiln operator. One who operates a kiln. *Bureau of Mines Staff.*

kiln placer. A workman who places clayware in kiln for drying or firing. Also called kiln setter; sagger filler; kiln loader; kiln stacker. *Bureau of Mines Staff.*

kiln run. Brick, or tile from one kiln which have not been sorted or graded for size or color variation. *ACSG, 1963.*

kiln-run brick. *See* stock brick. *Fay.*

kilns. For some types of kilns, see entries under chamber, circular, clamp, downdraft, dry, Hoffmann, muffle, periodic, rectangular, rotary, round, scove, and tunnel kiln. *ACSG, 1963.*

kiln scum. *See* scum. *Dodd.*

kiln setter. *See* kiln placer; setter.

kiln stacker. *See* setter.

kiln tender. *See* kiln burner; oven tender.

kiln wash. A coating, usually composed of refractory clay and silica, applied to the surface of kilns and kiln furniture to protect them from volatile glazes or glaze drops from the ware being fired. *ACSG, 1963.*

kiln white. A white scum that has formed on the (brick) surface during firing as the result of drier scum and kiln atmosphere. *See also* drier white. *ACSG, 1963.*

kilo-. One thousand units. The kilodyne is 1,000 dynes; K-gram is 2.2046 pounds avoirdupois; k-meter is 1,093.6 yards; K-watt is 1.341 horsepower. *Pryor, 3.*

kilo. A short form of kilogram, or 1,000 grams. Abbreviation, kg. *See also* kilogram. *Webster 3d.*

kilocalorie. A large calorie. Abbreviation, kcal. *Webster 3d.*

kilocurie. One thousand curies. Abbreviation, kc. *NRC-ASA N1.1–1957.*

kilocusec. A unit of volumetric rate of air flow, expressed in thousands of cubic feet per second. *B.S. 3618, 1963, sec. 2.*

kilocycle. One thousand cycles. Abbreviation, kc. *Crispin.*

kilo electron volt. One thousand electron volts. Abbreviation, kev. *NRC-ASA N1.1–1957.*

kilogram. One thousand grams; equals 2.204 pounds. Abbreviation, kg. *Crispin.*

kilometer. A length of 1,000 meters; equals 3,280.8 feet or 0.621 mile. The chief unit for long distances in the metric system. Abbreviation, km. *Standard, 1964.*

kiloton. A unit for measuring the energy of a nuclear explosion. A 1-kiloton explosion releases energy equal to that in the explosion of 1,000 tons of TNT. Abbreviation, kton. *L&L.*

kilovolt-ampere. One thousand volt-amperes. Abbreviation, kva. *Crispin.*

kilowatt. A unit of power that equals 1,000 watts or about 1.34 horsepower. Abbreviation, kw. *Webster 3d.*

kilowatt-hour. A unit of work or energy equal to that expended in 1 hour at a steady rate of 1 kilowatt or to 3.6×10^6 joules. Abbreviation, kwhr. *Webster 3d.*

kilve. *See* kelve, b. *Tomkeieff, 1954.*

Kimberley joint. Originally a pipe joint of English manufacture for use in South Africa. It consists of an outer wrought sleeve or ring belled out on the ends to form a suitable lead recess for calking, the pipes butting in the center of the sleeve. *Fay.*

Kimberley method. *See* combined top slicing and shrinkage stoping. *Fay.*

Kimberley reefs. S. Afr. Gold-bearing reefs above the Main reef and Bird reef groups. Also called battery reefs. *Beerman.*

kimberlite. A highly serpentinized peridotite, usually a breccia because of inclusion of surrounding rocks it has penetrated. It is the principal original environment of diamond, but only a small percentage of the known kimberlite occurrences are diamondiferous. It occurs in vertical pipes, dikes, and sills. Alteration of the kimberlite from the surface downward has produced material known as yellow ground and blue ground. *I.C. 8200, 1964, p. 149.* Also called blue earth or blue ground by miners. *Fay.*

Kim coal. *See* Kimmeridge shale. *Fay.*

Kimeridge clay. *See* Kimmeridge clay. *C.T.D.*

Kimeridge coal. *See* Kimmeridge coal. *C.T.D.*

Kimeridgian. *See* Kimmeridgian. *C.T.D.*

Kimmerian orogeny. Series of diastrophic movements beginning perhaps in Late Triassic and continuing to early Cretaceous. *A.G.I. Supp.*

Kimmeridge clay. A thick bed of black marine clay, constituting a member of the Oölite (Jurassic) group. It stretches across England from the Dorset Coast to the Yorkshire Coast. *C.T.D.*

Kimmeridge coal. A bituminous shale or impure coal which occurs in the Kimmeridge clays of England. *Fay.*

Kimmeridge shale. Extensive deposits of bluish-gray slaty clay, containing more or less volatile matter, and interstratified with thin beds of highly bituminous shale, occurring in Dorsetshire, England. This clay, which is a member of the Upper Oölite, attains in places a thickness of as much as 600 feet. Locally, it is called Kim coal. *Fay.*

Kimmeridgian. In geology, one of the stages of the Upper Oölite series of the Jurassic system of strata in Great Britain. *Fay.*

Kim shale. *See* Kim coal. *Tomkeieff, 1954.*

kimzeyite. A zirconiferous garnet, with 20 percent ZrO_2, from the Kimzey calcite quarry, Magnet Cove, Ark. Isotropic; light brown in thin section. *Hey, M.M., 1961.*

kind. Eng. Generally signifies tender, soft, or easy to work; said of certain ores. *Fay.*

Kind-Chaudron process. A method of sinking a deep shaft of large diameter in which a pilot bore of smaller diameter is first cut, after which the cut is enlarged to the full diameter, the debris falling into the pilot bore. When water is encountered a lining with a moss box at the bottom is forced into place. *Standard, 1964.*

kind clift. In South Wales, generally a dark shale, somewhat resembling slate; a fissile rock. *Nelson.*

kindebal; kinderball. Local Galician name for a soft, black variety of ozokerite. *Tomkeieff, 1954.*

kinderball. *See* kindebal. *Tomkeieff, 1954.*

Kinderhookian. Lower Mississippian, may be transitional to Devonian. *A.G.I. Supp.*

Kinderscout grit. A coarse sandstone, one of the Millstone grits in the Namurian stage of the Upper Carboniferous rocks of Derbyshire, England. *C.T.D.*

kindling temperature; kindling point; ignition temperature; igniton point. The temperature at which a substance ignites. *Crispin.*

kindly. A miner's term for a rock which is considered congenial or likely for carrying ore. *Fay.*

kindly ground. Eng. Those rocks in which lodes become productive of mineral of value. *Fay.*

kindred. A group of igneous rocks which show consanguineous chemical and mineral characters, and which appear to be genetically related. *Compare* series; suite; tribe; clan; branch. *See also* consanguinity. *A.G.I.*

Kind's plug. A device to withdraw steel casing from a borehole on abandonment of the hole. It consists of an oval piece of hard wood, slightly less in diameter than the inside of the casing. After the plug has been lowered, at the end of the rods, to the depth required, a few handfuls of grit are thrown into the borehole. The grit is trapped at the plug and the frictional grip is often sufficient to extract the casing. *See also* spring dart. *Nelson.*

kinematic viscosity. The absolute viscosity divided by the density at the temperature of the viscosity measurement. The metric units of kinematic viscosity are the stoke and centistoke, which correspond to the poise and centipose of absolute viscosity. *API Glossary.*

kinetic. Moving; pertaining to motion. *Mason.*

kinetic energy. The form of mechanical energy a body possesses by virtue of its velocity. The kinetic energy of a body, or the energy of motion, is the work done by it, or against it, in coming to rest. Water flowing through pipes or air flowing through a mine roadway possesses kinetic energy. *Morris and Cooper, p. 146.*

kinetic head. The energy of flowing water which is a function of its velocity. *Bureau of Mines Staff.*

kinetic metamorphism. The deformation of rocks without accompanying chemical reconstitution. Also called mechanical metamorphism. *A.G.I.*

kinetic theory. It assumes that molecules of all gases are moving about rapidly, like a swarm of midges; their movements being limited only by the walls of the vessel containing them. The continuous bombardment of the molecules against the surfaces of the vessel give rise to gas pressure. The effect of heating the gas results in an increased speed of the molecules and consequently an increased bombardment and pressure. *Cooper.*

King. Nongelatinous permissible explosive; used in coal mining. *Bennett 2d, 1962.*

kingbolt. a. The bolt with which a cage is attached to the hoisting cable. It supports the suspended cage. *Bureau of Mines Staff.* b. A large bolt that holds the upper end of the tripod legs together and from which the sheave-wheel clevis is suspended. *Long.*

king brick. Special, hollow, cylindrical, fire clay brick, between the bottom fountain brick and the first lateral brick in bottom-pour ingot assembly. *See also* bottom-pour ingot assembly. *Bureau of Mines Staff.*

king closer. A brick cut diagonally to have one 2 inch end and one full width end. *ACSG, 1963.*

King detaching hook. A safety device for a hoisting cage. *Bureau of Mines Staff.*

kingite. Hydrous aluminum phosphate, $Al_2O_3.Al(OH)_3.P_2O_5.9H_2O$, as white nodules in phosphate deposits in South Australia. *Spencer 21, M.M., 1958.*

kingle. Barren blaes, or ribs of hard calcareous or quartzose material, destitute of bituminous matter, occurring in the Scottish oil shales. *Fay.*

king pile. In a wide excavation where strutting is required, this is a long pile driven at the strut spacing in the center of the trench before excavation is started. *Ham.*

kingpin; king pin. A vertical swivel or hinge pin, usually supported at both top and bottom. *Nichols.*

king-post. a. A vertical member of a stamp battery frame which carries the camshaft. *C.T.D.* b. Eng. An apparatus for strengthening a beam. *Fay.*

king pot. The large central pot or crucible in a brass melting furnace. *Fay.*

king screen. A drum-type screen in which the pulp to be screened is delivered on the outside, the undersize passing through the screen and discharging through the open end. *Liddell 2d, p. 391.*

king tower. *See* crane tower. *Ham.*

kink. a. Loops in wire rope caused by careless handling and then pulled through by a tension on the wire rope until the diameter of the loop is quite small, resulting in permanently deformed and damaged wires at the kink. Wire rope that has been kinked will not give satisfactory service. *ASA M11.1-1960, p. 21.* b. Scot. A twist in a rope; a doubling and interlocking of several links in a chain. *Fay.* c. A sharp angular deflection in a borehole. *Long.* d. A dog leg in a wire line or cable. *Long.* e. A deflection in a vein or lode which does not interrupt the continuity of it. *Fay.*

kink bands. Megascopic deformation zones that form with the accompaniment of translation gliding within a mineral crystal such as is visible in mica, kyanite, and calcite. *Bureau of Mines Staff.*

kinkhead mill. A pan mill with a convex, conical bottom on which a muller, having two surfaces of different inclinations, grinds. The machine acts on the gyratory principal as regards to crushing between the surfaces. *Liddell 2d, pp. 356–357.*

kinne diabase. A type of olivine diabase containing intersertal chloritic matter and secondary quartz. *Holmes, 1928.*

kinoully. Corn. *See* kivully. *Fay.*

kinradite. A local trade name for jasper containing spherulites of colorless or nearly colorless quartz. Much of it is the same as orbicular jasper. From California and Oregon. *Shipley.*

kinsh. A crowbar. *C.T.D.*

kinzigite. A coarse-grained metamorphic rock consisting of garnet, biotite, quartz, feldspar, mica, cordierite, or sillimanite. *A.G.I.*

Kiowa shales. A shore facies of the lower Washita series lying above the Cheyenne sandstone in Kansas. Also known as Kiamitia shales. *C.T.D.*

kip. a. N. of Eng. A level or gently sloping roadway, at the extremity of an engine plane, upon which the full cars stand ready to be sent up the shaft. The tubs, or cars, usually go to the shaft by gravity. *Fay.* b. A load of 1,000 pounds. *ASM Gloss.*

kip ft Abbreviation for thousand foot-pounds. *BuMin Style Guide, p. 62.*

kippel. Dev. Schorl rock, Kelly iron mine, Newton Abbot. Also called cockle. *Arkell.*

Kipp's apparatus. Apparatus for producing a gas by the action of a liquid on a solid, consisting of three globes, the top one having a funnel-shaped extension into the bottom globe and storing the liquid, the middle globe containing the solid. *Bennett 2d, 1962.*

kir. A Russian name given to petroleum solidified on exposure, and having the appearance of asphalt. *Fay.*

Kirchhoff's laws of electric circuits. a. In an electric network, the algebraic sum of the currents in all the branches that meet at any point is 0. *Webster 3d.* b. In any closed circuit the algebraic sum of the products of the current and the resistance in each conductor in the circuit is equal to the electromotive force in the circuit. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F–47.*

Kirchhoff's laws of radiation. The relation between the powers of emission and the powers of absorption for rays of the same wavelength is constant for all bodies at the same temperature. (1) A substance when excited by some means or other possesses a certain power of emission; it tends to emit definite rays, the wavelengths of which depend upon the nature of the substance and upon the temperature. (2) The substance exerts a definite absorptive power, which is a maximum for the rays it tends to emit. (3) At a given temperature the ratio between the emissive and the absorptive power for a given wavelength is the same for all bodies, and is equal to the emissive power of a perfectly black body.

Handbook of Chemistry and Physics, 45th ed., 1964, p. F-47.

Kirkby Moor flags. The highest beds in the rocks assigned to the Silurian system in Westmoreland, England, consisting of about 2,000 feet of greenish and gray sandstones and flags. *C.T.D.*

Kirklington sandstone. A local sandstone belonging to the Keuper series of rocks, in the Triassic system of Cumberland, England. *C.T.D.*

Kirkup table. A machine for the dry cleaning of coal. The raw coal is fed on to a perforated plate inclined at 12½° to 15° to the horizontal. A pulsating air current is applied to the underside of the inclined plate, which stratifies the material, the coal forming the upper layer with the dirt below, which are then passed into separate compartments. The Kirkup table gives a three-product separation, that is, coal, middling, and dirt. *See also* pneumatic jig; pneumatic table; S.J. table. *Nelson.*

kirn. Scot. To bore with a hand jumper or kirner. *Fay.*

kirner. Scot. A hand jumper (drill). *Fay.*

kirovite. A variety of melanterite. *Spencer 15, M.M., 1940.*

Kirûna method. A borehole-inclination survey method whereby the electrolytic deposition of copper from a solution is used to make a mark on the inside of a metal container. *Compare* acid-dip survey. *Long.*

kirve. *N. of Eng.* To undercut. *See* kerve; kerf. *Fay.*

kirving. a. Newc. The cutting made at the bottom of the coal by the miner. *See* holing, b and c. *Fay.* b. Eng. Undercutting the coal horizontally usually by hand. Also called laying-in; ligging-in; holing. *SMRB, Paper No. 61.*

kirvings. N. of Eng. Small coal, fragments, or cuttings lying in the undercut made by a cutting machine jib. *Trist.*

kirwanite. a. A variety of anthracite with a metallic luster. *Tomkeieff, 1954.* b. Probably an impure altered amphibole. *Dana 6d, p. 398.*

kish. Free graphite that forms and floats out of molten hypereutectic cast iron as it cools. *ASM Gloss.*

kishly. Eng. Hard, dry vein matter, poor in ore; Yorkshire lead mines. *Arkell.*

kist. a. Eng. The wooden box or chest in which the deputy keeps his tools at the flat or inspection station; the station is said to be at the kist. *SMRB, Paper No. 61.* b. N. of Eng. The meeting place in a district where workmen assemble. (Strictly the box in which the deputy keeps his papers, etc.) *Trist.*

kisye. A Malayan term for rattan sieves used in gold washing. *Fay.*

kit. a. A wooden vessel. *Fay.* b. Any workman's necessary outfit, as tools, etc. *Zern.*

kitchen. *See* laboratory. *Fay.*

kitchens. Eng. Coal prepared and sold expressly for use in ranges, stoves, etc. *Fay.*

kitchenware enamel. A porcelain enamel adapted for application to kitchen utensils. *Hansen.*

kitran. *See* katran. *Tomkeieff, 1954.*

kitting. Eng. Thieving in combination. There are different modes of cheating the adventurers (owners) by miners mixing their ores, and sometimes by stealing from heaps not their own and carrying to their own heap. All these thefts are called "kitting." *Fay.*

kittle. Scot. Dangerous; risky. *Fay.*

kitty. N. of Eng. A length of about 4 inches of straw filled with gunpowder by which flame is communicated to the blasting charge. *Fay.*

kive. Eng.; Scot. Same as keeve. *Standard, 1964.*

kiver. Eng. A shallow keeve. *Standard, 1964.*

kivi-hiili. Finnish name for stone coal. *Tomkeieff, 1954.*

kivite. An extrusive rock consisting essentially of titanaugite, calcic plagioclase, and leucite, with minor opaque oxides, biotite, olivine, and apatite. A dark variety of leucite basanite. *A.G.I.*

kivully. Corn. Loose ground. Also spelled kinoully. *Fay.*

kl Abbreviation for kiloliter. *BuMin Style Guide, p. 60.*

kladnoite. An organic compound, $C_6H_4(CO)_2$-NH (phthalimide) as monoclinic crystals formed in burning waste heaps in the Kladno coal basin, Kladno, Bohemia, Czechoslovakia. *Tomkeieff, 1954.*

klaprothine. Same as lazulite. *Shipley.*

klaprothite. A discredited mineral since it is a mixture of wittichenite and emplectite *American Mineralogist, v. 32, No. 5-6, May-June 1947, p. 347.*

klebe hammer. A device for the compaction of test pieces of cement or mortar prior to the determination of mechanical strength; a weight falling from a fixed height on the test piece mold ensures compaction under standardized conditions. *Dodd.*

klebelsbergite. A basic hydrous sulfate of antimony. Small radiated bladed crystals on stibnite or barite. Monoclinic. From Felsöbanya, Romania. *English.*

Kleeman condenser. A rectangular clay pipe in which distilled zinc is condensed. *Fay.*

kleinite. A yellow to orange oxychloride of mercury, containing small amounts of nitrogen and sulfate. Small, short, prismatic crystals; hexagonal. May be a mixture of a mercury-ammonium chloride, in great preponderance with an oxychloride and sulfate or oxysulfate of mercury. From Terlingua, Tex. *English.*

Klein solution. A yellow aqueous solution of cadmium borotungstate, somewhat viscous when saturated, having a maximum specific gravity of 3.28. *Holmes, 1928.*

Klein turbidimeter. Apparatus designed by A. Klein for the determination of the specific surface of portland cement. The sample is suspended in castor oil in a dish and the turbidity is measured photoelectrically. Because of the high viscosity of the suspending liquid, the particles do not settle significantly. The specific surface is deduced from the turbidity by means of a calibration curve. *Dodd.*

kles. Coarse sand or fine gravel. *Holmes, 1928.*

kliachite. Same as cliachite and sporogelite. *English.*

kling. A type of transfer ladle for the conveyance of molten iron. *See also* transfer ladle. *Dodd.*

klingenburg. *See* Klingenburg clay.

Klingenburg clay; klingenburg. A highly plastic clay dug at Klingenburg, Bavaria; used as a binder in making abrasive wheels, graphite crucibles, and leads for lead pencils. *Hess.*

klinker brick. A type of building brick, which may be either of engineering-brick or facing-brick quality, made in Germany and Holland from clays that generally have a long vitrification range; the bricks have low water absorption and high crushing strength. The color may be yellow, red, or variegated. *Dodd.*

klinkstone. *See* phonolite. *Fay.*

klintite. A biohermal limestone, particularly the massive core. *A.G.I.*

klip. S. Afr. A rock or stone; a cliff or a mountain. *Standard, 1964.*

klippe. An isolated block of rocks separated from the underlying rocks by a fault that normally, but not necessarily, has a gentle dip. Generally, the rocks above the fault are older. A klippe may be an erosional remnant of an extensive overthrust sheet or it may have moved into place by gravity sliding. *A.G.I.*

klippen. Isolated mountainous masses or hills resting upon younger formations as, for example, remnants of translated rock sheets. *Hess.*

klipsteinite. Described as an amorphous, compact, dark liver-brown to black opaque mineral; hydrous silicate of Mn and Fe; impure material; Mohs' hardness, 5 to 5.5; specific gravity, 3.5 *Dana 6d, p. 381.*

klizoglyph. A term employed to designate desiccation cracks. *Pettijohn.*

klockmannite. A reddish-violet to slate-gray copper selenide, CuSe. Granular. Perhaps hexagonal. From Sierra de Umango, Argentina; Lehrbach, Harz, Germany; Skrikerum, Sweden. *English.*

klompje brick. A miniature facing brick of a type used in the Union of South Africa, for decorative construction. *Dodd.*

kloof. S. Afr. A mountain pass or cleft; a gorge or narrow valley. *Standard, 1964.*

kluft. A fault. *Fay.*

klystron. A velocity-modulation tube having two or more resonant cavities separated by a drift space. *NCB.*

km Abbreviation for kilometer. *BuMin Style Guide, p. 60.*

kmaite. An unnecessary name for a celadonite rich in Fe_2O_3 and K_2O, from the Midailov iron ores, Kursk, U.S.S.R. *Hey, MM, 1964.*

km^2. Abbreviation for square kilometer. *BuMin Style Guide, p. 62.*

knabbenkohle. Ger. A variety of brown coal occurring in the form of lumps. Same as knorpelkohle; stüskohle. *Tomkeieff, 1954.*

knacker. Prov. Eng. A collier's horse. *Fay.*

Knapp bottom pressure gage. This instrument was designed for studying harbor surging. A strain gage unit, used in connection with a pressure sensitive bellows, comprises the transducer of the pressure head. The four strain gages in the unit are connected to form a bridge circuit that is linked to the recorder by an electrical cable. A direct current voltage is applied to the bridge, and the record is obtained by recording photographically the unbalanced current from a magnetic oscillograph. Any standard strain gage recorder can be used for the recording system. *H&G.*

knapper. A stonebreaker; specifically one who breaks up flint flakes into sizes used for gunflints. *Fay.*

knapping. N.S.W. The act of breaking stone. Improving the grade of ore by removing gangue and low-grade material manually with a hammer. *New South Wales.*

knapping hammer. A special hammer or a machine to break rock and produce a minimum of fine material. *C.T.D.*

knapping machine. An instantaneous stone-crushing machine; a stonebreaker. *Standard, 1964.*

kneaded sandstone. A vague structure of some sandstone beds resembling kneaded dough, probably a variation of ball-and-pillow structure. *Pettijohn.*

kneading. A filling material composed of clayey rock from which balls are made by a special machine. These balls are driven by an air current through a tube resembling a gun barrel into the excavated area to be filled. By impact and weight the soft balls are squashed and perfectly fill the excavation. *Stoces, v. 1, p. 272.*

knebelite. A silicate mineral, $(Fe,Mn)_2SiO_4$, belonging to the mesosilicate group. Orthorhombic system. *Webster 3d; E.C.T., v. 12, p. 278.*

knee brace. A stiffener between a stanchion or column and a roof truss, to ensure greater rigidity in a building frame under wind load. *Ham.*

knee joint. A toggle joint. *Standard, 1964.*

kneeler. a. The triangular connection by which a horizontal motion is changed to a vertical one, as in certain mine pumps. *Standard, 1964.* b. A stone cut to provide a change of direction. *Crispin.* c. The return of the dripstone at the spring of an arch. *C.T.D.*

knee movement. The mechanism operating a toggle joint. *Standard, 1964.*

knee pad. A protective cushion, usually made of sponge rubber that can be strapped to the miner's knee. *Grove.*

knee piece. a. A bent piece of piping. *Fay.* b. An angular piece of timber used in a roof (mine) to strengthen a joint where two timbers meet. *Fay.*

knee timber. a. Timber with natural knees or angles in it. *Webster 3d.* b. A piece of timber with an angle or knee in it. *Webster 3d.*

knell stone. N. of Eng. Freestone (sandstone). *Arkell.*

knickpunkte. Breaks or interruptions, that is, abrupt changes in degree of declivity, are a conspicuous feature in many landscapes. In the German terminology, such breaks are knickpunkte. The English phrase, nick points, does not exactly translate knickpunkte. *Stokes and Varnes, 1955.*

knickung. Ger. In structural geology, a sharp bending of beds about certain planes during folding. *Bureau of Mines Staff.*

knife. The dirt cutting edge of a digging machine. *Nichols.*

knife and shears. *See* sheer. *Arkell.*

knife dog. A tool that fits around and grips drill rods or any tubular drilling equipment so they can be pulled or lifted from a borehole where workspace in narrow underground openings is too confined to allow the use of a hoisting plug. *Long.*

knife edge. The girdle of a brilliant cut to a sharp edge and polished. *Hess.*

knife-edge loading. In order to reduce complex loading calculations, in 1931 the British Ministry of Transport permitted bridges to be designed to sustain a uniform load, varying with the span, combined with a knife-edge load of 2,700 pounds per foot at the worst possible point, in any span. The loading is applied along a straight line of zero thickness. *Ham.*

knife switch. A switch which opens or closes a circuit by the contact of one or more blades between two or more flat surfaces or contact blades. *Crispin.*

knife-trimmed mica. Sickle-dressed or sickle-trimmed mica further refined with a knife to eliminate interior defects and also defects overlooked by sickle cutters. *Skow.*

knisterkohle. Ger. A variety of coal altered by an igneous intrusion, which on heating explodes with violence. *Tomkeieff, 1954.*

knistersalze. Crystals of salt mined at Wieliczka which decrepitate violently upon heating due to excessive enclosed water or gases. *Kaufmann.*

knits; knots. Small particles of ore. *Fay.*

knitted structure. A structure found in serpentine, consisting of two sets of interlacing scales lying parallel to the original cleavage planes of a nonaluminous augite, from which it was derived. *C.T.D.*

knitted texture. A texture typical for the mineral serpentine in rocks when it replaces a clinopyroxene. *Schieferdecker.*

knob. a. To remove knobs from, as in roughdressing stone in the quarry. *Standard, 1964.* b. A small support for the roof. *Fay.* c. An isolated, prominent rounded hill or mountain. *Webster 3d. See also* boss, i. *Fay.*

knob-and-kettle topography. Synonym for kame-and-kettle topography. Obsolete. *A.G.I.*

knob-and-trail. A structure found on glacial pavements characterized by protruding resistant knob and lee-side ridge of weaker rock. *Pettijohn.*

knobber. One who gets knobs off a face with a view to straightening it for efficient machine coal cutting. *Mason.*

knobbing. The act of roughdressing stone in the quarry by knocking off the projections and points. *Fay.*

knobbing fire. A bloomery for refining cast iron. *Fay.*

knobellite. An intergrowth of galena with bismuthinite or stibnite. *Hess.*

knock. a. To examine a mine roof for safety. *See also* chap. *Fay.* b. Eng. A sandbank; so called along the Lincolnshire coast. *Standard, 1964.* c. Signal. *Mason.* d. Eng. *See* jowl. *SMRB, Paper No. 61.*

knock-back ore. Eng. Ore mixed with barite or kevil. *Fay.*

knockbark. Crushed lead ore. *Arkell.*

knockdown. The method by which youthful colliery workers held out a portion of their wages for spending money. *Korson.*

knocker. A lever that strikes on a plate of iron at the mouth of the shaft, by means of which miners below can signal to those on the top. *Fay.*

knocker line. The signal line extending down the shaft from the knocker. *Fay.*

knocking. a. S. Wales. Signals made underground by knocking on the coal. *Fay.* b. Eng. Ore broken with a hammer, especially, the large lumps. *Webster 2d.* c. The accidental removal, during the period between glaze application and the glost firing, of a patch of glaze from the surface of ceramic ware. *Dodd.*

knocking-bucker. Eng. A tool cut out of a strong flat bar of iron, used for breaking or bucking ore. *Fay.*

knockings. a. Pieces of stone cut or taken off in blasting or in roughdressing. *Standard, 1964.* b. Derb. Lead ore with spar as cut from the vein. *Arkell.* c. Derb. Lead ore broken on a knocking stone. *Arkell.* d. The oversize residue obtained in screening a ceramic slip. *ASTM C242-60T.*

knocking-up. Eng. The calling up of miners by beating the landing wagon. *Fay.*

knockoff. a. The point upon an engine plane at which the trip is disconnected from the rope. *Fay.* b. A joint for disconnecting the bucket from the pump rods. *Fay.* c. To do away with. *Fay.* d. To stop (work) for the day or part of a day. *See* kenner. *Fay.*

knockoff bit. *See* detachable bit.

knockoff hook. a. Eng. A hook by which cars may be detached from a rope by the withdrawal of a pin or knocking off a catch. *Fay.* b. Also a hook by means of which the rope is detached from the cage when it is drawn too high by the winding engine. *Fay.*

knockoff joint. In well drilling, a joint used in the rods of deep-well pumps. The jointed ends of the rods are enlarged to a square section and notched to fit against one another, and are confined by a clasp or bridle embracing them. The joint is tapered lengthwise and the hole in the clasp is tapered to correspond, so that the tendency is always for the clasp to tighten around the joint. *Fay.*

knockout. a. A mechanism for freeing formed parts from a die used for stamping, blanking, drawing, forging, or heading operations. *ASM Gloss.* b. A portion of a piece of pressed ware which has been so designed that it can be knocked out to make a hole. *ASTM C162-66.*

knockout man. A laborer who frees solidified metal castings from inverted molds of a casting wheel by prying the castings from the molds with a long steel bar to drop them into a water pit (bosh) for cooling. *D.O.T. 1.*

knockstone. Eng. Stone bench on which lead ore is buckered or broken small for the hotching tubs, Yorkshire lead mines. Also called binkstone. *Arkell.*

knogging. Eng. Small refuse stones used for the inside of walls, Northamptonshire and Worcestershire. *Compare* knockings. *Arkell.*

knoll. a. A usually small rounded land eminence; a mound. *Webster 3d.* b. Eng. The top of a hill. *Webster 3d.*

knoll reef. *See* reef knoll. *Schieferdecker.*

Knoop hardness. Microhardness determined from the resistance of metal to indentation by a pyramidal diamond indenter, having edge angles of 172° 30′ and 130°, making a rhombohedral impression with one long and one short diagonal. *ASM Gloss.*

knop. A knob or rounded protuberance forming part of the stem of a goblet or wine glass. *Haggar.*

knorpelkohle. Ger. Same as knabbenkohle. *Tomkeieff, 1954.*

knot. a. An imperfection; an inhomogeneity in the form of a vitreous lump. *ASTM C162-66.* b. A unit of speed of 1 nautical mile per hour. Abbreviations, k and kn. *MacCracken.*

knotenschiefer. An argillaceous sediment in which new minerals have developed as more or less rounded porphyroblasts in response to low-grade metamorphism. *See also* desmoisite; desmosite; fleckschiefer; fructschiefer; garbenschiefer; hornfels; knotted slate; maculose; spilosite; spotted schist; spotted slate. *A.G.I.*

knots. a. Nodules or concretions of pyrites; any harder inclusions in a rock. *Arkell.* b. Eng. The Lower Oxford Clay used for bricks around Peterborough and Bletchley. *See also* knurs and knots. *Arkell.* c. Applied by quarrymen to dark gray or black masses, more or less oval or circular in cross section, which are segregations of black mica or hornblende formed in the granite. English quarrymen call them heathen. *Fay.* d. Applied to diamonds which apparently contain included crystals of smaller diamonds. Of importance because of trouble caused to diamond cutter. *Hess.*

knotted schist. *See* spotted slate. *Hess.*

knotted slate. Synonym for spotted slate. *A.G.I.*

knotts. Term sometimes applied to the Lower Oxford clay used for brickmaking in the Peterborough district, England. *Dodd.*

knotty. So altered by contact metamorphism as to have new minerals developed, giving a spotted or knotty appearance. Sometimes applied to concretions found in sedimentary rocks. *Fay.*

knotty coal. Dev. A variety of lignite found in Bovey Tracey. *Tomkeieff, 1954.*

knowledge box. A driller's term for the place where he keeps his orders and reports. *Williams.*

known mine. Lands can not be held to be "known mines" unless at the time the rights of the purchaser accrued there was upon the ground an actual and open mine which either had been worked or was capable of being worked. *Fay.*

known to exist. A vein or lode is known to exist when it could be discovered by anyone making a reasonable and fair inspection of the premises for the purpose of a location. *Fay.*

known vein. A vein or lode is known to exist within the meaning of the mining act when it could be discovered by or is obvious to anyone making a reasonable and fair inspection of the premises for the purpose of making a location of a placer mining claim. This term is not to be taken as synonymous with located vein, and refers to a vein or lode whose existence is known as distinguished from one which has been appropriated by location. Hence, a regular location is not necessary before a vein or lode can be a known vein or lode. The time at which a vein or lode must be known to exist in order to except it from a placer patent is the time at which the application for a patent is made and to contain minerals in such quantity and quality as to justify expenditure for the purpose of extracting them. *Ricketts, pp. 128-129.*

Knox and Osborne furnace. A continuously working shaft furnace for roasting quicksilver ores, having the fireplace built in the masonry at one side. The fuel is wood. *Fay.*

knox hole. A circular drill hole with two opposite vertical grooves which direct the explosive power of the blast. *Fay.*

knox system. A system of separating masses of rock by blasting with black blasting powder in reamed drill holes, a considerable air space being left between the charge and the stemming. *Fay.*

knuckle. The place on an incline where there is a sudden change in grade. The top of a grade or hill on a track over which mine cars are hauled. *Fay.*

knuckle boy. *See* knuckle man. *D.O.T.1.*

knuckle joint. A mechanism consisting of some form of two forks coupled together by means of a cube or sphere provided with projecting pins extending through holes provided in the outer end of each branch of the fork. When inserted between the bit and the drill rods, the mechanism can be used to deflect a borehole. A similar mechanism often is used as a connection between two shafts on a machine when the ends of the shafts are placed at an angle to each other. *Long.*

knuckle-joint press. A heavy short-stroke press in which the slide is directly actuated by a single toggle joint that is opened and closed by a connection and crank. It is used for embossing, coining, sizing, heading, swaging, and extruding. *ASM Gloss.*

knuckle man. In bituminous coal mining, one who works at the knuckle (top) of a haulage slope, coupling trains of cars and attaching and detaching cars to and from a haulage cable by which they are raised or lowered. Also called knuckle boy. *D.O.T. 1.*

knuckling. To throw, on the potter's wheel, using the knuckles of the right hand on the outer surface of the pot. *ACSG, 1963.*

Knudsen's tables. Tables published by Martin Knudsen in 1901 (Hydrographical Tables), to facilitate the computation of results of seawater chlorinity titrations and hydrometer readings, and their conversion to salinity, density and sigma-T. *H&G.*

knurling. Impressing a design into a metallic surface, usually by means of small, hard rollers that carry the corresponding design on their surfaces. *ASM Gloss.*

knurs and fundlers. Eng. Two words always used together and applied to lumps of gypsum in marl, Nottinghamshire. *Compare* foundling stones. *Arkell.*

knurs and knots. The stony nodules found loged in the strata; commonly harder than the rest of the mass of the strata. *Compare* Nerlys. *Arkell.*

kobeite. A titanate, niobate, and tantalate (Yt,Fe,U, etc.)(Ti,Nb,Ta, etc.)$_2$(O,OH)$_6$ differing from euxenite etc., in the low content of $(Nb,Ta)_2O_5$(4.84 to 5.45 percent). Black metamict crystals in pegmatite from Kobe, Kyoto, Japan. Named from locality. *Spencer 19, M.M., 1952.*

kobellite. A blackish-lead to steel-gray mineral with a black streak, $Pb_2(Bi,Sb)_2S_5$. *American Mineralogist, v. 27, No. 2, February 1942, p. 109.*

kobold. Old German name for cobalt, derived from undesired qualities attributed to gnomes. *Pryor, 3.*

kochenite. A fossil resin, like amber. From Kochenthal, Tirol, Austria. *English.*

Koch freezing process. A freezing method of shaft sinking, in which a solution of magnesium chloride ($MgCl_2$) is circulated through the freezing tubes instead of brine. The magnesium chloride is cooled to about −30° C at the refrigrating plant and this temperature is capable of freezing the ground without the solution itself freezing and choking the tubes. Anhydrous ammonia, carbon dioxide, or sulphur dioxide is used as the refrigerating agent. *Nelson.*

kochite. A white, hydrous silicate of aluminum. Perhaps $2Al_2O_3.3SiO_2.5H_2O$. Isometric. Granular aggregates of minute crystals; from Kochi-muri, Rikuchu Province, Japan. *English.*

kodurite. A coarsely crystalline rock of doubtful origin consisting of potash feldspar, garnet (spessartite andradite), and apatite. *A.G.I.*

kodurite series. A series of rocks of uncertain but probably igneous origin, associated with the Archean complex of Madras, and ranging from quartz-orthoclase rocks through kodurite to spandite rock and manganese pyroxenites. *Holmes, 1928.*

koe Abbreviation for kilo-oersted. *BuMin Style Guide, p. 60.*

koechlinite. A greenish-yellow molybdate of bismuth, $Bi_2O_3.MoO_3$. Orthorhombic. Minute, tabular crystals. From Schneeberg, Saxony, Germany. *English.*

Koehler furnace. A revolving, cylindrical, muffle furnace used in Upper Silesia. *Fay.*

koehler lamp. A naphtha-burning flame safety lamp for use in gaseous mines. *Fay.*

koela. Indian vernacular name, originally applied to charcoal, and now transferred to stone coal. *Tomkeieff, 1954.*

koenenite. An oxychloride of aluminum and magnesium, $Al_2O_3.3MgO.2MgCl_2.6$ or $8H_2O$; red, due to minute scales of hematite; rhombohedral; scaly crusts; very soft. From Volpriehausen, Hanover, Germany. *English.*

koenlinite. *See* konlite. *Tomkeieff, 1954.*

Koepe hoist. Winding system in which both cages in a mine shaft are connected to the same rope, via the drum. *Pryor, 3.*

Koepe sheave. The wheel which is used in the Koepe winder instead of a winding drum. It usually consists of a cast-steel hub with steel arms and rim of welded construction. The diameter of the sheave varies from about 16 to 26 feet depending on the size and type of winding rope and the total load. It is recommended that the ratio of the diameter of the sheave to the diameter of the rope should be 100 to 1 and that of the sheave to the largest wire in the rope 2,000 to 1. A Koepe sheave is fitted with renewable friction linings. *Nelson.*

Koepe system. a. A system of hoisting without using drums, the rope being endless and passing over pulleys instead of around a drum. *Zern.* b. In this system the hoisting drum is replaced by a large driving sheave 15 or 20 feet in diameter. The angle of contact of the rope with the sheave is from 190° to 200°, or a little over a half circle. Driving is done through the friction grip of the sheave on the rope, therefore, a tail rope is used around a sheave at the bottom of the shaft to give the necessary pull on the slack side. *Lewis, p. 246.*

Koepe winder. A system where the winding drum is replaced by a large wheel or sheave. Both cages are connected to the same rope which passes around some 200° of the sheave in a groove of friction material. The Koepe sheave may be mounted on the ground adjacent to the headgear or in a tower over the shaft. The drive to the rope is the frictional resistance between the rope and the sheave. It requires the use of a balance rope. It is often used for hoisting heavy loads from deep shafts and has the advantage that the large inertia of the ordinary winding drum is avoided. The system has been widely used on the Continent for many years and some large projects in Great Britain are being equipped with winders of this type. *See also* multirope friction winder. *Nelson.*

Koepe winder brake. A brake which acts directly on the Koepe sheave and can be applied by the winding engineman's brake lever and the other safety devices. *Nelson.*

koettigite. a. Preferred spelling for kottigite. *English.* b. A carmine mineral with 1 perfect cleavage; $3ZnO.As_2O_5.8H_2O$; found with smaltite at cobalt mine, Schneeberg, Germany. *Larsen, p. 125.*

koffer falt. Ger. In structural geology, a box fold common in the Juras. They are symmetrical, upright, and have vertical limbs and a horizontal crest. *Bureau of Mines Staff.*

koflach. A resin from the Tertiary brown coals of Styria, Austria. *A.G.I.*

kohalaite. A general term for oligoclase andesites; from the Kohala Mountain, Hawaii. *Holmes, 1928.*

kohle. Ger. Name for coal. *Tomkeieff, 1954.*

kohlenhobel. *See* coal plough, a. *Mason, v. 1, p. 123.*

kohm Abbreviation for kilohm. *BuMin Style Guide, p. 60.*

Köhn pipette. Apparatus for particle size analysis by sedimentation, it has been used more particularly in the study of clay soils. *Dodd.*

Koipato group. Continental arkosic sands, more than 6,000 feet thick, constituting the basal member of the Triassic succession in the Cordilleran geosynclinal region in Nevada. *See also* Star Peak group. *C.T.D.*

kokowai. N.Z. Red ocher; a common native pigment, mixed for use with fish oil or vegetal oil; also, the earth from which red ocher is obtained by burning. *Standard, 1964.*

koktaite. Hydrated sulfate of calcium and ammonium, $(NH_4)_2Ca(SO_4)_2.H_2O$, as acicular monoclinic crystals pseudomorphous after gypsum, from Moravia. *Spencer 18, M.M., 1949.*

kol. Sw. Name for coal. *Tomkeieff, 1954.*

kolbeckite. A blue to gray hydrous silicophosphate of beryllium. Monoclinic (?). Prismatic crystals. Not the same as kolbeckine. From Schmiedeberg, Saxony, Germany. *English.* It may be $(Sc,Be,Ca)(PO_4,SiO_4).2H_2O$; the structure is of the metavariscite type. *American Mineralogist, v. 45, No. 1-2, January-February 1960, p. 257.*

Kolene Process. Trade name; an electrolytic salt bath treatment of sheet steel before it is enameled. *Dodd.*

kolhan. Old Cornish name for coal. *Tomkeieff, 1954.*

Kollen garnet. Almandite from Kollen, Bohemia. *See also* Bohemian garnet. *Shipley.*

kolm. a. A variety of cannel coal occurring locally as lenticles in Swedish alum shales, and containing 30 percent of ash rich in rare metals, including uranium and radium. *Tomkeieff, 1954.* b. Culm. *A.G.I. Supp.* c. A variety of anthraxolite; a hydrocarbon that resembles oil shale. *Crosby, p, 66.* d. A shale impregnated with asphaltite. *Hess.*

kolovratite. A mineral, amorphous or crystalline. Botryoidal crusts. Color, yellow. Believed to be a vanadate of nickel. From Ferghana, Russian Turkestan, U.S.S.R. *English.*

Kolthoff buffer solutions. Solutions chosen for their low concentration of hydrogen ions and their resistance to change of pH when small quantities of acids or alkalis are added. Those mostly used in conjunction with colorimetric pH indicators are acetic acid with sodium acetate; boric acid with borax; citric acid with sodium citrate; and sodium phosphate with hydrochloric acid. *Pryor, 3.*

Koltreat. Calcium chloride with an inhibitor; used for dust- and freeze-proofing of coal. *Bennett 2d, 1962.*

kömür. Turkish name for coal. *Tomkeieff, 1954.*

kong. Barren bedrock underlying tin-bearing gravel. *Pryor, 3.*

Konga diabase. A type of granodolerite containing calcic labradorite laths and intergranular augite and orthorhombic pyroxene, in a microgranitic interstitial mass of quartz and orthoclase; from Konga, Sweden. *Holmes, 1928.*

konimeter. Apparatus used to measure dust in mine atmosphere. A measured volume of air is drawn through a jet so as to impinge on a glass surface coated with glycerin jelly. The adherent dust is then examined and the particles are counted under the microscope. *Pryor, 3.* Also called Zeiss konimeter.

koninckite. A hydrated ferric phosphate, apparently with the formula, $FePO_4.3H_2O$; yellow and transparent; luster, vitreous. *Dana 7, v. 2, p. 763.*

konite; conite. A magnesian dolomite. *Standard, 1964.*

konleinite. *See* konlite. *Tomkeieff, 1954.*

konlite; konleinite; koenlinite. A variety of hydrocarbon found in brown coal; color, brown to yellow; approximate composition, 91.75 percent carbon, 7.50 percent hydrogen, and 0.75 percent oxygen. *Tomkeieff, 1954.*

kool. Dutch name for coal. *Tomkeieff, 1954.*

koolyanobbing iron ore. A large high-grade deposit of iron ore in western Australia. The ore consists of hematite (and some limonite) with a surface iron content of about 63 percent. *Nelson.*

Kootenai series. Part of the Comanchean, of the continental facies, including coal seams, occurring in western Canada. *Compare* Morrison formation. *C.T.D.*

Kopecky elutriator. An elutriator consisting of three cylinders of different diameters; it has been used for the particle-size analysis of clays. *Dodd.*

kopje. S. Afr. A hillock; a knob. *Standard, 1964.*

Koppers-Becker oven. A byproduct coke oven employing a flue arrangement whereby the gas is burned on an entire wall simultaneously (both pusher and coke side). The products of combustion from groups of two or more vertical flues of the "on" walls in which the fuel gas is burning enter short bus flues and are thence conducted over the top of the oven through crossover flues to a companion series of bus flues whereby the entire "off" wall is simultaneously conducting waste gas to the regenerators. On reversal, the opposite conditions obtain. *Camp, 6th ed., 1951, p. 210.*

Koppers-Hasche process. The most highly developed process for reforming methane and natural gases containing only small proportions of higher hydrocarbons. It consists of partial oxidation with air using an alumina catalyst. The process is cyclic and is carried out in two catalyst-packed horizontal chambers. Reversal takes place every minute. Methane is mixed with some 2½ times its volume of air and burned in one chamber, raising the temperature to 850° C. The reaction gases leave the second chamber at 300° C. The process is self-supporting and operates at a thermal efficiency of about 96 percent. *Francis, 1965, v. 2, p. 417.*

Koppers oven. A type of coke oven heated by vertical flues. Distinguishing features are the preheating of air, and the arrangements for gas and air to prevent local overheating at points of issue and to carry the heat up high in the flues. *Bureau of Mines Staff.*

korb. Ger. *See* corf, a. *Fay.*

Korfmann arch saver. A machine for withdrawing steel arches by means of a controlled hydraulic system instead of drawing them by hand or winches. *Nelson.*

Korfmann power loader. A double-ended cutter loader, that is, it can cut and load in both directions. It consists of four milling heads and one cutter chain surrounding them; guided by armored conveyor; rope-hauled; cuts at 2.3 feet per second and flits at 10 feet per second. The minimum workable seam thickness is 26 inches on gradients from 0° to 12°; maximum length of face is 165 yards; takes 3½ feet per cut, continuous mining. *Nelson.*

kornelite. A colorless, brown, amethystine mineral with silky luster and 2 good cleavages, $Fe_2O_3.3SO_3.8H_2O$; from Szomolonok, Hungary. *Larsen, p. 107.*

kornerupine. A colorless, white to brown mineral with prismatic cleavage, $18MgO.6(Al,Fe,B)_2O_3.7SiO_2$; Mohs' hardness, 6.5; specific gravity, 3.27; found in Greenland. *Larsen, p. 183.*

korzhinskite. A mineral, $CaB_2O_4.H_2O$, in the skarn from the north Urals, U.S.S.R., that also contains the calcium borates calciborite, frolovite, nifontovite, uralborite, sibirskite, and pentahydroborite. *Hey, M.M., 1964; Fleischer.*

koswite. A variety of olivine pyroxenite containing diopside as its chief constituent, with olivine in moderate amount and magnetite acting as an interstitial cement. *Holmes, 1928.*

koth. A name given by the Spaniards to an earthy, slimy substance ejected from volcanoes in South America. The natives call it moya. *Fay.*

kotoite. Magnesium borate, $Mg_3B_2O_6$, occurring abundantly as a granular (orthorhombic) constituent of dolmitic marble in Korea. *Spencer 15, M.M., 1940.*

kotulskite. Minute grains in chalcopyrite, $Pd(Te,Bi)_{1-2}$, from Monchegorsk, U.S.S.R. *Hey, M.M., 1964; Fleischer.*

Kotze konimeter. A dust-sampling instrument consisting of an air cylinder and piston actuated by a spring, and so arranged that on release of the piston a known volume of air is impinged at high velocity against a vaselined plate. The dust spot so produced is examined under the microscope, and count is made of the number of particles. *R.I. 2392, Sept., 1922, p. 1.*

Kourbatoff's reagent. An etchant for steel; it consists of 7 parts of a solution containing 20 percent methyl alcohol, 20 percent ethyl alcohol, 20 percent iso-amyl alcohol, and 10 percent butyl alcohol added to 3 parts of a solution of 4 percent nitric acid in acetic anhydride. This etchant colors sorbite and troostite leaving the other constituents unaffected. *Osborne.*

koutekite. An arsenide of copper, Cu_2As. Distinct from beta domeykite. Hexagonal, occurring intergrown with an unnamed copper arsenide at Cerny Dul, Krkonose, Bohemia, Czechoslovakia; also obtained artificially; luster, metallic. *Hey, M.M. 1961.*

koyan. A measure of weight; used in the Malay Peninsula that equals 40 piculs or 5,705 pounds. *Webster 2d, p. 2,898.*

Kozeny equation. An equation relating the rate of flow (q) of a fluid of viscosity μ through a packed bed of particles of depth L and area A, under a pressure difference ΔP, the specific surface of the particles being S and the voids per unit weight being V:

$$q = \frac{K.AV^3}{\mu S^2} \cdot \frac{\Delta P}{L}$$

This equation, due to J. Kozeny forms a basis for the determination of the specific surface of a powdered ceramic material by the gas permeability method. *Dodd.*

Kr. Chemical symbol for krypton. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

krablite. A variety of crystal tuff containing abundant sanidine, with plagioclase, augite, and quartz in smaller proportions; from Mount Krabla, Iceland. *Holmes, 1928.*

krageröite. A rutile-rich plagioclase aplite consisting largely of sodic plagioclase and rutile, with minor quartz, potassic feldspar, and ilmenite. *A.G.I.*

kramerite. Identical with probertite. *English.*

krantzite. A fossil resin resembling amber and found in small yellowish grains disseminated in brown coal. *Tomkeieff, 1954.*

Krasnojarsk group. A type of meteorite belonging to the pallasites. *See also* pallasite. *Hess.*

krassyk. A local name for a decomposed ferruginous schist; in the Berseov gold-mining district of the Urals. *Fay.*

kratochvilite. Later name for fluorene. *Tomkeieff, 1954.*

Krause rolling mill. A sheet rolling mill which uses a reciprocating action that accomplishes a high reduction in thickness for a single passage of the sheet through the mill. *ASM Gloss.*

krausite. A yellowish-green hydrous sulfate of iron and potassium, $K_2SO_4.Fe_2(SO_4)_3.2H_2O$. Monoclinic. Minute long, prismatic crystals; crystalline crusts. From Borate, Calico Hills, Calif.; Valardena, Durango, Mex. *English.*

kremersite. An unstable ruby-red mineral, $KCl.NH_4Cl.FeCl_3.H_2O$; found at acid fumaroles on Vesuvius, Italy. *Larsen, p. 216.*

krennerite. One of the gold telluride group of minerals, $(Au,Ag)Te_2$; corresponds to the same general formula as sylvanite and calaverite. Silver-white to pale yellow color. Specific gravity, 8.35. Found in Colorado; Romania. *CCD 6d, 1961.*

Kreuger's ratio. A ratio claimed by H. Kreuger to be a criterion of the frost resistance of clay building bricks; it is the ratio of the percentage of water absorption after 4 days' immersion in cold water to the total water absorption calculated from the specific gravity. *Dodd.*

Kreutzer roof. A design for a furnace roof, particularly for open-hearth steel furnaces. Its feature is the system of transverse and longitudinal ribs, which divide the exterior of the roof into boxlike compartments. The design was patented by C. Kreutzer in Germany in 1948. *Dodd.*

kribergite. Hydrated phosphate and sulphate of aluminum, $2Al_2O_3.2(P_2O_5,SO_3).5H_2O$, as white chalklike masses from Kristineberg mine, Vasterbotten, Sweden. Named from locality. *Spencer 17, M.M., 1946.*

kroehnkite. An azure-blue mineral with the formula $CuO.Na_2O.2SO_32H_2O$; monoclinic. *Larsen, p. 163.*

Krohnke process. The treatment of silver ores preparatory to amalgamation, by humid chloridization with copper dichloride. *Fay.*

krokodyth; krokolite. Old terms for crocidolite used in the Cape field. *Sinclair, W. E., p. 484.*

Kroll process for producing titanium sponge. Purified titanium tetrachloride is reduced to the metallic state with magnesium in an inert atmosphere of helium or argon. *BuMines Bull. 619, 1964, p. 206.*

Krupp ball mill. An ore pulverizer in which the grinding is done by chilled iron or steel balls of various sizes moving against each other and the die ring, composed of five perforated spiral plates, each of which overlaps the next. The plates form steps which give the balls a drop from one plate to the next, and in addition give space through which oversize is returned. *Liddell 2d, p. 357.* Surrounding the perforated plates are circumferential sections of punched plate screen with relatively coarse aperature, and surrounding this a ring of fine screens. Both sets of screens are bolted to the heads and revolve with them—the revolving part is all contained in a sheet iron housing having a hopper bottom for discharge of screened material. *Bureau of Mines Staff.*

Kruppize. To apply the Krupp process to, as armor plate. *Standard, 1964.*

Krupp process. a. *See* Krupp washing process; also called Bell-Krupp process. *Fay.* b. A cementation process designed for the hardening of surface steel, as for armor plates, where the object is to strengthen the outer portion of the mass from the surface toward the interior. *Standard, 1964.*

Krupp-Renn. The process for the production of iron and steel from medium-grade ores, such as contain 44 to 57 percent iron and high silicon content. The process involves a continuous reduction and is carried out in a revolving tube furnace, which is designed for the production of iron. The iron is reduced into a sponge and then converted into low-carbon metallic grains which are called pellets. *Merriman.*

Krupp washing process. The removal of silicon and phosphorus from molten pig iron by running it into a Pernot furnace, lined with iron oxides. Iron ore may also be added, and the bath is agitated by rotation for 5 to 8 minutes only. *See also* Bell's dephosphorizing process. *Fay.*

kryoconite. Synonym for cryoconite. *A.G.I.*

Kryptol furnace. The term used on the Continent and in Russia for a granular-carbon resistance furnace; the name derives from the German company, Kryptol Gesellschaft, that originally supplied the carbon granules. *Dodd.*

kryptomere. Synonym for cryptomere. *A.G.I.*

krypton. An inert, monatomic (Kr), the gaseous element of the argon group, constituting about one-millionth by volume of the atmosphere, from which it is obtained by liquefaction; zerovalent; colorless; and odorless. Used in certain gas-filled electric lamps. Symbol, Kr; atomic number, 36; atomic weight, 83.80; melting point, −156.6° C; boiling point, −152.30° ±10° C; density of gas, 3.733 grams per liter (at 0° C); specific gravity of liquid, 2.155 (at −152.9° C); and soluble in water. *Fay; C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-117; B-184.*

krystic. In geology, pertaining to or treating of the subject of ice as a surface feature of the earth, in any and all of its forms, including glacier ice; as, krystic geology. *Standard, 1964.*

kryzhanovskite. A monoclinic mineral, $MnFe_2'''(PO_4)_2(OH)_2.H_2O$, of the dufrenite group. *Compare* frondelite; laubmannite; rockbridgeite. *Spencer 19, M.M., 1952.*

ksimoglyph. Drag mark. *Pettijohn.*

kt Abbreviation for carat. *Webster 3d.*

K.T.A.M. auger tube. Synonym for K.T.A.M. double-tube auger. *Long.*

K.T.A.M. double-tube auger. A double-tube soil sampling device designed to be rotated by hand to obtain soil samples from relatively shallow depths. The inner tube is a swivel type, and its cutting end leads the bottom of the spiral on the outside of the outer tube. *Long.*

ktenasite. Hydrous basic sulfate, $3(Cu,Zn)O.SO_3.4H_2O$, as blue-green monoclinic crystals from Lavrion, Greece. *Spencer 19, M.M., 1952.*

kton. Abbreviation for kiloton. *BuMin Style Guide, p. 60.*

kua. Specially shaped hoes used for working gravel in the sluice in Japan. *Fay.*

kucheryavchik. Russian name applied to thin films composed of algal remains and mineral matter. *Tomkeieff, 1954.*

kugel. The German word for ball or sphere, often prefixed to those igneous rocks that show a spheroidal development, such as corsite, orbicular granite, etc. *Fay.*

kugelkohle. Ger. Name for coal pebbles. *Tomkeieff, 1954.* Synonymous with mugelkohle.

Kühl cement. A hydraulic cement introduced by H. Kuhl and containing less SiO_2 but more Al_2O_3, and Fe_2O_3 (about 7 percent of each) than does portland cement; its strength properties are similar to those of rapid hardening portland cement. Also known as bauxitland cement. *Dodd.*

kukersite. A variety of oil shale of Ordovician age found in Estonia, U.S.S.R. *Tomkeieff, 1954.*

kulaite. A nepheline- or leucite-bearing trachydolerite in which hornblende is the dominant mafic mineral; varieties in which orthoclase cannot be recognized resemble tephrite. *Holmes, 1928.*

kullaite. A porphyritic dike rock containing red phenocrysts of plagioclase and microcline in an ophitic groundmass of oligoclase andesine, orthoclase, augite, and titanomagnetite; from Kullen, Sweden. *Webster 2d.*

kulm. *See* culm.

kundaite. A variety of grahamite from Estonia, U.S.S.R. Distinguished by the brown color of its powder and its greater solubility in turpentine and chloroform. *English; Tomkeieff, 1954.*

Kungurian. Middle Permian. *A.G.I. Supp.*

kunkur. A vernacular Indian term for stone, now restricted to concretionary masses of calcium carbonate occurring in alluvium. Also, applied to the red and variegated claylike deposits of laterite in Ceylon. *See also* kankar. *C.T.D.*

kunzite. A lilac-colored or pink spodumene. Used as a gem. *Sanford.*

kupfernickel. Ger. Niccolite. *Standard, 1964.*

kupferschiefer. Ger. A dark-colored shale worked for copper in Germany. *Standard, 1964.*

kupletskite; koupletskite. A variety of astrophyllite rich in manganese with 27.65 percent MnO, in pegmatite from Kola peninsula, U.S.S.R. *Spencer 21, M.M., 1958.*

Kurlbaum method. A method for the determination of flame temperature by means of an optical pyrometer. *Dodd.*

kurnakovite; kurnakowit. A mineral, $2MgO.3B_2O_3.13H_2O$, found in dense white aggregates; occurs as irregular lenses in szaibelyite (ascharite), at the Inder borate deposits; a member of the hexaborate group, and similar in composition to inyoite and inderite; probably monoclinic. *American Mineralogist, v. 26, No. 4, April 1941, p. 293.*

kuroko. In Japan, black ore. The kuroko deposits consist of intimately mixed zincblende, galena, and barite, associated (in places) with large masses of pyrite and gypsum. *Hess.*

kurtosis. In statistics, the technical name describing peakedness of a frequency distribution. It is statistically measured as the coefficient of quartile kurtosis. *Bureau of Mines Staff.*

kuskite. A name derived from the Kuskokwin River, Alaska, and applied by Spurr to certain porphyritic dikes, which cut Cretaceous shales, and have phenocrysts of quartz, scapolite, and probably basic plagioclase (the latter now represented by alteration products), in a groundmass of quartz, orthoclase, and muscovite. *Compare* yentnite. *Fay.*

kutch. In goldbeating, a package of vellum leaves between which, sheets of gold are placed for the first beating. *Standard, 1964.*

Kutter's formula. a. A formula for estimating the flow of water in rivers and canals, and sometimes modified for estimating the flow through long pipes with low velocity and entrance head. *Fay.* b. An empirical formula expressing the value of the coefficient, C, in the Chezy formula, in terms of the friction slope, hydraulic radius, and a coefficient of roughness. *Seelye, 1.*

kv Abbreviation for kilovolt. *BuMin Style Guide, p. 60.*

kva Abbreviation for kilovolt-ampere. *BuMin Style Guide, p. 60.*

kvaedfjordkohle. Rolled fragments of torbanite found on the Norwegian Coast. *Tomkeieff, 1954.*

kvar Abbreviation for reactive kilovolt ampere. *BuMin Style Guide, p. 61.*

kvellite. A rock containing considerable apatite and magnetite, olivine, lepidomelane, and barkevikite, also a minor amount of anorthoclase enclosing nepheline. *Hess.*

kw Abbreviation for kilowatt. *BuMin Style Guide, p. 60.*

kwhr Abbreviation for kilowatt-hour. *BuMin Style Guide, p. 60.*

kX unit. X-ray data are commonly expressed in kX units, in which k stands for kilo or 1,000. Therefore, 1 kX unit equals 1,000 X units and nearly equals 1 angstrom. One kX unit equals 1.00202 angstroms, or more accurately, 1.00202 ± 0.00003 angstroms. Abbreviations, kXU and kxu. *Bureau of Mines Staff; Handbook of Chemistry and Physics, 45th ed., 1964, pp. E-74, F-63; NRC-ASA N1.1-1957.*

kyack. A packsack to be swung on either side of a packsaddle. *Webster, 3d.*

kyanite; cyanite; disthene. A natural silicate of aluminum, Al_2SiO_5, found in metamorphic rocks. Triclinic; specific gravity, 3.56 to 3.66; Mohs' hardness, 5-7; luster, vitreous to pearly; color, blue, white, gray, or green. Occurs in Switzerland; Austria; France. In the United States, it is found in Massachusetts, Connecticut, North Carolina, Georgia, Virginia, and South Carolina. Used for refractory purposes, especially in spark plugs and other highly refractory porcelains. *CCD, 6d, 1961; Dana, 17.*

kyanize. To impregnate wood with mercuric chloride to prevent decay. *Crispin.*

kyanizing. Wood preservation by impregnation with mercuric chloride. *Pryor, 3.*

Kyan's process. A preservative method of impregnating timber with bichloride of mercury. *Crispin.*

kylite. A medium- to coarse-grained gabbroic rock, intermediate in mineral composition between typical teschenite and picrite, containing less feldspar than the latter, but more than the former. Named from the Kyles of Bute, Scotland. *C.T.D.*

kyrosite. A variety of marcasite. *Dana 6d, p. 95.*

kyschtymite. A phanerocrystalline igneous rock composed of anorthite, biotite, and corundum, with smaller amounts of green spinel, zircon, and apatite. *Holmes, 1928.*

L

l a. Abbreviation for liter. *BuMin Style Guide, p. 60.* b. Abbreviation for lumen. *Zimmerman, p. 65.* c. Abbreviation for liquid. *Zimmerman, p. 63.* d. Symbol for one of the Miller indexes (h, k, l). *Zimmerman, p. 151.* e. Symbol for latent heat per gram. *Zimmerman, p. 61.* f. Symbol for mean free path of molecules. *Zimmerman,* p. 67. g. With subscript, the symbol for ionic conductance. *Zimmerman, p. 59.* h. Abbreviation for light. *Zimmerman, p. 453.* i. Abbreviation for length. *Zimmerman, p. 62.* j. Abbreviation for landing, large, late, league, liner, link, long, low. *Webster 3rd.* k. Abbreviation for land. *Zimmerman, p. 61.* l. Abbreviation for lightning. *Zimmerman, p. 63.*

l a. Symbol for one of the Miller indexes, (*h, k, l*). *Zimmerman, p. 158.* b. Symbol for latent heat per gram. *Zimmerman, p. 170.* c. Symbol for length; length of path of heat flow; length of vibrating string, rod, or tube. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100; Zimmerman, pp. 157, 158.* d. Symbol for distance. *Zimmerman, p. 366.* e. Symbol for levo-; laevorotatary. *See l-. Handbook of Chemistry and Physics, 45th ed., 1964, pp. C-74, F-97.* f. Symbol for free path and when overscored *l*, the symbol for mean free path of molecules. *Zimmerman, pp. 156, 169.* g. With subscript, the symbol for equivalent ionic conductance. *Zimmerman, p. 171.* h. Symbol for azimuthal or orbital quantum number. *Zimmerman, p. 163.*

l- a. Abbreviated prefix meaning levo-; levorotatory; or levorotary (sometimes spelled laevo-; laevorotatory; and laevorotary). Usually printed in italic followed by a hyphen; for example, *l-tartaric acid* (levorotatory tartaric acid). *Handbook of Chemistry and Physics, 45th ed., 1964, pp. C-74, F-97; Webster 3d.* b. Abbreviated prefix which generally, and according to convention, refers to sinistral (counterclockwise) optical rotation (lavorotatory or levorotary, sometimes spelled laevorotatory and laevorotary), but which is sometimes used to refer to sinistral molecular configuration, for which the italic capital letter *L* followed by a hyphen, or the small roman capital ʟ followed by a hyphen, is ordinarily reserved. *Handbook of Chemistry and Physics, 45th ed , 1964, pp. C-74, 97; Webster 3d.* c. Lowercase *l-* means levorotatory (sometimes spelled laevorotatory) or levorotary (sometimes spelled laevorotary), but the symbolic prefix (-)- is preferred. *See also d-; L-. CCD 6d, 1961, p. 332; Handbook of Chemistry and Physics, 45th ed., 1964, p. F-97; Webster 3d.*

L a. Abbreviation for liter. *Zimmerman, p. 206.* b. Abbreviation for lambert. *BuMin Style Guide, p. 60.* c. Abbreviation for lumen. *Zimmerman, p. 206.* d. Symbol for inductance in henry's. *Zimmerman, p. 57.* e. Abbreviation for liquid. As a subscript, the symbol for liquid. *Zimmerman, pp. 63, 172.* f. Symbol for liquid rate in distillation; pound mole/hour. *Zimmerman, p. 63.* g. Symbol for mass velocity of liquid. *Zimmerman, p. 67.* h. Symbol for latent heat; latent heat of evaporation; latent heat of evaporation per mole. *Zimmerman, pp. 42, 61, 425.* i. Symbol for solubility product. *Zimmerman, p. 99.* j. Abbreviation for length; symbol for length along streambed; length of path of heat flow. *Zimmerman, pp. 53, 62.* k. As a subscript, the symbol for lower. *Zimmerman, p. 378.* l. Roman numeral for 50 and when overscored L, the Roman numeral for 50,000. *Zimmerman, p. 128.* m. Abbreviation for Lake. Also abbreviated l. *Zimmerman, p. 61.* n. Abbreviation for left. Also abbreviated l. *Zimmerman, p. 62.* o. Abbreviation for line. Also abbreviated l. *Zimmerman, pp. 65, 206.* p. Abbreviation for Latitude, Longitude. *Webster 3d.* q. Symbol in earthquake seismology that is a phase designation referring to surface waves without respect to type (whether Love waves or Rayleigh waves). Symbol was derived from long in the term long waves on early earthquake records. The surface waves were distinguished by their long periods from the preliminary waves (P-waves and S-waves). The symbol L^Q stands for Love waves (the Q having been derived from the German Querwellen meaning transverse waves) and L_R for Rayleigh waves. The symbols Q and R are preferred to the symbols L_Q and L_R, and these waves are called Q-waves and R-waves, respectively. *A.G.I.* r. Symbol for coil; winding of a transformer. *Zimmerman, pp. 119, 255.* s. Symbol for drizzle. *Zimmerman, p. 39.*

L a. Symbol for inductance in henry's. *Zimmerman, p. 259.* b. Symbol for self-inductance. *Zimmerman, p. 259.* c. As a subscript, the symbol for liquid. *Zimmerman, p. 168.* d. Symbol for liquid rate in distillation. *Zimmerman, p. 148.* e. Symbol for mass velocity of liquid. *Zimmerman, p. 147.* f. Symbol for latent heat per mole. *Zimmerman, p. 170.* g. Symbol for length; length along streambed; length of path of heat flow. *Zimmerman, pp. 146, 157, 186.* h. Symbol for relative heat content. *Zimmerman, p. 157.* i. Symbol for levo-; sometimes spelled laevo-. See *L. Handbook of Chemistry and Physics, 45th ed., 1964, p. C-74.* j. Symbol for solubility product. *Zimmerman, p. 170.* k. Symbol for kinetic potential or the Lagrange (or Langrangian) function. *Zimmerman, pp. 158, 162.* l. Symbol for total azimuthal or orbital quantum number. *Zimmerman, p. 163.* m. Symbol for lift. *Zimmerman, p. 366.*

L- a. Symbol for the abbreviated prefix levo- (sometimes spelled laevo-) meaning sinistral, or on, or toward, the left. Having a similar configuration at a selected asymmetric carbon atom in an optically active molecule to the configuration of levorotatory glyceraldehyde (*L*-glyceraldehyde). Printed in italic, as *L*, followed by a hyphen; for example, *L*-fructose, or as a small roman capital ʟ; followed by a hyphen; for example, ʟ-fructose. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-74; Webster 3d.* b. A prefix signifying the stereoisomeric form of an organic substance. It means that the substance has been correlated with the structure of *L*-glyceraldehyde. However, for amino acids, *L-* (or its opposite, *D-*) refers to the configuration of the lowest numbered asymmetric center (alpha-carbon atom); whereas for carbohydrates, it refers to the configuration of the highest numbered asymmetric center. *CCD 6d, 1961, p. 332.* c. Symbol generally refers to sinistral molecular configuration according to convention, but sometimes it is used to refer to sinistral (counter-clockwise) optical rotation (levorotatory or levorotary, sometimes spelled laevorotatory and laevorotary) for which lowercase *l*- is ordinarily reserved. *See also* *D*-; *l*-. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. C-74, F-97.*

La Chemical symbol for lanthanum. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

LA a. Abbreviation for lighter than air. *Zimmerman, p. 63.* b. Abbreviation for lightning arrester. *Zimmerman, p. 63.* c. Abbreviation for low altitude. *Zimmerman, p. 64.*

laanilite. A coarse-grained pegmatoid rock, the essential constituents of which are garnet, biotite, quartz, and iron oxides; from Laanila, Finnish Lapland. *Holmes, 1928.*

label. *See* tracer. *L&L.*

labeled atom. One rendered radioactive and thus traceable through a chemical process or a flow line. Also called tagged atom. *Pryor, 3.*

labile. a. Applied to particles in a rock that decompose easily. *A.G.I.* b. Unstable; easily displaced or altered. A labile ion can move along a solid surface from one lattice point to another. *Pryor, 3.*

labile constituent. Feldspar and rock fragments in sediments and sedimentary rocks. *A.G.I. Supp.*

labile protobitumens. Easily decomposable plant and animal products such as fats and oils or proteins that are found in peat and sapropels. *Tomkeieff, 1954.*

labile region. The temperature region in which the generation of crystals is rapid. *Stokes and Varnes, 1955.*

labile sandstone. Sandstone containing more than 25 percent of nonquartz material not including matrix and cement; synonym for subgraywacke. *A.G.I. Supp.*

lability. The property of bituminous emulsions, relating to the ease with which they break when put into use. Labile emulsions are quick breaking. *Nelson.*

labor. a. A shaft, cavity, or other part of a mine from which ore is being or has been extracted; a working, as a labor in a quicksilver mine. *Standard, 1964.* b. Sp. A Mexican land measure. *Standard, 1964.* c. The annual assessment work required on claims calls for a hundred dollars of labor and improvements. In Australia, claims have continuous labor, or are manned throughout the year. *von Bernewitz.*

labor and improvements. Labor performed or improvements made for development in such manner as to facilitate the extraction of the metals, though such labor and improvements may not be on the particular location itself. *Fay.*

laboratory. In the iron and steel industry, the space between the fire and flue bridges of a reverberatory furnace in which the work is performed. Also called kitchen and hearth. *Fay.*

laboratory furnace. Small furnaces of many designs used in laboratories for bench-scale experimental work. *Bureau of Mines Staff.*

laboratory moisture sample. In coal sampling, the quantity of coal prepared from the moisture sample which is delivered to the laboratory for the last stage of the determination of total moisture. *B.S. 1017, 1960, Pt. 1.*

Laborde method. A method of artificial respiration used on asphyxiated persons who are suffering from internal injuries. The patient is laid on his back and his tongue is grasped firmly between the folds of a handkerchief. The tongue is jerked forward, held for 2 seconds, and then pushed back for 2 or 3 seconds. *McAdam, p. 92.*

laborer. a. A man hired by the contract miner to assist him. *Fay. b.* Mine laborer; a man working for day wages in or about a mine; a company man distinguished from digger or contractor. *Fay.*

laborer, crusher. *See* crusher feeder. *D.O.T. 1.*

laborer, framing shop. A laborer who performs a variety of duties in lumber shop of a mine, such as loading, stacking or moving timbers, lifting and holding timbers in position for sawing, wheeling loaded trucks into wood-treating cylinder by means of pneumatic-powered winch, and assisting in the treating of lumber to preserve it. *D.O.T. Supp.*

labor turnover. The ratio of the new men taken on at a mine to the average total number on the books during the year. At a settled mine, this ratio may be less than 20 percent, while in remote areas it is considerably higher. *Nelson.*

La Bour centrifugal pump. A self-priming centrifugal pump containing a trap which always ensures sufficient water for the pump to function, and also a separator to remove the entrained air in the water. This type of pump is made in sizes for 50 gallons per minute against a 60-foot head to 350 gallons per minute against a 125-foot head and 500 gallons per minute against a 100-foot head. *Lewis, p. 655.*

labradite. A granular rock composed almost entirely of labradorite. *Holmes, 1928.*

labradophyric. In geology, of porphyritic texture, with labradorite phenocrysts. *Standard, 1964.*

labradorescence. A brilliant change of color caused in some stones, for example, labradorite, by the presence of minute enclosed crystalline plates or aligned rodlike inclusions. *C.M.D.*

labrador feldspar stone. Same as labradorite. *Standard, 1964.*

labrador hornblende. Same as hypersthene. *Standard, 1964.*

labradorite. A lime-soda plagioclase feldspar, $Ab_{50}An_{50}$—$Ab_{30}An_{70}$; triclinic. *See also* feldspar; moonstone. *Sanford; Dana 17.*

labradoritic. *See* labradophyric.

Labrador moonstone. A variety of labradorite. Specimens from the Malagasy Republic are translucent, yellowish-brown with fine bluish adularescence. *Shipley.*

Labrador rock. Labradorite. *Shipley.*

Labrador spar. Labradorite. *Shipley.*

Labrador stone. Labradorite. *Shipley.*

Labrador tea. Can. Shrub growing in barren lands and muskegs. *Hoffman.*

labuntzovite; labuntsovite; labountsovite. A hydrous titanosilicate, $(K,Na,Ba,Ca,Mn)(Ti,Nb)Si_2(O,OH)_7.\frac{1}{2}H_2O$, orthorhombic; from Kola peninsula, U.S.S.R. Originally described by A. N. Labuntzov as titaniferous elpidite (titanoelpidite) but now shown to contain only a trace of ZrO_2 with 25.49 percent TiO_2 and 1.45 percent Nb_2O_5. *Spencer 21, M.M., 1958.*

labyrinth. a. A series of canals through which a stream of water is directed for sorting crushed ore according to its specific gravity. *Fay.* b. A pipe or chamber of many turnings, for condensing vapors or fumes, as of mercury. *Standard, 1964.*

laccolite. Synonym for laccolith. *Fay.*

laccolites. Cistern or cake-shaped masses of igneous rocks, with a flat base, thinning out at the sides, which have consolidated in the space where the overlying rocks have been forced up into an arch or anticline. Laccolites occur in the South Staffordshire and other British coalfields. *Nelson.*

laccolith. A concordant intrusive body that has domed up the overlying rocks and also has a floor that is generally horizontal but may be convex downward. *A.G.I. Compare* phacolith. *C.T.D.*

lacculite. Synonym for laccolith; obsolete. *A.G.I. Supp.*

laced valley. A form of roof tiling designed to cover a reentrant corner of a roof. The courses of tiling meet and interlace to provide efficient drainage. *Dodd.*

laces; stoops; nicks. Eng. Lines cut, with the point of a pick, on slickensides. *Fay.*

lacework. Descriptive of mineral deposits with small veins or stockworks interspersed through barren rock. *Pryor, 3.*

lacing. a. The timber or other material placed behind and around the main supports. *See also* lagging. *Nelson.* b. Eng. Timbers placed across the tops of bars or caps to secure the roof between the timbers; from the North Staffordshire coalfield. Also called lagging. *Fay.* c. Strips or light bars of wrought iron bent over at the ends and wedged between the bars and the roof. *Fay.* d. Eng. Wood placed inside the sets of timber as a tie from prop to prop. Also called bracing; stringing piece. *SMRB, Paper No. 61.* e. Small boards or patches that prevent dirt from entering an excavation through spaces between sheeting or lagging planks. *Nichols.* f. Bars placed diagonally to space and stiffen members, as in a built-up column. *Crispin.*

lack clay. Ir. A thin pan under the moors. *Arkell.*

LaCoste-Romberg gravimeter. A long-period vertical seismograph suspended system adapted to the measurement of gravity differences. Sensitivity is achieved by adjusting the system to proximity to an instability configuration. *A.G.I.*

LaCour magnetometer. a. An instrument for measuring the horizontal component consisting of a small bar magnet suspended horizontally at the end of a vertical quartz fiber. The instrument balances the fiber torque against the magnetic torque. *A.G.I.* b. An instrument for measuring the vertical component in which the moving system is similar to that used in a Schmidt balance. An auxiliary magnet of known moment is mounted vertically below the moving system and is movable vertically against a scale which is read when the moving system has been restored to its null position. *A.G.I.*

lacquer back. A transparent or translucent stone, the pavilion of which has been covered with colored lacquer, cement, or similar material to change or intensify its color. A glass imitation stone so treated is an imitation lacquer back. Gemmologically, it is a variety of Foil back. *Shipley.*

lacroixite. Possibly a basic fluophosphate of sodium, lithium, calcium, and aluminum with a trace of beryllium (no manganese). Pale yellow or green. Monoclinic (?). Fragmentary crystals. From Ehrenfriedersdorf, Saxony, Germany. *English.*

lactic acid. In flotation, a depressant sometimes used to depress iron minerals. *Pryor, 3.*

lacustrine. a. Produced by or belonging to lakes. *A.G.I.* b. Of, pertaining to, formed, growing in, or inhabiting lakes. *A.G.I.* c. Deposits which have been accumulated in freshwater lakes or marshes. *Gordon.*

lacustrine clay. Any clay which has been deposited in a lake. *ACSB-1.*

lacustrine deposit. One formed by deposition of mineral from fresh water in lagoons, swamps, lakes. *Pryor, 3.*

lacustrine sands. These are of the same general character as estuarine sands except that the organic constituents are different. Such sands are largely a product of fluviatile action though in some cases, as in mountain regions, much glacial material has found its way into the beds of lakes. Lacustrine sands are usually fairly uniform in texture but tend to be very variable in chemical composition. Sands which are deposited in lakes. *A.G.I.*

Ladd circular tunnel kiln. A rotary hearth kiln of a type introduced in 1941 by the Ladd Engineering Company. *See also* rotary-hearth kiln. *Dodd.*

ladder. a. The arm which carries the tumblers and bucket line of a dredge. *Fay.* b. Som. A wooden slide with crossbars on which hutches (boxes) run in steep seams. *Fay.* c. A framework consisting of two parallel, or roughly parallel, posts connected by bars at regular intervals along their length, thus providing a series of steps which enable the ladder to be used as an aid to climbing to different levels. *C.T.D.* d. The continuous line of mud buckets, carried on an oblique endless chain, in a bucket ladder excavator or dredger. *C.T.D.* e. The digging boom assembly in a hydraulic dredge or chain-and-buckets ditcher. *Nichols.* f. A horizontal support for glass tubing that is to be cut into lengths. *See also* washboard. *Dodd.*

ladder-bucket dredge. *See* bucket-ladder dredge. *Bureau of Mines Staff.*

ladder ditcher. An excavator that digs ditches by means of a chain of traveling buckets supported by a boom. *Bureau of Mines Staff.*

ladder dredge. A dredge having buckets carried on a ladder chain. *Fay.*

ladder drilling. Arrangement used in large-scale rock tunneling. Retractable drills with pneumatic power legs are mounted on prefabricated steel ladders in tiers, connected into a holding frame or jumbo. As many as 22 can be worked simultaneously by a small labor force. *Pryor, 3.*

ladder lode. Transverse fractures formed by the cooling of an eruptive dike and which have later become filled with ore. *Fay.*

ladderman. The man who works on the ropes passing over the head of a pile frame; he is a member of the team which includes a topman and a hammerman. *See also* pile head. *Ham.*

ladder plan. A scheme introduced by the National Coal Board of Great Britain in 1950 to provide for the part-time education of young mineworkers and to help them to qualify as technicians, engineers, and colliery officials. *See also* directed practical training. *Nelson.*

ladder reefs. When cooling, an igneous dike shrinks and spaces along the walls and across the intrusion are formed. These spaces are often filled with mineral deposited from thermal springs. When several transverse veins occur in a dike, they are known as ladder reefs on account of their resemblance to the rungs of a ladder. *Nelson.*

ladder sollar. A platform at the bottom of each ladder in a series. *Standard, 1964.*

ladder vein. More or less regularly spaced, short, transverse fracture fillings sometimes occurring in dikes. Synonym for ladder lode. *Schieferdecker.*

ladderway. a. *See* manway. *Nelson.* b. Mine shaft, raise, or winze between two main levels, equipped with ladders. *Pryor, 3.* c. The particular shaft, or compartment of a shaft, containing ladders. Also called ladder road. *Fay.*

lade. a. Scot. A load. *Fay.* b. A watercourse, ditch, or drain. *Fay.* c. The mouth of a river. *Fay.*

laded metal. Molten glass dipped from a melting pot to a casting table. *Standard, 1964.* Also called gathered metal.

lade hole. Leic. A shallow hole cut in the floor to receive the drainage. *Fay.*

ladies. Building slates, size 16 by 8 inches. *Pryor, 3.*

lading hole. In glassmaking, an orifice through which melted glass is ladled or taken out by a cuvette. *Standard, 1964.*

Ladinian. Upper Middle Triassic. *A.G.I. Supp.*

ladle. a. In smelter or foundry, steel holding vessel used in transfer and transport of molten metal, matte, or slag. *Pryor, 3.* b. A long-handled, cup-shaped tool for ladling glass out of or from one spot to another. Also used for filling open pots. *ASTM C162-66.* c. In glassmaking, a cuvette. *Standard, 1964.*

ladle addition. In foundry work, addition of special metals (for example, granulated nickel) or compounds (for example, ferrosilicon) to molten iron in ladle to produce special qualities in castings. *Pryor, 3.*

ladle brick. Fire clay brick suitable for lining ladles used to contain molten metal. *ACSG, 1963.*

ladle chaser. A man who distributes hot metal in ladles to different operations to keep the hot-metal crew busy to prevent skulling of ladles and delay at the mill. *Fay.*

ladle craneman. In the iron and steel industry, one who places ladles under the tapholes of furnaces and holds them in position while the metal is poured into them. Also called charging floor crane operator; ladle crane operator; steel charger. *D.O.T. 1.*

ladle engineer. In the iron and steel industry, one who transports ladles of hot molten metal between furnaces. *D.O.T. 1.*

ladle filler. In metallurgy, one who transfers molten metal from the furnace into a ladle, and skims and fluxes metal preparatory to casting. *D.O.T. Supp.*

ladle furnace. A small furnace for calcining or melting substances in a ladle. *Standard, 1964.*

ladle houseman. *See* ladle liner. *Fay.*

ladle liner. In ore dressing, smelting, and refining, one who repairs and relines pouring ladles used to transport molten metals, such as iron, steel, and copper. Also called ladle cleaner; ladle dauber; ladle houseman; ladle mender; ladle patcher; ladle repairman. *D.O.T. 1.*

ladle lip. A concave projection at the upper edge of a ladle to guide the metal in pouring. *Mersereau, 4th, p. 414.*

ladler. One who pours molten glass from suspended ladle on casting table for rolling into sheet glass. *D.O.T. Supp.*

ladle skuller. A laborer who removes rim and bottom skulls from hot-metal ladle cars. *Fay.*

La Farge cement. An imported nonstaining byproduct cement produced during the calcination of hydraulic lime. It develops nearly the same strength as the portland cements. *Crispin.*

Lafayette formation. A fluvioglacial deposit of reddish siliceous sand, 40 to 200 feet thick, made in the Pleistocene during the first glacial retreat, over the Mississippi Valley to the Gulf, and along the Atlantic Coast from Maryland to South Carolina. Formerly called Orange sand and Appomattox formation. *Fay.*

Lafond's tables. A set of tables and associated information for correcting reversing thermometers and computing dynamic height anomalies, compiled by E. C. Lafond and published by the U. S. Navy Hydrographic Office as H. O. Pub. No. 617. *H&G.*

lag. a. A flattish piece of wood or other material to wedge the timber or steel supports against the ground and to secure the area between the supports. *See also* lid; wedge. *Nelson.* b. To protect a shaft or level from falling rock by lining it with timber (lagging). *C.T.D.* c. Time required for circulation liquid to travel downward from the drill pump through the drill string to the bit or upward from the bottom of the borehole to the collar. *Long.* d. The lapse of time between the occurrence of an event or condition and its detection on a recording device. *Long.* e. To place planks, slabs, or small timbers over horizontal, or behind upright, members of the mine timber sets to form a ceiling or wall. *Long.* f. To provide or cover with lags; as, to lag a boiler with a nonconductor; to lag timbers in a mine. *Standard, 1964. See also* lags; lagging. *Fay.* g. Delay in one action following another. *Nichols.* h. To install lagging, or increase the diameter of a drum. *Nichols.* i. A falling behind or retardation of one phenomenon with respect to another phenomenon to which it is closely related; especially delay of a physical effect behind its cause or of the response of an indicating instrument behind the changed condition it registers. *Webster 3d.* j. In flotation, any retardation of an output with respect to the casual input. *Fuerstenau, p. 545.*

laga; lages. Braz. Loose masses of thin, flaggy rocks, considered as an indication of manganese ore near the surface. *Fay.*

lag bolt. *See* lag screw. *Fay.*

lagerart. In German mining terminology, the worthless syngenetic minerals accompanying the ore substance in sedimentary ore deposits. *Schieferdecker.*

lagergestein. In German mining terminology, the enclosed pieces of older rocks in a sedimentary ore deposit. *Schieferdecker.*

lag fault. A normal fault having a high angle of hade. *B.S. 3618, 1964, sec. 5.*

laggan stone. Rocking stones; great weather-worn masses of rock so nicely balanced on a small basis that they rock with the application of a slight force. *A.G.I.*

lagging. a. To secure the roof and sides behind the main timber or steel supports with short lengths of timber, sheet steel, or concrete slabs. Lagging wedges and secures the supports against the rock and provides early resistance to pressure. If concrete slabs are used, they are made in lengths to fit between the arch webs. The lagging behind steel arches in tunnels may be pyrolith-treated, fire-resisting boards. Also called lacing. *Nelson.* b. Pieces of timber about 4 feet 6 by 6 by 2 inches with one end sharpened or beveled to give the lath an upward trend when being driven into the roof gravels. A number of laths driven into the roof form a protective shield for the miners working in the face. Sometimes called laths. *Engineering and Mining J., v. 139, No. 4, April 1938, p. 55.* c. In shafts, planks, usually 2 inches, placed on the outside of sets. Coeur D'Alene lagging has 2- by 2-inch cleats nailed to the top and bottom of the wall and end plates about 2 inches back from the outer edge. The lagging is then cut to fit between the plates and is placed against the cleats and flush with the plates on the outside. *Lewis, p. 48.* d. Narrow boards, generally planed, placed horizontally on the arch frames of a center. On this lagging the arch of masonry is built. The term is also applied to poling boards. *Stauffer.* e. Planks, slabs, or small timbers placed over the caps or behind the posts of the timbering, not to carry the main weight, but to form a ceiling or a wall, preventing fragments or rock from falling through. *Fay.* f. Heavy planks or timbers used to support the roof of a mine, or for floors of working places, and for the accumulation of rock and earth in a stope. *Fay.* g. Long pieces of timbers closely fitted together and fastened to the drum rings to form a surface for the rope to wind on. *Fay.* h. The narrow strips supporting an arch of masonry while in construction. *Standard, 1964.* i. The surface or contact area of a drum or flat pulley, especially a detachable surface or one of special composition. *Nichols.* j. Boards fastened to the back of a shovel for blast protection. *Nichols.* k. Covering on boilers, tanks, and pipes used to provide thermal insulation. *Pryor, 3.* l. *See* lag. *C.T.D.* m. Material applied to pulleys to increase traction between the pulley and belt and to decrease wear on both. *Bureau of Mines Staff.*

lagging bar. *See* roof stringer. *Kentucky, p. 141.*

lag gravel. Introduced by Udden for residual accumulations of coarser particles from which the finer material had been blown away; similar to desert pavement, but more restricted in its implications as to the extent and continuity of the accumulation. *See also* desert pavement; pebble armor. *A.G.I.*

lag (lagged liner). A metal plate with raised areas, to be inserted in the bottom of shaker conveyor troughs and held in place by spot welding. The raised areas assist coal travel on steep grades or under wet conditions. *Jones.*

lag machine. A machine for fashioning wooden lags or lagging. *Standard, 1964.*

lag of ignition. The time which elapses during the preflame period. *Sinclair, I, p. 239.*

lagoon. a. A marsh, shallow pond, or lake, especially one into which the sea flows. *Fay.* b. A depression in the high, grass-covered tablelands of the western Cordilleras of the United States; typically without outlet, but not, like kettle holes, in glacial deposits. *Standard, 1964.* c. The basin of an Italian hot spring. *Standard, 1964.*

lagoonal. Quiet shallow water environment back of a reef barrier or an offshore sandbar with distinctive organisms and sedimentary conditions. *Wheeler.*

lagoonal deposition. The accumulation of sediment in a shallow arm of the sea, which is cut off from the outer ocean by a barrier which prevents free communication. The strata formed under such conditions constitute a lagoon phase. Examples in the stratigraphical column occur in the Lower Carboniferous and in the Rhaetic series. *C.T.D.*

lagoon cliff. *See* lagoon slope. *Schieferdecker.*

lagoon floor. The undulating to nearly level floor of the lagoon which is encircled by the lagoon slope, or by the peripheral reef where lagoon slope or lagoon shelf is missing. *Schieferdecker.*

lagoon margin. The lagoonward margin of the lagoon shelf, or of the reef flat along those parts of the peripheral reef that lack islands. At most places the lagoon margin of the peripheral reef is less sharply defined than the seaward reef edge. *Schieferdecker.*

lagoon moat. A lagoon formed by a barrier reef encircling an island. *Schieferdecker.*

lagoon shelf. That part of the peripheral reef which borders the lagoon side of a reef island, or the sand-covered, lagoonward sloping shelf that is commonly found where sedimentation conspicuously exceeds organic growth in this area. *Schieferdecker.*

lagoon shoal. Shallow portion of the lagoon in which corals still flourish. *Schieferdecker.*

lagoon slope; lagoon cliff. The border zone of the lagoon that slopes steeply downward from the lagoon margin to the lagoon floor. *Schieferdecker.*

lagoon type of coast. A coast showing one or more lagoons. *Schieferdecker.*

lagoonward rise. The elevated lagoonward margin of reef islands, characteristically consisting of dune sand, and broader and lower than the seaward rise. *Schieferdecker.*

lagos salt. A light, dry, flocculent salt made in England for the West African trade; made by grinding bar salt. *Kaufmann.*

Lagrangian method of current measurement. This method of current measurement plots the trajectory of the water parcel in time and space by tracking a drifting object; drift bottle methods. *Hy.*

lagre. Fr. In sheet glass manufacture, a sheet of perfectly smooth glass, interposed between the flattening stone and the clyinder that is to be flattened. *Standard, 1964.*

lags. Eng. Long pieces of timber closely fitted together and fastened to oak curbs or rings forming part of a drum used in sinking through quicksand or soft ground. *Fay.*

lag screw. a. A square-headed, heavy wood screw. It must be tightened down with a wrench as its head is not slotted. *Crispin.* b. A flat-headed machine screw by which to fasten wood lagging, as on a curved surface. *Standard, 1964.*

lag time. The total time between the initial application of current and the rupture of the circuit within the detonator. *B.S. 3618, 1964, sec. 6.*

lahar. A mudflow of volcanic material; ash and coarser products mixed with water. There are rain lahars, the rain being either the condensation of volcanic vapors or ordinary rain, and crater lake lahars, the result of the overflow and evacuation of crater lakes, and lahars due to the plunging of a nuee ardente into a river, a snowfield, or the sea. *Challinor.*

laid out. Newc. When a car or tub contains an excess of small coal or stones, it is forfeited, or laid out by the miner. *Fay.*

laigh. Scot. Low as laigh doors; laigh lift; laigh side; laigh level. *Fay.*

lair. Clay; mud; mire. *Arkell.*

laired. Eng. Choked with mud. *Fay.*

laitakarite. A rhombohedral mineral, Bi_4Se_2S, isostructural with joseite; from Orijarvi, Finland. *Hey, M.M., 1961.*

laitance. The layer of water sometimes formed on the upper surface of freshly placed concrete as a result of the aggregate settling by sedimentation. *See also* bleeding. *Dodd.*

laja. Sp. Shale, including bituminous shale. *Hess.*

lakarpite. A phanerocrystalline rock composed of microcline, oligoclase, and soda-amphibole; aegirine or rosenbuschite may also be present; found at Korra Kärr, Sweden. *Holmes, 1928.*

lake. a. An inland body of water or natural enclosed basin serving to drain the surrounding country, generally of considerable size and connected with the sea by a stream formed from its overflow. *Standard, 1964.* b. A pigment formed by absorbing animal, vegetable, or coal-tar coloring matter, from an aqueous solution by means of metallic bases. *Fay.*

lake asphalt. *See* Lake pitch. *Tomkeieff, 1954.*

lake balls. Natural felt balls found in shallow waters of some lakes. Also called hair balls; water-rolled weed balls; burr balls. *See also* sea balls. *Pettijohn.*

lake-bed placers. In Alaska, placers accumulated in the beds of present or ancient lakes; generally formed by landslides or glacial damming. *Fay.*

Lake copper. Copper produced from the Lake Superior ores in which the metal occurs native and is of high purity. Before modern methods of refining were developed, this was the purest copper produced. *C.T.D.*

Lake George diamond. Colorless, doubly terminated quartz crystal from Herkimer County, N.Y. *Shipley.*

lake marl; bog lime. A fine calcareous deposit from plants in lakes. *Nelson.*

lake ore. *See* bog iron ore. *Fay.*

lake peat. Same as sedimentary peat. *Tomkeieff, 1954.*

lake pitch. Asphalt from the Pitch Lake, Trinidad. It is richer than the land pitch in bituminous matter; soluble in petroleum spirit. *Fay.*

Lake Superior agate. a. Any agate from the Lake Superior region. *Shipley.* b. An incorrect name for thomsonite from the same region which is marked or banded as is agate. *Shipley.*

Lake Superior fire agate. A glass imitation of opal. *Shipley.*

Lake Superior greenstone. Chlorastrolite. *Shipley.*

lakmaite. A compact, dark green to black igneous rock with small feldspar phenocrysts in a glassy groundmass. It is between basalt and andesite in character. *Hess.*

lam; lamb. War. A kind of fire clay. *Fay.*

lama. a. Mex. Literally, slime. The argentiferous mud which is treated by any amalgamation process; sometimes applied to tailings. Mud in a vein. *Fay.* b. Mex. Moist clay used by miners for stocking candles to their hats. *Fay.*

lamb. *See* lam. *Fay.*

lamb and slack. Can. Refuse coal. *Fay.*

lamber; lambre; lambur; lawmbyr; ambyr. Old English names for amber still preserved in dialect and vernacular. *Tomkeieff, 1954.*

Lambert's Law. *See* translucency. *Dodd.*

lambiotte process. A continuous carbonization process employed originally in Europe. *E.C.T., v. 15, p. 95.*

lambre. *See* lamber. *Tomkeieff, 1954.*

lambskin. A Wales term for anthracite coal of inferior quality; culm. *Fay.*

Lambton flight. *See* flight loader. *Nelson.*

lambur. *See* lamber. *Tomkeieff, 1954.*

lame. Earthenware; a potsherd. Variation of loam. *Fay.*

lamella. One of the layers of a cell wall. *A.G.I.*

lamellar. Composed of thin layers, plates, scales, or lamellae; disposed in layers like the leaves of a book. *Standard, 1964.*

lamellar flow. Movement of liquid whereby successive layers glide over one another like cards in a sheared pack of playing cards. *Compare* turbulent flow. *A.G.I.*

lamella roof. A vault of large span built up with short structural members of timber or pressed steel, joined together in diamond pattern by bolting or other suitable connections. This system, which is a type of stressed-skin construction, was patented in 1925 by a German engineer. *Ham.*

lamellar pyrites. Another name for marcasite. *Bureau of Mines Staff.*

lamellar stellate. In mineralogy, having or consisting of lamellae arranged in groups resembling stars. *Standard, 1964.*

lamellar twinning structure. A structure showing twinning parallel to crystal planes within grains or crystals. *Schieferdecker.*

lame-skirting. Newc. Widening a passage by cutting coal from the side of it. Also called skipping; slicing. *Fay.*

laminable. Capable of being rolled or hammered into thin sheets; as, gold is the most laminable metal. *Standard, 1964.*

laminae. The thinnest separable layers or sheets in stratified rocks, whether original planes of deposition, parallel or oblique, to the general stratification, or in rarer usage, planes of cleavage transverse to stratification. *Standard, 1964.*

laminar corrugations. *See* intraformational corrugation. *Pettijohn.*

laminar flow. a. That type of flow in which the stream lines (or stream surfaces) remain distinct from one another (except for molecular mixing) over their entire length. Under laminar flow the head loss is proportional to the first power of the velocity. It is typical of ground-water movement under most conditions. *A.G.I.* b. A flow of current without turbulence. A smooth flow at relatively slow velocity in which the fluid elements follow paths that are straight and are parallel to the channel walls. *See also* lamellar flow. *A.G.I.* c. Laminar or streamline flow is the smooth nonturbulent movement of a body of air when each particle travels parallel to the sides of the confining airway. *Spalding.*

laminaria. Kelp brown sea plants. A source for active carbon. *E.C.T., v. 12, pp. 116 and 2,887.*

laminar velocity. That velocity below which, in a particular conduit, laminar flow will always exist, and above which the flow may be either laminar or turbulent, depending on circumstances. *Seelye, 1.* Also known as lower critical velocity.

laminary flow. *See* laminar flow.

laminate. a. A material in sheet form consisting of several different layers united by a ceramic bond. Ceramic laminates have been made to provide lightweight heat insulation. Refractory laminates have been used as bats on which to fire electroceramics and ferrites; these laminates consist of a silicon carbide core with outer layers of alumina or mullite. *Dodd.* b. A composite metal, usually in the form of sheet or bar, composed of two or more metal layers so bonded that the composite metal forms a structural member. *ASM Gloss.* c. To form a metallic product of two or more bonded layers. *ASM Gloss.*

laminated. In thin parallel layers. *Nichols.*

laminated clay. A type of clay exhibiting lamination (that is, very fine stratification); characteristic of accumulation under lacustrine conditions. *C.T.D.*

laminated coal. a. Thinly bedded coal. *Tomkeieff, 1954.* b. Same as dysodile. *Tomkeieff, 1954.*

laminated glass. *See* laminated safety glass; safety glass. *ASTM C162-66.*

laminated glass pressman. One who operates a press that completes the binding of two plates of glass. *D.O.T. 1.*

laminated iron. Iron in the form of thin sheets; used as cores of transformers, etc. The losses due to eddy currents with laminated iron cores ore lower when compared with solid cores. *Nelson.*

laminated quartz. Vein quartz characterized by slabs or films of other material. Laminated quartz is a general term including book and ribbon structure. *A.G.I.*

laminated safety glass. Two or more pieces of glass held together by an intervening layer or layers of plastic materials. It will crack and break under sufficient impact, but the pieces of glass tend to adhere to the plastic and not to fly. If a hole is produced, the edges are likely to be less jagged than would be the case with ordinary glass. *See also* safety glass. *ACSG, 1963.*

laminating machine. A set of rolls or any apparatus for making thin plates of metal, as for rolling gold, preliminary to beating. *Standard, 1964.*

laminating roller. The adjustable roller in a rolling mill whereby the thickness of rolled metal sheets is regulated. *Standard, 1964.*

lamination. a. Stratification on a fine scale, each thin stratum, or lamina, being a small fraction of an inch in thickness. Typically, exhibited by shales and fine-grained sandstones. *C.T.D.* b. The layering or bedding less than 1 centimenter in thickness in a sedimentary rock. *A.G.I.* c. The more or less distinct alternation of material, which differs one from the other in grain size or composition. *A.G.I.* d. Some rocks, such as shales, can commonly be split into thin layers. Such rocks are said to be laminated or to possess a laminated structure. *Nelson.*

laminations. a. Of rocks, bedding in layers less than one-fourth inch thick; formation with thin layers which vary in grain or composition. *Pryor, 3.* b. Metal defects with separation or weakness generally alined parallel to the worked surface of the metal. They may be the result of pipe, blisters, seams, inclusions, or segregation elongated and made directional by working. Lamination defects may also occur in metal powder compacts. *ASM Gloss.* c. Planes or contours of weakness in a molded or extruded ceramic shape, which may develop during the forming process. *Bureau of Mines Staff.* d. In construction of electromagnets for alternating current, reduction of eddy glow by means of laminar poles or cores. *Pryor, 3.*

Laming process. The removal of carbon dioxide and hydrogen sulfide from coal gas by passing it through a bed of lime, sawdust, or cinders, and ferric hydroxide. *Standard, 1964.*

lamings. a. Partings in coal seams. *Arkell.* b. N. of Eng. A collier's term for accidents of almost every description to men and boys working in and about the mines. A variation of lame to cripple or disable. *Fay.*

laminite. Suggested by Knopf to replace rhythmite, in order to avoid positive implication of perfect periodicity in recurrence of laminae. *A.G.I.*

lammie. A brick swelled out of shape in the kiln. *Standard, 1964.*

Lamotte comparator. A pH meter of a type recommended by the United States Porcelain Enamel Institute for use in the determination of the acidity or alkalinity of pickling solutions. *Dodd.*

lamp. a. Any device employing a flame, incandescent wire, or the like, for furnishing an artificial light, or a similar device for heating, as in laboratory use. *Standard, 1964. See also* safety lamp. *Fay.* b. Among the specially developed sources of artificial light are the arc lamp, with electric discharge between two electrodes; the filament, in which current passes through resistant wire protected by vacuum or inert gas, and heats it to incandescence; the fluorescent, in which the interior of a tube or globe is coated with powder which fluoresces under the influence of ultraviolet radiation; the mercury, in which mercury vaporized in a high-vacuum tube conducts a current between electrodes and gives strong ultraviolet emission, the container being of quartz; the Nernst, with a metal oxide filament; and the spectrum lamp which has a nonluminous flame (used in spectrography). *Pryor, 3.* c. A small handheld electrical device that produces intense ultraviolet radiation. *Long.* d. The use of an electrical lamplike device producing intense ultraviolet radiations to examine visually drill cores or rock specimens for the presence and/or abundance of fluorescent minerals, such as scheelite, autunite, and petroleum. *Long.*

lampadite. Hydrated oxide of manganese and coper; the name is often used for all hydrous oxides of manganese containing copper, and regarded as a variety of wad. *Hey 2d, 1955.*

lampan. a. A Malayan term for an opencut hillside mine in which running water is used to remove the ore. *Fay.* b. A Malayan term for ground sluicing. *Hess.*

Lampasan. Upper lower Pennsylvanian. *A.G.I. Supp.*

lampblack. A black or gray pigment made by burning low-grade heavy oils or similar carbonaceous materials with insufficient air, and in a closed system so that that the soot can be collected in settling chambers. Properties are markedly different from carbon black. Used as a black pigment for cements and ceramic ware, an ingredient in liquid-air explosives, in lubricating compositions, and as a reagent in the cementation of steel. *CCD 6d, 1961.*

lamp-blown. Glassware shaped by means of an oxy-gas or air-gas burner; glass tubing or rod is the usual starting material. *Dodd.*

lamp cabin. a. Eng. A place above ground, or underground near the pit bottom, where the safety lamps are repaired, cleaned, examined, lighted, and locked, before being handed to the workmen in cases where naked lights are not allowed to be taken from the bottom of a shaft. *Fay.* b. *See* lamp room. *B.S. 3618, 1965, sec. 7.*

lamp charging rack. Mine lamp charging racks allow miners to store lamp units for recharging after daily use. Racks can be numbered to assure regularity. Connections allow batteries to be recharged while in storage. Racks expedite traffic through lamp house, assure lamps will be always ready for use, and help prevent lamp burnout. *Bests, p. 374.*

lamp cleaner. *See* lampman. *D.O.T. 1.*

lamp cup. A means for supporting a flame safety lamp on a tripod to provide a sight for surveying. *B.S. 3618, 1963, sec. 1.*

lamphole. A small shaft sunk over the center of a sewer so that a lamp can be lowered into it to facilitate inspection of the sewer from a manhole. *Ham.*

lamp house. *See* lamp cabin.

lamp-house man. *See* lampman. *D.O.T. 1.*

lamping. In prospecting, use of a portable ultra-violet lamp to reveal fluorescent minerals. *Pryor, 3.*

lamp keeper. *See* lampman. *D.O.T. 1.*

lampman. a. A person having responsibility for cleaning, maintaining, and servicing of miners' lamps. *ASA C42.85, 1956.* b. The man in charge of the lamp room at a mine and is responsible for the maintenance of the safety lamps. *Nelson.* c. In mining, one who cleans, tests, and repairs electric lamps, used underground by miners. Also called battery charger; lamp cleaner; lamp-house man; lamp keeper; lamp repairer; safety-lamp keeper. *D.O.T. 1.*

lamp oil. *See* kerosine. *C.T.D.*

lamp rack. A rack upon which electric cap-lamp batteries are placed to be charged. *Grove.*

lamp repairer. *See* lampman. *D.O.T. 1.*

lamprobolite. To replace the names basaltic hornblende, basaltine, and oxyhornblende for the black, lustrous crystals of hornblende rich in ferric iron, with high refringence and by refringence and strong pleochroism, of volcanic rock (not only basalts). *Spencer 16, M.M., 1943.*

lamproite. Volcanic or hypabyssal igneous rocks, melanocratic end-members of syenites. Includes ovendite, madupite, verite, wyomingite, leucite, phonolite, etc. *Hess.*

lamp room; lamp cabin. A room or building at the surface of a mine, provided for charging, servicing, and issuing all cap, hand, and flame safety lamps held at the mine. *B.S. 3618, 1965, sec. 7. See also* self-service system. *Nelson.*

lampropyllite. A platy titanium-bearing silicate, $CaNa_3Ti_3Si_3O_{11}(OH,F)$. *Dana 17, pp. 413,603.*

lamprophyre. A group name applied to dark dike rocks in which dark minerals occur both as phenocrysts and in the groundmass, and light minerals occur only in the groundmass. They differ from normal rocks in which light and dark minerals occur both as phenocrysts and in the groundmass. The essential constituents of lamprophyeres are biotite, hornblende, or pyroxene, or combinations of the three, and feldspar or feldspathoids. Olivine is present in some varieties. Apatite, perovskite, opaque oxides, and quartz are common accessories. Lamprophyres are commonly highly altered and contain much chlorite and calcite. They range in composition from syenitic to gabbroic and are transitional into ultramafics with increasing dark constituents. Usually they are rich in alkalies, especially potassium. *A.G.I.*

lamprophyric. In petrology, of fine-grained granophysic texture and characterized by phenocrysts of a dark silicate, such as biotite, hornblende, or augite. *Fay.*

lamproschist. A term given to metamorphosed lamprophyres with brown biotite and green bornblende. *A.G.I.*

lamps. General service lamp bulbs are made of soda lime glass in various styles of finish. For industrial use they are either clear, pearl or diffused, or internally coated with a thin coat of silica. The brightness of clear gas-filled lamps ranges from 2,500 to 4,400 candles per square inch depending on the size of lamp, while that of the pearl lamp is a maximum of 40 to 130 candles per square inch with a negligible light loss. The brightness of the silica coated lamp is about 20 candles per square inch with a light loss of about 5 percent as compared with the clear bulb. *Roberts, II, p. 184.*

lamp station. a. Fixed places in the intake airway of a coal mine where the miners' safety lamps are externally examined by a deputy before the men proceed to their working places. In a safety lamp mine, the lamp station is the only place where flame safety lamps may be opened and relighted. *See also* cabin. *Nelson.* b. A place underground, appointed for the examination, by an official, of safety lamps in use. *B.S. 3618, 1965, sec. 7.* c. Locations in gaseous mines where safety lamps are opened, cleaned, and refilled or charged by a qualified attendant. *Hudson.* d. A lamp room. *Fay.*

lamp testing. *See* trying a lamp. *B.S. 3618, 1965, sec. 7.*

lampworking. Forming glass articles from tubing and cane by heating in a gas flame. *ASTM C162-66.*

Lanarkian. A subdivision of the Coal Measures—based mainly on plant fossils. It represents in part the millstone grit of South Wales; well developed in South Scotland, where coal seams are present. *Nelson.*

lanarkite. A very rare monoclinic sulfate of lead, $PbO.PbSO_4$, with anglesite and leadhillite (into which it easily alters) from Leadhills, Lanarkshire, Scotland; white, greenish to gray; one perfect cleavage. *C.M.D.; Larsen, p. 207.*

Lancashire boiler; fire tube boiler. A cylindrical steam boiler consisting in its simplest form of two longitudinal furnaces or fire tubes fitted with internal grates at the front. After leaving the tubes the hot gases pass to the front along a bottom flue, and return to the chimney along wing or side flues. The Cornish and other relatively small boilers are of this general type. *Nelson.*

Lancashire bord-and-pillar system. *See* bord-and-pillar method. *Fay.*

Lancashire method. A method of working moderately inclined coal seams. The first stage consists in splitting a panel of coal into pillars and as a second stage the pillars are extracted on the retreat by a longwall face. *Nelson.*

Lancaster mixer. Trade name; a countercurrent pan-type mixer. *Dodd.*

lance. In founding, particularly in casting bombshells, an iron rod piercing through the mold and the core, for holding the latter firmly in place during the casting. *Standard, 1964.*

lanchut. A short sluice used for cleaning tin concentrate. *Hess.*

lancing. Cutting along a line in the workpiece without producing a detached slug. *ASM Gloss.*

land. a. The exposed part of the earth's surface, as distinguished from the submerged part. *Fay.* b. The rural regions. *Fay.* c. The plane surface between the furrows of a millstone. *Fay.* d. Forest of Dean. Rising in the direction of the surface or outcropping. Workings to the rise of a drainage level. *Fay.* e. To set or allow the bottom end of a drivepipe or casing to rest at a preselected horizon in a borehole. *Long.* f. A backfurrow. *Nichols.* g. For profile-sharpened milling cutters, the relieved portion immediately behind the cutting edge. *ASM Gloss.* h. For reamers, drills, and taps, the solid section between the flutes. *ASM Gloss.*

land accretion. The reclamation of land from the sea or from marshes. *Ham.*

land asphalt. An inferior asphalt containing various impurities and lacking cementing qualities; from places outside of the Trinidad asphalt lake. *Fay.*

land chain. A surveyor's chain of 100 links. *Fay.*

land chairs. Keps. *Pryor, 3.*

land compass. A surveyor's circumferentor, or compass. *Fay.*

land district. A division, of a State or Territory, created by law in which is located the land office for the disposition of the public lands therein. *Fay.*

land drain. *See* agricultural drain; French drain. *Ham.*

land drainage. The act or process of freeing land from water. *Fay.*

land-drain pipe. *See* field-drain pipe. *Dodd.*

Landenian. Upper Paleocene. *A.G.I. Supp.*

lander. a. A worker stationed at one of the levels of a mine shaft to unload rock from the bucket or cage and load drilling and blasting supplies to be lowered to the crew. *Webster 3d.* b. In the quarry industry, one who supervises and assists in guiding, steadying, and loading on trucks or railroad cars, blocks of stone hoisted from the quarry floor. Also called top hooker. *D.O.T. 1.* c. In metal mining, a laborer who cleans skips by directing a blast of compressed air into them through a hose; records number of loaded skips hoisted to surface; and loads railroad cars with ore from bins by raising and lowering chute doors. *D.O.T. 1.* d. In anthracite coal mining, bituminous coal mining, metal mining, one who works with shaft sinking crew at top of shaft or at a level immediately above shaft bottom, dumping rock into mine cars from a bucket in which it is raised. Also called bucket dumper; landing tender; top lander. *D.O.T. 1.* e. Eng. The man who reecives the loaded bucket or tub at the mouth of the shaft. Also called banksman. *Fay.*

landerite. A rose-pink variety of grossularite garnet. Dodecahedrons. From Xalostoc, Morelos, Mex. Also called rosolite; xalostocite. *English.*

lander's crook. A hook or tongs for upsetting the bucket of hoisted rock. *Fay.*

landesite. A brown, hydrous phosphate of manganese and iron, $3Fe_2O_3.20MnO.-8P_2O_5.27H_2O$; orthorhombic (?). Rough octahedral-like crystals. An alteration product of reddingite. From Poland, Me. *English.*

landfall. A landslide or landslip. *Fay.*

landfast ice. All types of ice, either broken or unbroken, attached to the shore, beached, or stranded in shallow water; also called fast ice. *Hy.*

land floe. A field of land ice. *Standard, 1964.*

landform. Applied by physiographers to each of the multitudinous features that, taken together, make up the surface of the earth. It includes all broad features, such as plain, plateau, and mountain, and also all the minor features, such as hill, valley, slope, canyon, arroyo, and alluvial fan. Most of these features are the products of erosion, but the term also includes all forms due to sedimentation and to movements within the crust of the earth. *USGS Bull. 730, 1923, p. 88.*

land ice. a. Ice formed on the land. *Standard, 1964.* b. Ice along the shore or fast between headlands, as distinguished from floe ice. *Standard, 1964.*

landing. a. Level stage in a shaft, at which cages are loaded and discharged. *Pryor, 3.* b. The top or bottom of a slope, shaft, or inclined plane. *Fay.* c. The mouth of a shaft where the cages are unloaded; any point in the shaft at which the cage can be loaded with men or materials. *Nelson.* d. The brow or level section at the top of an inclined haulage plane where the loaded tubs are exchanged for empty tubs or vice versa. *Nelson.* e. A platform on which tubs are turned or landed. Also called landing plate. *Mason.* f. N. of Eng. Area where tubs are assembled and connected to the seam haulage system. *Trist.* g. Eng. The passbye to and from which the mechanical haulage sets run. *SMRB, Paper No. 61.* h. A preselected and prepared horizon in a borehole on or at which the bottom end of a drivepipe or casing string is to be set. *Long.* i. A platform from which to charge a furnace. *Standard, 1964.*

landing box. Scot. The box into which a pump delivers water. *Fay.*

landing keps. *See* keps. Also called chairs. *Nelson.*

landings. S. Wales. Coal sent to the surface; the output. *Fay.*

landing shaft. S. Wales. A shaft through which coal is raised. *Fay.*

landing tender. *See* lander. *D.O.T. 1.*

land leveler. A towed scraper with a bottomless bucket centrally mounted in a long frame; used chiefly in agricultural grading. *Nichols.*

land pebble. A type of phosphate rock consisting of pebbles of phosphatic material in a clay and sand matrix. It sometimes contains a small amount of uranium, which is recovered as a byproduct. A source of phosphate for fertilizer. Found in Florida. *CCD 6d, 1961.*

land-pebble phosphate. A Florida term for certain phosphatic pebbles, as distinguished from river-pebble phosphates. *Fay.*

land pitch. Asphalt from the deposit in Trinidad lying between the Pitch Lake and the seacoast. *Fay.*

land plaster. Any earthy or rock gypsum ground fine and used as a fertilizer. *Standard, 1964.*

land rock. *See* phosphate rock. *Fay.*

landry box. Newc. A box at the top of a set of pumps into which the water is delivered. *See* launder. *Fay.*

land sale. a. Coals sold at the pithead or at a depot and conveyed in lorries to local consumers. *See also* haunt. *Nelson.* b. Scot. Sale of coal direct from colliery's road transport vehicles. Also called hillsale. *Pryor, 3.* c. Eng. Coal loaded into carts or wagons at the mine for local consumption. Also called cart trade; wagon sales. *Fay.* d. Applied to the coal as distributed and to the depot from which distribution is made. *B.S. 3323, 1960.*

land-sale colliery. N. of Eng. A colliery situated in a remote district, being unconnected with rail, canal, or sea, and generally working thin or inferior seams. *Fay.* Wagon mine. *Hess.*

landscape agate. White or gray chalcedony with inclusions of irregular arrangements of manganese oxide which bear fanciful resemblance to a landscape. *Shipley.*

landscape marble. A marble or argillaceous limestone containing dark coloring matter so distributed as to be imitative of forests or landscapes. Same as forest marble. *Holmes, 1928.*

land sculpture. The carving of the surfaces of the land by the various processes of erosion. *Standard, 1964.*

landshut. Prov. Eng. A landslide or a landflood. *Standard, 1964.*

landslide. a. The perceptible downward sliding or falling of a relatively dry mass of earth, rock, or mixture of the two. Same as landslip. *A.G.I.* b. Earth and rock which become loosened from a hillside by moisture or snow, and slides or falls down the slope. *A.G.I.* c. The downward and often sudden movement of superficial deposits on hillside slopes. The movement is in response to gravity and may start due to an increase in weight such as water content, or the removal of support at the base by cuttings. At new mine sites, deep excavations, heavy blasting, and the movement of heavy machines will increase the danger of landslides. *See also* rainwash; rock slip. *Nelson.*

landslide scar. A bare or relatively bare surface left by the removal of a mass of earth material in a landslide. *Stokes and Varnes, 1955.*

landslide topography. The topography developed by landsliding. It is characterized by short irregular hills, undrained depressions, and chaotic arrangement of boulders and finer fragments, and by its lack of harmony with the adjacent landscape. In some respects, it is similar to irregular, morainic deposits of glaciers. *Stokes and Varnes, 1955.*

landslip. A portion of a hillside or sloping mass which becomes loosened or detached, and slips down. A landslide. *Fay.*

landslip terrace. A short, rough-surfaced terrace resulting from the slip of a segment of a hill. *Standard, 1964.*

land surveying. *See* survey; survey, cadastral; surveying.

land surveyor. a. A trained specialist who measures land and its natural features together with any buildings, roads, etc., thereon, for drawing to scale as plans or maps. His usual professional qualification is membership of the Royal Institute of Chartered Surveyors and he may also hold a university degree. *Ham.* b. In the United States, the qualifications of land surveyors who engage in public practice, especially in connection with surveys related to ownership, legal disputes, etc., is normally controlled by registration with the State Government after suitable experience and passing appropriate tests. *Bureau of Mines Staff.*

lands valuable for minerals. As used in the mining law, applies to all lands chiefly valuable for nonmetalliferous deposits, such as alum, asphaltum, borax, guano, diamonds, gypsum, marble, mica, slate, amber petroleum, limestone, and building stone, rather than for agricultural purposes. Such lands are subject to disposition by the United States under the mining laws only. *Ricketts, I.*

land tie. A tie rod anchored to a dead man in a retaining wall of steel sheet piling or other construction. *Ham.*

land-tied island. *See* attached island. *Schieferdecker.*

land tile. Short pieces of porous pipe with but (open) joints, used for underground drainage. *Nichols.*

land weight. Lanc. The pressure exerted by the subsidence of the cover or overburden. *Fay.*

Lane mill. A slow-speed roller mill of the Chilean type. A horizontal spider carrying six rollers revolves slowly in a pan 10 feet or more in diameter making about 8 revolutions per minute. *Liddell 2d, p. 357.*

langbanite. An iron-black manganese silicate with ferrous antimonate, $Fe_2O_3,Mn_2O_3,-SiO_2$; prismatic crystals; hexagonal. From Langban, Sweden. *Webster 3d; Hess.*

langbeinite. A natural sulfate of potassium and magnesium, $K_2Mg_2(SO_4)_3$; found in salt deposits. It is colorless, yellowish, reddish, greenish; luster vitreous; hardness. 3.5 to 4; specific gravity, 2.83. Found in New Mexico; Germany and India. A source of potash. *CCD 6d, 1961.*

langite. A blue to green, rare ore of copper, $CuSO_2.xH_2O$, occurring in Cornwall, England. It is an essentially hydrated copper sulfate, crystallizing in the orthorhombic system. *C.M.D.*

lang lay rope. A rope in which the wires are twisted in the same direction as the strands and the wires are thus exposed to wear for a much greater length than in round rope. The smoother lang lay resists wear to better advantage and is frequently preferred for haulage ropes. *Lewis, p. 249.* Also known as universal lay rope. *Sinclair, V, p. 7.*

Langmuir's adsorption isotherm. The equation for calculating a gas monolayer on a flat surface. *Pryor, 3.*

Langmuir trough. Rectangular tank used to measure the surface tension of a monolayer adsorbed at the surface of a liquid. *Pryor, 3.*

Lang's lay rope. *See* winding rope. *Nelson.*

languedoc marble. A brilliant red or scarlet marble blotched with white; from the Montagne Noire, in the French Pyrenees. *Fay.*

lansfordite. An unstable colorless mineral with a perfect cleavage, $MgO.CO_2.5H_2O$; alters on exposure to air into nesquehonite. *Larsen, p. 96.*

lantern. a. Enclosed light (candle or oil) carried by a mine worker. *Hess.* b. In a centrifugal pump, a hollow casing on the engine side of the pump body. *Nichols.* c. In founding, a core barrel comparatively short for its diameter. *Standard, 1964.*

lantern coal. Another name for cannel coal. *Tomkeieff, 1954.*

lantern ring. Protecting device used in some centrifugal pumps to protect the driving shaft from abrasion due to back leakage of abrasives from the pulp being pumped. The ring has apertures through which water is forced into the system in such a way as to keep a trickle opposing this back pressure near the stuffing box (sealing ring). *Pryor, 3.*

lanthana. *See* lanthanum oxide. *CCD 6d, 1961.*

lanthanides. The rare earth elements from atomic numbers 58 to 71 inclusive. They have chemical properties similar to lanthanum; hence the group name, lanthanides. *NRC-ASA N1.1-1957.*

lanthanite. A very rare, weakly radioactive, orthorhombic mineral, $[(La,Ce)_2(CO_3)_3.8H_2O]$, occurring in zinc and iron ore deposits and in pegmatites; platy, thick tabular, lathlike; also fine granular, earthy, or scaly; colorless, white, pink, or yellow. *Crosby, pp. 103-104.*

lanthanum. The most common and most basic of the metals of the rare earth group. It is a silvery-white metal and can take a high polish. It occurs with other members of the rare earth group in cerite; in bastnaesite; in allanite found in Brazil, Scandinavia, and the United States; and in monazite sands of India and Ceylon. Symbol, La; valence, 3; atomic number, 57; atomic weight, 138.91; and specific heat, 0.045 (at 20° C). *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-117.* Malleable; ductile; soft; three allotropic forms, including hexagonal (alpha lanthanum) and isometric (beta lanthanum); transition temperature between alpha lanthanum and beta lanthanum, about 350° C; specific gravity, alpha lanthanum, 6.194, and beta lanthanum, 6.17, but ranges from 5.98 to 6.194, depending on the crystal structure; lights in air at 440° C; melting point, 920° C; boiling point, 3,469° C; decomposes in water forming lanthanum hydroxide; soluble in mineral acids; and insoluble in concentrated sulfuric acid. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-117, B-184.*

lanthanum carbide. LaC_2 exists in various forms: the tetragonal room temperature form changes to hexagonal at intermediate temperatures; at 1,750° C, through reaction with excess carbon a cubic phase is produced. *Dodd.*

lanthanum oxide; lanthana; lanthanum sesquioxide. White; amorphous, orthorhombic, or hexagonal; La_2O_3; specific gravity, 6.51 (at 15° C); melting point, 2,315° C; boiling point, 4,200° C; soluble in acids and in ammonium chloride; insoluble in cold water; decomposes in hot water; hisses in moist air like quicklime; and insoluble in acetone. Used in calcium lights instead of lime, in optical glass, and in technical ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-117, B-184.*

lanthanum sesquioxide. *See* lanthanum oxide. *CCD 6d, 1961.*

lanthanum titanates. Two compounds have been reported: $LaTiO_3$ and $La_2Ti_3O_9$; the former has a perovskite structure and can be synthesized by heating a mixture of La_2O_3 and Ti_2O_3 at 1,200° C in a vacuum. *Dodd.*

lanyon shield. An iron curtain, stiffened by ribs of angle iron, suspended from trolley wheels running on a rail parallel with and in front of a zinc furnace. Its main purpose is to protect the worker from the furnace heat. *Fay.*

lap. a. One coil of rope on the winding drum of the mine hoist. *Pryor, 3.* b. Polishing cloth used in preparing polished mineral specimens by abrasive grinding. *Pryor, 3.* c. A surface defect, appearing as a seam, caused by folding over hot metal, fins, or sharp corners and then rolling or forging them into the surface, but not welding them. *ASM Gloss.* d. To dimension, smooth, or polish (as a metal surface or body) to a high degree of refinement or accuracy. *Webster 3d.* e An imperfection; a fold in the surface of a glass article caused by incorrect flow during forming. *ASTM C162-66.* f. A tool used for polishing glass. *ASTM C162-66.* g. A revolving disk of brass, lead, etc., used to hold an abrasive powder on its surface for cutting glass, gems, etc. *Webster 2d.* h. To cut or polish with a lap as glass, gems, cutler, etc. *Webster 2d.*

laper; leaper; leper. Eng. Laper. Impure sandy limestone (containing green matter) with shaly partings and a few seams of beef in the lower part, Middle Purbeck beds, Swanage. *Arkell.*

lapidarist. A connoisseur of gems and precious stones and the art of cutting them. *Webster 2d.*

lapidary. A cutter, polisher, or engraver of precious stones other than diamonds. *Webster 3d.*

lapidify. To convert, or the process of conversion, into stone; the process by which soft animal bodies are converted into hard stone. *A.G.I.*

lapilli. Essential, accessory, and accidental volcanic ejecta ranging mostly from 4 to 32 millimeters in diameter. *A.G.I.*

lapilliform. Having the form of small stones. *Standard, 1964.*

lapis. A stone. Chiefly used in Latin phrases. *Webster 2d.*

lapis Assius. A limestone used among the Greeks for coffins which distintegrated within a few weeks, the flesh of bodies deposited in it; said to have been found at Assos, a city of Lycia. Also called Assian stone; sarcophagus. *Webster 2d.*

lapis lazuli; lazurite. A natural sodium aluminum sulfosilicate, $Na_{4-5}Al_3Si_3O_{12}S$; usually somewhat impure; color deep blue to greenish blue; luster vitreous; Mohs' hardness, 5 to 5.5; specific gravity, 2.4. Found in California; Afghanistan, U.S.S.R., Chile. Used in ornamental stone. Formerly a paint pigment (ultramarine) but now superseded by the artificial product. *CCD 6d, 1961.*

lapis lazuli ware. A variety of Wedgewood ware. *See also* pebble ware. *Fay.*

lapis matrix. Lapis lazuli containing prominent patches of calcite. *See also* Chilean lapis. *Shipley.*

lap joint. A joint made with two overlapping members. *ASM Gloss.*

La Plata sandstone. A Jurassic sandstone, representing a dune sand of desert origin, occurring in southwest Colorado; equivalent to the White Cliff sandstone of the Grand Canyon section. *C.T.D.*

LaPointe picker. Miniature belt conveyor, on which small ore particles move singly past a Geiger Muller tube which is set to operate a sorting device. This removes from the passing stream each particle of radioactive ore which reaches the required intensity, therefore sorting out the valuable material. *Pryor, 3.*

lapped. a. Overlapped and fitted together. *Nichols.* b. Polished with a lap. *Bureau of Mines Staff.*

lapping. Finishing surfaces by abrasion with an object, usually made of copper, lead, cast iron, or close-grained wood, having very fine abrasive particles rolled into its surface. *ASM Gloss.*

lappior. Corn. A miner who dresses refuse ore. *Fay.*

lapsed. A word that is unknown to mining usage or laws and is not equivalent to the term forfeited nor does it mean a technical forfeiture. *Ricketts, I.*

lapse rate. Temperature gradient. *A.G.I.*

lap-weld. To weld by overlapping the joints, as to lap-weld iron pipe. *Standard, 1964; Fay.*

Laramide revolution. A period of earth movement in early Tertiary times during which the interior regions of North America and South America were folded, producing the Rockies and the Andean and Antillean chains. The Appalachians were uplifted at this time, and the cycle of erosion was initiated that produced the existing landforms. Volcanic activity occurred from Mexico into Canada. *C.T.D.*

Laramidian orogeny. a. Post-Cretaceous diastrophism. *A.G.I. Supp.* b. In a broad sense, the series of diastrophic movements beginning perhaps in the Jurassic and continuing until the present. *A.G.I. Supp.*

Laramie group. A formation of the Cretaceous and Eocene Tertiary. *Fay.*

lardalite. *See* laurdalite.

larderellite. A hydrous ammonium borate, $(NH_4)_2O.5B_2O_3.5H_2O$; in microscopic crystals; white to yellowish; tasteless; found in Tuscan lagoons. Closely related compounds, $(NH_4)_2O.6B_2O_3.9H_2O$ and $(NH_4)_2O.4B_2O_3.6H_2O$ have also been reported. *See also* ammonioborite. *Hess.*

lardite. a. Hydrated silica, occurring in clay in central Russia. While moist, it is white and slightly transparent, but on drying it becomes opaque. *English.* b. Synonym for steatite. *Standard, 1964.* c. Synonym for pagodite; agelmatolite. *Standard, 1964.*

lard oil. An oil produced from animal fats. This oil is an efficient lubricant for use on metal-cutting tools. *Crispin.*

lard peat. a. Dredge peat. *Tomkeieff, 1954.* b. Bacon peat. *Tomkeieff, 1954.*

lard stone. A kind of soft stone found in China. *See also* agalmatolite. *Fay.*

large. Eng. The largest lumps of coal sent to the surface, or all coal which is handpicked or does not pass over screens; also the largest coal which passes over screens. *Fay.*

large-angle boundaries. Boundaries between adjacent grains. *VV.*

large coal. a. One of the three main size groups by which coal is sold by the National Coal Board of Great Britain. Large coal has no upper size limit and has a lower size limit of 1½ to 2 inches and embrace large screened coal, cobbles, and treble sizes. *See also* graded coal; smalls. *Nelson.* b. Coal above an agreed size without any upper size limit. Also called lump coal. *B.S. 3552, 1962.*

large colliery. Gt. Brit. In general, a colliery producing over 1,500 tons per day. *Nelson.*

large coke. The oversize which is removed before separating the largest size of graded coke. *B.S. 1017, 1960, Pt. II.*

large-diameter boring machine. An auger-type coal-cutting machine developed by the U.S. Bureau of Mines for use in anthracite mining. It can drill holes 1 foot in diameter 300 feet long, and larger holes for shorter distances. *Bureau of Mines Staff.*

large-diameter design. A descriptive name used by the DCMA to designate DCDMA standard-design, double-tube, swivel-type core barrels and fitting parts manufactured in the 4-, 6-, and 8-inch ranges. *Long.*

large-diameter holes. In large output quarries the most common method of primary blasting is by means of boreholes of 4 to 12 inch diameter. The burden and spacing of large-diameter holes depend on the diameter of the explosive cartridge used, and the general practice is to drill the hole from 3 to 6 feet below quarry floor level to get a heavy concentration of explosive at the bottom of the hole to break the rock out cleanly at floor level. It is not customary to drill horizontal holes in conjunction with these large-diameter vertical holes. *McAdam II, p. 149.*

large group. Synonym for large-diameter design. *Long.*

large knot. A large knot is one whose average diameter exceeds one-third the width of the surface on which it appears; but such a knot may be allowed if it occurs outside the sections of the mine track tie between 6 and 18 inches from each end. *ASA M7.3-1958, p. 9.*

large 9-inch brick. A rectangular brick modified so that it is 50 percent wider than a 9-inch brick. *A.R.I.*

large series. Synonym for large-diameter design. *Long.*

large shake. A large shake is one which exceeds one-third the width of the mine track tie. A shake not exceeding this limitation and which does not extend nearer than one-half inch to any surface shall be permissible. *ASA M7.3-1958, p. 9.*

large splits. A term applying to mine track ties. A large split is a split exceeding 5 inches in length. Splits not longer than 5 inches are permissible providing satisfactory antisplitting devices have been properly applied. *ASA M7.3-1958, p. 9.*

large-stone bit. Bits set with diamonds as large or larger than 8 stones per carat in size. *Long.*

larget. A piece of iron cut from a bar and ready to be heated and rolled into a sheet; about 14 pounds. *Standard, 1964.*

larnite. A gray, orthosilicate of calcium, Ca_2SiO_4, discovered in the contact zone of a Tertiary dolerite intrusive into chalk containing flint nodules; formed by reaction between the calcium carbonate of the former and the silica of the latter; monoclinic. Synonym for belite; felite. *Compare* wollastonite. *C.M.D.; Hey 2d, 1955.*

larry; lorry. a. A car to which an endless rope is attached, fixed at the inside end of the road, forming part of the appliance for taking up slack rope. *See also* barney. *Fay.* b. A car with a hopper bottom and adjustable chutes for feeding coke ovens. *Fay.* c. A truck. *Hess.* d. A motor-driven burden-bearing track-mounted car designed for side or end dumping and used for hauling material such as coal, coke, or mine refuse. *ASA C42.85: 1965.*

larry-car operator. In bituminous coal mining; ore dressing, smelting, and refining, one who operates a motor-driven car known as a larry, or a small electric locomotive to haul rock, slate, or ore from the tipple to the dump, or from storage bins to furnace. Also called larryman. *D.O.T. 1.*

larryman. In the coke products industry, one who charges coke ovens with pulverized coal, using a larry car. Also called charger-car operator; charging-car operator; gas tender. *D.O.T. Supp.*

larsenite. A white silicate of lead and zinc, $PbZnSiO_4$. Slender prisms or tabular; orthorhombic. Found in Franklin, N.J. *English.*

Larsen's pile. A type pile consisting of hollow cylinders that increase resistance against bending and crumpling. They are especially useful in shaft sinking in sand and gravel. *Stoces, v. 1, p. 512.*

Larsen's spiles. Steel sections of various forms, and made especially to resist bending, that are used in place of wooden spiles in forepoling. *Stoces, v. 1, p. 151.*

Larson ledge finder. A tool used to reach bedrock when the driven pipe has failed. The tool is a combination of a noncoring bit attached to a standard drill rod operating within a flush-joint casing. On the end of the casing is fitted a casing-shoe bit, which follows about 1½ inches behind the noncoring bit. A special driving connection is provided in the drill-rod string consisting of two pawls that fit into corresponding slots in a sleeve fitted into the casing; hence both the casing and the rod strings may be rotated to penetrate the overburden at equal rates. When the casing-shoe bit is socketed sufficiently in bedrock, the rod string and attached noncoring bit are pulled from the hole and drilling proceeds, using a bit attached to a core barrel and rods. *Long.*

larvikite; laurvikite. a. A nepheline-bearing syenite with abundant phenocrysts of feldspar. Titanaugite, barkevikite, and lepidomelane are minor constituents and apatite, opaque oxides, zircon, and olivine are accessories. *A.G.I.* b. A sodic syenite from south Norway, very popular for use as an ornamental stone when cut and polished; widely used for facing buildings, the distinctive feature being a fine blue color, produced by the Schiller structure in the anorthoclase feldspars. *C.T.D.*

laser. A convenient contracted version of the phrase light amplification by stimulated emission of radiation. A device making use of a new technique for obtaining exceedingly intense and coherent beams of visible radiation, by making use of the fluorescent properties of ruby, emerald, or other chromium phosphors. A large number of other compounds have also been utilized. *Anderson.*

lash; lash-on. To attach a chain to a haulage rope by wrapping or lapping the end of the chain around the rope, the other end being attached to a mine wagon. *Mason.*

lasher. a. A native employed to do lashing. *See also* lashing, b. *C.T.D.* b. *See* mullocker. *D.O.T. 1.* c. A mucker. *Bureau of Mines Staff.*

lasher-on. A man employed to lash the chains from the tubs to the endless rope, in underground mechanical haulage. *C.T.D.*

lashing. a. Any of a number of planks nailed inside of several frames or sets in a shaft to keep them in place. Also called listing. *Webster 2d.* b. In the Republic of South Africa, loading broken rock or ore with shovels. *Nelson.* c. Shoveling rock downstope to ore passes, work performed by a lasher. A lasher-on connects ore tubs or trucks to a rope haulage. *Pryor, 3.* Also called mucking. d. A binding, generally of light line around the end of a rope. *Bureau of Mines Staff.*

lashing chain. A short chain to attach tubs to an overrope in endless rope haulage by wrapping it around the rope. The chain may be about 12 feet long, or low manganese steel, with ⅜-inch-diameter standard links. At one end of the chain, a ring 4 inches in diameter is attached to the drawbar hook of the tub, and a hook about ⅞ inch in diameter to secure it to the rope at the lashing end. On an undulating road, two lashing chains may be necessary—one front and one rear of the tub. *Nelson.*

lash-up. Extemporized engineering rig for temporary job. *Pryor.*

lasionite. Same as wavellite. *Standard, 1964.*

lask; lasque. A thin, flat diamond with a simple facet at the side. Also called portrait stone. *Standard, 1964.*

lassenite. Formerly applied to volcanic glass from Lassen Peak, Calif., once thought to have the composition of trachyte but now known to be a dacite. The name should be considered obsolete. *A.G.I.*

last lift. N. of Eng. The last rib or jud to come off a pillar. *Fay.*

last of the air. a. Ark. That part of the air current which has passed through all the workings of the mine or split; the outtake air. *Fay.* b. Ark. The working place of a mine or split nearest the outtake of the air, or which receives the last of the air current. *Fay.*

lat Abbreviation for latitude. *BuMin Style Guide, p. 60.*

latch. a. Eng. To make an underground survey with a dial and chain; or to mark out upon the surface with the same instruments, the position of the workings underneath. *Fay.* b. Scot. A miry place. *Fay.* c. The locking device on a hoist hook, elevator, lifting bail, etc. *Long.* d. Synonym for elevator. *Long.* e. The inner-tube locking and unlocking device in the head of a wire-line core barrel. *Long.*

latches. a. Synonym for switch. Applied to the split rail and hinged switches. *Fay.* b. Hinged switch points, or short pieces of rail that form rail crossings. *Fay.*

latchings. Eng. Dialings or surveys made at a mine. *See also* latch, a. *Fay.*

latch jack. A fishing tool designed to engage and grasp the bail on a bailer. *Long.*

latchman. *See* switchman. *D.O.T. 1.*

late magmatic deposit. A deposit of magmatic origin formed during the late stages of magma consolidation. *Bateman.*

late magmatic mineral. A mineral formed during the late stages of magmatic activity, one formed between the main stage of crystallization and the pegmatitic stage. *A.G.I.*

late magmatic ore deposit. Straight magmatic deposits resulting from crystallization near the close of the magmatic period, that is, after the crystallization of the rock silicates. *Schieferdecker.*

latent heat. Thermal energy absorbed or evolved in a process (as fusion or vaporization) other than change of temperature. *Compare* sensible heat. *Webster 3d.*

latent heat of fusion. The amount of heat required to change 1 gram of a substance at the temperature of its melting point from the solid to the liquid state without changing temperature. *Morris and Cooper, p. 107.*

latent heat of vaporization. The quantity of heat necessary to change one gram or one pound of liquid to vapor without change of temperature. It is measured in calories per gram, or Btu per pound. *Brantly, 2.*

lateral. a. A hard heading branching off a horizon in horizon mining along the strike of the seams. It may be from 14 to 20 feet wide. At intervals of 1,000 to 1,500 yards along the lateral, crosscut roads are driven at right angles to intersect and develop the coal seams. From the crosscuts, conveyor panels are opened out in the seams. In general, the term lateral is also applied to any coal heading driven in a sideways direction. *Nelson.* b. Belonging to the sides, or to one side. *Fay.* c. A horizontal mine working. *Fay.* d. Situated on or at, or pertaining to, a side. *C.T.D.* e. A conduit diverting water from a main conduit, for delivery to distributaries. *Seelye, 1.* f. A secondary ditch. *Seelye, 1.*

lateral cleavage. Cleavage parallel to the lateral planes. *Webster 3d.*

lateral cone. A small subsidiary volcanic cone, usually a cinder cone, on the flank of a larger volcano. Synonymous with adventive cone; parasitic cone. *A.G.I.*

lateral crater. *See* adventive crater. *Fay.*

lateral development. Any system of development in coal seams or thick ore bodies in which headings are driven horizontally across the coal or ore and connected to main haulage drifts, entries, or shafts. There are many variations and modifications depending on the thickness, shape, and inclination of the deposit. *See also* horizon mining. *Nelson.*

lateral deviation. The horizontal distance by which a borehole misses its intended target. *Long.*

lateral draw. The angle of draw over a strike face or over workings in a flat seam. *Briggs, p. 112.*

lateral-force design. A basis for designing an earthquake-resistant structure, so that it will safely carry a horizontal force equal to a given proportion of the dead load of the structure together with some live load. *Ham.*

lateral moraine. A ridge of superficial debris, collected from higher cliffs, along a lateral margin of a glacier. *Standard, 1964. See also* moraine. *Fay.*

lateral pattern. A secondary dispersion pattern that is displaced to one side and entirely underlain by barren bedrock. *Hawkes, 2, p. 153.*

lateral planation. Reduction of the land in interstream areas to a plane parallel to the stream profile, effected by the lateral swinging of the stream against its banks. *USGS Bull. 730, 1923, p. 88.*

lateral secretion. A discarded theory of ore genesis according to which metals were supposed to have been dissolved from the wall rocks and redeposited in nearby openings. *Bateman.*

lateral shearing fault. A strike-slip fault that trends in the direction of the strike of the deformed rocks; occasionally observed after earthquakes. *Schieferdecker.*

lateral stress. A stress at right angles to the strain which produces it. *Fay.*

lateral support. Means whereby walls are braced either vertically or horizontally by columns, pilasters, or crosswalls or by floor or roof constructions, respectively. *ACSG.*

lateral velocity change. Change in a horizontal direction of the velocity distribution. *Schieferdecker.*

later arrival. A refracted wave that comes in on the seismogram later than the first arrival of energy. *Schieferdecker.*

laterite. a. Red residual soil developed in humid, tropical, and subtropical regions of good drainage. It is leached of silica and contains concentrations particularly of iron oxides and hydroxides and aluminum hydroxides. It may be an ore of iron, aluminum, manganese, or nickel. *A.G.I. Supp.* b. Altered basaltic rocks in India; obsolete. *A.G.I. Supp.*

lateritic. Extreme type of weathering common in tropical climates. Iron and aluminum silicates are decomposed and silicia (along with most other elements) removed by leaching. The product, laterite, is characterized by high content of alumina and/or ferric oxide. *McKinstry.*

lateritic constituent. One of the hydroxides and oxides of iron, aluminum, titanium, and manganese; these, and especially the first two, are the esesential constituents of laterite. *Holmes, 1928.*

lateritite. A detrital and reconstructed form of laterite. *Holmes, 1928.*

lateritoid. A lateritic rock formed by the metasomatic replacement of some other rock at its outcrop. *Holmes, 1928.*

laterlog. The electrical resistivity of coal appears to decrease with ash content. The laterlog measures what is virtually the true resistivity of the coal and may ultimately provide information on seam quality. The laterlog uses a sheet of current which is focused on each formation in succession and so measures the resistivity of that formation only. The mud column or a salty mud has no effect on the measured resistivity. The laterlog may be measured by a 7- or 3-electrode arrangement but the former is preferred. *Sinclair, III, p. 105.*

latex cement. A specialized cementing material consisting of a portland-type cement, latex, a surface-active agent, and water, having a setting time equivalent to a neat portland-cement slurry. Latex cement shrinks less and is tougher, stronger, less permeable, and more durable than portland cement. *Long.*

Latex spray. Trade name for a synthetic rubber fluid which, when sprayed onto underground stoppings, forms a tough nonflammable coating thus preventing air feeding fires or heatings, or air leakages through doors, surface air locks, and air crossings. Also called Latex sealant. *Nelson.*

lath. a. A board or plank sharpened at one end, like sheet piling, used in roofing levels or in protecting the sides of a shaft through a stratum of unstable earth. *See* spill. *Fay.* b. A long, thin mineral crystal. *A.G.I. Supp.*

lath door-set. A weak lath frame surrounding a main doorframe, the space between being for the insertion of spills. *Fay.* Lath frame; lath crib. *Hess.*

lathe. A machine for turning unfired hollow ware, for example, cups or vases. *Dodd.*

Lathe!; Laith! Mid. "Lower the cage!" or, "Lower more rope!" *Fay.*

lathe man. *See* stone lathe operator. *D.O.T. 1.*

lath frame; lath crib. A weak lath frame, surrounding a main crib, the space between being for the insertion of piles. *Fay.*

laths. Corn. a. The boards or lagging put behind a frame of timber. *Fay.* b. Pieces of timber about 4 feet 6 inches by 6 inches by 2 inches with end sharpened or beveled to give the lath an upward trend when being driven into the roof gravels. A number of laths driven into the roof form a protective shield for the miners working in the face. Also called lagging. *Engineering and Mining Journal, v. 139, No. 4, April 1938, p. 55.*

latite. The extrusive equivalent of monzonite and a variety of trachyandesite in which potash feldspar and plagioclase are present either as normative or modal minerals in nearly equal amounts. Potash feldspar is often concealed in the fine-grained crystalline or glassy groundmass and thus, a chemical analysis is often necessary for correct classification. Augite or hornblende is usually present and sometimes biotite, plus accessory apatite and opaque oxides. *A.G.I.*

latitude. a. Distance on the earth's surface from the equator, measured in degrees of the meridian. *Standard, 1964.* b. In surveying, the distance between two lines drawn east and west through the extremities of a course; northing or southing. *Standard, 1964.*

latitude correction. a. The amount of the adjustment of observed gravity values to an arbitrarily chosen base latitude. $K=0.8122 \sin 2\phi$ (mg/km) and $K=1.307 \sin 2\phi$ (mg/mi) where ϕ is the latitude angle. *A.G.I.* b. The north-south corrections made to observed magnetic intensities in order to remove the earth's normal field leaving as the remainder the anomalous field. *A.G.I.*

latiumite. A monoclinic mineral, $K_2Ca_6(Si,Al)_{11}O_{25}(SO_4,CO_3)$, in ejected blocks from Albano, Latiaum, Italy. Named from locality. *Spencer 19, M.M., 1952; Hey 2d, 1955.*

latosol. Synonym for laterite. *A.G.I.*

latosolic soils. These soils are characteristic of moist tropical and subtropical regions. Forest or savannah vegetation, a high temperature, and seasonal rainfall provide the most favorable conditions for their development. Free drainage in the upper part of the soil is essential. Although varying considerably in detail, latosols are typified by deep weathering, extremely thorough leaching and, commonly, a marked accumulation of sesquioxides. The iron oxide is responsible for the prevalent red-brown and yellow colors of these soils. *Hawkes, 2, p. 107.*

latrine cleaner. In metal mining, a laborer who brings mine toilet cars to surface on cage and flushes contents into sewer. Also called sanitary nipper. *D.O.T. 1.*

latrines. Water closets either fixed or of a portable nature. The latter are often maintained underground for use of miners. *Fay.*

latrobite. A pink anorthite from Amitok Island, Labrador. *Standard, 1964.*

latten. Metal in thin sheets, especially (and originally) brass, which in this form is also called latten brass. *Standard, 1964.*

latten brass. A metallic compound into which scrap-brass and other ingredients enter, and which is rolled in thin plates. *Fay.*

lattice. In mineralogy, orderly geometric structure in which a crystal's atoms are arranged. Repetition of unit crystal. The lengths of the sides of such a unit cell are its lattice constants, classified in Angstrom units. The symmetry of the lattice determines the shape of a crystal and classification. A lattice discontinuity is the boundary, interface, surface or sheared layer at which the formation ends. *Pryor, 3.*

lattice boom. A long, light shovel boom fabricated of crisscrossed steel or aluminum angles or tubing. *Nichols.*

lattice brick. A hollow building brick, or block, in which the cells form a pattern of open lozenges; such bricks are claimed to have a high heat-insulating value because of the extended path of any heat flow through the solid material. *Dodd.*

lattice constant. *See* parameter (lattice). *ASM Gloss.*

lattice energy. That required to separate the ions of an ionic crystal to an infinite distance from each other. *Pryor, 3.*

lattice girder. An open girder, beam, or column in timber, steel, or aluminum alloy, built up from structural members joined and braced together by intersecting diagonal bars. *See also* space lattice. *Ham.*

lattice parameter. *See* parameter (lattice). *ASM Gloss.*

lattice structure. The ionic lattice is built by symmetrically arranged ions and is a good conductor; the molecular lattice is composed of covalent molecules, usually volatile and nonconducting; the layer lattice has large ions each associated with two small ions, which form nearly neutral layers held to each other only by weak nonpolar forces and is, therefore, easily split into sheets. *Pryor, 3.*

lattice texture. a. An exsolution texture in which platy and/or needlelike segregates are arranged in the parent crystal according to the structural planes of the parent crystal. *Schieferdecker.* b. A texture typical for serpentine in rocks in which it replaces an amphibole. *Schieferdecker.*

lattice water. a. Water which is an integral part of the clay structure. This structural water (OH lattice water) is not to be confused with interlayer water. The lattice water can be removed by heating in the range of about 450° to 600° C. *ACSG, 1963.* b. Molecular water at specific lattice sites. *VV.*

latticino; latticinio. Decoration of glass with white threads of glass embedded in its surface. This technique was much used by Venetian workers, but was known and used earlier. *Haggar.*

Lattorfian. Lower Oligocene. *A.G.I. Supp.*

laubanite. a. A hydrous calcium aluminum silicate, $Ca_2Al_2Si_5O_{15}+6H_2O$. Resembles stilbite. A snow-white zeolite mineral. *Fay.* b. A discredited term equal to a natrolite that has lost about half its Na_2O, perhaps by exchange for H^+ or $(H_3O)^+$. *American Mineralogist, v. 42, No. 11-12, November-December 1957, p. 921.*

laubmannite. A dufrenitelike mineral, $Fe''_3Fe'''_6(PO_4)_4(OH)_{12}$, orthorhombic (?), isostructural with andrewaite; from Polk County, Ark. *Spencer 19, M.M., 1962; Hey 2d, 1955.*

Laue diagram; Laue pattern. Record of diffraction of X-rays by a crystal's nuclei, made photographically. *Pryor, 3.*

laueite; laueit. A hydrous basic phosphate, $MnFe_2(PO_4)_2(OH)_2.8H_2O$; triclinic, honey-brown; from Hagendorf, Bavaria, Germany. *Spencer 20, M.M., 1955; Hey 2d, 1955.*

Laue pattern. *See* Laue diagram. *Pryor, 3.*

laugenite. A general term for oligoclase diorites. *Holmes, 1928.*

laumontite; leonhardite; caporcianite. A white hydrous calcium-alminum silicate, $(Ca,Na)_7Al_{12}(Al,Si)_2Si_{26}O_{80}.25H_2O$. A zeolite, crystallizing in the monoclinic system; occurs in cavities in igneous rocks and in veins in schists and slates. *Fay; Dana 17.*

laun. In ceramics, a fine silken sieve through which clay is passed. *Standard, 1964.*

launder. a. A trough, channel, or gutter usually of wood, by which water is conveyed; specifically in mining, a chute or trough for conveying powdered ore, or for carrying water to or from the crushing apparatus. *Standard, 1964.* b. A flume. *Nelson.* c. An inclined channel, lined with refractory material, for the conveyance of molten steel from the furnace taphole to a ladle. Also spelled lander. *Dodd.*

launder man. In ore dressing, smelting, and refining, a laborer who maintains and repairs the launders (long boxes), used to convey water and mill pulp between the various units of ore-treating equipment in a mill. *D.O.T. 1.*

launder screen. A screen used for the sizing and dewatering of small sizes of anthracite. It consists of a stationary screen constructed by placing 6-inch-high partitions every 6 inches along a launder. Holes are then drilled on 6-inch centers across the bottom of the launder to receive pipe bushings of the desired diameter. Is employed to remove excess water from a feed product, as a screen to remove fine particles, and to produce a sized product. *Mitchell, pp. 145-146.*

launder separation process. In this process, a stream of fluid carries the material to be separated down a channel provided with draws for separating a heavy-gravity product and means for overflowing a lighter one. If properly constructed and operated, a comparatively solid bed of material will form on the bottom of the launder. Above this bed there will be found a layer of particles moved along by the stream at a comparatively slow speed. Above this, successive layers will move with greater and greater velocity. *Mitchell, p. 266.*

launder washer. a. A type of coal washer in which the coal is separated from the refuse by stratification due to hindered settling while being carried in aqueous suspension through a trough. Modern launder washers have various mechanisms for continuously removing refuse from the bottom of the trough. Early launder washes were intermittent in operation. Various types in present use include the Rheolaveur, Kopers-Battell, and Val mineral separators. *Bureau of Mines Staff.* b. *See* Rheolaveur system. *Nelson.*

laundry box. The box at the surface receiving the water pumped up from below. *Fay.*

Laurasia. Hypothetical continent in the Northern Hemisphere that supposedly broke up about the end of the Carboniferous period to form the present northern continents. *A.G.I. Supp.*

laurdalite. A nepheline syenite containing alkalic feldspar, biotite, pyroxene or amphibole, and accessory apatite and sodalite. *A.G.I.*

laurelite. All those granular to fibrous or radiating masses composed of anthophyllite and olivine. From the corundum deposits of Georgia. *English.*

Laurentian granite. a. The younger of the two types of igneous rocks comprising the Archean system. The Laurentian granites intruded the older Keewatin lava series. Also the corresponding geologic epoch during which the Laurentian granites were intruded. *A.G.I. Supp.* b. Gneissic granite constituting part of the older of two Precambrian systems; synonymous with Archean. *A.G.I. Supp.* c. The American Committee of Stratigraphic Nomenclature (1954) suggested that Archean be called Early Precambrian or Middle Precambrian. *A.G.I.* d. The oldest granitic intrusives in the Canadian shield, of post-Keewatin and pre-Timiskaming age; they occur as batholiths elongated northeast to souhtwest and consist of granite, granite-gneiss, and pegmatites mined as a source of potash. *See also* Algoman granite. *C.T.D.*

laurionite. A colorless oxychloride of lead, $PbCl_2.PbO.H_2O$, exceedingly rare, and found in ancient lead slags in Greece; distinct cleavage. *C.M.D.; Larsen, p. 209.*

laurite. An iron-black sulfide of ruthenium and osmium, RuS_2, found in association with platinum in placer deposits in Borneo, Oregon, and Columbia. It usually occurs as small black octahedrons that are difficult to distinguish from magnetite. *Dana 7, v. 1, p. 291.*

lauroleic acid. Unsaturated fatty acid, $C_{12}H_{22}O_2$. *Pryor, 3.*

laurvikite. *See* larvikite.

lausenite. A white, silky, fibrous mineral, $Fe_2O_3.3SO_3.6H_2O$; formed by fumarolic conditions during the burning of United Verde copper mine, Jerome, Ariz.; name given to replace rogersite. *Larsen, p. 171; English.*

lautarite. An iodate of calcium, $Ca(IO_3)_2$, found in the nitrate deposits in Chile. *Dana 7, v. 2, p. 313.*

Lauth mill. Has three rolls, the mdidle roll being much smaller than the other two. The two larger rolls only are driven, work being performed between the bottom and middle and middle and top rolls alternately; the roll setting is adjusted between passes. *Osborne, p. 357.*

lautite. An imperfectly determined copper sulfoarsenite, CuAsS, of the enargite family; from Marienberg, Saxony, Germany. *Weed, 1918.*

lava. The general name for the molten outpourings of volcanoes and fissures. Fluid rock as that which issues from a volcano or a fissure in the earth's surface; also, the same material when solidified by cooling. *Fay.*

lava cone. A volcanic cone composed entirely of lava. *Fay.*

lava dome. a. If a volcanic vent exudes lava at every eruption, a mountain of solid rock results which is a lava dome. *A.G.I.* b. The greater masses of lava which, in the form of many individual flows, have issued from a central vent in the proper directions to build a dome-shaped pile of lava. The world type is Mauna Loa, Hawaii. *A.G.I.*

lava flow. A stream or sheet of molten or solidified lava. *Webster 3d.*

lava millstone. A hard and coarse millstone found near the Rhine River. *Standard, 1964.*

lava pit. A crater that is visibly floored with massive lava, either liquid or solid. *Fay.*

lava plain. A broad stretch of level or nearly level land, usually many hundreds of square miles in extent, underlain by a relatively thin succession of lava flows, most of which are basaltic and the result of fissure eruption. The flatness of the surface of the plain is largely determined by the horizontal attitude of the underlying flows. The Snake River basalt plain of southern Idaho is an example. *A.G.I.*

lava plateau. A broad, elevated tableland or flat-topped highland, usually many hundreds or thousands of square miles in extent, underlain by a thick succession of lava flows, most of which are tholeiitic basalts and the product of fissure eruptions. The Columbia Plateau of the northwestern United States is an example. *A.G.I.*

lava sink. The foundering or sinking in of part of the lava surface produces vertical-walled pits, called lava sinks, in which molten lava may be visible. *Stokes and Varnes, 1955.*

lava streak. A dike of lava transecting other rocks. *Standard, 1964.*

lava stream. Synonym for lava flow. *Fay.*

lavatic. Consisting of or resembling lava. *Standard, 1964.*

lava toe. Bulbous protrusions in front of pahoehoe flows. *Challinor, p. 173.*

lavatory. A place where gold is obtained by washing. *Standard, 1964.*

lava tunnel. a. A lava cavern or lava tube open at the ends. *A.G.I.* b. Long cavern beneath the surface of a lava flow. *Lewis, p. 599.*

lava ware. Various coarse articles and utensils made from iron slag, resembling lava in appearance. *Standard, 1964.*

lave. Scot. To raise water out of a hole with a shovel or the hands. *Fay.*

lavender oil. An essential oil used in applying colors in certain enameling operations. *Enam. Dict.*

lavendine. Amethyst quartz. *Shipley.*

lavendulanite. Synonym for lavendulane. *Hey, M.M., 1964.*

lavenite. A complex zirconium silicate mineral, $Na(Mn,Ca,Fe)ZrOF(SiO_3)_2$. *E.C.T., v. 15, p. 309.*

lavialite. A metamorphic rock containing relict phenocrysts of labradorite. It was probably derived from a basaltic rock or tuff. The phenocrysts are penetrated by alteration passages containing quartz, microcline, biotite, and hornblende and are set in a recrystallized amphibolitelike groundmass of those minerals, among which green hornblende is the most conspicuous. *Holmes, 1928.*

lavic. Same as lavatic. *Fay.*

lavrovite. A green diopside in granular masses and imperfect crystals with quartz; the green color has been attributed to vanadium; from the vicinity of Lake Baikal, Siberia, U.S.S.R. *Hess.*

lawmbyr. *See* lamber. *Tomkeieff, 1954.*

lawn. A fine-mesh gauze used as a sieve for clay. *Crispin. See also* laun.

law of association. The occurrence of certain varieties of asbestos in certain geological formations. *Sinclair, W. E., p. 484.*

law of constant composition. *See* definite proportions law. *Cooper.*

law of cosines. In trigonometry, a law stating that in any triangle the square of one side equals the sum of the squares of the two other sides minus twice the product of these two other sides multiplied by the cosine of the included angle. *Jones, 2, p. 152.*

law of definite proportions. This states that in every sample of any one compound substance, the proportions by weight of the constituent elements are constant. *Osborne.*

law of equal volumes. In ore genesis, the generally observed metasomatic replacement of rock or ore minerals by gangue and/or metal compounds under retention of the original volume. *Schieferdecker.*

law of equivalent proportion. When elements combine (or replace one another) to form compounds they do so in weights which are proportional to their equivalents. *Cooper.*

law of extralateral rights. *See* apex law. *Lewis, p. 32.*

law of gravitation. The law, discovered by Sir Isaac Newton, that every particle of matter attracts every other portion of matter, and the stress between them is proportional to the product of their masses divided by the square of their distance apart. *Standard, 1964.*

law of indestructibility of matter. Matter is neither created nor destroyed in the course of chemical action. *See also* conservation of matter. *Cooper.*

law of mass action. The rate of a chemical reaction is directly proportional to the molecular concentrations of the reacting substances. *Webster 3d.*

law of motion. A statement in dynamics, a body at rest remains at rest and a body in motion remains in uniform motion in a straight line unless acted upon by an external force. The acceleration of a body is directly proportional to the applied force and is in the direction of the straight line in which the force acts. For every force there is an equal and opposite force or reaction. *Webster, 3d.*

law of multiple proportions. When two elements combine to form more than one compound, the quantity of one of them which combines with a fixed quantity of the other exhibits a simple multiple relation. *C.T.D.*

law of reciprocal proportion. When an element combines with several other elements, the weights of these latter elements which combine with the same weight of the former element give the proportions in which the latter elements combine, or give simple multiples of these proportions. *Cooper.*

law of refraction; Snell's law. When a wave crosses a boundary, the wave normal changes direction in such a manner that the sine of the angle of incidence between wave normal and boundary normal divided by the velocity in the first medium equals the angle of refraction divided by the velocity in the second medium. *A.G.I.*

law of sines. In trigonometry, a law stating that in any triangle (either right or oblique) the sides are proportional to the sines of their opposite angles. *Jones, 2, p. 151.*

law of superposition. The law that underlying strata must be older than overlying strata where there has been neither inversion nor overthrust. All geologic chronology is based on this law. *Standard, 1964.*

lawrencite. A green or brown unstable mineral, $FeCl_2$; found in meteoric iron. *Larsen, p. 81.*

lawrencium. Element having atomic number 103; made by bombarding californium (atomic number, 98) with either boron 10 or boron 11 nuclei. Atomic mass, 257 and half-life, 8 seconds. Symbol, Lw. *See also* actinide elements. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-117.*

lawsonite. A colorless, grayish-blue, basic silicate of aluminum and calcium, $H_4CaAl_2Si_2O_{10}$; orthorhombic. Prismatic or tabular crystals. From Tiburon Peninsula; California; Italy; France; Corsica; New Caledonia; Cuba. *English.*

laxite. Wadsworth's name for the fragmental or mechanical rocks, especially when unconsolidated. *Fay.*

laxmannite. Vauquelinite. *Weed, 1918.*

lay. a. To close or withdraw from work; said of collieries. *Standard, 1964.* b. A share of profit; specifically, in whaling and sealing, the proportionate share of the profits of a voyage which each officer or member of the crew receives. This term has been introduced into Alaska placer mining where it means a lease worked on shares or royalty. As a lay on No. 5 Glacier creek. *Fay.* c. The direction, or length, of twist of the wires and strands in a rope. *Zern.* d. The length of lay of wire rope is the distance parallel to the axis of the rope in which a strand makes one complete turn about the axis of the rope. The length of lay of the strand, similarly, is the distance in which a wire makes one complete turn about the axis of the strand. *ASA M11.1-1960, p. 9.* e. The pitch or angle of the helix of the wires or strands of a rope, usually expressed by ratio of the diameter of the strand or rope to the length required for one complete twist. *H&G, p. 130.* f. Direction of predominant surface pattern remaining after cutting, grinding, lapping, or other processing. *ASM Gloss.* g. Prov. Eng. A standard of fineness for metals; possibly from the Spanish ley. *Hess.*

lay-by. a. Siding in otherwise single-track underground tramming road. *Pryor, 3.* b. A term used in Joplin, Mo., for an underground siding at or near a shaft for storing empty mine cars. *Fay.* c. *See* bank, a. *Long.*

lay day. Scot. *See* lie time. *Fay.*

layer. a. A bed or stratum of rock. *Fay.* b. A stratum of one or more weld beads lying in a plane parallel to the surface from which welding was done. *ASM Gloss.* c. A person who has charge of laying the glass in plaster on the grinding and polishing tables. *ACSG, 1963.* d. Any stratum of rock separated from the adjacent rock by a plane of weakness. *BuMines Bull. 587, 1960, p. 2.*

layer depth. Thickness of the mixed surface layer of water. *Hy.*

layered. N. of Eng. Choked up with sediment or mud. *Fay.*

layered map. A contour map in which the areas between adjacent contours are distinguished by differing colors. *Ham.*

layering number. A dimensionless number, the value of which, taken in conjunction with inclination, roughness, and whether the ventilation is ascensional or descensional, determines the mixing and movement of firedamp roof layers. *B.S. 3618, 1963, sec. 2.*

layering of firedamp. The formation of a layer of firedamp at the roof of a mine working and above the ventilating air current. *B.S. 3618, 1963, sec. 2.*

layer-loading. Term applied to a procedure whereby the coal is placed in the railroad cars in horizontal layers. It owes its inception to the fact that coal as it comes from the mine is not uniform in structure, chemical composition, water content, and presence of dust. Layer-loading is a simple and inexpensive method for smoothing out these irregularities and consists in shuttling two or six railroad cars, hooked together, past the loading boom two or more at a time. This results in a more uniform product. *Mitchell, pp. 808-811.*

laying and finishing machine. Self-propelled machine, which is fed with road material, and which it spreads and compacts to form a road surface. *See also* Barber Greene finisher. *Ham.*

laying off. Can. Selling stock to public by promoter after he has exercised low-priced options from mining company. *Hoffman.*

laying out. *See* setting out. *Pryor, 3.*

laying yard. Place where the rough glass is laid on grinding and polishing tables with plaster. *ASTM C162-66.*

layme. Scot. Earthenware; lame. *Fay.*

layoff. A period of being away from or out of work; a shutdown. *Webster 3d.*

lay of rope. *See* winding rope. *Nelson.*

lay operations. An Alaskan term for mining on a lease or "lay" on an alluvial claim, for which the operator pays the owner a royalty up to 50 percent on the gross output. *Compare* lay, b. *Fay.*

lay operator. An Alaskan term for a miner who takes a lease or "lay" on an alluvial claim. *Fay.*

layout. a. The design or pattern of the main roadways and workings. The proper layout of mine workings is the responsibility of the manager aided by the planning department. *Nelson.* b. The map of a mine or part of a mine usually including future workings arrangement. *B.C.I.* c. N. of Eng. To set out, or put on one side, trams of coal, etc., that have been improperly filled. *Fay.* d. Diagram showing disposition of machines in a mill's flow line. *Pryor, 3.*

layover tracing. *See* overlay tracing. *B.S. 3618, 1963, sec. 1.*

lay rope. Ordinary lay rope has the wires twisted in a direction opposite to the twist of the strands in the rope. The pitch of wire is from 2½ to 3 times the diameter of the rope, and the pitch of the strands is from 6½ to 9 times the diameter of the rope, the wires being exposed only in short lengths at intervals. *Lewis, p. 249.*

layshaft. A fixed shaft supporting revolving drums. *Nichols.*

lay-up. The resin-impregnated reinforcing material. Also the process of making a lay-up. *Phillips.*

lazuli. Same as lapis lazuli. *Fay.*

lazulite. A hydrous, aluminum phosphate, with varying proportions of iron and magnesium, $MgAl_2(OH)_2(PO_4)_2$; azure blue, usually in pyramidal crystals; also massive; monoclinic; used as an ornamental stone. *Sanford; Dana 17.*

lazulitic. Of, pertaining to, or having the characteristics of lazulite. *Standard, 1964.*

lazurfeldspar. A blue variety of orthoclase, found in Siberia. *Fay.*

lazurite. a. A sodium aluminum silicate mineral containing sulfur, $(Na,Ca)_4(AlSiO_4)_3(SO_4,S,Cl)$; a constituent of lapis lazuli. Pyrite associated. Isometric. *Dana 17; Webster 3d.* b. Synonym for azurite. *Hey 2d, 1955.*

lazurquartz. Blue quartz. *See also* sapphire quartz. *Shipley.*

lazurspar. Lapis lazuli. *Shipley.*

lazurstone. Lapis lazuli. *Shipley.*

lazyback. S. Staff. The place at the surface where coal is stacked for sale. *Fay.*

lazy balk. a. Eng. A timber placed at the top of a hopper, against which the top of the car strikes in dumping, to prevent the car from falling into the hopper. *Fay.* b. Eng. The balk or girder held in position by a hanger. Also called lazy girder. *SMRB, Paper No. 61.*

lazy bench. The bench to one side of the drill tripod or derrick floor where visitors and workmen can sit while observing the drilling operation. *Long.*

lazy girder. Eng. *See* lazy balk. *SMRB, Paper No. 61.*

lazy kiln. Scot. A limekiln in which the whole contents are calcined and afterwards removed before refilling. *Fay.*

lazy tong conveyor. *See* accordion roller conveyor. *ASA MH4.1-1958.*

lazy tongs. A system of crossed jointed bars used for picking up articles not within easy reach. *Crispin.*

lb Abbreviation for pound. *BuMin Style Guide, p. 61.*

lb bhp^{-1} hr^{-1} Abbreviation for pounds per brake horsepower-hour. *BuMin Style Guide, p. 61.*

lb ft Abbreviation for pound-foot. *BuMin Style Guide, p. 61.*

lb ft^{-2} Abbreviation for pounds per square foot. *BuMin Style Guide, p. 61.*

lb ft^{-3} Abbreviation for pounds per cubic foot. *BuMin Style Guide, p. 61.*

lb in Abbreviation for pound-inch. *BuMin Style Guide, p. 61.*

lb in^{-2} Abbreviation for pounds per square inch. *BuMin Style Guide, p. 61.*

L bit. Nonstandard, short-shank, box-threaded coring bits made for use on nonstandard L-design core-barrel equipment. *Long.*

lb per bhp hr Abbreviation for pounds per brake horsepower-hour. *BuMin Style Guide, p. 61.*

lb t Abbreviation for troy pound. *Zimmerman, p. 83.*

lc Abbreviation for lowercase. *GPO Style Manual, p. 158.*

LC a. Abbreviation for lead covered. *Zimmerman, p. 61.* b. Abbreviation for leakage coefficient. *See* leakage coefficient. *Nelson.*

lcd Abbreviation for lowest common denominator. *Zimmerman, p. 65.*

lcl Abbreviation for less than carload; less than carload lots. Also abbreviated LCL. *GPO Style Manual, p. 158; Zimmerman, p. 62.*

LCL Abbreviation for less than carload lots. Also abbreviated lcl. *Zimmerman, p. 62.*

lcm Abbreviation for least common multiple. *GPO Style Manual, p. 158.*

LCM Abbreviation for lead-coated metal. *Zimmerman, p. 61.*

L. D. steel process. In this comparatively new steelmaking process, oxygen is blown downwards at high velocity through a water-cooled lance on to the surface of the hot metal contained in a basic lined vessel. To offset the intense heat produced coolant materials are added with the original charge. These may be iron ore, sinter, or roll scale, but usually steel scrap is the main material used. As much as 26 percent of scrap may be used. After about 20 minutes, the charge is converted into liquid steel. During the process, tests and analyses are made and materials may be added to bring the metal to the required grade and temperature. Production rates up to 120 tons per hour are obtaind with the L. D. process, compared with 35 tons per hour with the best open hearth without oxygen blowing. The process is so named because it was developed commercially (in 1951-1952) in the two Austrian steelworks at Linz and Donawitz. It is now often called the B.O.S. (that is, basic oxygen steelmaking) process. *See also* O.L.P. steel process. *Nelson.*

Lea and Nurse permeability apparatus. A device for the determination of the specific surface of a powder by measurement of the permeability to air of a prepared bed of the sample; the calculation is based on the Carman equation. *See also* Carman equation. *Dodd.*

leach. To wash or to drain by percolation. To dissolve minerals or metals out of the ore, as by the use of cyanide or chlorine solutions, acids, or water. *Fay.*

leachate. a. The liquid that has percolated through the soil or other medium. *Webster 3d.* b. A solution obtained by leaching. *Webster 3d.*

leached zone. Geologically, the part of a lode above the water table, from which some ore has been dissolved by down-filtering meteoric or spring water. *Pryor, 3.*

leacher. a. In ore dressing, smelting, and refining, one who dissolves valuable metal out of ore or slime, using chemical solution. Also called solution man. *D.O.T. Supp.* b. A worker who leaches minerals from crushed ore. *Webster 3d.* c. A worker who leaches soda ash from black ash. *Webster 3d.*

leach hole. A crevice created in land or in rock by the action of leaching or constant filtration; a hole or outlet formed in land by the process of percolation. *Standard, 1964.* Also called sink; sinkhole. *Fay.*

leaching. a. The removal in solution of the more soluble minerals by percolating waters. *A.G.I.* b. Extracting a soluble metallic compound from an ore by selectively dissolving it in a suitable solvent, such as water, sulfuric acid, hydrochloric acid, etc. The solvent is usually recovered by precipitation of the metal or by other methods. *Henderson.* c. Dissolution from ore or concentrates after suitable comminution to expose the valuable minerals, by aqueous and chemical attack. If heat and pressure are used to intensify or speed this, the work is called pressure leaching. *See also* chemical extraction; hydrometallurgy. *Pryor, 3.* d. The process of decomposition under natural agencies of an outcrop. Surface waters penetrating downwards may dissolve some or all of the mineral in their path, thus carrying it away from the surface zone. This process is referred to as leaching. *Nelson.*

leaching rate test. A test designed to assess the value of antifouling compositions by measuring the rate of loss of toxic ingredients from a painted surface during immersion in seawater. In conducting the test, small glass panels coated with the antifouling compositions under test are stored in seawater and transferred periodically into the leaching apparatus, where they are subjected to agitation (by bubbling) in a definite amount of seawater for a standard time; the toxic substances leached into the water are then determined. *Osborne.*

leach ion-exchange flotation process. A mixed method of extraction developed for treatment of copper ores not amenable to direct flotation. The metal is dissolved by leaching, for example, with sulfuric acid, in the presence of an ion exchange resin. The resin recaptures the dissolved metal and is then recovered in a mineralized froth by the flotation process. Abbreviation, L.I.F. *Pryor, 3.*

leach material. Material sufficiently mineralized to be economically recoverable by selectively dissolving the wanted mineral in a suitable solvent. *See also* leaching. *Bureau of Mines Staff.*

leach pile. Mineralized materials stacked so as to permit wanted minerals to be effectively and selectively dissolved by application of a suitable solute. *Bureau of Mines Staff.*

leach precipitation float. A mixed method of chemical reaction plus flotation developed for such copper ores as chrysocolla and the oxidized minerals. The value is dissolved by leaching with acid, and the copper is reprecipitated on finely divided particles of iron, which are then recovered by flotation, yielding an impure concentrate in which metallic copper predominates. Abbreviation, L.P.F. *Pryor, 3.*

lead. a. A metallic element, the heaviest and softest of the common metals. Inelastic; resists corrosion; silvery-bluish-white to bluish-gray; and rarely occurs in native form. Symbol, Pb; valences, 2 and 4; isometric; atomic number, 82; and atomic weight, 207.19. Bright metallic luster; highly malleable; ductile; poor conductor of electricity; specific gravity, 11.3437 (at 16° C); of lead derived from the disintegration of radium (radium-lead), 11.288 (at 20° C, referred to water at 20° C), of lead derived from the disintegration of uranium (uranium-lead), 11.2960 (at 16° C); melting point, 327.5° C; boiling point, 1,515° C or 1,744° C; insoluble in water; and soluble in nitric acid and in hot concentrated sulfuric acid. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-118, B-184.* b. A mixture of powdered lead oxide and linseed oil used as a pipe-thread, lubricant and sealant. Also called red lead. *Long.* c. In ceramics, to glaze with powdered metallic lead ore. *Fay.*

lead (pronounced leed). a. Commonly used as a synonym for ledge or lode. Many mining location notices describe the locator's claim as extending a certain number of feet along and so many feet on each side of the lode, lead, vein, or ledge. Thus Lead, S. Dak., was so named because of the Homestake lead. Blind lead: A lead or vein that does not outcrop or show at the surface. Used especially at Virginia City, Nev. *Compare* lode. *Fay.* b. Properly, placer gravels. Blue lead: A Tertiary river channel at Placerville, Calif. So called because of the bluish-gray color of the gravels. Deep lead: Gold-bearing gravels deeply covered with debris or lava; applied paritcularly to those of Victoria, Australia. *Fay.* c. Penna. A portion of a haulage system covered by a mule or by a locomotive of a maximum distance of, say, three-quarters of a mile. *Fay.* d. Eng. To haul or draw coal, etc., either by animal or engine power. *Fay.* e. A defined gutter of auriferous wash. *Gordon.* f. A track haulage term for the distance from the point of a frog to the point of the switch. *Kentucky, p. 235.* g. A term sometimes used for the distance between the sheave and the winding drum centers. The greater the lead, other things being equal, the smaller the fleeting angle. Too great a lead results in vibration and whipping of the rope between sheave and drum. Idler or sag rollers are frequently installed where long leads are necessary. *Nelson.* h. The longitudinal distance traveled in one revolution by a spiral thread or screw. *Long.* i. The distance a bit is held suspended off bottom in a borehole before rotation and downward movement of the drill string is started. *Long.* j. A small, narrow, uniformly trending passage in a cave. *A.G.I.* k. Inference from meager data suggesting a direction for further investigation. *A.G.I.* l. Navigable passage through pack ice. *Schieferdecker.* m. The axial advance of a helix in one complete turn. *ASM Gloss.* n. The slight bevel at the outer end of a face cutting edge of a face mill. *ASM Gloss.*

lead-acid accumulator. A secondary cell with an electromotive force of about 2 volts. It is suitable for work where a steady voltage is required, and extensively used for motor car lighting, miners' safety lamps, shuttle cars, and battery locomotives. *Morris and Cooper, p. 243.*

lead-acid battery lamp. A portable type of electric mining lamp in either cap or hand form. The latest type uses P.V.C. (polyvinyl-chloride) tubes giving a 20 percent increase in capacity. *See also* cap lamp. *Nelson.*

leadage. The distance coal has to be hauled from the mine to its place of shipment. *Standard, 1964.*

lead age. The age of a rock calculated by substituting abundance ratios of radiogenic lead isotopes, or values of radiogenic lead and radioactivity, in age equations. *American Journal of Science, v. 239, Aug. 1941, p. 609.*

lead angle. The angle that the electrode makes in advance of a line perpendicular to the weld axis at the point of welding, taken in a longitudinal plane. *ASM Gloss.*

lead antimonate; lead orthoantimonate; antimony yellow. a. $Pb_3(SbO_4)_2$; molecular weight, 993.07; orange-yellow; specific gravity, 6.58 (at 20° C, referred to water at 4° C); and insoluble in water and in dilute acids, Used in pottery manufacture and in staining glass. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-184.* b. A pigment produced by the slow oxidation of anitmony sulfide. Various shades, as antimony blue and antimony violet, are obtained by admixture of metal oxides or other mineral compounds. *CCD 6d, 1961.*

lead arsenate. *See* mimetite. *C.M.D.*

lead ash. The slag of lead; litharge; lead monoxide. *Standard, 1964.*

lead azide. Colorless; needles; $Pb(N_3)_2$; and it explodes at 350° C. A sensitive detonating agent. *CCD 6d, 1961.*

lead barium glass. *See* barium flint glass. *ACSG, 1963.*

lead bath. A furnace in which gold or silver ores are smelted with lead. *Standard, 1964.*

lead bearing. A term specifically applied to porcelain enamel frits in which lead oxide is used as one of the principal fluxes. *Enam. Dict.*

lead-bearing enamel. An enamel which depends on the presence of significant amounts of lead compounds for the required physical properties. *ACSB-3.*

lead bisilicate. *See* lead silicate. *Dodd.*

lead borate; lead metaborate. $Pb(BO_2)_2.H_2O$; loses water at 160° C; soluble in dilute nitric acid; insoluble in water and in alkalies; and specific gravity, (anhydrous), 5.598. Used in waterproofing paints and in lead glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-184.* Used as a low-temperature frit or flux, as in vitrifiable colors, in conducting coating, and in glass-bonded mica. *Lee.*

lead borosilicate. A constituent of optical glass, composed of a mixture of the borate and silicate of lead. *CCD 6d, 1961.*

lead burning. A misnomer for the welding of lead. *ASM Gloss.*

lead button. In the separation of the noble metals from their impurities, lead is fused with the ore. The bullion so formed drops to the bottom of the crucible in the lead button from which the precious metal is extracted by cupellation. *Nelson.*

lead carbonate; cerussite; white lead ore. $PbCO_3$; molecular weight, 267.20; orthorhombic; colorless; specific gravity, 6.6; decomposes at 315° C; insoluble in cold water; soluble in acids and in alkalies; and insoluble in ammonia and in alcohol. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-185.*

lead carbonate, basic; lead subcarbonate; white lead; hydrocerussite. White; hexagonal; $2PbCO_3.Pb(OH)_2$; soluble in nitric acid; insoluble in water and in alcohol; decomposes at 400° C; and specific gravity, 6.14. Used in ceramic glazes. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-185.* Used in raw lead glazes and also in enamels and glasses. The fine particle size of this material assists in suspending the glaze ingredients. *Lee.*

lead-chamber process. A process for the manufacture of sulfuric acid. The catalyst is a mixture of oxides of nitrogen. The chambers are lead-lined compartments into which air, steam, sulfur dioxide, and oxides of nitrogen are sprayed in correct proportions to yield sulfuric acid. *Nelson.*

lead chlorite. $Pb(ClO_2)_2$; molecular weight, 342.09; yellow; monoclinic; explodes at 126° C; slightly soluble in water; and soluble in potassium hydroxide. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-185.*

lead chromate; crocoite; chrome yellow. $PbCrO_4$; molecular weight, 323.18; yellow; monoclinic; specific gravity, 6.12 (at 15° C); melting point, 844° C; insoluble in water; and soluble in acids; for example, in dilute nitric acid and in alkalies. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-185.* Used as a colorant in glasses, glazes, and enamels. The chromium imparts the color and the lead acts as a flux. *Lee.*

lead colic. Intestinal colic associated with obstinate constipation due to chronic lead poisoning. Also called painter's colic. *Webster 3d.*

lead crown glass. An optical crown glass bordering on flint glass because of the addition of a substantial content of lead oxide and with somewhat higher dispersion than crown glass. Sometimes called crown flint glass. *ACSB-2.*

lead crystal. Glass made with lead as one of its ingredients. *Haggar.*

lead cyanide. White to yellowish; $Pb(CN)_2$; poisonous; slightly soluble in water; and it decomposes in acid. Used in metallurgy. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-185.*

lead dioxide; lead peroxide; brown lead oxide; plattnerite. a. PbO_2; molecular weight, 239.19; brown; tetragonal; specific gravity, 9.375; decomposes at 290° C; insoluble in water; and soluble in dilute hydrochloric acid. Used in manufacturing pigments, in electrodes, and in explosives. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-186.* b. The material from which the positive plates of electric storage batteries are made. *Crispin.*

lead dust. Lead in very finely powdered form. *CCD 6d, 1961.*

leaded bronze. Copper-base alloy containing 5 to 10 percent tin and 8 to 20 percent, and sometimes 30 percent, of lead; used for heavy-duty bearings. *C.T.D.*

lead edge; leading edge. The surfaces or inset cutting points on a bit that face in the same direction as the rotation of the bit. *Long.*

leaded glass. Pieces of glass fixed together with strip lead of H or U section to form a window. *ASTM C162-66.*

lead encephalopathy. The medical term for lead poisoning. *Fay.*

lead equivalent. a. The thickness of lead that has the same radiation absorption or the same attenuation as a unit thickness of the material in question. *ASM Gloss.* b. That thickness of lead which will produce the same attenuation or protection as the material in question when both are exposed under the same conditions. *ASM Gloss.*

leader. a. A narrow vein branching upwards at an angle from a much larger vein. *See also* dropper. *Nelson.* b. A thin layer of coal or coaly shale which serves as a guide towards a displaced seam. *See also* guiding bed. *Nelson.* c. A thin mineralized vein parallel to, or in continuation of, the main vein formation. *C.T.D.* d. A cast- or wrought-iron ring or shoe, bolted to the bottom (often around the outside) of a brick cylinder, a wooden drum, or a wrought-iron cylinder when used for sinking through quicksand or gravel. *Fay.* e. Som. The slip of a fault. *Fay.* f. Any particular or constant bed or band of coal, ironstone, etc., in connection with certain workable beds, serving as a datum line in a mine. *Fay.* g. N. of Eng. A back or fissure in a coal seam. *Fay.* h. Scot. One who conducts the putting down of a borehole. *Fay.* i. Corn. A small vein leading to a larger one. *Fay.* j. In warm air heating, the supply duct running horizontally from the furnace to the riser, or stack. *Strock, 10.*

leader of the lode. Eng. *See* leader, i. *Fay.*

leaders. Guides in a pile frame to take the drop hammer of a pile driver. *See also* hanging leaders. *Ham.*

lead feldspar. Synthetic $PbAl_2Si_2O_8$ with the feldspar structure; probably anorthic. *Hey, MM, 1964.*

lead flake. *See* lead carbonate, basic. *CCD 6d, 1961.*

lead fluosilicate; lead silicofluoride. Colorless; monoclinic; $PbSiF_6.2H_2O$; soluble in water; and it decomposes when heated. Used as a solution for electrorefining lead. *CCD 6d, 1961.*

lead fume. The fume escaping from lead furnaces and containing both volatilized and mechanically suspended metalliferous compounds. *Fay.*

lead glance. Same as galena, which is lead sulfide. *Fay.*

lead glass. Glass containing lead oxide. The amount may vary from 3-4 percent to 50 percent or more in special cases. English lead crystal used for tableware contains 33-34 percent. *C.T.D.*

lead glaze. *See* lead, c.

leadhillite. A monoclinic mineral of a yellowish or greenish color, consisting of a sulfate and carbonate of lead, perhaps $4PbO.SO_3.2CO_2.H_2O$; one perfect cleavage, rather sectile; rare. *Fay; Larsen, p. 207.*

lead-in-air indicator. This instrument utilizes reagents to measure the concentration of lead in the air. One type employs a pump which draws the air sample through a glass fiber filter disk; another type draws air through a scrubber containing an iodine solution; on a third type, air flow is induced by a high velocity freon jet passing through a venturi. Field units used in association with the cleaning and repair of leaded gasoline storage tanks, should be incapable of iginiting flammable or explosive vapors. *Bests, p. 587.*

leading. Aust. The unprofitable gravel above gold-bearing sand. *Fay.*

leading band. York. A heading about 18 yards wide driven to the rise and between a pair of bord gates. *Fay.*

leading bank. York. A breadth of about 18 yards of coal taken out to the rise between pairs of bord gates. *Fay.*

leading frames. Eng. In tunnel work, frames formed to the contour of the invert and the walls, to guide the bricklayers. *Fay.*

leading heading. The one of a pair of parallel headings which is kept a short distance in advance of the other. This may be adopted to drain the water and thus secure one dry heading. The term is also applied to a heading which is driven in the solid coal in advance of the general line of face. *See also* exploring heading. *Nelson.*

leading lengths. *See* lengths. *Fay.*

leading man. *See* first man. *Fay.*

leading place. Scot. A working place in advance of the others, such as a heading or a level. *Fay.*

leadings. Derb. Small sparry veins in the rock. Same as leader, f. *Fay.*

leading winning. Aust. A heading in advance of the ordinary bords. A leading bank. *Fay.*

leading wire. a. An insulated wire strung separately or as a twisted pair, used for connecting the two free ends of the circuit of the blasting caps to the blasting unit. *ASA C42.85: 1956.* b. *See* leads. *B.S. 3618, 1964, sec. 6.*

lead joint. a. Generally used to signify the connection between pipes which is made by pouring molten lead into the annular space between a bell and spigot, and then making the lead tight by calking. *Strock, 3.* b. Rarely used to mean the joint made by pressing the lead between adjacent pieces, as when a lead gasket is used between flanges. *Strock, 3.*

lead lap. a. A gem cutters' lap, of lead, copper, or iron; also, the entire machine. *Standard, 1964.* b. In mechanics, a lap of lead charged with emery and oil. *Fay.*

leadless. Any material which does not contain lead is so described. Leadless enamel frits have almost completely replaced the lead-bearing frits which were standard years ago. *Enam. Dict.*

leadless enamel. An enamel containing a negligible amount of lead compounds. *ACSB-3.*

leadless glaze. In the United Kingdom, this is defined in the Pottery (Health and Welfare) Special Regulations of 1950 as: a glaze which does not contain more than 1 percent of its dry weight of a lead compound calculated as PbO. *Dodd.*

lead luster. Lead oxide, used as a glaze for ceramic ware. *Standard, 1964.*

lead marcasite. A variety of sphalerite, called by miners blende, mock lead, or mock ore. *Fay.*

lead metacolumbate; lead metaniobate. $Pb(CbO_3)_2$ ($Pb(NbO_3)_2$) is a ferroelectric material with a Curie temperature of 570° C. The material can be polarized to obtain piezoelectric properties. Uses include high-temperature transducer applications, sensing devices, and accelerometers. *Lee.*

lead metal. Lead compounds are used in ceramic glazes and in glass, particularly that for which brilliance is desired, as in cut glass and glass may contain as much as 29.5 percent PbO. *Hess.*

lead metavanadate; lead vanadinate. $Pb(VO_3)_2$; molecular weight, 405.07; yellow; insoluble or slightly soluble in water; and soluble in dilute nitric acid. Used as a pigment. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-187.*

lead mill. A leaden disk charged with emery for grinding gems. *Standard, 1964.*

lead minerals. The most important industrial one is galena (PbS), which is usually argentiferous. In the upper parts of deposits the mineral may be altered by oxidation to cerussite ($PbCO_3$) or anglesite ($PbSO_4$). Usually galena occurs in intimate association with sphalerite (ZnS). *Pryor, 3.*

lead molybdate. *See* wulfenite. *C.M.D.*

lead motorman. In ore dressing, smelting, and refining, one who operates a small electric locomotive (motor) to haul pots of molten lead bullion from a blast furnace to refining kettles for the separation of copper, antimony, silver, and other metals contained in the lead buillion. *D.O.T. 1.*

lead niobate. $Pb(NbO_3)_2$; a ferroelectric compound having properties that make it useful in high-temperature transducers and in sensing devices. The Curie temperature is 570° C. *Dodd.*

lead nitrate. Colorless or white; isometric or monoclinic; $Pb(NO_3)_2$; promotes combustion in contact with organic matter; poisonous; soluble in water, in alcohol, in alkalies, and in ammonia; specific gravity, 4.53 (at 20° C); and it decomposes at 470° C. Used in explosives. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-186.*

lead ocher. A massicot or lead monoxide, PbO; massive, scaley, or earthy; color, yellow or reddish. *Fay.*

lead of a switch; frog distance. The distance measured on the main line from the point of switch to the point of frog. *Kiser, 2, p. 34.*

lead operator. In ore dressing, smelting, and refining, one who directs activities concerned with initial crushing of ore and transporting of crushed ore to secondary crushers. *D.O.T. Supp.*

lead ores. *See* anglesite; cerussite; crocoite; galena; linarite; pyromorphite; vanadinite; wulfenite. *C.M.D.*

lead oxide. Both litharge (PbO) and red lead (Pb_3O_4) are used in glass, glazes, and enamel batches. Red lead is generally preferred to litharge because the extra oxygen it contains helps to insure oxidizing conditions during the melting and thus there is less danger of lead reduction. Lead oxide is used in optical glass and tableware. It increases the density and refractive index of glass, can be cut more easily than other glasses, and has superior brilliancy. *Lee.*

lead oxide, red; red lead; lead tetroxide; triplumbic tetroxide; minium. Bright red; Pb_3O_4; specific gravity, 9.1; decomposes between 500° and 530° C; insoluble in water and in alcohol; and soluble in hydrochloric acid and in acetic acid. Used in glass, pottery, and enameling. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-186.* Pb_3O_4 is formed by heating lead monoxide in air at approximately 450° C. It occurs as red and yellow crystalline scales. Commercial varieties contain up to approximately 35 percent PbO_2. *C.T.D. See also* lead oxide.

lead oxide, yellow. *See* litharge.

lead paint. Ordinary paint, so-called because white lead is used as a base. *Crispin.*

lead palsy. Paralysis due to lead poisoning. *Webster 3d.* Lead paralysis. *Hess.*

lead paralysis. Paralysis resulting from lead poisoning. *Standard, 1964.*

lead poisoning. a. A morbid condition produced by the cumulative introduction of lead into the system. *Standard, 1964.* b. A disease affecting painters and workers in lead or lead products. *Crispin.*

lead rail. The lead rail of an ordinary mine switch is the turnout rail lying between the rails of the main track. *Kiser, 2, p. 34.*

lead reeve. Eng. An officer before whom aggrieved miners lodge their complaints. *Standard, 1964.* A mine foreman. *Fay.*

leads. The wires, forming part of an electric detonator, to which the shot-firing cable is attached. *B.S. 3618, 1964, sec. 6.*

lead screen. In radiography, a shield used (1) to filter out soft-wave or scattered radiation, and (2) to increase the intensity of the remaining radiation so that the exposure time can be decreased. *ASM Gloss.*

lead selenide; clausthalite. Gray; PbSe; molecular weight, 286.15; isometric; specific gravity, 8.10 (at 15° C); melting point, 1,065° C; insoluble in water; and soluble in nitric acid. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-186.*

lead sesquioxide. Reddish-yellow; amorphous; Pb_2O_3; decomposes at 370° C; soluble in alkalies; decomposes in acids; insoluble in cold water; and decomposes in hot water. Used in ceramics, in ceramic cements, and in metallurgy. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-186.*

lead sheath. A lead tube used as a protective covering to a power cable or a telecommunications cable. *Ham.*

lead sheet. Used for the cutting of stencils for sign work, for lining wooden pickling tanks for sulfuric acid pickling. *Hansen.*

lead silicate; lead metasilicate; alamosite. Colorless or white; monoclinic; $PbSiO_3$; insoluble in most solvents; and decomposes in acids. Used in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-186.* Molecular weight, 283.27; specific gravity, 6.49; melting point, 766° C; and insoluble in water. Used in glazing pottery, manufacturing glass, and in fireproofing fabrics. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-186.*

lead silicates. Various compositions; the anhydrous forms are made by roasting lead oxide with silica. Another means of preparation is by drying the reaction product of silica gel, litharge (PbO), and acetic acid. Used as fillers. *CCD 6d, 1961.*

lead silicofluoride. *See* lead fluisilicate. *CCD 6d, 1961.*

lead solubility test. The (British) Pottery (Health and Welfare) Special Regulations, 1947 and 1950 define this test, as applied to the specification of a low solubility glaze as follows: a weighed quantity of the material which has been dried at 100° C and thoroughly mixed is continuously shaken for 1 hour, at the common temperature, with 1,000 times its weight of an aqueous solution of HCl containing 0.25 percent by weight of HCl. This solution is thereafter allowed to stand for 1 hour and then filtered. The lead salt contained in the clear filtrate is then precipitated as PbS and weighed as $PbSO_4$. *Dodd.*

lead spar. a. The term "spar" is common among miners and applies to any of the metallic minerals which are cleavable and lustrous. *Fay.* b. Corn. Anglesite. *Fay.* c. Cerusite. *Standard, 1964.*

lead stannate. Light-colored; $PbSnO_3.2H_2O$; insoluble in water; and loses $2H_2O$; at about 170° C. Used as an additive in ceramic capacitors. *CCD 6d, 1961.* Added in quantities of 1 to 5 percent to barium-titanate capacitor bodies intended for piezoelectric applications, lead stannate reduces the tendency of these units to depolarize under load when used as oscillators. *Lee.*

lead styphnate; lead trinitroresorcinate. $C_6H(NO_2)_3OOPb$; molecular weight, 450.3. Used as an explosive. *Bennett 2d, 1962.*

lead subcarbonate. *See* lead carbonate, basic. *CCD 6d, 1961.*

lead sulfate, basic; white lead, sublimed; lanarkite. White; monoclinic; $PbSO_4.PbO$; molecular weight, 526.44; specific gravity, 6.92; melting point, 977° C; and only slightly soluble in hot water and in sulfuric acid. Used in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-186.*

lead sulfate, blue basic; sublimed blue lead. Blue-gray; corrosion-inihibiting pigment; and insoluble in water and in alcohol. Used as a component of structural-metal priming-coat paints, as a rust inhibitor in paints, and rarely used for color. *CCD 6d, 1961.*

lead sulfide; plumbous sulfide; galena; galenite; glance. Silvery, gray, or black; metallic; isometric; PbS; Mohs' hardness, 2.5; soluble in acids; insoluble in water, in alcohol, and in alkalies; specific gravity, 7.3 to 7.6; and melting point, 1,114° C. Used in ceramics and the main source of metallic lead. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-186, B-243.*

lead tantalate. $PbTa_2O_6$; a compound believed to have ferroelectric properties and of possible interest as a special electroceramic. The Curie temperature is 260° C. *Dodd.*

lead telluride; altaite. PbTe; molecular weight, 334.79; white; isometric; specific gravity, 8.16 (at 20° C, referred to water at 4° C); melting point, 917° C; and insoluble in acids. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-187.*

lead tetraethyl. *See* tetraethyllead.

lead tetroxide. *See* lead oxide, red.

lead time. The time taken between the conception of an idea and its quantity production. It is recorded that with mining equipment, the total lead time varies from about 6 months to 7 years. The latter period may apply to a completely new design of cutting and loading machine. *See also* prototype. *Nelson.*

lead titanate; lead metatitanate. Yellow; orthorhombic; $PbTiO_3$; molecular weight, 303.09; specific gravity, 7.52; and insoluble in water. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-187.* Used with lead zirconate ($PbZrO_3$) as a material for piezoelectric transducers. A useful combination contains 45 percent lead titanate and 55 percent lead zirconate. This has a Curie temperature of 340° C, compared to 120° C for barium titanate. The lead titanate-lead zirconate ceramic, known as PZT, has stable electromechanical properties over a wide range of temperature. *Lee.*

lead tree. A crystalline deposit of metallic lead on zinc that has been placed in a solution of acetate of lead. *Standard, 1964.*

lead tungstate. a. Stolzite. Green to gray or brown; $PbWO_4$; molecular weight, 455.04; tetragonal; Mohs' hardness, 2.75 to 3.0; specific gravity, 8.23; insoluble in water and in nitric acid; and soluble in potassium hydroxide. Used in pigments. *Bennett, 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-187, B-245.* b. Raspite. Colorless to brownish yellow; $PbWO_4$; molecular weight, 455.04; monoclinic; melting point, 1.123° C; slightly soluble in cold water; decomposes in acids; and insoluble in alcohol. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-187.*

lead-uranium ratio. The ratio of the amount of lead to the amount of uranium in a rock or mineral, or of the amounts of the various isotopes of the two elements; used in computing the geologic age of the rock or mineral. *A.G.I.*

lead vanadate. *See* vanadinite. *C.M.D.*

lead vitriol. Same as anglesite. *Standard, 1964.*

lead-well man. In ore dressing, smelting, and refining, one who maintains flow of molten lead from the blast furnace to the lead pot for removal to refinery. *D.O.T. Supp.*

lead wires. a. In blasting, the heavy wires that connect the firing current source or switch with the connecting or cap wires. *Nichols.* b. Two insulated copper wires leading from the battery or igniting apparatus to the primer cartridge in an explosive charge. Also called connecting wires. *Stauffer.*

lead wool. A material used in place of molten lead for making pipe joints. It is lead fiber, about as coarse as fine excelsior, and when made in a strand, it can be calked into the joints, making them very solid. *Strock, 3.*

lead works. A place where lead is extracted from the ore. *Fay.*

lead zirconate. $PbZrO_3$; a ferrolelectric material. It is also used in lead titanate-zirconate (P.Z.T.) piezoelectric ceramics. *Dodd.*

leaf. A very thin sheet or plate of metal, as gold. *Standard, 1964.*

leaf chain. A silent chain designed for low speed heavy duty work. *Nichols.*

leaf clay. Synonym for book clay. *A.G.I.*

leaf coal. Variety of brown coal mainly made of leaves. *Tomkeieff, 1954.*

leaf filter. *See* filter, b.

leaf injections. Thin sheets of pegmatite alternating with thin sheets of schists. *See also* lit-par-lit. *A.G.I.*

leaf peat. Synonymous with paper peat. *Tomkeieff, 1954.*

leafy post. In Northumberland and Durham, England, a very thin and platy sandstone, usually full of micaceous layers. *Nelson.*

league. a. A unit of linear measure. A land league = 3 statute miles or 15,840 feet. A nautical league = 3 geographical miles or 18,240.78 feet. *A.G.I.* b. An area embraced in a square 5,000 varas on each side. It contains 4,428.40 acres or 6.92 square miles. The term is used in Texas land descriptions. *A.G.I.*

Leaia. A tiny phyllopod crustacean, supposed to be of freshwater habitat. The genus Leaia has proved of considerable value as it may characterize a single horizon over widespread areas. For example, the horizon over the Swansea Four Feet coal seam (South Wales) with its relative abundance of Leaia has proved a reliable datum plane for correlation and identification purposes. *Nelson.*

leak. Low-grade mineralized rock into which an ore body degenerates. *Hess.*

leakage. a. An unintentional diversion of ventilation air from its designed path. *B.S. 3618, 1963, sec. 2.* b. In nuclear engineering, the escape of neutrons from a reactor core. Leakage lowers the reactivity of a reactor. *L&L.*

leakage coefficient. A numerical expression of a duct's liability to leak. The National Coal Board of Great Birtain defines this as the volume of air in cubic feet per minute which would leak from 100 feet of the duct under a uniform pressure of 1 inch of water gage. *Roberts, I, p. 225.*

leakage field. The magnetic field which leaves or enters a magnetized part at a magnetic pole. *ASM Gloss.*

leakage halo. a. A dispersion pattern formed in the rock overlying a mineral deposit by the movement of ore-forming fluids through a well-defined system of channels. *Hawkes.* b. Dispersion patterns in rocks and fracture zones over blind ore deposits where it is assumed that the dispersion patterns represent the leakage of nearly spent ore solutions. *Lewis, p. 301.*

leakage intake. An additional intake which is a component part of a system of controlled leakage. *B.S. 3618, 1963, sec. 2.*

leakage intake system. A ventilation circuit with two adjacent intake roadways leading to the coalface. The method has been criticized as the air flow may become so sluggish as to cause firedamp layers. *See also* two intakes. *Nelson.*

leak vibroscope. An instrument which detects leaks in water, oil, gas, steam, and air lines by amplifying the sound produced by the escaping fluid. *Osborne.*

lean. a. Of ore, low-grade; submarginal; unpay; of doubtful exploitable value. *Pryor, 3.* b. A cement-sand mixture containing a very small or less-than-normal amount of cement. *Long.* c. A rock in which the minerals sought occur in much less than exploitable amounts. *Long.* d. Eng. *See* hang, c. *SMRB, Paper No. 61.*

lean cannel coal. Cannel coal low in hydrogen and thus transitional to bituminous coal. *Tomkeieff, 1954.*

lean clay. Clay of relatively low plasticity. *Compare* fat clay. *A.G.I.*

lean coal. Term used in several European countries for coal with a low volatile matter. *B.S. 3323, 1960.*

lean concrete. Concrete with a high aggregate/cement ratio. *Taylor.*

lean gas. Gas containing little or no liquefiable hydrocarbons. Also called dry gas. *Williams.*

lean lime; poor lime. Hydraulic lime; opposite of fat lime. *Bennett 2d, 1962.*

lean-mix concrete. A concrete with a very low cement/aggregate ratio (1:12 to 1:15) used mainly as a subbase under concrete roads. *Nelson.*

lean mortar. Mortar that is deficient in cementitious components. It is usually harsh and difficult to spread. *See also* fat mortar; mortar. *ACSG, 1963.*

lean ore. A low-grade ore. *Nelson.*

leap. a. To disappear, as a vein of ore when broken by a fault. *Standard, 1964.* b. Eng. A dislocation of strata by faulting. *See also* downleap; upleap. *Fay.*

leaper; leper. *See* laper. *Arkell.*

leapfrog system. A system employed with self-advancing supports on a longwall face in which alternate supports are advanced on each web of coal removed. To do this, alternate units have to be moved a distance equal to twice the web thickness—half before snaking and half after snaking. *Nelson.*

leap ore. Tin ore of the poorest quality. *Standard, 1964.*

lear. *See* lehr.

learies. Eng. Empty places; old workings. *Fay.*

lease. a. Contract between landowner and another granting the latter right to search for and produce oil or mineral substances upon payment of an agreed rental, bonus, and/or royalty. *A.G.I. Supp.* b. The instrument by which such grant is made. *Fay.* c. A piece of land leased for mining purposes. *Fay. See also* claim; concession system; royalty. *Nelson.*

leaser. A Western colloquiallism meaning lessee. *Fay.*

lea stone. Lanc. Laminated sandstone. *Fay.*

leat. a. A mill stream which is used by small mines for power purposes. *Nelson.* b. Ditch which leads water to mineral workings, usually at slight downgrade along detour. *Pryor, 3.*

leath. Derb. The soft part of a vein. *Fay.*

leather. Disk-, cup-, or V-shaped rings of leather used as pressure packing on hydraulic and pump pistons and around piston rods. *Long.*

leather bed. Mid. A tough leatherlike clayey substance in a faultslip, composed of the crushed and fractured ends of the coal measures. *Fay. See also* fault breccia; fault gouge. *Nelson.*

leather coat. The thin veneer of plastically deformed rock on a fault plane. *Schieferdecker.*

leather-hard. Clay which is dried sufficiently to be stiff but is still damp enough to be joined to other pieces with slip. *ACSG, 1963.*

leather jacket. Aust. A Ballarat name for clay occurring in cross courses. *Fay.*

leather-jacket lode. A gold-bearing lode associated with west dipping reversed faults. Where the lode intersects massive sandstone it tends to be barren while where it intersects slate beds it becomes more productive. The term leather-jacket refers to the black shiny carbonaceous pug with a leathery appearance of the associated faults (leather-jacket faults). *See also* indicator. *Nelson.*

leather lap. A disk covered with leather for polishing gems. *Standard, 1964.*

leatherstone. Synonym for mountain leather. *Fay.*

leathery texture. Similar to eggshell but generally a larger pattern. *Bryant.*

leats. Forest of Dean. Miner's term for coal seams split into layers by soft mudstone partings. *Tomkeieff, 1954.*

leaving. Corn. The mineral left after the good ore has been removed; tailings. *Fay.*

lebensspuren. A general term for sundry tracks, trails, and burrows or casts derived therefrom. *See also* ichnofossil. *Pettijohn.*

LECA. Abbreviation for lightweight expanded clay aggregate. *See also* lightweight expanded clay aggregate. *Dodd.*

Le Chatelier-Braun principle. When a system which is in equilibrium suffers a change, it reacts to oppose or minimize that change. *Pryor, 3.*

Le Chatelier couple. A thermocouple employing a negative wire of pure platinum and a positive wire of 90 percent platinum and 10 percent rhodium. *Osborne.*

lechatelierite. Naturally occurring silica glass, SiO_2; amorphous. The chief constituent of fulgurites and of the fused sandstone of Meteor Crater, near Winslow, Ariz. *English; Dana 17.*

Le Chatelier soundness test. A procedure for assessing any expansion of hydraulic cement caused by the presence of excess lime, magnesia, or sulfates. The gaged cement is put into a split brass cylinder 30 millimeter inside diameter, to which are attached two needles 156 millimeter long from the centerline of the mold, one needle on each side of the split in the mold. The cement is allowed to set for 24 hours immersed in water at 58° to 64° F; the distance between the ends of the needles is then measured. The mold is immersed in water and boiled for 1 hour. When it has cooled, the distance between the ends of the needles is again measured. The difference between the first and second readings should not exceed 10 millimeter. The test is included in British Standards 12. *Dodd.*

lechosos opal. A variety of precious opal exhibiting a deep-green play of color. *C.M.D.*

leck. A thick, stony clay. Also called leck clay. *Standard, 1964.*

leckstone. A granular variety of trap found in Scotland; used for oven bottoms. *Standard, 1964.*

Leclanche cell. A zinc-carbon primary cell whose exciting liquid is a solution of sal ammoniac. *Webster 3d.*

lecontite. A colorless, water-soluble mineral, $(Na,NH_4,K)_2O.SO_3.2H_2O$. *Larsen, p. 148.*

Lecq decking system. A fully automatic system for a two-deck cage, decked simultaneously, which may be powered pneumatically, electrically, or hydraulically. In this system, at each decking level the roads leading from the cages and the full cars are fed by gravity to an automatic tippler situated close to the shaft. On the completion of the tipping the empty cars are rammed out of the tipplers by rams to the creepers, from which they run to shunt backs and are diverted as required. They are then in position to be rammed into the next cage coming to bank. *Sinclair, V. p. 75.*

led. N. of Eng. A spare tub, or one that is being loaded while another is being emptied. *Fay.*

ledeburite. The eutectic of the iron-carbon system, the constituents being austenite and cementite. The austenite decomposes into ferrite and cementite on cooling below the Ar_1. *ASM Gloss.*

ledge. a. A bed or several beds in a quarry or natural outcrop, particularly those projecting in a steplike manner. *A.G.I. Supp.* b. The surface of such a projecting bed. *A.G.I. Supp.* c. In mining, a projecting outcrop or vein, commonly of quartz, that is supposed to be mineralized; also, any narrow zone of mineralized rock. *A.G.I. Supp.* d. In northern Michigan, the same as bedrock. *A.G.I. Supp.* e. A mass of rock that constitutes a valuable mineral deposit. *Webster 3d.* f. Colloquial synonym of bedrock. *Long.* g. The only true ledges are deposits of oil-shale, slate, or the like. A ledge is a horizontal layer, therefore a vein or lode is not a ledge. *von Bernewitz.* h. A rocky formation continous with and fringing the shore. *H&G.*

ledge finder. *See* Larson ledge finder. *Long.*

ledgeman. *See* breaker. *D.O.T. 1.*

ledger. Eng. Applied to the lower side of a vein. *Fay.*

ledge rock. a. The true bedrock; distinguished from boulders or rock that has been transported. *Standard, 1964. Compare* false bottom. b. Ganister occurring in solid rock formations. *A.R.I.*

ledger wall. Same as footwall. *Fay.*

Ledian. Lower Upper Eocene. *A.G.I. Supp.*

ledmorite. A variety of melanite-augite nepheline syenite associated with borolanite but free from the pseudoporphyritic character of borolanite. *Holmes, 1928.*

Leean. Lower lower Pennsylvanian. *A.G.I. Supp.*

Leebar separator. A dense medium washer consisting of a static bath. The floats, or coal, are removed by means of paddles or chains suspended from bars connected to rotating spokes. The sinks, or shale, are extracted by a scraper device. The bath can be fed directly from the raw coal screens. The separator has been developed for the treatment of large coal and shale. *Nelson.*

Lee board. *See* hack. *Dodd.*

Lee configuration. An electrical resistivity measuring method using two current electrodes and three equispaced potential electrodes. *A.G.I.*

lee dune. A dune formed under constant wind direction in the lee of an obstacle or a source of loose sand. *Hess.*

leelite. A flesh-red variety of orthoclase. *Standard, 1964.*

Lee-Norse miner. A continuous miner, developed in the United States, for driving headings in medium or thick coal seams. It weighs about 26 tons, and makes a cut 8½ feet wide, gathers the cut coal and loads it into cars or conveyor at a rate up to about 4 tons per minute. It can work in seam heights from 4 feet 8 inches up to about 10 feet. It consists, mainly, of a boom carrying the cutting head; the gathering head, and at the rear the jib support frame on which the jib can be slewed. The machine is operated by hydraulic motors. *Nelson.*

Lee process. A process for shaping any of the softer metals or alloys, by simply squeezing it cold through or into a suitably shaped hole. Also called extrusion or squirting process. *Fay.*

leering. In glassmaking, the process of treating in the annealing oven or leer. *Standard, 1959.*

leer man. *See* lehr man. *D.O.T. 1.*

lee side. That side of glaciated rocks that faces away from the direction whence the ice came, as indicated by rough and weathered surfaces; opposite of stoss side. *Standard, 1964.*

lee-side concentration. Small-scale crossbedding formed by deposition on lee side of ripples. *Pettijohn.*

leet. A stack of peat, properly 24 feet long by 12 feet wide and 12 feet high. *Standard, 1964.*

Leet seismograph. A portable three-component seismograph designed primarily for registration of vibrations from blasts, traffic, machinery, and general industrial sources. *Leet, 2, p. 90.*

lefkasbestos. A white (bleached) variety of chrysotile asbestos; from Mt. Troodos, Cyprus. *English.*

left bank. The bank of a stream that is on the left when one looks in the direction in which the stream flows. *Seelye, 2.*

left hand. Drill rods, subs, pipe, or other threaded drilling equipment having left-handed threads. *See also* left-handed. *Long.*

left-hand cutting tool. A cutter all of whose flutes twist away in a counterclockwise direction when viewed from either end. *ASM Gloss.*

left-handed. Threaded members, such as pipe or drill rods, which can be coupled together only by turning or twisting the members in an anticlockwise or counterclockwise direction as opposed to the clockwise direction used when coupling standard right-hand-threaded components. *Long.*

left-hand rule. *See* Fleming's rule.

left lang lay. Wire or fiber rope or cable in which the wires or fibers in a strand and the strands themselves are twisted to the left. *Long.*

left lay. Wire rope, the strands of which form a left-hand helix like a left-hand screw thread. *H & G, p. 130.*

left long lay. Synonym of left lang lay. *Long.*

left regular lay. Wire or fiber rope or cable in which the individual wires or fibers in the strands are twisted to the right and the strands to the left. Also called regular-lay left lay. *Long.*

left twist. Same as right lay, and corresponds to a right-hand screw thread. *H & G, p. 130.*

leg. a. In mine timbering, a prop or upright member of a set or frame. *Pryor, 3.* Also known as uprights; posts; arms. *Nelson.* b. Eng. A prop set under a balk or bar is sometimes called a leg. *SMRB, Paper No. 61.* c. One of the main upright members of a drill derrick or tripod. *Long.* d. A side post in tunnel timbering. *Nichols.* e. A wire or connector in one side of an electrical circuit. *Nichols.* f. Eng. A stone that has to be wedged out from beneath a larger one. *Fay.* g. A term sometimes applied to a centrifugal discharge bucket elevator. Usually a double leg bucket elevator. *ASA MH4.1-1958.* h. *See* draft. *B.S. 3618, 1963, sec. 1.*

legato injection. An injection of igneous material that was completed in a single stage. *A.G.I.*

legend. The explanation of the symbols and patterns shown on a map or diagram. *A.G.I. Supp.*

leg of a fillet weld. Actual—the distance from the root of the joint to the toe of a fillet weld. Nominal—the length of a side of the largest right triangle that can be inscribed in the cross section of the weld. *ASM Gloss.*

leg piece. The upright timber that supports the cap piece in a mine. *Fay.*

legrandite. A yellow to nearly colorless basic hydrous arsenate of zinc, $Zn_{14}(AsO_4)_9OH.12H_2O$. Massive, radiating prismatic. Monoclinic. From Lampazos, Nuevo Leon, Mexico. *English.*

legs. a. The wires attached to and forming a part of an electrical blasting cap. *Fay.* b. The uprights of a set of mine timbers. *See also* leg piece. *Fay.* c. Legs are used under crossbars, headers, or collars in the three-piece set of timbers, and between the mudsill and the collar in the four-piece set. They may also be called sidepieces or posts. When used in four-piece sets, the reason of which is usually side pressure, the legs must be locked in the mudsill and the collar. This is called a dap. *Kentucky, p. 141.* d. Aust. The two sides or wings of a saddle reef or anticline. *Fay.*

legua. Sp. Land league used in the original surveys of the Philippines, California, and Texas. It is equal to 2.63 miles or 4.24 kilometers. *See also* league. *A.G.I.*

leg wire. One of the two wires attached to and forming a part of an electric blasting cap or squib. *ASA C42.85: 1956.*

Lehigh jig. A plunger-type jig with the following distinguishing characteristics: (1) the plunger contains check valves that open on the upstroke to reduce suction; (2) the makeup water is introduced with the feed; (3) the screen plate is at two levels, which have different perforations, to keep the water distribution uniform; (4) the bottom of the discharge end of the jig is hinged. This jig has been used extensively in washing anthracite. *Mitchell, p. 428.*

lehiite. A hydrous phosphate of calcium, sodium, potassium, and aluminum, $Ca_5Na_2Al_8(PO_4)_8(OH)_{12}.6H_2O$; monoclinic (?); white; crust of coarse fibers. Fonud near Fairfield, Utah. *English; American Mineralogist, v. 27, No. 4, April 1942, p. 287.*

lehm. The same as loess or mud. *Standard, 1964.*

Lehmann process. A process for treating coal by disintegration and separation of the petrographic constituents (Fusain, durain, and vitrain). It consists of subjecting the coal to resilient disintegrating or shattering action for a sufficient length of time to break the constituents into granules of various sizes by reason of their respective resistances to shattering impacts and separating the granules into different sizes by screening or equivalent means. *Mitchell, p. 601.*

lehr; leer; lear. An enclosed oven or furnace used for annealing, or other form of heat treatment, particularly used in glass manufacture. It is a kind of tunnel down which glass, hot from the forming process, is sent to cool slowly, so that strain is removed, and cooling takes place without additional strain being introduced. Lehrs may be of the open type (in which the flame comes in contact with ware), or of the muffle type. *C.T.D.*

lehr loader. A device for properly placing and spacing glass articles on a continuous lehr belt. *ASTM C162-66.*

lehr man. One who regulates temperature of a reheating oven (lehr) used to fire-glaze glass articles. Arranges glass articles according to size and shape on lehr conveyor so that maximum quantity will be carried in oven on a long paddle. Also called leer man; lehr operator, glass; lehr tender. *D.O.T. 1.*

leidleite. A glassy dacite or rhyodacite with microlites instead of phenocrysts of plagioclase, pyroxene, apatite, and opaque oxides. *A.G.I.*

leifite. A colorless, highly acidic, fluosilicate of sodium and aluminum, $Na_4(AlF)_2Si_9O_{22}$; prisms; hexagonal; from Narsarsuk, Greenland. *English.*

Leighton buzzard sand. An important source of sand from the Lower Greensand deposits of Bedfordshire, England. The sand is high in silica and well-graded; it is used as a refractory foundry sand and as a standard sand for mixing with portland cement for testing according to British Standard 12. *Dodd.*

leightonite. A pale blue hydrous sulfate of copper, calcium, and potassium, $CuO.2CaO.K_2O.4SO_3.2H_2O$. Crystals mostly lath-shaped and curved. Triclinic, pseudo-orthorhombic. From Chuquicamata, Chile. *English.*

leip. Scot. *See* lipe. *Fay.*

leith. Staff. A joint in coal. *Compare* leath. *Arkell.*

Leitz tyndallometer. Measures the intensity of the light scattered at an angle from the incident beam by a dust cloud, and correlates well with the concentration determined by the thermal precipitator or the surface area calculated from such a count. However, it needs to be calibrated for each type of dust cloud, owing to difference in mineralogical content, against the thermal precipitator. *Sinclair, I., p. 181.*

L.E.L. Lower explosive limit of a combustible compound. *Bennett 2d, 1962 Add.*

L-electron. One in the second innermost shell which surrounds the atomic nucleus. Principal quantum number 2. The complete shell contains eight electrons (neon, A.N. 10, composed of K + L shells, 2 + 8). *Pryor, 3.*

Lemberg's reaction. A chemical test for distinguishing calcite and dolomite. *Holmes, 1928.*

Lemberg's solution. Logwood digested in an aqueous solution of aluminum chloride is used as a combined stain and reagent. Calcite and aragonite are stained violet after treatment for about 10 minutes, but dolomite remains unchanged. *Holmes, 1928.*

Lemnian Reddle. Eng. An ocher of a deep-red color, occurring in conjunction with the Lemnian earth, and used as a pigment. *Fay.*

lemon. a. Eng. Any argillaceous rock forming the roof of a coal seam, North Staffordshire. *Arkell.* b. Eng. Similar to bannock, North Staffordshire. *Nelson.*

lenad. A contracted form of the names leucite and nephelite, suggested as an alternative group name for the feldspathoid minerals. *English.*

lencheon. Eng. A shelf of thin rock in a mine shaft. *Fay.*

lenco sapphire. White sapphire. *Schaller.*

lengenbachite. A steel-gray, often iridescent, sulfarsenite of lead, with small amounts of silver, copper, and antimony, possibly $6PbS.(Ag,Cu)_2S.2As_2S_3$. Probably triclinic. Thin blade-shaped crystals; soft. From Binnenthal, Switzerland. *English.*

length. The horizontal dimension of the unit in the face of a wall. *ASTM C43-65T.*

lengthening rod. A screwed extension rod for prolonging a well-boring auger or bit. *Standard, 1964.*

length, measures of. Shortest plane distance between two points. In the centimeter-gram-second system it is based on the meter. *Pryor, 3.*

length of back. The distance between levels on the plane of the ore body. *Higham, p. 160.*

length of lay. The distance measured along a straight line parallel to the rope in which the strand forms one complete spiral around the rope, or the wires around the strand. *See also* lay, d. *Ham.*

length of shot. a. The depth of the hole in which the powder is placed, or the size of the block of coal to be loosened by a single blast measured parallel with the hole. *Fay.* b. In the open-pit mining, the distance from the first drill hole to the last drill hole along the bank. *Bureau of Mines Staff.*

lengths. Eng. In tunnel construction, the successive sections in which a tunnel is executed. Shaft lengths are directly under the working shaft; side lengths are on each side of the shaft length; leading lengths are prolongations of the tunnel from the side lengths; and junction lengths complete the portion of the tunnel extending between two shafts, or between a shaft and an entrance. *Fay.*

lennilite. A greenish feldspar from Lenni Mills, Delaware County, Penn. *Hess.*

Lennox sand drier. A nonrotary hot air drier for foundry sand. *Osborne.*

lens. a. A body of ore or of rock thick in the middle and thin at the edges; similar to a double convex lens. *See also* lenticular. *Fay.* b. In optics, a device which modulates the direction taken by a transient beam of light. *Pryor, 3.*

lenses. Pyrite, round or oval in plan and lenticular in section, ranging up to 2 or 3 feet in thickness and several hundred feet in the greatest lateral dimension, that is found in coalbeds. Sometimes called kidney sulfur. *Mitchell, p. 67.*

lens-fronted tubing. Tubing for liquid-in-glass thermometers made in such a way as to magnify the width of the column of liquid. *Dodd.*

lens grinding. The process of grinding pieces of flat sheet glass (or pressed blanks) to the correct form of the lens. Cast-iron tools of the correct curvature, supplied with a slurry of abrasive and water, are used. *C.T.D.*

lensing. The thinning out of a stratum in one or more directions. *A.G.I.*

lens molder. One who molds glass for automobile lenses. Cuts disks from glass sheets to specification, using hand cutters. Places glass disks in molds, and inserts them in furnace for specified heating period to shape lens to molds. Removes molds from furnace, using tongs, and places them on bench to cool. Positions weights on lenses in molds to insure lenses retaining shapes while cooling. Also called glass bender. *D.O.T. 1.*

lenticle. A rock stratum or rock bed, which, from being thin at the edges, is more less lens-shaped. Nearly all undeformed strata are lenticles. *Standard, 1964.*

lenticular. Shaped approximately like a double convex lens. When a mass of rock thins out from the center to a thin edge all around, it is considered to be lenticular. *See also* lens. *Fay.*

lenticular bedding. Strata which wedge or pinch out within the confines of a given outcrop, hand specimen, or core. *See also* flaser structure. *Pettijohn.*

lenticular crossbedding. Crossbedding whose outline, in vertical section, is lenslike. *Pettijohn.*

lenticular iron ore. Impure concretionary hematite. *Hess.*

lenticular vein. Fat lenses in schists that may be caused by the bulging or dilation of the schistose rocks due to pressure transmitted by the mineralizing solutions. *Schieferdecker.*

lenticule. A very small, lens-shaped body in a rock mass. *Standard, 1964.*

lentil. a. A lens-shaped rock body. *A.G.I. Supp.* b. A minor stratigraphic unit, a subdivision of a formation similar in rank to a member, having relatively small geographic extent and presumably wedging out in all directions. *A.G.I. Supp.* c. A lenticular bed in a stratified series. *Fay.*

lentille. An isolated mass of rock containing fossils of a fauna older than the strata in which it occurs, though of contemporary age with those surrounding strata. *Fay.*

Lenzite. Trade name for an impure galena carrying some copper and probably other sulfides mined near Yucca, Arizona, and used as a detector in wireless telegraphy. *Hess.*

Lenz's law. When an electromotive force is induced in a conductor by any change in the relation between the conductor and the magnetic field, the direction of the electromotive force is such as to produce a current whose magnetic field will oppose the change. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-48.*

Leonardian. Upper lower Permian. *A.G.I. Supp.*

leonardite. A soft, earthy, medium-brown coallike substance associated with lignitic outcrops in North Dakota. It is a naturally oxidized form of lignite with variations in color and properties depending upon the extent of weathering. Usually, the material occurs at shallow depths, overlying or grading into the harder and more compact lignite. Of little value as a fuel, it has been used in oil-drilling muds, in water treatment, and in certain wood stains. It is frequently referred to as "slack" because of its texture; however, the term leonardite is finding common usage. *R.I. 5611, 1960, p. 2.*

Leon firedamp tester. A firedamp detector developed in 1902. A form of Wheatstone bridge is used and changes in electrical resistance due to temperature differences are measured. The firedamp/air sample flows over one set of wires and the gas burns catalytically while the other wires do not come into contact with the sample. *Nelson.*

leonhardite. a. A variety of laumontite with the formula $2[Ca_2Al_4Si_8O_{24}.7H_2O]$. *Hey 2d, 1955.* b. Synonym for starkeyite, $MgSO_4.4H_2O$, from the hydration of kieserite. Not to be confused with leonhardite of J. R. Blum, 1843. *Spencer 19, M.M., 1952.*

leonite. A colorless, white, yellowish hydrous sulfate of magnesium and potassium, $K_2SO_4.MgSO_4.4H_2O$; monoclinic; tabular crystals and massive. From Westeregeln and Leopoldshall, Germany. *English.*

leopardite. a. A siliceous rock from North Carolina that is spotted with stains of magganese oxide; usually considered to be a quartz porphyry. *Fay.* b. A variety of quartz porphyry containing small phencrysts of quartz in a microgranitic or micrographic groundmass of quartz, orthoclase, albite, and mica. The rock has a characteristically spotted or streaked appearance due to staining by hydroxides of iron and manganese. *Holmes, 1928.*

leopard jade. A descriptive term applied to spotted jade resembling the colors and marking of a leopard. *Shipley.*

leopard rock. a. A local name in Canada, applied to pegmatitic rocks that are associated with the apatite veins of Ontario and Quebec. *Fay.* b. Syenite gneiss consisting of ellipsoidal lumps measuring several inches and separated by material that is mainly greenish pyroxene. The rock may be slightly schistose. *A.G.I. Supp.*

Leopard stone. Scot. Local name for a dolomite full of dark worm castings set in a gray matrix and containing chert nodules near the base, Upper Cambrian. *Arkell.*

Leopoldi furnace. A furnace for roasting quicksilver ores, differing from the Bustamente in having a series of brick condensing chambers. Both are intermittent, that is, have to be charged and fired anew after each operation. The Californian intermittent furnace is a modification of the Leopoldi, having the fireplace on the side. *Fay.*

leopoldite. Synonym for sylvite. *Dana 6d, p. 156.*

lep. Local Galician name for a variety of ozocerite containing large amount of mineral matter. *Tomkeieff, 1954.*

Lepanto marble. Trade name given to a gray marble containing pink and white fossils; from the Lower Silurian, near Plattsburgh, N.Y. *Fay.*

leper. *See* laper. *Arkell.*

lepidoblastic. Pertaining to a flaky schistosity caused by an abundance of minerals like micas and chlorites with a general parallel arrangement. *A.G.I.*

lepidocrocite. An orthorhombic hydrous oxide of iron, $Fe_2O_3.H_2O$, occurring as scaly blood-red crystals, associated with limonite, in iron ores; one very perfect and two less perfect cleavages; dimorphous form of goethite. *C.M.D.; Larsen, p. 144.*

Lepidodendron. A common member of the lycopod plant group that flourished during Coal Measures times. The straight trunks of this tree sometimes reached a height of 100 feet tapering gradually from more than 2 feet at the base. Reproduction was by means of spores liberated from cones carried at the ends of some of the smaller branches. *Nelson.*

lepidolite; lithia mica. A fluosilicate of potassium, lithium, and aluminum, $K_2Li_3Al_3$-$(AlSi_3O_{10})_2(O,OH,F)_4$; monoclinic; color, pink and lilac to grayish white; luster, pearly; perfect micaceous cleavage; Mohs' hardness, 2.5 to 4; specific gravity, 2.8 to 3.0. A comparatively rare mineral found in pegmatite dikes, usually associated with other lithium-bearing minerals such as pink and green tourmaline, amblygonite, and spodumene. Found in Connecticut, California, South Dakota, and New Mexico. Used as a source of lithium, and in the manufacture of heat-resistant glass. *Dana 17, pp. 471-472.*

lepidomelane. A mineral, near biotite, but characterized by the presence of a large amount of ferric iron. *Fay.*

lepidomorphite. A variety of phengite. *Dana 6d, p. 614.*

lepidophaeite; lepidophäjte. Copper-bearing wad; lampadite. *Dana 6d, p. 258.*

lepolite. Synonym for anorthite. *Dana 6d, p. 337.*

Lepol kiln. *See* ACL kiln. *Dodd.*

leppey. Eng. Work that is easy, "soft, kind, and winable, without any hardship, as boring, cutting, blasting," etc. *Fay.*

leptinite. *See* leptynite. *Fay.*

leptite. A fine-grained metamorphic rock with little or no foliation. *A.G.I. Supp.*

leptite gneiss. A medium- to coarse-grained metamorphic rock with little or no foliation. *A.G.I. Supp.*

leptize. To disintegrate a material, in the dry state, into very fine particles by impact; at least 50 percent of the product is less than 50 microns and at least 1 percent is less than 2 microns. The term has not been generally adopted. *Dodd.*

leptoclase. a. Daubree's term for minor fractures. *Fay.* b. A miniature fissure. *Holmes, 1928.*

leptometer. An instrument for testing the viscosity of oil, by comparing the rate at which it drops from a small orifice with the known rate of dripping of a standard oil. *Standard, 1964.*

leptomorphic. A term suggested by Gumbel to apply to crystallized substances that lack definite crystalline borders, as the nepheline in many groundmasses. *Fay.*

lepton. A charged or an uncharged elementary particle (as a positron or a neutrino) having a mass of the same order as, or smaller than, that of the electron. *Webster 3d.*

leptothermal. A zone in ore deposits consisting of the top of Lindgren's mesothermal zone and the bottom of the epithermal zone. Mineral grain size averages smaller and more variable than in mesothermal ores. There is an increased development of vugs toward the shallower limit of the zone. Rock alteration varies from sericitic to propylitic. Vertical depth range is estimated from 10,000 to 15,000 feet. *Hess. See also* hypothermal ore deposit; mineralization.

leptothermal deposit. A mineral deposit formed under conditions intermediate between those characteristic for the mesothermal and epithermal zones of Lindgren. *Schieferdecker.*

leptynite; leptimite. A feldspathic granulite somewhat coarser in grain than halleflinta. Appears to be approximately synonymous with leptite and granulite. *See also* granulite; halleflinta; halleflintgneiss; leptite. *A.G.I.*

leptynite gneiss. Synonym for leptite gneiss. *A.G.I. Supp.*

leptynolite. A fine-grained, fissile metamorphic rock consisting essentially of mica, quartz, and feldspar; andalusite or cordierite may be present. *See also* astite; aviolite; cornubianite; edolite; hornfels; keralite; proteolite; seebenite. *A.G.I.*

lernilite. Synonym for vermiculte. *Dana 6d, p. 666.*

lesleyite. a. A mixture of damourite and corundum. *Dana 6d, p. 707.* b. A member of the brittle mica family, near $K_2Al_{8-2/3}$-$Si_4O_{20}(OH)_4$. *Hey 2d, 1955.*

lessee. One who leases mineral lands, including oil, gas, sulfur, and potash; incorrectly leaser. *Bureau of Mines Staff.*

lessingite, A greenish to cherry-red, weakly radioactive, very rare, vitreous mineral, $2CaO.2Ce_2O_3.3SiO_2.H_2O$, possibly the same as britholite; occurs in placer deposits associated with bastnaesite, cerite, tornebohmite, and allanite; from Kyshtymsk district, Ural, U.S.S.R. *Crosby, p. 104; Larsen, p. 199; Mineralogical Magazine, v. 22, No. 134, September 1931, pp. 622-623.*

Lessing process. A heavy-fluid coal-cleaning process in which a calcium chloride solution having a specific gravity of approximately 1.4 is used for the separation, which takes place in a cylindrical tank 6 to 10 feet in diameter with a conical bottom, the total height being nearly 30 feet. The cleaned coal rises to the top where it is removed by a chain scraper and delivered to draining towers. *Gaudin, p. 242.*

lessing rings. A particular shape for chemical stoneware tower fillings. *Dodd.*

lessor. One who transfers a mineral lease, including oil and gas leases. *Bureau of Mines Staff.*

le stérile. In French mining terminology, the combination of gangue and sterile country rock. *Schieferdecker.*

lestiwarite. Syenite aplite composed predominantly of microperthite with a small amount of aegirine and arfvedsonite, and accessory sphene. *A.G.I.*

lethal dose. A dose of ionizing radiation sufficient to cause death. Median lethal dose (abbreviated MLD or LD_{50}) is the dose required to kill half of the individuals in a group similarly exposed within a specified period of time. The median lethal dose for man is about 400 roentgens. *L&L.*

let into; box; needle; notch; stamp. Eng. The recessing of supports into the floor, side, or roof. *SMRB, Paper No. 61.*

letovicite. A triammonium sulfate, $H(NH_4)_3$-$(SO_4)_2$, as pseudohexagonal scales from the decomposition of pyrite in coal in Letovice, Moravia, Czechoslovakia; colorless tabular crystals. Named from locality. *Rice; English.*

lettenkohle. Ger. Laminated coal. *Tomkeieff, 1954.*

letter and tracing cutter. In the stonework industry, one who cuts incised or raised letters and simple designs on monumental stones with pneumatic and hand tools. Also called letter cutter; letterer. *D.O.T.1.*

letter cutter. *See* letter and tracing cutter. *D.O.T.1.*

letterer. *See* letter and tracing cutter. *D.O.T.1.*

letter name. A single letter or combination of letters used to designate a specific range, group, and/or design of diamond-drill fittings, such as casing, core barrels, drill rods, etc. *See also* group, f; range, e. *Long.*

letter stones. An igneous rock with sheath and core structure, giving the appearance of its surface of letters. *Arkell.*

lettsomite. Synonym for cyanotrichite. *Hey 2d, 1955.*

leuchtenbergite. a. A variety of clinochlore, white, pale green, or yellowish in color, containing little or no iron; often resembles talc. *Fay.* b. A colorless micaceous mineral, $12MgO.3Al_2O_3.7SiO_2.10H_2O$. *Larsen, p. 107.*

leucite. A natural potassium-aluminum silicate, $KAl(SiO_3)_2$ or $K_2O.4SiO_2$, found in lava. Color, white or gray; white streak; vitreous or greasy luster. Contains 21.5 percent potash; specific gravity 2.45 to 2.50; hardness 5.5 to 6. Found in Wyoming, Montana, Arkansas; Italy (most abundant source), Brazil, Sardinia, Bohemia, Turkey, Africa, Australia, Java, Borneo, Siberia. Possible source of potash. *CCD 6d, 1961.*

leucite basalt. A basaltic rock composed of leucite, augite, and olivine, some magnetite, and no feldspar. *Webster 2d.*

leucite basanite. A lava of basaltic habit, composed of leucite, plagioclase, and pyroxene. Magnetite and a little glass are usually present. *Webster 2d.*

leucite phonolite. According to Rosenbusch, a volcanic rock, the felsic minerals of which are leucite and orthoclase without nepheline. With the addition of nepheline (or nosean, etc.), the rock becomes a leucitophyre. It is preferable to follow Zirkel who calls the latter leucite phonolite and the former, from which nepheline is missing, leucite trachyte. *Holmes, 1928.*

leucite syenite. A feldspathoidal syenite containing leucite or more generally, pseudoleucite, which consists mainly of orthoclase and nepheline. *Holmes, 1928.*

leucite tephrite. A lava of basaltic habit, consisting of leucite, plagioclase, and pyroxene, usually with accessory magnetite, and differing from leucite basanite in containing no basanite. *Webster 2d.*

leucite trachyte. A volcanic rock containing leucite in addition to the constituents of trachyte which is equal to the leucite phonolite of Rosenbusch. *Holmes, 1928.*

leucitic. Of, or pertaining to, leucite; containing or resembling leucite. *Fay.*

leucitite. A fine-grained or porphyritic rock composed essentially of leucite and pyroxene; a basaltic rock with leucite instead of plagioclase, and free from olivine. *Holmes, 1928.*

leucitohedron. a. Synonym for trapezohedron. *A.G.I. Supp.* b. The term is derived from leucite which crystallizes as a trapezohedron. *Bureau of Mines Staff.*

leucitophyre. A variety of leucite phonolite, containing leucite and nepheline, or other soda feldspathoid, with generally inconspicuous feldspar; the characteristic mafic constituent is aegirine or aegirine-augite. *Holmes, 1928.*

leuco-; leuc-. A prefix from the Greek leukos meaning white. A combining form meaning: (1) white, colorless; and (2) in chemistry, a colorless or weakly colored compound obtained by reduction of a dye, or closely related in some way to a colored compound. *Webster 2d.*

leucochalcite. a. A hydrous arsenate of copper, usually found in white, or greenish, silky, needlelike crystals. *Fay.* b. A discredited term equal to olivenite. *American Mineralogist, v. 37, No. 3-4, March-April 1952, p. 362.*

leucocrate. A general name for a light-colored igneous rock containing a high percentage of felsic minerals and a correspondingly low percentage of mafic constituents. The adjective leucocratic is more commonly used. The prefix leuco- is used with such names as syenite, diorite, etc., to indicate a marked deficiency of dark-colored silicates. Thus, albitite is a soda leucosyenite consisting almost exclusively of albite. *C.T.D.*

leucocratic. Applied to light-colored rocks, especially igneous rocks, containing between 0 and 30 percent dark minerals, that is, rocks, the color index of which is between 0 and 30. *See also* mesocratic; melanocratic. *A.G.I.*

leucomanganite. Synonym for fairfieldite. *Dana 6d, p. 812.*

leucoperthite. A loamlike substance, between a resin and wax in character, $C_{50}H_{84}O_3$; very impure and sandy as found in a brown coal at Gesterwitz, near Weissenfels, Germany. It crystallizes in white needles from ether and boiling absolute alcohol, and melts above 100°C. *See also* earthy brown coal. *Fay; A.G.I.*

leucophane. A green to pale yellow sodium, calcium silicate containing beryllium. One of the sources of beryllium. *Dana 6d, p. 417.*

leucophanite. Synonym for leucophane. *Dana 6d, p. 417.*

leucophoenicite. A light purplish-red basic silicate chiefly of manganese, with zinc and calcium, $(Mn,Zn,Ca)_7(SiO_4)_3(OH)_2$. Monoclinic. Elongated crystals; granular massive. From Franklin, N.J. *English.*

leucophosphite. A white hydrous phosphate of potassium, iron, and aluminum, $K_2(Fe,-(Fe,Al)_7(OH)_{11}(PO_4)_4.6H_2O$. Chalky masses. From Ninghanboun Hills, Western Australia. *English.*

leucophyllite. A variety of muscovite. *Dana 6d, p. 614.*

leucophyre. An igneous rock containing a high percentage of feldspar and therefore very light in color. Opposite of lamprophyre. *A.G.I.*

leucopyrite. *See* loellingite. *Fay.*

leucosapphire. *See* white sapphire. *C.T.D.*

leucosphenite. A white, inclining to grayish-blue, titanosilicate of sodium and barium, $Na_4Ba(TiO)_2(Si_2O_5)_5$; monoclinic. In minute tabular, prismatic crystals with wedge-shaped terminations. Also spelled leukosphenite. From Narsarsuk, Greenland. *English.*

leucotephrite. A tephrite containing leucite but free from nepheline or other soda feldspathoid. The form leucitephrite is preferable as leucotephrite suggests a leucocratic tephrite. *Holmes, 1928.*

leucoxene. A brown, green, or black variety of sphene or titanite, $CaTiSiO_5$, occurring as monoclinic crystals. An earthy alteration product consisting in most instances of rutile; used in the production of titanium tetrachloride. *Hey 2d, 1955; Dana 7, v. 1, p. 560.*

Leukemia. A disease of the blood, corresponding to cancer in a tissue, which can be produced by excessive exposure to radiation. *Ham.*

leukonin. A commercial name for sodium antimonate, $(NaSbO_3)$, an opacifier used in formulating enamel frits. *Enam. Dict.*

leukorite. Bakelite. *Shipley.*

levando. A modified form of the Cornish keeve used in Bolivia in concentrating tin and tungsten ores. It is a wooden tub about 3 feet high, 2 feet across the top, and 18 inches across the bottom, with three plugs on one side about 6, 12, and 18 inches respectively above the bottom. The levando is nearly filled with water; and the finely crushed ore that has passed the buddles is fed slowly into the levando and stirred with a shovel. Meanwhile the levando is jarred with an iron rod. The upper layer, above the highest spigot, is thrown away as waste. The layer down to the second spigot is returned to the buddles, and that from the bottom is kept as concentrate. *Hess.*

Levantinian. Upper upper Pliocene. *A.G.I. Supp.*

levee. An embankment beside a river or an arm of the sea, to prevent overflow. *Standard, 1964.*

levee (natural). Bank of sand and silt built by a river during floods, where suspended load is deposited in greatest quantity close to the river. The process of developing natural leeves tends to raise riverbanks above the level of the surrounding flood plains. A break in a natural leeve is sometimes called a crevasse. *Leet.*

levee ridge. The elevated ridge upon which a river flows because of the building up of the river bed and the natural levees on each side of the river. *Stokes and Varnes, 1955.*

level. a. A main underground roadway or passage driven along the level course to afford access to the stopes or workings and to provide ventilation and haulageways for the removal of coal or ore. *See also* level interval. *Nelson.* b. Mines are customarily worked from shafts through horizontal passages or drifts called levels. These are commonly spaced at regular intervals in depth and are either numbered from the surface in regular order or designated by their actual elevation below the top of a shaft. *Lewis, p. 21.* c. In pitch mining, such as anthracite, there may be a number of levels driven from the same shaft, each being known by its depth from the surface or by the name of the bed or seam in which it is driven. *Jones.* d. Mine workings that are approximately at the same elevation. *Ballard.* e. Applied to seams which run like floors in an office building. Under and above the seam lie the rock strata. *Korson.* f. Eng. *See* mother gate. *SMRB, Paper No. 61.* g. To make level or to cause to conform to a specified grade. *Nichols.* h. An instrument for establishing a horizontal line or plane. *Long.* i. The act or process of adjusting something with reference to a horizontal line. *Long.* j. All openings at each of the different horizons from which the ore body is opened up and mining is started. *Higham, p. 35.* k. (N.S.W.) A drive in a mine *New South Wales.* l. In speleology, a series of related passageways in a cave, occurring at the same relative, vertical position. *A.G.I.* m. A gutter for the water to run in. *Fay.*

level course. a. A direction along the strike of an inclined coal seam; a coal seam contour line. The productive faces in a coal mine, such as stalls and conveyor faces are, in general, advanced on level course or slightly to the rise. *Nelson.* b. Scot. In the direction of the strike of the strata, or at right angles to the dip and rise. *Fay.*

level crosscut. A horizontal crosscut. *Nelson.*

level drive. A drive which opens up a deposit and makes it accessible along its length and forms the basis for the division of the deposit into levels. *Stoces, v. 1, p. 231.*

leveler. A buck scraper, drag, or any other form of device for smoothing land. *Seelye, 1.*

level-free. a. War. Old coal or ironstone workings at the outcrop, worked by means of an adit driven into the hillside. *Fay.* b. A mine that discharges water by gravitation. *Fay.*

leveling. a. In surveying, measurement of rises and falls, heights and contour lines in engineering projects or map making. A spirit level is mounted on a telescope which is adjusted to the horizontal by leveling screws. The telescope swings around a vertical axis and can be sighted on such a target as a leveling staff, a vertically held scale graduated in feed and decimals of a foot. Diaphragm lines inside the telescope show the reading on this staff at which the truly horizontal line through the instrument (the line of collimation) cuts the staff. Therefore, if the height of the collimation line (height of instrument, or H.I.) is known, that of the point on which the staff rests can be found by simple addition or subtraction. In a continuous traverse, the telescope is first sighted on a station of known height (the backsight, B.S.) and is then rotated to a new position of the staff (the foresight, F.S.). The line of collimation is therefore transferred and the height of the new station is found. The staff is then rotated without being removed from its base and the instrument is moved to a new setup from which a reading can be made (a new B.S. reading). From any station intermediate sights can be made, to tie in the heights of known points with the leveling survey. In the United States, first-order leveling describes work over a distance of under two kilometers, leveled in both directions with high precision; second-order leveling must close on to first-order bench marks (B.M.'s) and be of fairly high accuracy; third-order leveling must not go more than thirty miles from established first- or second-order lines and must close on to lines of their accuracy. *Pryor, 3.* b. The method of determining the relative heights of any number of points from a datum plane. *Mason, v. 2, p. 728.* c. Flattening of rolled sheet, strip, or plate by reducing or eliminating distortions. *See also* stretcher leveling; roller leveling. *ASM Gloss.*

leveling action. Action exhibited by a plating solution to give a plate smoother than the basis metal. *ASM Gloss.*

leveling instrument. A surveyors' level bearing a telescope. *See also* level. *Standard, 1964.*

leveling practice. In leveling, the station is the point at which the staff is held and not the position of the instrument. The operation is one of carrying forward a known level, hence the backsight is a reading taken on the staff at a known elevation and the last sight from each station is called the foresight. All other readings refer to intermediate sights. Leveling sections may be referred to bench marks or to arbitrary levels, but in all cases they must be checked either by closing on the starting point or by starting and finishing on convenient bench marks. *Mason, V. 2, p. 735.*

leveling rod. a. A graduated rod used in measuring the vertical distance between a point on the ground and the line of sight of a surveyor's level. *Webster 3d.* b. There are two general types in common use; target rods and self-reading rods. Target rods are read only by the rodman, while the self-reading rods are read directly by the level man. *Crispin.*

leveling screws. In survey instruments, the three screws which hold a theodolite or level and its tribrach to the leveling plate on the tripod. In very old instruments four screws may be found. Used to set the azimuth circle truly horizontal about a truly vertical axis of rotation. *Pryor, 3.*

level interval. a. The vertical distance between the levels turned off the shaft in metal mines for ore intersection and development. The interval varies but may be about 150 feet. *Nelson.* b. The horizontal distance between levels turned off main development drifts and varies from 200 to 600 yards. Levels are usually designated by numbers, names, or depth from the surface. *Nelson.*

level-luffing crane. A crane embodying an automatic device which causes the load to move horizontally with any alteration of the operating radius. *See also* luffing. *Ham.*

levelman. One who operates a surveyor's level. *Crispin.*

level of control. A measure of mastery over a process of production; in concrete work, it is measured by cube crushing strength and the standard deviation therefrom. *See also* statistical uniformity. *Ham.*

level recorder. An instrument operated by pressure or by a float, recording continuously the level of water in a channel. *Ham.*

levels. *See* level.

level stones. Scot. Stones on the surface of the ground indicating the direction of old levels underground. *Fay.*

level-surface ripple. A ripple that migrates along a level surface. *Pettijohn.*

level tons. Eng. A weight of mineral in even tons, any odd hundredweights not being taken into account. *Fay.*

lever. A simple machine consisting essentially of a rigid bar which has one fixed point about which it can turn. This point is known as the fulcrum. *Morris and Cooper, p. 155.*

leverage. *See* moment of force. *Morris and Cooper, p. 150.*

leveret skin. A Japanese glaze applied to ceramic ware, supposed to resemble a leveret's fur. *Standard, 1964.*

leverman. One who operates brakes, or levers, at the top of an incline plane. A brakeman. *Fay.*

lever mixer. In the iron and steel industry, one who operates a mixer (a large reservoir from which the molten metal is drawn for the converters) by manipulating various levers. Also called mixer leverman; mixer man. *D.O.T. 1.*

levigation. a. Separating fine powder from coarser material by forming a suspension of the fine material in a liquid. *ASM Gloss.* b. A means of classifying a material as to particle size by the rate of settling from a suspension. *ASM Gloss. Compare* trituration.

levitation. a. In the mineral process of froth flotation, raising of aerophilic particles to the surface of a pulp, by so activating them that they cling to the air-water interface of a rising or coursing air bubble. *Pryor, 3.* b. The act of making light, or the state of being light; buoyancy; lightness. *Standard, 1964.*

levitation melting. Melting metals in space; heat, stirring, and support are provided by magnetic fields from coils surrounding the metal. *ASM Gloss.*

levynite. A white or light-colored silicate mineral; a member of the tectosilicate group, $CaAl_2Si_3O_{10}5H_2O$. Trigonal. Synonym for levyne. *E.C.T., v. 12, pp. 278, 297; Webster 3d; Hey 2d, 1955.*

Lew board. *See* hack. *Dodd.*

lewis. In masonry a truncated steel wedge or dovetail made in three pieces, with the larger end downwards and fitting into a similarly shaped hole in the top of a block of masonry; it then provides, by its attached hoist ring, a means of lifting the stone. *C.T.D.*

lewis bolt. a. A wedge-shaped bolt fastened in a socket by pouring in melted lead, and used in raising a heavy block, as of stone. *Standard, 1964. Compare* lewis pin. b. Steel bolt with roughened conical base, used for anchorage in concrete. Also called rag bolt. *Pryor, 3.*

lewis hole. a. A series of two or more holes drilled as closely together as possible, but then connected by knocking out the thin partition between them, forming thus one wide hole, having its greatest diameter in a plane with the desired rift. Blasts from such holes are wedgelike in their action, and by means of them larger and better-shaped blocks can be taken out than would otherwise be possible. *Fay.* b. A dovetail mortise, as in a block of stone, for attaching a lewis for hoisting. *Standard, 1964.*

lewis pin. A pin used for attachment to a key block. It is placed in a shallow drill hole with a wedge at either side, and as the pin is larger at the bottom than near the top. When it is pulled upward it tends to tighten on the wedges, which prevents it from slipping out. *Fay.*

Lewistonian. Upper Lower Silurian. *A.G.I. Supp.*

lewistonite. A hydrous phosphate of calcium, potassium and sodium, $15CaO.(K,Na)_2O.$-$4P_2O_5.8H_2O$; hexagonal; white; minute prisms or powdery crusts. Found near Fairfield, Utah. *English.*

Leyner-Ingersoll drill. *See* Water Leyner.

ley pewter. A low-grade pewter having an excessive proportion of lead. *Standard, 1964.*

leys. a. Eng. In Lancashire, argillaceous rock in the roof of a coal seam, overlying dirt or clod. *Nelson.* b. Lanc. Same as bind, a. Also called blue leys. *Fay.*

lf Abbreviation for lightface. *GPO Style Manual, p. 158.*

LF Abbreviation for load factor. *Zimmerman, p. 64.*

lherzite. A holomelanocratic rock composed of brown hornblende and biotite, a little ilmenite, and occasionally garnet. The chemical composition indicates that it contains potential nepheline and leucite, and that it is a heteromorphic form of theralite. *Holmes, 1928.*

lherzolite. A variety of periodotite containing both monoclinic and orthorhombic pyroxenes in addition to olivine. *Holmes, 1928.* A synonym for picotite. *Hey 2d, 1955.*

Li Chemical symbol for lithium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Lias. a. The oldest and lowest of the series comprised of the Jurassic system of strata in Europe. *Fay.* b. A lithographic stone. *Fay.* c. Synonym for Liassic. *A.G.I. Supp.*

Liassic. Lower Jurassic. *See also* Lias, a. *Fay.*

Libbey-Owens process. *See* Colburn process. *Dodd.*

liber. An iron shaft by which a horse draws a line of rolleys in a coal mine. *Standard, 1964.* An erroneous spelling of "limber," which see. *Fay.*

liberation. Freeing by comminution, or crushing and grinding, of particles of a specific mineral from their interlock with other constituents of the ore. *Pryor, 4.* Also called severance.

liberation mesh. That particle size at which a specified mineral should in theory become detached from other minerals in the ore during comminution. *Pryor, 4.*

liberation of intergrown constituents. Crushing of intergrown material to free the constituent materials. *B.S. 3552, 1962.*

liberation size. The particle size at which substantially all of the valuable minerals are detached from the gangue minerals. *Fuerstenau, p. 365.*

liberator cells. In electrolytic refining of metals, tanks in which the electrolytic solution is reconstituted. *Pryor, 3.*

Liberty-Gel. Gelatinous permissible explosive; used in mining. *Bennett 2d, 1962.*

libethenite. An olive green to dark green, hydrous basic phosphate of copper, [$Cu_3(PO_4)_2Cu(OH)_2$]. *Fay.*

Libo. Trade name; a lightweight building material made from very fine sand and lime. *Dodd.*

libolite. An asphaltic coal. *A.G.I. Supp.*

lice. Dev. Thin beds of sand and lignite in clay. *Tomkeieff, 1954.*

licensed material. Source material, special nuclear material, or byproduct material received, possessed, used, or transferred under a general or special license issued by the Atomic Energy Commission. *L&L.*

licensed store. A place or building licensed by the local authority for the storage of explosives. *See also* magazine; registered premises. *B.S. 3618, 1964, sec. 6.*

lick. A swampy area surrounding a salt spring, the soil of which is licked up by animals frequenting it. *Fay.*

lick salt. Pan scale. *Kaufmann. See also* salt lick.

lid. a. A short, flattish piece of wood or steel plate wedged over a post, timber set, or steel arch. A lid is used to tighten the support against the ground and also to increase the area supported. *See also* clog; wedge. *Nelson.* b. A cap piece used in timbering. *B.C.I.* c. Eng. *See* headtree. *SMRB, Paper No. 61.* d. Eng. The roof of an ironstone working, from Forest of Dean coalfield. *Fay.* e. A cap or crossbeam on an upright prop. *Standard, 1964.* f. Scot. The cover or flap of a valve. *Fay.*

lidded. Eng. Applied to the contracted top of a pipe vein. *Fay.*

lidman. In the coke-products industry, a laborer who lifts lids of charging holes of oven and chips carbon from edges of holes, using bars with hook and chisel ends. Also called charger. *D.O.T. Supp.*

lidstone. Forest of Dean. The roofstone of an iron mine. *Fay.*

lie. a. Scot. To become quiet or inactive; said of a mine that is idle. *Fay.* b. Scot. The line, direction, or bearing as of a vein, lode, or fault. *Fay.* c. Pass-by; shunt; a storage or bypass arrangement in haulage track. Also spelled lye. *Mason.*

lie!; lie up! Scot. In mine haulage, a command to stop. *Fay.*

liebenerite - porphyry. Nephelite - porphyry whose nephelite phenocrysts are altered to muscovite. Its original locality is near Predazzo, Tirol, Austria. *Compare* gieseckite-porphyry. *Fay.*

liebigite. A rare, strongly radioactive, orthorhombic, siskin-green, or yellowish-green mineral, $Ca_2U(CO_3)_4.10H_2O$; a secondary uranium mineral found associated with schroeckingerite and beta uranophane. *Crosby, p. 27.*

lie days. Scot. *See* lie time, a. *Fay.*

Liege furnace. *See* Belgian zinc furnace; Belgian process. *Fay.*

lie key. Scot. A tool on which boring rods are hung when being raised or lowered in a borehole. *Fay.*

lien. Right to legal claim on goods or property. *Pryor.*

liesegang banding. Banding in color in composition of ores caused by diffusion. *A.G.I.*

lie time. a. Scot. The time for making up accounts preceding each payday in which work has been done, but payment for which has to remain or lie over til next payday. *Fay.* b. Scot. A period of rest or cessation from work during a shift or turn. *Fay.*

lievrite. *See* ilvaite. *Fay.*

life. When in cutting or getting coal it makes a crackling or bursting noise and works easily, it is said to have life in it, or to be alive. *Fay.*

life check. A metal identification check carried by a miner. *Grove.*

lifeline. A slide wire or cable extending from a work platform in a drill tripod or derrick at an oblique angle downward to an anchor on the ground, which the derrick or tripod man could grasp and use when sliding to safety in an emergency. *Long.*

life linesman. A diver's helper who remains by the lifeline as long as the diver is submerged. *Ham.*

life of mine. May be defined as the time in which, through the employment of the available capital, the ore reserves—or such reasonable extension of the ore reserves as conservative geological analysis may justify—will be extracted. *Hoov. p. 154.*

life of property. Theoretically, the mineral or coal reserves divided by the actual or projected average annual production. *Nelson.*

lift. a. The vertical height traveled by a cage in a shaft. *Fay.* b. The distance between the first level and the surface or between any two levels. *Fay.* c. Any of the various gangways from which coal is raised at a slope colliery. The term originally referred to the number of pump lifts, but in the anthracite regions its significance has become broader. *Fay.* d. Scot. A set of pumps from the suction to the delivery box; the uppermost set is called the lift, the lowest the bottom or laigh lift. *Fay.* e. Aust. A slice taken off a pillar when winning it. *Fay.* f. A certain thickness of coal worked in one operation. *Fay.* g. N. of Eng. To clear gas out of a working place. *Fay.* h. A broken jud. *Fay.* i. Penn. A block of coal measuring three-quarters of a mile on the strike by 1,000 yards to the rise. *Fay.* j. Eng. A rise in the price of coal or in miners' wages, from Forest of Dean coalfield. *Fay.* k. To break up, bench, or blast coal from the bottom of the seam upward. *Fay.* l. A certain vertical thickness of coal seams and measures, having considerable inclination, between or in which the workings are being carried on to the rise, all the coal being raised from one shaft bottom. *Fay.* m. The plane approximately parallel with the floor of the quarry, along which the stone is usually split in quarrying. *Fay.* n. The upheaval of the floor in coal mines. *See also* creep. *Nelson.* o. The extraction of a coal pillar in lifts or slices. *See also* jud. *Nelson.* p. The quantity of ore between one haulage level and the next above or below. *Nelson.* q. A step or bench in a multiple layer excavation. *Nichols.* r. In an airlift, the distance the water is elevated to the surface during pumping; it equals static head plus drop, equals the pumping head. *Lewis, p. 687.* s. The amount a bit is raised off the bottom of a drill hole by excessive pressure created by pump surges or the forcing of too great a volume of circulation fluid through the bit. *Long.* t. In churn drilling, the vertical movement of the drill tools while drilling. *Long.* u. In pumping, the difference in the elevation between the surface of the liquid being pumped and the elevation at which the pump stands or the elevation at which the liquid is discharged. *Long.* v. Eng. *See* creep; jud, b; skirting. *SMRB, Paper No. 61.* w. A fault in vitreous enamelware, a relatively large area of enamel coming from the metal; the fault is also known as peeling. The cause may be inadequate cleaning of the base metal or a defective ground coat. *Dodd.*

lifter. a. In mining, a shothole drilled near the floor when tunneling and fired subsequently to the cut and relief holes. *Pryor, 3, p. 241.* b. Synonym for core lifter. *Long.* c. In ore grinding, a projection, rib or wave profile on the horizontal liners (body liners) of a ball, tube or rod mill, designed to aid the crop land in the mill to rise. In a drum-washer or dense-media separator, a perforated plate projecting radially inward from the circumference of a horizontal cylindrical vessel, used to stir, lift or remove material. *Pryor, 3.* d. In metallurgical work, a bar set in the cope of a molding box to support the foundry sand. *Pryor, 3, p. 241.* e. Eng. The stem of iron or wood attached to the stamphead. *Fay.* f. Either of two tools for handling sand. *Standard, 1964.*

lifter case. The sleeve or tubular part attached to the lower end of the inner tube of M-design and some other types of core barrels in which is fitted a core lifter. Also called core-catcher case; core-gripper case; core-lifter case; core-spring case; inner-tube extension; ring-lifter case; spring-lifter case. *Long.*

lifter holes. Shotholes drilled along the floor of a tunnel for lifting the rock to floor level. They are fired after the cut holes, or by delay detonators in the round. *Nelson.*

lifters. *See* lifter holes.

lifter spring. Synonym for core lifter. *Long.*

lift gate. A lock gate which is raised vertically to open. *Ham.*

lift hammer. See tilt hammer. *Fay.*

lifting. a. *Scot.* Drawing hutches *cars* out of the working places into the main roads *Fay.* b. *See* peeling *ACSB-3.*

lifting bail. The link by which the water swivel is suspended. *B.S. 3618, 1963, sec. 3. See* bail. *Long.*

lifting block. An arrangement of pulleys and rope which enables heavy weights to be lifted with least effort. *See also* differential pulley block. *Ham.*

lifting capacity. a. The weight that the hydraulic cylinders in the swivel head of a diamond drill can raise or lift. *Long.* b. Synonym for drill capacity. *Long.*

lifting dog. a. A component part of the overshot assembly that grasps and lifts the inner tube of a wire-line core barrell. *Long.* b. A clawlike hook for grasping cylindrical objects, such as drill rods or casing, while raising and lowering them. *Long.*

lifting guard. Fencing placed around the mouth of a shaft, and lifted out of the way by the ascending cage. *Fay.*

lifting magnet. An electromagnet which is hung from a crane and used instead of a hook for lifting iron or steel components. *Ham.*

lifting set. A series of pumps or sets of pumps by which water is lifted from the mine in successive stages. *Standard, 1964. See* lift, d. *Fay.*

lifting tackle. An appliance for lifting or lowering heavy weights or loads with greater convenience and ease than would be possible by the direct application of force to the load. The equipment may be hand- or power-operated and usually consists of hooks, ropes or chains, slings, and pulleys so arranged that the applied force is considerably less than the weight lifted. *Nelson.*

lifting wicket. *S. of Wales. See* lifting guard. *Fay.*

lift joint. A type of tensional fracture observed in massive rocks, such as granite, thought to originate from the removal of load by erosion. Such joints lie parallel to present or former ground surfaces. *Stokes and Varnes, 1955.*

lift pump. A pump for lifting to its own level, as distinguished from a force pump. *Standard, 1964.* A suction pump. *Fay.* Also called bucket pump.

lifts. Pumps, or something which raises. *Gordon.*

lig Abbreviation for lignite. *BuMin Style Guide, p. 60.*

Ligand field theory. A theory concerned with the changes in electronic energy levels of ions, especially of transition element ions, which occur when other ions or polar groups *ligands* are brought into their immediate neighborhood. Variations in the environment of the ion, for example, in the nature of the ligands or the symmetry of their arrangement, cause variations in the spacings of the energy levels. This forms the basis of the modern explanation of the colors of crystals and of glasses. *Dodd.*

ligands. Molecular groups bonded about a central metal atom. If this offers one point of attachment the ligand is unidentate; if more, bidentate, etc. Bidentate ligands are also called chelates. The number of unidentates which can surround a metal atom is its coordination number, four to six being common, each in its definite position. *Pryor, 3.*

Ligerian. Lower Turonian. *A.G.I. Supp.*

light. a. A form of radiant energy which gives rise to the sensation of sight. Light travels through space with a velocity of 186,285 miles per second, in common with radio and other waves of a similar physical nature but different wavelength. *Anderson.* b. Visible radiation or radiant energy capable of stimulating the eye so as to produce the sensation of vision. *Sinclair, I, p. 199.* c. In optical glass, the subclass of a lower index of refraction. *ASTM C162-66.*

light alloys. The general term for alloys of aluminum, used for structural purposes; alloys of magnesium are also in use and are even lighter. *Ham.*

light blasting. Includes loosening up of shallow or small outcrops of rock and breaking boulders. It may constitute the entire job, be done in connection with dirt excatation, or follow heavy blasting which has failed to cut gradelines or slope lines, or has left chunks too large to load. *Nichols, p. 9-35.*

light burden. *See* burden, j.

light coal. *Scot.* Candle coal; gas coal. *Fay.*

light-colored mineral. Synonym for light mineral. *A.G.I. Supp.*

light drawn. Temper of copper or copper-alloy tubing drawn between 10 and 25 percent reduction in area, corresponding roughly to quarter hard. *ASM Gloss.*

lightening. A peculiar brightening of molten silver, indicating that maximum purity has been attained. *Standard, 1964.* Occurs in cupellation. *See also* blick. *Fay.*

light-extinction method. See turbidimeter. *Dodd.*

light figure. The visible geometric figure observed when an etched flat surface of quartz is placed over a pinhole-focused light source. *AM, 1.*

lighting. In metallurgy, annealing. *Standard, 1964.*

lightly coated electrode. A filler-metal electrode used in arc welding, consisting of a metal wire with a light coating applied subsequent to the drawing operation, primarily for stabilizing the arc. *Coal Age, v. 66, No. 3, Mar. 1961, p. 91.*

lightman. One who uses an electric extension light as an aid in detecting blisters and flaws in the inside of green pipe. *D.O.T.1.*

light metals; light metal alloys. The low-density metals and alloys, especially aluminum and magnesium, and their alloys. *See also* low-density metals. *Henderson.*

light mineral. A rock-forming mineral that has a specific gravity less than 2.8, including such minerals as quartz, calcite, feldspars, feldspathoids, and some micas. Also applied to the rock-forming minerals that are light in color; these minerals generally being the same as those that are classified as light on the basis of weight. *A.G.I.*

lightning arrester. A lightning arrester is a protective device for limiting surge voltages on equipment by discharging or bypassing surge current; it prevents continued flow of follow current to ground, and it is capable of repeating these functions as specified. *ASA M2.1-1963.*

lightning explosion. *Eng.* An explosion of firedamp caused by electric current, during a thunderstorm, entering a mine and igniting the gas. *Fay.*

lightning gap. A lightning gap is a break about 6 feet long made at the mine entrance in blasting circuits, used in firing blasts from the outside, to prevent lightning discharges from following the circuits into the mine. *ASA M2.1-1963.*

lightning protection. A system to enable high electrical discharge from the atmosphere to be conducted safely to earth by one or more conductors. The provision is very important in the case of mine explosive stores and also headgears, tower winders, and chimneys. *Nelson.*

lightning tube. *See* fulgurite. *C.M.D.*

light oil. A crude fraction distilled from high-temperature coal tar, containing hydrocarbons distilled below about 200° C. *See also* heavy oil. *Nelson.*

light, polarized. Light that vibrates only in one plane. *Fay.*

light railway. A railway built to narrow gage. *Ham.*

light red silver ore. Proustite. *Pryor, 3.*

light ruby silver. *See* proustite. *Fay.*

light water. Ordinary water (H_2O) as distinguished from heavy water (D_2O): D being the symbol for deuterium (heavy hydrogen or hydrogen 2). *L&L.*

lightweight aggregate. Aggregate of appreciably lower apparent specific gravity than that of ordinary aggregate. *Taylor.*

lightweight concrete. Concrete of appreciably lower unit weight than one made from gravel or crushed stone. *Taylor.*

lightweight expanded clay aggregate. A bloated clay aggregate made by the sudden heating of suitable clays either in a rotary kiln (the original method used in Denmark in 1939) or on a sinter hearth. It is used as an aggregate for making lightweight concrete. *Dodd.*

light yellow. Seventh grade diamonds. *Hess.*

light yellow heat. A division of the color scale, generally given as about 1,351° C (2.399° F). *Bureau of Mines Staff.*

ligneous. Having a woody structure. *Gordon.*

lignin. Fibrous portion of wood, consisting of 25 percent or more of the tree; approximate composition $C_{40}.H_{44}.O_{15}$. and considered to be aromatic or hydroaromatic. *Pryor, 3.*

lignin sulfonates. *See* lignosulfonates. *CCD 6d, 1961.*

lignin sulfonic acids. Chemicals produced during the sulfite treatment of wood pulps; sulfite cellulose lye. Of interest in flotation process as a deflocculating agent and protective colloid. *Pryor, 3.*

lignite. a. A brownish-black coal in which the alteration of vegetal material has proceeded further than in peat but not so far as subbituminous coal. *Fay.* b. Consolidated lignitic coal having less than 8,300 British thermal units (moist, mineral-matter-free). *ASTM D388-38.* c. Coal of low rank with a high inherent moisture and volatile matter; in this general sense, lignite may be subdivided into black lignite, brown lignite and brown coal. *B.S. 3323, 1960.* d. In the English-speaking countries, the terms lignite and brown coal are used synonymously, although some authors confine the term lignite to low-rank brown coal consisting largely of easily recognized wood. In Germany, the term lignite is restricted to individual pieces of wood found in the brown coal. *Tomkeieff, 1954.* e. In France, it is combustible fossil fuel younger than Permocarboniferous, even though this includes Jurassic and other real coals. In Germany, it it partly carbonized wood and other vegetal substances of a clear color possessing more, the properties of wood than of carbon. *Hess.*

lignitic. Containing lignite. *Fay.*

lignitic coal. Same as black lignite or subbituminous coal. *Tomkeieff, 1954.*

lignitiferous. Lignite-bearing. *Standard, 1964.*

lignitize. To convert into lignite. *Fay.*

lignitoid. Clarain laminae in coal; vitrain made of recognizable wood tissue. *Tomkeieff, 1954.*

lignitous coal. Coal containing 75 percent to 84 percent of carbon (ashless, dry basis). *Tomkeieff, 1954.*

ligno-concrete. Concrete reinforced by wood instead of steel. *Bennett 2d, 1962 Add.*

lignosulfonates; lignin sulfonates. Metallic sulfonate salts made from the lignin of sulfite pulp-mill liquors. Molecular weights range from 1,000 to 20,000. Light tan to dark brown powder; no pronounced odor; stable in dry form; relatively stable in aqueous solution; nonhygroscopic; no definite melting point because they decompose above 200° C; and specific gravity, about 1.5. Generally give colloidal solutions or dispersions in water and practically insoluble in all organic solvents. Used as dispersing agents in concrete, in oil mud additives, in ore flotation agents, and in the production of gypsum slurries. *CCD 6d, 1961.*

lignum fossile. Old name applied to fossil wood, peat or lignite. *Tomkeieff, 1954.*

ligroin; benzine; petroleum ether. a. The term ligroin should be used instead of benzine or petroleum ether. *CCD 6d, 1961.* b. A saturated, volatile fraction of petroleum boiling in the range 20° to 135° C. Used as a solvent, chiefly in laboratories. Flammable; use with adequate ventilation; and avoid prolonged breathing of its vapor. *CCD 6d, 1961.* c. A special grade of ligroin is petroleum benzin (sic, spelled without the final e). Clear; colorless; nonfluorescent;

volatile; flammable; liquid; ethereal or petroleumlike odor; specific gravity, 0.634 to 0.660 (at 25° C, referred to water at 25° C); vapor may be explosive if mixed with air and ignited; distillation range, 35° to 80° C; insoluble in water; and soluble in or miscible with most organic solvents and most oils. Derived from petroleum by distillation. Used as a solvent or as an extraction medium. *CCD 6d, 1961.*

ligurite. An apple-green variety of titanite. *Standard, 1964.*

likasite. A nitrate and phosphate of copper, $Cu_{12}(NO_{34})(PO_4)_2(OH)_{14}$, as sky-blue, orthorhombic plates; from Likasi, Republic of the Congo. Named from locality. *Spencer 20, M.M., 1955.*

likely. A belt of country or a lode is said to be likely when there are indications of valuable minerals; opposed to hungry. *Fay.*

lilin kalulut. Malay. A wax used by gold assayers. *Fay.*

lill. Eng. Greenish-gray shale, weathering yellow, Wenlock limestone, Dudley. *Arkell.*

lillianite. It has not been established whether this substance is a mineral, $Pb_3Bi_2S_6$, or a mixture consisting of galenobismutite and galena. *American Mineralogist, v. 25, No. 11, November 1940, p. 726; American Mineralogist, v. 47, No. 5-6, May-June 1962, p. 811.*

Lilly controller. A controller used on both steam and electric winding engines that protects against overspeed, overwind, too rapid acceleration, delayed retardation, and against starting in the wrong direction. It also gives warning of overspeed and indicates by a bell signal when retardation should commence. *Sinclair, V, p. 208.*

liman. A drowned river valley on a low coast, protected from the open sea by a barrier beach. *Schieferdecker.*

liman coast. Coast showing partly drowned valleys, which, as tidal movements of the sea level are absent, could be closed partly or even entirely by the formation of barrier beaches (coast of the Black Sea). *Schieferdecker.*

limb. a. One of the two parts of an anticline or syncline on either side of the axis. *See also* legs. *Webster 3d.* b. The graduated margin of an arc or circle in an instrument for measuring angles. *Webster 3d.* c. The graduated staff of a leveling rod. *Webster 3d.*

limber; limmer. Eng. A light, wooden, or iron shaft for attaching pit ponies to the trams. *Fay.*

limburgite. A glassy nepheline basalt, containing phenocrysts of titanaugite, olivine, and opaque oxides in a glassy groundmass. *A.G.I.*

lime. a. Quicklime (calcium oxide) obtained by calcining limestone or other forms of calcium carbonate. Loosely used for hydrated lime (calcium hydroxide) and incorrectly used for pulverized or ground calcium carbonate in agricultural lime and for calcium in such expressions as carbonate of lime, chloride of lime, and lime feldspar. *Bureau of Mines Staff.* b. Sometimes used by drillers as an abbreviated name for any rock consisting predominantly of calcium carbonate minerals. *Long.* c. Calcium oxide, CaO. *See also* quicklime. *Nelson.*

lime bag. A bag of powdered lime used in the foundry. Lime is sprinkled on the parting face of the drag and the cope is lowered on to it and then lifted and inspected. If the lime has adhered uniformly to the top face the joint is satisfactory. *Osborne.*

lime blowing. The falling away of small pieces from the face of a clay building brick as a result of the expansion (following hydration and carbonation by the atmosphere) of nodules of lime present in the fired brick. Some brick clays contain nodules of calcite ($CaCO_3$) which are converted into CaO during the kiln firing; these nodules can be rendred innocuous by fine grinding and harder firing. A cure that is more of an expedient is docking. *See also* docking. *Dodd.*

lime boil. A reaction in an open-hearth furnace caused by the decomposition of limestone and the escape of the carbon dioxide gas. This reaction begins before the ore boil is completed. *See also* ore boil. *Newton, p. 320.*

lime bostonite. A bostonite containing a notable amount of actual or normative anorthite in the plagioclase or pyroxene respectively. *Holmes, 1928.*

limeburner. One that burns limestone or shells to make lime. *Webster 3d.*

lime cartridge. A cartridge, 4 inches in diameter by 2 feet, 5 inches long, filled with compressed, ground lime. It is placed in a shothole and the gases evolved by slaking the lime breaks down the coal which has been previously undercut to assist the process. It was introduced in 1881 by C. S. Smith and T. Moore. *Nelson.*

lime catcher. A filtering apparatus for extracting lime salts from the feed water of a steam boiler, thus preventing the deposit of scale in the boiler. *Standard, 1964.*

lime coal. Staff. Inferior variety of coal suitable only for lime burning and similar purposes. *Tomkeieff, 1954.*

lime craig. Scot. Limestone rock in situ; the face of a limestone quarry. *Fay.*

lime crown glass. An optical crown glass containing a substantial quantity of calcium oxide. *ASTM C162-66.*

lime factor. Ratio of amounts of lime-alumina to silica in portland cement. *Bennett 2d, 1962.*

lime feldspar. Misnomer for calcium feldspar. *See also* anorthite. *A.G.I.*

lime glass. A glass containing a substantial proportion of lime, usually associated with soda and silica. *ASTM C162-66.*

lime hydrate. Hydrated lime or calcium hydroxide, $Ca(OH_2$. *CCD 6d, 1961.*

lime, hydraulic. *See* hydraulic lime.

lime index, available. *See* available lime index. *Bennett 2d, 1962 Add.*

lime kiln. A vertical shaft furnace or a rotary kiln for producing lime. *Bureau of Mines Staff.*

limelight. A brilliant light produced by white-hot quicklime, formerly used in lanterns and in theaters for illuminating the actors. *Cooper, p. 291.*

lime malachite. Apparently merely a malachite carrying gypsum or calcite, or both, as impurities. *Weed, 1918.*

limeman. One who attends to slaking lime, running lime water to vats beneath pig-machine molds at blast furnaces, and operates lime sprays when the machine is running. *Fay.*

lime mixer. *See* lime slaker. *D.O.T. 1.*

lime mortar. A mortar in which lime is used as a binding agent instead of cement. *Nelson.*

lime mud. A high pH drilling fluid on which slaked lime (calcium hydroxide) has been added. *Brantly, 1.*

lime nitrate. *See* calcium nitrate. *CCD 6d, 1961.*

lime pan. A thick layer indurated by calcium carbonate. *Schieferdecker.*

lime paste. Slaked lime. *Bennett 2d, 1962.*

lime pit. a. A limestone quarry. *Webster 3d.* b. A pit where lime is made. *Webster 3d.* c. A pit where lime is used (as in liming hides). *Webster 3d.*

lime powder. Air-slaked quicklime. *Bennett 2d, 1962.*

lime process. The method of mining coal by the use of the lime cartridge. *Fay.*

lime putty. The product that is obtained by slaking quicklime with an excess of water or soaking hydrated lime and, after settlement, siphoning off the excess liquor. Lime putty is highly plastic and its consistence varies with water content. *Taylor.*

lime ratio. Ratio of lime to total of silica, alumina, and iron in a cement. *Bennett 2d, 1962.*

lime refractory. Because of its abundance and high melting point (2,570° C), lime would be an attractive basic refractory but for its ready hydration and carbonation when exposed to the air. There has been much research on methods of stabilization, but the only accepted use of lime as a refractory has been as a container material for the melting of the platinum metals. *Dodd.*

limerickite. A very dark violet oölitic rock found in the meteorite of Oschansk. *Standard, 1964.*

lime roasting process. *See* Huntington-Heberlein roasting process. *Bennett 2d, 1962.*

lime rock. An unconsolidated or partly consolidated form of limestone, usually containing shells or shell fragments. Of marine origin. *Urquhart, Sec. 8, p. 4.*

lime saltpeter. *See* calcium nitrate. *CCD 6d, 1961.*

lime saturation value. The ratio of the actual lime content of a hydraulic cement to that calculated from an equation deduced as representing the amount of lime combined as silicate, aluminate and ferrite. Several such equations have been proposed; all are empirical. *Dodd.*

lime set. An infusible slag, too high in lime, in an iron blast furnace. *Bureau of Mines Staff.*

lime shells. Scot. Calcined limestone. *Fay.*

lime-silicate rock. a. A rock that results from the high-temperature contact metamorphism of limestone containing silica in detrital grains, in nodules of flint or chert, or in siliceous skeletons. The silica combines with the calcium oxide to form calcium-silicate minerals. *C.T.D.* b. A rock that results from the recrystallization of impure limestone containing silica and alumina under the influence of high temperature, commonly from an adjacent igneous body. It may also result from the recrystallization of pure limestone in the presence of high-temperature silica- and alumina-bearing emanations from an adjacent crystallizing magma. Among the calcium-silicate minerals formed in this way and occurring in lime-silicate rocks are andradite, anorthite, diopside, forsterite, grossularite, scapolite, tremolite, vesuvianite, and wollastonite. *Bureau of Mines Staff.*

lime sink. A hollow in a limestone region caused by the collapse of the roof of a cavern which was formed by solution by water. Synonym for sinkhole. *A.G.I.*

lime slaker. One who mixes lime and water in rotary slaker or open batch tank to make milk of lime (slaked lime). Also called lime mixer; milk-of-lime slaker; slaker. *D.O.T. 1.*

lime slurry. A form of lime hydrate in aqueous suspension that contains considerable free water. *Boynton.*

lime-soda method. A treatment of water designed to remove both temporary and permanent hardness of water. The water is first analyzed to determine the degree of temporary and/or permanent hardness, then the amount of lime and soda ash required to remove the hardness is calculated. The insolubles are either filtered or are given time to settle. *Cooper, p. 371.*

lime-soda sinter process. A process for manufacturing alumina (Al_2O_3). The raw material, such as clay or anorthosite, is sintered with limestone and soda ash to form sodium aluminate and calcium silicate. This sinter is then leached with water, caustic soda solution, or sodium aluminate liquor to dissolve the soluble sodium aluminate. The resulting slurry is then filtered, and the liquor is decomposed as in the Bayer process or is treated with carbon dioxide to precipitate hydrated alumina. When operated in conjunction with the Bayer process to recover alumina and soda from red mud, it is called the combination process. *Bureau of Mines Staff.*

limestone. a. A sedimentary rock containing calcium carbonate (calcite), or calcium-magnesium carbonate (dolomite), or any combination of these two carbonates at least to the extent of 50 percent of the rock. If the carbonate is calcite, the rock is a calcitic limestone; if dolomite is also present, it is a dolomitic limestone; or a dolomite, if calcite is absent. Limestones are formed by the consolidation of calcareous ooze, which may be chemically precipitated from solution, derived from some preexisting limestone by the normal processes of rock erosion, or formed by organic agencies (coral reefs and shell deposits, for example). *C. T. D.* b. A bedded, sedimentary rock, consisting chiefly of calcium carbonate, which yields lime (quicklime) when burned (calcined). Limestone is the most important and widely distributed of the carbonate rocks and is the consolidated equivalent of limey mud, calcareous sand, or shell fragments. *Stokes and Varnes, 1955.* c. The suitability of the rock for the manufacture of lime is not essential. In general, the term limestone is applied to those rocks in which the carbonate fraction exceeds the noncarbonate constituents. Normally, a rock in which the carbonate fraction is composed primarily of calcite. *Pettijohn, 2d, 1957, p. 381.* d. Usage includes under this term dolomitic limestone or dolostone, oolitic limestone, and crystalline limestone. Some highly crystallized limestones can be polished and are properly termed marbles. *BuMines Bull. 630, 1965, p. 876.*

limestone dust. Dust prepared by grinding limestone. *Rice, George S.*

limestone meter. An instrument for determining the proportion of calcareous matter in soils. *Fay.*

limestone sink. A hollow in a limestone region communicating with a cavern or subterranean passage so that waters running into it disappear. Also called sinkhole; swallow hole. *Webster 3d.*

limewash. a. A solution of lime and water used as a substitute for paint. *Webster 3d.* b. To cover (as walls or cupboards) with limewash; whitewash. *Webster 3d.*

limewater. A clear, colorless, odorless, alkaline aqueous solution of calcium hydroxide containing not less than 0.14 gram of $Ca(OH)_2$ in each 100 cubic centimeters at 25° C. Specific gravity, approximately 1.00 (25° C). Absorbs carbon dioxide from the air. Used in medicine. *CCD 6d, 1961.*

lime wavellite. An impure variety of wavellite that contains calcium. *Standard, 1964.*

liming material. A general term which includes all of the various chemical and physical forms of lime, limestone, mollusk shells, and marl whose calcium and magnesium content is capable of neutralizing soil acidity. *ASTM C51-47.*

limit charge. A charge that gives a complete loosening of the rock without throwing it excessively. *Bureau of Mines Staff.*

limited area, vertical excavation. This method of excavation is used in loose or wet soils—unconsolidated formations—where the banks must be supported by shoring or sheathing. The material must, out of necessity, be lifted out vertically. *Carson, p. 28.*

limiting creep stress. A somewhat loose term used to denote the maximum stress at which a material will not creep by more than a certain amount within the working life of the part. It is also used in some short-time creep tests, for example, the Hatfield time yield. *Ham.*

limiting current density. The maximum current density that can be used to get a desired electrode reaction without undue interference, such as may come from polarization. *ASM Gloss.*

limiting depth. An earlier theory that workings at a certain depth—the limiting depth—will have no effect on the surface. If there is such a depth it is much deeper than the present range of economic working. *Nelson.*

limiting gradient. The maximum railway gradient which can be climbed without the help of a second power unit. *Bureau of Mines Staff.*

limiting mixture. The mixture of coal and rock dusts that will not permit the propagation of an explosion. *Rice, George S.*

limiting range of stress. The greatest range of stress (mean stress zero) that a metal can withstand for an indefinite number of cycles without failure. If exceeded, the metal fractures after a certain number of cycles, which decreases as the range of stress increases. Also called endurance range (half this range is the fatigue limit or endurance limit). *C.T.D.*

limiting screen. The screen through which the particles have passed. *Pit and Quarry, 53rd, Sec. B, p. 115.*

limit line. The line joining the coal face underground and the surface limit of draw; the boundary of a mine. *Nelson.*

limit of draw. The point on the surface beyond which no movement occurs. *Nelson.*

limit of liquidity. *See* liquid limit. *Nelson.*

limit of proportionality. The point on a stress-strain curve at which the strain ceases to be proportional to the stress. Its position varies with the sensitivity of the extensometer used in measuring the strain. *C.T.D.*

limits. The maximum and minimum size of a part as determined by the specified dimension and tolerance. *ASM Gloss.*

limits law. The presence of combustible gases affect the limits of flammability. New limits can be calculated from the limits law: where L equals flammability of the mixture; x, y, and z equal the percent of each gas present in the mixture; and Lx, Ly, and Lz equal the limits of flammability of gases x, y, and z, respectively. *Mason, v. 1, p. 264.*

limits of flammability. a. Extreme concentration limits of a combustible in an oxidant through which a flame, once initiated, will continue propagating at a specified temperature and pressure. *I.C. 8137, 1963, p. 76.* b. Usually expressed as the limiting percentages of methane in air, beyond which the mixture is no longer flammable. The lowest percentage of methane in air that yields a flammable mixture is called the lower limit of flammability, and the highest percentage of methane in air to yield, a similar mixture is called the higher limit of flammability. These limiting percentages depend on a number of factors, such as the initial temperature and pressure; whether the mixture is at rest or moving; the manner in which the mixture is confined, etc. With methane mixtures at ordinary mine pressures and temperatures, the widest limits of flammability are; lower limit of flammability about 5.4 percent of methane in air; higher limit of flammability about 14.8 percent of methane in air. *Nelson.*

limit switch. a. A device fitted to an electrically driven hoist or winding engine which becomes effective at the end of a wind to prevent the cage overwinding or underwinding. *Nelson.* b. A control to limit some function. Examples are pressure limit switches which shut off the fuel burner when the steam pressure reaches a predetermined point; temperature limit switches for hot water and warm air. *Strock, 10.*

limit transducer. A transducer which applies a preset limit to any operation or movement. *NCB.*

limmers. Newc. The shafts by which the horses draw mine cars. *See also* limber. *Fay.*

limnic. A term applied to coal deposits which were formed inland in freshwater basins or peat bogs. *Tomkeieff, 1954. Compare* paralic. *See also* limnic coal basin.

limnic coal basin. A coal basin formed inland from the seacoasts—as opposed to paralic coal basin. *A.G.I.*

limnic peat. Peat formed beneath a body of standing water, consists mainly of the remains of planktonic organisms. *A.G.I. Supp.*

limnite. A yellow ocher or brown iron ore, containing more water than limonite. *Fay.*

limonite. Hydrous ferric oxide, $FeO(OH).nH_2O$, an important ore of iron, occurring in stalactitic, mammillary, or earthy forms, of a dark brown color, and as a yellowish-brown powder. The chief constituent of bog iron ore. Also called brown hematite. *See also* brown iron ore. *Webster 3d; Dana 17.*

limonite boxwork. Residual limonite of sulfide derivation left by oxidation in former sulfide voids and displaying a characteristic meshwork. *Bateman.*

limonitic. Consisting of, or resembling, limonite in appearance. *Fay.*

limonitization. The process of altering to or supplying with limonite. *Standard, 1964.*

limp. A sheet-iron or wooden scrape, for removing poor ore from the top of a sieve. *Standard, 1964.* Spelled limpeth in Derbyshire, England. *Fay.*

limpeth. *See* limp. *Fay.*

limurite. A metasomatic rock found at the contact between granitic and calcareous rocks and containing over 50 percent axinite; other constituent minerals include diopside, actinolite, zoisite, albite, and quartz. *A.G.I.*

limpy ply. *See* ply. *Arkell.*

linarite. A natural hydrous sulfate of lead and copper, $PbO.CuO.SO_3H_2O$, found in the oxide zone of metalliferous lodes; a deep blue mineral resembling azurite, and, like it, crystallizing in the monoclinic system. *Fay.*

lindackerite. An apple-green, monoclinic mineral, $H_2Cu_5(AsO_4)_4.8\text{-}9H_2O$, with a little Co and Ni replacing Cu; perfect cleavage. *American Mineralogist, v. 42, No. 1-2, January-February 1957, p. 124; Larsen, p. 121.*

lind coal. Charcoal made of the wood of the linden tree. *Fay.*

Linde drill. *See* fusion-piercing drill. *Long.*

Linde flame plating. *See* flame plating. *Dodd.*

Lindemann-Danielson test. *See* Danielson-Lindemann test. *Dodd.*

Lindemann glass. A lithium beryllium borate glass that is highly transparent to X-rays. It is made from a batch consisting of 10 parts $Li_2B_2O_7$, 2 parts BeO, and 3 parts B_2O_3; this glass is difficult to shape and is of low chemical durability. *Dodd.*

lindgrenite. A basic molybdate of copper, $2CuMoO_4.Cu(OH)_2$; monoclinic; tabular crystals; green. From Chuquicamata, Chile. *English.*

lindinosite. An igneous rock containing more than 50 percent riebeckite associated with quartz and microcline. *Hess.*

lindoite. a. An aplitic quartz-bearing syenite. *Fay.* b. Brogger's name for certain dike rocks in the region of Kristiana, Norway. They have trachytic texture; are seldom, slightly porphyritic; are medium to coarsely crystalline in the larger dikes; possess light colors and often lack dark-colored minerals, which when recognizable, are pyrite and chlorite. Ferriferous carbonates are present. Traces of aegirine and a dark, alkalic hornblende may be detected occasionally. *Fay.*

lindstromite; lindstroemite. A lead-gray to tin-white sulfobismuthite of lead and copper, $2PbS.Cu_2S.3Bi_2S_3$. Striated, prismatic crystals; monoclinic (?). From Gladhammar, Sweden. *English.*

line. a. The limit of a surface; a length without breadth; an outline; a contour. *Fay.* b. The course in which anything proceeds, or which anyone takes; direction given or assured. *Fay.* c. A unit of length that equals one-twelfth inch. *Fay.* d. A cable, rope, chain, or other flexible device for transmitting pull. *Nichols.* e. To line pieces up in order to couple them together. *Nichols.* f. *See* plumbline. *Fay.*

lineage structure. Deviations from perfect alinement of parallel arms of a columnar dendrite as a result of interdendritic shrinkage during solidification from a liquid. This type of imperfection may vary, in orientation from one area to another, from a few minutes to as much as two degrees of arc. *ASM Gloss.*

lineal foot. A foot in length as distinguished from square foot or cubic foot. *Crispin.*

lineal travel. Commonly used as a synonym for peripheral speed, as applied to bit rotation; also, a synonym for rope or cable speed, as applied to hoisting. *Long.*

lineament. a. A significant line of landscape that reveals the hidden architecture of the rock basement. Lineaments are character lines of the earth's physiognomy. *A.G.I.* b. A topographic feature; especially, one that is rectilinear. *Webster 3d.* c. A topographic line that is structurally controlled. Lineaments are studied especially on aerial photographs. Sometimes inappropriately called a linear. *Billings, 1954, p. 160.*

line-and-staff organization. Managerial control by a chain of command with lines downward from the top authority, and echelons (splits) where subsections branch from one line and from there continue as parallel lines under the submanagerial branch, which may be repeated. *Pryor, 3.*

linear. Composed of lines. *Kinney.*

linear accelerator. A long, straight tube in which particles (ordinarily electrons or protons) receive an electrostatic acceleration at periodic interals along their path. Models are available commercially which accelerate electrons to energies of 3 to 24 million electron volts. *L&L.*

linear alkylbenzene sulfonate. A high-quality, biodegradable detergent, obtained from lignite tar, which is derived from carbonizing coal at low temperatures. This detergent meets the most stringent requirements for modern washday products. *Bureau of Mines Staff.*

linear cleavage. A property of metamorphic rocks whereby they break in long pencil-like fragments; results from two intersecting cleavages or from linear parallelism of platy or prismatic minerals. *A.G.I.*

linear element. *See* element, linear. *A.G.I.*

linear expansion. The increase in one dimension of a soil mass, expressed as a percentage of that dimension at the shrinkage limit to any given water content. *ASCE P1826.*

linear flow structure. Lineation caused by flow in magma. *A.G.I.*

linear foliation. Foliation due to the linear arrangement of lamellar and prismatic minerals, such as biotite and hornblende. It is often associated with mullion or rodding structure where the foliation is itself parallel to the dip and pitch of the parallel series of folds of which that structure is one of the outward expressions. *Stokes and Varnes, 1955.*

linear measure. Includes the following: 12 inches (in) equal 1 foot (ft); 3 feet equal 1 yard (yd); 5½ yards equal 1 rod or pole; 40 rods equal 1 furlong; 8 furlongs equal 1 statute mile; 1 mile equals 1,760 yards or 5,280 feet; and 3 miles equal 1 league. *Crispin.*

linear parallelism. *See* lineation. *A.G.I.*

linear schistosity. A schistosity due to the parallel alinement of linear constituents in rocks which are largely composed of columnar or acicular crystals. *Schieferdecker.*

linear shrinkage. Decrease in one dimension of a soil mass, expressed as a percentage of the original dimension, when the water content is reduced from a given value to the shrinkage limit. *ASCE P1826. See also* shrinkage test.

linear strain. *See* strain. *ASM Gloss.*

linear structure. *See* lineation. *A.G.I.*

linear transducer. A transducer for which the pertinent measures of all the waves concerned are linearly related. *Hy.*

lineation. a. The parallel orientation of structural features that are lines rather than planes. Lineation may be expressed by the parallel orientation of the long dimensions of minerals, long axes of pebbles, striae on slickensides, streaks of minerals, cleavage-bedding intersection, intersection of two cleavages, and fold axis. Synonym for linear parallelism; linear structure. *A.G.I.* b. Lineal parallelism in fabric of some clastic rocks caused by preferred alinement of the long axes of the component particles at the time of deposition. *A.G.I.*

line brattice. A partition placed in an opening to divide it into intake and return airways. *Hartman, p. 252. See also* brattice.

line clinometer. A borehole-survey clinometer designed to be inserted between rods at any point in a string of drill rods. *Compare* clinometer; end clinometer; plain clinometer. *Long.*

lined gold. Gold foil backed with other metal. *Fay.*

line drilling. A term used in quarrying to describe the method of drilling and broaching for the primary cut. In this method, deep holes are drilled close together in a straight line by means of a reciprocating drill mounted on a bar. The webs between the holes are removed with a drill or a flat broaching tool; thus a narrow continuous channel cut is made. *AIME, p. 326. See also* broaching.

line drop. Loss in voltage owing to the resistance of conductors conveying electricity from a power station to the consumer. *Ham.*

line electrode. A series of electrodes put out along a straight line on the surface and electrically interconnected, approximately the condition of continuous electrical contact with the earth along that line. *Schieferdecker.*

line hydrophone. A directional hydrophone consisting of a single, straight line element or any array of contiguous or spaced electroacoustic transducing elements, disposed on a straight line, or the acoustic equivalent of such an array. *Hy.*

line in. *See* aline. *Long.*

line lubricator. *See* line oiler. *Long.*

lineman. a. One in charge of maintenance of light and power electric circuits at blasts furnaces, sometimes including the switchboard; however, an inspector usually takes charge at the switchboard. *Fay.* b. In surveying, a man who carries the tape, line, or chain. *Standard, 1964.* Also called chainman. *Fay.* c. *See* wireman. *D.O.T. 1.* d. *See* chainman, c. *D.O.T. 1.* e. In seismic prospecting, the men who lay the detectors on the ground and return them to a truck-mounted bin after each shot. They also string and connect the wires from the truck to the geophones. Sometimes they must dig handholes for bearing the geophones. *Dobrin, p. 57.* Also known as jug hustlers.

line map. *See* planimetric map. *Seelye, 2.*

linen tapes. Used for subsidiary measurements. They are generally five-eighths inch wide in varying lengths of 33, 50, 66, or 100 feet, and wound into round leather cases. The metallic linen tape in which fine copper wire is woven into the mesh of the linen is much stronger and withstands rough usage better. *Mason, v. 2, p. 713.*

line of bearing. a. The direction of the strike. *Fay.* b. The compass direction of the course a borehole follows. *Long.* c. A synonym for strike as applied to a rock stratum. *Long.*

line of cliffs. Cliffs on a graded shoreline. *Schieferdecker.*

line of collimation; line of sight. A continuation of the line through the optical center of the object glass and the intersection of the diaphragm hairs, and it is essential that this line be parallel to the axis of the bubble tube. *Mason, v. 2, p. 734.*

line of creep; path of percolation. The path that water follows along the impervious surface of contact between the foundation soil and the base of a dam or other structure. *ASCE P1826.*

line of dip. a. The line of greatest inclination of a stratum from the horizontal plane. *Fay.* b. The direction in which an inclined borehole is pointed. *Long.* c. A synonym for dip as applied to the inclination of a rock stratum. *Long.*

line of etch. *See* etch line. *Long.*

line of face of coal. A term sometimes employed for the main cleats in the coal. *Nelson.*

line of force. a. The straight line in which a force acts. *Standard, 1964.* b A curve in a field of force drawn so that at every point it has the direction of resultant force; specifically, a line of magnetic force. *Standard, 1964.*

line of least resistance; burden. The shortest distance between the center line of a drill hole and the free rock face. *Fraenkel.*

line of outcrop. The intersection of a stratum with the ground surface. *Schieferdecker.*

line of reefs. A belt of country in which a series of saddle reefs occur at intervals. *Nelson.*

line of seepage; seepage line; phreatic line. The upper free-water surface of the zone of seepage. *ASCE P1826.*

line of sight. The sighting or pointing line of a telescope, defined by the optical center of the objective and the intersection of crosshairs. *See also* collimation position; line of collimation. *Seelye, 2.*

line of thrust. Locus of the points through which the resultant forces in an arch or retaining wall passes. *Ham.*

line of tunnel. The width marked by the exterior lines or sides of a tunnel. *Fay.*

line oiler. An apparatus inserted in a line conducting air or steam to an air- or steam-actuated machine that feeds small controllable amounts of lubricating oil into the air or steam. Also called air-line lubricator; atomizer; line lubricator; lubricator; oiler; oil pot; pineapple; pot; potato. *Long.*

line pipe. Special brand of pipe that employs recessed and taper thread couplings, and usually greater length of thread than Briggs' standard. The pipe is also subjected to higher test. *Strock, 3.*

line pump. A pump connected into the discharge line leading from and located at some distance from the source pump. It picks up the liquid delivered to it by the source pump and forces it to continue to flow beyond the point at which a flow could not be maintained by the pump at the source. Also called booster pump. *Long.*

line reaming. Simultaneous reaming of coaxial holes in various sections of a workpiece with a reamer having cutting faces or piloted surfaces with the desired alinement. *ASM Gloss.*

line reversal method. *See* sodium-line reversal method. *Dodd.*

line-sawed. Said of oil-well casing when worn by the drill rope or cable. *Hess.*

line spectra. In spectrography, two types are adsorption spectra and emission spectra, the latter being further divisible into continuous bands and discontinuous lines. The line is characteristic of a series of images of the slit in the emission spectrometer or spectrograph, and is characteristic for the atomic interference pattern of the element from which these result. *Pryor, 3.*

line spectrum. A spectrum whose components occur at a number of discrete frequencies. *Hy.*

line speed. *See* cable speed. *Long.*

lines up. The number of lines strung through the traveling block and crown block. *Brantly, 2.*

liner. a. A foot piece for uprights in timber sets. *See also* sill, b and c. *Nelson.* b. Timber supports erected to reinforce existing sets which are beginning to collapse due to heavy strata pressure. *Nelson.* c. Leic. A bar put up between two other bars to assist in carrying the roof. *Fay.* d. A string of casing in a borehole. *Long.* e. A replaceable tubular sleeve inside a hydraulic or pump-pressure cylinder in which the piston travels. *Long.* f. Casing of small diameter extending into a producing sand from just inside the bottom of the last string of casing cemented in a well. *Institute of Petroleum, 1961.* g. The slab of coating metal that is placed on the core alloy and is subsequently rolled down to clad sheet as a composite. *ASM Gloss.* h. In extrusion, a removable, alloy-steel, cylindrical chamber, having an outside-longitudinal taper firmly positioned in the container or main body of the press, into which the billet is placed for extrusion. *ASM Gloss.* i. *See* lining, h and i. *Pryor, 3.*

lines. Plumblines, not less than two in number, hung from hooks driven in wooden plugs. A line drawn through the center of the two strings or wires, as the case may be, represents the bearing or course to be driven on. *Fay.*

linesman. An assistant to a surveyor. *B.S. 3618, 1963, sec. 1.*

line surge. a. The pressure fluctuations or pulsating flow of a liquid through a pipe, caused by the alternating strokes of the pump pistons. *Long.* b. Fluctuations of voltage in an electrical circuit. *Bureau of Mines Staff.*

line timbers. Timbers placed along the sides of the track of working place in rows on some predetermined plan. *Kentucky, p. 135.*

line up. a. A command signifying that the drill runner wants the hoisting cable attached to the drill stem, threaded through the sheave wheel, or wound on the hoist drum. *Long.* b. To reposition a drill so that the drill stem is centered over and parallel to a newly collared drill hole. *Long.* c. Regular linear pattern of peaks or troughs on a seismogram, such as occurs when a reflection comes in. *Schieferdecker.*

lingot. a. An iron ingot mold. *Standard, 1964.* b. An ingot, or something resembling one. *Standard, 1964.*

linguoid ripple marks. A name given to asymmetric current ripples that have a barchanlike shape, the horns pointing into the current. Also called cuspate ripples. *Pettijohn.*

linhay. Corn. A concrete platform on which to store dried china clay for shipment. *Hess.*

lining. a. The brick, concrete, cast iron, or steel casing placed around a tunnel or shaft as a support. Timber sets are not viewed as a lining. *See also* brick walling; concrete blocks; guniting; permanent shaft support. *Nelson.* b. Supporting the rock sides of a mine gallery is known as lining, and the material used in so doing is called the lining. *Spalding.* c. Eng. Clay ironstone in beds or bands, from Derbyshire coalfield. *Fay.* d. The planks arranged against frame sets. *Zern.* e. Eng. Same as dialing, from Newcastle coalfield. *Fay.* f. Supports as in roads or shafts. *Mason.* g. A replaceable tubular sleeve inside a hydraulic or pump pressure cylinder in which the piston travels. *Long.* h. Refractory brickwork of furnace used to protect hearth, bosh, roof, or walls. Slurry is used to repair (fettle) damaged linings. Acid linings are siliceous; basic ones contain lime, magnesium oxide, chrome, etc. *Pryor, 3.* i. In grinding of rocks, ores, etc. linings are of wear-resistant steel, alloy, cast iron, or silex, and are used to protect rock breakers, shells of ball mills, chutes, launders, and other areas subject to abrasion from passing mineral. Special plastics, rubber linings, and acid-resistant alloys are used in vats, piping, autoclaves, and for pump impellers exposed to abrasion and chemical attack. *Pryor, 3.* j. A cup or other hollow vessel partially formed on the wheel, to be finished in a mold. *C.T.D.*

lining mark. Eng. A drill hole in the mine roof with a wooden plug driven into it from which to hang a plumbline. *Fay.*

lining, mill. Porcelain enamel mills are usually of steel construction having a lining of porcelain bricks which are so designed as to conform with the contour of the steel shell. *Hansen.*

lining sight. An instrument consisting essentially of a plate with a longitudinal slot in the middle, and the means of suspending it vertically. It is used in conjunction with a plumbline for directing the courses of underground drifts, headings, etc. *Webster 2d.*

lining up a mine. In surveying, placing the sights for driving entries, drifts, or rooms nearer the working face. *Fay.*

linishing. The operation of polishing as carried out on a linisher. This machine is designed for the polishing of flat objects and carries a flat revolving cloth belt whose surface is impregnated with a suitable abrasive material. *Osborne.*

link. a. One of the standardized links of a surveyor's chain being 7.92 inches long and serving as a measure of length. *Webster 3d.* b. A chain unit of one pitch length. *ASA MH4.1-1958.* c. One of the loops of a piece of chain. *Crispin.* d. A mechanical device used on engines for controlling valve action.*Crispin.* e. In chemistry, a line used in structural formulas to represent valence bonds. *Pryor, 3.*

link bar. A lightweight steel bar extending faceward from the steel supports behind the conveyor. It supports the area between the conveyor and the coal on longwall faces where cutter loaders are carried on armored flexible conveyors. The joint and locking device may consist of a hinge pin and wedge. The standard bar can carry in cantilever a maximum tip load of about 2 tons. In general, linked bars are stronger than corrugated straps and wooden bars and their use is increasing. *Nelson.*

link conveyor. A chain conveyor. *Nelson.*

linked veins. A system of individual, more or less parallel veins linked together by cross veinlets. *Schieferdecker.*

Linkenbach table. In mineral processing, a stationary round table on to which finely divided pulp (slimes) is fed from the center from a revolving feed box. A light wash of water follows, and lighter particles are washed downslope to a peripheral discharge launder. Behind this a heavier water flush which displaces the settled heavier material (concentrates) and flushes it down to a bridging arrangement which delivers it to a separate discharge. *Pryor, 3.*

link motion. An assemblage of parts for operating the valves of a locomotive. *Crispin.*

link plate. One of the side plates of either a pin link or a roller link in a roller chain. For a silent chain, any one of the plates of which an assembled chain is composed. *J&M.*

link-plate belt. A grizzly type of belt consisting of two strands of endless chain connected by through rods at each articulation on which are carried a series of plates or bars mounted in a vertical plane for the purpose of rough screening while conveying. *ASA MH4.1-1958.*

linnaeite. *See* linneite.

linn and wool. Lanc. A streaky, gray sandstone. *Fay.*

linneite. A steel-gray, metallic mineral, Co_3S_4, or $(CoNi)_3S_4$, with reddish tarnish. Essentially cobalt sufide but part of the cobalt is nearly always replaced by nickel, and to a less extent, by iron and copper. Luster, metallic; Mohs' hardness, 5.5; specific gravity, 4.8 to 5. Found in Maryland, Missouri, Nevada; Germany. A source of cobalt and nickel. *CCD 6d, 1961.*

linnets. Derb. Oxidized lead ores. *Fay.*

linoleic acid. An unsaturated fatty acid, $C_{17}.H_{31}.COOH$, used as a collector in the flotation process. *Pryor, 3.*

linolenic acid. An unsaturated fatty acid, $C_{17}H_{31}.COOH$. *Pryor, 3.*

linolenyl alcohol. $CH_3CH_2CH:CHCH_2CH:CHCH_2CH:CH(CH_2)_7CH_2OH$; the fatty alcohol derived from linolenic acid. It has a long, straight carbon chain with three double bonds. Available commercially as a 50-percent product. It is liquid at room temperature. Iodine value, 190; cloud point, 50° F; specific gravity, 0.864; and white. Used in flotation. *CCD 6d, 1961.*

linoleyl alcohol. $CH_3(CH_2)_4CH:CHCH_2CH:CH(CH_2)_7CH_2OH$; the fatty alcohol derived from linoleic acid. It has a long, straight carbon chain with two double bonds in it. Available commercially as a 50 to 60 percent pure alcohol. It is liquid at room temperature. Iodine value, 137; cloud point, 59° F; specific gravity, 0.855; and white. Used in flotation. *CCD 6d, 1961.*

linophyre. A rock in which the phenocrysts are arranged in lines or streaks. *Fay.*

linophyric. Pertaining to porphyritic rocks in which the phenocrysts are arranged in lines or streaks. *Holmes, 1928.*

linosaite. An igneous rock composed of 50 percent labradorite, 5 percent nepheline, 20 percent augite, 14 percent olivine, 10 percent magnetite, and 1 percent apatite. *Johannsen, v. 4, 1938, pp. 68–69.*

linseed earth. Shrop. A dark gray clay suitable for making firebrick. *Fay.*

linseed fatty acid. Byproduct of manufacture of linseed oil. Flotation agent used as collector, emulsifier or stabilizer for davidite, an uranium mineral. *Pryor, 3.*

Linseis plastometer. A device designed by M. Linseis for the evaluation of the plasticity of clay on the basis of two parameters; cohesion (measured as tensile strength) and the capacity for relative movement of the clay particles without rupture. The apparatus is made by Netzsch Bros., Selb, Germany. *Dodd.*

linsey. Lanc. Strong bind; also streaky sandstone. A kind of clay rock. *Fay.*

lintel. A horizontal supporting member spanning a wall opening *HW.*

lintonite. An agatelike variety of thomsonite that is greenish or with alternating bands of pink and green. From the Lake Superior region where it is cut and sold as a gem stone. *Shipley.*

linum virum; linium asbesti. Used to describe early forms of asbestos cloth. *Sinclair, W. E., p. 484.*

Linz-Donawitz process. A process developed in Austria for making steel from cast iron; it resembles the Bessemer process except for two important differences: (1) oxygen is used rather than air and (2) instead of blowing the gas through tuyeres submerged in the bath (as in the Bessemer converter), the oxygen stream impinges on the surface of the molten iron. *Newton, p. 328.*

lionite. *a.* Synonym for tellurium. *Hey 2d, 1955.* b. Synonym for chillagite. *Hey 2d, 1955.*

Lionite. An abrasive similar to Alundum. *Bennett 2d, 1962.*

lip. a. The edge of the rippings in a roadway or gate. *See also* ripping lip. *Nelson.* b. (Eng.) The lower part of the roof of a gate road near the face, taken down as the face advances, from Midland coalfield. *Fay.* c. The edge of a front slip. *Fay* d. The digging edge of a dredge bucket. *Fay.* e. The cutting edge of a bucket; applied chiefly to edges including tooth sockets. *Nichols.* f. The cutting edge of a fixed wing bit, such as the cutting edge on a fishtail bit. *Long.* g. For a milling cutter, it is the material included between a relieved land and a tooth face. *ASM Gloss. h.* The edge of a pot. *ACSC.*

Lipalian. a. A theoretical geologic period immediately antedating the Cambrian and unknown anywhere in the record of marine sedimentation. *A.G.I. Supp.* b. The interval of time represented by the widespread unconformity separating Precambrian and Cambrian strata. *A.G.I. Supp.*

lip-and-gate builder. One who constructs lips and gates which support and regulate flow of molten glass from furnace to glass-rolling machine. *D.O.T. Supp.*

lip angle. For a milling cutter, it is the included angle between a tooth face and a relieved land. *ASM Gloss.*

liparite. Synonym for rhyolite that is largely used among Europeans, although rhyolite is chiefly current in the United States and the United Kingdom. The name is derived from the Lipari islands, off the coast of Italy, where this rock is abundant. *Fay.*

lipe; lype; leip. Scot. A small hitch or irregularity in the joints of a coal seam. *Fay.*

lipey. Scot. Rock intersected by irregular and glazed joints. *Arkell.*

lipey blaes. Scot. Lumpy bind or shale. *Fay.*

lipid. Fatty, or fatty oil. Also known as lipide, lipin, lipoid. *Pryor, 3.*

lip of shaft. Eng. The bottom edge of a shaft circle where open to the seam workings. *Fay.*

lipophilic. A fat-liking molecular group (for example, CH_3), which has affinity for hydrocarbons. *Pryor, 3.*

lipping. Laying brick so that the top edge of the unit is set in from the plane surface of the wall. *ACSG.*

lipscombite. Artificially produced tetragonal iron phosphate, approximating $(Fe'',Fe''')_7(PO_4)_4(OH)_4$. To replace the name iron lazulite. *See also* barbosalite; ferrroferrilazulite. *Spencer 20, MM., 1955; Hey 2d, 1955.*

lip screen. a. A common term applied to stationary screens installed in the loading chutes over which the coal flows as it is loaded into railroad cars for market. *Mitchell, p. 155. b.* A small screen or screen bars, placed at the draw hole of a coal pocket to take out the fine coal. *Fay.*

liptinite. *See* exinite. *IHCP, 1963, part I.*

liptite; sporite. The Nomenclature Subcommittee of the International Committee for Coal Petrology agreed in 1962 to adopt these terms to describe a microlithotype consisting mainly of the exinite group of macerals and especially of sporinite. Contains not less than 95 percent of exinite (liptinite) with thickness (bands) of exinite greater than 50 microns recorded as liptite (sporite). Liptite (sporite) is a rare constituent of hard coal. *IHCP, 1963, part I.*

liptobiolites. The resistant materials of plant decay, such as resins, waxes, spore, and exines, left behind after the less resistant parts of plants have decayed. Also applies to rocks formed of such materials, such as spore coal, pollen peat, etc. *Tomkeieff, 1954.*

liptobiolith. A coal high in wax, resin, fat, and oil. *Hess.*

lip union. a. A special form of union characterized by the lip that prevents the gasket from being squeezed into the pipe so as to obstruct the flow. *Strock, 3.* b. A ring union, unless flange is specified. *Strock, 3.*

liquation. a. The partial melting of an alloy. *ASM Gloss.* b. The process of separating by heat a fusible substance from a substance less fusible. *Henderson.* c. Applied to the sulfur industry, a method of recovering sulfur by liquefying under pressure and heat, and drawing off the molten sulfur and allowing it to solidify. *Fay.* d. A process of differentiation in which two immiscible liquids separate from their common solution, for example, from a magma. The term has also been applied to the separation of residual liquid from crystals already formed. *Holmes, 1928.* e. The heating of a solid mixture until one of the constituents melts and can be extracted. *Nelson.*

liquation furnace. A furnace specially adapted to liquation. *Fay.*

liquation hearth. A hearth specially adapted to liquation. *Fay.*

liquefaction. a. The process of making or becoming liquid. Conversion of a solid into a liquid by heat, or of a gas into a liquid by cold or by pressure. *Webster 3d.* b. The state of being liquid. *Webster 3d.* c. The sudden large decrease of the shearing resistance of a cohesionless soil. It is caused by a collapse of the structure by shock or other type of strain and is associated with a sudden but temporary increase of the pore fluid pressure. It involves a temporary transformation of the material into a fluid mass. Also called spontaneous liquefaction. *ASCE P1826.*

liquid. a. The state of matter which has definite volume and assumes the shape of the containing vessel. *Crispin.* b. The three types are nonpolar: (1) a normal nonassociated liquid with independent molecules (for example, carbon tetrachloride); (2) polar-associated, with its molecules grouped and bonded (for example, water); and (3) semipolar, intermediate between the above (for example, alcohol). *Pryor, 3.*

liquid air. Air in the liquid state but usually richer in oxygen than gaseous air. A faintly bluish, transparent, mobile, intensely cold liquid. Obtained by compressing purified air and cooling it by its own expansion to a temperature below the boiling points of its principal components, nitrogen (–195.8° C, at 760 mm) and oxygen (–182.96° C, at 760 mm). Used chiefly as a refrigerant and as a source of oxygen, nitrogen, and inert gases (as argon). *Webster 3d; Handbook of Chemistry and Physics, 45th ed. 1964, pp. B–123, B–200.*

liquid-air breathing apparatus. *See* Brown-Mills apparatus; Aerencheon apparatus. *McAdam, p. 37, 42.*

liquid asphalt. Asphaltic products which are so soft that their consistency cannot be measured at normal temperature by means of the penetration test. *Shell Oil Co.*

liquidation grade. The amount paid by the smelter or other purchaser per ton of ore mined. *McKinstry, p. 463.*

liquid bituminous materials. Those having a penetration at 25° C (77° F), under a load of 50 grams applied for 1 second of more than 350. *Urquhart, Sec. 2, p. 81.*

liquid controller. Commonest device used for speed control in electric winding systems. *Sinclair, V, pp. 112–113.*

liquid dump bailer. *See* dump bailer. *Long.*

liquid fuel. Any liquid used as fuel which can be poured or pumped. *Shell Oil Co.* Petroleum or crude oil is a natural liquid fuel, while distilled oil, coal tar, and residual oil are prepared liquid fuels. *Newton, p. 247.*

liquid glass. See sodium tetrasilicate. *Bennett 2d, 1962.*

liquid gold, silver, platinum. Solutions used for decorating clay, porcelain, and glass products. Firing produces bright metallic surface decorations. *Henderson.*

liquid gravitative accumulation. The gravitative sinking of a heavy residual liquid to the bottom of a magma chamber; a process that is sometimes held responsible for the formation of some kinds of strictly magmatic ore deposits. *Schieferdecker.*

liquid honing. Polishing metal by bombardment with an air-ejected liquid containing fine solid particles in suspension. If an impeller wheel is used to propel the suspension, the process is called wet blasting. *ASM Gloss.*

liquid inclusion. Inclusion of liquid in solid crystals. *Bateman.*

liquidity index; water-plasticity ratio; relative water content. A ratio expressed as a percentage of the natural water content of a soil minus its plastic limit to its plasticity index. *ASCE P1826.*

liquid limit. a. The water content corresponding to the arbitrary limit between the liquid and plastic states of consistency of a soil. *ASCE P1826.* b. The water content at which a pat of soil, cut by a groove of standard dimensions, will flow together for a distance of one-half inch under the impact of 25 blows in a standard liquid-limit apparatus. *Taylor.* c. The moisture content at which the soil passes from a plastic to a liquid state. *A.G.I. See also* Casagrande liquid limit apparatus; consistency limits.

liquid-liquid extraction; solvent extraction. a. A process in which one or more components are removed from a liquid mixture by intimate contact with a second liquid, which is itself nearly insoluble in the first liquid and dissolves the impurities and not the substance that is to be purified. *CCD 6d, 1961.* b. A process in which two immiscible liquids are brought into contact to effect a redistribution of solutes between them. *NRC-ASA N1.1-1957.*

liquid magmatic deposit. Various terms for straight magmatic mineral or ore deposits. *Schieferdecker.*

liquid measure. Includes the following: 4 gills (gi) equal 1 pint (pt); 2 pints equal 1 quart (qt); 4 quarts equal 1 gallon (gal); 31½ gallons equal 1 barrel (bbl); and 2 barrels equal 1 hogshead (hhd). *Crispin.*

liquid oxygen explosive. Sawdust or other suitable carbonaceous material, formed into cartridge and dipped into liquid oxygen before use in blasting. A little-used low explosive, with the safety value that in the event of a misfire it soon becomes innocuous. *Pryor, 3.*

liquid phase sintering. Sintering of a compact, or loose powder aggregate under conditions where a liquid phase is present during part of the sintering cycle. *ASTM B243–65.*

liquid pitch oil. See coal-tar creosote. *Bennett 2d, 1962.*

liquid platinum. *See* liquid gold, silver, platinum.

liquid pressure. The pressure of a liquid on the surface of its container or on the surface of any body in the liquid is equal to the weight of a column of the liquid whose height equals the depth of the liquid at that certain point. *Kentucky, p. 125.*

liquid silver. *See* liquid gold, silver, platinum.

liquidus. In a constitution or equilibrium diagram, the locus of points representing the temperatures at which the various compositions in the system begin to freeze on cooling or to finish melting on heating. *ASM Gloss.*

liquidus temperature. The maximum temperature at which equilibrium exists between the molten glass and its primary crystalline phase. *ASTM C162–66.*

liquor finish. A smooth, bright finish characteristic of wet-drawn wire when a liquor from fermented grain mash is used as a drawing lubricant. *ASM Gloss.*

liroconite. A natural hydrous arsenate of aluminum and copper, occurring in bluish-green crystals. *Fay.*

liskeardite. A white mineral found in fibrous crusts $3(Al,Fe)_2O_3.As_2O_5.16H_2O$; soft; from Liskeard, Cornwall, England. *Larsen, p. 68.*

Lissapol. A plasticizer added to concrete to retard or ease the flow rate. *Sinclair, II, p. 291.*

lissen. Eng. A cleft in a rock. *Fay.*

lissom. Eng. A layer or stratum. *Arkell.*

list. a. Used among miners in the English Midlands for dull coal sometimes dirty. *Tomkeieff, 1954.* b. Eng. A hard parting between coal seams, from Derbyshire coalfield and Leicestershire. *Arkell.* c. York. A weak shale or a thin bed of any kind of rock. *Arkell.* d. Eng. A mine inspector's term for the schedule of particulars of accidents. *Fay.*

listing. a. Fine shale or clay with glossy surfaces or slickensides due to crushing and relative movement. The rock may form a layer over a coal seam as clod; also applied to leather bed. *Nelson.* b. *See* lashing, a. *Fay.* c. A strip or band of cloth in weaving. *Sinclair, W.E., p. 484.*

list mill. In gem cutting, a wheel covered with list or cloth on which gems are polished. Also called list wheel. *Standard, 1964.*

list pan. A perforated skimmer for skimming molten tin. *Standard, 1964.*

list pot. In tinplate manufacturing, the last of a series of five pots used in coating the plates. *Standard, 1964.*

listric. a. Descriptive of rock surfaces that are polished, but not striated as in slickensides *B.S. 3618, 1964, sec. 5.* b. A particular form of thrust plane. *B.S. 3618, 1964, sec. 5.*

listric surface. A moderately inclined overthrust sliding plane concavely flexed towards the surface. *Schieferdecker.*

listwanite. A schistose rock of yellowish-green color composed of various combinations of quartz, dolomite, magnesite, talc, and limonite. *Holmes, 1928.*

listy bed. Eng. Soft freestone between the Chert Vein and House Cap in the Portland beds at Winspit in Purbeck. *Arkell.*

litchfieldite. A variety of nepheline syenite containing major albite and orthoclase, minor dark biotite, and in some specimens, cancrinite and/or sodalite. *A.G.I.*

liter; litre. A metric unit of capacity that equals the volume occupied by 1 kilogram of water at 4° C and at the standard atmospheric pressure of 760 millimeters; it equals 1.000028 cubic decimeters. *Webster 3d.*

liter-weight test. A work's test for the routine control of the firing of portland cement clinker. *Dodd.*

lith-; litho-. a. A prefix meaning stone or stonelike. *A.G.I.* b. -lith, a suffix meaning rock or rocklike. *A.G.I.*

Lithafrax. Trademark for a ceramic material made from beta spodumene. *CCD 6d, 1961.*

lithanthrax. Old name for stone coal. *Tomkeieff, 1954.*

litharge; lead oxide, yellow; plumbous oxide. An oxide of lead, PbO, made by heating metallic lead to 550° C. Exists in red and yellow modifications. In one manufacturing process, litharge may be collected in cakes of from 1 to 1.5 tons in weight when it will cool very slowly. The inner part of the cake will swell up and form flakes of red litharge; the outer part, which is necessarily chilled more rapidly, solidifies in lumps of yellow oxide. The flake may be separated from the lump by sifting and marketed as such. The solid material that remains on the screens is ground wet, settled in water, and dried. This product is known as levigated litharge. The colors of the commercial grades vary from canary yellow through lemon-yellow to reddish-yellow or red, while a very pure product has the color of yellow ocher. Mechanical compression will turn the pure yellow varieties red. Soluble in alkalies and acids; insoluble in water; specific gravity, 9.53; and melting point, 888° C. Used in ceramic cements and fluxes, in pottery and glazes, in glass, and in oil refining. *CCD 6d, 1961*. Also used in assaying. Also called massicot. *Fay*.

litharge glass. A glass in which litharge, PbO, replaces part of the calcium oxide of ordinary lime-soda glass. *CCD 6d, 1961*.

litharge-glycerin cement. Made by mixing glycerin with one-sixth to one-half portion of water and mixing with enough litharge to give a paste of desired consistency. Must be used as soon as mixed. Fillers retard the setting and avoid cracking. The product is somewhat resistant to acids. *CCD 6d, 1961*.

lithargite. Wherry's name for litharge. *English*.

lithia. Lithium monoxide. *Bennett 2d, 1962*.

Lithia amethyst. Kunzite. *Shipley*.

Lithia emerald. Hiddenite. *Shipley*.

lithia mica. *See* lepidolite. *Dana 17, p. 471*.

lithiaphorite. A manganese mineral near psilomelane, containing some lithium. *Fay*.

lithic. a. Synonym for lithologic. *A.G.I. Supp.* b. Refers to sediments and rocks in which rock fragments are more important porportionally than feldspar grains. *A.G.I. Supp.*

lithical. Proposed by Fletcher for the finer, textural characters of rocks, that is those for which texture, as distinguished from structure, is employed. Lithical, from the Greek for stone, is contrasted with petrical, from the Greek for rock. *Fay*.

lithic arenite. Synonym for lithic sandstone. *A.G.I. Supp.*

lithic graywacke. A low-rank graywacke, according to Krynine. *Pettijohn, 2d, 1957, p. 330*.

lithic sandstone. Sandstone with less than 25 percent labile constituents and more rock fragments than feldspar grains. *Pettijohn, 2d, 1957, p. 316*.

lithic tuff. A volcanic tuff in which the most conspicuous elements are rock fragments. *Compare* crystal; vitric tuff. *Holmes, 1928*.

lithidionite; litidionite. Probably a mixture of quartz and carbonates of potassium and sodium. *Dana 6d, p. 1041*.

lithification. a. The complex of processes that converts a newly deposited sediment into an indurated rock. It may occur shortly after deposition, be concurrent with it, or it may occur long after deposition. *Compare* induration; cementation. *A.G.I.* b. A type of coalbed termination in which the disappearance takes place because of a lateral increase in impurities resulting in a gradual change into bituminous shale or other rock. *Stutzer and Noe, 1940, p. 205*.

lithion beryl. Beryl containing lithium but no caesium, purely a chemical distinction. *Shipley*.

lithionite. The same as lepidolite; a lithia mica. *Fay*.

lithiophilite; triphylite. A phosphate of iron, manganese, and lithium, $LiMnPo_4$, varying from the bluish-gray triphylite with little manganese to the salmon-pink or clove-brown lithiophilite with but little iron; orthorhombic. *Dana 17*.

lithiophosphate. Lithium phosphate, Li_3PO_4, as white to colorless masses in pegmatite from Kola Peninsula, U.S.S.R. It is a hydrothermal alteration product of montebrasite, and weathers to mangan-apatite and davisonite. Named from the composition. *Spencer 21, M.M., 1958*.

lithium. A soft, silvery-white metallic element of the alkali group (group I), the lightest metal known, and never found uncombined in nature. Used, in alloy with calcium, as a deoxidizer for copper, and also added, in small amounts, to some lead-base bearing metals. Used also as a basis for lubricant grease with high resistance to moisture and to extremes of temperature, and as an ingredient of high-energy fuels. Isotope lithium 6 is used in hydrogen-bomb manufacture. Symbol, Li; valence, 1; isometric; atomic number, 3; atomic weight, 6.939; specific gravity, 0.534 (at 20° C); melting point, 179° C; boiling point, 1,317° C; and decomposes in water. *C.T.D.; C.T.D. Supp.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B–2, B–118, B–187*.

lithium aluminate; lithium metaaluminate. White; $LiA10_2$; orthorhombic; insoluble in water; melting point, 1,900° to 2,000° C; and specific gravity, 2.55 (at 25° C, referred to water at 4° C). Used as a flux in high-refractory porcelain enamels. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–187*.

lithium borosilicate. $Li_2O.B_2O_3.SiO_2$. Used in low-temperature enamels and as a component of high-temperature, corrosion-resistant coatings. *Lee*.

lithium carbonate. White; Li_2CO_3; monoclinic; molecular weight, 73.89; specific gravity, 2.111; melting point, 735° C; decomposes at 1,310° C (at 760 mm); more soluble in cold water than in hot water; soluble in acids; and insoluble in alcohol and in acetone. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–187*. It has been the principal source material for introducing Li_2O into glasses, glazes, and enamels. It gives a low melting range, greater fluidity, and smoother surfaces possessing higher gloss. *Lee*.

lithium ceramics. Ceramics based upon lithium aluminosilicate under the trade name of Stupalith. These materials possess high resistance to thermal shock, and can be produced with properties so controlled as to provide a range of coefficients of thermal expansion, from positive to negative. The ceramics are produced from blends of lithium-bearing minerals and clay or blends of other ceramic raw materials to obtain the desired ratio of lithia, alumina, and silica. *Osborne*.

lithium cobaltite. Dark blue; $LiCoO_2$; and insoluble in water. Exhibits both the fluxing property of lithium oxide and the adherence-promoting property of cobalt oxide. Used in ceramics. *CCD 6d, 1961*. Used in certain ground coat enamel frits in place of cobalt oxide and also in some blue enamel compositions because the blue color is stabilized and intensified by it. *Lee*.

lithium fluophosphate. White; crystals; $LiF.Li_3PO_4.H_2O$. Used in ceramics. *CCD 6d, 1961*.

lithium fluorhectorite. A synthetic product, $(K,Li)_xMg_{3-x}Li_xSi_4O_{10}F_2$, obtained as a fine-grained water-swelling phase. *Hey, M.M., 1964*.

lithium fluoride. White; LiF; isometric; molecular weight, 25.94; specific gravity, 2.635 (at 20° C); melting point, 842° C; boiling point, 1,676° C; slightly soluble in water; does not react with water at red heat; soluble in acids, including hydrofluoric acid; and insoluble in alcohol. Used in welding and soldering flux, in ceramics, as synthetic crystals in infrared and ultraviolet instruments, and proposed for use in space components. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–187*. Has high fluxing power in glasses, glazes, and enamels. Used in acid-resistant, cover coat enamels. It provides a valuable component of leadless glazes. Its low solubility permits using it as a mill addition. *Lee*.

lithium hydroxide. LiOH; colorless; tetragonal; specific gravity, 1.46; melting point, 462° C; decomposes at 924° C; soluble in water; and slightly soluble in alcohol. Used in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–188*.

lithium hydroxide monohydrate. $LiOH.H_2O$; colorless; monoclinic; specific gravity, 1.51; soluble in water; slightly soluble in alcohol; and insoluble in ether. Used in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–188*.

lithium manganite. Reddish-brown; Li_2MnO_3; insoluble in water; and extremely stable. Used as a smelter addition in the manufacture of frit and is used in ceramic-bonded grinding wheels. *CCD 6d, 1961*.

lithium metaborate dihydrate. White; crystalline; $LiBO_2.2H_2O$; soluble in water; melting point, (anhydrous), 840° C. Used in ceramics as a flux in enamel cover coats and it increases resistance to torsion. *CCD 6d, 1961*.

lithium metasilicate. Colorless or white; Li_2SiO_3; orthorhombic; specific gravity, 2.52 (at 25° C, referred to water at 4° C); melting point, 1,201° C; insoluble in cold water; and soluble in dilute hydrochloric acid. Used as a flux in glazes and ceramic enamels. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–188*. Has been used as a smelter addition in titania-opacified enamels to lower the firing temperature and to improve surface texture. The strong fluxing properties are of value in certain glazes. *Lee*.

lithium mica. *See* lepidolite.

lithium minerals. a. Main mineral sources of the element lithium such as spodumene ($Li.Al.Si._2O_6$); amblygonite ($Li.(Al.F)PO_4$); and lithium mica, lepidolite. *Pryor, 3*. b. Used in glassmaking and ceramics. Mined in North Carolina and South Dakota. *Barger*.

lithium niobate. $LiNbO_3$; a ferroelectric compound having the ilmenite structure and of potential interest as an electroceramic. *Dodd*.

lithium nitrate. Colorless or white; $LiNO_3$; hexagonal trigonal; specific gravity, 2.38; melting point, 261° C; decomposes at 600° C; soluble in water, in alcohol, and in ammonium hydroxide. Used in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B–188*.

lithium tantalate. $LiTaO_3$; a ferroelectric compound of potential value as a special electroceramic. The Curie temperature is above 350° C. *Dodd.*

lithium tetraborate pentahydrate. White; crystalline; $Li_2B_4O_7.5H_2O$; loses $2H_2O$ at 200° C; very soluble in water; and insoluble in alcohol. Used in ceramics. *CCD 6d, 1961.*

lithium titanate. White; Li_2TiO_3; and insoluble in water. Has strong fluxing properties when used in small percentages in titanium-bearing enamels. Its insolubility in water permits its use as a mill addition in vitreous and semivitreous glazes. *CCD 6d, 1961.*

lithium zirconate. White; Li_2ZrO_3; and insoluble in water. A very efficient flux in glasses containing zirconium dioxide. Used as a flux in zirconium-opacified enamels, glazes, and porcelains. *CCD 6d, 1961.*

lithium-zirconium silicate. White; $2Li_2O.ZrO_2.SiO_2$. A strong flux in enamels, glazes, and porcelains. Can be used in place of lithium zirconate. *CCD 6d, 1961.*

litho. The sheet of paper on to which the design or pattern is printed, and with the aid of which it is transferred on to the ceramic article. *Rosenthal.*

lithochemistry. The study of the chemistry of rocks. *A.G.I.*

lithoclase. Daubre's term for divisional planes due to rupture. *Fay.*

lithoclast. One who breaks stones. *Fay.*

lithofacies. The rock record of any sedimentary environment, including both physical and organic characters. *A.G.I.*

lithofracteur. Nitroglycerine mixed with siliceous earth, charcoal, sodium, and sometimes barium, nitrate, and sulfur. *Fay.*

lithogenesis. Synonym for petrogenesis. *A.G.I.*

lithogenesy. The science of the origin of minerals and the causes of their modes of occurrence. *Standard, 1964.*

lithogenetic. Of or pertaining to the origin or formation of rock. *A.G.I.*

lithogenous. Applied to stone-secreting organisms, such as a coral. *A.G.I.*

lithoglyph. A carving or engraving on a stone or gem; also, a stone or gem so engraved. *Standard, 1964.*

lithoglyptics. The art of gem cutting; the cutting or engraving of precious stones or gems. *Standard, 1964.*

lithographic limestone. a. An exceedingly fine-grained, crystalline limestone that is used in lithography and not for structural work. *A.G.I.* b. A compact, porous, fine-grained limestone, often dolomitic, that is used in lithography. Pale creamy yellow and occasionally gray. Fair samples are obtained from the Jurassic rocks of England, but the finest lithographic limestone comes from Solenhofen and Pappenheim, Bavaria, West Germany. *See also* Solenhofen stone. *C.T.D.*

lithographic texture. Used to denote grain size in calcareous sedimentary rocks. The grain size corresponds to that of clay, or less than one two-hundred and fifty-sixths millimeter. *A.G.I.*

lithography. The art of drawing upon and printing from stone; it is used for decorating pottery on and under glaze. *Rosenthal.*

lithoid. Rocklike or stonelike. *A.G.I.*

lithoidal. a. Applied to those groundmasses, especially of rhyolites, that are excessively finely crystalline, like porcelain, as distinguished from glassy varieties. The English equivalent stony is also used. *Fay* b. A dull, very close-grained structure giving the rock a strong appearance. The rock may or may not contain some glassy material. The term lithoidal is used in opposition to vitreous, and is especially applied to rocks formerly glassy which have become partially devitrified, for example, obsidian. *Nelson.*

lithoidite. A rhyolite with a dull, stony luster. *A.G.I.*

lithologic. Pertaining to lithology, or the study of rocks. Also pertaining to rock character. *See also* petrology. *Fay.*

lithologic correlation. The matching or linking up of identical rock formations, veins, or coal seams, exposed some distance apart, by lithology. *See also* correlation. *Nelson.*

lithologist. A specialist in lithology. *Fay.*

lithology. a. The character of a rock described in terms of its structure, color, mineral composition, grain-size, and arrangement of its component parts; all those visible features that in the aggregate impart individuality of the rock. Lithology is the basis of correlation in coal mines and, commonly, is reliable over a distance of a few miles. *Nelson.* b. The study of rocks based on the megascopic observation of hand specimens. In French usage, the term is synonymous with petrography. *Holmes, 1928.*

lithomarge. Compact kaolin; mineral. *Bennett 2d, 1962.*

lithophane. A decorative type of translucent pottery which, when viewed by transmitted light, exhibits a scene or portrait that is present in low relief on the ware. The process originated at Meissen, Germany, in 1828; examples of the ware were also produced in England during the 19th century. *Dodd.*

lithophile elements. Elements enriched in the silicate crust. Elements having a greater free energy of oxidation, per gram atom of oxygen, than iron. They concentrate in the stony matter or slag crust of the earth, as oxides and more often as oxysalts, especially silicates. *A.G.I.*

lithophosphor. A mineral, such as barite, that becomes phosphorescent when heated. *Standard, 1964.*

lithophyl. A petrified leaf or its impression, or a stone containing such petrifaction. *Standard, 1964.*

lithophysae. The large, hollow, bubblelike or roselike spherulites, usually with a radial and concentric structure, that occur in certain rhyolites, obsidians, and related rocks. *Holmes, 1920.*

lithophyte. A plant or plantlike organism that grows on the surface of rocks. *H&G.*

lithopone. A white pigment composed of a mixture of barium sulfate, zinc sulfide, and zinc oxide; it is made by mixing solutions of barium sulfide and zinc sulfate, filtering, washing and drying the precipitate, which is heated to redness, poured into water while hot, ground wet, then washed and dried. *Hess.*

lithosiderite. A group name for stony iron meteorites belonging to the subgroups of siderophyre and pallasite. *Compare* siderolite. *Holmes, 1928.*

lithosol. One of a group of azonal soils having no clearly expressed soil morphology and consisting of a freshly and imperfectly weathered mass of rock fragments; largely confined to steep hillsides. *Stokes and Varnes, 1955.*

lithospar. A naturally occurring mixture of spodumene and feldspar. *BuMines Bull. 585, 1960, p. 284.*

lithosphere. The solid globe of the earth, as contrasted with the enveloping hydrosphere and atmosphere. Especially, the earth's crust; the outermost portion or shell of the globe, of unknown thickness and is believed from direct observation or reasonable deduction to consist of solid rock, as distinguished from the unknown barysphere or centrosphere. *Fay.*

lithotope. An area of uniform sedimentation. *Schieferdecker.*

lithotype. a. This term was proposed by C. A. Seyler in 1954 in a communication to the Nomenclature Subcommittee of the International Committee for Coal Petrology to designate the different macroscopically recognizable bands of humic coals. These bands were described by M. C. Stopes in 1919 as the four visible ingredients in banded bituminous coal. The following macroscopic bands are distinguished in humic coals: vitrain, clarain, durain, and fusain. *IHCP, 1963, part I.* b. A rock defined on the basis of certain selected physical characters. *A.G.I. Supp.*

lithoxyl. Wood opal showing woody structure. *Hey 2d, 1955; Hess.*

Lithyalin. The patent name used by Friedrich Egermann of his opaque marbled glass. *Haggar.*

litmus. A blue dyestuff made from lichens. It turns red when treated by an acid and remains blue when treated by an alkali. *Crispin.*

litmus paper. Bibulous paper dipped into a solution of litmus. Used to test solutions to determine whether they are acid or alkaline. *Standard, 1964.*

lit-par-lit. French for bed-by-bed. A term used to designate the intimate peneration of bedded, schistose, or other foliate rocks by innumerable narrow sheets and tongues of granitic rock, usually granitic igneous rocks. *See also* leaf injections. *Holmes, 1920.*

lit-par-lit injection gneiss. A mixed rock formed by the injection of thin sheets of granitic magma between the layers of a schist or other fissile rock. *Stokes and Varnes, 1955.*

Little Demon exploder. Trade name for a small exploder which employs a manually operated electromagnetic generator as its source of power. It is approved for firing single shots in gassy mines and is in widespread use. *Nelson.*

little giant. A jointed iron nozzle used in hydraulic mining. *Fay. See also* hydraulic monitor.

little jap. *See* rock drill, b. *Fay.*

Littler's blue. A royal blue first produced in about 1750 by William Littler of Longton Hall, Stoke-on-Trent, by staining while slip with cobalt oxide, applying the slip to pottery ware, firing, and salt glazing. *Dodd.*

Littleton softening point. *See* softening point. *Dodd.*

little tops. Aust. A local name given to a thin band of coal occurring above the main seam. *Fay.*

little winds. a. Corn. A sump. *Fay.* b. An underground shaft, sunk from a horizontal drift. A winze. *Fay.*

littoral. Of or pertaining to a shore. A coastal region. *Webster 2d.*

littoral current. A current generated by waves breaking at an angle to the shoreline and which usually moves parallel to and adjacent to the shoreline within the surf zone. *See also* longshore current. *A.G.I.*

littoral deposit. A deposit of littoral drift located between high- and low-water lines. *A.G.I.*

littoral drift. a. Applied to the movement along the coast of gravel, sand, and other material composing the bars and beaches. *A.G.I.* b. Material moved in the littoral zone under the influence of waves and currents. *A.G.I.*

littoral rock. A rock composed of the coarse material deposited within the limits of the littoral zone through the agency of the waves and tidal currents. *Standard, 1964.*

Littoral System. *See* Benthic division.

littoral zone. a. In mine subsidence, the zone that embraces the disturbed strata lying round about and outside the mined strata. *Briggs, p. 61.* b. The marine environment influenced by a land mass; the coastal region. *Hy.* c. The zone between the level of the highest tides and the lower limit of illumination. Also called intertidal zone. *Schieferdecker.* d. The coastal strip lying between the lines of lowest and highest tides. Also called intertidal zone. *Schieferdecker.*

live. a. Electrically charged. In mechanical stress, dynamic loading. In mining, profitmaking, and operating. *Pryor, 3. See also* alive. b. Said of an electric circuit or conductor in which there is a potential difference between it and earth. *C.T.D.*

live axle. A revolving horizontal shaft. *Nichols.*

live boom. A shovel boom which can be lifted and lowered without interrupting the digging cycle. *Nichols, 2.*

live center. A lathe or grinder center which holds, yet rotates with, the work. It is used in either the headstock or tailstock of a machine to prevent wear and reduce the driving torque. *ASM Gloss.*

live hole. A flue left in a clamp and filled with brushwood to start the firing process. *Dodd.*

liveingite. A sulfarsenite of lead, $5PbS.4As_2S_3$; monoclinic. In crystals resembling other minerals of similar composition. From Binnenthal, Switzerland. *English.*

live load. a. In drilling, a variable load suspended on the hoist line. *Long.* b. In mechanics, a load that is variable, as distinguished from a load that is constant. Also called dynamic load. *Long.* c. A load on a structure which may be removed or its position altered, *See also* dead load; superimposed load. *Nelson.* d. It may not be a dynamic load, and it does not include wind load or earthquake shocks. *See also* distributed load. *Ham.*

live lode. A lode containing valuable minerals. *Fay.*

lively coal. Ark. Small, and generally hard coal that may be chipped off in good-sized pieces while being undermined or sheared with a pick. *Fay.*

live quartz. Quartz associated with a valuable mineral. *Fay.*

liver. In dry process enameling, a defect characterized by a wavelike form of abnormally thick porcelain enamel. *ASTM C286-65.*

live reel. A reel that supplies air, water, or electricity to the inner end of the hose or wire wound on it. *Nichols.*

livering. A general term covering curious faults in casting slip which may develop if the slip is allowed to stand; the cause is lack of control in the deflocculation. *Dodd.*

liverite. In Utah, the name for a variety of bitumen, probably elaterite. *Tomkeieff, 1954.*

live roll grizzly. A device for screening and scalping which consists of a series of spaced rotating, parallel rolls so constructed as to provide openings of a fixed size. *ASA MH-4.1-1958.*

live roller conveyor. A series of rolls over which objects are moved by the application of power to all or some of the rolls. The power transmitting medium usually is belting or chain. *ASA MH4.1-1958.*

liver opal. A liver-colored form of opaline silica. Synonym for menilite. *C.T.D.*

liver ore. *See* cinnabar. *Bennett 2d, 1962.*

liver peat. Greenish-brown, elastic, sapropelic peat with a distinct laminated structure. *Tomkeieff, 1954.*

Liverpool datum. A leveling datum formerly used for Ordnance Survey of Great Britain, based on observation of the mean sea level at Liverpool in 1844. This datum is now superseded by the Newlyn datum. *Ham.*

liver pyrites. A massive form or iron sulfide (marcasite and sometimes also pyrite and pyrrhotite) having a dull liver-brown color. *Fay.*

liver rock. A variety of sandstone which breaks or cuts as readily in one direction as in another. The working of the stone is not affected by stratification. *Fay.*

liver spotting. *See* mottling, b. *Dodd.*

liverstone. A variety of barite that gives off a fetid odor when rubbed or heated. *Fay.*

livesite. A term which is little used referring to a disordered kaolinite, particularly as found in some micaceous fire clays. *Dodd.*

live steam. Steam direct from the boiler and under full pressure. *Webster 3d.* Distinguished from exhaust steam, which has been deprived of its available energy. *Fay.*

living rock. Rock in its original or native state or location; rock not quarried. *Webster 2d.*

livingstonite. A natural mercury-antimony sulfide, probably $HgSb_4S_7$. Luster adamantine to metallic; color blackish gray; streak red. *Dana 7, v. 1, p. 485.*

lixiviation. Leaching. *Pryor, 3.*

lizard. A forked piece of timber used as a stone sled; a stoneboat. *Standard, 1964.*

lizardite. A platy serpentine mineral with X-ray c-axis half that of chrysotile. Named from locality, Lizard, Cornwall, England. *Spencer 21, M.M., 1958.*

lizard stone. Serpentine rock, of type found at Lizard Point, Cornwall, England. *Pryor, 3.*

L-joints; primary flat joints. Horizonatl or nearly horizontal joints that are found in igneous rock and related to the intrusion of magma. *A.G.I.*

Ljungberg process. A direct process in operation in Sweden in 1909. The furnace was similar to the blast furnace, with 3 electrodes. The ore and fuel were crushed to a suitable size and fed into the top of the furnace in the usual way, the ore being partially reduced by carbon monoxide rising through the charge. Reduction was completed in the smelting chamber. No air was used in the process, the gases being produced from the carbon in the charcoal and coke, and the oxygen in the ores ($FeO+C=FE+CO$. *Osborne.*

Llandeilian; Llandelian. Upper Middle Ordovician. *A.G.I. Supp.*

Llandoverian. Lower Silurian. *A.G.I. Supp.*

llanite. An aschistic igneous rock; a sodic feldspar granite porphyry. *Johannsen, v. 1, 2d, 1939, p. 264.*

llano. Sp. a. An extensive plain with or without vegetation. *A.G.I.* b. The exact equivalent of the English word plain and used by Spanish-speaking persons. The term is applied to the vast treeless plains of South America. *A.G.I.*

Llanvirnian. Lower Middle Ordovician. *A.G.I. Supp.*

Lloyd Davies formula. A formula in use in Great Britain for calculating the amount of run off, from which sizes of sewers are determined: Run-off water in cubic feet= 60.5 times the area drained in acres times the rainfall in inches per hour times the impermeability factor. *Ham.*

LLS. *See* shallow investigation laterolog. *Wyllie, p. 92.*

LM bit. A nonstandard 1.406-inch set-outside-diameter bit much used in Australia and Canada as a noncoring bit. It is used with a 1.428- to 1.438-inch set-outside-diameter reaming shell and LM rods. When set as a core bit, the inside diameter is such that it cuts a standard EX-size core. *Long.*

LM rod. An Australian and Canadian letter name for a nonstandard-size, nonstandard-design drill rod having an outside diameter 1-3/16 inches. It is usedd with XRN bits and shells in blasthole-drilling operations. *Long.*

LMT. Abbreviation for local mean time. *Zimmerman, p. 64.*

ln. Abbreviation for natural or Napierian logarithm. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-97.*

load. a. Unit of weight of ore used in the South African diamond mines; equal to 1,600 pounds or 0.8 short tons. The equivalent of about 16 cubic feet of broken ore. *I.C. 8200, 1964, p. 149.* b. Scot. An old measure of weight for coal. *Fay.* c. To transfer material to a hauling unit or hopper. *Nichols.* d. Sometimes used as a synonym for bit load. *Long.* e. The act or process of placing an explosive in a borehole; also, the explosive so placed. *See also* charge, a and b. *Long.* f. The weight borne by a structure caused by gravity alone (dead load) or by gravity increased by the stress of moving weight (live load), as in the case of hoisting a string of drill rods. *Long.* g. Full mine wagon. *Mason.* h. The resistance to a motor of the machinery that it drives, apart from its own friction. *Standard, 1964.* i. In electricity, current in amperes. *Mason.* j. The amount of material that a transporting agency, such as a stream, glacier, or the wind, is actually carrying at a given time. *Leet.* k. *See* pull, k. *ASTM C162-66.*

load admittance. The reciprocal of the load impedance. *H&G.*

load-bearing test. Load-bearing tests may be divided into two types, horizontal and vertical. Both types require excavation of a test pit into the region which is being investigated. This test pit must be excavated with a minimum of blasting, with particular attention to the bearing surfaces to avoid disturbance of the foundation rock. In the horizontal test, a hydraulic jack applies loads to bearing plates seated against opposite walls of the pit. The thrust is applied 6 to 8 feet from the pit floor to minimize the effect of that boundary. Sufficiently large bearing plates eliminate local failure. Mortar is placed between the bearing plates and the rocks to secure uniform contact. Deflection of the load-bearing plates is measured by means of dial gages mounted two to a plate to get the average deflection. Deflections of the rock outside the bearing plates is also measured. In vertical tests, a hydraulic jack, working against a dead weight, applies loads to a single bearing plate seated against the bottom of the pit. Where the rock is severely fractured, upward movement of the area adjacent to the bearing plate is restricted by use of a reinforced concrete mat at the bottom of the test pit; the load being applied through a central hole in the mat. Dial gages are used in the same manner as in the horizontal tests. Tests are conducted for periods extending from a few hours to several weeks duration. Load-bearing tests are being utilized to an increasing extent as a source of information for the design of heavily loaded surface structures and have supplanted seismic tests where the foundation rock is highly shattered. *Lewis, pp. 576-577.*

load-bearing tile. Tile for use in masonry constructions designed to carry superimposed loads. *ASTM C43-65T.*

load-bearing wall. A wall carrying any load put upon it together with its own weight and the wind load. *Ham.*

load binder. A lever that pulls two grabhooks together, and holds them by locking over center. *Nichols.*

load cast. The bulbous, mammillary or papilliform downward protrusions of sand produced by load deformation of underlying hydroplastic mud; due to yielding under unequal load. Also called flow cast. *Pettijohn.*

load-casted current markings. Flutes, grooves and other current marks swollen and misshapen due to load casting. *Pettijohn.*

load-casted sole marks. *See* load casted current markings. *Pettijohn.*

load-cast lineation. Small-scale, rather poorly defined, irregular, linear structures appearing as casts on base of sandstones attributed to dense sluggish turbidity current moving over soft mud. *Pettijohn.*

load-cast striations. A rilllike pattern of uncertain origin. *Pettijohn.*

load cell. Consists essentially of a hollow steel cylinder capped top and bottom by a steel plate. Strain gages are cemented on the inner wall of the cylinder in such a way that as the cylinder is compressed so the strain gages affixed thereto will be distorted with a resultant change in resistance. This instrument is designed for measuring the load transferred from the hanging wall on to props or other units used for support. *Isaacson, p. 212.*

load classification. A classification of drive loads based on the intensity of the shock that is imposed on the drive. *J&M.*

load controller. A device to control the load and prevent spillage on a gathering conveyor receiving coal or mineral from several loading points or subsidiary conveyors. The device is a simplified weightometer and is installed on the main belt a short distance before the intermediate loading point. When the main belt is fully loaded, the scale registers this fact and causes a break in the electrical circuit of the intermediate conveyor which is stopped. Immediately the flood loading on the main conveyor is finished, the load controller operates and starts up the subsidiary conveyor. *See also* sequence control. *Nelson.*

load dropper; car dropper. Ark. A person who runs loaded cars down a gently inclined track, one at a time. *Fay. See also* car runner; car dropper. *D.O.T. 1.*

loaded filter. A graded filter placed at the foot of an earth dam or other construction stabilizing the foot of the structure by virtue of its weight and permeability. *Ham.*

loaded stream. A stream that has all the sediment it can carry; it is partly loaded when it is carrying less than full capacity. *A.G.I.*

loaded track. A track used for loaded mine cars. *Fay.*

loaded wheel. A grinding wheel which has a glazed or clogged surface from particles of the material being ground. *Crispin.*

loader. a. A mechanical shovel or other machine for loading coal, ore, mineral, or rock. *See also* power loader; scraper loader; shaker-shovel loader; shovel loader; cutter loader; gathering-arm loader. *Nelson.* b. The man who loads coal, either by hand or by operating a loading machine, at the working face after the coal has been shot down. He also keeps the working place in order. *Fay; B.C.I.* c. In anthracite and bituminous coal mining, a laborer who shovels coal or rock, blasted from the working face in a mine, into cars or onto a conveyor belt from which cars are loaded at some point removed from the working place. May be designated as car loader; conveyor loader. Also called coal loader. *D.O.T. 1.* d. In metal and nonmetal mining, one who shovels ore or rock, caved or blasted from the working face in a mine, into cars or onto a conveyor belt from which cars are loaded at some point removed from the working place. *D.O.T. 1.* e. *See* gun perforator loader. *D.O.T. 1. See also* tractor shovel.

loader boss. a. In bituminous coal mining, a foreman who supervises a crew of loaders loading coal onto a conveyor or into cars at working places in a mine. Also called loading boss; loading-unit boss. *D.O.T. 1.* b. In anthracite coal mining, a foreman who supervises the loading of railroad cars with prepared coal. *D.O.T. 1.*

loader, bucket. *See* bucket loader. *ASA MH4.1-1958.*

loader engineer. *See* loader, machine; boxcar loader. *D.O.T. 1.*

loader gate. A gate road equipped with a gate conveyor or a gate-end loader; the gate to which the face conveyors deliver their coal. *Nelson.*

loader, hand. *See* loader. *D.O.T. 1.*

loader helper, machine. In anthracite coal mining, bituminous coal mining, a laborer who assists machine loader in loading coal into cars. *D.O.T. 1.*

loader, machine. In anthracite and bituminous coal mining, one who operates an electric loading machine which digs, elevates, and loads coal blasted from the working face into cars by means of a conveyor loaded by a scraping device, a digging conveyor, or a shoveling mechanism. May be designated according to machine used, as Joy loader. Also called loader engineer; loader operator; loader runner; loading-machine man; loading-machine operator; loading-machine runner. *D.O.T. 1.*

loader, machine I. In anthracite coal mining, bituminous coal mining, metal mining, one who operates a small electric or air-power shovel in underground working places to load ore or rock into cars after it has been blasted from the working face. Also called loader operator; loading-machine operator; mechanical-shovel operator; shovel operator. *D.O.T. 1.*

loader, machine II. In anthracite coal mining, bituminous coal mining, metal mining, one who operates a loading machine consisting of a small hoisting engine and a cable-drawn scraper, or scoop, to load ore or rock into cars after it has been blasted from the working face in underground or open-pit mines. Also called scraper-loader hoistman; scraper-loader operator; scraper operator. *D.O.T. 1.*

loader-off. Eng. A man who regulates the sending out of the full cars from a longwall stall, or gate. *Fay.*

loader operator. *See* loader, machine. *D.O.T.* 1.

loader runner. a. *See* boxcar loader, b. *D.O.T. 1.* b. *See* loader, machine. *D.O. T. 1.*

load-extension curve. A line plotted from the results of a tensile test on metal, the loads being shown as ordinates and the elongations of the gage length as abscissae, thus relating the extension of the material under test to the applied load. *See also* stress-strain curve. *Ham.*

load factor. a. The ratio of the average compressor load during a certain period of time to the maximum rated load of the compressor. *Lewis, p. 663.* b. The ratio of the collapse load to the working load on a structure or section. *Taylor.* c. In electric power engineering, the ratio of average electrical load to peak electrical load, usually calculated over a 1-hour period. *L&L.* d. Average load carried by an engine, machine, or plant, expressed as a percentage of its maximum capacity. *Nichols.* e. Ratio of average output during a period to maximum output during the period. Sometimes the ratio of output to maximum capacity. *Strock, 10.*

load fold. Load folds are plications of the underlying stratum which are believed to be the result of unequal pressure from the overlying load pockets and waves. *Pettijohn.*

load impedance. The load impedance of an energy load is the impedance which would be measured at the terminals of that load if they were not connected to a source. *H&G.*

load indicator. A measuring device used to indicate the load or weight suspended on a drill hoisting line or cable. *Long.*

loading. a. In cutting, building up of a cutting tool back of the cutting edge by undesired adherence of material removed from the work. *ASM Gloss.* b. In grinding, filling the pores of a grinding wheel with material from the work, usually resulting in a decrease in production and quality of finish. *ASM Gloss.* c. In powder metallurgy, the filling of the die cavity with powder. *ASM Gloss.* d. In ion exchange, sorption on to resins of uranium ions from pregnant solution in loading cycle. *Pryor, 3.*

loading belt. A loading boom in which the conveying element is a belt. *B.S. 3552, 1962.*

loading boom. a. In coal preparation, an overhanging steel chute for loading coal into rail wagons or lorries; usually capable of vertical movement as loading proceeds to minimize breakage. *Nelson.* b. An adjustable conveyor used for lowering coal into cars with little breakage. Widely used for handling domestic sizes of bituminous coal. *Mitchell, p. 802. c.* A hinged portion of a conveyor which is designed to receive materials at a fixed level and to discharge them at varying levels; usually employed for loading coal into wagons. *B.S. 3552, 1962.* d. A movable conveyor, installed under the tipple, that carries the coal to a railroad car. *Grove.*

loading-boom operator. *See* conveyor man, a *D.O.T. 1.*

loading boss. *See loader* boss. *D.O.T. 1.*

loading chute. a. A three-sided tray for loading or for transfer of material from one transport unit to another. *See also* chute. *Nelson.* b. A gravity chute used to convey coal from the pocket or the screen to the railroad car. *Mitchell, p. 801.* c. Used to direct material to a conveyor. *ASA MH 4.1-1958.*

loading chute, screen. See screen loading chute. *ASA MH4.1-1958.*

loading conveyor. Any of several types of conveyors adapted for loading bulk materials, packages, or objects into cars, trucks, or other conveyors. *ASA MH4.1-1958.*

loading density. The number of pounds of explosive per foot length of drill hole. *Nelson.*

loading equipment. Mechanical shovels or other machines singly or in combination used to load excavated or stockpiled materials into trucks, mine cars, conveyors, or other materials transportation or haulage units. *Bureau of Mines Staff.*

loading factor. In ion exchange, pounds of uranium oxide, U_3O_8, which can be loaded per cubic foot of resin. *Pryor, 3.*

loading gage. Dimensions limiting the height and width of rolling stock including any loads. *Ham.*

loading head. That part of a loading machine which gathers the coal or rock and places it on the machine's elevating conveyor. *Grove.*

loading-head man. A man who operates the loading device of a duck bill or other type of conveyance equipped with self-loading head for the mechanical underground loading of coal or other mineral. *Hess.*

loading hopper. A hopper used to receive and direct material to a conveyor. *ASA MH4.1-1958.*

loading machine. A machine for loading materials such as coal, ore, or rock into cars or other means of convenance for transportation to the surface of the mine. *ASA C42.85:1956.*

loading machine operator. a. A person who operates a mobile loading machine. *Grove.* b. *See* loader, machine. *D.O.T. 1.*

loading-machine runner. *See* loader, machine. *D.O.T. 1.*

loading pan. A box or scoop into which broken rock is shoveled in a sinking shaft while the hoppit is traveling in the shaft. A small hoist is used to lift and discharge the pans into the hoppit on its return to the shaft bottom. *See also* box filling. *Nelson.*

loading pick. Eng. A pick for cleaning coal. *Fay.*

loading point. a. The point where coal or ore is loaded into cars or conveyors; where a conveyor discharges into mine cars; where a wagon or lorry is loaded. *See also* transfer point. *Nelson.* b. N. of Eng. Where coal is transferred from a mother gate or trunk belt conveyor into tubs. *Trist.*

loading ramp. A surface structure, often incorporating storage bins, used for gravity loading bulk material into transport vehicles. *Nelson.*

loading ratio. In quarrying, the number of tons of rock blasted per 1 pound of explosive. This term is confusing because in soft rock the ratio is high whereas consumption is low. The harder the rock, the lower the ratio. *Streefkerk, p. 16. See also* explosive factor; explosive ratio. *Nelson.* Also called powder factor.

loadings. Eng. Pillars of masonry carrying a winding drum or pulley. *Fay.*

loading shovel. A mechanical shovel able to operate as a forklift truck, a crane, or a loader. *Ham. See also* shovel loader. *Nelson.*

loading station. A device which consists of one or more plates, or a hopper which receives and places material on the conveyor belt for tranport. When such a loading station is located at the tail end, it is known as a tail-end loading station; when it is located along the intermediate section, it is known as an intermediate loading station. *NEMA MB1-1961.*

loading-unit boss. *See* loader boss. *D.O.T. 1.*

loading weight. Weight of a powder which is filled into a container under stated conditions. *Pryor, 3.*

load metamorphism. The change in rocks supposedly brought about by a regular increase in temperature and hydrostatic pressure through deep burial. *A.G.I.*

load mold. The depression in the underlying bed occupied by the load pocket. *Pettijohn.*

load of ore. Derb. At mines where ore is not weighed, a measure of 9 dishes. *See also* dish, a. *Fay.*

load oil. The treating oil (in distinction to the new oil or formation oil). *Wheeler.*

load-out. To load coal or rock that is to be taken out of the mine. *Fay.*

load pocket. A load pocket is a sole mark characterized by a bulge of sand pressing into the underlying stratum. Same as load cast. *Pettijohn.*

load power. The load power of an energy load is the average rate of flow of energy through the terminals of that load when connected to a specified source. *H&G.*

loadstar. *See* loadstone. *Fay.*

loadstone; lodestone. A piece of magnetite possessing polarity like a magnetic needle. Also called loadstar; lodestar. *Fay.*

load stress. The stress produced by a load. *Zern.*

load test, hot. A test in which the refractory brick are heated while under a static load for the purpose of obtaining an index to refractories. *A.R.I.*

load transfer. The weight of the strata above every excavation is largely transferred to the coal pillars or packs in the vicinity. Attempts are made to control and facilitate this load transfer in the yield-pillar system and in double packing. *See also* abutment; pressure arch. *Nelson.*

load transition loss. The load transition loss at the junction between the energy load and a transducer connecting that load to an energy source is the transmission loss measured by the ratio of the output power of the transducer to the load power of the load. *H&G.*

load voltage. The load voltage of an energy load is the root-mean-square voltage between the terminals of that load when connected to a specified source. *H&G.*

load wave. A load wave (wisp or plume) is the salient curved unevenness of underlying material which appears to have been squirted up into the superjacent turbidity-current deposit. *See also* flame structure. *Pettijohn.*

loam. a. A mixture of sand, silt, or clay, or a combination of any of these with organic matter, humus. It is sometimes called topsoil in contrast to the subsoils that contain little or no organic matter. *ASCE P1826.* b. In founding, a mixture of sand and clay to which straw, horse dung, or other binding material is frequently added; used to make molds for iron or brass castings. *Standard, 1964.* c. A potter's clay, containing mica or iron ocher. An impure clay. *Fay.*

loam beater. A rammer used in making a loam mold. *Standard, 1964.*

loam board. A founder's tool and template used in making cores of loam. *Fay.*

loam box. A container in which loam is boiled in water by leading a steampipe into the mixture; the mixture is used in blast furnace runners. *Fay.*

loam cake. A disk of dried loam used to cover a loam mold, having holes through which melted metal is poured and air escapes. *Standard, 1964.*

loam casting. A casting made in a loam mold. *Standard, 1964.*

loaming. a. A method used in prospecting for tracing a hidden ore body consisting in systematically testing the surface material for indications of gold. As the ore body is approached, the ground may become richer or carry more shed material. *See also* geochemistry. *Nelson.* b. A method of prospecting for a metalliferous vein or mineralized area (source of eluvial mineral); dirt is washed from places chosen systematically around and up the slope of a hill. Presence, absence and the number of colors in the miner's pan eventually indicate the mineral source. *Hess.* c. In Tasmania, prospecting surface soil in an effort to locate the source of detrital minerals. *Hess.* d. In Australia, prospecting by which the earth of a hillside is washed (panned) to locate mineral deposits, the panning being continued in the direction of the greatest richness. *Hess.*

loam mold. a. Mold for casting metal in which a low grade of sand is used with clay, backed by brick or similar substance. *Bennett 2d, 1962.* b. A founder's mold made of loam and usually requiring no pattern. *Standard, 1964.*

loam molding. The act or operation of sweeping up a mold in loam, by templates; distinguished from dry-sand molding. *Standard, 1964.*

lobate coast. An ungraded coast showing a shoreline with lobes. *Schieferdecker.*

lobate plunge structure. *See* flute cast. *Pettijohn.*

lobate rill mark. The lobate rill mark is apparently the same as flute cast. *See also* flute cast. *Pettijohn.*

Lobbe Hobel. An earlier type of rapid plough traveling at 70 feet per minute across the face, and since it is not powered, it is not necessary to travel the face with it. The plough takes a 3 to 4 inch slice of coal at each traverse and gives 10 tons or more output per man per shift at the fact. *Nelson.*

Lobbert lagging. A lagging consisting of galvanized steel wire frames which are fastened to underground haulageway supports by special wire fasteners to provide a continuous lining. *Nelson.*

lobbs. Eng. Underground stairs; also, applied to a vein irregular in descent. *Fay.*

lobes. If a three-dimensional representation of a transducer directivity is made by rotating the two-dimensional directivity pattern, these sectors generate zones, or regions, on the constant distance surface. These regions are known as lobes. The term is also used with reference to the corresponding portions of the directivity pattern. The region, or sector, which includes the reference axis is known as the primary lobe; the remaining regions, or sectors, are known as the secondary lobes. When the primary lobe is the only lobe showing maximum response it is often called the major lobe. In that case the secondary lobes are called minor lobes. *Hy.*

lob of gold. A small but rich deposit of gold. *Fay.*

lobong. A malayan term for a hole, as in a sluicebox. *Hess.*

lobs. Steps in a mine. *Hess.*

local action. Corrosion due to the action of local cells; that is, galvanic cells resulting from inhomogeneities between adjacent areas on a metal surface exposed to an electrolyte. *ASM Gloss.*

local attraction. The deviation of a compass needle from the magnetic north at any particular point, often caused by the local presence of some ferrous metal. *Ham.*

local base level. Any surface other than that of the ocean below which a local land area cannot be reduced by ordinary erosion. *Stokes and Varnes, 1955.*

local cell. A galvanic cell resulting from inhomogeneities between areas on a metal surface in an electrolyte. The inhomogeneities may be of physical or chemical nature in either the metal or its environment. *ASM Gloss.*

local control. A term applied to a switch, circuit-breaker, starter or similar appartus to denote that its operation can be controlled manually by an external switch or push button integral with the appartus. *B.S. 3618, 1965, sec. 7.*

local correlation. Correlation of outcrops over areas of comparatively small extent. *Stokes and Varnes, 1955.*

local corrosion. This is the difference between the total corrosion and the galvanic corrosion of the anodic member of a galvanic couple. *BuMines Bull. 619, 1964, p. 206.*

local current. A natural earth current of local origin, such as those arising from the oxidation of sulfide deposits. A term used in electrical prospecting. *A.G.I.*

local current density. Current density at a point or on a small area. *ASM Gloss.*

local extension. The extension which is produced in a tensile test after the ultimate tensile stress has been passed, and which is concentrated on part of the gauge length where a neck is formed. *See also* uniform extension. *C.T.D.*

local gravity map; residual gravity map. Gravity map from which the gradual changes of gravity have been eliminated. *Schieferdecker.*

local mean time. Hour angle of mean sun. Local apparent noon is transit time at which upper limb of sun crosses local meridian. This must be corrected by use of the equation of time from the Nautical Almanac when making sun observations. *Pryor, 3.*

local metamorphism. Contact metamorphism, as distinguished from regional metamorphism. *Fay.*

local peat. Peat produced under the influence of ground waters. Also called basin peat. It is subdivided into (1) low moor stage peat and (2) raised moor stage peat. *Tomkeieff, 1954. See also* basin peat; amorphous peat. *A.G.I. Supp.*

local plant indicators. Plants of wide geographic distribution having an affinity for absorbing certain metallic elements from the soil and which can be used in geochemical exploration to indicate presence of local concentrations of metals. *Compare* universal plant indicators. They include the following:

Element	*Family*	*Genus & Species*	*Common Name*	*Locality*
bitumen	goosefoot	Anabasis salsa	—	Caspian Sea
	goosefoot	Salsola spp.	saltwort	Caspian Sea
	lily	Allium sp.	onion	California
boron	goosefoot	Salsola nitraria	saltwort	U.S.S.R.
	goosefoot	Eurotia ceratoides	winter fat	U.S.S.R.
	plumbago	Limonium suffruticosum	statice	U.S.S.R.
copper	pink	Polycarpea spirostylis	pink	Australia
	mint	Elsholtzia haichowensis	elsholtzia	China
	poppy	Eschsholtzia mexicana	Calif. poppy	Arizona
	plumbago	Armeria maritima	thrift	Scotland
gypsum	buckwheat	Eriogonum inflatum	desert trumpet	Western U.S.
	loasa	Mentzelia spp.	blazing star	Western U.S.
iron	birch	Betula sp.	birch	Germany
	guttiferae	Clusia rosea	copey clusia	Venezuela
lead	grass	Erianthus giganteus	beardgrass	Tennessee
phosphorus	morning glory	Convolvulus althaeoides	bindweek	Spain
selenium & uranium	legume	Astragalus preussi	poison vetch	Western U.S.
	legume	Astragalus sp.	garbancillo	Andes
silver	buckwheat	Eriogonum ovalifolium	eriogonum	Montana
zinc	saxifrage	Philadelphus sp.	mock orange	Washington

Hawkes, 2, pp. 309-311.

local shear failure. Failure in which the ultimate shearing strength of the soil is mobilized only locally along the potential surface of sliding at the time the structure supported by the soil is impaired by excessive movement. *ASCE P1826.*

local syngenetic pattern. In geochemical exploration, smaller dispersion patterns characterized by more local associations of ore with minor element patterns. *Hawkes, 2, p. 47.*

local unconformity. An unconformity on either side of which the beds are parallel to one another but where the unconformity appears to be only of local significance. A disconformity may be similar in appearance but is inferred to be of regional importance. *A.G.I. See also* classical washout.

local vent. A pipe or shaft serving to convey foul air from a plumbing fixture or a room to the outer air. *Crispin.*

local ventilation. Ventilation of the drives and headings in mines by use of the pressure gradient of the main air current. *Stoces, v. 1, p. 533.*

locate. To mark out the boundaries of a mining claim and establish the right of possession. *Fay.*

located. Delimited by having the boundaries as certained and monumented on the ground, identified by having a notice of location posted upon the land, and further proclaimed to the public by having such notice of location recorded in the manner customary under the rules for recording mining claims. *Ricketts, I.*

location. a. The act of fixing the boundaries of a mining claim, according to law. *Fay.* b. The claim itself. *Fay.* c. A townsite in a mining or lumbering district. *Fay.* d. The act of taking or appropriating a parcel of mineral land. It includes the posting of notices, the record thereof when required, and marking the boundaries so that they can be readily traced. The terms location and mining claim are synonymous, although a mining claim may consist of several locations. *Ricketts, I.* e. Selecting or defining, on a map or in the field, the alignment of a road, rail track, or the site of a shaft or mine; the actual route or site as fixed. *See also* location plan. *Nelson.* f. That which is given a definite place; a plot of ground defined by boundaries; a mining claim. *Standard, 1964.* g. The defining of the boundaries of a plot of ground, or identifying it with the place as described in a legal document. *Standard, 1964.* h. A place of settlement or residence. *Standard, 1964.* i. A spot or place where a borehole is to be drilled; a drill site. *Long.*

locational fit. A fit intended for locating the mating parts which may have clearance or interference. *ASM Gloss.*

location and patent. The location of a mining claim and patent for a mining claim are not governed by the same rules. The mining statutes expressly provide for the location of surface ground that must include the lode or claim as discovered; and a patent can not grant any greater extent of surface ground than the location as made and marked by the surface boundaries. *Ricketts, I.*

location damages. Compensation paid by an operator to the surface owner for injury to the surface or to growing crops in the drilling of a well. *Williams.*

location notice. A written notice prominently posted on a claim, giving name of locator and description of its extent and boundaries. *A.G.I.*

location plan. A map, drawn to a suitable scale, showing the proposed mine development, shafts, works, etc., in relation to existing surface features. *See also* site plan. *Nelson.*

location survey. a. *See* location, a. *Fay.* b. Laying out the line of railroad or canal, or the like. *Fay.*

location work. Labor required by law to be done on mining claims within 60 days of location, in order to establish ownership. *Weed, 1922.* Synonymous with assessment work. *Fay.*

locator. a. A prospector who according to the law is required to find valuable minerals in place on the surface as a condition preliminary to making a location. *Lewis, p. 25.* b. One who locates (or stakes) a mining claim; a prospector. *Bureau of Mines Staff.*

lochs. Unfilled cavities in a vein. *See also* vug. *Nelson.*

lock. a. In a compressed air system, a chamber that can be opened to pressure air at one end, and to atmospheric air at the other. *Nichols.* b. In forging, a condition where the flash line is not entirely in one plane. Where two or more changes occur, it is called a compound lock; where a lock is placed in the die to compensate for die shift caused by a steep lock, it is called a counterlock. *ASM Gloss.*

lockage. Water consumed in passing from the upper reach of a canal when a vessel passes through a lock. *Ham.*

lock band. A course of bondstones. *Standard, 1964.*

locked coil rope. Made of specially formed wires assembled in layers of alternate lay about a wire core, which gives a smooth rope, and the entire surface is available for resisting wear. Such ropes are used in the United States for track cables on aerial tramways and as hoisting ropes in English collieries. *Lewis, p. 249.*

locked particles. Particles of ore consisting of two or more minerals. *Gaudin, p. 70.*

locked test. In laboratory tests on small quantities of ore, a method in which any selected fraction of the product is added to a fresh batch of the sample, so that the cumulative effect of its retention can be studied under conditions which simulate a continuous process in which middlings are recirculated or partly used water or leach liquor is returned. *See also* cyclic test. *Pryor, 3.*

locked-wire rope. A rope with a smooth cylindrical surface, the outer wires of which are drawn to such shape that each one interlocks with the other and the wires are disposed in concentric layers about a wire core instead of in strands. Particularly adapted for haulage and rope-transmission purposes. *Zern.*

locke level. A particular type of hand level. *Ham.*

locker. A short piece of round timber or iron rod for inserting between the spokes of a tram wheel to retard its movement. Also called lolley; sprag. *Nelson.*

locking bolts. Bolts of any type used for locking parts in position. *Crispin.*

locknut. The nut securing the feed gears in the feeding mechanism in a gear-feed swivel head on a diamond drill; also, any extra nut used to secure a principal nut. Also called jamnut; jambnut. *Long.*

lockout. a. The withholding of employment by an employer and the whole or partial closing of his business establishment in order to gain concessions from employees. Compare strike, g. *Webster 3d.* b. *See* automatic reclosing relay. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

lock paddle. A sluice whereby a lock chamber is emptied or filled. *Ham.*

lock piece. Eng. A piece of timber for supporting the mine workings. *See also* lock timber. *Fay.*

lockpin. Any pin or plug inserted in a part to prevent play or motion in the part so fastened. *Crispin.*

Lockportian. Upper Middle Silurian. *A.G.I. Supp.*

Lockport limestone. Marine, highly fossiliferous strata that form the top of the scarp and the lip of the Niagara Falls, having a thickness of 130 feet above the falls, and faunally closely resembling the Wenlock limestone in England. Sometimes called Niagara limestone. *C.T.D.*

lock sill. A raised portion of the floor of a lock chamber, forming a stop against which the lock gates bear when they are shut. *Ham.*

lock timber. Eng. An old plan of putting in stull pieces in Cornwall and Devonshire. The pieces were called lock pieces. *Fay.*

lockup clutch. A clutch that can be engaged to provide a nonslip mechanical drive through a fluid coupling. *Nichols.*

locomotive. An electric engine, either operating from current supplied from trolley and track or from storage batteries carried on the locomotive. In some foreign countries, operated with compressed air. Used to move empty and loaded mine cars in and out of the mine. *B.C.I. See also* mine locomotive; electric mine locomotive; electric locomotive.

locomotive arches. Arches built of special refractory shapes, supported by water-circulating members. *Bureau of Mines Staff.*

locomotive brakeman. In anthracite and bituminous coal mining, one who works on trains or trips of cars hauled by locomotive or motor, as distinguished from rope haulage. Also called locomotive helper; locomotive patcher; motor brakeman; motor nipper; poleman. *D.O.T. 1.*

locomotive coupler. *See* coupler. *D.O.T.1.*

locomotive crane. A crane traveling on a standard gage railway track. *Ham.*

locomotive garage. An elongated recess in an intake airway of a mine for servicing locomotives. It contains two or three rail tracks (with pit space under one), good lighting, lifting equipment, oils, benches, and tools. Where battery locomotives are used, the garage will serve as a charging station. An average air velocity of about 150 feet per minute is desirable in underground garages. *Nelson.*

locomotive gradient. The statutory maximum gradient for locomotive haulage is 1 in 15, but ordinarily the practical limit is about 1 in 25. Roads driven specially for locomotives are normally graded about 1 in 400 in favor of the load, unless a steeper gradient is required for drainage. *Nelson.*

locomotive haulage. The transport of coal, ore, men, and materials underground by means of locomotive hauled mine cars. The locomotive may be powered by battery, diesel, compressed air, trolley, or some combined types such as battery/trolley or trolley/cable reel. The size of locomotive has steadily increased to about 15 tons and 100 horsepower. *Nelson.*

locomotive helper. *See* locomotive brakeman. *D.O.T. 1.*

locomotive pan brick. Shapes, used to build a burner enclosure, flash wall, and protecting walls for the water legs. *Bureau of Mines Staff.*

locomotive patcher. *See* locomotive brakeman. *D.O.T. 1.*

locomotive resistance. The combined resistance caused by the friction of the journal and the wheel tread. It may vary from 12 to 20 pounds, but for practical purposes may be taken as 15 pounds, as the locomotive represents only a small portion of the total tractive effort. *Kentucky, p. 235.*

lode. a. Strictly a fissure in the country rock filled with mineral; usually applied to metalliferous lodes. In general miners' usage, a lode, vein, or ledge is a tabular deposit of valuable mineral between definite boundaries. Whether it be a fissure formation or not is not always known, and does not affect the legal title under the United States federal and local statutes and customs relative to lodes. But it must not be a placer, that is, it must consist of quartz or other rock in place, and bearing valuable mineral. As used by miners, before being defined by any authority, the term lode simply meant that formation by which the miner could be led or guided. It is an alteration of the verb lead; and whatever the miner could follow, expecting to find ore, was his lode. Some formation within which he could find ore, and out of which he could not expect to find ore, was his lode. Lode, as used by miners, is nearly synonymous with the term vein, as employed by geologists. The word should not be used for a flat or stratified mass. *See also* ledge, a; lead, a; fissure; fissure vein; vein. *Fay.* b. A lode consists of several veins spaced closely enough so that all of them, together with the intervening rock, can be mined as a unit. *A.G.I.* c. The well-defined occurrence of valuable mineral bearing material in situ. Used synonymously with ore body and to some extent with reef and vein. *See also* zones of lode. *Nelson.* d. An inclined tabular mineral deposit of value, occurring between the definite walls of a fissure, crack, or vein in the earth's surface. When it contains gold, the term reef is often used. *C.T.D.* e. An aggregation of veins in a wide formation. Also called lode formation. *Hoov., p. 94.* f. *See* vein. *B.S. 3618, 1964, sec. 5.*

lode channel. The track of the lode along which the ore body may make or develop again. *Nelson.*

lode claim. a. That portion of a vein or lode, and of the adjoining surface, which has been acquired by a compliance with the law, both Federal and State. Any dispute as to whether a given parcel of land is a vein or lode is a question of fact to be determined by men experienced in mining, and it cannot be determined as a matter of law. *Ricketts, p. 453.* b. *See* vein or lode claim. *Fay.*

lode country. *See* ore channel. *Fay.*

loded. Magnetized by a lodestone. *Standard, 1964.*

lode formation. A wide low-grade mineralized zone. *Nelson.*

lode location. Among practical miners the terms lode, lode location, and mining claim are used interchangeably. *Ricketts, I.*

lode mining claim. A mining claim including a lode, fissures, or fissure vein. In the United States, the maximum length along the lode or vein is 1,500 feet and the maximum width is 600 feet. A tract of land with defined surface boundaries, including all lodes, veins, and ledges throughout their entire depth, the top or apex of which lies inside of vertical planes extended downward through the surface boundary lines, although such veins in their downward course may extend outside of the vertical side planes of the surface location. The extension of inclined veins beyond the sidelines has resulted in much litigation. In Meixco a claim is 100 meters square, and is bounded by vertical planes through the surface lines. *See also* claim; mining claim. In some mining districts, as Bisbee, Arizona, the operating companies have entered into mutual contracts, specifically eliminating extralateral rights, and defining underground property rights by downward vertical planes through the surface boundaries. *Fay.*

lode plot. A horizontal lode. *Fay.*

lodestar. *See* loadstone. *Fay.*

lodestone. a. A magnetic variety of natural iron oxide, Fe_3O_4. Lodestone can be made to swing like a magnet and thus indicate magnetic north, and was so used by early mariners. *Nelson.* b. Stone found in veins or lodes. *Fay. See also* loadstone.

lode stocwan. Eng. An open cutting toward a vein in rising ground. *Fay.*

lodestuff. Minerals included in a lode or vein, including economically valueless gangue. *Pryor, 3.*

lode tin. Tin ore (cassiterite) occurring in veins, as distinguished from stream tin or placer tin. *A.G.I.*

lodge. a. A reservoir of any size used for holding water in a mine. A sump or standage. Also called lodgement. *B.S. 3618, 1963, sec. 4.* b. Eng. A subterranean reservoir for the drainage of the mine made at the shaft bottom, in the interior of the workings, or at different levels in the shaft. *Fay.* c. A sump. *Fay.* d. Scot. A cabin at the mine shaft for workmen. *Fay.* e. Wales. *See* platt. *Fay.* f. The room or flat at the shaft into which the pushers or trammers empty their loads. *Standard, 1964.* g. In South Wales, the local branch of the coal miners' union. *Nelson.* h. A pump room, near the pit bottom or other main pumping station; a sump. *Nelson.*

lodge moraine. A kind of terminal moraine consisting of material dropped beneath the ice and pushed along by the glacier but falling short of its front. *Standard, 1964.*

lodgment. Scot. *See* sump; lodge, b. *Fay.*

lodgment level. Scot. A room driven from a level a short distance to the dip and used for storage of water. A sump. *Fay.*

lodranite. A siderolitic meteorite containing crystals of olivine and bronzite in a matrix of nickel-iron. *Holmes, 1928.*

loellingite; löllingite. Natural iron arsenide, $FeAs_2$, with some cobalt, nickel, antimony, and sulfur. Silver white to steel gray; streak grayish black; hardness, 5 to 5.5; specific gravity, 7.4. Found in Maine, New York, New Jersey, Colorado; Canada. A source of arsenic. *CCD 6d, 1961.*

loess. a. A uniform eolian deposit of silty material having an open structure and relatively high cohesion due to cementation by clay or calcareous material at the grain contacts. A characteristic of loess deposits is that they can stand with nearly vertical slopes. *ASCE P1826.* b. A widespread deposit of silt or marl extending from central Europe through the steppes of Asia. It is a buff-colored, porous but coherent deposit traversed by a network of narrow tubes representing the molds of successive generations of grass roots. The comminution of the constituents is ascribed to the grinding action of glaciers, the fine grade and distribution to the action of wind, and the accumulation in thick deposits to the grip of vegetation. *Holmes, 1928.*

loessification. The development of loess from swampy terrace sediments by weathering and downslope creep. *A.G.I. Supp.*

loess kindchen. A spheroidal or irregular nodule of calcium carbonate found in loess. *Standard, 1964.*

loeweite. A white water soluble mineral with a distinct cleavage, $MgO.Na_2O.2SO_3.2\frac{1}{2}H_2O$; Mohs' hardness, 3.5; specific gravity, 2.37. *Larsen, p. 78.*

Loewinson-Lessing classification. A chemical system of classification of igneous rocks. *A.G.I.*

Lofco car feeder. An appliance for controlling mine cars at loading points, for marshalling trains, for loading cars into cages and tipplers and other points. It consists of a carrying chain running between the rails. The dummy or live axles of the cars are held firmly by the chain's profile and an overload slipping action is provided. *See also* retarder, a. *Nelson.*

LOF-Colburn process. *See* Colburn process.

lofthead. An overhead cavity caused by a fall of roof. *Nelson.*

lofting. a. S. Wales. An old or disused heading over the top of another one. *Fay.* b. N. of Eng. *See* lacing, b. *Fay.* c. Scot. Wood filling up vacant space on top of crowns or gears. *Fay.* d. Timbers, usually old, laid across the caps of steel frames or sets in a working to support the roof. *Webster 2d.*

lofty tin. Corn. Large and rough tin ore. *Fay.*

log. a. A piece of timber either rough or squared. *Crispin.* b. The record of, or the act or process of recording, events or the type and characteristics of the rock penetrated in drilling a borehole as evidenced by the cuttings, core recovered, or information obtained from electronic devices. Also called logged; logging. *Long.* c. S. Staff. A balance weight near the end of the hoisting rope of a shaft to prevent its running back over the pulley. *Fay.* d. N. Staff. *See* dolly, b. *Fay.* e. A record of the performance of an engine or boiler or similar piece of equipment. *Webster 3d.* f. Abbreviation for logarithm. *BuMin Style Guide, p. 60.*

Logan slabbing machine. This machine consists essentially of two horizontal cutting chains, one working at the base of the coal seam, the other at a distance from the floor, while a third cutter chain is mounted vertically on a shearing jib at right angles to the other two and shears off the coal at the back of the cut. The upper jib breaks the coal up into loadable size and a short conveyor transfers it to the face conveyor. Similar in principle to the A.B. Meco-Moore cutter-loader. *Mason, v. 1, p. 122.*

logarithmic decrement (log decrement). The natural logarithm of the ratio of successive amplitudes of vibration of a member in free oscillation. It is equal to one-half the specific damping capacity. *ASM Gloss.*

logarithmic scale. In the common logarithm, where $a=b^n$ and a is the number, b its logarithmic base (10) and n its logarithm, the scale of measurement in which addition is used instead of multiplication. *Pryor, 3.*

logarithmic strain. *See* true strain. *Ro.*

logbook. A book in which the official record of events or the type and characteristics of the rock penetrated by the borehole is entered. Also called journal; journal book. *Compare* log, b. *Long.*

log chute. A way maintained through or alongside a dam for the passage of floating logs and driftwood. *Ham.*

loggan stone. Eng. A weather-worn block so finely balanced on its pivotlike base that a very ordinary force suffices to make it log, or rock, from side to side. Properly logging stone, and perhaps better known as rocking stone. *Fay.*

logged up. Supported by trees, props, or pucheons. *Fay.*

logging. The business of cutting and getting out logs or timber from a forest. Often closely associated with mining for the purpose of obtaining mine timbers. *Fay.*

logging chain. A chain composed of links of round bar pieces curved and welded to interlock, with a grabhook at one end and a round hook at the other. *Nichols.*

logging stone. *See* loggan stone. *Fay.*

logging tongs. Tongs with end hooks that dig in when the tongs are pulled. *Nichols.*

logical element; logical operator; static logic element. An element used in control systems. It is a self-contained circuit element, usually transistorized (hence static). These elements are combined to provide logical functions such as AND, OR, NOT, etc. For example, when the cage is correctly located at bank AND—the cage is empty—an empty tub may be rammed. The static logic element in such a case would link the difference-detecting circuits and would permit action only if the correct conditions were present. *NCB.*

logs. Portions of trunks of trees cut to length and built up so as to raise the mouth or collar of a shaft from the surface, in order to give the requisite space for the dumping of mullock and mineral. *Zern.*

log sheet. A sheet of paper on which the rock characteristics, sample assays, and other pertinent data obtained from a single borehole are recorded for future reference. *Compare* log, b. *Long.*

log washer. A slightly slanting trough in which revolves a thick shaft or log, carrying blades obliquely set to the axis. Ore is fed in at the lower end, water at the upper. The blades slowly convey the lumps of ore upward against the current, while any adhering clay is gradually disintegrated and floated out the lower end. *Liddell 2d, p. 388.*

Lohmannizing. A process by which a protective zinc coating is amalgamated to a base-metal sheet. *Liddell 2d, p. 494.*

L.O.I. Abbreviation sometimes used for loss on ignition. *See also* loss on ignition. *Dodd.*

loipon. A regolithic deposit resulting from intense and prolonged chemical weathering of rocks. *Compare* geest; laterite; saprolite. *A.G.I.*

Loiseau furnace. Gas-fired roasting and distillation furnace for processing zinc ores. *Bennett 2d, 1962.*

lok batanite. Variety of bituminous material derived from a mud volcano. *Tomkeieff, 1954.*

lokie. Diminutive for locomotive. Also applied to electric motors. *Korson.*

lokie helper. In bituminous coal mining for Pennsylvania, one who fires boilers of a steam locomotive; also, couples and uncouples cars and throws switches. *D.O.T. 1.*

löllingite. *See* loellingite. *CCD 6d, 1961.*

loma. Sp. A long, comparatively narrow, somewhat flat-topped mountain ridge, or ridge of hills. *Standard, 1964.*

lombong. Malay name for large excavations in tin placers. *Engineering and Mining Journal, v. 126, No. 26, Dec. 29, 1928, p. 1018.*

Lomite-1. High explosive; used in mines. *Bennett 2d, 1962.*

lommy. In Yorkshire, England, a soft holing clay. *Nelson.*

lomonite. Same as laumontite. *Standard, 1964.*

lomonosovite. A sodium titanium silicate-prosphate, $Na_2Ti_2Si_2.O_9.Na_3PO_4$; forms with murmanite a complete series of solid solutions; occurs in laminated tabular crystals; dark cinnamon-brown to black, also rose-violet; uneven fracture; monoclinic or triclinic; occurs in pegmatites in syenite; presumably from Kola Peninsula, U.S.S.R. *American Mineralogist, v. 35, No. 11-12, November-December, 1950, pp. 1092-1093.*

London clay. a. A geological formation near London, England. It has a maximum thickness of about 500 feet. *Fay.* b. A tertiary clay used in making building bricks. *Dodd.*

London Metal Exchange. Free and open market, established in 1882 to facilitate dealings in many nonferrous metals, ores and residues and to set authoritative daily prices, in accordance with standard contracts. These specify quality, brand, sampling agreement, delivery place and terms, etc. *Pryor, 3.*

London official price. The quotation on the London Metal Exchange of the price on the date of a transaction in valuable mineral. *Pryor, 3.*

London stock brick. *See* stock brick. *Dodd.*

London white. White lead. *Standard, 1964.*

long. Abbreviation for longitude. *BuMin Style Guide, p. 60.*

long. a. Clay which is very plastic and workable. *Crispin.* b. A comparative term signifying a slow-setting glass. *ASTM C162–66.*

long awn. A direction of less than 45° to the main natural line of cleat or cleavage in the coal. Also spelled horn. *TIME. Compare* short awn.

longback. Breakage material appearing in a coal product. Usually caused by the pocket having an insufficient pitch in order to clean itself. *Mitchell, p. 155.*

long chord. In railroad or highway surveying: (1) any chord (of a circular curve) longer than 100 feet; or (2) the chord that extends from the point of curvature to the point of tangency. *Seelye, 2.*

long clay. Clay possessing a high degree of plasticity. *Fay.*

long column. A column which fails by buckling, as distinct from crushing, when overloaded. *See also* slenderness ratio. *Ham.*

long dolly. A name for a follower used in pile driving. *Ham.*

long flame coal. Coal with a high volatile matter. Generally synonymous with free burning coal. *B.S. 3323, 1960.*

long glass. Glass that is slow setting. *Dodd.*

long hole. Underground boreholes and blastholes exceeding 10 feet in depth or requiring the use of two or more lengths of drill steel or rods coupled together to attain the desired depth. *Long.*

long-hole blasting. This method of blasting, employing diamond drills or extension steel drills with tungsten carbide bits, is being applied increasingly to ore winning operations where conditions are suitable. The essential requirements from the practical and economic points of view are: (1) a large ore body or wide regular vein; (2) a strong country rock; and (3) a good parting between the ore and the rock to avoid undue contamination of the ore. Holes to take up to 2-inch diameter cartridges may be drilled. Since the drilling of long holes is relatively expensive, high-strength, high-density gelatinous explosives are usually employed so that the maximum burden can be placed on each hole. For this reason also, the largest diameter of explosive cartridge that can be loaded into the holes should be used to obtain the greatest possible loading density. *McAdam II, pp. 139–140.*

long-hole drill. A rotary- or a percussive-type drill used to drill underground blastholes to depths exceeding 10 feet. *Compare* long hole. *Long.*

long-hole infusion. There are two methods: (1) Long holes are drilled parallel to the coal face. Charges of Hydrobel explosive are spaced along the holes and fired under water pressure. The object is to loosen the coal and allay the dust along the entire face in one operation. *See also* pulsed-infusion shot firing. (2) Two or more holes are drilled about 40 feet long in the line of advance of the workings. The holes are not charged with explosive and fired but only subjected to water pressure up to 3,000 pounds per square inch to loosen the coal and allay the dust in the cleats. The holes may be drilled during weekends and of a length about equal to the weekly advance of the face. *Nelson.*

long-hole jetting. A hydraulic mining system consisting essentially of drilling a hole down the pitch of the vein, replacing the drilling head with a jet cutting head and then retracting the drill column with the jets in operation to remove the coal. Coal cut loose by the jets drops to a flume drift, and is carried by water to a screening and loading plant. *Coal Age, v. 71, No. 8, August 1966, p. 196.*

longitude. a. The distance east or west on the earth's surface, measured by the angle which the meridian through the place makes with some standard meridian, as that of Greenwich, England or Paris. *Standard, 1964.* b. In surveying, the distance between two lines drawn north and south through the extremities of a course; easting or westing. *Fay.*

longitudinal-arch kiln. An annular kiln in which the axis of the arched roof, on both sides of the center line of the kiln, is parallel to the length of the kiln. Kilns of this type are much used in the firing of building bricks. *Compare* transverse-arch kiln. *Dodd.*

longitudinal bead test. A test for weldability in which a welded test piece is bent double; if the parent metal or the weld metal cracks, then neither is weldable. *Ham.*

longitudinal coast; conformable coast; Pacific type of coast. Coast parallel to the trend lines of a coastal orogenetic belt. *Schieferdecker.*

longitudinal direction. The principal direction of flow in a worked metal. *ASM Gloss.*

longitudinal dune. A general term for various types of linear dune ridges, commonly, more or less symmetrical in cross profile, which are known or inferred to extend parallel to the direction of the dominant dune-building winds. *A.G.I.*

longitudinal fault. A fault, the strike of which is parallel to the general structure. *A.G.I.*

longitudinal field. A magnetic field which extends within a magnetized part from one or more poles to another or other poles, and which is completed through a path external to the part. *ASM Gloss.*

longitudinal fissure. A fissure that is parallel with the strike of the deposit. *Stoces, v. 1, p. 266.*

longitudinal joint. A joint running parallel to flow lines in igneous rocks, steeply dipping and best developed where flow lines are horizontal. *A.G.I. Supp.*

longitudinal profile. A section drawn vertically through the centerline of a road, railway, or canal giving both the original and the final ground levels. *Ham.*

longitudinal ripple marks. Relatively straight crests parallel to current direction. May be symmetrical or asymmetrical. *Pettijohn.*

longitudinal valley. A valley having the same direction as the strike of the underlying rocks. *See also* subsequent stream. *A.G.I.*

longitudinal velocity. *See* Young's modulus of elasticity. *Lewis, p. 566.*

longitudinal wave. An elastic wave in which the displacements are in the direction of wave propagation. *A.G.I.*

long lay. Synonym for lang lay. *Long.*

long (lazy) flames. Partially aerated flames, particularly when aerated in stages. Nonturbulent flow. *Francis, 1965, v. 2, p. 436.*

Longmaid-Henderson process. Method of recovering copper from burned sulfides, by roasting with rock salt and using the issuing gases, after condensation, to leach the chloridized residue. Copper then dissolved is precipitated from the leach liquor onto scrap iron. *Pryor, 3.*

long pay. S. of Wales. A system of paying wages. *Fay.*

long piggybank conveyor; pick-a-back conveyor. An appliance to provide a constant flow of coal from a continuous miner to the main haulage system. It consists of a conveyor slung under the tail end of the loader and running on a bogey straddling the heading conveyor so that it can telescope over it. *Nelson.*

long-pillar work. Coal winning in three stages in underground mining. First, large pillars are left as the face is advanced by means of drives. Second, parallel drives connect these drives and form large blocks. Finally, the pillars so formed are mined. *Pryor, 3.*

long-ranged. Of crushed or ground ore, size distribution covering a wide range of meshes. *Pryor, 4.*

long-range order. Repetition of coordination over many atomic distances. The resulting structure is crystalline. *VV.*

long rigid cartridges. To facilitate the loading of drill holes long, rigid cartridges which are pushed into the drill hole without being deformed are sometimes used. The maximum degree of packing will not be particularly high, partly because of the thickness of the rigid case, partly because of the difference in diameter required between drill hole and cartridge. If this is made too small there will be the risk of the cartridges sticking when they are being pushed into the hole. *Langefors, p. 88.*

long run. To fill or nearly fill the core barrel with core on a single trip into the borehole. *Compare* short run. *Long.*

long-running thermal precipitator. A dust-sampling instrument designed by the Mining Research Establishment of Great Britain that operates over periods of up to 8 hours and collects only respirable dust which is selected aerodynamically during the sampling process. The respirable fraction is selected by drawing the dust through a horizontal duct elutriator which simulates the acting principle of the human nose and respiratory passages in that the larger and faster-falling particles are caught by the processes of settlement and impingement. *Roberts, I. p. 122.*

long section. A section of land in the United States Governmental Survey which contains more than 640 acres. *Williams.*

long-shank chopping bit. A steel chisel-edged chopping bit having a longer and heavier than normal shank, designed to give added weight and directional stability when chopping an angle hole through overburden. *Long.*

longshore current. A current in the surf zone, moving generally parallel to the shoreline, generated by waves breaking at an angle with the shoreline. Synonym for littoral current. *Schieferdecker.*

longshore drift. *See* beach drift. *Schieferdecker.*

long span. A span is regarded as long when it approaches the maximum economical length for a particular type of bridge. *Ham.*

long-term engagement. In long-term engagement, men are signed on for a number of years, and there is usually some incentive included in the agreement to encourage them to reengage for a further period at its termination. It usually is practiced where labor is in short supply. *Spalding, p. 371.*

long tom. A trough for washing gold-bearing earth. *Webster 3d.* It is longer than a rocker. *Fay.*

long ton. A unit that equals 20 long hundredweight or 2,240 pounds. Used chiefly in England. *Webster, 3d.*

longues tailles. Fr. Same as longwall. *Fay.*

longulite. An elongated crystallite of cylindrical or conical form considered to have been formed by the adhesion of a linear series of globulites. *Holmes, 1928.*

longwall. a. A long face of coal. *Stoces, v. 1, p. 248.* b. A method of working coal seams believed to have originated in Shropshire, England, towards the end of the seventeenth century. The seam is removed in one operation by means of a long working face or wall, thus the name. The workings advance (or retreat) in a continuous line which may be several hundreds of yards in length. The space from which the coal has been removed (the gob, goaf, or waste) is either allowed to collapse (caving) or is completely or partially filled or stowed with stone and debris. The stowing material is obtained from any dirt in the seam and from the ripping operations on the roadways to gain height. Stowing material is sometimes brought down from the surface and packed by hand or by mechanical means. Today more than 93 percent of Great Britain's coal output is obtained from longwall faces. *See also* longwall advancing; longwall retreating; longwall stalls. *Nelson.* Also known as longwork; Shropshire method; combination longwall; and Nottingham or Barry system. *Fay.* c. A system of mining in which all the minable coal is recovered in one operation. *Hudson.* d. A method of mining flat bedded deposits, in which the working face is advanced over a considerable width at one time. *Pryor, 3.* e. Opposite of shortwall. *B.C.I.*

longwall advancing. A system of longwall working in which the faces advance from the shafts towards the boundary or other limit lines. In this method, all the roadways are in worked-out areas. *Nelson.*

longwall coal cutter. Compact machine, driven by compressed air or electricity, which cuts into the coal face with its jib at right angles to its body. *Pryor, 3.*

longwall machine. A power-driven machine used for undercutting coal on relatively long faces. *ASA C42.85: 1956. See also* longwall coal cutter.

longwall miner. In bituminous coal mining, one who extracts coal from seams by a specialized method known as longwall mining. In this method, all coal is extracted as the work progresses, packs (supports of stone and timber) being built instead of leaving pillars of coal to support the roof. *D.O.T. 1.*

longwall mining. N. of Eng. A system of mining on straight faces 80 yards or more in length. *Trist.*

longwall peak stoping. A method of underland stoping in which rapid advance of the face is maintained, and by working the faces at an angle of 60° to the strike, the peak travels down the dip at twice the rate of the face advance. This method was introduced on the Witwatersrand for stoping below 5,000 feet where rapid face advance resulting from the closer spacing of holes reduces the incidence of rock bursts. *Higham, pp. 213–215.*

longwall pillar working. The extraction of the coal pillars formed by a pillar method of working, by a longwall face, which can be advancing or retreating. Where the crush is not excessive, this method is more efficient and often safer than extracting each pillar individually. *Nelson.*

longwall retreating. A system of longwall working in which the developing headings are driven narrow to the boundary or limit line and then the coal seam is extracted by longwall faces retreating towards the shaft. In this method, all the roadways are in the solid coal seam and the waste areas are left behind. *See also* mechanized heading development *Nelson.*

longwall stalls. A common method of working coal seams prior to machine mining. The coal is worked along the longwall face by a series of roadways or stalls which are turned off lateral or cross headings. The coal is hand-loaded into trains at the face and then hauled by horses along the stalls and cross headings and outwards to the main haulage system. The distance between the stalls varies from 10 to 15 yards and of length so that no repairs are required on the roadways before being cut off by a new cross heading. *See also* stepped longwall. *Nelson.*

longwall stope. *See* flat-back stope. *Fay.*

longwall stoping. *See* overhand stoping, b. *Fay.*

longwall working home. A term sometimes used by miners for longwall retreating. *Nelson.*

long wave. Waves under conditions where the relative depth (water depth/wave length) is less than 0.05 and where the phase velocity is dependent upon water depth but independent of wave length. *Hy.*

long weight. *See* long ton. *Fay.*

longwork. *See* longwall. *Fay.*

lonkey. Eng. The best York sandstone, Rossendale district. *Compare* lunker. *Arkell.*

loob; loobs. Corn. The clayey or slimy portion washed out of tin ore in dressing. *Fay.*

Loo board. *See* hack. *Dodd.*

loodwin. Burma. Ruby mines in which fissures, caves, and hollows in the limestone, filled with detritus from its disintegration, are followed, and their contents often cemented or buried under recent travertine, extracted and washed. *Hess.*

looking. N. of Staff. Examining the unwalled sides of a shaft. *Fay.*

looking-glass ore. Lustrous hematite (Fe_2O_3). Specular iron ore; iron glance. Mohs' hardness, 6; specific gravity, 5.2. *Pryor, 3.*

lool. A vessel to receive ore washings. *Standard,* 1964.

loom. Eng. A variant of loam, especially in the Thames Valley; applied to Thanet sand and dredged mud used for cement. *Arkell.*

Loomite. Trade name for a short fibered talc. *Bennett 2d, 1962.*

loon dung. Can. Silt on lake and river bottoms. *Hoffman.*

loop. a. A bend, or folding, or doubling of a part of a river or stream. *MacCracken.* b. A closed circuit of pipe in which materials and components may be placed to test them under different conditions. If part of the loop and contents are placed in a reactor, it is called an in-pile loop. *L&L.* c. *See* loup. *Fay.* d. A sling at the end of a hoisting rope. D-link. *Fay.*

loop-bedding. Small groups of laminae that are otherwise quite regular are sharply constricted or even end abruptly at intervals, giving the effect of long, thin loops or links of a chain. Thought to be a desiccation feature. Observed in some fine calcareous sediments and also in oil shale. *Pettijohn.*

loop boot elevator. An en masse elevator in which the lower end of the casing is in the form of a loop. *ASA MH4.1-1958.*

loop circuit. A term used when two positive wires are installed in divergent directions but later come close enough together to be connected. They then form the so-called loop circuit. *Compare* parallel circuit. *Kentucky, p. 250.*

loop drag. An eye at the end of a rod through which tow is passed for cleaning boreholes. *Fay.*

looper. In ore dressing, smelting, and refining, a laborer who attaches loops (folded copper sheets or strips) to starting sheets so that sheets can be suspended in electrolytic tanks. Also called looper puncher. *D.O.T. Supp.*

looper puncher. *See* looper. *D.O.T. Supp.*

loop haulage. A system used when a continuous supply of cars must be supplied to a loading station. In this system, the empty cars are simply coupled to one end of the standing cars, which are pulled forward by a hoist with the rope attached to a clip fixed to the side of the cars. The rope is pulled back by hand for a distance of three or four car-lengths and the process is repeated frequently as the end of the rope approaches the hoist. *Wheeler, H.R., pp. 32–33.*

looping. The running together of ore matter into a mass when the ore is only heated for calcination. *Standard, 1964. Compare* loup. *Fay.*

looping mill. Consists of one or more trains of alternating two-high stands. As the piece being rolled emerges from one stand, it is turned through 180° and entered into the next stand and similarly into the succeeding stands. In some mills, the looping is performed by hand, while in others it is done mechanically by means of repeaters or looping channels. *Osborne, p. 358.*

loops; looping. *See* curtains. *ASTM C286-65.*

loop takeup. An arrangement for storing spare belting (for extension of the conveyor) and also for applying tension to the belt. It is usually situated behind the drive unit. *Nelson.*

loop tunnel. A method of gaining grade in a tunnel location by looping or folding the line back upon itself. *Stauffer.*

loop-type pit bottom. A pit bottom layout in which the loaded cars are fed to the cage from one side only and the empties are returned to the same side by means of a loop roadway. The loop arrangement provides more standage room for cars and is more suitable for multideck cages. When the coal reaches the pit bottom from two sides, a double-loop layout may be adopted. *Nelson.*

loopway; double parting. A double-track loop in a main single-track haulage plane at which mine cars may pass. A loopway located close to the face or loading machine enables a train of empty cars to be stationed in the loop, while the loaded cars are run straight out on the main single track. *Nelson.*

loors. Corn. Tin-ore tailings. *Hess.*

loose. a. Eng. Applied to a working place to denote that it is open at both sides, that is, the coal has been previously removed at both sides. "Loose at an end," or "loose at one side," denotes that the coal has been worked or mined at one side. *Fay.* b. The end of a shift or of the day's work is spoken of as "loosing time," or "loose," or "kenner;" and when the workmen leave, the pit is said to be "loosed out." *Fay.* c. Synonym for junk when applied to pieces of metal that must be fished from a bore hole. *Long.*

loose black. Low-density carbon black. *Bennett 2d, 1962.*

loose bulk excavation. Excavation, in quantity, of loose, unconsolidated soils, of soils lying under water, or of soils so saturated with water as to prevent movement of equipment over their surface. Loose bulk excavation is generally performed from solid, or relatively solid, ground adjacent to the area being excavated. *Carson, p. 96.*

loose core. Large aggregate which has become separated from a concrete mix by incorrect handling during the mixing and placing process. *Ham.*

loose diamonds. *See* loose goods. *Long.*

loose dusted splittings. Loose-pack splittings dusted with mica powder. *Skow.*

loose end. a. A gangway in longwall working, driven so that one side is solid ground while the other opens upon old workings. *See* fast end, a. *Fay.* b. Coal prepared by cutting, or that coal which is certain to be loosened by a shot. *Fay.* c. The limit of a stall next to the goaf, or where the adjoining stall is in advance. *Fay.*

loose-flange joint. There are several patterns of this type of joint. The flanges are slipped on to the tubular portion of the pipe, one being made to slide within the other, the pipe ends being pressed outwards to form facings for the joint washer and another being reinforced by the formation of a special shoulder or the addition of a welded-on mild steel ring. *Mason, v. 2, p. 628.*

loose goods. Industrial diamonds as purchased from a diamond supplier in bulk. *Long.*

loose ground. a. Broken, fragmented, or loosely cemented bedrock material that tends to slough from sidewalls into a borehole. Also called broken ground. *Compare* breccia, b. *Long.* b. As used by miners, rock that must be barred down to make an underground workplace safe; also fragmented or weak rock in which underground openings cannot be held open unless artifically supported, as with timber sets and lagging. *Compare* broken ground, b. *Long.*

loose iron. *See* loose, c; junk. *Long.*

loose junking. *See* junking, b. *Fay, p. 372.*

loose needle. Same as dial. *Fay.*

loose-needle survey. Dial survey, in which the magnetic bearing of the traverse line is read at each setup of the instrument. *Pryor, 3.*

loose-needle traversing. A method of traversing in which the magnetic bearings of survey lines are separately obtained by reference to the magnetic needle. *B. S. 3618, 1963, sec. 1.*

loosening bar. An implement for loosening a pattern from a sand mold. *Standard, 1964.*

loose-packed splittings. Applied to mica, splittings of heterogeneous shapes, not arranged in any particular order but packed loosely in bulk form. Loose-packed splittings may or may not be dusted. *Skow.*

loose rails. Aust. Rails that can be lifted and placed across a permanent line when desired to run skips across it. *Fay.*

loose ribbons. Open-bed planes commonly found in slate quarry walls. *BuMines Bull. 630, 1965, p. 882.* b. Open joints that parallel the bedding. *AIME, p. 792.*

loose rock. *See* loose ground. *Long.*

looses; cricks. Eng. Vertical joints affecting only the lower strata in the Oolite quarries, Northamptonshire. *Arkell.*

loose stone. a. A diamond insecurely bonded in a bit matrix. *Long.* b. A diamond detached from a bit and lying on the bottom of a drill hole. *Long.* c. An unset industrial diamond. *Compare* loose goods. *Long.*

loose with powder splittings. *See* loose dusted splittings. *Skow.*

loose yards. Measurement of soil or rock after it has been loosened by digging or blasting. *Nichols.*

loosing. S. Staff. Lowering a cage, etc., into a shaft or pit. *Fay.*

loparite. A black variety of perovskite containing a large but undetermined amount of columbium in substitution for titanium $8[(Ce,La,Na,Ca,Sr)(Ti,Cb)O_3]$; from the Chibina tundra, Kola Peninsula, U.S.S.R. *Dana 7, v. 1, p. 732; Hey 2d, 1955.*

lopezite. Potassium dichromate, $K_2Cr_2O_7$, as minute orange-red balls in the soda niter of Chile. *Spencer 15, M.M., 1940.*

lopolith. A large, lenticular, intrusive body of igneous rock, generally concordant, and differing from a sill by being centrally depressed, so that its upper surface is basinlike. *Holmes, 1928.*

lorac. A precision radio surveying technique in which two or more fixed transmitters emit continuous waves and in the resulting standing wave pattern the position of a mobile receiver is determined by measuring with it the phase difference of the waves emanating from two of the transmitters. *A.G.I.*

loran. A pulse-type electronic navigation system for measuring distance differences with respect to fixed transmitters of known geographic position. *A.G.I.*

lorandite. Cochineal to carmine-read, dark lead-gray sulfarsenite of thallium, $Tl_2S.As_2S_3$. A mineral rich in thallium. Monoclinic. Tabular or prismatic crystals. Occurs on realgar. Found at the Rambler mine in Wyoming and in Macedonia. *English.*

loranskite. *See* euxenite. *CCD 6d, 1961.*

lord. Corn. Landlord; the owner of the soil or mineral, to whom rent or royalty is payable. *Fay.*

lordship. a. Scot. A mineral property. *Fay.* b. Scot. Royalty or acreage rent. *Fay.*

lord's mear. Eng. The portion of ore that belongs to the owner of the land. *Fay.*

lorettoite. A honey-yellow oxychloride of lead, $6PbO.PbCl_2$. Bladed masses. Tetragonal (?). From Loretto, Tennessee. *English.*

Lorol. Trade name of hydrogenation produca of coconut oil; mixture of aliphatic alcohols. *Pryor, 3.*

lorry. a. York. A movable bridge over a shaft top upon which the bucket is placed after it is brought up for emptying. *Fay.* b. A car used on mine tramways, or at coke ovens. *See also* larry, a and b. *Fay.* c. Gr. Brit. A long wagon having a very low platform and four very small wheels. *Standard, 1964.*

lorry track. In coke making, a car track laid, in block ovens, between the two parallel lines of ovens composing a block; and in bank ovens just back of a single row of ovens composing the bank. *Fay.*

Los Angeles testing machine. A machine for measuring abrasion resistance or toughness. It consists of a closed hollow steel cylinder 28 inches in diameter and 20 inches long mounted for rotation with its axis horizontal. The sample being tested and a charge of steel spheres are tumbled during rotation by an internal shelf. *AIME, p. 288.*

Loschmidt number. The number of molecules per cubic centimeter of a gas. *Hess.*

Loschmidt number per gram. The number of molecules per gram. *Hess.*

Loschmidt number per gram molecule. The number of molecules per gram molecule. *Hess.*

lose. a. Eng. To work a seam of coal, etc., up to where it dies out or is faulted out of sight. This is called "losing the coal." *Fay.* b. To be unable to work out a pillar on account of thrust, creep, gob fire, etc.

Fay. c. A pit shaft is said to be "lost" when it has run in or collapsed beyond recovery. *Fay.*

losero. Mex. At Guanajuato, sandstone quarries yielding a beautiful, colored stone for building purposes. *Fay.*

loseyite. A bluish-white basic carbonate of manganese and zinc with a little magnesium, $7RO.2CO_2.5H_2O$, where $R=Mn'':Zn:Mg=5:4:1$. Small, lath-shaped crystals in radiating bundles. Monoclinic. From Franklin, N.J. *English.*

losing iron. *See* furnace losing iron. *Fay.*

losing returns. Loss of drilling mud used to control high pressure into underlying structure. Heavy gas pressure may be encountered during drilling. In order to control the pressure it is necessary to use heavy drilling mud. The mud is normally returned to the surface by mud circulating pumps but sometimes the mud disappears into the reservoir down in the earth. This disappearance of mud into the underlying structure is known as "losing returns." *Williams.*

loss of vend. Difference between weight of raw coal and that of salable products, expressed as a percentage. *Pryor, 3.*

loss on ignition. As applied to chemical analyses, the loss in weight which results from heating a sample of material to a high temperature, after preliminary drying at a temperature just above the boiling point of water. The loss in weight upon drying is called free moisture; that which occurs above the boiling point, loss on ignition. *HW.*

lost circulation. A condition that occurs when the drilling fluid escapes into crevices or porous sidewalls of a borehole and does not return to the collar of the drill hole. Also called lose returns; lose water; lost returns; lost water. *Long.*

lost-circulation material. Pulverized or shredded material added to the circulation media or drilling mud to plug cracks or crevices through which the circulation fluid is escaping from a drill hole. Materials sometimes used in combating lost circulation include shredded cellophane, bark, cottonseed hulls, manure, and cement. *Long.*

lost closure. The amount of closure of the walls of a stope which occurs before supports have been got in place and begin to oppose that closure, is known as the lost closure. *Spalding.*

lost core. The portion of a core that is not recovered. It may be the soft rock that crumbles and falls from the core barrel or the solid piece or pieces of core that drop to the bottom of a bore hole after slipping out of the core barrel while the drill string is being pulled from the drill hole. *Long.*

lost corner. A corner whose position cannot be determined, beyond reasonable doubt, either from traces of the monument, or by reliable testimony relating to it; and whose location can be restored only by surveying methods and with reference to interdependent existent corners, by mutual agreement of abutters, or by court decision. *Seelye, 2.*

lost head. The energy of a given flow that is lost (converted into heat and, therefore, useless), as a result of friction, eddies, and impact expressed as a head, that is, as the height through which that flow would have to fall to produce an equivalent amount of energy. *Seelye, 1.*

lost hole. A borehole in which the target could not be reached because of caving, squeezing, loose ground, or inability to recover lost tools or junk. *Long.*

lost level. Corn. A level or gallery driven with an unnecessarily great departure from the horizontal. *Fay.*

lost returns. *See* lost circulation. *Long.*

lost river. a. A river that, by a secular increase in aridity in its region, has ceased to exist, its remnantal tributaries sinking into the ground before reaching into former channel. *Standard, 1964.* b. A river in a karst region that drains into an underground channel. *A.G.I. Supp.*

lost thread method. *See* string survey. *Pryor, 3, p. 372.*

lost time. The time spent in drilling operations on work other than deepening the boreholes such as cementing, breakdowns, fishing, moving, and setups. *Long.*

lost water. *See* lost circulation. *Long.*

lost-wax process. An investment casting process in which a wax pattern is used. *ASM Gloss.*

lot. A quantity of loose graded or ungraded industrial diamonds, such as drill diamonds in a single package or packet. *Long.*

Lotharingian. Uppermost lower Lower Jurassic. *A.G.I. Supp.*

loudspeaker face telephone. An intrinsically safe public address system developed for coal face communications. Up to 20 individual units, each containing a telephone handset and speaker, can be coupled together along the face and gate roads by a five-way cable. Instructions, requests, etc., made into any one of the handsets are broadcast simultaneously over all the loudspeakers. *Nelson.*

lough. a. Lanc. An irregular cavity in an iron mine. *Fay.* b. A lake in Ireland. *Fay.*

loughlinite. A hydrous sodium magnesium silicate, $Na_2O.3MgO.6SiO_2.8H_2O$, from the Green River formation, Sweetwater County, Wyo.; found in dolomitic oil shale; fibrous; pearly-white; silky luster; differs from sepiolite in containing 8 percent Na_2O; may also be distinguished from sepiolite by comparison of the X-ray fiber diagrams. *American Mineralogist, v. 45, No. 3–4, March-April 1960, p. 270.*

loup. a. The pasty mass of iron produced in a bloomery or puddling furnace. *See also* puddle ball. *Fay.* b. Scot. Slip or fault. *Fay.*

loupe. Any small magnifying glass mounted for use in the hand as a hand loupe, or so that it can be held in the eye socket or attached to spectacles as an eye loupe. Loupes may contain a single lens or a system of lenses, and in commercial usage range in magnifying power from 2 to 20, the usual jeweler's or watchmaker's loupe being from 2 to 3 power, and aplanatic loupes from 6 to 20 power. Also spelled lupe; loup; loop. *See also* loupe, corrected. *Shipley.*

loupe, corrected. A loupe in which the lens system has been corrected for either spherical or chromatic aberration, or both. *See also* aberration; aplanatic loupe. *Shipley.*

lousing. Picking over by hand a heap of dirt on the surface of a rich claim. *Gordon.*

louver cleaner. In ore dressing, smelting, and refining, one who trims carbon anodes and cleans louvers to minimize electrical resistance in magnesium refining cells. *D.O.T. Supp.*

louvers. Overlapping and sloping slats arranged to prevent entrance or exit of some substances but allow ventilation air to pass. *Strock, 10.*

love arrows. *See* fleches d'amour. *C.M.D.*

love stone. Aventurine quartz. *Shipley.*

Love wave. a. A transverse wave propagated along the boundary of two elastic media which both have rigidity, that is, both media must be capable of propagating transverse waves. *A.G.I.* b. A surface seismic wave in which the particles of an elastic medium vibrate transverse to the direction of the wave's travel, with no vertical component. *A.G.I.*

Lovibond tintometer. Compact tintometer, in which a number of small glass windows, mounted in a disc, are compared with the test solution to which an indicator dye has been added; useful in pH measurement. *Pryor, 3.*

low. a. Former stream channels in coalbeds. They do not extend downward through the entire thickness of coal. They are now filled with sandstone, clay, and shale. *See also* cutout; washout. *A.G.I.* b. N. of Eng. A candle or other naked light carried by a miner. Also spelled lowe. *Fay.* c. Eng. *See* horse, a, b; from Forest of Dean coalfield. *Fay.* d. Not high in upward extent; having little vertical extension, as a low roof in a mine. *Fay.* e. Lying below the natural or general level, as a low valley. *Fay.* f. A depression of the foreshore parallel to the trend of the beach. *Schieferdecker.*

low-alumina silica brick. Special brick in which the total alumina, titania, and alkali is significantly lower than in regular silica brick. *Bureau of Mines Staff.*

low-angle fault. A fault dipping less than 45°. *Billings, 1954, p. 143.*

low bed. A machinery trailer with a low deck. *Nichols.*

low blast. A blast delivered to a smelting furnace at low pressure. *Standard, 1964.*

low brass. A yellow brass alloy of 80 percent copper and 20 percent zinc. It is ductile and easily drawn, and is used for formed and drawn parts. *Crispin.*

low carbon steel. Steel with a carbon content not exceeding about 0.25 percent. *See also* dead mild steel. *Nelson.*

low coal. Coal occurring in a thin seam or bed. *Fay.*

low deflagrating explosive. Another name for black powder. *Kentucky, p. 157.*

Lowden drier. Mechanized drying floor used for ores or concentrates. Reciprocating rakes move the material gently over steel plates heated from below. *Pryor, 3.*

low-density dynamites. Dynamites containing up to 80 percent ammonium nitrate as the principal explosive ingredient. They have a minimum shattering effect and are designed for soft ores, limestone, and gypsum, and provide a maximum length of explosive column per unit weight of explosive. *Lewis, p. 110.*

low-density explosives. Explosives designed for use in the mining of coal of soft and medium hardness, where it is required to blast with the least amount of shattering. The density of ordinary permitted explosives may be decreased by (1) loose packing, (2) an alteration in the granular state of the ammonium nitrate, and (3) the impregnation of woodmeal or suitable substitutes. By decreasing the density of an explosive the same weight of explosive is used, but owing to its greater bulk the explosive effects are distributed over a greater area, thus producing a less shattering effect. *Cooper, p. 346.* Commonly referred to as extra dynamites. *Kentucky, p. 165.*

low-density metals. The lightest alloy-forming metals, in ascending order of their densities, are lithium, calcium, magnesium, beryllium, and aluminum. *See also* high-density metals. *Henderson.*

low-dipping fault. A fault dipping less than 45°. Synonym for low-angle fault. *Schieferdecker.*

low-discharge ball mill. One with a substantial downslope between the trunnion-high feed end and the peripheral discharge end. This facilitates the brisk movement of ore through the mill. *Pryor, 3.*

low doors. Scot. The lowest of two or more landings in a shaft. *Fay.*

low-duty fire clay brick. A fire clay refractory having a pyrometric cone equivalent not lower than 19 and a minimum modulus of rupture of 600 pounds per square inch. *A.R.I.*

lowe. Newc. A light. A piece of lowe is part of a candle. *See also* low, b. *Fay.*

lower break. The lower bend of either a terrace or a monocline, also known as the foot or the lower change of dip. *Stokes and Varnes, 1955.*

Lower Carboniferous. *See* Avonian. *A.G.I.*

lower high water. The lower of the two high waters of any tidal day. Abbreviation, lhw. *Hy.*

lowering conveyor. Any type of vertical conveyor for lowering of objects at a controlled speed. *See also* arm conveyor; suspended tray conveyor; vertical reciprocating conveyor. *ASA MH4.1–1958.*

lowering iron. A tool used in lieu of a safety clamp to grasp and hold rods during round trips. It is made of a heavy steel bar equipped with an eyelike opening in one end, the inside hole of which is straight walled and about one-eight of an inch greater in diameter than the drill rod on which it is to be used. *Long.*

lowering skips. Used in some river tipples to let the coal down into the barges. Also known as weigh pans. *Mitchell, pp. 800–801.*

lowering tongs. Synonym for brown tongs. *Long.*

lower leaf. *Scot.* The lower portion of a seam of coal that is worked in two sections or leaves. *Fay.*

lower limit of flammability. The smallest quantity of combustible gas which, when mixed with a given quantity of air (or oxygen), will just support a self-propagating flame. *Francis, 1965, v. 2, p. 437.*

lower liquid limit. In soil mechanics, the moisture content at which soil changes from plastic to liquid. *Pryor, 3.*

lower low water. The lower of the two low waters of any tidal day or the single low water when a semidiurnal tide becomes diurnal. Abbreviation, llw. *Hy.*

lower Nicol. In polarizing microscope, lower polarizing member. tI is usually located in place (crossed with respect to the upper Nicol) by a slight click when turned to its correct position. *Pryor, 3.*

lower official. *See* underofficial. *Nelson.*
as a torch. *Fay.*

lowe rope. N. of Eng. A piece of rope used

lower pickup. The lowest point reached by the traveling block during a hoisting operation. *Long.*

lower plastic limit. Moisture content of soil at which it changes from a plastic to a semisolid state. *Pryor, 3.*

lower punch. In powder metallurgy, the lower part of a die which forms the bottom of the die cavity and which may or may not move in relation to the die body. *ASM Gloss.*

lower side. *See* dip side. *Mason.*

lower water datum. An approximation of mean lower low water which has been adopted as a standard datum for a limited area, although it may differ slightly from a later determination. *Hy.*

lowest low water. A plane of reference, the depression of which below mean sea level corresponds to the level of the lowest low water of any normal tide. *Hy.*

lowest low-water springs. A plane of reference approximating the level of the lowest low water during syzygy. *Hy.*

lowest normal tides. A plane of reference lower than mean sea level by half the maximum range. This does not take into account wind or barometric pressure fluctuations. *Hy.*

lowest visible red-heat. Common division of the color scale—about 472° C (887° F). *Bureau of Mines Staff.*

low explosive. An explosive in which the change into the gaseous state is effected by burning and not by detonation as with high explosives. Blasting powder (black powder or gunpowder) is the only low explosive in common use. It requires no detonator but is ignited by means of a safety fuse. *Nelson.* Also called propellant.

low feed gear. *See* slow gear. *Long.*

low-freezing dynamites. Dynamites made by replacing part of the nitroglycerin of straight dynamites with some ingredient to render the dynamite incapable of freezing under ordinary conditions of use. The freezing point is depressed by adding nitro substitution compounds, such as nitrated sugars, nitrotoluene, nitrated polymerized glycerin or ethylene glycol dinitrate. *Lewis, p. 108.*

low-freezing explosives. *See* polar explosives. *Nelson.*

low-frequency induction furnace. *See* electric furnaces for melting and refining metals. *Dodd.*

low gear. a. *See* slow gear. *Long.* b. Mining and/or drilling operations carried on at a leisurely pace and at less-than-normal output per manshift. *Long.*

low gloss. *See* dullness. *Bryant.*

low-grade. a. An arbitrary designation of dynamites of less strength than 40 percent. It has no bearing on the quality of the materials, as they are of as great purity and high quality as the ingredients in a so-called high-grade explosive. *Fay.* b. Sometimes applied to poor- or low-quality drill diamonds. *Long.* c. Pertaining to ores that have a relatively low content of metal compared to other richer material from the same general area. Also designates coal high in impurities. Low-grade metamorphism refers to metamorphism at a relatively low temperature and/or pressure. *Stokes and Varnes, 1955.* d. Lean ore. *Fay.*

low-grade coal. Combustible material which has only limited uses owing to undesirable characteristics (for example, ash content or size). *B.S. 3552, 1962.*

low-grade ore. Ore which is relatively poor in the metal for which it is mined. *Compare* high-grade ore. *A.G.I.*

low-heat cement. A cement in which there is only limited generation of heat during setting, achieved by modifying the chemical composition of normal portland cement. *Ham.*

low-heat duty clay. A clay which fuses between 1,520° and 1,590° C. *Osborne.*

low-heat duty refractories. Fire clay brick with a pyrometric cone equivalent of at least 19. *VV.*

low-hydrogen electrode. A covered arc-welding electrode that provides an atmosphere around the arc and molten weld metal which is low in hydrogen. *ASM Gloss.*

low hysteresis steel. Steel which contains between 2½ and 4 percent silcon, has high permeability and electrical resistance and low hysteresis loss. *Pryor, 3.*

low-iron magnesite brick. A burned magnesite brick, containing 90 percent or more of magnesia, and 1.5 to 2.5 percent iron oxide. *Bureau of Mines Staff.*

lowland moor. A moor occurring on level ground and having a level or nearly level surface, and thought to be similar to the kind of environment in which many ancient peat beds and resulting coal seams originated. They may be differentiated into lowland-moor swamps, lowland-moor meadows, and lowland-moor forests. *Stutzer and Noe, 1940, p. 135.*

low level; laigh level. Scot. The drift or working which is furthest to the dip. *Fay.*

low lift; laigh lift. Scot. The lowest set in a system of pumps. *Fay.*

low moor peat. Peat formed in low-lying moors or swamps in which sphagnum is absent or rare. *A.G.I. Supp.* It is subdivided into limnic peat, telmatic peat, and terrestrial peat. It is characterized by a low cellulose content, low acidity, high ash and high nitrogen content. *Tomkeieff, 1954.*

low nitrate barren. In uranium leach treatment, the bulk of the barren solution after some 20,000 gallons of high-nitrate solution have been run through the ion exchange (IX) column. Low in nitrate and uranium and contains some backwash water. *Pryor, 3.*

low-pass filter. A wave filter having a single transmission band extending from zero up to some critical or cutoff frequency which is not infinite. *H&G.*

low-population zone. An area of low-population density sometimes required around a nuclear installation. The total number and density of residents is of concern in providing, with reasonable probability, that effective protective measures can be taken in the event of a serious accident. *L&L.*

low powders. Explosives containing a small portion of nitroglycerin and a base similar to blasting powder. Intermediate between blasting powder and dynamite in action. *See* low-grade, a. *Fay.*

low-pressure air stower. The filling of the waste by means of an inby compressed-air blower. The blower is usually located close to the stowing machine and operated at a pressure below 15 pounds per square inch. For light duties, only one blower is required to operate one stowing machine. For heavier work, or very long lengths of pipeline, two blowers are used in series. The maximum horsepower for two blowers in series does not commonly exceed 200 at large installations. *See also* pneumatic stowing. *Nelson.*

low-pressure limit. The lowest pressure at which flame propagation can be obtained through a combustible-oxidant system at a fixed temperature in a particular chamber. *I.C. 8137, 1963, p. 76.*

low quartz. Low-temperature quartz; when formed below 573° C, SiO_4 tetrahedra are less symmetrically arranged than at higher temperatures; inversion is reversible. *A.-G.I. Supp.*

low-rank coals. *See* rank. *B.S.I.*

low-rank graywacke. Nonfeldspathic graywacke. *A.G.I. Supp.*

low-rank metamorphism. Metamorphism accomplished under conditions of low to moderate temperature and pressure. *See also* metamorphic grade. *A.G.I. Supp.*

low red-heat. Temperature of iron at which redness is observable in subdued daylight (525° to 700° C.). Bright red heat is in the range 700° to 1,000° C., and is followed by orange, at 1,000°; white, 1,300° and, blue-white at 1,500° C+. *Pryor, 3.*

low residual phosphorus copper. Deoxidized copper with residual phosphorus present in an amount (usually 0.004 to 0.012 percent) generally too small to decrease appreciably the electrical conductivity of the copper. *ASM Gloss.*

lowse. Scot. To cease working. "The pit's lowsed," that is, work has ceased for the day. *Compare* loose, b. *Fay.*

low shaft furnace. A short shaft-type blast furnace used to produce pig iron and ferroalloys from low-grade ores, using low-grade fuel. The air blast is often enriched with oxygen. It is also used for making a variety of other products such as alumina, cement-making slags, and ammonia synthesis gas. *ASM Gloss.*

low side. That portion of a mechanical refrigeration system under relatively low pressure, extending from the expansion valve through the evaporator to but not including the compressor. *Strock, 10.*

low-soda alumina. Aluminum oxide (Al_2O_3) with less than 0.15 percent sodium oxide (Na_2O) content. Used in high grade electric insulators and in other ceramic bodies. *CCD 6d, 1961.*

low-solubility glaze. The (British) Pottery (Health and Welfare) Special Regulations, 1947 and 1950, define this as a glaze which does not yield to dilute HC1 more than 5 percent of its dry weight of a soluble lead compound, calculated as PbO, when determined by the lead solubility test. *See also* lead solubility test. *Dodd.*

low steel. Steel weak in carbon, containing from .03 to 0.5 percent (carbon) and therefore comparatively tough and soft; usually not susceptible of hardening or tempering. *Standard, 1964.*

low, structural. An area in which the beds are structurally lower than in neighboring areas; a syncline or a structural depression; sometimes also applied to saddles between local highs along the crests of anticlines. *A.G.I.*

low-temperature carbonization. Carbonization carried out at a low-temperature (between 500° and 700° C). During the process, the smoke producing compounds are driven off as tars and oils and collected as valuable byproducts, leaving a coke with about 10 percent volatile matter. The coke yield is about 14 hundred weight per ton and used as a domestic fuel. *Nelson. See also* carbonization of coal.

low-temperature coke. A solid fuel produced by the low-temperature carbonization of coal. *Nelson.*

low-temperature incineration method. In this method for the determination of incombustible matter, the mine roadway dust (dust containing carbonates) is incinerated at a temperature of not less than 500° C and not more than 530° C until it is constant in weight. This temperature is sufficient to complete the combustion of the organic matter in the dust, but is not high enough to decompose the carbonates. However, this method is unsuitable for dust containing magnesium carbonate because this substance decomposes below 500° C and therefore a low result for the incombustible matter would be obtained. The moisture content of the sample may be calculated so that an allowance can be made for the weight loss attributed to moisture. *Cooper, p. 416.*

low-tension detonator. A detonator requiring a minimum current of 1 ampere for firing and having a resistance of about 1 ohm. *B.S. 3618, 1964, sec. 6.*

low-terrace drift. Aust. Gravel and shingle in terraces. *Fay.*

low tide. The minimum height reached by each falling tide. *Schieferdecker.*

low-tide level. *See* low-water level. *Schieferdecker.*

low-tide line. *See* low-water line. *Schieferdecker.*

low velocity. *See* velocity.

low-volatile bituminous coal. Nonagglomerating bituminous coal having 78 weight-percent or more, and less than 86 weight-percent, of fixed carbon (dry, mineral-matter-free) and 22 weight-percent or less, and more than 14 weight-percent of volatile matter (dry, mineral-matter-free). *ASTM D388-38.*

low water. The minimum height reached by a tide. The height may be due solely to the periodic tidal forces or it may have superimposed upon it the effects of meteorological conditions. Abbreviation, lw. *Hy.*

low-water datum. An approximation of mean low water which has been adopted as a standard datum for a limited area, although it may differ slightly from a later determination. *Hy.*

low-water equinoctial springs. Low-water springs near the times of the equinoxes. *Hy.*

low-water level; low-tide level. The plane of low water. *Schieferdecker.*

low-water line; low-tide line. The line of intersection of the low-water datum with the shore. *Schieferdecker.*

low working voltage. Low working voltage in coal mines is one of the many conditions that must be given continual attention. Loss of voltage means a proportional loss in power. Since the quantity of dc power is obtained by multiplying the number of amperes times the number of volts, it follows that for a given amount of power if the volts are lowered the amperes are increased, and the increase in amperes results in an increase in power loss in the mine circuit. Lower operating voltages result in heavier currents in the dc motor circuits, thus heating the motors, cables, and circuit wiring causing loss in motor speed, inefficient operation, and increased maintenance cost. *Kentucky, p. 248.*

LOX Abbreviation for liquid oxygen explosive. *Zimmerman, p. 63.*

loxoclase. An orthoclase containing considerable sodium. *Webster 3d.*

loza. Sp. a. Pottery. *Fay.* b. Bedrock in alluvial mines. *Fay.*

lozenge. A form of cut stone produced by the meeting of the skill- and star-facets on the benzil of brilliants; by the meeting of the facets in the horizontal ribs of the crown. *Hess.*

lp. In electricity, low pressure. *Mason.*

l-p. Abbreviation for low-pressure. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-97.*

LPF process. *See* leach precipitation float.

lpg. Abbreviation for liquified petroleum gas. Also abbreviated LPG. *BuMin Style Guide, p. 60.*

LP gas. *See* bottle gas. *Long.*

LPM. Abbreviation for long particular meter. *Zimmerman, p. 64.*

LPW. Abbreviation for lumens per Watt. Also abbreviated lpw. *Zimmerman, p. 206; BuMin Style Guide, p. 60.*

L.R.T.P. *See* long-running thermal precipitator.

lt. Abbreviation for long ton. *Zimmerman, p. 64.*

LTA. Abbreviation for lighter than air. *Zimmerman, p. 388.*

lu. Abbreviation for lumen. *BuMin Style Guide, p. 60.*

Lu. Chemical symbol for lutetium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

lubber's line. A reference line on any direction-indicating instrument, marking the reading which coincides with the heading. *H&G.*

lublinite. A soft cheesy mixture of calcite and water. Synonym for mountain milk. *Schieferdecker.*

lubricant. a. Oil, grease, graphite, and in general, anything of the sort used to overcome friction and to permit a freer action of parts. *Crispin.* b. A solution which, when applied to glass fibers, facilitates their handling by reducing mutual abrasion. *See also* mold lubricant. *ASTM C162-66.* c. A solution that is used to coat dies or molds to facilitate the forming of ceramic ware. *Bureau of Mines Staff.* d. Substances which assist flow of nonplastic materials in pressing or extruding. They may be liquids or solids and either organic or inorganic. They assist by reducing friction between particles or between particles and the die surfaces. Some lubricants serve as binders and plasticizers. Typical lubricants which are used include: kerosine-lard oil mixtures, graphite, talc, clay, mica, fuel oil, aluminum and magnesium stearate, stearic acid, cetyl alcohol, camphor, mineral oil, starches, alginates, emulsions of polyvinyl alcohol, polyvinyl acetate, and waxes. *Lee.*

lubricating. In powder metallurgy, mixing with or incorporating in a powder, some agent to facilitate pressing. *Henderson.*

lubricating grease. A solid to semifluid product of dispersion of a thickening agent in a liquid lubricant. Other ingredients imparting special properties may be included. *ASTM D288-57.*

lubrication. The act of applying lubricants *Crispin.* There are two main types of lubricants, solid and liquid. Examples of the solid type are graphite, French chalk, and sulfur. Liquid lubricants are by far the more important, and among these, oils and greases the most common. *Morris and Cooper, p. 187.*

lubricator. *See* line oiler. *Long.*

lubricites. Used by Wadsworth to include all mineral lubricants or antifriction materials. *Fay.*

Lucalox. Trade name; a translucent, pure, polycrystalline alumina made by General Electric Company. The translucency results from the absence of micropores. Because the crystals are directly bonded to one another, without either matrix or pores between the crystal boundaries, the mechanical strength is very high; transverse strength, 50,000 pounds per square inch; modulus of elasticity 56×10^6 per square inch. *Dodd.*

Lucas sounder. *See* sounder. *C.T.D.*

Luce and Rozan process. A modification of the Pattinson process whereby the molten lead is stirred by the injection of steam; used in desilverizing base bullion. *Fay.*

lucianite. A dark gray peculiar clay which swells up to many times its original volume when immersed in water. Mainly a hydrated magnesium silicate. Colloidal. From Santa Lucia, near City of Mexico, Mex. *English.*

lucid attrite. Variety of attritus which is transparent in thin section. *Tomkeieff, 1954.*

luciite. A fine-grained diorite, composed essentially of plagioclase, hornblende, and in some varieties a little quartz. It differs from malchite only in its coarser grain. *Holmes, 1928.*

lucinite. Variscite from Lucin, Utah. *Shipley.*

lucite. Arcylic resin used in mounting of mineral specimens. *Pryor, 3.*

Luckhart furnace. A continuously working shaft furnace for roasting quicksilver ores, having the fireplace in the shaft at the bottom, protected by a cast-iron roof. The fuel is wood. *Fay.*

Luckiesh-Moss visibility meter. This instrument has been used over a wide range of lighting applications. It consists of a pair of similar photographic gradient filters, which increase in density as they are rotated together before the eyes. The filters therefore reduce the apparent brightness of the observed field and at the same time lower the contrast between the object of view and its background. *Roberts, II, p. 100.*

luckite. A vitreous green variety of melanterite in which part of the iron is replaced by manganese, $(MnFe)SO_4.7H_2O$, that crystallizes in the monoclinic system. *Standard, 1964.*

lucky stone. Same as staurolite. *Shipley.*

lucullite; lucullan. An Egyptian marble colored black by carbon. *Webster 3d.*

Lucy coal. Welsh coal of volatile content of 13 to 14½ percent. *Bennett 2d, 1962.*

Lüders bands. Surface markings or depressions resulting from localized plastic deformation in metals which show discontinuous yielding. *See also* stretcher strains. *ASM Gloss.*

Lüders lines. Surface markings that result from strain. Sometimes called Hartmann lines; Piobert lines; stretcher strains. *ASM Gloss.*

ludlamite. A monoclinic mineral, $(Fe'',Mg,Mn)_3(PO_4)_2.4H_2O$; vitreous luster; bright green to apple-green; from Cornwall, England. Tabular, sometimes in parallel aggregates; also massive, granular. *Dana 7, v. 2, pp. 952-953.*

Ludlovian. Upper Silurian (restricted), below Downtonian. *A.G.I. Supp.*

ludwigite. A borate of iron and magnesium $(Mg,Fe'')_2Fe'''BO_5$, found in conatct metamorphic deposits at Moravicza, Banat, Hungary; orthorhombic; contains Mg greater than Fe″ and forms an isostructural series with paigeite, which contains Fe″ greater than Mg; dark green color; silky luster. *Dana 7, v. 2, pp. 321-323.*

Ludwig's chart. A diagram proposed by T. Ludwig to relate the refractoriness of a fireclay with its composition, which is first recalculated to a molecular formula in which Al_2O_3 is unity, that is, $xRO.Al_2O_3.ySiO_2$. In the chart, x is plotted as ordinate and y as abscissa; a series of diagonal lines indicates compositions of equal refractoriness. The diagram is inevitably a rough approximation only. *Dodd.*

Ludwik hardness tester. Device for measuring hardness of a substance in which a 90° cone is indented into the surface, using constant load. *Bennett 2d, 1962.*

lue. Prov. Eng. To sift; a miner's term. *Standard, 1964.*

lueneburgite. A colorless mineral, $3MgO.B_2O_3.P_2O_5.8H_2O$; specific gravity, 2.05. Monoclinic. *Larsen, p. 157.*

lueshite. A mineral, $NaNbO_3$, cubic, with perovskite structure, occurring with mica at the contact of a carbonatite and a cancrinite-bearing syenite at Lueshe, Goma, Republic of the Congo. *Compare* igdloite. *Hey, M.M., 1961.*

luffing cableway mast. A cableway tower hinged at the base and sustained by adjustable guys so that its inclination can be varied. *Ham.*

lug. A replaceable cutting member on an expansion reamer. *Long.*

lugarite. Analcite-rich teschenite. The major minerals are analcite (predominant), titanaugite, and barkevikite, with minor plagioclase, olivine, and accessory apatite and opaque oxides. Nepheline may or may not be present. *A.G.I.*

lug down. To slow down an engine by increasing its load beyond its capacity. *Nichols.*

lug sands. Eng. Soft, argillaceous marine sands, the upper parts banded with brown, associated with the 100-foot beach between Arundel and Chichester. Presumably so called because they suggest the sands exposed at low tide on the seashore where lugs abound. *Arkell.*

luhite. Probably a hybrid transition rock produced by the assimilation of sediments and similar to alnöite in composition. *Johannsen, v. 4, 1938, p. 387.*

luhr. Abbreviation for lumen-hour. *BuMin Style Guide, p. 60.*

Luhrig vanner. Vanning machine with side feed and end shake—a hybrid between the true vanner and the shaking table. *Pryor, 3.*

Luisian. Lower upper Miocene. *A.G.I. Supp.*

lujavrite. A variety of nepheline syenite with trachytoid texture. Major perthitic feldspar, aegirine, nepheline, and minor eudialyte. May contain lampropyhllite and sphene. *A.G.I.*

lum. a. A chimney structure erected, during an earlier period, at the top of the upcast shaft as a means of increasing the ventilation. *Nelson.* b. Derb. A basin or natural swamp in a coal seam, often extending several hundred yards. *Fay.* c. Eng. An area of softness in a coal seam. *Webster 2d.* d. Scot. A fall of roof in which the breakage of the rock extends in a conical form to a considerable height. *Fay.* e. Eng. A hole at the foot of a shaft for collecting water. Also spelled lumb. A sump. *Fay.*

lumachelle. A dark brown shelly marble, having brilliant fire or chatoyant reflections from within. Also called fire marble. Also spelled lumachel; lumachella. *Fay.*

lumb. Eng. *See* lum, e. *Fay.*

lumber. Timber that has been sawed into boards, planks, staves, or other pieces of comparatively small dimensions. In mines, timber is used in the construction of coal chutes, mine cars, mine doors, forms for concrete structures, surface buildings, and for many other purposes. *Jones, 2, p. 57.*

lumbering; bump. Vibration and noise accompanying collapse of old underground workings. *Pryor, 3.*

lumber scale. A graduated measuring scale for determining the number of board feet in rough-sawed lumber. *Crispin.*

lumberyard motorman. *See* shuttle man. *D.O.T. Supp.*

lumen. The quantity of light required to illuminate 1 square foot to an average intensity of 1 foot-candle. By multiplying the mean candlepower (mcp) by 3.63, the quantity of light expressed in lumens for the solid cone with a spread of 130° is obtained. *Hess.*

lumen bronze. An alloy of 86 percent zinc, 10 percent copper, and 4 percent aluminum. It is particularly valuable for high-speed bearings which do not carry a heavy load. *Crispin.*

lumenized. Lenses coated with MgF_2. (Trade name, Kodak Ltd.). *Dodd.*

Lumen method of design. Devised by Harrison and Anderson in 1915 and since widely used for the planning of interior lighting in general lighting practice. The essence of the method is to consider the flux distribution characteristics of the various available fittings as being divided into specific components, and then to determine by observation in typical interiors the percentage of each component incident on the working plane, such percentage being termed the utilization factor. The ratio of useful flux to total flux from a fitting is termed its coefficient of utilization, under the conditions concerned. *Roberts, II, p. 63.*

lumen per square foot. *See* foot-candle. *Sinclair, I, p. 200.*

lumhead. Scot. A chimney top. *See* lum, a. *Fay.*

luminance. a. A measure of surface brightness that is expressed as luminous flux per unit solid angle per unit projected area. *ASM Gloss.* b. Physical brightness. *Roberts, II, P. 21.*

luminance of a surface. Luminous intensity per unit of apparent area, that is, the area as projected on a plane normal to the direction of viewing. It is determined by the incident light flux falling upon the surface, the reflection factor of the surface, and the angle which the surface makes with the direction in which it is viewed. It is independent of distance, that is, a surface appears equally bright no matter what the distance from which it is seen. *Roberts, II, p. 21.*

luminescence. a. An emission of light that is not ascribable directly to incandescence and therefore occurs at low temperatures, that is produced by physiological processes (as in the firefly), chemical action, friction, or electrical action (as the glow of gases in vacuum tubes when subjected to electric oscillations of high frequency or as the glow of certain bodies when subjected to cathode rays), by certain bodies while crystallizing, by suddenly and moderately heating certain bodies previously exposed to light or to cathode rays, or by exposure to light, or that occurs in radioactivity. *Webster 3d.* b. The light produced by luminescence. *Webster 3d.*

luminescent enamel. Enamels which glow in the dark after exposure to light. *ACSB-3.*

luminosity. a. The quality of emitting or of giving out light; shining. *Crispin.* b. Subjective brightness sensation. *Roberts, II, p. 21.*

luminous. Radiating or emitting light; bright; clear. *Crispin.*

luminous flame. A candle, nonaerated oil, tar, or coal gas flame. *Francis, 1965, v. 2, p. 436.*

luminous flux. a. Customarily referred to as the light radiations given out from a lamp and the unit of luminous flux is given the name lumen. *Roberts, II, p. 15.* b. The rate of passage or flow of light. *Sinclair, I, p. 199.*

luminous intensity. The solid angular flux density in a given direction. *Sinclair, I, p. 199.*

luminous paint. Paint containing a phosphorescent sulfide or oxide in oil; for example, calcium and barium sulfide and calcium tungstate. *Bennett 2d, 1962.*

luminous wall firing. Term sometimes used for kiln or furnace firing by surface combustion. *See also* surface combustion. *Dodd.*

Lummer-Brodhun photometer. This type photometer makes more refined measurement possible, and its principle is used in a wide variety of instruments. There are two types, one employing an equality of brightness field and the other employing a contrast field. On the other hand, since the two surfaces of the cube are not in optical contact over the peripheral field, light which is totally reflected at the glass to air surface passes into the viewing telescope from the right-hand side of the bench, and is not seen at all from the left-hand side. The viewing field of the telescope, therefore, presents a ring and spot to the eye, in which the central point is light from the left-hand side and the annular ring is light from the right-hand side. The point of balance is then determined by equality of brightness on the two parts of the field, that is, when the spot is no longer defined against its background. *Roberts, II, p. 24-26.*

Lumnite. A well-known brand of quick-setting cement, for sealing rock cavities, plugging drill holes, etc. *Cumming.* Is made from bauxite ore and limestone and is highly resistant to acids and heat. *Hess.*

Lumnite cement. Trade name; a high-alumina cement made by Universal Atlas Cement Division of U.S. Steel Corp., N.Y. *See also* high-alumina cement. *Dodd.*

lump. a. A heap of unmelted batch floating on the molten glass in a tank furnace. *Dodd.* b. The most defective saleable pottery ware remaining after the sorting process. *Compare* firsts; seconds. *Dodd.*

lump coal. Bituminous coal in the large lumps remaining after a single screening that is often designated by the size of the mesh over which it passes and by which the minimum size lump is determined. *Webster 3d.* Also, the largest marketable size. *Fay.*

Lump Coal. Trademark for permissible dynamites (types C and CC) with very low velocity of detonation. Are used in coal mining where maximum production of large-size coal is desired. *CCD 6d, 1961.*

lumper. a. In quarry industry, one who chips out dogholes (notches) in blocks of stone with a pick, or with a hammer and a steel point. *D.O.T. 1.* b. In stonework industry, a laborer who performs heavy laboring duties involved in transporting blocks and slabs of stone in the shop and yard of a stone working plant. Also called scabbler. *D.O.T. 1.*

lumping. A system of railway track renewal in which a crane is used to pick up a complete assembly of rails and sleepers, replacing it with another complete assembly. *Ham.*

lump lime. A physical shape of quicklime, derived from vertical kilns. *Boynton.*

lump lime, screened. Lump lime after forking or screening to remove the finer portion. The portion removed is usually that which will pass a ½-inch sieve. *ASTM C51-47.*

lumpman. A workman in a glassworks whose job is to observe and control any lumps of floating batch in a glass-tank furnace. *Dodd.*

lump picker. In anthracite coal mining, a laborer who picks out large lumps from run-of-mine coal as it is dumped at the breaker for crushing, sizing, and cleaning. *D.O.T. 1.*

lumpy. Stones cut thick. *Hess.*

lunar day. The time for one rotation of the earth with respect to the moon or the interval between two successive upper transits of the moon over a local meridian. The mean lunar day is approximately 24.84 solar hours or 1.035 times as great as the mean solar day. Also called tidal day. *Hy.*

lunar stone. A phosphorescent variety of barite. *Shipley.*

luncart; lunker. Scot. A lenticular mass, nodule, or ball. *Fay.*

Lunden conductive tile flooring. A method of using ceramic tiles in an antistatic floor; electrically conducting dots of metal, or of special ceramic material that has been made conducting by loading the body with carbon, are interspersed among the normal tiles. The method was devised by S.E. Lunden, a Californian architect, in 1950. *See also* antistatic tiles. *Dodd.*

lundyite. An intrusive rock with an orthophyric texture characterized by a high percentage of alkalies and the presence of a catophoritelike amphibole. *Holmes, 1928.*

lung-governed breathing apparatus. A type of breathing apparatus in which the amount of oxygen supplied to the wearer is related to the amount of oxygen required by the wearer. Thus, when a man is doing hard work and inhaling more deeply and more frequently than usual, the excessive movement of the breathing bag actuates the mechanism controlling the oxygen supply valve more vigorously and a larger feed of oxygen is supplied to the breathing circuit. Conversely, if the wearer is resting, there is less movement of the breathing bag and the supply of oxygen is reduced accordingly. It is classified into two groups: (1) Apparatus with a steady but small feed of oxygen which can be supplemented, when required, by a lung-governed oxygen admission valve, and (2) Apparatus in which the oxygen feed is entirely lung-governed. *McAdam, p. 21.*

Lungmotor. Trade name for a mechanical device for inducing respiration in cases of asphyxia, drowning, electric shock, etc. It consists of two parallel cylinders with pistons externally connected so that a stroke in one direction exhausts the lungs through one cylinder while the other cylinder fills with air, oxygen, or both, and a stroke in the opposite direction inflates the lungs with the air or oxygen and discharges the foul gases drawn from the lungs. *Fay.*

Lungovox apparatus. A self-contained breathing apparatus of the lung-governed type. By means of the lung-governed device, consisting of a lever attached to the breathing bag and to the reducing valve assembly, the flow of oxygen is controlled by the distension of the breathing bag in relation to the exertion of the wearer, thus economizing in oxygen consumption. When performing harder work the user automatically augments the oxygen supply by the lung-governed device and no manipulative action on his part is necessary. The apparatus is contained in a strong metal carrying frame with removable cover and weighs 32 pounds when fully charged. *Sinclair, I, pp. 316-317.*

lungs. In the respiratory system, that organ consisting of soft, spongy, elastic tissues, which expands and contracts as the chest cavity expands and contracts. *McAdam, p. 82.*

lunker. Scot. Lenticular mass of ironstone. *Nelson.*

lurching allowance. An allowance calculated to offset the additional load imposed on the outer girders and stringers of a railway bridge owing to the sway of a locomotive and train. *Ham.*

lurching coal seam. In areas of jumbled coal associated with tremor tracts, whole masses of coaly material and shale have been set in motion and lurched forwarded in the direction of travel of the shock. This lurching of the deposits is an indication of the nature of the disturbance. *Nelson.*

Lurgi gasifier. A process for the production of gas from coal. The coal is made to react with a controlled mixture of oxygen and superheated steam under very high pressure (about 25 atmospheres). The oxygen reacts with the carbon in the coal to form a mixture of carbon monoxide and carbon dioxide and releases heat. The steam reacts with the coal to form hydrogen, carbon monoxide and carbon dioxide absorbing heat. At the same time the high pressure conditions promote a synthesis reaction between the hydrogen and the coal resulting in the formation of methane which increases the heating power of the gas produced. *Nelson.*

Lurgi process. This process consists of roasting iron ore in a reducing atmosphere, thus forming magnetic oxide of iron which is separated by crushing followed by magnetic separation. The internal structure of the kiln is so designed that the ore is caused to fall in a continuous veil through the current of reducing gases. Burners are distributed throughout the periphery of the kiln so that roasting and reduction can be controlled in the various zones to the required temperature. Blast furnace gas for reduction passes into the center of the lower end of the kiln while the gas and air for heating pass in from the circumference of the drum, nearer to the center and upper end of the furnace. The ingoing ore is crushed to give a maximum size of 0.8 inch, while the outgoing concentrate is crushed to 0.15 inch after cooling. *Osborne.*

Lurmann front. An arrangement of water-cooled castings through which iron and cinder are tapped from the blast furnace, thus avoiding the use of a forehearth. *See also* closed front. *Fay.*

lurry. a. York. A weighted tram to which an endless rope is attached, fixed at the inbye end of the plane, forming part of an appliance for taking up the slack rope. *Fay.* b. A movable platform on wheels, the top of which is level with the bank or surface. It is run over the mouth of a shaft to receive the bucket when it reaches the top. A variation of lorry, c. *Fay.*

luscladite. A type of olivine theralite or essexite characterized by the general absence of hornblende (*compare* berondrite) and the presence of olivine and often of biotite. Orthoclase mantles the plagioclase, and nepheline, not abundant, occurs interstitially. *Holmes, 1928.*

Lusitanian. Lower Jurassic, above Oxfordian. *A.G.I. Supp.*

lussatite. A crystalline form of chalcedony optically positive in character. *Dana 6d, p. 197.*

luster. a. The character of the light reflected by minerals; it constitutes one of the means for distinguishing them. There are several kinds of luster: metallic, the luster of metals; adamantine, the luster of diamonds; vitreous, the luster of broken glass; resinous, the luster of yellow resin, as that of eleolite; pearlylike pearl, and silkylike silk. These lusters have different degrees of intensity, being either splendent, shining, glistening, or glimmering. When there is a total absence of luster, the mineral is characterized as being dull. *Fay.* b. In ceramics, a glaze, varnish, or enamel applied to poreclain in a thin layer, and giving it a smooth, glistening surface. *Standard, 1964.* c. An iridescent decorative surface appearance. *ASTM C286-65. See also* gloss.

luster color. Solution of metal oxide in organic solvent. Used for colored ceramic coating. *Bennett 2d, 1962.*

lustered ware. In ceramics, glazed ware painted with metallic pigments and fired a second time in a kiln so constructed that the gases come into contact with the surface, giving a prismatic effect. *Standard, 1964.*

luster mottling. a. Applied by Pumpelly to certain augitic rocks that have a shimmering luster because the shining cleavage faces of the augite crystals are mottled by small inclusions. *Fay.* b. In some rocks, ophitic texture grades into poikilitic; roughly circular patches of pyroxene envelop feldspar laths to produce a luster mottling. *Bureau of Mines Staff.* c. The largest crystals of calcite in sandstone may incorporate whole colonies of detrital grains within a single crystal and produce what is known as luster mottling. Barite and gypsum cements also develop this habit locally. *Bureau of Mines Staff.*

luster ware. Pottery decorated with metallic colors. *Standard, 1964.*

luster wash. A metallic wash used upon pottery. *Standard, 1964.*

lutaceous; argillaceous. A fine-grained texture and particularly, but not entirely, applicable to silts and clays and their derivatives. *A.G.I.*

lutalite. A tephritic leucite nephelinite containing over 50 percent mafic minerals. *A.G.I.*

lute. a. A mixture of fire clay used to seal cracks between the crucible and cover or between the container and cover when heat is to be applied. *ASM Gloss.* b. To seal with clay or other plastic material. *ASM Gloss.* c. In brickmaking, a scraper having a cutting edge. *Standard, 1964.* d. To smooth the surface of (a drying yard) before placing new bricks upon it to dry. *Standard, 1964.*

lutecite. A fibrous chalcedonylike quartz having the elongation of the fibers perpendicular to the c-axis (opposite of the usual orientation of chalcedony fibers) and showing optical anomalies that have led to their being considered distinct species. *A.G.I.*

lutecium. *See* lutetium. *A.G.I.*

luter. *See* luterman. *D.O.T.1.*

luterman. In the coke products industry, a laborer who seals coke-oven doors with lute (a mud made of fire clay, coke dust or ashes, and water) to prevent escape of gases during coking of coal. Also called dauber; luter; mud carman; paster. *D.O.T. 1.*

Lutetian. Middle Eocene. *A.G.I. Supp.*

lutetium. A silvery-white metallic element and a member of the rare earth group. It occurs in monazite, blomstrandite, gadolinite, polycrase, and xenotime. Symbol, Lu; valence, 3; hexagonal; atomic number, 71; atomic weight, 174.97; specific gravity, 9.842 or 9.872; melting point, 1,625° C or 1,652° C; boiling point, 3,327° C; reacts slowly with water; and soluble in dilute acids. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-118, B-188; CCD 6d, 1961.*

luthos lazuli. Violet fluorite. *Shipley.*

luting. a. Sealing of joint of mercury retort with fire clay. *Pryor, 3.* b. The process of affixing precast or modeled ornament to ceramic bodies by means of liquid clay, before glazing and firing. *C.T.D.* c. Joining leather-hard clay by slip. *ACSG, 1963.*

lutite; lutyte. a. A general name for all natural materials composed of muds; that is, silts, clays, and similar materials which when mixed with water form mud. Although many terms have been created by using lutite as a combining form, only a few are in current wide usage. *Stokes and Varnes, 1955.* b. A sediment or sedimentary rock consisting principally of clay or clay-sized particles. *A.G.I. Supp.* c. Grabau proposed a number of terms composed of this word with various appropriate prefixes: Anemoargillutite, anemolutite, argillutite, atmolutite, atmoargillutite, autoargillutite, autolutite, autosililutite, biolutite, calcilutite, hydrargillutite, hydrocalcilutite, hydroferrilutite, hydrosilicilutite, pyrolutite, and silicilutite. The terms are intended to cover every type or variety of clayey or silty sediment. *A.G.I.* d. Material of grain size less than 4 microns. This term may be used instead of clay, to avoid mineralogical implications. *H&G.*

lutose. Covered with clay; miry. *Webster 2d.*

lu w^{-1} Abbreviation for lumens per watt. *BuMin Style Guide, p. 60.*

luxmasse. The residue left after extracting the alumina from bauxite. It is mostly iron oxide with less titanium oxide and has been used as a catalyst in the hydrogenation of coal. *Hess.*

luxulianite; luxullianite. Tourmalinized granite in which the tourmaline occurs in radial groups of crystals enclosed in quartz or feldspar. *A.G.I.*

luzonite. A variety of famatinite with the formula, $Cu_3(Sb,As)S_4$ with As up to 10 percent. Much of it proves to be a mixture with enargite. *Hey 2d, 1955.*

lv. Abbreviation for liquid volume. *BuMin Style Guide, p. 60.*

lvb. Abbreviation for low-volatile bituminous. *BuMin Style Guide, p. 60.*

Lw. Chemical symbol for lawrencium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-117.*

LW. Abbreviation for low water. *Zimmerman, p. 65.*

LWC. Abbreviation for lightweight concrete. *Zimmerman, p. 63.*

L.W.F. Abbreviation for luminous wall firing, a term sometimes used for kiln or furnace heating by surface combustion. *See also* surface combustion. *Dodd.*

lwm. Abbreviation for low water mark. *GPO Style Manual, p. 159.*

Lycopodiales. An important group of Coal Measures plants, the best known being the Lepidodendron and Sigillaria. The tissues and spores of these plants contributed largely to the constitution of many coal seams. Although they disclose affinities with modern club mosses, the Carboniferous lycopods grew to the size of forest trees. *Nelson.*

lycopods. These formed gigantic trees in the coal forests, and are represented today by the lowly club mosses. *Nelson.*

lyddite. High explosive based on picric acid $(C_6H_2OH(NO_2)_3$, with 10 percent nitrobenzene and 3 percent vaseline. *Pryor, 3.*

Lydian stone; touchstone. A velvet-black form of quartz closely allied to or grading into chert, jasper, or flint. Used as a testing quality of precious metals (the metal tested is rubbed on the Lydian stone and the mark is checked against others made by alloys of predetermined composition). *CCD 6d, 1961.*

lydite. Obsolete name for Lydian stone. *Rice.*

lye. a. Scot. A siding or turnout in a mine. *Fay.* b. *See* double parting. *C.T.D.* c. *See* lie, c. *Mason.* d. Sodium hydroxide (NaOH) or potassium hydroxide (KOH). A solution or powder derived from a substance containing alkali. Used in soapmaking. *Crispin.*

lying money; idle-time money. An allowance to miners on piecework who are rendered idle during a shift owing to circumstances beyond their control, such as a breakdown in power services, or supplies of empty cars. *Nelson.*

lying side. Derb. The lower side of a vein. That portion next to the footwall. *Fay.* Same as hading side. *Arkell.*

lying time. Scot. *See* lie time. *Fay.*

lying wall. Same as footwall. *Fay.*

Lynch machine. A machine for the manufacture of glass bottles; it is based on the original design introduced by J. Lynch in

1917 and operated on the blow-and-blow principle. Press-and-blow Lynch machines are also widely used. *Dodd.*

lyncurium. A stone used for intaglios, not now identified with certainty, but supposed to be the modern hyacinth. Pliny used the name for amber, 77 A.D. *Fay.*

Lynen furnace. A zinc-distillation furnace with a common condensation chamber. *Fay.*

lynx eye. Green labradorite. *Shipley.*

lynx eye labradorite. Labradorite with a green schiller. *Shipley.*

lynx sapphire. a. Dark blue iolite. *Shipley.* b. Applied to dark blue sapphires in Ceylon. *Shipley.* c. Very pale blue sapphire with a girasol effect. *Shipley.*

lynx stone. An early synonym for Pliny's lyncurium. *Fay.*

lyonium ion. Solvent molecule plus proton (for example, H_3O+). *Pryor, 3.*

Lyonnaise marble. Trade name for a chocolate-red and white variety of dolomitic marble used mainly for wainscoting and tiling; from Malletts Bay, on Lake Champlain. *See also* Winooski marble. *Fay.*

lyophilic. a. Condition of solid-liquid mixture in which surface-active molecules which contain two or more groups have an affinity for the phase in which one group is dissolved, and a repulsion from this phase for another group or ion (Hartley's amphipathy). When the solvent is water these groups are hydrophilic or hydrophobic, and influence the attraction of surfaces to which they are adsorbed either toward the aqueous or the gaseous phase of a gas/liquid system. If aqueous, they are wetting agents and oriented with most of their hydrophilic groups turned toward the aqueous phase and most of the hydrophobic groups toward the solid phase. Opposite of lyophobic. *Pryor, 3. See also* hydrophilic, c. b. Having the property of attracting liquids. *Pryor, 4.*

lyophobic. Of, relating to, or having a lack of strong affinity between a dispersed phase and the liquid in which it is dispersed; systems such as colloidal metals in water are easily coagulated. Opposite of lyophilic. *Webster 3d.*

lyosorption. Adsorption of liquid to a solid surface. *Pryor, 3.*

lype. Scot. An irregularity in the mine roof. A projecting rock in a mine roof that may fall at any time. Usually used in the plural, and sometimes spelled lipe. *Fay.*

lysimeter. Structure containing a mass of soil, and so designed as to permit the measurement of water draining through the soil. *A.G.I.*

Lyster process. A flotation process that separates galena and zinc blende by treatment, at a low temperature, with eucalyptus oil or other frothing agent, and with agitation or aeration in a neutral or alkaline, but not acid, solution of the sulfates, chlorides, or nitrates of calcium, magnesium, sodium, potassium, or mixtures of these substances. *Fay.*

Lytag. Trade name; a lightweight aggregate for concrete made by sintering pulverized fuel ash. *Dodd.*

Lytron Sand Conditioner. Trademark for a finely divided, pale yellow powder, polyelectrolyte designed especially for foundry sand systems. Used to improve sand workability and packability for better metal casting molds. *CCD 6d, 1961.*

lyway. This term is commonly used in and around mines in Indiana and Illinois to describe a mine sidetrack or a passing track. *Hess.*

M

m. a. Abbreviation for meter (instrument); meter (unit of length). Also the abbreviation for metric. *BuMin Style Guide, p. 60; Webster 3d; Zimmerman, p. 389.* b. Abbreviation for mile; nautical mile. *Zimmerman, pp. 69, 72.* c. Abbreviation for mass; symbol for rest mass of electron; quantity of matter. *Zimmerman, pp. 40, 67, 87.* d. Abbreviation for the prefix milli-, which indicates that the basic unit that follows is multiplied by one-thousandth or by 10^{-3}. *Zimmerman. p. 172.* e. Abbreviation for the prefix micro-, which indicates that the basic unit that follows is multiplied by one-millionth or by 10^{-6}. The lowercase Greek letter μ (mu) is the preferred symbol for the prefix micro-, because it avoids confusion with the abbreviations for the same basic units prefixed by milli-, which multiplies the basic unit by one thousandth or by 10^{-3} and which is also abbreviated m. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-97; Webster 3d; Bureau of Mines Staff.* f. Abbreviation for mega; prefix mega-; which indicates that the basic unit that follows is multiplied by 1 million or by 10^{6}. The preferred abbreviation for the prefix mega- is M, so that when basic units are prefixed mega- and abbreviated, these abbreviations can be distinguished from abbreviations in which the same basic units are prefixed by milli-, which multiplies the basic unit that follows by one thousandth or by 10^{-3} and which is usually abbreviated m. *Bureau of Mines Staff; Webster 3d.* g. Abbreviation for mine. Also abbreviated M. *Webster 3d.* h. Followed by a temperature figure, abbreviation for melts at, melting at. *Zimmerman, p. 142.* i. Abbreviation for mill; milled. *Webster 3d.* j. Abbreviation for mix, mixed, mixture. Also abbreviated M. *Webster 3d; Zimmerman, p. 70.* k. Abbreviation for mesh. Also abbreviated M. *Zimmerman, p. 68.* l. Abbreviation for measure. *Webster 3d.* m. Abbreviation for modulus. *Webster 3d.* n. Abbreviation for magnetic; symbol for magnetic moment. *Webster 3d; Zimmerman, p. 159.* o. Abbreviation for moment. *Webster 3d.* p. Abbreviation for minute. *Zimmerman, p. 70.* q. Abbreviation for mark; marker; mechanical; meridian; middle; minor; month; mortar. *Webster 3d.* r. Abbreviation for mil. *Zimmerman, p. 69.* s. Abbreviation for minim. Also abbreviated min. *Zimmerman, p. 70.* t. Symbol for slope of equilibrium curve. *Zimmerman, p. 42.* u. Symbol for coefficient of roughness in hydraulics. *Zimmerman, p. 93.* v. Abbreviation for miscellaneous. *Webster 3d.* w. Abbreviation for mist. *Zimmerman, p. 70.* x. Abbreviation for moon. *Webster 3d.*

m. a. Symbol for quantity of matter; mass; mass of electron; electronic mass; rest mass of electron; mass of atom; atomic mass; mass of molecule; molecular mass. *Zimmerman, pp. 146, 155, 159, 169, 174.* b. Symbol for linear magnification. *Zimmerman, p. 159.* c. As a subscript, a symbol for maximum. *Zimmerman, p. 168.* d. Symbol for meta, and for the prefix meta-. *See also m;* m-. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-74.* e. Symbol for pole strength. When enclosed in parentheses as (*m*), a symbol for magnetic pole strength. *Zimmerman, pp. 162, 259.* f. Symbol for magnetic quantum number. *Zimmerman, p. 163.* g. Symbol for order of spectrum. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.* h. Symbol for slope of equilibrium curve. *Zimmerman, p. 148.* i. Symbol for number of phases in electric circuits. *Zimmerman, p. 161.* j. Symbol for modulation factor. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.* k. Symbol for maritime. *Zimmerman, p. 425.*

m-; m- Abbreviations for the prefix meta-. *Webster 3d.*

M. a. Symbol for Mississippian. *USGS Sugg., p. 86.* b. Abbreviation for meter (instrument); meter (unit of length); metric. *Webster 3d; Zimmerman, pp. 106, 207.* c. Abbreviation for mass; symbol for quantity of matter (weight). *Zimmerman, pp. 67, 501.* d. Abbreviation for molecular weight. *Zimmerman, p. 71.* e. Abbreviation for mole; molar (concentration). *Webster 3d.* f. Abbreviation for thousand and for 1,000. *Webster 3d; Zimmerman, p. 108.* g. Abbreviation for the prefix milli-, which indicates that the basic unit that follows is multiplied by one-thousandth or by 10^{-3}. *Zimmerman, p. 207.* h. Roman numeral for 1,000, and when overscored as M, the Roman numeral for 1 million. *Zimmerman, p. 128.* i. Abbreviation for million. *Webster 3d.* j. Abbreviation for the unattached word mega meaning million; and for the prefix mega-, which indicates that the basic unit that follows is multiplied by 1 million or by 10^{6}. *Zimmerman, pp. 172, 207.* k. Abbreviation for metal; Metal. Also, the symbol for metal, and it is used especially for a univalent cation; for example, M in the general formula for a strong base, MOH. Also abbreviated m. *Webster 3d.* l. Symbol for mutual inductance. *Zimmerman, p. 57.* m. Abbreviation for magnetic; magnetization; Magnaflux. Symbol for intensity of magnetization; magnetic polarization; magnetic moment. *Zimmerman, pp. 65, 158, 159.* n. Symbol for moment of force. *Zimmerman, p. 71.* o. Symbol for bending moment. *Zimmerman, p. 71.* p. Symbol for torque. *Zimmerman, p. 110.* q. Abbreviation for Mach; Mach number. *Webster 3d.* r. Abbreviation for mark; marker. *Webster 3d; Zimmerman, p. 67.* s. Abbreviation for mountain; Mountain. Also abbreviated m. *Webster 3d.* t. Abbreviation for mud. *Webster 3d; Zimmerman, p. 71.* u. Abbreviation for medium. Also abbreviated m. *Webster 3d; Zimmerman, pp. 68, 454.* v. Abbreviation for mean. *Webster 3d.* w. Symbol formerly applied in earthquake seismology to the phase showing the maximum amplitude on the seismogram. Usage in this sense became obsolete with the recognition of the importance of the constants of seismographs in determining which phase will have the maximum amplitude on a record. Sometimes used to refer to the phase having the maximum ground amplitude. *A.G.I. Gloss.* x. Abbreviation for model. As a subscript, the symbol for model when contrasted with full scale. *Zimmerman, pp. 70, 378.* y. Abbreviation for manual; Manual. *Webster 3d.* z. Abbreviation for maritime; Maritime. *Webster 3d.* aa. Abbreviation for motor. *Webster 3d.* bb. Abbreviation for missing.

Zimmerman, p. 441. cc. Abbreviation for noon. Derived from the Latin meridies, meaning noon. Also abbreviated m; n. *Zimmerman, p. 74.* dd. Abbreviation for monsoon; monsoon air. *Webster 3d; Zimmerman, p. 71.*

M. a. Symbol for atomic weight. *Zimmerman, p. 151.* b. Symbol for molecular weight. *Zimmerman, p. 160.* c. Symbol for molar (concentration). *Zimmerman, p. 142.* d. Symbol for mesh. Also abbreviated *m. Zimmerman, p. 148.* e. Symbol for mutual inductance. *Zimmerman, p. 160.* f. Symbol for moment. *Zimmerman, p. 367.* g. Symbol for magnetic moment; magnetic potential; magnetomotive force. *Zimmerman, pp. 171, 259.* h. Symbol for total magnetic quantum number. *Zimmerman, p. 163.* i. Symbol for Mach; Mach number. *Zimmerman, p. 367.*

ma. Abbreviation for major; milliampere. *Webster 3d; Zimmerman, p. 69.*

mA. Abbreviation for milliangstrom. *Zimmerman, p. 69.*

MA. a. Abbreviation for mechanical advantage. *Nichols.* b. Abbreviation, often not capitalized, for meter angle; mill annealed. *Zimmerman, pp. 68-69.*

maacle. A flat triangular diamond crystal which is a twin crystal. *Hess.*

maar. A relatively flat-floored volcanic explosion crater at a vent that is either coneless or has an inconspicuous cone. *Fay.*

Maas borehole compass. A borehole surveying instrument. A glass tube, containing a compass floating in molten gelatin in the upper part and dilute hydrofluoric acid in the lower part, is lowered in the borehole. The instrument is allowed to remain until the gelatin solidifies and the acid has etched a line on the glass. On removal, the tube may be placed in a goniometer from which the angles of vertical and horizontal deflection may be determined. *See also* syphonic inclinometer. *Nelson.*

Maas survey. A borehole-surveying technique employing a Maas compass. *Long.*

Maas survey instrument. *See* Maas borehole compass.

macadam. Crushed stone of regular sizes below 3 inches for road construction. The smaller sizes below 1 inch are more specifically defined as chippings. *See also* penetration macadam; tar macadam. *Nelson.*

MacAdam system. A method of color notation in which nonspherical regions of equal perceptual differences are inscribed in the Commission Internationale de l'Eclairage (CIE) space. *See also* CIE System. *Dodd.*

MacArthur and Forest Cyanide process. A process for recovering gold by leaching the pulped gold ore with a solution of 0.2 to 0.8 percent of potassium cyanide, KCN, and then with water. The gold is obtained from this solution by precipitation on zinc or aluminum, or by electrolysis. *Fay. See also* Elsner's equation.

Macbeth illuminometer. This contains a comparison surface of opal glass which is illuminated by a lamp carried at the end of an extensible arm, so that its distance from the comparison surface can be altered by the operator. This is done by a rack and pinion device and provides the means of controlling the illumination on, and therefore the brightness of, the comparison field. *Roberts, II, p. 51.*

maccaluba. A mud volcano. *Standard, 1964.*

macedonite. a. An olivine-bearing trachyte. *A.G.I.* b. An aphanitic basaltic rock containing minute feldspars, nosean, melilite, perovskite, and pseudomorphs after olivine (serpentine or chlorite) in a green vitreous or chloritic base. *Holmes, 1928.*

maceral. Applied to all petrologic units seen in microscopic sections of coal, as distinct from the visible units seen in the hand specimens. Comparable in rank to mineral as used in petrography. Thus, macerals are organic units composing the coal mass, being the descriptive equivalent of the inorganic units composing rock masses and universally called minerals. Individual macerals have the termination -inite, that is, vitrinite, as the organic unit making up the lithologic specimen, vitrain. Three groups are recognized (1) vitrinites, (2) exinites, and (3) inertinites. *A.G.I.; A.G.I. Supp.*

macerate. To soften and wear away especially as a result of being wetted or steeped. *Webster 3d.*

macfarlanite. A silver ore found in the mines of Silver Islet, Lake Superior. It contains arsenic, cobalt, nickel, etc., but is not a homogeneous mineral. *Fay.*

MacGeorge borehole tube. A method of borehole surveying with a gelatin tube containing a small compass and plumb bob. *See also* gelatin borehole tube. *Nelson.*

MacGeorge's method. Borehole deflection survey in which a tube of warm liquid gelatin containing a plumb bob is lowered and allowed to solidify. *Pryor, 3.*

MacGovernite. Same as McGovernite. *English.*

Mache unit. A unit of measurement for the radioactivity of water, equal to the quantity of radon in equilibrium with 0.364 millimicrocurie per liter. *Hess.*

machinability. The relative ease of machining a metal. *ASM Gloss.*

machinability index. A relative measure of the machinability of an engineering material under specified standard conditions. *ASM Gloss.*

machinability operator. One who determines machinability of stainless steel stock by operating machine tools on test pieces; performs operations, such as milling, threading, reaming, tapping, turning, drilling, and forming, varying speeds, rates of feed, and depth of cuts, and observes effect on workpiece; measures piece with scale, micrometer calipers, and other instruments, and calculates such data as amount of surface feed per minute in given operations. *D.O.T. 1.*

machine. a. Formerly applied only to the mining machine or coal cutter. Lately, it is being applied to other types of machines used in mines, such as loading machines, drilling machines, etc. *Jones.* b. All types of drills operated by air, steam, electric, or combustion-type motors and engines. *Long.* c. Eng. A weighbridge or weighing machine upon which wagons, trams, carts, etc., are weighed, either with or without their load of coal. *Fay.* d. In Queensland, an ore crusher. In other parts of Australia, crushing machine and battery are used synonymously with mill to designate the reduction plant as a whole. *Fay.* e. When a mechanism is required to transmit power or do some particular kind of work, the various elements or links have to be designed so as to carry with safety the forces, both static and kinetic, to which they are subjected. The arrangement then becomes a machine. *See also* theory of machines. *Nelson.* f. A device to enable a force to do a given task or range of tasks or jobs. Machines enable simple forces to perform complicated tasks; for instance, flowing water is made to generate electricity, wind is harnessed to pumps and electric generators and steam pressure is used to generate electric power. *Mason, v. 2, p. 351.*

machine boss. In bituminous coal mining, a foreman who is in charge of machine men who undercut the working face of coal prior to blasting, and machine loaders who load the coal into cars after it is blasted down. *D.O.T. 1.*

machine cut. A slot or groove made horizontally or vertically in a coal seam by a coal cutter, as a preliminary step to shot firing. *See also* cutting horizon. *Nelson.*

machine-cutter helper. *See* machine helper. *D.O.T. 1.*

machined. a. A smooth surface finish on metal. *Nichols.* b. Shaped by cutting or grinding. *Nichols.*

machine design. The application of scientific principles to the practical constructive art of engineering, with the object of expressing original ideas in the form of drawings. *Nelson.*

machine drawing. The application of practical geometry to the representation of machines. Using this graphic language, and with the principles of projection as a basis, the designer of machinery expresses his idea in a form intelligible to craftsmen. *See also* drawings. *Nelson.*

machine drill. Any mechanically driven diamond, rotary, or percussive-type drill. *Long.*

machine driller. In mining, one who operates any one of several types of heavy, mounted or unmounted, compressed air drilling machines to drill holes into the working face of ore, rock, or slate into which explosives are inserted and set off to blast down the mass. Also called drill engineer; drillman; drill operator; power driller. *D.O.T. 1.*

machine drilling. The drilling of work under a power-driven machine. *Crispin.*

machine end. N. of Eng. *See* gearhead. *Trist.*

machine forging. Forging performed in upsetters or horizontal forging machines. *ASM Gloss.*

machine hand. In the stonework industry, a general term for a worker who can set up, operate, and keep in general repair several stonecutting machines, such as gangsaws and lathes. *D.O.T. 1.*

machine helper. In anthracite and bituminous coal mining; one who assists the machineman in moving and setting up the coal-cutting machine in position for cutting a channel under or along the sides of the coal working face prior to breaking the coal down with explosives. Also called chain-machine helper; coal-cutter helper; cutter helper; cutting-machineman helper; jack setter; machine-cutter helper; machineman helper; miner; assistant; mining-machine-operator helper. *D.O.T. 1.*

machine holings; gummings. The small coal or dirt produced by a coal cutter. *Nelson.*

machine language. Symbols, characters, etc., and rules for their combination in computer processing. *Pryor 3, p. 31.*

machineman. a. A coal-cutter operator. *See also* coal-cutter team. *Nelson.* b. One who sets up and operates an electrically driven or compressed-air-driven coal-cutting machine which is used to cut out a channel along the bottom or side of the working face of coal so that it may be blasted down without shattering the mass. Also called coal cutter; coal-cutting machine operator; cutter, machine; cutter operator; cutting machine operator; holer; undercutter. *D.O.T. 1.* c. *Eng.* One who weighs coal, etc., and keeps an account of the number of cars sent to the surface. *Fay.* d. *See* jackhammer operator. *D.O.T. 1.*

machineman helper. *See* machine helper. *D.O.T. 1.*

machine miner. In bituminous coal mining, a general term applied to workers who are capable of operating one or more coal mining machines used for drilling, loading, and undercutting. Usually designated as driller, machine; loader, machine I; loader, machine II; machineman. Also called machine operator; machine runner; mining machine operator. *D.O.T. 1.*

machine mines. Mines in which coal is cut by machines. *Kiser, 1, p. 1.*

machine mining. a. Implies the use of power machines and equipment in the excavation and extraction of coal or ore. In coal mines, the term almost invariably signifies the use of coal cutters and conveyors and perhaps some type of power loader working in conjunction with face conveyors. *See also* face mechanization. *Nelson.* b. Mechanized mining. *C.T.D.*

machine molding. The art of making molds by mechanical operation. *Freeman.*

machine nog. Eng. A wedge-shaped wood block for supporting machine-cut coal. *SMRB, Paper No. 61.*

machine operator. *See* machine miner. *D.O.T. 1.*

machine rating. a. The amount of power a machine can deliver without overheating. *Crispin.* b. Also, work capacity of a machine. *Bureau of Mines Staff.*

machine runner. *See* machine miner. *D.O.T. 1.*

machinery steel. An open-hearth steel with 0.15 percent to 0.25 percent carbon content. The term is rather general in its use and is frequently applied to any mild steel which cannot be tempered but may be case-hardened. *Crispin.*

machine scraper. In anthracite and bituminous coal mining, a laborer who follows behind a coal-cutting machine and shovels or scrapes fine coal and chippings from groove (channel) as it is cut along the bottom of the coal working face, using a shovel or some special scraping tool. Also called bug duster; bugger; doodler; machine shoveler; mucker; muckman; scraper. *D.O.T. 1.*

machine screw. A very commonly used type of screw with clear-cut threads and of a variety of head shapes. It may be used either with or without a nut. *Crispin.*

machine set. Synonym for mechanical set. *Long.*

machine shoveler. *See* machine scraper. *D.O.T. 1.*

machine steel. Low-carbon steel (carbon minus 0.3 percent). *Pryor, 3.*

machine sumper. *See* sumper, d. *D.O.T. 1.*

machine tool. Any machine used for cutting metal, such as a boring machine, drill, grinder, planing machine, hobber, shaper, or lathe. *Ham.*

machine wall. The face at which a coal-cutting machine works. *Fay.*

machine welding. Welding with equipment that performs under the observation and control of an operator. It may or may not perform the loading and unloading of the work. *Compare* automatic welding. *ASM Gloss.*

machine whim. A winding drum operated by a steam engine. *Fay.*

machining. Removing material, in the form of chips, from work, usually through the use of a machine. *ASM Gloss.*

machining stress. Residual stress caused by machining. *ASM Gloss.*

machinist. a. Aust. The man in charge of a coal cutter. *Fay.* b. One who makes or repairs machines, or is versed in their design or construction or in the use of metal-working tools. *Standard, 1964.*

Mach number. Ratio of speed of body to local fluid of sound. *Pryor, 3.*

mackayite. Hydrous tellurite of iron, perhaps $Fe_2(TeO_3)_3.xH_2O$, as green tetragonal crystals from Goldfield, Nev. *Spencer 17, M.M., 1946.*

Mackenzie-Shuttleworth equation. Relates to the progress of shrinkage, or densification, during the sintering of a compact, the latter being considered as a continuous matrix containing uniformly distributed spherical pores. *Dodd.*

macker; macket; mawkie; mawker. Northumb. Miners' term for shaly coal or coaly shale. *Tomkeieff, 1954.*

mackinawite. A mineral $(Fe,Ni)_{1.1}S$, from the Mackinaw mine, Snohomish County, Wash. Named from locality. *Hey, M.M., 1964; Fleischer.*

mackintoshite. a. A black uranium-rich uranothorite. *Crosby, p. 48.* b. A discredited term equal to thorogummite. *American Mineralogist, v. 39, No. 3-4, March-April 1954, p. 407.*

Mackler's glaze. A type of aventurine glaze. *Dodd.*

Mack's cement. Cement made by adding potassium sulfate to dehydrated gypsum. *Bennett 2d, 1962.*

Mac-Lane system. This system consists essentially of an inclined rail track with the haulage gear and the loading station at the base. The haulage rope passes round a return sheave in the extending frame at the top of the heap. The tipping gear may consist of a carriage with a portable tippler which conveys a tub of dirt to the top of the heap, where a trigger operates the tippler, thus discharging the tub. For a greater quantity the carriage incorporates a revolving frame carrying two or three tubs; this gives a broader top to the heap. The main disadvantages of this system are the unsightly conical heaps produced and the tendency to segregation of material, with the large pieces at the base of the heap, which increases the danger of spontaneous combustion. *Sinclair, V, pp. 361-362.*

macle. A twinned crystal of diamond, usually composed of two flat crystals. Occasionally macles composed of three flat crystals are found. Useful for certain industrial applications, such as wiredrawing dies and occasionally as gems. Also spelled maacle; mackle. *I.C. 8200, 1964, p. 149.* Also called flat; flats. *Long.*

Maclean separator. A revolving disk-type magnetic separator widely used for the separation of large quantities of ilmenite from tin. *Harrison, p. 275.*

macled. a. Spotted or checkered, like chiastolite. *Standard, 1964.* b. Twinned, as a twin crystal. *Standard, 1964.*

maclureite. a. A deep green to black pyroxene. *Standard, 1964.* b. Same as chondrodite. *Standard, 1964.*

MacMichael viscometer. A rotation-type viscometer designed for the testing of clay slips. *Dodd.*

Macquisten tube process. An antiquated sink-float concentration method that makes use of surface tension for separating minerals, whereby some of them float and some sink. The apparatus consists of a long tube with helical grooves, which, upon rotation, screw the pulp through the tube. The tailings are removed from the bottom of a box at the upper end of the tube and the concentrates float off. *Fay.*

macro-. A prefix meaning large, long; visibly large. *A.G.I.*

macro-axis. The *b* axis (long) in orthorhombic and triclinic crystals. *Fay.*

macroclastic coal. A well-laminated coal with a high proportion of vitrinite bands and fragments together with some resins, spore exines, cuticles, and a little fusinite. *Compare* microclastic coal. *Raistrick and Marshall, p. 200.*

macrocrystalline. a. Applied to the texture of holocrystalline igneous rocks in which the constituents are distinguishable with the naked eye. Opposite of microcrystalline. *A.G.I.* b. In recrystallized sedimentary rocks, the texture of a rock with grains or crystals over 0.75 millimeter in diameter. *A.G.I.*

macrodiagonal. In crystallography, the longer lateral axis in the orthorhombic and triclinic systems. *Standard, 1964.*

macrodome. In crystallography, a dome parallel to the macrodiagonal. *Standard, 1964.*

macroetch. Etching of a metal surface for accentuation of gross structural details and defects for observation by the unaided eye or at magnifications not exceeding 10 diameters. *ASM Gloss.*

macrofragmental coal. Coal composed of visible fragments or lenticles of various constituents, such as vitrain, durain, and fusain. *Tomkeieff, 1954.*

macrograph. A graphic reproduction of the surface of a prepared specimen at a magnification not exceeding ten diameters. When photographed, the reproduction is known as a photomacrograph. *ASM Gloss.*

macromeritic. Of or pertaining to a granitoid structure of rocks that is discernible to the naked dye; opposite of micromeritic. *Standard, 1964.*

macromolecule. Very large molecule, notably one polymerized to a size visible without need for magnification. *Pryor, 3.*

macrophyric; macroporphyritic. A textural term descriptive of medium- to fine-grained igneous rocks containing phenocrysts more than 2 millimeters long. *Compare* microphyric. *C.T.D.*

macropinacoid. In crystallography, a pinacoid parallel to the vertical and macrodiagonal axes. *Standard, 1964.*

macropolyschematic. Applied to a body of rock or a mineral deposit, the fabric of which consists of macroscopically different domains, that is, a coarsely mixed fabric. *See also* chorismite. *A.G.I.*

macroporosity. Porosity visible without the aid of a microscope, such as pipes and blowholes in ingots. *Newton, p. 496.*

macroprism. A prism, the intercept of which on the macrodiagonal is larger than 1. *Standard, 1964.*

macropyramid. A pyramid, the intercept of which on the macrodiagonal is larger than 1. *Standard, 1964.*

macrosample. A sample large enough to be weighed accurately on an analytical balance. *ASTM STP No. 148-D.*

macroscopic. a. Visible at magnifications of from 1 to 10 diameters. *ASM Gloss.* b. Visible without a microscope or in a hand specimen. *Compare* microscopic. *Bureau of Mines Staff.*

macroscopic stresses. Residual stresses which vary from tension to compression in a distance (presumably many times the grain size) which is comparable to the gage length in ordinary strain measurements, hence, detectable by X-ray or dissection methods. *ASM Gloss.*

macrosegregation. Gross differences in concentration of constituents in an alloy mass; for example, from one area of an ingot to another. *See also* segregation; coring. *Henderson.*

macroseismic region. The area in which the earthquake is felt by the inhabitants. *Schieferdecker.*

macroshrinkage. A casting defect, detectable at magnifications not exceeding 10 diameters, consisting of voids in the form of stringers shorter than shrinkage cracks. This defect results from contraction during solidification where there is not an adequate opportunity to supply filler material to compensate for the shrinkage. It is usually associated with abrupt changes in section size. *ASM Gloss.*

macrostress. The same as macroscopic stress. *ASM Gloss.*

macrostructure. a. The general arrangement of crystals in a solid metal (for example, an ingot) as seen by the naked eye or at low magnification. The term is also applied to the general distribution of impurities in a mass of metal as seen by the naked eye after certain methods of etching. *C.T.D.* b. The structure of metals as revealed by examination of the etched surface of a polished specimen at a magnification not exceeding 10 diameters. *ASM Gloss.* c. A structural feature of a rock that is discernible to the unaided eye, or with the help of a simple magnifier. *Fay.*

maculose. Applied to the group of contact-metamorphic rocks represented by spotted slates to denote their spotted or knotted character. May be applied either to the rocks or to their structures. *See also* spotted slate. *A.G.I.*

maculose rock. A rock in which the porphyroblasts of such minerals as andalusite, cordierite, chloritoid, ottrelite, biotite, etc., are well developed, or in which spotting appears as the result of the incipient crystallization of these minerals and of the segregation of carbonaceous matter. *Compare* maculose structure. Synonym for spotted slate. *Schieferdecker.*

maculose structure. A structure typically developed in argillaceous rocks under contact or thermal metamorphism. *Compare* maculose rock. *Schieferdecker.*

Madagascar alexandrite. Alexandrite from the Malagasy Republic of inferior quality to Ceylon alexandrite or Russian alexandrite. *Shipley.*

Madagascar amethyst. Amethyst from the Malagasy Republic, which is dark violet, has a slightly smoky tinge, and, if lighter in color, is usually violetish purple. *Shipley.*

Madagascar aquamarine. A strongly dichroic variety of blue beryl obtained, as a gem stone material, from Malagasy Republic. *C.T.D.*

Madagascar topaz. *See* citrine. *C.M.D.*

Madaras system. A method of obtaining pig iron, developed by Dr. Madaras in the United States. The process consists of charging a retort with a mixture of iron ore, coal, and enough water to form a paste; injecting compressed air at 2 to 4.2 kilogram/square centimeter pressure and at 815° to 930° C to burn the coal. In a few minutes the entire mineral charge is heated to 980° to 1,095° C which is the optimum range for hydrogen reduction; injecting hydrogen at a temperature of 815° to 925° C at 2 to 8 kilogram/square centimeter pressure so that it penetrates the entire mass and reacts with the iron oxide to produce steam and metallic iron. About 50 percent of the injected hydrogen reacts with the ore to produce sponge iron. Sulfur is oxidized by the hot air and is eliminated by the hydrogen. *Osborne.*

made ground. a. A recent deposit, as of river silt. *Fay.* b. Ground formed by filling in natural or artificial pits with hardcore or rubbish. *C.T.D.*

Madeira topaz. A form of Spanish topaz. *C.M.D. See also* false topaz.

madeirite. A porphyritic variety of alkali picrite containing abundant phenocrysts of titaniferous augite and somewhat serpentinized olivine in a groundmass consisting mainly of augite and magnetite with a little plagioclase. *Holmes, 1928.*

madelung constant. The ratio of energy of an ion in a three-dimensional solid to the energy between two single ions. *VV.*

made up. Coupled; the assembled component parts of a drill string or pipe system. *Long.*

madrepore. A madreporoid coral; also, any perforate stone coral. *Standard, 1964.*

madrepore marble. A fossiliferous limestone occurring in a variety of colors. It admits of a high polish. is used as a marble, and derives its name from its most characteristic fossil, a species of coral. *Fay.*

madupite. A fine-grained extrusive rock containing phenocrysts of phlogopite, diopside, and perovskite in a brown glassy base which has a composition corresponding to a mixture of leucite and nosean. *A.G.I.*

mad water. Corn. Water that, through neglect, rushes back to the mine. *Fay.*

maenite. An intrusive trachytic rock, regarded as a differentiation product of a gabbro magma. Maenite is a bostonite relatively high in calcium and low in potassium. The name was derived from Lake Maena, near Gran, Norway, by Brögger. *Fay.*

Maerz-Boelens furnace. A type of open-hearth steel furnace with back and front walls sloping inwards, therefore reducing the span of the roof. Also known as pork-pie furnace. *Dodd.*

maf. Abbrevation for moisture and ash free. *BuMine Style Guide, p. 61.*

mafelsic. Refers to igneous rocks containing roughly equal amounts of felsic and mafic minerals, color index 40 to 70. *A.G.I. Supp.*

mafic. a. Pertaining to or composed dominantly of the ferromagnesian rock-forming silicates; said of some igneous rocks and their constituent minerals. Contrasted with felsic. In general, synonymous with dark minerals, as usually used. *See also* mafite. *Fay.* b. A mnemonic term denoting that ferromagnesian minerals are present in an igneous rock. It is also applied to rocks composed of this group of minerals predominantly. Not synonymous with femic. *Schieferdecker.*

mafite. Any dark mineral in Johannsen's classification of igneous rocks. *See also* mafic. *A.G.I.*

mafraite. A heteromorphic form of berondrite containing soda hornblende in large idiomorphic crystals, together with pyroxene and labradorite. The type differs from berondrite by the absence of nepheline, the constituents of that mineral being present in the amphibole. From Mafra, Cintra, Portugal. *Holmes, 1928.*

mafurite. An olivine leucitite in which the polymorph, kalsilite, occurs instead of leucite. *A.G.I.*

magazine. a. A storage place for explosives. *Jones.* b. A building specially constructed and located for the storage of explosives. In the United Kingdom, a magazine must be licensed by the Secretary of State and is usually for quantities of explosives greater than 4,000 pounds. Storage of such large quantities is seldom required at coal mines. *See also* explosive store. *Nelson.* c. *See* licensed store; registered premises. *B.S. 3618, 1964, sec. 6.*

Magdolo. Trade name; half-way product in the extraction of magnesia from seawater, used in Japan as a refractory material for the L-D process. It contains 55 to 62 percent MgO, and 30 to 35 percent CaO, together with minor amounts of SiO_2, Al_2O_3, and Fe_2O_3. *Dodd.*

magerkohle. a. Ger. Literally, dry coal. Coal that burns with little or no flame; low-volatile coal. *Hess.* b. Ger. Name for lean coal or semianthracite. *Tomkeieff, 1954.*

maggie. Scot. An inferior and sandy part of ironstone; inferior or stony coal. *Fay.*

maggie blaes. Scot. An inferior sulfurous ironstone. *Fay.*

maggy. Scot. *See* maggie. *Tomkeieff, 1954.*

maghemite. A strongly magnetic form of Fe_2O_3, that, except for the color of its streak, has all the properties of ordinary hematite. From upper part of the Bushveld igneous complex, Transvaal, Republic of South Africa. Walker applies this name to a magnetic mixture of sesquioxides of iron and titanium from the Bushveld, Transvaal, Republic of South Africa, $(Fe,Ti)_2O_3$. Winchell prefers the name oxymagnite. *English.*

magic stone. A white, opaque variety of hydrophane, in rounded lumps, with a chalky or glazed coating; from Colorado. *Shipley.*

magistral. Roasted copper pyrites. *Pryor, 3.*

Mag-li-kote. Synthetic dolomite consisting of magnesium limestone and clay; powder; slightly soluble in water; used for coating ingot molds. *Bennett 2d, 1962.*

magma. A comprehensive term for the molten fluids generated within the earth from which igneous rocks are believed to have been derived by crystallization or by other processes of consolidation. A magma not only includes the material represented by all or part of an igneous rock but also any volatile fluxes and residual liquors that may have escaped during or after consolidation. It is, therefore, incorrect to assume that the composition of a rock represents that of the magma from which the rock developed. With respect to suddenly chilled margins this may be nearly true, except for gases and vapors, but where the rocks of an area show differentiation into a wide range of types, these types may chemically represent only fractions of the bulk magma and may, therefore, differ considerably from the magma. *Holmes, 1928.*

magma basalt. In part synonymous with limburgite, but also applied to porphyritic, glassy basaltic rocks more closely related to ordinary basalt. *Holmes, 1928.*

magma granite. Granite produced by the crystallization of a magma. *A.G.I. Supp.*

magma reservoir. A chamber within the earth that contains magma. *Bateman.*

Magmaster Magnesite. Trademark for dead-burned magnesite. Used in the manufacture of refractories. *CCD 6d, 1961.*

magmatic. a. Or, pertaining to, or derived from magma. *Fay.* b. Related to bodies of molten rock within the earth. *Bateman.*

magmatic assimilation. *See* assimilation. *A.G.I.*

magmatic blister. The swelling up by differential heating of magma; for example, by local concentrations of radioactive matter. *Schieferdecker.*

magmatic cycle. *See* igneous cycle. *C.T.D.*

magmatic deposit. One of certain kinds of mineral deposits that form integral parts of igneous rock masses and permit the inference that they originated in their present form by processes of differentiation and cooling in molten magmas. *A.G.I.*

magmatic differentiation. The process by which different types of igneous rocks are derived from a single parent magma, or by which different parts of a single molten mass assume different compositions and textures as it solidifies. Also called magmatic segregation. *Fay.*

magmatic disseminated ore deposit. Straight magmatic mineral (ore) deposit having disseminated crystallization, that is, without local concentrations of the valuable mineral. *Schieferdecker.*

magmatic emanations. *See* emanations, magmatic. *A.G.I.*

magmatic injection deposit. Straight magmatic mineral (ore) deposit, the formation of which has often been ascribed to injection into the older country rock of liquefied crystal differentiates, of residual liquid segregations, or of immiscible-liquid separations and accumulations. *Schieferdecker.*

magmatic ore deposit. During the progress of differentiation certain metallic substances, such as oxides of iron, or sulfides, may be collected into fractions concentrated in these substances, and consolidated either as part of the intrusion or as separately injected bodies to form magmatic ore deposits. *Stokes and Varnes, 1955.*

magmatic segregation. A process of ore formation dependent upon the concentration of valuable minerals in particular parts of a cooling magma. The ore body grades off gradually into the igneous rock and is usually marginal in position. Examples are the Sudbury nickel deposits, many magnetite deposits of Scandinavia, etc. *Nelson. See also* mineralization; syngenetic igneous deposits.

magmatic segregation deposit. a. An ore deposit formed by preferential solidification of a liquid mass of rock. *Pryor.* b. A magmatic mineral (ore) deposit which was formed by the accumulation of early crystallized minerals, by the crystallization of residual liquid accumulations, or by the crystallization of immiscible-liquid segregations. *Schieferdecker.*

magmatic stoping. A process of igneous intrusion by which a magma gradually works its way upward by breaking off blocks of the country rock. As originally proposed, the hypothesis assumed that these blocks sank downward. In piecemeal stoping, the blocks are small, measured in feet or in hundreds of feet. In ring-fracture stoping, they are large, thousands of feet or miles across. *A.G.I.*

magmatic water. a. Water derived from igneous magma. *See also* juvenile water. *Fay.* b. Water that exists in, or which is derived from, molten igneous rock or magma. *A.G.I.* c. Water which constitutes an important part of fluid magmas. As the magma comes to the surface the water may be released in part giving rise to hot springs. *Lewis, p. 630.*

magmatist. a. One who believes that much granite has crystallized from a mobile magma whatever the origin of that material may have been. *Compare* transformist. *A.G.I. Supp.* b. One who believes that much granite is a primary igneous rock produced by differentiation from basaltic magma. *A.G.I. Supp.*

Magnafloat. Trademark for iron-oxide heavy media systems for the purification of coal, sand, gravel, and other similar materials. *CCD 6d, 1961.*

magnalium. An alloy of aluminum and from 2 to 10 percent magnesium. It is very strong and can be easily cast, forged, or machined. *Crispin.*

Magnedisc. A widely used medium for magnetic recording. It consists of a circular platter of magnetically coated plastic material which rotates on a turntable in the same way as a phonograph record. The magnetic channels, each in contact with a fixed head alined along a radius from the center, are on concentric circular bands extending inward from the outer edge of the disk. *Dobrin, p. 53.*

magnefer brick. *See* dolomite brick. *Hess.*

magnesia. a. Magnesium oxide, MgO, a light, earthy, white substance. A constituent of lime made from dolomitic limestone. Is used extensively as a refractory material and is obtained by calcining magnesite. *Barger; A.G.I.; Mersereau, 4th, p. 210.* b. Equivalent to magnesium in such inaccurate expressions as sulfate of magnesia. *A.G.I.*

magnesia-alum. *See* pickeringite. *C.M.D.*

magnesia brick; magnesite brick. Refractory bricks consisting essentially of MgO (periclase) with about 15 percent of other oxides. Magnesia brick are used wherever the corrosion of basic slags is severe, as for almost the whole of open-hearth steel furnaces, of copper reverberatory furnaces, in soaking pits and in the basic electric steel furnace. Certain factors tend to reduce their application, including higher cost, comparatively lower mechanical strength at elevated temperatures and greater thermal expansion. *See also* refractories. *CCD, 6d, 1961.*

magnesia cement. *See* magnesium oxychloride cement.

magnesia covering. Hydrated magnesium carbonate containing about 15 percent asbestos, used for heat insulation. *Osborne.*

magnesia, fused. Used as a refractory and to handle electricity at high temperatures. *See also* Magnorite. *CCD 6d, 1961.*

magnesia glass. Glass containing usually 3 to 4 percent of magnesium oxide. Electric lamp bulbs have been mainly made from this type of glass since fully automatic methods of production were adopted. *C.T.D.*

magnesia, heavy. *See* magnesium oxide. *CCD 6d, 1961.*

magnesia, light. *See* magnesium oxide. *CCD 6d, 1961.*

magnesian hornfels. A fine-grained metamorphic rock derived from a high-magnesium igneous rock; for example, serpentine. *See also* hornfels. *A.G.I.*

magnesian lime. Lime which contains a significant proportion (over 5 percent) of magnesium oxide or magnesia. *Taylor.*

magnesian limestone. Any limestone containing more than 20 percent magnesia. *See also* dolomite. *A.G.I.*

magnesian limestone, dolomitic. A limestone containing not less than 5 nor more than 40 percent of magnesium carbonate. *ASTM C119-50.*

magnesian marble. Applied to both dolomitic marbles and marbles with magnesian silicates. *See also* ophicalcite; pencatite; predazzite. *A.G.I.*

magnesian marble, dolomitic. A crystalline variety of limestone containing not less than 5 nor more than 40 percent of magnesium carbonate as the dolomite molecule. *ASTM C119-50.*

magnesian schist. A schistose metamorphic rock derived from a rock high in content of magnesium; for example, serpentine. *See also* basic schist; schist. *A.G.I.*

magnesia ramming materials. Granular, air-setting mixtures, containing 70 to 80 percent MgO, used for monolithic furnace linings. *Bureau of Mines Staff.*

magnesia, sinter. *See* sinter magnesia. *Bennett 2d, 1962 Add.*

magnesiochromite. A spinel being similar in occurrence and appearance to chromite, $MgCr_2O_4$; isometric. *Dana 17. See also* picrochromite. *Dodd.*

magnesiocopiapite. *See* ferricopiapite. *Spencer 15, M.M., 1940.*

magnesioferrite. A typical member of the group of minerals known as spinels, with the formula, $MgFe_2O_4$. Isometric; strongly magnetic. Rarely found in nature; usually constitutes the brown coloring material in magnesite brick. Specific gravity, 4.5; Mohs' hardness, 5½ to 6½. *Dana, 17; A.G.I.; HW.*

magnesiokatophorite. A name for the end-member, $Na_2CaMg_4FeAlSi_7O_{22}(OH)_2$, of the catophorite series. *Hey, M.M., 1961.*

magnesiolaumontite. A mineral, $(Ca,Mg)_6(Si,Al)_{36}O_{72}.19H_2O$, with only 0.7 percent MgO; in monoclinic needles from Musari, Rumania. *Hey, M.M., 1964.*

magnesite. Carbonate of magnesium, crystallizing in the trigonal system. Magnesite is a basic refractory used in open-hearth and other high-temperature furnaces and is resistant to attack by basic slag. It is obtained from natural deposits (mostly magnesium carbonate, $MgCO_3$), which is calcined at a high temperature to drive off moisture and carbon dioxide, before being used as a refractory. *C.T.D.*

magnesite brick. *See* magnesia brick.

magnesite, caustic-calcined. Principally magnesia (magnesium oxide), MgO. The product obtained by firing magnesite, or other substances convertible to magnesia upon heating, at temperatures below 1,560° C, so that some carbon dioxide is retained (2 to 10 percent) and the magnesia displays adsorptive capacity or activity. Used in magnesium oxychloride and oxysulfate cements; uranium processing; chemical processing (adsorption and catalysts); refractories; minor uses are glass constituents and abrasives. *CCD 6d, 1961.*

magnesite cement. Common term for ground magnesite. *Bureau of Mines Staff.*

magnesite-chrome brick. A refractory brick, which may be either fired or chemically bonded, manufactured substantially of a mixture of dead-burned magnesite (magnesia) and refractory chrome ore, in which the magnesite predominates by weight. *HW.*

magnesite grain. *See* grain magnesite. *ACSG, 1963.*

Magnesite H-W. Trade name for an over 90 percent burned magnesia brick with minor added components to control properties. Resistant to molten metal and basic slags. Used in open-hearth furnaces, electric steel furnaces; copper and nickel converters; refining industries, and other metallurgical industries. *CCD 6d, 1961.*

magnesite refractory. A refractory material, fired or chemically bonded, consisting essentially of dead-burned magnesite; the MgO content usually exceeds 80 percent. Such refractories are used in the hearths and walls of basic steel furnaces, mixer furnaces, and cement kilns. *Dodd.*

magnesite wheel. A grinding wheel bonded with magnesium oxychloride. *ASM Gloss.*

magnesium. A silvery-white metallic element in group II of the periodic table; malleable; ductile; and light. Only occurs in nature as compounds. Used chiefly in the form of magnesium ribbon or powder to produce a brilliant light by its combustion, as in signaling, photography, or pyrotechny. New alloys with zirconium and thorium are used in aircraft construction. Symbol, Mg; valence, 2; hexagonal; atomic number, 12; atomic weight, 24.312; specific gravity, 1.74 (at 5° C); melting point, 651° C; boiling point, 1,107° C; insoluble in cold water; decomposes in hot water to form magnesium hydroxide; soluble in mineral acids, in concentrated hydrofluoric acid, and in solutions of ammonium salts; and insoluble in chromic trioxide and in alkalies. *C.T.D.; C.T.D. Supp.; Fay; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-119, B-189.*

magnesium aluminate. $MgAl_2O_4$; melting point, 2,135° C, specific gravity, 3.6; thermal expansion (100 to 1,000° C) 9.0×10^{-6}. This compound is the type mineral of the spinel group. *See also* spinel group. *Dodd.*

magnesium-aluminum garnet. Same as pyrope. *Shipley.*

magnesium bentonite. A bentonitic magnesian clay mineral from California, formula $7MGO.10SiO_2.5H_2O$ or $2MgO.3SiO_2.3H_2O$. *Spencer 15, M.M., 1940.*

magnesium bicarbonate. A compound, $Mg(HCO_3)_2$; molecular weight, 146; soluble in water; one of the chief causes of temporary hardness of water. *Cooper, p. 316.*

magnesium blodite. Synonym for blodite. *Hey, M.M., 1964.*

magnesium carbonate; magnesite. Colorless or white to yellowish brown or black; $MgCO_3$; hexagonal trigonal rhombohedral; molecular weight, 84.32; specific gravity, 2.95 to 3.2; Mohs' hardness, 3.5 to 4.5; loses CO_2 at 900° C; soluble in cold water, in water containing dissolved carbon dioxide, and in acids; and insoluble in acetone and in ammonia. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-189, B-244.* Used in glasses, glazes, and enamels and as an auxiliary flux in ceramic bodies. *Lee.*

magnesium chalcanthite. A mineral, $MgSO_4.5H_2O$, triclinic, the artificial analogue of chalcanthite. Synonym for allenite; pentahydrite. *See also* copper chalcanthite. *Spencer 19, M.M., 1952.*

magnesium chloride. Colorless or white; $MgCl_2$; hexagonal; deliquescent; specific gravity, 2.32; melting point, 708° C; boiling point, 1,412° C; and soluble in water and in alcohol. Used for the electrolytic production of magnesium metal, in manufacturing magnesium-oxychloride cement, in ceramics, in cooling drilling tools in drilling for saline deposits, in dustlaying compounds, as a flocculating agent, and as a catalyst. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-189.*

magnesium chloride hexahydrate; bischofite. Colorless or white; $MgCl_2.6H_2O$; monoclinic; deliquescent; specific gravity, 1.56; no melting point because it loses $2H_2O$ at 116° to 118° C; no boiling point because it decomposes to the oxychloride; and soluble in water and in alcohol. Used for the electrolytic production of magnesium metal, in manufacturing magnesium-oxychloride cement, in ceramics, in cooling drilling tools in drilling for saline deposits, in dustlaying compounds, as a flocculating agent, and as a catalyst. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-190.*

magnesium chlorophoenicite. A basic arsenate of magnesium and manganese, $(Mg,Mn)_2As_2O_8.7(Mg,Mn)(OH)_2$. Monoclinic. From Franklin, N. J. *English.*

magnesium fluoride; sellaite. Colorless or white; MgF_2; tetragonal; Mohs' hardness, 5.0; fluoresces by electric light; soluble in nitric acid; insoluble in alcohol and in water; specific gravity, 3.0, ranging from 2.972 to 3.170; melting point, 1,266° C or 1,396° C; molecular weight, 62.31; boiling point, 2,239° C; and slightly soluble in acids. Used in ceramics and glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-190, B-245.*

magnesium fluosilicate hexahydrate; magnesium silicofluoride hexahydrate. White; effloresces; $MgSiF_6.6H_2O$; hexagonal trigonal; molecular weight, 274.48; specific gravity, 1.788; decomposes at 120° C; soluble in water; and insoluble in alcohol. Used in ceramics and in concrete hardeners. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-190.*

magnesium hydride. White; MgH_2; molecular weight, 26.34; tetragonal; and it decomposes with the evolution of hydrogen on contact with water. Decomposes at 280° C in a vacuum and is insoluble in ether. *Bennett 2d, 1962 Add.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-190.*

magnesium hydroxide. White powder or milky liquid, $Mg(OH)_2$; slightly soluble in water; readily soluble in ammonium chloride solution; in solution turns red litmus blue. Prepared by the action of potassium hydroxide, or sodium hydroxide upon a solution of magnesium chloride. Known as milk of magnesia. *Cooper, pp. 317-318.* Naturally occurring magnesium hydroxide is known as brucite. *HW.*

magnesium kaolinite. Flaky aggregates, $Mg_2Al_4Si_3O_{10}(OH)_8$, from the Elbrus mine, north Caucasus, U.S.S.R. *Hey, M.M., 1964.*

magnesium leonite. Synonym for leonite. *Hey, M.M., 1964.*

magnesium metasilicate hydrate; hydrated magnesium metasilicate. White; $3MgSiO_3.5H_2O$ (variable); specific gravity, 2.6 to 2.8; and insoluble in water and in alcohol. Used in ceramics, glass, and refractories, and as a filler, a catalyst, and a catalyst carrier. *See also* magnesium trisilicate; serpentine. *CCD 6d, 1961.*

magnesium mica. *See* phlogopite. *C.M.D.*

magnesium minerals. Main sources are magnesite, dolomite, Stassfurt salt deposits, brine, and brucite. *Pryor, 3.*

magnesium nitrate dihydrate. $Mg(NO_3)_2.2H_2O$; molecular weight, 184.35; colorless; prisms; specific gravity, 2.0256 (at 25° C); melting point, 129° C; and soluble in water, in alcohol, and in liquid ammonia. Used in explosives. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-190.*

magnesium nitride. A greenish-black compound, Mg_3N_2, formed when magnesium is heated with nitrogen. *Cooper, p. 314.*

magnesium orthite. A variety of allanite. *English.*

magnesium orthophosphate; magnesium phosphate. $Mg_3(PO_4)_2$; molecular weight, 262.88; orthorhombic plates; iridescent; melting point, 1,184° C; insoluble in water and in liquid ammonia; and soluble in ammonium salt solutions. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-190.* Has been used successfully to replace tin oxide in raw, leadless, sanitaryware glazes maturing at cone 8 or higher, resulting in satisfactory color, permanent opacity, and good brilliance and texture. *Lee.*

magnesium oxide; magnesia; magnesia, heavy; magnesia, light; periclase. Colorless or white; MgO; isometric; called either light magnesia or heavy magnesia, depending upon whether it was prepared by heating magnesium carbonate or the basic magnesium carbonate; molecular weight, 40.31; specific gravity, 3.6 (varies); melting point, 2,800° C; boiling point, 3,600° C; insoluble in water and in alcohol; and soluble in acids and in ammonium salt solutions. The term magnesia is usually reserved for magnesium oxide that has been specially processed and implies the purer varieties. Used in high-temperature refractories, in oxychloride and oxysulfate cements, in adsorption and catalysis, in uranium processing, and in space components, possibly for nose cones. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-190.*

magnesium-oxychloride cement; Sorel cement. A mixture of magnesium chloride and magnesium oxide that reacts with water to form a solid mass, presumed to be magnesium oxychloride. Fillers such as wood flour, sawdust, sand, powdered stone, talc, cork, and more recently, powdered metals, are usually present. A variety of proprietary mixtures are available. *CCD 6d, 1961.* Used as artificial building stone, marble, stone flooring. Synonym for xylolith. *Bennett 2d, 1962.*

magnesium pyrophosphate. $Mg_2P_2O_7$; molecular weight, 222.57; colorless; monoclinic; specific gravity, 2.598 (at 22° C); melting point, 1,383° C; insoluble in water and in alcohol; and soluble in acids. Used in porcelains and in enamels. *Bennett 2d, 1962.*

magnesium stannate trihydrate. White; crystalline; $MgSnO_3.3H_2O$; soluble in water; and decomposes at about 340° C. Used as an additive in ceramic capacitors. *CCD 6d, 1961.*

magnesium stannide. Mg_2Sn; molecular weight, 167.31; bluish-white metal; melting point, 778° C; and soluble in cold water and in dilute hydrochloric acid. Used in semiconductor research. *Bennett 2d, 1962 Add., Handbook of Chemistry and Physics, 45th ed., 1964, p. B-191.*

magnesium sulfate. a. Colorless, small orthorhombic crystals, usually needlelike; $MgSO_4$; molecular weight, 120.37; cooling, saline, bitter taste; neutral to litmus; specific gravity, 2.65; decomposes at 1,124° C; soluble in glycerol; very soluble in water; and slightly soluble in alcohol and in ether; insoluble in acetone. Used in ceramics. explosives, and fertilizers. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-191.* b. Extensively employed as an electrolyte for enamel and glaze slips and used for setting up enamels. The correct addition permits the use of the enamel slip for a long time without tendency toward excessive flocculation or equally undesirable thinning on aging. *Lee.*

magnesium sulfate heptahydrate; Epsom salt; epsomite. Colorless, small orthorhombic or monoclinic crystals, usually needlelike; $MgSO_4.7H_2O$; cooling, saline, bitter taste; neutral to litmus; specific gravity, 1.678; loses $7H_2O$ at 200° C; soluble in glycerol; very soluble in water; and slightly soluble in alcohol. Used in ceramics; explosives; and fertilizers. *CCD, 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-191.*

magnesium titanate. $MgTiO_3$. Used in ceramic dielectric bodies. Although relatively low in dielectric constant, it has a positive temperature coefficient of capacity. Thus, it can be used in conjunction with a negative coefficient material; for example, titania, to produce a near 0 temperature coefficient product. *Lee.*

magnesium trisilicate; hydrated magnesium trisilicate. White; odorless; tasteless; approximately $Mg_2Si_3O_8.5H_2O$; insoluble in water and in alcohol; and readily decomposed by mineral acids. Used as a decolorizing agent. *CCD 6d, 1961.*

magnesium tungstate. $MgWO_4$; molecular weight, 272.16; colorless; monoclinic; specific gravity, 5.66; insoluble in water and in alcohol; and decomposes in acids. Used in fluoroscopy and in luminescent paint. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-191.*

magnesium zirconate. $MgZrO$; melting point 2,150° C. This compound is sometimes added in small amounts (up to 5 percent) to other electroceramic bodies to lower their dielectric constant at the Curie point. *Dodd.*

magnesium-zirconium silicate. White; $MgZrSiO_5$; melting point, 1,760° C; density, 80 pounds per cubic foot; insoluble in water and in alkalies; and slightly soluble in acids. Used in electrical resistor ceramics and as a glaze opacifier. *CCD 6d, 1961.*

magnes stone. A magnet. *Fay.*

magnet. a. A large horseshoe magnet employed to lock and unlock safety lamps. The operation can be accomplished only by direct contact with the magnet. *Fay.* b. A fishing tool utilizing the property of magnetism to recover ferrous material or junk lost in a borehole. *Long.* c. A plate or bar in which a permanent magnetic field has been induced into it by means of an electromagnet. Fine cast steel is often employed, containing 3 percent of tungsten. *See also* lifting magnet. *Nelson.* d. A body that produces a magnetic field external to itself. An electromagnet is a magnet the magnetic field of which is induced by an electromotive force. A permanent magnet is a magnet the body of which having once been magnetized retains a substantial portion of its magnetism. *See also* magnetic. *Henderson.*

magnetic. Of or pertaining to a mineral, object, area, or locale possessing the properties of a magnet. *Long.*

magnetic alloys. Alnico is an alloy of aluminum, nickel, and cobalt, with strong magnetic properties similar in all directions. Alcomax is anisotropic, with maximum flux along preferred axis. Hycomax is also anisotropic. Platinax, a cobalt-platinum alloy containing 23.3 percent cobalt is isotropic. *Pryor, 3.*

magnetically hard alloy. A ferromagnetic alloy capable of being magnetized permanently because of its ability to retain induced magnetization and magnetic poles after removal of externally applied fields; an alloy with high coercive force. The name is based on the fact that the quality of the early permanent magnets was related to their hardness. *ASM Gloss.*

magnetically soft alloy. A ferromagnetic alloy that becomes magnetized readily upon application of a field and that returns to practically a nonmagnetic condition when the field is removed; an alloy with the properties of high magnetic permeability, low coercive force and low magnetic hysteresis loss. *ASM Gloss.*

magnetic-analysis inspection. A nondestructive method of inspection to determine the existence of variations in magnetic flux concentration in ferromagnetic materials of constant cross section, such as might be caused by defects, discontinuities, and variations in hardness. The variations are usually established by a change in pattern on an oscilloscopic screen. *ASM Gloss.*

magnetic anomaly. Variation of the measured magnetic pattern from a theoretical or empirically smoothed magnetic field on the earth's surface. *Hy.*

magnetic bearing. Azimuth angle of line with respect to magnetic pole. *Pryor, 3.*

magnetic bort. *See* bort, c. *Hess.*

magnetic bottle. A magnetic field used to confine a plasma in controlled fusion experiments. *L&L.*

magnetic ceramics. Ceramic products which have unique electrical properties particularly useful in high frequency microwave electronic applications. *Bureau of Mines Staff.*

magnetic circuit. The closed path taken by the magnetic flux in an electric machine or other piece of apparatus. *C.T.D.*

magnetic clutch. One in which connection between drive and driven member is provided by electromagnetic force. *Pryor, 3.*

magnetic correlation. The orientation of an underground survey, using the earth's magnetic field. *B.S. 3618, 1963, sec. 1.*

magnetic crack detection. The part to be examined is magnetized either by passing a heavy current through it or by making it the core of a coil through which a heavy current is passed. Small cracks, or nonmagnetic phases such as inclusions, cause the magnetic flux to break the surface thus forming small magnets. When the part is sprayed with a suspension of iron oxide particles in paraffin, the particles cling to the small magnets and thereby reveal defects. *Ham.*

magnetic cranes. Power-operated cranes provided with magnets instead of hooks which are energized by direct current. Such magnets can handle loads of any magnetizable material effectively and cheaply, the material to be lifted being gripped or released instantaneously. *Osborne.*

magnetic declination. The continually changing acute angle between the direction of the magnetic and geographic meridians. In nautical and aeronautical navigation, magnetic variation is preferred. *A.G.I.*

magnetic detector. An electrical device for indicating the entry of magnetic material into a definite area. *ASA MH4.1-1958.*

magnetic dip. Vertical angle through which a freely suspended magnetic needle dips from horizontal. *Pryor, 3.*

magnetic domain. Aggregation of ferromagnetic atoms into a group, usually a fraction of a micron in size, which lies among similar groups with random group orientation. This cancels out any magnetic moment until or unless they all are oriented by an applied magnetic field. *Pryor, 3.*

magnetic drum. Rotating cylinder with magnetic surface, used as memory store. Magnetic tape is also used. *Pryor, 3, p. 31.*

magnetic effect. Phenomenon exhibited by certain metals, particularly nickel and its alloys, which change in length when magnetized, or, (Villari effect) when magnetized and then mechanically distorted, undergo a corresponding change in magnetization. *H&G.*

magnetic elements. These are declination, dip, and magnetic intensity in the horizontal plane. *Pryor, 3.*

magnetic equator. The line on the surface of the earth where the magnetic needle remains horizontal, or does not dip; that is, where the magnetic lines of force are horizontal. Also called the aclinic line. *A.G.I.*

magnetic feeder. Any feeder which uses magnetism to pick up, hold, separate and deliver objects. *ASA MH4.1-1958.*

magnetic field. Space surrounding a magnet or current-carrying coil, in which appreciable magnetic force exists. Its intensity (H) is the force exerted on a unit pole. *Pryor, 3.*

magnetic field strength. H. The force exerted on a unit pole at any point is the field strength at that point. *A.G.I.*

magnetic flocculation. Phenomenon which results from residual magnetism of ferromagnetic particles which have bunched together under the influence of their individual polar forces. *Pryor, 3.*

magnetic flowmeter. A device used for the flow measurement of abrasive slurries. The calibration is affected by the presence of magnetic constituents in the slurry, and therefore, a pipe coil is also used to compensate the magnetic flowmeter calibration for varying amounts of magnetic material in the slurry. *Nelson.*

magnetic flux. Induced strength or flux density in a magnetic field, measured in maxwells:

$$B = \frac{4\pi m}{A} + H$$

where B is the flux density, m the strength of each magnetic pole, A the cross-sectional area of a cylinder through which the flux flows, and H is the magnetic intensity in oersteds. *See also* magnetic intensity. *Pryor, 3.*

magnetic force. a. The mechanical force exerted by a magnetic field upon a magnetic pole placed in it. *Webster* 3d. b. Magnetizing force. *Webster 3d.* c. Magnetic intensity. *Webster 3d.*

magnetic gradiometer. An instrument, designed but not applied, for measuring the gradient of the magnetic intensity. *A.G.I.*

magnetic guard. A double mask of magnetized steel wire gauze, to protect a workman from the flying dust of iron and steel. *Standard, 1964.*

magnetic hoist. A hoisting device which does its lifting by means of an electromagnet. *Crispin.*

magnetic induction. B. In a magnetic medium the vector sum of the inducing field H and the corresponding intensity of magnetization I, according to the relationship $B=H+4\pi I$. *A.G.I.*

magnetic intensity. A vector quantity pertaining to the condition at any point under magnetic influence (as of a magnet, an electric current, or an electromagnetic wave) measured by the force exerted in a vacuum upon a free unit north pole placed at the point in question. Also called magnetic force. *Webster 3d.*

magnetic iron ore. *See* magnetite. *Nelson.*

magnetic iron oxide. *See* black iron oxide. *Bennett 2d, 1962.*

magnetic level coil. A device for measuring the liquid level in sumps and other vessels. It consists of a loop of wire which is encased in a fiber glass protective sheath. The loop is inserted in a sump of thickener containing a magnetite or ferrosilicon slurry and the electrical signal given off represents the level of the slurry surrounding the loop. *Nelson.*

magnetic lock. A locking device on miners' lamps which requires a magnet for its release. *See also* flame safety lamp. *Nelson.*

magnetic meridian; geomagnetic meridian. The horizontal line which is oriented, at any specified point on the earth's surface, along the direction of the horizontal component of the earth's magnetic field at that point; not to be confused with isogonic line. *H&G.*

magnetic method. A geophysical prospecting method which maps variations in the magnetic field of the earth which are attributable to changes of structure or magnetic susceptibility in certain near-surface rocks. Sedimentary rocks generally have a very small susceptibility compared with igneous or metamorphic rocks and most magnetic surveys are designed to map structure on or within the basement, or to detect magnetic minerals directly. Most magnetic prospecting is now carried on with airborne instruments. *Dobrin, pp. 5, 8.*

magnetic mirror. A magnetic field used in controlled fusion experiments to reflect charged particles back into the central region of a magnetic bottle. *I&L.*

magnetic moment. That vector associated with a magnetized mass, the vector product of which and the magnetic field intensity in which the mass is immersed (ignoring the field distortion thereby produced) is a measure of the resulting torque. *A.G.I.* Also called moment of a magnet.

magnetic needle. A short wirelike length of metallic material, which displays the properties of a magnet and which, when suspended at its midpoint, will orient itself toward the earth's magnetic north. *Compare* Maas compass. *Long.*

magnetic north. At any point on the earth's surface, the horizontal direction of the earth's magnetic lines of force (direction of a magnetic meridian) toward the north magnetic pole, that is, a direction indicated by the needle of a magnetic compass. Because of the wide use of the magnetic compass, magnetic north, rather than true north, is the common 0° (or 360°) reference in much of navigational practice, including the designation of airport runway alinement. A heading or course toward magnetic north would be written, 0° mag. *See also* aclinic line. *H&G.*

magnetic ore. A black, hard ore that is magnetic, as magnetite. *Standard, 1964.*

magnetic-particle inspection. A nondestructive method of inspection for determining the existence and extent of possible defects in ferromagnetic materials. Finely divided magnetic particles, applied to the magnetized part, are attracted to and outline the pattern of any magnetic-leakage fields created by discontinuities. *ASM Gloss.*

magnetic permeability. Ratio of magnetic induction to the inducing field of magnetic intensity. With magnetic intensity lines of force per square centimeter in air, and flux density lines in a substance placed in that field, B/H is the magnetic permeability. When this is less than 1.0 the susbtance is diamagnetic; above 1.0, paramagnetic, and when high, ferromagnetic. *Pryor, 3.*

magnetic plug. A drain or inspection plug magnetized for the purpose of attracting and holding iron or steel particles in lubricant. *Nichols.*

magnetic polarity. The orientation of the constituent minerals within the rocks of the earth's crust conforming to the earth's magnetic field as it existed at the time the strata were deposited. *See also* core orientation. *Long.*

magnetic pole. a. Either of two points on the earth's surface where the lines of magnetic force are vertical; an end of the axis of the earth's magnetic polarity, not coincident with a geographic pole, and continually changing its position. The north magnetic pole is in northern British America. *Standard, 1964.* b. Either of two nonstationary regions on the earth that sometimes move many miles in a day, toward which the isogonic lines converge, and at which the dip is plus or minus 90°. *Webster 3d.* c. The area on a magnetized part at which the magnetic field leaves or enters the part. It is a point of maximum attraction in a magnet. *ASM Gloss.*

magnetic prospecting. *See* magnetic method. *Dobrin, p. 263.*

magnetic pulley. A pulley at the discharge end of a conveyor belt that removes magnetic metal contamination. *ACSG, 1963.*

magnetic pyrites. *See* pyrrhotite.

magnetic recording. Any process in which the output of a seismic detector-amplifier setup is recorded on a magnetic recording medium. The advantages of such a system are that the resulting records may be played back and converted into conventional records with phase shifting, mixing, etc., between traces and with filtering variations. *A.G.I.*

magnetic roasting process. The essential feature of this process is that of heating iron ore in the presence of air in order to oxidize the iron content, present in whatever form, to the magnetic oxide so that in a subsequent operation it may be separated from the gangue by means of a magnetic separator. *Osborne.*

magnetic roll feeder. One which utilizes magnetized, power-operated rolls for separating and delivering objects. *ASA MH 4.1-1958.*

magnetics. That branch of science which deals with the laws of magnetic phenomena. *Osborne.*

magnetic scale. A diagram of metals showing their comparative magnetic qualities. *Fay.*

magnetic separation. a. The separation of magnetic materials from nonmagnetic materials, using a magnet. This is an especially important process in the beneficiation of iron ores in which the magnetic mineral is separated from nonmagnetic material; for example, magnetite from other minerals, roasted pyrite from sphalerite, etc. *Newton, p. 85; Henderson.* b. The use of permanent magnets or electromagnets to remove relatively strongly ferromagnetic particles from paramagnetic and diamagnetic ores. *Pryor, 2.*

magnetic separator. a. A machine for bringing together magnetic minerals found in nonmagnetic material. Minerals of weak magnetism are now separated by using powerful magnetic fields. *Standard, 1964.* b. A device used to separate magnetic from less magnetic or nonmagnetic materials. The crushed material is conveyed on a belt past a magnet. *ASM Gloss.* c. For medium solids recovery. A device in which medium solids are caused to adhere, by magnetic means, to a conveying belt or drum, while a current of water removes nonmagnetic particles which contaminate the medium. *B.S. 3552, 1962.*

magnetic shales; magnetite. S. Afr. Magnetic ironstone and associated formations are useful to determine, by their effect on electromagnetic apparatus, the presence of certain rocks from which the position of valuable ore can be deduced. *Beerman.*

magnetic storm. A considerable variation of the earth's magnetic field, with time, occurring over extensive areas. The variations are greater, more irregular, and more rapid than the diurnal variations. In areas where they are frequent they present a serious obstacle to effective magnetic surveys. *A.G.I.*

magnetic susceptibility. A measure of the degree to which a substance is attracted to a magnet; the ratio of the intensity of magnetization to the magnetic field strength in a magnetic circuit. *A.G.I.*

magnetic unit in prospecting. The gamma (Y) which equals 10^{-5} oersted. *A.G.I.*

magnetic variations. Diurnal and annual changes in focal point and dip of magnetic north, which must be corrected for in precise survey work where reliance is placed on magnetic readings. *Pryor, 3.*

magnetic variometer. A geophysical instrument similar to the gravimeter in that absolute values are not measured, but only the differences in vertical magnetic force between field stations and a selected base station. *Nelson.*

magnetic writing. A nonrelevant indication caused by contact between a magnetized part and another piece of magnetic material. *ASM Gloss.*

magnetism. a. That property of iron, steel, and some other substances, by virtue of which they exert forces of attraction and repulsion according to fixed laws. *Crispin.* b. The science that is concerned with the conditions and laws of magnetic force. *Crispin.*

magnetite; magnetic iron ore. Natural black oxide of iron, Fe_3O_4. As black sand, magnetite occurs in placer deposits, and also as lenticular bands. Magnetite is used widely as a suspension solid in dense-medium washing of coal and ores. *Nelson.*

magnetite olivinite. A dunite high in content of titaniferous magnetite and containing shreds of biotite. *Holmes, 1928.*

magnetite spinellite. An eruptive iron ore occurring at Routivara, Sweden, and consisting of magnetite (in part titaniferous), spinel, and smaller amounts of olivine, pyroxene, apatite, and pyrrhotite. The ore contains about 14 percent titanic oxide. *Fay.*

magnetite. An igneous rock consisting essentially of magnetite and having an iron content of 65 to 70 percent or more. Apatite may accompany the magnetite. *Johannsen, v. 4, 1938, p. 466.*

magnetized. A body is said to be magnetized when it possesses or can be made to possess that peculiar property whereby under certain circumstances it will naturally attract or repel a similar body in accordance with magnetic laws; for example, drill rods become magnetized in use and will strongly attract other iron or steel articles. *Long.*

magnetizing coil. Coil winding which surrounds core of electromagnet. *Pryor, 3.*

magnetizing force. a. The phenomenon associated with a magnetic flux density at a point. Theoretically, measured by the mechanical force on a unit magnetic pole in an evacuated tunnel along the direction of the magnetic flux; the magnetomotive force per centimeter in this direction. *C.T.D.* b. A force field, resulting from the flow of electric currents or from magnetized bodies, that produces magnetic induction. *ASM Gloss.*

magnetizing roast. A process in which an ore containing pyrite is heated and the magnetic iron oxide so formed is removed by a magnetic separator. In many cases the iron oxide is extracted as gangue. *Nelson.*

magneto. A small alternating current generator having a permanent field magnet. *Mason, v. 2, p. 423.*

magnetometer. a. An instrument for measuring magnetic intensity. In ground magnetic prospecting, an instrument for measuring the vertical magnetic intensity; in airborne magnetic prospecting, an instrument for measuring the total magnetic intensity. Also, an instrument used in magnetic observatories for measuring various components of the magnetic field of the earth. *A.G.I.* b. A sensitive instrument for detecting and measuring changes in the earth's magnetic field, used in prospecting to detect magnetic anomalies and magnetic gradients in rock formations. *Pryor. See also* nuclear resonance magnetometer; airborne magnetometer.

magnetomotive force. Flux strength flowing between magnetic poles in accordance with Rowland's law. Symbol, fmmf.

$$\text{Magnetic flux} = \frac{\text{mmf}}{\text{reluctance}}$$

magnetoplumbite. A black double oxide of ferric iron with lead and manganese and some titanium, etc., $2(Pb,Mn)O.3Fe_2O_3$. Acute, pyramidal crystals. Hexagonal. Related to plumboferrite, but differs in being strongly magnetic. From Langban, Sweden. *English.*

magnetorque. A form of transmission based on the principle that a magnetic field of force is produced whose strength is varied so as to transmit a torque of corresponding magnitude. With a system of this kind, control of any particular operation is effected through the agency of the magnetorque clutch, while the motor runs continuously at constant speed. *Institution of Mining and Metallurgy. Symposium on Opencast Mining, Quarrying, and Alluvial Mining. London, 16-19 November 1964. Paper 13, p. 18.*

magnetostriction. The characteristic of a material that is manifest by strain when it is subjected to a magnetic field; or the inverse. Some iron-nickel alloys expand; pure nickel contracts. *ASM Gloss.*

magnetotelluric method. This electrical prospecting technique, introduced in 1953 by Cagniard, is based on an entirely new application of telluric currents in which the magnetic fields induced by the alternations in earth currents would be measured simultaneously with the voltage fluctuations between electrodes at the surface. The ratio between the amplitudes of these alternating voltages and then associated magnetic fields would be plotted as a function of frequency. *Dobrin, p. 365.*

magnetron. A thermionic vacuum tube in which the movement of the electrons is controlled by a combination of crossed electric and magnetic fields. *NCB.*

magnet steel. A steel from which permanent magnets are made. It must have a high remanence and coercive force. *C.T.D.*

magnet thickness gage. A non-destructive device for determining the thickness of a coating of vitreous enamel; it depends on the principle that the force required to pull a permanent magnet off the surface of enamelware is inversely proportional to the thickness of the nonmagnetic enamel layer on the magnetic base metal. *Dodd.*

magnifer; magnefer. *See* dolomite brick. *Hess.*

magnifying power. Ratio of apparent size of optically magnified object to that seen by the naked eye. *Pryor, 3.*

magniotriplite. Triplite rich in magnesium. *Spencer 19, M.M., 1952.*

magniphyric. Suggested by Cross, Iddings, Pirsson, and Washington for a coarsely microphyric texture; a porphyritic texture in which the longest diameter of phenocrysts is between 0.2 and 0.4 millimeter. *A.G.I.*

Magnit. Trade name; a tarred magnesitic-dolomite refractory made by Vereinigte Oesterreichische Eisen und Stahlwerke Linz, Austria, and used by them in the L-D process of steelmaking. The composition of the calcined raw material varies as follows: 65 to 80 percent MgO, 10 to 25 percent CaO, 2 to 5 percent SiO_2, 1 percent Al_2O_3, 4 to 6 percent Fe_2O_3; loss on ignition, 0.5 to 2 percent. *Dodd.*

magnite. A dolomite clinker. *Hess.*

magnitude. a. In terrestrial magnetism, the intensity of a short-period magnetic fluctuation, usually expressed in milligausses or gammas. *Hy.* b. A number related to the total energy released by an earthquake. *Compare* intensity, b. *Leet.*

magnochromite. A variety of chromite that contains magnesium. *Standard, 1964.*

magnocolumbite. Black acicular and tabular orthorhombic crystals, $(Mg,Fe,Mn)(Nb,Ta)_2O_6$; the magnesium analogue of columbite. From Kugi-Lyal, southwest Pamir, China. *Hey, MM, 1964; Fleischer.*

magnoferrite. Original form of magnesioferrite. *Dana 6d, p. 226.*

magnolia metal. A lead-base alloy containing 78 to 84 percent lead; remainder is mainly antimony, but small amounts of iron and tin are present. It is used for bearings. *C.T.D.*

Magnum. Trade name of the Nevada Magnesite Products Company, Reno, Nevada, for an artificial stone made from diatomaceous earth and calcined magnesite. *Hess.*

magnussonite. Arsenite of manganese, etc., $(Mn,Mg,Cu)_5(AsO_3)_3(OH,Cl)$, cubic, as green crusts on dolomite from Langban, Sweden. *Spencer 21, M.M., 1958.*

Magox. Mixture of magnesia and calcined magnesite; used as construction material. *Bennett 2d, 1962 Add.*

maguefer brick. *See* dolomite brick. *Hess.*

Mahler bomb calorimeter. An instrument which includes a pear-shaped steel bomb in which the fuel is placed together with the oxygen required for its combustion. It is immersed in a weighted jar of water and the temperature rise of the water after ignition makes it possible to compute the amount of heat in the fuel. *Porter.*

mahogany ore. Compact mixture of oxides of iron and copper. *Schaller.*

mahogany soap. Complex soap formed during cracking of crude oil residues from distillation; used as collecting agent in froth flotation of iron minerals. *Pryor, 3.*

maiden coal. Intact coal. *See also* virgin coal. *Nelson.*

maiden field. Scot. An unbroken or unworked mineral property. *Fay.*

maidens. Scot. Iron frames or standards carrying pillow blocks of shaft pulleys. *See also* mingles. *Fay.*

mailly stone. A softer sort of limestone, very dusty. *Arkell.*

main airway. a. The road along which the principal ventilating current passes. *Peel.* b. Underground ventilation channel directly connected with a shaft or other entry to a mine. *Pryor, 3.*

main and tail. Rope haulage by means of a main rope to draw out the full wagons and a tail rope to draw back the empties. *C.T.D.*

main-and-tail haulage. A single track haulage system operated by a haulage engine with two drums each with a separate rope. The engine is usually located at the outby end of the system. The main rope is attached to the outby end of the set of tubs, and the tail rope passes around a sheave inbye and is then attached to the rear end of the set. To draw the full set out, the main rope is wound in, the tail rope being allowed to run free. To draw the empty set inby, the tail rope is wound in, the main rope being allowed to run free. The tail rope is equal to twice the length of the haulage road. The main-and-tail haulage is adopted when the gradient is irregular and the empty set will not run inby by gravity. *Nelson.*

main arch. a. The refractory blocks forming the part of a horizontal gas retort comprising the division walls and the roof that covers the retorts and the recuperators. *See also* division walls. *Dodd.* b. General term for the central part of a furnace roof, particularly used as a synonym of the crown of a glass tank furnace. *Dodd.*

main bord gate. York. The heading which is driven slightly to the rise from the shaft. *Fay.*

main bottom. Hard rock below alluvial deposits. *Fay.*

main break. In mine subsidence, the break that occurs over the seam at an angle from the vertical equal to half the dip. *Lewis, p. 619.*

main brow. Eng. *See* gate. *SMRB, Paper No. 61.*

main canal. The main conduit beginning at the source of water supply, from which the lateral system receives its supply. *Seelye, 1.*

main cleat; master cleat; bord cleat. In a coal seam, a cleavage plane at right angles to the bedding plane on which it was laid. This cleavage plane is shiny and smooth and miners give it names according to their locality. *Mason, v. 1, p. 8.*

main conveyor. *See* underground mine conveyors. *ASA MH4.1-1958.*

main crosscut. The crosscut that traverses the entire mining field and penetrates all deposits. There is such a crosscut at each level and it is the main one for the level in question. It serves the same purpose as the shaft and thus must have correct cross section, and be particularly well constructed, as repairs to its support would hold up the transport of the entire level. *Stoces, v. 1, p. 223.*

main drain. A sewer or drainage channel leading directly to its point of discharge. *See also* outfall. *Ham.*

main drive; main reef drive. A main tunnel driven in the rock underlying a lead and about 50 feet below the wash dirt. It is used as a drainage tunnel for carrying the water from the drainage holes to the shaft sump and also for the transport of cars from the raises. *Engineering and Mining Journal, v. 139, No. 4, April 1938, p. 55.*

main endings. Pairs of narrow coal headings with crosscuts at intervals, driven to form large pillars of coal in panel working. *Nelson.*

main engine. N. of Eng. The surface pumping engine, usually of the Cornish type. *Fay.*

main entry. a. The principal entry or set of entries driven through the coalbed from which cross entries, room entries, or rooms are turned. *U.S. BuMines Federal Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. 1 Underground Mines, October 8, 1953.* b. A term used in the United States for the principal horizontal gallery giving access to a coal seam and used for haulage, ventilation, etc. Where two entries are driven in parallel the term double entry is used. With three parallel entries, the term triple entry is used. *See also* entry. *Nelson.* c. An entry driven at right angles with the face slips of the coal. *See also* entry. *Fay.* d. A main haulage road. *See also* main road. *Fay.*

Maine sampler. A drive-type, split-tube soil-sampling device, usually equipped with a flap or clack valve near the cutting shoe. Usually produced in sizes having outside diameters ranging from 4 to 6⅝ inches. *Long.*

Maine-type sampler. A soil-sampling device that works essentially on the same principle as a Maine sampler. *Long.*

main facets. a. The bezel and pavilion facets. *Shipley.* b. Any other facets extending from the girdle to the table or from the girdle to the culet. *Shipley.*

main fans. Main fans produce the general ventilating current of the mine, and are of large capacity and permanently installed. They are assisted by natural ventilation, if present, and, if necessary, by booster fans. They are installed to perform a certain duty and great attention is paid to their efficiency since this governs the cost of performing the duty. *Roberts, I, pp. 200, 224.*

main firing. The firing of a round of shots by means of current supplied by a transformer fed from a main power supply. *B.S. 3618, 1964, sec. 6.*

main gate. The principal or central heading along which the coal is conveyed from two or more conveyor panels. Normally, the main gate is also the intake airway to the face. *See also* double unit; mother gate. *Nelson.*

main hanging wall. That portion 20 to 30 feet above the reef body. *Hess.*

main haulage. a. That portion of the haulage system which moves the coal from the secondary haulage system to the shaft or mine opening. The method employed is the same for either longwall or room-and-pillar mining. Any one of four methods may be used: (1) mine cars and battery or trolley locomotives; (2) mine cars and a direct rope haulage; (3) a combination of methods 1 and 2; or (4) belt conveyors. *Wheeler, H.R., p. 2.* b. The system by which coal is transported in trains in or out of a slope or drift entry or from the bottom of a shaft. *B.C.I.*

main haulage conveyor. Generally 500 to 3,000 feet in length. It is used to transport material between the intermediate haulage conveyor and a car loading point or the outside. *NEMA MB1-1961.*

main haulageway. The principal transportation road. *B.C.I.*

main hole. The first or primary borehole from which secondary or branch holes are drilled. Also called original hole; parent hole. *Compare* branch, e. *Long.*

main intake. The trunk or principal intake airway of a mine. The main intake air current is usually split into two or more air currents before reaching the workings. *Nelson.*

main levels; main roads. The first and leading excavations in mines which are made for the purpose of opening out or winning the coal, and which are intended to be the principal roadways of the mine. *Peel.*

main-line coupler. *See* coupler. *D.O.T. 1.*

main-line locomotive. A large, high-powered locomotive which hauls trains of cars over the main haulage system. *B.C.I.*

main-line motorman. In bituminous coal mining, one who operates a mine locomotive to haul cars over the main haulage tracks underground or at the surface as distinguished from the branch lines. *D.O.T. 1.*

main rake. Derv. The main or principal vein. *Fay.*

Main reef; and Main reef leader. S. Afr. The principal reefs of the Witwatersrand, the latter somewhat above the former. When in conjunction they are called composite reef. On the Far East Rand the correlation is not quite clear. Some mining reports speak of the Main reef, others of the Main reef leader, and again others of the Nigel reef, which are all the same thing in that area. *Beerman.*

main reef drive. *See* main drive. *Engineering and Mining Journal, v. 139, No. 4, April 1938, p. 55.*

main return. The principal return airway of of a mine. The main return air current represents the total quantity of air, that is, after the air splits have reunited. *Nelson.*

main road. The principal underground road in a district along which the coal or ore is conveyed to the shafts, generally forming the main intake air course of each district. *Fay.*

main rod. Corn. *See* pump rod. *Fay.*

main roof. The rock above the immediate roof. *BuMines Bull. 587, 1960, p. 2.*

main rope. The rope which pulls a train of loaded cars outby along a haulage plane as opposed to a tail rope which pulls a train of empty cars inby as in main-and-tail haulage. *Nelson. See also* main and tail.

main-rope haulage system. This system of haulage is used for hauling loaded trains of tubs or cars up or lowering them down, a comparatively steep gradient which is not steep enough, in the latter case, for a self-acting incline. In the normal system a single track only is required. The electrically or compressed-air-driven engine has a single drum which runs loose on the forged-steel drum shaft; it is controlled by the brake when lowering the empty train, and is clutched to the shaft by means of a dog clutch when hauling the loaded train up the gradient. *Sinclair, V, p. 343.*

main-rope rider. In bituminous coal mining, one who has charge of and rides trips (trains) of cars hauled in and out of the mine along the main cable haulageway. *D.O.T. 1.*

main-rope system. A system of underground haulage in which the weight of the empty cars is sufficient to draw the rope inby. *Fay.*

main separation door. A wooden or steel door erected near the pit bottom to prevent the intake air leaking into the main return airway or upcast shaft; a door to direct the main intake air inbye towards the workings. It may be fitted with an appliance, or shutter, to ease the opening for traveling purposes. *See also* fan-drift doors. *Nelson.*

mains firing. Firing blasts from a mains supply. *McAdam II, p. 78.*

main shaft. The line of shafting which receives its power directly from the engine or motor and transmits power to other parts. *Crispin.*

mains lighting. A system of underground mine lighting in which the lamps are fed from the main electrical supply. It is used principally at the pit bottom, using filament lamps in either transparent well glass or prismatic bulkhead fittings. After 1947, mains lighting became a compulsory requirement in British mines at the shaft bottom and main intake junctions. *Nelson.*

main-slope engineer. In bituminous coal mining, one who operates the hoisting engine for raising or lowering men, material, coal, and rock along the main haulage slope (incline) of a mine having one or more auxiliary or relay slopes. *D.O.T. 1.*

main suit. Brist. A heavy spring or feeder of water. *Fay.*

maintainer. Eng. A shareholder. *Fay.*

maintaining levels. In quarrying, consists of the removal by blasting of rock protruding above the level of the quarry floor or bench, to allow the movement of loading and transport equipment. *Streefkerk, p. 16.*

maintenage. Fr. The face of workings in inclined or vertical seams consisting of a series of steps each about 6 feet high, and forming the working place for one man. *Fay.*

maintenance. Proper care, repair, and keeping in good order. *Crispin.*

maintenance staff. The skilled staff of electricians, mechanics and fitters kept at a mine for the maintenance and service of face machinery, haulages, locomotives, pumps, compressors, etc. It is reported that the maintenance staff at German coal mines forms about 10 percent of the total labor force, whereas in British coal mines, the number is between 4 and 5 percent. *Nelson.*

main tie. Tension member connecting the feet of a roof truss, usually at the level of bearing on the wall plate or padstone. *Ham.*

main transport. The conveying or haulage of coal or mineral from the inby subsidiary transport to the shaft bottom or surface. For the main transport of coal, the trend is towards trunk conveyors or locomotive haulage. A conveyor belt is capable of high-capacity continuous transportation. *Nelson.*

main way. A gangway or principal passage. *Fay.*

Majac mill. A mill for dry-grinding mica by means of fluid energy. It consists of a chamber containing two horizontal directly opposed jets. Mica is fed continuously from a screw conveyor into this chamber. The particle size of the product from this mill can be controlled over a broad range down to the micron sizes. *BuMines Bull. 630, 1965, p. 588.*

majolica. A type of pottery with opaque white glaze and overglaze colored decorations, except in the tile industry, where the term faience tile is used. *ACSG, 1963.*

major constituents. Those chemical elements present in seawater which together make up over 99.9 percent of the known dissolved solid constituents of seawater. These include the following ions: chloride, sulfate, bicarbonate, bromide, fluoride, boric acid, sodium, magnesium, calcium, potassium and strontium. *Hy.*

major diameter. Formerly called outside diameter. It refers to the largest diameter of a thread on a screw or nut. *Crispin.*

major face. Used in widely different meanings in different manufacturing plants; the meaning of the term depends on the special process of cutting used. Thus, the faces of the major rhombohedron r (1011) are spoken as the major face when BT wafers are cut directly from a faced mother crystal. Also applied to the three prism faces which terminate in the faces of the major rhombohedron, etc. *AM, 1.*

major joint. One of the most strongly developed joints in a region. *Stokes and Varnes, 1955.*

major mine disaster. Is defined by the U.S. Bureau of Mines as any accident that results in the death of five or more persons. *Compare* minor mine disaster. *Bureau of Mines. Instructions for Disaster, Fatal-Accident, and Miscellaneous Health and Safety Reports, April 1966, Chapter 2.1, p. 3.*

major principal plane. The plane normal to the direction of the major principal stress. *ASCE P1826.*

major principal stress. The largest (with regard to sign) principal stress. *ASCE P1826.*

make. a. A formation or accumulation of profitable vein material; as, a make (that is, a body) of ore in a vein or in a series of lenticular deposits. Also called make of stone; make of quartz; make of reef. *Fay.* b. The amount produced; yield; as, the make from a furnace. *Standard, 1964.*

make gas. Mid. To yield or produce gas. A seam of coal that gives off firedamp is said to make gas. *Fay.*

make of quartz. *See* make, a. *Fay.*

make of reef. *See* make, a. *Fay.*

make of stone. Aust. A shoot of ore. *See also* make, a. *Fay.*

make of water. The rate of entry of water into a mine or part of a mine. Also called growth. *B.S. 3618, 1963, sec. 4.*

makes. The wide portions of lodes. *See also* pinches. *Nelson.*

makeup. a. N. of Eng. Payment made by management (deputy and overman) when earnings from agreement fall below a seam norm. *Trist.* b. To assemble; to couple or screw together. Usually applied to the process of assembling the component parts of a drill string or pipe system. *Long.*

makeup bunker. *See* makeup shed. *Nelson.*

makeup gun. Same as breakout gun. *Long.*

makeup medium; makeup medium solids. Medium or medium solids added to the circuit to replace loss during the separating operation. *B.S. 3552, 1962.*

makeup shed; makeup bunker. A surface building at which explosives, drawn from the magazine are issued and where the charges are prepared or made up. *Nelson.*

makeup time. The time required to couple together the component parts of a drill or casing string and the lowering of such a string to the working position in a borehole. *Long.*

makeup tongs. *See* breakout tongs. *Long.*

makeup water. a. Water supplied to a washery to replace that lost from the circuit. *B.S. 3552, 1962.* b. Water supplied to replenish that lost by leaks, evaporation, etc. *Strock, 10.*

making hole. a. The depth gained in the day's drilling. *Hess.* b. The act of, or portion of work time spent in actual drilling and advancement of a bore or drill hole. *Bureau of Mines Staff.*

makings. Newc. The small coal hewn out in undercutting or channeling. Also, in some localities, called bug dust. *Fay.*

malachite. A green, basic cupric carbonate, [$Cu_2(OH)_2CO_3$], crystallizing in the monoclinic system. It is a common ore of copper, and occurs typically in the oxidation zone of copper deposits. *Dana 17.*

malachite green. a. A pigment made of ground malachite. *Webster 3d.* b. A triphenylmethane basic dye prepared from benzaldehyde and dimethylaniline and used chiefly in coloring paper bluish green, in making organic pigments, in industrial and biological stains, and also in medicine as an antiseptic. *Webster 3d.*

malacolite. A pale-colored, translucent variety of diopside. *Fay.*

malacon. A brown, vitreous variety of altered zircon in which the element hafnium was discovered in 1923. Found in Norway and in France. *Standard, 1964.*

malapai. Lava rock from Spanish mal pais. *Hess.*

malaspina glacier. *See* piedmont glacier. *Fay.*

malchite. A fine-grained granular igneous rock. A diorite dike, composed of labradorite, hornblende, and biotite phenocrysts in a groundmass of the same minerals and some quartz. In most malchites, only one generation of femic minerals occurs and the rocks are classed as microdiorites, microgabbros, diorite, or gabbro aplites. If, however, two generations of femic minerals are present, the rock is classed as a hornblendic lamprophyre and is synonymous with spessartite. *A.G.I.*

maldonite. A metallic, pinkish, silver-white, alloy of gold and bismuth, Au_2Bi, found native. *Standard, 1964.*

male. Synonym for pin. *Long.*

male thread. Synonym for pin thread. *Long.*

maletra furnace. A hand reverberatory furnace for roasting finely divided ore entirely without the aid of extraneous heat. *Fay.*

malgachite. A group term for an igneous rock facies which includes granite, granodiorite, diorite, and gabbro. *Hess.*

malignite. A mafic nepheline syenite. Fifty percent of the rock is composed of aegirine-augite, the remainder is predominantly nepheline and orthoclase in about equal amounts. Accessory apatite, biotite, titanite, and opaque oxides. *A.G.I.*

malinger. To feign illness; sham sickness in order to avoid duty; counterfeit disease. *Fay.*

malingerer. a. A soldier or a sailor who feigns sickness to avoid doing his duty; hence, in general, one who shirks his duty by pretending illness or inability. *Webster 2d.* b. In industrial accident insurance, one who feigns disability or prolongs his period of disability, in order to collect accident insurance or compensation. *Fay.*

malingering. Said of miners when it is alleged that they are feigning sickness in order to avoid duty or to draw compensation for an unnecessary length of time. *See also* ca'canny. *Nelson.*

malinite. Name used in Indiana for halloysite, very similar in composition to kaolinite, but containing more alumina. *Bureau of Mines Staff.*

malinowskite. A variet yof tetrahedrite that contains lead and silver. *Standard, 1964.*

mall; mell. Eng. A heavy hammer. A drawing or prop mall is a long handled mall used when withdrawing timber. *SMRB, Paper No. 61.*

malladrite. A silicofluoride of sodium, Na_2SiF_6. Minute prisms. Hexagonal. Not to be confused with mallardite. From Vesuvius, Italy. *English.*

mallan. Derb. Soft tuft containing lumps of ore. *Arkell.*

mallardite. A pale rose, monoclinic mineral of the melanterite group with the formula, $MnSO_4.7H_2O$. *Dana 7, v. 2, p. 507.*

malleability. a. The characteristic of metals which permits plastic deformation in compression without rupture. *ASM Gloss.* b. Minerals are malleable when slices cut from them may be flattened out under a hammer. Examples are native gold; silver; copper; platinum. *Nelson.*

malleable. Capable of being extended or shaped by beating with a hammer, as gold, silver, etc. *Compare* brittle; flexible; sectile. *Webster 3d.*

malleable castings. Iron castings made from malleable pig iron and heated in scale. *Mersereau, 4th, p. 481.*

malleable cast iron. A cast iron made by a prolonged anneal of white cast iron in which decarburization or graphitization, or both, take place to eliminate some or all of the cementite. The graphite is in the form of temper carbon. If decarburization is the predominant reaction, the product will have a light fracture, hence, whiteheart malleable; otherwise, the fracture will be dark, hence, blackheart malleable. Pearlitic malleable is a blackheart variety having a pearlitic matrix along with, perhaps, some free ferrite. *ASM Gloss.*

malleable copper. Name given by miners to virgin copper. *Bureau of Mines Staff.*

malleable mineral. A mineral that may be flattened or deformed by hammering without breaking, for example, native copper or gold. *Stokes and Varnes, 1955, p. 149.*

malleable nickel. Nickel obtained by remelting and deoxidizing electrolytic nickel and casting into ingot molds. It can be rolled into sheet and used in equipment for handling food, for coinage, condensers, and other purposes where resistance to corrosion, particularly by organic acids, is required. *C.T.D.*

malleablizing. Annealing white cast iron in such a way that some or all of the combined carbon is transformed to graphite or, in some instances, part of the carbon is removed completely. *ASM Gloss.*

malleate. To shape into a plate or leaf by beating or hammering; said of metal. *Standard, 1964.*

mallet. a. Corn. The sledge hammer used for striking a drill. *Fay.* b. A wooden hammer. *Crispin.*

mallon; mallion. Eng. A soft kevil. *See also* kevil, a. *Fay.*

malm. a. Synonym for marl in its original sense of a calcareous clay. *Dodd.* b. Eng. A soft, friable chalky limestone. *Webster 3d.* c. A light clayey soil containing chalk; marl; also an artificial mixture of clay and chalk used in the manufacture of bricks. *Webster 3d.*

Malm. Upper Jurassic. *A.G.I. Supp.*

malmfält. A Scandinavian term for an ore field; an area in which there is a group of ore deposits. *Hess.*

malming. The preparation of an artficial malm by mixing chalk and clay reduced to a pulp, and allowing the mixture to consolidate by evaporation. *Fay.*

malm rock. Eng. A local name for the sandstone of Surrey and Sussex. Also called firestone. *Fay.*

malmstreck. A Scandinavian term for a line along which is a series of ore bodies. *Hess.*

Malm process. Treating complex sulfide ores, particularly those of zinc, with dry chlorine in a tube mill at a temperature of approximately 160° F; followed by heating on a multiple-hearth furnace at approximately 750° F. The resulting metal chlorides, after solution in water or hot brine, are then converted to metal. In the case of zinc, this is accomplished by electrolysis of the fused chloride, the byproduct chlorine returning to the process. *Bennett 2d, 1962.*

malm rock. Eng. A local name for sandstone sometimes used as a building material. Also known as firestone; malmstone. *Fay.*

malmstone. *See* malm rock.

malpais. Mex. Ground covered with a lava flow. Literally, bad land. *Fay.*

maltesite. A variety of andalusite, resembling chiastolite, showing a maltese cross of pure material separated by areas of impure material. From Finland. *English.*

maltha. a. Various natural tars resulting from the oxidation and drying of petroleum. *A.G.I.* b. A black viscid substance intermediate between petroleum and asphalt. Also called malthite. *Webster 3d.* c. A variety of ozocerite. *Webster 2d.*

malthacite. A scaly, sometimes massive, white or yellowish clay related to fuller's earth. *Standard, 1964.*

malting coal. A Wales term for anthracite coal. *Fay.*

mammillary; mammillated. Of, or pertaining to, smoothly rounded masses resembling breasts or portions of spheres; descriptive of the shape of some mineral aggregates, as malachite or limonite; similar to but a larger size than botryoidal. *Fay.*

mammillary structure. *See* pillow structure. *Pettijohn.*

mammillated. A mineral displaying large spheroidal surfaces, for example, malachite. *Nelson.*

mamu Abbreviation for millimass unit, or 10^{-3} atomic mass unit. *NRC-ASA N1.1-1957.*

management. The art and science of planning, organizing and directing human effort and machines so that all will function efficiently in the task of winning the materials of nature for the benefit of mankind. Modern mining has become so complex and diversified that management is aided by specialists with specialist responsibilities. *Nelson.*

management accounting. Presentation of information given by detailed analysis of accounts in such a way as to aid management in policy forming and in interpretation of day-by-day operations. Costing. Cost accounting. Comparison of a cost-per-ton detail between similar accounting periods as an aid to scientific appraisal. *Pryor, 3.*

manager. An official who has control and supervision of a mine, both under and above ground, and generally also of the sale of the product. At some mines he is called superintendent, general superintendent, or agent. *Fay.*

manager, extraction of mineral. In anthracite coal mining, bituminous coal mining, metal mining, nonmetal mining, and the quarry industry, one who directs all operations in the extraction of minerals at such places as mines, quarries, gravel pits, and salt wells, either through subordinate foremen or supervisors, or by personally overseeing the individual phases of the work. Also called superintendent, extraction of mineral. *D.O.T. 1.*

manager's clerk. Generally, a young man who takes charge of a mine manager's clerical duties and office routine. Inter alia, he enables the manager to devote more time to technical matters and underground inspections. *Nelson.*

manager's plan. A plan of the workings kept at the office of the mine, in addition to the working plan, for everyday use by the manager. *B.S. 3618, 1963, sec. 1.*

manandonite. A white, basic borosilicate of lithium and aluminum, $H_{24}Li_4Al_{14}B_4Si_6O_{53}$. Micaceous, six-sided scales. Orthorhombic (?). Obtained from the Manandona River, Malagasy Republic. *English.*

manasseite. Hydrous basic carbonate of magnesium and aluminum, $Al_2Mg_6(OH)_{16}CO_3.4H_2O$, as hexagonal scales dimorphous with the rhombohedral hydrotalcite. *Spencer 16, M.M., 1943.*

man cage. A special cage for raising and lowering men in a mine shaft. *See also* man car. *Fay.*

man car. A kind of car for transporting miners up and down the steeply inclined shafts of some mines, as at Lake Superior. *See also* man cage. *Fay.*

manchado. a. Sp. Spotted ore. *Fay.* b. Braz. A commercial grade of mica which is stained to very slightly spotted. *Hess.*

Manchester kiln. A type of longitudinal-arch kiln that was introduced in the Manchester district of England for the firing of building bricks. It is top-fired. A distinctive feature is the flue system, with horizontal damper plates, in the outside wall. The Manchester kiln usually has a hot-air system. *Dodd.*

Manchester process. A wet scrubbing process for removing hydrogen sulfide from fuel gases in which the gas is scrubbed with a suspension of ferric hydroxide in a dilute solution of ammonia or sodium carbonate. The concentration of iron in solution is maintained by addition of ferrous sulfate. Sulfur is recovered by blowing air through the liquor. *Francis, 1965, v. 2, p. 428.*

Manchurian jade. Soapstone. *Shipley.*

mandarin porcelain. A Chinese porcelain brilliantly decorated with figures of mandarins in their official robes. *Standard, 1964.*

mandelstone. Same as amygdaloid. *Fay.*

man door. a. A small door in a stopping to allow the passage of men. *Nelson.* b. Scot. A small trapdoor on a traveling road. *Fay.*

mandrel. a. A miner's pick. *Webster 3d.* b. A usually tapered or cylindrical axle spindle, or arbor that is inserted into a hole in a piece of work so as to support the work during machining. *Webster 3d.* c. A metal bar that serves as a core around which metal or other material may be cast, molded, forged, bent, or otherwise shaped. *Webster 3d.* d. Any of a train of jointed units intended to be pulled through an underground duct as each joint is made to insure perfect alinement, or through a steel pipe in process of welding to insure a smooth interior. *Webster 3d.* e. The shaft and bearings on which a tool (as a grinding disk or circular saw) is mounted. *Webster 3d.* f. A temporary interior support for a thin-walled tube (as a tubular steel pile to be filled later with concrete) being driven into something. *Webster 3d.*

mandrel socket. A well tool for straightening out the top of casing, etc., within a well, consisting of a lemon-shaped swage within a cone or bellmouth, by means of which the casing is worked to a circular shape. Also useful for straightening a lost sand pump, etc., so that the dogs may enter. *Fay.*

mandril; mandrel. A miner's pick. *Nelson.*

mandshurite. A nepheline basanite. *A.G.I.*

Manebach law. A type of twinning in the monoclinic crystal system. The basal pinacoid is the twinning plane. *Hess.*

Manebach twin. A monoclinic twin crystal in which the basal pinacoid was the twinning plane. *Fay.*

man engine. *See* man machine. *Fay.*

Mangalore tile. A clay roofing tile of the interlocking type as made in the Mangalore district of India. *Dodd.*

manganandalusite. A variety of andalusite containing 6.91 percent Mn_2O_3. It differs from ordinary andalusite in its grass-green color and strong pleochroism. From Vestana, Sweden. *English.*

mangan berzeliite. A variety of berzeliite in which magnesium is largely replaced by manganese, typically $(Ca,Na)_3Mn_2(AsO_4)_3$. Originally called pyrrharsenite. From Langban, Sweden. *English.*

manganblende. *See* alabandite. *Fay.*

mangandalusite. Variety of andalusite containing manganese. *Bennett 2d, 1962.*

manganepidote. a. A brown member of the epidote group of minerals $4(Ca,Na,Mn)O.3(Al,Fe)_2O_3.6SiO_2.H_2O$. *Larsen, p. 196.* b. Piedmontite. Obsolete. *Larsen, p. 196.*

manganese. A hard, brittle, metallic element of group VII of the periodic table; grayish-white tinged with red; rusting like iron; and not magnetic. Exists in four allotropic forms: Alpha manganese (isometric, body-centered cubic); beta manganese (isometric, cubic); gamma manganese (tetragonal, face-centered); and delta manganese. Alpha manganese is stable at ordinary temperatures, and gamma manganese transforms to alpha manganese at ordinary temperatures. Symbol, Mn; valences, 1, 2, 3, 4, 6, and 7; atomic number, 25; atomic weight, 54.938; isometric or tetragonal; specific gravity, 7.20 to 7.44, depending on allotropic form; melting point, 1,220° C or 1,244° ±3° C; boiling point, 2,097° C or 2,152° C; decomposes water; and soluble in dilute acids. Does not occur uncombined in nature and is obtained from minerals which are oxides, silicates, and carbonates. Pyrolusite (MnO_2) and rhodocrosite ($MnCO_3$) are common ores. Nodules on the ocean floors contain about 2 percent manganese. Used as a deoxidizing and a desulfurizing agent in steel manufacture, and is used in many important alloys. Manganese in steel improves the rolling and forging and its strength, toughness, stiffness, wear resistance, hardness, and hardenability. Manganese forms ferromagnetic alloys with aluminum and antimony, especially with small percentages of copper. Manganese metal can be made ferromagnetic by special treatment. *See also* ferromanganese; manganese steel. *C.T.D.; Fay; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-119, B-191.*

manganese alloys. Manganese is not used as the basis of alloys, but is a common constituent in those based on other metals. It is present in all steel and cast iron, and in larger amount in special varieties of these, for example, manganese steel, silicomanganese steel, etc. It is also present in many varieties of brass, aluminum bronze, and in aluminum- and nickel-base alloys. *C.T.D.*

manganese-alumina pink. A ceramic stain, particularly for the coloring of pottery bodies; it is produced by calcination of a mixture of $MnCO_3$, hydrated alumina, and borax. This stain will produce a strong, clean color over a wide firing range but the glaze must be rich in Al_2O_3; this requirement makes it difficult to produce a smooth glaze. *Dodd.*

manganese-aluminum garnet. Same as spessartite. *Shipley.*

manganese black. *See* manganese dioxide. *CCD 6d, 1961.*

manganese bronze. Alloy of 59 percent copper, 1 percent tin, and up to 40 percent manganese. Practically a brass with high tensile strength and toughness. Used for ship's impellers and such fittings as must withstand corrosion by seawater. *Pryor, 3.*

manganese carbonate. *See* rhodochrosite. *C.M.D.*

manganese chromate dihydrate. $2MnO.CrO_3.2H_2O$ variable; molecular weight, 278; brown; and partly soluble in water. Used as a pigment in ceramics. *Bennett 2d, 1962.*

manganese copper. *See* manganese bronze. *Fay.*

manganese dioxide; manganese peroxide; manganese black; pyrolusite; polianite. Black; orthorhombic; molecular weight, 86.94; MnO_2; the mineral is pyrolusite; soluble in hydrochloric acid; insoluble in water; specific gravity, 5.026; decomposes to Mn_2O_3 and oxygen at 535° C; Mohs' hardness, 2.0 to 2.5; insoluble in water, in nitric acid, and in acetone; and soluble in hydrochloric acid. One of the prime oxidizing agents; also used in pyrotechnic mixtures; in glass enamels and glazes as a colorant, a decolorizer, and a scavenger; as a coloring agent in brick pigments; in paint dryers; in processing uranium ore; in ferrites; in manufacturing electrolytic zinc; and in alloy steels, cast irons, and wrought irons. *CCD 6d, 1961; Handbook of Chemistry and Physics, 4th ed., 1964, pp. B-192, B-245.*

manganese epidote. *See* piemontite. *C.T.D.*

manganese feldspar. Synonym for manganese anorthite. *Hey, MM, 1964.*

manganese fluoride; manganese difluoride; manganous fluoride. MnF_2; molecular weight, 92.93; red; tetragonal prisms; specific gravity, 3.98; melting point, 856° C; insoluble in water, in alcohol, and in ether; and soluble in acids. Used in ceramics. *Bennett 2d, 1962; CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-192.*

manganese garnet. *See* spessartite, a.

manganese glance. Naturally occurring sulfide of manganese, MnS. Also called manganese blende; alabandite. *Bureau of Mines Staff.*

manganese glaze. A dark gray or black glaze for pottery which receives its color from an oxide of manganese. *Standard, 1964.*

manganese green. *See* barium manganate.

manganese hornesite; manganese hoernesite. A mineral, $(Mn,Mg)_3(AsO_4)_2.8H_2O$; monoclinic; isomorphous with hornesite, $Mg_3(AsO_4)_2.8H_2O$, and bobierrite, $Mg_3(PO_4)_2.8H_2O$. From Langban, Sweden. *Spencer 20, M.M., 1955.*

manganese hydrate. *See* psilomelane. *Fay.*

manganese hydroxide. Synonym for manganic hydroxide; manganous hydroxide. *See also* manganic hydroxide. *CCD 6d, 1961.*

manganese minerals. Those in principal production are pyrolusite, some psilomelane, and wad. Used chiefly in steel manufacture. *Pryor, 3.*

manganese monoxide. *See* manganous oxide. *CCD 6d, 1961.*

manganese nitrate. *See* manganous nitrate. *CCD 6d, 1961.*

manganese nodules. The concretions, primarily of manganese salts, covering extensive areas of the ocean floor. These vary in size from extremely small to some 6 inches in diameter. They have a layer configuration and may prove a useful source of minerals. *Hy.*

manganese ore. A term used by the Bureau of Mines for ore containing 35 percent or more manganese, and may include concentrate, nodules, or synthetic ore. *BuMines Bull. 630, 1965, p. 555.*

manganese oxide. There are several manganese oxides, the commonest being MnO_2 (pyrolusite). It is used as a coloring oxide (red or purple); mixed with the oxides of cobalt, chromium, and iron, it produces a black. This oxide is also used to color facing bricks, and to promote adherence of ground-coat vitreous enamels to the base metal. *Dodd. See also* manganite; psilomelane.

manganese sicklerite. Name applied to the manganese sicklerite derived from lithiophilite. From Varuträsk, near Boliden, Sweden. *English.*

manganese silicate. A mineral, $MnSiO_3$. *See also* rhodonite. *C.M.D.*

manganese spar. *See* rhodonite; rhodochrosite. *Webster 3d.*

manganese stains. Strongly colored yellowish, reddish, or brownish deposits of manganese oxides. *Skow.*

manganese steel. A term sometimes applied to any steel containing more manganese than is usually present in carbon steel (that is, 0.3 to 0.8 percent), but generally to austenitic (Hadfield's) manganese steel, which contains 11 to 14 percent manganese. This steel is very resistant to shock and wear, and used for railway crossings and switches, rock-crusher parts, dredger buckets, etc. *C.T.D.*

manganese tungstate. *See* wolframite.

manganic. Of, pertaining to, or containing manganese in the trivalent state; for example, manganic oxide (Mn_2O_3). *Bennett 2d, 1962.*

manganic hydroxide; manganese hydroxide. Brown; $Mn(OH)_3$; rapidly loses water to form $MnO(OH)$; specific gravity, 3.258; decomposes on heating; decomposes in acids; and insoluble in water. Used in ceramics. *CCD 6d, 1961.*

manganiferous iron ore. A term used by the Bureau of Mines for ores containing 5 to 10 percent manganese. *BuMines Bull. 630, 1965, p. 554.*

manganiferous ore. A term used by the Bureau of Mines for any ore of importance for its manganese content containing less than 35 percent manganese but not less than 5 percent. *BuMines Bull. 630, 1965, p. 555.*

manganin. An alloy in which manganese and nickel are compounded in somewhat small proportions with copper, the ratio of manganese to nickel being as 3 or 4 to 1. This alloy is used almost exclusively in the construction of a standard of electrical resistance, the temperature coefficient being practically zero. *Standard, 1964.*

manganite; gray manganese ore. Steel-gray to iron-black mineral, $Mn_2O_3.H_2O$, reddish-brown to black streak, submetallic luster. Contains 62.4 percent manganese; 27.3 percent oxygen; 10.3 percent water. Formed in the same deposits as pyrolusite which is frequently an alteration product of manganite. Specific gravity, 4.2 to 4.4; hardness, 4. Insoluble in water; soluble in hot sulfuric acid and hydrochloric acid. Found in Michigan, Colorado; Germany, Sweden, England, Canada. An important ore of manganese. *CCD 6d, 1961.*

mangan neptunite. A variety of neptunite with Fe:Mn=1:2. Dark red crystals. From Kola Peninsula, Russian Lapland, U.S.S.R. *English.*

manganocalcite. A variety of calcite that contains manganese carbonate and is closely related to rhodochrosite. *Standard, 1964.*

manganolangbeinite. A rose-red sulfate of manganese and potassium, $K_2Mn_2(SO_4)_3$. Isometric. Small tetrahedrons. From Vesuvius, Italy. *English.*

manganolite. Wadsworth's name for rocks composed of manganese minerals, such as wad, psilomelane, etc. *Fay.*

manganosiderite. A carbonate of manganese and iron intermediate between rhodochrosite and siderite. *Fay.*

manganosite. Manganous oxide, MnO. In isometric octahedrons; cleavage cubic. Color emerald-green, becoming black on exposure. *Fay.*

manganosteenstrupine. An amorphous (metamict?) material in pegmatites on Mount Karnasurt, Kola Peninsula, U.S.S.R., that is formulated $(Ln,Th,Ca)MnSiO_3(OH)_3.2H_2O$ and regarded as a manganese analogue of steenstrupine. *Hey, M.M., 1961.*

manganotantalite. A variety of columbite-tantalite; essentially a tantalite with divalent manganese substituting for most of the ferrous iron, $(Mn,Fe)O.(Ta,Cb)_2O_5$; orthorhombic. *Dana 17; Crosby, p. 119.*

manganous. Of, pertaining to, or containing manganese in the bivalent state; for example, manganous oxide (MnO). *Bureau of Mines Staff.*

manganous nitrate; manganese nitrate. Colorless or pink; monoclinic; $Mn(NO_3)_2.4H_2O$; molecular weight, 251.01; very soluble in water; deliquescent; very soluble in alcohol; specific gravity, 1.82; melting point, 26° C; and boiling point, 129° C. Used in ceramics and as a catalyst. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-192.*

manganous oxide; manganese oxide; manganese monoxide; manganosite. Grass-green; isometric; MnO; soluble in acids and in ammonium chloride; insoluble in water; Mohs' hardness, 5.0 to 6.0; specific gravity, 5.18 to 5.46; and melting point, 1,650° C but converted to Mn_3O_4 if heated in air. Used in ceramics and in colored glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 4th ed., 1964, pp. B-192, B-245.*

manganous sulfate terathydrate; manganese sulfate tetrahydrate. Translucent; pink or pale rose-red; efflorescent; monoclinic or orthorhombic prisms; $MnSO_4.4H_2O$; molecular weight, 223.06; soluble in water; insoluble in alcohol; specific gravity, 2.107; melting point, 30° C; melting point, (anhydrous), 700° C; and it decomposes at 850° C. Used in ceramics and in ore flotation. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-193.*

manganpyrosmalite. Variety of pyrosmalite with manganese in excess of iron. *Spencer 20, M.M., 1955.*

mangle; mangle dryer. A vertical continuous dryer used for drying clayware and glazed bisque ware. *Rosenthal.*

mangrove coast. A tropical coast the shoreline of which is overgrown by a mangrove vegetation. *Schieferdecker.*

man-hoist engineer. In bituminous coal mining, one who operates the hoisting engine that serves the shaft in which only men are raised from and lowered into a mine. *D.O.T. 1.*

manhole. a. A safety hole. *Hudson.* b. Cubicles cut into the solid strata or built into the gob pile along haulageways in which miners can be safe from passing locomotives and cars. Also called refuge hole. *B.C.I.* c. A refuge hole constructed in the side of a gangway, tunnel, or slope. *Fay.* d. A small and generally very short passage used only for the ingress and egress of the miners. *Fay.* e. A hole in cylindrical boilers through which a man can get into the boiler to examine and repair it. *Fay.* f. A small passage connecting a level with a stope, or with the level next above. *Webster 2d.*

manhole cover. A movable cast-iron plate fitting a cast-iron frame bedded on a rebated concrete slab or kerb over a manhole. Covers over foul drains are formed with a seal to prevent escape of foul air. *See also* double-seal manhole cover. *Ham.*

man hudge. Glouc. A kind of barrel or box in which men ride in a shaft. *Fay.*

manifold. a. A chamber or tube having a number of inlets and one outlet, or one inlet and several outlets. *Nichols.* b. A multiple header for connecting several fluid streams. *ASM Gloss.*

manila. The fiber of Musa textiles; manila hemp. *Zern.*

manila rope. Broadly, rope or cordage formed from twisted fibers obtained from abaca, agave, or hemp plants. *Long.*

manipulated variable. In flotation, a quantity or condition which is varied as a function of the actuating signal so as to change the value of the controlled variable. *Fuerstenau, p. 542.*

manipulator. a. A machine for moving and turning over hot billets or blooms of iron or steel in the process of rolling. *Standard, 1964.* b. A mechanical device used for safe handling of radioactive materials. Frequently, it is remotely controlled from behind a protective shield. *L&L.*

manjak. A high grade of asphalt used largely in paints and varnishes. *Mersereau, 4th, p. 206.*

manjakite. An igneous rock with a granoblastic structure containing phenoblasts of almandine pyrope, biotite, pyroxene, and a varying amount of feldspar, magnetite, hypersthene, and labradorite. Similar in composition to kentallenitic monzonite but with less calcium. *Hess.*

manless coal face. A coal face manned by remotely controlled equipment that eliminates the need for men in dangerous places. *Encyclopaedia Britannica. Britannica Book of the Year, 1964, p. 570-571.*

manless coal mining. Longwall coal faces equipped for the automatic starting, stopping, and steering of power-loading machines as well as the manipulation of electric trailing cables, including air and water hoses; controlled automatic advancing of face conveyors as well as advancing and setting of roof supports. Each and all operations are correctly phased and accomplished from a remote point. With the advent of electronics and automation techniques the prospects of manless coal mining are very promising. *Nelson.*

manless face. A longwall face on which the coal is cut and brought out to the gate road mechanically, without the aid of miners on the face. The face is unsupported. In general, the coal seam is thin but of high grade, and some type of rapid plow is employed. *See also* coal-sensing probe; ram scraper. *Nelson.*

manlock. An air lock through which men pass to a working chamber which is under air pressure. *See also* decanting. *Ham.*

man machine; man engine. Corn.; Derb. An obsolete term for a mechanical lift for lowering and raising miners in a shaft by means of a reciprocating vertical rod of heavy timber with platforms at intervals, or of two such rods moving in opposite directions. In the former case, stationary platforms are placed in the shaft, so that the miner in descending, for instance, can step from the moving platform at the end of the downstroke and step back upon the next platform below at the beginning of the next downstroke. When two rods are employed, the miner steps from the platform on one rod to that on the other. *Fay.*

manmade diamond. Diamond produced synthetically. Also called MM diamond. *See also* diamond, c. *Long.*

Mannehim process. Contact method of catalyzing SO_2 to SO_3 in two stages, using first iron oxide and second platinized asbestos as catalysts. *Pryor, 3.*

Mannesmann mill. A mill used in the Mannesmann process. *ASM Gloss.*

Mannesmann process. A process used for piercing tube billets in making seamless tubing. The billet is rotated between two heavy rolls mounted at an angle and forced over a fixed mandrel. *ASM Gloss.*

Manning's formula. An empirical formula for the value of the coefficient, C, in the Chezy formula, the factors of which are the hydraulic radius and a coefficient of roughness; a simplification of the Kutter formula. *Seelye, 1.*

man-of-war. Staff. A small pillar of coal left in a critical spot; also, a principal support in thick coal workings. *Fay.*

manometer. a. Any instrument which measures gaseous pressure. *Nelson.* b. Measures pressure or a pressure difference by balancing the applied pressure against the hydrostatic head of a column of liquid of known density. In practice, most manometers measure a pressure difference, so that if an absolute pressure is to be measured, it is essential to have access to an accurate barometer to determine the atmospheric pressure. *Roberts, I, p. 24.* c. An instrument designed to give a continuous record of the pressure of an explosion at the point where the instrument is located. *Rice, George S. See also* Chattock - Fry tilting micromanometer; curved-tube manometer; inclined tube manometer; inclined U-gage; micromanometer; piezometer; two-liquid differential manometer; U-tube manometer; vernier-reading manometer; water gage. *Roberts, I, pp. 24-36.*

manometer calibration. Many manometers require calibration and this may be carried out by the (1) static method in which simultaneous readings of the manometer under test and the primary standard are taken when one limb of the manometer and the standard are connected to a variable pressure source, the other limbs being connected to a source of constant pressure, or (2) the dynamic method in which the difference in pressure obtained between a low-speed atmospheric wind-tunnel hole (static pressure) and the atmospheric static pressure is used to carry out the calibration. One limb of the manometer and the low pressure side of the Chattock-Fry are connected to the tunnel-wall hole (reference variable pressure) while the other limb of the manometer is connected to the atmospheric outlet of the Chattock-Fry. *Roberts, I, pp. 36-37.*

manometric efficiency. a. The ratio of the actual head developed to the velocity pressure of air moving at the fan-tip speed, equal to one-half the theoretical head of a radial-tip fan. *Hartman, p. 182.* b. An indication of the capability of the fan to produce pressure and is the ratio of the initial depression to the theoretical depression.

$$\text{Manometric efficiency} = 4{,}380\ \frac{\text{Total w.g.}}{U^2}$$

where U=tip speed in feet per second of fan blades. *Nelson.* c. The chief value of the manometric efficiency lies in its being a rough check on the mechanical efficiency of the fan. *Lewis, p. 725.*

manoscope. A manometer. *Standard, 1964.*

manoscopy. The science of determining the density of gases and vapors. *Standard, 1964.*

manpower deloyment. *See* deployment of manpower. *Nelson.*

manpower deployment chart. A chart or record on a board showing at a glance the position of every workman underground very shortly after the beginning of a shift. It assists the officials in deploying the men to ensure that the right persons are withdrawn from their usual employment to replace absentees, with as little delay as possible. *See also* daily manning sheet. *Nelson.*

man-riding car. A car or carriage designed for the riding of miners to and from the workings. The car body has a low center of gravity to avoid the risk of overturning, and is fitted with track brakes and an overspeed clutch. The train set is arranged to brake from the rear to avoid pileup and the brakes are applied immediately on overspeed from a preset velocity. *Nelson.*

man-riding conductor. A man appointed by the mine manager to be in charge of the running of a train of man-riding cars. He is the responsible person for starting and stopping the vehicles, for giving the proper signals, and for seeing that the safe seating capacity is not exceeded. During the shift he is employed on other duties. *Nelson.*

man rope. A winding rope used exclusively for lowering and raising men and animals, when tacklers and swinging bonts were used and cages were unknown. *Fay.*

Mansard roof. A tiled roof having a steeper pitch towards the eaves than towards the ridge; the term is also applied to a flat-topped roof with steeply pitched tiling towards the eaves. *Dodd.*

mansfieldite. A white to pale gray mineral, $Al_2O_3.As_2O_5.4H_2O$, occurring as porous, cellular masses of spherulitic fibers; an end member of the isomorphous mansfieldite-scorodite series. From Hobart Butte, Lane County, Ore. Vitreous luster; orthorhombic. *American Mineralogist, v. 31, No. 3-4, March-April 1946, p. 189.*

manshift. The output or work done by a man in one shift; a basis for assessing the magnitude of a job to complete. *See also* O.M.S. *Nelson.*

Manson effect. The boiling of vitreous enamel that occurs when heated cast-iron is dredged with only a thin coating of enamel, which is allowed to fuse before a further coating of enamel has been applied. The effect was first observed by M. E. Manson. *Dodd.*

mantel block. a. A refractory block for use in the gable wall of a glass tank furnace above the dog house. *See also* doghouse. *Dodd.* b. The upper course of refractory blocks, in a sheet glass furnace, enclosing the Fourcault drawing pit. *Dodd.*

Man-Ten steel alloy. An alloy containing 0.35 percent carbon as maximum, from 0.25 to 1.75 percent manganese, 0.10 to 0.30 percent silicon, 0.01 to 0.25 percent copper, 0 to 0.40 percent molybdenum, and 0 to 0.20 percent vanadium. Used for bodies and doors of stripping shovel dippers, which have manganese steel for bail, lip, and renewable teeth. *Lewis, p. 533.*

mantle. a. The soil or other unconsolidated rock material more commonly referred to as overburden. *See also* burden, a; cover, d. *Long.* b. In comminution, a sheath of manganese steel which fits over the iron or steel cone of the breaking (gyrating) head of a gyratory crusher. In metallurgy, that part of the blast furnace which carries the weight of the stack, continuing up from the bosh. *Pryor, 3.* c. The layer of the earth between the crust and core; bounded above by the Mohorovicic discontinuity at about 35 kilometers below the continents and about 10 kilometers below the oceans; bounded below by the Weichert-Gutenberg discontinuity about 2,900 kilometers below the surface of the earth; believed to consist of ultrabasic material. *A.G.I. Supp.* d. Synonym for mantle rock; regolith. *A.G.I. Supp.* e. A penstock for a waterwheel. *Fay.* f. The outer covering of a wall when this is of different material from the inner part. *C.T.D.*

mantle rock. Synonym for regolith. *A.G.I.*

manto. A blanketlike replacement of rock (commonly limestone) by ore. In some districts, the term has been modified to designate a pipe-shaped deposit confined within a single stratigraphic horizon. *A.G.I.*

man trip. a. A trip made by mine cars and locomotives to take men rather than coal, to and from the working places. *B.C.I.* b. Trip made by a man cage in a shaft to take men rather than ore, to and from a working place in a mine. *Bureau of Mines Staff.*

manual haulage; hand tramming; putting. The practice of pushing tubs, trams, etc., by hand. *Sinclair, V, p. 350.*

manual takeup. A hand-operated mechanism for adjusting the takeup or movable pulley. *NEMA MB1-1961.*

manual-type belt tensioning device. A hand-operated mechanism for adjusting a take-up pulley to vary the tension in a conveyor belt. The most common types are chain-jack, sylvester, rack, and screw. *NEMA MB1-1956.*

manual welding. Welding wherein the entire welding operation is performed and controlled by hand. *Coal Age, v. 66, No. 3, Mar. 1961, p. 91.*

manual winding control. A system in which the winder is controlled in the conventional manner by the driver following the usual bell signals from the onsetter and the banksman. The system of control ensures that the speed of the winder follows closely the position of the driver's level, driving or dynamic braking being applied automatically to the motor as may be required to preserve the chosen speed. *See also* automatic cyclic winding. *Nelson.*

manufactured alumina. An abrasive consisting essentially of alumina made by crystallization from a melt or by sintering various mixtures. Various alumina types are listed under the titles: friable, microcrystalline, regular ruby, semifriable, single-crystal, sintered, and white. *ACSG, 1963.*

manufactured gas. A mixture of gaseous hydrocarbons produced from coal or oil. *Barger.*

manufactured marble. A mixture of marble dust and plastics. *Bureau of Mines Staff.*

manufactured sand. Fine aggregate produced by crushing rock. *AIME, pp. 286-288.*

manufactured stone. In gemmology, any manmade substitute for a genuine gemstone. It may be an imitation, a synthetic stone, or any other manmade reproduction. *Shipley.*

manus tester. An instrument for determining the flashpoint of petroleum. *Fay.*

manway. a. A compartment, vertical or inclined, for the accommodation of ladders, pipes, and timber chutes. The drivage may be a winze or a raise and its purpose is to give convenient access to a stope. Also called ladderway. *Nelson.* b. A passageway for the use of miners only; an airshaft; a chute. *Standard, 1964.* c. Eng. A manhole. *Standard, 1964.* d. A passage in or into a mine used as a footpath for workers. *Korson.* e. A short heading between two chutes. *Fay.*

manx stone. *See* china stone. *Dodd.*

map. a. A horizontal projection of surface plants, mine workings, or both, drawn to a definite scale, upon which is shown all the important features of the mine; a plan; a plat. *Fay.* b. The act of preparing such plans of a mine. *Bureau of Mines Staff.* c. A representation to a definite scale on a horizontal plane of the physical features of a portion of the earth's surface (natural or artificial or both) by means of symbols, which may emphasize, generalize, or omit certain features as conditions may warrant. A map may be derived from ground surveys made by transit, plane table, or camera, or from aerial photographic surveys, or both. *Seelye, 2.*

map projection. A method of representing the curved surface of the earth on a flat surface map. As the only true shape of the earth is a globe, it is impossible to make a map of large areas of the earth's surface without some distortion. *Ham.*

maraging steel. Ultrahigh-strength, low-carbon iron alloys with 18 to 25 percent nickel. *Encyclopaedia Britannica. Britannica Book of the Year, 1963, p. 550.*

Marathonian orogeny. Post-Pennsylvanian diastrophism. *A.G.I. Supp.*

marathon mill. A form of tube mill used in the cement industry, in which the pulverizing is done by long pieces of hardened steel shafting. *Liddel 2d, p. 357.*

marauder. A prospector or placer miner who works any gold-bearing territory he can find, regardless of its ownership. *Hoov, p. 496.*

marbel band. Scot. Musselband ironstone. *Fay.*

marbella. A Spanish magnetite with a siliceous gangue. *Osborne.*

marble. Denotes a metamorphic rock composed essentially of calcite, dolomite, or a combination of the two, but long usage of the term by the quarry industry also includes serpentines, alabaster, onyx, travertines, and some granites. *BuMines Bull. 630, 1965, p. 876.* A true marble is a limestone which has been crystallized by heat or pressure and is capable of taking a polish. Commercially, any limestone that is sufficiently hard and coherent to take a good polish is called a marble. For statuary and monumental work a fine even texture and uniform color are required, although colored marbles are used. *Nelson.*

marble cleaner. In the stonework industry, one who removes stains from the finished surfaces of marble blocks and slabs with cleaning solution and a cloth, taking extreme care not to damage the stone where the stains are deep. *D.O.T. 1.*

marbled glaze. A glaze coating on pottery, having colored veins in imitation of marble. *Standard, 1964.*

marble dust. Crushed and pulverized limestone. Large quantities are used in making putty. *Crispin.*

marble handsaw. A toothless blade fitted at the back with a block handle, used with sand for cutting slabs of marble into pieces. *Fay.*

marbleized. An enameled surface color grained to give the appearance of variegated marble. Color may be applied on either the fired or unfired enamel surface. *ACSB-3.*

marbleized finish. A surface appearance, obtained by coloring and graining, that resembles variegated marble. *ASTM C286-65.*

marbleizer. In the stonework industry, one who makes imitation marble from slate. *D.O.T. 1.*

marble-machine operator. One who makes marbles of various colors and sizes from molten glass, using an automatic machine. *D.O.T. Supp.*

marble polisher. a. A block of sandstone used to rub a marble slab in the preliminary polishing. Also a linen cushion with which the polishing is completed by the agency of emery dust, etc. *Fay.* b. A machine for polishing marble. *Fay.* c. A marble rubber. *Fay.* d. One who polishes the flat rough sawed or bed rubbed surfaces of marble blocks or slabs to a high luster by machine. Also called finisher; buffer; stone finisher. *See also* stone polisher. *D.O.T. 1.*

marbler. A quarrier or cutter of marble. *Fay.*

marble rubber. a. A rubber for surfacing, smoothing, and polishing marble slabs. *Fay.* b. *See* bed rubber. *D.O.T. 1.*

marble saw. A toothless blade used with sand in marble cutting. *Standard, 1964.*

Marble's reagent. An etchant for stainless steels, consisting of 4 grams of copper sulfate in 20 milliliters hydrochloric acid and 20 milliliters of water. *Osborne.*

marble ware. Articles decorated in the unbaked state with opaque slips and colored transparent glazes to represent marble, and then fired in the kiln. *C.T.D.*

marble wax. Local Galician name for a variety of ozokerite of pale yellow color veined with greenish, brownish, and black markings. *Tomkeieff, 1954.*

marble worker. *See* stonecutter, hand. *D.O.T. 1.*

marbling. A procedure sometimes used by the studio potter; the marble effect is obtained by covering the piece of previously dried ware with colored slips and then shaking the ware (while the slips are still wet) to make the colors run into one another. *Dodd.*

marcasite. a. White iron pyrites, FeS_2, the orthorhombic dimorph of pyrite, having a lower specific gravity, less stability, and a paler color. Often called white iron pyrites, coxcomb pyrites, and spear pyrites. *A.G.I.* b. In the gem-stone trade, marcasite is either pyrite, polished steel (widely used at present in ornamental jewelry in the form of small brilliants), or even white metal. *C.T.D.*

march. The border or limit of a mineral area leased to, or owned by, a mining company. *See also* boundary. *Nelson.*

marching. Scot. A boundary working. *Fay.*

marchite. An igneous rock consisting essentially of enstatite and diopside. *Johannsen, v. 4, 1938, p. 461.*

march place. Scot. A heading driven up to or alongside the march, or boundary of a mining property. *Fay.*

march stones. Scot. Stones set at intervals on the surface to indicate the boundary line. *Fay.*

marco. a. Sp. A weight equal to one-sixth of an avoirdupois pound. Silver assays are expressed in marcos per ton. *Hess.* b. Mex. Set of shaft timbers; square set. Timber frame of any kind. *Fay.* c. Mex. A weight of 8.1184 ounces avoirdupois, or 7.3995 ounces troy. *Fay.* d. Chile. A pulley frame. *Fay.*

marcus. a. A patented shaker screen with a nonharmonic or quick-return motion. *Zern.* b. A large hammer with an iron head. *C.T.D.*

Marcy mill. A ball mill in which a vertical grate diaphragm is placed near the discharge end. Between this perforated diaphragm and the end of the tube, there are arranged screens for sizing the material, oversize being returned for further grinding while undersize is discharged. *Liddell 2d, p. 357.*

mare balls. Eng. Spherical ferruginous concretions, Yorkshire and Lancashire. *Compare* caballa balls. *Arkell.*

marekanite. A rhyolitic perlite broken down into more or less rounded pebbles. *C.T.D.* It is of special interest because of its low water content compared with that of the surrounding perlite. The difference is often as great as 1 to 10. *A.G.I.*

mareugite. An even-grained theralitic rock, consisting of bytownite and haüyne with variable and sometimes considerable amounts of hornblende and augite. *Holmes, 1928.*

Marezzo marble. An artificial marble made with Keene's cement. *C.T.D.*

margarite. a. A crystallite consisting of an aggregate of globulites arranged like beads in a linear series. *A.G.I.; Dana 17.* b. A monoclinic mineral, $CaAl_2(Si_2Al_2)O_{10}(OH)_2$, member of the mica group. Color, grayish, reddish-white, pink, and yellowish. *A.G.I.; Dana 17.*

margarodite. A variety of muscovite, or common potash mica, affording upon ignition, a small percentage of water. *Fay.*

margarosanite. A colorless or snow-white silicate of lead, calcium. and manganese, $Pb(Ca,Mn)_2(SiO_3)_3$. Triclinic. Prismatic crystals; lamellar or columnar. From Franklin, N. J.; Langban, Sweden. *English.*

margaryize. The impregnation of timber with a solution of copper sulfate. *Fay.*

margin. The cylindrical portion of the land of a drill that is not cut away to provide clearance. *ASM Gloss.*

marginal assimilation. The solution and incorporation of country rock into the margins of an intruding igneous mass. *Stokes and Varnes, 1955.*

marginal deposit. A magmatic segregation deposit at the bottom and periphery of the instrusive mother rock; for example, nickel-copper-sulfide deposits at Sudbury, Ontario, Canada. *Schieferdecker.*

marginal fissure. A joint along the margin of an intrusive body that dips inward toward the intrusive. *A.G.I.*

marginal mine. S. Afr. A mine which just manages to pay its way but may be unable to do so if the price of its product falls or its production costs rise slightly. *Beerman.*

marginal ore deposit. A deposit near the lower limit of commercial workability. *Bateman.*

marginal sea. An adjacent sea that is widely open to the ocean. *See also* adjacent sea. *A.G.I.*

marginal thrust. A thrust fault along the margin of an intrusive that dips toward the intrusive. Synonym for marginal upthrust. *A.G.I.*

marginal upthrust. *See* marginal thrust. *A.G.I.*

marginal utility. Factor which controls demand, and hence pricing of product. Marginal increment at which buyer is just induced to acquire a product. *Pryor, 3.*

margination texture. Proposed by Holmquist (1906) for a texture of granites that is characterized by curved and sinuous contacts between the quartz and the feldspar grains, the mineral material of later crystallization having corroded the mineral already formed. *Holmes, 1920.*

margin draft. In masonry, the plain-dressed portion of the face of a hewn block next to its edge. *Standard, 1964.*

margin of safety. As used in aeronautical design, the term means the percentage by which the ultimate strength of a member exceeds the design load. The design load is the applied load, or maximum probable load, multiplied by a specified factor of safety. The use of the terms margin of safety and design load in the above sense is practically restricted to aeronautical engineering. *Ro.*

maria glass. An early name for both mica and selenite. *Fay.*

marialite. A variety of scapolite, $(Na,Ca)_4Al_3(Al\,Si)_3Si_6O_{24}(Cl,CO_3,SO_4)$; tetragonal. *Fay; Dana 17.*

marienbergite. A porphyritic igneous rock containing phenocrysts of sanidine, andesine, zoned augite, remnants of resorbed hornblende, and some biotite in a dense green-gray to ash-gray groundmass. The rock contains 20 to 30 percent natrolite. *Johannsen, v. 4, 1938, p. 169.*

Marietta miner. Trade name for a heavy caterpillar-mounted continuous miner for operation in thick seams. The front end contains two cutter arms which rotate in opposite directions to sweep the coal they cut inwards towards the center. The broken coal is taken back through the machine to a chain conveyor. Two cutter chains are arranged at roof and floor level behind the arms to cut down the coal left between the rotating arms. The machine cuts an area 12 feet wide and 7 feet high. Power is supplied by two motors, one of 70 horsepower and the other 25 horsepower. It has a continuous capacity from 3 to 3½ tons per minute. This machine has been subject to several modifications. *Nelson.*

marigraph. A gage set up at a tidal observation station to record the heights of the tide. *Ham.*

marine. Of or pertaining to the sea, particularly as applied to deposits and erosion. *Challinor.*

marine abrasion. *See* marine erosion. *Schieferdecker.*

marine band. Roof shale overlying coal seams and being uncommonly high in content of freshwater or marine shells. Also called mussel band. *See also* plant bed. *A.G.I.*

marine bed. *See* marine band. *B.S. 3618, 1964, sec. 5.*

marine biology. That science which treats of the living organisms of the sea, the chemical and physical characteristics of their environment and factors affecting their distribution. *Hy.*

marine borers. Crustaceans and molluscs which are generally found in warm waters and attack timber by eating into it. *See also* gribble. *Ham.*

marine-built platform. *See* wave-built platform. *Schieferdecker.*

marine clay. A clay which has been accumulated as a sediment on the sea floor. Such clays do not include estuarine or sea-delta deposits, but they may grade into them. *ACSB-1.*

marine corrasion. *See* marine erosion. *Schieferdecker.*

marine-cut platform. *See* wave-cut platform. *Schieferdecker.*

marine-cut terrace. Synonym for plain of marine abrasion; plain of marine denudation; plain of marine erosion; plain of submarine denudation; shore platform; wave-cut plain; wave-cut terrace. *A.G.I.*

marine cycle. *See* shoreline cyle. *Schieferdecker.*

marine deposit. a. A sedimentary deposit laid down in the sea, usually beyond the seaward edge of the littoral belt. *Stokes and Varnes, 1955.* b. Rock waste laid down under marine conditions. *C.T.D.*

marine engine oil. A petroleum oil compounded with blown rapeseed oil and used for lubricating the crankshafts of marine engines. *Shell Oil Co.*

marine environment. Comprising all sea floors below the upper tidal limit. *Schieferdecker.*

marine erosion; marine abrasion; marine corrasion; wave erosion. Erosion by moving seawater, the action of which is largely intensified by detritus carried by it. *Schieferdecker.*

marine humus. Organic matter deposited on the sea bottom. *Tomkeieff, 1954.*

marine invasion. The spread of the sea over land areas. *Schieferdecker.*

marine metal. A sheathing material for ships, usually an alloy, principally copper. *Standard, 1964.*

marine plain of denudation. *See* plain of marine erosion. *Schieferdecker.*

mariner's compass. Consists essentially of a magnetic needle fastened beneath a graduated cardboard face or dial, free to swing on a pivot and enclosed in a nonmagnetic case. The compass case is pivoted on two sets of gimbals at right angles to enable the instrument to remain perfectly horizontal as the ship rolls. *Morris and Cooper,* p. 205.

marine salt. An early chemical name for sodium chloride, particularly because of its source. *Kaufmann.*

marine science. Any of the single sciences which together comprise the field of oceanography, such as marine geology, chemical oceanography, or physical oceanography. *Hy.*

marine surveying. The study and mapping of the seabed with an estimation of currents and other linked factors. *Ham.*

marine terrace; coastal terrace; shore terrace. Strip of fossil wave-cut platform, at the landward side of which the old cliff is situated and at the seaward side of which a new cliff has been formed. *Schieferdecker.*

mariopteris. A fernlike tree of the coal forest, the pinnules of which were large and contracted at the base. *Nelson.*

Mariotte tube. An orifice-type viscometer designed by E. Mariotte in Paris, France, in 1700. One such instrument with a tube diameter of 2⅞ inches and an ⅛-inch orifice has been used for the assessment of the fluidity of clay slips. *Dodd.*

mariposite. A light green variety of muscovite found with pyrite. *Standard, 1964.*

maritime plants. Plants which grow naturally under salty conditions on a foreshore and which may materially help to prevent scour and stabilize sand dunes. *Ham.*

mariupolite. Albite-nepheline syenite with aegirine, lepidomelane, and accessory zircon and fluorite. *A.G.I.*

mark. a. A band of hemp, etc., wrapped around a winding rope to indicate to the engineer the position of the cage in the shaft. *Fay.* b. The chalk mark made at the working faces, etc., by a fire boss as an indication that he has made an examination of that place. *Fay.*

marken. Forest of Dean. Miners' term for soft carbonaceous shale with a black silky surface luster—an impure cannel coal. *Tomkeieff, 1954.*

marker. a. A stratified rock having characteristics distinctive enough for it to serve as a readily identifiable subsurface reference or geologic horizon in a borehole or mine working. Also called marked bed; marker formation. *Long.* b. Synonym for marker block. *Long.* c. S. Afr. Outcrop. *Hess.*

marker bed. a. A bed that accounts for a characteristic segment of a seismic refraction time-distance curve and which can be followed over reasonably extensive areas. Synonym for marker horizon. *A.G.I.* b. A bed that yields characteristic reflections over a more or less extensive area. *See also* horizon. *A.G.I.* c. A stratigraphic bed selected for use in preparing structural maps, paleogeologic maps, and other maps that emphasize the nature or attitude of a plane or a surface. Generally selected for lithologic characteristics, but biologic factors and unconformities may control. Also called key bed. *See also* horizon, a. *A.G.I.* d. *See* marker, a. *Long.*

marker block. A small block on which the footage below the collar of a borehole is marked and inserted between pieces of core at its appropriate place in a core box to indicate the depth in the borehole at which the core was obtained. Also called footage block; footmark; marker. *Long.*

marker formation. *See* marker, a. *Long.*

marker horizon. Synonym for marker bed, a and b. *A.G.I.*

marketable copper. A name given in the trade to copper which has been smelted from its ores; tough pitch copper. It contains approximately 99.5 percent copper. *Camm.*

market house. Eng. A point near the mine entrance to which loaded mine cars are taken for examination when it is suspected that the miner has loaded more than the allowable amount of rock with the coal. *Fay.*

marketing department. A department formed (1) to ensure that the customer is provided with the grade most suitable to his requirements; (2) to ensure that the price is consistent with the quality and value of the mineral or coal supplied; and (3) to anticipate markets for increased outputs. *Nelson.*

market lead. Lead ready for market. *Standard, 1964.*

market pot. In silver refining, the pot at the end of the series of pots used in the Pattinson process, in the direction in which the amount of silver left in the lead is diminishing. It contains the market lead. *Fay.*

market value. The market value of a company is that which would be obtained by liquidating its assets through ordinary commercial transactions, after satisfaction of external liabilities. *Truscott, p. 275.*

markfieldite. An igneous rock composed of idiomorphic crystals of plagioclase, together with augite and/or hornblende, embedded in a groundmass of micropegmatite. A dioritic granophyre, intermediate between granophyre and granodolerite. *Holmes, 1928.*

Markham throwing belt. This machine consists of a high-speed belt driven at a speed of 50 feet per second by a 10 horsepower compressed-air motor. Stowing dirt is fed in at the bottom and is pressed onto the belt by centrifugal force. It is ejected at a velocity approaching that of the belt. Wet washery material can be used and material up to 4 inch size can be thrown up to 50 feet. *Mason, v. 2, pp. 573-574.*

markings. Stakes, posts, piles of stone, boulders, blazing trees along the boundaries of the claim or at the corners thereof, cutting away undergrowth, making a trail through the timber along the sides or ends of the claim, putting up a stake at the point of discovery, blazing stumps, posting a notice at the point of discovery, posting a notice upon the ground, placing such notice in a tin can and attaching it to a stake, fastening such notice to a tree or placing it in a box, are all markings. *Ricketts, I.*

marking stone. Red ocher; raddle. *Arkell.*

Markle basalt. A type of the Scottish Carboniferous basalts; characterized by the presence of large and numerous phenocrysts of labradorite with small grains of olivine in a normal basaltic groundmass. The type differs from the Jedburgh type in being much more conspicuously porphyritic. *Holmes, 1928.*

markovnikovite. Variety of petroleum found in Russia. *Tomkeieff, 1954.*

Mark V depth recorder. An instrument used by Oceanographic Office to obtain a continuous echo sounder profile of sea floor. *Hy.*

marl. a. A calcareous clay, or intimate mixture of clay and particles of calcite or dolomite, usually fragments of shells. Marl in America is chiefly applied to incoherent sands; but abroad, compact, impure limestones are also called marls.

Fay. b. A clay which contains sand and fluxes like feldspar and lime. *Rosenthal.*

marlaceous. Resembling or containing marl. *Standard, 1964.*

marl brick. A fine quality of brick used in the fronts of houses; a cutter. *Standard, 1964.*

marlinespike. A sharp-pointed and gradually tapered round iron, used in splicing ropes. *Fay.*

marlite. a. Marl that has become somewhat stony in character. *Fay.* b. Same as marlstone. *A.G.I.*

marloesite. An igneous rock somewhat resembling pantellerite, containing glomeroporphyritic groups of olivine and albite-oligoclase in a felted groundmass composed largely of soda feldspar. *Holmes, 1928.*

Marlow kiln. A tunnel kiln fired with producer gas and preheated air; it was first used, in Stoke-on-Trent, England, for the biscuit and glost firing of wall tiles. *Dodd.*

marlpit. A pit where marl is dug. *Webster 3d.*

marl slate. Calcareous shale; a variety of marl splitting into thin plates. *Fay.* Not a true slate. *C.T.D.*

marlstone. An indurated mixture of clay and calcium carbonate (rarely dolomite) that normally contains 25 to 75 percent clay. Same as marlite. *A.G.I.*

marlstone ore. A stratified ironstone located in the Midlands (England) and occurring at the top of the Middle Lias series. In south Lincolnshire and Leicestershire (England) it has a low iron content of 20 to 28 percent but with sufficient lime content to provide a self-fluxing ore. The workable ore generally lies under clay overburden. *Nelson.*

marly. Of, relating to, or resembling marl; abounding with marl. *Webster 3d.*

marmarization. The process by which limestone is altered to marble. Synonym for marmarosis. *Schieferdecker.*

marmarosh diamond. Same as dragomite. *Shipley.*

marmarosis; marmorosis. The process of crystallizing limestone to marble either by contact metamorphism or by regional metamorphism. Proposed by Geikie from the Latin for marble. *Fay.*

marmatite. A dark brown to black ferriferous variety of sphalerite, containing 10 percent or more, of iron. *Fay.*

marmolite. A thin laminated serpentine, usually pale green. *Webster 3d.*

marmoratum. A cement formed of pounded marble and lime mortar well beaten together. Used by the ancient Romans in building terrace walls, etc. *Fay.*

marmoric. Of or pertaining to marble. *Webster 2d.*

marm stone. Obsolete term for marble. *Arkell.*

marokite. Large black orthorhombic crystals, $CaMn_2O_4$, from Tachagalt, Ouarzazate, Morocco. *Hey, M.M., 1964; Fleischer.*

marosite. A variety of shonkinite containing major biotite and augite, minor sanidine, calcic plagioclase, and feldspathoid, and accessory apatite and opaque oxides. *A.G.I.*

Marquardt porcelain. A mullitic porcelain introduced early in the present century by the State Porcelain Factory, Berlin, chiefly for pyrometer sheaths and furnace tubes. Typically, the body consists of 55 percent clay, 22.5 percent feldspar, and 22.5 percent quartz; it is fired at 1,400° to 1,450° C for a sufficiently long time for all the quartz to dissolve so that the fired product consists of mullite in a glassy matrix. *Dodd.*

Marriner process. A modification of the cyanide process in which the ore is dead-roasted, all of it ground to slime, and the resulting product treated by agitation. *Liddell 2d, p. 494.*

marrow. a. Eng. Oxfordshire well sinkers' term for a fine-grained floury rock. *Arkell.* b. N. of Eng. A workmate or partner. In single place working, from two to six men may marrow up to form a set which pools and shares earnings equally. Marrows may work on different shifts although always in the same workplace. *Trist.*

marry. To combine; couple; attach. *Mason.*

Marsaut lamp. An earlier type of miners' flame safety lamp fitted with two or three conical gauzes, thus adding to the safety of the lamp when used in high air velocities. The Marsaut lamp is the basis of modern flame safety lamps. *Nelson.*

Mars brown. A yellowish-brown pigment, artificially prepared from earths, and colored by iron oxide. *Webster 3d.*

marscoite. A hybrid rock resulting from the partial absorption of granitic rock by a gabbro magma, containing xenocrysts of quartz and feldspar in a gabbroid matrix of abnormal composition. *Holmes, 1928.*

Marseilles tile. A clay roofing tile of the interlocking type, particularly of the pattern made in the Marseilles district of France. These tiles are made in a revolver press. *See also* revolver press. *Dodd.*

marsh. a. A tract of soft, wet or periodically inundated land, generally treeless and usually characterized by grasses and other low growth. *H&G.* b. A fen, swamp, or morass. *Webster 3d.*

marsh bar. The elevated outer margin of a salt marsh, genetically partly a natural levee, partly formed by waves. *Schieferdecker.*

marsh basin. Depression between raised banks of creeks in a salting. *Schieferdecker.*

marsh buggy. A special, self-propelled geophysical vehicle designated to operate over marsh or extremely soft ground, usually having wheels with very wide tread or buoyant wheels which will float the vehicle in water. *A.G.I.*

marsh creek. A drainage channel in a salt marsh. *Schieferdecker.*

Marsh funnel. An appliance for measuring viscosity. It consists of a copper funnel, about 12 inches long and a 6 inch diameter at the top, which has a 10-mesh screen over half its diameter to remove debris and a ¼-inch-diameter exit tube at the bottom through which the rate of flow is timed. It takes 26 seconds for a quart of clean water to flow through and correspondingly longer for muds of greater viscosity. Gel strength is measured by comparing the rate of flow of freshly agitated mud with that which has been allowed to remain quiescent for 10 minutes. *Nelson.*

marsh gas. a. Methane, CH_4. If the decaying matter at the bottom of a marsh or pond is stirred, bubbles of methane rise to the surface, thus the name marsh gas. *Nelson.* b. It is nonexplosive until met with air or oxygen. In miners' language, synonymous with firedamp. *See also* methane; firedamp. *B.C.I.; Fay.*

marshite. A reddish, oil-brown cuprous iodide, CuI; isometric; tetrahedral crystals. From Broken Hill, New South Wales, Australia. *English.* Has a dispersion exceeding that of diamond. *Larsen, p. 66.*

marsh ore. A synonym for bog iron ore. *Fay.*

marsh pan. *See* pan. *Schieferdecker.*

marsh peat. Peat consisting of a mixture of plant debris and sapropelic material. *Tomkeieff, 1954.*

marsut. *See* mazout.

martempering. Quenching an austenitized ferrous alloy in a medium at a temperature in the upper part of the martensite range, or slightly above that range, and holding it in the medium until the temperature throughout the alloy is substantially uniform. The alloy is then allowed to cool in air through the martensite range. *ASM Gloss.*

martenite. A synthetic fettling material, used for sintering open-hearth furnace bottoms. The approximate composition (variable) is: 5.2 percent silica, 2.1 percent alumina, 10.5 percent ferric oxide, 13.4 percent lime, 66.5 percent magnesia (ignition loss, 2.3 percent). Martenite sinters more rapidly than magnesite, thereby reducing repair time and, moreover, it is suitable for hot patching. Martenite is as wear-resistant as magnesite, and has no deleterious effect on the slag. *Osborne.*

martensite. a. In an alloy, a metastable transitional structure intermediate between two allotropic modifications whose abilities to dissolve a given solute differ considerably, the high-temperature phase having the greater solubility. The amount of the high-temperature phase transformed to martensite depends to a large extent upon the temperature attained in cooling, there being a rather distinct beginning temperature. *ASM Gloss.* b. A metastable phase of steel, formed by a transformation of austenite below the M_s (or Ar″) temperature. It is interstitial, supersaturated solid solution of carbon in iron having a body-centered tetragonal lattice. Its microstructure is characterized by an acicular or needlelike pattern. *ASM Gloss.*

martensite range. The temperature interval between M_s and M_f. *ASM Gloss.*

martensitic stainless steels. They contain from 11.5 to 18.0 percent chromium, the lower limit being the minimum necessary to maintain stainless characteristics. They are magnetic, hardenable by heat treatment, and provide the best combination of mechanical properties and corrosion resistance when in the hardened condition. *Henderson, p. 378.*

martensitic transformation. A reaction which takes place in some metals on cooling, with the formation of an acicular structure called martensite. *ASM Gloss.*

martial vitriol. *See* green vitriol.

martic. A mixture of bituminous matter, such as asphalt, and some foreign material, such as sand. *Mersereau, 4th, p. 206.*

martin. A stone-faced, perforated plate or runner, used for grinding and polishing stone. *Standard, 1964.*

Martindale dust respirator. A respirator, weighing 4½ ounces, which provides protection against mine dusts as fine as 0.5 micron and smaller. The filter box, containing the Ultron (ultramicron) filter, ensures an initial resistance to breathing of 0.65-inch water gage at 3 cubic feet per minute. The respirator is approved for use in British mines and quarries. *Nelson.*

martinite. a. A leucite-bearing orthoclase-plagioclase extrusive rock. *Johannsen, v. 4, 1948, p. 200.* b. A colorless mineral found in rhombic tablets with 65° angles; $5CaO.2P_2O_5.1\frac{1}{2}H_2O$; specific gravity, 2.89. *Larsen, p. 111.*

Martin process. Used in the manufacture of steel. Also called Siemens-Martin and open-hearth process. *Fay.*

martinsite. Synonym for kieserite. *Dana 6d, pp. 156, 932.*

martite. Ferric oxide, Fe_2O_3, occurring in iron-black crystals of isometric form, and probably a pseudomorph after magnetite. *Webster 3d; Dana 17.*

martörv. Shaly variety of peat found on the west coast of Jutland usually buried under sand dunes. *Tomkeieff, 1954.*

martourite. Synonym for berthierite. *Dana 6d, p. 114.*

marundite. A coarse-grained pegmatite consisting of corundum and margerite with accessory biotite, plagioclase, apatite, tourmaline, garnet, and kyanite. Allied to plumasite grading into normal pegmatite. *Hess.*

marver. A flat plate on which a hand gather of glass is rolled, shaped, and cooled; also, the process of doing same. *ASTM C162-66.*

maryanne. Capstan cage, used occasionally to move heavy or awkward loads down (or up) mine shaft. *Pryor, 3.*

Mary Kathleen. A large uranium ore body near Cloncurry in Queensland, Australia. The ore occurs in highly altered metasediments in the Corella beds of Lower Proterozoic age. *Nelson.*

masafuerite. A diaschistic olivine melabasalt dike rock with more olivine than any other mineral, and in addition, calcic plagioclase and augite. *Johannsen, v. 3, 1937, p. 334.*

masanite. A quartz monzonite prophyry having phenocrysts of zoned plagioclase and corroded quartz in a finely granitic or micropegmatitic groundmass. *Holmes, 1928.*

masanophyre. A masanite in which the feldspar phenocrysts are oligoclase mantled with orthoclase, and the groundmass contains blue-green hornblende and sphene. *Holmes, 1928.*

mascagnine. Original spelling of mascagnite. *Hey 2d, 1955.*

mascagnite. A native ammonium sulfate, $(NH_4)_2SO_4$, that occurs about volcanoes. Also called mascagnine. *Fay.*

mascot emerald. Trade name for genuine beryl triplet. *See also* emerald triplet. *Shipley.*

masculine. Applied to rubies of an intensely red hue. *Hess.*

maser. Contracted version of microwave amplification by simulated emission of radiation. A class of amplifier from which the optical laser was developed. *See also* laser. *Anderson.*

mash. Scot. A double-hand hammer for breaking coal, setting up props, etc. *Fay.*

mashing. The excessive granulation of a rock by crushing, accompanied by the displacement of the granules and often by recrystallization involving flow of the rock. *A.G.I.*

mash seam weld. A seam weld made in a lap joint, in which the thickness at the lap is reduced plastically to approximately the thickness of one of the lapped parts. *ASM Gloss.*

mask. a. A screen, usually made of tracing cloth, to subdue and diffuse the light behind a plumbline or other sighted object. *B.S. 3618, 1963, sec. 1.* b. *See* respirator. *Hansen.*

maskelynite. A mineral which occurs in colorless isotropic grains in meteorites and has a composition near labradorite. It probably represents refused feldspar. *C.M.D.*

masking. The same as blocking, b. *ASM Gloss.*

masking power. The ability of a fired glaze to mask visually the body on which it is applied. *ASTM C242-60T.*

masking tape. A tape used as a resist for stopping-off purposes. *ASM Gloss.*

mason. A mechanic whose occupation is the laying of brick and stone in building; one who has charge of or contracts for mason work; also, a stonecutter. *Standard, 1964.*

masonry. a. The art or work of constructing, as buildings, walls, etc., with regularly arranged stones or bricks; the occupation or skill of a mason. *Fay.* b. That which is built by masons; stonework; brickwork. *Fay.*

masonry bit. a. A thin-wall-type core bit used for drilling through building walls or floors, coring concrete, or asphalt pavements. *See also* thin-wall bit. *Long.* b. Carbide-tipped twist drill used to drill holes in plaster, masonry or concrete structures. *Bureau of Mines Staff.*

masonry cement. A masonry mortar, mixed at the mill, to which only the proper amount of sand and water must be added. *ACSG.*

masonry support. A support consisting of dry or wet stonework or brickwork. Concrete tends to be classified separately. Masonry is not subjected to tensile loading due to its weakness to this stress. Therefore, circular, semicircular or oval sections are preferred. Also, compressible material, such as sand or fine debris is packed between the ground and the masonry support, and the lining is usually inetrspersed with compressive layers of soft wood. *Nelson.*

masonry unit. Concrete block, cinder block, brick, stone, or other similar structural unit. *Bennett 2d, 1962, Add.*

mason's hammer. A square-faced hammer with a peen in line with handle. *Standard, 1964.*

Mason's ironstone china. A vitrified type of earthenware introduced by C. J. Mason, Stoke-on-Trent, England. According to his patent, the batch composition was, 4 pints china clay, 4 pints china stone, 4 pints flint, 3 pints prepared ironstone, and a trace of cobalt oxide. It is now known that the body did not contain ironstone, the name merely being a highly successful method of indicating to the public that the ware was very strong. *Dodd.*

mason's lime. A hydrated lime used in mortar for masonry purposes. *Boynton.*

masonwork. *See* masonry, b. *Fay.*

mass. a. A number that measures the quantity of matter. It is obtained on the earth's surface by dividing the weight of a body by the acceleration due to gravity. *Leet.* b. Copper; a solid chunk of native metal. *Weed, 1922.*

mass action. Goldberg and Waage's law states that in a homogeneous system the rate of chemical reaction is proportional to the active masses of the reactants. The product of the active masses on one side of a chemical equation divided by that on the other side is a constant. *Pryor, 3.*

mass aqua. Trade term for borosilicate crown glass imitation of aquamarine. Mohs' hardness, 6; specific gravity, 2.35 to 2.37; refractive index, 1.50 to 1.51. *Shipley.*

mass concrete. Concrete without reinforcement; concrete measured after solidification. *Nelson.*

mass copper. In the Lake Superior region, a term for native copper occurring in large masses. *Fay.*

mass density. Mass of air per unit volume. Measured in pounds-mass per cubic foot. *Hartman, p. 8.*

mass diagram. A plotting of cumulative cuts and fills used for engineering computation of highway jobs. *Nichols.*

mass effect. The tendency for hardened steel to decrease in hardness from the surface to the center, as a result of the variation in the rate of cooling throughout the section. Becomes less marked as the rate of cooling required for hardening decreases, that is, as the content of alloying elements increases. *C.T.D.*

masses. a. Irregular deposits of ore, which cannot be recognized as veins or beds. Many hematite deposits occupy irregular cavities in the Carboniferous limestone. *See also* nontabular deposits. *Nelson.* b. Large ore bodies of irregular shape, the long axis of which may extend in any direction. *Lewis, p. 20.*

mass fiber. One of the three recognized forms in which asbestos fiber is found in rock deposits. In this form the fibers are usually found intermixed in a matrix which forms the ore body. Found mostly in the matrix of the deposits of the amphibole varieties of asbestos, the rock forming the ore body is sometimes inclined to be soft, and the fibers intermingled in such a mass deposit consist of patches of apparent slip-fiber forms, and indications of disturbed cross-fiber disposition are often discernible. *Sinclair, W. E., p. 42.*

mass haul diagram. Diagram used in construction work to show location of digging and filling sites, and distances over which earth and materials are to be transported. *Pryor, 3.*

massicot. a. A natural lead monoxide, PbO, containing 92.8 percent lead. Found in Colorado, Idaho, Nevada, and Virginia. *CCD 6d, 1961.* b. This term was formerly used in metallurgy to designate an oxide of lead corresponding to the same formula as litharge (PbO) but having a different physical state. It is formed by the oxidation of a bath of metallic lead at a temperature of about 345° C; so that the oxide formed is not melted; specific gravity, 9.3; melting point, 600° C. If the oxide is melted, it is converted into litharge. *CCD 6d, 1961.*

massif. a. The dominant, central mass of a mountain ridge that is more or less defined by longitudinal or transverse valleys. *Standard, 1964.* b. A diastrophic block, or any isolated central independent mass. *Standard, 1964.*

massifs longs. Fr. Pillars in longwall workings. *Fay.*

massive. a. Homogeneous structure without stratification, flow-banding, foliation, schistosity, etc.; descriptive of the structure of some rocks. Occurring in thick beds, free from minor joints and lamination; descriptive of some stratified rocks. *Fay.* b. In mineralogy, without apparent crystalline structure. *Fay.*

massive amber. A compact, almost colorless to dark orange-yellow variety of Baltic amber. *Shipley.*

massive bedding. A term commonly applied to very thick homogeneous beds. Also used to describe absence of structure in rocks regardless of thickness. *Pettijohn.*

massive deposit. Ore deposits are roughly divided into massive and tabular deposits. Massive deposits are those which have developed in three dimensions, and have very variable shapes. Tabular deposits are principally developed in two dimensions, the width being small in comparison to length and depth, although some may have considerable thickness. *Higham, pp. 1-2.*

massive eruption. The outpouring of lava from a line or system of fissures, so that vast areas have become covered by nearly horizontal sheets of extrusive flows. *Fay.*

massive mineral. If the crystalline grains are so small that they cannot be distinguished except under the high magnification of a microscope, the structure is described as compact and the mineral as massive. *C.M.D.*

massive pluton. Any pluton that is not tabular in shape. *Leet.*

massive post. Eng. Thick beds of sandstone, Northumberland and Durham. *Nelson.*

massive rock. One of the two subdivisions of competent rock. Massive rock is considered to be elastically perfect, isotropic, and homogeneous and to possess a strength that does not vary appreciably from point to point. Typical examples are massive igneous rocks such as granite, diorite, basalt, and rhyolite; some massive metamorphic rocks such as marble and quartzite; and some sedimentary rocks. *BuMines Bull. 587, 1960, p. 5.*

mass movement. The unit movement of a portion of the land surface as in creep, landslide, or slip. *A.G.I.*

mass number. The sum of the neutrons and protons in a nucleus. The mass number of uranium 235 is 235. It is the nearest whole number to the actual atomic weight of the atom. *L&L.*

mass opal. Opal matrix. *Shipley.*

mass profile. A road profile showing cut and fill in cubic yards. *Nichols.*

mass shooting. Simultaneous exploding of charges in all of a large number of holes, as contrasted with firing in sequency with delay caps. *Nichols.*

mass spectra. Positive ray spectra obtained by means of the mass spectrograph. In such spectra the images due to positive ray particles of different masses are spaced according to the masses of the particles, that is, according to their atomic weights. Isotopes were investigated by Aston by means of mass spectra. *C.T.D.*

mass spectrograph. Appliance in which atoms or molecules are ionized by electron bombardment, then accelerated by passage through electric fields and finally deflected as they pass through a magnetic field by an amount consistent with their mass. A mass spectrum is thus produced, which shows the proportions of the various isotopes present. *Pryor, 3.*

mass spectrometer. An apparatus similar to a mass spectrograph but usually with electrical measurement of the data. Used especially in determining abundance ratios of isotopes and in analyzing mixtures of compounds. *Webster 3d.*

mass unit weight. *See* wet unit weight. *ASCE P1826.*

mass-wasting. a. The slow downslope movement of rock debris. *A.G.I.* b. A general term for a variety of processes by which large masses of earth material are moved by gravity either slowly or quickly from one place to another. *Stokes and Varnes, 1955.*

mast. a. A drill derrick or tripod mounted on a drill unit, which can be raised to operating position by mechanical means. *Long.* b. A single pole, used as a drill derrick, supported in upright or operating position by guys. *Long.* c. A tower or vertical beam carrying one or more load lines at its top. *Nichols.*

master. A collier's term for the owner of the mine. *Fay.*

master alloy. An alloy, rich in one or more desired addition elements, that can be added to a melt to raise the percentage of a desired constituent. *ASM Gloss.*

master cave. a. A hall situated upstream of an actual or former sump; it has a low gradient of its floor and a wide and high cross section. *Schieferdecker.* b. A hall developed on a fissure. *Schieferdecker.*

master cleat. *See* main cleat. *Mason, v. 1, p. 8.*

master hauler. S. Wales. The man in charge of haulers in a coal mine; he controls the horse haulage traffic and the allocation of trams. *See also* gaffer hauler; pusher-on. *Nelson.*

master joint. A large and persistent plane of division that passes with regularity and parallelism through a number of beds. *Fay.*

master lode. The most productive lode of a district. *Standard, 1964. See also* champion lode. *Fay.*

master mechanic. The supervisor at the mine in charge of the installation, maintenance, and repair of mechanical and electrical equipment. *Jones.*

master mold. *See* mold (mould). *Dodd.*

master pin. The only pin in an integrated crawler track that will open the track when driven out. *Nichols.*

master river; master stream. One of the larger, dominating, or trunk rivers of the drainage system in the land sculpturing and baseleveling of any area of the earth's surface. *A.G.I.*

mastershifter. N. of Eng. Official responsible for the working of a seam during the third (night) shift of the day. *Trist.*

master station. A position in the ventilation circuit of a mine specially chosen for the regular and accurate estimation of the total quantity of air circulating. *Spalding.*

master's weighman; company weighman. A man employed by the coal owner to weigh the loaded coal trams before they enter the tippler. The miners' checkweighman verifies the weight and records. *Nelson.*

master wasteman. Eng. The person who has charge of the wastemen. *Fay.*

mastic. A bitumen preparation employed as an adhesive or waterproofing agent, for example, when bedding wood-block flooring on concrete. *Institute of Petroleum, 1961.*

mastic asphalt. A type of asphalt composed of suitably graded mineral matter and asphaltic cement in such proportions as to form a coherent, voidless, impermeable mass, solid or semisolid under normal temperature conditions, sufficiently fluid when brought to a suitable temperature to be spread by means of a hand float. *Institute of Petroleum. 1961.*

mastic (rock asphalt). Sandstone naturally saturated with bitumen; excellent for paving and floors. *Crispin.*

mat. a. An accumulation of broken mine timbers, rock, earth, etc., coincident with the caving system of mining. As the ore is extracted the mat gradually settles and forms the roof of the working levels, stopes, etc. *Fay.* b. A cover of rope netting, of logs tied together, etc., laid over blasting places to check flying rocks. *Standard, 1964.* c. A heavy, flexible fabric of woven wire rope or chain used to confine blasts. *Nichols.* d. A wood platform used in sets to support machinery on soft ground. *Nichols.* e. A lusterless or dull surface in a metal, produced by a method of finishing. *Standard, 1964.* f. A tool for finishing a metal surface so as to produce a neat appearance. *Standard, 1964.* g. A uniformly smooth surface almost, or entirely, lacking gloss. Also spelled matt; matte. *AGSB, 3.*

match. a. A charge of gunpowder put into a paper several inches long, and used for igniting explosives. *Fay.* b. The touch end of a squib. *Fay.* c. The part of a detonator which is most easily ignited. *Mason.* d. In founding, a casing of hard sand, block of plaster, or the like, for guarding any deficiency in the matching or joining of the parts of a mold. *Standard, 1964.* e. To pair by bringing similar things or pairs together; to find something similar. *Mason.*

matched sale. By this method, the manipulator will issue orders through different brokers, one to buy and the other to sell shares at certain prices. The manipulator thereby sells his own stock to himself through the market, thus obtaining a recorded quotation advantageous to himself at no greater cost than the usual brokers' commissions. *Hoov, p. 289.*

matching color. Addition of inorganic coloring material to frit so that its color will correspond with a given color sample. *ACSB-3.*

matching piece. A short refractory channel between the spout of a glass tank furnace and the pot spout for a revolving pot. Also known as a intermediate piece. *Dodd.*

match mark. *See* joint line. *Dodd.*

match plate. A plate of metal or other material on which patterns for metal casting are mounted or formed as an integral part so as to facilitate the molding operation. The pattern is divided along its parting plane by the plate. *ASM Gloss.*

material man. Corn. One who has the care of materials and issues supplies to miners. A warehouse man. *Fay.*

materials handling. a. Is the art and science involving movement, packaging, and storage of substances in any form. *ASA MH4.1-1958.* b. Is the movement of everything within an establishment: the handling of raw materials and tools; the movement of components between operations and in stores, of finished products and scrap, cutting oils and process machinery, the movements of work people in relation to the handling of material. *ASA MH4.1-1958.*

materials lock. An air lock through which materials are passed into or out of a pneumatic caisson or a shaft being driven under air pressure. *See also* manlock. *Ham.*

mat glaze. A colorless or colored ceramic glaze having low gloss. *ASTM C242-60.*

mathematical pendulum. A theoretical assumption, a point mass suspended by a massless thread. *Schieferdecker.*

Mather and Platt system. A system of boring with a heavy chisel, suspended by a flat or round rope and given a vertical reciprocating motion by mechanical means. About 25 blows are delivered per minute with a stroke varying from 12 inches to 8 feet. The cuttings are removed from the borehole by a sludger as in dry boring. *See also* American boring system. *Nelson.*

Matheson joint. A wrought-pipe joint made by enlarging the one end of the pipe to form a suitable lead recess, similar to the bell end of a cast-iron pipe, and receiving the male or spigot end of the next length. Practically the same style of a joint as used for cast-iron pipe. *Fay.*

Mathewson's device. An apparatus for separating matte and slag at lead-silver blast furnaces where matte is of secondary importance. *Fay.*

matildite. A sulpharsenite of silver, $AgBiS_2$. It has been suggested that the name matildite be replaced by the earlier schapbachite, but the latter name has never been applied to pure $AgBiS_2$ and is not suitable. *Hey 2d, 1955.*

matka. Local Galician name for blower wax. *Tomkeieff, 1954.*

matless. A type of pneumatic flotation machine which eliminates the mat through which the air passed in the older types. *Hess.*

matlockite. Oxychloride of lead, $PbO.PbCl_2$, which occurs in tabular tetragonal crystals. *C.M.D.*

mat packs. Small packs of timber consisting of a number of timbers laid side by side to form a solid mass 2 or 2½ feet square by 4 to 6 inches thick. Holes are drilled edgeways through the mat and wires are threaded through to hold it together. Mats are transported underground and built up to form very effective supports. *Spalding. p. 111.*

matrass; matras; mattrass. A rounded glass flask with a long neck. Formerly used for dissolving substances by the application of heat or used for distilling. *Webster 3d.*

matrice. *See* matrix. *Fay.*

matrix. a. The rock containing a mineral or metallic ore; the gangue. Sometimes called the groundmass. *Fay.* b. The material which forms a cushion, or binder, in the construction of pavements. *Fay.* c. The impression or mold of the exterior of a fossil, crystal, or mineral left in the containing rock when the fossil, crystal, or mineral is removed, or the mass in which a fossil, crystal, or mineral is embedded. *Standard, 1964.* d. The metal in which the diamonds inset in the crown of a bit are embedded. *Long.* e. A specially designed cavity, usually of plaster, in which terra-cotta plastic clay is packed to produce forms. Also called mold. *Mersereau, 4th, p. 269.* f. The finer grained material between the larger particles of a rock or the material surrounding a fossil or mineral. *B.S. 3618, 1964, sec. 5.* g. The principal phase or aggregate in which another constituent is embedded. *ASM Gloss.* h. In electroforming, a form used as a cathode. *ASM Gloss.*

matrix jewelry. Jewelry cut from some stone, as opal or turquoise, and its surrounding matrix. Such mixtures are called opal matrix, turquoise matrix, etc. *Fay.*

matrix metal. a. The continuous phase of a polyphase alloy or mechanical mixture; the physically continuous metallic constituent in which separate particles of another constituent are embedded. *ASTM B243-65.* b. A term used in powder metallurgy in reference to the metallic constituent of a powder mixture that has a lower melting point than the other constituents. On sintering, this matrix metal fuses and acts as a cementing medium for the balance of the materials present. *Bureau of Mines Staff.*

matrix of coal. Attritus-coal component made up of microscopical fragments of plant tissue. *Tomkeieff, 1954.*

matrix rock. Same as land-pebble phosphate. *Fay.*

matrosite. A microscopical constituent of torbanite, opaque, black mass forming its groundmass. *Tomkeieff, 1954. Compare* gelosite; humosite; retinosite.

matt blue. A color for pottery decoration depending on the formation of cobalt aluminate; zinc oxide is usually added, a quoted recipe being 60 percent Al_2O_3, 20 percent CoO, and 20 percent ZnO. *Dodd.*

matte. A metallic sulfide mixture made by melting the roasted product in smelting sulfide ores of copper, lead, and nickel. *ASM Gloss.*

matte dip (etching solution). A solution which will react with a metal to give a desired dull finish. *ASM Gloss.*

matte fall. Weight of matte expressed as a percentage of the total charge. *Newton, p. 339.*

matter. Anything that takes up space and has weight and inertia. *MacCracken.*

matte smelting. The smelting of copper-bearing materials, usually in a reverberatory furnace. The valuable product is a liquid, copper-iron sulfide called matte. *Ency. of Chem. Tech., v. 8, p 937.*

matteuccite. Sodium bisulfate, $NaHSO_4\text{-}H_2O$, with mercallite ($KHSO_4$) in saline stalactites from Vesuvius, Italy. *Spencer 19, M.M., 1952.*

matt glaze. A ceramic glaze that has partially devitrified; the effect is deliberately achieved; for example, on some types of glazed wall tile. The glazes used for the purpose are usually leadless and devitrification is encouraged by the introduction, into the glaze batch, of such oxides as TiO_2, CaO, or ZnO. *Dodd.*

matting. The process of smelting sulfide ores into matte. *Weed, 1922.*

matting tool. *See* mat, b. *Fay*

mattkohle. Ger. Name for dull coal. *Tomkeieff, 1954.*

mattock. a. A miner's pickax. *Fay.* b. An implement that combines the features of an adz, ax, and pick and is used for digging, grubbing, and chopping. *Webster 3d.* c. A picklike tool used for digging asphalt. *Mersereau, 4th, p. 206.*

mattress. A blanket of brush or poles interwoven or otherwise lashed together and placed to cover an area subject to scour, weighted with rock, concrete blocks, or otherwise held in place. *Seelye, 1.*

Matura diamond. a. An inferior diamond from Matura, Ceylon. *Fay.* b. A name given in Ceylon to a zircon from the district of Matura. *Fay.*

mature. Having reached the maximum vigor and efficiency of action or the maximum development and accentuation of form; applied to streams, to the stage of erosion of land, and to the resultant topography. *Compare* young; old. *Fay.*

mature conglomerate. A conglomerate consisting chiefly of well-sorted, stable constituents. *A.G.I.*

matureland. Proposed by Willis, to include subdued landforms which have lost the relief that characterizes maturity. *See also* senesland; oldland. *A.G.I.*

mature lignite. A descriptive term commonly used in coal literature in referring to high-rank types of lignite. *A.G.I.*

mature river. A river in the third stage of development. *Fay.*

mature stage of the shoreline cycle. The stage of decrease of wave action because of the widening of the abrasion platform, which is reaching its profile of equilibrium, just sufficient for the movement seaward of loosened material; creation of a beach. *Schieferdecker.*

maturing period. *See* hardening period. *Nelson.*

maturing range. The time-temperature range within which a ceramic body, glaze, or other composition may be fired to yield specified properties. *ASTM C242-60.*

maturing temperature. The temperature at which porcelain enamel must be held for a selected time to achieve the desired properties. *ASTM C286-65.*

maturity. That stage in the development of streams, drainage patterns, or in land sculpture at which the process is proceeding with maximum vigor and efficiency, or the maximum development and accentuation of relief has been attained. *Compare* youth; old age. *Fay.*

maturity index. The measure of the progress of a sediment in the direction of chemical stability. A sediment may be said to be mature when it contains only the most stable mineral species and is relatively deficient in the more mobile oxides. *A.G.I.*

maucherite. A reddish silver-white, tarnishing to gray copper-red nickel arsenide, Ni_3As_2, or Ni_4As_3. Tetragonal. Square, tabular crystals. The furnace product, placodine, is identical; also temiskamite. From Eisleben, Thuringia. *English.*

maujaite. A nepheline syenite rich in sodalite, with microcline and small amounts of albite, analcite. aegirine, and soda-amphiboles; characterized by a peculiar poikilitic texture. *Holmes, 1928.*

maul. Derb. A large hammer or mallet. *Fay.*

maum; mawm; maun. Old forms of malm. Also sometimes used for a marlpit. *Compare* marl. *Arkell.*

maundril. Derb.; Wales. A prying pick with two prongs. Also spelled mandrel; mandril. *Fay.*

maverick. Anything dishonestly obtained, as a saddle, mine, or piece of land. *Fay.*

Mawco cutter loader. A cutter loader similar to an Anderton shearer except that the drum is replaced by a frame jib 42 inches high and 20 inches deep. The machine travels on an armored flexible conveyor at a speed of about 4½ feet per minute. It cuts a 20-inch web on the cutting run and the plough deflector loads the cut coal onto the conveyor. On the reverse run, the deflector loads all the loose coal left on the track and the conveyor is snaked over behind the machine. The loader is suitable for medium thickness seams, and the yield of large coal is good. *Nelson.*

max. As a subscript, a symbol for maximum. *Zimmerman, p. 378.*

maximal breathing capacity. The greatest respiratory minute volume which a person can produce during a short period of extremely forceful breathing. In healthy young men, it may average as much as 170 liters per minute. *H&G.*

maximum and minimum densities. In soil tests, the maximum density is found by compacting soil with a Kango hammer; the minimum density is measured by pouring soil into a container of known capacity. This test is useful for determining the relative density of sands, by comparison with field tests. *Ham.*

Maximum angle of inclination. The maximum angle at which a conveyor may be inclined and still deliver a predetermined quantity of bulk material within a given time. As the maximum angle is approached the rate of handling of bulk material is usually decreased. *ASA MH 4.1-1958.*

maximum belt slope. The slope beyond which the material on the belt tends to roll downhill. The maximum slope on which a conveyor can operate depends on (1) the material carried; (2) the loading or feeding efficiency; (3) size and type of belt; and (4) the environment. In general, in the case of run-of-mine coal and ore, belt conveyors can operate up to about 18°. If the material conveyed contains large lumps, spillage may result if the belt is too narrow. *Nelson.*

maximum belt tension. The total of the starting and operating tensions. In the average conveyor this is considered to be the same as the tight side tension. *ASA MH4.1-1958.*

maximum carbon dioxide content. The recommended maximum allowable concentration of carbon dioxide is 0.5 percent. *Hartman, p. 17.*

maximum credible accident. The most serious reactor accident that can be hypothesized from an adverse combination of equipment malfunction, operating errors, and other foreseen causes. *L&L.*

maximum demand. Upper limit of electric power which may be drawn at any time from the mains without penalty, as agreed by contract. *Pryor, 3.*

maximum density. *See* maximum unit weight. *ASCE P1826.*

maximum dry density. The dry density obtained by the compaction of soil at is optimum moisture content. *Ham.*

maximum operating belt tension. The tension in the carrying run necessary to maintain the normal operating speed of a loaded belt. *ASA MH4.1-1958.*

maximum per delay. The maximum vibration at distant points is that which has been generated by the greatest amount of explosive fired at any one instant. This is referred to as the maximum per delay. *Leet, 2, p. 120.*

maximum permissible concentration. That quantity of radioactive material in air, water, and foodstuffs that has been established as the maximum concentration that would not create undue risk to human health. *See also* radioactivity concentration guide. *L&L.*

maximum permissible dose. That dose of ionizing radiation which has been established as the maximum quantity that can be absorbed without undue risk to human health. *See also* radiation protection guide. *L&L.*

maximum-pressure arch. *See* pressure arch theory. *Coal Age, v. 71, No. 8, August 1966, p. 198.*

maximum-pressure gage. An instrument for registering the maximum pressure occurring during an explosion at the point where the instrument is located. *Rice, George S.*

maximum sound pressure. For any given cycle of a periodic wave, the maximum absolute value of the instantaneous sound pressure occurring during that cycle. *Hy.*

maximum subsidence. The maximum amount of subsidence in a subsidence basin. The essential requirement for maximum subsidence is that all the coal should be extracted with full caving. Very broadly, maximum subsidence may be from 80 to 95 percent of the seam thickness for caving and from 50 to 60 percent for solid packing. *Nelson.*

maximum tensile stress. *See* ultimate tensile stress. *C.T.D.*

maximum unit weight; maximum density. The dry unit weight defined by the peak of a compaction curve. *ASCE P1826.*

maximum year. In terrestrial magnetism, the year of greatest magnetic storm activity. *Hy.*

Maxixe aquamarine. A name applied to a deep blue, boron-bearing beryl from the Maxixe mine, Minas Geraes, Brazil. *Shipley.*

Maxton screen. A screening machine of the trommel class, rotating on rollers that support the tube. There are radial elevating ribs to prevent wear of screen cloth and to elevate the oversize. Unscreened material is delivered on the inside screen surface, undersize passing through, and oversize being elevated and discharged into a separate launder. *Liddell 2d, p. 301.*

maxwell. Magnetic flux acting on unit magnetic pole to exert a force of one dyne; amount of flux passing through one square centimeter to give a flux density of one centimeter-gram-second unit. A unit magnetic pole exerts one dyne on another unit pole at one centimeter distance. Maxwell's rule states that each part of an electric circuit is influenced by a force tending to move it so as to enclose the maximum amount of magnetic flux. *Pryor, 3.*

Maxwell's rule. A law stating that every part of an electric circuit is acted upon by a force tending to move it in such a direction as to enclose the maximum amount of magnetic flux. *C.T.D.*

Mayari iron. Pig iron made from Cuban ores which contain vanadium and titanium, or is pig iron made to duplicate the Cuban iron. *Brady, p. 580.*

mayenite. Cubic $Ca_{12}Al_{14}O_{33}$, as grains in metamorphosed limestone from the Bellerberg, Mayen, Eifel, Germany. This compound has long been known as a constituent of cement clinker. Named from the locality. *Hey, M.M., 1964; Fleischer.*

mazarine blue; royal blue. A ceramic color, for on-glaze or underglaze, based on the use of cobalt oxide (40 to 60 percent) together with a flux. *Dodd.*

mazout; marsut. A Russian petroleum product remaining after the distillation of benzine and kerosine. It is a brownish-black liquid, and used largely as a fuel oil. *Fay.*

mb Abbreviation for millibar. *BuMin Style Guide, p. 60.*

M barrel. Synonym for M-design core barrel. *Long.*

mbh One htousand British thermal units per hour. *Strock, 10.*

Mbm Abbreviation for thousand feet board measure. *Zimmerman, p. 108.*

mbozite. An amphibole, $Na_2CaFe_3^{+2}Fe_2^{+3}Al_2Si_6O_{22}(OH)_2$, from the Mbozi syenite-gabbro complex in southwest Tanzania. Named from locality. *Hey, M.M., 1964; Fleischer.*

mc Abbreviation for magnetic course. *Zimmerman, p. 65.*

Mc Abbreviation for megacycle (1 million cycles). Also abbreviated mc. *BuMin Style Guide, p. 60; Zimmerman, p. 68.*

MC Abbreviation for momenatry contact, multiple contact. *Zimmerman, p. 71.*

MCA Abbreviation for Manufacturing Chemists' Association. *CCD 6d, 1961.*

McAbees. High explosives; used in mines. *Bennett 2d, 1962.*

McCaa apparatus. A two-hour, self-contained, oxygen-breathing apparatus with an oxygen feed that is completely lung-governed. It weighs 38 pounds, and is carried on the wearer's back inside a protective aluminum cover, which can easily be removed to inspect the component parts of the apparatus or recharge the oxygen cylinder or regenerative canister. *McAdam, pp. 27-28.*

McCaa breathing device. A device designed by the U.S. Bureau of Mines for mine rescue work. This compressed-oxygen apparatus can also operate safely under high air pressure, by carefully modifying the way in which it is used. Tests have shown that it may be worn at pressures up to 45 pounds per square inch higher than normal; this is equivalent to the pressure exerted by 100 feet of water. Sandhogs, and others who may be threatened by concentrations of dangerous gases when working in compressed air now have a better chance of survival, since this device permits rescue teams to enter areas of contaminated air under high pressures encountered in caisson work and in driving tunnels through earth strata that lie underwater. *Bureau of Mines Staff.*

McCoy number. The total alpha radiation of a substance divided by the alpha radiation per square centimeter in a direction perpendicular to the surface of a layer of uranium oxide of indefinite thickness. *Bennett 2d, 1962.*

Mcf Abbreviation for thousand cubic feet. *BuMin Style Guide, p. 62.*

MCF Abbreviation for thousand cubic feet. Also abbreviated Mcf. *Zimmerman, p. 108.*

McGinty. Three sheaves over which a rope is passed so as to take a course somewhat like that of the letter M. The friction resulting causes the rope to slide with difficulty. It is used for lowering loaded cars from the face to the mouth of a room on a steep roadway. *Zern.*

mckittrite. Variety of bitumen from Elk Hills, California. *Tomkeieff, 1954.*

McLuckie gas detector. This nonautomatic detector, or portable air analysis apparatus, can be used underground, or samples of air can be brought out of the mine in small rubber bladders and analyzed at the surface. This apparatus depends for its action on the fact that when methane is burned in air (oxygen) a definite chemical action takes place. When the steam condenses to water there is a reduction in pressure and in the McLuckie this reduction of pressure, which is proportionate to the methane present, is indicated by the height of the liquid in one limb of the U-tube which rises up the side of the scale: the scale is graduated from 0 to 3 percent in steps of 0.1 percent. *Cooper, pp. 226-227.*

McMichael viscosity. The test made to show the extent of fibrous characteristic or consistency of fiber base greases. This is done by obtaining the torque on a special calibrated wire which is attached to a special spindle around which the lubricant rotates. *Shell Oil Co.*

McNally-Carpenter centrifuge. A fine-coal dewatering machine consisting of a conical rotating element with vertical axis, built up of three rows of perforated stainless-steel screen plates or stainless-steel wedge- or round-wire sections cut and rolled to conform to the surface of the cone. Wet feed is deposited by gravity into the top of the cone-shaped dryer onto a distributing disk which throws the material by centrifugal force onto the stepped screen or basket. The rapid circular movement of the basket forces the water through the screen while the coal moves toward the bottom. Peripheral velocity and centrifugal force become greater for each particle, breaking down the surface tension of water film on each piece, increasing drying action directly in ratio with the cone circumference and peripheral speed. The most effective drying area is at the bottom of the cone just before the material is discharged from the machine. *Kentucky, p. 316; Mitchell, p. 662.*

McNally-Norton jig. In this jig, the raw coal is conveyed to a wash box through sluices. Air pulsations are transmitted through valves to water in a compartment adjacent to the washing bed, causing the water in the wash box to rise. Pulsating water causes the incoming fuel to be loosely suspended in the water and permits heavier refuse to sink to the screen plate while suspended coal spills over into the second compartment. In the second compartment the process is repeated with the remaining refuse sinking to the screen and clean coal discharging to the dewatering screens. *Kentucky, p. 310.*

McNally-Vissac dryer. A convection dryer of the forced draft type. The heat source is a coal-fired furnace. It consists essentially of a declined reciprocating screen over which the coal travels. Two balanced tandem decks are used. They are suspended from the supporting structure by inclined flexible hangers and actuated in opposition through flexible pitmans from a common eccentric shaft. The removal of moisture is accomplished by passing hot furnace gases, tempered with coal air, downward through the bed of coal as it travels along the screen. An induced-draft fan at the exhaust end provides the motive force for the gases. *Mitchell, pp. 678-679.*

McNamara clamp. A drill-rod safety clamp somewhat similar to a Wommer's safety clamp. *Long.*

M core barrel. Synonym for M-design core barrel. *Long.*

M-curve; Mayer curve. A cumulative curve used in the first instance to express the washability of a coal, plotted on a vectorial diagram in which the projection of the vector on the abscissa represents the percentage of the product (coal) and the direction of the vector represents the percentage of a particular constituent of the product. *B.S. 3552, 1962.*

McQuaid-Ehn test. A test by means of which it is possible to predict the reaction of plain carbon case hardening steels and alloy steels in quenching. The interpretation of the test depends upon the examination of the pearlite and cementite in the hypereutectoid zone. *Hess.*

McQuisten's process. A development based on the DeBavay flotation process; obsolete. *Pryor, 3.*

md Abbreviation for millidarcy. *BuMin Style Guide, p. 60.*

Md Chemical symbol for mendelevium. Also Mv. *Bennett 2d, 1962 Add.; Webster 3d.*

M design. A specific-style, swivel-type, double-tube core barrel and parts manufactured in accordance with design and dimensional standards specified as those of the M design by the DCDMA. *See also* M-design core barrel. *Long.*

M-design bit. DCDMA standard design, long-shank, box-threaded core bit made to fit DCDMA standard M-design core barrels. *Long.*

M-design core barrel. DCDMA standard-design, double-tube, swivel-type core barrel made in sizes to be used with appropriate standard ranges of diamond-drill fittings. Its distinguishing features are that a 2-½° taper core lifter is carried inside a short tubular sleeve (called a lifter case) coupled to the bottom end of the inner tube, and that the lifter case extends downward inside the bit shank to within a very short distance behind the face of the core bit. *Long.*

MDF Abbreviation for main distributing frame. *Zimmerman, p. 66.*

MDN. An explosive consisting of picric acid and dinitronaphthalene. Yellow; crystals; and melting point, 105° to 110° C. *Bennett 2d, 1962.*

mds Abbreviation for millidarcies, a measure of permeability. *Williams.*

Me Abbreviation for methyl. *Zimmerman, p. 68.*

ME Abbreviation for mechanical engineer; mining engineer. *Zimmerman, pp. 68, 70.*

meadow ore. Same as bog iron ore. *Fay.* Synonym for limonite. *Dana 6d, p. 250.*

meadow peat. Peat derived from stems and roots of grasses. *Tomkeieff, 1954.*

meager feel. Moistureless; dry and rough to the touch, as chalk and magnesite. *Nelson.*

mean. a. The middle position or value between two extremes. *MacCracken.* b. The arithmetic mean of a set of quantities is an average in which all signs are taken as positive. In an algebraic mean, the signs of the quantities are taken into account, so that the mean may result in being either positive or negative. *Ham.*

mean birefringence. The numeral which represents the average between the greatest strength of double refraction and the least strength of double refraction possessed by a species or variety. The refractive index of sphene is 1.885 to 1.990 and 1.915 to 2.050; hence the birefringence varies from 0.105 to 0.135. The average, or mean, is 0.120. *See also* refractive index. *Shipley.*

mean calorie. One-hundreth of the heat required to raise 1 gram of water from 0° to 100° C. *Newton, p. 122.*

mean depth. Cross-sectional area of a stream divided by its surface width. *Seelye, 1.*

mean depth of the sea. That depth above and below which 50 percent of the earth's submerged solid surface lies. Generally considered to be 3,800 meters. *Hy.*

meander. One of a series of somewhat regular and looplike bends in the course of a stream that develop when the stream is flowing at grade through the lateral shifting of its course in the direction of the convex segments of the original curves in the course. *Fay.*

meander belt. a. That part of a floodplain between two lines tangent to the outer bends of all the meanders is called the meander belt. *A.G.I.* b. The zone within which channel migration occurs. Within such a zone, channel migration is indicated by abandoned channels, accretion topography, and oxbow lakes. *A.G.I.*

meander channel. A narrow erosion channel in the floor of a passage. *Schieferdecker.*

meandering. Lateral migration of streams by forming large bends which become cut off, thereby shifting the channel. *Bateman.*

meander line. a. A line run in a survey of a mining claim bordering upon a stream or other body of water, not as a boundary of the tract surveyed, but for the purpose of defining the sinuosities of the bank or shore of the water, and as a means of ascertaining the quantity of land within the surveyed area. *Ricketts, I.* b. A usually irregular surveyed line that is not a boundary line. *Webster 3d.* A traverse line. *Fay.*

mean deviation. The difference of each observation from the average is taken, all differences are added (whether plus or minus) and divided by number of such observations. Also known as the mean variation. *Pryor, 3, p. 129.*

mean diameter. The average of two measurements on the diameter, taken at right angles to each other. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

mean diameter, geometric. The diameter equivalent of the arithmetic mean of the logarithmic frequency distribution. In the analysis of beach sands, it is taken as that grain diameter determined graphically by the intersection of a straight line through selected boundary sizes (generally points on the distribution curve where 16 and 84 percent of the sample by weight is coarser) and a vertical line through the median diameter of the sample. *H&G.*

mean effective pressure. In an air compressor, the equivalent average pressure exerted by the piston throughout the stroke. *Lewis, p. 668.*

mean error. The mean deviation of a distribution of accidental errors. *Webster 3d.*

mean free path. The average distance traveled by a particle, photon, atom, or molecule between successive collisions. *L&L.*

mean higher high water. The average height of the higher high waters over a 19-year period. Can be calculated for shorter periods by applying corrections for a 19-year period. Abbreviation, mhhw. *Hy.*

mean high springs. The average height of high water during syzygy over a 19-year period. *Hy.*

mean high water. The average height of the high waters over a 19-year period. Abbreviation, mhw. *Hy.*

mean high-water neaps. The average height of high water during quadrature over a 19-year period. Abbreviation, mhwn. *Hy.*

mean horizontal candlepower. The mean horizontal candlepower of a light source having its axis of symmetry in the vertical plane is the mean candlepower in a horizontal plane through the luminous center of the source. *Sinclair, I, pp. 200-201.* Abbreviation, M.H.C.

mean lower low water. The average height of the lower low waters over a 19-year period. Can be calculated for shorter periods by applying corrections for a 19-year period. Abbreviation, mllw. *Hy.*

mean lower low-water springs. The average height of low water during syzygy over a 19-year period. *Hy.*

mean low water. The average height of the low waters over a 19-year period. Abbreviation, mlw. *Hy.*

mean low-water neaps. The average height of low water during quadrature over a 19-year period. Abbreviation, mlwn. *Hy.*

mean low-water springs. The average height of low waters occurring at the time of syzygy over a 19-year period. It is usually derived by taking a plane depressed below the half-tide level by an amount equal to half the spring range of tide, necessary corrections being applied to reduce the result to a mean value. Abbreviation, mlws. *Hy.*

mean radiant temperature (mrt). That single temperature of all enclosing surfaces which would result in the same heat emission as the same surface with various different temperatures. *Strock, 10.*

mean range. The difference in height between mean high water and mean low water over a 19-year period. *Hy.*

mean refractive index. The mean of the values of the index of refraction for the extreme red and the extreme violet rays. *Fay.*

mean river level. The average height of the surface of a river at any point for all stages of the tide over a 19-year period, usually determined from hourly height readings. Unusual variations of river level may be excluded in computation. *Hy.*

mean sea level. The mean surface level determined by averaging all stages of the tide over a 19-year period, usually determined from hourly height readings and referred to a fixed tide level. Abbreviation, msl. *Hy.*

mean size. The weighted average particle size of any sample, batch or consignment of particulate material. *B.S. 3552, 1962.*

mean sounding velocity. Mean values for velocity of sound through the vertical water column of specific depths based on different velocities of sound in different sections of the column. These values yield more nearly correct depths when sonic depth finding machines are used. The velocity of sound at any specific depth may differ considerably from the mean. *Hy.*

mean sphere depth. That uniform depth to which water would cover the earth if the solid surface where smoothed off and were parallel to the surface of the geoid. Generally accepted as a depth of 2,440 meters. *Hy.*

mean spherical candlepower. The mean spherical candlepower of a light source is the average flux through a unit solid angle, that is, the total flux in lumens from the source divided by 4; in other words, the average intensity of a light source in all directions. *Sinclair, I, p. 200.*

mean square error. Square root of mean of squares of deviations from a mean value repeatedly observed. *Pryor, 3.*

mean stress. a. In fatigue testing, the algebraic mean of the maximum and minimum stress in one cycle. Also called the steady-stress component. *ASM Gloss.* b. In any multiaxial stress system, the algebraic mean of three principal stresses; more correctly called mean normal stress. *ASM Gloss.*

mean tide level. a. The plane, or surface, that lies exactly halfway between mean high water and mean low water. On account of the lack of symmetry of the tidal curve this is not exactly the same as mean sea level. *Seelye, 2.* b. The average of the high waters and the low waters over a 19-year period. *Hy.* Also called half-tide level.

mean time. Civil mean time is that recorded by clock. Local mean time is the hour angle of the mean sun. *Pryor, 3.*

mean velocity. a. The velocity at a given section of a stream obtained by dividing the discharge of the stream by the cross-sectional area at that section. *Seelye, 1.* b. Mean velocity may also apply to a reach of a stream by dividing the discharge by the average area of the reach. *Seelye, 1.*

mean wall thickness. The average of two measurements on the wall thickness of a tubular product, beyond the standard or specified dimensional tolerances. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

mean water level. The mean surface level as determined by averaging the height of the water at equal intervals of time, usually hourly, over a long period of time. Abbreviation, mwl. *Hy.*

mear; meer. *See* mere. *Fay.*

measured depth. Synonym for measured drilling depth. *Long.*

measured drilling depth. The apparent depth of a borehole as measured along the longitudinal axis of the borehole. The measured drilling depth is always equal to the unoverlapped drilled footage in a borehole. Also called measured depth. Sometimes abbreviated md. *Long.*

measured ore. Ore for which tonnage is computed from dimensions revealed in outcrops, trenches, workings, and drill holes and for which the grade is computed from the results of detailed sampling. The sites for inspection, sampling, and measurement are so closely spaced and the geologic character is so well defined that the size, shape, and mineral content are well established. The computed tonnage and grade are judged to be accurate within limits which are stated, and no such limit is judged to differ from the computed tonnage or grade by more than 20 percent. *Forrester, pp. 552-553.*

measurement. The finding of the number of units of measure in a line, area, space or volume, period of time, etc. *Jones, 2, p. 39.*

measurement of concentration. In order to assess the degree of concentration at National Coal Board collieries (Great Britain), certain basic data are collected, involving the pithead output, length of main haulage roads, and length of coalface in production. *See also* face concentration; geographical concentration; overall concentration. *Nelson.*

measurement transducer. Transmitter, which converts measurement of a physical quantity into a proporational analogue. *Pryor, 3, p. 31.*

measurer. a. In the iron and steel industry, one who measures iron or steel rails, rods, and sheets for length and width with a flexible steel tape, and checks measurements against specifications. *D.O.T. 1.* b. *See* stone grader. *D.O.T. 1.*

measures. A group or series of strata having some characteristic in common coal measures, for example; almost obsolete. *Fay.*

measures head. A heading or drift made in various strata. *Fay.*

measuring chain. A surveyor's chain, containing 100 links of 7.92 inches each. *Fay.*

measuring chute; pocket. An ore bin or coal-bin installed adjacent to the shaft bottom in skip winding. The capacity of the chute is equal to that of the skip used, ranging from 4 to 10 tons. Bin-feeding arrangements differ but may be by a steelplate conveyor from a surge bunker which in turn receives the ore or coal from the mine cars or trunk conveyor. A measuring chute insures a quick and correct loading of skips without spillage. Immediately the skip is proved in line, the measuring chute bottom door opens and the coal is discharged into the skip. *Nelson.*

measuring day. The day when face or other work is measured and recorded for assessing the wages. *See also* bill day. *Nelson.*

measuring element. In flotation, that portion of the feedback elements which converts the signal from the primary detecting element to a form compatible with the reference input. *Fuerstenau, p. 542.*

measuring load. The specified standard load under which a chain is to be measured for length. *J&M.*

measuring pocket. Storage space near entry from underground working to hoisting shaft; laid out so as to deliver a measured volume into the hoisting skip and to be refilled before the skip returns empty. *Pryor, 3.*

measuring tape. A graduated tape, steel or linen, usually in 50- or 100-foot lengths, used by engineers, builders, surveyors, etc. *Crispin.*

measuring weir. A device for measuring the flow of water, It generally consists of rectangular, trapezoidal, triangular, or other shaped notch in a thin plate in a vertical plane through which the water flows. The weir head is an index of the rate of flow. *Seelye, 1.*

meat earth. a. A term sometimes applied to topsoil at opencast pits. It varies from 8 inches to 2 feet deep and may be put aside for relaying on restoration of site. *See also* resoiling; surface reinstatement. *Nelson.* b. The vegetal mold. *Fay.*

mechanic. A man skilled in assembling, operating, and repairing mining plant and equipment. He has a number of fitters, on each shift, working under his instructions. He is responsible to the manager of the mine and also perhaps to a mechanical engineer. *Nelson.*

mechanical advantage. Ratio between the resistance or load raised by a machine, and the applied force. Mechanical advantage divided by velocity ratio gives the efficiency of the machine. *Ham.*

mechanical air machine. A flotation machine which utilizes pulp-body concentration by the agitation froth method and bubble-column action by pneumatic and cascade means. *Taggart, p. 826.*

mechanical analysis. a. The relative proportions of the different sized mineral particles present in a soil or rock. It is determined by mechanical analysis, in which the particles are separated into a number of arbitrary fractions, each consisting of particles whose size lies between definite limits. For uniformity and convenience the International Society of Soil Science has fixed the following limits. *Nelson.*

Diameter of particles	Designation
2.0 to 0.2 mm	coarse sand
0.2 to 0.02 mm	fine sand
0.02 to 0.002 mm	silt
less than 0.002 mm	clay.

Nelson.

b. An analysis of the particle-size distribution of a sediment. *Pettijohn, 2d, 1957, p. 30. See also* grain-size analysis. *ASCE P1826.*

mechanical analysis of sediments. The operation of determining the distribution of grains of a granular material in accordance with size. The separations of the relatively large grains are made by the use of sieves with varying sized mesh, the material passing through mesh of one size being retained on the sieve of the next smaller size being considered as coming within one size range or bracket. Generally expressed in percentage of weight of materials within specific limits of size. Other methods are used for silt and clay separation. *H&G.*

mechanical bond. Increased adhesion between concrete and its reinforcement effected by the use of helical or indented reinforcing bars. *See also* specific adhesion; helical reinforcement; indented bars. *Ham.*

mechanical boy. A device used for controlling the mold during the hand blowing of glassware. *Dodd.*

mechanical brake. The brake in which the brakeshoes are pressed against the brakedrum by mechanical connections. *Shell Oil Co.*

mechanical classifiers. Machines, such as the Dorr classifier, that are commonly used to classify a ball-mill or rod-mill discharge into finished product and oversize. *Newton, pp. 80-81.*

mechanical clay. A clay formed from the products of the abrasion of rocks. *A.G.I.*

mechanical cleaning. The removal of impurities by mechanical units as compared with hand picking, by which impurritties are removed by hand. *Mitchell, p. 3.* Broadly, mechanical cleaning may be subdivided into drycleaning and wet cleaning. *Nelson.*

mechanical clutch. A clutch for transmitting torque from the drive to the crankshaft of a press through an arrangement of irregular mating surfaces. *ASM Gloss.*

mechanical concentration deposit. A deposit of heavy minerals concentrated on the surface by moving water or air. *Bateman.*

mechanical efficiency. The ratio of the air-indicated horsepower to the indicated horsepower in the power cylinder, in the case of compression driven by steam or internal-combustion engines, and to the brake horsepower delivered to the shaft in case of a power-driven machine. *Lewis, p. 663.*

mechanical engineer. An engineer responsible for the safe and efficient operation of all machines and plant at a mine or group of mines. He has the assistance of mechanics and fitters. The modern trend is to appoint mechanical/electrical engineers. *Nelson.*

mechanical eqaution of state. Any equation relating the stress, strain, strain rate, and temperature that is based on the concept that the instantaneous value of any one of these quantities is a single-valued function of the others, regardless of the prior history of the deformation. *ASM Gloss.*

mechanical equivalent of heat. Amount of mechanical energy which can be transformed into a single heat unit, the equivalent of 778 foot-pounds per British thermal unit. *Ham.*

mechanical extensometer. An appliance for measuring strain and often used in roof control investigations. It employs a micrometer dial gage actuated through a lever giving initial magnification of the movement. A sensitivity of 10 microstrain over a 10-centimeter base length can be obtained by a micrometer reading to one-hundredth of a millimeter and a 10:1 lever. *Nelson.*

mechanical feed. Synonym for gear feed. *Long.*

mechanical-feed head. Synonym for gear-feed swivel head. *Long* .

mechanical-feed swivel head. Synonym for gear-feed swivel head. *Long.*

mechanical flotation cell. A cell in which the ore-water pulp feeds, is kept agitated, and is circulated by means of an impeller mounted at the bottom of a vertical shaft. The rotating impeller creates vacuum enough to draw air down the standpipe surrounding the impeller shaft, and the impeller disperses the air throughout the pulp in the form of small bubbles. The flotable minerals are carried upward by the bubbles and eventually collect in the froth above the pulp in the machine. Automatic scrapers remove the mineral-laden froth which contains the concentrate, and after the values have been removed, the barren pulp containing the tailing flows out of the cell. *Newton, Joseph. Introduction to Metallurgy, 1938, pp. 255-256.*

mechanical hysteresis. Energy absorbed in a complete cycle of loading and unloading within the elastic limit and represented by the closed loop of the stress-strain curves for loading and unloading. Sometimes referred to as elastic, but more properly, mechanical. *ASM Gloss.*

mechanical impedance. The mechanical impedance of a given surface area of an acoustic medium perpendicular, at every point, to the direction of propagation of sinusoidal acoustic waves of given frequency and having equal acoustic pressures and equal volume velocities per unit area at every point of the surface at any instant, is the quotient obtained by dividing (1) the phasor corresponding to the force, due to the acoustic pressure on the given area, by (2) the phasor corresponding to the volume velocity per unit area. *H&G.*

mechanical loader. A power machine for loading coal, pay mineral, or dirt. *See also* loader. *Nelson.*

mechanically held water. *See* mechanical water. *Dodd.*

mechanical metallurgy. The technology dealing with the manner in which metals react to their mechanical environment. *ASM Gloss.*

mechanical mixture. A composition of two or more substances, each remaining distinct, and generally capable of separation by mechanical means. *Standard, 1964.*

mechanical mucking. The loading of stone or dirt by machines. Two main methods of mechanical mucking are in use in shaft sinkings: (1) Cactus grab, and (2) crawler-mounted rocker shovel loaders. The grab has a capacity up to about 30 cubic feet. Some engineers prefer a circular ring on which the grab moves round the shaft bottom, others adopt a boom from which the grab is suspended and placed immediately over the broken rock. However, there is general agreement that if fast sinking rates are required, a cactus grab is essential. In tunnels, a fairly wide range of machines are available for mechanical mucking, the most common type being the shovel loader. *Nelson.*

mechanical ohms. Mechanical impedance is measured in mechanical ohms. One mechanical ohm is equal to 1 gram per second, or to 1 dyne second per centimeter. *H&G.*

mechanical origin. When a rock originates through the operation of an external force, as water flowing in streams, currents, etc., the term is used in contradistinction to rocks which may be described as having a chemical origin, or the particles of which have been consolidated by a chemical force. *A.G.I.*

mechanical-picker attendant. *See* picker attendant. *D.O.T. 1.*

mechanical plating. Plating, wherein fine metal powders are peened onto the work by tumbling or other means. *ASM Gloss.*

mechanical porpoise. An instrumented device which glides underwater and is designed to chart sea temperatures at varying depths. *Hy.*

mechanical press. A press whose slide is operated by a crank, eccentric, cam, toggle links, or other mechanical means. *ASM Gloss.*

mechanical properties. Of metals, the elastic limit, elongation, fatigue range, hardness, maximum stress, reduction in area, shock resistance, and yield point. *Pryor, 3.*

mechanical puddler. A wrought-iron (rocking) furnace in which the puddling is done by mechanical motion instead of by hand. *Mersereau, 4th, p. 443.*

mechanical puddling. *See* mechanical puddler. *Bennett 2d, 1962.*

mechanical rabble. A rabble worked by machinery. *See also* rabble, c. *Fay.*

mechanical rammer. A machine embodying a weight which is lifted and dropped upon the material being rammed. *See also* frog rammer; power rammer. *Ham.*

mechanical sampling. The principle of mechanical sampling is that it systematically removes a portion of the stream of material for a sample. Mechanical sampling is widely used in mills and concentrators where large quantities of ore, concentrate, or tailings are to be sampled, while hand sampling is used for smaller amounts. *Newton, p. 30.*

mechanical sediments. Sediments that have been brought to their places of deposition as separate particles by mechanical means. Water, wind, and ice are the agents commonly involved and the resulting rocks are conglomerates, sandstones, shales, and certain limestones. *Stokes and Varnes, 1955.*

mechanical set. Bits produced by the various means in which diamonds are set in a bit mold into which a cast or powder metal is placed, embedding the diamonds and forming the bit crown, as opposed to handsetting. Also, the act or process of producing diamond bits in such a manner. Also called cast set; machine set; sinter set. *Compare* handset. *Long.*

mechanical-set bit. A diamond bit produced by mechanical methods as opposed to handsetting methods. *See also* mechanical set. *Long.*

mechanical shovel. A loader limited to level or only slightly graded drivages. The machine operates a shovel in front of it and pushes itself forward; when full, the shovel is swung over the machine and delivers into a mine car or tub behind. It will shunt, pull, and push its own cars, delivering them into a shunt or passby when full. *Mason, v. 1, pp. 86-87. See also* shovel loader.

mechanical slip. *See* self-slip. *ACSG, 1963.*

mechanical spalling of refractories. The spalling of a refractory unit caused by stresses resulting from impact or pressure. *ASTM C71-64.*

mechanical stabilization. Mixing two or more poorly graded soils to obtain a well-graded one. *Nelson.*

mechanical twin. A twin formed in a metal during plastic deformation by a simple shear of the lattice. *ASM Gloss.*

mechanical water; mechanically held water. The water that is present in moist clay and is not chemically combined. When the clay is heated, the mechanically held water is virtually all removed by the time that the temperature has reached 150° C. *Dodd.*

mechanical weathering. The process by which rock is broken down into smaller and smaller fragments as the result of energy developed by physical forces. Also known as disintegration. *Leet.*

mechanical working. Subjecting metal to pressure exerted by rolls, presses, or hammers, to change its form or affect the structure and therefore, the physical properties. *Rolfe.*

mechanical yielding prop; friction yielding prop. A steel prop in which yield is controlled by friction between two sliding surfaces or telescopic tubes. Although crude when compared with the hydraulic prop, the friction yield prop is very robust, cheap, and requires little maintenance. *Nelson.*

mechanics. The branch of physics that treats of the phenomena caused by the action of forces on material bodies. It is subdivided into statics, dynamics, or kinetics; or into the mechanics or rigid bodies and hydromechanics (including hydrostatics and hydrodynamics). *Standard, 1964.*

mechanization. Essentially, the introduction of power machines to replace manual labor. In coal mining, it may denote the introduction of conventional machine mining to replace hand mining, or continuous mining to replace conventional machine mining. *Nelson.*

mechanization engineer. Usually a qualified mining engineer with first-hand experience and knowledge of the various mining machines and the physical conditions most suitable for them. In general, the National Coal Board, Great Britain, appoints a mechanization engineer for each group of collieries. *Nelson.*

mechanization scheme. A plan or project to convert a handmining or a conventional machine mining face to mechanized mining, that is, the use of machines which either load prepared coal or cut and load coal simultaneously (cutter loaders). The scheme may also include the introduction of locomotives, skip winding, and so on. The preparation of the scheme would be the responsibility of the planning department with the close cooperation of the manager, mechanization engineer, and other experts. *Nelson.*

mechanized. Term descriptive of a mine that has a high percentage of machinery for all steps of mining and handling of coal or other mineral product from the face to the mine working place to the coal tipple or other mineral treatment plant. *Bureau of Mines Staff; B.C.I.*

mechanized heading development. A pillar method of working suitable for seams 4 feet and over in thickness. Three or more narrow headings are driven rapidly with machines at about 30-yard centers with crosscuts for ventilation. The headings are 10 feet or more wide and 5 to 6 feet high or seam thickness. Upon reaching the boundary, the pillars formed by the headings are extracted, again with machines, on the retreat. This method is favored in the United States and the heading work is quite productive, if not more so, than pillar working. *See also* entry. *Nelson.*

mechanized output. The coal produced by all coal face machinery which either loads prepared coal or cuts and loads coal simultaneously. Also includes all coal obtained by hand filling on faces where an armored flexible conveyor is used on a prop-free front. *Nelson.*

mechanoglyph. A hieroglyph of mechanical origin. *Pettijohn.*

Meco-Moore cutter loader. A heavy 120-horsepower cutter loader. The first Meco-Moore was used in a Lancashire, England, colliery in 1934. *See also* A. B. Meco-Moore. *Nelson.*

Meco-Moore machine. The original cutter loader used in coal mining. *Pryor, 3.*

medfordite. A local Oregon name for massive white quartz with streaks and patches of green and brown moss. *Shipley.*

medial moraine. A moraine formed interiorly upon a compound glacial stream by the coalescence of two lateral moraines of the coalescing glaciers. *Standard, 1964. See also* moraine. *Fay.*

median diameter. The diameter which marks the division of a given sample into two equal parts by weight, one part containing all grains larger than the diameter and the other part containing all grains smaller. *H&G.*

medical center. At collieries in Great Britain with more than 800 men, medical centers with full time nursing sisters have been established according to a National Coal Board (Great Britain) directive. Any injury is reported at the medical center (or ambulance room in the case of smaller mines) before the injured workman leaves the colliery. *Nelson.*

medical department. Each area of the National Coal Board, Great Britain, has a medical department headed by a qualified doctor who is responsible for general matters of health among all employees in the area, whether staff or manual labor. Pre-examination of all new employees and organization of first-aid services at the collieries are examples of the work carried out. *Nelson.*

medical lock. An air chamber comprising a steel cylinder 18 feet long and about 6 feet in diameter, which has airtight doors at one end and is closed at the other. It is used for immediate treatment of sufferers from caisson disease. *Ham.*

Medina emerald. Green glass. *Shipley.*

Medina quartzite. A quartzite used as a raw material for silica refractories. A quoted chemical analysis is: 97.8 percent SiO_2, 0.9 percent Al_2O_3, 0.85 percent Fe_2O_3, and 0.4 percent alkalies. *Dodd.*

Medina sandstones and shales. A subdivision of the Silurian of North America, typically exposed in the Niagara Gorge section, and comprising a basal quartzite followed by green and red shales and sandstones capped by another quartzite. These beds constitute the Medina group of the Niagaran series in some classifications; but in others, they are given the status of a series. *C.T.D.*

mediosilicic. Suggested in place of intermediate to designate rocks that have a silica content between 52 and 66 perecnt. *Holmes, 1928.*

Mediterranean series; Mediterranean province; or Mediterranean suite. A third great group of igneous rocks that are high in potassium. Typified by certain igneous rocks in the Mediterranean Sea area. *See also* Atlantic series; Pacific series. *A.G.I.*

medium. Any suspension of medium solids in water. *B.S. 3552, 1962.*

medium band. A field term that, in accordance with an arbitrary scale established for use in describing banded coal, denotes a vitrain band ranging in thickness from 2 to 5 millimeters (about 1/12 to ⅕ inch). *Compare* thin band; thick band; very thick band. *A.G.I.*

medium beam projector. A floodlight producing a beam angle within the range of 25° to 40°. *See also* narrow beam projector. *Nelson.*

medium-bright attritus. A field term that denotes the degree of luster of attrital coal compared with the brilliant luster of associated vitrain in the same locality. *Compare* bright attritus; moderately bright attritus; moderately dull attritus; dull attritus. *A.G.I.*

medium carbon steel. Steel containing 0.15 to 0.30 percent carbon; used especially for structural purposes. *Fay.*

medium coal. *See* medium-bright attritus. *A.G.I.*

medium colliery. Gr. Brit. In general, a colliery producing from 1,000 to 1,500 tons per day. *Nelson.*

medium draining screen. A screen for draining the separating medium from a dense-medium bath product. *B.S. 3552, 1962.*

medium-duty fire clay brick. A fire clay brick with a pyrometric cone equivalent not lower than 29 nor higher than 31 to 31½. *HW.*

medium-grained. Descriptive of rocks, the constituent particles of which are neither coarse nor fine. It is used in a relative sense but the size range of 1 to 5 millimeters has been suggested. *Stokes and Varnes, 1955.*

medium-inclined. Said of deposits and coal seams with a dip of from 25° to 40°. *Stoces, v. 1, p. 56.*

medium pressure. When applied to valves and fittings, means suitable for a working pressure of from 125 to 175 pounds per square inch. *Strock, 3.*

medium recovery screen. A composite screen for draining and spraying the product from a dense medium bath to remove adherent medium solids. *B.S. 3552, 1962.*

medium-round nose. A diamond bit the cross-sectional outline of which is partially rounded but not as fully rounded as a double-round nose bit. Also called half-round nose; modified-round nose. *Compare* double-round nose. *Long.*

medium solids. The solid component of a dense medium. *B.S. 3552, 1962.*

medium solids preparation. Any purification or grinding of the raw dense medium solids to make them suitable for use. *B.S. 3552, 1962.*

medium solids recovery plant. The equipment used to remove adherent medium solids from a product from a dense-medium bath (after drainage of surplus medium), usually by spraying, and to remove contaminating coal and clay from these medium solids. *B.S. 3552, 1962.*

medium-stone bit. A bit with diamonds ranging from 8 to 40 per carat in size. *Long.*

medium thickness seam. In general, a coal seam over 2 feet and up to 4 feet in thickness. *Nelson.*

medium-volatile bituminous coal. Nonagglomerating bituminous coal having 69 percent or more, and less than 78 percent, of fixed carbon (dry, mineral-matter-free), 31 percent or less, and more than 22 percent, of volatile matter (dry, mineral-matter-free). *ASTM D388-38.*

medmontite. A clayey mineral allied to montmorillonite containing 20.96 percent CuO, from Kazakhstan, U.S.S.R. Named from copper and montmorillonite. *See also* cupromontmorillonite. *Spencer 19, M.M., 1952.*

medusae. *See* jellyfish. *Hy.*

meehanite. High-duty cast iron produced by ladle addition of calcium silicide. *Pryor, 3.*

meend; meand. Forest of Dean. Old ironstone workings at the outcrop, some of which were worked by the Romans. *Fay.*

meer. A length of 29 yards in any vein. *Hess.*

meerschaum; sepiolite. A hydrated silicate of magnesium. It is claylike, and shown microscopically to be a mixture of a fibrous mineral called parasepiolite and an amorphous mineral, beta sepiolite. It is used for making pipes, and formerly was used in Morocco as a soap. *C.T.D.*

meerschaum, artificial. A product similar to natural meerschaum. It is prepared from meerschaum shavings, kieselguhr, and silicates of aluminum, calcium, and magnesium. *Brady, p. 475.*

meer stake. A pin of wood driven into the surface to indicate the extent or end of a meer of ground. *Hess.*

meet. a. Eng. To keep pace with, for example, to keep sufficient supply of coal at the pit bottom to supply the winding engine. *Fay.* b. To come together exactly, as in survey lines from opposite directions. *Fay.*

meeting. a. A siding or bypass on underground roads. *Fay.* b. Newc. The place at middle-depth of a shaft, slope, or plane, where ascending and descending cars pass each other. *Fay.*

meeting post. A vertical timber at the outer edge of each of a pair of lock gates mitered so that the gates fit tightly when closed. *Ham.*

meeting station. N. of Eng. *See* kist. *Trist.*

mega-. a. A prefix meaning large. As a prefix to petrological and other geologic terms, it signifies parts or properties that are recognizable by the unaided eye. Opposite of micro-. *Stokes and Varnes, 1955.* b. A combining form meaning 1 million times, for example, megavolt for 1 million volts. *A.G.I.*

megabar. A unit of pressure equal to 1 megadyne per square centimeter. *Standard, 1964.*

megacycle. A unit of 1 million cycles. *C.T.D.*

megalith. A huge undressed stone used in various prehistoric monuments, such as the menhir, dolmen, etc. *Webster 3d.*

megalithic masonry. Masonry in very large stones, whether wholly or partly rough. *Standard, 1964.*

megaphenocryst. A large phenocryst that is visible to the unaided eye. *A.G.I.*

megaporphyritic. A porphyritic texture in which the phenocrysts are visible to the unaided eye. *Schieferdecker.*

megaripple. Any type of ripple with a wavelength greater than 1 meter. *Pettijohn.*

megascopic. Applied to observations of minerals and rocks and to the characters observed by means of the naked eye or pocket lens but not with a microscope. *Holmes, 1928.*

megaseismic region. The most disturbed earthquake area. *Schieferdecker.*

megaspores. Female spores; part of reproduction organs of many Coal Measures plants. *See also* spores. *Nelson.*

Megator. A displacement type of pump operating on the eccentric principle. It is interesting and ingenious in design. *Mason, v. 2, p. 626.*

megavolt. A unit of electromotive force that equals 1 million volts. Abbreviation, Mv. *Crispin.*

megawatt day per ton. A unit used for expressing the burnup of fuel in a reactor. Specifically, the number of megawatt days of heat output per metric ton of fuel. *L&L.*

megger. An electrical measuring instrument comprising a hand-operated generator equipped with a governor, a moving measuring system consisting of a voltage, and a current coil so disposed that the deflection of the moving system is proportional to the voltage to current ratio. Used to measure insulation resistance and resistance to ground. It has been somewhat used in electrical prospecting. *A.G.I.*

megohm. A unit of electrical resistance that equals 1 million ohms. Abbreviation, meg. *Crispin.*

Meigen's reaction. A test for distinguishing calcite and aragonite. A solution of cobalt nitrate is used as a combined stain and reagent. Aragonite is stained a lilac tint which remains visible in thin section after boiling in the solution for about 20 minutes; calcite (and dolomite) may be stained pale blue but they appear unchanged in thin section. *Holmes, 1928.*

meionite. A silicate of aluminum and calcium, together with calcium carbonate, $(Ca,Na)_4 Al_3 (Al,Si)_3 Si_6O_{24} (Cl,Co_3SO_4)$, which crystallizes in the tetragonal system. It is a species of the isomorphous series forming the scapolite group. *C.M.D.*

meizoseismal. Of or pertaining to the maximum destructive force of an earthquake. *Standard, 1964.*

meizoseismal area. The most disturbed area within the innermost isoseismal line. *Schieferdecker.*

meizoseismal curve. A curved line connecting the points of the maximum destructive energy of an earthquake shock around its epicentrum. *Standard, 1964.*

mela-. A prefix meaning dark-colored. *See also* melano-. *A.G.I.*

melaconite. *See* tenorite.

melamine formaldehyde. A resin. Used as a bonding agent for fibrous glass in making electrical insulating parts. *Lee.*

melanasphalt. An early name for albertite. *Tomkeieff, 1954.*

melanchyme; melanchym. A bituminous substance found in masses in the brown coal of Zweifelsruth, Bohemia, Czechoslovakia. That part of this substance which is soluble in alcohol is termed rochlederite, the residue melanellite. *Fay.*

melane. Synonym for mafic mineral. *A.G.I. Supp.*

melanellite. That portion of melanchyme which is insoluble in alcohol; it is black and gelatinous. *Fay.*

melange. Diamonds of mixed sizes. *Hess.*

melanic. Dark-colored, refers to igneous rocks having a color index between 30 and 90. *A.G.I. Supp.*

melanite. A black andradite variety of common garnet, isometric. *Dana 17.*

melano-. A prefix meaning black or dark. *A.G.I.*

melanocratic. Applied to dark-colored rocks, especially igneous rocks, containing between 60 and 100 percent dark minerals, that is, rocks, the color index of which is between 60 and 100. *See also* leucocratic; mesocratic. *A.G.I.*

melanophlogite. A colorless mineral crystallizing in cubes SiO_2 with 5 to 7 percent SO_3; possibly SiO_2 with SiS_2; Mohs' hardness, 6.5 to 7; specific gravity, 2.04; with sulfur crystals of Girgenti, Sicily. *Larsen, p. 48.*

melanostibian. A black antimonite of manganese and iron. Massive; foliated; from Sjo mine, Orebro, Sweden. *English.*

melanotekite. A black mineral with 2 cleavages $3PbO.2Fe_2O_3.3SiO_2$; Mohs' hardness, 6.5; specific gravity, 5.73. *Larsen, p. 144.*

melanovanadinite. A vanadium ore, $2CaO.3V_2O_5.2V_2O_4.6H_2O$. *Osborne.*

melanovanadite. A very rare, weakly radioactive, monoclinic, black mineral, $2CaO.2V_2O_4.3V_2O_5.xH_2O$, found impregnating ore in fractures in sandstone; in oxidized ore associated with pascoite, hummerite, rossite, and tyuyamunite; from Minasragra, Peru. *Crosby, p. 126; English, p. 147.*

melanterite. A hydrous ferrous sulfate, $FeSO_4.7H_2O$, which crystallizes in the monoclinic system; color, green-blue. It usually results from the decomposition of iron pyrite or marcasite. Also called copperas. *Webster 3d; Dana 17.*

melaphyr. A general term for altered and amygdaloidal rocks of basaltic or andesitic types. *McKinstry.*

melaphyre. a. A porphyritic rock consisting of phenocrysts of feldspar in a dark groundmass; broadly, a porphyritic igneous rock with dark colored aphanitic groundmass and phenocrysts of various kinds. *Webster 3d.* b. A Mesozoic basalt. *Webster 3d.*

meldon stone. A china stone of low quality from Cornwall, England. A quoted analysis is: 70 percent SiO_2, 18 percent Al_2O_3, 0.4 percent Fe_2O_3, 0.6 percent CaO, 4 percent Na_2O, 4.5 percent K_2O, 2.5 percent loss on ignition. *Dodd.*

m-electron. Electron of third concentric shell surrounding an atom's nucleus; principal quantum number 3. When filled contains 8 electrons. *Pryor, 3.*

melee. Small diamonds. *Hess.*

melikaria. The vein fillings or boxwork of septa which have weathered out from a septarian nodule. *A.G.I.*

melilite. A mineral group, $(Na,Ca)_2(Mg,Al)(AlSi)_2O_7$, the most common end-members including, $Ca_2MgSi_2O_7$ (akermanite) and $Ca_2Al_2SiO_7$ (gehlenite). Tetragonal. Occurs as a component of certain recent basic eruptive rocks. *A.G.I.; C.T.D.*

melilite basalt. A rare basaltic rock in which the feldspathoid is melilite. The rock is excessively basic. Alnoite is the corresponding dike rock. *Fay.*

melilitite. An extrusive or hypabyssal rock composed predominantly of pyroxene (usually titaniferous augite) and melilite. The minor minerals may be nepheline, leucite, or other feldspathoids, and sometimes plagioclase or olivine, or both. The accessory minerals are apatite, sphene, and opaque oxides. With an increase of plagioclase, the rock passes into melilite basalt (melilite tephrite) and with an increase of olivine, it passes into olivine melilitite. With an increase of both olivine and plagioclase, the rock becomes a melilite-olivine basalt (melilite basanite). In olivine melilitites, biotite is a common constituent. *A.G.I.*

melinite. a. A high explosive similar to lyddite, said to be chiefly picric acid. *Webster 2d.* b. A species of soft, unctuous clay, common in Bavaria, and probably identical with bole. *Standard, 1964.*

melinophane. Meliphanite. *Dana 6d, p. 418.*

meliphanite. A yellow, red, or black pseudotetragonal mineral with 1 distinct cleavage, $2CaO.2BeO.3SiO_2.NaF$; Mohs' hardness, 5; specific gravity, 3.0. *Larsen, p. 168.*

mell. a. Eng. A large hammer. *Fay.* b. Eng. *See* mall. *SMRB, Paper No. 61.*

melle. Small cut diamonds, usually about one-eighth carat. Generally refers to stones used in jewelry. *Hess.*

mellilite. *See* mellite. *Tomkeieff, 1954.*

mellite; mellilite. A hydrous aluminum mellate, $Al_2C_{12}O_{12}.18H_2O$; color, honey-yellow; luster, resinous; usually occurring as nodules and found in brown coal. *Tomkeieff, 1954.*

mellorite. A silicate of ferric iron, calcium, etc., approaching garnet in composition, but with optical properties similar to those of an orthorhombic pyroxene. Formed by the action of basic slag on silica brick in a steel furnace. *Spencer 16, M.M., 1943. See also* fire clay mineral. *A.G.I*

mellow amber. A name for gedanite. *Shipley.*

mellowing. A change of color in a building stone due to the oxidation of some ferruginous constituent or to the absorption of impurities. *Standard, 1964.*

melonite; tellurnickel. A nickel telluride, Ni_2Te_3; in indistinct granular and foliated particles; color, reddish-white, with metallic luster. *Fay.*

melt. a. A melted substance; also the mass melted at a single operation or the quantity melted during a certain period. *Webster 3d.* b. To change a solid into a liquid by the application of heat; or the liquid resulting from such action. *ASTM C242-60T.* c. A specific quantity of glass made at one time. *ASTM C162-66.*

melteigite. A plutonic igneous rock consisting predominantly of aegirine-diopside with a smaller amount of nepheline and minor biotite, cancrinite, calcite, apatite, titanite, melanite, and opaque oxides. With an increase in nepheline, melteigite passes into ijolite and with a decrease in nepheline, it passes into jacupirangite. *A.G.I.*

melter. a. In metallurgy, the man in charge of the furnace. *Newton, p. 312.* b. The chamber of a tank furnace where the glass batch is melted. *ASTM C162-66.* c. Person in charge of the furnace during the early stages of filling and melting of the batch. *ASTM C162-66.*

melting. a. Batch—a remelting process in which all ingredients are charged into the furnace, and the furnace is cleaned out before additional ingredients are charged in for the next batch. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.* b. Continuous—a process in which continuous melts are regularly employed for pure metal casting or for alloys when scrap or alloy pig is continually being charged to the melt, while tapping is in process. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.* c. Semicontinuous melting—a process in which alloy ingredients and pure metal pig are added in small batches, and only a portion of the bath poured off before stopping and recharging with additional ingredients. Semicontinuous melting is necessary where stirring has to be employed, as when alloying ingredients are added. It is not necessary in the continuous type of remelting. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.* d. The thermal process by which the charge is completely converted into molten glass free from undissolved batch. *ASTM C162-66.*

melting area. The area of a furnace under fire. Usually the area up to the bridgewall or floater. *ASTM C162-66.*

melting end. The part of a glass tank furnace where the batch is melted and the glass is refined. *Dodd.*

melting furnace. A glassmakers' furnace in which the frit for the glass is melted before it goes to the blowing furnace. *Fay.*

melting hole. The opening in the floor to the furnace in a melting house. *Mersereau, 4th, p. 459.*

melting house. The building in which the crucible furnaces for steel making are located. *Mersereau, 4th, p. 459.*

melting point. That temperature at which a single, pure solid phase changes to a liquid or to a liquid plus another solid phase, upon the addition of heat at a specific pressure. Unless otherwise specified, melting points are usually stated in terms of 1 atmosphere pressure. The term can also be used for the isothermal melting of certain mixtures, such as eutectic mixtures. Erroneously and loosely used also to refer to the temperature at which some appreciable but unspecified amount of liquid phase develops in a complex solid mixture that possesses a melting range; for example, the melting point of granite. Abbreviations, mp or MP. *A.G.I.*

melting point of refractory. The temperature at which a small cone of the refractory bends so that the tip touches the base. The melting point is usually 50° to 100° C above the refractoriness under load temperature. The latter is a better guide to the behavior of a material as a refractory. *Francis, 1965, v. 2, p. 653.*

melting pot. a. A vessel of fire clay holding from a few pounds to 30-40 hundredweight, according to the type of manufacture; used to contain the glass while melting in the pot furnace. Such pots may be open or closed (that is, provided with a hood to prevent furnace gases from acting on the glass). *C.T.D.* b. A crucible *Standard, 1964.*

melting rate. In electric arc welding, the weight or length of electrode melted in a unit of time. Sometimes called melt-off rate or burn-off rate. *ASM Gloss.*

melting shop. The open-hearth plant. *Newton, p. 312.*

melting snow jade. Descriptive term for a white to grayish color grade of jadeite with opaque patches traversed by translucent streaks. *Shipley.*

melting temperature. The range of furnace temperatures within which melting takes place at a commercially desirable rate, and at which the resulting glass generally has a viscosity of $10^{1.5}$ to $10^{2.5}$ poises. For purposes of comparing glasses, it is assumed that the glass at melting temperature has a viscosity of 10^{2} poises. *ASTM C162-66.*

melting zone. The hottest part of the furnace where the melting takes place. *Mersereau, 4th, p. 399.*

melt-off rate. *See* melting rate. *ASM Gloss.*

member. a. In the usage of the U.S. Geological Survey, a division of a formation, generally of distinct lithologic character or of only local extent. *Fay.* b. Any part or element of a machine or structure such as a beam, column, shaft, etc. *Ro.*

membrane theory. An advanced theory of design for thin shells, based on the premise that a shell cannot resist bending because it deflects. The only stresses that exist, therefore, in any section are shear stress and direct compression or tension. *Ham.*

membrane theory of plasticity. Attributes the plasticity of clay to the compressive action of a postulated surface envelope of water around the clay particles. *Dodd.*

memorial designer. In the stonework industry, one who conceives, drafts plans for, and makes plaster models of monuments, statues, and other memorials. *D.O.T. 1.*

memory. Equipment which holds machine language information in store by electrical or magnetic means, inside the computer. Storage, whether electrical, magnetic or by cards, etc., is made outside the computer, *Pryor, 3, p. 31.*

menaccanite. A synonym for ilmenite. *Fay.*

menachanite; menachite. A black, magnetic sand from near Menachan, Cornwall, England, from which the element, titanium, was first isolated *Hess.*

menachite. *See* menachanite.

menage. Fr. A club of working men in Scotland and North England. Common in mining districts. *Fay.*

mend. Eng. To load, or reload, trams at the gate ends out of smaller trams used only in the working faces of thin seams. *Fay.*

Mendeleev group. Any one of the groups (group 0 through group VIII) into which the elements were classified by Mendeleev in his periodic system. *Standard, 1964.*

Mendeleev's law. *See* periodic law. *Fay.*

mendelevium. A synthetic radioactive element produced in a cyclotron by bombarding einsteinium 253 with alpha particles. The element is named for D. I. Mendeleev. At the time of discovery (1955), only 17 atoms of it were prepared and identified. Mendelevium 255 decays by spontaneous fission with a half-life of about 30 minutes. It is believed to have chemical properties similar to those of the rare earth thulium, and it was predicted as eka-thulium. Symbol, Md or Mv; atomic number, 101; and the mass number of the most stable isotope, 256. *CCD 6d,* 1961; *Handbook of Chemistry and Physics, 45th ed.,* 1964, *p. B-*120.

mender. Tin or terneplate too imperfect to be sold, but usable if run through the metal pot again. *Bennett 2d,* 1962.

Mendheim kiln. A gas-fired chamber kiln designed by G. Mendheim of Munich, Germany, in about 1910 for the firing of refractories at high temperature. The gas enters at the four corners of each chamber, and burns within bag walls which direct the hot products of combustion towards the roof; they then pass downward through the setting and are exhausted through the chamber floor. *Dodd.*

mendipite. A white, oxychloride of lead,

$2PbO.PbCl_2$, which crystallizes in the orthornhombic system; found in the Mendip Hills, Somerset County, England. *C.M.D.*

mendozite. A massive, fibrous, white, hydrous, sodium aluminum sulfate, $NaAl(SO_4)_2 + 12H_2O$. Also called alunogen; soda alum. *Fay.*

menaghinite. A lead-antimony sulfide mineral, $Pb_{13}Sb_7S_{23}$; orthorhombic. In slender prismatic crystals; also massive. Color, blackish lead-gray. *Dana 17.*

Menevian. Middle Cambrian. *A.G.I. Supp.*

menilite. A concretionary, opaque, dull, grayish variety of opal. *Fay.*

meniscus. a. The curved top surface of a liquid column. It is concave upwards when the containing walls are wetted by the liquid (as water in a vertical glass tube) and convex upwards when wetted with liquid (as mercury in a vertical glass tube). *Webster 3d; Bureau of Mines Staff.* b. A concavoconvex lens; especially, one of true crescent-shaped cross section. *Webster 3d.* c. *See* onion. *ASTM C162-66.*

mennige. Ger. Minium. *Hess.*

men on! Scot. A brief expression to indicate that men are on the cage to be raised, or lowered, in the shaft. *Fay.*

Menzies cone separator. Consists of a 60° cone with a short cylindrical top section. It is provided with a stirring shaft, located in its vertical axis, carrying several sets of horizontal arms with rings of nozzles, projecting through the sides of the cone for the admission, at several horizons, of the required water currents. At the base of the cone, a classifier column several feet long is fitted, through which refuse discharges continuously to an inclined refuse conveyor. Water is supplied by a centrifugal pump. *Mitchell, pp. 319-321.*

Meotian. Lower lower Pliocene. *A.G.I. Supp.*

mep Abbreviation for mean effective pressure. Also abbreviated MEP. *BuMin Style Guide, p. 60.*

mephitic. Foul; noxious; poisonous; stifling. *Fay.*

mephitic air. a. Carbon dioxide. *Webster 3d.* b. Air exhausted of oxygen and containing chiefly nitrogen. *Webster 3d.* c. Blackdamp; chokedamp. *Fay.*

mephitic gas. Same as mephitic air. *Webster 3d.*

mephitis. A noxious exhalation caused by the decomposition of organic remains; applied also to gases emanating from deep sources, as in mines, caves, and volcanic regions. *Standard, 1964.*

mer Abbreviation for maximum efficient rate. Also abbreviated MER. *BuMin Style Guide, p. 60.*

Meramecian. Lower Upper Mississippian. *A.G.I. Supp.*

mercallite. Potassium-hydrogen sulfate, $KHSO_4$; minute tabular crystals; orthorhombic; color, sky-blue; from Vesuvius, Italy. *English.*

mercantile system. A theory in political economy that wealth consists not in labor and its products, but in the quantity of silver and gold in a country, and hence that mining, the exportation of goods, and the importation of gold should be encouraged by the State: held generally up to the close of the 18th century. *Standard, 1964.*

mercaptan. Any of a class of compounds with the general formula RSH that are analogous to the alcohols and phenols but which contain sulfur in place of oxygen. Those of low molecular weight have very disagreeable odors; especially, ethyl mercaptan. *Webster 3d.*

Mercator's projection. A cylindrical projection used for maps of the world, first introduced by Mercator in 1569. All parallels of latitude have the same length as the equator, but on the globe they decrease in length towards the poles. There is east-west stretching on Mercator's projection everywhere except at the equator. This stretching increases with distance from the equator. A 1° square at latitude 60° is half the length of the equator, and to compensate for this a north-south stretching is also made. There is great distortion of distances, areas, and shapes of land masses. *Ham.*

merchant bar. Wrought-iron bars produced by reheating, welding, and rerolling muck bars. *Mersereau, 4th, p. 443.*

merchant iron. Iron in the common bar form, convenient for the market. Also called merchant bar. *Standard, 1964.*

merchant mill. A mill, consisting of a group of stands of three rolls each arranged in a straight line and driven by one power unit, used to roll rounds, squares, or flats of smaller dimensions than would be rolled on the bar mill. *ASM Gloss.*

merchant rolls. *See* merchant mill.

merchant train. *See* merchant mill.

merch bricks. Term sometimes used for building bricks that come from the kiln discolored, warped, or off-sized. *Dodd.*

mercurial barometer. An instrument that measures atmospheric pressure. The height of a column of mercury in a vertical glass tube varies with changes to atmospheric pressure. *Jones. See also* barometer. *Compare* aneroid barometer.

mercurial horn ore. Same as calomel. *Standard, 1964.*

mercurialism. Chronic poisoning with mercury, as from excessive medication or industrial contacts with the metal or its fumes. Also called hydrargyrism. *Webster 3d.*

mercuric. Of, pertaining to, or containing mercury in the bivalent state; for example, mercuric chloride $HgCl_2$. *Webster 3d.*

mercuric cyanate. *See* mercury fulminate. *CCD 6d, 1961.*

mercuric fulminate; fulminating mercury. a. $Hg(CNO)_2$; white; isometric; specific gravity, 4.42; explodes before melting; and soluble in water, in alcohol, and in ammonium hydroxide. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-194.* b. An explosive obtained by the action of nitric acid and alcohol on mercury. Used in percussion caps. *Bennett 2d, 1962.*

mercuric oxide. Oxide of mercury. *Shell Oil Co.*

mercuric oxide, red; mercury oxide, red. Molecular weight, 216.59; orange to red; orthorhombic; HgO; soluble in acids, including dilute hydrochloric and nitric acids; slightly soluble in water and more soluble after boiling; insoluble in alcohol, in ether, in acetone, in alkalies, and in ammonia; specific gravity, 11.00 to 11.29 (11.21 for finely ground material); and it decomposes at 500° C. Used as an oxidizing agent, in producing mercury salts, in desulfurizing organic compounds, in ceramics (pigment), in polishing compounds, and as an analytical reagent. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-194.*

mercuric sulfate; mercury sulfate. Colorless or white; orthorhombic; $HgSO_4$; molecular weight, 296.65; decomposes in water; soluble in acids; insoluble in alcohol, in acetone, and in ammonia; specific gravity, 6.466; and it decomposes at red heat. Used for extracting gold and silver from roasted pyrites. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-194.*

mercuric sulfide, black; mercury sulfide, black; metacinnabar. Black; molecular weight, 232.65; isometric; HgS; soluble in aqua regia, in sodium sulfide solutions, and in alkalies; insoluble in water, in alcohol, and in nitric acid; specific gravity, 7.73 and it sublimes at 583.5° C. Used as a pigment for coloring horn. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-194.*

mercuric sulfide, red; mercury sulfide, red; vermillion; cinnabar. Red; molecular weight, 232.65; hexagonal; HgS; specific gravity, 8.10; Mohs' hardness, 2.0 to 2.5; sublimes at 583.5° C; insoluble in water, in alcohol, and in nitric acid; and soluble in aqua regia and in sodium sulfide solutions. Used as a pigment and it is the chief ore of mercury. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-194, B-243; CCD 6d, 1961.*

mercurous. Of, pertaining to, or containing mercury in the univalent state; for example, mercurous chloride (Hg_2Cl_2). *Webster 3d.*

mercurous chloride; calomel. Hg_2Cl_2; occurs naturally in whitish or grayish masses; associated with cinnabar. From it can be obtained, by digesting in air with hydrochloric acid, mercuric chloride ($HgCl_2$), the corrosive sublimate, which is used for intensification processes in photography. *C.T.D.*

mercurous chromate; mercury chromate. Brick-red; needles; Hg_2CrO_4; molecular weight, 517.17; decomposes on heating; very slightly soluble in water; soluble in concentrated nitric acid and in hydrocyanic acid; and insoluble in alcohol. Used in ceramics for coloring green. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-193.*

mercury; quicksilver. A heavy, silvery-white metallic element that is liquid at ordinary temperatures. Occurs as native mercury but its principal source is cinnabar (HgS). A solvent for most metals; the products are called amalgams. Its chief uses are in the manufacture of drugs and chemicals, fulminate, and vermilion (vermillion); and it is used as metal in mercury-vapor lamps, arc rectifiers, power-control switches, thermometers, and barometers. Symbol, Hg; valences, 1 and 2; hexagonal rhombohedral; atomic number, 80; atomic weight, 200.59; specific gravity, 13.546 (at 20° C) or 13.5939 (at 20° C, referred to water at 4° C); poisonous; rather poor conductor of heat, as compared with other metals; fair conductor of electricity; melting point, −38.87° C; boiling point, 356.58° C; insoluble in water, in dilute hydrochloric acid, in hydrobromic acid, in hydroiodic acid, and in cold sulfuric acid; and soluble in nitric acid. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-120, B-193.*

mercury arc. An electric discharge through mercury vapor in a glass or a quartz tube emitting a blue-green light that is high in actinic and ultraviolet rays. Used for water sterilization, in photography, and in rectifiers. *Webster 3d.*

mercury-arc rectifier. Any common alternating-current voltage may be converted to direct-current voltage above 120 volts, by means of a mercury-arc rectifier and its associated equipment. The rectifier consists of insulated anodes and a mercury-pool cathode sealed into an evacuated tube. Current can pass between the anodes and cathode in only one direction. Thus when an alternating-current voltage is applied to the rectifier, direct current is obtained. *Pit and Quarry, 53rd, Sec. D, p. 34.*

mercury-barium iodide. $HgI_2.BaI_2$; molecular weight, 945.65; yellow; poisonous; crystalline; deliquescent; and soluble in water and in ethyl alcohol. Used in mineralogy and in chemical analysis. *Bennett 2d, 1962.*

mercury chloride; mercuric chloride; corrosive sublimate. Colorless; transparent; orthorhombic; $HgCl_2$; poisonous; specific gravity, 5.44 (at 25° C); melting point, 276° C; and soluble in water and in alcohol. Usually made by heating mercury with gaseous chlorine or by subliming a mixture of mercury sulfate and common salt. Used in making other mercury compounds. *Webster 3d; Handbook of Chemitry and Physics, 45th ed., 1964, p. B-193.*

mercury chromate. *See* mercurous chromate. *CCD 6d, 1961.*

mercury cup. a. The cistern of a mercury barometer. *Standard, 1964.* b. A cup containing mercury for making an electric connection, as by dipping the ends of two wires in it. *Standard, 1964.*

mercury fulminate; mercuric fulminate; mercuric cyanate. White or gray; isometric; molecular weight, 284.62; $Hg(CNO)_2$; explodes when dry under the slightest friction or shock; must be kept moist until used; soluble in alcohol, in amonium hydroxide, and in hot water; slightly soluble in cold water; specific gravity, 4.42; and no melting point because it explodes. Used in the manufacture of caps and detonators for producing explosions. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-194.*

mercury furnace. A furnace in which cinnabar is roasted in order to cause the pure mercury to pass off in fume, which is condensed. *Fay.*

mercury gatherer. A stirring apparatus that causes quicksilver, which has become floured or mixed with sulfur in amalgamating, to resume the fluid condition, through the agency of mechanical agitation and rubbing. *Fay.*

mercury minerals. Main source is the red sulfide, cinnabar. *Pryor, 3.*

mercury number. A measure of the free sulfur in a sample of naphtha. Mercury is shaken with a sample of naphtha and the amount of discoloration in the sample is compared with a standard to determine the number. *Williams.*

mercury ores. Native mercury; same as cinnabar (sulfide). *Fay.*

mercury oxide, red. *See* mercuric oxide, red. *CCD 6d, 1961.*

mercury-potassium cyanide. $Hg(CN)_2.2KCN$; molecular weight, 382.84; colorless; crystals; and soluble in water and in ethyl alcohol. Used for silvering glass and for chemical analysis. *Bennett 2d, 1962.*

mercury seal. a. In laboratory glassware, a joint sealed by liquid mercury to form a gastight joint when a stirrer is in use. *Pryor, 3.* b. A device which insures that a piece of apparatus is gastight, while the point of entry of a stirrer shaft with allowing free rotation of the stirrer. *Bennett 2d, 1962.*

mercury spectrum. Mercury-vapor lamps of various kinds emit the following powerful lines in the visible and ultraviolet regions (wavelengths in angstrom units) 6907, 6234, 5790, 5769, 5460, 4358, 4046, 3650, 2536. Being rather widely spaced, individual lines in the visible spectrum and in the ultraviolet can be more or less isolated by the use of appropriate filters. *Anderson.*

mercury sulfate. *See* mercuric sulfate. *CCD 6d, 1961.*

mercury sulfide. *See* cinnabar; metacinnabarite. *C.M.D.*

mercury sulfide, black. *See* mercuric sulfide, black. *CCD 6d, 1961.*

mercury switch. A glass tube employing mercury to establish electrical contact between circuits when the tube is tilted so that the mercury bridges the gap between contacts, and conversely. *Strock, 10.*

mercury trap. *See* trap.

mercury-vapor lamp. Consists essentially of a sealed glass tube provided with two electrodes and containing a gas. When an electrical potential difference is applied, a current passes and with a suitable gas, light will be emitted. In the case of mercury vapor this light is of a bluish color and has proven effective in distinguishing dirt from coal. A special starting electrode close to one of the main electrodes initiates the discharge, and a choke coil in series with the lamp serves to limit the current passing, since the resistance tends to fall with increasing current. *Mason, v. 1, p. 258.*

mercury-vapor rectifier. *See* mercury-arc rectifier.

mere; mear. a. Eng. a boundary line. *Standard, 1964.* b. In Derbyshire peak a measure of mining claims of 29 or 31 yards. *Standard, 1964.* The discoverer of the lode was allowed to claim 2 meres. *Fay.*

merese. A flat sharp-edged button of glass used between the bowl and stem of a wine glass or goblet to connect the two parts. *Haggar.*

mere stake; meer stake; mear stake. A stake to mark the boundary of mining property. *Fay.*

merestone. A stone used as a boundary; also, figuratively, a boundary. *Standard, 1964.*

meridian. A great circle on the surface of the earth passing through the poles and any given place. A north-south line. *Webster, 3d.* Also called terrestrial meridian. *Standard, 1964.*

meridian indicator. *See* gyroscopic compass.

meridian passage. *See* culmination. *Ham.*

merismite. A chorismite, characterized by the irregular penetration of the units of the fabric. It is built up of differently shaped parts. *A.G.I.*

mero-. A prefix meaning part, or fraction, from the Greek meros. *A.G.I.*

merocrystalline. Synonymous with hypocrystalline; semicrystalline; hemicrystalline. Hypocrystalline is preferred. *A.G.I.*

merohedral. Having only a part of the planes required by the full symmetry of the crystal form. *Standard, 1964.*

meroleims. Coalified remains of parts of plants. *Tomkeieff, 1954.*

merosymmetric. Having only a part of the maximum symmetry of the crystal system concerned. *A.G.I.*

meroxene. Biotite mica with its axial plane parallel to crystal axis *b. Dana 6d, p. 627.*

Merrill-Crowe process. Removal of gold from pregnant cyanide solution by deoxygenation followed by precipitation on zinc dust, the work being completed by filtration to arrest the resultant auriferous gold slimes. *Pryor, 3.*

Merrill filter. A type of plate and frame pressure filter. *Bureau of Mines Staff.*

Merrill filter press. A variation of the plate-and-frame press. *Liddell 2d, p. 391.*

merrillite. a. A colorless phosphate of calcium and sodium, $3CaO.Na_2O.P_2O_5$. Uniaxial, negative. Found in minute quanities in some meteoric stones. *English.* b. A zinc dust of high purity used to precipitate gold and silver in the cyanide process. *Brady, p. 837.*

Merriman test; sugar test. A quality test (now discarded) for hydraulic cement. The sample is shaken with a solution of cane surgar and the amount of cement dissolved is determined by titration with HCl. *Dodd.*

Merrit plate. *See* bloomery. *Fay.*

Mersey "yellow coal." Synonym for tasmanite. *Fay.*

merwinite. A colorless to pale green, silicate of calcium and magnesium, $Ca_3Mg(SiO_4)_2$; grains; monoclinic. From Crestmore, Calif; Scawt Hill, Antrim County, Ire.; Valardena, Durango, Mex. *English.*

mesa. Sp. A high, broad, flat tableland, bounded, at least on one side, by a steep cliff rising from lower land; a plateau; terrace; flat-topped hill. *Standard, 1964.*

Mesabi casing. *See* Mesabi E casing. *Long.*

Mesabi E casing. Nonstandard-size flush-joint casing, usually made from a 1-½-inch-inside-diameter and 1-29/32-inch-outside-diameter standard pipe. Also called E casing; E Mesabi casing; Mesabi casing. *Long.*

Mesabi structural drilling. A method of mineral exploration drilling developed on the western Mesabi range and utilizing reverse-circulation wash boring and/or churn drilling to drill through and obtain samples of the soft (wash ore) or fractured bodies of iron ore. *Long.*

Mesabi tripod. A drill tripod having a back upright unit made with two poles spaced about 24 inches apart at the bottom and about 12 inches apart at the top and joined together by step strips to form a ladder. *Compare* Michigan tripod. *Long.*

Mesa Grande tourmaline. Tourmaline from pegmatite ledge near Mesa Grande, San Diego County, Calif. Much of fine quality was formerly mined there together with pink beryl. *Shipley.*

mesh. a. In ventilation surveys, a closed path traversed through the network. *Roberts, I, p. 296.* b. The size of diamonds as determined by sieves. *Long.* c. Engagement or working contact of teeth of gears or of a gear and a rack. *Long.* d. The hole in a sieve or gauze. *Mason.* e. The screen number of the finest screen of a specified standard screen scale.*Bureau of Mines Staff.* f. Strictly, the number of apertures per unit area of a screen (sieve). In laboratory sizing, the number of wires per linear inch, measured either along warp or woof. In the Institution of Mining and Metallurgy system, wire diameter is equal to mesh width. In other systems, this is not the case, and mesh should therefore be stated with reference to either the system used or (better) to the aperture in microns as measured along one side of the mesh. *Pryor, 3.* g. Woven or interlaced welded steel used for reinforcing concrete. *Ham.*

mesh aperture. The dimension or dimensions of the aperture in a screen deck, usually with a qualification as to the shape of aperture, for example, round-hole; square-mesh; long-slot. *B.S. 3552, 1962.*

mesh fraction. That part of a matreial passing a specified mesh screen and retained by some stated finer mesh. *Henderson.*

mesh number (grit number). The designation of size of an abrasive grain, derived from the openings per linear inch in the control sieving screen. *ACSG, 1963.*

mesh of grind. Optimum particle size resulting from a specific grinding operation, stated in terms of percentage of ore passing (or alternatively being retained on) a given sizing screen. The mesh of grind is the liberation mesh decided on as correct for commercial treatment of the ore. Abbreviation, m.o.g. *Pryor, 3.*

mesh reinforcement. An arrangement of rods or wires normally in two directions at right angles, and tied or welded at their intersections or interwoven. Alternatively, it is a diamond mesh of expanded metal. *Taylor.*

mesh structure. A structure resembling network or latticework that is found in certain alteration products of minerals. *Standard, 1964.* Also called net structure; lattice structure. *Fay.*

mesh texture. A texture resembling a network, caused by the alteration of certain minerals, for example, by the serpentinization of olivine. Synonym for reticulate texture. *Schieferdecker.*

mesitine spar. Mesitite; a carbonate of magnesium and iron, $2MgCO_3.FeCO_3$. *Fay.*

mesitite. A white magnesium iron carbonate, $2MgCO_3.FeCO_3$, intermediate between magnesite and siderite. *See also* mesitine spar. *Fay.*

M.E. 6 exploder. An exploder approved for firing 6 shots simultaneously in British coal mines. It contains a 67½-volt high-tension dry battery, used to charge a 150-microfarad condenser, which in turn is discharged through the shotfiring circuit by a firing key. The test circuit an ohmmeter are incorporated in the exploder, the ohmmeter pointer moving over a scale to indicate whether or not the external circuit is in order. A push-button disconnects the test circuit from the external circuit and makes connection with the firing circuit. *Nelson.*

Mesnager notch. *See* Charpy test. *Ham.*

meso-. a. A prefix to denote rocks belonging to the middle zone of metamorphism; that is, produced by high temperature, hydrostatic pressure, and intense stress. *See also* apo-; cata-; epi-; kata-; meta-. *A.G.I.* b. A prefix meaning Mesozoic age. The names of igneous rocks of Mesozoic age sometimes have this prefix; for example, mesodiabase. *See also* mezo-. *Fay.*

mesocratic. Applied to igneous rocks, which, with respect to their content of dark silicate minerals, are intermediate between leucocratic and melanocratic rocks, and contain 30 to 60 percent heavy, dark minerals. *C.T.D.*

mesocrystalline. The texture of recrystallized rocks with crystal or grain size ranging from 0.20 to 0.75 millimeter. *A.G.I.*

mesokaites. Group name for brown coals. *Tomkeieff, 1954.*

mesole. Same as thomsonite. *Fay.*

mesolite. A white or colorless mineral intermediate in composition between natrolite and scolecite. Crystallizes in the monoclinic system, and occurs in amygdaloidal basalts and similar rocks. *Fay.*

Mesolithic. A tansitional period of the Stone Age between the Paleolithic and Neolithic. *Webster 3d.*

mesomicrocline. A mineral, $K(Al,Si)_2Si_2O_8$; triclinic pseudomonoclinic. *Spencer 21, M.M., 1958.*

meson. General term for the short-lived elementary particles with masses between that of the electron and that of the proton; for example, mu-mesons (muons); pi-mesons (pions); and K-particles. *L&L.*

mesophyte. An organism living under moderate moisture conditions; intermediate between xerophyte and hydrophyte. *A.G.I.*

mesosiderate. A variety of meteorite. *Standard, 1964.*

mesostasis. a. The interstitial material between the larger mineral grains in a microcrystalline rock or in a microcrystalline groundmass. Synonymous with base or basis. *A.G.I.* b. Synonymous with matrix or groundmass as applied to igneous rocks. *A.G.I.*

mesothermal. Applied to hydrohtermal deposits formed at intermediate temperature and intermediate pressure. *Bateman.*

mesothermal deposit. A mineral deposit formed at moderate temperatures and moderate pressures, in and along fissures or other openings in rocks, by deposition at intermediate depths, chiefly from hydrothermal fluids derived from consolidating intruding rocks. A mesothermal deposit differs from a mineral deposit formed in the deep veins and from one formed at shallow depths in its mineral composition and in the character of the alteration of the wall rock accompanying its formation. Mesothermal deposits are believed to have formed mostly between 175° and 300° C at depths of 4,000 to 12,000 feet. Many valuable metalliferous deposits of western North America are of this type. *Stokes and Varnes, 1955.*

mesothorium. Isotope of radium, chemically identical with it, but having a much shorter half-life; mesothorium decomposes into radiothorium, chemically identical with thorium. *Bennett 2d, 1962.*

mesothorium I. a. A name for radium 228; half-life, 6.7 years; a member of the thorium disintegration series; and symbol, $MsTh_1$. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 42d ed., 1960, p. 499; 45th ed., 1964, p. B-83.* b. This isotope of radium has a much shorter half-life than that of radium 226; 6.7 years instead of 1,622 years. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 42d ed., 1960, p. 499; 45th ed., 1964, p. B-83.* c. As a member of the thorium disintegration series, mesothorium I is the immediate product of the disintegration of thorium 232. *Glasstone, 2, p. 134.*

mesothorium II. a. A name for actinium 228; half-life, 6.13 hours; a member of the thorium disintegration series; and symbol, $MsTh_2$. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 42d ed., 1960, p. 499; 45th ed., 1964, p. B-83.* b. This isotope of actinium has a much shorter half-life than that of actinium 227, which is the most stable, or longest-lived, isotope of actinium, and has a half-life of 21.6 years. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-83.* c. As a member of the thorium disintegration series, mesothorium II is the immediate product of the disintegration of mesothorium I (radium 228), and it disintegrates into radiothorium (thorium 228), which is chemically identical with thorium and has a half-life of 1.91 years. *Bennett 2d, 1962; Glasstone, 2, p. 134; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-83.*

mesotrophic peat. Variety of peat moderately supplied with nutrients. *Tomkeieff, 1954.*

mesotype. a. Proposed by Shand in place of mesocratic to indicate igneous rocks containing between 30 and 60 percent dark minerals. *Compare* mesocratic. *Schieferdecker.* b. A variety of natrolite. *Fay.*

Mesozoic. One of the great divisions or eras of geologic time, following the Paleozoic and preceding the Cenozic era. It includes the Triassic, Jurassic, and Cretaceous periods. Also the rocks formed during that era. *Fay.*

mesozone. The middle zone of metamorphism in Grubenmann's system for the classification of metamorphic rocks and in Niggli's extension of that system. *See also* epizone; katazone. *Schieferdecker.*

mesquite. Sp. Am. A spiny, deep-rooted tree or shrub of the southwestern United States and Mexico that bears pods which are rich in sugar and important as a livestock feed, and that is often the only woody vegetation on large areas. Also spelled mesquit; mezquit; mezquite. *Webster 3d.*

messelite. A colorless to brownish triclinic mineral with one good cleavage, $Ca_2(Fe,Mg)(PO_4)_2.2H_2O$; from Messel, Hesse; Czechoslovakia; Kazakhstan, U.S.S.R. *Larsen, p. 118; American Mineralogist, v. 44, No. 3-4, March-April 1959, p. 469.*

mess kit. The cooking and table utensils of a mess together with the receptacle in which they are packed for transportation. *Webster 3d.*

mestre. Port. Mine boss. *Hess.*

met. A convenient and approximate unit of human heat production equivalent to the average metabolic heat produced by resting man, about 18.50 British thermal units per square foot per hour. *Strock, 10.*

meta-. a. A prefix which, when added to the name of a rock, signifies that the rock has undergone a degree of change in mineral or in chemical composition through metamorphism. *Fay.* b. A prefix to denote (1) resemblance, (2) that an oxygen acid has been formed from the ortho acid by withdrawing one, two, or three molecules of water, or (3) that the two radicals which replace hydrogen in the benzene nucleus are considered as attached to alternate carbon atoms. *Standard, 1964.*

meta-alunogen. Partly dehydrated alunogen (triclinic, $Al_2O_3.3SO_3.16H_2O$) yielding monoclinic $Al_2O_3.3SO_3.13\frac{1}{2}H_2O$. *Spencer 16, M.M., 1943.*

meta-anthracite. Nonagglomerating anthracite coal containing 98 percent or more of fixed carbon (dry, mineral-matter-free) and 2 percent or less of volatile matter (dry, mineral-matter-free). *ASTM D 388-38.*

meta-argillite. A rock having weak metamorphic reconstruction, no recrystallization, and no slaty cleavage or foliation. *A.G.I. Supp.*

meta-arkose. Arkose that has been metamorphosed so that it may resemble granite. *Compare* recomposed granite. *A.G.I. Supp.*

meta-autunite I. A yellow, common secondary mineral, $Ca(UO_2)_2(PO_4)_2.2\frac{1}{2}\text{-}6\frac{1}{2}H_2O$, containing 52.4 to 57.1 percent uranium. On drying or slight heating, autunite passes reversibly to meta-autunite I, which is tetragonal. Does not occur as a primary deposit in nature. *Frondel, p. 183; Dana 7, v. 2, pp. 981, 985.*

meta-autunite II. A yellow alteration product, $Ca(UO_2)_2(PO_4)_2.O\text{-}6H_2O$, that is not found in nature; contains 53.0 to 60.4 percent uranium. Meta-autunite I passes into this orthorhombic phase upon heating to about 80° C. *Frondel, p. 184; Dana 7, v. 2, pp. 981, 985.*

metabasite. A metamorphosed, basic igneous rock. *See also* basic schist; cucalite; epidiorite; greenschist; greenstone; lavialite; ophiolite; ophite; timazite. *A.G.I.*

metabentonite. Originally designated a metamorphosed bentonite, but subsequently used for potassium bentonite. *A.G.I.*

metabitumite. Hard black lustrous variety of hydrocarbon found in proximity of igneous intrustions. *Tomkeieff, 1954.*

metabituminous coal. Bituminous coal containing from 89 to 91.2 percent carbon (ash-free, dry basis). *Tomkeieff, 1954.*

meta boghead coal. High-rank torbanite. *Tomkeieff, 1954.*

metabolism. a. The utilization of oxygen by all cells of the body for the production of energy and heat. In this process carbon dioxide is produced. *H&G.* b. This is the change of nutritive material into living cells. It is accomplished by digestion, in the process of which chemical energy is converted into heat energy. When a man is at rest the amount of heat being generated is about 400 British thermal units per hour; this is known as the basal metabolism. *Spalding.*

metabolism of rocks. Proposed by Barth for the processes of redistribution of materials during metamorphism. Opposite of metasomatism, which involves the addition of new materials. *A.G.I.*

metabolite. a. Wadsworth's name for altered, glassy trachytes, of which lassenite is the unaltered form. *Fay.* b. A class of meteorites. *Hey 2d, 1955.*

metabond. A zinc-iron phosphate coating for application to iron and steel. *Osborne.*

metaborite. HBO_2, the cubic modification of metaboric acid, in white crusts. *Hey, M.M., 1964; Fleischer.*

metabrushite. Synonym for brushite. *Dana 6d, p. 829.*

metacannel coal. High-rank cannel coal. *Tomkeieff, 1954.*

metachemical metamorphism. Proposed by Dana to describe metamorphism which involves a chemical change in the affected rocks. *Fay.*

metacinnabarite. A mineral of the same composition as a cinnabar, but black in color, and crystallizing in isometric forms (tetrahedral). Used as a source of mercury. *Sanford.*

metacinnibar. A variant of metacinnabarite. *English.*

metaclase. A rock having cleavage that was secondarily developed during deformation. *Compare* protoclase. *Fay.*

metacolloid. One of the minerals that solidified from a colloidal state and acquired crystallinity, which very often is a radial structure. *Schieferdecker.*

metacryst. Any large crystal developed in a metamorphic rock by recrystallization, such as garnet or staurolite in mica schists. *A.G.I.*

metadiabase. The contraction of metamorphic diabase, suggested by Dana for certain rocks simulating diabase, but which were possibly produced by the metamorphism of sedimentary rocks. *Compare* pseudodiabase. *Fay.*

metadiorite. a. The contraction of metamorphic diorite that was proposed for certain metamorphic rocks that resemble diorite, but which may have been the result of the metamorphism of sedimentary rocks. *Compare* metadiabase; pseudodiorite. *Fay.* b. Metamorphosed gabbro, diabase, or diorite. *A.G.I. Supp.*

metadolomite. a. A metamorphic dolomite. *A.G.I. Supp.* b. The contraction of metamorphic dolomite. Metadolomite is to dolomite as marble is to limestone. *Bureau of Mines Staff.*

metadurit. Durain of a high-rank bituminous coal. *Tomkeieff, 1954.*

metaglyph. A hieroglyph formed during metamorphism. *Pettijohn.*

metagranite. Granite produced by metamorphism without even partial remelting. *A.G.I. Supp.*

metahalloysite. Halloysite, $H_4Al_2Si_2O_9.2H_2O$, when partially dehydrated at 50° C, loses $2H_2O$, then having the kaolinite formula $H_4Al_2Si_2O_9$, but with a distinct crystal structure. *English.*

metaheinrichite. The arsenic analogue of metauranocircite, $Ba(UO_2)_2(PO_4)_2.8H_2O$, occurs along with the fully hydrated mineral near Lakeview, Oregon, and in the Schwarzwald, Germany. L.N. Belova gave the name arsenuranocircite to this lower hydrate; M. Fleischer points out that meta-arsenuranocircite would be more appropriate. It is not clear which name has priority. *Hey, M.M., 1961.*

metahewettite. A very rare, weakly radioactive, probably orthorhombic, red mineral, $CaV_6O_{16}.9H_2O$, dimorphous with hewettite. Found in highly oxidized ore as coatings and fracture fillings, associated with rauvite, steigerite, fervanite, navajoite, carnotite, tyuyamunite, etc.; from southwest Colorado and southeast Utah. *Crosby, pp. 126-127; Dana 7, v. 2, p. 1061.*

metahohmannite. Hydrated basic ferric sulfate, $Fe_2(SO_4)_2(OH)_2.3H_2O$, as an orange-colored powder from the partial dehydration of hohmannite from Chile. *Spencer 15, M.M., 1940.*

metahydroboracite. A hydrous calcium and magnesium borate, $CaMgB_6O_{11}.11H_2O$, like hydroboracite but with more water. Synonym for inderborite. *Spencer 16, M.M., 1943.*

metakahlerite. A mineral, $Fe(UO_2)_2(AsO_4)_2.8H_2O$, the lower hydrate of kahlerite; found in the Sophia shaft, Baden, Germany. *Hey, M.M., 1961.*

metakaolin. An intermediate product formed when kaolinite is heated at temperatures between about 500° and 850° C; the layer structure of the parent kaolinite presists in modified form but collapse of the layers destroys any periodicity normal to the layers. At higher temperatures (925° C) metakaolin transforms to a cubic phase with a spinel-type structure; at 1,050° to 1,100° C, mullite is formed. *Dodd.*

metakirchheimerite. A mineral, $Co(UO_2)_2(AsO_4)_2.8H_2O$, a member of the metatorbernite group; from the Sophia shaft, Baden, Germany, on pitchblende. *Hey, M.M., 1961.*

metal. a An opaque, lustrous, elemental, chemical substance that is a good conductor of heat and electricity and, when polished, a good reflector of light. Most elemental metals are malleable and ductile and are, in general, heavier than the other elemental substances. *ASM Gloss.* b. As to structure, metals may be distinguished from nonmetals by their atomic binding and electron availability. Metallic atoms tend to lose electrons from the outer shells, the positive ions thus formed being held together by the electron gas produced by the separation. The ability of these free electrons to carry an electric current, and the fact that the conducting power decreases as temperature increases, establish one of the prime distinctions of a metallic solid. *ASM Gloss.* c. From the chemical viewpoint, an elemental substance whose hydroxide is alkaline. *ASM Gloss.* d. An alloy. *ASM Gloss.* e. Ore from which a metal is derived. *Webster 3d.* f. N. of Eng. In coal mining, indurated clay or shale. *See also* bind. *Fay.* g. Broken stone for road surfaces or for railway ballast. *Standard, 1964.* h. Railway rails. *Standard, 1964.* i. Scot. All the rocks penetrated in mining ore. *Fay.* j. Road metal, rock used in macadamizing roads. *Fay.* k. A general term for rock, generally a hard shale. *Nelson.* l. Eng. Shale. *SMRB, Paper No. 61.* m. Sp. Term applied both to the ore and to the metal extracted from it. It is sometimes used for vein, and even for a mine itself. *Fay.* n. Molten glass in a melting unit. *ASTM C162-66.*

metal arc cutting. Metal cutting with the heat of an arc between a metal electrode and the base metal. *ASM Gloss.*

metal arc welding. Arc welding with metal electrodes. Commonly refers to shielded metal arc welding using covered electrodes. *ASM Gloss.*

metal bath. A bath, as of mercury or tin, employed for chemical processes requiring great heat. *Standard, 1964.*

metal blister. Bloating of the metal sheet. *ASTM C286-65.*

metal-cased refractory. A basic refractory with a thin sheet metal casing on three or four sides, leaving the ends of the brick exposed; the refractory material itself (generally magnesite or chrome-magnesite) is usually chemically bonded. Such bricks are used chiefly in steel furnaces; during use, the metal case at the hot end of the brick oxidizes and knits each brick to its neighbors. There are many variants of this type of basic refractory but all derive from the steel tubes packed with magnesite. *Dodd.*

metal-ceramic. Substance consisting of mixture of a metal in a ceramic such as metallic oxide, carbide, or nitride, which in general gives some ductility to the ceramic. Also called ceramet. *NRC-ASA N1-1-1957.*

metal coal. Northumb. Miners' term for coal containing pyrites. *Tomkeieff, 1954.*

metal deactivator. An organic compound added to hydrocarbon distillates to suppress the catalytic action of metal compounds (especially copper) present as the result of refining or handling operations. *Institute of Petroleum, 1961.*

metal-distribution ratio. The ratio of the thickness of metal deposited on a near portion of a cathode to that deposited on a far portion of the cathode. *ASM Gloss.*

metal drift. A drift or heading driven in barren and hard rock. *Nelson.*

metaled. a. Surfaced with stone; macadamized; said of an ordinary road. *Standard, 1964.* b. Stone ballasted; said of a railway. *Standard, 1964.*

metal electrode. A filler or nonfiller metal electrode, used in arc welding, consisting of a metal wire, with or without a covering or coating. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.*

metal-electrode arc welding. A group of arc-welding processes wherein metal electrodes are used. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.*

metaleucite. A dimorphous form of leucite of higher symmetry, met with at ordinary temperatures, whereas the name leucite is properly restricted to the isometric, optically isotropic, modification of the same substance, which is stable only above 600° C. *English.*

metalico. Sp. Metallic. *Hess.*

metalifero. Sp. Ore-bearing; metalliferous. *Hess.*

metalignitous coal. Coal containing from 80 to 84 percent carbon (ashless, dry basis). *Tomkeieff, 1954.*

metalimestone. The contraction of metamorphic limestone. Synonym for marble. *A.G.I. Supp.*

metaline. a. A substance of variable composition as metallic oxides, wax, fats, etc., used as a substitute for ordinary lubricants. *Webster 2d.* b. An alloy of 35 parts cobalt, 30 copper, 25 aluminum, and 10 iron. *Webster 2d.*

metalist. One who works in, or has special knowledge of, metals. *Standard, 1964.* A metallurgist. *Fay.*

metalized slurry blasting. The breaking of rocks, etc., using slurried explosive medium containing a powdered metal, as powdered aluminum. *Bureau of Mines Staff.*

metalkase brick. Basic brick provided with thin steel casings. *HW.*

metal leaf. Thin metal sheet, usually thinner than foil, and traditionally produced by beating rather than by rolling. *ASM Gloss.*

metallic. a. Of or belonging to metals; containing metals, more particularly, the valuable metals that are the object of mining. *Fay.* b. Applied to minerals having the luster of a metal, as gold, copper, etc. *Fay.* c. Used to indicate the condition of a metal in which it exists by itself, and is not mineralized nor combined with those substances which take away its metallic character and convert it into an ore. *Ricketts, I.*

metallic-arc welding. Welding in which one or more metal electrodes are used, the melting of the electrodes providing the filler metal. *Ham, p. 249.*

metallic armor. An outer covering consisting of round metal wires or flat metallic strip. *BuMines Coal-Mine Inspectors' Manual, June 1966, pt. 3–18e, p. 52.*

metallic asbestos yarn. Metallic asbestos yarn is yarn consisting of plain asbestos yarn twisted with brass, copper, or other fine wire. *See also* asbestos yarn. *Hess.*

metallic bond. The chemical bond typical of the metallic state and characterized by mobile valence electrons that hold the atoms together usually in crystal lattices and are responsible for the good electrical and heat conductivity of metals. *Webster 3d.*

metallic colors. Metal particles, gold, silver, or platinum, suspended in oils, to decorate mainly the edges of dinnerware. *ACSG, 1963.*

metallic crystals. The crystals of which metals and alloys are composed. Three main types are recognized; namely, pure metal crystals, primary solid-solution crystals, and intermediate-constituent crystals. *C.T.D.*

metallic elements. Elements that are generally distinguishable from other elements (nonmetallic elements) by their luster, malleability, electrical conductivity, and their usual ability to form positive ions. *Henderson.*

metallic iron. Metal iron, as distinguished from iron ore. *Fay.*

metallic luster. The ordinary luster of metals. When feebly displayed, it is termed submetallic. Gold, iron pyrites and galena have a metallic luster; chromite and cuprite a submetallic luster. *Nelson.*

metallic materials. Materials which contain elements that readily release their electrons, as contrasted to ceramic materials and nonmetallic materials; for example, aluminum, magnesium, steel, $CuAl_2$, $MoSi_2$, etc. *VV.*

metallic minerals. Minerals with a high specific gravity and metallic luster, such as titanium, rutile, tungsten, uranium, tin, lead, iron, etc. In general, the metallic minerals are good conductors of heat and electricity. *See also* nonmetallic minerals. *Nelson.*

metallic ore. From a strictly scientific point of view the terms metallic ore and ore deposits have no clear significance. They are purely conventional expressions, used to describe those metalliferous minerals or bodies of mineral having economic value, from which the useful metals can be advantageously extracted. In one sense rock salt is ore of sodium, and limestone an ore of calcium, but to term beds of those substances ore deposits would be quite outside of current usage. *Ricketts, I.*

metallic overglaze. A solution of mineral pigments in a suitable organic solvent. The pigments are either precious metals or tinctorial oxides of certain base metals. Firing results in discernible platings. *Kinney.*

metallic oxide. One of those oxides that consist of a metallic element and oxygen, and are for the most part basic. *Standard, 1964.*

metallics. a. A term used to describe particles of metals, such as gold in ores. *Newton, p. 28.* b. Native metal particles, wires, laminae, nuggets of gold, silver, or copper. *Pryor, 3.*

metallic-sheathed cable. A metallic-sheathed cable is a cable with a tubular metallic sheath, a corrugated metallic sheath, or an interlocked metallic armored sheath. *ASA M2.1–1963.*

metallic sulfide. A sulfide in which the basic radical is a metal. Applied chiefly to certain minerals; such as iron sulfide (pyrite) and zinc sulfide (sphalerite). *Standard, 1964.*

metallic tremor. The trembling palsy of metal workers, as of workers with lead or quicksilver; the mercurial-trade disease. *Fay.*

metalliferous. The term is not one admitting of precise definition. It means yielding or producing metals; as a metalliferous ore or deposit; a metalliferous district. But the metals and nonmetals are not subject, chemically or scientifically, to a conclusive definition or classification. *Ricketts, I.*

metalliferous deposit. A mineral deposit which contains or yields ore minerals containing one or more metals. Several metals may be contained in a single mineral, or the same metal may occur in several minerals. Usually there is a considerable amount of gangue or waste material and the metal content may range between wide extremes. *Stokes and Varnes, 1955.*

metalliferous veins. Fissures and cracks in rocks containing, among other minerals, the ores of metals. *Nelson.*

metallify. To convert into metal. *Fay.*

metal line. The surface line of the metal or glass in a tank furnace or pot. *ASTM C162–66.*

metalline. a. Metallic. *Webster 3d.* b. Impregnated with metallic substances. *Webster 3d.*

metallites. A word used by M. E. Wadsworth to embrace all ores or metalliferous material. *Fay.*

metallization. a. The process, or group of processes, by which valuable metals, or minerals containing valuable metals, are introduced into rocks. Mineralization is often used in this sense which is more comprehensive. The formation of garnet in limestone, for example, is a result of mineralization but it may have no economic significance. *Fay* b. The conversion of a substance, for example, selenium, into a metallic form. *C.T.D.*

metallize. To turn into a metal; to infuse mineral or metallic particles into, as the pores of wood. *Standard, 1964.*

metallizing. Electroceramics are metallized when it is required to join the ceramic to a metal of form a seal. An alumina ceramic, for example, can be metallized by painting it with a powdered mixture of molybdenum and iron and firing it in a protective atmosphere to bond the metals to the surface; the metallized area is then plated with copper or nickel. This two-stage procedure is known as the Telefunken process. Single stage metallizing is possible if the hydride of titanium or zirconium are used, together with a hard solder; this is sometimes known as the Bondley process. *Dodd.*

metallizing (spray metallizing). Forming a metallic coating by atomized spraying with molten metal or by vacuum deposition. *ASM Gloss.*

metalloceramic. One of the old, now obsolete, names of cermet. *Dodd.*

metallogenetic epoch; minerogenetic epoch. The time interval favorable for the genesis or deposition of certain useful metals or minerals. *A.G.I.*

metallogenetic province. *See* minerogenetic province. *A.G.I.*

metallogenic element. An element normally forming sulfides, selenides, tellurides, arsenides, antimonides, sulfosalts, or occurring uncombined as a native element; that is, an element of primary ore deposits. *Schieferdecker.*

metallogenic mineral. Same as ore mineral. *A.G.I. Supp.*

metallogenic province. A large area of the earth's surface characterized by an unusual abundance of ores of a particular metal or of a particular type. *Hawkes, 2, p. 47.*

metallogeny. The branch of geology that deals with the origin of ore deposits. *Webster 2d.*

metallograph. An optical instrument designed for both visual observation and photomicrography of prepared surfaces of opaque materials at magnifications ranging from about 25 to about 1,500 diameters. The instrument consists of a high-intensity, illuminating source, a microscope, and a camera bellows. On some instruments, provisions are made for examination of specimen surfaces with polarized light, phase contrast, oblique illumination, dark-field illumination, and customary bright-field illumination. *ASM Gloss.*

metallography. The science dealing with the constitution and structure of metals and alloys as revealed by the unaided eye or by such tools as low-powered magnification, optical microscope, electron microscope, and diffraction or X-ray techniques. *ASM Gloss.*

metalloid. a. archaic. An alkali metal, as sodium or an alkaline-earth metal, as calcium. *Webster 3d.* b. Nonmetal. *Webster 3d.* c. A nonmetal, as carbon or nitrogen, that can combine with a metal to form an alloy. *Webster 3d.* d. An element, as boron, silicon, arsenic, or tellurium, intermediate in properties between the typical metals and nonmetals. *Compare* semiconductor. *Webster 3d.* e. Resembling a metal. *Webster 3d.* f. Of, relating to, or being a metalloid. *Webster 3d.*

metalloidal luster. Reflecting light, somewhat like a metal, but less than metallic luster. *Shipley.*

metallometric surveying. Geochemical prospecting term used by Russian authors for soil surveys or for the chemical analysis of systematically collected samples of soil and weathered rock. *Hawkes, 2, p. 3.*

metallometry. The geochemical determination of metals. *A.G.I. Supp.*

metallo-organic compound. A compound in which a metal combines with naturally occurring organic compounds to form metallo-organic complexes such as porphyrins and salts of various organic acids. Some metallo-organic compounds are soluble in water, others are not. *Hawkes, 2, p. 125.*

metallophyton. Old name for stone coal. *Tomkeieff, 1954.*

metallurgical balance sheet. Material balance of a process. *Bureau of Mines Staff.*

metallurgical cement. *See* supersulfated cement. *Ham.*

metallurgical coke. A coke with very high compressive strength at elevated temperatures, used in metallurgical furnaces, not only as a fuel, but also to support the weight of the charge. *ASM Gloss.*

metallurgical coke base carbon refractory. A manufactured refractory comprised substantially of metallurgical coke. *ASTM C71–64.*

metallurgical engineer. One who applies engineering principles to the science and technology of metallurgy. *Bureau of Mines Staff.*

metallurgical fume. A mixture of fine particles of elements and metallic and nonmetallic compounds either sublimed or condensed from the vapor state. *Fay.*

metallurgical smoke. A term applied to the gases and vapors, and fine dust entrained by them, that issue from the throat furnaces and consists of three distinct substances, gases, (including air) the flue dust, and the fume. *Fay.*

metallurgist. One who is skilled in, or who practices metallurgy. *Compare* metallurgical engineer. *Fay.*

metallurgy. The science and technology of metals. Process (chemical) metallurgy is concerned with the extraction of metals from their ores and with the refining of metals; physical metallurgy, with the physical and mechanical properties of metals as affected by composition, mechanical working and heat treatment. *ASM Gloss.*

metallurgy, adaptive. *See* adaptive metallurgy. *Bennett 2d, 1962 Add.*

metal man. a. Eng. One who repairs underground roads. *Standard, 1964.* b. One who works in metals. *Standard, 1964.*

metal marking. *See* silver marking of glazes. *Dodd.*

metal mine inspector. In metal mining, one who examines the safety conditions of a mine in regard to the roof, timbering, haulage, ventilation, and electricity, and reports findings to his superior. Must have a thorough knowledge of state mining laws, local mine rules and regulations, principles of ventilation, use of explosives, and mining methods. Also called examiner; mine inspector; safety inspector. *D.O.T.1.*

metal mining. The industry that supplies the community with the various metals and associated products. Similar to coal mining, it is an extractive industry and once the raw material, that is, the ore body, is depleted it is not replenishable. *Nelson.*

metal notch. *See* taphole, a. *Fay.*

metal physics. A term used to describe the whole range of subjects associated with the structure, physical properties, and theories of metals and alloys. *Osborne.*

metal pickling. The immersion of metal objects in a hot acid bath to remove scale, oxide, tarnish, etc., leaving a chemically clean surface for galvanizing or painting. *Nelson.*

metal powder. a. A general term applied by drillers, bit setters, and bit manufacturers to various finely ground metals, which when mixed are commonly used to produce sintered-metal diamond bit crowns. Also called powdered metal; powder metal. *Long.* b. Metallic elements or alloys in finely divided or powder form. *Henderson.*

metal protection. Metals can be protected from oxidation at high temperature by various types of ceramic coating, the commonest being flame-sprayed alumina and refractory enamels. Such coatings have found particular use on the exhaust systems of aircraft. *Dodd.*

metal ridge. a. N. of Eng. A pillar or pillars that form a support for a mine roof. *Fay.* b. Eng. The strata forced up by a creep. *Fay.*

metal rigs. Eng. Old roadways in a pillar method of working which have been filled tight and hard from roof to floor with debris; from Durham. *Nelson.*

metals. Scot. A general name for the strata in which minerals occur. *Fay.*

metal spraying. Coating objects by spraying molten metal upon the surface with gas pressure. *ASM Gloss.*

metal stone. a. Newc. An argillaceous stone. Shale and sandstone. *Fay.* b. Staff. Ironstone. *Arkell.*

metal tender. One who regulates the temperature of the furnace in order that the glass may have the proper viscosity for casting. *ASTM C162–66.*

metaluminous. A division in the Shand classification of igneous rocks embracing those rocks in which the molecular proportion of alumina exceeds that of soda and potash combined but is generally less than that of soda, potash, and lime combined. *A.G.I.*

metalunite. Dehydrated alunite. *Bennett 2d, 1962.*

metameric colors. Colors that appear to be the same under one type of illuminant but, because they have different spectral reflectivity curves, will not match under a different illuminant. Two white viterous enamels may be metameric, for example, if one is opacified with titania in the anatase form whereas the other contains titania in the form of rutile. *Dodd.*

metamerism. Isomerism produced by the attachment of different radicals to the same atom or group, the same general chemical properties being retained. *Bennett 2d, 1962.*

metamic. A metal ceramic consisting of high Cr-Al$_2$O$_3$. *Osborne.*

metamics. *See* ceramals. *Osborne.*

metamict. A mineral which has become virtually amorphous due to the breakdown of the original crystal structure by internal bombardment with alpha particles (helium nuclei) emitted by radioactive atoms within the mineral. Many green zircons, especially those from Ceylon, which are Precambrian in age, and have thus had over 800 million years of this internal bombardment, owe their low refractive index and density to this cause, and may be termed metamict zircons. *Anderson.*

metamictization. The process of disruption of the structure of a crystal by radiations from contained radioactive atoms, rendering the material partly or wholly amorphous. *A.G.I.*

metamict mineral. A mineral, the crystal structure of which has been disrupted by radiation from contained radioactive atoms. *A.G.I.*

metamontmorillonite. The product of dehydration of montmorillonite at 400° C. *Hey, M.M., 1961.*

metamorphic. Characteristic of, pertaining to, produced by, or occurring during the metamorphism of certain rocks. *Fay.*

metamorphic aureole; contact metamorphism. The zone of altered rocks surrounding an igneous intrusion. Along the contact belt between the intrusion and country rock, the latter may contain material derived from the igneous mass resulting in the formation of valuable ore deposits. *Nelson.*

metamorphic deposit. Ore deposits that have undergone change from being subjected to great pressure, high temperature, and chemical alteration by solutions. They have become warped, twisted, and folded, and the original minerals are rearranged and recrystallized. *Lewis. p. 276.*

metamorphic differentiation. The segregation of certain minerals into lenses and bands. *A.G.I. Supp.*

metamorphic diffusion. Migration by diffusion of material from one part of a rock to another during the recrystallization of the rock. *Schieferdecker.*

metamorphic facies. A group of metamorphic rocks characterized by particular mineral associations or assemblages indicating origin under restricted conditions of temperature and pressure. *A.G.I. Supp.*

metamorphic grade; metamorphic rank. The grade or rank of metamorphism depends upon the extent to which the metamorphic rock differs from the original rock from which it was derived. If a shale is converted to a slate or a phyllite, the metamorphism is low grade; if it is converted to a mica schist containing garnet and sillimanite, the metamorphism is high grade. *A.G.I. Supp.*

metamorphic rank. Synonym for metamorphic grade. *A.G.I. Supp.*

metamorphic rock. Any rock which has been altered by heat or intense pressure, causing new minerals to be formed and new structures in the rock. Thus clays have been changed into slates, and limestones into marble. *Nelson.*

metamorphic water. Water driven out of rocks by metamorphism. *Stokes and Varnes, 1955.*

metamorphic zone. An area subjected to metamorphism and characterized by a certain metamorphic mineral that formed during the process. *Leet.*

metamorphism. Any process by which consolidated rocks are altered in composition, texture, or internal structure by conditions and forces not resulting simply from burial and the weight of the subsequently accumulated overburden. Pressure, heat, and the introduction of new chemical substances are the principal causes of metamorphism, and the resulting changes, which generally include the development of new minerals, are a thermodynamic response to a greatly altered environment. Diagenesis has been considered to be incipient metamorphism. *See also* contact metamorphism; thermal metamorphism; dynamic metamorphism; regional metamorphism; high-rank metamorphism; low-rank metamorphism. *A.G.I. Supp.*

metamorphosis. The change of form, structure, or substance; a transformation of any kind. *Webster 2d.*

metamorphous. Same as metamorphic. *Fay.*

metapepsis. Proposed by Kinahan for regional metamorphism due to steam or boiling water under great pressure. Also called parotepsis. *Fay.*

metaripples. Large asymmetrical sand waves. *Pettijohn.*

metarossite. A very rare, weakly radioactive, light yellow or pale greenish-yellow mineral, $CaV_2O_6.2H_2O$, occurring in thin seams in sandstone or shale in Colorado as a dehydration produce of rossite. *Crosby, p. 127; Mineralogical Magazine, v. 21, No. 122, September 1928, p. 571.* A vanadium ore. *Osborne.*

metasapropel. Compact sapropel rock. *Tomkeieff, 1954.*

metaschoderite. A dehydration product of schoderite, $Al_2PO_4VO_4.3H_2O$. *Hey, M.M., 1961.*

metasediment. A partly metamorphosed sedimentary rock. *Stokes and Varnes, 1955.*

metashale. Shale altered by incipient metamorphic reconstitution but not recrystallized and without the development af partings or preferred mineral orientation. *A.G.I. Supp.*

metasideronatrite. Hydrated basic sulfate of sodium and ferric iron, $Na_4Fe_2(SO_4)_4$-$(OH)_2.3H_2O$, as yellow, fibrous, orthorhombic crystals from Chile. A partly dehydrated form of sideronatrite. *Spencer 15, M.M., 1940.*

metasilicate. A salt of the hypothetical metasilicic acid, H_2SiO_3. The pyroxenes, for example, are metasilicates; for example, diopside, $CaMg(SiO_3)_2$. This method of classifying silicates is obsolete. *See also* inosilicate. *A.G.I.*

metasomasis. A process of ore formation by the partial or complete replacement of a preexisting rock by the ore body. Limestone is usually the rock replaced, and the degree of replacement is greatest along shatter belts, joints and porous bands in the rock. Metasomatic ore deposits may be recognized by the presence of fossils and characteristic sedimentary structures preserved in the ore. Many veins, some zinc and lead deposits, etc., are of metasomatic origin. For example, the Cleveland ore is an oolitic iron carbonate which has replaced a limestone, retaining in the process the oolitic structure of the original rock. *See also* mineralization. *Nelson.*

metasomatic. Characteristic of, pertaining to, produced by, or occurring during metasomatosis (replacement). The term is especially used in connection with the origin of ore deposits. *Fay.*

metasomatic ore. *See* metasomasis. *Nelson.*

metasomatism; metasomatosis. a. The process of practically simultaneous capillary solution and deposition by which a new mineral of partly or wholly differing chemical composition may grow in the body of an old mineral or mineral aggregate. *A.G.I.* b. The processes by which one mineral is replaced by another of different chemical composition owing to reaction set up by the introduction of material from external sources. *Holmes, 1920.* c. Practically simultaneous solution and deposition, through small openings, usually submicroscopic, and mainly by hypogene water solutions, by which a new mineral of partly or entirely different composition may grow in an old mineral or in an old mineral aggregate. *A.G.I.*

metasomatite. A rock in which one mineral has completely replaced another, or certain minerals have completely replaced others, producing an entirely new composition. *A.G.I.*

metasome. A mineral developed within another mineral. *Fay.*

metasomosis. *See* metasomatism.

metastable. A state of pseudoequilibrium which has a higher free energy than the true equilibrium state, yet does not change spontaneously. *ASM Gloss.*

metastable phase. The existence of a substance as a solid, liquid, or vapor under conditions in which it is normally unstable in that state. *Hackh's Chem. Dict.*

metastrengite. Monoclinic $FePO_4.2H_2O$ dimorphous with orthorhombic strengite; named to correspond with metavariscite and variscite $AlPO_4.2H_2O$. Synonym for phosphosiderite; clinostrengite. *Spencer 19, M.M., 1952.*

metathesis. The name given to a group of chemical reactions: (1) single replacement, (2) double decomposition (or double replacement), and (3) neutralization. *Cooper.*

metatorbernite. A strongly radioactive, tetragonal, pale green to dark green mineral, $Cu(UO_2)_2(PO_4)_2.8H_2O$, one of the most common supergene uranium minerals; a secondary mineral, or perhaps a low-temperature hydrothermal mineral. *Croshy, pp. 28–29.*

metatropy. A change in the physical character of a rock but there is no essential change in its chemical composition, for example, the vitrification and devitrification of rocks. *Fay.*

metatyuyamunite. A lower hydrate 5-$7H_2O$ of tyuyamanunite, $Ca(UO_2)(VO_4)_2.9H_2O$. *Spencer 20, M.M., 1955.*

metauranocircite. A very rare, strongly radioactive, tetragonal, yellow-green to yellow mineral, $Ba(UO_2)_2(PO_4)_2.8H_2O$, occurring as a secondary mineral in quartz veins; also in a fluorite deposit with other secondary uranium minerals. *Crosby, p. 54.*

metauranopilite. A very rare, strongly radioactive, possibly orthorhombic, yellow, grayish, brown, or green mineral, $(UO_2)_6(SO_4)(OH)_{10}.5H_2O$, found with uranopilite. *Crosby, p. 29.* Partially dehydrated uranopilite, betauranopilite of R. Novacek. *Spencer 19, M.M., 1952.*

metauranospinite. The lower hydrate of uranospinite; occurs naturally at the Sophia shaft, Baden, Germany. *Hey, M.M., 1961.*

metavariscite. A green, hydrous phosphate of aluminum, $AlPO_4.2H_2O$; orthorhombic. Dimorphous with variscite. From Lucin, Utah. *English.*

metavauxite. A colorless or white, basic, hydrous phosphate of iron and aluminum, $FeO.Al_2O_3.P_2O_5.4H_2O \pm 5H_2O$; monoclinic; acicular crystals, or radiating fibrous aggregates. From Llallagua, Bolivia. *English; American Mineralogist, v. 30, No. 7–8, July-August 1945, p. 550.*

metavermiculite. The product of dehydration of vermiculite at 400° C. *Hey, M.M., 1961.*

metavolcanic. Partly metamorphosed volcanic rock. *Stokes and Varnes, 1955.*

metavoltine. a. A name applied by Blaas to a mineral from Madeni Zakh, Persia (Iran), near $K_4Na_2Fe''F'''_5(SO_4)_{12}.16H_20$. Distinguished from metavoltine of Bandy (b) by the presence of Fe″. *Hey 2d, 1955.* b. A name applied by Bandy to a mineral near $KNa_3 Fe'''_3(SO_4)_6OH.10H_2O$. Differs from metavoltine of Blaas (a) in the absence of Fe″. *Hey 2d, 1955.* c. A synonym for mausite. *Hey 2d, 1955.*

metaxite. a. Hauy's name for micaceous sandstone. *Fay.* b. A fibrous serpentine. *Webster 3d.*

metazeunerite. A tetragonal, grass-to emerald-green mineral, $Cu(UO_2)_2(AsO_4)_2.8H_2O$. The same formula is given for zeunerite. *Spencer 19, M.M., 1952.*

meteor. Originally, any atmospheric phenomenon. Sometimes still used in this sense, as in such terms as hydrometeor, optical meteor, etc. Now more commonly restricted to astronomical meteors, called shooting stars or falling stars, which are relatively small bodies of matter traveling through interplanetary space and which are heated to incandescence by friction when they enter the atmosphere of the earth, and are either wholly consumed or partially consumed, in which case they reach the earth's surface as meteorites. *A.G.I.*

meteoric iron. Iron occurring in meteors; also, an iron meteorite. *Fay.*

meteoric stone. A meteorite having the composition of a stone or the appearance of a stone. *Standard, 1964.*

meteoric water. Water derived from rain, water courses, other bodies of water. This water passes down into the earth and part of it becomes stored in the pores and cracks in the rocks and part of it circulates. As far as mine pumping is concerned, meteoric water is the only class of importance. *Lewis, p. 630. See also* ground water.

meteorite. A naturally occurring mass of matter that has fallen to the earth's surface from outer space. *A.G.I. Supp.*

meter; metre. a. An instrument, an apparatus, or a machine for measuring fluids, gases, electric currents, etc., and recording the results obtained; for example, a gasmeter, a watermeter, or an air meter. *Standard, 1964.* b. The fundamental unit of length in the metric system. Originally defined as one ten-millionth of the distance on the earth's surface from the pole to the equator. Now defined as the distance between two lines on a certain metallic rod preserved in the archives of the International Metric Commission at Paris. *Standard, 1964.* It equals 39.37079 inches or 3.2808 feet. *Fay.*

metering pin. A valve plunger that controls the rate of flow of a liquid or a gas. *Nichols.*

metering pump. A portable, high-precision pump developed by U.S. Bureau of Mines engineers to aid studies of rock and ground pressure changes. Small enough to be carried in a coat pocket, the hand-operated device preloads high-pressure hydraulic cells, that, embedded in rock or concrete, measure the variations in load or pressure that accompany nearby excavations. The pump also meters, without leakage, the fluid—usually mercury, glycerin, or oil—that must be added to or withdrawn from a cell to obtain a desired pressure. *Bureau of Mines Staff.*

meter oil. An oil of low cold-test, like the light lubricating oils from Texas crude oil. *Fay.*

methanal. *See* formaldehyde. *CCD 6d, 1961.*

methane. CH_4, carbureted hydrogen or marsh gas or firedamp; formed by the decomposition of organic matter, The most common gas found in coal mines. It is a tasteless, colorless, nonpoisonous, and odorless gas; in mines the presence of impurities may give it a peculiar smell. Its weight relative to air is 0.555 and may therefore form layers along the roof and occupy roof cavities. Methane will not support life or combustion; with air, however, it forms an explosive mixture, the reaction being: $CH_4 + 2(4N_2 + O_2) = CO_2 + 2H_2O + 8N_2$. The gases resulting from a methane explosion are irrespirable.*Nelson.* Often referred to as firedamp because it is the principal gas composing a mixture which when combined with proper proportions of air will explode when ignited. Methane is nontoxic, and its breathing causes ill effects only where the air is so heavily laden with it that oxygen is supplanted. *See also* marsh gas; firedamp; firedamp tests; limits of flammability. *Webster 2d; B.C.I.*

methane detector. *See* gas detector. *Jones.*

methane drainage. Three main systems of methane drainage have been developed: (1) the cross-measure borehole method which consists of boring holes from 2¼ to 3¼ inches in diameter and 150 to 300 feet in length, into the strata above or below the seam, generally close to the working face. This method has the advantage of being suited to a wide variety of conditions and does not resquire another seam within reasonable distance above or below the seam to be drained, or the use of solid stowing; (2) the superjacent roadway system in which boreholes are drilled from a roadway situated above the seam being worked, the drainage of the methane then taking place from this roadway; and (3) the pack cavity system in which corridors are left and supported in the goaf as the face advances, and from these firedamp is drawn off. *Sinclair, I, pp. 15-17; Roberts, I, pp. 77-82. See also* firedamp drainage.

methane-hydrogen gas. A gas made by vaporizing tar and passing it through a bed of incandescent fuel. Candlepower, 11; British thermal units, 400. *CCD 3d, 1942.*

methane indicator. A portable instrument to determine accurately the methane content in a given area. Air samples are taken in through an aspirator bulb and passed through a replaceable absorbent cartridge which removes any moisture from the sample. A flashlight battery and bulb illuminate its direct-reading scale. The compact device is carried in a leather case with shoulder straps. Used in mines, manholes, and similar areas subject to methane gas. *Bests, p. 587.*

methane monitoring system. A system whereby the methane content of the mine air is indicated automatically at all times, and when the content reaches a predetermined concentration the electric power is cut off automatically from each machine in the affected area. The mechanism is so devised that its setting cannot be altered. The system is used, mainly, in conjunction with the operation of continuous miners and power loaders. *Nelson.*

methanephone. An instrument for detecting methane in mine air. It contains an electric battery that sustains a small electric glow light. As soon as a certain percentage of methane enters the workings a tiny explosion occurs in the fuse head where a fine wire filament is melted and starts a bell to ringing continuously. *Fay.*

methane recorder. An instrument which gives a continuous record of the methane concentration over a period of time. *Roberts, I, p. 83.*

methane removal. *See* water infusion method.

methane tester. A firedamp detector. *See also* methanometer. *Nelson.*

methane tester type S.3. A nonautomatic firedamp detector approved under the Regulations for use in coal mines. The instrument is normally calibrated at 1 percent methane, and this provides an accuracy of plus or minus 0.05 percent over the most important part of the scale, that is, 0.75 to 1.5 percent, It weighs 3½ pounds and the source of power is an Edision cap lamp battery. Developed by Mines Safety Appliances. *Nelson.*

methanol; methyl alcohol; carbinol; wood alcohol; methyl hydrate. a. CH_3OH. Used as a fuel, as a solvent, and for denaturing ethyl alcohol. *Crispin.* b. Limpid; colorless; volatile liquid; boiling point, 64.96° C (at 760 mm); specific gravity, 0.7914 (at 20° C, referred to water at 4° C); burns with a nonluminous flame; a solvent for fats and oils; and soluble in all proportions in water, in ethyl alcohol, in ether, and in acetone. Used sometimes for the cleaning of wood-graining boards following the acid treatment. *Hansen; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-408.*

methanometer; methane tester. An instrument for determining the methane content in mine air. *See also* catalytic methanometer. *Nelson.*

methanometry. Testing mine air for firedamp by the used of gas detectors. *Cooper, pp. 226, 232.*

methenyl tribromide; tribromomethane. *See* bromoform. *CCD 6d, 1961.*

method of working. The system adopted to work or extract a coal seam or ore body. It includes all the operations involved in the cutting, handling, and transport of valuable material and waste rock, support of ground, ventilation of workings, and provision of supplies. The term does not include winding or hoisting, surface handling, and preparation or dressing. *See also* coal-mining methods. *Nelson.*

methodology. Orderly arrangement of ideas or procedures in any branch of operational activity. *Taylor.*

method study. A study to provide the essential data on which mine management can operate in making the most effective use of manpower, machines, and materials. Method study has been applied in the mining industry for many years, although perhaps under different names. It is firmly established in certain metalliferous mines, in the gold mines of Ghana, and in the Dutch collieries. It is also employed extensively in British coal mines. In the U.S.S.R., it is reported that each mine employes between four and six engineers solely engaged on method study. *See also* motion study; time study; work measurement; work study. *Nelson.*

methyl acetone. A mixture of methyl acetate and acetone. Used as a solvent. *Crispin.*

methyl alcohol. A poisonous liquid, CH_3OH, and also known as methanol, which is the lowest member of the alcohol series. Also known as wood alcohol, since its principal source is the destructive distillation of wood. *API Glossary.*

methylene iodide. A straw-colored liquid, CH_2I_2, with a specific gravity of 3.32 at 18° C, a melting point between 5° and 6° C, a decomposition point of 180° C, and a refractive index of 1.756. Used as a component of refractive index liquids and in specific-gravity mineral separations. *A.G.I.*

methyl iodide. CH_3I. *Pryor, 3.*

methyl phenol. *See* cresol. *CCD 6d, 1961.*

metore. Both capping and gossan. *A.G.I.*

metra. A pocket implement combining the uses of many instruments, such as thermometer, level, plummet, and lens. *Standard, 1964.*

metric carat. An international unit equal to 200 milligrams that had been adopted in most European countries and in Japan when it was made the standard in the United States in 1913. Abbreviations, M.C. and cm. *See also* carat. *Webster 3d.*

metric system. A system of weights and measures depending upon the meter in which the original factors are derived from the meter. The system includes measures of length, of which the meter is the unit; measures of surface, of which the area is the unit; measures of capacity, of which the liter is the unit; and weights, of which the gram is the unit. *Standard, 1964.* First used in France, now in universal use in scientific work. *Crispin.*

metric ton. A unit of mass and weight that equals 1,000 kilograms or 2,204.6 avoirdupois pounds; abbrevation, MT. *Webster 3d.*

mett. Scot. An old measure of capacity for coal. *Fay.*

Mettlach tile. A vitreous floor tile (especially of the multicolored type) as first made at Mettlach, in the Saar. The term (often misspelled Metlach) is now commonly used on the Continent and in Russia for any vitreous floor tile. *Dodd.*

Mev Abbreviation for million electron volts. Also abbreviated mev. *GPO Style Manual, p. 159; BuMin Style Guide, p. 60.*

Mexican agate. Banded calcite or aragonite. *Shipley.*

Mexican amber. Fossil resin from Mexico, related to San Domingo amber. *See also* bacalite. *Shipley.*

Mexican amethyst. Amethyst of a distinctive reddish-purple color from Guanajuato, Mexico. *Shipley.*

Mexican diamond. Rock crystal. *Shipley.*

Mexican jade. A green-dyed common mineral, usually calcite. A variety of Mexican onyx. *Shipley.*

Mexican onyx. A variety of aragonite, chiefly from Tecali, Mex., used for interior decorations. *Standard, 1964. See also* onyx marble. *Fay.*

Mexican opal. a. Any opal from Mexico. *Shipley.* b. An almost transparent, whitish, very pale red or yellow precious opal, often with fine play of color. Specific gravity, 1.98 to 2.03. *See also* fire opal. *Shipley.*

Mexican tile. A term sometimes applied to roofing tile of semicircular cross section. *Fay.*

Mexican turquoise. a. A light-blue to green-blue and bluish-green turquoise from New Mexico. *Shipley.* b. A correct but little-used name for genuine turquoise from the central part of Lower California. *Shipley.*

Mexican water opal. A term applied to translucent to almost transparent opal variety from Mexico with vivid play of color; yellowish by transmitted light. *Shipley.*

meyerhofferite. A colorless hydrous borate of calcium, $2CaO.3B_2O_3.7H_2O$; triclinic. Prismatic crystals, often tabular; fibrous. From Inyo County, Calif. An alteration product of inyoite. *English; Larsen, p. 156.*

meymacite. A resinous, light brown, hydrated tungstic oxide, WO_3H_2O, which is formed by the alteration of scheelite. *Fay.*

mezo; meso. A term sometimes prefixed to the names of igneous rocks of Mesozoic age. *Fay.*

mezza majolica. It. A decorated and glazed earthenware made in Italy prior to the introduction of the majolica ware. *Standard, 1964.* The figures on it are traced in blue or black, the flesh is white, and the draperies are blue. *Fay.*

mf a. Abbreviation for microfarad (one-millionth farad or 10^{-6} farad). Also abbreviated µf or µf. *Zimmerman, p. 69; Webster 3d.* b. Abbreviation for millifarad. *BuMin Style Guide, p. 60.*

m-f Abbreviation for medium frequency. *Zimmerman, p. 68.*

M_f. *See* transformation temperature. *ASM Gloss.*

MF Abbreviation for medium frequency. *GPO Style Manual, p. 159.*

Mft^3 Abbreviation for thousand cubic feet. *BuMin Style Guide, p. 62.*

mg Abbreviation for milligram. *BuMin Style Guide, p. 60.*

mG Abbreviation for milligauss. *BuMin Style Guide, p. 60.*

Mg Chemical symbol for magnesium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

MG Abbreviation for motor generator. Also abbreviated mg. *Zimmerman, pp. 71, 207.*

mgal d^{-1} Abbreviation for million gallons per day. *BuMin Style Guide, p. 61.*

MGD Abbreviation for million gallons per day. Also abbreviated mgd. *Zimmerman, p. 207; BuMin Style Guide, p. 61.*

mg point. *See* transformation points. *Dodd.*

mh Abbreviation for millihenry. *BuMin Style Guide, p. 60.*

mhcp. Mean horizontal candlepower. *Mason.*

mho. The practical unit of conductance equal to the reciprocal of the ohm. *Webster 3d.*

mho m^{-1} Abbreviation for mhos per meter. *BuMin Style Guide, p. 60.*

mho per m Abbreviation for mhos per meter. *BuMin Style Guide, p. 60.*

MHW Abbreviation for mean high water. *Zimmerman, p. 67.*

mi Abbreviation for mile. *Zimmerman, p. 69.*

MI Abbreviation for malleable iron. *Zimmerman, p. 66.*

miamia. Aust. A screen of brushwood, supported on poles, and placed near a shaft to protect the men from the weather. *Fay.*

miargyrite. A sulfide of antimony and silver, $AgSbS_2$, occurring in monoclinic crystals of an iron black color with a dark, cherry-red streak. *Fay; A.G.I.*

miarolite. A granite having miarolitic cavities, a textural modification of normal granite. *Johannsen, v. 2, 1932, p. 130.*

miarolithite. Chorismite in which drusy crystallizations, often with distinct remnants of cavities, are distributed within the mass of which the aggregate is mainly composed. *A.G.I.*

miarolitic. Containing small interstitial cavities that formed when the igneous rock solidified. Small crystals project into the cavities. Also, characteristic of, pertaining to, or occurring in such cavities. *Fay.*

miarolitic cavity. A cavity of irregular shape in certain plutonic rocks. Crystals of the rock constituents sometimes project into the cavity. Synonym for druse. *Schieferdecker.*

miarolitic structure. A structure found in igneous rocks. The structure consists of irregularly shaped cavities into which the constituent minerals of the rock may project as perfectly terminated crystals. *C.T.D.*

miascite. A mixture of strontianite and calcite. *Hey 2d, 1955.*

mica. A group of phyllosilicate minerals having similar chemical compositions and highly perfect basal cleavage; monoclinic. Mica is one of the best electrical insulators. Biotite, lepidolite, muscovite, and phlogopite are some varieties of mica. *A.G.I.* Also called isinglass; muscovy glass. *Fay.* Synthetic mica is now being produced in various forms including a powder, sheet, and hot-pressed, machineable solid form. *Lee.*

micaceocalcareous. Containing mica and calcite. *Standard, 1964.*

micaceous. Composed of, resembling, or pertaining to mica. Occurring in thin plates or scales like mica. *Stokes and Varnes, 1955.*

micaceous hematite. Variety of specular hematite (Fe^2O^3) of micaceous shape. *Pryor, 3.*

micaceous iron ore. Hematite in which the texture is foliated or micaceous; some micaceous varieties are soft and unctuous. *Rice.*

micaceous sandstone. A sandstone containing mica flakes. *C.T.D.*

mica convention. *See* rational analysis. *Dodd.*

mica diorite. A diorite in which mica replaces hornblende. *Standard, 1964.*

mica, glass-bonded. An electroceramic made by the bonding of mica (natural or synthetic) with a glass of high softening point. Some products of this type can be used up to 500° C. They have good dielectric properties. Transverse strength, 13,000 to 15,000 pounds per square inch. Thermal expansion, 1×10^{-6}. *Dodd.*

mica house. A shop where hand-cobbed mica is rifted, trimmed, graded, and qualified. *Skow.*

mica lamprophyre. The commonest type of lamprophyre, characterized by an abundant content of mica, which was originally biotite but is often bleached and altered. *C.T.D.*

mica, natural. Group name for a series of silicates, the most important of which to the ceramist, is muscovite, a common impurity in clays. *See also* muscovite. *Dodd.*

micanite. *See* built-up mica. *Skow.*

Micanite. Trade name for an easily molded prepared form of mica used for insulating. *Fay.*

mica paper. *See* reconstituted mica. *Skow.*

mica peridotite. A peridotite consisting principally of altered olivine and biotite. *Fay.*

micaphyre. Porphyry containing phenocrysts of mica. *Standard, 1964.*

mica plate examiner. In ground minerals and earths industry, a laborer who inspects mica plates or sheets to be used for electrical insulation, for unsatisfactory processing and presence of foreign matter. *D.O.T. 1.*

mica powder. A dynamite in which the dope consists of fine scales of mica. *Fay.*

micaramic. A material consisting of finely divided natural mica bonded with water-soluble aluminum phosphate. *Skow.*

mica schist. A foliated, crystalline metamorphic rock composed of alternating layers of quartz and mica in various proportions, the typical specimen being about two-thirds quartz and about one-third mica. The percentage of mica generally appears higher than it is because the rock splits along the mica folia and the flat surfaces of the mica. The true composition may be judged correctly by looking at the squarely broken edges. *See also* schist. *Fay.*

mica slate. A slate composed chiefly of fine mica. *Fay.*

mica splitter. In ground minerals and earths industry, a laborer who rubs the ends of mica sheets over sandpaper covered portion of a worktable to pry loose the edges of the layers. *D.O.T. 1.*

Micatex. Trade name for mica prepared for addition to drilling fluids to reduce water loss to the formation and for overcoming mild losses of circulation. *CCD, 6d, 1961.*

micatization. a. A metamorphic alteration of other material into mica. *Standard, 1964.* b. The development, in a rock, of mica as a secondary mineral. *A.G.I.*

mica trap. a. An English field name for a dark dike rock high in mica content. *Fay.* b. An obsolete term for a mica lamprophyre. *C.T.D.*

mice-eaten quartz. Quartz that is full of holes that were once occupied by sufides. The sulfides were decomposed and removed, probably in solution. *Fay.*

micellar colloids. Aggregated molecules or atom groups, held together by secondary valencies. *See also* molecular colloid. *Pryor, 3.*

micelle. Aggregation of surface-active ions or molecules with hydrophilic portion of molecule oriented outward and hydrophobic group inward. Structure believed to be spherical, cylindrical, or disk-shaped. The spherical type is postulated by McBain as highly charged, with its hydrophobic chains unoriented save in response to the packing effect produced by the hydrophilic groups at the micelle to water interface which encloses the system. Hartly postulates a liquid structure which contains numerous gegenions in addition to his amphipathic ions. In the lamellar micelle, the energy relations make it essential to make the interface (hydrocarbon chains and/or water) as small as possible. Micelle formation, by affecting dispersed availability of surface-active molecules, diminishes their effect if the chemical exceeds an optimum concentration. Colloids are either micellar or molecular (Lumiere and Staudinger), the former being aggregated molecules or groups of atoms bound by adhesive of Van der Waals forces. The boundary between micellar and molecular colloids is indistinct. *Pryor, 3.*

michenerite. A palladium bismuthide, cubic with pyrite structure, probably $PdBi_2$, occurring in the ores of the Frood mine, Sudbury, Ontario, Canada. *Hey, M.M., 1961.*

Michie sludge test. Oil under test is heated to 150° C, and a measured quantity of air is bubbled through at controlled rate, copper foil being present. *Pryor, 3.*

Michigamme jasper. A highly altered ferruginous rock, usually carrying apparently fragmental quartz grains, found at Michigamme Mountain, Mich. *Fay.*

Michigan cut. a. In the United States a cut which consists of drilling a hole with a large diameter or a number of holes of smaller diameter at the center of the heading and parallel to the direction of the tunnel. These holes are not charged. The remaining bench holes are then broken out towards these holes. *Fraenkel, v. 1, Art. 6:02, p. 31.* b. *See* burned cut. *Hess.* c. *See* burned cut. *Pryor, 3.*

Michigan slip. A very plastic, tough, fine-grained impure clay, similar to Albany slip clay; used as a bonding and plasticizing agent in grinding wheels, refractories, etc., and as a suspension agent for glassy frit in vitreous enamels. *CCD 3d, 1942, p. 195.*

Michigan tripod. A drill structure consisting of three barked timber poles of pine or fir about 25 feet long, the butt ends of which generally are about 12 inches in diameter. Through the upper or smaller ends of the poles, holes are drilled, through which a 1-inch bolt is passed to join the three poles. On the bolt, a large clevis is hung, the open ends of which straddle the center pole. The sheave is suspended on the clevis, and the poles are placed in a raised position (pyramid fashion) over the drill with the sheave alined over the hoisting drum and the borehole and the center pole placed behind the drill. In its raised position the tripod is high enough to provide a minimum of 22 feet of headroom above the drill floor. *Compare* Mesabi tripod. *Long.*

micoquille. Thin glass similar to coquille but with a radius of curvature of 7 inches. *See also* coquille. *Dodd.*

micrain. Suggested by Stopes for a bituminous coal consisting largely of unidentified particles not more than 1 or 2 microns in diameter. *Hess.*

micrinite. a. A maceral of the inertinite group consisting of granular material without cellular structure; one of the principal components of durain and clarain. *A.G.I. Supp.* b. Proposed by the Heerlen Congress, 1935, as a substitute for micronite. *Tomkeieff, 1954.*

micrinoid. A coal constituent similar to material derived from finely macerated vegetation. *A.G.I. Supp.*

micrite. Limestone consisting of microcrystalline calcite and with less than 1 percent allochems. *A.G.I. Supp.*

micro-. a. A prefix that divides a basic unit 1 million or multiplies it by 10^{-6}; abbreviation, μ. *L&L.* b. A prefix meaning small. In lithology, for example, it indicates that the mineral or texture so designated is so small that it cannot be recognized without a microscope. *Fay.*

microaerophile. An organism growing best in the presence of small quantities of oxygen. *I.C. 8075, 1962, p. 63.*

microampere. One-millionth of an ampere; 10^{-6} ampere; abbreviation, μa. *Crispin.*

microanalysis. Recognition and qualitative or quantitative analysis of substances on a microscopic scale. Special equipment used includes miniature gas apparatus, microscope under which analysis is watched, microbalance, and spectroscope. The microbalance is one unusually sensitive. The chemical reaction performed on the microstage is called microchemistry. *Pryor, 3.*

microangstrom. One-millionth of an angstrom; abbreviation, μA. *BuMin Style Guide, p. 60.*

microbalance. One extremely sensitive. *Pryor, 3, p. 35.*

microbar. A unit of pressure commonly used in acoustics. One microbar is equal to 1 dyne per square centimeter. *H&G.*

microbial metallurgy. The use of bacteria to alter minerals. The activity may be useful in the selective separation of metals from ores, the production of sulfur from gypsum or pyrites, and the production of sulfuric acid from elemental sulfur. Metallurgical activity by bacteria may be harmful. *Nelson.*

microboulders. Fine-grained metal-bearing particles too small or decomposed to be identified by eye. *Hawkes, 2, p. 186.*

microbreccia. a. A sedimentary rock consisting of relatively coarse, sharply angular sand grains. *A.G.I. Supp.* b. A breccia within fragments of a coarser breccia. *A.G.I. Supp.*

microcharacter hardness. A scratch hardness test in which a loaded diamond is used; it has been applied to the testing of glazes. *Dodd.*

microchemical. a. Pertaining to chemical reactions on a very small scale. *ASTM STP No. 148-D.* b. Applied to chemical reactions conducted on the stage of a microscope and viewed through the microscope. *Bureau of Mines Staff.*

microchemical tests. Chemical tests made on minute objects under a microscope. The form, color, and optical properties of minute crystals are also examined. *Fay.*

microchemistry. Analysis for traces of elements or compounds. *Pryor, 3, p. 80.*

microchill. A very thin skin of hardened iron on castings. Due to the sudden, faster chilling or cooling of the outside surface of castings, in pouring, must be sandblasted or ground off of castings before enameling. If it is not removed, this skin causes blistering in the fired enamel. *Hansen.*

microclastic. Applied to a clastic or fragmental rock composed of very small particles. *Fay.*

microclastic coals. Coals composed of very finely divided plant material together with a varying amount of impurity. They show little or no banding. *Cooper, p. 887.*

microcline. A white to pale yellow, green, or occasionally red mineral of the feldspar group, like orthoclase or common feldspar in composition, but triclinic in form, $K(AlSi_3O_8)$. Green microcline is known as Amazon stone. *Webster 3d; Dana 17.*

microconglomerate. A sedimentary rock composed of relatively coarse sand grains in a very fine silt or clay matrix. *A.G.I. Supp.*

microcosmic salt. *See* stercorite.

micro cross lamination. Small distinctive cross lamination similar to trough cross lamination. Also called rib-and-furrow. Originally called schrägschichtungsbögen. *Pettijohn.*

microcryptocrystalline. Applied to a rock or groundmass in which the mineral constituents are too small to be recognized with a microscope but which are known to be crystalline as shown by their aggregate polarization. *A.G.I.*

microcrystalline. Minutely crystalline; applied to crystalline rocks, the constituents of which are individually so minute that they cannot be distinguished from each other by the naked eye; same as cryptocrystalline. *Fay.*

microcrystalline alumina. An abrasive produced by recrystallization from a molten bath in such a way, as to produce crystals much smaller than those in regular alumina. This abrasive is much tougher than any other manufactured from molten baths. *See also* regular alumina. *ACSG, 1963.*

microcrystalline silica. An abrasive used for buffing and polishing compounds which comes mainly from southwestern Illinois and to some extent from Wayne County, Tenn. *AIME, p. 16.*

microcrystallitic. Of, or pertaining to, a metamorphic rock in which the devitrification has continued until the original glassy material has changed into little granules, needles, and hairs. *Standard, 1964.*

microcurie. One-millionth of a curie; abbreviation, μc. *NRC-ASA N1.1-1957.*

microdiabase. An aphanitic diabase. *Fay.*

microdiorite. A fine-grained diorite or diorite porphyry. *Fay.*

microdist. *See* electrotape. *H&G.*

microfacies. The aspect of rocks as seen in thin sections. *A.G.I. Supp.*

microfarad. A unit of capacity; one-millionth of a farad; abbreviation, μf. *Crispin.*

microfelsite. A name used in microscopic work for those varieties of groundmass that do not affect polarized light, but that are not true glasses because they have a fibrous, a granular or some such texture. The textures are no doubt in many cases the results of devitrification of a glassy base. *Fay.*

microfelsitic. Suggested by Zirkel for a devitrified glass in which devitrification has proceeded so far that the hyaline character is lost but not far enough to develop distinct individual mineral crystals. *Fay.*

microfissure. A crack of microscopic proportions. *ASM Glass.*

microfluidal. Having a microscopic flow texture. *Standard, 1964.*

microfoliation. Minute foliation that is visible only under the microscope. *Fay.*

microfragmental coal. Coal composed of compact macerated mass of vegetable debris, such as durain, cannel, algal cannel, and boghead. *Tomkeieff, 1954.*

microgas survey. A prospecting method which seeks to locate oil by the detection, in soil samples, of gases such as ethane, propane, and butane as evidence of leakage in the vicinity of oil pools. Methane is not significant as it is also formed by the decomposition of vegetable matter. *Compare* geochemistry. *Nelson.*

microgeology. a. The study of the microscopic features of rocks. *A.G.I. Supp.* b. The study of the relationships of microorganisms to geology. *A.G.I. Supp.*

microglass. Thin glass for making cover slips for use in microscopy. *Dodd.*

microgram. One-millionth of a gram; abbreviation, μg. *Bennett 2d, 1962.*

microgranite. An igneous rock composed, like granite, of crystals of quartz and an alkalic feldspar, but on a very small scale, as are the groundmasses of certain porphyries. *Strokes and Varnes, 1955.*

microgranitic. *See* microgranular; microcrystalline. *A.G.I.*

microgranitoid. Having a microscopic granitoid structure. *Standard, 1964.*

microgranular. *See* microcrystalline. *A.G.I.*

microgranulite. The French equivalent of granophyric. *Fay.*

micrograph. A graphic reproduction of a magnified object as seen through a microscope. When it is a photograph, it is called a photomicrograph. *Stokes and Varnes, 1955.*

micrographic. Having the composition and texture of graphic granite on a microscopic scale. *Standard, 1964. See also* micrographic texture.

micrographic texture. A distinctive rock texture in which the simultaneous crystallization of quartz and alkalic feldspar resulted in the quartz occurring as apparently isolated fragments, resembling runic hieroglyphs, set in a continuous matrix of the feldspar. *C.T.D.*

microgroove cast. Cast of striations less than 2.5 centimeters long. Thought to be a cast of a groove cut by coarse sand grains. *Pettijohn.*

microhardness. The hardness of microscopic areas or of the individual microconstituents in a metal, as measured by such means as Tukon, Knoop, or scratch methods. *ASM Gloss.*

microhm. One microhm equals 10^{-6} ohm which equals 10^{3} electromagnetic units. *Merriman.* Abbreviation, μΩ. *Webster 2d.*

microinch. One-millionth of an inch; abbreviation, μin. *ASM Gloss.*

microite. A term proposed in 1961 by H. R. Brown, A. C. Cook, and G. H. Taylor for a microlithotype composed principally of inertinite in which micrinite is the most abundant form. Microite contains at least 95 percent inertinite. The further specification is that the proportion of micrinite must exceed that of fusinite, semifusinite, and sclerotinite combined. The micrinite occurs mainly in the massive form. Microite is found in many coals and occurs in large quantities in Gondwana coals and in Permocarboniferous coals of the U.S.S.R. It is most abundant in coals with little exinite, or coals of high rank in which exinite cannot be recognized, and may occur in very persistent thick bands. It is present in small amounts in Carboniferous coals of the Northern Hemisphere. *IHCP, 1963, part I.*

microlaterolog. A well log obtained with an arrangement of electrodes similar to a miniature laterolog but disposed in concentric fashion in an insulating pad. The current from a central electrode is focused and flows out in a pattern which resembles the shape of a trumpet (hence the synonym, trumpet log). As in the microlog, the electrodes are mounted on a pad which is held against the wall of the hole by springs. The microlaterolog serves a purpose similar to that of a microlog, investigating only a small volume of rock immediately adjacent to the hole. *A.G.I.*

microlite. a. A mineral which is essentially a pyrotantalate of calcium, $Ca_2Ta_2O_7$, but which frequently contains niobium, fluorine, and a variety of bases. It crystallizes in the cubic system. *C.T.D.; Dana 17.* Also, it is a member of the pyrochlore-microlite series; its radioactivity ranges from weak to moderately strong; colorless, pale yellow brown, reddish, green, or black; found in the albitized parts of granite pegmatites, particularly those containing lepidolite and spodumene; also occurs in alluvial sands and gravels. *Crosby, p. 77.* b. A general term for minute crystals (needlelike, lathlike, or of prismatic habit) occuring in microcrystalline or hypocrystalline rocks and groundmasses. They may be distinguished from crystallites by being transparent, light- or dark-colored, and by the fact that one can determine some of the optical properties, such as anisotropism, refractive index, etc. *Schieferdecker.*

microlith. One of the microscopic isotropic needle- and red-shaped bodies found in vitrophyric rocks. *Standard, 1964.*

microlithic. Composed or constructed of small stones. *Standard, 1964.*

microlithotype. A term introduced by C. A. Seyler in 1954. It designates in the microscopy of humic coals the typical associations of macerals, the minimum band width of which has been fixed at 50 microns. The microlithotypes are: vitrite, liptite, fusite, clarite, durite, vitrinertite, duroclarite, and clarodurite. Their delimitation although arbitrary and conventional appears to agree well with technological behavior. *IHCP, 1963, pt. I.*

microlitic. A textural term applied to porphyritic igneous rocks whose groundmasses consist of an aggregate of differently oriented or parallelly oriented microlites in a base that is generally glassy. Hyalopilitic, pilotaxitic, and trachytic textures are all included under this term. When the microlites are not in parallel arrangement, the term felty is synonymous. *Johannsen, v. 1, 2d, 1939, p. 223.*

microlog. A resistivity log in borehole surveying obtained with a device consisting of closely spaced electrodes, the arrangement of which is basically the same but in miniature, as the normal and lateral devices in the regular electric survey. It is designed to measure the resistivity of a small volume of rock next to the borehole. To this end, the electrodes are mounted on an insulating pad which is pressed against the face of the well bore by means of springs. The spacing between electrodes is 1 inch. The log distinguishes porous and permeable beds from impervious layers by detecting the filter cake deposited on the borehole face by invading drilling fluid. *A.G.I.*

micrologging. A development of electrical logging in which three vertically disposed electrodes are used spaced an inch apart and flush mounted in an insulating pad which bears firmly against the side of the borehole to prevent short-circuiting of the current by the mud flush. Two electrodes can be used for reading, the third being a current electrode, giving a reading equivalent to a 1½-inch spacing. Alternatively each can be used separately, with the earthed point at the surface as the second electrode in each case, when the spacings are 1 inch and 2 inch. In practice only the micrologs for the 1½- and 2-inch spacings are recorded, each at two sensitivity scales, together with the self-potential log. By the use of the closely spaced electrodes the error in recording the boundaries between formations is less than an inch. Thickness of seams and dirt bands are measured to this limit. *Sinclair, III, p. 104.*

micromalignite. An igneous rock occurring as a fine-grained dike or border facies consisting of nepheline-orthoclase pyroxene. *Johannsen, v. 4, 1938, p. 142.*

micromanipulator. Laboratory appliance used to probe, dissect, detach, or remove selected grains or sections of specimen being observed by microscopy. *Pryor, 3.*

micromanometer. Essentially U-type gages employing a micrometer to measure the change in inclination of the gage from its zero or datum position. Normally, micromanometers are used in the laboratory for such purposes as the calibration of secondary manometers and, in conjunction with pressure measurement, in low-speed atmospheric wind tunnels. *Roberts, I. 31.*

micromelteigite. A very fine-grained igneous dike rock consisiting of the same minerals as melteigite. *Johannsen, v. 4, 1938, p. 381.*

micromeritic. *See* microcrystalline. *Standard, 1964.*

micromeritics. Study of crystalline structures on a microscopic scale. *Pryor, 3.*

Micromerograph. Trade name for an instrument for particle-size analysis depending on the rate of fall of particles in the air; it is suitable for use in the range of 1 to 250 microns (μ). *Dodd.*

micrometer. a. An instrument for measuring very small dimensions or angles. Used in connection with a microscope or a telescope. There are a great variety of forms, but in nearly all, the measurement is made by turning a very fine screw, which gives motion to a scale, a spider line, a lens, a prism, or a ruled glass plate. *Standard, 1964.* b. A micrometer caliper or a micrometer gage. *Standard, 1964.*

micrometer caliper. A caliper with a graduated screw attachment for measuring minute distances. *Crispin.*

micrometer-reading manometer. *See* vernier-reading manometer. *Roberts, I, p. 33.*

micrometer theodolites. Optical micrometer theodolites are capable of speedy and accurate work and reading circles are all illuminated by one beam shone on to a mirror. A small instrument of this kind solves the underground illumination problem with theodolites. *Mason, V. 2, p. 748.*

micrometrics. The study of very fine particles. *A.G.I.*

micromicrofarad. One-millionth of a microfarad; 10^{-12} farad; abbreviation, μμf. *Bennett 2d, 1962.*

micromicron. One-millionth of a micron; 10^{-6} micron or 10^{-9} millimeter; abbreviation, μμ. *Bennett 2d, 1962.*

micromillimeter. One-millionth of a millimeter; abbreviation, mμ. *A.G.I. Supp.*

micromineralogy. Mineralogy based on the use of the microscope. *Fay.*

micron. A unit of length, equal to one-millionth of a meter; used in measuring the dimensions of dust particles, etc. (1 micron = about 1/25,000 inch). *Nelson.*

micronite. The micropetrological constituent, or maceral, which makes up the major part of durain, but present to a lesser extent in clairain. It consists of granular opaque matter residuum of submicroscopic size. *A.G.I.*

micronized mica. An ultrafine material produced in a disintegrator that has no moving parts but depends on jets of high pressure superheated steam to reduce the mica to micron sizes. Micronized mica is produced in particle size ranges of 10 to 20 microns and 5 to 10 microns. *BuMines Bull. 630, 1965, pp. 587-588.*

Micronizer. A special type of dry-grinding machine in which micronized mica is produced. It consists of a disintegrator that has no moving parts but depends on jets of high pressure superheated steam for reducing the mica to micron sizes. *BuMines Bull. 630, 1965, p. 587.*

micronizer mill. Disintegrator, in which feed particles are entrained in a pressure jet (steam or air) and whirled through a cylindrical chamber with sufficient force to break them. *Pryor, 3.*

micro-organisms. In geochemical prospecting, may be taken to include bacteria, algae, fungi, and any others of the relatively small forms of plant and animal life that inhabit soils and natural waters. *Hawkes, pp. 260-261.*

micropegmatite. Microscopic pegmatite. Applied to the groundmass of porphyritic rocks whose microscopic quartz and feldspar mutually penetrate each other. The several parts of the same crystal, though isolated, extinguish together. *See also* granophyric. *Fay.*

micropegmatitic. In petrology, the same as micrographic, which is much better and which is replacing it. *Fay.*

micropegmatitic texture. A microscopic intergrowth of two minerals, especially of quartz and feldspar in which one mineral contains particles of the other arranged in a more or less regular pattern which, from its fancied resemblance to certain ancient inscriptions has been called also "graphic texture." *Fay.*

microperthite. A variety of rock-making feldspar composed of orthoclase thickly set with microscopic spindles or plates of albite. It is common in gneisses. *Compare* granophyric. *Fay.*

micropetrological unit. Same as maceral. *Tomkeieff, 1954.*

microphenocryst. A phenocryst of microscopic dimensions, distinguishable only under the microscope. *A.G.I.*

microphylline. Composed of minute leaflets or scales. *Fay.*

microphyric. a. A textural term descriptive of medium- to fine-grained igneous rocks containing phenocrysts less than 2 millimeters in length. *Compare* macrophyric. *C.T.D.* b. Suggested for the texture of porphyritic rocks having phenocrysts (microphenocrysts). *Johannsen, v. 1, 2d, 1939, p. 223.*

microphysiography. Same as petrography. *Standard, 1964.*

micropipette. Pipette somewhat resembling an injection syringe, from which fractions of a milliliter of liquid can be accurately dispensed. *Pryor, 3.*

micropoikilitic. Microscopically poikilitic, a microscopic shiller structure. *See also* poikilitic. *A.G.I.*

microporosity. Porosity visible only with the aid of a microscope. *ASM Gloss.*

microporphyritic. Microscopically porphyritic. *Standard, 1964.*

microprojector. A portable instrument which projects an enlarged image of the microscope's field on a ruled screen. Magnification of 1,000 diameters, enables dust samples being examined to be assessed with reduced eyestrain. *Nelson.*

microscope. Optical instrument, the main parts of which are the stand on which is fixed a stage that holds the material under examination; a condenser through which light is transmitted from its source through a hole in the stage for the purpose of viewing translucent matter; a vertical illuminator in the metallurgical or petrological microscope, which directs a beam of incident light down upon an opaque object on the stage, the beam then being reflected up through the system of lenses; a polarizer below the stage or in the incident light beam of the vertical illuminator; an analyzer in the ocular system, which consists of objective and ocular or eyepiece, these being carried in a tube which can be focused on the object viewed. The electron microscope views by means of a stream of electrons which are focused by means of a circular magnet acting as a lens onto the object under examination. A second magnetic lens acts as the objective and projects an enlarged image which is further magnified by a magnet acting as eyepiece. *Pryor, 3.*

microscopic. a. Of, relating to, or conducted with the microscope or microscopy. *Webster 3d.* b. So small or fine as to be invisible or not clearly distinguishable without the use of a microscope. *Compare* macroscopic; megascopic. *Webster 3d.*

microscopic stresses. Residual stresses which vary from tension to compression in a distance (presumably approximating the grain size) that is small compared to the gage length in ordinary strain measurements. Hence, not detectable by dissection methods; they can sometimes be measured by X-ray line shift. *ASM Gloss.*

microscopy, special forms. In dark ground microscopy, a special substage condenser causes the object viewed to be lit by oblique rays, so as to stand out against a dark background. In fluorescent microscopy, ultraviolet source of light is used, thus exhibiting fluorescent qualities of object. In flying-spot microscopy, a cathode-ray scanning tube sends a flying spot of light from microscope eyepiece, by way of objective, specimen and condenser to a photoelectric cell. Wherever the spot is masked by an opaque area, pulses are generated and amplified for record on a display tube. In X-ray microscopy, these rays emanate from the microsystem and record photographically using reflection, contact of ray with object, or projection. *Pryor, 3.*

microsecond. One-millionth of a second; abbreviations, μsec and μs. *Webster 3d.*

microsection. a. A transparently thin section of some susbtance mounted for examination with the microscope. *Standard, 1964.* b. A thin section of rock so mounted for petrographic examination. *Fay.*

microsegregation. Segregation within a grain, crystal, or small particle. *See also* coring. *ASM Gloss.*

microseism. A very slight tremor or vibration of the earth's crust. *Standard, 1964.*

microseismic instrument. An instrument, among other things, for observing the behavior of roof strata and supports. The device is inserted in 4 foot long 1½-inch-diameter holes, drilled at selected points, for listening to subaudible vibrations which are known to precede rock failure. *Nelson.*

microseismic movement. Rather permanent, faint vibrations of the earth's crust (usually not exceeding 25 microns) caused by breakers on the coast or by storms far out at sea (up to 3,000 kilometers from the coast). Synonym for microseism. *Schieferdecker.*

microseismic rate. The number of microseisms per unit of time. *Isaacson, p. 172.*

microseismic region. Area in which the earthquake is registered by instruments only. *Schieferdecker.*

microseismometer. An apparatus for indicating the direction, duration, and intensity of microseisms. Also called microseismograph. *Standard, 1964.*

microshrinkage. A casting defect, not detectable at magnifications lower than ten diameters, consisting of interdendritic voids. This defect results from contraction during solidification where there is not an adequate opportunity to supply filler material to compensate for shrinkage. Alloys with a wide range in solidification temperature are particularly susceptible. *ASM Gloss.*

microspar. Material consisting of very tiny, clear calcite crystals. *A.G.I. Supp.*

microspectroscopy. A method of identifying metallic constituents; it consists of drilling out the minute portion to be analyzed, flowing collodion over the resulting chips, and transferring the collodion together with the chips to a pure carbon electrode for analysis in a standard spectrographic arc. *Gaynor.*

microspherulitic. In petrology, having a texture composed of minute spherulites, closely packed. *Standard, 1964.*

microspores. Male spores; part of reproduction organs of many Coal Measures plants. *Nelson.*

microstress. Same as microscopic stress. *ASM Gloss.*

microstriations. Microscopic scratches developed on the polished surfaces of rocks or minerals as a result of abrasion. *A.G.I.*

microstructural changes. Changes in solid alloys which involve alteration in the microstructure. Usually associated with constitutional changes, but may occur independently of these, as for example, when crystals are deformed by working of the metal or when deformed crystals recrystallize. *C.T.D.*

microstructure. The structure of polished and etched metals as revealed by a microscope at a magnification greater than ten diameters. *ASM Gloss.*

microstylolite. A type of microscopic grain boundary relationship indicating differential solution between two mineral grains and characterized by fine interpenetrating teeth; boundary often marked by a little opaque material concentrated along it. *Compare* stylolite. *A.G.I.*

microsyenite. Intrusive igneous rocks which are the medium-grained equivalents of the syenites on the one hand and the trachytes on the other. *A.G.I.*

microthrowing power. A qualitative measure of the ability of an electroplating solution to deposit metal in a small hole, pore, or crevice having dimensions not exceeding a few thousandths of an inch and with its depth usually greater than one of the other two dimensions. *ASM Gloss.*

microtine. Plagioclase feldspar having the appearance of sanidine. *Hess.*

microvitrain. The thin vitrainlike bands present in clarain, having a maximum thickness of about 1/10 inch (2 millimeters) with a tolerance of 1 millimeter, and a minimum thickness of 0.05 millimeter (50 microns). *A.G.I.*

microvolt. One-millionth of a volt; 10^{-6} volt; abbreviation, μv. *Crispin.*

microwatt. One-millionth of a watt; abbreviation, μw. *Webster 3d.*

midalkalite. An igneous rock known as foyaite or nepheline syenite. *Hess.*

Mid-Atlantic Ridge. A great mountain range extending the entire length of the Atlantic Ocean. This ridge is now thought to curve around the southern tip of Africa, cross the Indian Ocean, curve around southern Australia and New Zealand, and extend well up into the Pacific Ocean. *Mero, p. 103.*

Middleback ranges. A broken line of prominent ridges situated near the port of Whyalla (South Australia). These hills are composed of a series of iron-rich rocks, containing local concentrations of high grade iron ore, averaging 65 percent ferrous content. *Nelson.*

middle band. A stratum of rock, or more usually soft dirt, near the middle of a coal seam. *See also* middle man. *Fay.*

middle cut; intermediate cut. A machine cut in the midsection of a coal seam; sometimes adopted in thick seams (over 4 feet) with a layer of dirt or inferior coal in the middle. A middle cut would be made with a turret coal cutter. *Nelson.*

middle man. A stratum of rock dividing or separating two seams or beds of coal. *See also* middle band. *Fay.*

middle prop. Eng. *See* center prop. *SMRB, Paper No. 61.*

middles. *See* middlings. *Nelson.*

middle third. The part of the thickness of a wall or arch of which the width is one-third of the total thickness, and is central in it. If all forces acting on such a structure form a resultant within the middle third, no tensile stress can occur. *Ham.*

middletonite. A brown, resinous, brittle mineral found between layers of coal at the Middleton collieries, near Leeds, England, and also at Newcastle; it has a specific gravity of 1.6, does not alter at 210° C, and is soluble in cold concentrated sulfuric acid. *Fay.*

middling pale solder. An alloy of tin, lead, and bismuth; used by pewterers. *Fay.*

middlings; middles. a. That part of the product of a washery, concentration, or preparation plant which is neither clean coal nor mineral nor reject (tailings). It consists of fragments of coal and shale or mineral and gangue. The material is often sent back for crushing and retreatment. *Nelson.* b. In two-component ore, particles incompletely liberated by comminution into concentrate or gangue. In complex ores, in addition to incomplete liberation, there may be multiphased particles of middling or intermediate species which react too feebly to treatment to report as concentrate or tailing. *Pryor, 2.*

middlings elevator. An elevator which removes material for further treatment or for disposal as an inferior product. *B.S. 3552, 1962.*

mid-door. Scot. The middle one of three landing places in a shaft. *Fay.*

midfeather. a. In mining, a support to the center of a tunnel. *Standard, 1964.* b. Derb. Stringers of ore connecting two larger bodies. *Fay.* c. A dividing wall between two flues, for example, in a gas retort or a glass tank furnace; in the latter, the wall may also be called a tongue. *Dodd.*

midges. N. of Eng. Lamps (not safety) carried by trammers, etc. *Fay.*

midge stone. Same as gnat stone. *Shipley.*

midget impinger. A dust-sampling apparatus almost identical in principle and design with the regular Greenburg-Smith impinger, the main difference being its smaller size and the fact that only a 12-inch head of water is required for its operation. *See also* Greenburg-Smith impinger. *R.I. 3360, December 1937, p. 2.*

midget miner. *See* Crawley midget miner. *Nelson.*

Midlin hypothesis. *See* free field stress. *Lewis, p. 611.*

midspan. The center of a span which rests on two abutments. *Ham.*

mid-wall. Scot. A close wooden partition dividing a shaft into compartments. *Fay.*

Midwayan. Lower lower Eocene or Paleocene. *A.G.I. Supp.*

mid-workings. a. Scot. Mine workings above or below in the same mine or colliery. *Fay.* b. *See* mid-door. *Fay.*

miemite. Synonym for dolomite. *Dana 6d, p. 271.*

miersite. A canary-yellow iodide of silver and copper, 4AgI.CuI. Isometric. Tetrahedral or cubo-octahedral crystals. From Broken Hill, New South Wales. *English.*

miesite. A brown variety of pyromorphite containing calcium. *Standard, 1964.*

miffil. N. of Eng. Term in use among miners for an impure ashy coal forming the lower part of a seam. *Tomkeieff, 1954.*

migma. A mush of partly fluid and partly solid rock material from which migmatite arises by consolidation. If the amount of its liquid portion becomes great enough, it will acquire mobility and may intrude into its surroundings in typical eruptive or instrusive fashion. *Schieferdecker.*

migmatite. A mixed rock consisting of thin alternating layers or lenses of granitic rock and schist. *Compare* composite gneiss; injection gneiss. *A.G.I. Supp.*

migmatization. The process whereby metamorphic rocks are converted into migmatite. *A.G.I.*

migration. a. The movement of oil, gas, or water through porous and permeable rock. Parallel (longitudinal) migration is movement parallel to the bedding plane. Transverse migration is movement across the bedding plane. *A.G.I.* b. Correction that is applied in reflection shooting in the case of dipping boundary planes by which the reflection points, that are originally plotted vertically downwards, are shifted to their proper position. *Schieferdecker.*

migration of ions. Change of position. Migration velocity is that with which ions move through solutions during electrolysis. *Pryor, 3.*

migration of oil. The movement or seepage of oil through the rocks wherever they are sufficiently permeable to allow such passage; of considerable importance in oil geology. *Nelson.*

miharaite. A quartz-bearing hypersthene basalt. *A.G.I.*

mijakite. A variety of andesite containing manganiferous pyroxene. *A.G.I.*

mike. a. Synonym for micrometer. *Long.* b. As a verb, to determine the size of an object with a micrometer. *Long.*

mikheevite. A mineral, $K_2Ca_4(SO_4)_5.H_2O$, triclinic, in salt deposits. Identical with gorgeyite. *Spencer 20, M.M., 1955; American Mineralogist, v. 41, 1956, p. 816.*

mil. One-thousandth of an inch. *Dodd.*

milarite. A vitreous, hydrous, potassium-calcium-aluminum silicate, $HKCa_2Al_2(Si_2O_5)_6$; colorless to greenish; brittle. In hexagonal prisms. *Fay.*

mild and tough. Mellowed or ripened by weathering; said of brick clay; opposite of short and rough. *Standard, 1964.*

mild clay; sandy clay. Loam. *Bennett 2d, 1962.*

mild earth. Eng. Soft, loamy clay suitable for brickmaking, as opposed to stiffer clay below, suitable for making tiles and drainpipes. Kimeridge clay, Brill, Buckinghamshire. *Arkell.*

mildewbronze. Bronze made to look as if mildewed by long burial underground. *Standard, 1964.*

mild purple stone. *See* Cornish stone. *Hess.*

mild steel. One which contains from 0.12 to 0.25 percent carbon. Also called low-carbon steel; soft steel. *Pryor, 3.*

mild-steel reinforcement. Reinforcement made of steel containing approximately 0.12 to 0.25 percent of carbon and having a tensile strength of 28 to 33 tons per square inch. *Taylor.*

mile. A unit of length commonly used to measure distance in the United States and in the British Empire. A statute mile equals 5,280 feet, 1,760 yards, or 1,609.3 meters. *C.T.D.*

mile hr^{-1} Abbreviation for miles per hour. *BuMin Style Guide, p. 60.*

mile sec^{-1} Abbreviation for miles per second. *BuMin Style Guide, p. 60.*

mil-foot. A standard of resistance in wire. The resistance of 1 foot of wire that is 1 mil in diameter. *Crispin.*

Milford-Astor machine. A simple printing machine that has been used for the small-scale production of transfers for the decoration of pottery. *Dodd.*

miliary arkose. Grains of quartz and feldspar, as large as millet seeds at the most; disseminated colored clay; quartz dominant, little mica—does not differ from common or granitoid arkose except by grain size. *A.G.I. Supp.*

milinch. One-thousandth of an inch. *Strock, 10.*

milk glass. Translucent or nearly opaque milk-colored glass produced by adding calcium fluoride and alumina to an ordinary glass. *CCD 6d, 1961. See also* cryolite glass.

milkiness. A condition of pronounced cloudiness in glass. *ASTM C162-66.*

milk-of-lime. A dilute lime hydrate in aqueous suspension and is the consistency of milk. *Boynton.*

milk of sulfur. *See* colloidal sulfur. *Cooper, p. 277.*

milk opal. A translucent, milky-appearing variety of common opal. Rarely exhibits play of color. *Shipley.*

milkstone. a. Any of various white stones, as flint pebble. *Webster 3d.* b. A flint whitened by fire, found among prehistoric remains. *Standard, 1964.*

milky quartz. Vitreous quartz of a milklike color and of somewhat greasy luster; also called greasy quartz. *Fay.*

mill. a. An excavation made in the country rock, by a crosscut from the workings on a vien, to obtain waste for filling. It is left without timber so that the roof may fall in and furnish the required rock. *Fay.* b. A passage connecting a stope or upper level with a level below, intended to be filled with broken ore that can then be drawn out at the bottom as desired for further transportation. An opening in the floor or bottom of a stope through which the ore or mineral is passed or thrown downward along the footwall to the level. *Fay.* c. To fill a winze, or interior incline, with broken ore, to be drawn out at the bottom. *Fay.* d. In quarrying, usually applied to the finishing plant where blocks are sawed into slabs; all other manufacturing processes are classed as shop work. *AIME, pp. 331-332.* e. *See also* glory hole. *Lewis, p. 403.* f. To grind or cut away steel or iron with a toothed or serrated face bit; also, the tool so used. *Long.* g. Can. Reducing plant where ore is concentrated and/or metals recovered. *Hoffman.* h. In mineral processing, one machine, or a group, used in comminution. This older limitation of the term has today been broadened to cover the whole mineral treatment plant in which crushing, wet grinding, and further treatment of the ore is conducted. Crushing and grinding mills include the Aerofall (dry), amalgamator, ball mill, barrel mill, beater, buhr, cage, cascade, Chilean, Cobbe, colloid, conical, disc, disintegrating, Griffin, grinding, hammer, Huntington, Krupp, pebble, pendulum, pin, pulverizing, Raymond, reduction, rod, stamp, tricone, tumbling, most of which are defined under these names. Ball mills are high or low discharge, according to whether outflow is axial or peripheral. Primary mills (set to grind to moderately coarse sand) are usually low-discharge and square (length little more than diameter). Secondary mill may be high-discharge and have a 2½ to 1 ratio of length to diameter. The main parts of a ball mill are its feed scoop, crown-and-pinion drive, retaining grid or grate, liners with their securing bolts, shell, trunnions, and crop load of balls, ore, and water. *Pryor, 3.* i. *See also* grinding mill. *Nelson.* j. *See* cogging mill. *Nelson.* k. One-thousandth part. A mill of a dollar is one-tenth of a cent, for example, if an assessment of 5 mills per share is levied, the amount payable is ½ cent. *von Bernewitz.* l. A single machine or a complete plant for rolling metals. *Bureau of Mines Staff.* m. Eng. That part of an ironworks where puddle bars are converted into merchant iron; that is, rolled iron ready for sale in bars, rods, or sheets. *See also* forge, c and d. *Fay.* n. By common usage, any establishment for reducing ores by other means than smelting. More strictly, a place or a machine in which ore or rock is crushed. *Fay.*

mill addition. a. Any of the materials added to the ball mill charge of a frit. *ASTM C286-65.* b. The materials used to prepare liquid enamels. Such materials as clay, opacifier, color oxide and water, as well as setting up agents and enamel frit, comprise mill additions. *Enam. Dict.*

mill bar. A rough bar rolled or drawn directly from a bloom or puddle bar for conversion into merchant iron in the mill. *Fay.*

Millburn beds. A group of slate rocks found in the Lake district of England; they belong to the Llanvirn series of the Ordovician system. *C.T.D.*

mill car. A car without a roof for carrying hoisting apparatus. *Standard, 1964.*

mill cinder. The slag from the puddling furnaces of a rolling mill. *Fay.*

mill coal. a. A noncoking coal mined from strip pits and used for zinc smelting. *A.G.I.* b. In Kansas, same as dead coal. *Fay.*

mill dirt. S. Afr. Free milling ore. *Fay.*

milled. A metal object lost in a borehole that has been cut or ground away with a mill, milling bit, or rose bit. *Long.*

milled asbestos. a. All grades produced by the mechanical treatment of asbestos ore. *Sinclair, W. E., p. 253.* b. Consists of many grades of fiber produced by varying degrees of mechanical treatment and graded in the Quebec Standard Asbestos Testing Machine. *Arbiter, p. 67.*

milled enamel. Enamel ground to proper fineness. A thick liquid. *Bryant.*

milled fire clay. Dry-milled fire clay. *Bureau of Mines Staff.*

milled salt. An obsolete name for vacuum pan salt. Now used to limited extent to designate salt mechanically ground to very fine mesh. *Kaufmann.*

millefiori. Decorative glassware, particularly paperweights, made by setting multicolored glass cane to form a design within a clear glass matrix. This type of glassware originated in Italy and derives its name from Italian words meaning, a thousand flowers. *Dodd.*

Miller indices, plane. Indices which identify a family of planes in crystal structure. The intercepts m, n, and p for any plane within a crystal give the reciprocals l/m, l/n, and l/p, which may be changed to a common denominator, resulting in the numerators h, k, and l, respectively. These numerators when written as (khl) identify the family of planes to which the specific plane belongs. *ASM Gloss.*

millerite. Nickel sulfide, NiS, containing 64.1 percent nickel; rhombohedral. *Sanford; Dana 17.*

millet-seed sandstone. A sandstone consisting essentially of small spheroidal grains of silica; typical of deposits accumulated under desert conditions. *C.T.D.*

mill feeder. In ore dressing, smelting, and refining, a laborer who regulates flow of ore, coke, flue scrapings, or other materials from bins, chutes, or belts into crushers, furnaces, or other equipment, or onto conveyor belts leading to equipment. Also called feeder man. *D.O.T. Supp.*

mill finish. The surface finish on rolled products characteristic of rolling. *ASM Gloss.*

mill foreman. A foreman who supervises and coordinates all operations concerned with crushing, grinding, and concentrating ore preparatory to smelting and refining. Also called floorwalker; mill shifter. *D.O.T. Supp.*

mill furnace. An iron furnace for reheating iron that is to be rerolled, or welded, under the hammer. *Standard, 1964.*

millgrit rock. Som. The dolomitic conglomerate, Trias. *Arkell.*

mill head. a. Ore accepted for treatment in a concentrator, after any preliminary rejection such as waste removal. *Pryor, 4.* b. Assay value, or units of value per ton, in ore accepted for treatment in the concentrating plant or mill. *Pryor, 3.*

mill-head grade. The grade of ore as it comes from the mine and goes to the mill. In calculating it one must make appropriate allowance for dilution. *McKinstry, p. 463.*

mill-head ore. *See* run-of-mill. *Pryor, 3.*

mill hole. An auxiliary shaft connecting a stope or other excavation with the level below. *See also* mill, b; glory hole, a. *Lewis, p. 403; Fay.*

milli-. A prefix that divides a basic unit by 1,000, or multiples it by 10^{-3}; abbreviation, m. *L&L.*

milliampere. One-thousandth of an ampere; abbreviation, ma. *Crispin.*

milliangstrom. One-thousandth of an angstrom; abbreviation, mA. *Webster 3d.*

millibar. A unit of atmospheric pressure equal to one-thousandth of a bar or 1,000 dynes per square centimeter; abbreviation, mb. *Webster 3d.*

millicurie. One-thousandth of a curie; abbreviation, mc. *NRC-ASA N1.1-1957.*

millicurie-hour. A measure of gamma-ray exposure expressed as the product of the source in millicuries and the time of exposure in hours. *NCB.*

millidarcy. The customary unit of measurement of permeability equal to one-thousandth of a darcy. *See also* permeability. *A.G.I.* Abbreviation, md. *Webster 3d.*

millidegree. A unit of temperature equal to one-thousandth of a degree; abbreviation, mdeg. *Webster 3d.*

millifarad. One-thousandth of a farad; abbreviation, mf. *Webster 3d.*

milligal. A unit employed in the gravitational method of geophysical prospecting. It is about one millionth of the average value of the acceleration due to gravity at the earth's surface, that is, 1 gallon=1 centimeter per second per second. *Nelson.*

milligauss. One-thousandth of a gauss; abbreviation, mG. *Standard, 1964.*

milligram. A unit of weight in the metric system. Equals 0.001 or 10^{-3} gram, 0.05432 grain, 0.000643 pennyweight, or 0.00003215 troy ounce; abbreviation, mg. *Fay.*

milligram-hour. A measure of gamma-ray exposure expressed as the product of the equivalent radium content of the source, in milligrams, and the time of exposure in hours. *NCB.*

millihenry. One-thousandth of a henry; a unit of inductance; abbreviation, mh. *Webster 3d.*

milliliter. a. A metric unit of capacity that equals one-thousandth of a liter; abbreviation, ml. *Webster 3d.* b. Laboratory glassware (beakers, flasks, graduates, etc.) are commonly identified by their capacities expressed in milliliters; especially in multiples of 10 milliliters or 100 milliliters. *Bureau of Mines Staff.*

millimass unit. One-thousandth of an atomic mass unit; abbreviation, mamu. *See also* mamu. *NRC-ASA N1.1-1957.*

millimeter. A metric unit of length that equals one-thousandth of a meter; abbreviation, mm. *Webster 3d.*

millimeter screw micrometer. A precision caliper gage which measures the overall dimensions of unmounted fashioned gems more accurately but less conveniently than dial gages. *Shipley.*

millimicron. One-thousandth of a micron, usually symbolized as 1 mμ. Formerly much used as a measure for the wavelength of visible light. Easily translated into angstroms merely by the shift of a decimal point, since 1 mμ equals 10 angstroms. *Anderson.*

milling. a. In the Lake Superior district, a combination of open-cut and underground mining, wherein the ore is mined in open cut and handled underground. It is underhand stoping applied to large deposits, wherein the ore is mined near the mouth of winzes or raises, and dropped by gravity to working levels below for transportation to the surface. Sometimes called glory-hole method. *See also* mill, b and c. *Fay.* b. The grinding or crushing of ore. The term may include the operation of removing valueless or harmful constituents and preparation for market. *Nelson.* c. The act or process of cutting or grinding away a metal object lost in a borehole with a mill or milling bit. *Long.* d. Removing metal with a milling cutter. *ASM Gloss.* e. In powder metallurgy, the mechanical treatment of material, as in a ball mill, to produce particles or alter their size or shape, or to coat one component of a powder mixture with another. *ASM Gloss.* f. The process of grinding ceramic materials to fine particle sizes in a ball mill. *Bureau of Mines Staff.*

milling bit. A bit equipped with hardened serrations or teeth used to grind or cut away metallic materials or junk obstructing a borehole. Also called junk mill; rose bit. *Long.*

milling cutter. A rotary cutting tool provided with one or more cutting elements, called teeth, which intermittently engage the workpiece and remove material by relative movement of the workpiece and the cutter. *ASM Gloss.*

milling grade. a. Ore containing sufficient recoverable value to warrant treatment. *Pryor, 3.* b. S. Afr. An assumed average value of the ore sent to the mill, expressed as a percentage, or in pennyweights per short ton. *Beerman.*

milling ore. a. A dry ore that can be amalgamated or treated by leaching and other processes; usually these ores are low grade and free, or nearly so, from base metals. *Fay.* b. Any ore that contains sufficient valuable minerals to be treated by any milling process. *Fay.*

milling width. Width of lode which is designated for treatment in the mill, as calculated with regard to daily tonnage. Any excess broken during mining (stoping width) should be rejected before milling. *Pryor, 3.*

milling yield. S. Afr. The valuable material obtained from milling, expressed as a percentage or in pennyweights per short ton. *Beerman.*

million electron volts. A common unit of energy in nuclear science; equals 10^6 electron volts; abbreviation, mev. *NRC-ASA N1.1-1957.*

milliroentgen. One-thousandth of a roentgen; abbreviation, mr. *NRC-ASA N1.1-1957.*

millisecond. One-thousandth of a second; abbreviations, msec and ms. *Webster 3d.*

millisecond delay. A type of delay cap with a definite but extremely short interval between passing of current and explosion. *Nichols.*

millisecond-delay cap. A detonating cap that fires from 20 to 500 thousands of a second after the firing current passes through it. *Nichols.*

millisecond-delay detonator. *See* short-delay detonator. *B.S. 3618, 1964, sec. 6.*

millisite. A hydrous phosphate of aluminum, calcium, and sodium, $2CaO.Na_2O.6Al_2O_3.4P_2O_5.17H_2O$; monoclinic; white; fibrous bands resembling chalcedony. Found near Fairfield, Utah. *English.*

millivolt. One-thousandth of a volt; abbreviation, mv. *Crispin.*

mill-labor foreman. A foreman who supervises workers engaged in maintaining ore-dressing equipment, such as ball mills, classifiers, and flotation machines, and working areas, offices, and rest rooms in clean and orderly condition. *D.O.T. Supp.*

mill loader. *See* blunger loader. *D.O.T. 1.*

millman. a. In brick, tile, and nonclay refractory industries, one who prepares clay for molding by grinding, mixing, and tempering it in a combination grinding and mixing mill. Also called clay temperer. *D.O.T. 1.* b. One who is employed in a mill, as in an ore-dressing plant. *Fay.*

mill ore. *See* second-class ore. *Nelson.*

mill pick. A tool for dressing mill stones. *Fay.*

mill race. The current of water that drives a mill wheel, or the channel in which it flows from the dam to the mill. *Fay.*

mill rolls. The rolls through which puddled iron is run previous to being marketed. *Standard, 1964. See also* merchant train. *Fay.*

mill run. a. A given quantity of ore tested for its quality by actual milling; the yield of such a test. *Craigie, v. 3, p. 1523.* b. Average, not especially selected. *Craigie, v. 3, p. 1523.* c. To yield (a stated amount) in terms of a mill run. *Craigie, v. 3, p. 1523.* d. Pac. The work of an amalgamating mill between two cleanups. *Fay.* e. In intermittent treatment of ore, with periodic clean up, the period of such a run. Bulk test on sample of ore during development of treatment process. *Pryor, 3.*

mills. *See* ball mill; hammer mill; pug mill; rod mill. *ACSG, 1963.*

mill sampler. A laborer who removes samples of crushed ore, concentrates, or tailings at various stages of processing, and puts them in labeled buckets or sacks for laboratory analysis. Also called sampler. *D.O.T. Supp.*

mill scale. The scale of ferric oxide that peels from iron during rolling. *Compare* forge scale. *Standard, 1964.*

Mills-Crowe process. Method of regeneration of foul cyanide liquor from gold leaching process. The barren solution is acidified, gaseous hydrocyanic acid (H.CN) is liberated and separated, and is reabsorbed in an alkaline solution, for example, lime water. *Pryor, 3.*

mill shifter. *See* mill foreman. *D.O.T. Supp.*

mill shoe. A shoe equipped with a hardened serrated cutting edge used to mill downward over and around a piece of drill-stem equipment lost in a borehole. *See also* mill. *Long.*

millsite. a. A plot of ground suitable for the erection of a mill, or reduction works, to be used in connection with mining operations. *Fay.* b. A millsite is square or rectangular in shape and cannot exceed 5 acres, or 217,800 square feet in area. *Lewis, p. 27.*

millstock. Term used in slate industry to include all forms of structural slate used in exterior or interior construction. *BuMines Bull. 630, 1965, p. 882.*

millstone. A hard, tough stone used for grinding cereals, cement rocks, and other materials. Usually a coarse-grained sandstone or fine quartz conglomerate. *Sanford.* Quarried underground in Virginia; also, produced in New York and (of granite) in North Carolina. *Barger.*

Millstone grit. An old English name for the conglomeratic sandstone at the base of the Carboniferous Coal Measures. It was formerly more or less current in this country as a synonym for Pottsville conglomerate. *Fay.*

milltail. The current of water leaving a mill wheel after turning it, or the channel through which it runs; a tailrace. *Fay.*

mill test. a. The determination of the metallic contents and recoverable metal in any given ore by the milling of a sufficient quantity to afford average milling conditions. *Weed, 1922.* b. *See* mill run. *Fay.*

milltons. Net tonnage of ore available for milling after eliminating waste and unpayable material. *Beerman.*

mill value. S. Afr. The calculated value of ore before crushing. After treatment there remains a residue of the valuable metal in the sands, slimes, or tailings, which, added to the yield obtained by treatment, should be equal to the mill value. *Beerman.*

millwright. a. A worker specializing in construction or erection of mills and milling machines. *Pryor, 3.* b. A mechanic who installs machinery in a mill or shop. *Crispin.*

mimesite. An obsolete snyonym for dolerite. *Fay.*

mimetic. Imitative; said of crystals that have a form produced by the penetration twinning of forms of lower symmetry. *Standard, 1964.*

mimetic tectonite. Tectonite whose grains have forms resulting from recrystallization rather than deformation. *A.G.I. Supp.*

mimetite. A natural chloride and arsenate of lead, $Pb_5(AsO_4)_3Cl$; color, yellow to yellowish brown; streak, white; luster, resinous to subadamantine; specific gravity, 7.24; Mohs' hardness, 3.5 to 4. Forms a continuous series with pyromorphite. Found in the United States (California, Arizona, and Nevada) and in Europe. A minor ore of arsenic. *CCD 6d, 1961.*

mimic. Same as mimetic. *Fay.*

mimicry. Imitations of crystal forms of higher symmetry by those of lower grade of symmetry, usually the result of twinning. *Shipley.*

mimophyre. Suggested by Elie de Beaumont in 1814 for metamorphosed, argillaceous rocks in which feldspars had developed, so that they resembled porphyries. Volcanic tuffs are a frequent original, but graywackes and arkoses have also yielded them. *Compare* porphyroid. *Fay.*

min Abbreviation for minute; minim. *BuMin Style Guide, p. 61; Zimmerman, p. 70.* As a subscript, a symbol for minimum. *Zimmerman, p. 378.*

minable. a. Capable of being mined. *A.G.I.* b. Material that can be mined under present day mining technology and economics. *Bureau of Mines Staff.*

minal. a. Synonym for end-member. *A.G.I.*

Supp. b. A solid usually capable of assuming definite geometrical forms, representing definite chemical composition, and possessing definite physical properties that enter into the composition of natural minerals. Most minals are not found by themselves, but are associated with other minals, forming minerals. Therefore, minerals are composed of minals. *Hess.*

minargent. An alloy of copper, nickel, and antimony with a little aluminum. *Standard, 1964.*

minasragrite. A blue, acid, hydrous vanadyl sulfate, $V_2O_4.3SO_3.16H_2O$; monoclinic. Usually as an efflorescence on patronite in granular aggregates, from Minasragra, Peru. *English.* A vanadium ore. *Osborne.*

Mindel. Second Pleistocene glaciation. *A.G.I. Supp.*

mine. a. An opening or excavation in the earth for the purpose of extracting minerals; a pit or excavation in the earth from which metallic ores or other mineral substances are taken by digging; an opening in the earth made for the purpose of taking out minerals, and in case of coal mines, commonly a worked vein; an excavation properly underground for digging out some usual product, as ore, metal, or coal, including any deposit of any material suitable for excavation and working as a placer mine; the underground passage and workings by which the minerals are gotten together with these minerals themselves. *Ricketts, I.* b. A work for the excavation of minerals by means of pits, shafts, levels, tunnels, etc., as opposed to a quarry, where the whole excavation is open. In general, the existence of a mine is determined by the mode in which the mineral is obtained, and not by its chemical or geological character. The term also includes only mines valuable for their minerals or valuable mineral deposits. The term mine as used in the mining act appears to be synonymous with vein or lode; it is also used as synonymous with the term mining claim. *Ricketts, I.* c. An excavation beneath the surface of the ground from which mineral matter of value is extracted. The word carries the sense of men working beneath a cover of ground and thus excludes oil, brine, and sulfur wells. Excavations for the extraction of ore or other economic minerals not requiring work beneath the surface are designated by a modifying word or phrase as: (1) opencut mine—an excavation for removing minerals which is open to the weather; (2) steam shovel mine—an opencut mine in which steam shovels or other power shovels are used for loading cars; (3) strip mine—a stripping; an opencut mine in which the overburden is removed from a coalbed before the coal is taken out; (4) placer mine—a deposit of sand, gravel, or talus from which some valuable mineral is extracted; and (5) hydraulic mine—a placer mine worked by means of a stream of water directed against a bank of sand, gravel, or talus; soft rock similarly worked. A quarry from which rock is extracted becomes a mine when it is carried under cover. Mines are commonly known by the mineral or metal extracted as bauxite mines, copper mines, silver mines, coal mines, etc. *Hess.* d. Loosely, the word mine is used to mean any place from which minerals are extracted, or ground which it is hoped may be mineral bearing. *Hess.* e. By metaphor a mine may be any large source of supply—a learned person becomes a mine of information, a source of wealth is a gold mine. *Hess.* f. A word of wide application. It may be defined as a system of excavations made for the purpose of getting minerals (whether in their natural state or in solution or suspension). A mine usually involves the employment of persons below ground. It covers the getting of mineral such as coal in solid form and also the getting of a mineral such as salt by the pumping of brine. The term mine also includes opencast pits, mine buildings, land, structures, and works. In South Wales, mine also applies to ironstone beds and nodules. *See also* coal mine. *Nelson.* g. In general, any excavation for minerals. More strictly, subterranean workings, as distinguished from quarries, placers, and hydraulic mines, and surface or open works. The distinction between the French terms mine and miniere results entirely from the law, and depends upon the depth of the working. The former is the more general term, and, ordinarily speaking, includes the latter which signifies shallow or surface workings. The word mine in statutes prescribing safety appliances and protection for the miner has generally been held as including not only a place where pay ore has been discovered, but one where an excavation alone exists, as a cross-measures heading, an incline communicating with two or more seams or veins, or a trial heading, drift, adit, or shaft, etc., to prove the existence of minerals; in fact, any excavation for the development of a mineral deposit, or for the extraction of the ore, rock, or coal therefrom. In a military sense, a mine is a subterranean gallery run under an enemy's works, to be subsequently exploded. *Compare* quarry. *Fay.* h. Any deposit of mineral or ore suitable for extraction, as an ore deposit. The Federal and State courts have held that the word mine, in statutes reserving mineral lands, included only those containing valuable mineral deposits. In England, the term mine is applied to any seam of coal, as well as to a deposit of ironstone either in thin bands, or in one bed of considerable thickness. *Fay.* i. The terms mine and coal mine are intended to signify any and all parts of the property of a mining plant, either on the surface or underground, that contribute directly or indirectly to the mining or handling of coal. *Fay.* j. The term mine, as applied by quarrymen, is applied to underground workings having a roof of undisturbed rock. It is used in contrast with the open pit quarry. *Fay.* k. To dig a mine; to get ore, metals, coal, or precious stones out of the earth; to dig into as the ground for ore or metal; to work in a mine. *Webster 3d.* l. Discovery of a mine: In statutes relating to mines the word discovery is used; (1) in the sense of uncovering or disclosing to view ore or mineral; (2) of finding out or bringing to the knowledge the existence of ore or mineral, or other useful products which were unknown; and (3) of exploration, that is, the more exact blocking out or ascertainment of a deposit that has already been discovered. In this sense it is practically synonymous with development, and has been so used in the U.S. Revenue Act of February 9, 1919 (Sec. 214, subdivision A10, and Sec. 234, subdivision A9) in allowing depletion to mines, oil and gas wells. Article 219 of Income and War Excess Profits Tax Regulations No. 45, construes discovery of a mine as; (1) the bona fide discovery of a commercially valuable deposit of ore or mineral, of a value materially in excess of the cost of discovery in natural exposure or by drilling or other exploration conducted above or below the ground; and (2) the development and proving a mineral or ore deposit which has been apparently worked out to be a minable deposit of ore, or mineral having a value materially in excess of the cost of improving or development. *Fay.* m. Can. Site of operation where ores and/or metals are excavated. *Hoffman.* n. In certain coalfields, a coal seam. Obsolete. *B.S. 3618, 1964, sec. 5.* o. Any mineral or ore, especially ironstone or coal. Obsolete. *B.S. 3618, 1964, sec. 5.*

mine ambulance car. *See* ambulance car.

mine analyst. *See* mining engineer, d; safety engineer. *D.O.T. 1.*

mine bank. a. An area of ore deposits that can be worked by excavations above the water level. *Craigie, v. 3, p. 1524.* b. The ground at the top of a mining shaft. *Craigie, v. 3, p. 1524.*

mine blower, portable. *See* portable mine blower.

mine cable, concentric. *See* portable concentric mine cable.

mine cable, parallel duplex. *See* portable parallel duplex mine cable.

mine cable, portable. *See* portable mine cable.

mine cages. Elevators used to transport workers in mine shafts. They are available in open, semienclosed or fully enclosed models with a choice of sliding, folding, or rollup doors. Cages are used in either vertical or incline mine shafts. All cages contain necessary safety features. *Bests, p. 373.*

mine call factor. *See* assay plan factor. *Truscott, p. 98.*

mine captain. a. A superintendent of a mine. *Standard, 1964.* b. The director of work in a mine, with or without superior officials or subordinates. *Fay.* c. In metal mining, a foreman who supervises the extraction, hauling, and hoisting of ore in a mine. Also called ground boss. *D.O.T. 1.*

mine-car coupler. *See* coupler. *D.O.T. 1.*

mine-car dropper. *See* car runner. *D.O.T. 1.*

mine carpenter. In anthracite, bituminous, and metal mining, one who constructs and repairs buildings, chutes, bins, and ladders, and does general carpentry work underground and at the surface of a mine. Also called pitwright. *D.O.T. 1.*

mine-car repairer. *See* mine-car repairman. *D.O.T. 1.*

mine-car repairman. In anthracite coal mining; bituminous coal mining; metal mining; nonmetal mining, one who repairs or replaces damaged parts of mine (pit) cars, such as axles, wheels, bodies, and couplings, straightening, bolting, riveting, refitting, and making parts as required. Also called car whacker; mine-car repairer; pit-car repairer. *D.O.T. 1.*

mine cars. Cars which are loaded at production points and hauled to the pit bottom or surface in a train by locomotives or other power. They vary in capacity from 1 to 12 tons, and are either of wood or steel construction or combinations of both. Mine cars have been classified into six kinds: (1) the solid or box type, which requires a rotary dump at the unloading terminal; (2) the rocker dump type, which has a V-shaped body rounded at the bottom; (3) the gable-bottom car, which is shaped like a capital W in cross section; (4) the Granby car, a special form of a side-dumping car; (5) bottom-dump cars; and (6) end-dump cars, which are commonly used for hand tramming in small mines. *See also* drop-bottom car; endgate car; solid car. *B.C.I.; Kentucky, pp. 211-212; Lewis, p. 222.*

mine characteristic. The relation between pressure, p, and volume, Q, in the ventilation of a mine of resistance, R, is $p=RQ^2$. The curve of this equation for a particular mine may thus be plotted on the same axes as the characteristics of a fan. The point of intersection of this curve, termed the mine characteristic, with the pressure characteristic of the fan indicates the pressure and volume at which the fan would work in ventilating that mine. Knowing the volume and pressure, the power and efficiency are obtained. The suitability or otherwise of any fan to any duty can be studied and the effect of possible changes in mine resistance may be predicted. *Roberts, I, pp. 189-190.*

mine characteristic curve. As a graphical aid to the solution of problems in mine ventilation, the mine head (static and/or total) is often plotted against the quantity. This is called the mine characteristic curve, or simply the mine characteristic. *Hartman, p. 123.*

mine circulating fan. Mines create special problems in proper ventilation by their isolation from fresh air sources and the presence of dangerous gases and dusts. Large fans are used for the stationary systems, while small portable types provide fresh air in dead-ends and other inaccessible locations. These fans may be driven by electricity or compressed air, and in addition to mine operations, are useful for work in manholes, pipe galleries, silos, tanks, vats, plane fuselages, ship holds, etc. The U.S. Bureau of Mines can furnish specific recommendations concerning special problems. *Bests, p. 605.*

Minecoat. Trademark for a coal-tar coating for mine interiors. *CCD 6d, 1961.*

mine committee. Representatives chosen by the union employees to confer with the representatives of the company; corresponds in mining to shop committees in manufacturing. Also called pit committee. *B.C.I.*

mine conveyor. *See* underground mine conveyors. *ASA MH4.1-1958.*

mine cooling load. The total amount of heat, sensible and latent, in British thermal units per hour, which must be removed by the air in the working places. *Hartman, p. 327.*

mined area. The area from which mineral has been removed. *Briggs, p. 23.*

mine development. The term employed to designate the operations involved in preparing a mine for ore extraction. These operations include tunneling, sinking, crosscutting, drifting and raising. *BuMines Bull. 419, 1939, p. 76.*

mine dial. *See* miner's dial. *Fay.*

mine door. *See* door. *Kentucky, p. 88.*

mine door, air power operated. Mine doors help to keep the air flow in shafts and mine working areas constant. In cases of explosions, doors "give" to relieve the pressure, then close automatically. The doors are mobile and can be set up in any location. They are opened and closed by a compressed air cylinder and are designed to be used where haulage equipment operates on a trolley wire. *Bests, p. 373.*

mine drainage. *See* drainage; drain tunnels; water hoists.

mined strata. In mine subsidence, the strata lying vertically over the excavated area. *Briggs, p. 61.*

mine dust. a. Dust from rock drills, blasting, or handling rock. *Fay.* b. In the quantity inhaled by workers, dust may be classified as dangerous, harmless, and borderline, though the classification is purely arbitrary. Silica is a dangerous dust; bituminous coal dust is relatively harmless, and aluminum hydroxide is borderline. *Lewis, p. 735.* c. Scot. Calcined ironstone screenings. *Standard, 1964.* d. *See* coal dust. *Fay.*

mined volume. In mine subsidence, the mined area multiplied by the mean thickness of the bed, or of that part of the bed which has been extracted. *Briggs, pp. 23-24.*

mine earth. a. N. Staff. Synonymous with ironstone in beds. *Fay.* b. Ironstone deposits collectively. *Standard, 1964.*

mine examiner. *See* fire boss. *D.O.T. 1.*

mine expert. *See* mining engineer. *D.O.T. 1.*

mine fan. a. The main fan for the mine, normally situated at the surface. *B.S. 3618, 1963, sec. 2.* b. A radial- or axial-flow ventilator. *See also* fan; ventilation. *Nelson.*

mine fan signal system. A system which indicates by electric light or electric audible signal, or both, the slowing down or stopping of a mine ventilating fan. *ASA C42.85:1956.*

mine feeder circuit. A conductor or group of conductors, including feeder and sectionalizing switches or circuit breakers, installed in mine entries or gangways and extending to the limits set for permanent mine wiring beyond which limits portable cables are used. *ASA C42.85:1956.*

mine fill. *See* hydraulic fill. *Pryor, 3.*

mine fire patrolman. *See* mine patrolman. *D.O.T. 1.*

mine fires. These very dangerous occurrences may arise as the result of spontaneous combustion, the ignition of timbers by gob fires, electric cable defects, or the heating and ignition of conveyor belts due to friction. *Nelson.*

mine fire truck. Designe to fight underground fires in mining operations, this low slung railcar is equipped with water supply and pressure equipment for its fire hoses. When a fire occurs, the car can be sped to the scene along existing rails. The truck is capable of delivering hundreds of gallons of water, depending upon the size and model used. *Bests, p. 373.*

mine foreman. a. The person charged with the responsibility of the general supervision of the underground workings of a mine and the persons employed therein. In certain states, the mine foreman is designated as the mine manager. *U.S. BuMines Fed. Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. I Underground Mines, Oct. 8, 1953.* b. Generally used to designate that company representative in complete 24-hour charge of underground workings and legally held responsible for the safety and welfare of all underground employees. He is generally state certified for competency. *B.C.I. See also* foreman; bank boss. c. A deputy in metal mines. *Nelson.* d. An official in charge of plant and associated labor on the surface, for example, screen foreman. *Nelson.*

Mine Gel. Brand name applied to a series of semigelatin dynamites. Used in underground mining, quarrying, construction, and general blasting. *CCD 6d, 1961.*

mine ground. a. A stratum or collection of strata containing ironstone in layers. *Standard, 1964.* b. Strata containing mine earth. *Hess.*

minehead. Pithead. *Webster 3d.*

mine heads. In a mine ventilation system, the cumulative energy consumptions are called the mine heads. These heads are in reality pressure differences, determined in accordance with Bernoulli's principle. *Hartman, p. 78.*

mine hoist. A device for raising or lowering ore, rock, or coal from a mine and for lowering and raising men and supplies. *ASA C42.85:1956.*

mine hoist control. This mechanism is designed to prevent accidents in mine cages caused by overspeeding in hoisting and lowering. It also prevents hoisting or lowering beyond the limits for which the controller is set. On electric hoists, it can apply brake in case of power failure and may regulate brake speed in the event of an emergency stop. *Bests, p. 373.*

mine inspector. a. One who checks mines to determine the safety condition of working areas, equipment, ventilation, and electricity, and to detect fire and dust hazards. *Webster 3d.* b. Generally used as denoting the state mine inspector as contrasted to the federal mine inspector. *B.C.I. See also* inspector. c. *See* metal mine inspector; coal mine inspector. *D.O.T. 1.*

mine iron; mine pig. Pig iron made entirely from ore; distinguished from cinder pig. *Standard, 1964.*

Mine-ites. High explosive; used in mines. *Bennett 2d, 1962.*

mine jeep. A special electrically driven car for underground transportation of officials, inspectors, repair, maintenance, and surveying crews and rescue workers. *ASA C42.85:1956.*

mine lamp. Battery operated lamps may be attached to miner's caps to provide illumination in poorly lighted mine areas. Lamps are designed to focus on working areas when attached. Unit consists of a rechargeable battery, bulb, reflector, wires, etc. All models must be approved by the U.S. Bureau of Mines. Mine lamps may be purchased outright or leased. Models include cap lamps, hand lamps and trip lamps, etc. *Bests, p. 373.*

mine locomotive. A low, heavy, haulage engine, designed for underground operation; usually propelled by electricity, gasoline, or compressed air. *Fay. See also* electric mine locomotive; battery locomotive; trolley locomotive.

mine mason. Mineworker who lines the galleries and other rooms with masonry, works on the repair of mine supports, and builds ventilation doors and dams. *Stoces, v. 1, p. 649.*

mine measures. Forest of Dean. *See* mine ground. *Fay.*

mine motorman. In bituminous coal mining, *see* motorman. *D.O.T. 1.*

mine-mouth generation. Generation of electrical energy based on the premise that it is cheaper to ship electricity than coal. *Encyclopaedia Britannica. Britannica Book of the Year, 1964, p. 569.*

mine opening. *See* opening, c.

mineowner. A whole or part owner of a mine. *Webster 3d.*

mine patrolman. In metal mining, one who goes through all parts of a mine at regular intervals, looking for fire hazards, loose rock, poor timbering, and other dangers, and reports conditions to superior. Also called firebug; fire inspector; fire patrolman; mine fire patrolman; safety man. *D.O.T. 1.*

mine pig. Eng. Pig iron made wholly from ore, in distinction from cinder pig. *Webster 3d; Fay.*

mine planning. *See* planning. *Nelson.*

mine power center. A mine power center is a combined transformer and distribution unit complete within a metal enclosure, usually of explosion-proof design, from which one or more low voltage power circuits are taken. *I.C. 7962, 1960, p. 22.*

mine props. Sections of wood generally of small tree trunks, used for holding up pieces of rock in the roof of mines. *Mersereau, 4th, p. 352.*

miner. a. One who mines; as (1) one engaged in the business or occupation of getting ore, coal, precious substances, or other natural substances out of the earth; (2) a machine for automatic mining (as of coal); and (3) a worker on the construction of underground tunnels and shafts (as for roads, railways, waterways). *Webster 3d.* b. A worker in a coal mine who is paid a certain price for each ton of coal he digs or blasts from the solid seam, as distinguished from the laborer who loads the cars, etc. His helpers load the coal; they are also called laborers. *Fay.* c. Includes all classes and laborers who work in a mine whether digging coal, timbering, or making places safe. *Fay.* d. Loosely used to designate all underground employees; technically, and in many cases legally, only those who have served an apprenticeship as helpers or those who are state licensed as miners. *B.C.I.* e. A worker who cuts coal in a breast or chamber by contract; the highest skilled worker of a colliery. *Korson.* f. One who mines; a digger for metals and other minerals. He is not necessarily a mechanic, handcraftsman or artisan, and the term imports neither learning nor skill. *Ricketts, I.* g. Abbreviation for continuous miner. *Nelson.* h. In anthracite and bituminous coal mining, one who performs the complete set of duties involved in driving underground openings to extract coal, slate, and rock, with a hand or machine drill, into which explosives are charged and set off to break up the mass. Also called coal digger; coal getter; coal hewer; digger; faceman. *D.O.T. 1.* i. In nonmetal mining, one who drills holes in working face of limestone mine, and inserts and sets off charges of explosives in holes. May be designated as development miner when working in new areas to drive drifts, shafts, sumps, and entry areas into stopes; high-raise miner when working in vertical areas to gain access into new development areas; or stope miner when working in horizontal openings in limestone strata. *D.O.T. Supp.* j. In metal mining, one who performs the complete set of duties involved in driving underground openings to extract ore or rock; drills holes in working face of ore or rock, with a hand or machine drill; inserts explosives in drill holes and sets it off to break up the mass; shovels ore or rock into mine cars or onto a conveyor, and pushes mine cars to haulageways where they are hauled by draft animals, mine locomotive (motor), or haulage cable to the surface, or to the shaft bottom for hoisting; installs timbering to support the walls and roof, or for chutes or staging. Due to standardization of mining methods and development of mining machinery, these jobs may be performed by several men. Where conditions are favorable, loading is done by machine. *D.O.T. 1.*

mine radio telephone system. A means to provide communication between the dispatcher and the operators on the locomotives where the radio impulses pass along the trolley wire and down the trolley pole to the radio telephone set. *ASA C42.85: 1956.*

mineragraphy. The microscopic study of minerals in polished section. Synonym for mineralography. *A.G.I.*

mineral. a. An inorganic substance occurring in nature, though not necessarily of inorganic origin, which has (1) a definite chemical composition or, more commonly, a characteristic range of chemical composition, and (2) distinctive physical properties or molecular structure. With few exceptions, such as opal (amorphous) and mercury (liquid), minerals are crystalline solids. No definition of a mineral is yet widely accepted; the divergence of views is mainly in regard to applying the term to a group of related substances, such as plagioclase, or reserving it for individual members of such a series or isomorphous group. In a broad nontechnical sense, the term embraces all inorganic and organic susbtances that are extracted from the earth for use by man, for example, the mineral fuels. *Stokes and Varnes, 1955.* b. In flotation, the terms mineral or metallic particles refer back to the French (mineral, ore) and Spanish (metal, ore) meanings. Both terms refer to those valuable constituents in the ore that it is the object of the process to separate from the nonvaluable constituents, or gangue. *Fay.* c. Lake Superior. Concentrates containing about 65 percent metallic copper. The crude ore is called rock. *Fay.* d. In miner's phraseology, ore. *Compare* ore. *Fay.* e. The term mineral, when employed in a conveyance, is understood to include every inorganic substance that can be extracted from the earth for profit whether it be solid, such as rock, fireclay, the various metals, and coal, or fluid, such as mineral waters, petroleum, and gas. *Fay.*

mineral acre. The full mineral interest in one acre of land. *Williams.*

mineral adipocire. *See* hatchettite. *Fay.*

mineral association. A group of minerals found together in a rock. *Schieferdecker.*

mineral belt. a. The strip, or zone, of mineralized territory in a given formation or district. *Weed, 1922.* b. Broad region of extensive mineralization with a high favorability of containing commercial deposits. *Ballard.*

mineralbildner. Ger. Mineralizers. *Hess.*

mineral black; slate black. Black pigments made by grinding and/or heating black slate, shale, slaty coal, coke, or coal. Pigment for various inks, coatings, surface coatings, etc. *CCD 6d, 1961.*

mineral blossom. Drusy quartz. *Fay.*

mineral blue. Applied loosely to any of a number of varieties of iron blue pigments, usually containing considerable extender, such as alumina. *CCD 6d, 1961.*

mineral borer. Scot. A person whose business it is to search for minerals by boring. *Fay.*

mineral bruto. Sp. Raw ore. *Hess.*

mineral caoutchouc. Synonym for elaterite; helenite. *Fay.*

mineral carbonatado. Sp. Carbonate ore. *Hess.*

mineral charcoal. a. A pulverulent, lusterless substance, showing distinct vegetal structure, and containing a high percentage of carbon with little hydrogen and oxygen, occurring in thin layers in bituminous coal. Called by miners mother of coal. *Fay.* b. Another name for fusain. *B.S. 3323, 1960.*

mineral claim. A mining claim. *Mathews, v. 2, p. 1058.*

mineral cleavage. The property of crystals of certain minerals by virtue of which the crystal can be broken or split along smooth planes which correspond to specific crystallographic directions *McKinstry, p. 636.*

mineral coal. A name for native coal to distinguish it from charcoal. *Fay.*

mineral cotton. *See* mineral wool. *Fay.*

mineral deed. A conveyance of an interest in the minerals in, on, or under a described tract of land. The grantee is given operating rights on the land; easements of access to the minerals are normally implied unless expressly negated. *Williams.*

mineral de fusion propia. Sp. Self-fluxing ore. *Hess.*

mineral deposit. a. Any valuable mass of ore. Like ore deposit, it may be used with reference to any mode of occurrence of ore, whether having the characters of a true, segregated, or gash vein, or any other form. *See also* ore deposit. *Fay.* b. A body of mineral matter in or on the earth's surface which may be utilized for its industrial mineral or metal content. *Bateman.*

mineral dresser. A machine for trimming or dressing mineralogical specimens. *Standard, 1964.*

mineral dressing. a. Physical and chemical concentration of raw ore into a product from which a metal can be recovered at a profit. *ASM Gloss.* b. Treatment of natural ores or partly processed products derived from such ores in order to segregate or upgrade some or all of their valuable constituents, and/or remove those not desired by the industrial user. Mineral dressing processes are applied to industrial wastes to retrieve useful by-products. *Pryor 2. See also* mineral processing.

mineral economics. Study and application of the technical and administrative processes used in management, control, and finance connected with the discovery, development, exploitation, and marketing of minerals. *Pryor, 3.*

mineral engineering. Term covers a wide field in which many resources of modern science and engineering are used in discovery, development, exploitation, and use of natural mineral deposits. *Pryor, 3.*

mineral entry. The filing of a claim for public land to obtain the right to any minerals it may contain. *Craigie, v. 3, p. 1524.*

mineral facies. Mineral facies comprises all rocks that have originated under temperature and pressure conditions so similar that a definite chemical composition has resulted in the same set of minerals regardless of the manner of crystallization or recrystallization. Synonym for metamorphic facies. *A.G.I.*

mineral fat. Synonym for ozocerite. *Tomkeieff, 1954.*

mineral field. Scot. A tract of country in which workable minerals are found; a mineral leasehold. *Fay.*

mineral-filled asphalt. Asphalt cement containing 10 to 50 percent 200-mesh mineral matter. *Bennett 2d, 1962.*

mineral filler. A finely ground, generally inert, cheap mineral substance that is added to such manufactured products as paint, paper, rubber, linoleum, and other materials to give body, weight, opacity, wear, toughness, or other useful properties. *See also* filler. *A.G.I.*

mineral fuels. Coal and petroleum. *Pearl, p. 17.*

mineral granules. Granular inorganic mineral material more than 50 percent of which is retained on the No. 35 (500-micron) sieve. *ASTM D1079-54.*

mineral inclusions in coal. This term is applied to the mineral matter which has become associated with coal by various processes during the various stages of coalification; the inorganic constituents of the original plant material (that is plant ash), discrete bands of dirt within the seam, and rock from strata above and below the seam are not included in the term. *IHCP, 1963.*

mineral interests. Mineral interests in land means all the minerals beneath the surface. Such interests are a part of the realty and the estate in them is subject to the ordinary rules of law governing the title to real property. *Ricketts, I.*

Mineralite. Powdered mica; used as filler in rubber compounding. *Bennett 2d, 1962 Add.*

mineralization. a. The process of replacing the organic constituents of a body by inorganic fossilization. *Standard, 1964.* b. The addition of inorganic substances to a body. *Standard, 1964.* c. The action of mineralizing; the state of being mineralized. *Webster 3d. See also* mineralize. *Fay.* d. The process of converting or being converted into a mineral, as a metal into an oxide, sulfide, etc. *Fay.* e. The processes taking place in the earth's crust resulting in the formation of valuable minerals or ore bodies. *See also* enrichment, secondary; epigenetic ore deposit; epithermal deposit; hydatogenesis; magnatic segregation deposit; metamorphic aureole; metasomasis; pneumatolysis. *Nelson.*

mineralize. a. To change from a metal into a mineral, as iron when exposed to the air. *Standard, 1964.* b. To impregnate or supply with minerals or any organic compounds. *Webster 3d.* c. To petrify; to promote the formation of minerals. *Webster 3d.*

mineralized bubbles. Mineralized froth. In flotation, the bubbles which rise from the pulp loaded with particles of desired mineral. They are said to be armored with their adherent film of particles. *Pryor, 3.*

mineralized matter. Crushed and loose rock material containing minerals irregularly deposited, from solution. It may be in beds, or in fissures. *Fay.*

mineralized zone. A mineral-bearing belt or area extending across or through a district. It is usually distinguished from a vein or lode as being wide, the mineralization extending in some cases hundreds of feet from a fissure of contact plane. *Compare* contact deposit. *See also* zone, b. *Fay.*

mineralizer. a. A substance, especially water or other gas, which, when present in solution in magmas, lowers the liquidus temperature and the viscosity, aids crystallization, and permits the formation of minerals containing it. A hydrothermal fluid is presumed to be formed by the concentration of such a mineralizer. Also called mineralizing agent. *A.G.I.* b. The dissolved vaper in an igneous magma, such as steam, hydrofluoric acid, boric acid, and others, that exerts a powerful influence in the development of some minerals and textures; also, the word is technically used in some definitions of ore. Thus, it is said that an ore is a compound of a metal and a mineralizer, such as copper and sulfur, iron and oxygen, etc. *Fay.*

mineralizer, geologic. *See* geologic mineralizer. *Bennett 2d, 1962 Add.*

mineralizing agent. *See* mineralizer. *A.G.I.*

mineralizing fluids. Liquids and gases that give rise to mineralization. *Bateman.*

mineral jelly. A semisolid substance from petroleum that is similar to but cruder than petrolatum and that is used as a stabilizer in explosives. *Webster 3d.*

mineral kingdom. One of the prime divisions of nature, embracing all minerals. *Standard, 1964.*

mineral lake. Tin-chromate glass, forming a pink pigment. *Standard, 1964.*

mineral land. Land which is worth more for mining than for agriculture. The fact that the land contains some gold or silver would not constitute it mineral land if the gold and silver did not exist in sufficient quantities to pay to work. Land not mineral in character is subject to entry and patent as a homestead however limited its value for agricultural purposes. *Ricketts, I.*

mineral lease. *See* mining lease. *Webster 3d.*

mineral line. Eng. A line that carries only mineral, especially coal. *Webster 2d.*

mineral matter (in coal). The inorganic material in coal. *B.S. 1016, 1961, Pt. 16.*

mineral monument. A permanent monument established in a mining district to provide for an accurate description of mining claims and their location. *Fay.*

mineral mud. Slurry too thick to flow. *Pryor, 3, p. 358.*

mineralogical bottoming. *See* bottoming. *Lewis, p. 295.*

mineralogical guides. Minerals which are present near ore bodies and which are related to the processes of deposition. These are very practical guides to the location of ore. The concentration of minerals, ore gangue, or alteration products, may constitute targets for ore search. *Lewis, p. 290.*

mineralogical phase rule. *See* Goldschmidt's mineralogical phase rule. *A.G.I.*

mineralogist. One who examines, analyzes, and classifies minerals, gems, and precious stones; isolates specimen from ore, rocks, or matrices; performs physical and chemical tests and makes X-ray examinations to determine composition of specimen and type of crystalline structure; and develops data and theories on mode of origin, occurrence, and possible uses of minerals. *D.O.T. 1.*

mineralogize. To study and collect minerals. *Standard, 1964.*

mineralography. The study under the microscope by reflected light of the structure of opaque minerals and ores. *A.G.I.*

mineralogy. The science of the study of minerals. *A.G.I.*

mineraloids. Minerallike constituents of rocks which are not definite enough in chemical composition or in physical properties to be considered a mineral. Hydrocarbons, volcanic glass, and palagonite are classed as mineraloids. *Hess.*

mineral oil. Oil derived from any mineral source, including petroleum, shale, and coal. *Institute of Petroleum, 1961.*

mineral paint. Minerals used as pigment, including the ochers, iron oxides, barite, etc. *See also* ochers; sienna, a; umber. *Fay.*

mineral pigments. Mineral materials used to give color, opacity, or body to a paint, stucco, plaster, or similar material. *AIME, p. 585.*

mineral pitch. Asphaltum. *Pryor, 3.*

mineral processing; ore dressing; mineral dressing. The dry and wet crushing and grinding of ore or other mineral-bearing products for purpose of raising concentrate grade; removal of waste and unwanted or deleterious substances from an otherwise useful product; separation into distinct species of mixed minerals; chemical attack and dissolution of selected values. Among the methods used are hand sorting, radioactivation, and fluorescence perhaps being added; dense media separation; screening and classification; gravity treatment with jigs, shaking tables, Humphries spirals, Frue vanners, sluices; magnetic separation at low or high intensity; leach treatment, perhaps using pressure and heat; and (universally) froth flotation. Also called beneficiation; preparation mecanique. *Pryor, 3.*

mineral province. A region in which the source, age, and regional distribution of a complex of minerals in a sediment are unified. *Schieferdecker.*

mineral purple. An iron-oxide red pigment. *Standard, 1964.*

mineral region. A region possessing mineral wealth or importance. *Craigie, v. 3, p. 1524.*

mineral reserves. *See* reserves. *Nelson.*

mineral resin. Any of a group of resinous usually fossilized deposits found in various rocks, such as bitumen and asphalt. *Webster 3d.*

mineral right. The ownership of the minerals under a given surface, with the right to enter thereon, mine, and remove them. It may be separated from the surface ownership, but, if not so separated by distinct conveyance, the latter includes it. *Fay.*

mineral rod. Same as divining rod. *Craigie, v. 3, p. 1524.*

mineral rouge. *See* red iron oxide. *Bennett 2d, 1962.*

mineral rubber. *See* gilsonite. *Mersereau, 4th, p. 206.*

mineral salt. Mined rock salt, as found in nature. *Kaufmann.*

minerals crude. A term used in the classification of ores under the tariff act of 1897 and embraces minerals, crude or not advanced in value or condition by refining or grinding, or by other processes not especially provided for in the act; or metallic mineral substances in a crude state and metals unwrought, not specifically provided for in this act. *Ricketts, I.*

mineral sequence. The order of deposition during formation. A normal sequence is stated to be oxides followed by sulfides and ending with elements, such as gold. Ideal conditions necessary for normal deposition are those which are not subjected to crowding, telescoping, stretching, etc., during the deposition or rejuvenation of mineralizing solutions, effective changes of wall rock along the vein, or any of the similar changes common in ore deposition. *Hess.*

mineral species. a. A homogeneous substance produced by the processes of inorganic nature, having a chemical composition, crystal structure, and physical properties which are constant within narrow limits. *Anderson.* b. Any mineral that can be distinguished from all other minerals by current determinative methods. *Stokes and Varnes, 1955.*

mineral sperm oil. *See* mineral seal oil. *Fay*

mineral spring. A spring whose water contains large quantities of mineral salts, either those commonly occurring in the locality or of a rare or uncommon character. *A.G.I.*

minerals separation process. A flotation process based on surface-tension phenomena, accelerated by means of addition to the pulp of small quantities of oil and air in minute subdivision. There is only about 0.1 percent oil added, and the pulp violently agitated for from one to ten minutes. Innumerable small bubbles of air are thus mechanically introduced, which join the oil-coated particles. These are then removed in a spitzkasten. Exposure to the air after this treatment then aerates any mineral which has not already taken up its oil film, after which a second spitzkasten treatment removes this. *Liddell 2d, p. 407.* An early name of froth flotation. *Pryor, 3.*

mineral stabilizer. Fine water insoluble inorganic mineral material all of which will pass a No. 100 (149-micron) sieve used in admixture with solid or semisolid bituminous materials. *ASTM D1079-54.*

mineral stains. In mica, inclusions and intergrowths of recognizable crystals or crystal groups. Stains that are distinctly black, red, brown, or green when viewed by transmitted light. *Skow.*

mineral streaking. An aggregate of grains of one mineral strung out like beads on a string to produce a lineation. Synonym for mineral streaming. *A.G.I.*

mineral streaming. *See* mineral streaking. *A.G.I.*

mineral surveyor. a. An officer or employee of the general land office within the scope of section 452 of the Revised Statutes of the United States. *Ricketts,* I. b. *See* deputy surveyor. *Fay.*

mineral synthesis. The production of artificial minerals by a laboratory process. *Fay.*

mineral tallow. Hatchettite. *Fay.*

mineral tar. a. A viscid variety of petroleum. *Fay.* b. Tar derived from various bituminous minerals, such as coal, shale, peat, etc. Shale tar. *Standard, 1964.* c. Synonym for maltha; pittasphalt. *Hey 2d, 1955.*

mineral time. a. Geologic time estimated on the basis of radioactive minerals. *A.G.I. Supp.* b. Eng. An 8-hour period in Derbyshire and in some other districts. *Fay.*

mineral turquoise. Term occasionally used to distinguish turquoise from odontolite. *Shipley.*

mineral variety. One of a number of related minerals; as, hornblende is a variety of amphibole. *Stokes and Varnes, 1955.*

mineral vein. a. A fracture, fissure, or crack in a rock which was subsequently lined or loaded with minerals. *Nelson.* b. A vein formed by aqueous deposition or sublimation. A vein containing ore. *See also* fissure; lode; vein. *Fay.*

mineral waters; spa waters. Waters which contain an unusually high percentage of some mineral substance which gives the water a distinctive taste and sometimes other properties. Considered to be beneficial in the treatment of various ailments. *Cooper, p. 361.*

mineral way. Derb. The roadway over which the miner transports ore to the highway, or supplies from the highway to the mine. *Fay.*

mineral wax. Certain types of viscous to solid, unctuous bitumens or artificial petroleum products; of various colors, waxy luster, relatively nonvolatile; composed principally of saturated hydrocarbons, virtually free from oxygenated compounds, contains crystallizable pariffins, is easily fusible and soluble in carbon disulfide, yielding water-insoluble sulfonation products. *Abraham, v. 1, 6d, 1960, p. 56.*

mineral wedging. A form of chemical weathering resulting in the formation of new minerals that have greater aggregate volumes than the old ones. These expanding minerals then act as wedges to split adjacent minerals and rocks apart. *A.G.I.*

mineral white. a. Blanc fixe. *Webster 3d.* b. Gypsum ground and used in pigments. *Webster 3d.*

mineral wool. A substance outwardly resembling wool, presenting a mass of fine interlaced filaments. It is made by subjecting furnace slag, or certain rocks, while molten to a strong blast. Being both insect proof and fireproof, it forms a desirable packing for walls, a covering for steam boilers, etc. *Standard, 1964. Compare* glass wool. Also called mineral cotton, silicate cotton, and slag wool. *Fay.*

mineral yellow. Synonym for yellow ocher; Cassel yellow. *Webster 3d.*

mineral zoning. The phenomenon of a zonal arrangement of mineral deposits outward from an igneous center, with the high-temperature minerals nearest the source and the low-temperature minerals farther out. *Schieferdecker.*

miner, assistant. *See* machine helper. *D.O.T. 1.*

miner, boss. In bituminous coal mining, one who takes a contract from the company or owner of the property to produce coal at a certain price per ton. He may employ other workers to do the actual mining under his supervision, or frequently work with a partner. Also called miner, efficiency. *D.O.T. 1.*

mine rent. The rent or royalty paid to the owner of a mineral right by the operator of the mine—usually dependent, above a fixed minimum, upon the quantity of product. *Fay.*

mine rescue apparatus. A name applied to certain types of apparatus worn by men, and permitting them to do work in noxious or irrespirable atmospheres such as obtained during mine fires, following mine explosions, as a result of accidents in ammonia plants, from smelter fumes, etc. Oxygen compressed in cylinders, a regenerating substance to purify the breathed air with a closed circulation system constitute the general principle of the apparatus. *Fay.*

mine rescue car. One of a number of railway cars specially equipped with mine rescue apparatus, safety lamps, first-aid supplies, and other materials, maintained by the U.S. Bureau of Mines in various sections of the United States. These cars serve: as movable stations for the training of miners in the use of mine rescue apparatus, and in first aid to the injured; as centers for the promotion of mine safety; as emergency stations for assisting at mine fires, explosions, or other disasters. Similar cars are maintained by a number of mining companies. *Fay.*

mine rescue crew. A crew consisting usually of five men who are thoroughly trained in the use of mine rescue apparatus, and are capable of wearing it in rescue or recovery work in a mine following an explosion, or to combat a mine fire. *Fay.*

mine rescue lamp. A name given to a particular type of electric safety hand lamp used in rescue operations. It is equipped with a lens for concentrating or diffusing the light beam as occasion may require. *Fay.*

mine resistance. a. The resistance offered by a mine to the passage of an air current, or the mine resistance is due to the friction of the air rubbing along the sides, top and bottom of the air passages. To overcome this friction, the total ventilating pressure must be applied against the airway and this pressure must be equal to the mine resistance. Mine resistance is caused by the dragging of the air against the mine surfaces and other obstructions. The rougher the mine surfaces and the more the obstructions, the greater the resistance to the flow of air. *Kentucky, p. 81.* b. Includes any natural ventilation effect present and is calculated from air volume and total pressure. The standard practice in the United Kingdom is to express the resistance of a mine in square feet of equivalent orifice. *Roberts, I, p. 207.*

mine road. Any mine track used for general haulage. *Fay.*

mine roadway area measurement. *See* Craven Sunflower method; plane-table method; tape-triangulation method. *Roberts, I,* pp. 59-60.

mine rock. A more or less altered rock found in ore channels. Gangue. *Fay.*

minerocoenology. The study of mineral associations in the widest sense, as the correlation of igneous rocks or magmatic provinces with their ore deposits. *Hess.*

minerogenesis. The origin and growth of minerals. *Challinor.*

minerogenetic epoch. *See* metallogenetic epoch. *A.G.I.*

minerogenetic province. a. A localized area in which mineralization has been active at one or more periods. If the mineralization has been chiefly metalliferous, the term metallogenetic is applicable. *A.G.I.* b. Certain regions characterized by relatively abundant mineralization dominantly of one type. *A.G.I.*

mine royal. Derb. A gold or silver mine that belongs to the king, by his prerogative to make (Coin) money. *Fay.*

miners. The row of drill holes in a tunnel face, located below the breaking-down holes. *Stauffer.*

miner's anemia. Hookworm disease. *See also* ancylostomiasis. *Webster 3d.*

miner's asthma. *See* pneumoconiosis. *Webster 3d.*

miners' bar. An iron bar pointed at one end, chisel-edged at the other, used in coal mining. *Standard, 1964.*

miner's bond. Prior to the middle of the 19th century the employment of colliers was governed by a signed agreement, known as the Yearly Bond or Monthly Bond. This was signed by the miner in the presence of witnesses, and under its provisions he undertook to serve his master faithfully for a year in consideration of fortnightly payments of wages in accordance with the terms specified. This was known as the Bond or Bondage system. *Nelson.*

miner's box. A wood or iron box located in or near the working place of the miner in which he keeps his tools, supplies, etc. Required by law in some states. *Fay.*

miners' coal ton. In Wales, 21 hundredweights of 120 pounds each. *Fay.*

miner's consumption. *See* pneumoconiosis. *Webster 3d.*

miner's cramps. Heat cramps. *Webster 3d.*

miners' devices. Miners use various devices to protect the posted notice from destruction by the elements, such as covering it with glass, or folding it in a box and placing the box in a conspicuous place, or putting the notice upon a mound of rocks, folding it and partially covering it with a rock or putting the notice in a tin can. A substantial compliance with the law is sufficient. *Ricketts, I.*

miner's dial. An underground surveying instrument for measuring and setting out angles and determining magnetic north. *B.S. 3618, 1963, sec. 1.*

miner's dip needle. A portable form of dip needle used for indicating the presence of magnetic ores. Also called dipping compass. *C.T.D.*

miners' elbow. A swelling on the back of the elbow, common with miners. *Standard, 1964.*

miner's electric cap lamp. a. An electric lamp designed for fixing to the miner's helmet. Its principal parts are: (1) the battery, either lead acid or alkaline; (2) the headpiece, of plastic or aluminum alloy, with switch; and (3) length of twin-cord cable covered with tough rubber or with neoprene—a fire- and acid-resisting substitute. The modern lead-acid lamps commonly use either a 4-volt 1.0-ampere bulb with a light output of about 47.5 lumens or else a 4-volt 0.8-ampere bulb of 38 lumens output. The headpiece is equipped with an auxiliary bulb rating 4 volt 0.46 ampere. *Nelson.* b. A lamp for mounting on the miner's cap and receiving electric energy through a cord which connects the lamp with a small battery. *ASA C42.85:1956.*

miners' friend. a. A Davy safety lamp. *Standard, 1964.* b. Name given by Captain Savery, in 1702, to his invention of the first practical steam engine, which was used to pump water from underground. *Pryor, 3.*

miners' hammer. A hammer for breaking ore. *Standard, 1964.*

miner's hand lamp. A self-contained mine lamp with handle for convenience in carrying. *ASA C42.85:1956.*

miner's hard cap. Caps made of rigid, strong materials such as aluminum, vulcanized fiber, glass fiber or plastic, protect workers from injury caused by falling objects, large chips, or by striking the head against projecting materials. The caps have a cradle to cushion the shock of blows and a sweat band to absorb perspiration. They are water resistant and may be nonconductive. A front visor shields the face and eyes from overhead glare, and makes the cap suitable for wear in close, confined spaces where a full brim might interfere. *Bests, pp. 83, 84.*

miner's helmet; hard hat. A hat designed for miners to provide head protection and for holding the cap lamp. Texolex helmets are made of layers of Lancashire cotton fabric, impregnated with phenol-formaldehyde resin, and molded into shape under high pressure. Headbands are of soft leather or plastic-coated fabric with webbing harness. *See also* face shield; protective clothing. *Nelson.*

miners' horn. A horn or metal spoon, used to collect the ore particles in gold washing. *Standard, 1964.*

miner's inch. a. The miner's inch of water does not represent a fixed and definite quantity, being measured generally by the arbitrary standard of the various ditch companies. Generally, however, it is accepted to mean the quantity of water that will escape from an aperture 1-inch square through a 2-inch plank, with a steady flow of water standing 6 inches above the top of the escape aperture, the quantity so discharged amounting to 2,274 cubic feet in 24 hours. *Fay.* b. Inasmuch as the miner's inch is a local term, the flow of the water shall be expressed in cubic feet per second, and where it is desirable, for local reasons, to use the term miner's inch it shall represent a flow of 1½ cubic feet per minute. *Fay. Compare* sluice head. *Fay.* c. The term is not definite without specification of the head or pressure. It has no fixed meaning and in one locality sometimes is a very different quantity according to miner's measurement in another locality. It has been defined as the amount of water that will pass in 24 hours through an opening 1-inch square under a pressure of 6 inches. *Ricketts, I.* d. The discharge from an orifice 1-inch square under a definite head. It is a rate of flow. The value of a miner's inch has been fixed by statute in various states as follows: In Arizona, California, Montana, and Oregon, 40 miner's inches are the equivalent of 1 cubic foot per second; in Idaho, Nebraska, Nevada, New Mexico, North Dakota, South Dakota, and Utah, 50 miner's inches are the equivalent of 1 cubic foot per second; in Colorado, the accepted equivalent is 38.4, and, in British Columbia, 35.7. In some parts of California 40 miner's inches to 1 cubic foot per second is used, whereas in the southern part quite generally 50 miner's inches to 1 cubic foot per second is used, regardless of the legal definition. *Seelye, 1.* e. N.Z. A stream of water capable of discharging 60 cubic feet per minute=1 cubic foot per second=1 sluice head. *Gordon.* f. A unit used in California, around 1900, for measuring water flow in hydraulicking. It represented the outflow from a square inch opening in the side of a box. It varied from 2,000 to 2,600 cubic feet per 24 hours, according to height of water, etc. *Nelson.* g. An aperture 1-inch square the upper edge of which lies 6 inches below the surface of a stream; used to measure the rate of flow. The yield is about 90 cubic feet (673.2 gallons) per hour. *C.T.D.* h. See V notch. *B.S. 3618, 1963, sec. 4.*

miner's inch day. Flow of 1 miner's inch for 24 hours. *Institution of Mining and Metallurgy, Symposium on Opencast Mining, Quarrying, and Alluvial Mining, London, 16-19 November 1964, Paper 9, p. 5.*

miners' lamp. a. In nongassy mines, acetylene lamps and various electric lamps; in gassy mines, approved flame safety lamps, electric hand or cap lamps. *Nelson.* b. Any one of a variety of lamps used by a miner to furnish light; as, oil lamps, carbide lamps, flame safety lamps, electric cap lamps, etc. *Fay.*

miner's lien. A creature of statute to which the miner must look for the right and authority to file any such lien. *Ricketts, I.*

miner's lung. *See* pneumoconiosis. *Fay.*

miners' needle. A long, slender, tapering, metal rod left in a hole when tamping and afterwards withdrawn, to provide a passage, to the blasting charge, for the squib. *Fay.*

miners' nystagmus. An occupational disease that occurs among coal miners, usually those of middle age or elderly, who have worked for a period of 25 to 30 years underground. Its physical symptoms consist of difficulty of seeing in the dark or in poor light, excessive sensitivity to and intolerance of glare, and a rhythmic oscillation of the eyeballs. As a result of these oscillations there may be apparent movement of the objects looked at and defective visual acuity. Associated with these ocular symptoms there are other general disorders, such as headaches and dizziness, particularly after stooping or bending, and the development of psychoneurotic symptoms is common in the later stages of the disease. If the disease is not checked the nervous disorders may become so severe as to render the miner totally disabled. *Roberts, II, pp. 85-86.*

miners' oil. An oil, producing little smoke, used in miner's wick-fed open lamps. *Fay.*

miner's pan. *See* gold pan; pan.

miner's phthisis. A disease of miners as (1) anthracosis, (2) anthracosilicosis, (3) pneumoconiosis. *Webster 3d.*

miner's pick. *See* pick. *Nelson.*

miners rescue party. A team of trained mine rescue workers, from five to eight strong; they operate after explosions, and during and after mine fires. *See also* rescue team. *Nelson.*

miners' right. a. An annual permit from the Government to occupy and work mineral land. *Fay.* b. In California, the right of a miner to dig for precious metals on public lands, occupied by another for agricultural purposes; in Australia, a written or printed license to dig for gold. *Fay.* c. N.S.W. A document showing that the holder is entitled to enter upon certain classes of Crown land to search for gold and minerals and to take possession of such land under certain conditions. It is not a title deed showing that he is the owner of the land, but is a document showing that he has a right to avail himself of the mining laws. *New South Wales, p. 95.*

miners' rules. Rules and regulations proclaimed by the miners of any district relating to the location, recording and the work necessary to hold possession of a mining claim. It was the miners' rules of the early days of the mining industry that were the basis of the present laws. The local mining laws and regulations of 1849 and later are given in vol. 14, 10th

Census of the United States, 1880, compiled by Clarence King. *Fay.*

miner's safety lamp. *See* Davy safety lamp. *Crispin.*

miners salt. An infrequent, local designation for mined rock salt. *Kaufmann.*

miners' self-rescuer. A small pocket form of gas mask for protection against carbon monoxide, contained in a case measuring 1¾ by 3⅝ by 7 inches and weighing 13 ounces by itself or 21 ounces including the case. It is a small canister with a mouthpiece directly attached to it. The wearer breathes through the mouth, the nose being closed by a clip. The canister contains a layer of fused calcium chloride to absorb the water vapor in the air which destroys the efficiency of the other chemical called hopcalite. The self-rescuer affords protection for 30 minutes, so that men surviving an explosion may walk out through a mine atmosphere that contains sufficient oxygen but also a fatal percentage of carbon monoxide. *Lewis, p. 761.*

miner's squib. A small tube filled with fine-grained black powder. May vary in burning time from 25 to 86 seconds, depending upon the grade used. In use, the stemming is tamped around a copper needle reaching back and into the powder charge. After stemming the hole the needle is removed and the remaining hole acts as a passageway for the squib. Upon lighting and the burning of the ignition match the squib assumes a rocket effect and darts back into the hole to ignite the powder charge. *Kentucky, p. 158.*

miners' sunshine. A soft grade of paraffin wax used by miners for burning in lamps. *See also* sunshine. *Fay.*

miner's tent. Usually a triangular tent that is suspended from a tree or set up with one center pole. *Webster, 3d.*

miners' wax. A refined paraffin wax with a melting point of 118° to 120° F. *Compare* sunshine. *Fay.*

miners' wedge. A metallic wedge or plug for splitting off masses of coal. *Standard, 1964.*

miner's weight. The term used in a coal mining lease as the basis for the price per ton to be paid for mining. It is not a fixed, unvarying quantity of mine-run material, but is such a quantity of material as operators and miners may, from time to time, agree as being necessary or sufficent to produce a ton of prepared coal. *Ricketts, I.*

miner's worm. The hookworm, ancylostoma duodenale, which often infests miners and tunnel workers. *Webster 3d. See also* ancylostomiasis.

mine run. a. The entire unscreened output of a mine. *Zern.* Also called run-of-mine. *Fay.* b. The product of the mines before being sized and cleaned. *Hudson.* c. A product of common or average grade. *Webster 3d.*

mine-run coal. Ungraded coal of mixed sizes as it comes from the mine. *Hess.*

mine-run mica. *See* book mica. *Skow.*

minery. a. A place where mining is carried on. *Webster 3d.* b. Mines collectively; a mining district or its belongings; a quarry. *Fay.*

mine-safety car. Same as mine rescue car. *Fay.*

mine salting. *See* salt, c. *Fay.*

mine sample. A small quantity of coal or mineral taken at underground exposures for analysis and laboratory tests. *See also* quartering. *Nelson.*

mine sampler. *See* sampler. *D.O.T. 1.*

Mines and Quarries Act, 1954. The latest Act covering operations at mines and quarries in Great Britain. *Nelson.*

mine scrap. The scrap mica obtained from mining and cobbing the books that will yield sheet mica. Also the mica from deposits that contain no sheet mica. *Skow.*

mine signal system. Designed especially for use in mines, these signal lights installed at individual switches immediately indicate to the motorman whether or not he can safely proceed. Green and amber lights work automatically with the movement of the switches. May be used with locally controlled switches, or with those operated by a central dispatcher. *Bests, p. 373.*

mine skips. Skips, used to bring mined ore to the surface of a mine shaft, can be obtained in various sizes and designs for both vertical and incline shafts. Tipover models and bottom door dump models are available. *Bests, p. 373.*

mine static head. The energy consumed in the ventilation system to overcome all flow head losses. It includes all the decreases in total head (supplied from static head) which occur between the entrance and discharge of the system. *Hartman, p. 78.*

mine superintendent. A colliery manager or group manager. *See also* superintendent. *Nelson.*

mine surveyor. The official at a mine who periodically surveys the mine workings and prepares plans for the manager. In Great Britain, the surveyor must possess a Mine Surveyor's certificate of the Ministry of Power. Formerly, the mine surveyor carried out many of the duties now performed by the planning department. *Nelson.* See surveyor for the mine. *B.S. 3618, 1963, sec. 1.*

mineta. A rock composed chiefly of feldspar and biotite mica, and sometimes with chlorite, quartz, and hornblende. A mica syenite. *Fay.*

mine teamster. In mining, one who drives horses or mules to haul wagons or cars loaded with coal, ore, rock, or slate underground or at the surface of a mine. *D.O.T. 1.*

mine-timber chopper. In bituminous coal mining, one who works in the forest, felling, chopping, and sawing trees to be used for timbering in mines. *D.O.T. 1.*

mine tin. Tin obtained from veins or lodes, as distinguished from stream tin. *Fay.*

mine tons. Gross tonnage of ore including waste and unpayable material. *Beerman.*

mine total head. The sum of all energy losses in the ventilation system. Numerically, it is the total of the mine static and velocity heads. *Hartman, p. 78.*

mine track devices. A variety of track devices to provide maximum safety for haulage trains in mines. Designed to be used in conjunction with switch signals, these devices include electric switch throwers operated by hand contractors on a copper plate, overhead hand controllers, remote control, or trolley contractors. Other safety equipment includes mechanical switches for gaseous or hot mines, derailing switches for trains out of control, and automatic mine-door opening devices. *Bests, p. 372.*

mine tractor. A trackless, self-propelled vehicle used to transport equipment and supplies and for general service work. *ASA C42.85:1956.*

minette. An orthoclase-biotite lamprophyre that consists of biotite and subordinate diopside phenocrysts in a groundmass of orthoclase or sanidine. In some varieties, olivine is an important mineral. Accessory minerals are plagioclase, apatite, sphene, and opaque oxides. *A.G.I.*

minette basin. The source of minette ore, that is, Lorraine, France, Luxembourg, Belgium, and Northern France. *Osborne.*

minette ore. Jurassic ironstone of the Briey Basin and Lorraine, France. *Holmes, 1920.*

mine valuation. Properly weighing the financial considerations to place a present value on mineral reserves. *Nelson.*

mine velocity head. The velocity head at the discharge of the system. Throughout the system, the velocity head changes with each change in duct area or number and is a function only of the velocity of air flow. It is not a head loss. The velocity head for the system must technically be counted a loss, because the kinetic energy of the air is discharged to the atmosphere and wasted. Therefore, it must be considered a loss to the system in determining overall energy loss. *Hartman, p. 78.*

mine ventilating fan. A motor-driven disk, propeller, or wheel for blowing (or exhausting) air to provide ventilation of a mine. *ASA C42.85:1956. See also* ventilation, c. *Nelson.*

mine ventilation system. An arrangement of connecting airways in a mine together with the pressure sources and control devices which produce and govern airflow. *Hartman, p. 158.*

mine viewer. A surveyor of mines. *Standard, 1964.*

mine water. Water pumped from mines usually contains impurities, some of which are in suspension, but the majority being soluble cause the water to be hard. The water often contains corrosive agents such as acids or alkalis. *Cooper, p. 361.*

mine wireman. *See* wireman. *D.O.T. 1.*

minework. Eng. An ironstone mine or workings. *Fay.*

mineworker. A workman in a mine. *Webster 3d.*

mineworks. Ancient subterranean passages or mine excavations. *Standard, 1964.*

ming coal. *See* mingy coal. *Nelson.*

minge; mingy coal. Coal of a tender or friable nature. *Fay.*

mingled ground. Mixed clay and sand or rock. *Arkell, p. 53.*

mingles. Scot. The vertical timbers of the upper part of a pulley frame, on the top of which the pulleys are fixed. *See* maidens. *Fay.*

minguzzite. Oxalate of potassium and ferric iron, $K_3Fe(C_2O_4)_3.3H_2O$, green monoclinic crystals with oxalite-humboldtine, $FeC_2O_4.$-$2H_2O$, in limonite from Elba. *Spencer 21, M.M., 1958.*

mingy coal; ming coal; mosh. Coal of a soft or friable nature. *Nelson.*

miniature atoll. An atoll-shaped coral colony. *Schieferdecker.*

miniature current meter. The passage of current past a probe on each blade of a propeller type, or each cup of a price-type meter can be detected by the change of electrical resistance between that probe and a distant electrode. A voltage pulse is produced as each blade passes the electrode; the pulse rate which depends on the velocity of the current is indicated on a milliammeter. *H&G.*

minicoal. Prepacked coal. *Nelson.*

minimum bend radius. The minimum radius over which metal products can be bent to a given angle without fracture. *ASM Gloss.*

minimum deviation. The position of a prism in relation to a beam of light where the beam is passing through symmetrically, and, as a corollary, with minimum deviation. By measuring the prism angle (A) and the angle of minimum deviation (D), refractive index may be determined from the formula:

$$n=\frac{\sin \frac{1}{2}\,(A+D)}{\sin \frac{1}{2}\,A}$$ *Shipley.*

minimum firing current. As applied to electric blasting caps, the limit below which firing will not occur. *Fraenkel, v. 3, Art. 16:10, p. 5.*

minimum ignition energy. The minimum ignition energy required for the ignition of a particular flammable mixture at a specified temperature and pressure. *I.C. 8137, 1963, p. 76.*

minimum interfacial energy, law of. The tendency of seed crystals to assume a position on previously formed crystals that is the most stable position as far as forces of crystallization are concerned. This law explains a parallel grouping of crystals and the symmetrical or the parallel arrangement of inclusions in large single host crystals. *Hess.*

minimum oxygen content. The U. S. Bureau of Mines and other recognized safety and health agencies recommend 19.5 percent as the minimum oxygen content allowable. *Hartman, p. 17.*

minimum rent. A mine owner acquires the right to work coal by the payment of an annual (or minimum) rent and a royalty to the landowner (the coal or mineral owner). There is no rule regulating the principle upon which a minimum rent is determined, it varies according to circumstances and is a matter of arrangement between the parties. Also called fixed rent. *Nelson.*

minimum wage. The lowest rate of wages payable to the separate classes of underground workers. *See also* abnormal place. *Nelson.*

minimum year. In terrestrial magnetism, the year of minimum magnetic storm activity. *Hy.*

mining. a. The science, technique, and business of mineral discovery and exploitation. Strictly, the word connotes underground work directed to severance and treatment of ore or associated rock. Practically, it includes opencast work, quarrying, alluvial dredging, and combined operations, including surface and underground attack and ore treatment. *Pryor, 3.* b. Process of obtaining useful minerals from the earth's crust, includes both underground excavations and surface workings. *Lewis, p. 20.* c. Includes placer mines in which the workings are open, and therefore the question whether an enterprise is mining or not cannot be determined by an inquiry as to whether the workings are open or underground. *Ricketts, I.* d. The industry which supplies the community with its coal, mineral, or metal raw materials. *Nelson.* e. The art or practice of operating mines profitably. *Hoov., p. 1.* f. Usually, the removal of soil or rock having value because of its chemical composition. *Nichols.* g. The process or business of making or of working mines. *Webster 3d.* h. Ark. The excavation made in undermining a coalface. *Fay.* i. Ark. A soft band of dirt in or beneath a coal seam in which a preliminary excavation can be readily made. *See also* mining ply. *Fay.* j. Reduction of ore, whether mined or purchased, and refining the products thereof, is mining, within the statute permitting the cutting of timber for mining purposes. *Fay.* k. Designating areas or regions where mining is carried on. *Craigie, v. 3, p. 1525.* l. Designating persons working in or having to do with mines. *Craigie, v. 3, p. 1525.* m. Designating a community, settlement, etc., adjacent to a mine or mines. *Craigie, v. 3, p. 1525.*

mining advancing. A method of mining by which the ore or coal is mined as the excavation advances from the shaft or main opening. *Compare* mining retreating. *Fay.*

mining camp. a. A colony of miners settled temporarily near a mine or a goldfield. *Standard, 1964.* b. A term loosely applied to any mining town. *Fay.*

mining captain. One in charge of mining operations. *Craigie, v. 3, p. 1525.*

mining case. A frame of a shaft, or gallery, composed of four pieces of plank. *Standard, 1964.*

mining claim. a. That portion of the public mineral lands which a miner, for mining purposes, takes and holds in accordance with mining laws. *Fay.* b. A mining claim is a parcel of land containing precious metal in the soil or rock. A location is the act of appropriating such parcel of land according to law or to certain established rules. *See also* claim; lode mining claim; placer claim; location. *Fay.* c. In the mining act, that portion of a vein or lode and of the adjoining surface, or of the surface and subjacent material to which a claimant has acquired the right of possession by virtue of a compliance with such statute and the local laws and rules of the district within which the location may be situated. Independent of acts of Congress providing a mode for the acquisition of title to the mineral lands of the United States, the term has always been applied to a portion of such lands to which the right of exclusive possession and enjoyment by a private person or persons, has been asserted by actual occupation, or by a compliance with the local mining laws, or district rules. *Ricketts, I.* d. Distinction between mining claim and location is that they are not always synonymous and may often mean different things, as a mining claim may refer to a parcel of land containing precious metal in its soil or rock, while location is the act of appropriating such land according to certain established rules. A mining claim may include as many adjoining locations as the locator may make or purchase, and the ground covered by all, though constituting what he claims for mining purposes will constitute a mining claim and will be so designated. *Ricketts, I.* e. Title issued by the government concerned to an individual or group, which grants him the right to exploit the mineral wealth in a specified area by approved methods in accordance with the ruling laws and regulations. *Pryor, 3.* f. The marking out and acquisition of land for mining purposes. *See also* concession system. *Nelson.*

mining company. A group organized for carrying on mining operations. *Craigie, v. 3, p. 1525.*

mining compass. An instrument that gives qualitative indications of anomalies of the magnetic field. *Schieferdecker.*

mining debris. The tailings from hydraulic mines. Also called debris. *Fay.*

mining dial. *See* dial. *C.T.D.*

mining diseases. *See* ankylostomiasis; anthracosis; beat elbow; beat hand; beat knee; caisson disease; infective jaundice; nystagmus; pneumoconiosis; silicosis; simple silicosis.

mining district. a. A section of country usually designated by name, having described or understood boundaries within which mineral is found and which is worked under rules and regulations prescribed by the miners therein. There is no limit to its territorial extent and its boundaries may be changed if vested rights are not thereby interfered with. *Ricketts, I.* b. A settlement of miners organized after the plan that, in the first years of mining in the western part of the United States, the miners, in the independence of all other authority, devised for their own self-government. *Fay.*

mining ditch. A ditch for conducting water used in mining. *Craigie, v. 3, p. 1525.*

mining easement. *See* easement, a. *Fay.*

mining engine. a. Any engine used in mining, as a pumping engine or mining locomotive. *Standard, 1964.* b. *See* man machine. *Fay.*

mining engineer. a. A man qualified by education, training, and experience in mining engineering. *Nelson.* b. If qualified and of standing in his profession, a trained engineer with knowledge of the science, economics, and arts of mineral location, extraction, concentration and sale, and the administrative and financial problems of practical importance in connection with the profitable conduct of mining. Usually he is a specialist in one or more branches of his work. His activities may include prospecting, surveying, sampling and valuation, technical underground management, milling, assaying, ventilation control, layout of workings and plant, geological examination, and company administration. *Pryor, 3.* c. One versed in, or one who follows, as a calling or profession, the business of mining engineering. Graduates of technical mining schools are given the degree of engineer of mines and authority to sign the letters E.M. after their names. The letters M.E. stand for mechanical engineer, when given by a school, but are often used by men engaged in mining who lack scholastic degrees, as an abbreviation for mining engineer, or mining expert. *Fay.* d. In anthracite, bituminous, and metal mining, one who makes preliminary surveys of coal deposits or undeveloped mines and plans their development; examines deposits or mines to determine whether they can be worked at a profit, making geological and topographical surveys to determine location, size, and slope of deposits and character of surrounding strata; lays out plans for development of property, such as shaft, drift, or slope (mine entrance) location, breaker or tipple location, water supply, and power requirements; evolves method of mining best suited to character, type, and size of deposits, including type of machinery and equipment to be used; supervises all mining operations. Also called mine analyst; mine expert. *D.O.T. 1.*

mining engineering. That branch of engineering chiefly concerned with the discovery, development, and exploitation of coal, ores and minerals. The term also embraces the cleaning, sizing and dressing of the product. *Nelson.*

mining explosives. High explosives used for mining and quarrying can be divided into four main classes, namely: (1) gelatins; (2) semigelatins; (3) nitroglycerin powders, and (4) non-nitroglycerin explosives. *McAdam II, p. 28.*

mining floor. *See* square-set stopes. *Nelson.*

mining gas mask. A filter-type respirator consisting of a face piece, connecting tube, and a canister, and used as a protective device against carbon monoxide gas and smoke. The canister contains the filtering materials which remove the toxic substances from the air as it is inhaled. *McAdam, p. 59.*

mining geology. a. The study of geologic structures and particularly the modes of formation and occurrence of mineral deposits and their discovery. *Nelson.* b. In coal mining, the study of rock formations, particularly with reference to the carboniferous system; the mode of formation of coal seams, their discovery and correlation. *Nelson. See also* geology.

mining ground; mining land. No land can be a mining claim unless based upon a location; otherwise it may be mining ground or a mine. For instance, the bed of a navigable river is not subject to mining location, but if mining is conducted thereon by dredging, it is mining ground; or, where land is covered by an agricultural patent and worked for its mineral deposits, it is mining ground and not a mining claim. Hence, land from which a mineral substance is obtained from the earth by the process of mining may, with propriety, be called mining ground or mining land, although the terms valuable for minerals and valuable for mineral deposits are not equivalent to the term mining ground. *Ricketts, I.*

mining hazards. The dangers peculiar to the winning and working of coal and minerals. These include collapse of ground, explosion of released gas, inundation by water, spontaneous combustion, inhalation of dust and poisonous gases, etc. *Nelson.*

mining head. The mechanism on a continuous mining machine that breaks down the coal. *Bureau of Mines Staff.*

mining hole. A hole for blasting purposes. *Standard, 1964.*

mining lease. A legal contract for the right to work a mine and extract the mineral or other valuable deposits from it under prescribed conditions of time, price, rental, or royalties. Also called mineral lease. *Webster 3d.*

mining locomotive. A small locomotive for use in underground haulage, sometimes consisting of a car bearing a powerful electric motor, built very low and operated through a trolley. *Standard, 1964.* May also be operated by electricity from batteries. *Bureau of Mines Staff.*

mining machine. A coal-cutting machine. *Standard, 1964.*

mining machine operator. *See* machine miner. *D.O.T. 1.*

mining-machine-operator helper. *See* machine helper. *D.O.T. 1.*

mining machine truck. A truck used for transporting shortwall mining machines. Track-mounted trucks are necessarily limited in use to sections employing track. Crawler-type trucks use a platform mounted on a caterpillar chassis, and are capable of transporting the cutting machine without need of track and without benefit of ropes. *Jones.*

mining methods. The systems employed in the exploitation of coal seams and ore bodies. The method adopted depends on a large number of factors, mainly, the quality, shape, size, and depth of the deposit; accessibility and capital available. *See also* coal mining methods; metal mining; stoping methods. *Nelson.*

mining ore from top down. *See* top slicing and cover caving. *Fay.*

mining partnership. a. A legal partnership in which the partners agree to conduct mining operations and to share profits and losses, which is recognized in many states as having the character of an ordinary partnership except that it exists only during the existence of actual mining operations, which upon the death or bankruptcy of a partner is not dissolved, and in which upon the sale of a partner's interest his assignee becomes a partner regardless of the consent of the other partners. *Webster 3d.* b. A partnership in which two or more men join together for the purpose of exploiting a mining claim on equal shares. *Hoov., p. 238.* c. A partnership in mining business in which one partner may sell his partnership interest, and bring his purchaser into the partnership without making a dissolution. *Standard, 1964.* d. Under the Civil Code of California, section 2511, a mining partnership exists when two or more persons acquire a mining claim and actually engage in working the same. The actual working of the mine by the joint owners is essential to a mining partnership. *Fay.*

mining ply. A soft, thin, interstratified portion of a coalbed. In the Pittsburgh seam of western Maryland it is 3 to 6 inches thick, and it is in this that the machine does the undercutting. *See* mining, i. *Fay.*

mining property. Property, especially land, valued for its mining possibilities. *Craigie, v. 3, p. 1525.*

mining purposes. The phrase mining purposes as used in connection with mill-site locations, is very comprehensive, and may include any reasonable use for mining purposes which the quartz lode mining claim may require for its proper working and development. This may be very little, or it may be a great deal. The locator of a quartz lode mining claim is required to do only one hundred dollars worth of work each year until he obtains a patent therefor. But if he does only this amount, and used the mill site in connection therewith, is not this the use of a mill site for mining purposes in connection with the mine? Who shall prescribe what shall be the kind and extent of the use under the statute so long as it is used in good faith in connection with the mining claim for a mining purpose. *Ricketts, I.*

Mining Qualifications Board. A board set up in Great Britain to examine candidates for certificates of competency, which are granted by the Minister of Power on the recommendation of the board. It consists of a chairman and from seven to ten other members, including persons having experience of mining, education or organization, all appointed by the Minister for not more than five years. *Nelson.*

mining recorder. In a mining camp, a person selected to keep a record of all mining claims and properties. *Mathews, v. 2, p. 1059.*

mining retreating. A process of mining by which the ore, or coal, is untouched until after all the gangways, etc., are driven, when the work of extraction begins at the boundary and progresses toward the shaft. *Fay.*

mining right. Upon a specific piece of ground, a right to enter upon and occupy the ground for the purpose of working it, either by underground excavations or open workings, to obtain from it the mineral ores which may be deposited therein. *Ricketts, I.*

mining rod. A divining rod. *Craigie, v. 3, p. 1525.*

mining rush. A rush or stampede to an area where gold was, or was thought to be, plentiful. *Mathews, v. 2, p. 1059.*

mining share. A share of mining stock. *Craigie, v. 3, p. 1525.*

mining shark. A mining expert. *Craigie, v. 3, p. 1525.*

mining shield. A cover or canopy for the protection of men and machines at the face of a mechanized coal heading. Hydraulic rams telescope and steer the shield forward as the face advances. It enables continuous miners to operate with greater safety. Developed by the U.S. Bureau of Mines. *Nelson.*

mining sluice. An artificial channel or passage for water used in mining. *Compare* mining ditch. *Craigie, v. 3, 1525.*

mining stock. Stock issued by a mining company. *Craigie, v. 3, p. 1525.*

mining stream. A stream made use of in mining. *Craigie, v. 3, p. 1525.*

mining theodolite. A theodolite having particular features of design which make it suitable as an underground surveying instrument, for example, incorporating an arrangement for the centering movement to be above the foot screws. *See also* auxiliary telescope. *B.S. 3618, 1963, sec. 1.*

mining time. Half an hour faster than sun time. *Mathews, v. 2, p. 1059.*

mining title. A claim, exclusive prospecting license, concession, right, or lease. A grant under laws and mining regulations to a person or group of approved persons of right to develop and exploit a properly delineated area for its mineral wealth. *Pryor, 3.*

mining town. A town that has grown up adjacent to a mine or mines. *Craigie, v. 3, p. 1525.*

mining transit. *See* transit. *Staley, p. 4.*

mining-type visibility meter. An instrument to facilitate observation of the essential elements of visual tasks in coal mines. It is a brightness meter in which the comparison field is illuminated by a cap lamp headpiece attached outside the instrument. No internal electrical circuit exists other than that which connects the photocell to the microammeter and the meter can therefore be used anywhere in a safety-lamp mine without restrictions. *Roberts, II, p. 103.*

mining under. The act of digging under coal or in a soft strata in coal seams. *Fay.*

mining width. The minimum width necessary for the extraction of the ore regardless of the actual width of ore-bearing rock. *A.G.I. See also* stoping width.

mining with self-filling. *See* controlled caving. *Stoces, v. 1, p. 315.*

minion. The siftings of iron ore after calcination. *Standard, 1964.*

minium. Red oxide of lead, $2PbO.PbO_2$, containing 90.6 percent lead. *Sanford.*

minnesotaite. A hydrous silicate of ferrous iron (magnesium, etc.), $(OH)_{5.8}(Fe'',Mg)_{5.5}(Si,Al,Fe''')_8O_{18.5}$, with the crystal structure of talc and regarded as an iron talc, of abundant occurrence in iron ores in Minnesota. *Spencer 17, M.M., 1946.*

Minol. Explosive, used in naval depth charges, consisting of TNT, ammonium nitrate, and aluminum powder. *Bennett 2d, 1962.*

minophyric. Minutely porphyritic rocks with phenocrysts whose longest diameters are between 1 and 0.2 millimeter. *Fay.*

minor constituents. Those chemical elements present in seawater which together comprise approximately 0.1 percent of the total known dissolved solid constituents. Nearly all of the elements occur in seawater, although most are present in extremely small amounts. *Hy.*

minor elements. Synonym for trace elements. *A.G.I.*

minor intrusions. The collective name for igneous instrusions of relatively small size, compared with plutonic (major) intrusions. They comprise dikes, sills, veins, and small laccoliths. The injection of the minor intrusions constitutes the dike phase of a volcanic cycle. *C.T.D.*

minor mine disaster. A minor mine disaster is defined by the U.S. Bureau of Mines as any accident coming within one of the following categories: (1) A mine accident (not an explosion or fire) causing the death of less than five persons and considerable property damage; (2) A mine explosion or ignition causing injury to one or more persons or considerable property damage but no loss of life; (3) A mine explosion or ignition resulting in the death of less than five persons; (4) A mine fire causing injury to one or more persons or considerable property damage but no loss of life; and (5) A mine fire resulting in the death of less than five persons. *Compare* major mine disaster. *Bureau of Mines Instructions for Disaster, Fatal-Accident, and Miscellaneous Health and Safety Reports, April, 1966, Chapter 3.1, p. 24.*

minor principal plane. The plane normal to the direction of the minor principal stress. *ASCE P1826.*

minor principal stress. The smallest (with regard to sign) principal stress. *ASCE P1826.* Equals least principal stress. *Bureau of Mines Staff.*

Minton oven. A down-draught type of pottery bottle oven. *Dodd.*

minus mesh. Portion of a powder sample passing through a given screen. *Bennett 2d, 1962.*

minus minerals. Minerals (such as garnets) whose molecular volumes are less than the sum of the molecular volumes of the constituent oxides. In the case of allotropic modifications of the latter, the more condensed form, having the smaller molecular volume, is assumed for the calculation. *Holmes, 1928.*

minus sieve. In powder metallurgy, the portion of a powder sample which passes through a standard sieve of specified number. Contrast with plus sieve. *ASM Gloss.*

minus sight. *See* foresight, d. *Fay.*

minus station. Stakes or points on the far side of the zero point from which a job was originally laid out. *Nichols.*

minute of arc. A unit of angular measure equal to the 60th part of a degree and containing 60 seconds of arc. *Webster 3d.*

minverite. A basic intrusive rock, in essentials a dolerite, containing a brown, soda-rich hornblende; named from St. Minver, Cornwall, England. *C.M.D.*

miny. Of, resembling, or having the characteristics of a mine. *Webster 3d.*

minyulite. A white, basic, hydrous fluophosphate of potassium and aluminum, $2K(OH,F).2Al_2O_3.2P_2O_5.7H_2O$; orthorhombic. Radiating groups of needles. From Dandaragan, Western Australia. *English.*

Miocene. The fourth of the five epochs into which the Tertiary period is divided. Also, the series of strata deposited during that epoch. *A.G.I.*

mirabilite; Glauber's salt. A hydrous sodium sulfate, $Na_2So_4+10H_2O$. *Sanford.*

Mirac process. Trade name for a process for the treatment of steel claimed to permit one-coat enameling. *Dodd.*

miradero. Sp. Inlier. *Hess.*

mire. A small, muddy marsh or bog; wet, spongy earth; soft, deep mud. *A.G.I.*

mire black. Ire. Mud peat. *Tomkeieff, 1954.*

mirror black. Having a lustrous black gloss; said of pottery. *Standard, 1964.*

mirror plate. Plate glass suitable for mirrors. *Standard, 1964.*

mirror stone. Muscovite. *Fay.*

miscelle (part). A colloidal aggregate of molecules present in aqueous solutions of many soaps and dyestuffs. *Pryor, 2.*

mischio marble. A violet-red breccia from Serravezza, Italy. Also known as African breccia (breche Africaine). *Fay.*

mischmetal. A natural mixture of the rare-earth metals cerium, lanthanum, and didymium. The waste matter from monazite sand after the extraction of thoria may contain large quantities of ceria, lanthana, didymia, yttria, and other substances. This is reduced to the metallic state by converting the oxides to chlorides, and then recovering the metal by electrolysis. The material obtained is an alloy containing about 50 percent of cerium and 45 percent of lanthanum and didymium. It is used in making pyrophoric alloys and as a getter in electronic tubes. *Henderson.*

miscible. Refers to liquids and their ability to mix. Liquids that are not miscible separate into layers according to their specific gravity. *Compare* immiscible. *Webster 3d; Bureau of Mines Staff.*

misenite. Probably acid-potassium sulfate, $HKSO_4$. In silky fibers of a white color. *Fay.*

miser. A tubular well-boring bit having a valve at the bottom, and a screw for forcing the earth upward. *Standard, 1964.* Also spelled mizer. *Fay.*

miserite. $KCa_4Si_5O_{13}(OH)_3$, a pink, fibrous (orthorhombic?) alteration product of wollastonite in metamorphosed shale from Arkansas. Previously described as natroxonotlite. *Spencer 19, M.M., 1952.*

misfire. a. An explosive charge in a drill hole which has partly or completely failed to explode as planned. Causes include unskilled charging, defective explosive, detonator or fuse, broken electric circuit or—most dangerous—cutting off of part or all of the charge through lateral rock movement as other holes in the vicinity are fired. Stringent safety precautions cover procedure in minimizing these risks and in dealing with known or suspected misfires. Smoldering fuse may delay explosion, causing a hangfire, so return to workings after a suspected failure is necessary. Another main cause of accident is drilling into or dangerously near a socket—an apparently empty drill hole. *Pryor, 3. See also* hangfire. b. *See* missed hole. *Fraenkel.* c. A failure to establish an arc between the main anode and cathode during a scheduled conducting period. *Coal Age, 1.*

misfire hole. *See* missed hole.

mishandling. Damage resulting from the lack of proper care in the handling of the enamelware in the shop. *Hansen.*

mismatch. Error in register between forged surfaces formed by opposing dies. *ASM Gloss.*

mismatched lumber. Worked lumber that does not fit tightly at all points of contact between adjoining pieces, or in which the surfaces of adjoining pieces are not in the same plane. *Crispin.*

mispickel. Arsenical pyrites; sulfide of iron and arsenic; FeAsS; occurs in tin, copper and especiallly lead and silver veins. Mispickel is a silver-white or steel-gray mineral yielding a dark grayish-black powder on being ground. Dense white fumes (poisonous), forming the white arsenic of commerce, are obtained by roasting. *Nelson.*

mispickled. Faultily pickled ware. *ACSB-3.*

misplaced material. a. In mineral processing, particularly screen products and tailings, material which has reported in the wrong section. *Pryor, 3.* b. Material wrongly included in the products of a sizing or density separation, that is, material which has been included in the lower size or specific gravity product but which itself has a size or specific gravity above that of the cut point, or vice versa. Its weight may be expressed as a percentage of the product or of the feed. Also called tramps (undesirable usage). *B.S. 3552, 1962.* c. In sizing and screening, undersize contained in the overflow, or oversize contained in the underflow. *B.S. 3552, 1962.* d. In cleaning, material of specific gravity lower than the separation density which has been included in the high density product, or material of specific gravity higher than the separation density which has been included in the low density product. *B.S. 3552, 1962.*

misrun. A casting not fully formed, resulting from the metal solidifying before the mold is filled. *ASM Gloss.*

missed hole; misfire; misfire hole. A drill hole charged with explosives, in which all or part of the explosive has failed to detonate. *Fraenkel.*

missed round. A round in which all or part of the explosive has failed to detonate. *Fraenkel.*

missed sizes. Undersize in the coal after preparation due to incomplete screening. *Mitchell, p. 178.*

missile ceramics. Ceramic products that are used in missiles and rockets (ceramic materials used in nose cones and rocket throats must withstand high temperatures and have good erosion resistance). *Bureau of Mines Staff.*

mission tile. A name sometimes applied to roofing tile of semicircular cross section. *Fay.*

Mississippian. Formerly the lower of two epochs into which the Carboniferous was subdivided. Recently, the Am. Comm. Strat. Nomenclature recommended advancement to period rank, and that is now accepted by the U.S. Geological Survey. In the United States, the Mississippian is fifth of seven periods in the Paleozoic era. Also, the system of rocks found during this period. *A.G.I.*

Missourian. Upper middle Pennsylvanian. *A.G.I. Supp.*

missourite. Plutonic equivalent of olivine-leucitite basalt or olivine-leucite basalt. Major diopside, leucite, and olivine with minor analcite and biotite, accessory apatite, and opaque oxides. *A.G.I.*

mist. *See* fog. *Pryor, 3.*

Mistox. Lauryl pentachlorphenol in spirit. A hose that is not rubber-lined may be proofed against mildew attack by immersion in a 1-percent solution of Mistox. *Sinclair, I, p. 282.*

mist projector. An appliance to allay dust and fume during blasting operations in a tunnel by means of a mist-spray. The projector is sometimes mounted on top of the drill carriage and connected to the compressed-air manifold by a short length of hose. The spray acts on the scent-spray principle and draws water from a tank. Prior to firing a round of shots, the drill carriage is run back some 15 yards from the face and the projector is started up and left running until the men return after blasting. *See also* atomizer; Hay mist projector. *Nelson.*

mistress. a. Scot. A waterproof cover for miners when sinking in a wet shaft. *Fay.* b. N. of Eng. A wooden or tin box, having the front open, in which a candle is carried in a pit. *Fay.*

misy. a. In Egypt, a synonym for copiapite. *Fay.* b. Various ill-defined sulfates of iron. *Hey 2d, 1955.*

mit Abbreviation for milled in transit. *Zimmerman, p. 69.*

Mitchell slicing system. Developed in Arizona for mining ground in blocks not larger than 20 by 30 feet in plan and about 50 to 60 feet high. The ore should be free from waste and the pressure not too heavy. The block is first freed on two sides and one end (leaving the rest of the block as a pillar) by a single row of square sets carried up to the capping above. Long caps, supported by inclined bracing, are used across the top of the pillar to support the roof. The pillar is then mined in horizontal slices from the top down. The ore runs into chutes made by lining vertical rows of square sets with lagging. This is a cheaper method of mining than square setting. *Lewis, p. 506. Compare* sublevel stoping.

miter box. A device used as a guide in sawing miter joints. *Crispin.*

miter cut. In glassmaking, an angular groove, as in plate glass, having a bottom angle of approximately 90°. *Standard, 1964.*

mitered tile. Roofing tile cut off obliquely, so as to fit in upright work, such as dormer corners. It also includes pieces flanged at right angles so as to cover such corners. *Fay.*

miter gear. *See* bevel gear, a. *Long.*

miter iron. A fagot of iron bars of cylindrical section arranged about a central circular bar, ready for forging. *Standard, 1964.*

miter sill. *See* lock sill. *Ham.*

mitis castings. a. The process of making castings of wrought iron, the melting point of which has been lowered by a slight addition of aluminum. *Standard, 1964.* b. A casting made by this process. *Standard, 1964.*

mitridatite. Hydrated phosphate of calcium and ferric iron, as earthy yellowish-green nodules and veinlets in iron ore in the Kerch Peninsula, Crimea, U.S.S.R. *Spencer 15, M.M., 1940.*

M.I.T. sampler. A single-tube, drive-type, soil-sampling barrel especially adapted to sampling deposits of plastic clay where a minimum 5-inch-diameter sample is required. A loop or snare of piano wire is inserted in a groove inside the cutting shoe with the free end of the wire extending through a slot on the side of the sampler to the surface. When pulled, the wire cuts the sample off at the bottom of the cutting shoe. *Long.*

mitscherlichite. A greenish-blue, hydrous chloride of potassium and copper, $K_2CuCl_4.2H_2O$; tetragonal; minute crystals. From Vesuvius, Italy. *English.*

mi^2 Abbreviation for square mile. *BuMin Style Guide, p. 62.*

mix. a. The proportion as specified by volume or by weight of the materials, including water, making a batch of concrete, mortar, or plaster. *Ham.* b. A batch after it has been mixed. *Dodd.*

mixed. Drill diamonds ranging from 23 to 80 per carat in size. *Long.*

mixed blast process. A modification of the basic Bessemer process in which all the nitrogen is removed from the blast, the blast being made up of a mixture of oxygen and carbon dioxide or oxygen and superheated steam. The oxygen and superheated steam blast is claimed to be the more efficient, the final nitrogen content of the metal being brought to a mean level of 0.0028 percent. *Osborne.*

mixed cements. A product obtained by mixing, or blending, either portland, natural, or pozzolana cement with one another or with other inert substances. *Zern, p. 145.*

mixed dust. Dust prepared for testing in the mine by mixing coal dust and inert dust in predetermined proportions. The mixture may also contain water, and different sizes of coal dust may be mixed to produce some desired intermediate size. *Rice, George S.*

mixed explosion. One in which each ingredient, firedamp and coal dust, are present below their lower limits, but in combination product sufficient heat of combustion to propagate an explosion. *Sinclair, I, p. 261.*

mixed explosives. Such explosives consist of an intimate mechanical mixture of substances which consume and generate oxygen but are not in themselves explosive. To this group belong inorganic nitrates, chlorates, and perchlorates. Most important is ammonium nitrate. *Fraenkel, v. 3, Art. 16:01, p. 29.*

mixed face. In tunneling, digging in dirt and rock in the same heading at the same time. *Nichols.*

mixed-feed kilns. Upright lime kilns in which the fuel (coal) is mixed and burned with the limestone charge. *Mersereau, 4th, p. 235.*

mixed-flow fan. A mine fan in which the flow is both radial and axial. The Schicht fan is of this type and has the advantage that it can produce a high water gage with a single stage. This fan, however, is not well suited to mines where a large change in equivalent orifice may occur. *See also* axial-flow fan; radial-flow fan. *Nelson.*

mixed-flow turbine. An inward flow, reaction-type water turbine, in which the runner vanes are so shaped that they are acted on by the water pressure both axially and radially. *Ham.*

mixed-in-place method. *See* road-mix method. *Pit and Quarry, 53rd, Sec. E, p. 70.*

mixed-layer clay mineral. Clay consisting of micaceous grains with two different minerals in layers regularly or randomly interstratified; the layers most common are differently hydrated. *A.G.I. Supp.*

mixed-layer mica. *See* clay mineral. *A.G.I. Supp.*

mixed ores. Ores containing both oxidized and unoxidized minerals. *See also* oxidized ores; sulfide ore. *Nelson.*

mixed peat. Peat consisting of alternating layers of material of distinct origin. *Tomkeieff, 1954.*

mixed tide. Tide in which the presence of a diurnal wave produced a large inequality in either the high or low water heights, with two high waters and two low waters usually occurring each tidal day. This term is usually applied to the tides intermediate to those predominantly semidiurnal and those predominantly diurnal. *Hy.*

mixer. a. An apparatus used to thoroughly mix water with drilling-mud ingredients. Also called atomizer; mud mixer. *Long.* b. In the clay industries, the usual types of mixer are: (1) batch-type mixer, operates by rotating arms; (2) shaft mixer, a continuous mixer for wet or plastic material which is fed into an open trough along which it is propelled and mixed by one or two rotating shafts carrying blades; and (3) pug mill, a shaft mixer with a closed barrel instead of an open trough; the term pug mill should not be confused with pug. *See also* pug. *Dodd.* c. *See* agitator. *Nelson.*

mixer cone. A funnel-shaped hopper attached to the body of a mud mixer into and by means of which the dry, powdered, drill-mud ingredients are fed into the mud mixer. *Long.*

mixer furnace. *See* hot metal mixer. *Dodd.*

mixer runner. *See* concrete mixer operator. *D.O.T. 1.*

mix-house man. One who mixes sintered lead or zinc ore with such materials as pulverized coal and coke, salt, skimmings, water, and chemical solutions preparatory to smelting. Also called mixer operator. *D.O.T. Supp.*

mixing. a. In powder metallurgy, the thorough intermingling of powders of two or more different materials (not blending). *ASM Gloss.* b. An instrumentation technique used in seismograph recording in which a certain portion of the energy from each amplifier channel is fed to the adjacent channels giving results somewhat analogous to those obtained from the use of multiple geophones. *A.G.I.*

mixing chamber. The part of a torch in which the gases are mixed. *ASM Gloss.*

mixing man. *See* concrete mixer operator. *D.O.T. 1.*

mixing-mill operator. *See* pug-mill operator. *D.O.T. 1.*

mixing-pan tender. *See* mix-house man. *D.O.T. Supp.*

mixing pit. A pit in which drill mud is mixed and stored until the mud is cured and needed for use as a drill circulation fluid. *Long.*

mix-in-place. A common soil stabilization method in which the soil on the site is first pulverized, then mixed with an admixture or stabilizing agent, compacted and, if necessary, surfaced. All the work is carried out on the site. *Nelson. Compare* plant mix.

mixite. An emerald-green to blue-green acicular mineral, $20CuO.Bi_2O_3.5As_2O_5.22H_2O$; Mohs' hardness, 3-4; specific gravity, 3.79; from tintic district, Utah. *Larsen, p. 74.*

mix-metal; misch metal. Cerium alloy (55 to 65 percent) containing rare-earth metals and iron. *Bennett 2d, 1962.*

mixture. A commingling in which the ingredients retain their individual properties or separate chemical nature; if chemically combined, it is a compound. *See also* mechanical mixture. *Standard, 1964.*

miyashiroite. The hypothetical amphibole end-member, $Na_3Mg_3Al_3(Si_7Al)O_{22}(OH)_2$. *Hey, M.M., 1964; Fleischer.*

mizer. The chief tool used in certain systems of sinking the cylinders of small shafts through water-bearing strata, to remove the ground from beneath them. *See also* miser. *Fay.*

mizzonite. One of the series of minerals forming the scapolite groups, consisting of a mixture of the meionite and mariolite molecules. It includes those minerals with 54 to 57 percent silica, and occurs in clear crystals in the ejected masses on Mount Somma, Vesuvius, Italy. Also called dipyre; dipyrite. *C.M.D.*

mkg Abbreviation for meter-kilogram. *BuMin Style Guide, p. 60.*

mks Abbreviation for meter-kilogram-second (system). *BuMin Style Guide, p. 60.*

ml a. Abbreviation for milliliter. *BuMin Style Guide, p. 60.* b. Abbreviation for mixed lengths. *Zimmerman,* p. 70.

mL Abbreviation for millilambert. *BuMin Style Guide, p. 60.*

mld Abbreviation for minimum lethal dose. *Zimmerman, p. 70.*

mm Abbreviation for millimeter. *BuMin Style Guide, p. 60.*

Mmcf One million (one thousand thousand) cubic feet. *Williams.*

MM diamonds. Synonym for manmade diamonds. *Long.*

mmf Abbreviation for micromicrofarad (one-millionth of one-millionth farad or 10^{-12} farad. Also abbreviated mmfd, or μμf. Also abbreviation for magnetomotive force. *Zimmerman, p. 69; Webster 3d; BuMin Style Guide, p. 60.*

mm^2 Abbreviation for square millimeter. *BuMin Style Guide, p. 62.*

Mn Chemical symbol for manganese. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

MN Abbreviation for magnetic north. *Zimmerman, p. 65.*

mo. A term of Swedish origin applied to glacial silts or rock flour having little plasticity. *Stokes and Varnes, 1955.*

Mo Chemical symbol for molybdenum. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

moat. a. A ditch or deep trench. To surround with a ditch. *Fay.* b. Scot. To puddle; to cover up the mouth of a pit or other opening so as to exclude air in the event of an underground fire. *Fay.*

moating. A backing of clay, as for the masonry lining of a shaft. *Standard, 1964.*

mobby. S. Staff. A leathern girdle, with a small chain attached used by the boys who draw bowks (buckets or tubs). *Fay.*

mobile belt. An elongated zone of the earth's crust subjected to relatively great structural deformation. *Schieferdecker.*

mobile conveyor. A hand-loaded, hoist-operated hauler used principally in certain central Pennsylvania coal mines. It is essentially a chain-and-flight conveyor of exceptional width, with high sideboards, mounted on wheels for operation on mine track, with motive power supplied by a hoist mounted on the chassis of the machine. The conveyor chain and flights can be moved in the bed of the machine to assist in loading or unloading. The hoist rope can be attached to props at the face and near the dumping point to provide anchorage when the conveyor is moved. *Jones.*

mobile crane. A crane driven by petrol, diesel, or electric motor, traveling on crawler tracks, pneumatic tires or solid rubber tires, and capable of moving in any direction under its own power. *Ham.*

mobile drill. A drill unit mounted on wheels or crawl-type tracks to facilitate moving. *Long.*

mobile equilibrium. Van Hoff's law (1884) shows that a temperature rise induces an endothermic change in the equilibrium constant, and fall in temperature an exothermic change. *Pryor, 3.*

mobile equipment. Applied to all equipment which is self-propelled or which can be towed on its own wheels, tracks, or skids. *Nelson.*

mobile filling. Filling which is supplemented only from above, and which sinks of its own accord, filling the mined-out rooms. This is achieved generally by sinking a vertical shaft alongside the orebody, and from the shaft crosscuts are made in the orebody and connected by winzes. From these auxiliary crosscuts are driven, dividing the deposit into slices which are mined simultaneously in advance cuts. The mined-out room is filled with waste, which slides down of its own accord and fills the room. The filling is continuously supplemented from above. The advance cuts hold it, and thus protect the part which is actually being mined. *Stoces, v. 1, p. 278.*

mobile hoist. A platform hoist which is mounted on a pair of pneumatic-tired road wheels, so that it can be towed from one site to another. This type of hoist has been developed for use in house and flat construction. *Ham.*

mobile loader. A self-propelling machine capable of lifting coal off the bottom and placing it in a mine car, conveyor, or other means of transportation. *Jones.*

mobility. a. The tendency of an element to move in a given geochemical environment. *Hawkes.* b. The rate of change of flow of a plastic material with changing pressure. *Hansen.*

mobilometer. An instrument which has become very popular for the determination of the mobility of yield values of enamels. The principle upon which the Gardner mobilometer operates, is that of forcing a disk down through the liquid enamel slip, which is contained in a cylinder. Loading the disk with known weights controls the force and the rate of movement is timed with a stopwatch. *Hansen.*

mobot. An underwater robot being developed for undersea salvage operations. *Hy.*

Mocha pebble. Same as moss agate; Mocha stone. *Standard, 1964.*

Mocha stone. Same as moss agate. *Standard, 1964. See also* moss agate. *Fay.*

Mocha ware. Earthenware originally for table use and variously decorated (as with brush patterns or bandings). Produced in the early 19th century by Staffordshire, England, potteries. *Webster 3d.*

mock acid gold. *See* acid gold. *Dodd.*

mock lead. A Cornish term for zinc blende; also called wild lead. *Fay.*

mock ore. Same as sphalerite. *Standard, 1964.*

mock platinum. An alloy of 8 parts brass and 5 parts zinc. *Standard, 1964.*

mock silver. A white alloy of copper, tin, nickel, zinc, etc., of the same class as britannia metal; pewter. *Fay.*

mock-up. Assembly before shipment of engineering plant for checking purposes or customer demonstration. *Pryor, 3.*

mock vermilion. A basic chromate of lead. *Fay.*

Modder Deep. *See* Venturi blower. *Roberts, I, p. 223.*

mode. a. In geology, mineral composition of rock expressed as percentages of its constituent minerals. In statistical mathematics, value of variable which occurs most frequently. *Pryor, 3.* b. The actual mineral composition of an unaltered igneous rock; contrasted with norm. *Fay.*

model. A facsimile in three dimensions—a reproduction in miniature of the underground workings of a mine, showing the shafts, tunnels, crosscuts, etc. in all their details. From its very nature, it does not fall within any definition of the word map and it is a misapplication of the term to call it a map, though it may far better serve the purpose in hand. *Ricketts, I.*

model analysis. The comprehensive testing of scale models of various structures, including harbors and rivers to determine the behavior of the actual structure under consideration. *See also* deformeter; dimensional analysis; photoelasticity. *Ham.*

model coal face. A coal face, which is a replica of a real coal face, where injured miners can regain their skills and confidence, and where surgeons and gymnasts can check that the miners can physically perform pit jobs again—the final stage in occupational therapy. *Talygarn rehabilitation center, South Wales. See also* rehabilitation; training face. *Nelson.*

modeler. One who shapes plaster of Paris, clay, etc., to form original models which are used to make molds for producing ceramic ware. *Bureau of Mines Staff.*

modeling clay. Fine, plastic clay, especially prepared for artists in modeling by kneading with glycerin, or by other methods *Fay.*

model maker, terra-cotta. One who makes metal profiles and wooden forms for use in casting plaster terra-cotta block mold. *D.O.T. 1.*

moder. Material intermediate between the original plants and the decayed plants. *Tomkeieff, 1954.*

moderately bright attritus. Same as medium-bright attritus. *A.G.I.*

moderately dull attritus. Same as medium-dull attritus. *A.G.I.*

moderate vitrain. A field term that, in accordance with an arbitrary scale established for use in describing banded coal, denotes a frequency of occurrence of vitrain bands comprising from 15 to 30 percent of the total coal layer. *Compare* sparse vitrain; abundant vitrain; dominant vitrain. *A.G.I.*

moderator. A material, such as water or graphite, used in a reactor to slow down high-velocity neutrons, thus increasing the likelihood of further fissions. *L&L.*

modernization. The replacement of old, inefficient machines and plant in an existing installation without fundamental changes in the main structure. Underground, modernization schemes may involve mine cars, new tracks, and locomotive haulage. *See also* project. *Nelson.*

moderstone. Old form of motherstone. *Arkell.*

modhbovite. An igneous rock variety of melilite basalt. *Hess.*

modification. a. Treatment in the molten state of aluminum-silicon alloys containing 8 to 13 percent silicon with a small percentage of sodium or sodium fluoride. By this process the eutectic temperature, structure, and composition are apparently altered to give improved mechanical properties. *ASM Gloss.* b. Now also the production of fine graphite in gray cast iron by various treatments. *C.T.D.*

modified Atkinson formula. As a result of further research, the original Atkinson formula, that is, $P=KSV^2/A$, has been simplified by grouping together the physical components KS/A and substituting the term resistance. Therefore, a unit of resistance, known as the Atkinson has been introduced and the modified Atkinson formula may be stated as $P=RQ^2$, where

P=pressure in pounds per square foot

R=resistance in Atkinsons

Q=air quantity in thousands of cubic feet per second.

Therefore, with constant resistance, $Q \propto \sqrt{P}$. Also, if the pressure is constant, then $Q \propto 1\sqrt{R}$. The modified Atkinson formula is now used in ventilation calculations. *Nelson.*

modified California sampler. A California-type soil sampler modified by the addition of a mechanically retractable piston within the barrel, making it possible to recover four consecutive 4-inch samples instead of three to five 12-inch samples. *See also* California sampler. *Long.*

modified longwall. A method used in room-and-pillar mining where the lease requires at least 80 percent of recovery. Basically it consists of turning the rooms on 70-foot centers then working the room up 30 feet wide and butting it off at its completion, then withdrawing the remaining 40 feet of pillar immediately. *Kentucky, p. 335.*

modified room-and-pillar working. *See* bord-and-pillar method. *Fay.*

modified-round nose. Synonym for medium-round nose. *Long.*

modifiers. a. In froth flotation, reagents used to control alkalinity and to eliminate harmful effects of colloidal material and soluble salts. *Fuerstenau, p. 59.* b. *See* modifying agents.

modifying agents; modifiers. In flotation, chemicals which increase the specific attraction between collector agents and particle surfaces, or conversely which increase the wettability of those surfaces. *Pryor, 3.*

modlibovite. An igneous rock consisting of olivine- and melilite-bearing, augite-free lamprophyres with monticellite. If monticellite is present, it is called vesecite. *Johannsen, v. 4, 1938, p. 388.*

Modocs. Anti-Molly Maguire vigilantes, made up of English, Welsh, and Pennsylvania Germans. *Korson.*

modular brick. A brick of such size that, combined with the mortar joint, lays up to fill a 4-inch modular unit. *ACSG, 1963.*

modular coordination; module. A system for the standardization of the dimensions of building components on the basis of multiples of one or more modules, that is, basic units of length. The British Standards Institution has issued (1963) two proposals: (1) A single module of 4 inches and (2) four modules, 1½, 3, 4, and 12 inches. Proposal (1) would approximate closely to the metric module or 10 centimeter; proposal (2) is more flexible and would permit retention of the present British size of building brick. *Dodd.*

modular masonry unit. A masonry unit whose nominal dimensions are based on the 4-inch module. *ACSG, 1963.*

modular ratio. The ratio of the modulus of elasticity of steel in tension to the assumed modulus of elasticity of concrete in compression. *Taylor.*

modulating. A control adjusting by increments. *Strock, 10.*

modulation. The process by which the essential characteristics of a signal wave are impressed upon another wave (the carrier wave). *NCB.*

module. a. A device for delivering a definite quantity or discharge of water, or for measuring and controlling the flow. *Seelye, 1.* b. A common unit particularly specified for dimensional coordination. *Taylor.* c. *See* modular coordination. *Dodd.*

modulus. Factor used in conversion of units from one system to another. Formula or constant which defines properties (for example, density, elasticity) of materials. *Pryor, 3.*

modulus of deformation. *See* modulus of elasticity. *ASCE P1826.*

modulus of elasticity. a. A measure of the rigidity of metal; ratio of stress, within proportional limit, to corresponding strain. Specifically, the modulus obtained in tension or compression is Young's modulus, stretch modulus, or modulus of extensibility; the modulus obtained in torsion or shear is modulus of rigidity, shear modulus, or modulus of torsion; the modulus covering the ratio of the mean normal stress to the change in volume per unit volume is the bulk modulus. The tangent modulus and secant modulus are not restricted within the proportional limit; the former is the slope of the stress-strain curve at a specified point; the latter is the slope of a line from the origin to a specified point on the stress-strain curve. Also called elastic modulus and coefficient of elasticity. *ASM Gloss.* b. The ratio of stress to strain for a material under given loading conditions; numerically equal to the slope of the tangent or the secant of of a stress-strain curve. Modulus of elasticity is recommended for materials that deform in accordance with Hooke's law, and modulus of deformation for materials that deform otherwise. Also called modulus of deformation. *ASCE P1826.*

modulus of elasticity in shear. *See* modulus of rigidity. *Ro.*

modulus of incompressibility. The ratio between the pressure in the mass of a soil and the change of volume caused by such pressure. *Ham. Compare* Poisson's ratio.

modulus of resilience. a. The strain energy per unit volume absorbed up to the elastic limit under the condition of uniform uniaxial stress. *Ro.* b. The resilience of a material subjected to a stress corresponding to its proportional limit. *H&G.*

modulus of rigidity. a. A measure of stiffness of a material subjected to shear loading. Usually the tangent or secant modulus of elasticity of a material in the torsion test. Also called shear modulus of elasticity; modulus of elasticity in shear; torsional modulus of elasticity; modulus of elasticity in torsion. *H&G.* b. The rate of change of unit shear stress with respect to unit shear strain, for the condition of pure shear within the proportional limit. For nonisotropic materials such as wood, it is necessary to distinguish between the moduli of rigidity in different directions. *Ro.* c. If a small block of elastic material is acted on by two noncollinear forces (couple) a shearing stress is produced and the body is deformed. The modulus of rigidity is defined as the shearing stress divided by the deformation. *Lewis, pp. 566-567.*

modulus of rupture. a. The tensile strength of rocks is low as compared with the compressive strength and is not accurately known except in a few cases. The modulus of rupture or R has, however, been determined in a number of cases: Modulus of rupture$=R=\frac{3L}{2BD^2}$ W(Young), where W equals breaking load concentrated at center of test piece, L equals unsupported length of rock prism, B equals width of rock prism, and D equals depth of rock prism. R is in excess of the tensile strength of a rock, while the shearing strength is generally slightly in excess of R. The magnitude of R indicates the self-sustaining power of a rock where it spans an opening. R for granite equals 1,681 and sandstone equals 806 pounds per square inch. *Nelson.* b. Nominal stress at fracture in a bend test or torsion test. In bending, modulus of rupture is the bending moment at fracture divided by the section modulus. In torsion, modulus of rupture is the torque at fracture divided by the polar section modulus. *ASM Gloss.* c. The load required to break a refractory brick supported on two spaced and parallel flat bearing edges with the load applied through a third bearing edge placed midspan and on top of the brick. *A.R.I.* d. A measure of transverse or cross-breaking strength. *ACSG, 1963.* e. An ultimate strength pertaining to the failure of beams by flexure equal to the bending moment at rupture divided by the section modulus of the beam. *Webster 3d.*

modulus of rupture in bending; computed ultimate bending strength. The fictitious tensile or compressive stress in the extreme fiber of a beam computed by the flexure equation $s=Mc/I$, where M is the bending moment that causes rupture. *Ro.*

modulus of rupture in torsion; computed ultimate twisting strength. The fictitious shear stress at the surface of a circular shaft computed by the torsion formula $s_s=Tr/J$, where T is the twisting moment that causes rupture. *Ro.*

modulus of section. The moment of inertia, I, of a section divided by the distance, y, from the extreme fiber to the neutral axis, known as Z and given by the formula $f=\frac{M}{Z}$, where M is the bending moment and f is the stress. *Ham.*

modulus of strain hardening. *See* rate of strain hardening. *ASM Gloss.*

modulus of subgrade reaction. *See* coefficient of subgrade reaction. *ASCE P1826.*

Moebius process. A method of electrolytic refining of silver. Silver plate of 95 to 98 percent pure forms the anodes, and thin silver plate forms the cathodes. The electrolyte consists of a weak, acidulated solution of silver nitrate. *Fay.*

Moe gage. A diamond weight calculator which estimates to within a few hundredths the weights of brilliant-cut diamonds only, by simple measurements of width and depth of both set or unset diamonds. *Hess.*

mofette. A vent from which carbon dioxide and some nitrogen and oxygen issue from the earth in a last stage of volcanic activity. *Webster 3d. See also* fumarole; solfatara; soffioni. *Fay.*

Moffet ore hearth. Ore hearth; used in smelting ores. *Bennett 2d, 1962.*

mogensenite. A titaniferous magnetite containing exsolution ulvöspinel, Fe_2TiO_4. *See also* titanmagnetite. *Spencer 21, M.M., 1958.*

MOH Abbreviation for a compound (MOH) containing the hydroxide anion (OH^-) or the hydroxyl group (OH) that is capable of yielding in aqueous solution a hydroxyl ion together with the cation (M^+), the degree of ionization in dilute solutions of strong bases (for example, sodium hydroxide and calcium hydroxide) being virtually complete and that of weak bases (for example, ammonium hydroxide) being in the range of 1 percent or less. *Webster 3d.*

Mohammedan blue. *See* Chinese blue. *Dodd.*

Mohave moonstone. Translucent, lilac-tinted chalcedony from the Mohave Desert, Calif. *Shipley.*

mohavite. A dull white hydrous borate of sodium, $Na_2B_4O_7.5H_2O$. Rhombohedral. An alteration film on borax. Locally, octahedral borax (same as tincalconite). From the Mohave Desert, Calif. *English.*

Mohawkian. Upper Champlainian. *A.G.I. Supp.*

Mohnian. Middle upper Miocene. *A.G.I. Supp.*

Moho. Short name for the Mohorovicic discontinuity believed to separate the earth's crust from the mantle; first identified by a Yugoslav seismologist of that name. *Mather.*

mohole. A program to drill through the earth's crust under the ocean in order to provide scientific knowledge of the earth's mantle. *Hy.*

Mohorovicic discontinuity. The sharp discontinuity in composition between the outer layer of the earth (the crust) and the next inner layer (the mantle). This was discovered by Mohorovicic from seismograms. The thickness of the crust has been determined by the refraction of seismic waves at this discontinuity. Abbreviation, Moho. *Hy.*

Mohr balance. *See* Westphal balance.

Mohr circle. A graphical representation of the stresses acting on the various planes at a given point. *ASCE P1826.*

Mohr envelope; rupture envelope; rupture line. The envelope of a series of Mohr circles representing stress conditions at failure for a given material. According to Mohr's rupture hypotheses, a rupture envelope is the locus of points, the coordinates of which represent the combination of normal and shearing stresses that will cause a given material to fail. *ASCE P1826.*

Mohr's dome. In the so-called "dome theory" the dome is taken as semicircular by some and parabolic by others. F. Mohr conceives of the dome as being semielliptical and states that the ratios of the semiaxes of the ellipse will be in the same ratio as the vertical and lateral principal stresses. *Isaacson, pp. 238-239.*

Mohr's salt. A ferrous-ammonium sulfate, $FeSO_4.(NH_4)_2SO_4.6H_2O$; a light green crystalline salt. *Webster 3d.*

Mohr's theory. Mohr's theory of failure utilizes the well-known stress circle and the envelope to a family of circles as criteria of failure of materials subject to biaxial or triaxial stress. Thus Mohr's theory predicts that failure of materials is due to failure in shear, whereas Griffith's theory postulates that it is due to failure at crack tips. *Lewis, pp. 607, 611.*

mohsite. Native titanic iron; ilmenite. *Fay.*

Mohs' scale. Arbitrary quantitative units by means of which the scratch hardness of a mineral is determined. The units of hardness are expressed in numbers ranging from 1 through 10, each of which is represented by a mineral that can be made to scratch any other mineral having a lower-ranking number; hence the minerals are ranked from the softest, as follows: talc (1) ranging upward in hardness through gypsum (2), calcite (3), fluorite (4), apatite (5), orthoclase (6), quartz (7), topaz (8), corundum (9), to the hardest, diamond, with the highest ranking number (10). *Compare* Knoop hardness. *Long.*

moil. a. A tool for breaking and wedging out rock or coal. *See also* gad. *Nelson.* b. A long gad used for accurate cutting in a mine; a set. *Standard, 1964.* c. A short pointed length of drill steel used to cut a step in rock, for example, to hold a timber butt (moiling a hitch), and for dressing faces, removing loose fragments after blast, etc. *Pryor, 3.* d. The best tool for handcutting a sample in hard rock. Moils are made of ¾- or possibly ⅝-inch octagonal steel and are usually from 10 to 12 inches long. They are preferably sharpened to a diamond point having a taper about 2 inches long. A square or pyramidal point is sometimes used but does not cut a channel in hard rock as well as the diamond point. *Lewis, p. 340.* e. The glass remaining on a punty or blowpipe after a gob has been cut off or after a piece of ware has been blown and severed. *ASTM C162-66.* f. The glass originally in contact with the blowing mechanism or head, which becomes cullet after the desired article is severed from it. *ASTM C162-66.*

moil point. A solid bar of casehardened steel, pointed at one end, with a shank and upset collar at the other. The moil point, hammered into rock or concrete, produces a small hole that gradually deepens and widens until the sides of the point are in full contact with the rock. The effect is then that of wedging, similar to plug-and-feathering. *Carson, p. 300.*

moiré metallique. Name given to the surface of sheet tin or tinplate which has been treated with hydrochloric or sulfuric acids, under which treatment the metal surface acquires a peculiar crystalline or watered silk appearance. This is sometimes made permanent by being coated with colored varnishes. *Camm.*

moissanite. Carbon silicide, CSi, minute green plates in the meteoric iron of Canon Diablo, Ariz. Hexagonal. Identical with the artificial carborundum. *English.*

Moissan process. A process for the reduction of chromic oxide with carbon in an electric furnace, the hearth of which is lined with a calcium chromite prepared by heating together lime and chromic oxide. *Fay.*

moist coal. Coal containing natural bed moisture but not including visible surface moisture. *Bennett 2d, 1962.*

moisture. a. Essentially water, quantitatively determined by definite prescribed methods which may vary according to the nature of the material. In the case of coal and coke, the methods employed shall be those prescribed in the Standard Methods of Laboratory Sampling and Analysis of Coal and Coke, ASTM Designation: D 271 of the American Society for Testing Materials. *ASTM D 121-62.* b. Agreed percentage of water to be allowed for in sale of mineral products. Deduction for loss of weight of coal in transit, which arises from drainage between colliery and consumer. *Pryor, 3.* c. A liquid (for example, water) diffused or condensed in relatively small quantity and dispersed through a gas, either as invisible vapor or as visible fog, or in or on a solid body in insensible form or as sensible dampness, or condensed on a cool surface as visible dew; specifically, atmospheric water vapor. *Webster 3d.*

moisture allowance. A deduction from the inital weight of washed coal to allow for the expected loss of water by drainage. *B.S. 3323, 1960.*

moisture, bed. The total moisture (percent) in a seam of coal before working. *B.S. 3552, 1962.*

moisture content. a. The percentage moisture content equals the weight of moisture divided by the weight of dry soil multiplied by 100. The moisture content of a coal or mineral sample consists of two portions, namely, the free or surface moisture which can be removed by exposure to air, and the inherent moisture which is entrapped in the fuel, and is removed by heating at 220° F. *Nelson.* b. Of soils, the ratio, expressed as a percentage, of the weight of water in a given soil mass to the weight of solid particles. *ASCE P1826.* c. In chemical analysis the moisure content is determined by drying the sample at 110° C until the weight is constant. For works' control of the moisture content of a powder or of clay, instruments are available based on measurement of the pressure developed by the evolution of acetylene from a mixture of the sample with calcium carbide. Methods depending on the variations of the electrical properties of a material with changes in its moisture content are not applicable to clays owing to the great influence of exchangeable bases and soluble salts. The neutron absorption method is more promising. *Dodd.*

moisture density curve. *See* compaction curve. *ASCE P1826.*

moisture density test. *See* compaction test. *ASCE P1826.*

moisture equivalent (of soils). The ratio of the weight of water which the soil, after saturation, will retain against a centrifugal force 1,000 times the force of gravity to the weight of the soil when dry. The ratio is stated as a percentage. *A.G.I.*

moisture expansion. An increase in dimension or bulk volume of a manufactured ceramic article caused by reaction with water or water vapor. This reaction may occur in service at atmospheric temperature and pressure, but is expedited by exposure of the articles to water or water vapor at elevated temperatures and pressures. *ACSG, 1963.*

moisture-holding capacity. The quantity of moisture (not removable by mechanical means) contained by a coal in equilibrium with an atmosphere saturated with water vapor. This is employed in some systems of classification as a criterion of rank. *B.S. 3323, 1960.*

moisture in air-dried coal. Moisture retained in coal after air-drying under standard conditions. *B.S. 3552, 1962.*

moisture, inherent. Moisture not normally removable from coal except by drying with the aid of heat. *B.S. 3552, 1962.*

moisture in the air-dried sample; inherent moisture. The moisture retained by a coal sample after it has attained approximate equilibrium with the atmosphere to which it is exposed. *B.S. 3323, 1960.*

moisture in the analysis sample. The moisture which is retained by the "through 72-mesh B.S. sieve" sample of coal after it has been exposed to the laboratory atmosphere and has attained approximate equilibrium with it. *B.S. 3323, 1960.*

moisture man. One who determines the moisture content of ores or concentrates by removing a sample from pile or conveyor, using metal paddle, and weighing the sample before and after drying. *D.O.T. Supp.*

moisture meter. *See* atomic moisture meter.

moisture movement. The difference between the length of a specimen of concrete or mortar when dried to constant length and its length when subsequently saturated, expressed as a percentage of the dry length. *Taylor.*

moisture sample. a. A sample taken for the determination of moisture content in which the sample is weighed, placed in a drying oven, dried at 105° C and weighed again, the loss in weight representing the moisture content. Grab sampling is commonly used, since this method is the most rapid. *Newton, pp. 31-32.* b. In coal sampling, a sample to be used exclusively for the purpose of determining the total moisture. *B.S. 1017, 1960, Pt. 1.* c. In coke sampling, the prepared sample for determining the total moisture subsequently used for preparing the analysis sample. *B.S. 1017, 1960, Pt. 2.*

molality. Moles of solute in 1 kilogram of solvent. *Pryor, 3.*

molar. A strength of solution involving 1 gram-molecular weight or fraction thereof per liter of solution. *API Glossary.*

molar conductivity. Electrical conductivity of a solution containing 1 gram-molecular weight of a substance per liter. *ASM Gloss.*

molarity. Moles of solute per liter of solution. *Pryor, 3.*

Molasse. a. A provincial Swiss name for a soft green sandstone associated with marl and conglomerates, belonging to the Miocene Tertiary period, extensively developed in the lower country of Switzerland, and composed of Alpine detritus. *A.G.I.* b. The detritus worn from elevated ranges during and immediately after the major diastrophism, deposited in the later foredeep, considerably in front of the preceding Flysch geosyncline. It may be deformed and overthrust by the final last advance of the nappes (overthrust sheets). As this is also a typical formation common to all large mountain chains, the term Molasse may be applied to all orogenic deposits of a similar genesis. *A.G.I.*

molasses/A.N. explosive. A new explosive mixture consisting of about 80 pounds of ammonium nitrate mixed with 10 pints of molasses and 5 pints of water, for quarry and opencast blasting. The molasses and water may be used instead of fuel oil and give a denser mixture with improved fragmentation. *See also* A.N./fuel oil explosive. *Nelson.*

mold; mould. a. An impression made in the earth or rock by the outside of a fossil shell or other organic form; a cast of the inner surface of such a fossil. *Webster 3d.* b. Loose, broken, or friable earth; hence, the surface soil. *Arkell.* c. A body of molding sand or other heat-resisting material containing a cavity which when filled with molten metal yields a casting of the desired shape. *Freeman.* d. In powder metallurgy, the same as die. *ASM Gloss.* e. A shape container in which the feed is compressed to form the briquette; also the indentations in the face of a roll. Also called cup; impression. *B.S. 3552, 1962.* f. A form in which ceramic or glassware is fabricated. Molds are usually made from plaster, metal, or wood. *Bureau of Mines Staff.* g. A hollow shape, usually of plaster, into which plastic material is pressed or poured. *ACSG.* h. A form, usually metal, in which glass is shaped. *ASTM C162-66.*

moldable refractory. A graded refractory material, moistened ready for use and intended for ramming into position in a furnace lining; such a material may be air-hardening. Also known as plastic refractory. *Dodd.*

moldavite. a. A specific name for ozocerite from Moldavia. Also spelled moldovite. *English.* b. A transparent, green, vitreous stone or natural glass, regarded by some petrologists as of meteoric origin and by others as a form of obsidian. Also spelled moldauite. *Fay. See also* bouteillenstein; moldovite.

moldboard. a. A board on which to ram a pattern; a follow board. *Standard, 1964.* b. A curved surface of a plow, dozer, or grader blade, or other dirt mover, which gives dirt moving over it a rotary, spiral, or twisting movement. *Nichols, 2.*

mold box. A box in which molten steel is hydraulically compressed. *Standard, 1964.*

mold brick. A fire clay brick, or a heat insulating brick, shaped to fit in the top of an ingot mold to help to maintain the top of the ingot molten until the main part of the ingot has solidified. *Dodd.*

mold capper. One who caps ingot molds after they are filled with hot metal by placing an iron plate on top of the mold. Also called hot baller and platform man. *D.O.T. 1.*

molded brick. A term sometimes used for soft-mud brick. *Fay.*

molded cameo. A cameo produced by casting in a mold such materials as ceramics, metals, glass, plastics, or sealing wax. *See also* Wedgewood. *Shipley.*

molded coal. An artificial fuel made of charcoal refuse and coal tar, molded into cylinders, dried, and carbonized. *Fay.*

molded glass. Glass which is formed in a mold, as distinct from cast, rolled, drawn, or offhand ware. *ASTM C162-66.*

molder. a. One who makes molds for castings. *Standard, 1964.* b. One who molds tempered clay into unburned bricks. *Standard, 1964.* c. One who forms pottery and porcelain ware by compressing plastic clay in mold. *D.O.T. 1.* Also spelled moulder.

moldering. That process in the decomposition of vegetable and animal substances taking place with inadequate air available for complete disintegration, and which, because it is incomplete, leaves small quantities of substances rich in carbon as residue. *Compare* disintegration; peat formation; putrefaction. *A.G.I.*

molders' rule. A ruler, with measurements sufficiently elongated to compensate for the heat expansion and contraction of a metal. Such rules are used in metal casting to correct dimensions to normal temperatures. *Bennett 2d, 1962. See also* shrinkage rule. *Bureau of Mines Staff.*

mold facing. A fine powder or wash applied to the face of a mold to ensure a smooth casting. *Standard, 1964.*

molding. a. The practice of pouring molten metal into suitable molds. *Hansen.* b. The pressing of powder to form a compact. *ASTM B243-65.* c. The art of making molds. *Freeman.*

molding compound. A mixture of resins, ingredients, and fillers before processing into the finished product. *BuMines R.I. 5971, 1962, p. 2.*

molding crane. A crane adapted for use in a foundry in handling molds and flasks. *Fay.*

molding frame. A template to shape a loam mold. *Standard, 1964.*

molding hole. An excavation in a foundry floor for large castings. *Standard, 1964.*

molding loam. A coarse silica sand with only small quantities, if any, of clay or feldspar. In the foundry, it is mixed with fireclay to make cupola and ladle linings. *Hess.*

molding machine. A machine for making sand molds by mechanically compacting sand around a pattern. *ASM Gloss.*

molding press. In powder metallurgy, a press used to form compacts. *ASM Gloss.*

moldings. Derb. Weathered ore at surface of outcrop. *Arkell.*

molding sand. a. Sand containing sufficient refractory clay substance to bond strongly without destroying the permeability to air and gases when rammed to the degree required. *Freeman.* b. Sands used in the foundry for making molds are divided into two classes: (1) facing sand, a specially prepared mixture used to form the face of the mold, where it will be in direct contact with the cast metal; and (2) backing sand, which fills up the body of the molding box or flask and supports the facing sand. The backing sand consists of floor or black sand, that is, sand that has been in previous use. *Osborne. See also* foundry sand.

molding table. A potter's table for shaping their ware. *Standard, 1964.*

mold lubricant. A substance applied on or into molds to reduce friction or prevent adhesion. *ASTM C162-66.*

mold mark. Mark or seam on glassware resulting from a mold joint. *ATSM C162-66.*

mold oil. Liquids, such as oil, soft soap, or worthless paint, which are not absorbed by formwork and are applied over its surface to prevent the adhesion of concrete and thus to facilitate its removal after the concrete has set. *See also* shuttering. *Ham.*

mold plug. A truncated cone shaped refractory piece which sets in the bottom of an ingot mold. *A.I.S.I. No. 24.*

mold runner. A man or youth who, in old pottery factories, carried filled molds from the making department to the drying room and empty molds back again to the maker; this work has now been eliminated by the introduction of dryers of various types placed adjacent to the making machines. *Dodd.*

mold wash. An aqueous or alcoholic emulsion or suspension of various materials used to coat the surface of a mold cavity. *ASM Gloss.*

mole. a. A massive, solid-fill nearshore structure of earth, masonry, or large stone which may serve as either a breakwater or a pier. *Hy.* b. An egg-shaped device pulled behind the tooth of a subsoil plow to open drainage passages. Also called mole ball. *Nichols.* c. Colom. Galena. *Fay.* d. Colom. Sulfides or concentrates consisting principally of galena. *Fay.* e. The molecular weight expressed in grams (gram-molecular weight). *Crispin.* f. Weight in grams of a compound in terms of its molecular weight. A molar solution of sulfuric acid, for example, contains H_2 (2 grams), sulfur (32 grams), and O_4 (64 grams) or 98 grams per liter. Also spelled mol. *See also* gram molecule. *Pryor, 3.*

molecular colloid. Single macromolecule which repeats structure of the unit molecule, its atoms being chemically bonded. *Pryor, 3.*

molecular concentration. Mols in stated volume of solution. *Pryor, 3.*

molecular crystals. Loosely bound aggregates of stable molecules, for example, dry ice, solid iodine, sulfur, paraffin, and most of the other crystalline organic solids. *Newton, p. 162.*

molecular filter sampler. Using a porous membrane filter of very small openings, this sampler achieves nearly 100 percent efficiency at moderate rates of flow. Membranes of three different porosities are used to permit the sampling of dusts of varying concentration and particle size. Flow rate is controlled by the use of calibrated orifices. *Hartman, pp. 53-54.*

molecular orientation. Dipole effect at discontinuity lattice of solid surrounded by liquid which contains ions of opposite charge to the electric charges on the discontinuity lattice points, and are therefore attracted to the interface where they form an oriented monolayer. *Pryor, 3.*

molecular weight. That of one molecule of a compound or element as compared with the atomic weight of hydrogen (1) or more usually oxygen (16). Summation of the atomic weights of the elements in a molecule. *Pryor, 3.*

molecule. The smallest part of a substance that can exist separately and still retain its composition and characteristic properties. The smallest combination of atoms that will form a given chemical compound. *Standard, 1964.* An activated molecule is one with its electrons moving at excited energy levels and therefore (Arrhenius) mainly responsible for rate of chemical reaction. Energy of activation is that required to raise a normal molecule to its active state. *Pryor, 3.*

mole drain. A drainage slot cut through stiff clay by means of a mole plough. It is a cheaper method of drainage than laying agricultural drains. *Ham.*

mole mining. A method of working coal seams about 30 inches thick, using a small continuous miner type of machine, which is remote controlled from the roadway and without any associated supports. The machine is used to cut and extract sections of coal about 6 feet wide for a distance of 100 yards or so from pillars alongside the roadway. Small ribs of coal, 3 to 6 feet wide, are left between the sections extracted by the machine. The accurate steering of the machine is a critical feature of this new system of mining. *See also* coal auger; Collins miner. *Nelson.*

mole-pct Abbreviation for mole-percent. *BuMin Style Guide, p. 61.*

mole plough. A vertical knife blade with a horizontal torpedo-shaped bottom member about 3 inches in diameter, which is hauled through the ground to cut a mole drain. A mole plough can be used to lay copper and plastic water pipes. *Ham.*

moler. A deposit of diatomite of marine origin occurring on the island of Mors, Denmark; it has been worked since 1912 for use as a heat insulating material, as a constituent of special cements, and for other purposes. *Dodd.*

Möller and Pfeiffer dryer. A multitrack tunnel dryer with concurrent air flow and heat recuperation from the hot air at the exit end. This design of dryer is well suited to heavy clay products requiring gentle initial drying. *Dodd.*

Mollusca. The widespread swamps during Coal Measures' times were exceptionally favorable habitats for a group of molluscs, closely resembling the present day freshwater mussel Anodonta. These animals, belonging to the general carbonicola, anthracomya, and niadites, were undergoing fairly rapid evolution during Coal Measures' times and therefore have proved of great value for the purpose of coal seam correlation. *Nelson.*

Molluscoidea. Soft-bodied animals having a shell in two halves usually unequal in size, and include the Brachiopods. *Mason, v.1, p. 26.*

molluskite. The dark-colored carbonaceous matter sometimes found in shell marbles due to the petrifaction of organic portions of mollusks. *Standard, 1964.*

mollusks; molluscs. Marine animals (usually with shells) significant as fouling forms. Include mussels, jingle shells, oysters, and boring forms, such as shipworms and boring clams. *Hy.*

Molly Maguire. a. A member of a secret association formed among the tenantry in Ireland about 1843, principally to intimidate law officers and prevent the service of legal writs. Its members disguised themselves in the dress of women. *Webster 2d.* b. A member of a similar association of Irishmen organized in the anthracite coal region of Pennsylvania, about 1854, and broken up in 1877. *Webster 2d.*

molten. Reduced to the fluid state by heat; melted; fused; as, molten metal. *Standard, 1964.*

molten cast brick. Refractory material made by fusing refractory oxides in an electric furnace and pouring the molten material into molds to form finished shapes. *A.R.I.*

molten cast refractory. A solidified material made by melting refractory ingredients and pouring into molds. *ASTM C71-64.*

molten-salt reactor. *See* fused-salt reactor. *L&L.*

molten slag. A waste product of smelting, usually a mixture of silicates. *Ency. of Chem. Tech., v. 8, p. 937.*

moluranite. A uranium molybdate, $UO_2 \cdot 3UO_3 \cdot 7MoO_3 \cdot 20H_2O$; isotropic; black; resinous luster; amorphous; occurs in fine fissures in granulated albitite. *American Mineralogist, v. 43, No. 3-4, March-April 1958, p. 380; v. 45, No. 1-2, January-February 1960, p. 258.*

mol wt Abbreviation for molecular weight. *BuMin Style Guide, p. 61.*

molybdate orange. Mixed crystals containing 70 percent lead chromate, 14 percent lead sulfate, and 9 percent lead molybdate. Used as a pigment. *Bennett 2d, 1962 Add.*

molybdenite. A black, platy, disulfide of molybdenum, MoS_2, crystallizing in the hexagonal system. It is the most common ore of molybdenum. *Fay; Dana 17.*

molybdenite concentrate. Commercial molybdenite ore after the first processing operations. Contains about 90 percent molybdenum disulfide along with quartz, feldspar, water, and processing oil. *CCD 6d, 1961.*

molybdenum. A silvery-white, very hard, metallic element in the chromium group or group VI of the periodic system. Its physical properties are similar to those of iron and its chemical properties are similar to those of a nonmetal. Used for electrodes of mercury-vapor lamps, as wire for winding electric-resistance furnaces, and in steel alloys. Symbol, Mo; isometric; valences, 2, 3, 4 ?, 5 ?, and 6; atomic number, 42; atomic weight, 95.94; specific gravity, 10.22 (at 20° C); melting point, 2,620°± 10° C; boiling point, 5,560° C or sublimes at 4,507° C (at 760 mm); insoluble in water, in hydrofluoric acid, and in ammonia; soluble in hot concentrated nitric acid, in hot concentrated sulfuric acid, and in aqua regia; and slightly soluble in hydrochloric acid. As an alloying agent, it increases the hardenability and toughness of quenched and tempered steels and it raises the strength of steel at high temperatures. Used in nickel-based alloys that are heat-resistant and corrosion-resistant; in electrodes in electrically heated glass furnaces and forehearths; in nuclear-energy applications; for missile and aircraft parts; and as a wire for filaments for metal-evaporation processes and for filaments, grids, and screens in electronic tubes. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-121, B-195.*

molybdenum aluminide. Mo_3Al; melting point, 2,150° C. Although its oxidation resistance is poor compared to other aluminides and silicides, it is good compared to molybdenum metal. It is a refractory crucible material for melting certain metals. *Lee.*

molybdenum borides. Five compounds have been reported: Mo_2B, melting point, 2,120° C, and specific gravity, 9.3; Mo_3B_2, dissociates at 2,250° C; MoB, exists in two crystalline forms: alpha MoB, melting point, 2,350° C, specific gravity, 8.8; and beta MoB, melting point, 2,180° C, specific gravity, 8.4; Mo_2B_5, dissociates at approximately 1,600° C, specific gravity, 7.5; and MoB_2, melting point, 2,100° C, specific gravity, 7.8, and thermal expansion, 7.7×10^{-6}. *Dodd.*

molybdenum carbides. MoC, melting point 2,692° C, specific gravity 8.5; Mo_2C, melting point 2,687°, specific gravity 8.9. *Dodd.*

molybdenum disilicide; molybdenum silicide. $MoSi_2$; gray; metallic; tetragonal; and melting point, 2,000° C. It has good oxidation resistance at elevated temperatures; maintains fairly good strength; and has refractory applications. Molecular weight, 152.11; specific gravity, 6.31 (at 20.5° C); insoluble in acids and in aqua regia; and soluble in hydrofluoric acid plus nitric acid. *Lee; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-196.*

molybdenum disulfide. A mineral resembling graphite, both in appearance and to the touch. When highly refined and purified it has unusual qualities as a dry lubricant and may be applied in powder form to metal surfaces or used with carriers such as oil, grease, and silicones. It has been incorporated in plastics and powdered metal compacts. It is effective at temperatures up to about 315° C and under high pressure. *Osborne.*

molybdenum enamel; moly enamel. A vitreous enamel containing about 7.5 percent molybdic oxide, which improves the adherence and acid resistance. *Dodd.*

molybdenum minerals. Main ore is molybdenite; a subsidiary one is wulfenite. Metal is used in special iron alloys, electrical apparatus and chemistry. *Pryor, 3.*

molybdenum roaster operator. One who filters and dries molybdenum concentrate preparatory to roasting, and roasts the concentrate in a multiple-hearth furnace to remove sulfur. *D.O.T. Supp.*

molybdenum silicide. *See* molybdenum disilicide. *Dodd.*

molybdenum trioxide; molybdic oxide; molybdic anhydride; molybdenum anhydride; molybdite. a. MoO_3; white at ordinary temperatures; yellow at elevated temperatures; molecular weight, 143.94; orthorhombic; specific gravity, 4.69 (at 21° C); melting point, 795° C; boiling point, 1,264° C or sublimes at 1,155° C (at 760 mm); sparingly soluble in water; very soluble in excess alkali with the formation of molybdates; and soluble in concentrated mixtures of nitric and hydrochloric acids and in mixtures of nitric and sulfuric acids. Two hydrates are known: $MoO_3.H_2O$ and $MoO_3.2H_2O$. Readily combines with acids and bases to form a series of polymeric compounds. Used in the production of metallic molybdenum, in ceramic glazes, in enamels, in pigments, and as a catalyst in the petroleum industry. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-195.* b. Used in small quantities in some whiteware bodies to increase strength and to lower firing temperatures due to the increased wetting action of the glass phase. In porcelain enamels, large quantities produce opacity due to the crystallization of molybdates of the alkaline earths, lead or zinc, when the quenched frit is heated. Quantities greater than 1 percent smelted in frits act as adherence promoters in cast-iron enamels, sheet-steel enamels, jewelry enamels, and high-temperature ceramic coatings. White frits which contain smelted molybdic oxide, with or without antimony oxide, have excellent adherence when applied directly to steel. *Lee.*

molybdic anhydride. *See* molybdenum trioxide. *CCD 6d, 1961.*

molybdic ocher. *See* ferrimolybdite. *CCD 6d, 1961.*

molybdine. *See* molybdite.

molybdite. *See* ferrimolybdite.

molybdocolic. Lead colic. *Fay.*

molybdomenite. An orthorhombic mineral; colorless to yellowish-white; pearly or greasy lustered; contains lead and selenite. *American Mineralogist, v. 39, No. 9-10, September-October 1954, p. 850.*

molybdonosus. Lead poisoning. *Standard, 1964.*

molybdoparesis. Lead palsey; painters' paralysis. *Standard, 1964.*

molybdophyllite. A colorless, white, pale green basic silicate of lead and magnesium, $2(Pb,Mg)O.SiO_2.H_2O$; has one perfect cleavage; hexagonal. Foliated, resembling mica. From Langban, Sweden. *English; Larsen, p. 89.*

moly enamel. *See* molybdenum enamel. *Dodd.*

molysite. An incrustation, brownish-red, light or dark, and yellow, ferric chloride, $FeCl_3$, found usually in the vicinity of volcanoes as a deposit on lavas, etc. *Fay.*

moment distribution. A method of calculating bending moments, in redundant frames and continuous beams, using successive approximations. *Ham.*

moment of force. The turning effect on a body about a point called the pivot or fulcrum. In practice, turning effect is commonly called leverage. *Morris and Cooper, p. 150.*

moment of inertia. Resistance offered by a body to angular acceleration about a specific axis of rotation. *Pryor, 3.*

moment of resistance. The couple produced by the internal forces in a beam subjected to bending under the maximum permissible stress. *See also* bending moment. *Ham.*

momentum. Mass times velocity. *Pryor, 3.*

momentum grades. Grades so situated that the kinetic energy of a train (due to its speed at the foot of the grade) will enable the locomotive to haul the train to the top without a reduction of speed below 10 or 12 miles per hour. *Urquhart, Sec. 2, p. 26.*

Momertz-Lintz system. A unique winding arrangement where two winding engines are arranged alongside the shaft, the shaft collar forming a common foundation. The ropes are practically vertical and there is less rope oscillation. *Sinclair, V, pp. 103-104.*

M.O. mine safety indicator. A system showing, by means of lights, the position of all switchgear underground, with a master control which would show up if a section of a mine had been switched off at the substation, leaving switches inbye in the on position. A recorder gives a complete operating picture of a power-loading face. *Nelson.*

monadnock. Residual hill rising above a peneplain and not yet worn down to that plane; named after Mt. Monadnock, New Hampshire. *Mather.*

monazite. A phosphate of the cerium metals and the principal ore of the rare earths and thorium. Monoclinic. One of the chief sources of thorium used in the manufacture of gas mantles. It is a moderately to strongly radioactive mineral, $(CE,La,Y,-Th)(PO_4)$; yellowish, reddish-brown, yellowish-brown, and green. It occurs widely disseminated as an accessory mineral in granitic igneous rocks and gneissic metamorphic rocks. Detrital sands in regions of such rocks may contain commercial quantities of monazite. It also occurs in pegmatites associated with zircon, xenotime, gadolinite, samarskite, fergusonite, magnetite, apatite, columbite, and ilmenite. Thorium-free monazite is rare. *Crosby, pp. 30-31; Fay; Dana 17.*

monazite sand. *See* monazite. *Bennett 2d, 1962.*

moncheite. Minute steel-gray grains in chalcopyrite, $(Pt,Pd)(Te,Bi)_2$; from Monchegorsk, U.S.S.R. *Hey, M.M., 1964; Fleischer.*

monchiquite. A mafic lamprophyre composed of titanaugite, barkevikite, olivine, and titanomagnetite in an isotropic base of analcite. Biotite may be present, and also accessory apatite. Some varieties contain accessory melilite, nepheline, haüyne, or leucite. *A.G.I.*

Mond gas. A producer gas made by using a large proportion of steam to air at a relatively low temperature, so that large amounts of ammonia can be recovered as a byproduct. *Webster 3d.*

mondhaldeite. A name derived from a locality on the Kaiserstuhl, Baden, Germany, and applied by Osann to a group of dike rocks having the mineralogy of the hornblende-pyroxene andesites. Chemically, they are andesites of about 60 percent silica with almost as much potash as soda. *Fay.*

Mond process. A process for extracting and purifying nickel. The main features consist of forming nickel carbonyl by reaction of the finely divided reduced metal with carbon monoxide, and decomposing the nickel carbonyl, with deposition of nickel on small nickel pellets. *ASM Gloss.*

Mond producer. A furnace used for the manufacture of producer gas. *Fay.*

Monell process. A two-step modification of the basic open-hearth process of steel manufacturing in which limestone and ore are heated till pasty; molten pig iron is then added; the slag is brought to a foaming state by oxidation of the carbon in the iron and runs out of the furnace through special slag notches. *Bennett 2d, 1962.*

Monel Metal. Copper-nickel alloy of high tensile strength, with great resistance to chemical corrosion. Consists of 27 percent copper, 2 to 3 percent iron, and 68 percent nickel. A little tellurium may be added to improve machinability. *Pryor, 3.*

monetite. A pale yellowish mineral with 3 pinacoidal cleavages, $2CaO.P_2O_5.H_2O$; Mohs' hardness, 3.5; specific gravity, 2.75. *Larsen, p. 111.*

money stone. A local name in Pennsylvania for rutile. *Shipley.*

mongrel. Eng. Irregular gray limestone, Lower Lias, Lyme Regis. *Compare* bullymong; minge. *Arkell.*

monheimite. A variety of smithsonite containing iron carbonate. *Fay.*

monimolite. An antimonate of lead, containing also substantial amounts of calcium and ferrous iron. The approximate formula is: $(Pb,Ca)_3Sb_2O_8$. Fracture is small conchoidal, splintery; luster, greasy to adamantine; color, yellow, gray-green or dark brown. *Dana 7, v. 2, p. 1023.*

monistic. Not ionized in solution. *Pryor, 3.*

monitor. a. In hydraulicking, a high-pressure nozzle mounted in a swivel on a skid frame. *Nichols, 2.* b. Jet used to direct high-pressure water (hydraulic water) on unconsolidated gravels and sands in alluvial mining to break down, wash, and transport them. *Pryor, 3.* c. A self-dumping car, holding from 5 to 8 tons of coal. It is filled by emptying the mine car into it at the foot of the slope or top of the incline. *See also* gunboat. *B.C.I.* d. *See* hydraulic monitor. *Nelson.* e. A gas sampler for continuous sampling of the atmosphere in a mine, usually sounding an alarm when the gas threshold is exceeded. *Hartman, p. 25.* f. An instrument that measures the level of ionizing radiation in an area. *L&L.*

monitoring. Eng. The taking of air samples underground with particular reference to the detection of outbreaks of spontaneous combustion or heatings in their early stages, from Warwickshire. *Nelson.*

monitor operator. *See* incline man. *DOT 1.*

monk-and-nun tile. Popular name for Spanish tile. *See also* Spanish tile. *Dodd.*

monkey. a. An appliance for mechanically gripping or letting go the rope in rope haulage. *Fay.* b. A block placed between the rails on an incline to prevent the cars from running back. *Standard, 1964.* c. The word monkey prefixed to a technical term means small, thus monkey chute, a small chute; monkey drift, a small drift, usually driven in for prospecting purposes. *Fay.* d. *See* casing drive hammer. *B.S. 3618, 1963, sec. 3.* e. A small, water-cooled, bronze casting in the cinder-notch cooler through which cinder runs from the cinder notch when the bot is withdrawn. *Fay.* f. A small glass-melting crucible. *Standard, 1964.*

monkey board. A single, unrailed, heavy plank, mounted above the drill platform in the derrick or tripod and serving as a walkway or work platform. *Long.*

monkey chock. Aust. *See* bobbin, a. *Fay.*

monkey cooler. In a blast furnace, a water-cooled casting, usually of copper, that is installed inside of the intermediate cooler, and in which is inserted the cinder, tapping-hole closure or bot. *Henderson.*

monkey drift. A small drift driven in for prospecting purposes, or a cross-cut driven to an airway above the gangway. *Zern.*

monkey face. A term applied to a chain bracket to be inserted between adjacent shaker conveyor troughs to permit suspension of the trough line from the roof. *Jones.*

monkey gangway. a. Penn. An air course driven parallel with a gangway and heading at a higher level. Used where a seam has considerable pitch or dip. *Fay.* b. A small gangway parallel to a main gangway. *Hudson.*

monkey hair. Caotchouc, or rubber, derived from a milk juice of plants and which fills latex cells and tubes. It is resistant to decomposition and found in many brown coals as a wooly mass. *Stutzer and Noe, 1940, p. 73.*

monkey heading. A narrow and low passage driven in the coal where miners take refuge while coal is being blasted. Chiefly in mine where seams pitch sharply. *Korson.*

monkey hole. *See* dog hole. *Zern.*

monkey jar. An earthenware vessel used in tropical countries for cooling drinking water. Also called water monkey. *Standard, 1964.* In Mexico it is called an olla. *Fay.*

monkey ladder. A ladder made of saplings in which the widely separated steps rest in the coal. Used by miners in going to and from their breasts in steeply pitching seams. *Korson.*

monkey pot. *See* jockey pot. *C.T.D.*

monkey rolls. The smaller rolls in an anthracite breaker. *Fay.*

monkey shaft. A small shaft raise extending from a lower to a higher level. *Fay.*

monkey winch. A device for exerting a strong pull and may be used to withdraw steel arches from disused roadways. It consists of a framework containing a hand-operated drum, around which a steel rope 50 feet in length is wound. To hold the drum in position a ratchet device is used with both gears. A simple reversing mechanism which disengages the ratchet is also attached. The winch is firmly anchored when in use. *See also* sylvester. *Nelson.*

monkey wrench. An adjustable wrench named for its inventor, Thomas Monkey. *Crispin.*

monmouthite. A variety of urtite consisting mainly of nepheline (three-fourths rock) and hastingsite, with minor cancrinite, albite, calcite, and sodalite, and accessory apatite and opaque oxides. *A.G.I.*

Monnier kiln. A tunnel kiln designed for the firing of building bricks; it is mechanically fired from the top with coal, which burns among the bricks as in a Hoffmann kiln. *See also* Hoffmann kiln. *Dodd.*

Monnier process. The treatment of copper sulfide ores by roasting with sodium sulfate, and subsequent lixiviation and precipitation. *Fay.*

monobasic. Containing one hydrogen atom replaceable by a metal with the formation of a salt. *C.T.D.*

monobasic acid. Acid which yields one hydrogen ion per molecule in solution, for example, nitric acid, HNO_3. *Bennett 2d, 1962.*

Monobel. Trademark for low-velocity permissible dynamites furnished in six grades based upon velocity and cartridge count. Fair to poor water resistance. Used for mining coal where lump coal is a factor. *CCD 6d, 1961.*

monocable. A form of aerial ropeway in which the same rope is used both to support and haul along the overturning skips in which the debris is carried. These rest upon the rope and obtain a sufficient frictional grip on it to be carried up moderate gradients and over pulleys by means of an inverted Vee-shaped saddle lined with wood, rubber, or composition. The rope is driven by a surge wheel in a similar manner to an endless-rope haulage. *See also* fixed clip monocable; normal monocable. *Sinclair, V, p. 359.*

monochromatic. Having or consisting of one color only. *Shipley.*

monochromatic light. Light which vibrates at one frequency or optical wavelength. *Pryor, 3.*

monochromator. A device for producing monochromatic light. Usually applied to a form of spectroscope which can be adjusted to transmit light from any desired region of the spectrum, but may also be applied to any source of monochromatic light (for example, to a sodium vapor lamp). *Shipley.*

monochrome decoration. A single color decoration. *ASTM C242-60T.*

monoclinal; monocline. a. In geology, dipping only in one direction, or composed of strata so dipping; as, a monoclinal ridge; a monoclinal flexure. Sometimes improperly called uniclinal. *Standard, 1964.* b. An abrupt downward flexure of nearly horizontal strata without any corresponding bend to form an anticline or syncline. *Standard, 1964.* c. Loosely, any series of strata dipping in one direction only, as an isocline. *Standard, 1964.*

monoclinal coast. Coast formed by a monoclinal fold. *Schieferdecker.*

monocline. A monoclinal fold. *Fay. See also* monoclinal.

monoclinic. A crystal system in which crystals have one twofold axis, a symmetry plane, or both. *Hurlbut.*

monoclinic block. A quarry term, applied to a block of stone bounded by 3 pairs of parallel faces, 8 of the 12 interfacial angles being right angles, 2 obtuse angles, and 2 acute angles. *Fay.*

monoclinic sulfur; prismatic sulfur. Artificial; forms needle-shaped crystals; stable between 95.5° C and 120° C and is prepared by crystallizing sulfur above 95.5° C; melting point, 120° C; specific gravity, 1.96; soluble in carbon disulfide; insoluble in water; unstable, slowly changes to rhombic form. It is usually obtained by simply melting sulfur and allowing it to solidify at 120° C, if pure, or just less than this temperature when it is not pure. *Cooper, pp. 277, 278.*

monoclinic symmetry. In structural petrology, it may refer to either the movement or the fabric. Monoclinic symmetry of movement is analogous to the sliding of cards over one another in one direction; in this movement, there is one plane of symmetry parallel to *a*, the direction of tectonic transport. In monoclinic symmetry of fabric there is one plane of symmetry parallel to *a*, the direction of tectonic transport. *A.G.I.*

monoclinic system. That system of crystals whose forms are referred to three unequal axes, two intersecting obliquely and the third perpendicular to both the others. *Fay.*

Monofrax. Refractory of alumina and other oxides. *Bennett 2d, 1962.*

monogene. Proposed by Naumann and applied to rocks composed of a single mineral species, for example, dunite. Synonymous with monomineralic. *A.G.I.*

monogenetic. One in genesis; resulting from one process of formation; said of a mountain range. *Webster 2d.*

monogenetic gravel. A loose detrital sediment in which the predominant size of the particles is 2 to 10 millimeters; it consists of one type of constituent. *C.T.D.*

monograin. A free-flowing high explosive widely used for charging bulled holes and large-diameter (well drill) holes. *Nelson.*

monohydrate. A hydrate containing one molecule of water. *Webster 3d.*

monolayer; monomolecular film. Layer one molecule deep adsorbed to the discontinuity lattice or surface of the solid in a solid/liquid system, or to the liquid in one of liquid/gas. *Pryor, 3.*

monolith. a. A single stone or block of stone, especially one of large size, shaped into a pillar, statue, or monument. *Webster 2d.* b. A building material for floors, having a sawdust base and applied in a plastic condition. It is both fireproof and waterproof. *Webster 2d.* c. A hollow foundation piece of concrete, brickwork, or masonry with a number of open wells passing through it. It is sunk in a manner similar to the cylinder caisson, the wells being filled with concrete to form a solid foundation. *C.T.D.*

monolithic. A wall without joints; for example, concrete. *VV.*

monolithic concrete. Concrete cast without joints, other than construction joints. *Taylor.*

monolithic lining. In a furnace, one formed by ramming or sintering a crushed refractory substance into position. *Pryor, 3.*

monolithic refractory. Furnace lining made in one piece or formed by casting, ramming, or tamping into position. *Osborne.*

monomaceral. Coal microlithotype consisting of a single maceral, that is, fusite or vitrite. *A.G.I. Supp.*

monometallic. Consisting of but one metal. *Fay.*

Monometer furnace. Trade name for an oil-fired rotary furnace, particularly for the melting of cast iron; a rammed refractory lining is used, generally similar to that in a cupola. *Dodd.*

monomineralic rock. A rock consisting essentially of one mineral, for example, dunite or anorthosite. *C.T.D.*

monomolecular film. *See* monolayer. *Pryor, 3.*

monomolecular layer. *See* unimolecular layer. *Pryor, 3.*

Monongahelan. Upper Pennsylvanian. *A.G.I. Supp.*

Monongahela series. The Upper Productive Coal Measures of the Pennsylvanian, of which they constitute the highest member. *C.T.D.*

Mono pump. This pump consists essentially of a rubber stator in the form of a double internal helix and a single helical rotor which rolls in the stator with a slightly eccentric motion. The rotor maintains a constant seal across the stator and this seal travels continuously through the pump, giving a positive uniform displacement. The Mono pump is manufactured to meet mining conditions. The rotor is made of special abrasion-resisting or noncorroding steel. It is self-priming and will therefore work on the snore. The length of the stator and rotor provides for a twist of slightly more than 360° to provide for a complete seal. For greater heads the length of stator and rotor are increased so as to provide two or more complete seals in series and the head is then developed in stages. *Mason, V. 2, p. 626.*

monopyroxene. Any of several pyroxene minerals that crystallize in the monoclinic system. They usually have considerable calcium and may or may not contain aluminum and the alkalies. Preferably called clinopyroxene. *Stokes and Varnes, 1955.*

monorail. A relatively new underground transport system in which the carriages, or buckets, are suspended from, and run along, a single continuous overhead rail or taut wire rope. The monorail is used in coal mines to transport supplies to the workings. It may be installed alongside the gate conveyor and worked by endless or main rope. *See also* overhead monorail; overhead rope monorail; Becorit system. *Nelson.*

monorail crane. A traveling crane which is suspended from a single rail. *Crispin.*

monoschematic. Applied to a body of rock or a mineral deposit, the fabric of which is identical throughout. Opposite of macropolyschematic. *See also* chorismite. *A.G.I.*

monotectic. An isothermal, reversible reaction in a binary system, in which a liquid on cooling decomposes into a second liquid or a different composition and a solid. It differs from a eutectic in that only one of the two products of the reaction is below its freezing range. *ASM Gloss.*

monotower crane. A tower crane which rotates through a full circle and is erected on a fixed base. *Ham.*

monotron. An identation hardness testing machine by which measurements are obtained by the pressure required to indent the specimen with a diamond of five-eighths millimeter in diameter, the depth of indentation remaining constant. *Henderson.*

monotron hardness test. A method of determining the indentation hardness of metals by measuring the load required to force a spherical penetrator into the metal to a specified depth. *ASM Gloss.*

monovalent; univalent. a. Having a valence of 1. *Webster 3d.* b. Having one valence; for example, calcium which has only a valence of 2. *Webster 2d.*

Monroan or Monroe stage. Marine and estuarine strata which succeed the Salinian in Michigan, Ohio, and New York, and in Ontario, Canada; they consist of limestones, dolomites, and a pure quartz sand, the Sylvania sandstone. *C.T.D.*

montana. a. Sp. Mountain. *Fay.* b. Mex. ores scattered through country rock and not found in deposits of any appreciable size. *Fay.*

Montana agate. A name for mocha stone from Montana. *Shipley.*

Montana moss agate. So-called moss agate or mocha stone from Montana, the principal source of these stones. Principally from bed of the Yellowstone River and containing manganese (pyrolusite). *Shipley.*

Montanan. The Middle Cretaceous, comprising the Pierre group below and the Fox Hill group above; succeeded by the Laramian and underlain by the Coloradoan. Represented in Canada by coal-bearing strata in Alberta. *C.T.D.*

Montana ruby. a. Pyrope or almandine garnet, although like any misnomer it may have been used for other garnets, or indeed any stone. *Shipley.* b. Grossularite garnet. *Shipley.*

Montana sapphire. A sapphire from Montana. Many fancy colors in addition to blue stones have been produced in this state. As a trade grade, it refers to the sapphire, no matter where found, possessing a comparatively light and comparatively grayish-blue color called electric blue, or steel blue. Stones of this grade from Montana have a slightly metallic-appearing luster. *Shipley.*

montanite. A rare tellurate of bismuth, $Bi_2O_3.TeO_3,2H_2O$, from Montana. *Fay.*

montan wax. Wax extracted from certain lignites, partly saponifiable; not related to ozokerite. *Schieferdecker.*

Montasite. A registered trade name for asbestos fiber from the Montana mine, Pietersburg-Lydenburg District, Republic of South Africa. A variety of amosite. *English.*

Mont Blanc ruby. Reddish quartz. *Shipley.*

montbrayite. Gold telluride, Au_2Te_3, as tin-white triclinic crystals from Montbray, Quebec. Named from the locality. *Spencer 17, M.M., 1946.*

montebrasite. The name given to amblygonite when there is an increase of hydroxyl. *C.M.D.*

Monteifiore furnace. A small furnace used for the recovery of zinc from blue powder by liquation. *Fay.*

monteponite. Cadmium oxide, CdO, as minute black octahedra described by B. Neumann and E. Wittich from Monteponi, Sardinia. Named from the locality. *Spencer 18, M.M., 1949.*

Monterey shale. A hard flinty shale passing upwards into a chalky rock containing only foraminifera and diatoms; a formation of Middle Miocene age in California and possible source rock of oil. It is 7,000 feet thick. *C.T.D.*

montgomeryite. A hydrous phosphate of calcium and aluminum, $Ca_4Al_5(PO_4)_6(OH)_5.11H_2O$, as green to colorless monoclinic crystals in variscite nodules. Found in Utah. *Spencer 15, M.M., 1940.*

Montgomery jig. A plunger-type jig with the plunger beneath the screen. The distinguishing feature of this jig is the use of two sets of valves beneath the screen plate. Used extensively in washing bituminous coal, both closely sized and slack sizes. *Mitchell, p. 427.*

Montian. Middle or lower Paleocene. *A.G.I. Supp.*

monticellite. A mineral, $CaMgSiO_4$, usually occurring in colorless to gray orthorhombic crystals embedded in limestones. *A.G.I.*

monticle. A little hill, knob, or mound; especially, a subordinate volcanic cone. *Standard, 1964.*

monticulate. Characterized by or having little knobs or hills. *Standard, 1964.*

montiform. Mountainlike; having the shape of a mountain. *Fay.*

montmartrite. A variety of gypsum, containing calcium carbonate. *Standard, 1964.*

montmorillonite. a. Clay minerals which have a theoretical composition of essentially $Al_4Si_8O_{20}(OH)_4.nH_2O$. Montmorillonite always differs from the theoretical formula because of substitutions within the lattice, for example, magnesium, nickel, zinc, iron, phosphorus, or some of the substituting elements. *Bureau of Mines Staff; Pryor, 3.* b. A hydrated silicate of magnesium, one of the important clay minerals and the chief constituent of bentonite and fuller's earth, $(Al,Mg)_8(Si_4O_{10})_3(OH)_{10}.12H_2O$. *Dana 17.*

montre. An opening in a kiln wall to permit inspection of the contents. *Standard, 1964.*

montrealite. A melanocratic-olivine essexite consisting of major titanaugite and titanhornblende, olivine, and plagioclase. It may contain biotite and nepheline, with accessory calcite, apatite, sphene, zircon, and opaque oxides. *A.G.I.*

montroseite. a. A uranium-bearing sandstone *E.C.T., v. 14, p. 585.* b. A rare, weakly radioactive, orthorhombic, black mineral, (V,Fe)O(OH); occurs filling interstices in sandstones, associated with hewettite, pitchblende, and corvusite. A member of the diaspore group. *Crosby, p. 128.*

montroydite. Oxide of mercury, HgO. *Sanford.*

monument. The structure erected to mark the position of a corner. Permanence is implied. In a legal sense a monument is any physical evidence of a boundary of real property. *Seelye, 2.*

monument worker. In the stonework industry, a general term applied to any worker connected with the finishing of marble or granite into memorials. *D.O.T. 1.*

monzonite. a. (of von Kobell). An aluminosilicate of alkalies, Fe'', and calcium. *Hey 2d, 1955.* b. (of de Lapparent) A rock name. *Hey 2d, 1955.* c. A granular plutonic rock containing approximately equal amounts of orthoclase and plagioclase and thus, intermediate between syenite and diorite. Quartz is usually present but, if it exceeds 2 percent by volume, the rock is classified as quartz monzonite or adamellite. Either hornblende or diopside, or both, are present and biotite is a common constituent. Accessories are apatite, zircon, sphene, and opaque oxides. *A.G.I.*

moocher. A man in attendance during sampling operations to prevent salting, whether fraudulent or accidental. *Nelson.*

moonstone. A gem stone which is a variety of orthoclase or albite or intermediary mixtures. Found in California, Virginia, and Pennsylvania; and in Ceylon, Switzerland, Brazil, Australia, and Canada. *See also* feldspar. *CCD 6d, 1961*.

moonstone glass. A type of opal glass resembling the mineral moonstone. *ASTM C162-66*.

moor. a. A more or less elevated tract of open waste, or barren land, having, as a rule, a rather broad, flat, and poorly drained surface, commonly diversified by peat bogs and patches of health. *Fay*. c. Corn. An enrichment of ore in a particular part of a lode. *See also* more. *Fay*. c. A common term for peat unfit for fuel, as opposed to turf, which is dug for fuel. *Tomkeieff, 1954*.

moorband. Synonym for moorband pan. *Fay*.

moorband pan; moorpan. Eng. A hard ferruginous crust that forms at the bottom of boggy places above a stiff and impervious subsoil. *Fay*.

moor coal. a. A friable variety of lignite. *Fay*. b. Variety of brown coal characterized by good cleavage; it breaks into cuboidal or trapezoidal fragments. *Tomkeieff, 1954*.

Moore and Neill sampler. This sediment coring device is essentially a protected glass tube through which water flows freely during descent and which is forced by impact into the sediment. On hauling, a simple valve mechanism closes the top of the tube and the sample may be brought to the surface. The body of the sampler is a brass cylinder into which fits a thinner metal tube holding the glass sampling tube. When the glass tube is in position it is closed by a rubber bung which comes hard against the upper surface of the main body of the sampler in the center of which is a hole. *H&G*.

Moore-Bin Discharger. Trade name for a system of vibrating fins arranged to assist the discharge of clay, or other sticky material, from a storage bin. *Dodd*.

Moore-Campbell kiln. An early type of electric tunnel kiln; its principal feature was the free suspension of the heating elements on refractory knife edges. *Dodd*.

Moore filter press. A movable, intermittent vacuum filter consisting of a series, or basket, of leaves fastened together in such a way, that it may be dropped in a pulp tank and kept submerged until a cake is formed; it is then transferred by crane to an adjoining wash-solution tank and washed; the basket is then lifted out of the tank and the cake dropped. *Liddell 2d, p. 391*.

Moore free corer. This sediment sampler is designed to drop free from a ship to the sea floor, obtain a core and return to the surface leaving its expendable weight and casing embedded in the bottom. The free corer consists of two basic assemblies: (1) a recoverable core barrel, check valve, buoyant chamber assembly filled with gasoline, and (2) an expendable weight and casing assembly. When these two assemblies are combined, the core barrel fits loosely inside the casing. The device is dropped over the side of the ship and allowed to fall free to the bottom. A simple release-delay timer made of magnesium releases the core barrel and its buoyant float rises from the weight and casing assembly. *H&G*.

mooreite. A glassy white hydrous sulfate of magnesium, zinc, and manganese, $RSO_4.7R(OH)_2.4H_2O$, with $R=Mg:Mn:Zn=4:1:2$. Tabular crystals. Monoclinic. From Sterling Hill, N.J. *English*.

moorhouse. Corn. A hovel built of turf for miners to change clothes in. *See also* changehouse, b. *Fay*.

moorlog. a. Remains of a submerged forest, composed of a tangled mass of brushwood and tree trunks and forming a layer from 3 to 8 feet thick. *Tomkeieff, 1954*. b. Hard, brown peat dredged by fishing boats from the bed of the North Sea. *Arkell*.

moorpeat. Peat formed from moss, as is found in certain moors. *Fay*.

moor's head. A name for a colorless or greenish tourmaline crystal with a black termination or end. *Shipley*.

moorstone. Corn. Loose masses of granite found on Cornish moors. *Fay*.

moor whin. Same as whin. *Fay*.

moose pasture. Can. Derisive term applied to mining country which is largely muskeg. *Hoffman*.

mop. a. A disc of some material used around a drill, to prevent water from splashing up. *Stauffer*. b. Also, a piece of burlap or coarse cloth used for the same purpose. *Fay*.

mor. In contrast to "mull" a type of forest soil in which the humus layer forms a dense carpet over the soil. *Tomkeieff, 1954*. Synonymous with raw humus. *A.G.I.*

Mora diamond. Probably rock crystal. *Shipley*.

moraesite. Hydrous beryllium phosphate, $Be_2PO_4(OH).4H_2O$, as white fibrous masses. Monoclinic. From Sapucaia pegmatite mine, Brazil. *Spencer 20, M.M., 1955*.

morainal apron. Same as apron, a. *Fay*.

moraine. a. An accumulation of earth and stones carried and finally deposited by a glacier. *See also* end moraine; ground moraine; lateral moraine. *Webster 3d*. b. Accumulation of glacial drift with a distinct topographic form such as a ridge. *Mather*.

moraine of recession. A moraine formed in the course of a glacier's retreat. Also called moraine of retreat; retreatal moraine. *Standard, 1964*.

moraine profonde. Same as ground moraine. *See also* moraine. *Fay*.

morainic. Of, pertaining to, forming, or formed by a moraine. *Standard, 1964*.

morainic loops. Great loops, convex southward, in the continental terminal moraine of the North American glacial period; caused by ice tongues filling valleys. The junction of contiguous loops formed the interlobular moraines. *Standard, 1964*.

Moran and Proctor sampler. A simple, split-tube, drive-type soil-sampling barrel. The sampler is equipped with a thin-walled unsplit brass liner, which can be capped and sealed to act as a watertight shipping container for the sample. *Long*.

Moran sampler. Synonym for Moran and Proctor sampler. *Long*.

morass ore. Same as bog iron ore. *Standard, 1964*.

Morcol. A semigelatinous permitted explosive possessing both high power and good water-resisting properties. It has a density about midway between Dynobel No. 2 and Ajax. *Nelson*.

mordant. Dye-fixing agent (for example, basic hydroxides of aluminum, chromium, iron) which absorbs dye to form a lake. *Pryor, 3*.

mordenite. A white, yellowish, or pinkish member of the zeolite group of minerals with the formula $(Ca,Na_2)O.Al_2O_3.9SiO_2.6H_2O$. *Larsen, p. 96*.

more. Corn. A quantity of ore in a particular part of a lode, as a more of tin. *See also* moor, b. *Fay*.

Morecrop. Trademark for a dolomitic, hydrated lime having a neutralizing value reported as 166 percent in terms of calcium carbonate; used for adjusting soil potential hydrogen and furnishing the elements magnesium and calcium. *CCD 6d, 1961*.

Morehouse mill. A mill of the attrition type consisting esssentially of a vertically driven shaft, with horizontal milling elements, made of sintered alumina. It has been used for the preparation of vitreous-enamel slips and ceramic glazes. *Dodd*.

morenosite. A hydrated nickel sulfate, $NiSO_4+7H_2O$. *Fay*.

morgan. Aust. A band of carbonaceous shale occurring in the Borhole seam. *Fay*.

Morganian. Upper Upper Carboniferous. *A.G.I. Supp*.

morganite. A rose-colored, alkali-bearing, variety of beryl, of gem quality. Identical with the previously described vorobyevite. From Maharits, Valley of Sahatony, Malagasy Republic; Pala, San Diego County, Calif. *English*.

Morgan-Marshall test. A sandblast test for the evaluation of the abrasion resistance of refractory bricks. *Dodd*.

morgen. The South African measure of land, equal to 640.25 square roods, 92,196 square feet, 1.44 claims, or 2.1165 English acres. There are 284 morgens to the square mile. *Beerman*.

Moriah stone. Granular and spotted verd antique (serpentine). *Schaller*.

morinite. A red to white mineral with 1 perfect cleavage, $3Al_2O_3.2Na_2O.4P_2O_5.6CaF_2.18H_2O$; Mohs' hardness, 4; specific gravity, 2.94. *Larsen, p. 160*.

morion. A nearly black variety of smoky quartz. *Fay*.

Morisette expansion reamer. A reaming device equipped with three tapered lugs or cutters designed so that drilling pressure necessary to penetrate rock with a noncoring pilot bit forces the diamond-faced cutters of the reamer to expand outward, thereby enlarging the pilot hole sufficiently to allow the casing to follow the reamer as drilling progresses. The casing is rotated with a pipe wrench while the noncoring and expansion bit is turned by the drill, and the casing is allowed to follow down the reamed-out pilot hole about 1-½ to 2 inches behind the upper end of the reamer lugs. *Long*.

Morisette reamer. Synonym for Morisette expansion reamer. *Long*.

Morkill's formula. Valuation formula used to ascertain present value (Vp) of a mining share. *Pryor, 3*.

morlop. Aust. A mottled jasper pebble found in New South Wales, and much sought by miners, as it usually occurs with diamonds. *Fay*.

Mormon sandstone. A member of the Jurassic succession in California, comparable with the British Inferior Oölite. *C.T.D.*

moroxite. A blue or greenish-blue variety of apatite. *Fay*.

morphological crystallography. The study of the external shapes of crystals. *Hurlbut.*

morphologic unit. a. A rock stratigraphic unit identified by its topographic features, for example, a Pleistocene glacial deposit. *A.G.I. Supp.* b. A surface either depositional or erosional recognized by its topographic character. *A.G.I. Supp.*

morphology. a. The observation of the form of lands. *Standard, 1964.* b. The study of the form and structure of organisms. *A.G.I.*

morphotectonics. The tectonic interpretation of the morphological features of the earth. It is particularly a study of the larger features of continents and oceans, the great elevations and depressions and the lineaments that transect them, or in many instances, determine their outlines. *Challinor.*

Morrison formation. Part of the Upper Jurassic and Lower Cretaceous of the Rocky Mountain region, consisting of floodplain, fluviatile deposits containing dinosaur bones. *Compare* Kootenai series. *Bureau of Mines Staff.*

Morrowan. Lowermost Pennsylvanian. *A.G.I. Supp.*

mortar. a. A heavy iron vessel, in which rock is crushed by hand with a pestle, for sampling or assaying. *Fay.* b. The receptacle beneath the stamps in a stamp mill, in which the dies are placed, and into which the rock is fed to be crushed. *Fay.* c. A material used in a plastic state which can be troweled, and becomes hard in place, to bond units of masonry structure. *ASTM C11-60.* d. A plastic mixture of cementitious materials, fine aggregate, and water. *ACSG, 1963.*

mortar admixture. A material added to mortar as a water repellent or coloring agent to control setting rate. *ACSG, 1963.*

mortar aggregate. Fine granular material composed of hard, strong, and durable mineral products free of injurious amounts of saline, alkaline, organic, or other deleterious substances. *ACSG.*

mortar and pestle. An apparatus used for pulverizing chemicals in the laboratory. *Shell Oil Co.*

mortar bed. Lime-cemented, valley-flat deposits of clays, silts, sands, and gravels, found in Nebraska and Kansas. *A.G.I.*

mortar board. A square board, with handle underneath, on which a mason holds mortar. A hawk. *Crispin.*

mortar box. a. The large, deep, cast-iron box into which the stamps fall and the ore is fed in a gold or silver stamp mill; also called stamper box. *See also* mortar, b. *Fay.* b. The large box or trough in which mortar or plaster is mixed. *Crispin.*

mortar, heat setting. A refractory mortar of finely ground materials whose potential strength is dependent on use at furnace or process temperatures. *ASTM C71-64.*

mortar joints. A variety of styles of finishing the mortar in brick or masonary work. *Crispin.*

mortar mill. A mixing and stirring machine for combining lime, sand, and other materials to make mortar. A form of pug mill. *Fay.*

mortar, refractory. *See* air-setting refractory mortar; grog fire clay mortar; ground fire clay mortar. *ACSG, 1963.*

mortar structure. Suggested by Tornebohm to describe those granites, gneisses, or other rocks that have been dynamically crushed, so that large nuclei of their original minerals are set in crushed and comminuted borders of the same, like stones in a wall. *Fay.*

morted ware. A fault in pottery ware resulting from a small local concentration of soluble salts forming on the surface of the green ware or the biscuit ware. In the green state, the fault may result from a drop of water falling on the ware, during fettling for example. In the biscuit state, the fault arises from moisture condensing on the ware during the early stages of firing. *Dodd.*

Morte slates. Slate rocks found in the Upper Devonian strata of north Devonshire and west Somerset, England; extensively quarried for roofing slates. *C.T.D.*

mortification. Destruction of active qualities, as in mercury amalgamation. *Standard, 1964.*

mortise; mortice. A rectangular hole cut in one member of a framework to receive a corresponding projection on the mating member. *C.T.D.*

morts terrains. Fr. Barren or dead ground. The water-bearing strata overlying the coal measures. *Fay.*

mosaic. a. A map made from aerial photographs. The individual photographs are set in such a way that a complete picture of the area is obtained. Mosaics are either uncontrolled or controlled. Uncontrolled mosaics are cheaper to produce but are not related to any ground survey control and details on one photograph are simply joined to adjacent points on the next photographs. Such mosaics cannot be used for making accurate measurements. The production of controlled mosaics is costly and are only used for special purposes and where reproduction of every ground feature is required. Also called airborne mosaic. *See also* aerial mapping. *Nelson.* b. A petrological term for metamorphosed and fragmented rocks which have reformed in an angular pattern. *Pryor, 3.* c. A design formed by small pieces of glass, stone, or tile, usually set in a ground of cement or stucco. *Crispin.*

mosaic agate. Brecciated Mexican agate. *Shipley.*

mosaic gold. A complex product obtained by heating dry tin amalgam, ammonium chloride, and sulfur in a retort. A complex stannic sulfide. Sometimes used as a pigment. *C.T.D.*

mosaics. *See* ceramic mosaic tile; faience mosaic; glazed ceramic mosaic tile. *ACSG, 1963.*

mosaic silver. An amalgam of mercury, tin, bismuth, used for imitating silverwork. *Standard, 1964.*

mosaic structure. In crystals, a substructure in which neighboring regions have only slightly differing orientations. *ASM Gloss.*

mosaic texture. a. In mineralogy, a texture in which crystal fragments are angular and granular, and appear, in polarized light, like pieces of a mosaic. *Schieferdecker.* b. In petrology, a granoblastic texture in which the dividing planes between the individual grains are flat or nearly so. *Schieferdecker.*

mosandrite. A complex zirconium silicate mineral. *E.C.T., v. 15, p. 309.* Weakly radioactive, very rare, reddish-brown, becoming dull green or yellowish-brown by alteration; found in pegmatites. *Crosby, pp. 75-76.*

Moscovian. Middle Upper Carboniferous. *A.G.I. Supp.*

mosesite. A yellow mineral, $8[Hg_2N(Cl,SO_4,MoO_4,CO_3).H_2O]$, from El Doctor, Mex.; Terlingua, Tex. *American Mineralogist, v. 38, No. 11-12, November-December 1953, p. 1225.*

mosh. *See* mingy coal. *Nelson.*

mosquito amethyst. Amethyst containing tiny scaly or platy inclusions of goethite. *Shipley.*

moss. a. A term used for fractures or fissures in gem stones which produce the appearance of moss, as in many emeralds. *Shipley.* b. English vernacular name for peat. *Tomkeieff, 1954.*

moss agate. A kind of agate containing brown or black mosslike dendritic forms, due to the oxides of manganese or iron distributed through the mass. Also called Mocha pebble; Mocha stone. *Fay.*

moss box. A special feature of the Kind-Chaudron method of shaft sinking. Layers of moss were compressed to form a watertight joint between the bottom of the tubbing and the surrounding strata. It is now of historic interest only. *Nelson.*

moss copper. Fine green velvety filaments of impure copper found in lumps of smelted copper. *Bennett 2d, 1962.*

moss fallows. Parts of a bog from which the moss has been removed for fuel. *Standard, 1964.*

Mossfield loader. A scraper-box type of coal loader developed at Mossfield colliery (Great Britain) in 1953. It consists of a hinged front scooplike plate which elevates and deflects the broken coal onto the armored conveyor. On inclined faces, the loader is hauled by a double-drum Pikrose haulage. *Nelson.*

moss gold. Gold in dendritic forms. *Webster 3d.*

moss hag. A pit or slough in a marshy place; especially, a place where peat has been cut. *Webster 3d.*

mossing. During low water in the Salmon River, Calif. the algae and other plants growing in the stream are gathered, dried, and burned. The ashes are washed, and some gold is obtained. This process is called mossing. *Hess.*

mossite. A member of the tapiolate series, $Fe(Cb,Ta)_2O_6$. *See also* tapiolite. *Dana 7, v. 1, p. 775.*

moss jasper. a. A term sometimes used synonymously with moss agate although Eppler defines as moss agate almost opaque from packed inclusions. *Shipley.* b. A regional name for banded petrified wood with streaks of translucent quartz found in Arizona and in New Mexico. *Shipley.*

moss land. Land abounding in peat moss, but scarcely wet or marshy enough to be called a bog or moss. *Standard, 1964.*

moss opal. Milky opal with black mosslike (treelike) inclusions. *Shipley.*

mossotite. Synonym for mossottite. *Hey 2d, 1955.*

mossottite. A variety of aragonite. *Hey 2d, 1955.*

moss peat. Peat derived from water-loving mosses, chiefly Sphagnum. *Tomkeieff, 1954.*

moss silver. Silver in dendritic or filiform shapes. *Webster 3d.*

moss stone. a. Crystalline quartz containing inclusions of green, fibrous crystals, probably asbestos. *Shipley.* b. Same as moss agate. *See also* Thetis hair stone. *Shipley.*

mossy. Like moss in form or appearance; said of certain minerals. *Fay.*

mossy stone. In gemmology, a stone containing mosslike inclusions. *Shipley.*

mossy zinc. Granulated zinc obtained when the molten metal is poured into cold water. *Bureau of Mines Staff.*

mote; moat. A straw filled with gunpowder for igniting a shot; a fuse. *Fay.*

mother. a. Gouge clay in a mineral vein. *Arkell.* b. Shale adhering to quarried limestone. *Arkell.*

mother coal. A more or less pure carbon that still shows the cell structure of the original plant when viewed under the microscope. It is very soft and has a satin luster. *Kentucky, p. 26.*

mother conveyor. A term frequently used in connection with conveyors used in gathering service. The mother conveyor receives coal from other conveyors or gathering machines, such as shuttle cars, and delivers it to some central loading point. *Jones. See also* underground mine conveyors. *ASA MH4.1-1958.*

mother crystal; mother. A name given to the mass of raw quartz, either faced or rough, as found in nature. *AM, 1.*

mother gate. a. N. of Eng. The main roadway to a coal face up which men travel, air, power, and supplies pass, and down which coal from the face travels on a conveyor belt. *Trist.* b. The main gate of a district in longwall conveyor mining. *Nelson.* c. Eng. The main road of a district off which crossheadings are set away in longwall working. Also called level. *SMRB, Paper No. 61.*

motherham. Old name for fusain. *Tomkeieff, 1954.*

Mother Hubbard bit. A heavy drag-type or fishtaillike bit having a long grooved shank, the diameter of which is only slightly less than the width of the cutting edges; it is designed for drilling boreholes in formations that mud-up excessively. *Long.*

mother liquor. The magmatic rest solution from which a mineral deposit has received its metal content. *Schieferdecker.*

mother lode. a. The principal lode or vein passing through a district or particular section of country. *Fay.* b. The great quartz vein in California, traced by its outcrop for 80 miles from Mariposa to Amador. *Standard, 1964. See also* champion lode. *Fay.*

mother of coal. *See* mineral charcoal. *Fay.*

mother of emerald. A variety of prase; a leek-green quartz owing its color to included fibers of actinolite; thought at one time to be the mother rock of emerald. *C.M.D.*

mother of opal. Rock matrix containing minute disseminated specks of precious opal. *Shipley.*

mother of pearl. Iridescent portion of mollusk shells, made of the mineral aragonite. *Hurlbut.*

mother-of-pearl opal. Same as cachalong. *Shipley.*

mother-of-ruby. Ruby matrix. *Shipley.*

mother rock. Any rock from which other rocks or sediments are derived or in which ores or other deposits are found. *See also* parental magma. *A.G.I.*

mother substance of coal. Plant debris which eventually gave rise to coal. *Tomkeieff, 1954.*

motion. a. A local Ohio term for the area of a quarry covered by the swing of a derrick boom, and, in addition, the area from which the blocks of stone may be economically dragged. *Fay.* b. Used in granite regions to designate small paving-block quarries. *Fay.* c. A place in which a stonecutter quarries his own stone for subsequent cutting and finishing. *Fay.* d. The part of the pit in which work is in actual progress. *Fay.*

motion driver. In bituminous coal mining, one who operates the engine that motivates an endless cable by which cars are raised or lowered along an inclined haulageway. Also called motioner. *D.O.T. 1.*

motioner. *See* motion driver. *D.O.T. 1.*

motion study. A technical investigation of the essential movements of a workman when performing a specific task, and assessing the results with the object of reducing his labor and increasing his work performance. The study may also include the layout tasks, availability of tools or materials, and the design of new methods. *See also* time study. *Nelson.*

motive column. The height of a column of air, of the same density as the air in the downcast shaft, which exerts a pressure equal to the ventilating pressure. It is the ventilating pressure expressed in feet of air column. *Nelson.*

motive power. An agency (as water, steam, wind, or electricity) used to impart motion to machinery. *Webster 3d.*

motive zone. In mine subsidence, that portion of the mined strata which, being still in process of sinking, goes far to furnish the motive power producing the phenomena. *Briggs, p. 61.*

motometer. A speed counter, as for a steam engine; also a speedometer. *Crispin.*

motor. a. One who or that which produces or imparts motion or mechanical power. Specifically, a machine for producing or causing motion, especially one that acts by transmitting some other kind of energy into mechanical energy, or the energy of position into that of motion; a prime mover, as a steam engine, windmill, water wheel, or reversed dynamo. *Standard, 1964.* b. A haulage engine used around mines and operated by electricity or compressed air. *Fay.* c. A mine locomotive. *Grove.* d. A machine for converting electrical energy into mechanized energy. *See also* generator. *Nelson.*

motor benzol. A mixture of the three lower aromatic hydrocarbons, benzene, toluene, and xylene in the approximate proportions 75, 15, and 10 percent, respectively. Small proportions of other hydrocarbons and impurities may be present, usually less than 10 percent. *Francis, 1965, v. 1, p. 302.*

motor body. The boxlike portion at the lower end of a coal-cutting machine. *Fay.*

motor boss. In mining, a foreman who directs locomotive (motor) haulage operations underground and at surface of mine. Also called car dispatcher; car distributor; dispatcher; passing boss; traffic man; train dispatcher; turn keeper. *D.O.T. 1.*

motor brakeman. *See* locomotive brakeman. *D.O.T. 1.*

motor-change man. In anthracite and bituminous coal mining, one who in addition to charging and repairing batteries, removes spent storage batteries from electric mine locomotives and replaces them with freshly charged ones. *D.O.T. 1.*

motor driver. In bituminous coal mining, one who operates a small electric haulage locomotive to haul mine cars underground and at the surface of a mine. *D.O.T. 1.*

motor enclosure. The principal methods of enclosure are: (1) open-type construction, employed when the motor is to work in a well-ventilated, dust-free engine room (2) screen-protected: the casing is built to protect the windings, but large openings are provided to allow free entry of air; (3) drip-proof: air is allowed easy access to the interior of the motor, but specially shaped hoods or cowls are fitted to prevent water dripping or being splashed into the machine; (4) totally enclosed: all the heat of the motor is radiated from the external surface, sometimes provided with ribs or fins to increase heat dissipation; and (5) totally enclosed fan-cooled type has an external fan mounted on the shaft, the air from which is directed over the outer surface of the motor casing, increasing the cooling effect, and thus enabling a greater horsepower to be obtained from a given frame size than would be possible with a plain, totally enclosed design. *Mason, v. 2, pp. 430-431.*

motor hammer drills. These drills usually have a built-in gasoline engine as prime mover, flushing being provided by the exhaust gases or by compressed air produced in the machine. Total weight varies between 50 and 120 pounds. Motor hammer drills are used for odd-job operations, on forest roads, in prospecting, etc., where it is not worth while to lay air supply lines on account of transport difficulties or insufficient volume of work. *Fraenkel, v. 1, Art. 8:30, pp. 19-21.*

motorized grader. *See* grader. *Nelson.*

motorman. The man who operates a haulage locomotive. *Jones.*

motorman coupler. *See* coupler, a. *D.O.T. 1.*

motorman helper. *See* brakesman, c. *D.O.T. 1.*

motor nipper. *See* locomotive brakeman. *D.O.T. 1.*

motor truck; lorry. A self-propelled road vehicle. For quarry and open-cast transport, motor truck capacities range from 5 to 40 tons; for smooth operation, adverse road grades should not exceed about 1 in 7. The truck bodies are usually steel, with end, side or bottom discharge, and tilting may be performed by hydraulic cylinder and ram. Where discharge is at a fixed station, an auxiliary hoist is sometimes used for tilting. *See also* dump truck. *Nelson.*

motorway. A road designed and reserved for use only by power-driven vehicles. *Ham.*

mottle. The spotted, blotched, or variegated appearance of any mottled surface, as of wood or marble; especially, in metallurgy, the appearance of pig iron of a quality between white and gray. *Standard, 1964.*

mottled clay. Variegated clay rock, found, for example, in the Keuper marls. The mottling results from oxidation of iron compounds in localized patches. *C.T.D.*

mottled iron. Pig iron in which the majority of the carbon is combined with iron in the form of cementite, Fe_3C, but in which there is also a small amount of graphite. The fractured pig has a white crystalline fracture with clusters of dark spots, indicating the presence of graphite. *C.T.D.*

mottled limestone. Limestone with narrow branching or anastomosing fucoidallike, cylindrical masses of dolomite, often with a central tube or hole. May be organic or inorganic in origin. *A.G.I.*

mottled sandstone. A variegated sandstone found in the Bunter series of the Triassic system in the Midlands and North of England. *C.T.D.*

mottled silica brick. Those having harmless areas of dark cream to reddish brown. *Bureau of Mines Staff.*

mottled slates. Those in which blotches of red or purplish colors appear on a generally green surface. They are ascribed chiefly to mineralogical differences brought about by metamorphism. *AIME, p. 792.*

mottled structure. Primary mottling consists of discontinuous lumps, tubes, pods, and pockets of a sediment randomly enclosed in a matrix of contrasting textures; usually formed by filling of animal borings and burrows. *Pettijohn.*

mottled ware. A finish, most often of gray color, and composed of a series of spots of various depths of gray reproducing in enamel the appearance of coarse granite structure. *Hansen.*

mottling. a. A form of decoration applied to vitreous enamelware, to glazed ceramic tiles, and to some studio pottery. For tiles the effect is produced by hand, with a sponge, or by a rubber roller. *Dodd.* b. The staining that sometimes develops during the firing of silica refractories; the stains are irregular in shape and vary from red to brown. The cause is precipitation of Fe_2O_3 from solution in the matrix of the brick. These stains are also sometimes referred to as liver spotting or flowers. *Dodd.*

mottramite. A variety of descloizite in which the zinc element is almost entirely replaced by copper; one of the more important vanadium minerals. *C.M.D.*

Mott-Smith gravimeter. An instrument in which the moving system consists entirely of fused quartz, the restoring and labelizing forces being provided by quartz fibers. *A.G.I.*

motty. a. Check; tally; token. *Mason.* b. Eng. A collier's mark on his corf. *See* tally, a and b. *Fay.*

mould. *See* mold.

moulin. Fr. A nearly cylindrical vertical shaft in a glacier scoured out by meltwater and rock debris pouring into it. *Webster 3d.*

mound. *See* terp. *Schieferdecker.*

mound breakwater. *See* rubble-mound breakwater. *Ham.*

mountain. An eminence or ridge, either isolated or part of a range or a group, standing conspicuously above the surrounding or neighboring country and, as a rule, characterized by steeply sloping sides, a relatively small summit area, and considerable bare rock surface. *Fay.*

mountain blue. Blue copper ore; azurite. *Fay.*

mountain brown ore. Limonite or brown iron ore. A local name applied in Virginia to the low-grade siliceous variety, which commonly occurs in hard lumps and is found on the mountain slopes at or near the contact of the Cambrian shale and sandstone with the Cambro-Ordovician limestone. *See also* valley brown ore. *Sanford.*

mountain building. The building of mountains, by accumulation (volcanoes) or by any kind of earth movement. *Challinor.*

mountain butter. Synonym for alunogen. A hydrated aluminum sulfate in delicate fibrous masses or crusts. *Fay.*

mountain chain. A series of mountains connected, and having some common characteristics. *Fay.*

mountain cork. A variety of asbestos resembling cork. It is light and floats on water. Also called mountain leather. *Fay.*

mountain crystal. Rock crystal. *Webster 3d.*

mountain flax. a. Same as amianthus. A fine silky variety of asbestos. *Fay.* b. Asbestos or asbestos cloth. *Standard, 1964.* Also called earth flax. *Fay.*

mountain glacier. All types of glaciers in which rock projects above the highest levels of the ice and snow are known as mountain glaciers. *A.G.I.*

mountain green. Malachite. *Fay.*

mountainite. A fibrous zeolitic mineral containing no Al_2O_3, unit-cell contents $(Ca,Na_2K_2)_{10}Si_{32}O_{80}\cdot 24H_2O$; monoclinic. *Spencer 21, M.M., 1958.*

mountain leather. A tough variety of asbestos in thin, flexible sheets. *See also* mountain cork. *Fay.*

Mountain Lily topaz. Blue topaz from the Mountain Lily mine in San Diego County, Calif., in which large fine blue topaz has been found. *Shipley.*

mountain limestone. The English designation of a limestone of the lower part of the Carboniferous age; also called Subcarboniferous limestone. *Fay.*

mountain meal. Infusorial earth. *See also* bergmehl. *Fay.*

mountain milk. A very soft, spongy variety of calcite. *Standard, 1964.*

mountain mine. Eng. A name of a coal in the Burnley coalfield. *Tomkeieff, 1954.*

mountain paper. a. A thin, paperlike, variety of mountain cork. *Fay.* b. Synonym for mountain leather. *Hey 2d, 1955.*

mountain pediment. a. Many of the mountains in the Papago Country of southwestern Arizona are bordered by plains cut in rock which superficially resemble alluvial slopes. These plains are eroded by weathering in place and by corrosion of running water. An analysis of the processes of erosion of mountain slopes and of the rock plains at their bases are presented. The term pediment, with a series of qualifying adjectives, is proposed for the rock plains. *A.G.I.* b. A plain of combined erosion and transportation at the foot of a desert mountain range similar in form to the alluvial plains that front the mountains of an arid region but without alluvial cover and composed of solid rock. *USGS Bull. 730, 1923, pp. 52-58, 88.*

mountain railway. A railway having such steep gradients that trains are hauled up them by ropes or by a rack locomotive. *See also* funicular railway. *Ham.*

mountain range. a. Loosely, same as mountain chain. *Standard, 1964.* b. Strictly, one of the component portions of a mountain chain, formed by a single orogenic movement (monogenetic). *Standard, 1964.*

mountain sickness. *See* soroche. *Hoov, p. 509.*

mountain soap. An unctuous variety of halloysite containing some iron oxide and about 24 percent water. *Fay.*

mountains of dislocation. Applies to such ridges as are due to the rearrangement of strata, either by bending or fracture. The modern terms are fold mountains and fault mountains. *A.G.I.*

mountain structure. Structure produced by the deformation of rocks. *Leet.*

mountain system. When several more or less parallel ranges are grouped together, they constitute a mountain system. *See also* mountain chain; mountain range; cordillera. *A.G.I.*

mountain tallow. A soft, waxlike, hydrocarbon; also known as hatchettite. *Fay.*

mountain tar. Same as mineral tar. *Tomkeieff, 1954.*

mountain wood. A variety of asbestos that is compact, fibrous, and gray to brown in color, resembling wood. *Fay.*

mounted-drill operator. *See* driller, machine *D.O.T. 1.*

mounted point. A small abrasive unit, variously shaped, permanently mounted on a spindle. *Dodd.*

mounted wheel. A small grinding wheel permanently mounted on a spindle. Formerly also called mounted point. *ASM Gloss.*

mounting. In power shovel nomenclature, the mounting consists of a frame on which the entire shovel is supported and on which it moves. *Carson, p. 38.*

mounting height. The mounting height of a lighting fitting is normally specified as the vertical distance between the working plane and the light source, or the distance between the ground level and the light source. *Nelson.*

mounting pipe. *See* column pipe. *Fay.*

mourite. A hydrous uranium molybdate having a composition near $(UO_2,UO_3).5\frac{1}{2}MoO_3 5\text{-}\frac{1}{3}H_2O$; violet nodules, crusts, and plates. Named from the composition. *Hey, M.M., 1964; Fleischer.*

mousehole. In a rotary drill substructure, a socket that holds a single piece of drill pipe ready to be added to the string. *Nichols.*

mousetrap. A cylindrical fishing tool fitted with an inward-opening flap valve at the bottom end, used to recover small metal fragments from the bottom of a borehole. *Long.*

mousseline. A thin glass, blown so as to imitate patterns in lace, as for claret glasses. Also called mousseline glass. *Standard, 1964.*

mouth. a. An opening resembling or likened to a mouth, as one affording entrance or exit. *Webster 2d.* b. The end of a shaft, adit, drift, entry, tunnel, etc., emerging at the surface. *Fay.* c. The entrance to a mine. *B.C.I.* d. The top of a mine shaft or the point of entrance to a slant, drift, or adit. *Nelson.* e. Synonym for collar, as applied to a borehole. *Long.* f. Any of several furnaces, each connected by a flue to a central opening in the oven of a pottery kiln. *Webster 3d.* g. The opening in a metallurgical furnace through which it is charged; also, the taphole. *Fay.* h. *See* nose, f. *Dodd.*

mouth grinding. After the cap of a hollow blown article has been cracked off, the mouth is ground flat and then sometimes beveled slightly on the inside and outside edges before being fire finished. *C.T.D.*

mouthing. *See* shaft inset. *Nelson.*

mouth of pit. Aust. The top of a shaft. *Fay.*

mouthpiece. There is a difference in usage of this term as applied to a pug or auger, more commonly it refers to the die only, but sometimes to the die-plus-spacer. *See also* auger; pug. *Dodd.*

mouth plate. a. Scot. A ridged cast-iron plate to direct hutch wheels from plates to rails.

Fay. b. Scot. An iron plate over the mouth of a borehole. *Fay.*

movable conveyor. Any of several types of conveyors designed to be moved in a defined path. *See also* portable conveyor, b; shuttle conveyor, b. *ASA MH4.1-1958.*

movable jaw. The jaw or slip of a safety or foot clamp, which can be raised or lowered into or out of the body or frame of the clamp either to engage or to disengage the drill rods being run into or pulled out of a borehole. *Long.*

movable ladder. *See* man machine. *Fay.*

movable sieve-type washbox. A washbox in which the screen plate supporting the bed of material under treatment is moved up and down in water. *B.S. 3552, 1962.*

movable slip. Synonym for movable jaw. *Long.*

movable stock. Eng. Such equipment as can be sold without prejudice to the working of the colliery. It comprises, therefore, old pumps, unnecessary engines, and useless materials of every description. *Fay.*

move. a. N. Wales. A roof which is just about to fall, or is taking weight. *Fay.* b. In the handmade glass industry, a stipulated output per chair for an agreed rate of pay. *See also* chair, b and c. *Dodd.*

move-up. Extension; move to a forward position. *Mason.*

moving annual total. In study of process costs (in large or in detail) a series of costs-per-unit observed and recorded at regular intervals (usually in monthly financial summaries cross referenced to analyzed detail cost). Twelve months are covered and each month the new month's figures are added and those for the corresponding month of the previous year are removed. Therefore, like periods are always compared and seasonal fluctuations are smoothed out. Abbreviation, M.A.T. *Pryor, 3.*

moving-coil instrument. A coil of very light construction is pivoted so that it can move in the air gap of a powerful permanent magnet; current is led to and from the coil through hair springs, which also restrain the movement in the zero position. A pointer attached to the coil spindle moves across the instrument scale to indicate the magnitude of the voltage or current being measured. *Mason, v. 2, p. 406.*

moving electrode controller. *See* liquid controller. *Sinclair, V, p. 112.*

moving forms. Climbing forms for concrete work, used with great success for the construction of grain silos and similar structures. *Ham.*

moving grizzly. One in which alternate bars rise and then fall gently, any required lateral (conveying) movement being built into the mechanism, therefore reducing loss of headroom in conveying and screening. Other types are traveling bar grizzly, ring-roll and chain grizzly. *Pryor, 3.*

moving-iron instrument. This instrument depends for its action upon the movement of a pointer attached to a spindle carrying a piece of soft iron, which may be either attracted or repelled under the influence of a field produced by a fixed magnetizing coil. The pointer is restrained in the zero position by a spring. *Mason, v. 2, pp. 406-407.*

moya. S. Am. Volcanic mud, sometimes carbonaceous: applied chiefly to such exudations in South America. *Standard, 1964.* Also called mud lava. *Fay.*

moyite. A fine- to coarse-grained, gray, white, or pink igneous rock with a hypautomorphic-granular texture; quartz, orthoclase, cryptoperthite or microperthite, biotite and hornblende are essential constituents. From Moyie Sill, British Columbia, Canada. *Johannsen, v. 2, 1932, p. 28.*

moyle. An iron with a sharp steel point, for driving into clefts when levering off rock. *Zern.*

mp Abbreviation for melting point. *BuMin Style Guide, p. 60.*

MP Abbreviation for multipole. *Zimmerman, p. 72.*

M.P.F.M. jet auger. An auger equipped with cutting blades, designed so that fluid, under pressure, passing through inclined holes just above the blades, washes away the material loosened by the blades, thereby cleaning the inside of the casing without disturbing the material below the bottom of the casing that is to be sampled. *Long.*

MPG Abbreviation for miles per gallon. Also abbreviated mpg. *Zimmerman, p. 207; Webster 3d.*

mph Abbreviation for miles per hour. *BuMin Style Guide, p. 60.*

MPH Abbreviation for miles per hour. Also abbreviated mph. *Zimmerman, p. 207; GPO Style Manual, p. 159.*

MPM Abbreviation for meters per minute. Also abbreviated mpm. *Webster 3d.*

mps Abbreviation for miles per second. *BuMin Style Guide, p. 60.*

m.r. Abbreviation for mine run. *Zimmerman, p. 70.*

MR Abbreviation for mill run. Also abbreviated m.r. *Zimmerman, p. 69.*

M.R.E. The Mining Research Establishment of the National Coal Board, Great Britain. Its prime purpose is to carry out tests and investigations aimed at increasing the efficiency of coal production while maintaining a high level of safety. *Nelson.*

M.R.E. profilometer. This apparatus consists essentially of a suitable tripod and drawing board, to which is attached a profilograph. This is a small ring pointer attached to a nylon cord which is carried on a spring-loaded reel. The reel rotates on a spindle which in turn rotates a smaller pulley and actuates the mechanism by which a slider carrying a marking point moves in sympathy with the ring pointer but to a reduced scale. When in use the board is placed in the plane section to be measured, a sheet of paper is pinned on to it and the ring pointer is moved to a point on the perimeter of the section. As well as measuring cross-sectional areas the apparatus can be used to survey mine shafts and to record the postions of pitot-static tubes and vane anemometers when a fixed point survey is being made. *Roberts, I., p. 61.*

MS Abbreviation for machine steel; margin of safety; medium steel. *Zimmerman, pp. 65, 68.*

M.S.A. all-service gas mask. A filter-type box respirator produced by the Mine Safety Appliances Company and which is approved by the U.S. Bureau of Mines for 2 hours of continuous or intermittent use. A timer is fitted to the top of the canister, and the position of the hand indicates the time that the canister has been in use; one complete revolution of the pointer indicates that the canister has completed the recommended period of usefulness. If desired, a speaking diaphragm can be incorporated in the facepiece, enabling the wearer to speak to another person or to speak by telephone. *McAdam, pp. 61-62.*

M.S.A. carbon monoxide detector. An apparatus for estimating the amount of carbon monoxide in mine atmospheres. It consists of a rubber bulb fitted with inlet and outlet valves which circulate the sample of air under test through a detector tube containing pumice stone impregnated with a mixture of fuming sulfuric acid and iodine pentoxide. If carbon monoxide is passed through this detector tube, the gas reacts with the iodine pentoxide, and the iodine which is liberated changes the color of the material in the tube in direct proportion to the amount of carbon monoxide present. The color in the tube is then compared with a color scale of percentages to show the percentage of carbon monoxide present. *McAdam, pp. 155-156.*

M.S.A. distributor. A higher-air-pressure directional machine which operates in the manner of a whitewashing machine and displaces coal dust from the roof and sides. This machine carries two tons of stone dust, and traveling at 11 feet per minute distributes over 26 pounds of dust per minute. *Sinclair, I, p. 259.*

M.S.A. methanometer. This methane indicator is one in which the sample is made to flow continuously over the filaments while the determination is being made. In this case two matched filaments form the adjacent arms of the bridge. One of these is specially activated in order to burn the methane while the other filament is inactive and operates at a somewhat lower temperature. This arrangement is designed to compensate for changes in barometric pressure, temperature, humidity, and the presence of carbon dioxide. Facilities for adjustment are provided to compensate for zero drift and change in battery voltage. The meter is provided with two shunts so that two ranges are provided on the scale, 0 to 5 percent by 0.1 division and 0 to 2 percent by 0.02 division. *Roberts, I, p. 88.*

M.S.A. self-rescuer. The Mine Safety Appliances Company produces this compact, lightweight device which consists of a flexible molded rubber body with a mouthpiece at the top, a hermetically sealed chemical cartridge within the body, and a nose clip. When the self-rescuer is to be used, the seal on the cartridge is broken, a plunger is pushed inward towards the body, and the unit is then ready to be inserted into the mouth. The body can be easily recharged with new hermetically sealed cartridges. It gives protection for 30 to 70 minutes according to the amount of carbon monoxide present. Is approved by the U.S. Bureau of Mines. *McAdam, p. 70.*

mscp Mean spherical candlepower. *Mason.*

msec Abbreviation for millisecond. *BuMin Style Guide, p. 61.*

Msec Abbreviation for megasecond. (1 million seconds). Also abbreviated ms. *BuMin Style Guide, p. 60; Zimmerman, p. 127.*

M series. Synonym for M design. *Long.*

M-series bit. Synonym for M-design bit. *Long.*

M-series core barrel. Synonym for M-design core barrel. *Long.*

msf Abbreviation for magnetostrictive force. *BuMin Style Guide, p. 60.*

MSL Abbreviation for mean sea level. Also abbreviated msl. *Zimmerman, p. 67.*

MSP Abbreviation for monosodium phosphate; monobasic sodium phosphate. *CCD, 6d, 1961.*

MST Abbreviation for mean solar time; mountain standard time. Also abbreviated mst. *Zimmerman, pp. 67, 71.*

M_s temperature. The temperature at which martensite begins to form in an alloy system on cooling. Specifically for steel, it is the temperature at which austenite begins to change into martensite on cooling. *ASM Gloss.*

Mt Abbreviation for mountain. Also abbreviated mt. *Zimmerman, p. 71.*

MT Abbreviation for metric ton. *Webster 3d.*

MTF Abbreviation for mechanical time fuse. *Zimmerman, p. 68.*

m^2 Abbreviation for square meter. *BuMin Style Guide, p. 62.*

M^3cf Billion cubic feet. *Williams.*

mμ Abbreviation for millimicron. *BuMin Style Guide, p. 60.*

mtn Abbreviation for mountain. Also abbreviated Mtn. *Zimmerman, p. 71.*

Mton Abbreviation for megaton. *BuMin Style Guide, p. 60.*

muck. a. Stone; dirt; debris. *Mason.* b. Unconsolidated soils, sands, clays, loams encountered in surface mining; generally, earth which can be severed and moved without preliminary blasting. *Pryor, 3.* c. Useless material; earth or rock which may or may not be mixed with coal or mineral. *See also* mullock. *Nelson.* d. (Can.) Rock or ore broken in process of mining. Also used to denote confusion and litter. *Hoffman.* e. To excavate or remove muck from. *Webster 2d.* f. To work hard; to toil. *Webster 2d.* g. (Scot.) Rubbish; soft, useless material. *See also* smut; dirt; mullock. *Fay.* h. A layer of earth, sand, or sediment lying immediately above the sand or gravel containing, or supposed to contain, gold in placer mining districts, and may itself contain some traces of gold. *Fay.* i. Mud rich in humus. *Nichols.* j. Finely blasted rock, particularly from underground. *Nichols.* k. Refuse from a mine; to remove such refuse. *B.C.I.* l. The broken rock or other material coming from a tunnel excavation. *Stauffer.*

muck bar. Gray, forge pig iron melted in a puddling furnace, then balled, squeezed, and rolled. *Mersereau, Materials of Industry, 1941, p. 458.*

muck boss. In bituminous coal mining, a foreman who is in charge of a crew of loaders shoveling rock into cars during the driving of new underground passageways from one part of the mine to another. *D.O.T. 1.*

mucker. a. A laborer who loads broken mineral into trams, or pushes them from stope chute to shaft. *Pryor, 3.* b. One who clears away material, as earth, gravel, rock, from a working area. *Webster 3d.* c. This term applies more especially to metal mines. *See also* mullocker. *Fay.* d. One who removes the refuse; a local term for work clothes. *B.C.I.* e. A miner whose duty is to load ore in the heading on cars after the ore has been extracted by the miners. *Ricketts, I.* f. (Can.) One who shovels muck into mine cars. The lowliest underground job. *Hoffman.* g. In metal and nonmetal mining, a laborer who shovels ore or rock into mine cars or onto a conveyor from which mine cars are loaded at some point removed from the working face, or works in a stope (vertical underground opening in which ore is mined), shoveling ore into chutes from which it is loaded into cars on haulage level below. Also called car filler; rock passer; shoveler. *D.O.T.1.* h. In the quarry industry, one who removes mud and muck from the surface and sides of natural stone deposits in a quarry with a pick and shovel. Also called grouter; quarry hand. *D.O.T. 1.* i. *See* grouter; machine scraper. *D.O.T. 1.*

mucking. a. The operation of loading broken rock by hand or machine usually in shafts or tunnels. *See also* mechanical mucking. *Nelson.* b. Can. Removing muck. A slang term to denote the act of cleaning up. *Hoffman.* c. *See* lashing, b. *C.T.D.* d. Term applied to shoveling underground. *Lewis, p. 197.*

muck iron. Crude puddled iron ready for squeezing or rolling. *Fay.*

muckite. A resin from the coalbeds at Neudorf, Moravia, Czechoslovakia; it fuses between 290° and 310° C, has a specific gravity of 1.0025, and a composition corresponding to $C_{20}H_{23}O_2$. *Fay.*

muckle. a. Soft clay overlying or underlying coal. *Fay.* b. Corn. A large jumper or drill. *Fay.*

muckle hammer. A scaling or spalling hammer. *Standard, 1964.*

muckman. *See* machine scraper. *D.O.T. 1.*

muck rolls. The first pair of rolls in a rolling mill. *Fay.*

mucks. Staff. Bad earthy coal. *See also* smut, b. *Fay.*

muck saw. A saw using an uncharged blade, usually steel, which runs in a bath or stream of carborundum abrasive. *AM,1.*

muck shifting. a. Operations concerned with stripping overburden, valuable gravels or sands in exploitation of opencast mineral deposits. *Pryor, 3.* b. Used for extensive earth-moving operations. *Pryor, 4.*

muck soil. Soil composed of thoroughly decomposed black organic material, with a considerable amount of mineral soil material, finely divided and with a few fibrous remains. *Stokes and Varnes, 1955.*

muck train. A set of muck rolls. *Standard, 1964.*

mucky hole. A taphole from which the iron is so pasty that it does not run freely. *Fay.*

mud. a. Generally, any soil containing enough water to make it soft. *Nichols.* b. A fine-grained, unconsolidated rock of the clay grade, usually with a high percentage of water. The dominant grain size is less than 0.01 millimeter. Mud is produced by erosion and according to the rocks from which it is derived, it may consist of clay, sand, limestone, or mixtures of these and other materials in any proportion. *Nelson.* c. The suspension made by mixing the drill circulation fluid (water) with the fine cuttings produced by the bit when drilling a borehole. *Long.* d. The mixture of water or oil with clay, and sometimes other special materials, used as a drill circulation liquid in drilling a borehole. Also called drill mud. *Long.* e. A fluid used for drilling wells. *Brantly, 1.* f. Moist and soft earth, or earthy matter whether produced by rains on the earthy surface, by ejections from springs and volcanoes, or by sediment from turbid waters; same as mire. *Fay.* g. Pelagic or terrigenous detrital material consisting of particles smaller than sand; that is, an undifferentiated sediment made up of particles mostly within the silt-clay range smaller than 0.0025 inch (0.0625 millimeter). *Hy.*

mud auger. A diamond-point bit with the wings of the point twisted in a shallow, augerlike spiral. Also called clay bit; diamond-point bit; mud bit. *Long.*

mud balance. An instrument used to measure the density of drilling mud. *B.S. 3618, 1963, sec. 3.*

mud barrel. a. A double-tube core barrel with a greater-than-normal clearance between the inner and outer tubes, for use with mud-laden circulation liquids. *Long.* b. A bailing device to bring to the surface the cuttings formed by the action of the bit at the bottom of a borehole in free-fall or churn drilling. *Long.* c. A small bailer. *Long.*

mud belt. The belt of marine deposits composed largely of detrital clay, and lying between the coarser terrigenous sediments to the landward and the deep oceanic organic oozes on the seaward side. At present, the inner boundary of the inner mud belt is the edge of the continental shelf. *A.G.I.*

mud bit. A pointed-edge, chisellike tool used for boring drill holes through clay or claylike overburden materials. Also called clay bit; diamond-point bit; mud auger. *Long.*

mud blasting. In this method, sticks of explosive are stuck on the side of a boulder with a covering of mud, and when detonated, very little of the energy of the explosive is used in breaking the boulder. *Higham, p. 92.*

mud bucket. The bucket attached to a dredger. *Standard, 1964.*

mud-buried ripple mark. Ripple mark with troughs filled with mud. *Pettijohn.*

mud cake. The material filling the cracks, crevices, pores, etc., of the rock or adhering to the walls of the borehole. The cake may be derived from the drill cuttings, circulating drill mud, or both; it is formed when the water in the drilling mud filters into porous formations, leaving the mud ingredients as a caked layer adhering to the walls of the borehole. *Long.*

mudcap. A charge of dynamite, or other high explosive, fired in contact with the surface of a rock after being covered with quantity of wet mud, wet earth, or sand, no borehole being used. The slight confinement given the dynamite by the mud or other material permits part of the energy of the dynamite being transmitted to the rock in the form of a blow. A mudcap may be placed on top or to one side, or even under a rock, if supported, with equal effect. Also called adobe; dobie; sandblast. *Fay.*

mudcap method. *See* secondary blasting.

mudcapping; plaster shooting. Charge for blasting rock without drilling, in which an explosive is placed on top of the rock and covered by a cap of mud or earth. *Fraenkel.*

mud carman. *See* luterman. *D.O.T. 1.*

mud cast. *See* mud crack. *Pettijohn.*

mud column. The length in feet, as measured from the bottom of a borehole of a drill-mud liquid standing in a borehole either while being circulated during drilling operations or when the drill string is not in the hole. *Long.*

mud cone. A volcanic cone built up of ejected mud. *See also* mud volcano. *Fay.*

mud crack; mud cast. Filling of desiccation cracks in mud, customarily sandstone; generally preserved as raised ridges (casts) arranged in polygonal patterns on underside of sandstone bed. *Pettijohn.*

mudding. Filling voids with clay in limestone from which sulfur has been extracted. *Bennett 2d, 1962 Add.*

mudding off. Commonly thought of as reduced productivity caused by the penetrating, sealing, or plastering effect of a drilling fluid. Actually there is little penetration into the capillaries of an ordinary producing formation, and a slight amount of differential back pressure will remove even thick filter cakes. *Brantly, 1.*

mud drag. A dredge for clearing the bottoms of rivers or harbors. *Compare* hedgehog, b. *Standard, 1964.* Also called mud dredge. *Fay.*

mud drilling. Drilling operations in which a mud-laden circulation fluid is used. *Long.*

mud engineer. An engineer who studies and supervises the preparation of various fluids and emulsions, collectively termed mud, used in rotary drilling. *A.G.I.*

mud fat. Aust. Unctuous and plastic like mud. *Standard, 1964.*

mudfish; mud engineer. In drilling an oil well, the man in charge of the mud pump which forces drilling fluids (mud flush) down to the bottom of the hole. *Pryor, 3.*

mud flat. A muddy, low-lying strip of ground by the shore, or an island, usually submerged more or less completely by the rise of the tide. *Fay.*

mudflow. A rapidly moving stream of mixed soil or rock and water having the consistency and composition of mud. The proportions of liquid and solid constituents vary widely. *Stokes and Varnes, 1955. See also* mudrush; soil creep.

mud fluid. *See* mud flush; drill mud.

mud flush. a. To clear fragmented materials from a borehole by circulating a mud-laden fluid. *See also* mud drilling. *Long.* b. The mud which is kept circulating in the borehole during rotary boring. It is pumped down the inside of the hollow rods and returns to the surface, with the rock chippings, on the outside of the rods. The mud flush (1) cools the bit; (2) helps to support the walls of the borehole; and (3) acts as a lubricant for the drill pipe. The mud flush was developed mainly for oil drilling in an effort to reduce the earlier number of blow outs. Also called mud fluid. *See also* drilling fluid; bentonite. *Nelson.*

mud-flush drilling. A method of drilling in which a mud of controlled physical properties is used as the circulating fluid. *B.S. 3618, 1963, sec. 3.*

mud-flush tests. Tests carried out at the boring site to insure that the mud solution is of the correct density and viscosity. The mud should test close to the following standards: specific gravity, 1.07; viscosity (500 cubic centimeter outflow), 15 seconds; filtrate (15 minutes at 100 pounds per square inch), 16 cubic centimeters; filter cake, three thirty-seconds of an inch. The only limit to the thickness of the mud is the capacity of the pumps to handle it, that is, it must be fluid and not a pasty clay. *Nelson.*

mud furrows. An early, now obsolete, term for groove casts. *Pettijohn.*

mud geyser. A geyser that erupts sulfurous mud. A type of mud volcano. *A.G.I.*

mud glacier. *See* solifluction. *A.G.I.*

mud gun. An apparatus for pushing a clay stopper into the taphole of a blast furnace. A steam cylinder operates a plunger inside a steel tube into which clay is fed from a hopper tube as the plunger is worked back and forth, and is thus forced into the taphole at end of cast. *Fay.*

mud hog. a. Synonym for mud pump. *Long.* b. Pressure tunnel worker. *Bureau of Mines Staff.* c. A machine for the disintegration of dry or moist plastic clay. It consists of a rotating swing hammer operating close to a series of anvils linked together to form a steeply inclined slat conveyor. *Dodd.*

mud jacking. A process in which a hole is bored through a concrete road slab which has subsided, and a water-soil-cement slurry is pumped under the slab to support it. *Ham.*

mud-laden. A liquid (usually water) mixed with finely ground earthy or clayey materials. *Long.*

mud-laden fluid. The water or oil fluid in which mud-like solids are suspended, used to support the open bore and cool and clear the cuttings from the bit. The fluid is circulated while rotary- and/or diamond-drilling a borehole. *See also* drill mud. *Long.*

mud lava. a. The water-saturated volcanic debris of mudflows or lahars. *A.G.I.* b. The sulfurous and occasionally carbonaceous material contained in mud pots or erupted from mud geysers or mud volcanoes. *A.G.I.*

mudline. Line of demarcation between fairly clear supernatant water and settling solids in a thickener or other sedimentation vessel. *Pryor, 3.*

mud logging. A method of determining the presence or absence of oil, gas, and salt water in the various formations penetrated by the drill bit. The drilling fluid and the cuttings are continuously tested on their return to the surface, and the results of these tests are correlated with the depth of origin. *Brantly, 1.*

mud lump. One of numerous mud-discharging cones dotting the shallows at the mouth of the Mississippi; upheaved from lower clays by pressure of surface deposits. *Standard, 1964.*

mud man. The operator of the valve at the end of the mud hose. *Williams.*

mud marks. The hardened flowings of mud over a smooth surface, or the same petrified (fossil mud marks). *Standard, 1964.*

mud mixer. A machine, pump, hopper, or other apparatus used to mix dry ingredients with water or other liquids to prepare a drill mud. Also called atomizer; jet mixer; mixer. *Long.*

mud off. The act or process of filling a borehole with mud-laden fluid to seal and support the walls, thereby preventing sloughing or the ingress or loss of water or oil. *Long.*

mud peat. Term in use in Ireland for a highly macerated peat forming the lower layers in a peat bog. *Tomkeieff, 1954.*

mud-pellet conglomerate. A sandstone containing abundant, flattened to rounded, small mudstone masses. *A.G.I. Supp.*

mud penetrator. A continuous seismic profiling system using electronically generated acoustic pulses to determine the sub-bottom structure of the sea floor in shallow water areas. *H&G.*

mud pit. a. A pit in which drilling mud is mixed, prepared, stored, or caught as it overflows from the drill-hole collar. *Long.* b. A reservoir acting as an intake pond for the suction hose of the mud pump circulating the mud fluid. *Long.* c. *See* slush pit. *Williams.*

mud pot. a. A geyser that throws up mud. *Standard, 1964.* Also called mud geyser. *Fay.* b. Synonym for mud swivel. *Long.*

mud pump. a. A pump used to pump mud-laden drill fluid to maintain circulation during borehole drilling operations. Also called mud hog; slush pump. *Long.* b. The circulating pump that supplies fluid to a rotary drill. Also called slush pump. *Nichols.* c. *See* circulating pump. *B.S. 3618, 1963, sec. 3.*

mud-pump valve. Valves of special design for use in mud pumps. *Long.*

mud ring. a. The section of a boiler where scale, alkalies, and sediment collect. *Bureau of Mines Staff.* b. The ring or frame forming the bottom of a water leg in a steam boiler. *Webster 3d.*

mud rocks. A general name applied to sediments composed most commonly of microscopic particles of quartz and clay, sometimes one and sometimes the other predominating. Such mud rocks may be massive or may have a fine and irregularly bedded or laminated structure when they are called shales. *A.G.I.*

mud rush. The more or less sudden inflow of peat, moss, sand, gravel, silt, or any other waterlogged material into shallow mine workings. The manager has a duty to take steps to prevent such inrushes as laid down in the Precautions against Inrushes Regulations, 1956. Also called mud run. *See also* inrush of water. *Nelson.*

mud saw. A disk of iron, steel, or copper varying in diameter from 8 to 50 inches, which, when fashioning colored stones, passes through a metal container partly filled with mud. *Shipley.*

mud scow. A flatboat or barge for the transportation of mud, generally used in connection with dredges. *Fay.*

mudsill. The lowest sill of a structure (as of a house, bridge, or dam) usually embedded in soil or mud. *Webster 3d.*

mud snapper. A small clamshell-type snapper which is about 11 inches long and weighs 3 pounds. It is attached to the bottom of a sounding lead by means of a hole drilled in the lead. The jaws are cast bronze and are actuated by a spring. The jaws are held open by engaging two trigger pins within the jaws. The mud snapper and sounding lead may be operated in shallow water by hand lowering or by lowering from a bathythermograph or oceanographic winch. *H&G.*

mud socket. A device attached to drill rods and used to remove or sand from a borehole. *Compare* mule shoe. *Long.*

mud solution. *See* drill mud; mud c and d. *Long.*

mudstone. A fine, more or less sandy argillaceous rock, having no fissile character, and somewhat harder than clay. *Fay.*

mudstone ratio. The numerical value of the ratio of the total thickness of red mudstone to the total thickness of green mudstone occurring within an assumed stratigraphic horizon. Its value is based upon the premise that uranium-bearing solutions will bleach red mudstone containing ferric iron to green mudstone containing ferrous iron. *Ballard.*

mudstone trap. Where uranium mineralization has been trapped at a mudstone-sandstone interface. *Ballard.*

mud stream. A mass of moving sediment mixed with water that includes landslides, mudflows, and turbidity currents. *A.G.I. Supp. See also* mudflow; solifluction. *A.G.I.*

mud sump. Synonym for mud pit. *Long.*

mud swivel. A modification of a water swivel specially designed for use when a mud-laden drill fluid is circulated in borehole-drilling operations. Also called mud pot. *Long.*

mud system. a. The technique and use of drilling mud as a circulating medium in drilling operations. *Long.* b. The mixer, sump, piping, and other equipment used to prepare, maintain, and transport mud-laden fluid. *Long.*

mud tank. A large tank or reservoir for mixing and storing drilling mud that is fed to the mud pump for circulation in the borehole. Returning circulation fluid is fed into the tank at the end opposite the pump suction line to allow coarse drill cuttings to settle. *Long.*

mud up. a. The act or process of filling, choking, or clogging the waterways of a bit with consolidated drill cuttings. Also called sludging; sludging up. *Long.* b. The act of process of filling the pores or cracks in the rock surrounding a borehole; also, to cause mud to adhere to the walls of a borehole. *Compare* mud off. *Long.* c. To seal a pot stopper or a joint in a furnace or in a producer gasline, by the application of wet clay. *ASTM C162–66.*

mud viscosity. The property of a mud-laden fluid to resist flow due to internal friction and the combined effects of adhesion and cohesion; for example, a Marsh funnel (used to measure the viscosity of mud) will discharge 1 quart of water in about 36 seconds, whereas an equal volume of an average drilling mud is discharged in 40 to 55 or more seconds from the same funnel. *Long.*

mud volcano. a. A conical hill of mud, from which material is ejected, generally cold, by and with various gases. The usual quiet emissions are interrupted at times by violent discharges, sometimes with columns of flame. *Standard, 1964.* b. A hollow cone in a volcanic region, from which mud (of volcanic ashes) is violently ejected by jets of steam and hot water. *Standard, 1964.* Also called salse; air volcano; maccaluba; mud cone. *Fay.*

mud wall cake. Synonym for mud cake. *Long.*

mud-walled. Having a wall of mud, or materials laid in mud instead of mortar. *Fay.*

mud wheel. In brickmaking, a wheel by which clay is thoroughly worked with water; a tempering wheel. *Standard, 1964.*

Mueseler lamp. An earlier type of miners' flame safety lamp in which the inner gauze cylinder of the Marsaut lamp is replaced by a conical chimney and that was supported by a gauze diaphragm which fitted between the top of the glass cylinder and the bottom of the outer gauze. The fitting improved the ventilation of the lamp, but made it rather liable to extinction on being tilted. The further introduction of a combustion tube depending from the base of the chimney led to a marked improvement in the illuminating power of the lamp. *Nelson.*

muff. a. A joining tube, or coupler, for uniting two pipes end to end. *Fay.* b. A term sometimes applied to the crude magnesium deposit produced by the Pidgeon ferrosilicon process. *Merriman.* c. A cylinder of glass before it is flattened out. *Standard,* 1964.

muffle. a. A semicylindrical or long, arched oven (usually small and made of fireclay), heated from outside, in which substances may be exposed at high temperature to an oxidizing atmospheric current, and kept at the same time from contact with the gases from the fuel. Cupellation and scorification assays are performed in muffles and on a larger scale, copper ores were formerly roasted in muffle furnaces. *Fay.* b. An enclosure in a furnace protecting the ware from the flame and products of combustion. *ASTM C162–66.*

muffle furnace. A furnace in which heat is applied to the outside of a refractory chamber containing the charge. *C.T.D.* The charge may be held in a muffle, crucible retort, or other enclosure which is enveloped by the hot flame gases, and the heat must reach the charge by flowing through the walls of the container. *Newton, p. 280.*

muffle kiln. a. An arched fire clay lined furnace in which seggars are placed. *C.T.D.* b. A kiln in which combustion of the fuel takes place within refractory muffles, which in turn conduct heat into the ware chamber. *ACSG, 1963.*

muffle painting. Decoration, as on china, which will not bear kiln heat, but is fired in a muffle. It is of two kinds, hard and soft. *Standard, 1964.*

muffler; pneumatic rock-drill muffler. A muffler designed by the U.S. Bureau of Mines that concentrates on suppressing sound waves vibrating 200 to 2,000 times a second, the loudest and most objectionable created by rock drills. Because the muffler bypasses the lower frequencies, it does not interfere with the column of air that makes a pneumatic drill function. *Bureau of Mines Staff.*

muffle roasting. Roasting in a furnace in which heating is indirect, and products of combustion are kept away from the charge. *Bennett 2d, 1962.*

mugearite. Orthoclase-bearing oligoclase basalt. Major oligoclase, olivine, orthoclase, accessory apatite, and opaque oxides. Pyroxene may or may not be present. *A.G.I.*

mugelkohle. Ger. Name for coal pebbles. *Tomkeieff, 1954.*

muji. Peru. A term used by native miners for chunks of iron oxide. *Hess.*

mulatto. A local name in Ireland for a Cretaceous greensand. *Fay.*

mulatto stone. Ire. Green-speckled sandstone with a calcareous cement, base of the Upper Cretaceous, Antrim. So called on account of its mottled appearance. *Arkell.*

mule. a. A small car, or truck, attached to a rope and used to push cars up a slope or inclined plane. *Fay.* b. An extra man who helps push the loaded cars out in case of an upgrade, etc., from Joplin, Mo. *Fay.* c. *See* pusher. *D.O.T. 1.*

mule's foot. A Kansas term for an extension bit used in boring coal. *Hess.*

mule shoe. A short length of tubing coupled to the bottom of a drill string to wash and clean out sand or mud from a borehole, the washing action being aided by cutting off the bottom end of the tubing at an angle of 45° to its longitudinal axis. Also called mud socket. *Long.*

mule skinner. A mule driver. *Fay.*

muleway. Heavily timbered passage between levels in a mine for the transfer of unattached mules from one level to the other. *Korson.*

muley brick. An imperfectly pressed brick. *Standard, 1964.*

mull. a. In contrast to "mor" a type of forest soil in which humus is intimately mixed with the mineral matter. *Tomkeieff, 1954.* b. Paste formed by grinding a powder in a viscous medium, for example, heavy mineral oil. *Bennett 2d, 1962 Add.*

mullen stone; muller stone. Grindstone. *Arkell.*

muller. a. Stone, iron shoe, heavy steel rubbing disk, used to bear down upon rock in comminution. *Pryor, 3.* b. A heavy grinding wheel which is the crushing and mixing member in a dry or wet pan *A.R.I.* c. A bucking iron. *Fay.*

muller crusher. *See* dry pan. *ACSG, 1963.*

muller mixer. A wet pan in which the mullers are suspended out of contact with the pan bottom; by this means the material charged to the pan is mixed without further grinding taking place. *See also* wet pan. *Dodd.*

Muller's glass. Hyalite, a variety of opal which is as clear as glass and colorless. *Fay.*

mullet. A knife-shaped piece of iron used in serving a handmade glass bottle from the blowpipe. *Dodd.*

Mullfrax. Refractory made from artificial mullite. *Bennett 2d, 1962 Add.*

mullicite. A variety of vivianite occurring in cylindrical masses. *Fay.*

mulligan. a. A miner's term for soup. *Fay.* b. A heavy, double-handed sledge for breaking runner scrap at blast furnaces. *Fay.*

mulling. a. Mixing sand and clay particles by a rolling, grinding, rubbing, or stirring action. *ASM Gloss.* b. The practice of grinding ceramic inks and pigments, etc., between an etched glass muller and a similarly etched square plate of glass. *Enam Dict.* c. The process of grinding and mixing clays, shales, and other ceramic materials in a dry or wet pan. *See also* dry pan. *Bureau of Mines Staff.*

mulling ratio. The ratio of water by weight to clay content by weight, used in the milling of molding sand. *Osborne.*

mullion structure. a. The larger grooves in a fault plane parallel to the direction of displacement. Synonym for rodding structure. *A.G.I.* b. A series of parallel columns in metamorphic rocks several inches in diameter and several feet long, each column being composed of folded metamorphic rocks. *A.G.I.*

mullite. An aluminum silicate, $3Al_2O_3.2SiO_2$, formed by heating other aluminum silicates (such as cyanite, sillimanite, and andalusite) to high temperatures, and the only stable member of the group. Colorless crystals; specific gravity, 3.15; melting point, 1,810° C; insoluble in water. Found in nature, but rare. Used in refractories and in glass. *CCD 6d, 1961.*

mullite ceramic. Any ceramic whiteware in which mullite, $(3Al_2O_3.2SiO_2)$, is the essential crystalline phase. *ACSB–4.*

mullite refractories. Refractory products consisting predominantly of mullite ($3Al_2O_3.2SiO_2$) crystals formed either by conversion of one or more of the sillimanite group of minerals or by synthesis from appropriate materials employing either melting or sintering processes. *ASTM C71-64.*

mullite whiteware. Any ceramic whiteware in which mullite, ($3Al_2O_3.2SiO_2$), is the essential crystalline phase. *ASTM C242-60.*

mullock. a. N.S.W. The accumulated waste or refuse rock about a mine. *New South Wales.* b. Eng. A term sometimes used for the accumulated waste or refuse rock about a mine. *Fay.* c. *See* muck, the term used in the United States. *Fay.* d. Aust. The mullocker (muck shifter) deals with this by mullocking. *Pryor, 3.* e. A soft mass of country or decomposed dike containing gold or other metal; also, decomposed and broken rock mixed in a lode. *Gordon.*

mullocker. a. In metal mining, a colloquialism of Australian origin for a mucker who shovels and loads waste rock, as distinguished from ore, into cars. Also called lasher. *D.O.T. 1.* b. *See* mucker, the term used in the United States. *Fay.*

mullocking. Aust. Act or process of excavating and removing mullock. The American term is mucking. *Fay.*

mullock reefs. Aust. Reefs in which the matrix of the ore consists of country rock, frequently decomposed eruptive dikes. *Fay.*

mullock tip. Aust. Accumulations of waste rock coming out of a mine; a dump; also, spoil heap. *Fay.*

mullock vein. Aust. A decomposed eruptive dike in which the original disseminated gold and silver have been deposited in joints and fissures of the dike rock. This term appears to be unnecessary. *Fay.*

multiaxial stresses. Any stress state in which two or three principal stresses are not zero. *ASM Gloss.*

multibucket excavator. A machine similar to a dredger used for excavating cuttings for roads, railways, or canals. One large machine of this type can dig 100 yards per hour on a slope 25 feet high. *Ham.*

Multicut chain. Trade name for a coal-cutter chain designed for use with curved jibs. It is short pitch and of high flexibility. *Nelson.*

multicycle coast. Emergent coast formed during several interrupted cycles so that two or more elevated marine terraces have been formed. *Schieferdecker.*

multideck cage. A cage containing two or more compartments or platforms to hold the mine cars. Every effort is made to keep the number of decks as low as possible for a given output in order to cut down the decking time and equipment at shaft top and bottom. *Nelson.*

multideck screen. A screen with two or more superimposed screening surfaces mounted rigidly within a common frame. *B.S. 3552, 1962.*

multideck sinking platform. A sinking platform consisting of several decks to enable various shaft-sinking operations to be performed simultaneously. The bottom deck, in a three-deck platform, is usually suspended from four winch ropes which also act as guides for the kibbles, and the middle and top decks are supported above the bottom deck by rigid supports. The top deck is used for the manipulation of the concrete buckets and for fixing the shuttering. The center deck is used by the men when placing the concrete, while the bottom deck carries telephone, blasting, lighting, and signaling cable drums. The lower side of the bottom deck may carry the equipment for manipulating the cactus grab. *See also* sinking and walling scaffold. *Nelson.*

multideck table. Shaking table with two or more superposed decks, independently fed and discharged but worked by one vibrating mechanism. *Pryor, 3.*

multifuse igniter; electric master fuse. A device employed to reduce the number of fuses to be lit by the miner before he can retire to safety. By means of a multifuse igniter, it is possible to remote fire stopes or headings, primed with plain detonators and safety fuse. *Nelson.*

multihearth furnace. Roasting furnace with several hearths vertically superposed. Material is raked downward by horizontally rotating rabbles, so as to work alternately to periphery and center of successive hearths, encountering roasting heat as it gravitates downward. *Pryor, 3.*

multijib cutter. A cutter loader with a number of horizontal jibs similar to a coal cutter. The loose coal is diverted onto the conveyor by gummer and plough plate. The machine is usually used in seams up to about 3 feet in thickness with a clean roof parting. The depth of cut varies up to 4 feet. Coal degradation is considerable. *Nelson.*

multilayer bit. A bit set with diamonds arranged in successive layers beneath the surface of the crown. *Compare* impregnated bit. *Long.*

multilock lodes. Lodes that occupy a shear zone. Such a zone has no definite walls, the ore gradually shading off into the country rock. It is probable that the gold of some rich alluvial fields came from shear zones. *Nelson.*

multilouvre dryer. A dryer whose moving element consists of two strands of roller chain with specially designed flights, suspended in such a way as to provide means for keeping the bed in a constantly flowing mass. The material flows in a shallow bed over the ascending flights and at the same time is gradually moved across the dryer from the feed point to the discharge point. The gases are pulled from the furnace and through the flowing bed of coal. The entire area of the dryer is covered by suction from the exhaust fan. *Mitchell, p. 684.*

multipassage kiln. A kiln consisting of a number of adjacent tunnels, each of small cross section, through which the ware is pushed on refractory bats. These kilns may be electric or gas fired. The typical electric multipassage kiln has 24 passages arranged 4 across and 6 high; the ware is pushed in opposite directions in adjacent passages. Gas-fired multipassage kilns usually have only 4 passages and the ware is pushed in the same direction in each passage. *Dodd.*

multiphase. In electricity, the same as polyphase. *Standard, 1964.*

multiple-arch dam. A lightweight dam constructed of repeated arches with axes sloping at about 45° to the horizontal, the arches being carried on parallel buttress walls. *See also* counter-arched revetment. *Ham.*

multiple-bench quarrying. The method of quarrying a rock ledge in a series of successive benches or steps. *Fay.*

multiple-cord belt conveyor. A belt conveyor composed of two or more spaced strands of Vee, double Vee, or round belts. *ASA MH4.1-1958.*

multiple detectors. Two, or more, seismic detectors whose combined output energy is fed into a single amplifier-recorder circuit. This technique is used to effect a cancellation of undesirable near-surface waves. Synonym for multiple geophones; multiple recording groups. *A.G.I.*

multiple dike. A dike made up of two or more intrusions of the same kind of igneous rock. *Billings, 1954, p. 307.*

multiple-entry system. A system of access or development openings generally in bituminous coal mines involving more than one pair of parallel entries, one for haulage and fresh air intake and the other for return air. Multiple-entry systems permit circulation of large volumes of air. *Bureau of Mines Staff.*

multiple-expansion engine. An engine driven by steam or compressed air expanding in two or more stages. *Ham.*

multiple fault. A faulting structure consisting of several parallel faults in close proximity with no distortion. *See also* step faults. *Nelson.*

multiple firing. Firing electrically with delay blasting caps in a number of holes at one time. *Mitchell, p. 212.*

multiple fuse-igniter cartridge. Consists of a cardboard cartridge about 2 inches long with a ¾-inch outside diameter. The closed end is coated with black powder, and the ends of eight fuses are inserted in the cartridge, in contact with the powder. A master fuse is then inserted, which, when lit, burns to the powder and ignites it. The powder flares brightly and lights the eight fuses. *South Australia, pp. 40-41.*

multiple gases indicator. The detector is designed to trace and determine the concentration of a variety of gases. The hand-operated instrument is used with many different detecting tubes. Typical choice may include tubes for acetone, freons, kerosine, ammonia, acetylene, carbon tetrachloride, phosgene, nitrous gases or trichloroethane, in addition to more common contaminants and many that are more exotic. *Bests, p. 580.*

multiple geophones. Synonym for multiple recording groups; multiple detectors. *A.G.I.*

multiple-impulse welding. Spot, projection, or upset welding with more than one impulse of current during a single machine cycle. Sometimes called pulsation welding. *ASM Gloss.*

multiple intersections. The intercepts that cross a vein, ore body, or other geologic feature, accomplished by drilling several auxiliary boreholes from a single, main, or parent borehole with the aid of wedges and similar deflecting devices. *Long.*

multiple intrusion. Applied to sills, dikes, laccoliths, and other intrusions, formed by two or more successive injections of approximately the same magma. *Stokes and Varnes, 1955.*

multiple lines. A single line reeved around two or more sheaves so as to increase pull at the expense of speed. *Nichols.*

multiple mineral development act; multiple

use act. The Act of August 13, 1954, permitting oil and gas leases and mining claims on the same land, with the oil and gas lessee obtaining his rights under his lease and the mining claimant being accorded his rights to go to patent, subject, however, to the oil and gas lessee's interest. *Williams.*

multiple openings. Any series of underground openings separated by rib pillars or connected at frequent intervals to form a system of rooms and pillars. *BuMines Bull. 587, 1960, p. 2.*

multiple-pass weld. A weld made by depositing filler metal with two or more successive passes. *ASM Gloss.*

multiple-ply plate. Steel plates made up of thicknesses of other plates of steel or steel and wrought iron welded together. *Mersereau, 4th, p. 426.*

multiple proportions, law of. *See* Dalton's law; law of multiple proportions.

multiple recording groups. Synonym for multiple detectors; multiple geophones. *A.G.I.*

multiple reflections. Reflection line-ups which arise from waves which have suffered more than one reflection prior to emergencies. *A.G.I.*

multiple ribbon belt conveyor. A belt conveyor having a conveying surface of two or more spaced strands of narrow flat belts. *ASA MH4.1–1958.*

multiple-row blasting. The drilling, charging, and firing of several rows of vertical holes along a quarry or opencast face. The holes may be spaced in the square pattern with delay detonators in the rows as well as row by row. The spacing of the holes will vary according to their depth, diameter, and the type of rock. In general, 6-inch-diameter holes, 30 to 70 feet deep may be spaced 14 to 20 feet apart, and 9-inch-diameter holes 20 to 25 feet apart. The explosive factor may vary from 0.5 to 1.25 pounds per cubic yard (solid) of rock. *See also* small-diameter blastholes. *Nelson.*

multiple-seam mining. Mining two or more seams of coal, frequently close together, that can be mined profitably where mining one alone would not be profitable. *Coal Age, v. 71, No. 8, August 1966, p. 229.*

multiple seismometers. *See* bunched seismometers. *Schieferdecker.*

multiple series; parallel series. A method of wiring a large group of blasting charges by connecting small groups in series and connecting these series in parallel. *Fay.*

multiple shooting. The firing of an entire face at one time. The holes are connected in a single series and when the current is applied to the leading line, each of the electric blasting caps in the series receives its proportionate share of current and all the holes shoot at the same instant. *Kentucky, pp. 184–185.*

multiple shot. *See* battery of holes. *Fay.*

multiple-shot blasting unit. A multiple-shot blasting unit is designed for firing simultaneous explosive charges in mines, quarries, and tunnels. *ASA M2.1–1963.*

multiple shotholes. Two or more shot holes which are shot simultaneously. They are so spaced as to minimize near-surface interferences which mask desired signals if only one shothole is used. *A.G.I.*

multiple-shot instrument. A borehole-survey instrument capable of taking and recording a series of inclination and bearing readings on a single trip into the borehole. *Compare* single-shot instrument. *Long.*

multiple-shot survey. A borehole survey using a multiple-shot instrument. *Long.*

multiple sill. A sill made up of two or more intrusions composed of the same kind of igneous rock. *Billings, 1954, p. 295.*

multiple-slide press. A press with individual slides, built into the main slide or connected to individual eccentrics on the main shaft, they can be adjusted so as to give variations in length of stroke and in timing. *ASM Gloss.*

multiple-speed floating control system. As used in flotation, a form of floating control system in which the manipulated variable may change at two or more rates each corresponding to a definite range of values of the actuating signal. *Fuerstenau, p. 549.*

multiple splitting. The parting or separation of a thick seam into more than two layers of coal. For example, the Ten Yards Coal of Staffordshire splits, within a distance of about 5 miles, into more than a dozen thin seams, between which the partings in the thick seam have swollen out to an aggregate of about 500 feet of shales and sandstones. *See also* simple split seam. *Nelson.*

multiple spot welding. Spot welding in which several spots are made during one complete cycle of the welding machine. *ASM Gloss.*

multiple-strand chain. A roller chain made up of two or more strands assembled as a single structure on pins extending through the entire assembly. *J&M.*

multiple-strand conveyor. a. Any conveyor which employs two or more spaced strands of chain, belts, or cords as the load-supporting medium. *ASA MH4.1–1958.* b. Any conveyor in which two ore more strands are used as the propelling medium connecting pans, pallets, etc. *ASA MH4.1-1958.*

multiple-strand rope. A wire rope designed to obviate spinning due to untwisting. It is formed by a series of layers of strands built around a center fiber core. Each layer of strands is given a lay opposite to that on which it is built, each layer thus tending to impart its own twist which is cancelled by the next layer. Therefore, this rope can be used for sinking or where a free load is to be lifted. The stretch with a multiple strand rope is not so great as with round strand and flattened strand ropes. *Nelson.*

multiple system. A method of connecting the anodes and cathodes in electrolytic refining. Each cell contains a number of electrodes, anodes and cathodes being connected in parallel. From the cathodes of one cell, the current flows to the anodes of the next. The cells are therefore in series. *C.T.D.*

multiple task machines. N. of Eng. Any machine which mechanizes more than one task of the cycle. *Trist.*

multiple tippler. A steel structure, with mine car tracks, which can receive and rotate for discharging, two or more cars simultaneously. The discharging is sometimes performed while the cars are still attached to the haulage rope, in which case the tippler does not make a complete revolution but is reversed back from the tipping position to avoid twisting the haulage rope. *See also* tippler. *Nelson.*

multiple vent basalts. *See* shield basalts. *A.G.I.*

multiple wedge. *See* plug and feathers. *Nelson.*

multiplication factor; multiplication constant. The ratio of the number of neutrons in any one neutron generation to that in the immediately preceding generation. Criticality is achieved when this ratio equals 1. *L&L.*

multiplough; Gusto multiplough. A layout consisting of six or more ploughs, 220 pounds each, 20 yards apart on one rope or chain, feeding onto an armored conveyor; load on conveyor is well distributed. A driving unit is arranged at both ends of the face and operated alternately to impart the to-and-fro movement to the ploughs. The minimum workable seam thickness is 20 inches at gradients from 0° to 20°; maximum length of face about 190 yards. *Nelson.*

multiplying constant. This is the constant, used in stadia work, by which the staff intercept is multiplied to determine the distance between the staff and the theodolite. The value is generally taken as 100. *See also* tacheometer. *Ham.*

multirope friction winder. A winding system based on the principles of the Koepe winder. The drive to the winding ropes is the frictional resistance between the ropes and the driving sheaves. Multirope friction winders are usually tower mounted, with either cages or skips, and provided with a counterweight. The sheaves are from about 6 to 12 feet in diameter with a direct coupled or geared drive. Four ropes are favored and these operate in parallel and share the total suspended load. The system was introduced partly because of the difficulty of winding heavy loads from deep shafts with a single large-diameter winding rope. Modern winding ropes have become large and heavy, being 2¼ inches in diameter locked coil, weighing 74.28 pounds per fathom or 16.5 tons for a 1,000 yard shaft, therefore, the introduction of the friction winder, with its counterweight, and using four smaller ropes side by side in place of one. Such ropes need be only 1¼ inches in diameter to give equivalent breaking strain. *Nelson.*

multishift working. The working of two or three shifts per day on production faces underground. Face machines and power supports in coal mines represent a heavy capital outlay and the aim is to make them productive as long as possible in the 24 hours. In British coal mines, in 1960, 4 percent were working three shifts, 40 percent two shifts, and 56 percent one shift. *Nelson.*

multishot firing. The firing of a number of shots simultaneously. Under the Coal Mines (Explosives) Order, 1951, up to six shots may be fired simultaneously anywhere in any coal mine in Great Britain, rounds of more than six shots being limited to stonedrifts and shaft sinkings. The detonators must be connected in series to a shotfiring cable not less than 50 yards in length for rounds in coal and the circuit tested for continuity with an approved testing appliance. *See also* M. E. 6 Explorer. *Nelson.*

multishot gyroscopic instrument. A borehole surveying instrument which can take a number of readings during its descent and ascent in the borehole. It comprises gyroscopic and photographic recording units; direction and inclination indicators; a timing clock, and other accessories. A movie film enables numerous records being taken throughout the depth of the borehole. *See also* gelatin borehole tube. *Nelson*

multispeed motors. Multispeed squirrel cage motors are available for drives such as fans, blowers or pumps, which require operation at different speeds but do not require adjustable speed characteristics. Motors of this type may be two, three or four speed, with one or two stator windings, and built for variable torque, constant torque or constant horsepower operation. These machines have a constant speed characteristic at each particular speed. *Pit and Quarry, 53rd, Sec. D, p. 6.*

multistage fan. A fan having two or more impellers working in series. *B.S. 3618, 1963, sec. 2.*

multistrand rope. These ropes are flexible and nonspinning. They are composed of concentric layers of strands of relatively fine wires, alternate layers of strands being wound in opposite directions over a hemp core. These ropes make good tail ropes. *Sinclair, V, p. 6.*

multiunit wall. A wall composed of two or more wythes of masonry. *ACSG, 1961.*

multiuse bit. A detachable drill bit that can be sharpened and reshaped when worn. *Nichols.*

multiwheel roller. A heavy roller with pneumatic tires used to consolidate embankments. *Ham.*

multopost. A period of replacement taking place later than that designated as paulopost; much later as opposed to a little after. *Hess.*

mu-meson. *See* muon. *L&L.*

Mu-metal. An alloy of Permalloy type (that is with high magnetic permeability and low hysteresis loss) but containing copper and manganese in addition to iron and nickel. *C.T.D.*

mummification. The process of preservation of plant tissues under the influence of arrested decay. *Tomkeieff, 1954.*

mun. Corn. Any fusible metal. *Fay.*

mundic. A drillers' term for pyrite. *See also* iron pyrites. *A.G.I. Supp.*

mungle shale. An oil shale, in the West Calder district, Scotland. *Fay.*

Munsell System. A method of color notation based on evaluation of three parameters: lightness, hue, and saturation. *Dodd.*

muntenite. A variety of amber from Olanesti, Romania. *Shipley.*

Muntz metal. Alloy of copper (3) and zinc (2), once used as holding base for quicksilver in plate amalgamation of gold ores. *Pryor, 3.*

muon. Contraction of mu-meson. An elementary particle with 207 times the mass of an electron. It may have a single positive or negative charge. *L&L.*

Murakami's reagant. An etching reagent developed for use in the investigation of the structure of iron-carbon-chromium alloys. It consists of a solution of 10 grams potassium ferricyanide, 10 grams potassium hydroxide, and 100 milliliters water. *Osborne.*

muralite. From "muralis" of walls. A phyteral of coal. The cellular structure—the form not the substance, representing cell walls of various parts of the stems or roots of plants as observed in some vitrain, that is, as in the provitrain of Stopes. *A.G.I.*

murambite. A variety of leucite basanite rich in mafic minerals. *A.G.I.*

murasakite. A schistose rock composed of piedmontite and quartz. *See also* ollenite. *A.G.I.*

murchisonite. A variety of orthoclase of flesh-red color, resembling perthite. *Fay.*

Murderian. Upper Upper Silurian. *A.G.I. Supp.*

murdochite. A mineral, Cu_6PbO_8, as tiny, black octahedra with NaCl structure. *Spencer 20, M.M., 1955.*

Murex process. A flotation process which is not strictly of the same class as the others, but still makes use of the principle of selective oiling of sulfide particles. The crushed ore is fed into an agitator and mixed with 4 to 5 percent of its weight of a paste made of one part of oil or thin tar with three or four parts of magnetic oxide of iron. This oxide must be ground to an impalpable powder. These ingredients, with enough water to make a pulp, are agitated from 5 to 20 minutes. The paste preferentially adheres to the sulfides because of the oil. The ore is then fed over magnets and oxide of iron, with the mineral adhering to it, pulled out. The oil and magnetite are then recovered. *Liddell 2d, p. 408.*

Murgatroyd belt. That portion of the sidewall of a bottle near the bottom. *ASTM C162-66.*

muriacite. Synonym for anhydrite; halite. *Hey 2d, 1955.*

muriatic acid. Old term for hydrochloric acid. *CCD 6d, 1961.*

murite. An olivine-bearing nepheline phonolite containing about 50 percent mafic minerals. *A.G.I.*

murmanite. A violet hydrous titanosilicate of sodium with manganese, calcium, iron, zirconium, etc., $RO.2Na_2O.4SiO_2.4(TiO_2.\text{-}ZrO_2).4H_2O$. Scales with micaceous cleavage. From Kola Peninsula, Russian Lapland, U.S.S.R. *English.*

murphy. *See* rock drill, b. *Fay.*

murra; murrha. The Latin term for a material first brought to Rome by Pompey, and used for costly vases and cups. It has been variously supposed to be Chinese jade, porcelain, iridescent glass, fluor, etc. *Standard, 1964.*

Murray-Curvex machine. A device for offset printing from an engraved copper plate onto pottery flatware by means of a solid convex pad of gelatin. Cold-printing colors are used, the medium being formulated from synthetic resins and oils. Output is about 1,200 pieces per day. *Dodd.*

Muschamp coal miner. A cutter loader which is essentially a conversion unit for Anderton shearer machines and designed to produce a reasonable percentage of large coal. The top and bottom of the seam are cut by rotating drums of small diameter and simultaneously shearing the back of the cut with a narrow-kerf jib and chain. *Nelson.*

muscovado. The Spanish word for brown sugar, used by Minnesota geologists for a rusty brown, outcropping rock that resembles brown sugar. Applied to both gabbros and quartzites. *Fay.*

muscovite; white mica; common mica. A mineral member of the mica group; the common white, green, red, or light brown mica of granites, gneisses, and schists. Composition, $KAl_2(AlSi_3)O_{10}(OH)_2$; monoclinic. In clay mineralogy, synonymous with illite. It can be used as an insulator (not above 600° C), as a lubricant, or for nonflammable windows. *A.G.I.; A.G.I. Supp.; Fay; Dana 17.*

muscovite granite. A granite which contains a fairly large proportion of the mineral muscovite. *C.T.D.*

muscovitization. The process of changing a mineral, or rock, more or less into muscovite. *Standard, 1964.*

Muscovy glass. Same as muscovite. *Fay.*

Musgrave-Harner turbidimeter. An instrument developed in 1947 which has been used for the particle-size analysis of clays and other ceramic raw materials in the range 0.25 to 60 micron. *Dodd.*

mush. a. Soft and damp small coal; a coal which has been so crushed that it is unprofitable to mine. *Nelson.* b. Leic. Soft, sooty, dirty, earthy coal. *Fay.* c. A greasy mud, sometimes found on bituminous coal. *Fay.*

Mushet steel. Contains 9 percent tungsten, 2.5 percent manganese, and 1.85 percent carbon. It is used mainly for cutting tools, particularly for those used for taking heavy cuts on extra hard material. *Crispin.*

mushroom. a. A bit that during use has been overheated to the point where it becomes plastic and flattens or deforms. *Long.* b. To flatten or deform a metal object by successive impacts. *Long.*

mushroom construction. Reinforced concrete solid slabs carried by columns flared at the top but not joined by beams. *See also* flared column head. *Ham.*

mushroom hitch. An obstruction in the floor of a coal mine caused by the projection of basalt or other hard foreign substance. *Standard, 1964.*

mushroom jib. A standard form of coal cutter jib with a sprocket at the end remote from the machine. The sprocket carries a vertical turret or bar and is driven by the cutting chain. The bar makes a vertical cut at the back of the normal horizontal cut. *See also* turret jib. *Nelson.*

mushroom stone. A fossil resembling a mushroom. *Standard, 1964.*

mushy coal. Leic. Soft, sooty or dirty coal, or coal that has been crushed. Same as mush, b. *Fay.*

musical salt. An obsolete term applied to vacuum pan salt when first introduced. The fine-grain size met much market resistance. When a tightly packed container of the new-fangled salt was twisted, a squeaky sound was made by the hard cubical particles rubbing together, hence the name musical salt. *Kaufmann.*

muskeg. A level, practically treeless area supporting dense growth consisting primarily of grasses. The surface of the soil is covered with a layer of partially decayed grass and grass roots which is usually wet and soft when not frozen. *ASCE P1826.*

muslin glass; mousseline glass. Same as mousseline. *Fay.*

mussel band. A bed of clay ironstone containing fossil bivalve shells, anthracosia, etc. *Fay.* Very valuable in the correlation of coal measure strata. *Mason.* Also called mussel bind; marine band.

mussel-band ironstone. Ironstone containing fossil shells. *Arkell.*

mussel bed. A band containing or chiefly composed of mussellike shells, very valuable in the correlation of Coal Measure strata. *Mason.*

mussel bind. Same as mussel band. *Fay.*

mussel gold. An old form of prepared gold for use in the decoration of pottery. It was made by rubbing together goldleaf, sugar (or honey), and salt; the paste was then washed free from soluble material and, traditionally, stored in mussel shells. *Dodd.*

mussels. a. Loose term for fossil nonmarine shells, such as carbonicola or naiadites. *B.S. 3618, 1964, sec. 5.* b. Marine, brackish, or freshwater molluscs; sometimes called clams. *Hy.*

mussite. Same as diopside. *Shipley.*

Musso process. A mixture of iron ore and fuel is reduced in an externally heated rotary retort. The gases are exhausted and constitute the fuel when the process has been started. The gases, after purification, are passed through combustion rings surrounding the retort and are burned according to the method of catalytic combustion. After reduction, the charge is cooled, when it is poured through a layer of fluxing material, it is then transferred to a steelmaking furnace. *Osborne.*

mustard gold. N.S.W. Very fine gold, sometimes with an earthy color. *New South Wales, p. 115.*

mutabilite. A soft "corklike" bitumen of porous or resinous consistency. Partly soluble in organic solvents. *Tomkeieff, 1954.*

mutation. A change in the genetic composition of an organism resulting in a change in its characteristics. *I.C. 8075, 1962, p. 63.*

muthmannite. A gray-white, tarnishing to brass-yellow, montelluride of silver and gold, (Ag,Au)Te. Tabular crystals. Previously confused with krennerite, a ditelluride, $AuTe_2$, containing but little silver. Presumably from Nagyag, Transylvania, Romania. *English.*

Muthmann's liquid. *See* acetylene tetrabromide. *CCD 6d, 1961.*

Mutt and Jeff shot. A Kansas term for a long shot under a short shot. *Hess.*

mutu. A Malayan term denoting the degrees of fineness of gold. *Fay.*

mutual admittance. The mutual admittance of a transducer may be defined as the quotient obtained by dividing the phasor representing the short-circuited current at one pair of terminals by the phasor representing the voltage across the second pair of terminals when the first pair is short-circuited. *H&G.*

mutual boundary texture. A texture showing smooth, regular, curved contacts between minerals. *Schieferdecker.*

mutual impedance. The mutual impedance of a transducer is the quotient obtained by dividing the phasor representing the open-circuit voltage between one pair of its terminals by the phasor representing the current through the other pair. *H&G.*

muur. S. Afr. A wall or barrier. *Hess.*

mv Abbreviation for millivolt. *BuMin Style Guide, p. 61.*

Mv Chemical symbol for mendelevium. Also Md. *Webster 3d.*

mvb Abbreviation for medium-volatile bituminous. *BuMin Style Guide, p. 60.*

MVC Abbreviation for manual volume control. *Zimmerman, p. 66.*

mw Abbreviation for megawatt (one million watts); milliwatt (one thousandth watt). Also abbreviated MW; Mw. *Zimmerman, pp. 68, 70, 207.*

MWP Abbreviation for maximum working pressure. *Zimmerman, p. 67.*

Mycalex. A mica substitute consisting mainly of mica bonded with glass prepared by pressing in molded forms. *Hess.*

mycelium. The threadlike vegetative mass of a fungus, forming a filamentous mat in soil or other substrata. *I.C. 8075, 1962, p. 64.*

myelin. A soft, yellowish- or reddish-white, claylike substance, identical with kaolin. *Fay.*

myg Abbreviation for myriagram. *BuMin Style Guide, p. 61.*

myl Abbreviation for myrialiter. *BuMin Style Guide, p. 61.*

mylius test. *See* iodoeosin test. *Dodd.*

mylonite. A hard, compact rock with a streaky or banded structure produced by extreme granulation in both strike-slip and thrust fault zones. *Bureau of Mines Staff.*

mylonite gneiss. A mylonitic rock which has been partly recrystallized. *See also* augen schist; cataclasite; flaser gabbro; flaser gneiss; flaser granite; kakirite; mylonite; phyllonite. *A.G.I.*

mylonitization. The sum of the processes by which mylonites are formed. *A.G.I.*

mylonization. Synonym for mylonitization. *G.S.A. Mem. 50, 1952, p. 1.*

mym Abbreviation for myriameter. *BuMin Style Guide, p. 61.*

mynpacht. a. S. Afr. A mining concession, especially one made by the government to the owner of the surface concerned. *Webster 3d.* b. S. Afr. A landowner's mining location covering one tenth of the surface leased to the government. *Webster 3d.* c. S. Afr. A portion, usually 25 percent, of a farm proclaimed as a public digging, which the freeholder or owner of the mineral rights has the first right to peg out for himself. In the past the remaining portion of the farm was generally thrown open to the public, and this is still occasionally done, for example, with diamond fields. But in the case of the large areas required by modern mines this method has long become impracticable, and the government holds the right to precious minerals in the remaining portion of the farm. It disposes of this right by lease agreements which make allowance for the owner's mynpacht. *Beerman.*

myrickite. a. A name used for whitish or grayish chalcedony, opal, or massive quartz marked by or intergrown with pink or reddish inclusions of cinnabar, the color of which tends to become brownish. The opal variety is also known as opalite. From California, Arizona, Nevada, Oregon, and Washington. *Shipley.* b. A local trade name for a variety of chalcedony, showing red spots on a gray ground, resembling St. Stephen's stone. From San Bernardino County, Calif. *English.* c. Cinnabar intergrown with common white opal or translucent chalcedony. *Shipley.* d. Massive quartz unevenly colored pink or reddish by cinnabar, which soon turns brownish. *Shipley.*

myrmekite. An intergrowth of plagioclase and vermicular quartz, generally replacing potassium feldspar, formed during the later or deuteric stage of consolidation of an igneous rock. *Holmes, 1920.*

myrmekite antiperthite. Myrmekitelike intergrowth of predominant plagioclase and vermicular orthoclase. The wormlike forms of orthoclase are, as a rule, broader than those of quartz in the typical myrmekite. *Schieferdecker.*

myrmekite perthite. Myrmekitelike intergrowth of microcline and vermicular plagioclase. *Schieferdecker.*

myrmekitic texture. Any rock or ore texture with vermicular forms. *A.G.I.*

N

n Abbreviation for nano—used as a prefix to units of measure, indicating multiplication of the basic unit by 10^{-9} or division by 1 billion. *Bureau of Mines Staff.*

n a. Symbol for index of refraction, or refractive index. (Often appearing with a subscript, indicating the index of refraction (1) with reference to a particular vibrational direction, or optic axis, in a crystal; for example, n_{α} which is the lowest index of refraction in a biaxial crystal and is the index of the fast ray vibrating parallel to the optic axis X or d; (2) obtained using sodium light, as N_D; and (3) of a group of refractive indexes as n_{γ}). *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100; Zimmerman, pp. 142, 164; Bureau of Mines Staff.* b. Symbol for number of moles. *Zimmerman, p. 160.* c. Symbol for the number of moles per unit volume; the molecular concentration; or the molecular density. *Zimmerman, pp. 160-161.*

n- Abbreviated prefix meaning normal. Used followed by a hyphen at the beginning of the names of aliphatic hydrocarbons, their derivatives, or alkyl radicals. For example, *n*-butane for normal butane and *n*-pentane for normal pentane. Usually the prefix *n-* is ignored in alphabetical arrangements. *CCD 6d, 1961.*

N a. Chemical symbol for nitrogen. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.* b. Symbol for north. *Zimmerman, p. 74.* c. Symbol for the number of items in a sample. *Zimmerman, p. 59.* d. The names of certain compounds (such as N, N-dibutyl urea) contain this symbol as an indication that the group or groups appearing next in the name (that is, the butyl groups in the example cited) are joined to the nitrogen atoms in the molecule of the compound under discussion. *CCD 6d, 1961.*

N a. Symbol for number in general. *Zimmerman, p. 367.* b. Symbol for normal, referring to the concentration of a solution; for example, O.1 *N* hydrochloric acid. Commonly used in analytical chemistry. Usually in italics, but sometimes Roman. *Zimmerman, p. 142; CCD 6d, 1961.* c. Symbol for Avogadro's number (the number of molecules per mole or per gram-molecular weight at 0° C and 760 mm). Sometimes it appears with the subscript o, as N_o. *Zimmerman, p. 161; Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.* d. Symbol for the number of molecules. *Zimmerman, p. 160.* e. Symbol for the intensity of radiation. *Zimmerman, p. 147.*

Na Chemical symbol for sodium; derived from the Latin natrium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

naats. Thin flat crystals (diamond) used for roses and, by resplitting, for drawplates. *Hess.*

nablock. A rounded mass, as of flint in chalk, or of ironstone in coal. *Standard, 1964.*

nacre. a. Fr. Resembling nacre, as in iridescence; nacreous; as nacre enamel. *Standard, 1964.* b. Fr. Mother-of-pearl. *Standard, 1964.* Also spelled nacker. *Fay.*

nacreoscope. A pearl illuminator. An instrument containing a strong light through which the nature of the nucleus of a pearl can sometimes be observed. Differs from pearloscope in that the effect of the passage of light through the whole pearl is observed. Can be used as an accessory of the gemmological microscope. *See also* pearl illuminator; pearloscope. *Shipley.*

nacreous. Applied to the luster of certain minerals, usually on crystal faces parallel to a good cleavage; the luster resembling that of pearls. *C.M.D.*

nacreous sulfur. A crystalline modification the true nature of which is not definitely settled. Obtained by crystallizing sulfur, under special conditions, from its solution in organic solvents such as benzene. Of monoclinic structure. *Cooper, pp. 277, 279.*

nacrite. A species of clay mineral, identical in composition with kaolin, from which it differs in certain optical characters and in atomic structure. Formula, $Al_4(Si_4O_{10})(OH)_8$; monoclinic. *C.M.D.; Dana 17.*

nadel diorite. Needle diorite; a German term for diorites with acicular hornblende. *Fay.*

nadir. a. In aerial photography, the point on the ground plane that is vertically beneath the lens of an aerial mapping camera. Sometimes called the plumb point or ground nadir point. *Seelye, 2.* b. Point at which extension of plumbline downward would reach center of earth. Opposite of zenith. *Pryor, 3.*

nadorite. A mineral containing antimony, lead, oxygen, and chlorine, $PbClSbO_2$, occurring in brownish orthorhombic crystals, at Djebel-Nador, Algeria. *Fay.*

naegite. A zirconium mineral, $(Zr,Si,Th,U)O_2$. *Hey 2d, 1955.* Zircon with appreciable amounts of uranium, thorium, and rare earths, plus columbium and tantalum. Occurs in pegmatites and tin placers. *Crosby, p. 88.*

naetig. Industrial diamonds having a grain in all directions instead of in regular layers. *Compare* feinig. *Brady, 4th ed., 1940, p. 164.*

nafalapatite. Artificial sodian aluminian apatite produced by heating morinite to 400° C. *Hey, M.M., 1964.*

nafalwhitlockite. Artificial sodian aluminian whitlockite produced by heating morinite to 800° C. *Hey, M.M., 1964.*

nagatelite. A variety of allanite with P_2O_5 partially substituting for SiO_2. Has been formulated $(Ca,Fe)_4(Al,Ce,La)_6(Si,P)_6O_{26}.2H_2O$ and $Ca_2(Ce,La)_2Al_4Fe_2(Si,P)_6O_{25}OH$. Also spelled nagetelite. *Crosby, p. 66; Frondel, p. 197.*

nagelfluh. A conglomerate rock belonging to the Tertiary of Switzerland. Also called gompholite. *Fay.*

nager. Brist. A drill for boring holes for blasting charges. *Fay.*

nagyagite. A sulfotelluride of lead, gold, and antimony, possibly $Pb_5Au(Te,Sb)_4S_{5-8}$. The gold content ranges from 5.8 to 12.8 percent, the silver from 8.1 to 10.8 percent. *Sanford; Dana 17.*

nahcolite. A white sodium bicarbonate, $NaHCO_3$. Small prismatic crystals. Monoclinic. From Naples, Italy. *English.*

Nahnsen process. An electrolytic process for the refining of impure zinc; used in Upper Silesia. *Fay.*

naif. Having a natural luster when uncut; as, a naif gem. *Standard, 1964.*

nail. a. A shooting needle. *Fay.* b. A slender piece of metal, one end of which is pointed, the other end having a head, either flattened or rounded. It is a common means of fastening together several pieces of wood or other material by striking the head with a hammer. The term penny as applied to nails refers to the number of pounds per 1,000 nails; for example, sixpenny nail means 6 pounds per 1,000; three-penny means 3 pounds per 1,000, etc. *Crispin.*

nailhead scratch. *See* nailhead striation. *Pettijohn.*

nailhead spar. A composite variety of calcite having the form suggested by the name. *Fay.*

nailhead striation; nailhead scratch. A glacial scratch or marking with blunt end, generally, but not always, down current. *Pettijohn.*

nail plate. A plate of metal rolled to the proper thickness for cutting into nails. *Fay.*

nails (double-pointed). Nails pointed at either end and used for wooden racks on which ware is placed after each operation. *Hansen.*

naked. Synonym for bare. *Long.*

naked light. a. Any light which is not so enclosed and protected as to preclude the ignition of an ambient firedamp-air mixture. Also called open light. *B.S. 3618, 1963, sec. 2.* b. Open flame, such as lamp, a match, and a burning cigarette end, that is a general fire risk in mines if handled carelessly. *McAdam, p. 111.*

naked light mine. A nongassy coal mine where naked lights may be used by the miners. Such mines are exceptional and limited to small collieries operating near the outcrop of the seams. *Nelson.*

Nakta. Trademark for lime-base greases made with highly refined mineral oil and suitable for low temperature dispensing and use. Available in a wide range of consistencies for all types of mine car plain and roller bearings. *CCD 6d, 1961.*

name of lode. That by which it is designated in the notice of location, and subsequent addition thereto is immaterial. The same vein or lode may have different names in different mining locations. *Ricketts, I.*

namma hole. Aust. A hollow in the earth in which rainwater accumulates. *Standard, 1964.*

Namurian. Lower Upper Carboniferous. *A.G.I. Supp.*

nankin porcelain. Blue china. *Standard, 1964.*

nannies. a. York. Natural joints, cracks, or slips in the coal measures. *See also* cleat, a. *Fay.* b. Used to denote a slip met with first at roof level. *T.I.M.E.*

Nansen bottle. An oceanographic water sampling bottle made of a metal alloy which is little reactive with seawater, equipped with a rotary valve at each end so that when it is rotated at depth the valves close and lock shut entrapping a water sample and setting the reversing thermometers. This bottle is named for its designer, Fridtjof Nansen. *Hy.*

Nansen-Pettersson water bottle. *See* insulating water bottle. *C.T.D.*

nantokite. Cuprous chloride, Cu_2Cl_2. Granular, massive. Cleavage cubic. Luster adamantine. Colorless to white or grayish. *Fay.*

napal. A Malayan term for indurated white clay carrying auriferous quartz streaks. Also called steatite. *Fay.*

napalite. A peculiar, waxy, dark reddish-brown hydrocarbon, C_6H_4; brittle; begins to fuse at 42° C, and boils above 300° C; found in the Phoenix mine, near Middletown, Calif. *Fay.*

napalm. An aluminum soap of a mixture of oleic, naphthenic, and coconut fatty acids. Becomes viscous when shaken and makes gasoline thicken or jell. The production of oil and gas wells may be increased by pumping in a mixture of napalm, crude oil, and sand instead of using explosives and acids. *CCD 6d, 1961.*

Napcogel. Gelatinous permissible explosive; used in mining. *Bennett 2d, 1962.*

naphtabitumen. Soluble organic matter (natural gas, petroleum, ozokerite, natural asphalt, asphaltite). *Schieferdecker.*

naphtein. *See* naphthine. *Tomkeieff, 1954.*

naphtha. a. As used by ancient writers, a more fluid and volatile variety of asphalt or bitumen. *Fay.* b. In modern use, an artificial, volatile, colorless liquid obtained from petroleum; a distillation product between gasoline and refined oil. *Fay.*

naphtha gas. Illuminating gas charged with the decomposed vapor of naphtha. *Standard, 1964.*

naphtha, heavy. A deep amber to dark red liquid; a mixture of xylene and higher homologs; flammable; specific gravity, 0.885 to 0.970; boiling point, 160° to 220° C (about 90 percent at 200° C); flash point, not above 100° F; and evaporation, 303 minutes. A solvent for asphalts, road tars, and pitches. *CCD 6d, 1961.*

naphthalene. A hydrocarbon which forms platelike crystals, has the odor of mothballs, and is always present to a considerable extent in coal tar and coal gas. *Shell Oil Co.*

naphthene. Any of a series of saturated cyclic hydrocarbons, C_nH_{2n}; cycloparaffin—used especially of those members (as cyclopentane (C_5H_{10}) and cyclohexane (C_6H_{12}) and their alkyl derivatives) that occur in various kinds of petroleum, in shale, and in tar oil, and that yield useful aromatic hydrocarbons on dehydrogenation. *Webster 3d.*

naphthine; naphteine; naphtine. Mineral wax, identical with hatchettite, found in cavities in limestone in France. *Tomkeieff, 1954.*

naphthode. Concretions of bituminous limestone rich in carbonaceous matter. *Tomkeieff, 1954.*

naphthol mineral spirits. Petroleum naphtha. Used as a solvent. *Bennett 2d, 1962 Add.*

Napierian logarithm. A natural logarithm. *Webster. 3d.*

napoleonite. a. Synonym for corsite. *Fay.* b. A variety of hornblende. *Standard, 1964.*

nappe. a. A major structure of mountain chains, such as the Alps, consisting essentially of a great recumbent fold with both limbs lying approximately horizontally, and produced by compressional earth movements which have involved translation of the folded strata over distances of many miles in a horizontal sense. *C.T.D.* b. Faulted overturned folds. Synonym for decke. *A.G.I.* c. A large body of rock that has moved forward more than 1 mile from its original position, either by overthrusting or by recumbent folding. *Billings, 1954, p. 189.* d. In Belgium, a synonym for aquifer. *A.G.I.*

nappes. Belg. Water-bearing strata. *Fay.*

nappe structure. *See* decken structure. *A.G.I.*

naps. Eng. Calcareous nodules occurring in Etruria marls. *Arkell.*

napthoid. Liquid petroleumlike product found in cavities of igneous rocks and assumed to be a product of thermal distillation of bituminous substances contained in the country rocks. *Tomkeieff, 1954.*

nariyas. Gold washers of the northwest provinces of India. *Fay.*

narrow. a. A roadway driven in the solid coal with rib sides. All roadways when opening out a pillar method of working are narrow. *See also* working the whole. *Nelson.* b. N. of Eng. A gallery, or roadway, driven at right angles to a drift, and not quite so large in area. *Fay.*

narrow beam projector. A floodlight producing a beam angle within the range of 12° to 25°. *See also* medium beam projector. *Nelson.*

narrow gage. A railway gage narrower than the standard gage of 4 feet 8½ inches. *Ham.*

narrow places. Aust. Working places that are less than 6 yards wide; these are paid for by the yard in length. *Fay.*

narrow stall. A stall driven in the solid coal, usually from 6 to 9 feet wide; it has rib sides in coal. *Nelson.*

narrow work. a. The driving of narrow stalls to form coal pillars as the first stage in the pillar-and-stall method of working. *Nelson.* b. A system of mining in which narrow coal roadways, called endings, are driven along the strike of the seam, from 12 to 15 yards apart, to a limit line. The long narrow coal pillars between the endings are extracted on the retreat. It has been adopted in parts of Yorkshire and Lancashire. *See also* main endings. *Nelson.* c. All work for which a price per yard of length driven is paid, and which, therefore, must be measured. Any dead work. *Fay.* d. Penn. Headings, chutes, crosscuts, gangways, etc., or the workings previous to the removal of the pillars. *Fay.* e. A working place in coal only a few yards in width. *Fay.*

narrow working. *See* bord-and-pillar method; narrow work. *Fay.*

narsarsukite. A yellow, highly acidic titanosilicate of sodium (and iron), $Na_2TiSi_4O_{11}$. Tabular crystals. Tetragonal. From Narsarsuk, Greenland; Sweet Grass Hills, Mont. *English.*

nascent. a. Undergoing the process of being born; beginning to exist. *Webster 3d.* b. Just formed by a chemical reaction, and therefore very reactive. Nascent gases are probably in an atomic state. *C.T.D.*

nascent hydrogen. New-born hydrogen produced by chemical action, before molecular combination to H_2 occurs. In this state it is much more reactive. *Pryor, 3.*

nasinite. A mineral, $Na_4B_{10}O_{17}.7H_2O$ (?); monoclinic; found in recent incrustations at Larderello, Tuscany, Italy. Identical with auger's borate. *Hey, M.M., 1964; Fleischer.*

nasledovite. A hydrous carbonate and sulfate of Pb, Mn, Mg, and Al, from the Altyn-Topken mining field, Sardob, Central Asia. *Hey, M.M., 1961.*

Nasmyth hammer. A steam hammer, having the head attached to the piston rod, and operated by the direct force of the steam. *Fay.*

nasonite. A white silicate of lead and calcium with lead chloride, $Pb_4(PbCl)_2Ca_4(Si_2O_7)_3$. Rounded crystals; usually massive. Hexagonal. Franklin, N.J.; Langban, Sweden. *English.*

natch. a. Scot. A small hitch or dislocation. *Fay.* b. Scot. The junction of two rails where, through improper laying, the two are not on the same level or line. *Fay.* c. British variant of notch. *Webster 3d.* d. A key used to register two halves of a plaster mold; it may be of plaster or a brass insert. Sometimes called a joggle. *ACSG, 1963.* e. Underpart of saucer bevelled to fit brass head of a making machine. *Noke.*

Nathusius furnace. Electric arc furnace, usually three-phase, of the direct series arc type and with one electrode or series of electrodes imbedded in the hearth. *Bennett 2d, 1962.*

National. Nongelatinous permissible explosive; used in mining. *Bennett 2d, 1962.*

National coarse thread. The screw thread of common use, formerly known as the United States Standard thread. *Crispin.*

National Electrical Code. A set of rules to guide electricians when installing electrical conductors, devices, and machinery. *Crispin.*

national grid. Gr. Brit. A system of rectangular coordinates used by the Ordnance Survey and based upon the Transverse Mercator Projection (which is also known as the Gauss Conformal Projection). *B.S. 3618, 1963, sec. 1.*

national grid coordinates. Gr. Brit. Coordinates, referred to the National Grid of the Ordnance Survey, which are specified in meter and consist of two components, an Easting and a Northing. *B.S. 3618, 1963, sec. 1.*

Nationalization Act. The Coal Industry Nationalization Act, 1946, which brought all coal mines in the United Kingdom under public ownership. It was passed through Parliament in July 1946 and put into operation on January 1, 1947. *Nelson.*

National Physical Laboratory. British government organization which, among other things, tests and certifies calibration of scientific glassware, weights and measures. Abbreviation N.P.L. *Pryor, 3.*

native. Occurring in nature, either pure or uncombined with other substances. Usually applied to metals, such as native mercury, native copper. Also used to describe any mineral occurring in nature in distinction from the corresponding substance formed artificially. *Fay.*

native arsenic. The element as it occurs naturally; tin-white, hexagonal; specific gravity, 5.64 to 5.78; Mohs' hardness, 3 to 4. *Bennett 2d, 1962.*

native asphalt. Asphalt occurring as such in nature. *ASTM D288-57.*

native bismuth. Metal as it occurs naturally; reddish-white, hexagonal; specific gravity, 9.70 to 9.83; Mohs' hardness, 2.0 to 2.5. *Bennett 2d, 1962.*

native bitumen. Bitumen found in nature carrying a variable proportion of mineral matter. The term does not apply to the residuals from the distillation of asphaltic oils. *Nelson.*

native coke. *See* carbonite, a and natural coke.

native copper. a. Metallic copper, sometimes containing a little silver and bismuth, occurs as a metasomatic deposit filling cracks and forming the cement of sandstone and conglomerate. Such deposits have been located in Keweenaw, Lake Superior, Michigan; Chile; Queensland, Australia; and Rhodesia, in the Union of South Africa. Native copper is also found in the upper workings of copper mines, particularly in Australia. It crystallizes in the cubic system. *Merriman.* b. A mineral in the form of particles and nuggets of very pure metallic copper associated (but not alloyed) with small amounts of silver and arsenic minerals. It is found in small amounts in many copper ores but occurs in commercial quantities in only one place in the world, the Upper Peninsula in Michigan. *Newton, p. 15.*

native elements. Elements that occur in nature uncombined, as nugget gold, metallic copper, etc. *Compare* native. *Fay.*

native gas. Gas originally in place in a particular underground structure as opposed to injected gas. *Williams.*

native gold. Gold as it occurs naturally; yellow cubic; specific gravity, 14.56 to 19.33; Mohs' hardness, 2.5 to 3.0; rarely pure, usually alloyed with silver and sometimes containing appreciable amounts of copper, palladium, or bismuth. *Bennett 2d, 1962.*

native metals. Metals, such as copper, gold, silver, and those of the platinum group, that occur in the elemental or metallic state. *Ency. of Chem. Tech., v. 8, p. 934.*

native paraffin. *See* ozocerite.

native platinum. Platinum as it occurs naturally; silvery-white, cubic; specific gravity, 13.35 to 19.00; Mohs' hardness, 4 to 6. *Bennett 2d, 1962.*

native Prussian blue. Also called Vivianite. *Fay.*

native salt. Natural salt, halite, rock salt in its native state, as found and mined. *Kaufmann.*

native silver. Silver as it occurs naturally; white, tarnishes to gray or black, cubic; specific gravity, 10.1 to 11.1; Mohs' hardness, 2.5 to 3.0. *Bennett 2d, 1962.*

native steel. A steel or steely iron occurring in small masses and made by the ignition of coal near an iron-ore deposit. *Fay.*

native sulfur. Sulfur that occurs in elemental form in nature. *BuMines Bull. 630, 1965, p. 903.*

natrite. Synonym for natron. *Dana 6d, p. 301.*

natrium. Sodium. *Webster 3d.*

natroalunite. A variety of alunite in which sodium replaces potassium in part, $Na_2O.3Al_2O_3.4SO_3.6H_2O$. *Dana 17, p. 370; Larsen, p. 71.*

natroautunite. Variant of sodium autunite. *Spencer 19, M.M., 1952.*

natrochalcite. A bright, emerald-green hydrous sulfate of copper and sodium, $Na_2SO_4.Cu_4(OH)_2(SO_4)_3.2H_2O$. Steep, pyramidal crystals. Monoclinic. From Chuquicamata, Antofagasta, Chile. *English.*

natrojarosite. A yellowish-brown to golden-yellow basic sulfate of iron and sodium. A glistening powder made up of minute tabular crystals. Rhombohedral. From Sodaville, Nev.; Cook's Peak, New Mex.; Kingman, Ariz.; Cape Calamito, Elba; Kundip, Western Australia. *English.*

natrolite. A mineral of the zeolite family. A silicate of sodium and aluminum, $Na_2(Al_2Si_3O_{10}).2H_2O$. Monoclinic. *Dana 17.*

natromimetite. The artificial compound, $Pb_4Na(AsO_4)_3$; apatite family. *Hey, M.M., 1964.*

natromontebrasite. To replace the name natramblygonite, since the mineral is a hydrofluophosphate rather than a fluophosphate, thus emphasizing the distinction between amblygonite and montebrasite. *See also* fremontite. *English.*

natron. A sodium carbonate with 10 molecules of water. *Bateman.*

natronborocalcite. A synonym of ulexite. *Hey 2d, 1955.*

natron granites. Granites abormally high in soda, presumably from the presence of an orthoclase rich in soda, or of anorthoclase. They are also called soda granites. Natron is likewise used as a prefix to minerals and rocks that are rich in sodas, as natron orthoclase, natron syenite, etc. *Fay.*

natroniobite. The monoclinic dimorph of lueshite, $NaNbO_3$; from the Lesnaya Baraka and Sallanlatvi massifs, Kola Peninsula, U.S.S.R. Named from composition. *Hey, M.M., 1964.*

natronmikroklin. Synonym for anorthoclase. *Dana 6d, p. 324.*

natron-saltpeter. Same as soda niter. *Dana 6d, p. 870.*

natrosanidine. A feldspar similar to orthoclase but with soda replacing potash, $(Na,K)_2O.Al_2O_3.6SiO_2$. *Larsen, p. 233.*

nattle. Eng. To make a slight rattling or tapping noise. *Webster 3d.* Said of a mine when movement or settling is taking place. *Fay.*

natural aging. Spontaneous aging of a supersaturated solid solution at room temperature. *See also* aging. *Compare* artificial aging. *ASM Gloss.*

natural air crossing. An air crossing in which the two airways are separated by rock in its natural state. *B.S. 3618, 1963, sec. 2.*

natural alumina. An abrasive of two general varieties, corundum and emery. *ACSG, 1963.*

natural arch. a. Formed in a protruding piece of a sea cliff by the cutting of a cave right through it, or by two caves, one from each side, meeting. *Challinor.* b. An anticline in a well-bedded formation, conspicuously exposed in section. *Challinor.*

natural asphalt. Asphalt before crushing or refining, as mined or quarried in the case of natural rock asphalt, or surface-excavated in the case of lake deposits. *Ham.*

natural carbon. Carbon the natural as found shape of which has not been artificially modified. Also called natural stone. *Long.*

natural cement. A hydraulic cement produced by pulverizing and then heating naturally occurring rock (cement rock) containing appropriate proportions of limestone, clay, magnesia, and iron. Ignition temperatures are usually lower than for portland cement. Final pulverizing is necessary as with portland cement. *CCD 6d, 1961.*

natural circulation reactor. A reactor in which the coolant (usually water) is made to circulate without pumping owing to the different densities of its cold and reactor-heated portions, that is, by natural convection. *L&L.*

natural clay tile. A tile made by either the dust-pressed method or the plastic method, from clays that produce a dense body having a distinctive, slightly textured appearance. *ASTM C242-60T.*

natural coke. a. Aust. Coal that has been more or less coked by contact with an igneous rock. *Fay.* b. Coke made by natural processes, usually by the intrusion of an igneous dike. *Hess. See also* black coal; blind coal; burnt coal; cinder coal; coke coal; carbonite; cokeite.

natural convection. *See* convection. *Strock, 10.*

natural depreciation. The wearing out of a plant to a point where it cannot for that reason be used. This is a relatively rare occurrence in mining if the plant is properly maintained. *Hoov, pp. 147-148.*

natural diamond. This abrasive is the densest form of crystallized carbon, the hardest substance known. It occurs most commonly as well-developed crystals in volcanic pipes or in alluvial deposits. Bort (boart or borts) sometimes refers to all diamonds not suitable for gems, or it may refer to off-color flawed, or impure diamonds not fit for use for gems or most other industrial applications, but suitable for the preparation of diamond grain and powder for use in lapping or the manufacture of most diamond grinding wheels. This type of bort is also called crushing bort or fragmented bort. *ACSG, 1963.*

natural earth currents. Electric currents in the earth not due to human activity. *Schieferdecker.*

natural face. A name given to the X direction as pencilled on Z sections of unfaced quartz and whose position is determined by X-ray measurements or etching. The name is also given to the artificial prism face (parallel to 1120), thus located and produced by sawing the section in the YZ plane. Also applied to the natural growth faces on faced raw quartz crystals. *AM, 1.*

natural finish tile. Facing tile having unglazed or uncoated surface burned to the natural color of the material used in forming the body. *ASTM C43-65T.*

natural floatability. *See* inherent floatability. *Pryor, 3.*

natural frequency. The frequency of free oscillation of a system. For a multiple-degree-of-freedom system, the natural frequencies are the frequencies of the normal modes of vibration. *Hy.*

natural frequency of a foundation. The frequency of free vibration of a complete soil-foundation oscillating system. This frequency must differ distinctly from that of any machinery carried by the foundation if resonance is to be avoided. *Ham.*

natural frequency vibrating conveyor. A vibrating conveyor in which the rate of free vibration of the trough on its resilient supports is approximately the same as the rate of vibration induced by the driving mechanism. *ASA MH4.1-1958.*

natural gamma-ray logging. A process whereby gamma rays naturally emitted by formations traversed by a borehole are measured. A tool containing a radiation detector is lowered into the borehole, and as a result of the impingement thereon of gamma rays naturally emitted by the formations, outputs signals indicative of said gamma rays are produced and transmitted to the earth's surface. The signals are utilized to produce a record of gamma rays detected in correlation with the depth of the detector in the borehole. The record thus obtained in the form of a curve indicating relative number per unit of time of natural gamma rays at different depths, is a conventional natural gamma-ray log, sometimes simply called a gamma-ray log. *Williams.*

natural gas. A mixture of the low molecular weight paraffin series hydrocarbons methane, ethane, propane and butane with small amounts of higher hydrocarbons, also frequently containing small or large proportions of nitrogen, carbon dioxide, hydrogen sulfide and occasionally small proportions of helium. Methane is almost always the major constituent. Natural gas accompanying petroleum always contains appreciable quantities of ethane, propane, butane, as well as some pentane and hexane vapors and is known as wet gas. Dry gas contains little of these higher hydrocarbons. The exact composition of natural gas varies with locality. The heating value of natural gas is usually over 1,000 Btu/cu ft unless nitrogen or carbon dioxide are important components of the gas. Natural gas is used directly as a fuel and the higher hydrocarbons in it are also recovered for blending in motor fuel, and for use as liquefied gases. *See also* sour gas. *CCD 6d, 1961.*

natural gas indicator. This indicator consists of a naphtha-burning safety lamp with a mirror attached to one side so that the action of the flame may be observed from above. The lamp should be lowered slowly and carefully into the tank, meter pit, or manhole being tested. Lengthening of the flame's reflected image to the end of the mirror indicates a dangerous concentration of natural gas. This type of lamp should not be used if there is any possibility that manufactured gas or acetylene are present. When testing for undiluted natural gas, the lamp should have a rubber bulb and hose so that the lamp can be set up outside the area to be tested. *Best's, p. 588.*

natural gasoline. a. Those liquid hydrocarbon mixtures containing substantial quantities of pentane and heavier hydrocarbons, which have been extracted from natural gas. *A.G.I.* b. A light gasoline removed from casing-head gases. Same as casing-head gasoline. *Shell Oil Co.*

natural glass. Magma of any composition is liable to occur in the glassy condition if cooled sufficiently rapidly. Acid (that is granitic) glass is commoner than basic (that is basaltic) glass; the former is represented among igneous rocks by pumice, obsidian, and pitchstone; the latter by tachylyte. Natural quartz glass occurs in masses lying on the surface of certain sandy deserts (for example, the Libyan Desert); while both clay rocks and sandstones are locally fused by basic intrusions. *See also* buchite; tektites. *C.M.D.*

natural harbor. A harbor formed by the configuration of the coastline, outstanding examples being Sydney, Rio de Janeiro, and Milford Haven. *See also* artificial harbor. *Ham.*

natural levee. In floodtime, the muddy water flows over the riverbanks, where its velocity is at once checked as it flows gently down the outer side, causing more material to be deposited there, and a long alluvial ridge, called a natural levee, is built upon either side of the stream. *A.G.I.*

natural logarithm. A logarithm with e as a base. *Webster 3d.*

naturally bonded molding sand. A term used by foundrymen to refer to a sand which, as mined, contains sufficient bonding material for molding purposes. *Osborne.*

natural ore. Iron ore that contains moisture, in contrast to "dry ore" that has been dried but not calcined. *BuMines Bull. 630, 1965, p. 458.*

natural paper. Brownish paperlike deposit formed from the filaments of Conferva. *Tomkeieff, 1954.*

natural pressure cycle. A cycle in which pressure buildup conforms proportionately to the buildup of stresses due to forming. *ASM Gloss.*

natural radiation. *See* background radiation. *L&L.*

natural rock asphalt. Rock, usually almost pure limestone, which is impregnated with bitumen or asphalt. *See also* natural asphalt; rock asphalt. *Ham.*

natural sand. Sand derived from a rock, in which the grains separate along their natural boundaries. This includes unconsolidated sand, or a soft sandstone where little pressure is required to separate the individual grains. *Osborne.*

natural scale. Applied to a drawing made to equal vertical and horizontal scales. *Ham.*

natural slope. The maximum angle at which loose material in a bank or spoil heap will stand without slipping. *See also* angle of repose; angle of slide. *Nelson.*

natural soft porcelain. A porcelain which has a varied composition as sand, niter, soda, gypsum, salt, and other materials. *Standard, 1964.*

natural splitting. In mine ventilation, a practice which allows the air flow to divide among the branches, of its own accord and without regulation, in inverse relation to the resistance of each airway. *Hartman, p. 127.*

natural steel. a. Steel manufactured directly from the ore or by refining cast iron. *Fay.* b. Steel in the condition left by a hot-working operation, and cooled in the open air. *Fay.*

natural stone. Applicable originally to stream-rounded carbons; currently applicable to any nonmanmade diamonds the as found shape of which has not been artificially modified. *Long.*

natural strain. *See* strain; true strain.

natural stress relief. The failure of the skin rock of an excavation by crushing, shear, or plastic flow, surrounds that excavation with an envelope of rock under less than the preexisting stress. This action is called natural stress relief. It is the cause of arching. *Spalding.* Can occur also on free surface rock with explosive force. *Bureau of Mines Staff.*

natural ventilating pressure. a. It is usual in mining to find that air returning from the workings to the surface via the upcast shaft is of a higher temperature than the air in the downcast shaft. This is caused mainly by the addition of heat to the ventilation current from the strata exposed in the mine. Thus, even in a mine with the fan stopped, the upcast air density is less than the downcast air density. This lack of balance in the two vertical air columns produces a pressure difference across the shaft bottom doors known as natural ventilating pressure. *Roberts, I. p. 160.* b. The ventilating pressure which produces natural ventilation. *B.S. 3618, 1963, sec. 2.*

natural ventilation. The ventilation produced in a mine as a result of a difference in density of the air in the upcast and downcast shafts, brought about by natural causes. Natural ventilation is feeble, seasonal, and inconstant. *Nelson.*

natural water. Water obtained from the seas, lakes, rivers, streams, canals, springs, wells, mines, etc., all of which have dissolved some kind of impurity either from the air or from the rocks with which they have come into contact. *Cooper, p. 359.*

nauckite. A variety of resin. *Tomkeieff, 1954.*

naujakasite. A silvery white, grayish hydrous silicate of sodium, iron, and aluminum, $3(Na_2,Fe)O.2Al_2O_3.8SiO_2.H_2O$. Aggregates of minute micalike plates. Monoclinic, pseudohexagonal. From Naujakasik, Greenland. *English.*

naumanite. A selenide of silver and lead, occurring in large cubical crystals, also granular, and in thin plates of iron black color and a brilliant metallic luster. *Fay.*

nautical chart. A representation on a horizontal plane, and according to a definite system of projection, of a portion of the navigable waters of the earth, including the shorelines, the topography of the bottom, and aids and dangers to navigation; it may be derived from hydrographic, topographic or aerial surveys, or a combination thereof. *Seelye, 2.*

nautical measure. One nautical mile or knot equals 6,080.20 feet; 3 nautical miles equal 1 league; and 60 nautical miles equal 1 degree (at the equator). *Crispin.*

nautical mile. Any of various units of distance, used for sea and air navigation, based on the length of a minute of arc of a great circle of the earth and differing because the earth is not a perfect sphere: (1) a British unit that equals 6,080 feet or 1,853.2 meters; also called Admiralty mile; (2) a U.S. unit, no longer in official use, that equals 6,080.20 feet or 1,853.248 meters; and (3) an international unit that equals 6,076.1033 feet or 1,852 meters; used officially in the United States since July 1954. *Webster 3d.*

nautiloid. a. One of the nautiloidea; a shelled cephalopod having an external chambered shell either straight or variously curved or coiled, with simple septa forming sutures that are simple lines without marked flexures. *A.G.I.* b. Pertaining to the nautiloidea. *A.G.I.* c. In a planispiral coil with enlarging whorls, as in the genus nautilus. *A.G.I.*

navajoite. A very rare, weakly radioactive, hydrated vanadium pentoxide, $V_2O_5.3H_2O$. It is dark brown, soft, and fibrous, with a silky luster; associated minerals include corvusite, hewettite, tyuyamunite, rauvite, steigerite, and limonite. Navajoite is readily distinguished by X-ray powder pattern from hewettite and corvusite, which it may resemble in physical appearance. *Science, v. 119, March 1954, p. 326; Crosby, pp. 128-129.*

naval brass. Alloy of 62 percent copper, 1 percent tin, and 37 percent zinc. Resistant to sea-water corrosion. *Pryor, 3.*

Navier's hypothesis. An assumption in the design calculation of beams. It states that the stress at any point due to bending is assumed as being proportional to its distance from the neutral axis. *Ham.*

navigation. The name given to a river, the flow of which is controlled by canalization to render it navigable by shipping. *See also* slack-water navigation. *Ham.*

navite. A porphyritic variety of olivine dolerite containing abundant phenocrysts of serpentinized olivine, with fewer of augite and labradorite, in a holocrystalline, doleritic groundmass. *Holmes, 1928.*

navvy. a. Eng. The part of the face of an ironstone mine between two roads. *Fay.* b. A machine for excavating; also called steam shovel. *Webster 3d.* c. Eng. A laborer employed in mining, excavation, railroad work, etc. *Fay.*

nayagite. A sulfotelluride of lead and gold (sometimes containing antimony) crystallizing in the orthorhombic system. *C.M.D.*

Naylor spiralarm. An automatic methane detector which gives an alarm at a set percentage (usually 1.25) of gas in mine air. *Nelson.*

Nb Chemical symbol for niobium (columbium). *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

NCB The National Coal Board of the United Kingdom. *Nelson.*

N.C.B. boring tower. A boring tower developed by the National Coal Board of the United Kingdom to make test drillings for coal from positions off the coast. When drilling is in progress the tower is resting on the seabed. The base is divided into four airtight sections, which are filled with water when the tower is in position for drilling. The water is pumped out to give buoyancy when the tower is refloated for towing to a new drilling site. The tower is designed to withstand 80 miles per hour gales and waves of 30 feet from crest to trough, and can be used in any depth of water up to 120 feet. The overall height of the tower is 189 feet, and its total weight about 570 tons. It has reached over 3,000 feet drilling depth with core recovery. The first borehole was put down in the Firth of Forth, Scotland. *Nelson.*

N.C.B. comparator. An instrument with a hand pump for taking dust samples underground. The number of pump strokes are regulated to give a dust stain intermediate between two slightly differing standard stains supplied with the instrument. By comparison, the dust density of a sample may be assessed. *Nelson.*

N.C.B. recorder. This butane firedamp recorder has a small flame of burning butane gas which is controlled to give constant heat output with varying ambient temperature and humidity, and with varying butane gas pressure. The heat output is measured by means of a group of thermocouples in a chimney above the flame. The presence of methane in the atmosphere, which has access to the flame via suitable gauzes, increases the voltage generated by the thermocouples. These changes are recorded on a rotating chart calibrated in percentage methane. *Roberts, I, pp. 86-87.*

negor Abbreviation for net current gas-oil ratio. *BuMin Style Guide, p. 61.*

Nd Chemical symbol for neodymium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Ne Chemical symbol for neon. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

neanthropic. In geology, according to Dawson, the more recent portion of the anthropic, in which the area of land had become; by subsidence, smaller than in the palanthropic. *Fay.*

neap range. The average semidiurnal range occurring at the time of quadrature. *Hy.*

neap tides. a. In oceanography, high tides occurring at the moon's first or third quarter, when the sun's tidal influence is working against the moon's, so that the height of the tide is below the maximum in the approximate ratio of 3 to 8. *C.T.D.* b. Tide of decreased range occurring semimonthly as a result of the moon being in quadrature. *Schieferdecker.*

near accident. A potentially dangerous incident in which no one is injured. *See also* accident-cause code. *Nelson.*

near gravity material. A washability term popularly defined as the percentage of material in the raw coal within plus or minus 0.1 of the separating specific gravity. *See also* efficiency of separation. *Nelson.*

near-mesh. Near-sized; grains close in cross section to a specified screening mesh, which tend to blind apertures and slow down sizing. *Pryor, 4.*

near-mesh material. Material approximating in size to the mesh aperture. *B.S. 3552, 1962.*

nearshore currents. Currents adjacent to and in conjunction with coastal areas. *Hy.*

nearshore water. *See* inshore water. *Hy.*

neat. Cement slurries containing no aggregate, such as sand or gravel. *Long.*

neat cement. A slurry composed of Portland cement and water. *Brantly, 1.*

neat lines. The excavation lines of a tunnel within which the rock removed is paid for at the agreed contract rate. *See also* overbreak. *Nelson.*

neat work. In a brick structure, the brickwork set out at the base of a wall. *Dodd.*

Nebraska beds. Strata of Upper Miocene age occurring in Western North America; famous as containing Hipparion. *C.T.D.*

Nebraskan. First Pleistocene glaciation. *A.G.I. Supp.*

nebulite. A type of mixed rock whose fabric is characterized by indistinct, streaky inhomogeneities or schlieren and in which no sharp distinction can be made between the component parts of the fabric. *A.G.I.*

nebulitic. Applied to a macropolyschematic body of rock or mineral deposit in which no sharp boundary can be recognized between the fabric units. The boundaries have more or less vague contours and show diffuse cloudlike interpenetration. Such rocks are classed as nebulitic chorismites (nebulitic phlebites, ophthalmites, stromatites, merismites, etc.). They grade into actual nebulites, which show indistinct, streaky inhomogeneities (schlieren). *A.G.I.*

Necator. A common genus of hookworms that have buccal teeth resembling flat plates, that include internal parasites of man and various other mammals, and that are probably of African origin though first identified in North America. *Compare* Ancylostoma. *Webster 3d.*

neck. a. The narrow entrance to a room next to the entry, or a place where the room has been narrowed on account of poor roof. *Fay.* b. A pipe of igneous rock crossing bedding planes. *Mason, v. 1, p. 23.* c. In metallurgy, that part of a furnace where the flame is contracted before reaching the stack. *Standard, 1964.* d. A lava-filled conduit of an extinct volcano exposed by erosion; also called chimney. *Fay.* e. A narrow stretch of land, such as an isthmus or a cape. *Webster 3d.* f. A narrow body of water between two larger bodies; a strait. *Webster 3d.* g. The part of a bottle between finish and shoulder. *ASTM C162-66.* h. The structure connecting the melting and working chambers of a tank furnace. *ASTM C162-66.* i. The structure connecting the uptake and port in a tank furnace. *ASTM C162-66.* j. In brickmaking, one of a series of walls of unburned bricks in a clamp. *Standard, 1964.*

neck brick. A brick modified so that one large face is inclined toward one end. *A.R.I.*

neck cutoff. The breakthrough of a river across the narrow neck separating two meanders, where downstream migration of one has been slowed and the next meander upstream has overtaken it. *Compare* chute cutoff. *Leet.*

necking. a. Reducing the cross-sectional area of metal in a localized area by stretching. *ASM Gloss.* b. Reducing the diameter of a portion of the length of a cylindrical shell or tube. *ASM Gloss.*

necking down. Localized reduction in area of a specimen during tensile deformation. *ASM Gloss.*

necking strain. The same as uniform strain. *ASM Gloss.*

necklace. In ceramics, a necklacelike molding encircling the upper part of a vase or bottle. *Standard, 1964.*

neck leathers. Scot. Washers fixed on the top of a pump bucket or clack lid. *Fay.*

neck mold; neck ring. The mold that shapes the neck of a glass bottle. *See also* finish mold; ring mold. *Dodd.*

neck ring. A metal mold part used to form the finish of a hollow glass article. *ASTM C162-66.*

needle. a. A piece of copper or brass about one-half inch in diameter and 3 or 4 feet long, pointed at one end, and turned into a handle at the other, tapering from the handle to the point. It is thrust into a charge of blasting powder in a borehole, and while in this position the borehole is tamped solid, preferably with moist clay. The needle is then withdrawn carefully, leaving a straight passageway through the tamping for the miner's squib to shoot or fire the charge. *Fay.* b. A hitch cut in the side rock to receive the end of a timber. *Fay.* c. (Scot.) A beam across a shaft at a landing to support the cage; buntons. *Fay.* d. A small iron rod for making the touchhole used in blasting. *Gordon.* e. A timber set on end to close an opening for the control of water; it may be either vertical or inclined; a form of stop plank. *Seelye, 1.* f. Eng. *See* let into. *SMRB, Paper No. 61.* g. A needle-shaped or acicular crystal. *Standard, 1964.* h. The vertical reciprocating, refractory part of a feeder which alternately forces the glass through the orifice and pulls it up after shearing. *ASTM C162-66.* i. *See* stack, k. *Schieferdecker.*

needle antimony. A raw material, Sb_2S_3, sometimes used in the manufacture of enamels. Named from the long needle-shaped crystals which make up the mass when cooled. Liquated stibnite. *Enam. Dict.; Hess.*

needle bearing. An antifriction bearing using very small-diameter rollers between wide faces. *Nichols.*

needle coal. Variety of lignite composed of fibrous needlelike mass of vascular bundles of palm stems. *Tomkeieff, 1954.*

needled. Pocketed, as when face bars are set with the face end of the bar pocketed into the coal adjacent to the roof. *TIME.*

needle instrument. Any surveying instrument controlled by a magnetic needle. *See also* compass. *Ham.*

needle ironstone. The capillary variety of goethite. *Fay.*

needle ore. a. Same as aikinite. A lead-copper-bismuth sulfide. *Fay.* b. Iron ore of very high metallic luster, found in small quantities, which may be separated in long slender filaments resembling needles. *Standard, 1964.* c. *Corn.* Fibrous aggregates of acicular crystals of goethite iron ore, Land's End District. *Compare* wood iron ore. *Arkell.*

needles. a. Elongated crystals, tapering at each end to a fine point, as those typical of martensite. *Rolfe.* b. In powder metallurgy, metal powder particles of elongated form, resembling a needle. *Rolfe.* c. An English term used for a special form of poling boards; they are sometimes made of iron or steel plate and may be as much as 10 feet long by 6 inches wide. *Stauffer.*

needle spar. An old synonym for aragonite. *Fay.*

needle stone. Natrolite. A synonym for mesotype. *Fay.*

needle timber. Aust. Long sticks of timber, the lower end of which rests against the foot of a prop in a steep seam, so as to keep it in position, while the upper end is let into a hitch in the roof. *Fay.*

needle tin ore. An acute pyramidal variety of cassiterite. *Dana 6d, p. 235.*

needle traverse. In survey with dial, use of magnetic needle to read bearing of lines. Opposite is fast needle traverse or work, and refers to use of dial as in traversing with theodolite, where proximity of iron might deflect needle. Systems can be combined, using needle readings where iron is absent. Also called swinging needle traverse; loose needle traverse. *Pryor, 3.*

needle valve. A valve provided with a long tapering point in place of the ordinary valve disk. The tapering point permits fine gradation of the opening. Also called drip valve; needlepoint valve. *Compare* feed-control valve. *Long.*

needle weir. A fixed frame weir carrying heavy vertical timbers in contact. These can be withdrawn in order to lower the water level upstream of the weir. *Ham.*

needle zeolite. Synonym for mesotype. *Fay. See* needle stone.

needling. To cut holes, notches, or ledges in a coal or rock surface to receive the ends of timber supports. *Nelson.*

neft-gil; neftdegil. A mixture of paraffins and a resin occurring on Cheleken Island in the Caspian. It is related to zietrisikite. *Fay.*

negative. Carrying charge due to electrons; negative electrode; cathode. A negative element is acid-forming, its atom having 5, 6 or 7 valence electrons (one with 4 is ambivalent). The negative pole of a magnet is the one which turns toward the south. *Pryor, 3.*

negative crystal. A birefringent crystal in which the refractive index of the extraordinary ray is less than the refractive index of the ordinary ray. *Fay.*

negative element. a. Those which have shown a decided tendency to rise are designated positive elements and those which have tended to sink are termed negative elements. *A.G.I.* b. Applied to a large structural feature in the earth's crust, characterized through a long geologic time by a tendency to sink when diastrophism takes place. *A.G.I.* c. A portion of the earth's crust which has been submerged again and again during geologic history. *Stokes and Varnes, 1955.*

negative gradient. Describes conditions in a layer where the temperature decreases with increasing depth. *H&G.*

negative landforms. Topographic forms resulting from erosion and having the shape of depressions. *Stokes and Varnes, 1955.*

negative moment. *See* hogging moment. *Ham.*

negative movements. Relative movements of the sea level, subsiding with regard to the land. *Schieferdecker.*

negative rake. a. Describes a tooth face in rotation whose cutting edge lags the surface of the tooth face. *A.S.M. Gloss.* b. The orientation of a cutting tool in such a manner that the angle formed by the leading face of the tool and the surface behind the cutting edge is greater than 90°. Also called drag rake. *Long.*

negative temperature coefficient. *See* temperature coefficient. *L&L.*

negligence. In a legal sense, a failure upon the part of a mine operator to observe for the protection of the interests of the miner that degree of care, precaution, and vigilance which the circumstances justly demand, whereby the miner suffers injury. *Ricketts, I.*

negro. a. Mex. A lead-gray cinnabar. *Fay.* b. Mex. Tetrahedrite. *Fay.* c. Mex. Sulfide silver ores. *Fay.* d. Mex. Iron pyrite containing native silver and argentite. *Fay.* e. Mex. Antimonial gray copper ore mixed with blende, galena, copper and arsenical iron pyrite. *Fay.*

negrohead; niggerhead. A dark clump of reef coral, often an erosion relic or hurricane-tossed block on a coral beach. *Schieferdecker.*

negrohead tuyere. A tuyere having on its end a cubical block which is built into the furnace. Also called niggerhead tuyere. *Standard, 1964.*

neighborite. A mineral, $NaMgF_3$, orthorhombic and isostructural with perovskite, occurs in dolomitic oil-shale at South Ouray, Uintah County, Utah, as rounded grains and as octahedral crystals. *Hey, M.M., 1961.*

Neil-Robertson stretcher. One of several types of stretchers used for underground first-aid. It is made of stout canvas with bamboo strips to support the patient's head, chest, abdomen, hips, and legs. On the back there are supporting ropes which end in loops at the head and feet, and the loops make convenient carrying handles. Used for transporting casualties in highly inclined workings. *McAdam, p. 104.*

nekoite. A dimorphous triclinic form of $CaO.2SiO_2.2H_2O$, applied to the okenite from Crestmore, Calif., which differs in optical and X-ray data from okenite from other localities. *Spencer 21, M.M., 1958.* Its formula is probably $3CaO.6SiO_2.8H_2O$. *Mineralogical Magazine, v. 33, No. 256, March 1962, p. 70.*

Nekoza. In Japan, straw mats specially woven and used for catching gold in the sluices. *Fay.*

nekton. A biological division made up of all the swimming animals found in the pelagic division. *Hy.*

n-electron. One in the fourth orbital shell of an atom, which is completed with 32 electrons. *Pryor, 3.*

Nelson Davis separator. A cylindrical dense-medium washer developed in the United States. It uses a magnetite water suspension as medium. The bath resembles a drum in shape, its longitudinal axis being horizontal; within the stationary outer casing there is a rotor divided into compartments. The raw coal is fed near the top of the separator and separation takes place as the rotor revolves. The machine produces clean coal and shale; the magnetite is recovered. It can handle coal up to 10 inches in size, the lower limit being about one-fourth inch. Magnetite consumption runs at about one-half pound per ton of feed. *See also* Leebar separator. *Nelson.*

nelsonite. A rock composed essentially of ilmenite and apatite, with or without rutile. The dominant mineral may be either ilmenite or apatite, although ilmenite is usually the more important. *Johannsen, v. 1, 2d, 1939, p. 268.*

nemaline. In mineralogy, fibrous or threadlike; said of structure. *Standard, 1964.*

nemalite. A fibrous brucite containing ferrous oxide. *Standard, 1964.*

nematoblastic. a. Pertaining to the texture of a recrystallized rock in which the shape of the grains is threadlike. *Pettijohn, 2d, 1957, p. 92.* b. Applied to a fibrous type of schistosity that is seen in rocks composed largely of such minerals as glaucophane and actinolite. *A.G.I.*

nenadkevichite. A niobotitanosilicate $(Na,Ca)(Nb,Ti)Si_2O_7.2H_2O$, orthorhombic, in alkalic rock from Kola Peninsula, U.S.S.R. *Spencer 20, M.M., 1955.*

Neocene. The later of the two epochs into which the Tertiary period was formerly divided and at one time used by many geologists. Also, the series of strata deposited during that epoch. Obsolete. *Fay.*

neocianoite. Anhydrous copper silicate. Crystallization, monoclinic, in microscopic tables as a blue sublimate on lava. *Weed, 1918.*

Neocomian. Of or pertaining to the lower part of the Cretaceous epoch. *Standard. 1964.*

Neocryptozoic. Late Precambrian. *A.G.I. Supp.*

neodymia. *See* neodymium oxide. *CCD 6d, 1961.*

neodymium. a. A metallic element and member of the rare earth group, occurring in combination with cerium, lanthanum, and other rare earth metals. Silvery-white to yellowish and it tarnishes quickly in air. Symbol, Nd; valence, 3; atomic number, 60; and atomic weight, 144.24. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-121.* b. Two allotropic forms: Alpha neodymium, hexagonal up to transition temperature 868° C; and beta neodymium, isometric from 868° C to melting point; specific gravity, 7.004 (hexagonal) and 6.80 (isometric); melting point, 1,024° C; boiling point, 3,027° C; and decomposes in cold water. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-196.*

neodymium oxide; neodymia. Molecular weight, 336.48; light blue to blue-gray; Nd_2O_3; hexagonal; and melting point, about 1,900° C. Technical grade is a brown powder. Grades: 65 percent, 75 percent, 85 percent, 95 percent, 99 percent, and 99.9 percent oxide. Fluorescent; specific gravity, 7.24; insoluble in water; soluble in acids; hygroscopic; and it absorbs carbon dioxide from the air. Used in ceramic capacitors, in coloring glass, and in catalysts. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-196.*

neodymium sulfate. Red or pink; monoclinic; $Nd_2(SO_4)_3.8H_2O$; specific gravity, 2.85; melting point, 1,176° C; soluble in cold water; and slightly soluble in hot water. Grades: 75 percent, 99 percent, and 99.9 percent neodymium salt. Used in decolorizing glass and in coloring glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-197.*

neogen. An alloy resembling silver and containing 58 parts copper, 27 parts zinc, 2 parts tin, 12 parts nickel, ½ part bismuth, and ½ part aluminum. *Standard, 1964.*

Neogene. The later of the two periods into which the Cenozoic era is divided in the classification adopted by the International Geological Congress and used by many European geologists. Also, the system of strata deposited during that period. It comprises the Miocene, Pliocene, Pleistocene, and Holocene (or Recent) epochs. *See also* Paleogene. *Fay.*

Neo-Jurassic. a. Of or pertaining to the later Jurassic time, or to the upper part of the Jurassic system of strata. *Standard, 1964.* b. The upper part of the Jurassic system of strata, including the Middle and Upper Oölite series; also, the corresponding interval of geologic time. *Standard, 1964.*

neokaolin. Kaolin produced artificially from nepheline. *English.*

neokerogen. Organic debris deposited among the marine sediments and modified by bacterial action in such a way as to form the source material of petroleum, or, under certain conditions, to form kerogen of the oil shales. *Tomkeieff, 1954.*

neolite. A silky, fibrous, stellated, green, hydrous magnesium-aluminum silicate. *Standard, 1964.*

Neolithic. Of, being, or relating to the latest period of the Stone Age following the Mesolithic and Aeneolithic and characterized by the use of polished stone implements, the art of grinding stone, horn, bone, and ivory tools with sandstone, pottery making, the use of bow and arrow, domestication of animals, the cultivation of grain and fruit trees, the invention of the wheel, linen weaving, and the beginning of settled village life. *Webster 3d.*

neolote. A name used by Clarence King for an order of volcanic rocks embracing the rhyolites and basalts with which, according to the succession formulated by von Richthofen, eruptive activity terminates in any given area. *Fay.*

neomineralization. Chemical interchange within a rock resulting in alteration of its mineral components and production of new minerals. *G.S.A. Mem. 6, 1938, p. 14.*

neomorphic. Applied to the deuteromorphic constituents of a rock which have been regenerated by zones of secondary growth in crystalline continuity. The new material may have been deposited from solutions or from molten fluids. *Schieferdecker.*

neon. A zerovalent (inert) element in group O of the periodic system; colorless; odorless; monatomic gas (Ne); and constituting about 18 parts per million parts of air in the atmosphere (by volume). Obtained by the fractional distillation of liquid air. used in glow-discharge lamps. Symbol, Ne; atomic number, 10; atomic weight, 20.183; and density of gas, 0.9002 gram per liter (at 0° C). *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-197.* Isometric when crystalline; melting point, —248.67° C; boiling point, —245.92° C (at 1 atm); density of gas, 0.89990 gram per liter (at 1 atm and 0° C); specific gravity of liquid, 1.204 (at —245.9° C); slightly soluble in cold water; and soluble in liquid oxygen. Occurs in the atmosphere as 1 part per 65,000 parts of air. As a gas, it is used in making advertising signs, high-voltage indicators, lightning arrestors, wave meter tubes, and television tubes. Liquid neon is a refrigerant. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-121, B-197.*

Neo-Paleozoic. The later portion of the Paleozoic era, including the Upper Silurian, Devonian, and Carboniferous. *Standard, 1964.*

Neoprene. Trade name for polychloroprene, a substitute for rubber and nonflammable. *Nelson.*

neoprene plug closure. The function of the neoprene plug is to provide a completely waterproof seal at the open end of the detonator. Moisture penetration could cause desensitization of the explosive charge in the detonator and, in the case of copper-tubed detonators, moisture could produce a potentially dangerous chemical reaction between the lead azide and the copper. *McAdam II, p. 55.*

neovolcanic. Of effusive character and erupted during the Cenozoic era; formerly said of some igneous rocks, but now virtually obsolete. Opposite of paleovolcanic. *Fay.*

Neozoic. Of, relating to, or constituting the entire period from the end of the Mesozoic to the present time. *Webster 3d.*

nepheline; nephelite. A mineral found in igneous rocks and used at times, instead of feldspar in the glass industry, (Na,K)$(AlSiO_4)$; hexagonal and has a greasy luster. *Dana 17.*

nepheline basalt; nephelite basalt. A general name for any basic lava carrying nepheline as an essential constituent. By some petrologists, the term is restricted to those nepheline basalts which carry olivine but no feldspar. A more accurate name for the latter is olivine nephelinite. *See also* nephelinite; basanite; tephrite. *C.T.D.*

nepheline basanite. Basaltic rocks with plagioclase, nepheline, augite, olivine, and basis. *Compare* nepheline tephrite. *Fay.*

nepheline syenite; nephelite syenite. a. A coarse-grained igneous rock of intermediate composition, undersaturated with regard to silica, and consisting essentially of elaeolite, a varying content of alkali feldspar, with soda-amphiboles and/or soda-pyroxenes. Common hornblende, augite, or mica are present in some varieties. *See also* foyaite; laurdalite. Also called elaeolite syenite. *C.T.D.* b. A mineral aggregate consisting chiefly of albite, microcline, and nephelite, each in significant amount. *ASTM C242-60.*

nepheline tephrite. A gray volcanic rock composed of pyroxene, plagioclase, nepheline, and magnetite; a feldspathic nephelinite. *Standard, 1964.*

nephelinite. A fine-grained igneous rock normally occurring as lava flows, and resembling basalt in general appearance; consists essentially of nepheline and pyroxene, but not of olivine or feldspar. The addition of the former gives olivine nephelinite, and of the latter, nepheline tephrite. *C.T.D.*

nephelinitoid. Boricky's term, now used in microscopic work for nepheline glass, or the glassy basis in nepheline rocks, whose easy gelatinization indicates its close relations with this mineral; unindividualized nepheline. *Fay.*

nephelinitoid phonolite. A general term for phonolites in which feldspathoids are more abundant than feldspars. *Holmes, 1928.*

nephelinization. The process of introduction of or replacement by nepheline. *A.G.I.*

nephelite. *See* nepheline.

nephelometer. An instrument which measures the scattering of light by determining the amount of light emitted at right angles to the original beam direction. Such devices are useful in studies of particles (size and amount) suspended in water. *H&G.*

nephelometry. The measurement of concentration or other property of a suspension by means of its light transmission or light dispersion. *Lowenheim.*

nephrite. A tough, compact variety of tremolite, $Ca_2Mg_5(Si_8O_{22})(OH)_2$. It supplies much of the material known as jade. Monoclinic. *Dana 17, p. 445. See also* jade.

neptune powder. An explosive resembling dynamite No. 2, and consisting of nitroglycerin with a more or less explosive dope. *Fay.*

neptunian. An early term applied to water-formed strata as opposed to plutonic or igneous rocks. *Fay.*

neptunian dikes. Dikes filled by sediment, generally sand, in contrast to plutonic dikes filled by volcanic materials. *Pettijohn.*

neptunian theory. A general theory of aqueous origin of rocks proposed by Werner in the 18th century. *A.G.I.*

neptunic. Denotes one of the three great subdivisions of rocks under a classification proposed by Read. The term includes the sedimentary rocks. *A.G.I.*

neptunism. The theory that the rocks of the earth's crust were formed through the agency of water. Obsolete. *A.G.I.*

Neptunists and Plutonists. Rival geological schools at close of eighteenth century. The Neptunists, led by Werner, believed that all rocks were hydatogenetic. The Plutonists, following Hutton, attributed them to lava flows and volcanos. The position was clarified by Lyell in 1830. *Pryor, 3.*

neptunite. A titano-silicate of iron, manganese, sodium, and potassium, $(Na,K)_2(Fe,Mn)(Si,Ti)_5O_{12}$; monoclinic; black; prismatic crystals. Found in Narsarsuk, Greenland; San Benito County, California; Kola Peninsula, Russian Lapland. *English.*

neptunium. A silvery metallic element in group VI of the periodic system. Produced artificially by nuclear reaction between uranium and neutrons. Symbol, Np; valences, 3, 4, 5, and 6; atomic number, 93; and the mass number of the most stable isotope, 237. Three allotropic forms: Alpha neptunium, to 278° C, orthorhombic; beta neptunium, 278° to 500° C, tetragonal; and gamma neptunium, 500° C to melting point, isometric. Specific gravity, alpha neptunium, 20.45; beta neptunium, 19.36 (at 313° C); and gamma neptunium, 18.0 (at 600° C). Melting point, 630° C; and soluble in hydrochloric acid. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-122, B-197.*

neptunium disintegration series; neptunium decay series; neptunium series. a. The series of nuclides resulting from the decay of the long-lived (half-life, 2.2×10^6 years) synthetic nuclide, neptunium 237. Mass numbers of all members are given by 4n + 1, where n is an integer. The sequence is also known as the 4n + 1 series. Many other synthetic nuclides decay in collateral series into this sequence. The stable end-product, bismuth 209, occurs in nature. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-87.* b. Plutonium 241 to americium 241 to neptunium 237 to protactinium 233 to uranium 233 to thorium 229 to radium 225 to actinium 225 to francium 221 to astatine 217 to bismuth 213 to polonium 213 plus thallium 209 to lead 209 to bismuth 209, the stable end-product. *Glasstone, 2, p. 136.*

Nerchinsk aquamarine. Aquamarine-colored topaz from Nerchinsk, Siberia. *Shipley.*

Nerchinsk beryl. Aquamarine, chrysolite beryl, and morganite from Nerchinsk district. Transbaikal, Siberia. *Shipley.*

Nerchinsk rubellite. Rubellite from near Nerchinsk in Transbaikal, Siberia. *Shipley.*

nereite. The track left by a fossil worm. *Standard, 1964.*

neritic. Pertaining to the shallow seas; for accumulations of shells, but sometimes for the whole environment of deposition on the continental shelf. *Challinor.*

neritic environment. The shallow sea floors to a depth of 100 fathoms. *Schieferdecker.*

neritic province. *See* pelagic division. *Hy.*

neritic zone. a. That part of the sea floor extending from the low tideline to a depth of 200 meters. *A.G.I.* b. A part of the pelagic division of the oceans with water depths less than 200 meters. *A.G.I.*

Nerlys. Eng. White marly limestone with scattered oölite grains, beds known a Top and Bottom Nerlys (freestone). *Arkell.*

Nernst body. A sintered mixture of thoria, zirconia, and yttria together with small amounts of other rare earth oxides. After it has been preheated to about 2,000° C, this body becomes sufficiently electrically conducting for use as a resistor in high temperature laboratory furnaces. *Dodd.*

Nernst film. In ion exchange, the diffusion layer supposed to surround a bead o resin. This static film is reduced, or diffusion through it is accelerated, if agitation of the ambient liquor is increased, i temperature is raised or if concentratio of ions in solution is made greater. *Pryor, 3.*

Nernst lamp. An incandescent lamp whos lighting element consists of a pencil composed of the refractory oxides of rar earth. *Crispin.*

Nernst's law. The solubility of a salt is decreased by addition to its solution o another salt with a common ion (common ion effect). *Pryor, 3.*

nero-antico. It. A black marble found i Roman ruins: probably the ancient mar mor Taenarium, from the Taenarian pen insula, Greece. *Standard, 1964.*

nesh. Eng. Friable, soft, crumbly, powder dusty; said of coal. *Fay.*

nesosilicates. Silicate structures in which i divdual SiO_4 tetrahedra are not linke together, that is, they do not share oxygens. An example is olivine. Synonym f orthosilicate. *See also* silicates, classification. *A.G.I.*

nesquehonite. A hydrous, magnesium ca bonate, $MgCO_3+3H_2O$. In radiatin groups of prismatic crystals. Colorless t white. From a coal mine at Nesquehoning, Carbon, Pa. *Fay.*

ness; naze. A cape, headland, or promontory most commonly used as a termination, as in Dungeness, England. *Fay.*

nest. a. A small isolated mass of ore or mineral within another formation. *Webster 3d.* b. To place the next-smaller-size casing inside the casing already set in a borehole. *Long.* c. To fit one tube inside another. *Long.* d. A cushion upon which glass is placed to be cut with a diamond. *C.T.D.* e. An arrangement comprising a graduated series of sieves. *Bureau of Mines Staff.*

nested crater. A central volcanic vent showing a crater within a crater. *Fay.*

nest-weise. Forest of Dean. Iron ore that occurs in pockets is said to lie nest-weise. *Fay.*

net. Scot. Strapping used for lowering or raising horses in shafts. *Fay.*

net calorific value. a. Net heat of combustion. In the case of solid fuels and liquid fuels of low volatilty, a lower value calculated from gross calorific values as the heat produced by combustion of unit quantity, at constant atmospheric pressure, under conditions, such that all water in the products remains in the form of vapor. *ASTM D407-44.* b. The amount of heat liberated by the complete combustion of unit weight of coal under specified conditions; the water vapor produced during combustion is assumed to persist as such. *B.S. 3323, 1960.*

net calorific value (at constant pressure). The number of heat units which would be liberated if unit quantity of coal or coke was burned in oxygen at constant pressure in such a way that the heat release was equal to the gross calorific value of the coal or coke at constant pressure, less the latent heat of evaporation at 25° C and constant pressure of the water both originally contained in the coal or coke and formed by its combustion. *B.S. 1016, 1961, Pt. 16.*

net calorific value (at constant volume). The number of heat units which would be liberated if unit quantity of coal or coke was burned in oxygen at constant volume in such a way that the heat release was equal to the gross calorific value of the coal or coke at constant volume, less the latent heat of evaporation at 25° C and constant volume of the water both originally contained in the coal or coke and formed by its combustion. *B.S. 1016, 1961, Pt. 16.*

net-corrected fill. Net fill after making allowance for shrinkage during compaction. *Nichols.*

net cut. a. In sidehill work, the cut required less the fill required at a particular station or part of a road. *Nichols.* b. The amount of excavated material to be removed from a road section, after completing fills in that section. *Nichols.*

net drilling time. The rotating time actually spent in deepening the borehole. *Long.*

net fill. a. The fill required, less the cut required, at a particular station or part of a road. *Nichols.* b. In sidehill work, the yardage of fill required at any station, less the yards of material obtained from the cut at that station. *Nichols.*

net heat of combustion. *See* net calorific value. *A.G.I.*

nether. The lower part of, as in nether roof, and opposed to the term upper. *TIME.*

nether coal. Mid. The lower division of a thick seam of coal. *Fay.*

nether-formed. Formed or crystallized below the earth's surface such as granite. *Standard, 1964.*

nether roof. a. The strata directly over the coal seam. The props set at the face only hold the nether roof. For example, if the props carry a load of 20 tons each and are set 4 feet apart each way, the supported weight per square foot is 1.5 tons. *See also* immediate roof. *Nelson.* b. In mine subsidence, the immediate roof of limited depth, such as timber might be expected to support. *Briggs, p. 62.*

nether strata. The roof and strata immediately above the coal. *Mason.*

net masonry. Masonry formed of small square bricks or stones placed diagonally in a lozenge pattern; reticulated masonry. *Standard, 1964.*

net plankton. Those plankton which can be removed from the water by filtration through a fine net. *H&G.*

net slip. The total slip along a fault; the distance measured on the fault surface between two formerly adjacent points situated on opposite walls of the fault. It is the shortest distance measured in the fault plane between the two formerly adjacent points. The slip or net slip is a vector quantity defining the direction and distance of movement, parallel to a fault surface or zone, of a specified wall relative to the other wall. *A.G.I.*

Nettleton method. An indirect means of density determination in which a closely spaced gravity traverse is run over some topographic feature, such as a small hill or valley, with dimensions that have been measured accurately. When the profile of observed values is plotted, the gravitational effect of the feature itself is calculated at each observation point along the profile and removed from the observed value for that point. The calculation is repeated a number of times, different densities being assumed for each computation. The density value at which the hill is least conspicuous on the gravity profile is considered to be most nearly correct. *Dobrin, p. 227.*

net unit value. The difference between the gross unit recoverable value and the cost of mining, treating, and marketing the ore; in other words, the net operating profit. *See also* gross unit value. *Nelson.*

network. a. Especially in surveying and gravity prospecting, a pattern or configuration of stations, often so arranged as to provide a check on the consistency of the measured values, for example, a level network, a gravity network based on the integration of torsion-balance gradients. *A.G.I.* b. In ventilation surveys, a ramified system of mine workings. *Roberts, I, p. 296.*

network deposit. Masses of rock intersected by so many little veins as to make the whole worth mining. *Nelson.*

network formers. Oxides which contribute to the polymerization of glass, such as SiO_2, B_2O_3, GeO_2, P_2O_5, As_2O_5. *VV.*

network forming ion. One of the ions in a glass that form the network in the glass structure. The ratio of the ionic radius of the network-forming ion to that of the oxygen ion must lie between 0.155 and 0.225 for triangular coordination, or between 0.225 and 0.414 for tetrahedral coordination; such ions include B^{3+}, Al^{3+}, Si^{4+}, and P^{5+}. *See also* network modifying ion. *Dodd.*

network modifiers. Oxides that contribute to the depolymerization of glass, such as barium oxide, calcium oxide, potassium oxide, magnesium oxide, sodium oxide, and litharge. *VV.*

network modifying ion. One of the ions in a glass which do not participate in the network. They must have a rather large radius and a low valency, for example, the alkali metals and the alkaline earths. *Dodd.*

network of faults. A not too irregular system of faults strikng in different directions. *Schieferdecker.*

network of veins. A not too irregular system of veins striking in different directions. *Schieferdecker.*

network structure. A structure in which one constituent occurs primarily at the grain boundaries, thus partially or completely enveloping the grains of the other constituents. *ASM Gloss.*

network structures. *See* tectosilicates. *A.G.I.*

neudorfite. A resinous substance found in coalbeds at Neudorf, Moravia. *A.G.I. See also* duxite.

Neuenburg saw. A plough consisting of a 2-inch steel plate 6 feet by 20 inches of 7 pieces hinged together to follow floor rolls; picks on the face edge cut in both directions. The minimum workable seam is 14 inches on gradients 35° to 70°. Maximum face length is 80 yards. The machine is used in the Ruhr. *Nelson.*

neuk. The tailgate corner of a face behind the face conveyor tension end. *Trist.*

Neumann band. Mechanical twin in ferrite. *ASM Gloss.*

Neumann lamellae. Straight, narrow bands parallel to the crystallographic planes in the crystals of metals that have been subjected to deformation by sudden impact. They are actually narrow twin bands, and are most frequently observed in iron. *C.T.D.*

neuropteris. A large tree-fern of the coal forest, with trunks about 2 feet thick, containing several cylinders of wood inside the stem instead of one column of wood as in modern trees. *Nelson.*

neutral. Of slags, neither acid nor basic; of wrought iron, neither red-short nor cold-short; of iron ores, suitable for the production of neutral iron. *Fay.*

neutral atmosphere. One in which there is neither an excess nor a deficiency of oxygen. *Bureau of Mines Staff.*

neutral axis. The line of zero fiber stress in any given section of a member subject to bending; it is the line formed by the intersection of the neutral surface and the section. *Ro.*

neutral depth. *See* normal depth. *Seelye, 1.*

neutral, derived. *See* derived neutral. *I.C. 7962, 1960, p. 22.*

neutral equilibrium. A body is said to be in neutral equilibrium if on being slightly displaced it remains in its new position; for example, a ball placed on a horizontal surface, a cone supported on its side on a horizontal surface, or any body supported at its center of gravity. *Morris and Cooper, p. 167.*

neutral flame. a. A gas flame in which there is no excess of either fuel or oxygen. *ASM Gloss.* b. In welding, flame produced by a mixture at the torch of acetylene and oxygen in equal volumes. *C.T.D. Supp.*

neutral fold. A sideways-closing fold. *Challinor.*

neutral gear. A set of gears, such as in a gear-feed swivel head, that when enmeshed allows the drive rod and attached drill string to be rotated without its being fed forward or backward. *Long.*

neutral glass. A name sometimes applied to glass that is resistant to chemical attack. *Compare* neutral-tinted glass. *Dodd.*

neutralization. Making neutral or inert, as by the addition of an alkali or an acid solution. *Crispin.*

neutralize. To add either an acid or alkali to a solution until it is neither acid nor alkaline. *Gordon.*

neutralizer. A dilute solution of alkali or of sodium cyanide used in the treatment of the base metal for vitreous enameling after the pickling process. Alkali neutralizer consists of a warm (65° to 70° C) solution of soda ash, borax, or trisodium phosphate, the strength being equivalent to 0.3 to 0.4 percent Na_2O. Cyanide neutralizer is a 0.10 to 0.15 percent solution of sodium cyanide; other ingredients may be present to neutralize the hardness of the water. *Dodd.*

neutral linings. Furnace linings of neutral refractories. *Osborne.*

neutral oxides. Oxides which react neither with acids nor with bases to form salts; for example, water or carbon monoxide. *Cooper.*

neutral point. a. A neutral point in a wye-connected alternating-current power system means the connection point of transformer or generator windings from which the voltage to ground is nominally zero, and is the point generally used for system grounding. *I.C. 7962, 1960, p. 22.* b. In titration, that at which hydrogen ions and hydroxyls are approximately balanced, each at about 1 times 10^{-7} molar. Since color-change indicating dyes do not all react at this point, selection for a given titration must be made with regard to the required point of change. *Pryor, 3.*

neutral pressure. The hydrostatic pressure of the water in the pore space of a soil. *See also* effective pressure; pore-water pressure. *Ham.*

neutral refractories. a. A term applied to refractories which are neither strongly basic nor strongly acid, such as chrome, mullite, or carbon. *A.R.I.* b. Refractories that are resistant to chemical attack by both acid and basic slags, refractories, or fluxes at high temperatures. *ASTM C71-64.*

neutral refractory. A refractory material such as chrome ore that is chemically neutral at high temperatures and so does not react with either silica or basic refractories. *Dodd.*

neutral salt. A salt in which all the hydrogen of the hydroxyl groups of an acid is replaced by a metal. *Standard, 1964.*

neutral salt effect. Reduction of ionization of weak acid or base by addition of ionizing salt which contains one of the ions already present; form of common ion effect. *Pryor, 3.*

neutral shoreline. A shoreline whose essential feature does not depend on either the submergence of a former land surface or the emergence of a former subaqueous surface. While of the the world's shorelines have resulted from submergence of land areas or emergence of subaqueous surfaces, there remain important groups of shorelines whose essential characteristics depend on causes independent of either submergence or emergence. To this class of a shoreline, it was proposed to apply the term neutral shoreline. *A.G.I.*

neutral stress; pore pressure; pore-water pressure. Stress transmitted through the pore water (water filling the voids of the soil). *ASCE P1826.*

neutral surface. The longitudinal surface of zero fiber stress in a member subject to bending; it contains the neutral axis of every section. *Ro.*

neutral-tinted glass. A gray glass, usually of the borosilicate type; these glasses are used in light filters to reduce the transmission without (as far as possible) selective absorption of the particular wavelengths. *Compare* neutral glass. *Dodd.*

neutral zone. A strain-free area. *See also* compression zone; tension zone. *Nelson.*

neutretto. A neutral meson. *Webster 3d.*

neutrino. An electrically neutral elementary particle with a mass so small that it is extremely difficult to detect. It is produced in many nuclear reactions; for example, in beta decay, and has high penetrating power. Neutrinos from the sun usually pass right through the earth. *L&L.*

neutron. An uncharged elementary particle with a mass that nearly equals that of the proton. The isolated neutron is unstable and decays with a half-life of about 13 minutes into an electron, a proton, and a neutrino. Neutrons sustain the fission chain reaction in a nuclear reactor. *See also* fast neutron; thermal neutron. *L&L.*

neutron-absorbing glass. For thermal neutron-absorption, a glass must contain cadmium, which is the only common glass constituent having a high neutron-capture cross section; it is used to form a cadmium borate glass, which is made more chemically durable by the addition of TiO_2 and ZrO_2. *Dodd.*

neutron capture. The reaction that occurs when an atomic nucleus absorbs or captures a neutron. The probability that a given material will absorb neutrons is proportional to its neutron-capture cross section and depends on the energy of the neutrons and the nature of the material. *L&L.*

neutron density. The number of neutrons per cubic centimeter. *L&L.*

neutron economy. The degree to which neutrons in a nuclear reactor are used for desired ends instead of being lost by leakage or useless absorption. Desired ends may include propagation of the chain reaction; converting fertile material to fissionable material; producing desired isotopes; and experimental use. *L&L.*

neutron flux. *See* flux. *L&L.*

neutron flux, total. The scalar sum of all the neutron fluxes in a cubic centimeter. Physically, the total flux may be considered as the total track length (zigzag) traveled by the neutrons within a cubic centimeter in one second. If a neutron scource provides a neutron density of n neutrons per cubic centimeters moving with a velocity v centimeters per second in a given direction, then the product nv, expressed in terms of number of neutrons per square centimeters per second, is called the neutron flux. *A.S.M. Gloss.*

neutron-gamma log. A radioactivity log employing both gamma and neutron-log curves. The neutron log should respond best to porous fluid-filled rock and the gamma best to shale markers. *A.G.I.*

neutron log. Strip recording of the secondary radioactivity arising from the bombardment of the rocks around a borehole by neutrons from a source being caused to move through the borehole. Used, generally in conjunction with other types of logs, for the identification of the fluid-bearing zones of rocks. *Institute of Petroleum, 1961. See* neutron logging. *A.G.I.*

neutron logging. A radioactivity logging method used in boreholes in which a neutron source provides neutrons which enter rock formations encountered and induce additional gamma radiation which is measured by use of an ionization chamber. The gamma radiation so induced is related to the hydrogen content of the rock. *A.G.I.*

neutron-neutron logging; n-n logging. A technique in which the formation is bombarded by neutrons and the scattered neutrons are measured. *A.G.I.*

Nevada diamond. Obsidian artificially decolorized. *Shipley.*

Nevada system. *See* square-set stoping. *Fay.*

Nevada turquoise. a. Variscite. *Shipley.* b. Turquoise from Nevada, the state which produces the greatest quantity of this gemstone. *Shipley.*

Nevadian orogeny. Late Jurassic-Early Cretaceous diastrophism. *A.G.I. Supp.*

nevadite. An acid lava (rhyolite) containing an abnormally large quantity of phenocrysts, with correspondingly little groundmass. *C.T.D.*

névé. The partially compacted granular snow that forms the surface part of the upper end of a glacier; broadly, a field of granular snow. Also called firn. *Webster 3d.*

nevyanskite. A tin-white alloy of iridium and osmium with other platinum metals occurring in flat scales. *Standard, 1964.* Contains more than 40 percent iridium. *Fay.*

Newark series. Continental strata of Upper Triassic age in the United States, consisting essentially of red sandstones, shales, arkoses, and conglomerates, some 14,000 to 18,000 feet thick; they include black shales with fish remains, thin coal seams in the Rhaetic of Virginia and North Carolina, and basaltic flows and sills. *C.T.D.*

Newaygo screen. A slanting screen in which the material to be screened passes down. The screen is kept in vibration by the impact of a large number of small hammers. *Liddell 2d, pp. 391-392.*

newberyite; newberite. An acid magnesium phosphate, named after J. C. Newberry, an Australian, found in white orthorhombic crystals in guano, $MgHPO_4.3H_2O$. *Webster 3d; Hey 2d, 1955.*

Newcastle kiln. A type of intermittent kiln formerly popular in the Newcastle-on-Tyne area. In its original form it is a rectangular kiln with two or three fireboxes at one end and openings for the exhaustion of waste gases at the base of the other end wall, which incorporates a chimney. In a later design the kiln is of double length, there are fireboxes at each end, and the waste gases are removed from the center of the kiln. Such kilns found particular use in the firing of refractories and salt-glazed ware. *Dodd.*

new diamond. A diamond that has not been used. Also called new stone; virgin diamond; virgin stone. *Long.*

New England method. *See* pick and dip. *ACSG.*

New Guinea jade. Nephrite from Humboldt Bay district, New Guinea. *Shipley.*

Newhouse crusher. Secondary gyratory crusher in which the gyrating breaking cone is direct-driven via a flexible coupling from a slow-running motor mounted above it, the assembly being hung from overhead supports. *Pryor, 3.*

newjersite. Variety of resin. *Tomkeieff, 1954.*

newkirkite. An early synonym for manganite. *Fay.*

newlandite. A variety of griquaite composed of garnet, enstatite, and chrome diopside. *Holmes, 1928.*

Newlyn datum. The mean sea level now used as the British Ordnance Datum for leveling. It was determined as the result of several years' observations at Newlyn, Cornwall, England, and differs at various places by more than a foot from levels based on the Liverpool datum which it supersedes. *Ham.*

Newman limestone. A thick group of limestones, about 3,300 feet thick, referred to the Upper Mississippian of Virginia. *C.T.D.*

Newmann hearth. A modified Scotch hearth in which poking or rabbling is done mechanically. *C.T.D.*

new mine fire clay. A fire clay (there are five seams) occurring below the old mine fire clay in the Stourbridge district, England. *See also* old mine fire clay. *Dodd.*

New Red Sandstone. The assemblage of red sandstone, conglomerates, shales, etc., occupying the interval between the top of the Coal Measures and the base of the Jurassic system in Western Europe. It is now separated into Triassic and Permian and the name has only a historic interest. *Fay.*

new rock. Abbreviation for new rock turquoise. *Shipley.*

new rock turquoise. a. An old Persian term for inferior turquoise or for turquoise matrix. *Shipley.* b. A term sometimes used for turquoise which does not retain its color very well. *Shipley.*

new sand. Newly mixed, but not unused, molders' sand. *Standard, 1964.*

new scrap. The refuse produced in the manufacture of articles for ultimate consumption; it includes defective castings, clippings, turnings, borings, drosses, slags, etc. *Newton, p. 38.*

Newson's boring method. A method of boring small shafts up to 5½ feet in diameter and is similar in principle to chilled-shot drill, but conducted on a larger scale. A heavy cutting tool, man cage, debris bucket, bailer, core puller, safety devices, hoist, derrick, and reels for power cable and air hose form the complete equipment. The method can be used in hard firm strata which are not water bearing. *Nelson.*

new stone. Synonym for new diamond. *Long.*

Newtonian fluid. Term marking the distinction made in mineral processing which involves agitation, between a truly viscous (Newtonian) liquid and one in which shear or apparent viscosity (pseudoviscosity) varies with the dimensions of the containing system and the speed of agitation. The latter type of fluid is said to be non-Newtonian. *Pryor, 3.*

Newton's alloy. An alloy containing 50 percent bismuth, 31 percent lead, and 19 percent tin; melting point 202.1° F. *Webster 2d.*

Newton's law of gravitation. *See* law of gravitation.

Newton's law of motion. *See* law of motion. *Webster, 3d.*

New York rod. A leveling rod marked with narrow lines, ruler fashion. *Nichols.*

New Zealand greenstone. Nephritic jade of gemstone quality, from New Zealand. *C.M.D.*

New Zealand jade. Same as nephrite; from New Zealand. *Shipley.*

nfe Abbreviation for nitrogen-free extract. *BuMin Style Guide, p. 61.*

N-frame brace. A diagonal brace in a square set. *Fay.*

ngavite. A stony meteorite composed of bronzite and olivine in a friable breccialike mass of chondri. *Hess.*

ngor Abbreviation for net gas-oil ratio. *BuMin Style Guide, p. 61.*

n'hangellite. An algal sapropelic deposit similar to coorongite. It is found as a crust several inches thick in certain localities in Portuguese East Africa and is used as a fuel by the natives. *A.G.I.*

Ni Chemical symbol for nickel. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

niadites. A Coal Measures molluscan shell sometimes found in the fine-grained shales overlying certain coal seams. The umbones are positioned at the extreme end of the shell. It has proved of great value for the identification and correlation of coal seams. *See also* mollusca. *Nelson.*

Niagara limestone. *See* Lockport limestone. *C.T.D.*

Niagaran. Middle Silurian (restricted). *A.G.I. Supp.*

Niagara spar. A term applied locally in Niagara Falls, N.Y., to fibrous gypsum imported through Canada from England. Fibrous calcite, originally, found in veins in limestone near Niagara Falls, Ontario, Canada, was perhaps the original satin spar. *See also* satin spar. *Shipley.*

nib. a. A protrusion at one end of a roofing tile serving to hook the tile on the laths in the roof. *Dodd.* b. A fault in flat glass, in the form of a protrusion at one corner, caused during cutting. *Dodd.* c. In powder metallurgy, a pressed, presintered, shaped, sintered, hot-pressed, rough-drilled, or finished compact; also, a generic term used for a piece of hard carbide material intended for use as a drawing die. *Rolfe.*

nibbed saggar. A saggar with internal protrusions to support a bat (therefore, permitting the placing of two separate layers of ware) or to allow a cover to be placed inside the top of the saggar. *See also* saggar. *Dodd.*

nibber. The blade of a squeegee. *ASCG.*

nibbling. Contour cutting of sheet metal by a rapidly reciprocating punch making numerous small cuts. *ASM Gloss.*

nicarbing. a. The same as carbonitriding. *ASM Gloss.* b. (Ni-carbing, trade name.) Surface-hardening process which is a combination of nitriding and carburizing to produce a thin, hard case. *Bennett 2d, 1962.*

niccoliferous. *See* nickeliferous. *Fay.*

niccolite. A copper-red arsenide of nickel; usually contains a little iron, cobalt, and sulfur; also, one of the chief ores of metallic nickel. Hexagonal. Also called copper nickel; kupfernickel. *Fay, Dana 17.*

Nicholls' technique. A technique used in the determination of elastic constants of rock in situ. Longitudinal and shear waves are generated in rock by small explosive charges in shallow drill holes. Accelerometers and strain gages are employed to measure arrival times for both waves. From wave velocities and measured density, Poisson's ratio, modulus of elasticity, modulus of rigidity, Lame's constant and bulk modulus can be calculated. *Lewis, p. 568.*

nicholsonite. A variety of aragonite containing up to 10 percent zinc. From Leadville, Colo.; Tintic District, Utah; magnificent specimens at Tsumeb, Southwest Africa. *English.*

Nichrome. Registered trademark used in respect of a range of heat- and oxidation-resisting alloys (not necessarily solely nickel and chromium) made by the Driver Harris organization. *C.T.D.*

nick. a. To make a perpendicular cut, with the pick, in the face of (coal) at the junction with the rib, to weaken resistence to the blast or wedge; to shear. *Standard, 1964. See* nicking. *Fay.* b. To cut vertically in the coal. *SMRB, Paper No. 61.*

nickel. Hard; malleable; ductile; silvery-white metallic element of group VIII of the periodic system; capable of taking a high polish; resistant to oxidation; and attracted by magnets. Used in alloys, in electroplating, and in coinage. Symbol, Ni; valences, 0, 1, 2, and 3; isometric; atomic number, 28; atomic weight, 58.71; and specific gravity, 8.85 (at 20° C). *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-122.* Melting point, 1,453° C; boilng point, 2,732° C; specific gravity, 8.902 (at 25° C); a fair conductor of heat and electricity; insoluble in water and in ammonia; soluble in dilute nitric acid; and slightly soluble in hydrochloric acid and in sulfuric acid. Occurs alloyed with iron in meteorites. Principal ore minerals are pentlandite and nickeliferous pyrrhotite. Belongs to the iron-cobalt-nickel group of metals. Used in stainless steel and in other corrosion-resistant alloys, in nickel steel for armor plate and burglar-proof vaults, as plating to protect less corrosion-resistant metals, in magnets, to impart a green color to glass, in ceramics, and as a catalyst. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-122, B-197.*

nickel-alkali accumulator. A secondary cell with a voltage of about 1.30 volts. Is similar in construction to the lead-acid type, but the electrolyte is a solution of caustic potash, the solution being a strong alkaline. The active material of the positive plate is nickel hydrate; that of the negative is cadmium oxide, with a small percentage of iron oxide. *Morris and Cooper, p. 246.*

nickel alloys. Nickel is the main constituent in Monel metal, Permalloy, and nickel-chromium alloys. It is also used in cuponickel, nickel silver, various types of steel and cast iron, brass, bronze, and light alloys. *C.T.D.*

nickel aluminum. Eighty percent aluminum and 20 percent nickel. Nickel increases the tensile strength of aluminum alloys, and improves the finish in die castings. *Crispin.*

nickel-ammonium sulfate; nickel-ammonium

sulfate hexahydrate; ammonium-nickel sulfate; ammonium-nickel sulfate hexahydrate; nickel salt, double; nickel salts, double. Dark blue-green; monoclinic; $NiSO_4.(NH_4)_2SO_4.6H_2O$; molecular weight, 395.00; specific gravity, 1.923; soluble in water and in ammonium sulfate solutions; and insoluble in alcohol. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-151.* Used in the preparation of nickel dip solutions. *Hansen.*

nickel antimony glance. Sulfantimonide of nickel, crystallizing in the cubic system. Also called ullmannite. *C.M.D.*

nickel bloom. Hydrated and oxidized patina on outcropping rocks indicating existence of primary nickel minerals. Called nickel indicators, they are green carbonate (emerald color), sulfate (apple-green) or arsenate (apple-green). *Pryor, 3.*

nickel carbonate, basic. a. Used in electroplating, in the preparation of nickel catalysts, and as an ingredient in ceramic colors and in glazes. *CCD 6d, 1961.* b. Applied to two different compounds: (1) light green crystals or brown powder; $2NiCO_3.3Ni(OH)_2.4H_2O$; molecular weight, 587.67; decomposes on heating; insoluble in cold water; decomposes in hot water; and soluble in acids in ammonium salt solutions; and (2) emerald green; isometric; $NiCO_3.2Ni(OH)_2.4H_2O$ (?) molecular weight, 376.23; specific gravity, 2.6; insoluble in hot water and in cold water; and soluble in hot dilute hydrochloric acid and in ammonium hydroxide. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-122.*

nickel carbonyl. a. A volatile compound of nickel, $[Ni(CO)_4]$, formed by passing carbon monoxide over the heated metal. The compound is decomposed into nickel and carbon monoxide by further heating. It is used on a large scale in industry for the production of nickel from its ores by the Mond process. *C.T.D.* b. *See* Mond process. *Nelson.*

nickel-chromium steel. Steel containing nickel and chromium as alloying elements; 1.5 percent to 4 percent nickel and 0.5 percent to 2 percent chromium are added to produce an alloy of high tensile strength, hardness, and toughness. It is used for highly stressed automobile and aeroengine parts, armor plate, etc. *C.T.D.*

nickel-cobalt sulfate; cobaltonickelous sulfate. Reddish-brown; crystalline; and soluble in water. Used in blackening brass and zinc. *CCD 6d, 1961.*

nickel copper. A nickel and copper alloy used in making acid-resistant castings and bearing bronzes. Navy specifications call for 60 percent nickel, 33 percent copper, 3.5 percent manganese, and up to 3.5 percent iron. *Crispin.*

nickel cyanide tetrahydrate. $Ni(CN)_2.4H_2O$; molecular weight, 182.81; light green plates; poisonous; loses $4H_2O$ at 200° C; insoluble in water; and soluble in potassium cyanide solutions, in ammonium hydroxide, and in alkalies. Used in metallurgy and in electroplating. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-197.*

nickel glance. Same as gersdorffite. *Standard, 1964.*

nickel green. Synonym for annabergite. *Dana 6d, p. 818.*

nickel gymnite. A gymnite in which part of the magnesium is replaced by nickel. Synonym for genthite. *Fay.*

nickelic. Of, pertaining to, or containing nickel in the trivalent state; for example, nickelic oxide (Ni_2O_3). *Webster 3d.*

nickeliferous. Containing nickel. *Fay.*

nickeline. Any of several varieties of nickel silver; also, an old term for niccolite. *C.T.D.; Webster 3d.*

nickel iron. A mineral, NiFe, containing about 76 percent nickel and found in meteorites. Isometric. *Dana 17.*

nickel-iron storage battery. *See* alkaline storage battery. *Bennett 2d, 1962.*

nickel molybdenum iron. A class of alloys containing from 20 to 40 percent molybdenum and up to 60 percent nickel with a small amount of carbon. Such alloys are much used on account of high acid resistance. *Crispin.*

nickel nitrate hexahydrate. Green; deliquescent; monoclinic; $Ni(NO_3)_2.6H_2O$; molecular weight, 290.81; specific gravity, 2.065; melting point, 56.7° C; boiling point, 136.7° C; and soluble in water, in ammonium hydroxide, and in alcohol. Used in nickel plating, in the preparation of nickel catalysts, and in the manufacture of brown ceramic colors. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-122, B-198.*

nickel ocher. An early name for annabergite. *Fay.*

nickelous. Of, pertaining to, or containing nickel in the bivalent state; for example, nickelous oxide (NiO). *Webster 3d.*

nickelous oxide; nickel monoxide; nickel protoxide; green nickel oxide; bunsenite. a. NiO; green, becoming yellow. Found in nature as the mineral bunsenite. Soluble in acids and in ammonium hydroxide; insoluble in water; and specific gravity, 6.6 to 6.8. NiO absorbs oxygen at 400° C forming Ni_2O_3 which is reduced to NiO at 600° C. Used in nickel salts and in porcelain painting. *CCD 6d, 1961.* b. Isometric; green to black; molecular weight, 74.71; melting point, 1,990° C; and specific gravity, 6.67. Used for painting on china. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-198.*

nickel oxide. The two nickel oxides, nickelous oxide (NiO) and nickelic oxide (Ni_2O_3), are used extensively as colorants in glasses, glazes, and enamels. The use of nickel oxide in enamels is generally in the ground coat, in which it is used with cobalt and manganese. It is also used in cover coat enamels to give what is known as a daylight shade for reflector units. Nickelic oxide (Ni_2O_3) imparts a color to glass which is dependent upon the character of the alkali present. Nickelous oxide (NiO) is used in glazes to produce blues, greens, browns, and yellows. Nickel oxide is also one of the principal components of certain type of ferrites, for example, the nickel-zinc ferrite. *See also* nickelous oxide. *Lee.*

nickel plating. The deposition of a coating of metallic nickel by electrolysis. *Nelson.*

nickel protoxide. *See* nickelous oxide. *CCD 6d, 1961.*

nickel silver. A series of silver-white alloys containing copper, zinc, and nickel within the limits, 52 to 80 percent copper, 10 to 35 percent zinc, and 5 to 35 percent nickel. Also called German silver. *C.T.D.*

nickel skutterudite. A tin white mineral of the skutterudite type, containing nickel. An arsenide of nickel and cobalt, of gray color and granular structure, $(Ni,Co,Fe)As_3$. Isometric. *Fay; Dana 17.*

nickel stannate. Light-colored; crystalline; $NiSnO_3.2H_2O$; and it loses $2H_2O$ at about 120° C. Used as an additive in ceramic capacitors. *CCD 6d, 1961.*

nickel steel. Steel containing nickel as an alloying element. Varying amounts, between 0.5 percent and 6.0 percent, are added to increase the strength in the normalized condition, to enable hardening to be performed in oil or air instead of water, or to increase the core strength of carburized parts. *C.T.D.*

nickel sulfate; nickelous sulfate. Yellow; isometric; $NiSO_4$; molecular weight, 154.78; specific gravity, 3.68; decomposes at 848° C (at 760 mm); soluble in water; and insoluble in alcohol, in ether, and in acetone. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-198.* Solutions containing nickel sulfate are used in the enameling industry as a nickel bath following the acid rinse in the pickling operation. *Lee.* Used in nickel plating, in blackening zinc and brass, and in ceramics. *CCD 6d, 1961.*

nickel sulfate heptahydrate; nickel salt, single; nickel salts, single; morenosite. a. Green; orthorhombic; $NiSO_4.7H_2O$; molecular weight, 280.88; specific gravity, 1.948; loses $1H_2O$ at 31.5° C and $6H_2O$ at 103° C; and soluble in water and in alcohol. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-198.* b. Used in nickel dip solutions and is more economical to use than double nickel salt(s). *Hansen.* c. Used in nickel plating, in blackening zinc and brass, and in ceramics. *CCD 6d, 1961.*

nickel sulfate hexahydrate; nickel salt, single; nickel salts, single. Molecular weight, 262.86; $NiSO_4.6H_2O$; two allotropic forms: Alpha nickel sulfate hexahydrate; blue; tetragonal; and beta nickel sulfate hexahydrate; green; monoclinic; transformation temperature, 53.3° C; specific gravity, 2.07; loses $6H_2O$ at 103° C; and soluble in water, in ethyl alcohol, in methyl alcohol, and in ammonium hydroxide. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-198.* b. Used in nickel dip solutions and is more economical to use than double nickel salt(s). *Hansen.* c. Used in nickel plating, in blackening zinc and brass, and in ceramics. *CCD 6d, 1961.*

nickel-tantalum alloy. A hard but ductile alloy containing 70 percent nickel and 30 percent of tantalum. Used for electrical resistance wires. *Crispin.*

nickel-telluride. *See* melonite. *Bennett 2d, 1962.*

nickel vitriol. Morenosite, $NiSO_4.7H_2O$. Weathered bloom from primary Ni ores. *Pryor, 3.*

nicking. a. The cutting of a vertical groove in the seam to liberate the coal after it has been holed or undercut. *Nelson.* b. Used in wire rope terminology to describe the internal crosscutting of wires within the rope. *Sinclair, V, p. 6.* c. A vertical cutting or shearing up one side of a face of coal. Also called cut; cutting. *Fay.* d. The chipping of the coal along the rib of an entry, or room, which is usually the first indication of a squeeze. *Fay.*

nickings. Newc. The small coal produced in making the nicking. *See also* bug dust; makings. *Fay.*

nicking trunk. A tub in which metalliferous slimes are washed. *Fay.*

nicks. Very small fractures along the girdle or facet junction of a cut stone; more common in synthetic or glass reproductions than in the natural stones. *See also* pit. *Shipley.*

niclad. Composite sheets, made by rolling together sheets of nickel and mild steel to obtain the corrosion resistance of nickel with the strength of steel. *C.T.D.*

nicolite. Another spelling for niccolite. *Bureau of Mines Staff.*

nicolo. Onyx with a black or brown base and a bluish-white top layer. *Shipley.*

Nicol prism. A special prism for producing polarized light, made from two pieces of Iceland spar (calcite) cemented together with Canada balsam. Light entering the prism is split into two polarized rays; of these, the ordinary ray is totally reflected at the balsam layer while the extraordinary ray is able to pass through the prism. In a petrological microscope two Nicol prisms are incorporated. *Anderson.*

nicopyrite. A variety of pyrite containing nickel. An old synonym for pentlandite. *Fay.*

nicrosilal. Cast-iron alloy of austenitic structure, containing nickel (18 percent) and silicon (about 5 percent); used particularly in construction of parts of high-temperature operations. *C.T.D. Supp.*

nidge. Eng. To dress, as stone, with a sharp-pointed hammer. Same as nig. *Fay.*

niello. a. Any of several metallic alloys of sulfur with silver, copper, or lead, having a deep black color. *Webster 3d.* b. The art, process, or method of decorating metal with incised designs filled with niello. *Webster 3d.* c. Any object decorated with niello. *Webster 3d.*

niello silver. A bluish composition of silver, lead, copper and bismuth, with admixture of sulfur. Also called Russian tula. *Standard, 1964.*

nig. To dress, as stone, with a sharp-pointed hammer. *Standard, 1964.* Same as nidge. *Fay.*

Nigerite. Aluminate of tin (SnO_2 25.33 percent), iron, zinc, etc. $(Zn,Mg,Fe'')(Sn,Zn)_2(Al,Fe''')_{12}O_{22}(OH)_2$, as dark brown hexagonal plates from Nigeria. Named from the country. *Spencer 18, M.M., 1949.*

nigged ashlar. A block of stone dressed with a pointed hammer. *C.T.D.*

niggerhead. a. A term used by miners to describe somewhat spherical masses varying in size from small rounded pieces to rather large forms several feet in diameter. They lie on top of the coal and are imbedded in it, and drop from the roof of mines. They are rather high in specific gravity and frequently contain iron in varying quantites. *Kentucky, p. 25.* b. A cathead or small capstan. *Long.* c. A slip pulley on a winch. The rigger takes about six turns of rope about the pulley, and by varying tension on the rope which he holds, can vary speed of hoist on lowering object with engine running. *Fay.* d. A boulder or rounded field stone. *Fay.* e. A black nodule found in granite. *Fay.* f. Slaty rock occurring with sandstone. *See also* hardhead, a and b. *Fay.* g. A hard, round piece of rock, sometimes found in coal seams. *Fay.* h. *See* negrohead. *Fay.*

niggerhead coal. Variety of coal made of roughly sperical masses called niggerheads, varying from an inch or less to a foot or more in diameter. They resemble spherical masses produced by the spheroidal weathering in igneous rocks and may have been formed in coal situated near igneous intrusion through contraction on cooling. *Tomkeieff, 1954.*

niggliite. A silver-white mineral from Waterfall Gorge, Insizwa, Republic of South Africa. Anisotropic; grains; soft. *English.* Its composition is PtSn; previously thought to be $PtTe_3$. *American Mineralogist, v. 39, No. 7-8, July-August 1954, p. 691.* Probably PtTe. *American Mineralogist v. 40, No. 7-8, July-August 1955, p. 695.*

Niggli's classification. A class ification of rocks on the basis of their chemical composition, simlar in some respects to the norm system. *A.G.I.*

night emerald. Same as evening emerald. *Shipley.*

night fossicker. Aust. One who robs gold-diggings in the night. *Standard, 1964. See* fossick, b and c; fossicker, c. *Fay.*

night pair. Corn. Miners who work underground during the night. The night shift. *Fay.*

night shift. The coal miners' shift from about 10:30 p.m. to 6 a.m. It may be a coal-winning shift, but in general it is a preparation shift. *Nelson.*

nigrine. A ferriferous rutile. *Fay.*

nigrite. a. A variety of asphaltum from Utah. Not the same as nigrine. *English.* b. An insulating composition consisting of the impure residuum obtained in the distillation of paraffin. *Standard, 1964.*

nigritite. A product of the coalification of fix bitumens rich in carbon; insoluble or only slightly soluble in organic solvents. It is subdivided into polynigritite, humonigritite, exinonigritite, and keronigritite. *Tomkeieff, 1954.*

Ni-hard. Martensitic cast iron containing about 4½ percent of nickel, added in the ladle before pouring the casting Used for abrasion-resistant linings, pump impellers and balls in ball mill. *Pryor, 3.*

nihil album; nil album. *See* zinc oxide. *Fay.*

niklesite. An igneous rock consisting of diopside, enstatite, and diallage, subordinate olivine, ilmenite, chromite, and magnetite. *Johannsen, v. 4, 1938, p. 461.*

nil. Nothing; zero. *Webster 3d.* Often used in reporting gold and silver assays. *Fay.*

nill. a. Scales of hot iron thrown off during forging. *Fay.* b. Sparks of brass during manufacture. *Standard, 1964.*

nine-inch brick. A rectangular brick measuring approximately 9 by 4 7/16 by 2½ inches and used as a standard unit of size in the refractories. *A.R.I.*

nine-inch straight. A standard 9- by 4½- by 2½-inch straight brick. *Bureau of Mines Staff.*

nine-point sample. Final sample taken for test when a small quantity of finely ground mineral is required for assay. A suitable quantity of dry material is thoroughly mixed on glazed cloth or paper, if necessary being rolled lightly with a round bottle to break down any floccules. It is then flattened to a disc and eight equal segments are marked out diametrically with a spatula. Approximately equal quantities are taken from each segment and from the center, making the nine points of withdrawal. *Pryor, 3.*

ningyoite. A mineral of the rhabdophane group, $(Ca, U,Ce)PO_4.H_2O$, with some replacement of calcium and uranium by lanthanons; orthorhombic. Occurs in an unoxidized zone of the Ningyo-toge mine, Tottori prefecture, Japan. Named from locality. *Hey, M.M., 1961; American Mineralogist, v. 47, No. 3-4, March-April 1962, p. 420.*

niobite. Columbite. *Pryor, 3.*

niobium. *See* columbium. *C.T.D.*

niobium borides. Several compounds have been reported, including the following. NbB_2, melting point, 3,050° C, specific gravity, 7.0, thermal expansion, 5.9×10^{-6} parallel to a and 8.4×10^{-6} parallel to c. NbB, melting point, 2,300° C, specific gravity 7.6. Nb_3B_4 melts incongruently at 2,700° C; specific gravity, 7.3. *Dodd.*

niobium minerals. Used the most is tantalite-columbite, of formula between nearly pure tantalite and nearly pure columbite. $(Fe,Mn)(Nb,Ta)_2O_6$; gray brown, or black in color. Mohs' hardness 6; streak dark red to black; specific gravity 5.3 to 7.3. *See also* pyrochlore. *Pryor, 3.*

niobium nitrides. Three nitrides have been reported: NbN, Nb_2N, and Nb_4N_3. During reaction between Nb and N_2 at 800° to 1,500° C the product generally consists of more than one compound. Most of the phases are stable at least to 1,500° C. *Dodd.*

nioboeschynite. Eschynite having niobium greater than titanium; color, black, red in fine splinters; luster, resinous; fracture, conchoidal; amorphous; occurs in prismatic crystals in quartz-arfvedsonite veinlets cutting fenites at Vishnevye Gor, U.S.S.R. *American Mineralogist, v. 47, No. 3-4, March-April 1962, p. 417.*

Niobrara limestone. A member of the Upper Coloradoan (Senonian) strata, which follows the Benton shales and limestone in the Gulf States of North America. *C.T.D.*

niocalite. A niobosilicate of calcium, $Ca_4NbSi_2O_{10}(OH,F)$, orthorhombic, as pale yellow prismatic crystals in metamorphic limestone from Oka, Quebec. Named from the composition. *Spencer 21, M.M., 1958.*

nip. a. Newc. A crush of pillars of workings. *See also* pinch, a. *Fay.* b. When the roof and the floor of a coal seam come close together pinching the coal between them. *B.C.I.* c. The contact ends of cables for quick attachment to the power cables. *B.C.I.* d. Where a vein becomes small in passing through hard country. *Gordon.* e. Eng. A temporary pinching out of a coal seam resulting from earth movements, Northumberland and Durham. Same as want. *Arkell.* f. S. Wales. A fault. *Arkell.* g. The devices at the end of the trailing cable of a mining machine used for connecting the trailing cable to the trolley wire and ground. *Jones.* h. Moving a machine along a track by sliding the nip along the trolley wire. *Hess.* i. The seizing of stone between the jaws or rolls of a crusher. *Nichols.* j. *See* nip out. *Nelson.* k. To cut grooves at the ends of bars, to make them fit more evenly. *Fay.* l. *See* angle of nip. *Fay.* m. An undercutting notch in rock, particularly limestone, along a seacoast between high- and low-tide levels produced by erosion or possible solution. *A.G.I. Supp.* n. The gap between rollers in a sheet-glass rolling machine. *C.T.D. Supp.*

nip, angle of. In a rock-crushing machine, the maximum angle subtended by its approaching jaws or roll surfaces at which a piece of ore of specified size can be gripped. *Pryor, 3.*

niperyth. *See* penthrite. *Bennett 2d, 1962.*

nip out. a. The disappearance of a coal seam by the thickening of the adjoining strata, which takes its place. *Zern.* b. Local thinning or disappearance of a coal seam due to tectonic movement. *B.S. 3618, 1964, sec. 5.*

nipped. Pinched; applied to veins when they become narrower or thinner than usual. *Fay.*

nipper. a. An errand boy, particularly one who carries steel, bits, etc., to be sharpened. *Zern.* b. Eng. A tool used by the landers for seizing the kibble, and upsetting it into the wheelbarrow. *Fay.* c. In coal mining, a trapper or door boy. *Fay. See also* doorman; reel boy; brakeman. *D.O.T. 1.*

nippier. *See* clipper, b. *C.T.D.*

nipping fork. A tool for supporting a column of bore rods while raising or lowering them. *Fay.*

nipple. a. Mid. A word used to express the crepitant noises made by the settling down or weighting of the roof. *Fay.* b. *See* fissle. *Fay.* c. A tubular pipe fitting usually threaded on both ends and under 12 inches in length. Pipe over 12 inches long is regarded as cut pipe. *See also* close, short, shoulder, and space nipples. *Strock, 3.*

nips. *See* nip.

Ni-resist. A cast iron consisting of graphite in a matrix of austenite. It contains 3.0 percent carbon, 14.0 percent nickel, 6.0 percent copper, 2.0 percent chromium, and 1.5 percent silicon; has a high resistance to growth, oxidation, and corrosion. *C.T.D.*

Nissen stamp. Machine once used in rock crushing to sand sizes, developed from stamp battery; an individual stamp worked in its own circular mortar box. *Pryor, 3.*

niter. Potassium nitrate KNO_3; orthorhombic; white. Lilac flame color. Mohs' hardness, 2; specific gravity, 2.1. *See also* saltpeter. *Pryor, 3.*

niter cake. a. Crude sodium sulfate, a byproduct in the manufacture of nitric acid from sodium nitrate. *Fay.* b. *See* sodium bisulfate. *CCD 6d, 1961.*

nitinol. A nonmagnetic alloy that promises to have a wide range of use, including use in underwater demolition. *Hy.*

nitralloy. Steel specially developed for nitriding (which is not effective with ordinary steels). It contains 0.2 to 0.3 percent carbon, 0.9 to 1.5 percent aluminum, 0.9 to 1.5 percent chromium, and 0.15 to 0.25 percent molybdenum. *C.T.D.*

Nitramex No. 2-H. Trademark for a high density blasting agent of Nitramon type. *CCD 6d, 1961.*

nitramines. Amines with general formula $R.NH.NO_2$, an amino-H having been replaced by an NO_2. *Pryor, 3.*

Nitramite. Trademark for a low density blasting agent of Nitramon type. *CCD 6d, 1961.*

Nitramon. Proprietary name of an ammonia gelatin explosive manufactured by Du Pont. *A.G.I.*

nitrate. a. A salt of nitric acid; for example, silver nitrate or barium nitrate. *Standard, 1964.* b. As a verb, to treat or to prepare with nitric acid; to convert a base into a salt by combination with nitric acid. *Fay.*

nitrates. Salts formed by the action of nitric acid on metallic oxides, hydroxides, and carbonates. Readily soluble in water and decompose when heated. The nitrates of polyhydric alcohols and the alkyl radicals explode with violence. *C.T.D.*

nitration. The conversion of glycerin and cellulose into their respective nitrates. The raw materials are mixed with nitric acid and sulfuric acid in the proper proportions. The sulfuric acid absorbs the water produced by the reaction. *Nelson.*

nitric acid. Transparent; colorless or yellowish; fuming; suffocating; caustic; corrosive; poisonous; liquid; HNO_3; molecular weight, 63.01; miscible with water; boiling point, 83° C (decomposes); melting point, −41.59° C; and specific gravity, 1.5027 or 1.504 (at 25° C, referred to water at 4° C). Primary use is in the manufacture of ammonium nitrate for explosives. Other important uses are organic synthesis (explosives), in metallurgy, in etching steel, and in ore flotation. Soluble in water in all proportions; decomposes alcohol violently; and soluble in ether. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-199.*

nitric oxide. A colorless gas, NO; if exposed to air reddish-brown fumes are produced by the oxidation of the gas by the oxygen of the air. Slightly soluble in water; molecular weight, 30. *Cooper, p. 208.*

nitriding. Introducing nitrogen into a solid ferrous alloy by holding at a suitable temperature (below Ac_1 for ferritic steels) in contact with a nitrogenous material, usually ammonia or molten cyanide of appropriate composition. Quenching is not required to produce a hard case. *ASM Gloss.*

nitrification. The oxidation by bacteria of ammonium salts to nitrites and the further oxidation of nitrites to nitrates wherever the proper conditions of temperature, air, moisture, and alkalinity allow the nitrobacteria to act (as in all productive soils and in the heaps of waste organic matter formerly used in manufacturing potassium nitrate). *Webster 3d.*

nitrite. A salt or an ester of nitrous acid, O:NOH. *C.T.D.*

nitro. An abbreviation for nitroglycerin or dynamite. *Fay.*

nitrobarite. A colorless barium nitrate, $(BaNo_3)_2$. *Standard, 1964.*

nitrocalcite. Hydrous calcium nitrate, $Ca(NO_3)_2+{}_nHO$. *Fay.*

nitrocarbonitrate. A blasting agent consisting of ammonium nitrate sensitized with diesel oil. *CCD 6d, 1961.*

nitrocelluloses; cellulose nitrates. Nitric acid esters of cellulose formed by the action of a mixture of nitric and sulfuric acids on cellulose. The cellulose can be nitrated to a varying extent, ranging from two to six nitrate groups in the molecule. Nitrocellulose having a low nitrogen content, up to the tetranitrate, are not explosive. They dissolve in ether-alcohol mixtures and in so-called lacquer solvents; for example, butyl acetate. A nitrocellulose having a high nitrogen content is guncotton, an explosive. The principal nitrocellulose plastic is celluloid. *C.T.D.*

Nitrochalk. A fertilizer consisting of a mixture of ammonium nitrate mixed with limestone to make it less hygroscopic. *Cooper, p. 332.*

nitrocotton. A chemical combination of ordinary cotton fiber with nitric acid. It is explosive, highly inflammable and in certain degrees of nitration, soluble in nitroglycerin. *Fay.*

nitrogelatin. Same as gelatin dynamite. *Standard, 1964.*

nitrogen. A nonmetallic element in group V of the periodic system. Colorless; tasteless; odorless; chemically relatively inert; and a diatomic gas (N_2). It constitutes about 78 percent by volume and 75.5 percent by weight of the atmosphere. It occurs combined as nitrates, as ammonium salts, in the soil, and in all living matter. The gas is obtained from liquid air. Used in gas-filled electric lamps and large quantities are fixed by various methods. Symbol, N; valences, 3 and 5; atomic number, 7; atomic weight, 14.0067; density, 1.2506 grams per liter; molecular weight, 28.0134; isometric when solid; specific gravity ol liquid, 0.808 (at −195.8° C), and of solid 1.026 (at −252° C); melting point, −209.86° C; boiling point, −195.8° C (at 760 mm); soluble in water; and slightly soluble in alcohol. Constitutes 78 percent of the air, by volume. Obtained from liquid air by fractional distillation. Used in the production of ammonia and other nitrogen compounds, as a blanketing medium in the electronics industry, as a refrigerant, and for forcing crude oil from oil wells. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-123, B-199.*

nitrogen, available. See available nitrogen. *Bennett 2d, 1962 Add.*

nitrogen base. The compound of carbon, hydrogen and nitrogen that is generally present in crude oil obtained in California. *Shell Oil Co.*

nitrogen case hardening. *See* nitriding. *C.T.D.*

nitrogen dioxide. This reddish-brown gas is considered the most dangerous of mine gases and is produced by the incomplete detonation of some explosives. It is very irritating to the air passages; a few hours after exposure bronchitis develops and is fatal if the concentration of the gas was high. It can be detected by paper soaked in a solution of potassium iodide and starch blue, which it turns blue by liberating iodine. *Lewis, p. 696. See also* nitrogen peroxide. *Bennett, 2d, 1962.*

nitrogen dioxide indicator. Nitrogen dioxide detectors provide a field method for determining the concentration of nitrogen oxides, while auotmatic indicators and recorders provide continuous monitoring of combustion gases and of operations involving its use as an oxidizer. The detector comes in a kit which includes syringes, needles, solution bottles, and color chart. Detection is by comparison of air samples, treated with a reagent, with the standard color chart, representing known gases and elements. The automatic type is based on an electrochemical reaction of the gas sample with a sensing solution. *Best's, p. 588.*

nitrogen fixation. Applied to methods of abstracting nitrogen from the air in commercial quantities and fixing it in some comparatively inexpensive and stable form so that it can be used in either agricultural or industrial operations. *CCD 3d, 1942.*

nitrogen hardening. *See* nitriding. *Nelson.*

nitrogenize. To combine with nitrogen, or to introduce nitrogen into. *Bennett 2d, 1962.*

nitrogen narcosis. Like most inert gases, nitrogen in air or nitrogen-oygen mixtures breathed at high ambient pressure can decrease mental clarity, impair judgment, and produce poor muscle coordination in a manner similar to that found in alcohol intoxication. The narcotic effect is related to the partial pressure of inspired nitrogen; it is therefore a function of depth of diving and the percentage of nitrogen in the respired gas. Nitrogen narcosis is not in itself harmful, but when air (80 percent nitrogen) is breathed (as in open-circuit scuba equipment) at depths below about 60 to 80 feet, the resulting impaired judgment and incoordination begins to interfere with the diver's performance and predispose him to accidents. The narcotic effects increase progressively with depth until at about 280 to 300 feet even routine tasks become extremely difficult. As in the drinking of alcohol, personality, motivation, and training in a specific task, account for the different reactions among different men. In orthodox deep-sea diving, narcosis can be reduced by substitution of helium for nitrogen. Unfortunately, on deep dives of short duration typical of underwater swimming, the use of helium in place of nitrogen increases the decompression time required to avoid bends. *H&G.*

nitrogen pentoxide. N_2O_5; molecular weight, 108.02; white hexagonal (rhombic); specific gravity, 1.642^{18}; melting point, 30° C; soluble in water to give nitric acid. *Bennett 2d, 1962.*

nitrogen peroxide; nitrogen dioxide; nitrogen tetroxide. NO_2(or N_2O_4); molecular weight, 46.01 (or 92.02); colorless solid (N_2O_4) or yellow liquid or red-brown gas; specific gravity, 1.491; melting point, −9.3° C; soluble in water. *Bennett 2d, 1962.*

nitrogen trioxide. Red-brown gas or black solid or liquid, N_2O_3; molecular weight, 76.02; specific gravity, 1.447^2; melting point, −102° C; soluble in water. *Bennett 2d, 1962.*

nitroglycerin; trinitrate glycerol; trinitrin; explosive oil. $CH_2NO_3CHNO_3CH_2NO_3$; pale yellow; flamable; explosive; thick liquid; soluble in alcohol; soluble in ether in all proportions; slightly soluble in water; melting point, 13.1° C; and explosion point, 256° C. Used as an explosive, in the production of dynamite and other explosives, as an explosive plasticizer in solid rocket propellants, and as a possible liquid rocket propellant. Molecular weight, 227.09; triclinic or orthorhombic when solid; specific gravity, 1.5918 (at 25° C, referred to water at 4° C); soluble in methanol and in carbon disulfide; verv soluble in chloroform; and slightly soluble in petroleum ether. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-340.* This highly explosive liquid is made by mixing sulfuric acid and nitric acid in a steel tank and then adding glycerin. Its great shattering effect has made it especially suitable for shooting oil wells. Because of its sensitiveness to shock, liquid nitroglygerin is dangerous to transport and unsuitable for use in mining and quarrying operations. *Lewis, pp. 104, 107.*

nitroglycerin explosive. An explosive containing, principally, nitroglycerin, nitrocotton, and inorganic nitrates, with a suitable combustable absorbent giving a balanced composition. *Nelson.*

nitroglycerin powders. These explosives are usually characterized by a low nitroglycerin content, up to 10 percent, and a high ammonium nitrate content of 80 to 85 percent, with carbonaceous material forming the remainder of the composition. This composition produces a powdery consistency and, consequently, nitroglycerin powders have relatively poor water-resistance properties, so that they should be used only in dry conditions. Their storage properties are fairly good, but this is largely dependent on the protection given after manufacture, for example, in the methods of cartridging and packing. The main application of these explosives is in quarrying and mining where the ground to be blasted is of a relatively soft nature. *McAdam II, p. 32.*

nitroglycol; ethylene nitrate; 1,2-ethanediol dinitrate. $C_2H_4(NO_3)_2$; molecular weight, 152.06; colorless or yellow; specific gravity, 1.4918 (at 20° C, referred to water at 4° C); melting point, −22.3° C; boiling point, 197° ± 3° C (at 760 mm); insoluble in water; soluble in alcohol; and decomposes in alkalies. Used as an explosive. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-309.*

nitroguanidine; 1-nitroguanidine. Yellow; needles; $H_2NC(NH)NHNO_2$; molecular weight, 104.07; melting point, 246° C; slightly soluble in water and in alcohol; and very soluble in alkalies. Used in explosives and in smokeless powders. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-344.*

nitrolite. An excellent and cheap explosive in powder form, consisting of the constituents, ammonium nitrate + trotyl + nitroglycerin + silicon. This quality is sensitive to moisture owing to the high ammonium nitrate content. *Fraenkel, v. 3, Art. 16.02, p. 27.*

nitromagnesite. A hydrous magnesium nitrate, $Mg(NO_3)_2+nH_2O$. *Fay.*

nitroparaffins. These are part of certain formulations for the electrophoretic deposition of ceramic materials. *Lee.*

nitrostarch; starch nitrate. $C_{12}H_{12}(NO_2)_8O_{10}$; molecular weight, 684.21; orange powder; and soluble in ethyl alcohol. Used in explosives. *Bennett 2d, 1962.*

nitrostarch explosives. Nitrostarch explosives have been used to a limited extent for over 50 years. When these explosives were first introduced, nitrostrach was the principal explosive ingredient in their composition. Of recent years due to the trend toward the low sensitivity, noncap sensitive nitrocarbonitrates and ammonium nitrate-oil mixtures, certain grades of explosives are being produced with low amounts of sensitizers. Some of these explosives today contain a very large percentage of ammonium nitrate, and nitrostarch is used only in small quantities to act as a sensitizer. *Pit and Quarry, 53rd, Sec. A, p. 79.*

nitrosubstitution. The act or process of introducing by substitution the nitryl radical(NO_2) in place of one or more replaceable hydrogen atoms, as in an organic compound. *Standard, 1964.* Nitrosubstitution compounds are used in the manufacture of some explosives. *Fay.*

nitrosulfuric acid. An exceedingly corrosive mixture of one part by weight of nitric acid and two parts by weight of sulfuric acid. Used in the manufacture of nitroglycerin. *Standard, 1964.*

nitrous fumes. Oxides of nitrogen (NO_2-N_2O_4), are only produced in mines when the explosive charge is prevented from detonating completely. The maximum percentage of nitrous fume produced under the worst possible conditions of shotfiring is in the region of 0.008 percent. The presence of 0.004 percent can be detected by smell and tolerated for several hours. A content of 0.024 percent is rapidly fatal. *Nelson.*

nitrous oxide. A gas with the chemical formula, N_2O; molecular weight, 46; specific gravity, 1.6. This gas is produced by the blasting of certain nitroglycerine explosives, especially if there is incomplete detonation. It is also produced in the exhaust of diesel locomotives. It is used as an anesthetic in dentistry, and is commonly known as laughing gas. *Morris and Cooper, pp. 46-47.*

nittings. a. Eng. Refuse of workable ore. *Standard, 1964.* b. Derb. Ore that stays in the sieve at washing of smitham. *Arkell.*

nivation. In geology, the specific effects produced by névé in land sculpture: distinguished from those of the glacier ice, called glaciation. *Standard, 1964.*

nivenite. A variety of uraninite high in uranium and carrying 10 percent or more of the yttrium earths and 6.7 to 7.6 percent thoria. It is wholly soluble in dilute sulfuric acid. *See also* uraninite. *Sanford.* Contains more UO_3 than UO_2. *Crosby, p. 53.*

nml Abbreviation for nuclear megnetism log. *See also* nuclear magnetism log. *Wyllie, p. 154.*

N-mode. A corruption of "normal mode," a term that contrasts with "cathode-spot mode"; a particular mode of arc operation as observed in laboratories of the Linde Co. The normal mode has a normally diffuse cathode spot and no unusual constriction at the cathode. *BuMines Bull. 625, 1965, p. VII.*

n-n logging. *See* neutron-neutron logging. *A.G.I.*

No a. Chemical symbol for nobelium, now called element 102. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-1, B-109.* b. Abbreviation for number. *BuMin Style Guide, p. 61.*

Nobel blastometer. A galvanometer-type instrument for testing continuity in detonators and blasting circuits. It has a special dry cell insufficient to fire a detonator and further reduced within the instrument by resistances to 10 milliamps. *Nelson.*

nobel elutriator. An early type of multiple-vessel elutriator for particle size analysis. *Dodd.*

nobelium. The name given to the synthetic radioactive element having atomic number 102 reported as having been produced in 1957 in a cyclotron by bombarding curium 244 with nuclei of carbon 13 accelerated to high energies. Chemical symbol, No. Efforts have failed to duplicate the 1957 experiment, and the international acceptance of the name nobelium for element 102 is considered to have been premature. Element 102, however, was definitely discovered and identified in 1958 by Ghiorso, Sikkeland, Walton, and Seaborg who prepared the element 102 isotope having mass number 254 and a half-life of 3 seconds by bombarding curium 246 with carbon 12 nuclei accelerated in a heavy-ion linear accelerator (HILAC). The name nobelium has been replaced by the name, element

102. The chemical properties of element 102 are unknown, but like the other elements of the actinide series, the properties of this very short-lived element may resemble those of the rare earth metals. The three known isotopes of mass numbers 253, 254, and 255 have half-lives of about 10 minutes, 3 seconds, and 15 seconds, respectively. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-92. B-109.*

noble. Used in mineralogy to express superiority or purity, for example, noble opal, noble tourmaline, noble serpentine, noble metals, etc. *Fay.*

noble gas. A rare inert gas: Helium, neon, argon, krypton, xenon, and radon. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-2.*

nobleite. A mineral, $CaB_6O_{10}.4H_2O$, monoclinic crystals with other borates, from Furnace Creek, Death Valley, Calif. *Hey, M.M., 1961.*

noble metal(s). a. A metal whose potential is highly relative to the hydrogen electrode. *ASM Gloss.* b. A metal with marked resistance to chemical reaction, particularly to oxidation and to solution by inorganic acids. The term as often used is synonymous with precious metal. *ASM Gloss.* c. The metals which have so little affinity for oxygen, that is, are so highly electronegative, that their oxides are reduced by the mere application of heat without a reagent; in other words, the metals least liable to oxidation under ordinary conditions. The list includes gold, silver, mercury, and the platinum group (including palladium, iridium, rhodium, ruthenium, and osmium). The term is of alchemistic origin. *Fay.*

noble potential. The potential for the passive state, if the metal can exist in both the active and passive states in a given medium. *ASM Gloss.*

noble stone. Same as precious stone. *Shipley.*

nocerite. A discredited term equal to fluoborite. *American Mineralogist, v. 43, No. 5-6, May-June 1958, p. 626.*

nocking. Corn. *See* knocking, b; cob, a. *Fay.*

no-cut rounds. In blasting underground, drilling all holes straight into the face. *Lewis, p. 164.*

noddle; nodule. A small rounded mass. *Fay.*

node. A point, line, or surface in a standing wave system where some characteristic of the wave field has essentially zero amplitude. Nodes may be of several types, such as pressure or velocity. *ASM Gloss.*

nodular. Having the shape of or composed of nodules; said of certain ore. *Fay.*

nodular bedding. Layers which consist of scattered to loosely packed nodular bodies of rock in matrix of like or unlike character. Also called lumpy bedding. *Pettijohn.*

nodular cast iron. A cast iron that has been treated while molten with a master alloy containing an element, such as magnesium or cerium, to give primary graphite in the spherulitic form. *ASM Gloss.*

nodular fire clay. An argillaceous rock containing aluminous and/or ferruginous nodules. *Dodd.*

nodular powder. In powder metallurgy, irregular particles that have knotted, rounded, or other similar shapes. *ASM Gloss.*

nodular structures. Spheroidal, ovoid, or irregular bodies often encountered in both igneous and sedimentary rocks, and formed by segregation about centers. *See also* clay ironstone; dogger; flint. *C.T.D.* Synonym for orbicular structure. *A.G.I.*

nodule. a. Rounded masses of pyrite found deposited in coalbeds or in the roof or floor which range from a fraction of an inch to several feet in diameter. The larger balls occur usually in the roof, protruding down into the coal. The smaller ones, called nodules, may be completely embedded in the coal or in clay or shale partings in the bed. Also called balls. *Mitchell, p. 67.* b. A rounded mineral accretion built of successive layers, of easily handled size. *Pryor, 3.* c. A small, more or less rounded body generally somewhat harder than the enclosing sediment or rock matrix. *A.G.I. Supp.* d. Generally applied to nonregular bodies of contrasting composition from the matrix in which they are embedded. Most nodules seem to be secondary, such as chert nodules, but some investigators claim others have a primary origin, such as the manganese nodules on present deep-sea floor. *Pettijohn.* e. A small, rounded, irregularly shaped mass, as those of graphite in malleable cast iron. *Rolfe.* f. In powder metallurgy, the knotted, rounded, or other similar shapes observed in metal powder particles. *Rolfe.*

nodule clay. *See* nodular fire clay.

nodulize. To convert into nodules, as finely divided ores. *Webster 3d.*

nodulizing; balling. The forming of rounded shapes by the application to fine coal of a gyratory, rotary or oscillatory motion, without the use of pressure. *B.S. 3552, 1962.*

no-fines concrete. Concrete which contains little or no fine aggregate. *Taylor.*

nog. a. Roof support for stopes, formed of rectangular piles of logs squared at ends and filled with waste rock (noggings). *See also* chock; crib; cog; pigsty. *Pryor, 3.* b. A block of wood wedged tightly into the cut in a coal seam after the coal cutter has passed. It forms a temporary support for the coal and the roof above. Sometimes nog is also applied to a timber chock. *See also* holing nog. *Nelson.* c. Sprag for the cut or holing in coal cutting. *Mason.* d. Eng. A single member of a wood chock. *SMRB, Paper No. 61.* e. Derb. A piece of iron driven into wood to prevent forks (props) getting loose. *Fay.* f. N. of Eng. The wooden blocks used to build chocks. Also used as wedges for supports and to hold up the undercut. *Trist.*

noger. A jumper drill. *Fay.*

nogging. a. Rough brick masonry used to fill in the open spaces of a wooden frame. *Webster 3d.* b. Pieces of wood inserted in a masonry wall to stiffen it, or upon which to nail finishing stuff. *Standard, 1964.*

nogging piece. A horizontal timber set in between courses in a wall of masonry. *Standard, 1964.*

noggins. York. Lumps of ore, generally larger than knockings, which can be broken by buckering on a knockstone; as much as a man can lift. *Arkell.*

no-heat metal. An antifriction metal composed of lead hardened with sodium. Also known as tempered lead. *Crispin.*

noise. a. Any undesired sound. *NCB.* b. By extension, any unwanted disturbance such as undesired electric waves in any transmission channel or device. *NCB.* c. In gravity and magnetic prospecting, disturbances in observed data due to more or less random inhomogeneities in surface and near-surface material. *A.G.I.* d. In seismic prospecting, all recorded energy not derived from the explosion of the shot. Sometimes loosely used for all recorded energy except events of interest. *A.G.I.*

noise level. In observed or recorded data the irreducible background due to noise. *A.G.I.*

noise spectrum. The relative amplitude of the several frequencies present in a complex tone (sound). *Hy.*

nolanite. Iron vanadate, $3FeO.V_2O_3.3V_2O_4$ or $4FeO.V_2O_3.4V_2O_4$, as minute, black hexagonal plates with uranium ore from Beaverlodge (= Goldfields), Saskatchewan. Intergrown with a second phase $(FeO.2V_2O_4)$. *Spencer 21, M.M., 1958.*

Nolichucky shale. A Cambrian formation of the southern Appalachians. From the Nolichucky River, Tenn. *Webster 2d.*

Nomag. A cast-iron alloy of austenitic structure containing 10 to 12 percent nickel and 5 percent manganese. It is nonmagnetic and possesses high electrical resistance. *C.T.D. Supp.*

nominal area. Of a screen, the total area of the screen deck exposed to the flow of the material feed. *B.S. 3552, 1962.*

nominal bandwidth. In a filter, the difference between the nominal upper and lower cutoff frequencies. This difference may be expressed in cycles per second, as a percentage of the passband center frequency, or as the difference between the upper and lower cutoffs in octaves. *Hy.*

nominal capacity. A notional figure expressed in tons per hour used in the title of the flowsheet and in general descriptions of the plant, applying to the plant as a whole and to the specific project under consideration. It may be taken as representing the approximate tonnage expected to be supplied to the plant during the hour of greatest load. *B.S. 3552, 1962.*

nominal dimension. A dimension that may be greater than the specified masonry dimension by the thickness of a mortar joint. *ASTM C43-65T.*

nominal horsepower. An obsolete method of rating steam engines, devised by Watt. It is based on a fixed mean effective pressure and piston speed. *C.T.D.*

nominal mix. A volumetric description of the proportions of dry materials in a concrete mix. *Taylor.*

nominal screen aperture; nominal screen size. a. A nominal mesh aperture used to designate the result of a screening operation. *B.S. 3552, 1962.* b. A notional size at which it is intended to divide a feed by a screening operation. *B.S. 3552, 1962.*

nominal size. The limit or limits of particle size used to describe a product of a sizing operation. *B.S. 3552, 1962.*

nominal stress. *See* stress. *ASM Gloss.*

nomogram. A chart or set of scales for avoiding or shortening calculations. A simple form consists of three straight lines each graduated to represent one of the variables in an equation. A straight-edge joining values on two of them will intersect the required value on the third. For example, a nomogram may be prepared for the rapid determination of values in accordance with the modified Atkinson formula $P = RQ^2$. *Nelson.*

nomograph. *See* nomogram.

nonasphaltic pyrobitumens. Species of pyrobitumens, including dark-colored, comparatively hard and nonvolatile solids, composed of hydrocarbons containing oxygenated bodies, infusible and largely insoluble in carbon disulfide. This includes peat, coal, and nonasphaltic pyrobitumen shales. *Tomkeieff, 1954.*

nonbanded coal. Coal that does not display a striated or banded appearance on the vertical face. It contains essentially no vitrain and consists of clarain or durain, or of material intermediate between the two. *A.G.I.*

non-Bessemer ores; basic ores. Ores containing up to about 0.18 percent phosphorus. *Newton, p. 11.*

noncaking coal. Coal which does not form cake, namely hard, splint, cherry and durain coal. *Tomkeieff, 1954.*

noncaving methods. Stoping methods that include the following: open stopes, sublevel, shrinkage, cut-and-fill, and square set. *Lewis, p. 415.*

noncognate block. Synonym for accidental block. *A.G.I.*

noncohesive soil. A soil, such as sand or gravel, classified as frictional. *See also* frictional soil. *Ham.*

noncoking coal. A bituminous coal that burns freely without softening or any appearance of incipient fusion. The percentage of volatile matter may be the same as for coking coal, but the residue is not a true coke. *Fay.*

noncombustible. Any material that will neither ignite nor actively support combustion in air at 1,200° F when exposed to fire. *ACSG, 1963.*

nonconformable. *See* unconformity. *Fay.*

nonconformity. An unconformity where the older rocks are of plutonic origin. Synonymous with angular unconformity. *Billings, 1954, p. 247.*

nonconsumable-electrode arc melting. A method of arc melting in which a carbon or tungsten electrode is used, and the sponge metal to be melted is fed into the arc at the proper rate. *Newton, 510.*

noncore bit. *See* plug bit, b. *B.S. 3618, 1963, sec. 3.*

noncore drilling. To drill a borehole without taking core. *Long.*

noncoring bit. A general type of bit made in many shapes that does not produce a core and with which all the rock cut in a borehole is ejected as sludge. Used mostly for blasthole drilling and in the unmineralized zones in a borehole where a core sample is not wanted. Also called blasthole bit; plug bit. *Compare* fishtail bit; roller bit. *Long.*

noncrystalline. Same as amorphous. *Shipley.*

nondeforming steel. An oil hardening steel containing up to 1.5 percent manganese. Used for tools and dies. *Crispin.*

nondestructive inspection. Inspection by methods that do not destroy the part to determine its suitability for use. *ASM Gloss.*

nondestructive testing. a. Methods of examination, usually for soundness, which do not involve destroying or damaging the part being tested. It includes radiological examination, magnetic inspection, etc. *Rolfe.* b. The same as nondestructive inspection. *ASM Gloss.*

nondiamond core drill. A rotary or percussive-type drill equipped with core-cutting tools or bits, the cutting points of which are not inset with diamonds. *Long.*

nonelectrolyte. Substance which, in aqueous solution, does not dissociate to produce ions. *Pryor, 3.*

nonemergents. Algae and sea grasses which are not exposed at lowest low water or chart datum. *Hy.*

nonesite. Porphyrites with orthorhombic pyroxene. The name was given by Lepsius. *Fay.*

nonfading slate. Slate in which color is virtually unchanged even after many years of exposure. *AIME p. 792.*

nonferrous. Metals and compounds not containing appreciable quantities of iron; ores not worked primarily for their iron content. *Pryor, 3.*

nonferrous alloy. Specifically, an alloy containing no iron. Generically, any alloy that has as its base any element other than iron. Common commercial nonferrous alloys are based upon aluminum, copper, lead, magnesium, nickel, tin, and zinc. *Henderson.*

nonferrous metallurgy. That branch of metallurgy which deals with the broad field of metals other than iron, or alloys other than of iron base, as distinguished from ferrous metallurgy. *Henderson.*

nonferrous metals. Metals other than iron and its alloys in steel; usually applied to base metals, such as copper and lead. *A.G.I.*

nonflowing well. A well that does not discharge water at the surface except through the operation of a pump or other lifting device. *Stokes and Varnes, 1955.*

nonfreezing explosives. Explosives to which 15 to 20 percent of nitroethylene glycol has been added. This acts as a freezing-point depressant, and prevents freezing at ordinary temperatures. Polar or Arctic explosives are nitroglycerin explosives of this type. *Higham, p. 60.*

nongraded sediments. a. In geology, detrital sediments, loose or cemented, containing notable amounts of more than one grade; for example, loam or boulder clay. *Stokes and Varnes, 1955.* b. In engineering, sediments in which the constituent particles are all of nearly the same size. *Stokes and Varnes, 1955.*

nonhardening salt. Salt containing substantial quantities of impurities such as calcium and/or magnesium chloride, which are highly deliquescent and prevent caking. *Kaufmann.*

nonionic detergent. A detergent which does not ionize in solution. *ASM Gloss.*

nonlinear damping. Damping due to a damping force that is not proportional to velocity. *H&G.*

nonload bearing tile. Tile for use in masonry walls carrying no superimposed loads. *ASTM C43-65T.*

nonluminous flame. Hydrogen, carbon monoxide, or aerated coal gas flames. *Francis, 1965, v. 2, p. 436.*

nonlustrous glazed tile. Facing tile whose surface faces are covered by an inseparable fire-bonded glaze of nonlustrous finish. *ASTM C43-65T.*

nonmagnetic rod. A drill rod made of brass, aluminum, or other metal unaffected by magnetism. *See also* brass rod. *Long.*

nonmagnetic steel. Steel alloyed with 12 percent or more of manganese, chromium or nickel. Such an alloy cannot be removed from a passing stream of ore by an ordinary guard magnet. Magnetic permeability is below 1.05. *Pryor, 3.*

nonmagnetic taconite. An abundant type of iron ore that is not utilized by the iron industry because it does not respond to magnetic separation, the most widely accepted method of removing iron oxide from associated ore minerals. *Bureau of Mines Staff.*

nonmarine. Indicating an aqueous condition, product, association, or environment, not known precisely (especially as to whether the water was fresh or brackish), but evidently not typically marine. *Challinor.*

nonmetal. A chemical element (as boron, carbon, phosphorus, nitrogen, oxygen, sulfur, chlorine, or argon) that is not classed as a metal because it does not exhibit most of the typical metallic properties. An element that, in general, is characterized chemically by the ability to form anions, acidic oxides and acids, and stable compounds with hydrogen. *Webster 3d.*

nonmetallic. a. Not metallic (as in luster or in other physical properties). *Webster 3d.* b. Of, relating to, or being a nonmetal. *Webster 3d.*

nonmetallic armor. Nonmetallic armor means a tough outer covering or cable sheath of rubber, rubber compound, or thermoplastic, designed to protect the cable conductors and insulation from abrasion or other damage from external sources. *I.C. 7962, 1960, p. 22.*

nonmetallic cable sheath. *See* cable sheath, nonmetallic.

nonmetallic inclusions. *See* inclusions. *C.T.D.*

nonmetallic materials. Materials that contain elements which readily accept or share additional electrons (as contrasted to metallic materials and ceramic materials). Examples: O_2, CH_4, CH_3COOH, oils, plastics, wood, etc. *VV.*

nonmetallic minerals. Minerals are conveniently divided into metallic and nonmetallic groups, and then arranged in subdivisions according to the elements which form their main constituents. The nonmetallic minerals (carbon, diamond, coals, bitumen, asphalt, boron, sulfur, rock salt, etc.) lack the properties of the metallic minerals such as a bright metallic luster, hardness, density, and good conductors of heat and electricity. *Nelson.*

nonmetallic sheathed cable. A nonmetallic sheathed cable is an assembly of two or more insulated conductors having an outer sheath of moisture-resistant, flame retardant, nonmetallic material. *ASA M2.1-1963.*

non-Newtonian flow. Flow of non-Newtonian fluids in which, as distinct from Newtonian flow, viscosity depends on shearing stress and is not independent of rate of flow. *Pryor, 3.*

non-nitroglycerin explosives. These explosives contain TNT instead of nitroglycerin to sensitize ammonium nitrate, and a little aluminum powder may also be added to increase their power and sensitiveness. Straight TNT/ammonium nitrate explosives usually contain 15 to 18 percent TNT and 82 to 85 percent ammonium nitrate. TNT/ammonium nitrate explosives have densities between 1.0 and 1.2 grams per cubic centimeter and velocities of detonation between 3,200 and 4,000 meters per second. They are reasonably free from noxious fumes. This type of explosive is susceptible to moisture and should be used only in dry conditions unless packed in sealed containers. The main use of non-nitroglycerin explosives is in primary blasting in quarries and opencast mining, although they are used in some underground work, particularly in ironstone mining. The combination of high strength and relatively high velocity of detonation also makes them applicable for secondary blasting by plaster shooting. *McAdam II, pp. 32-33.*

nonpareil brick. An insulating brick. *Bureau of Mines Staff.*

nonpermitted explosive. An explosive which is not approved in law for use in permitted light (safety lamp) mines. *B.S. 3618, 1964, sec. 6.*

nonplastics. A trade term referring to ceramic materials other than the plastic clays. *ACSG, 1963.*

nonpolar adsorption. Capture of nonelectrolytes. *Pryor, 3.*

nonpolarizable electrode. Electrode in which the phenomenon of polarization does not occur. *Schieferdecker.*

nonproductive formation. a. A rock unit that, because of its stratigraphic position, is presumed to contain no valuable mineral deposits. *Long.* b. A rock unit in which no minerals of interest are found. *Long.*

nonreturn valve. *See* check valve. *Ham.*

nonrotating cable. *See* nonspin cable. *Long.*

nonrotating rope. A wire rope composed of 18 strands of 7 wires each; the inner 6 strands are left lay and outer 12 strands are right lay. It is especially fabricated for use where loads are handled in free suspension, as in lifting of loads with a single line. *Lewis, pp. 248, 252.*

nonseat. Mid. *See* D-link. *Fay.*

nonsegregating chute. A chute, usually used to charge stoker hoppers, so designed as to deliver the coal in a mixed state rather than having the large lumps tend to be deposited separate from the fine. *ASA MH4.1-1958.*

nonselective mining. The object of nonselective mining is to secure a low cost, generally by using a cheap stoping method combined with large-scale operations. This method can be used in deposits where the individual stringers, bands, or lenses of high-grade ore are so numerous and so irregular in occurrence and separated by such thin lenses of waste that a selective method cannot be employed. Nonselective methods of stoping include caving, top slicing, some forms of open stoping, and shrinkage stoping under most conditions. *BuMines Bull. 390, 1936, p. 32.*

nonsequence. A diastem or other relatively unimportant sedimentary or stratigraphic interruption. *Compare* unconformity; paraconformity. *A.G.I. Supp.*

nonsignificant anomaly. An anomaly that is superficially similar to a significant anomaly but is unrelated to ore. *Hawkes, 2, pp. 26-27.*

nonslip floor. In concrete work, a floor surfacing which is impregnated with iron filings or Carborundum powder to roughen it. *Ham.*

nonspin cable. A wire or fiber cable so constructed as to reduce twisting to a minimum. *Long.*

nonspin differential; limited action differential. A differential that will turn both axles, even if one offers no resistance. *Nichols.*

nonspinning rope. A rope wire consisting of 18 strands of 7 wires each, in two layers; the inner layer consists of 6 strands Lang lay and left lay around a small hemp core, and the outer of 12 strands regular lay, right-hand lay. Will carry a load on a single end without untwisting. *H&G, p. 130.*

nonstoichiometric. A chemical compound is said to be nonstoichiometric if the ratio of its constituents differs from that demanded by the chemical formula. This may happen with oxides that are readily reducible, or with compounds containing an element of variable valency, or when interstitial atoms are present in the lattice. Nonstoichiometric ceramics are of interest as being semiconducting. *Dodd.*

nonstranded rope. A rope in which the wires are not laid up in strands but in concentric sheaths, and in opposite directions in the different sheaths, which gives the rope nonspinning properties. The outer sheaths are composed of specially shaped interlocking wires and there is no hemp core in the rope. *See also* locked coil rope. *Sinclair, V, p. 9.*

nontabular deposits. Mineral deposits of irregular shape. *See also* masses. *Nelson.*

nontectonite. A rock in which both the position and the orientation of grains have not been influenced by the movement of neighboring grains. *A.G.I. Supp.*

nontidal currents. Includes the permanent currents in the general circulatory systems of the sea as well as temporary currents arising from winds. *Hy.*

nontilting mixer. A drum-shaped concrete mixer having two openings, rotating about a horizontal axis. When mixed, the concrete is extracted by means of a hinged chute. *Ham.*

nontronite. An iron-rich clay mineral, $Fe(AlSi)_8O_{20}(OH)_4$, of the montmorillonite group. It is apple- or pistachio-green or yellowish-green and commonly occurs in weathered basaltic rocks, where it may occupy vesicles, veins, or may occur between flows. *Stokes and Varnes, 1955; Dana 17.*

nonuniform flow. A flow the velocity of which is undergoing a positive or negative change. If the flow is constant it is referred to as uniform flow. *Seelye, 1.*

nonvitreous; nonvitrified. A relative term as applied to ceramic products based on the water absorbing characteristics, that is, brick, tile, etc., which absorb water in excess of that given by the specifications would be described as nonvitreous. *See also* impervious; semivitreous. *Bureau of Mines Staff.*

nonvitrified. *See* nonvitreous.

nonweathering coal. Coal having a weathering index, as defined by U.S. Bureau of Mines standards of less than 5 percent. *A.G.I.*

nonwetted. a. A term used in the flotation process and applied to certain metallic minerals that refuse to be wetted with water but are easily wetted with oil. *Fay.* b. As used by diamond-bit setters, a diamond inset in a metal or alloy that has not adhered to or wetted the surface of the diamond. *Long.*

nonwetting. As used by diamond-bit setters, a metal or alloy that, when molten, does not adhere to or wet the surface of a diamond. *Long.*

nook. a. The corner of a working place at the junction of the face with one side. *Fay.* b. N. of Eng. A corner of a pillar of coal. Also spelled neuk. *Fay.*

nooper. A pick for splitting large lumps of coal or for cutting away stone as the material passes on picking conveyors. *Nelson.*

noper. Derb. *See* loading pick. *Fay.*

norbergite. A yellow or pink basic fluosilicate of magnesium, $Mg_2SiO_4.Mg(F,OH)_2$. Orthorhombic. From Norberg, Sweden; Franklin, N.J. *English.*

Norbide. A trade name introduced in 1934 by the Norton Company for boron carbide, an artificial abrasive; chemical formula, B_4C_3. It is formed by heating coke and boric acid in an electric furnace. It is the hardest material produced for commercial use, being markedly harder than silicon carbide and second only to diamond. It is used in place of diamond dust for grinding and lapping dies and tools made of tungsten carbide or tantalum carbide. It is also very suitable for use as linings for nozzles used in sandblasting because of its high abrasion resistance. It is used as a deoxidizer for steel. Also known as Norton boron carbide. *AIME, p. 18.*

nordfieldite. *See* northfieldite. *Hess.*

Nordhausen acid. Fuming sulfuric acid, a solution of SO_3 in H_2SO_4 with formula $H_2S_2O_7$. *Pryor, 3.*

nordite. A silicate of rare earths, Na,Sr,Ca,-Mn, as pale-brown orthorhombic crystals from the Kola Peninsula, U.S.S.R. So named because of its northern origin. *Spencer 16, M.M., 1943.*

nordmarkite. Brögger's name for a sodic variety of syenite consisting of orthoclase, some oligoclase, more or less microperthite, quartz, and somewhat subordinate biotite, pyroxene, hornblende, and aegirite. Nordmarkites are high in silica and the alkalies. *Fay.*

nordstrandite. A mineral, $Al_2O_3.3H_2O$; from Sarawak, Malaysia. *Hey, M.M., 1964; Fleischer.*

Norian. Middle Upper Triassic. *A.G.I. Supp.*

norite. A coarse-grained igneous rock of basic composition consisting essentially of plagioclase (near labradorite in composition) and orthopyroxene. Other colored minerals are usually present in varying amount, notably clinopyroxene, which, however, must not exceed half of the total pyroxene content. *C.M.D.*

norm. a. A theoretical, and in part arbitrary, mineral composition of a rock that is calculated, in accordance with certain rules, from the chemical analysis for the purpose of assigning the rock its place in the norm system of rock classification. The norm rarely coincides with the real mineral composition, or mode, of a rock. *Compare* mode, b. *Fay.* b. Optimum operating condition of one or more controlled characteristics in a process such as continuous ore treatment. *Pryor, 3.*

normal. a. According to, constituting, or not deviating from an established norm, rule, or principle. Conformed to a type, standard, or regular pattern; not abnormal. Synonym for regular. *Webster 3d.* b. Of or pertaining to a solution having a concentration of 1 gram-equivalent weight of solute per liter of solution. Commonly used in analytical chemistry. Symbol, *N*. For example, 0.1 *N* hydrochloric acid. *See also* normal solution. *CCD 6d, 1961; Webster 3d.* c. Used to designate aliphatic hydrocarbons, their derivatives, or alkyl radicals, the molecules of which contain a single unbranched chain of carbon atoms. For example, normal butane (C_4H_{10}) is the compound the molecular structure of which is indicated by the formula $HCH_2CH_2CH_2$-CH_3. Abbreviated by the prefix *n* followed by a hyphen; for example, *n*-butane. *CCD 6d, 1961; Webster 3d.* d. Forming a right angle. Synonym for perpendicular. *Webster 3d.*

normal air. A mixture of dry air and water vapor, varying from 0.1 percent to 3 percent by volume (usually over 1 percent in mines). *Hartman, p. 7.*

normal arc. A term specifically intended to differentiate between the arcs that are commonly observed and the low-pressure "skittering arcs." *BuMines Bull. 625, 1965, p. VII.*

normal beach ridge. A ridge having its base well below low tide level, along medium to high energy shores. *Schieferdecker.*

normal calorie. The quantity of heat required to raise 1 gram of water from 14.5° to 15.5° C. *Newton, p. 122.*

normal corrosion. When used in connection with galvanic corrosion it may refer to corrosion of the anodic metal when there is no contact with the dissimilar metal. *BuMines Bull. 619, 1964, p. 206.*

normal depth. The depth of water in an open conduit that corresponds to uniform velocity for the given flow. It is a hypothetical depth under conditions of steady nonuniform flow; the depth for which the surface and bed are parallel; also termed the neutral depth. *Seelye, 1.*

normal dip. The regional or general inclination of stratified rock over a wide area, as contrasted to local dip due to the presence of local structures. *A.G.I.*

normal displacement. Used by Tolman to designate dip slip. *A.G.I.*

normal erosion. The subaerial, as distinguished from the marine, eroding agencies, fall into two groups, normal and special, and it is by the normal group, running water and the weathering processes, that the shaping of the land surface is mainly effected. *Challinor.*

normal fault. A fault at which the hanging wall has been depressed relative to the footwall. *A.G.I.*

normal field. In magnetic prospecting, the smoothed value of a magnetic field component as derived from a large scale survey, world-wide or of continental scope. The normal field of the earth varies slowly with time, and maps of it are as of a certain date. *A.G.I.*

normal fold. An anticline, or syncline, with equal dips on each side; in contradistinction to an overthrow fold. *Fay.*

normal haul. A haul whose cost is included in the cost of excavation, so that no separate charge is made for it. *Nichols.*

normal interest. A rate of interest on the money laid out equal to the prevailing rate paid on sound securities or on savings deposits. *Hoov, p. 156.*

normalized steel. Steel that has been given a normalizing heat treatment intended to bring al of a lot of samples under consideration into the same condition. *Fay.*

normalizing. Heating a ferrous alloy to a suitable temperature above the transformation range and then cooling in air to a temperature substantially below the transformation range. *ASM Gloss.*

normalizing conveyor. A conveyor which moves material through a normalizing furnace under heat. *ASA MH4.1-1958.*

normal limb. One which is right side up; the overturned, inverted, or reversed limb has been rotated through more than 90° to attain its present position. *McKinstry, p. 641.*

normally consolidated soil deposit. A soil deposit that has never been subected to an effective pressure greater than the existing overburden pressure and one that is also completely consolidated by the existing overburden. *ASCE P1826.*

normally free. In Great Britain, the Mines Acts and Regulations state that an intake airway is not deemed to be normally free from flammable gas if the average percentage of flammable gas found in six samples taken by an inspector in the air current of that airway at intervals of not less than a fortnight exceeds one quarter. *Mason, v. 1, p. 183.*

normal monocable. An aerial ropeway similar in principle to the fixed clip monocable except that the carrier can be disengaged from the moving rope. In transit the carrier is firmly mounted on the rope, but leaves it while still running to run on to a shunt rail for unloading and loading. Individual loads are about 1 ton and total capacity 100 tons per hour or more. *See also* bicable. *Nelson.*

normal order of crystallization. A term which perpetuates a misconception. Generally there is no applicable order of crystallization, but for any particular rock the study of thin sections enables the observer to deduce the order in which the minerals finished crystallizing. The order in many rocks is: accessories, mafic minerals in the order olivine, orthopyroxenes, clinopyroxenes, amphiboles, micas overlapping with plagioclase, orthoclase and quartz; but there are many exceptions. *C.T.D.*

normal pressure; standard pressure. Usually equal to the weight of a column of mercury 760 millimeters in height. *Webster 3d.* Approximately 14.7 pounds per square inch. *Fay.*

normal price. As applied to metal prices, it is the average over a long term—sometimes a period greater than the life of a mine. *See also* basic price. *Fay.*

normal pyroxenic. Bunsen's name for his assumed, typical, basic, igneous magma with 48 percent SiO_2 as contrasted with the corresponding normal trachytic one with 76 percent SiO_2. He sought to explain all intermediate rocks by the intermingling of these two. Although apparently applicable at times and serviceable in their day, the conceptions have long since exploded. *Fay.*

normal ripple marks. Simple asymmetrical ridges with various ground plans. *Pettijohn.*

normal salt. A salt that contains neither replaceable hydrogen nor hydroxide ions. *A.G.I.*

normal scale. *See* effective temperature scale. *Roberts, I., p. 135.*

normal segregation. A type of segregation in which the content of impurities and inclusions tends to increase from the surface to the center of cast metals. Of special importance in steel, in which phosphorus, sulfur, and oxide inclusions segregate in this way. *See also* inverse segregation. *C.T.D.*

normal shift. The horizontal component of the shift at right angles to the fault strike. *Fay.*

normal solution. A solution made by dissolving 1 gram-equivalent weight of a substance in sufficient distilled water to make 1 liter of solution. Symbol, *N. See also* normal, b. *C.T.D.*

normal spinel. Spinel with all divalent cations in four-fold (tetrahedral) sites, and all trivalent cations in six-fold (octahedral) sites. *VV.*

normal stress. The stress component normal to a given plane. *ASCE P1826. See also* stress.

normal stress component. That component of the stress in a rock mass which acts perpendicular to the lode plane or any other reference plane. *Spalding.*

normal temperature. a. Normal temperature and pressure are taken as 0° C (273° absolute) and 30 inches (760 millimeters) of mercury pressure. Also called standard temperature. *Cooper.* b. As applied to laboratory observations of the physical characteristics of bituminous materials, is 25° C (77° F). *Urquhart, sec. 2, p. 81.*

normal theory. In 1858, Gonot, a Belgian engineer, published his "Theory of the Normal," claiming that the removal of a coal seam caused the overlying strata to fracture at right angles to the inclination of the beds. Subsidence observations do not support this theory. *See also* dome theory. *Nelson.*

normal travel-time curve. In fan shooting, a time-distance curve obtained along a profile in some nearby area which does not contain geologic structures of the type being sought. *A.G.I.*

normal uranium. *See* uranium, natural. *L&L.*

normal water. The standard used in determination of chlorinity. It is prepared by the Hydrographical Laboratories in Copenhagen, Denmark. Chlorinity of this water is adjusted to approximately 19.4 [per thousand] and accurately determined by analysis. *Hy.*

normal winter. Refers to normal ice season, that is, the average ice conditions based on a number of recorded winters in a given area. *Hy.*

normal year. A year of normal or average water supply. *Seelye, 1.*

Norman brick. A brick whose nominal dimensions are 2½ x 4 x 12 inches. *ACSG, 1963.*

Norman slabs. A type of glass for stained windows; it is made by blowing bottles of square section and cutting slabs of glass from the four sides. *Dodd.*

normative. In petrology, characteristic of, pertaining to, agreeing with, or occurring in the norm; used in the quantitative or norm system of classification of igneous rocks, a normative mode being one which is essentially the same as the norm. *Fay.*

normative mineral. Synonym for standard mineral. *A.G.I.*

normative mode. A mode which is so nearly the same as the standard mineral composition calculated from the analysis of the rock that either may be used to classify the rock correctly. *Schieferdecker.*

norm system. A system of classification and nomenclature for igneous rocks based on the norm of each rock. Only undecomposed rocks of which accurate chemical analyses are available are classifiable, in this system, which consequently is more used in detailed petrologic studies than in ordinary geologic or mining work. The system was devised by Cross, Iddings, Pirsson, and Washington, and by them originally designated the quantitative system, and later the C.I.P.W. system, which has also been referred to as the American system. *Fay.*

norsethite. A mineral, $BaMg(CO_3)_2$, in rhombohedral crystals in the Westvaco Trona mine, Wyo. *Hey, M.M., 1961.*

Norskalloy. A trade name for pig iron produced from Norwegian ores containing vanadium and titanium. *Brady, p. 557.*

Norsk-Staal process. A process for the direct production of iron sponge. A mixture of carbon monoxide and hydrogen is used as the reducing agent. The equipment consists of three vertical ovens, for preheating, reducing and cooling the charge, and apparatus for regenerating the spent gases. The ore is contained in a series of muffle trays, each tray holding about 3 tons of ore. These trays pass down through the preheating oven, where the ore is heated to 1,000°, and are then transferred to the reducing oven, where they are raised slowly through and against the downward gas current, then transferred to the cooling shaft, and slowly lowered down it. The transfer of a tray from one oven to another is made without contact with air. The ore is preheated in the first oven by part of the gases from the reduction oven, and the sponge iron is cooled in the third oven to 50° by cold gas from a gas holder. *Osborne.*

Northampton sand ironstone. Eng. An important stratified iron ore deposit in the east Midlands and forms the feature known as the Oölitic Cliff. It occurs at the base of the lower Oölites. The ore bed varies from 12 to 25 feet, of which only 6 to 14 feet are worked. The iron content is between 28 and 34 percent as quarried. *Nelson.*

north end. York. The rise side of the coal in North Yorkshire. *Fay.*

northern dust filter. A device for trapping the dust during the extraction ventilation of a stone drivage. The filter unit is attached to the discharge end of the ducting and contains 67 fabric sleeves or bags, giving an approximate total surface area of 200 square feet. The sleeves are attached at their upper ends to a shaking mechanism. The dust collected in the bags can be discharged and removed from the lower compartment. (Developed by the Central Engineering Establishment in collaboration with the Mining Research Establishment of the National Coal Board, Great Britain.) *Nelson.*

northfieldite. An obsolete name for a quartz-muscovite pegmatmite. *A.G.I.*

northing. a. In surveying, difference of latitude, measured toward the north, between any position and the last one determined. *Standard, 1964.* b. The northerly component of a National Grid coordinate. *B.S. 3618, 1963, sec. 1.*

North of England caving. *See* top slicing. *Nelson.*

north-seeking pole. The end of a magnet which points approximately north. The other end is the south-seeking pole. *Morris and Cooper, p. 197.*

North Staffordshire method. *See* bord-and-pillar method. *Fay.*

northupite. A white, yellow, or gray chloride and carbonate of magnesium and sodium, $MgCO_3.Na_2CO_3.NaCl$. Isometric; octahedrons. From Borax Lake, San Bernardino County, Calif. *English.*

Norwalt separator. Trade name for a dense-medium washer for treating coal from lump size down to about one-eighth inch. It comprises a shallow circular tank with a flat base and a conical inner shell containing the driving mechanism. The clean coal floats and passes over a weir while the shale sinks to the bottom and is conveyed to an outlet chute. Its capacity ranges from about 50 to over 500 tons per hour depending on the size of the vessel. *Nelson.*

Norway iron. Swedish soft iron. *Hess.*

Norwegian amber. Baltic amber, from the coast of Norway. *Shipley.*

Norwegian cut. A variation of the ordinary cut and may be said to represent a combination of the latter and the fan cut. The first drill holes are formed with a sharper angle towards the working face which facilitates breaking. This type of cut has been employed successfully in headings of small section, the cut hole being blasted first, followed by the bench holes. In order to obtain the maximum possible advance the cut may also be deepened after blasting, during the first pause in working, for example, the whole section then being broken out simultaneously. *Fraenkel, v. 1, Art. 6:02, p. 27.*

no-screen films (nonscreen films; direct X-ray films). Any films intended for use under conditions such that the direct action of X-rays or gamma rays on the emulsion is largely responsible for the density produced. Films for use with lead screens are included in this class. *ASM Gloss.*

nose. a. Scot. A point; a projecting angle of coal or other mineral. *Fay.* b. The lead face of the crown of a diamond bit. *Long.* c. Place where a fold shows the maximum curvature. There is a nose for each stratum. *McKinstry, p. 641.* d. To dip or run in the form of a geological nose. *Webster 3d.* e. An accumulation of chilled material around the inner end of a tuyere in a smelting shaft furnace, protecting and prolonging the tuyere. *Fay.* f. The constricted circular opening at the top of the refractory lining of a converter; through this opening molten pig iron is charged and steel is subsequently poured. Also called mouth. *See also* converter. *Dodd.* g. The working end or refining chamber of a tank. *ASTM C162-66.*

nosean. *See* noselite. *Fay.*

nose helve. Eng. *See* frontal hammer. *Fay.*

nosehole. In glass manufacturing, a boccarella. *Webster 2d.*

nose in. Eng. A stratum is said to nose in when it dips beneath the ground into a hillside in a V-form or nose form. *Fay.*

noselite; nosean; nosin; nosite. A mineral of the sodalite group, near haüynite, but containing little or no lime. A feldspathoid, $Na_4Al_3Si_3O_{12}SO_4$. Isometric. *Dana 17.*

nose out. a. Eng. A nose-shaped stratum cropping out. *Fay.* b. To diminish by losing stratum after stratum and getting into the lower part of the measure; said of a coal seam. *Standard, 1964.*

nose piece. Microscopically, a mounting which carries two or more objectives of different focal lengths thus facilitating changes in magnifying power. *Pryor, 3.*

nose pipe. The inside nozzle of a tuyere. *Standard, 1964.*

nose radius. The radius of the rounded portion of the cutting edge of a tool. *ASM Gloss.*

nose-ring block. A block of refractory material specially shaped for building into the discharge end of a rotary cement kiln; also known as a discharge-end block. *Dodd.*

nosin. Synonym for nosean. *Hey 2d, 1955.*

nosing. a. A literal load from the wheels of a locomotive imposed in either direction. *See also* lurching allowance. *Ham.* b. Closing the end of a tubular shape to a desired curved contour. *ASM Gloss.*

nosite. Synonym for nosean. *Hey 2d, 1955.*

nostril. The refractory gas- or air-port in a gas retort. *Dodd.*

nostril blocks. *See* rider bricks. *Dodd.*

notch. a. An angular recess cut in the ends of a crossbar of a timber set to fit over a corresponding wedge in the upright posts. With the advent of steel arches, the craft of notching is becoming extinct. *See also* Welsh notch. *Nelson.* b. Eng. *See* let into. *SMRB, Paper No. 61.* c. A small weir made for use in measuring flow in laboratory models of hydraulic structures. *See also* measuring weir. *Ham.* d. A hollow formed by the undermining of a cliff, as a result of wave erosion and/or solution. *Schieferdecker.*

notch acuity (sharpness). Relates to the severity of the stress concentration produced by a given notch in a particular structure. If the depth of notch is very small compared with the width (or diameter) of the narrowest cross section, the acuity may be expressed as the ratio of the notch depth to the notch radius. Otherwise, the acuity is defined as the ratio of one-half the width (or diameter) of the narrowest cross section to the notch radius. *ASM Gloss.*

notch brittleness. Susceptibility of a material to brittle fracture at points of stress concentration. For example, in a notch tensile strength; otherwise, it is said to be notch ductile. *ASM Gloss.*

notch depth. The distance from the surface of a test specimen to the bottom of the notch. In a cylindrical test specimen, the percentage of the original cross-sectional area removed by machining an annular groove. *ASM Gloss.*

notch ductile. *See* notch brittleness. *ASM Gloss.*

notch ductility. The percentage reduction in area after complete separation of the metal in a notch tensile test. *ASM Gloss.*

notched-bar test. A test in which a notched metal specimen is given a sudden blow by a striker carried by a pendulum or a falling weight and the energy absorbed in breaking the specimen is measured. Also called impact test. *See also* Izod test; Charpy test; Fremont test. *C.T.D.*

notched weirs. *See* measuring weir. *Seelye, 1.*

notch effect. Locally increased stress at that point in a structural load bearing member where the section changes at a sharp angle. *Ham.*

notcher. A machine tool in a steel fabrication shop by which the flanges are stripped from the ends of rolled steel joists. *Ham.*

notching. a. A method of excavating in a series of steps. *Standard, 1964.* b. Cutting out various shapes from the edge of a strip, blank, or part. *ASM Gloss.*

notching press. A mechanical press used for notching internal and external circumferences and also for notching along a straight line. These presses are equipped with automatic feeds, since only one notch is made per stroke. *ASM Gloss.*

notch plate. V-shaped overflow; used to measure rate of overflow of liquid or to control that rate. *Pryor, 3.*

notch rupture strength. The ratio of applied load to original area of the minimum cross section in a stress-rupture test of a notched specimen. *ASM Gloss.*

notch sensitivity. A measure of the reduction in strength of a metal caused by the presence of stress concentration. Values can be obtained from static, impact, or fatigue test. *ASM Gloss.*

notch sensitivity ratio. Alternative term for factor of stress concentration in fatigue or fatigue strength reduction factor. *Ro.*

notch stick. Forest of Dean. A short stick notched or nicked, used by miners as records of the number of cars of coal, etc., they send out of the mine during the day. *Fay.*

notch strength; notch tensile strength. The ratio of maximum load to the original minimum cross-sectional area in notch tensile testing. *ASM Gloss.*

notch test. A test for the assessment of the low-temperature spalling tendency of fireclay refractories. A notch is made in a transverse strength test piece and the effect of this on the strength at 800° C is determined; if the transverse strength is but little reduced by the notch, the low-temperature spalling resistance of the fire clay refractory will be good. *Dodd.*

notch toughness. The energy in foot-pounds required to break standard specimens under the standard conditions realized in the Izod or Charpy test. It may also mean the opposite of notch brittleness. *C.T.D.*

note. N. of Eng. Itemized list of payments due to a man or a set of men for work done during a week. *Trist.*

not previously known to exist. These words refer to the time of the location and commencement of the tunnel and not to the respective times of the discoveries of the various veins in the tunnel. *Ricketts, I.*

Nottingham system; Barry mining. A longwall method of working coal seams in which the trams run on a rail track along the face and handloaded at the sides. It follows that the system can only be adopted in relatively thick seams where the trams can travel along the face without any roof ripping. The method is now largely replaced by face conveyors. *Nelson.*

noumeite. The same as garnierite. *Fay.*

Nouvelle Montagne furnace. A modification of the Liege furnace, in so far as the arrangement of the fireplace is concerned. It is a double furnace served by one fireplace. *Fay.*

novacekite. A very rare, strongly radioactive, tetragonal, straw-yellow to lemon-yellow mineral, $Mg(UO_2)_2(AsO_4)_2.nH_2O$; a secondary mineral found in veins with other uranium-bearing minerals. Probably one end-member of a complete series, the other being the phosphate analogue, saleeite. *Crosby, p. 31-32.*

novaculite. An exceedingly fine-grained, cryptocrystalline quartzose rock supposed to be a consolidated, siliceous slime and of sedimentary origin. It is especially developed in Arkansas, and used much as a whetstone. *Fay.*

novakite. Arsenide of copper and silver, occurring in carbonate gangue at Cerny Dul (Schwarzenthal), Czechoslovakia. The formula is given as $(Cu,Ag)_4As_3$ or $(Cu,Ag)_{11}As_8$, but the constants given lead to a cell content of $(Cu,Ag)_{26.5}As_{10.9}$ *Hey, M.M., 1961.*

novit. An explosive; a mixture of TNT and hexyl. *Bennett 2d, 1962.*

Novita reviving apparatus. An apparatus used for the administration of oxygen which is fitted with a hand-operated control valve thereby enabling the rate of feed of oxygen to be regulated at any desired quantity between 0 and 30 liters per minute. It does not have a lung-governing device normally, but can be fitted with a lung-governed valve. The twin-cylinder model consists of the following parts: (1) two oxygen cylinders; (2) a T-piece; (3) a breathing bag; and (4) a rubber tube and mask. *McAdam, pp. 97-98.*

Novox reviving apparatus. An oxygen-type reviving apparatus in which the oxygen supply is controlled by a lung-governed admission valve, supplemented by a hand-operated by-pass valve which can be used when the patient's breathing is too weak to operate the lung-governed valve. There are several different models of the Novox apparatus, but the standard twin-cylinder model consists of the following main parts: (1) two oxygen cylinders; (2) a line pipe; (3) a breathing bag; and (4) a breathing tube and face mask. *McAdam, p. 94.*

nowel. a. The inner part of a large mold, corresponding to the core in small work. *Standard, 1964.* b. The bottom or drag of a molding flask, as distinguished from the cope. *Standard, 1964.*

noxious. Causing or tending to cause injury, especially to health; hurtful; pernicious; for example, noxious gases. *Standard, 1964.*

noxious gas. A gas which is injurious to health. *B.S. 3618, 1963, sec. 2.*

nozzle. a. A short tube, usually tapering, forming the vent of a hose or pipe. *Webster 3d.* b. The front nosepiece of a bellows or a blast pipe for a furnace. *Fay.* c. A short piece of pipe with a flange on one end and a saddle flange on the other end; may be made of cast iron, cast steel, or wrought steel. *Fay.* d. A side outlet attached to a pipe by such means as riveting, brazing, or welding. *Fay.* e. A cylindrical fire clay shape traversed by a central hole of uniform diameter; the top of the nozzle is contoured to form a seating for a stopper; nozzles are fitted in the bottom of ladles used in the teeming of steel. *See also* stopper, a. *Dodd.*

nozzle brick. A tabular refractory shape used in a ladle with a hole through which steel is teemed at the bottom of a ladle, the upper end of the shape serving as a seat for the stopper. *A.R.I.*

nozzleman. In metal mining, one who operates a hydraulic giant or monitor (nozzle) used to direct a stream of water under high pressure against a bank of gold-bearing gravel to erode and force the gravel into sluiceboxes where the gold separates out and is caught by riffles (cleats). Also called giant tender. *D.O.T. 1.*

Np Chemical symbol for neptunium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

NPA. The initials of the National Petroleum Association. *API Glossary.*

N.P.N. process. A modification of the basic Bessemer process. The main feature is the shortening of the blow by increasing the pressure of the blast as much as possible. Normally, the melt is cooled by the addition of scrap or iron ore but it is claimed that a fairly high temperature can be maintained without an undue increase of the nitrogen content, so that ladle sculls can be avoided. *Osborne.*

N rod bit. A Canadian standard noncoring bit having a set diameter of 2.940 inches. More commonly called a 2-15/16 N drill-rod bit. *Long.*

NS bit. Letter name for a step-face core bit having the same set diameters as a Pennsylvania standard N bit. *Long.*

N.T.P. Normal temperature and pressure; a temperature of 0° C and a pressure of 760 millimeters of mercury. *Nelson.*

N-truss. A bridge or roof truss which has parallel upper and lower chords and an arrangement of web members consisting of tension diagonals and compression verticals, with the vertical struts separating the panels. Also known as a Pratt truss. *Ham.*

nubber. a. Mid. A block of wood about 12 inches square, for throwing mine cars off the road in case the couplings or ropes break. *Fay.* b. *See* stopblocks. *Nelson.*

Nubian sandstone. The basal member of the Cretaceous system in Egypt, deposited in the southern part of the Tethys. By its disintegration, it has formed the great Libyan Desert. *C.T.D.*

nuclear battery. *See* radioisotopic generator. *L&L.*

nuclear ceramics. Ceramic products which are used in atomic reactors. Their major use is as shielding material. *Bureau of Mines Staff.*

nuclear chemistry. The chemical aspects of nuclear science and the applications of nuclear science to chemistry. In a limited sense, it denotes the study of the reactions of nuclei and the properties of the resulting nuclear species. *NRC-ASA N1.1-1957.*

nuclear energy. Energy released in nuclear reactions, especially in quantities sufficient to be of interest in engineering. *NRC-ASA N1.1-1957.*

nuclear explosion (first self-contained). *See* Rainier. *Lewis, p. 141.*

nuclear log. Radiometric record made in a bore hole. *See also* gamma ray log; spectral gamma-ray log; neutron logs. *A.G.I. Supp.*

nuclear magnetism log. Primarily a hydrogen log, and is useful for the following purposes: (1) provides valuable correlating curve to replace the S.P. in holes containing oil or invert muds; (2) provides a means of qualitatively distinguishing zones containing hydrocarbons from zones containing only water; (3) provides a means of measuring quantitatively what proportion of the total fluid-filled porosity in a formation is sufficiently free from the influence of chemical binding forces to be considered mobile and thus potentially recoverable; and (4) provides a means of estimating the permeabilities of formations. *Wyllie, pp. 154-160.*

nuclear magnetometer. *See* nuclear resonance magnetometer.

nuclear power. Power released in exothermic nuclear reactions and useful in ways comparable with, for example, electric power. *NRC-ASA N1.1-1957.*

nuclear power plant. Any device, machine, or assembly thereof that converts nuclear energy into some form of useful power, such as mechanical or electric power. In a nuclear electric power plant, heat produced by a reactor is used to make steam, and the steam drives a turbine generator in the conventional way. *L&L.*

nuclear power station. An assemblage of machines and equipment, including the necessary housing, where electrical energy is produced from nuclear energy. The heat generated in the graphite-moderated uranium reactors is conveyed to the steam plant by carbon dioxide under pressure. The hot gas gives up its heat to the preheating, evaporating, and superheating sections of the steam plant, and after passing through the steam-raising towers, the cooled gas is recirculated by blowers to the reactor where the cycle is repeated. *See also* power station. *Nelson.*

nuclear reaction. A reaction involving the nucleus of the atom, such as fission, neutron capture, radioactive decay, or fusion; and distinct from a chemical reaction, which is limited to changes in the electron structure surrounding the nucleus. *L&L.*

nuclear reactor. A device by means of which a fission chain reaction can be initiated, maintained, and controlled. The essential component of a nuclear reactor is a core with a fissionable fuel. It usually has a moderator, a reflector, shielding, and control mechanisms. *L&L.*

nuclear reactor ceramics. These special ceramics include: fuel elements—UO_2, UC, and UC_2; control materials—rare earth oxides, and B_4C; moderators—BeO and C. *Dodd.*

nuclear resonance magnetometer. With this instrument the measurement of the earth's magnetic field depends on the magnetic moment of the atom. Hydrogen atoms are generally used, and these can be in a compound such as water. Each hydrogen atom can be looked upon as a tiny electromagnet whose strength and direction are determined by the revolution of the electron of the atom about its nucleus. In a magnetic field, atoms of hydrogen have a tendency to align themselves in opposition to the field. If the direction of the field is suddenly changed, there will be a moment pulling the atoms toward the new direction. But each atom is a midget gyroscope, and instead of shifting directly to the new field direction, it will precess about this direction. The frequency of this precession will be a function only of the strength of the magnetic field. To measure the strength of the earth's magnetic field, a bottle of water is subjected to a strong magnetic field at right angles to the earth's field. The voltage induced in a coil of wire wrapped around the bottle is observed when the auxiliary field is suddenly removed. This voltage will have a frequency of alternation of the order of 2,000 cycles per second, its exact value depending on the strength of the earth's field. The time of 2,000 cycles of this voltage can be measured using a 100-kilocycle oscillator and a high-speed counter, giving an accuracy of measurement of 1 part in 10^5, or of the order of ± ½ gamma. *H&G. See also* Varian nuclear magnetometer.

nuclear rocket. A rocket powered by an engine that obtains from a nuclear reactor, rather than by chemical combustion, the heat for expanding a propulsive fluid, such as hydrogen. *L&L.*

nuclear superheating. Superheating the steam produced in a reactor by using heat from a reactor. Two methods: Recirculating the steam through the same core in which it is first produced (integral superheating) or passing the steam through a second, separate reactor. *See also* superheating. *L&L.*

nuclear weapons. A collective term for atomic bombs and hydrogen bombs. *L&L.*

nucleation. The process of developing in a given metastable phase the initial fragment, germ, or nucleus of a second more stable phase, which in turn grows to give larger fragments or crystals of the stable phase. *ACSG, 1963.*

nuclei. Points at which crystals begin to grow during solidification. In general, they are minute crystal fragments formed spontaneously in the melt, but frequently nonmetallic inclusions act as nuclei. *See also* crystal nuclei. *C.T.D.*

nucleometer. A Geiger counter employing twenty Geiger tubes to increase the sampling area and overcome the inefficiency of a one-tube counter. *Ballard.*

nucleon. A constituent of the atomic nucleus; that is, a proton or a neutron. *L&L.*

nucleonic level indicator. An appliance which measures automatically the level of solids or liquids in bins, pipes, or other containers. A beam of gamma rays is directed from a source unit on one side of a container to a detector on the other side. Any material present intercepts the beam, thus weakening it, and this is registered on an indicator unit. It shows how much material present intercepts the beam, thus and loading can then be automatically controlled. The equipment is available in flameproof units which meet the mining regulations. *Nelson.*

nucleonics. In nuclear technology, the applications of nuclear science in physics, astronomy, chemistry, biology, geology, industry, and armaments, and the techniques associated with these applications. *NRC-ASA N1.1-1957.*

nucleus. a. A particle on which metal forms and grows (as in solidification, condensation, recrystallization, or transformation from one solid crystalline form to another. *Webster 3d.* b. A central point, part, group, or mass about which gathering, concentration, or accretion takes place. *Webster 3d.* c. The positively charged central portion of an atom that comprises nearly all of the atomic mass but occupies only a very small fraction of the volume, and that consists of protons and neutrons except in the case of hydrogen which consists of only one proton. *Webster 3d.*

nuclide. Any species of atom that exists for a measurable length of time. A nuclide can be distinguished by its atomic weight, atomic number, and energy state. The term is used synonymously with isotope. A radionuclide is the same as a radioactive nuclide, a radioactive isotope, or a radioisotope. *L&L.*

nuee ardente. Avalanche of fiery ash enveloped in compressed gas from a volcanic eruption. *Mather.*

nuevite. a. Titanoniobate of yttrium and iron as black grains and orthorhombic (?) crystals in quartz from Riverside County, Calif. Named from the locality. *Spencer 18, M.M., 1949.* b. A discredited term equal to samarskite. *American Mineralogist, v. 37, Mar.-Apr. 1952, p. 362.*

Nuflex. Trade name for a nonrotating rope of 17 x 7 or 34 x 7 construction. *Ham.*

nug. a. Scot. The dull sound caused by breaking strata. *Fay.* b. Eng. A protuberance; a nub. *Standard, 1964.* c. Eng. A block of wood. *Standard, 1964.*

nugget. a. A small mass of metal, such as gold or silver, found free in nature. *ASM Gloss.* b. The weld metal in a spot, seam, or projection weld. *ASM Gloss.* c. A waterworn piece of native gold. The term is restricted to pieces of some size, not mere "colors" or minute particles. Fragments and lumps of vein-gold are not called "nuggets" for the idea of alluvial origin is implicit. *Fay.* d. A lump of native gold, silver, platinum, copper, etc. *Fay.*

nuggeting. Searching for nuggets of gold. *Fay.*

nuggety. Having or resembling a nugget; occurring in nuggets; also covered with small rocks. *Webster 3d.*

nujols. In flotation, group of nonionizing hydrocarbon oils which act as collector agents by smearing action, giving aerophilic quality to the surface they selectively coat. *Pryor, 3.*

Nullagine Series. Local name in Western Australia for the formation consisting essentially of pre-Cambrian rocks made up mainly of jasperoid quartzites and dolomite. Crocidolite asbestos occurs in this formation as cross-fiber seams in lodes in stratified ferruginous quartzites and shales with occasional bands of dolomite. *Sinclair, W. E., p. 98.*

nullah. The name given in India to a normally dry watercourse, which will become a raging torrent after heavy rain. *Ham.*

number of rectifier phases. A rectifier circuit is equal to the total number of successive, nonsimultaneous commutations occurring within that rectifier circuit during each cycle when operating without phase control. It is also equal to the order of the principal harmonic in the direct-current potential wave shape. *Coal Age, 1.*

Numidian marble. A general name given to some celebrated marbles of cream, yellow, pink, and red colors, found in northern Africa. According to the best authorities, the name Numidian is incorrect, the true source of the stone being not Numidia, but the provinces of Africa and Mauritania. The quarries were worked by the ancient Romans. *Fay.*

Nummulite limestone. A thick bed of limestone, of Eocene age, composed mainly of foraminifera; stretches from the Alps through Iran to China. *C.T.D.*

Nummulitic. Same as Eocene; named for its abundant, large, disclike foraminifera. *A.G.I. Supp.*

nunatak. Mountain top projecting above an ice sheet, as in Greenland. *Mather.*

Nunkirchen jasper. Light gray to yellow or brownish-red jasper from Nunkirchen, near Idar-Oberstein, Germany. Dyed and sold as Swiss lapis. *Shipley.*

nurse. a. To carefully handle drilling tools, equipment, or bits. *Long.* b. To use undersized or damaged and weakened equipment or tools in such a manner as not to impose any suddenly applied or excessive strain. *Long.*

Nusse and Grafer PIV/6 drilling machine. A rotary machine used for drilling the holes in firedamp drainage. It is a two-speed, 150 to 250 revolutions per minute machine, drill-rod rotation being operated by a 6 horsepower motor, and traversing is done by a 2 horsepower motor, a pinion of which engages a toothed rack which runs the length of the drill frame. A forward drilling thrust of 4 tons is possible. The machine measures 10 feet overall and weighs about 1,000 pounds. With an improved high-speed gearbox, 100 to 130 feet of Coal Measures strata can be drilled in a shift. *See also* Fortschritt PIV/6 boring machine. *Nelson.*

nut coal. a. An abbreviation for chestnut coal. Also called nuts. *Fay.* b. Prepared bituminous coal which passes through 2 to 3 inch round holes and over ¾-, 1- or 1¼-inch holes, depending on the screening practice. Anthracite, through 1⅝-inch and over 3/16-inch round holes. *Jones.*

nutcracker. Synonym for boulder buster. *Long.*

nuts. a. A commercial term for sized coal (irrespective of size). *B.S. 3323, 1960.* b. Small coal. *Fay.*

nutty slack. Mixture of small coals, sized from 2 inches downward and probably of high ash content. *Pryor, 3.*

Nu-value. Expressed by the Greek letter ν or by the English letter V. Designates reciprocal dispersive power as follows: Nu-

$$\text{value} = \frac{n_D - 1}{n_F - n_c}.$$

ASTM C162-66.

nylon. A generic term for a group of synthetic fiber-forming polyamides. The polymer is melted, extruded, stretched, and finally processed to turn it into a textile yarn having a very high strength, great powers of energy absorption, and high resistance to abrasion and rotting. Its major uses in mining are as a reinforcement for conveyor belting and ventilation ducting. *Nelson.*

nylon belt. A rubber belt containing nylon fiber reinforcing. It is stronger than cottonduct belts of equivalent size and possesses better troughability and fastener holding strength. Nylon belt has the advantage of a long flex life and the thinner carcass means easier bending. *Nelson.*

nystagmus. An eye disease suffered by some miners, in which there is a spasmodic oscillatory movement of the eyeballs and in severe cases, the victim finds difficulty in walking straight. Bad lighting is generally believed to be the main cause, and possibly aggravated by the men lying on their sides in thin seams. *Nelson.*

O

O Chemical symbol for oxygen. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Oaktree Clay. Eng. Name for the Kimeridge Clay, on account of the prevalence of oaks on the outcrop. Also applied in S.E. England to the London Clay. *Arkell.*

oakum. Loosely twisted fiber usually of hemp or jute impregnated with tar or with a tar derivative (as creosote or asphalt) and used in caulking seams (as of the wood hulls and decks of ships) and in packing joints (as of pipes, caissons). *Webster 3d.*

Oamaru stone. Aust. A white, granular limestone found in large quantities in Oamaru, New Zealand, and valued as a building stone. *Fay.*

objective. The system of lenses in a microscope which furnishes the initial magnification of the object being examined. The image formed by the objective is picked up and further magnified by the ocular. *Shipley.*

obligate anaerobe. An organism growing only in the absence of free oxygen. *I.C. 8075, 1962, p. 64.*

oblique air photograph. A photograph taken from the air, for purposes of aerial survey work, with the optical axis of the camera inclined from the vertical, generally at some predetermined angle. *C.T.D.*

oblique bedding. a. An archaic term meaning inclined bedding. *Pettijohn.* b. Synonym for crossbedding. *A.G.I.*

oblique block. A quarry term applied to a block of stone bounded by 3 pairs of parallel faces, 4 of the 12 interfacial angles being right angles, 4 obtuse, and 4 acute. *Fay.*

oblique fault. A fault whose strike is oblique to the strike of the strata. *A.G.I.*

oblique joint. A joint the plane of which forms an acute angle with dip joints and strike joints. *Lewis, p. 593.*

oblique lamination. a. An early term for crossbedding. *Pettijohn.* b. Same as transverse lamination. *Fay.*

oblique offset. The distance of a point from a main survey line measured at an angle to the latter which is not a right angle. *See also* offset. *Ham.*

oblique photograph. *See* oblique air photograph. *See also* aerial mapping.

oblique projection. A pictorial view of an object showing its elevation, plan, or section to scale with parallel lines projected from the corners, at 45° or any other angle, indicating the other sides. *See also* axonometric projection; isometric projection. *Ham.*

oblique slip fault. A fault in which the net slip lies between the direction of dip and the direction of strike. *A.G.I.*

oblique stratification. *See* oblique bedding. *Pettijohn.*

obliterated corner. A survey or mining claim marker where no visible evidence remains of the work of the original surveyor. *Ricketts, I.*

obra. The narrow prismatic part of a blast furnace immediately above the crucible. *Fay.*

O'Brien furnace. A roasting furnace of the Herreshoff type with a central vertical shaft carrying stirring arms. *Fay.*

obsequent faultline scarp. A scarp along a faultline, but where the topographically low area is in the block that has been relatively uplifted. *See also* resequent faultline scarp. *A.G.I.*

obsequent stream. a. A stream flowing in a direction opposite to that of the dip of the strata or the tilt of the surface. Also called reversed stream. *Fay.* b. A stream which flows in a direction opposite to that of the consequent drainage. *A.G.I.*

observation error. An error caused by misreading of a signal or measuring device, or to faulty recording. *Pryor, 3, p. 159.*

observer. a. In seismic prospecting, the man in charge of the recording crew, including the shooters and linemen. He must maintain the electronic equipment and decide on the best shooting and detector arrangement as well as the best instrumental settings for getting records of optimum quality. He operates the recording equipment in the field, often with the help of an assistant. In conventional recording, or in tape recording when photographic monitors are run, the observer or his assistant develops the record in the recording truck immediately after it is shot. Also called operator. *Dobrin, p. 56.* b. In gravity and magnetic prospecting, a fieldman who secures the instrument readings, for example, on the torsion balance or magnetometer. *A.G.I.*

observer helper, gravity prospecting. In petroleum production, one who transports equipment and gravity prospecting party personnel to field locations and assists in making gravity observations that provide data for petroleum exploration activities. Also called gravity prospecting operator helper. *D.O.T. 1.*

obsidian. a. An ancient name for volcanic glass. Most obsidians are black, although red, green, and brown ones are known. They are often banded and normally have conchoidal fracture and a glassy luster. In recent years, the name has been somewhat restricted to glasses having a very low water content as contrasted with pitchstones and perlites. Most obsidians are rhyolitic in composition. *A.G.I.* b. A highly siliceous natural glass. *ASTM C162-66.*

obsidian cat's-eye. Obsidian possessing schiller. Never chatoyant. *Shipley.*

obsidianite brick. Lightweight, siliceous fire clay, acid-resisting brick, burned to a glasslike mass. *Bureau of Mines Staff.*

obtuse bisectrix. That axis which bisects the obtuse angle of the optic axes of biaxial minerals. *Fay.*

Occam's razor. If the facts established by an experiment are explicable without the need for developing a new hypothesis, there are no valid grounds for such an extension. *Pryor, 3.*

occidental agate. Agate poorly marked and not very translucent. *Shipley.*

occidental amethyst. *See* oriental amethyst. *Fay.*

occidental carnelian. Rarely used term for all but quite translucent carnelian. *See also* oriental carnelian. *Shipley.*

occidental cat's-eye. Quartz cat's-eye. *See also* oriental cat's-eye. *Shipley.*

occidental chalcedony. Rarely used term for all but quite translucent white or gray chalcedony. *See also* oriental chalcedony. *Shipley.*

Occidental diamond. Eng. A lapidary's term for limpid and colorless varieties of rock crystal when cut and polished. Used in contradistinction to the Oriental or true diamond. *Fay.*

Occidental topaz. A trade name for certain yellow-colored varieties of quartz used as semiprecious gem stones. *See also* Spanish topaz. *C.T.D.*

occidental turquoise. Odontolite. *Shipley.*

occlude. To take in and retain (a substance) in the interior rather than on an external surface; to sorb. Used especially of metals sorbing gases; such as, palladium occludes large volumes of hydrogen. *Webster 3d.*

occluded. Contained in pores (said of gas occluded in coal). *Mason.*

occluded gases. Gases which enter the mine atmosphere from pores, as feeders and blowers, and also from basting operations. These gases pollute the mine air chiefly by the absorption of oxygen by the coal, and in addition by chemical combination of oxygen with carbonaceous matter, for example, from decaying timbers, rusting of iron rails, burning of lights, and breathing of men and animals. These gases include oxygen, nitrogen, carbon dioxide, and methane. *Kentucky, pp. 57-58.*

occlusion. a. The retention of a gas or liquid in a solid mass or on the surface of solid particles; especially, the retention of gases by solid metals. *C.T.D.* b. The mechanical retention of gases in the pores of solids. *See also* occlude. *Fay.*

occult mineral. A mineral which might be expected to be present in a rock (as from the evidence of chemical analysis) but which is not found. *A.G.I.*

occupant. An occupant of a tract of land, as the word ordinarily is used, is one who has the use and possession thereof, whether he resides upon it or not. *Ricketts, I.*

occupation. As used in the mining law, it is equivalent to possession, and the right to locate is included in the right to occupy, and incident to a location is the right of possession; but mere occupancy of the public lands and making improvement thereon gives no vested right therein as against a location made in pursuance of law. *Ricketts, I.*

occurrence. In geology, the existence or presence of anything or phenomenon in any special position, or in any specified relation to other objects or phenomena; as, the occurrence of gold in a vein. *Standard, 1964.*

ocean. The great body of salt water surrounding the land of the globe, or one of its major subdivisions. *Schieferdecker.*

ocean basin. That part of the floor of the ocean that is more than about 600 feet below sea level. *A.G.I.*

ocean coal. Cumb. Coal seams lying beneath the sea. *Fay.*

ocean current. a. The name current is usually restricted to the faster movements of the ocean, while those in which the movement amounts to only a few miles a day are termed drifts. *A.G.I.* b. A nontidal current constituting a part of the great oceanic circulation. Examples are gulf stream, kuroshio, and equatorial currents. *A.G.I.*

ocean depths. The greatest depth (over 10,400 meters) discovered in the various oceans lies in the Pacific; depths of over 8,500 meters and 7,000 meters have been recorded in the Atlantic and Indian Oceans, respectively. *C.T.D.*

oceanic bank. This term is appropriate when the platform has a depth less than 100 fathoms. *Schieferdecker.*

oceanic island. An island rising from the deep sea floor. *Schieferdecker.*

oceanic province. *See* pelagic division. *Hy.*

oceanic stratosphere. The cold, deep layers of the ocean consisting of waters of polar or subpolar origin. *Schieferdecker.*

oceanite. A picritic basalt. *A.G.I.*

oceanographer. One who studies the characteristics of the ocean for use in navigation, geography, meteorology, and other sciences, by making oceanic explorations to gather data on the configuration and nature of the ocean bed and such phenomena as tides, currents, and icebergs. *D.O.T. 1.*

oceanographic dredges. Apparatus used aboard ships to bring up quantity samples of the ocean bottom deposits and sediments. *H&G.*

oceanographic equator. The oceanographic or thermal equator lies to the north of the geographic equator and shifts its position with the seasons. It seldom reaches south of the geographic equator at any time due to prevailing wind conditions. *Hy.*

oceanographic survey. A study or examination of conditions in the ocean or any part of it, with reference to animal or plant life, chemical elements present, temperature gradients, etc. Also called marine survey. *H&G.*

oceanography. The broad field of science which includes all fields of study which pertain to the sea. This includes the studies of boundaries of the ocean, its bottom topography, the physics and chemistry of seawater, the characteristics of its motion and marine biology. *Hy.*

ocean salinity. Total amount of solids in 1 keg of seawater after all carbonates have been converted to oxides, the bromine and iodine replaced by chlorine and all organic matter has been completely oxidized. *Bennett 2d, 1962 Add.*

ocean-spray. Satin spar (gypsum). *Shipley.*

ocean temperatures. The mean surface temperature of both the Pacific and Atlantic Oceans is 17° C; that of the Indian Ocean is 18° C. Maximum temperatures are respectively, 32° C, 30° C, and 35° C. *C.T.D.*

ocean water. Water having the physical-chemical characteristics of the open sea, where continental influences are at a minimum. *Hy.*

ocellar. A rock texture characterized by radiating groups of prismatic or platy minerals, such as biotite or pyroxene, disposed around the borders of larger euhedral crystals, such as analcite or leucite. The structures themselves are called ocelli. *A.G.I.*

ocellar texture. A texture due to the tangential disposition of minerals, such as biotite or pyroxene, around the borders of idiomorphic crystals of later growth, such as analcite or leucite. *Holmes, 1928.*

ocherous. Earthy and usually red, yellow, or brown in color. Also spelled ochreous. *Shipley.*

ocherous iron ore. Powdery hematite. *Hess.*

ochers. A name given to various native earthy materials used as pigments. They consist essentially of hydrated ferric oxide admixed with clay and sand in varying amounts and in impalpable subdivision. When carrying much manganese they grade into umbers. Ochers are either yellow, brown, or red. The best reds are sometimes obtained by calcining the yellow varieties. They are called burnt ochers. Others are obtained by calcining copperas or as a residue from roasting pyrite. In general, the native yellows and browns are varieties of limonite and the native reds, varieties of hematite. One variety of red ocher is known as scarlet ocher. Their value as pigments depends not only on the depth of color but also on the amount of oil required as a vehicle. *CCD 6d, 1961.*

Ochoan. Upper Permian. *A.G.I. Supp.*

Ocimum homblei. A copper flower or copper indicator plant discovered in Northern Rhodesia in 1949. Field studies have shown that the minimum copper content of soils in which Ocimum will grow is 100 parts-per-million, but that it will tolerate and thrive in soils containing 5000 parts-per-million and more. Is one of the most successful of all the ore indicators. *Hawkes, 2, p. 312.*

Ocoee. Precambrian. *Bureau of Mines Staff.*

ocratation. Treatment of concrete with silicon tetrafluoride to increase chemical resistance. *Bennett 2d, 1962 Add.*

Ocrate process. The treatment of concrete with gaseous SiF_4 to transform any free CaO into CaF_2. The treated concrete has improved resistance to chemicals and to abrasion. *Dodd.*

octad. Having a valence or a combining power of 8; octavalent. *Standard, 1964.* Two octavalent elements are osmium and ruthenium. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-124, B-132.*

octagon. A polygon having eight sides. *Jones, 2, p. 109.*

octahedral. Referring to or resembling an octahedron. *Shipley.*

octahedral borax. A rhombohedral form of hydrous sodium borate, $Na_2B_4O_7.5H_2O$, simulating regular octahedrons. From the Lagoons of Tuscany, Italy. *See also* mohavite. *English.*

octahedral cleavage. In the isometric system, cleavage parallel to the faces of the octahedron. *Fay.*

octahedral copper ore. Common name for cuprite. *Weed, 1918.*

octahedral iron ore. Magnetite. *Webster 3d.*

octahedral plane. In cubic crystals, a plane with equal intercepts on all three axes. *ASM Gloss.*

octahedral sulfur. *See* rhombic sulfur.

octahedrite. a. A tetragonal form of titanium dioxide, TiO_2, in brown, dark blue, or black crystals. *See also* anatase. *Dana 17.* b. A class of meteorites. *Hey 2d, 1955.*

octahedron. In the isometric system, a closed form of eight faces each having equal intercepts on all three axes. *Fay.*

octane. a. Any of several isomeric liquid paraffin hydrocarbons; C_8H_{18}: As (1) the normal hydrocarbon, $CH_3(CH_2)_6CH_3$, in petroleum, and (2) isooctane. *Webster 3d.* b. A rating scale used to grade gasoline as to its antiknock properties. *Bureau of Mines Staff.*

octane number. The designation adopted to show the antiknock value of motor fuel. Actually, it is the percentage of iso-octane in a blend of iso-octane and normal heptane which will give the same antiknock characteristics as the fuel sample in question. *Shell Oil Co.*

octanoic acid. *See* caprylic acid. *CCD 6d, 1961.*

octaphyllite. A trioctahedral clay mineral. *A.G.I. Supp.*

octavalent. Having a valence of 8 or a combining power of 8. *Standard, 1964.* Two elements that have a valence of 8 are osmium and ruthenium. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-124, B-132.*

octet. An outermost atomic shell of eight valence electrons, completion of which confers chemical stability and inertness. Elements are octavalent when these shells are filled by gain or loss of valence electrons. *Pryor, 3.*

octibbenite. A metallic alloy of iron and nickel, usually rich in the latter element. *Standard, 1964.*

octoic acid. *See* caprylic acid. *CCD 6d, 1961.*

octopus. A bin or tank to facilitate the concrete lining of circular shafts. The concrete is mixed on the surface, taken down the shaft in buckets, and discharged into the octopus. The concrete is then led away through flexible rubber pipes to different points around the shaft. An octopus enables faster concreting and sinking rates. *Nelson.*

octyl alcohol. Used as an aid in de-airing casting slips and as a wetting agent. *Lee.*

ocular. Eyepiece of microscope. *Pryor, 3.*

od Abbreviation for outside diameter. Also abbreviated OD. *BuMin Style Guide, p. 61.*

odd knobbing. Working coal from the rib sides in thick seams. *Nelson.*

odd man. a. Eng. One who works by the day at sundry jobs in the mine. *Fay.* b. One who cleans up broken saggers, broken ware, and pins (small clay pegs used to support glazed ware in saggers for firing) as they fall from the sagger when it is cleaned by a glost-kiln drawer. Also called laborer, glost kiln. *D.O.T. 1.*

oddments; fittings. Special glazed clayware shapes used in conjunction with glazed pipes. These shapes include bends, junctions, tapers, channels, street gullies, syphons, interceptors, and yard gullies; the first five of these are made partly by machine and partly by hand, the last three items have to be entirely hand-molded. *Dodd.*

oddside. A permanent impression or mold of part of a pattern, used by molders in like manner to a false part. *See also* false part. *Standard, 1964.*

odd work. Work other than that done by contract, such as repairing roads, constructing stoppings, dams, etc. *Fay.*

Oden balance. An apparatus for particle size analysis; one of the pans of a delicate balance is immersed in the settling suspension and the change in weight as particles settle on the pan is measured. *Dodd.*

odenite. A black mica, supposed to contain a new element, odenium; from Finbo, Sweden. *English.*

OD grinding. a. Shop term for external grinding. *ASM Gloss.* b. Abbreviation for cylindrical grinding. *ACSG, 1963.*

odinite. A gabbroic lamprophyre occurring in dikes. It has a groundmass of plagioclase and hornblende rods, with phenocrysts of labradorite, augite, and sometimes hornblende. *A.G.I.* Synonym for odenite. *Hey 2d, 1955.*

odometer. a. An instrument for performing a consolidation test. *Nelson.* b. A device for measuring distance traveled; it is attached to the hub of the wheel. *Crispin.* c. In oceanography, a recording sheave used with line and weight sounders and other machines when it is necessary to know how much warp or wire has been paid out. *C.T.D.*

O'Donaghue formula. A formula used for calculating the thickness of tubbing: $t = \frac{hdF}{2C} + A$, where t is the required thickness of tubbing in inches, h is the pressure of water in pounds per square inch, d is the diameter of the shaft in inches, C is the crushing strength of cast iron in pounds per square inch which may be taken as 95,000, F is the factor of safety adopted between 5 and 10, and A is the allowance for possible flaws and corrosion and may vary from one-fourth inch to 1 inch averaging one-half inch. *Sinclair, II, p. 318.*

O'Donahue's theory. A mine subsidence theory based on an extension of the theory of the normal. In it, subsidence is regarded as taking place in two stages. There is, first, a breaking of the rocks in which the lines of fracture tend to run at right angles to the stratification. This is followed by an "aftersliding," or inward movement from the sides, resulting in a pull or draw beyond the edges of the workings. *Briggs, p. 43.*

odontolite. A bluish fossil bone, or tooth (tusk). Naturally colored blue by phosphates of iron and rarely, green, by copper. Mohs' hardness about 5; specific gravity, 3.0 to 3.5; sometimes as low as 2.4. Same as bone turquoise. *Shipley.*

odor of metals. Some metals emit a faint but distinctive odor when they are rubbed, particularly in the warm state. This phenomenon has never been adequately explained except in the case of highly volatile metals, such as mercury and arsenic. *Camm.*

odor test. One made by heating, breathing upon, rubbing, or striking a mineral. Rarely of value in gem identification except in distinguishing amber from its substitutes. *Shipley.*

oe Abbreviation for oersted. *BuMin Style Guide, p. 61.*

Oehman and Payne-Gallwey instrument. A borehole surveying instrument. It consists of a plumb bob suspended over a gimbal-supported carrier on which a disc of sensitized paper records the shadow of the plumb bob suspended over it. A compass needle on a similar carrier likewise records its shadow upon a sensitized paper disc. Small lamps are so placed as to flash at a predetermined interval by a clock mechanism and dry batteries. A series of measurements are taken at known depths and the course of the borehole is indicated by plotting the results. *See also* Maas borehole compass. *Nelson.*

Oehman's survey instrument. A drill-hole-surveying apparatus that makes a photographic record of the compass and clinometer readings. *Long.*

o'erlayer. Derb. A piece of wood on which the sieve is placed after washing the ore in a vat. *Fay.*

oersted. a. The practical, centimeter-gram-second electromagnetic unit of magnetic intensity. A unit magnetic pole, placed in a vacuum in which the magnetic intensity is 1 oersted, is acted upon by a force of 1 dyne in the direction of the intensity vector. *A.G.I.* b. Prior to 1932, the practical, centimeter-gram-second electromagnetic unit of magnetic reluctance. *A.G.I.*

Oesterheld method. A form of asbestos-cement manufacture in which the dry cement is sprinkled onto the blanketlike fleeces of asbestos, which is passed around on roller sieves after it has been thoroughly mixed with water. This process is repeated several times so that alternating layers of cement and asbestos are eventually pressed together and united by pressure. *Sinclair, W. E., p. 307.*

Oetling freezing method. A method of shaft sinking by freezing the wet ground in sections as the sinking proceeds. The permanent lining is also inserted as the shaft is sunk. The freezing equipment is a cylinder equal in diameter to the shaft and 44 inches in height, with the lower end closed by a plate. The cylinder is in sections, each of which can be removed. Each section is provided with freezing coils. After freezing the ground, two sections are removed, the ground is thawed locally and removed, and a segment of the permanent lining is inserted. The process is repeated. *See also* freezing method. *Nelson.*

off. N. of Eng. Worked out; gotten; wrought; as, the mine is off. *Fay.*

off-bear. To carry (bricks) from the molding table and deposit on the drying floor. *Standard, 1964.*

off bottom. Not touching the bottom or above the bottom of a borehole. *Long.*

offcenter waterway. A waterway port in a noncoring diamond bit, not located in the center of the bit face. *Long.*

offcolor. Unsatisfactory in color; for example, an offcolor gem. *Standard, 1964.*

off-color gems. Those not of first water due to faint trace of color. *Pryor, 3.*

off gage. Deviation of thickness or diameter of a solid product, or wall thickness of a tubular product beyond the standard or specified dimensional tolerances. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

off gates. N. of Eng. Goaf roadways in longwall workings about 120 yards apart. *Fay.*

off grain. Synonym for hard vector as applied to a diamond by diamond cutters and setters. *Long.*

offhand. Handmade glassware produced without the aid of a mold. *Dodd.*

offhand glass. Glass produced by the offhand process. *ASTM C162-66.*

offhand grinding. Grinding where the operator manually forces the wheel against the work, or vice versa. *ASM Gloss.* Also known as freehand grinding.

offhand process. The process of forming glassware by an expert, working without the aid of molds. *ASTM C162-66.*

off-highway truck. a. A truck of such size, weight, or dimensions that it cannot be used on public highways. *Bureau of Mines Staff.* b. In the United Kingdom, the term off-highway refers to certain standards of construction in the truck, such as increased ruggedness, larger tires, thicker paneling, and less chromium trim, etc., than is commonly used for on-highway trucks. Usually no account is taken of legal highway axle loadings and dimensional limits (for example, as with Euclid and Scammell trucks), but some vehicles are made within legal dimensional limits (for example, A.E.C. and Foden trucks) and the intrinsic load-carrying ability has to be reduced for on-highway operation so that legal axle loadings are not exceeded. *See also* dump truck. *Nelson.*

official plat or survey. The expression in a patent according to the official plat of survey of the land returned to the general land office by the surveyor general refers to the description of the land as well as to the quantity conveyed. *Ricketts, I.*

officials' inspection lamp. A portable combined electric lamp and battery, fitted with a reflector to provide directional illumination. *B.S. 3618, 1965, sec. 7.*

offlap. Used for the reverse of transgressive onlap. Offlap occurs where a shoreline has retreated seaward and progressively younger strata have been deposited in layers offset seaward. It may be marked by an upward gradation into coarser sediments. Some describe offlap as regressive overlap, but that is confusing to others. *A.G.I.*

off line. a. A condition existing when the drive rod of the drill swivel head is not centered and parallel with the borehole being drilled. *Long.* b. A borehole that has deviated from its intended course. *Long.* c. A condition existing wherein any linear excavation (shaft, drift, borehole, etc.) deviates from a previously determined or intended survey line or course. *Bureau of Mines Staff.*

off-peak load. Electricity drawn at period when the power station which supplies it is not fully loaded. *Pryor, 3.*

offputter. Eng. A calling agent who superintends the loading of vessels. *Standard, 1964.*

offretite. A discredited term equal to phillipsite. *American Mineralogist, v. 42, No. 5-6, May-June 1957, p. 444.*

offset. a. A short drift or crosscut driven from a main gangway or level. *Fay.* b. The horizontal distance between the outcrops of a dislocated bed. *Fay.* c. A side (horizontal) measurement of distance perpendicular to a line, usually a transit line. *Seelye, 2.* d. In chain surveying, offsets are normally taken at right angles, but corners of buildings and important features may be located by a pair of oblique measurements. Where there is a large amount of detail to be picked up within the framework of the survey, this can be referred to detail lines anchored from the main lines. The maximum length of offset should not normally exceed 50 feet. *Mason, V. 2, p. 715.* e. An abrupt change in the trend of a drill hole, usually caused by a small shelflike projection of rock alongside one wall of the drill hole. *Long.* f. To collar and drill a borehole at some distance from the designated site to avoid a difficult setup. *Long.* g. To drill a borehole near one previously drilled for purposes of correlation or to determine the lateral extent of mineralization. *Long.* h. A well drilled near the boundary of a lease opposite a completed well on an adjacent lease. *Long.* i. To offset a well by drilling the next adjoining location in accordance with a spacing pattern. *Wheeler.* j. To any given location there are four close-in direct offset locations and four more distant diagonal offsets. *Wheeler.* k. Of a fault, the horizontal separation measured perpendicular to the strike of the disrupted horizon. *Ballard.* l. In surveying, a short distance usually measured at right angles from a line as to a boundary, or to continue a line parallel to itself at some little distance away to avoid an obstruction, or the like. *Fay.* m. A spur or minor branch from a principal range of hills or mountains. *Fay.* n. The distance along the strain coordinate between the initial portion of a stress-strain curve and a parallel line that intersects the stress-strain curve at a value of stress which is used as a measure of the yield strength. It is used for materials that have no obvious yield point. A value of 0.2 percent is commonly used. *ASM Gloss.* o. An imperfection resulting from mold parts not properly matched, for example, a finish or base offset from body or neck. *ASTM C162-66.*

offset chopping bit. A chisel chopping bit with one wing considerably wider than the other, as measured from the center of the bit. *Long.*

offset deposit. Applied to magmatic segregation deposits of a mixed magmatic and hydrothermal character which were injected into the country rock at a moderate or small distance from the mother rock, especially to nickel-copper-sulfide deposits of this kind at Sudbury, Canada. *Schieferdecker.*

offset digging. In a ladder ditcher, digging with the boom not centered in the machine. *Nichols.*

offset drilling. *See* directional drilling, c. *Nichols.*

offset fault. Horizontal separation measured perpendicular to the strike of the disrupted horizon. *McKinstry, p. 639.*

offset finish. *See* finish. *Dodd.*

offset hole. a. Synonym of branch. *See* branch, e. *Long.* b. *See* offset. *Long.*

offset line. In surveying, a line established parallel to the main survey line, and usually not far from it; for examples, a line on a sidewalk, 2 feet from the established street line; or a line parallel to the centerline of a bridge and 50 feet from it. *Seelye, 2.*

offset link. A combined pin-and-roller link in a roller chain, consisting of two offset link plates, a single bushing with roller, and a single pin. *J&M.*

offset punt. The bottom of a bottle if it is asymmetric to the axis. *Dodd.*

offset ridge. A ridge held up by a resistant layer which had been displaced by a dip or a diagonal fault. *Billings, 1954, p. 153.*

offset section. For a roller chain, a factory assembled section, made up of a roller link and an offset link. For a silent chain, a factory assembled section, made up of three or more links, one or more of which consists of offset plates. It is used to connect the two ends of a chain having an odd number of pitches. *J&M.*

offset shot point. A shot point that has been displaced from the shooting line in a perpendicular direction. *Schieferdecker.*

offset staff. In surveying, a rod, usually 10 links long, used in measuring short offsets. *Webster 2d.*

offset well. *See* offset, h and i.

offset yield strength. *See* yield strength. *H&G.*

shore. *Schieferdecker.*

offshore. Situated at a distance from the

offshore bar. An accumulation of sand in the form of a ridge, built at some distance from the shore and under water. It results chiefly from wave action. *A.G.I.*

offshore barrier. *See* barrier beach. *H&G.*

offshore currents. Nontidal currents outside the surf zone, which are not affected by shoaling and river discharge. *Hy.*

offshore slope; frontal slope of the wave-built terrace. The slope below the outer edge of the wave-built platform. *Schieferdecker.*

offshore terrace. A deposit of sand which is built out into deep water by the combined action of waves and currents. It trends parallel to the shore. The materials are dumped over its outer edge. Its upper surface is a continuation of the shore bench or wave-cut bench with which it is associated. Shore terraces are not exposed except by sufficient subsidence of the water level. *Stokes and Varnes, 1955.*

offshore trough; low. A depression of the offshore, parallel to the trend of the coast. *Schieferdecker.*

offshore water. Water adjacent to land in which the physical properties are slightly influenced by continental conditions. *Hy.*

offshore winds. Land breeze. Winds blowing seaward from the coast. *Hy.*

offside. The opposite work-shift. *Long.*

off-sider. A driller or drill crewman working on the opposite shift. *Long.*

offtake. a. Eng. The raised portion of an upcast shaft above the surface, for carrying off smoke, steam, etc. *Fay.* b. A length of boring rods unscrewed and detached at the top of a borehole. Also called rod stand; setout. *B.S 3618, 1963, sec. 3.* c. Scot. A deduction from workmen's wages for house rent, coal, etc. *Fay.* d. A channel for taking away air or water; also, the point of beginning of such a channel. *Webster 2d.*

offtake drift; offtake level. a. Scot. A water level driven from the surface to a point in a pumping shaft where the water is delivered. *Fay.* b. *See* delivery drift. *B.S. 3618, 1963, sec. 4.*

offtake joint. Eng. The joint by which the bucket is fastened to the rods. *Fay.*

offtake lad. *See* shackler. *C.T.D.*

offtake rods. Auxiliary rods at the top of a winding shaft for guiding and steadying the cages during decking or loading and unloading operations. *Nelson.*

off-the-road hauling. Hauling which takes place off the public highways, and generally on the mining site or excavation site. The hauling units used are generally higher and wider than those used in over-the-road hauling since highway restrictions do not limit size, weight, etc. *Compare* over-the-road hauling. *Carson, p. 345.*

off the solid. In this type of blasting the coal is blasted from the solid with no precutting or shearing. *McAdam II, p. 106.*

off time. In resistance welding, the time that the electrodes are off the work. This term is generally applied where the welding cycle is repetitive. *ASM Gloss.*

ogie. The space before the fire in a kiln. Also called killogie. *Standard, 1959.*

O'Hara furnace. A horizontal, double-hearth furnace for calcining sulfide ores. *Fay.*

OH furnace. Open-hearth furnace. *Dodd.*

Ohio sampler. A single tube or pipe with a pipe thread on top and the bottom beveled and hardened for driving into the ground to obtain a soil sample. *Long.*

ohm. The practical meter-kilogram-second (mks) unit of electric resistance that equals the resistance of a circuit in which a potential difference of 1 volt produces a current of 1 ampere, or to the resistance in which 1 watt of power is dissipated when 1 ampere flows through it. The standard in the United States. *Webster 3d.* Symbols, Ω and ω. *Zimmerman, pp. 76, 208.*

ohm cm Abbreviation for ohm-centimeter. *BuMin Style Guide, p. 61.*

ohm m Abbreviation for ohm-meter. *BuMin Style Guide, p. 61.*

ohmmeter. A type of galvanometer which directly indicates the number of ohms of the resistance being measured. *Crispin.*

ohmmeter-galvanometer. A special instrument for measuring the resistance of an electric blasting circuit. The instrument is connected in the circuit and adjusted until a point of balance is reached on the galvanometer. The resistance of the circuit is then read on the calibrated scale. *Lewis, 124.*

Ohm's law. a. The electric current flowing in a circuit is proportional to the electromotive force and inversely proportional to the resistance. Frequently expressed in mathematical form. *Crispin.* b. The formula expressing Ohm's law is I =, in$\frac{R}{E}$ which I is the electric current in amperes; E is the electromotive force in volts; and R is the resistance in ohms. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-52.*

-oid. A suffix meaning in the form of. *A.G.I.*

oikocryst. A matrix or host crystal through which smaller crystals (chadacrysts) of other minerals are distributed as poikilitic inclusions. *Holmes, 1920.*

oil. a. A general term given to various mixtures of natural hydrocarbons. To the miner oil is petroleum. *Nelson.* b. Any of various substances that typically are unctuous, viscous combustible liquids or solids easily liquefiable on warming and are not miscible with water but are soluble in ether, naphtha, and often alcohol and other organic solvents, that leave a greasy not necessarily permanent stain, that may be of animal, vegetable, mineral, or synthetic origin, and that are used according to their types, chiefly as lubricants, fuels, and illuminants. *Webster 3d.* c. This term includes: (1) fatty oils and acids; (2) essential oils, mostly of vegetal origin, such as eucalyptus and turpentine; and (3) mineral oils, such as petroleum products, including lubricating oils. Used in the flotation process. *Fay.* d. A common name for mineral oil or petroleum. *Tomkeieff, 1954.* e. Any fluid lubricant. *Nichols.* f. Any liquid petroleum derivative that is less volatile than gasoline. *Nichols.* g. As used in an oil and gas lease, the oil produced from a well, or crude petroleum in its natural state. *Ricketts, II.*

Oil and Gas Lease. Contract conveying mineral interest for drilling purposes. *Wheeler.*

oil asphalt. Asphalt obtained from petroleum. *Bennett 2d, 1962.*

oil-base mud. A mud-laden drill-circulation medium in which an oil is used as the laden liquid instead of water. *Long.*

oil bath-type air cleaner. An air cleaner containing an oil sump. The air is washed by the oil in the sump, thus removing all of the abrasive dirt. *API Glossary.*

oil-bearing shale. Shale impregnated with petroleum. Not to be confused with oil shale. *Tomkeieff, 1954.*

oil canning. The same as canning. *ASM Gloss.*

oil car. a. A boxcar with an open side for carrying oil in barrels. *Fay.* b. A platform car with tanks for carrying oil in bulk. Commonly called a tank car. *Fay.*

oil circuit breaker. A circuit breaker used on medium, high, and extra-high tension systems to control feeder cables and motor circuits. The switch contact is in a strong tank containing oil, which rapidly quenches the arc which forms when the switch is opened. *Mason, V.2, p. 438.*

oil coal. Another name for stellarite. *Tomkeieff, 1954.*

oil-cut. Term used to describe a mixture of oil and drilling mud recovered in testing. *Wheeler.*

oildag. Colloidal dispersion of graphite in oil. *Pryor, 3.*

oil derrick. A towerlike frame used in boring oil wells, to support and operate the various tools. *Standard, 1964.*

oiled. A term used in flotation when a particle is given a water repellent surface. When such a coating has been formed, the particle is said to be oiled or treated and ready to be floated. *Newton, p. 100.*

oiled-aggregate. A bituminous pavement which is mixed and laid at temperatures ranging from 175° to 200° F. *Pit and Quarry, 53rd, sec. E, p. 70.*

oiler. a. In flotation, oil which provides a film around a mineral particle. *Fay.* b. A producing oil well. *Webster 3d.* c. An oil-can, oil cup, or other receptacle or device for applying oil to mechanical bearing surfaces. *Webster 3d.* d. One who is employed to do routine oiling and greasing of mechanical equipment, as in a mill, power plant, etc. *Webster 3d.* e. One of several types of mechanical devices that deliver oil to machines and into air or steam lines in controllable amounts. Also called atomizer; line oiler; lubricator; oil pot; pineapple; pot. *Long.* f. A workman responsible for keeping machinery properly lubricated. Also called grease monkey. *Long.*

oilfield. A region rich in petroleum deposits; especially, a region containing numbers of producing oil wells. *Webster 3d.*

oilfield casing. Synonym for oil-well casing. *Long.*

oilfield rotary. The type and size of drilling machines used to rotary-drill boreholes in search of petroleum. *See also* rotary drill. *Long.*

oilfield winch. An extremely powerful low-speed winch on a crawler tractor. *Nichols.*

oil flotation. A process in which oil is used in ore concentration by flotation. *See also* flotation process. *Fay.*

oil flow, rate of. In powder metallurgy, the rate at which oil will pass through a sintered, porous compact under specified test conditions. *Rolfe.*

oil fuel. Refined or crude petroleum, shale oil, grease, residuum tar, or similar substances, used as fuel. *Fay.*

oil gage. An instrument of the hydrometer type arranged for testing the specific gravity of oils; and oleometer. *Fay.*

oil gas. A gas of high calorific value, obtained by the destructive distillation of high-boiling mineral oils. It consists chiefly of methane, ethylene, acetylene, benzene, and higher homologues. *C.T.D.*

oil gas tar. A tar produced by cracking oil vapors in the manufacture of oil gas. *Fay.*

oil-hardening steel. Alloy steel which can be hardened by cooling in oil instead of water. A typical example is 0.3 percent carbon, 3.0 percent nickel, and 0.75 percent chromium. *C.T.D.*

oil-hole drills. Drills with one or two oil holes running from shank to cutting point; used principally for drilling deep holes. *Crispin.*

oil lease. The permission granted by a landowner to a company to prospect and drill for oil and gas under his land and to produce them when found. *Shell Oil Co.*

oil-line pump. A pump for forcing crude petroleum along a pipeline. *Standard, 1964.*

oil of talc. A nostrum of calcined talc, famous in the 17th century as a cosmetic. *Fay.*

oil of vitriol. Concentrated sulfuric acid. *Webster 3d.*

oil payment. A fixed sum payment measured by a percentage of the gross income from production. *Wheeler.*

oil pearl. Same as Antilles pearl. *Shipley.*

oil, Pennsylvania. *See* Pennsylvania oil. *Bennett 2d, 1962 Add.*

oil pits. *See* hand-dug wells. *Fay.*

oil pocket. A cavity in the rocks containing oil. *Mersereau, 4th, p. 199.*

oil pool. An accumulation of oil in sedimentary rock that yields petroleum on drilling. The oil occurs in the pores of the rock and is not a pool or pond in the ordinary sense of these words. *Fay.*

oil pot. Synonym for line oiler. *Long.*

oil process. *See* concentration and flotation process. *Fay.*

oil pulp. An aluminum soap, consisting of aluminum salts of the fatty acids, chiefly oleic, palmitic, and stearic acids. It is dissolved in mineral oil to form an oil thickener. *Fay.*

oil pump. A hydraulic pump supplying oil under pressure to the hydraulic-feed cylinders and pistons of a hydraulic-type swivel head on a diamond drill. *Long.*

oil-pumped nitrogen. Dry nitrogen. Used in metal fluxing. *Bennett 2d, 1962.*

oil refinery. A plant where petroleum is distilled and otherwise refined. *Mersereau, 4th, p. 199.*

oil room man. In metal mining, one who maintains a storeroom for oil and issues specified amounts to workers. *D.O.T. 1.*

oils. A group of neutral liquids comprising three main classes: (1) fixed (fatty) oils, from animal, vegetable, and marine sources, consisting chiefly of glycerides and esters of fatty acids; (2) mineral oils, derived from petroleum, coal, shale, etc., consisting of hydrocarbons; and (3) essential oils, volatile products, mainly hydrocarbons with characteristic odors, derived from certain plants. *C.T.D.*

oil sand. Porous sandstone from which petroleum is obtained by drilling wells. *Webster 3d.*

oil sands. Sands which have been bonded with oil, for example, linseed oil. Such sands are particularly suitable for the production of large cores where high strength and considerable permeability are required. *Osborne.*

oil saver. An appliance affixed to the mouth of an oil well when the latter requires deepening, although still flowing in small quantities. It consists of a cap fitted to the top of the well casing and having a lateral pipe communicating with a reservoir for the oil. *Fay.*

oil seepage. The slow leakage of petroleum oil from its underground accumulation. *Shell Oil Co.*

oil shale. a. Shale containing such a proportion of hydrocarbons as to be capable of yielding mineral oil on slow distillation. *See also* shale; shale oil; Pumpherston shale; kerogen; bituminous shale. *Fay.* b. A compact rock of sedimentary origin, with an ash content of more than 33 percent, and containing organic matter that yields oil when destructively distilled but not appreciably when extracted with the ordinary solvents for petroleum. *ASTM D288-57.* c. A fine black or dark brown shale containing sapropelic material (kerogen) and characterized by having a brown streak, a leathery appearance with parting planes often smooth and polished, and a minutely laminated structure. It differs from an ordinary carbonaceous shale by curling when it is cut into thin flakes, and by its toughness and resistance to disintegration by weathering. It is capable of yielding oil or gas on distillation. *Tomkeieff, 1954.*

oil shale lands. Lands on or under which oil shale is present. *Bureau of Mines Staff.*

oil smellers. Men who profess to be able to indicate where oil-bearing strata is to be found, and locate places for successful well boring, by the sense of smell. *Fay.*

oil spot. A surface fault, seen as a mottled circle, on electric lamp bulbs or valves; it is caused by carbonization of a contaminating drop of oil. *Dodd.*

oil spots. Lustrous metallic markings on dark iron glazes. *ACSG, 1963.*

oil spring. A spring of petroleum, maltha, or other hydrocarbon, with or without admixture of water. *Fay.*

oilstone. A fine-grained stone used for sharpening edged tools or other similar metal surfaces. *Fay.*

oilstone powder. Pulverized oilstone used with oil for grinding and polishing metal surfaces. *Standard, 1964.*

oil-temper. To harden steel by quenching in oil after heating. *Webster 3d.*

oil trap. A geologist's term for a place where oil collects underground. *MacCracken.*

oil well. A dug or bored well, from which petroleum is obtained by pumping or by natural flow. *Fay.*

oil-well casing. Ordinary outside-coupled pipe used as borehole casing or drivepipe. Also called oilfield casing. *Long.*

oil-well cement. A hydraulic cement which sets at a slower rate than portland cement. *Nelson.*

oil-well drilling mud. *See* drilling mud.

oil-well packing. A packing inserted between the pipe and the interior surface of the boring in an oil well to keep surface water or water from the sides of the hole from running into the well, and to prevent oil in some wells from being forced out around the pipe by a pressure of gas. *Fay.*

oil-well tubing. Seamless steel tubing for use in the pumping of oil from oil wells. *Bennett 2d, 1962.*

oil white. Usually a mixture of lithopone and white lead or zinc white. May also contain gypsum, magnesia, whiting, or silica. Used as a white lead substitute. *CCD 6d, 1961.*

oily; greasy. These are substantially equivalent terms. All oils are greasy. Greasiness suggests more viscidity than oiliness. A term used in the flotation process. *Fay.*

oil zone. A formation that contains capillary or supercapillary voids, or both, that are full of petroleum and will move under ordinary hydrostatic pressure. *Fay.*

oisanite. Same as delphinite. *Shipley.*

okaite. A feldspathoidal, ultramafic rock composed primarily of melilite and haüyne and containing accessory biotite, perovskite, apatite, calcite, and opaque iron oxides. *A.G.I.*

okenite. a. A compact or fibrous mineral, $CaSi_2O_4(OH)_2.H_2O$, consisting of a whitish hydrous calcium silicate. *Webster 3d.* b. A vulcanized mixture of ozocerite and resin with caoutchouc and sulfur, used as an insulating material for electric conductors. *Fay.*

old. Having reached the stage of decreasing vigor and efficiency of action or of increasing simplicity of form and reduction of relief; said of streams and landforms. *Fay.*

old age. That stage in the development of streams and landforms when the processes of erosion are decreasing in vigor and efficiency or the forms are tending toward simplicity and subdued relief. *Compare* youth; maturity. *Fay.*

old cliff. A wave-cut cliff abandoned by the sea. *Schieferdecker.*

oldhamite. A pale brown meteoritic mineral which rapidly oxidizes in air, CaS. *Larsen, p. 63.*

Oldham stone duster. A self-contained transportable stone duster. A high velocity current of air from a fan or blower is mechanically fed from a hopper above, both the fan and the feeding mechanism being driven from the tub axle as it is drawn along by rope haulage, horse, or manually. It delivers about three-fourths of a pound of dust per yard of travel. *Sinclair, I., p. 259.*

Oldham-Wheat lamp. A cap lamp designed for full self-service. This lamp, weighing 6⅝ pounds, has a 4-volt lead-acid battery in a hard rubber case with covers of stainless steel or nickel-plated hard brass. The switch is magnetically operated and is situated in a sealed plastic moulding. A 4-watt bulb burning 11 hours or a 2-watt bulb burning 14 hours is used. The lamp is "one piece" in construction and no dismantling is needed to charge the accumulator. *Sinclair, I., p. 216.*

old hole. *See* main hole; parent hole. *Long.*

oldland. a. The Canadian shield marks the site of the oldland area from which the materials of the later sedimentary deposits were derived. *A.G.I.* b. That portion of land behind the coastal plain which supplied the material of which the strata of the coastal plains were formed. *A.G.I.* c. That part of the landmass which projected above sea level while the materials of a coastal plain were being deposited in the sea. *A.G.I.* d. Proposed by Maxson and Anderson for the feature previously termed senesland; Maxson adopted the earlier term in 1950. *See also* matureland. *A.G.I.*

old man. a. Ancient workings, goaves. *Fay.* b. Scot. A rocking center to guide pump rods at an angle. *Fay.*

old man workings. Ancient mine workings. *See also* old workings, weeldrous. *Nelson.*

old men. Pipes of waste material left after removal of profitable sand or ballast. *Arkell.*

old mine fire clay. A fire clay occurring in the Brierley Hill district, near Stourbridge (England); it usually contains 56 to 64 percent SiO_2, 25 to 30 percent Al_2O_3, and not greater than 2.5 percent Fe_2O_3. A smooth plastic fire clay formerly much used for making glass pots, but now largely worked out. *Dodd.*

old plain. Synonym for peneplain. *A.G.I.*

Old Red Sandstone. A thick group of reddish sandstone, conglomerates, and shales, of nonmarine origin, which constitute the Devonian system in parts of Great Britain and is regarded as equivalent in age to the normal marine Devonian strata. In North America, the name was formerly applied to rocks of the Catskill group, which display some striking analogies to the Old Red Sandstone of Europe. *Fay.*

old river. It has been suggested that any river whose members are all graded should be termed an old river. There is no critical change between maturity and old age. Usually in old age, the valley is several times the width of the meander belt. *Stokes and Varnes, 1955.*

old sand. A molding sand rendered friable and porous by frequent high heating. *Fay.*

old scrap. Scrap derived from metal articles that have outlived their usefulness; it includes discarded trolley wire, battery plates, lithographer's plates, old rails, etc. *Newton, p. 38.*

old silver. Silver made to appear old by the application of graphite and grease. *Fay.*

old stage of the shoreline cycle. Stage of the wide wave-cut platform and a sea cliff with a faint slope; a rather theoretical case, as shoreline cycles usually are interrupted before this stage. *Schieferdecker.*

oldtimer. a. A drill runner with 30 to 40 years of experience. *Long.* b. An antiquated drilling rig; generally applied to a steam-motivated diamond drill. *Long.*

old waste. Scot. Old or abandoned workings. *Fay.*

old workings. Mine workings which have been abandoned, allowed to collapse, and perhaps sealed off. Unless proper safeguards are taken, old workings can be a source of danger to workings in production particularly if they are waterlogged and their plan position is uncertain. *See also* exploring heading; inrush of water. *Nelson.*

oleaginous. Oily; of or pertaining to oil. *Crispin.*

oleander-leaf texture. Leaf-shaped masses of stromeyerite (or other minerals) in a matrix of chalcocite (or other mineral). *A.G.I.*

oleate. Soap, ester, or other compound of an alkaloid metal base with oleic acid. *Pryor, 3.*

olefiant gas. Ethylene; formerly so called because of the oily compound it forms with chlorine. *Standard, 1964.*

olefinite. A variety of bitumen which, on distillation, yields a high percentage of olefine products. Atomic ratio H/C varies from 1.25 to 1.75. It is black, brown, or greenish in color and is insoluble in organic acids. *Tomkeieff, 1954.*

olefins. Unsaturated hydrocarbons of the ethylene series (for example, ethylene and propylene, having the general formula, C_nH_{2n}. They contain a double bond and are very reactive substances, forming derivatives by the addition of a halogen, hydrogen, hydrochloric acid, etc. *C.T.D.*

oleic acid; cis-9-octadecenoic acid; red oil. a. $CH_3(CH_2)_7CH:CH(CH_2)_7COOH$; a mono-unsaturated fatty acid; a common component of almost all naturally occurring fats as well as tall oil. Most commercial oleic acid is derived from animal tallow or natural vegetable oils. Commercial grade: Yellow to red; oily liquid; lardlike odor; and darkens to exposure to air. Purified grade: Colorless; liquid; specific gravity, 0.8905 (at 20° C, referred to water at 4° C); melting point, 13.2° C; boiling point, 286° C (at 100 mm) and 225° C (at 10 mm); refractive index, 1.4599 (at 20° C); insoluble in water; and soluble in alcohol, in ether, and in most other organic solvents. Used in ore flotation. *CCD 6d, 1961.* b. Molecular weight, 282.47; needles; specific gravity, 0.895 (at 18° C, referred to water at 4° C); melting point, 16.3° C; soluble in acetone; and soluble in all proportions in alcohol, in ether, in benzene, and in chloroform. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-437.*

oligist; oligist iron. Hematite. *Webster 3d.*

oligiste iron. Specular iron ore. *See also* hematite. *C.M.D.*

Oligocene. The third of the epochs into which the Tertiary period is at present ordinarily divided. Also, the series of strata deposited during that epoch. *Fay.*

oligoclase. A variety of feldspar intermediate between albite and anorthite, but more nearly the composition of the former, $Ab_{90}An_{10}$-Ab_{70}-An_{30}. Triclinic. *Dana 17.*

oligoclase moonstone. A white to grayish adularescent variety of oligoclase. From North Carolina. *Shipley.*

oligoclasite. A variety of granular olivine norite which has suffered a certain amount of alteration. The plagioclase is labradorite in part, generally saussuritized, and reduced to oligoclase with complementary secondary products. Hypersthene and olivine, with hornblende, chlorite, and bastite as alteration products, are the characteristic mafic minerals. By recent authors, the name oligoclasite has been given to phanerocrystalline leucocratic rocks composed chiefly of oligoclase, and it is in this more general sense that the term is now used. *Holmes, 1928.*

oligomictic rocks. Those rocks characteristic of epicontinental seas, and found only rarely in geosynclinal depressions. *A.G.I.*

oligonite. A variety of siderite containing manganese carbonate. *Standard, 1964.*

oligon spar. Same as oligonite. *Fay.* A variety of chalybite.

oligosiderite. A meteorite characterized by the presence of only a small amount of metallic iron. *Webster 3d.*

oligotrophic peat. Peat poorly supplied with nutrients. *Tomkeieff, 1954.*

olistoglyph. A slide mark or mark due to interlaminar gliding. *Pettijohn.*

olistolith. An exotic rock fragment occurring in an olistostrome. *A.G.I. Supp.*

olistostrome. A bed or layer accumulated as result of sliding. Generally without internal bedding and composed of intimately mixed heterogeneous materials. *Pettijohn.*

oliveiraite. a. A mineral regarded as a variety of zircon. *E.C.T., v. 15, p. 308.* b. An alteration product of euxenite. *Crosby, p. 20.*

olivenite. A natural basic arsenate of copper, $Cu_2(AsO_4)(OH)$. Color, various shades of green, brown, and gray; luster, adamantine to vitreous; streak, olive-green to brown; specific gravity, 4.4; Mohs' hardness, 3. Found in England; Chile; Utah. *CCD 6d, 1961.*

olive ore. *See* olivenite. *Fay.*

Oliver filter. A continuous-type filter made in the form of a cylindrical drum with filter cloth stretched over the convex surface of the drum. The drum rotates slowly about a horizontal axis, and the lower part is immersed in a tank containing the pulp to be filtered. Arrangement of pressure and suction pipes on the interior of the drum permits the application of suction to the filtering surface. As the filter passes through the tank, it picks up a layer of solid material and emerges carrying a layer of filter cake. *Newton, p. 104.*

olivine; chrysolite; peridot. A magnesium iron silicate, $(Mg,Fe)_2SiO_4$, usually olive green, occurring in basic and ultramafic igneous rocks; orthorhombic. The clear green variety is used as a gem stone under the name peridot. The word olivine is prefixed to the names of many rocks that contain the mineral. *Fay; Dana 17.*

olivine diabase. A diabase composed essentially of plagioclase, augite, and olivine. *Standard, 1964.*

olivine gabbro. A gabbro containing olivine. *Standard, 1964.*

olivine leucitite. Leucite basalt. *Holmes, 1928.*

olivine nephelinite. Nepheline basalt. *Holmes, 1928.*

olivine norite. A variety of norite characterized by the presence of olivine. *Standard, 1964.*

olivine rock. *See* dunite. *C.M.D.*

olivinite. A foliated rock with olivine as the principal constituent. Also used for hornblende picrite with augite and anorthite. *A.G.I.*

olivinoid. An olivinelike substance found in meteorites. *Standard, 1964.*

olivinophyre. Porphyry containing olivine phenocrysts. *Fay.*

ollenite. Applied to a variety of hornblende schist characterized by abundant epidote, sphene, and rutile, with smaller amounts of garnet and other accessories. *Holmes, 1928.*

ollite. Potstone; a variety of impure soapstone. *Fay.*

O.L.P. steel process. A steelmaking method similar to the L. D. except that powdered lime is blown with the oxygen stream (therefore, the letters O.L.P.—oxygen/lime/powder process). It was developed by the French Institut de Recherches de la Siderurgie in conjunction with European steelworks, for the treatment of high-phosphorus irons. *See also* Kaldo steel process. *Nelson.*

Olsen ductility test. A cupping test in which a piece of sheet metal, restrained except at the center, is deformed by a standard steel ball until fracture occurs. The height of the cup in thousandths of an inch at time of failure is a measure of the ductility. *ASM Gloss.*

ombrogenous peat. Peat, the nature of which is determined by the amount of rainfall. *Tomkeieff, 1954.*

omission of beds. The disruption and displacement of beds by faulting in any of a number of ways such that exposures of certain beds do not appear at the surface or in any other specified section. *Stokes and Varnes, 1955.*

omnibus. In glassmaking, a sheet-iron cover to protect from drafts the glass articles in a leer. *Standard, 1964.*

omnidirectional hydrophone. A hydrophone whose response is essentially independent of angle of arrival of the incident sound wave. *Hy.*

omphacite. A greenish, vitreous variety of pyroxene that is a common constituent of the garnet rock, eclogite. *Fay.*

o.m.s. a. Output (usually in hundredweights) per manshift. It is a method of expressing the productivity of mines, miners, and management. *Nelson.* b. N. of Eng. Output (usually tons) per manshift. Interpretation depends on the basis for calculating manshifts, for example, face o.m.s. is based on manshifts at the face; seam o.m.s. on piecework and bargain work manshifts in the seam; overall (pit) o.m.s. on all manshifts underground, including datal labor. *Trist.*

on air. a. The state of a pump which is operating although having no liquid in its working parts. *B.S. 3618, 1963, sec. 4.* b. Scot. Said of a pump when air is drawn at each stroke. *Fay.*

on bottom. At rest or touching the bottom of a borehole. *Long.*

once each week. Is interpreted to mean not more than seven days apart rather than at any time during each calendar week. *BuMines. Coal-Mine Inspectors' Manual, June 1966, pt. 3-15x, p. 40.*

once-fired ware; single-fired ware. Ceramic whiteware to which a glaze is applied before the ware is fired, the biscuit firing and glost firing then being combined in a single operation. Because the glaze must mature at a relatively high temperature, it is usually of the leadless type. Sanitary ware is the principal type of ware made in this way. *Dodd.*

oncosimeter. An instrument for determining the specific gravity of a molten metal by the immersion of a ball made of another metal and of known weight. *Standard, 1964.*

oncost. Overhead establishment charges; loading, burden. Amount not directly spent on any detail of production, but part of overall expenditure on administration, amortization, interest charges and the like. *Pryor, 3.*

oncost man; day-wage man. A miner who receives day wage and is not on piecework. *Nelson.*

one-coat ware; one-coat work. a. Articles finished in a single coat of porcelain enamel. *ASTM C286-65.* b. Sometimes a contraction of one cover-coat ware, in which the finish consists of a single cover-coat applied over ground coat. *ASTM C286-65.*

one-coat work. *See* one-coat ware.

one-fire finish. A porcelain enamel on the finished product processed in a single firing. *ASTM C286-65.*

onegite. A variety of goethite. *Hey 2d, 1955.*

one-man mine. The simplest type of mining business in which a mine is worked by a single individual. *Hoov, p. 233.*

on end. a. The direction of the coal face when at right angles to the main cleat. Coal undercut "on end" is usually larger and there is less tendency for long slabs to roll off the face when being cut. *Mason, v. 1, p. 118.* b. *See* headway, f. *SMRB, Paper No. 61.*

Oneonta group. A series of flagstones, red, gray, and greenish shales, yielding plant remains, and reaching a thickness of 3,000 feet in eastern New York. *See also* Portage group. *C.T.D.*

one on two; one to two. A slope in which the elevation rises 1 foot in 2 horizontal feet. *Nichols.*

one-part line. A single strand of rope or cable. *Nichols.*

one-piece set. A term applied to a single stick of timber, called a post, stull, or prop. Post and prop are applied to vertical timbers, and stull is applied to inclined timbers, or those placed horizontally. *Lewis, p. 40.*

one-pipe hot water system. One in which the heated and cooled water to and from the radiators are carried in the same main in the same direction but with the hot water on top. *Strock, 10.*

one-pipe steam system. A steam heating system in which steam supplied to a radiator travels in the same pipe but in the opposite direction to the cold water or condensate returning from the radiator. *Strock, 10.*

one-point press. A mechanical press in which the pressure is applied to the slide by a connection to a single crank or eccentric. *ASM Gloss.*

one shot. a. A borehole-survey instrument that records a single inclination and/or bearing reading on each round trip into a borehole. *Long.* b. Single shot. *Bureau of Mines Staff.*

one-shot exploder. *See* Little Demon exploder. *Nelson.*

one-spot strip mining. Consists of three operations: The top material is cast out of the way, pay material is dug and trucked away, and the top is pushed or cast back in. *Nichols, p. 10-4.*

Onesquethawan. Upper Lower Devonian. *A.G.I. Supp.*

one-track tipple. A tipple having but one railroad track beneath it. *Fay.*

one way. S. Staff. A particular class of house coal. *Fay.*

one-way ram; single-acting ram. A hydraulic cylinder in which fluid is supplied to one end so that the piston can be moved only one way by power. *Nichols.*

one-way ventilation. See peripherical ventilation. *Stoces, v. 1, p. 528.*

one-year pearls. Cultured pearls with exceptionally thin nacreous layers. *Hess.*

on-glaze decoration. Decoration applied to pottery after it has been glazed; the ware is again fired and the colors fuse into the glaze, the decoration thus becoming durable. Because the decorating fire can be at a lower temperature with on-glaze decoration, a more varied palette of colors is available than with underglaze decoration. *Dodd.*

on grain. Synonym for soft vector, as applied to a diamond by bit setters and diamond cutters. *Long.*

on-highway truck. *See* off-highway truck. *Nelson.*

onicolo. A variety of onyx used in making cameos, being characterized by a bluish tinge, produced by a thin layer of white over the black. *Standard, 1964.*

onion. a. A term sometimes used for the bulblike mass of glass at the origin of the drawn sheet in the Fourcault process. *ASTM C162-66.* b. Eng. Spheroids of weathered basalt. *Arkell.*

onkilonite. An olivine nephelinite. A variety of feldspathoid basalt consisting of nepheline, augite, olivine, and perovskite, with small amounts of leucite and interstitial glass; feldspars and iron ores are absent. *A.G.I.; Holmes, 1928.*

onlap. The progressive pinching out, toward the margins of a depositional basin, of the sedimentary units of a conformable sequence of rocks. Synonym for transgressive overlap. *A.G.I.*

on line. a. A linear underground excavation advancing in compliance with a predetermined surveyed direction or line. *Bureau of Mines Staff.* b. A borehole the course of which is not deviating from the intended direction. *Long.* c. Said of a diamond drill when its drive rod is centered on and parallel to a borehole. *Long.*

on long awn. A face between end and crosscut. *Sinclair, VI, p. 9.*

O'Neill machine. A machine for making glass bottles originally designed in 1915; it was based on the use of blank molds and blow molds. The principle in modern O'Neill machines is the same, they are electrically operated and are capable of high outputs. *Dodd.*

onofrite. Sulfoselenide of mercury, Hg(S,Se); contains 81 to 82 percent mercury. It is a source of the element selenium. *Sanford.*

Onondaga limestone. The coral reef limestone in the Ulsterian of the Middle Devonian, extending from New York to Ohio, Michigan, and Kentucky. Famed for its well-preserved fossils; an important oil-bearing formation in Ontario, Canada, and in the Eastern-Central United States. *C.T.D.*

Onondagan. Lower Middle Devonian. *A.G.I. Supp.*

on plane. Scot. In a direction at right angles to, or facing, the plane or main joints. *Fay.*

on reef. Drives being driven on the ore-body. *Higham, p. 170.*

onsetter. a. The man in charge of the loading and unloading of the cages or skips at the pit bottom, and also the signaling to the pithead. In modern mines, the onsetter is stationed in a cabin and all controls are within his reach for the loading and unloading of the cages, shaft signaling, and other car control equipment at the shaft bottom. *Nelson. See also* bottomer; cager; head hitcher; hitcher. b. The person in charge of winding operations underground. He is stationed at the shaft side and gives all signals from his inset to the winding engineman. *Mason.*

onsetting machine. Eng. A mechanical apparatus for loading cages with the full tubs and discharging the empties, or vice versa, at one operation. *Fay.*

on shift. Scot. A workman or working place is said to be on shift, or on shift wages when the work is not let under contract, but paid for by day's wages. *Fay.*

onshore winds. Sea breeze. Winds blowing shoreward from the sea. *Hy.*

on short awn. A face in a direction between bord and crosscut. *Sinclair, VI, p. 9.*

on sights. a. Following sights placed by a surveyor. *Fay.* b. On line. *Bureau of Mines Staff.*

on snore. The operation of a pump with its strainer partly exposed to air and passing a mixture of air and water. *B.S. 3618, 1963, sec. 4.*

Ontarian. a. Middle and Upper Ordovician. *A.G.I. Supp.* b. Silurian (restricted). *A.G.I. Supp.* c. Lower Middle Silurian. *A.G.I. Supp.*

on the back. N. Staff.; S Wales. Term used to describe the face when the slips make an obtuse angle with the floor. *Sinclair, VI, p. 9.*

on the face. N. Staff.; S. Wales. Term used to describe the face when the slips make an acute angle with the floor. *Sinclair, VI, p. 9.*

on-the-run. Penn. The ability to work a seam of coal that has sufficient inclination to cause the coal, as worked toward the rise, to fall by gravity to the gangways for loading into cars, is called working coal on-the-run. *Fay.*

on-the-solid. a. Applied to a blasthole extending into the coal farther than the coal can be broken by the blast. *Fay.* b. That part of a blasthole which cannot be broken by the blast. *Fay.* c. A practice of blasting coal with heavy charges of explosives, in lieu of undercutting or channeling. *Fay.*

on the track. Diamonds inset in the crown of a bit in concentric circles so that the diamonds in any one circle follow the same groove cut into the rock. *Long.*

onychite. An alabaster, or calcite (stalagmite) with yellow and brown veins, carved by the ancients into vases, etc. *Standard, 1964.*

onyx. a. A cryptocrystalline variety of quartz, consisting of different colored layers, chiefly white, yellow, black, or red. *Fay.* b. Translucent layers of calcite from cave deposits, often called Mexican onyx or onyx marble. *A.G.I.*

onyx agate. Banded agate with straight parallel layers of differing tones of gray. It is incorrect to use onyx agate as a synonym for onyx. *See also* onyx. *Shipley.*

onyx alabaster. Misnomer for parallel-banded calcite. *See also* onyx marble.

onyx marble. A dense, crystalline form of lime carbonate deposited usually from cold-water solutions. Generally translucent and shows a characteristic layering due to mode of accumulation. *ASTM C119-50.* Also called Mexican onyx; cave onyx.

onyx obsidian. Parallel-banded obsidian. *Shipley.*

onyx opal. Common opal with straight parallel markings. *Shipley.*

oöcastic. Used by students of calcareous and siliceous rocks denoting the voids left in rock after solution of oölites. *A.G.I.*

oölite. a. A spherical to ellipsodial body, 0.25 to 2 millimeters in diameter, which may or may not have a nucleus, and has a concentric or radial structure, or both. It is usually calcareous, but may be siliceous, hematitic, or of other composition. *A.G.I.* b. Accretionary oölite usually has a nucleus such as a quartz grain, and a radial or concentric structure. It is grown in suspension in an agitating medium. *A.G.I.* c. Replacement oölite usually is without a nucleus, or has a nucleus of quartz. It is less regular and spherical, with a concentric and radial structure, less well developed than in accretionary oölites. *A.G.I.* d. A rock composed chiefly of oöliths. *A.G.I.* e. Limestone rock of the Jurassic system consisting of small round grains, resembling fish roe, cemented together. *Sandstrom.*

oölith. A more or less spherical concentration of calcium carbonate, chamosite, or dolomite, not exceeding 2 millimeters in diameter, usually showing a concentric-layered and/or a radiating fibrous structure. *C.M.D.*

oölitic. Characteristic of, pertaining to, of the nature or texture of, or composed of oölite. *Fay.*

oölitic limestone. A granular variety of limestone made up of minute spherical particles. *Crispin.*

oölitic texture. A texture composed of oölites, that is, small spherical or ovoid bodies of mineral matter of concentric structure and usually consisting of a core or nucleus enclosed by a cortical envelope made up of concentric layers. The oölitic texture is common in sedimentary iron ores. *Schieferdecker.*

oömicrite. A limestone similar to oösparite except that microcrystalline matrix exceeds calcite cement. *A.G.I. Supp.*

oömicrudite. Oömicrite with oölites larger than 1 millimeter. *A.G.I.*

Ooms-Ittner kiln. An annular, longitudinal-arch kiln divided into chambers by permanent walls and with a flue system designed for the salt glazing of clay pipes; the fuel can be coal, gas or oil. *Dodd.*

oösparite. A limestone consisting of less than 25 percent intraclasts, more than 25 percent oölites, and more calcite cement than microcrystalline matrix. *A.G.I. Supp.*

oösparrudite. Oösparite with oölites larger than 1 millimeter. *A.G.I. Supp.*

ooster coal. Same as houster coal. *Tomkeieff, 1954.*

ooze; oaze. a. A soft, slimy, sticky mud. *Fay.* b. To emit or give out slowly. *Webster 3d.* c. A fine-grained pelagic deposit which contains more than 30 percent of material of organic origin. *A.G.I.* d. An unconsolidated deposit composed almost entirely of the shells and undissolved remains of Foraminifera, diatoms, and other marine life; diatom ooze and Foraminiferal ooze. *Hy.*

opacifier. a. A phase which decreases the transparency of a glass, and thereby increases the diffuse reflectance. *VV.* b. Any material which gives or adds opacity to anything. Formerly tin oxide was the common opacifier for enamels; more recently antimony, zircon, and titanium compounds are used as opacifiers. *Enam. Dict.*

opacite. A general term for microscopic, opaque grains in rocks, usually applied to such materials in the groundmass of volcanic rocks. It is generally regarded to consists largely of magnetite dust. *A.G.I.*

opacity. The property of reflecting light diffusely and nonselectively. *See also* contrast ratio. *ASTM C286-65.*

opal. An amorphous hydrous silica, $SiO_2 \cdot nH_2O$. When it shows a play of colors, or opalescence, it becomes the gem stone or precious opal of commerce, known as fire opal. Conchoidal fracture. *Sanford; Dana 17.* Very weakly radioactive; white, yellow, red, brown, green, gray, blue; generally pale; impurities result in dark colors; found associated with almost all types of rocks; it is deposited from silica-bearing waters at low temperatures. *Crosby, pp. 129-130.*

opal agate. A variety of opal, of different shades of color and agatelike in structure. *C.M.D.*

opal cat's-eye. Rarest variety of harlequin opal. Exhibits chatoyant line, usually green, said by Eppler to result from included fibers of crocidolite. *Shipley.*

opal dirt. Opal-bearing layers of soft claylike material, or clayey layers of soft material, or clayey sand, underlying sandstone in most Australian deposits. *Shipley.*

opal doublets. More or less thin, usually flat layers or films of precious opal cemented onto some substance, usually of same appearance; liable to crack and disintegrate more easily than thicker sections. *Shipley.*

opalescence. Pearly or milky appearance of mineral. *Pryor, 3.*

opalescent. Resembling opal. *Fay.*

opalescent cat's-eye. A confusing term sometimes applied to chrysoberyl cat's-eye. *Shipley.*

opalescent chrysolite. a. Greenish chrysoberyl or corundum, exhibiting opalescence. *Shipley.* b. Chrysoberyl cat's-eye (a rare usage). *Shipley.*

opalescent glaze. Glaze with a milky appearance. *ACSG, 1963.*

opalescent sapphire. Girasol sapphire. *Shipley.*

opal glass. a. Glass with fiery translucence. Loosely, any translucent glass. *ASTM C162-66.* b. Glass which is opalescent or white; made by the addition of fluorides (for example, fluorspar or cryolite) to the glass mixture. *C.T.D.*

opaline. a. An earthy form of gypsum or a magnesian limestone. *Gordon.* b. A brecciated impure opal replacement of serpentine. Obtained from the quicksilver region, Napa County, Calif. *English.* c. In glassmaking, a translucent, milky variety of glass; fusible porcelain; milky glass. *Standard, 1964.* Also called hot-cast porcelain. *Fay.*

opalite. Synonym for opal. *Hey 2d, 1955.*

opalized wood. Wood petrified by siliceous earth, and acquiring a structure similar to that of opal. *See also* wood. *Fay.*

opal jasper. A common opal with the color of yellow jasper. *Fay.*

opal matrix. Opal with portions of matrix included in the fashioned gem. *See also* opaline. *Shipley.*

opal mother. A dark opal matrix from Hungary. *Shipley.*

opal onyx. Misnomer for onyx opal. *Shipley.*

opaque. Anything which is not transparent but acts as an obscuring body is considered opaque. *Hansen.*

opaque-attrite. Attritus which is opaque in thin sections. *Tomkeieff, 1954.*

opaque attritus. This term was first used by R. Thiessen in 1930 referring to coal material of which the most prominent and important constituent is opaque matter and also referred to as opaque matrix, black fundamental matter or matrix and residuum. Opaque attritus consists of three common types of organic matter all of which are opaque to transmitted light in thin section: (1) opaque matter consisting of fusain less than 30 microns thick; (2) amorphous opaque matter equivalent in general to dispersed humic degradation matter in form but suggesting a fusinized mode of preservation and, (3) granular opaque matter consisting of discrete granules, 0.5 to 1.5 microns in diameter, opaque when aggregated but showing greyish to faintly brownish translucency in extremely thin section or when sufficiently dispersed in translucent humic material. Occasionally granular opaque matter impregnates cellular cavities of well decayed plant tissue. Opaque attritus is a collective term and not comparable with any of the microlithotypes of the Stopes-Heerlen nomenclature. It is present, at least in minor amounts, in most banded and nonbanded coals. It is the characteristic component of splint and many dull coals. *IHCP, 1963, part I.*

opaque ceramic glazed tile. Facing tile whose surface faces are covered by an inseparable fire-bonded, opaque, colored ceramic glaze of bright satin or gloss finish. *ASTM C43-65T.*

opaque-durit. Same as opaque-attrite. *Tomkeieff, 1954.*

opaque enamel. Enamel having high opacity. *ACSB-3.*

opaque glaze. A nontransparent colored or colorless glaze. *ASTM C242-60T.*

opdalite. An igneous rock consisting of orthoclase-bearing, hypersthene-mica quartz diorite closely related to granodiorite. *Johannsen, v. 2, 1932, p. 347.*

open. a. A borehole free of any obstructing object or material. *Long.* b. To remove obstructing objects from a borehole. *Long.* c. The uncased part of a borehole. Also called bare; barefoot; naked. *Long.* d. To make a clay more open or porous in structure by adding fillers or grog. *ACSG.* e. To start a hollow or opening in a ball of clay as it spins on the potter's wheel. *ACSG, 1963.*

open-back inclinable press. A vertical crank press that can be inclined, so that the bed will have an inclination generally varying from 0 to 30 degrees. The formed parts slide off through an opening in the back. It is often called an OBI press. *ASM Gloss.*

open-burning clay. A clay which is porous after firing. *Hess.*

open-burning coal. Coal which does not cake, but burns with much flame and smoke and is soon reduced to ashes. *Tomkeieff, 1954.*

open caisson. A cylinder that may be made of steel plate, concrete, concrete blocks, or brickwork. It is open at the top and bottom and is sunk to provide a foundation. *Ham.*

opencast. a. A working in which excavation is performed from the surface. *Compare* strip mine. *Webster 3d.* b. Exposed to the air like a quarry; as, opencast working; a deposit worked opencast. *Webster 2d.* Commonly called opencut and open-pit. *Fay.* c. A working place open to the sky from which ore is extracted. *Pryor, 2.*

opencast method. The method consists in removing the overlying strata or overburden, extracting the coal, and then replacing the overburden. When the overlying material consists of earth or clay it can be removed directly by scrapers or excavators, but where rock is encountered it is necessary to resort to blasting to prepare the material into suitable form for handling by the excavators. The usual method of working is to extract the coal in a series of regular slices called cuts. The length of each cut is governed by the limits of the area to be worked. The width of the cut depends on the type of excavating equipment available; for example, in the case of dragline excavators the casting distance will be a determining factor. The first operation is to open up an initial cut, called the box cut, from solid ground. This overburden has to be loaded into vehicles and transported to a suitable dumping ground. The exposed coal can then be excavated. The next operation is to deposit the overburden of the second cut into the void of the preceding cut, thereby exposing a fresh area of coal for excavation. This system is repeated across the area to be worked and the original box cut overburden is used to fill the void of the final cut. *McAdam II, p. 162.*

opencast mine. *See* open-pit mine. *Bureau of Mines Staff.*

opencast working. *See* strike working. *Nelson.*

open-cell process. *See* empty-cell process. *Ham.*

open chain. In organic chemistry, carbon chain not closed to form cyclic compound. *Pryor, 3.*

open channel. A conduit in which the upper surface of the water is freely below the crown of the channel, and remains at atmospheric pressure. *Ham.*

open circuit. In mineral dressing, a flow line in which the solid particles pass from one appliance to the next without being screened, classified, or otherwise checked for quality, no fraction being returned for retreatment. *Pryor 2.*

open-circuit mill. A grinding mill without classifiers. *Nelson.*

open-connected. Applied to dredges in which a link is interposed between the buckets. *Fay.*

open-crib timbering. Shaft timbering with cribs alone, placed at intervals. *Fay.*

opencut. a. Eng. To drive headings out, or commence working in the coal, etc., after sinking the shafts. *Fay.* b. Scot. To commence longwall working. *Fay.* c. To increase the size of a shaft when it intersects a drift so as to form a puddle wall behind the sets of timber. *Fay.* d. An open trench through a hill or mountain or as access to a tunnel portal. *Fraenkel.* e. Open pit; surface working. *Fraenkel.* Also called opencast; open pit. *Fay.* Synonym for strip mine. *A.G.I. Supp.* f. A method of excavation in which the working area is kept open to the sky. Used to distinguish from cut-and-cover and underground work. *Nichols, 2.*

opencut mine. An excavation for removing minerals which is open to the weather. *Hess. See also* open-pit mine.

opencut mining. *See* surface mining; open-pit mining. *B.C.I.*

opencut system. See overhand stopping, b, stripping. *Fay.*

open cycle. Cycle of operation of a heat engine in which the power fluid is used only once and replaced with fresh fluid instead of being recirculated after its passage through the power cycle. Also applicable to a cooling system in which the coolant is used once and then discarded. *Compare* closed cycle. *NRC-ASA N1.1-1957.*

open-cycle reactor system. A nuclear reactor system in which the coolant passes through the reactor core only once and is then discarded. *L&L.*

open dies. *See* closed dies. *ASM Gloss.*

open-drive sampler. A drive-type soil-sampling device that is essentially a headpiece, threaded to fit a drill rod, to which is attached a removable length of thin-wall brass or steel tubing. An example is the Shelby tube. *Long.*

open end method. A method of mining pillars in which no stump is left; the pockets driven are open on the goaf side and the roof is supported on timbers. *Lewis, p. 543.*

open fault. A fault in which the two walls are separated. *A.G.I.*

open fires. Fires occurring in a roadway or at the coal face in a mine. Such fires may or may not be easily accessible. They may be in the roof of a roadway or seam, or in the kerf of a machine-cut face. However, they are quite distinct in their initiation from gob fires. An open fire may be ignited by a blown-out shot, electrical failure, or from sparks produced by friction. *Nelson.*

open firing. Firing in which the flame may impinge on the ware. *ACSG, 1963.*

open flow. The rate of flow of a gas well when flowing into the air, unrestricted by any pressure other than that of the atmosphere, usually in units of cubic feet per 24 hours. *A.G.I.*

open fold. A fold, the limbs of which diverge at a large angle. *A.G.I.*

open-frame girder. See Vierendeel girder. *Ham.*

open front. The arrangement of a blast furnace with a forehearth. *Fay.*

open-graded aggregate. Mineral aggregate containing very few small particles so that the void spaces are relatively large. *Shell Oil Co.*

open-grained coal. Term used by British miners for clearly banded bright and dull coal. *Tomkeieff, 1954.*

open handle. A cup handle of the type that is attached to the cup at the top and bottom only, the side of the cup itself forming part of the finger opening. *Compare* block handle. *Dodd.*

open hearth. The form of regenerative furnace of the reverberatory type used in making steel by the Martin, Siemens, and Siemens-Martin processes. *See also* furnace. *Fay.*

open-hearth door liner. One who lines and repairs furnace doors and hot, metal spouts to keep furnace in condition for continuous use. Also called door and spout liner, mason liner, and spout liner. *D.O.T. 1.*

open-hearth furnace. A reverberatory melting furnace with a shallow hearth and a low roof. The flame passes over the charge on the hearth, causing the charge to be heated both by direct flame and by radiation from the roof and sidewalls of the furnace. In ferrous industry, the furnace is regenerative. *ASM Gloss. See also* acid open-hearth furnace; basic open-hearth furnace; all-basic furnace.

open-hearth process. A process for manufacturing steel, either acid or basic, according to the lining of the reverberatory furnace, in which selected pig iron and malleable scrap iron are melted, with the addition of pure iron ore. The latter, together with the air, contributes to the oxidation of the silicon and carbon in the melted mass. The final deoxidation is sometimes produced by the addition of a small quantity of aluminum or ferromanganese, which at the same time desulfurizes and recarburizes the metal to the required extent. *Fay. See also* L.D. steel process.

open-hearth steels. A process of steel manufacture which consists in smelting the steel in a gas-fired regenerative furnace constructed with a shallow trough or hearth. *See also* Siemens-Martin process. *Camm.*

open hole. a. Coal or other mine workings at the surface or outcrop. Also called opencast; opencut; open pit. *Fay.* b. A borehole which is drilled without cores. *Nelson.* c. Uncased portion of borehole. *Pryor, 3.* d. A borehole free of any obstructing object or material. *Long.*

opening. a. A widening out of a crevice, in consequence of a softening or decomposition of the adjacent rock, so as to leave a vacant space of considerable width. *Fay.* b. A short heading driven between two or more parallel headings or levels for ventilation. *Fay.* c. Surface entrance to mine workings. *Hudson.*

opening material. Non-plastic materials, such as flint, sand, grog, used in clay mixtures to facilitate drying and reduce shrinkage. *Rosenthal.*

opening out. The formation of a longwall face by driving headings and cross headings and connecting the faces to form a continuous line of coal face. It may be viewed as the final stage in development, leading to full coal production. In pillar-and-stall mining, opening out would imply the setting off of the main headings and subsidiary drivages for the formation of coal pillars. *See also* mechanized heading development. *Nelson.*

openings. a. The parts of coal mines between the pillars, or the pillars and ribs. *Fay.* b. A series of parallel chambers or openings, separated by pillars or walls, in slate mining. The width of the openings varies from 35 to 50 feet depending on roof conditions. *Nelson.*

opening shot. In blasting into solid rock, the wedging shot, gouging shot or burn cut. Leading shot fired to open up the rock face by creating a cavity and therefore ease the work done by later shots in a round. *Pryor, 3.*

opening stock. Quantity on hand at start of accounting period—ore, concentrates, stores, etc. *Pryor, 3.*

open lagging. Lagging placed a few inches apart. *Bureau of Mines Staff.*

open light. A naked light. Not a safety light. *Fay.*

open-loop control. A control of a mechanism which is direct between the operator and the mechanism. Any faults or deviations of the mechanism must be corrected by the operator. In closed-loop control, the operator is only required to supervise or set the control. Any faults or deviations of the mechanism are detected, and the control is automatically altered to correct them. *Nelson.*

open-mine doctrine. A doctrine which developed at common law and which permits a life tenant to continue to sever and appropriate minerals from a mine which was opened before creation of the life estate. With this exception, a life tenant normally may not sever minerals without the concurrence of the owner of future interests in the land. *Williams.*

open mold. A mold without cover, in which objects like ingots are cast; distinguished from close mold. *Standard, 1964.*

open off. a. To turn stalls off stalls, or to drive branch roadways from crossheadings. *Nelson.* b. Eng. To begin the longwall system from the shaft pillar, or the far end of the royalty, or from any headings previously driven out for the purpose of commencing such system. *Fay.* c. To start any new working, as a heading, entry, gangway, room, etc., from another working, as a slope, gangway, etc. *Fay.*

open-pit mine; opencast mine; opencut mine; strip mine. A mine working or excavation open to the surface. *Bureau of Mines Staff.*

open-pit mining; opencut mining. a. A form of operation designed to extract minerals that lie near the surface. Waste, or overburden, is first removed, and the mineral is broken and loaded, as in a stone quarry. Important chiefly in the mining of ores of iron and copper. *Barger.* b. The mining of metalliferous ores by surface-mining methods is commonly designated as "open-pit mining" as distinguished from the "strip mining" of coal and the "quarrying" of other nonmetallic materials such as limestone, building stone, etc. *Woodruff, v. 3, p. 469.*

open-pit quarry. A quarry in which the opening is the full size of the excavation. One open to daylight. *Fay.*

open port. A port which is not icebound during winter. *Hy.*

open pots. Fire-clay pots for melting glass—open at the top. *Mersereau, 4th, p. 329.*

open rock. Any stratum capable of holding much water, or conveying it along its bed by virtue of its porous or open character. *Fay.*

open rod press. A hydraulic press in which the slide is guided by vertical, cylindrical rods (usually four) that also serve to hold the crown and bed in position. *ASM Gloss.*

opens. Large, open cracks or crevices and small and large caverns. *Long.*

open-sand castings. Castings made in molds simply excavated in sand, without flasks. *Fay.*

open-sand mold. A process of founding without any cope or top to the mold; used for heavy objects. *Standard, 1964.*

openset. Scot. An unfilled space between pack walls. *See also* cundy, a and b. *Fay.*

open sheeting. a. Vertical poling boards set apart from each other and supported by struts and walings. *Ham.* b. *See* open timbering. *Nelson.*

open-shell auger. Eng. A coal-boring tool for extracting clay and other debris from the hole. *Fay.*

open-shoal reef. *See* patch reef. *Schieferdecker.*

open shop. A shop, or mine, where the union price is paid, but where the workmen are not all union men. *Fay.*

open source. Any radioactive source of ionizing radiations that is not firmly bonded within metals or sealed in a capsule or similar container. *NCB.*

open sparking. Sparking which owing to lack of adequate provisions for preventing the ignition of flammable gas external to apparatus, would ignite such gas. *Nelson.*

open split. A split in which no regulator is installed. *Higham, p. 281.*

open stope. a. An unfilled cavity. *Nelson.* b. Underground working place either unsupported, or supported by timbers or pillars of rock. *Pryor, 3.*

open-stope and filling. *See* overhand stoping, b. *Fay.*

open-stope method. a. Stoping in which no regular artificial method of support is employed, although occasional props or cribs may be used to hold local patches of insecure ground. The walls and roof are self-supporting, and open stopes can be used only where the ore and wall rocks are firm. The simplest open stopes are those in which the entire ore body is removed from wall to wall without leaving any pillars. The stoping of ore in this manner is usually confined to relatively small ore bodies, since regardless of the firmness of the ground, there is a limit to the length of unsupported span which will stand without breaking. *BuMines Bull. 390, 1936, p. 5.* b. *See* overhand stoping. *Fay.*

open-tank method. A method of treating mine timber to prevent decay in which the timber is immersed in a tank of hot preservative and then in a tank of cold preservative. The preservatives used are creosote, zinc chloride, sodium fluoride, and other chemicals. *Lewis, p. 71. See also* Bethell's process.

open timbering; open sheeting. The usual method of setting timber or steel supports in mines, that is, they are spaced from 2 to 5 feet apart, with laggings and struts to secure the ground between each set. The method is used in ground which does not crumble or flow. *See also* close timbering. *Nelson.*

open-top carriers. The main use of this type of bucket elevator has been in handling the product of the larger crushers. Steel buckets of large capacity, which may be as long as 7 feet, are attached rigidly to heavy flat bar chain, each strand made of two bars with a pitch of 24 to 30 inches and with self-oiling flanged rollers at each intersection. The elevator rises at an angle of about 60°, and the rollers run on ways made of light T-rails. The buckets have overlapping edges, so that there is no spill between them. *Pit and Quarry, 53rd, Sec. C, p. 38.*

open-top tubbing. A length of tubbing having no wedging crib on the top of it. *Fay.*

open traverse. In surveying, one in which the last line is not so directed as to close on the starting point. *Pryor, 3.*

open up. Term used among miners to describe operations that uncover the deposit and provide access to it. *Stoces, v. 1, p. 214.*

open water. Water with less than one-tenth ice coverage. *Hy.*

open-web girder. *See* lattice girder. *Ham.*

open workings. Surface workings, for example, a quarry or opencast mine. Among the minerals often exploited by open workings are coal, brown coal, gems, and the ores of copper, gold, iron, lead, and tin and all kinds of stone. Also called open work. *Nelson.*

operating carrier. The mechanism used with the automatic duckbill through which the extension and retraction of the shovel trough are controlled. *Jones.*

operating cost. The sum of the costs of mining, beneficiation, and administration gives the operating cost of a mine. *Nelson.*

operating engineer. *See* hoistman. *D.O.T. 1.*

operating point. A ventilation system is composed of a fan and a set of connected ducts. In a mine ventilation system, mine openings comprise the ducts. At a given air density and with the fan operating at constant speed, there is only one head and quantity of air flow which can result. This is an equilibrium condition and is known as the operating point of the system. *Hartman, p. 198.*

operating stress. The stress to which a structural unit is subjected in service. *ASM Gloss.*

operational capacities. Figures given on the flowsheets to indicate quantities passing various points in the plant per unit time, taking account of fluctuations in the rate of supply and composition (as to size and content of impurity), as follows: (1) design capacity, the rate of feed, defined by limits expressing the extent and duration of load variations, at which specific items of plant subject to a performance guarantee must operate continuously and give the guaranteed results on a particular quality of feed; (2) peak design capacity, a rate of feed in excess of the design capacity which specific items of plant will accept for short periods without fulfilling the performance guarantees given in respect of them; and (3) mechanical maximum capacity, the highest rate of feed at which specific items of equipment, not subject to performance guarantees, will function on the type and quality of feed for which they are supplied. *B.S. 3552, 1962.*

operational research. Statistical analysis of data accumulated to aid planning of best technique for a given operation. Development of optimum standards and variances in processing methods which involve both choice and chance. Stems from older concept of efficiency engineering. *Pryor, 3.*

operation waste. The water lost from an irrigation system either through spillways or by other means. *Ham.*

operative temperature. Operative temperature is that temperature of an imaginary environment in which, with equal wall (enclosing areas) and ambient air temperatures and some standard rate of air motion, the human body would lose the same amount of heat by radiation and convection as it would in some actual environment at unequal wall and air temperatures and for some other rate of air motion. *Strock, 10.*

operator. a. The person, owner, or lessee actually operating a mine. *Long.* b. Synonym for driller. *Long.* c. One who operates the seismic instrument. *Schieferdecker.* d. *See* observer, a. *Dobrin, p. 56.*

ophicalcite. A marble containing serpentine; also used for any calcite-serpentine rock. *A.G.I.*

ophidite. Synonym for prasinite; ophite. *A.G.I.*

ophiolite. Basic igneous rocks associated with geosynclinal sediments, generally altered to rocks rich in serpentine, chlorite, epidote, and albite. *See also* basic schist; epidiorite; greenschist; greenstone; metabasite; ophicalcite; ophite; prasinite. *A.G.I. Supp.; A.G.I.*

ophite. a. Any of various usually green and often mottled or blotched rocks (as a serpentine or serpentine marble). *Webster 3d.* b. A variety of marble colored green by serpentine. Synonym for ophicalcite. *Standard, 1964.* Also called verd antique. *Fay.*

ophitic. Applied to a texture characteristic of diabases or dolerite in which euhedral or subhedral crystals of plagioclase are embedded in a mesotasis of pyroxene crystals, usually augite. *A.G.I.*

ophitic texture. A texture characteristic of dolerites in which relatively large pyroxene crystals completely enclose smaller, lath-shaped plagioclases. *See also* poikilitic. *C.M.D.*

ophthalmic glass. Glass used in spectacles, generally having specified optical and physical properties and quality. *ASTM C162-66.*

ophthalmite. A type of chorismite consisting of coarsely lenticular augenlike, boulder-like, or nodular elements in a crystalline groundmass. Lenticular varieties are said to show flaser development when strands of the groundmass cling closely to the lenses. When the lenses are flat and disk-like, the term flatschig is used in German texts. The mineral aggregates (elements) embedded in the groundmass may also exhibit spindle-shaped or cylinderlike forms. *A.G.I.*

opr Abbreviation for oil production rate. *BuMin Style Guide, p. 61.*

optalic metamorphism. The indurating, burning, and fritting effects produced by lavas and small dikes on the rocks with which they come into contact. *Schieferdecker.*

optic. a. Having variations in wall thickness, producing refractive effects. *ASTM C162-66.* b. A lens or prism in an optical instrument. *ASTM C162-66.*

optical anomaly. An irregularity in optical properties or unusual phenomenon, such as anomalous double refraction in a diamond or other singly refractive mineral. Observable in most synthetic spinel, but rarely seen in a genuine spinel. *See also* strain. *Shipley.*

optical blank. A piece of optical glass that has been pressed approximately to the shape finally required; also called a pressing. *Dodd.*

optical calcite. Calcite crystals so clear that they have value for optical use. *A.G.I.*

optical centering device. An optical device which enables a theodolite to be accurately positioned over or under a survey station. Also called optical plummet (undesirable usage). *B.S. 3618, 1963, sec. 1.*

optical character. The designation as to whether optically positive or optically negative; said of minerals. *Fay.*

optical constants. In optical mineralogy, the indices of refraction, axial angle, extinction angle, etc. *Fay.*

optical crown glass. Any glass of low dispersion used for optical equipment. There are many varieties, their names indicating their characteristic composition, for example, barium crown, borosilicate crown, fluor-crown, phosphate crown, zinc crown. *Compare* flint glass. *Dodd.*

optical crystallography. The study of the behavior of light in crystals. *Hurlbut.*

optical flat. Glass or other surface rendered truly plane. *Pryor, 3.*

optical flint glass. *See* flint optical glass.

optical glass. Carefully made glass of great uniformity and usually special composition to give desired transmission, refraction, and dispersion of light. *CCD 6d, 1961.*

optical glass classification. A system by which an optical glass is classified according to its refractive index, n_D, and its Abbe Value, v. Standard borosilicate crown glass, for example, has $n_D = 1.510$ and $v = 64.4$; its classification by this system is 510644. Further identification is often provided by letters, preceding the number, for example, BSC = borosilicate crown; LF — light flint, etc. *Dodd.*

optical glass numerical designation. The numerical designation in common usage is based on the index of refraction for sodium line (n_D) and the Nu-value (v). The unity factor for the index is dropped (that is, 1.496 becomes 496), and the decimal point for the Nu-value is also dropped (Nu = 64.4 becomes 644). Thus, the glass is specified 496/644 without reference to chemical composition. In cases, it is permissible to precede the numerical designation by the abbreviated name indicative of composition. For instance, borosilicate crown (BSC) 496/644 may be used. For example, dense barium crown may be crown 610/574 or DBC 610/574, or just 610/574 meaning $n_D = 1.610$ and Nu-value = 57.4 *ASTM C162-66.*

optically dense. Term applied to gems with a high refractive index. *Pearl, p. 119.*

optical plumbing. The establishing of points by direct observation with the transit. *Staley, p. 164.*

optical properties. The effects of a substance upon light. Refractive index, double refraction, (and its strength, birefringence), dispersion, pleochroism, and color are gemmologically the most important optical properties. *Shipley.*

optical pyrometer. An instrument for measing the temperature of heated material by comparing the intensity of light emitted with a known intensity of an incandescent lamp filament. *ASM Gloss.*

optical sign. When a translucent crystal is viewed under microscope, light travels through the mineral at a speed which corresponds with its refractive index, as this is affected by the crystal planes. A uniaxial crystal has a negative optical sign when the velocity of its extraordinary ray exceeds that of the ordinary ray and vice versa. Calcite is negative, quartz positive. For biaxial crystals there are three principal directions of vibration, mutually at right angles, X being the fastest and Z the slowest. *Pryor, 3.*

optical square. A hand-held instrument enabling right angles to be set out accurately on a site. *Ham.*

optical system. A group of lenses so arranged that the desired optical result is secured. *Shipley.*

optical twinning. A type of twinning in quartz in which the parts of the twin are alternately left- and right-handed. Optical twinning is also known as Brazil twinning and chiral twinning. So called because it can be recognized by optical tests in distinction to Dauphine (electrical) twinning. Optical twinning as ordinarily applied includes all twin laws in quartz with the exception of the Dauphine. *AM, 1.*

optic angle. In a biaxial crystal, the angle between the optic axes. *Standard, 1964.*

optic axes. Those directions in anisotropic crystals along which there is no double refraction. *Fay.*

optic axial angle. The acute angle between the two optic axes of a biaxial mineral. Usually given as 2V, which is the apparent value with the mineral not immersed. *Shipley.*

optic axis. A direction of single refraction in a doubly refracting mineral. Hexagonal and tetragonal minerals have one such axis, and are termed uniaxial; rhombic, monoclinic, and triclinic minerals have two optic axes and are thus biaxial. *Anderson.*

optics. The division of physics which covers the behavior of light. *Shipley.*

optic sign. The type of double refraction in a mineral. On uniaxial minerals, the material is positive when the extraordinary ray has a higher refractive index than the ordinary ray, negative when the ordinary ray has the greater index. In biaxial minerals, which have three basic optical directions, the refractive index of the intermediate or beta ray is the criterion; if its refractive index is nearer that of the low or alpha ray, it is said to be a positive mineral or stone; if it is nearer the high or gamma ray, it is said to be a negative mineral or stone. *Shipley.*

optimization. Coordination of various processing factors, controls, and specifications to provide best overall conditions for technical and/or economic operation. *Pryor, 4.*

optimum. a. The best; said of values not necessarily the highest or lowest, but which give the best results. *Mason.* b. Desired normal condition of material at a specified point in the flow line of a continuous process, at which it is considered to be in the most favorable state for further treatment. *Pryor, 3.*

optimum depth of cut. That depth of cut required to completely fill the dipper in one pass without undue crowding. *Carson, p. 46.*

optimum moisture content. The water content at which a soil can be compacted to the maximum dry unit weight by a given compactive effort. Also called optimum water content. *ASCE P1826.*

option. a. A privilege secured by the payment of a certain consideration for the purchase, or lease, of mining or other property, within a specified time, or upon the fulfillment of certain conditions set forth in the contract. *Fay.* b. S. Afr. The word option may refer to shares under option to the holder of option certificates. In regard to mining activities, options are granted to acquire the mineral rights and/or surface rights over some farm at a price fixed in the agreement. This price may be a sum of money or a participation in a mining company still to be formed. The option itself can be acquired for a lump sum or for a payment of so much per morgen a year. The option contract is generally connected with the permission for the option holder to prospect for minerals and briefly referred to as option and prospecting contract. *Beerman.*

optional-flow storage. In coal preparation, optional-flow setups are those where the coal usually goes to the plant but can be diverted into storage, either in bins or hoppers or on the ground. *Coal Age, v. 71, No. 8, August 1966, p. 238.*

opus incertum. Masonry of small stones set irregularly in mortar. *Standard, 1964.*

opus lateritium. Brickwork or tilework in horizontal courses with broken joints. *Standard, 1964.*

opus reticulatum. Recticulated masonry. *Standard, 1964.*

opus tessellatum. Mosaic composed of small cubes of marble, glass, or clay. *Standard, 1964.*

oral agreement to locate. An agreement to locate need not be in writing. If a party, in pursuance of an oral agreement to locate at the expense of another, locates the claim in his own name, he holds the legal title to the ground in trust for the benefit of the party for whom the location was made. Such a party could, upon making the necessary proofs, compel the locator of the mining claim to convey the title to him, although the agreement so to do was not in writing. Such an agreement is not within the statute of frauds. *Ricketts, I.*

orange heat. A division of the color scale, generally given as about 900° C (1,652° F). *Bureau of Mines Staff.*

orangepeel. a. A pebble-grained surface which develops in forming of metals having coarse grains. *ASM Gloss.* b. A pitted texture of a fired glaze resembling the surface of rough orangepeel. *ASTM C242-60T.* c. A variant of the clamshell bucket with four or five leaves instead of the clamshell's two. Each leaf ends in a reinforced point. Its digging ability is less than that of the clamshell, and its principal use is for underwater excavation and digging. *Carson, p. 128.*

orangepeel bucket sampler. This sampler is used primarily to obtain bottom samples in shallow water and several sizes are available. The size considered here weighs 45 pounds and holds about 300 cubic inches of sediment. A small hook, attached to the end of the lowering wire, supports the sampler as it is lowered and also holds the jaws (four curved triangular blades which form a hemisphere when closed) in the open position. When contact with the bottom is made the sampler jaws sink into the sediment and the wire tension is released, allowing the hook to swing free of the sampler. Upon hoisting, the wire takes a strain on the closing line which is also attached to a handle which activates a ratchett chain and sheave that close the jaws. The closing line supports the sampler as it is being hoisted. To prevent washing out of the sample from the top, a canvas cover is frequently used. *H&G.*

orangepeel effect. A surface roughening in the form of a grain pattern where a metal of unusual coarse grain is stressed beyond its elastic limit. Also called pebbles; alligator skin. *ASM Gloss.*

orangepeel sampler. An apparatus consisting of four movable jaws that converge to a point when closed; used to obtain samples of underwater sediment. *A.G.I. Supp.*

Orange sand. A deposit of sand, gravel, and pebbles, containing boulders of northern Paleozoic rocks, occurring in the Mississippi Valley; a diluvial deposit of the Champlain or Quaternary epoch. *Fay.*

orange topaz. Same as Spanish topaz. *Shipley.*

orangite. A bright, orange-yellow variety of thorite. *See also* thorite, a. *Fay.*

orbicular. Containing spheroidal aggregates of megascopic crystals, generally in concentric shells composed of two or more of the constituent minerals; said of the structure of some granular igneous rocks, such as corsite. *See also* kugel; spheroidal. *Fay.*

orbicular granite. A granite containing numerous rounded segregations of minerals, chiefly dark silicates. *Fay.*

orbicular jasper. Jasper containing round or spherical inclusions, sprinkled or spotted here and there, usually of contrasting color to the body of the stone. *Shipley.*

orbicular structure. A structure developed in certain phanerocrystalline rocks (for example, granites, diorites, and corsite) due to the occurrence of concentric shells of different mineral composition around centers that may or may not exhibit a xenolithic nucleus. Synonymous with spheroidal structure; nodular structure. *Holmes, 1920.*

orbit. In water waves, the path of a water particle affected by the wave motion. In deep water waves, the orbit is nearly circular and in shallow water waves, the orbit is nearly elliptical. In general, the orbits are slightly open in the direction of wave motion giving rise to mass transport. *A.G.I.*

orbital. Path of electron around atomic nucleus. *Pryor, 3.*

orbite. Proposed by Chelius for certain diorite dikes near Orbeshöhe, Hesse, Germany, of porphyritic texture and having large phenocrysts of hornblende, biotite, and plagioclase. *Fay.*

orcelite. A vein in serpentinized harzburgite in the Tiebaghi massif, New Caledonia, consists almost wholly of a new mineral, Ni_2As, distinct from maucherite and niccolite. Probably identical with the artificial phase $Ni_{5-x}As_2$. *Hey, M.M., 1961.*

orchard heating oil. A dark oil from California petroleum, possessing a gravity of 26° to 28° Be′; it is also termed smudge oil, and is used in the orange and lemon groves to prevent frost from injuring the trees. *Fay.*

ordanchite. A variety of haüyne tephrite containing phenocrysts of andesine and orthoclase. *Holmes, 1928.*

order. A division of igneous rocks, considered after the division into classes, based (in classes I, II, and III) on the relative proportions of normative quartz or nepheline to the sum of the normative feldspars. This division is analogous to the division of rocks into oversaturated, saturated, and (as regards to feldspathoids) undersaturated types. In classes IV and V, the orders are based on the relative proportions of the normative pyroxenes, and olivine, etc., to the sum of the normative iron ores and titanium minerals. *Holmes, 1928.*

ordered solid solution. A condition when atoms in a solid solution arrange themselves in regular or preferential positions in the lattice, rather than at random. *Newton, pp. 181 & 183.*

order of crystallization. The apparent chronological sequence in which crystallization of the various minerals of an assemblage takes place, as evidenced mainly by textural features. *A.G.I.*

order of persistence. *See* stability series. *A.G.I.*

order of reaction. A classification of chemical reactions based on the index of the power to which concentration terms are raised in the expression for the instantaneous velocity of the reaction, that is, on the apparent number of molecules which interact. *C.T.D.*

ordinary cut. In the ordinary cut the holes are placed symmetrically in relation to the vertical center line of the section. The drill holes are horizontal and the angle towards the working face is large. The symmetrical holes meet at the bottom. *Fraenkel, v. 1. Art. 6:02, p. 23.*

ordinary lay. a. That of a wire rope in which each strand is twisted oppositely to its constituent wires. *Pryor, 3.* b. Synonym for regular lay. *Long.* c. *See* winding rope. *Nelson.*

ordinary portland cement. Cement made by calcining in a rotary kiln a slurry of clay and crushed limestone, and by grinding and processing the resultant clinker so as to comply with B.S. 12 for portland cement. *See also* portland blast-furnace cement; low-heat cement; high-alumina cement. *Ham.*

ordinary ray. a. That ray of polarized light which, in a doubly refracting medium, follows the usual law as to the constant ratio between the sines of the angles of incidence and refraction. *Fay.* b. In uniaxial stones, that ray which travels with constant velocity in any direction within the crystal. *Anderson.*

ordinary rolling strata. Relatively uniform asymmetrical wavy bedding with conformable crests and troughs; called uniform deposition or ripples superimposed in rhythm. *Pettijohn.*

ordinary sheathed explosives. These are ordinary permitted explosives, but their safety has been greatly increased by encircling the cartridges with sodium bicarbonate to the thickness of one-eighth of an inch (the cartridge ends are not sheathed). The sodium bicarbonate may be in powder form, but it is more often in the form of a felt sheath, where it is mixed with wood pulp to make the sheathing stronger and more trustworthy. During the explosion the sodium bicarbonate absorbs heat and breaks up. The carbon dioxide gas which is formed acts as a flame-extinguishing blanket around the hot detonation wave as it passes down the shothole; this reduces the change of any firedamp in breaks in the shothole being ignited. *Cooper, p. 346.*

ordinary tides. The word ordinary may be used in tides as the equivalent of the word mean. *Hy.*

ordinate. Y-axis; vertical scale of graph. *Pryor, 3.*

ordnance bench mark. Survey station the level of which has been officially fixed with reference to the ordnance datum, the arbitrary mean sea level at Newlyn in Cornwall, England. *Pryor, 3.*

ordnance survey. Originally, a military mapping activity; now a precise survey maintained by government which maps land and building features of Great Britain in close detail. *Pryor, 3.*

ordonezite. Zinc antimonate, $ZnSb_2O_6$, tetragonal, brown crystals in tin ore from Guanajuato, Mex. *Spencer 20, M.M., 1955.*

ordosite. A dark igneous rock consisting of an aegirine syenite with microcline, phlogopite, and apatite in addition to about 60 percent aegirine as needles in the microcline. *Johannsen, v. 4, 1938, p. 17.*

Ordovician. The second of the periods comprised of the Paleozoic era, in the geological classification now generally used. Also, the system of strata deposited during that period. *Fay.*

ore. a. A natural mineral compound of the elements of which one at least is a metal. Applied more loosely to all metalliferous rock, though it contains the metal in a free state, and occasionally to the compounds of nonmetallic substances, as sulfur ore. *Fay.* Also, less commonly, material mined and worked for nonmetals, as pyrite is a sulfur ore. *Webster 2d.* b. A mineral of sufficient value as to quality and quantity which may be mined with profit. *Fay.* c. A mineral, or mineral aggregate, containing precious or useful metals or metalloids, and which occurs in such quantity, grade, and chemical combination as to make extraction commercially profitable. *Fay.* d. A metalliferous mineral, or an aggregate of metalliferous minerals, more or less mixed with gangue, which, from the standpoint of the miner, can be won at a profit or, from the standpoint of a metallurgist, can be treated at a profit. The test of yielding a metal or metals at a profit seems, in the last analysis, to be the only feasible one to employ. *Fay.* e. Eng. Copper ore; tin ore being spoken of in Cornwall as tin. *Fay.* f. Joplin, Mo. A lead, zinc, or lead-zinc concentrate obtained from milling. The crude ore is called dirt. *Fay.* g. Raw and run-of-mine ore is ore as it comes from the working place. *Pryor, 2.* h. In metallurgy, a soft but compact variety of hematite used for the bottom of puddling furnaces. *Webster 2d.*

ore at grass. N.S.W. Ore stacked literally on the grass awaiting treatment, shipment, etc. *New South Wales.*

ore bands. Zones of rock rich in ore. *Fay.*

ore beds. Economic aggregations of minerals occurring between or in rocks of sedimentary origin. *Bureau of Mines Staff.*

ore bin. a. A receptable for ore awaiting treatment or shipment. *Fay.* b. Robustly constructed steel, wooden, or concrete structure which receives intermittent supplies of mined ore and can transfer them continuously by rate-controlled withdrawal systems (bottom gates and ore feeders) to the treatment plant. Thus a buffer stock is held which allows the mine to hoist ore intermittently without bringing milling operations to a standstill. It characteristically receives a weighed-in input of finely broken ore from the final dry-crushing section (usually between 1 inch and 3/8 inch maximum particle size). The surge bin is a much smaller one, able to receive a dumped load of run-of-mine ore and to transfer it at a regular rate to the crushing system between arrivals of further skip loads. *Pryor, 3.*

ore blending. Where a mine, or a group served by a common mill, sends ores of slightly varied character for treatment, separate bins or stockpiles are provided. From these regulated percentages are drawn and blended to provide a steady and predictable feed to the mineral dressing plant. *Pryor, 3.*

ore block. A section of a vein bounded above and below by upper and lower drifts and on one or both ends by winzes or raises and ready for stoping. *Nelson.*

ore blocked out. Ore exposed on three sides within a reasonable distance of each other. *Fay.*

ore boat. A boat constructed especially for transporting iron ore on the Great Lakes. *Mersereau, 4th, p. 382.*

ore body. a. Generally, a solid and fairly continuous mass of ore, which may include low-grade ore and waste as well as pay ore, but is individualized by form or character from adjoining country rock. *Fay.* b. S. Afr. A mineral deposit that can be worked at a profit under the existing economic conditions. *Beerman.*

ore boil. A reaction which occurs in an open-hearth furnace in which the carbon monoxide evolved by the oxidation of carbon causes a violent agitation of the metal as it escapes. *Newton, p. 320.*

ore bridge. A large electric gantry-type crane which, by means of a clamshell bucket, stocks ore or carries it from the stockpile into bins or larry car on trestle. *Fay.*

ore-bridge bucket. A clamshell grab bucket of 5 to 7½ tons capacity. *Fay.*

ore car. A mine car for carrying ore or waste rock. *Weed, 1922.*

ore channel. The space between the walls or boundaries of a lode which is occupied by ore and veinstone. Also called lode country. *Fay.*

ore chute. a. An inclined passage, from 3 to 4 feet square, for the transfer of ore to a lower level. It may be constructed through waste fills. It generally requires support to provide for wear, although an unlined passage may be used in suitable ground. In square-set stoping, chutes are constructed by boarding a vertical line of sets with 2 to 3 inch planks. Where a chute is relatively permanent, timber blocks 10 by 10 inches to 12 by 14 inches may be used. Chutes are also constructed in close timber cribbing, the round timber being slabbed to present a smooth interior to the chute. *Nelson.* b. An inclined or vertical way for the passage of ore. The apparatus at the bottom of it for filling cars is a gate or a chute. Also called ore pass. *Spalding, p. 159.* c. A trough or lip at the bottom of a bin for conveying ore to a car, conveyor, etc. *Fay.*

ore cluster. A group of ore bodies sometimes differing from each other in structure but interconnected or otherwise closely related genetically. Some ore clusters gather downward into a restricted root. *A.G.I.*

ore control. A geologic feature that has influenced the deposition of ore. *Ballard.*

ore crusher. a. A machine for breaking up masses of ore, usually previous to passing through stamps or rolls. *Fay.* b. *See* crusher man. *D.O.T. Supp.*

ore currents. Aqueous solutions of metalliferous minerals circulating through the earth's crust. *Fay.*

ore delfe. a. Ore lying underground. *Fay.*

b. Right or claim to ore from ownership of land in which it is found. *Fay.*

ore deposit. A general term applied to rocks containing minerals of economic value in such amount that they can be profitably exploited. Also applied to deposits which, though they may not be immediately capable of profitable exploitation, may yet become so by a change in the economic circumstances that control their value. *See also* mineral deposit. *Holmes, 1928.*

ore developed. Ore exposed on four sides in blocks variously prescribed. *See also* positive ore; proved ore. *Fay.*

ore developing. Ore exposed on two sides. First class, blocks with one side hidden; second class, blocks with two sides hidden; third class, blocks with three sides hidden. *See also* probable ore. d. *Fay.*

ore dike. An injected wall-like intrusion of magmatic ore, forced in a liquid state across the bedding or other layered structure of the invaded formation. *Schieferdecker.*

ore district. A combination of several ore deposits into one common whole or system. *Fay.*

ore dressing. a. The cleaning of ore by the removal of certain valueless portions as by jigging, cobbing, vanning, and the like. *See also* concentration. *Fay.* b. The same as mineral dressing. *ASM Gloss.*

ore dump. A heap or pile of ore at the tunnel or adit mouth, the top of shaft, or other place. *Weed, 1922.*

ore expectant. The whole or any part of the ore below the lowest level or beyond the range of vision. The prospective value of a mine beyond or below the last visible ore, based on the fullest possible data from the mine being examined, and from the characteristics of the mining district. *See also* possible ore; prospective ore. *Fay.*

ore faces. Those ore bodies that are exposed on one side, or show only one face, and of which the values can be determined only in a prospective manner, as deducted from the general condition of the mine or prospect. *Fay.*

Orefraction. Trademark for domestic zircon. Used for ceramic and foundry purposes. *CCD 6d, 1961.*

ore genesis. The origin of ores. *Bateman.*

ore geology. The branch of applied geology dealing with the genetic study of the ore deposits in relation to age, regional tectonics, and petrographic provinces. Synonym for metallogeny. *Schieferdecker. See also* economic geology; mining geology.

Oregonian orogeny. Mid-Cretaceous diastrophism. *A.G.I. Supp.*

oregonite; oregonit. Probably Ni_2FeAs_2; hexagonal. From Josephine Creek, Josephine County, Ore. Named from the locality. *Hey, M.M., 1961.*

Oregon jade. Misnomer for massive grossularite garnet found in Oregon, and indeed for almost any translucent to opaque green stone found in Oregon or California. *Shipley.*

Oregon moonstone. Same as chalcedony moonstone. *Shipley.*

Oregon sledge. A broad-faced sledge hammer. *Fay.*

ore grader. In metal mining, one who directs and regulates the storage of iron ores of various grades in bins at shipping docks or that the grade of ore contained in each bin will contain approximate percentage of iron guaranteed to the buyer (iron and steel mills). *D.O.T. 1.*

ore guide. A natural feature, organic or inorganic, that often indicates the proximite of an ore body, as gossan, mineral alteration, certain structural features, indicator plants, etc. *Ballard.*

ore hearth. a. A small, low fireplace surrounded by three walls, with a tuyere at the back. Three important types are: (1) Scotch ore hearth; (2) American waterback ore hearth; and (3) Moffet ore hearth, used in smelting. *Fay.* b. Eng.; Scot. A small blast furnace for smelting lead; a blast hearth. *Standard, 1964.*

ore-hearth process. A process for the extraction of lead in which lead ore, mixed with fuel, is treated on a roasting hearth. *Fay.*

orei. A quarry term applied to granite that has been rendered valueless by the alteration of its aegirite particles. *Fay.*

oreing down. A blocking operation in which ore is added to the openhearth bath to oxidize the bath and to further reduce the carbon. *Henderson.*

ore in sight. a. A term frequently used to indicate two separate factors in an estimate, namely: (1) ore blocked out, that is, ore exposed on at least three sides within reasonable distance of each other; and (2) ore which may be reasonably assumed to exist, though not actually blocked out; these two factors should in all cases be kept distinct, because (1) is governed by fixed rules, while (2) is dependent upon individual judgment and local experience. The expression ore in sight as commonly used in the past, appears to possess so indefinite a meaning as to discredit its use completely. The terms positive ore, probable ore, and possible ore are suggested. *Fay.* b. Ore-bearing rock so separated and blocked off by being worked around on two or more sides that it is subject to examination and measurement. Prospective purchasers have a right to rely upon statements as to the amount of ore in sight. *Ricketts, I.* c. *See* developed reserves. *Nelson.*

ore intersection. The point at which a borehole, crosscut, or other underground opening encounters an ore vein or deposit; also, the thickness of the ore-bearing deposit so traversed. *Long.*

ore leave. The value of the right to dig and take ore; also, the value of ore in place. *Fay.*

oreless. Having no ore. *Webster 3d.*

ore magma. A heavy and highly concentrated solution containing metals and nonmetals. *A.G.I.*

ore man. A laborer who fills hoppers of aluminum reduction pots with aluminum oxide. *D.O.T. 1.*

ore mill. A stamp mill; a concentrator. *Fay.*

ore mineral. A mineral that carries the valuable or desired metallic constituents of any ore deposit. In some instances, it makes up the entire ore body. *Stokes and Varnes, 1955.*

orendite. A phlogopite-leucite phonolite with major leucite, sanidine, diopside, phlogopite, accessory apatite, and brookite. Kataphorite may or may not be present. *A.G.I.*

ore of sedimentation. Ore deposits resulting from the decomposition and erosion of metal-bearing rocks and the concentration of the metallic fragments in beds, such as stream tin, black sands, and some diamond and other gem deposits. *Nelson.*

ore partly blocked. Those ore bodies that are only partly developed, and the values of which can be only approximately determined. *See also* probable ore, d. *Fay.*

orepass. A vertical or inclined passage for the downward transfer of ore, and is equipped with gates or other appliances for controlling the flow. An orepass is driven in ore or country rock and connects a level with the hoisting shaft or with a lower level. *See also* ore chute. *Nelson.*

ore personal property. Ore, or other mineral product, becomes personal property when detached from the soil in which it is imbedded. *Ricketts, I.*

ore pipes. Long and relatively thin deposits which commonly are formed at intersections of two planes. *Stokes and Varnes, 1955.*

ore plot. A place where the dressed ore is kept. *Fay.*

ore pocket. Excavation near hoisting shaft into which ore from stopes is moved, preliminary to hoisting. Also, term used in such a phrase as a rich pocket of ore to describe an unusual concentration in the lode. *Pryor, 3.*

ore preparation. The same as ore dressing. *Newton, p. 51.*

ore process. In steelmaking, the Siemens process. *See also* open hearth. *Fay.*

ore province. Preferential occurrence of some kinds of ore deposits in certain well-defined areas, for example, the porphyry-copper deposits of the southwestern United States. *Hawkes, 2, p. 320.*

ore reserve. a. The term is usually restricted to ore of which the grade and tonnage have been established with reasonable assurance by drilling and other means. *Nelson.* b. The total tonnage and average value of proved ore, plus the total tonnage and value (assumed) of the probable ore. *Hoov., p. 122.* c. The mine's substantial asset, without which none of the surface works are economically viable. A body of ore which has been proved to contain a sufficient tonnage of amenable valuable mineral to justify the mining enterprise. The British Institution of Mining and Metallurgy, which regulates the professional standards of its membership, considers that the term ore reserves should be restricted to ore of which the quantity and grade have been established with reasonable assurance by a responsible, professionally qualified person. Additional ore insufficiently developed or tested for inclusion in ore reserves should be clearly described in simple terms best suited to the circumstances; modes of mineral occurrence vary too widely to permit standardization of categories. *Pryor, 3.* d. S. Afr. Ore bodies made available for mining through drives connected by winzes (a connection driven down) and raises (a connection driven up), thus forming blocks which are accessible from four sides. Some companies record partially developed ore reserves in which this making of blocks has not been completed. Newcomers in gold mining occasionally speak of ore reserves when they mean the ore bodies contained in a mining area and in copper mining this method of expression has been accepted by large concerns. *Beerman.* e. *See* reserve. *Fay.*

ore roasting. The process of heating certain ores to temperatures slightly below their reducing temperatures to drive off such impurities as are capable of oxidation at the lower temperatures, thus simplifying the subsequent reducing operations. *Henderson.*

ore sampling. The process in which a portion (sample of ore) is selected in such a way, that its composition will represent the average composition of the entire bulk of ore. Such a selected portion is a sample, and the art of properly selecting such a sample is called sampling. *Newton, p. 27.*

ore separator. A cradle, frame, jigging machine, washer, or other device or machine used in separating the metal from broken ore, or ore from worthless rock. *Standard, 1964.*

ore shoot. a. Concentration of primary ore along certain parts of a rock opening. *Bateman.* b. A large and usually rich aggregation of mineral in a vein. It is a more or less vertical zone or chimney of rich vein matter extending from wall to wall, and has a definite width laterally. Sometimes called pay streak, although the latter applies more specifically to placers. *Fay.* c. An area of payable lode surrounded by low values is called an "ore shoot" or "shoot". *Spalding, p. 159. See also* shoot.

ore sill. A tabular sheet of magmatic ore, injected in a liquid state along the bedding planes of a sedimentary or layered igneous formation. *Schieferdecker.*

ore sorter. *See* sorter. *D.O.T. 1.*

ore stamp. A machine for reducing ores by stamping. The most familiar form is the stamp battery, and the latest is the powerful steam stamp. *Standard, 1964.*

ore-storage drier man. One who removes moisture from ore or other material preparatory to roasting or electrolytic processing, using a gas or hotair drier. Also called drier operator. *D.O.T. Supp.*

ore strands. Individual masses of quartz with their halos of alteration and ore minerals, or close assemblages of seams of such quartz and accompanying altered ground. *A.G.I.*

ore trend. A term used on the Colorado Plateau to indicate the extension of an ore body along its major axis; the average trend of ore in a particular area; or the regional trend of mineralization over large area. The local trend of individual ore bodies may vary from the regional trend of so-called mineral belts. *Ballard.*

ore vein. A tabular or sheetlike mass of ore minerals occupying a fissure or a set of fissures and later in formation than the enclosing rock. *Schieferdecker.*

ore washer. A machine for washing clay and earths out of earthy brown hematite ores. The log washer is a common type. *Fay.*

ore zone. A horizon in which ore minerals are known to occur. *Long.*

Orford process. A process used by the International Nickel Company for separating the copper and nickel in the matte obtained by Bessermerizing. The matte, which consists of copper-nickel sulfides is fused with sodium sulfide, and a separation into two layers, the top rich in nickel and the bottom rich in copper, is obtained. *C.T.D.* Also known as top-and-bottom process.

organ. A series of closely spaced props placed at the borders of the chamber at the coal face. Such an arrangement protects the future, adjoining chamber from caving. *Stoces, v. 1, p. 346.*

organic. Being, containing, or relating to carbon compounds, especially in which hydrogen is attached to carbon whether derived from living organisms or not. Usually distinguished from inorganic or mineral. *Webster 3d.*

organic acid. An acid derived from substances having life origin and carbon. An example is naphthenic acid. *Shell Oil Co.*

organic ash. Ash in coal derived from the incombustible material contained in plants. *Tomkeieff, 1954.*

organic bond. A bond consisting of an organic material, such as rubber, synthetic resin, or shellac. *ACSG, 1963.*

organic chemistry. That of carbon compounds. *Pryor, 3, p. 80.*

organic clay. A clay with a high organic content. *ASCE P1826.*

organic colloids. Depressants used in the flotation process. They include glue, gelatin, albumen, dried blood, casein (proteins), tannin, licorice, quebracho extract, and saponin (complex polyhydroxy carboxylic acids and glucosides. *Pryor, 3.*

organic-cooled reactor. A nuclear reactor that uses waxlike organic chemicals, such as mixtures of polyphenyls and terphenyls, as coolant and usually also as moderator. *L&L.*

organic deposits. Rocks and other deposits formed by organisms or their remains. *Fay.*

organic gem materials. Naturally occurring substances whose origin is wholly or partly organic, such as pearl, amber, coral, and jet. *Shipley.*

organic hieroglyph. *See* ichnofossil. *Pettijohn.*

organic sediments. *See* organic deposits. *Stokes and Varnes, 1955.*

organic silt. A silt with a high organic content. *ASCE P1826.*

organic soil. Soil with a high organic content. In general, organic soils are very compressible and have poor load-sustaining properties. *ASCE P1826.*

organic sulfur. The difference between the total sulfur in coal and the sum of the pyritic sulfur and sulfate sulfur. *B.S. 1016, 1961, Pt. 16.*

organic test. The test in which organic matter in soil is destroyed by oxidizing agents and the loss measured. This test is used in preparation of soil for a sedimentation test, and gives an indication of the amount of organic matter present. *Ham.*

organic theory. The theory that oil and gas originated from the natural distillation of vegetable and animal remains in stratified rock. *Shell Oil Co.*

organism. A living plant or animal. *A.G.I.*

organization, managerial. Coordination of functional units and presentation of the results of their achievements in policy guiding form as facts, conclusions and recommendations. Efficient integration of the operations managed. *Pryor, 3.*

organogenic. Derived from or composed of organic materials. *A.G.I.*

organegenous. A group named applied to rocks of organic origin. *Holmes, 1928.*

organolites. Rocks formed from organic substances, especially those of vegetable origin, such as coal, oil, resins, and bitumens. *Tomkeieff, 1954.*

organ-pipe coral. A tubiporoid coral consisting of cylindrical tubes placed side by side and united by horizontal floorlike expansions. *Standard, 1964.*

OR-gate. A gate whose output is energized when one or more of the inputs is in its prescribed state. *NCB.*

oriascope. An instrument used to determine orientation by directed reflection or by pinhole transmission from sawn and etched sections of quartz. *AM, 1.*

orichalc. Under the Roman empire, an alloy of copper and zinc resembling gold in appearance; brass. There was also a white orichalc. *Standard, 1964.*

orichalceous. Having a color between gold and brass; of or pertaining to orichalc. *Standard, 1964.*

orichalcum. An ancient copper alloy resembling gold in color. *Hess.*

orient. a. To place a diamond in a bit mold in such an attitude that when it is embedded in the crown matrix one of its hard vector planes will come in contact with the rock to be abraded or cut by the diamond. *Long.* b. To place a deflection wedge in a borehole in such an attitude that the concave surface is pointed in a predetermined direction. *Long.* c. To place a piece of core in the same relative plane as it occupied below the surface. *See also* core orientation. *Long.* d. To turn a map or planetable sheet in a horizontal plane until the meridian of the map is parallel to the meridian on the ground. In this position all lines on the map have the same azimuths as the corresponding lines on the ground. *Seelye, 2.* e. In a transit, to turn the instrument so that the direction of the 0° line of its horizontal circle is parallel to the direction it had in the preceding, or in the initial, setup. *Seelye, 2.* f. The characteristic sheen and irridescence displayed by pearl. *Anderson.*

oriental. a. Frequently used in the same sense as precious when applied to minerals; from an old idea that gems came principally from the East, for example, oriental amethyst, oriental chrysolite, oriental emerald, oriental topaz, all of which are varieties of sapphire. *Fay.* b. Specially bright, clear, pure, and precious; said of gems. *Standard, 1964.*

oriental agate. The most beautiful and translucent sorts of agate. *Fay.*

oriental alabaster. a. Calcium carbonate in the form of onyx marble. Gibraltar stone. *Hess.* Also called Algerian onyx. *C.T.D.* b. Synonym for onyx marble. *Hey 2d, 1955.*

Oriental almandine. A trade name for corundum of gem stone quality, which is deep red in color, resembling true almandine (a garnet) in this, but no other, respect. *C.M.D.*

oriental amethyst. a. A variety of sapphire, but the term is applied to any amethyst of exceptional beauty. *Fay.* b. A variety of corundum. *Hey, 2d, 1955.* c. A type of false amethyst. *C.T.D.*

oriental aquamarine. Pale bluish-green to greenish-blue corundum. *Shipley.*

oriental beryl. An emerald-colored sapphire. *Hess.*

oriental carnelian. Deep bright red translucent carnelian. *Shipley.*

oriental cat's-eye. Synonym for cymophane. *C.M.D. See also* cat's-eye.

oriental chalcedony. Fine translucent gray or white chalcedony. The latter when cut cabochon is the same as chalcedony moonstone. *Shipley.*

oriental chrysoberyl. Yellowish-green sapphire. *Shipley.*

oriental chrysolite. A variety of chrysoberyl. *Hey 2d, 1955.*

oriental emerald. A green variety of corundum. *Fay.*

oriental garnet. A precious garnet. *Webster 2d.*

oriental girasol. Girasol sapphire. *Shipley.*

oriental hyacinth. Orange-red sapphire. *Shipley.*

oriental jasper. An early name for heliotrope. *Hey, M. M., 1964.*

oriental lapis. Lapis lazuli. *Shipley.*

oriental moonstone. a. Girasol corundum. *Shipley.* b. Genuine moonstone as distinguished from chalcedony moonstone. *Shipley.*

oriental onyx. Banded, mottled, or clouded travertine. *Shipley.*

oriental opal. Precious opal. *Shipley.*

oriental peridot. Olive-green sapphire. *Shipley.*

oriental powder. An explosive consisting of tan bark, sawdust, or other vegetable fiber, or resins, such as gamboge, impregnated with a nitrate or chlorate and mixed with gunpowder. *Standard, 1964.*

oriental ruby. The true ruby, a variety of corundum. *Fay.*

oriental sapphire. The true sapphire, a variety of corundum. *Fay.*

oriental sunstone. Reddish or yellowish girasol corundum. *Shipley.*

oriental topaz. A yellow variety of corundum, Al_2O_3. *Fay.*

oriental turquoise. Synonym for turquoise. *Hey 2d, 1955.*

oriental vermeille. Red-brown corundum. *Shipley.*

orientation. a. In surveying, the rotation of a map (or instrument) until the line of direction between any two of its points is parallel to the corresponding direction in nature. *Fay.* b. The placing of a crystal in the conventional attitude, so as to show its symmetry and the forms to which its faces belong. *Fay.* c. In structural petrology, refers to the arrangement in space of the particles (grains or atoms) of which a rock is composed. *A.G.I.* d. The act or process of setting a diamond in the crown of a bit in such an attitude that one of its hard vector planes will become in contact with the rock and be the surface that cuts or abrades it. *Fay.* e. As used in borehole surveying and directional drilling practice, orientation refers to the method and procedure used in placing an instrument or tool, such as a deflection wedge, in a drilled hole so that its directional position, bearing, or azimuth is known. *Long.* f. The relative position of particles with respect to one another or to a reference point. *ASTM STP No. 148-D.* g. The position of important sets of planes in a crystal in relation to any fixed system of planes. *See also* pure metal crystals. *C.T.D.*

orientation, crystal. Arrangement in space of the axes of a crystal with respect to a chosen reference or coordinate system. *See also* preferred orientation. *ASM Gloss.*

orientation survey. In geochemical prospecting, a soil survey normally consisting of a series of preliminary experiments aimed at determining the existence and characteristics of anomalies associated with mineralization. This information is then used in selecting adequate prospecting techniques and in determining the factors and criteria that have a bearing on interpretation of the geochemical data. *Hawkes, 2, p. 204.*

oriented. Type in which adsorbed molecules are ordered in their orientation at surface of solid. *Pryor, 3, p. 7.*

oriented adsorption. Surfacial grouping of a monomolecular layer in a definite direction. *Pryor, 3.*

oriented bit. A surface-set diamond bit with individual stones set so as to bring the hard vector direction or planes of the crystal into opposition with the rock surface to be abraded or cut. *See also* orient, a. *Long.*

oriented core. A core specimen which can be positioned on the surface as it was in the borehole prior to extraction. Such a core is useful where the general dip of the strata is required from one borehole. A magnetic method may be used to disclose the polarity the core specimen possessed while in situ. *See also* borehole surveying. *Nelson. Compare* core orientation.

oriented core barrel. An instrument used in borehole surveying, which marks the core to show its orientation. *Ham.*

oriented diamond. A diamond inset in the crown of a bit in such an attitude that one of its hard vector planes will be the surface that cuts or abrades the rock. *See also* orient, a. *Long.*

oriented rods. Drill rods that are lined up in reference to a specific mark, carried from rod to rod, as they are lowered into a borehole by using alinement clamps, a transit, or a theodolite. *Long.*

oriented sample. Synonym for oriented core. *Long.*

oriented specimen. a. In structural petrology, a hand specimen so marked that its exact arrangement in space is known. *Billings, 1954, p. 366.* b. In paleontology, a fossil whose position is known in regards to such features as anterior and dorsal sides, dorsal and ventral sides, the axis of coiling, the plane of coiling, etc. *A.G.I.*

oriented stone. A stone so fashioned as to place the optic axis in a predetermined position, as, for instance, in asteriated stones which should be so oriented as to place the axis normal to the top surface in order to achieve the best star. Most rubies should be cut with the axis normal to the table in order to exhibit the best color; most tourmalines with axis parallel to the table. *Shipley.*

oriented survey. A borehole survey made by lining up a reference mark on the clinometer case with that on the drill rods, which in turn are oriented as they are lowered into the borehole. *See also* oriented rods.

orienting coupling. A rotatable coupling on a Thompson retrievable wedge-setting assembly that may be set and locked in a predetermined position in reference to the gravity-control member. This places the deflection wedge so as to direct the branch borehole in the desired course. *Long.*

orientite. A brown to black hydrous silicate of calcium and manganic manganese, $Ca_4Mn_4(SiO_4)_5.4H_2O$. Minute, radiating, prismatic crystals. Orthorhombic. From Oriente Province, Cuba. *English.*

orifice. a. In ventilating, a hole in a very thin plate. *Mason.* b. A hole or opening, usually in a plate, wall, or partition, through which water flows, generally for the purpose of control or measurement. *Seelye, 1.* c. The end of a small tube, as the orifice of a Pitot tube, piezometer, etc. *Seelye, 1.* d. An opening through which glass flows. In a feeder, an opening in bottom of spout formed by the orifice ring. *ASTM C162–66.* e. Opening. Commonly used to apply to discs placed in pipelines or radiator valves to reduce the fluid flow to desired amount. *Strock, 10.*

orifice meter. A form of gas or liquid flowmeter consisting of a diaphragm in which there is an orifice placed transversely across a pipe, the difference in pressure on the two sides of the diaphragm is a measure of flow velocity. *Lowenheim.*

orifice of passage (of a fan). A value which is comparable to the equivalent orifice of a mine, that is, the area in a thin plate which requires the same pressure to force a given volume of air through as is required to force the same volume through the fan. Orifice of passage

$$O = \frac{0.389\ Q}{\text{w.g.f.}},$$

where Q=volume of air passing in thousands cubic feet per minute; w.g.f.=loss of pressure in the fan in inches of water gage. *Nelson.*

orifice plate. a. A plate containing an orifice. In pipes, the plate is usually inserted between a pair of flanges. The orifice is smaller than the pipe, and the drop in the hydraulic gradeline caused thereby is an index of the discharge. *Seelye, 1.* b. Is a convenient and practicable method of measuring the quantity of air flowing in ducts, as it is easily introduced between the flanges of adjacent lengths of ducting. The pressure tappings can be positioned near the flanges, on either side of the orifice plate, with little error. The flow emerges from the orifice in the form of a jet and converges to a vena contracta before expanding downstream, to fill the duct. *Roberts, I. p. 45.*

orifice ring. That ring which forms the hole through which glass flows in the feeder process. *See also* bushing, e. *ASTM C126–66.*

origin. The source or ground of the existence of anything, either as cause or as occasion; that from which a thing is derived or by which it is caused; especially, that which initiates or lays the foundation; as, the origin of ore deposits. *Standard, 1964.*

original. Characteristic of or existing in a rock at the time of its formation; said of minerals, textures, etc., of rocks; essentially the same as primary, a., and contrasted with secondary, a. *Fay.*

original dip. The dip of beds immediately after deposition. Because of sinking of the basin these dips may steepen. The dip just prior to folding is initial dip. Synonym for primary dip. *A.G.I.*

original hole. *See* main hole. *Long.*

original lead. The common lead in a uranium mineral. *A.G.I.*

original lots. Unbroken parcels of diamonds as graded and assorted at the mines. *Hess.*

original mineral. *See* primary mineral. *Nelson.*

original package. The term properly is applied to natural gas transported by pipe lines. *Ricketts, II.*

Oriskanian. Upper Lower Devonian. *A.G.I. Supp.*

Oriskany sandstone. A sandstone occurring in the Devonian age in the United States. *Fay.*

Orizaba limestones. Thick limestones in the Comanchean, partly of Fredericksburg and partly of Washita age, occurring in Mexico. *C.T.D.*

Ormerod detaching hook. A detaching hook consisting of three plates, the center one moving on a steel pin. Normally, the plates are locked with a copper pin. In the event of an overwind, the central plate is pushed sideways which releases the rope shackle. Projections on the plates engages in the bell fixed in the headgear and support the cage until released. *Nelson.*

ormolu. a. Gold ground for use in gilding; also metal gilded with ground gold. *Webster 3d.* b. A brass made to imitate gold and used in mounts for furniture and for other decorative purposes. Also called mosaic gold. *Webster 3d.*

ornamental brick. A somewhat broad term applied to front brick, that are either of some form other than that of a rectangular prism or, that have the surface ornamented with some form of design. *Fay.*

ornansite. A stony meteorite composed of bronzite and olivine in a friable mass of chondri. *Hess.*

ornell. The same as urnel. *Arkell.*

ornoite. A variety of hornblende diorite. *A.G.I.*

orocline. A structural or mountain arc owing its form to differential horizontal displacement after the main features of the structural zone originated. *A.G.I. Supp.*

orogen. A belt of deformed rocks, in many places accompanied by metamorphic and plutonic rocks; for example, the Appalacian orogen or the Alpine orogen. *A.G.I.*

orogenesis. *See* orogeny. *A.G.I.*

orogenetic. Formed as the result of mountain-building processes. *Hess.*

orogenic. a. Pertaining to the processes by which great elongate chains and ranges of mountains are formed. *BuMines Bull. 587, 1960, p. 2.* b. An adjective derived from orogeny. *A.G.I.*

orogenic sediment. Any sediment whose origin is directly attributable to the region of mountain building in which it later becomes involved. *Stokes and Varnes, 1955.*

orogeny. a. The process of mountain making especially by folding of the earth's crust. *Webster 3d.* b. Earth movement, folding, and faulting during rise of mountains. *Pryor.*

orography; orology. A branch of physical geography that deals with mountains and mountain systems. *Webster 3d.*

oroide. An alloy, chiefly of copper and zinc, or tin, resembling gold in color and brilliancy; used in making cheap jewelry. *Webster 3d.*

orology. *See* orography. *Fay.*

orometer. An aneroid barometer having a second scale that gives the approximate elevation above sea level of the place where the observation is made. *Webster 3d.*

oronite. An enamel paint for protecting metal surfaces from the action of hot vapors. *Fay.*

oropion. A dark brown to black clay probably halloysite. *Dana 6d, p. 688.*

O'Rourke car switcher. A crossover switch that consists essentially of a single-acting cylinder hoist on a crossrail fastened to the roof at right angles to the track. While a car is being loaded, the switcher picks up the empty car next to the locomotive and holds it to one side. As soon as a car is loaded the locomotive pulls the train back past the switcher, and the empty car is placed at the front of the train and pushed under the slide. *Lewis, pp. 201–202.*

orpiment. A yellow arsenic trisulfide, As_2S_3, containing 61 percent arsenic; monoclinic. *Dana 17.*

Orsat gas-analysis instrument. An instrument for analyzing flue gases. Although outside its normal field of application, it may be used for analyzing mine air. *Nelson.*

orstein. Hard, cemented B-horizon of a podzol. *Schieferdecker.*

orthite. Slender acicular crystals of allanite. *Crosby, p. 65.*

ortho-. a. A combining form meaning straight; at right angles; proper. *A.G.I.* b. In petrography, the prefix indicating that a metamorphic rock was originally igneous. *A.G.I.*

orthoamphibole. A group name for the orthorhombic amphiboles. *Hey 2d, 1955.*

orthoantigorite. A variety of antigorite based on an orthohexagonal cell; from Unst, Shetland, Scotland. *Spencer 20, M.M., 1955.*

orthoaxis; orthodiagonal. In the monclinic system, the axis that is perpendicular to the other two axes. *Fay.*

orthobituminous coal. Bituminous coal containing from 87 to 89 percent carbon (ashless, dry basis. *Tomkeieff, 1954.*

orthochlorite. Chlorites commonly occurring in distinct crystals or plates; name proposed by Tschermak. *Dana 6d, p. 643.*

orthochrysotile. *See* clinochrysotile. *Spencer 20, M.M., 1955.*

orthoclase. A silicate of potassium and aluminum, $K(AlSi_3O_8)$, crystallizing in the monoclinic system; it occurs as an essential constituent in granitic and syenitic rocks, and as an accessory in many other rock types. A feldspar. *See also* sanidine; microcline. *Fay; Dana 17.*

orthoclase gabbro. A descriptive name for rocks now known as monzonite, in which the plagioclase is at least as calcic as labradorite. *Holmes, 1928.*

orthoclasite. A medium- to fine-grained dike rock containing about 90 percent or more of orthoclase. *Holmes, 1928.*

orthoclastic. Cleaving in directions at right angles to each other. *Webster 3d.*

orthodiagonal. *See* orthoaxis.

orthodibromobenzene; benzene dibromide. A heavy liquid; pleasant aromatic odor; $C_6H_4Br_2$; specific gravity, 1.9767 (at 25°C, referred to water at 4° C); miscible with alcohol, acetone, ether, benzene, carbon tetrachloride, and *n*-heptane; and insoluble in water. Used in ore flotation. *CCD 6d, 1961.*

orthodolomite. A sedimentary dolomite. *A.G.I. Supp.*

orthodome. A monoclinic crystal form whose faces parallel the orthoaxis and cut the other axes. *A.G.I. Supp.*

orthofelsite. Suggested by Teall for porphyritic rocks with felsitic groundmass and phenocrysts of orthoclase. *Fay.*

orthoferrosilite. An end-member, Fe(Mn)-O.SiO_3, of the enstatite-hypersthene series of orthorhombic pyroxenes. Named from analogy with ferrosilite and clinoferrosilite. Contains 0–12 percent of enstatite, MgO.-SiO_2. From Manchuria. *See also* iron-hypersthene. *English.*

orthogneiss. Applied to gneissose rocks which have been derived from rocks of igneous origin. *Compare* paragneiss. *C.T.D.*

orthogonal. A term meaning at right angles. *Ham.*

orthoguarinite. Cesaro's name for an orthorhombic form of guarinite, through superposition of hemitropic lamellae of the monoclinic mineral, clinoguarinite. *English.*

orthohydrous coal. Normal bituminous coal of medium hydrogen content (5 to 6 percent. *Tomkeieff, 1954.*

orthohydrous macerals. Macerals having a normal hydrogen content, such as vitrine. *Tomkeieff, 1954.*

orthokalsilite. The artificial orthorhombic high-temperature polymorph of $KAlSiO_4$. *Hey, MM, 1964.*

ortholignitous coal. Coal containing from 75 to 80 percent carbon (ashless, dry basis). *Tomkeieff, 1954.*

ortholimestone. A sedimentary limestone. *A.G.I.*

orthomagmatic. Applied to a stage in the crystallization of magmas during which only pyrogenetic minerals (minerals crystallizing directly from the magma) are formed. *A.G.I.*

orthomagmatic stage. Applied to the main stage of crystallization of silicates from a typical magma; the stage during which perhaps 90 percent of the magma crystallizes. Synonymous with orthotectic stage. *Compare* pegmatitic stage. *A.G.I.*

orthomic feldspars. Triclinic feldspars, which by repeated twinning (orthomimicry), simulate a higher degree of symmetry with rectangular cleavages. They include orthoclase, anorthoclase, and cryptoclase. *English.*

orthophyre. An obsolete name for orthoclase porphyry. *A.G.I.*

orthophyric. A textural term applied to medium- and fine-grained syenitic rocks consisting of closely packed orthoclase crystals of stouter build than in the typical trachytic texture. *C.M.D.*

orthophyric texture. A groundmass texture distinguished from trachytic texture by the presence of abundant stumpy rectangles of feldspar. *Holmes, 1928.*

orthopinacoid; orthopinacoidal. In the monoclinic system, the form consisting of the two planes parallel to the vertical and orthodiagonal axes. *Standard, 1964.*

orthopinakiolite. Orthorhombic polymorph of pinakiolite, $Mg_3Mn''Mn'''_2B_2O_{10}$, as black needles in dolomite from Langban, Sweden. *Hey, M.M., 1961.*

orthoprism. A monoclinic prism, the orthodiagonal intercept of which is greater than 1. *Standard, 1964.*

orthopyroxene. Any of several pyroxene minerals that crystallize in the orthorhombic system. They generally contain no calcium and little, or no aluminum. *Stokes and Varnes, 1955.*

orthoquartzite. A clastic sedimentary rock composed of silica-cemented quartz sand. The cement is commonly deposited in crystallographic continuity with the quartz of the worn grains. *A.G.I.*

orthorhombic. The crystal system in which crystals have two or three symmetry planes and twofold symmetry axes at their intersection. *Hurlbut.*

orthorhombic symmetry. In structural petrology, refers to either symmetry of movement or symmetry of fabric. Orthorhombic symmetry of movement is exemplified by the motion that occurs when a sphere is subjected to a single compressive force acting along the vertical axis but is constrained on two opposite sides. Orthorhombic symmetry of fabric is the symmetry of an ellipsoid; there are three planes of symmetry. Synonym for rhombic symmetry. *A.G.I.*

orthorhombic system. In crystallography, that system of crystals whose forms are referred to three unequal mutually perpendicular axes; also called prismatic system; rhombic system; trimetric system. *Fay.*

orthorocks. Metamorphic rocks which are derived from rocks of igneous origin. *Schieferdecker.*

orthoschist. Used to denote a schist derived from an igneous rock. *See also* paraschist; schist. *A.G.I.*

orthose. a. A name for the whole feldspar family before it was divided into separate species. *Fay.* b. Synonym for orthoclase. *Hey 2d, 1955.*

orthosilicate. A salt of the hypothetical orthosilicic acid, H_4SiO_4; for example, forsterite is an orthosilicate, Mg_2SiO_4. This method of classifying silicates is obsolete. *See also* silicates, classification. *A.G.I.*

orthosilicic acid; silicic acid. a. H_4SiO_4; known chiefly by its salts found in minerals. *Standard, 1964.* b. An amorphous gelatinous compound, H_4SiO_4, consisting of silica and water, into which constituents it readily decomposes. *Standard, 1964. See also* silicic acid.

orthotectic. Designates those processes and products, strictly magmatic in the narrowest sense, exemplified in the normal crystallization of normal igneous rocks. *A.G.I.*

orthotectic stage. Synonym for orthomagmatic stage. *A.G.I.*

orthotomous. Same as orthoclastic. *Fay.*

orthotropic. The description applied to the elastic properties of material, such as timber, which has considerable variations of strength in two or more directions at right angles to one another. *See also* isotropic. *Ham.*

ortlerite. A variety of hornblende porphyrite containing phenocrysts of hornblende in a holocrystalline feldspathic groundmass. *Holmes, 1928.*

Ortmann's coastal regions. In oceanography, a series of faunistic regions into which the coastal waters of the world have been divided. *C.T.D.*

Orton cones. a. Pyrometric cones made in two sizes, 2½ inches high for industrial kiln control, and 1-1/8 inches high for pyrometric cone equivalent testing. *See also* pyrometric cone. b. Used in the United States for heat recording; they are similar to Seger cones, but the same numbers do not indicate the same temperatures, for example, Orton cone 14 corresponds to Seger cone 13. *Rosenthal.*

orvietite. An extrusive rock composed of plagioclase and sanidine in about equal amounts together with leucite and augite. Contains minor biotite and olivine, with accessory apatite and opaque oxide. The rock is intermediate between leucite phonolite and leucite tephrite. *A.G.I.*

oryctogeology. The classification and arrangement of fossils. *Standard, 1964.*

oryctognosy. The description and systematic arrangement of minerals; mineralogy. *Fay.*

oryktognosie. Applied by Werner to determinative mineralogy, especially as it related to mining. It has long been obsolete. *A.G.I.*

os. A Swedish term, equivalent to esker, for certain elongated ridges of detrital material, generally explained as having been deposited in subglacial tunnels. *Fay.*

Os Chemical symbol for osmium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B–1.*

Osagean. Lower Middle Mississippian. *A.G.I. Supp.*

osannite. A soda-amphibole between riebeckite and arfvedsonite, $H_{10}(Na,K)_{28}(Fe'',Mn,Mg,Ca)_{28}Fe'''_{18}(Si,Ti)_{64}O_{190}$, from Cervadaes, Portugal. The riebeckite from Quincy, Mass., may be osannite. *English.*

Osann's classification. A chemical system of classification of igneous rocks. *A.G.I.*

osar. *See* esker. *C.T.D.*

osarizawaite. A yellow powdery crust, $PbCuAl_2(SO_4)_2(OH)_6$; the aluminum analogue of beaverite. From the Osarizawa mine, Akita prefecture, Japan. Named from the locality. *Hey, M.M., 1964; Fleischer.*

Osborn-Shaw process. *See* Shaw process. *Dodd.*

oscillating beam. *See* walking beam.

oscillating conveyor. A type of vibrating conveyor having a relatively low frequency and large amplitude of motion. *See also* vibrating conveyor. *ASA MH4.1–1958.*

oscillating die press. A small, high-speed press in which the die and punch move horizontally with the strip during the working stroke. Through a reciprocating motion, the die and punch return to their original positions to begin the next stroke. *ASM Gloss.*

oscillating feeder. *See* conveyor type feeder. *ASA MH4.1–1958.*

oscillating grease table. An assembly of 4 to 8 metal trays, usually 30 inches wide and 8 to 15 inches long, arranged in series in the direction of flow. The trays are detachably mounted in the assembly by steps so that the overflow from one tray overlaps the next tray by an inch and is 2 to 4 inches above it. The trays are inclined downward in the direction of the flow at an angle adjustable from 14 to 18 degrees. The entire assembly is mechanically oscillated transversely to the direction of the flow at about 200 strokes per minute with an adjustable stroke of about ½ inch. The storage bin and feed roller are independently mounted and discharge a layer 1 grain thick. *I.C. 8200, 1964, p. 70.*

oscillation. Independent movement through a limited range, usually on a hinge. *Nichols.*

oscillation ripple marks. a. Ripple marks with relatively straight crests and symmetrical profile. *Pettijohn.* b. *See* wave ripple mark. *A.G.I.*

oscillator plate. A thin slab of quartz which, by mechanical vibration, controls the frequency of a radio transmitter. *Hurlbut.*

oscillator quartz. Used in reference to raw quartz, which is of a sufficiently high quality, to be used in the manufacture of oscillator plates. *AM,1.*

oscillatory ripple mark. *See* wave ripple mark. *A.G.I.*

oscillatory twinning. Repeated twinning in which the crystal is made up of thin lamellae alternately in reversed position; polysynthetic twinning; found in some feldspars. *Fay.*

oscillatory wave. A wave in which each individual particle oscillates about a point with little or no permanent change in position. The term is commonly applied to progressive oscillatory waves in which only the form advances, the individual particles moving in closed orbits. Distinguished from a wave of translation. *See also* orbit. *A.G.I.*

oscillogram. A record of the indications on an oscillograph. *ASM Gloss.*

oscillograph. An instrument which renders visible, or automatically traces, a curve representing the time variations of electric phenomena. The recorded trace is an oscillogram. *A.G.I.*

oscilloscope. An intsrument for showing visually graphical representations of the waveforms encountered in electrical circuits. *H&G.*

osmiridium. Iridosmine; hexagonal; Mohs' hardness 6.7; specific gravity 19.3 to 21.1. An alloy of iridium and osmium. *Pryor, 3.*

osmite. a. Iridosmine with 40.83 percent osmium. *English.* b. Native osmium, perhaps present among the grains of iridosmine from Brazil; Ural Mountains, U.S.S.R. *English.* c. Later applied to an iridosmine from Borneo, West Indies, containing 80 percent osmium; 10 percent iridium; 5 percent rhodium. *English.* d. Synonym for nevyanskite. *Hey 2d, 1955.*

osmium. An extremely hard, bluish or grayish metallic element in group VIII of the periodic system and a member of the platinum group. Either osmium or iridium is the densest or the heaviest element known. Finely divided, it is an important catalyst for gas reactions. The metal is not attacked by any acids. Symbol, Os; valences, 2, 3, 4, and 8; atomic number, 76; atomic weight, 190.20; hexagonal; specific gravity, 22.48 (at 20° C); melting point, 3,000° ± 10° C or 2,700° C; boiling point, 5,000° or 5,300° C; insoluble in water and in ammonia; and slightly soluble in aqua regia and in nitric acid. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B–124, B–199.*

osmondite. A solid solution of iron carbide in alpha ferrite occurring in steel hardened by quenching; a mixture of iron and cohenite. *Webster 2d; Hey 2d, 1955.*

osmond stone. Picrite or teschenite formerly used in Scotland in the construction of furnaces (osmond furnaces) and bakers' ovens. *Arkell.*

osmose. The tendency of two liquids or gases to mix by passing through a membrane or a porous wall separating them. *Standard, 1964.*

osmosis. The passage of a solvent through a membrane from a dilute solution into a more concentrated one, the membrane being permeable to molecules of solvent but not to molecules of solute. *A.G.I.*

osmotic. Of, relating to, or having the property of osmosis. *Webster 3d.*

osmotic equivalent. The ratio between the quantity of solvent that passes through the membrane or septum of an osmotic cell and the quantity of solute which passes in the opposite direction. *Webster 2d.*

osmotic pressure. If a pure solvent is separated from a solution by a membrane permeable only to molecules of the solvent, the extra pressure which must be applied to the solution in order to prevent flow of solvent into it by osmosis is known as the osmotic pressure of the solution. *A.G.I.*

osmund furnace. A kind of high forge, intermediate in the development of the Catalan forge and the blast furnace, formerly used for making wrought iron from which wire was first made in England, in the 15th century. *Fay.*

osmund (osmond) iron. A superior iron formerly imported into England from Sweden and used especially for making arrowheads, fishhooks, clocks, etc. *Webster 3d.* Also, iron made in the osmund furnace. *Fay.*

osseous amber. Opaque or cloudy amber containing numerous minute bubbles. *Tomkeieff, 1954.*

osseous breccia. The cemented mass of fragments of bones of extinct animals found in caverns and fissures. *Fay.*

ossiferous. Containing or yielding bones. *Challinor.*

osteolite. Earthy apatite. *Fay.*

ostler. The person who feeds the mine horses or mules and keeps the stable in order. A contraction of hostler. *Fay.*

ostracods. Minute crustaceans with bean-shaped bivalve shells completely enclosing the body. *A.G.I.*

ostraite. A variety of ariegite characterized by abundant magnetite and spinel. *Holmes, 1928.*

Ostwald's dilution law. In weak solutions, the degree of electrolytic dissociation is proportional to the dilution. *Bennett 2d, 1962.*

osumilite. A mineral resembling cordierite, but hexagonal, $(K,Na,Ca)(Mg,Fe'')_2(Al,Fe''',Fe)_3(Si,Al)_{12}O_{30}.H_2O$, in volcanic rock from Province of Osumi, Japan. Named from locality. *Spencer 20, M.M., 1955.*

Oswegan. Lower Silurian (restricted). *A.G.I. Supp.*

otavite. S.W. Afr. A mineral, $CdCO_3$, consisting of cadmium and isostructural with calcite. *Webster 3d.*

other rock in place. As used in the mining act, means any rocky substance containing mineral matter. *Ricketts, p. 132.*

other valuable deposits. Includes nonmetalliferous as well as metalliferous deposits. *Ricketts, I.*

ottajanite. A variety of leucite tephrite richer in plagioclase and poorer in leucite than vesuvite. Corresponds in chemical composition to sommaite. *Holmes, 1928.*

Otto cycle. In a four-stroke internal combustion engine two complete revolutions of the crankshaft correspond with the working cycle—inlet stroke (suction downstroke of piston in cylinder); compression upstroke; explosion at peak of compression followed by expansion of hot exploded gases on driving downstroke; rising exhaust stroke to complete cycle. *Pryor, 3.*

ottrelite. a. A manganese-bearing chloritoid mineral, $(Fe'',Mn)(Al,Fe''')_2Si_2O_{10}.H_2O$, metamorphism of certain argillaceous sedimentary rocks; sometimes gray, though varying in color. Monoclinic. *Fay; Dana 17.* b. Synonym for diallage. *Hey 2d, 1955.*

ottrelite schists. Schistose rocks with the peculiar micaceous mineral ottrelite. They are best known from the Ardennes, Belgium, but are also found in New England. *Fay.*

ottrelite slate. A metamorphic argillaceous rock characterized by abundant crystals of ottrelite. *C.M.D.*

Ouachitaian orogeny. Late Mississippian-Early Pennsylvanian diastrophism. *A.G.I. Supp.*

ouachita stone. Same as novaculite. *Shipley.*

ouachitite. A melanocratic and lamprophyric dike rock composed of phenocrysts of biotite, less augite, and rarely hornblende, in a glassy groundmass. *Webster 2d.*

ouenite. A fine-grained eucritelike rock containing green augite and anorthite with smaller quantities of hypersthene and olivine. Both melanocratic and leucocratic varieties occur. *Holmes, 1928.*

ouges. Eng. The solid rock on the side of the vein. *Fay.*

oulopholite. In the United States, radiating gypsum crystals simulating outward curving flower petals. Synonym for gypsum flower. *Schieferdecker.*

ounce. Any of various units of weight based on the ancient Roman unit equal to 1/12 Roman pound: (1) a unit equal to 1/12 troy pound, and (2) a unit equal to 1/16 avoirdupois pound. *Webster 3d. See also* avoirdupois; troy.

ounce stuff. Aust. Quartz producing about an ounce of gold to the ton. *Standard, 1964.*

ounce, troy. Consists of 480 grains; 31.1 grams. *Nelson.*

ouster. An entry by one on the land of another is an ouster of the legal possession arising from the title, or not, according to the intention with which it is done. If made under claim and color of right, it is an ouster; otherwise it is a mere trespass. In legal language, the intention guides the entry and fixes its character. *Ricketts, I.*

outage. a. Production time lost owing to breakdowns or other unforeseen causes. *Pryor, 3.* b. The difference between the full-rated capacity and actual contents of a barrel or tank. *Long.* c. The loss of a volatile liquid such as gasoline ascribed to evaporation or pilferage. Also called shrinkage. *Long.*

outbond. Laid parallel to the face of the wall; said of a brick. *Standard, 1964.*

outbreak coal. Eng. An old term for outcrop of a coal seam. *Fay.*

outburst. a. The name applied to the violent evolution of firedamp (usually together with large quantities of coal dust) from a working face. Outbursts are known wherever coal is worked. *See also* floor burst. *Roberts, I, p. 71.* b. The occurrence is violent and may overwhelm the workings and fill the entire district with gaseous mixtures. Roadways advancing into virgin and stressed areas of coal are particularly prone to outbursts in certain seams and faults often intersect the area. *See also* blower. *Nelson.* c. Scot. Outcrop. *Arkell.* d. Scot. A sudden accession of water or firedamp. *Arkell.*

outby; outbye. a. Nearer to the shaft, and therefore away from the face, toward the pit bottom or surface; toward the mine entrance. The opposite of inby. Also called outbyeside. *B.C.I.; Fay.* b. In a direction toward the mouth of the entry from the point indicated as the base or starting point. *Rice, George S. See also* backbye work. *Nelson.*

outcrop. a. The part of a rock formation that appears at the surface of the ground. *Webster 3d.* b. To crop out; to come out to the surface of the ground. *Webster 3d.* c. A term used in connection with a vein or lode as an essential part of the definition of apex. It does not necessarily imply the visible presentation of the mineral on the surface of the earth, but includes those deposits that are so near to the surface as to be found easily by digging. *Fay.* d. On an areal geology map, a formation or other stratigraphic unit is shown as an area of outcrop even if the rock is not exposed, provided it is covered only by soil alluvium, drift, or other surficial deposits and not by younger strata of the geologic column. *A.G.I.* e. Coal which appears at or near the surface; the intersection of a coal seam with the surface. *B.C.I.*

outcrop map. A special type of geologic map that represents only actual outcrops. Areas without exposures are left blank. *Stokes and Varnes, 1955.*

outcroppings. Applied to a rock or ore vein as seen exposed on the surface. *Stauffer.*

outcrop water. The rain and surface water which seeps downwards along porous and fissured strata. Water may also flow downwards along fault planes, old shafts, or surface drifts. Outcrop water is of importance when working shallow deposits and also during site investigations. *See also* drift mining. *Nelson.*

outdoor stroke. That stroke of a Cornish pumping engine by which the water is forced upward by the weight of the descending pump rods, etc. *Fay.*

outer barrel. Synonym for outer tube. *Long.*

outer core. a. Outer part of the earth's core between depths of about 2,900 and 5,000 kilometers; may be liquid. *A.G.I. Supp.* b. A layer of the earth located between the inner core and the mantle. *MacCracken.*

outer gage. Synonym for outside diameter. *Long.*

outer shoreline. The shoreline at the open seaside of the barrier. *Schieferdecker.*

outer slope. The steeply descending outer slope of the reef below the dwindle-point of abundant living coral and coralline algae, which is ordinarily at about 10 fathoms. *Schieferdecker.*

outer stone. A diamond set on the outside wall of a bit crown. Also called kicker; outside stone; reamer; reamer stone. *Long.*

outer tube. The outermost of a pair of nesting tubes of a double-tube core barrel. Also called outer barrel; outside barrel; outside tube. *Long.*

outfall. a. Eng. A seam cropping out at a lower level. *Fay.* b. The vent of a river, drain, etc. *H&G.* c. A structure extending into a body of water for the purpose of discharging sewage, storm runoff, or cooling water. *H&G.*

outfit. a. A drill machine complete with tools and equipment needed to drill boreholes. *Long.* b. To acquire a drill and equip it with tools and equipment needed to drill boreholes. *Long.*

outlaw strike. Strike disapproved by the union or in violation of the contract between the union and the operators. *Zern.*

outlay. a. The act of laying out or expending. *Webster 3d.* b. Something that is laid out; expenditure. *Webster 3d.* c. The cost of equipping a mine and placing it on a producing basis. *Fay.*

outlet. a. The passage by which the ventilating current goes out of a mine. Same as upcast, a. *Fay.* b. An opening from a mine to the surface. *Fay.* c. Synonym for discharge, as applied to pumps or a piping system. *Long.*

outlier. a. An isolated mass or detached remnant of younger rocks, or of rocks overthrust upon others, separated by erosion from the main mass to which they belong and now surrounded, areally, by older, or at least underlying, rocks. Opposite of inlier. *Fay.* b. Ore or favorable geology distant from main ore zone of a district. *Hoffman.*

out of gage. Bits and reaming shells having set inside or outside diameters greater or lesser than those specified as standard. Also, a borehole the inside diameter of which is undersize or oversize. *Long.*

out-of-round. The imperfection of nonroundness in glass or ceramic articles. *ASTM C162-66.*

out of the house. Newc. The downstroke of a pumping engine. *Fay.*

out-over. Same as outby. *Fay.*

outpost well. A well drilled to extend a known oil or gas pool. If successful in this objective, it is an extension well. If unsuccessful, it is a dry outpost. *A.G.I.*

output. a. The quantity of coal or mineral raised from a mine and expressed as being so many tons per shift, per week, or per year. *Nelson.* b. The power or product from a plant or prime mover in the specific form and for the specific purpose required. *See also* concentration of output; o.m.s.; productivity. *Nelson.* c. The volume of a liquid discharged by a pump; volume of air discharged by a compressor; horsepower delivered by a motor. *Long.* d. Current or signal delivered by any circuit or device. *NCB.* e. The terminal or other point at which a current or a signal may be delivered. *NCB.*

output current. The output current of a transducer connected to a given source is the root-mean-square current which would be measured at its load terminals if they were short-circuited. *H&G.*

output devices. Machines which print information computed from their memory or store. *Pryor, 3, p. 32.*

output impedance. The output impedance of a transducer connected to a given source is the impedance which would be measured at its load terminals if they were not connected to a load and if the source voltage of the source were zero. *H&G.*

output power. The output power of a transducer connected to a given source is the available power at its load terminals. *H&G.*

output shaft. A shaft that transmits power from a transmission or clutch. *Nichols.*

output voltage. The output voltage of a transducer connected to a given source is the root-mean-square voltage which would be measured at its load terminals if they were open-circuited. *H&G.*

outrigger. An outward extension of a frame which is supported by a jack or block. Used to increase stability. *Nichols, 2.*

outrush. Before a mixture of methane and oxygen explodes the gases expand, owing to the great heat. This causes what is called an outrush. *Morris and Cooper, pp. 50–51.*

outset. a. The walling of a shaft which is built above the surface ground level. *Nelson.* b. A brick or stone shaft wall built within tubbing. *Fay.*

outside. Can. The large world of cities beyond the bush. *Hoffman.*

outside amalgamation. Another name for plate amalgamation. *New South Wales, p. 142.*

outside angling. *See* angling. *Sinclair, V, p. 33.*

outside barrel. Synonym for outer tube. *Long.*

outside clearance. One-half the total difference between the outside diameter of any piece of downhole equipment and the inside diameter of the borehole. *Long.*

outside diameter. The maximum length as measured between the terminal ends of an imaginary line drawn to the outside through the center of a circular or spherical object, such as a bit, tube, cylinder, or ball. *Long.*

outside face. The peripheral portion or that part of a bit crown, roller bit cutter, or any cutting edge of a bit in contact with the walls of the borehole while drilling. *Long.*

outside foreman. In bituminous coal mining, a foreman who supervises all operations at the surface of a mine. *D.O.T.1.*

outside gage. Synonym for outside diameter. *Long.*

outside-haulage engineer. In bituminous coal mining, one who operates a mine locomotive to haul trains of cars about the surface workings of a mine. *D.O.T.1.*

outside-slope engineer. In bituminous coal mining, one who operates a hoisting engine at the surface of a mine to raise and lower cars along a haulage slope (incline) between lower levels and the surface. *D.O.T. 1.*

outside stone. Synonym for outer stone. *Long.*

outside tap. Synonym for bell tap. *Long.*

outside tube. Synonym for outer tube. *Long.*

outside upset. The act or process of thickening a length of tubing at its ends by increasing its outside diameter without changing the inside diameter; a length of tubing or drill rod so processed *Long.*

outside wall. That part of a bit crown, bit shank, reaming shell, core barrel, drill rod, casing, or other piece of downhole equipment that when in use comes in contact with the wall of the borehole. *Long.*

outside work. Drilling operations conducted on the surface, as opposed to drilling done in underground or enclosed workplaces. *Long.*

outstroke. Eng. The privilege of breaking a barrier, and working and conveying underground, the coal from an adjoining royalty, or mine. *Fay.*

outstroke rent. Eng. Payment made for the privilege of working through a barrier and mining the coal of an adjoining property. *Fay.*

outtake. The passage by which the ventilating current is taken out of the mine; the upcast. The return air course. An outlet. *Fay.*

outwan. Scot. Outwards. *Fay.*

outwash. a. Stratified drift that is stream built (washed out) beyond the glacier itself. *A.G.I.* b. Stratified drift deposited by meltwater streams beyond active glacier ice. *A.G.I.*

outwash fan. A fan-shaped accumulation of glacial debris brought from a glacier and spread out by meltwater. *Stokes and Varnes, 1955.*

outwash plain. A plain composed of material washed out from the ice; the surface of a broad body of outwash. *A.G.I.*

ouvarovite. *See* uvarovite. *Fay.*

ovalness. Deviation from a truly circular periphery, usually expressed as the total difference found at any one cross section, between the maximum and minimum outside diameters of a tube which usually occur at or about 90° to each other. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

ovaloid. A plane figure resembling a rectangle with semicircular ends. *BuMines Bull. 587, 1960, p. 2.*

oval socket. A fishing tool used to recover broken drill rods from a borehole. *Long.*

oven. a. A chamber in which substances are artificially heated for the purposes of baking, roasting, annealing, etc.; specifically, (1) a kiln; as, a coke oven, and (2) in glassmaking, a leer. *Standard, 1964.* b. An enclosure made of brick or metal which is used for heat treating glass, enamel, or ceramic products. *Bureau of Mines Staff.*

oven attendant. *See* oven tender. *D.O.T. 1.*

oven coke. Coke produced by the carbonization of coal for the primary purpose of manufacturing coke. *B.S. 1017, 1960, Pt. II.*

oven-dry soil. Soil dried in an oven at a temperature of 105° C. *Ham.*

oven glass. a. Glass suitable for manufacture of articles to be used in baking and roasting foods. *ASTM C162-66.* b. Glassware made from oven glass. *ASTM C162-66.*

oven-heater helper. In the coke products industry, a laborer who assists heater by swabbing gas mains to maintain proper openings, removing tar deposits with steel wool, watching for gas leaks and controlling flow of air to flues to burn carbon from gas and air nozzles by moving caps over flues with handwheel as heat is reversed. Also called heater helper. *D.O.T. Supp.*

oven loader. *See* enamel-oven feeder; oven tender. *D.O.T. 1.*

ovenman. *See* oven tender. *D.O.T. 1.*

oven tender. One who loads and controls the temperature of an oven in which freshly painted parts are baked to harden their finish. Pushes truckload of dipped or sprayed pieces into heated oven, or hangs pieces on hooks suspended from an overhead trolley. Allows pieces to bake for a specified length of time and removes finished articles from oven. Also called baker, paint; enamel burner; kiln tender; oven attendant; oven loader; ovenman. *D.O.T. 1.*

ovenware. Ceramic whiteware for culinary oven use. *ASTM C242-60.*

overaging. Aging at a higher temperature, or for a longer time, or both, than required for critical dispersion, thus causing particle agglomeration of the precipitating phase and, as a result, loss of strength and hardness. *See also* aging. *Henderson.*

overall concentration. The ratio of pithead output (0 tons) to length of main haulage roads (L yards) or tons per yard of main haulage roads, that is, 0 divided by L. *See also* concentration of output. *Nelson.*

overall drilling time. The sum of the times required for actual rock drilling, setting up and withdrawal, moving drills from hole to hole and machine delays. The overall drilling time is a better basis for estimating drilling efficiency than penetration speed alone. *Nelson.*

overall efficiency. a. Of an air compressor, the product of the compression efficiency and the mechanical efficiency. *Fay.* b. Ratio of power output of an engine to the power input, and is the measure of the difference between indicated and brake horsepower. *Brantly, 2.*

overall fan efficiency. The ratio of the horsepower in the air to the horsepower absorbed by the driving motor of the fan. *B.S. 3618, 1963, sec. 2.*

overall reduction ratio. With reference to a crusher, this term may be expressed as: $\frac{\text{Mean size of feed}}{\text{Mean size of product}}$. *South Australia, p. 103. See also* reduction ratio.

overall ventilation efficiency. The ratio between the air horsepower and the indicated horsepower of driving unit. The percentage is expressed by

$$\frac{\text{Air horsepower x 100}}{\text{indicated horsepower of driving unit.}}$$

Measurements are taken of the air pressure and volume in the fan drift, and the power absorbed by the driving unit. *See also* volumetric efficiency. *Nelson.*

over-and-under conveyor. Two endless chains or other linkage between which carriers are mounted and controlled so that the carriers remain in an upright and horizontal position throughout the complete cycle of the conveyor. *ASA MH4.1-1958.*

overarching weight. The pressure of the rocks over the active mine workings. It is the roof weight that acts on the packs and the solid coal in the working area. *See also* abutment; nether roof; underweight. *Nelson.*

overbending. Bending metal through a greater arc than that required in the finished part, to compensate for springback. *ASM Gloss.*

overblown. Burnt by reason of an excessive blast; said of steel made by the Bessemer process. *Standard, 1964.*

overbreak; backbreak. The rock which is broken (and sometimes must be excavated) by blasting outside the intended area or line of break. Overbreak may occur as the result of misalinement or unintentional overcharging of blastholes or intentionally overbreaking as in the toe of a bench face to facilitate digging to grade. *Bureau of Mines Staff. Compare* underbreak.

overbreaking. *See* overhand stoping.

overburden. a. Used by geologists and engineers in several different senses. By some, it is used to designate material of any nature, consolidated or unconsolidated, that overlies a deposit of useful materials, ores, or coal, especially those deposits that are mined from the surface by open cuts. By others, overburden designates only loose soil, sand, gravel, etc., that lies above the bedrock. The term should not be used without specific definition. *Stokes and Varnes, 1955.* Also called burden, cover, drift, mantle, surface. *See also* burden, a and b. b. To charge in a furnace too much ore and flux in proportion to the amount of fuel. *Fay.*

overburden bit. A special diamond-set bit, similar to a set casing shoe, used to drill casing through overburden composed of sand, gravel, boulders, etc. *Long.*

overburden drilling. a. A technique developed in Sweden which involves the sinking, by percussive-rotary drilling, of a drill casing through the overburden to where it seats in the underlying rock. A rotary percussion drill hole is then continued to the desired depth in the rock. While the casing is being sunk through the overburden it is coupled to the drill rod and rotates and reciprocates with it. The rock bit on the end of the drill rod projects about an inch beyond the end of the ring bit with which the casing is fitted and acts as a pilot bit for the casing bit. *Woodruff, v. 3, p. 475.* b. A drilling method whereby drilling is carried out through subsoil and boulders or underwater to and through bedrock. *Engineering and Mining Journal, v. 165, No. 11, November 1964, p. 83.*

overburning. a. A condition sometimes occurring in the firing of ceramics or enamelware where the temperature of the furnace is too high or the ware is left in the furnace for a greater length of time than necessary. *Enam. Dict.* b. Heating dry products to temperatures which cause bloating. *Bureau of Mines Staff.*

overcast. a. An enclosed airway to permit one air current to pass over another one without interruption. They should be built of incombustible materials such as concrete, tile, stone, or brick. The use of overcasts results in better ventilation, removes the danger due to doors, such as being left open and leakage. *Kentucky, p. 90. Compare* undercast. b. Casting the removed overburden from coal mined from surface mines to an area from which the coal has been mined. *Bureau of Mines Staff.* c. To cast, throw, or spread something over or past. *Standard, 1964.* d. Pushed forward, so as to overlie other rocks, as in thrust faults. *Standard, 1964.*

overcasting. A procedure used in certain mining activities including strip mining and in some heavy construction work such as channel excavation. Overcasting may be performed in a simple operation consisting of digging out the material (the stripping shovel and stripping dragline are the most common machines used), lifting it from one position, moving it over, and dumping it in the spoil position where it remains, for practical purposes, indefinitely. The mechanics of the operation, regardless of the machines used, is called "simple overcasting." *Woodruff, v. 3, p. 407.*

overchaining. A drive is overchained when it incorporates a chain of substantially higher rating than that indicated by normal selection procedures. *J&M.*

overcharging. a. Adding material in excess of the capacity of the equipment used for processing. *Bureau of Mines Staff.* b. Sometimes occurs in the milling process when too great an amount of enamel is loaded into the mill. The procedure should be avoided as the material will take an exceptionally long time to grind and often results in decreased gloss of the enamel in the subsequent firing operation. *Enam. Dict.*

overconsolidated soil deposit. A soil deposit that has been subjected to an effective pressure greater than the present overburden pressure. *ASCE P1826.*

overcrossing. *See* air crossing; overcast. *Fay.*

overcurrent relays. Relays used to trip circuit breakers when abnormal currents of two to three times the normal flow in the circuit. They are adaptable to transmission lines, buses, feeder circuits, transformers, and motors. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

overcut. a. A machine cut made along the top or near the top of a coal seam; sometimes used in thick seams or a seam with sticky coal. By releasing the coal along the roof, its mining becomes easier. *See also* turret coal cutter. *Nelson.* b. The process of producing a larger size hole than the outside diameter of the bit and/or reaming shell used, due to the eccentric rotational movements of a bit, core barrel, or drill stem. *Long.*

overcutting machines. Coal-cutting machines that are adaptations of shortwall machines, designed to make the cut, or kerf, at a desired place in the coal seam some distance above the floor. The main difference between the overcutting machine and the ordinary shortwall machine is that the cutter bar in the overcutting machine is mounted at the top of the machine instead of at its bottom. *See also* turret coal cutter. *Kiser, 1. pp. 26-27.*

overdense medium. Medium of specific gravity above that in the separating bath, usually produced in the medium recovery system and used to maintain the desired specific gravity in the bath. *B.S. 3552, 1962.*

overdraft. a. A condition where a metal curves upward on leaving the rolls because of the higher speed of the lower roll. *ASM Gloss.* b. An arrangement of flues to force air through a brickkiln downward from its top; also the heated air and gas so forced through the kiln. *Standard, 1964.*

overdrilling. The act or process of drilling a run or length of borehole greater than the core-capacity length of the core barrel, resulting in loss of the core. *Long.*

overfall. The part of a dam or wier over which water flows. *Ham.*

overfalls. Turbulent water surface produced either by strong currents flowing over shoal bottom or by conflicting currents. *See also* rip. *Hy.*

overfeed; overfeeding; overfed. To attempt to make a diamond or rock-drill bit penetrate rock being drilled at a rate in excess of that at which the optimum economical performance of the bit is attained, which needlessly damages the bit and shortens its life. *Long.*

overfired. A term related to the condition of a ceramic product which has been heated to a temperature in excess of that required to produce proper vitrification. *Bureau of Mines Staff.*

overfiring. Heating ceramic materials or ware above the temperature required to produce the necessary degree of vitrification. Usually results in bloating, deformation, or blistering of the ware. *Bureau of Mines Staff.*

overflow, screen. That portion of the feed material discharged from the screen deck without having passed through the apertures. *B.S. 3552, 1962.*

overflow stand. A standpipe in which water rises and overflows at the hydraulic gradeline. *Steelye, 1.*

overflush. A fault in glassware caused by the flow of too much glass along the line of a joint. *Compare* fin. *Dodd.*

overfold. An anticlinal fold pushed over until its sides are brought together and one overlies the other; an inverted or reflexed fold. *Standard, 1964. See also* overthrow fold. *Fay.*

overgage diameter. The measurement over gagepins of specified diameter inserted in opposite tooth gaps of a sprocket. For an odd number of teeth, the gagepins are placed in the nearest opposite gaps. *J&M.*

overgate. *See* air crossing; overcast. *Fay.*

overgettings. Eng. Minerals worked and sold from a royalty in excess of the certain quantity upon which a rent or royalty per acre is paid. *Fay.*

overglaze. An additional glaze on porcelain when the first has been painted upon with vitrifiable colors, or when by reason of defects a second glaze is necessary. *Standard, 1964.*

overglaze colors. Finely ground mixtures of pigments and low-melting glasses suitable for use over standard ceramic glaze. Temperature range is 1,300° to 1,500° F; cones are 018 to 014. Used as decorative designs fired on china, pottery, terra cotta, pigments and low-melting glasses suitable for use over standard ceramic glazes. Temperature range is 1,300° to 1,500° F; cones are 018 to 014. Used as decorative designs fired on china, pottery, terra cotta, tile, and other glazed ceramic surfaces. *CCD 6d, 1961.*

overglazed. Pottery ware having too thick a glaze layer, particularly on the bottom; this thick glaze is likely to be crazed. Causes of this fault are incorrect dipping, the use of slop glaze of too high a density, or biscuit ware that is too porous, that is, underfired. *Dodd.*

overglaze decoration. A ceramic or metallic decoration applied and fired on the previously glazed surface of ceramic ware. *ACSG, 1963.*

overgrinding. Comminution of ore to a smaller particle size than is required for effective liberation of values before concentrating treatment. Opposite of undergrinding. *Pryor, 3.*

overhand cut-and-fill. In this method, two level drives are first connected, the lower and upper one by a raise, from the bottom of which mining is begun. The work proceeds upwards, filling the mined-out room, but in the filling, chutes are left through which the broken ore falls. In inclined seams the chutes, also inclined, have to be timbered. The lower-level drive is protected either by timbering or vaulting, or by a fairly strong pillar of vein fillings. Stoping in the different cuts always proceeds upwards, but as a whole it proceeds between the two level drives in a horizontal direction. Overhand cut-and-fill, especially in mining irregular ore bodies of greater size, is also called back stoping. *Stoces, v. 1, pp. 405-406.*

overhand stope. a. One in which the ore above the point of entry to the stope is attacked, so that severed ore tends to gravitate toward discharge chutes and stope is self-draining. *Pryor, 3.* b. An overhand stope is made by working upward from a level into the ore above. *McKinstry, p. 655.*

overhand stoping. a. In this method, which is also widely used in highly inclined deposits, the ore is blasted from a series of ascending stepped benches. Both horizontal and vertical holes may be employed. Horizontal breast holes are usually more efficient and safer than vertical upper holes, although the latter are still used in narrow stopes in steeply inclined ore bodies. *McAdam II, p. 137.* b. The working of a block of ore from a lower level to a level above. In a restricted way overhand stoping can be applied to open or waste-filled stopes that are excavated in a series of horizontal slices either sequentially or simultaneously from the bottom of a block to its top. Stull timbering or the use of pillars characterize the method. Filling is used in many instances. Modifications are know as: backfilling method; back stoping; block system; breast stoping; combined side and longwall stoping; crosscut method of working; cross stoping; Delprat method; drywall method; filling system; filling-up method; flat-back stoping; horizontal slicing; longwall stoping; open-cut system; open-stope and filling; open-stope method; open-stope, timbering with pigsties, and filling; overhand stoping on waste; resuing; rock filling; room-and-pillar with waste filling; sawtooth back stoping; side stoping; slicing-and-filling system; stoping-and-filling; stoping in horizontal layers; transverse with filling. *Fay. Compare* underhand stoping.

overhand stoping and milling system. *See* combined overhand and underhand stoping. *Fay.*

overhand stoping in inclined floors. *See* rill stoping, b. *Fay.*

overhand stoping on waste. See overhand stoping, b. *Fay.*

overhand stoping with shrinkage and delayed filling. See shrinkage stoping.

overhand stoping with shrinkage and no filling. *See* shrinkage stoping.

overhand stoping with shrinkage and simultaneous caving. See combined shrinkage stoping and block caving. *Fay.*

overhang. a. Projecting parts of a face or bank. *Nichols.* b. Uusupported area between the punch and die. *ASM Gloss.* c. The overhanging edge of an undermined cliff. *Schieferdecker.*

overhaul. a. Describes a condition when a journey travels towards the haulage engine at a faster rate than the rope which then becomes slack and liable to foul the drum. Also applied to inspection, cleaning, and repairing of machines or plant. Also called overrun. *Nelson.* b. The transportation of excavated material beyond certain specified limits. *Seelye, 1.* c. In many highway contracts, a movement of dirt far enough so that payment, in addition to excavation pay, is made for its haulage. *Nichols.*

overhauling (slab milling, scalping). Cutting surface layers from castings or slabs to remove scale and surface defects. *ASM Gloss.*

overhead bare-wire system. A mine signaling system in which galvanized-iron signal wires are supported by insulators suitably fixed overhead between rail tracks. The wires are connected to a bell circuit. One bell is placed in the haulage enginehouse and the others may be installed at coupling-on places along the road. Bell pushers are connected across the wires at coupling-stations and often at intermediate points. These insure clear and distinct signals. *Mason, V. 2, p. 537.*

overhead cableway. A type of equipment for the removal of soil or rock. It consists of a strong overhead cable, usually attached to towers at either end, and on which a car or traveler may run back and forth. From this car a pan or bucket may be lowered to the surface and subsequently raised and locked to the car and transported to any position on the cable where it is desired to dump its contents. *Fay.*

overhead charges. Those general charges or expenses which cannot be charged up as belonging exclusively to any particular part of the work or product. *Fay.*

overhead conveyor. See trolley conveyor. *ASA MH4.1-1958.*

overhead drive press. A mechanical press with the driving mechanism mounted in or on the crown or upper parts of the uprights. *ASM Gloss.*

overhead monorail. This system is popular for use in mines since it can be suspended from the roadway supports as the face advances and can carry supplies over equipment installed in the roadway; transport is by means of endless, main-and-tail, or main-rope winches. They are generally slow-moving and can carry light loads into and around many places inaccessible to other forms of transport. *Sinclair, III, p. 208.*

overhead position welding. Welding that is performed from the underside. *ASM Gloss.*

overhead-rope monorail. In this system the loads are carried by bogies running on a taut wire rope instead of steel joists or flat-bottomed rails. *Sinclair, III, p. 211.*

overhead ropeway. *See* aerial ropeway. *Ham.*

overhead shovel. A tractor loader which digs at one end, swings the bucket overhead, and dumps at the other end. *Nichols.*

overhead traveling crane. A crane which traverses the whole width of a workshop between the rails on which it runs. *Ham.*

overhead trolley conveyor. See trolley conveyor. *ASA MH4.1-1958.*

overheated. Said of metal which has been heated in preparation for hot-working, or during a heat-treating operation, to a temperature at which rapid grain growth occurs and large grains are produced. The structure and properties can be restored by treatment, and in this respect it differs from burning. *C.T.D.*

overheating. Heating a metal or alloy to such a high temperature that its properties are impaired. When the original properties cannot be restored by further heat treating, by mechanical working, or by a combination of working and heat treating, the overheating is known as burning. *ASM Gloss.*

overings. Newc. The top framing of a wagon to increase its capacity. *Fay.*

overite. A hydrous phosphate of calcium and aluminum, $Ca_3Al_8(PO_4)_8(OH)_6.15H_2O$, as pale green to colorless orthorhombic crystals in variscite nodules. Found in Utah. *Spencer 15 M.M., 1940.*

overlap. a. The extension of a bed beyond underlying conformable beds *B.S. 3618, 1964, sec. 5.* b. A reversed fault or thrust. *B.S. 3618, 1964, sec. 5.* c. The heave of a reversed fault. *B.S. 3618, 1964, sec. 5.* d. A geological unconformity in which each successively younger bed within the younger group of strata extends beyond the edge of the next older bed. *Webster 3d.* e. Process by which older sedimentary units are lost during the transgressive invading phase of marine deposition. *Wheeler.* f. The lineal portion of a borehole that must be redrilled subsequent to caving of the hole, the cementing of a section of the hole, or the bypassing of unrecoverable material in the hole. *Long.* g. The lineal portion of a branch hole that nearly parallels the parent hole. *Long.* h. Protrusion of weld metal beyond the bond at the toe of the weld. *ASM Gloss.* i. In spot, or projection welding, the amount one sheet overlays the other. *ASM Gloss.*

overlap auxiliary ventilation. To combine the forcing and exhausting systems, it is not necessary to provide two ducts, one forcing and one exhausting, throughout the length of the heading. An arrangement that serves the same purpose is the overlap system. In this system a main exhausting duct is used within a convenient distance of the face, often about 100 feet. Some of the intake air in the heading, before reaching the end of this duct, enters a short length of tubing and is blown on to the face. The advantages of both systems are thus obtained. Precautions must be taken against recirculation of air by the forcing unit, to prevent concentration of dust, and in collieries, firedamp, at the face. The two ducts must overlap by a minimum distance which, in practice, is usually taken as 30 feet. *Roberts, I, pp. 220-221. See also* two-fan auxiliary ventilation.

overlap fault. A thrust fault in which the shifted strata double back over themselves. *A.G.I.*

overlap seal. A natural trap for the accumulation of oil or gas partially created by an angular unconformity in which the overlapping sediments are relatively impervious to the passage of these hydrocarbons. East Texas is a good example. *A.G.I.*

overlay. Scot. The material above the rock in a quarry. *See* overburden, b. *Fay.*

overlay tracing. A tracing on which the workings in a seam are shown. A series of such tracings allows the workings in several seams to be seen in their correct horizontal relationship. Also called layover tracing (undesirable usage). *B. S. 3618, 1963, sec. 1.*

overload. a. In general, a load or weight in excess of the designed capacity. The term may be applied to mechanical and electrical engineering plants, to loads on buildings and structures, and to excess loads on haulage ropes and engines. *Nelson.* b. To apply an excessive pressure to a drill string and bit. *Long.* c. Synonym for overweight. *Compare* crowd, b and d. *Long.*

overloader. A loading machine of the power-shovel type for quarry and opencast operations. It may be either pneumatic tired or caterpillar tracked. It need not turn from the face to the truck if the latter can be spotted parallel to the face. The bucket is filled, the machine retracted, and the bucket swung over to the discharge point; used chiefly in sand and gravel pits. *Nelson.*

overload level. The overload level of a component or system is that level at which operation ceases to be satisfactory as a result of signal distortion, overheating, etc. In an acoustical system, sound pressure level is to be understood, unless otherwise specified. *H&G.*

overload trip. A protective device on a circuit breaker or motor starter which cuts off the power if the current exceeds a set value. *Nelson.*

overlooker. a. One who overlooks. *Standard, 1964.* b. An overseer, superintendent, or inspector. *Standard, 1964.* c. A mine official between a deputy and undermanager. Also called overman. *Mason.*

overlying beds. The beds situated above a deposit. *Stoces, v. 1, p. 63.*

overman. a. Eng. A coal mine underground official intermediate in status between a deputy and the undermanager. He may hold a certificate of competency, but a deputy's certificate is the only essential qualification. For a person with service as an overman before June 1, 1952, an Overman's Service Certificate will suffice. An overman may be in charge of two or more deputies' districts, or he may have special duties, such as supervising development work, etc. *Nelson.* b. Eng. The mining official next in rank below the manager, who is next below the agent. Also called oversman. *Fay.* c. The foreman of the underground workings. *Fay.* d. An umpire appointed to an arbitration board in a mine dispute. *C.T.D.* e. N. of Eng. An official responsible for the working of a seam during a shift. *Trist.*

overmilled. Excessive opening up or fiberization of strands to a stage when the asbestos assumes a texture of cotton wool. *Sinclair, W. E., p. 484.*

overmining. S. Afr. Mining a grade of ore above the average grade of the ore reserves. This practice has the effect of leaving the lower grade ore in the reserves. The opposite is undermining. *Beerman.*

overpickling. May result from the use of pickling solutions of greater strength or higher temperature than that recommended, or by allowing the ware to remain in the tanks for a greater length of time than necessary, generally causing a blistered condition in the subsequent enameling process. This condition may be avoided by running frequent and careful tests on pickling solutions in addition to observing proper pickling time control. *Enam. Dict.*

overpoled. In refining blister copper by reducing its oxides through stirring a molten bath of metal with a green timber pole, continuation of this process until the desirable characteristic fracture of tough-pitch refined metal is lost. Some reoxidation then becomes necessary. *Pryor, 3.*

overpress. An imperfection; projecting excess glass resulting from imperfect closing of mold joints. *ASTM C162-66.*

overpressure. The transient pressure over and above atmospheric pressure resulting from a blast wave from a nuclear explosion. *L&L.*

override. A royalty or percentage of the gross income from production deducted from the working interest. *Wheeler.*

overriding. Can. Sum added to option prices as payment to agent. *Hoffman.*

overriding royalty. The term applied to a royalty reserved in a sublease or assignment over and above that reserved in the original lease. *Ricketts, II.*

overrope. A winding or hoisting rope. *Fay.*

overrope haulage. Usually applied to endless rope haulage in which the rope is carried on top of the mine cars which may be either clipped or lashed to the rope. *See also* underrope haulage. *Nelson.*

overrun. *See* overhaul, a. *Nelson.*

overrun brake. A special brake fitted to a towed vehicle which operates as soon as the towing vehicle slows down. *Ham.*

overrunning clutch, free-wheeling unit. A coupling that transmits rotation in only one direction, and disconnects when the torque is reversed. *Nichols.*

oversaturated rocks. Those rocks which contain an excess of silica, over and above that necessary to form saturated minerals from all bases present. *See also* saturated rocks; saturation; undersaturated rocks. *A.G.I.*

overshot. A fishing tool for recovering lost drill pipe or casing. *Institute of Petroleum, 1961.*

overshot head. The upper section of the shell containing the lifting-dog assembly on a wire-line core barrel. *Long.*

overshot wheel. A vertical water wheel, the circumference of which is covered with cavities or buckets, and is turned by water that shoots over the top, filling the buckets on the farther side and acting chiefly by its weight. *Webster 3d.*

overside. Discharging over the side, such as a dredge. *Standard, 1964.*

oversize. a. In sizing on screens or sorting in classifiers of mineral pulps, the grain size or grain mass above a limiting value, which either fails to pass through the meshes of a retaining screen or to be lifted to the overflow discharge of a classifying device. Also called underflow. *Pryor 3.* b. When a mixture of coal or ore is screened or classified into two products of definite size limits, the larger is the oversize and the smaller the undersize. *See also* classifier, b. *Nelson.* c. In quarry or opencast blasting, that size of rock or ore which is too large to handle without secondary blasting. *Nelson.* d. A synonym applicable to those sizes of drill rods, the dimensions of which exceed the DCDMA standard sizes designated as the W group. *Long.* e. Incorrectly applied to the size of core barrels and accessory parts, properly called large-diameter design. *Long.* f. A piece of equipment larger than specified or accepted standard size. *Long.*

oversize control screen; guard screen; check screen. A screen used to prevent the entry into a machine of coarse particles which might interfere with its operation. *B.S. 3552, 1962.*

oversize core. a. Core cut by a thin-wall bit, as opposed to a standard-diameter core. *Long.* b. A core the diameter of which is greater than a standard size. *Long.*

oversize coupling. a. Synonym for swelled coupling. *Long.* b. Sometimes used in Canada as a synonym for reaming shell. *Long.*

oversize hole. A borehole the diameter of which is excessive because of the whipping action or eccentric rotation of the drill string and bit. *Long.*

oversize powder. In powder metallurgy, particles coarser than the maximum permitted by a given specification for particle size. *ASM Gloss.*

oversize rod. Synonym for drill collar; guide rod. *Long.*

overspeed device, hoist. *See* hoist overspeed device.

overspray. a. The slip from the spray gun not deposited on the ware. Also, spray application of a light coat of slip to an unfired porcelain enamel. *ASTM C286-65.* b. Process of spraying a second coat of an enamel directly over the wet or dry bisque. *Enam. Dict.*

overspringing. *See* springing, c. *Lewis, p. 161.*

overstressed area. In strata control, a term used to describe an area where the force is concentrated on pillars. This type area is said to be overstressed or superstressed. This superstressing is limited by the strength of the seam or pillar. *Compare* destressed area. *Mason, v. 1, p. 143.*

overstressing. In fatigue testing, cycling at a stress level higher than that used at the end of the test. *ASM Gloss.*

Overstrom table. Similar to a Wilfley table but of diamond shape (rhomboid), thus eliminating the waste corners. *Liddell 2d, p. 388.*

over-the-road hauling. Hauling over public highways employing a haul unit commonly termed a truck. Various restrictions, such as weight, width of vehicle, safety features, guard against spillage, etc. must be considered in the type equipment used. Generally, over-the-road haul units are termed dump trucks. *Compare* off-the-road hauling. *Carson, p. 342.*

over-the-track car unloader. *See* car unloader. *ASA MH4.1-1958.*

overthrow. a. Penn. Wooden air pipes for connecting headings for ventilation. *Fay.* b. York. *See* air crossing. *Fay.*

overthrow fold. *See* overturned. *Fay.*

overthrust. a. A thrust fault with low dip and large net slip, generally measured in miles. *A.G.I.* b. A thrust fault in which the hanging wall was the active element; contrasted with underthrust, but it is usually impossible to tell which wall was actively moved. *A.G.I.* c. The process of thrusting the hanging wall (relatively) over the footwall. *A.G.I.*

overthrust block. The block above the overthrust plane. *Schieferdecker.*

overthrust fault. A reverse fault with low dip or large hade. *Fay.*

overthrust fold. A recumbent fold of which the reversed middle limb has been completely sheared out as a result of the great horizontal translation. *Schieferdecker.*

overthrust nappe. An overthrust mass which has been displaced over a great distance. Synonym for overthrust sheet. *Schieferdecker.*

overthrust plane. Synonym for thrust plane. *Schieferdecker.*

overthrust sheet; overthrust block. The block, above a low-angle fault plane, which has been displaced a matter of miles. *Billings, 1954, p. 184.*

overthrust slice. Single large mass caught between the walls of an overthrust. *Schieferdecker.*

overtime. The period beyond the normal shift time when a workman, on request by the management, performs emergency tasks which are necessary for safety or efficient operation of the oncoming shift. *Nelson.*

overtopping. Flow of water over the top of a dam or embankment. *Nichols.*

overtravel. An overwind. *Nelson.*

overtub system. An endless-rope system in which the rope runs over the tubs or cars in the center of the rails. This system is generally adopted on undulating roads, where the tension in a heavily loaded rope would cause the rope to lift in swilleys and derail tubs. It is also generally adopted in highly inclined roads, as the lashing chain, often adopted with this method of haulage, obtains a good positive grip on the rope and is easier to detach than a clip. The rope is kept from rubbing on roof supports by holding-down pulleys: six or eight small pulleys are mounted in circular cheeks, allowing chains or clips to be accommodated in the spaces between the pulleys; or large diameter pulleys may be used, of the hat or mushroom shape, often starred to provide recesses for chains and clips. Similar large pulleys direct the rope around curves. *Compare* undertub system. *Sinclair, V, pp. 331-332.*

overturn. The exchange of position in fall and spring of bottom and upper waters in a lake, caused by density differences due to temperature changes. *A.G.I.*

overturned. Having been tilted past the vertical and hence, inverted in outcrop; said of folded strata and of the folds themselves. *Fay.*

overturned fold. Synonym for overfold. *A.G.I.*

overturned limb. That limb of an overfold (overturned fold) that is overturned, that is, has rotated through more than 90°. *Billings, 1954, p. 41.*

overturning skip. A type skip commonly used at metal mines but not as often at coal mines because of increased breakage. This skip consists of a rectangular receptacle for the material and a suspending frame of bail to an upper crosspiece of which is attached a suspension gear connecting the rope to the skip. Three guide shoes are generally provided at each side of the bail to keep it vertical. The skip body turns about a horizontal shaft at the lower end of the bail. Two rollers on the upper part are mounted on a shaft and cause the skip to tilt at an angle of 35° at the tipping point in the headgear, where rollers run on to the curved guides. To prevent shocks in the case of an overwind the skips are fitted with overwind guides which glide along rollers fitted to the headgear above the tipping point. *Sinclair, V, p. 73.*

overventilation. Too much air in the mine workings. *Fay.*

overvoltage. The difference between the actual electrode potential when appreciable electrolysis begins and the reversible electrode potential. *ASM Gloss.*

overvoltage relays. Relays that serve primarily the same purpose as overcurrent relays except that they are connected in the line by potential transformers which measure the voltage across the lines. When an overvoltage exists the relay operates and opens the circuit breaker. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

overwash. That portion of the uprush that carries over the crest of a berm or of a structure. *H&G.*

overwash drift. The material which is washed out from the front of a glacier. *Fay.* Obsolete. *See also* outwash.

overweight. a. Aust. The settling down of the upper rocks when worked by the longwall system. It is regulated by the pack walls. If it settles too quickly, it binds the underweight, causing the latter to throw too much weight on the face. *Fay.* b. Scot. Excess weight of disposals (sales) over output. *Fay.* c. A diamond bit in which oversize diamonds are crowded into the bit face or crown. *Compare* crowd, c.; overload. *Long.*

overwind. a. To hoist the cage into or over the top of the headframe. *Fay.* b. In hoisting through a mine shaft, failure to bring cage or skip smoothly to rest at proper unloading point at surface. If severe, can lead to serious accident unless the special preventive devices function effectively. Overwind can also cause cage to be lowered into sump at bottom of shaft, also with serious consequences. *Pryor, 3.*

overwind device, hoist. *See* hoist overwind device.

overwinder. One of the best known overwinders consists of two vertical-screwed spindles each carrying two traveling nuts and chain driven from the drum shaft so as to rotate in opposite directions. The nuts are prevented from rotating by projections engaging with a fixed plate and therefore travel up and down according to the movement of the cages. The upper nut takes care of overwinding and the lower nut of overspeeding. *Mason, v. 2, pp. 459-460.*

overwinding. a. A term applied to a continued pull on the hoisting rope of a cage, after the cage has reached the top of the shaft. The result of this carelessness, or accident, is a broken hoisting rope and all the danger that implies. *Stauffer.* b. A rope or cable wound and attached so that it stretches from the top of a drum to the load. *Nichols.*

overwind switch. A switch which may be used on winders, or haulages, to cause the power to cut off from the driving motor, or engine, and the brakes to be applied. Such a switch may be either: (1) situated in the headgear and operated by the conveyance, (2) mounted on the automatic contrivance, or (3) operated by the depth or distance indicator. *B.S. 3618, 1965, sec. 7.*

Ovoca classifier. A classifier of the free-settling type in which the heavy material is removed by a double-screw, continuous-flight conveyor, working up an inclined plane. *Liddell 2d, p. 392.*

ovoid. a. Egg-shaped. *Gordon.* b. An egg-shaped briquette. *B.S. 3552, 1962.*

ovulite. Synonym for oölite, used in the sense of an individual spherite. *A.G.I.*

Owen process. A flotation process involving the violent agitation of the pulp in cold water to which a small percentage of eucalyptus oil, about 2 ounces per ton, is added. *Fay.*

Owen's borehole surveying instrument. A clockwork photographic apparatus which records clinometer and compass readings on sensitized paper. It is used during borehole surveying. *Ham.*

Owen's jet dust counter. An instrument similar to the konimeter but differing in that the air to be sampled undergoes humidification prior to being blown through the jet. The velocity of impingement is about 200 to 300 meters per second and the jet is rectangular instead of circular. The prior humidification of the air causes condensation of moisture upon the dust particles by super saturation due to the pressure drop at the jet, and so assists in the deposition and retention of the particles on the slide. The Bausch and Lomb dust counter is the American counterpart of this instrument. *Osborne.*

Owens machine. A suction type machine for making glass bottles. *Dodd.*

Owens process. A bottlemaking process in which the blank or parison mold is filled by suction. *ASTM C162-56.*

Ower anemometer. A vane anemometer in which the friction of gearing is minimized. The normal gearing of the ordinary anemometer is replaced by a simple worm drive which rotates a pointer over a dial divided into four sections. When making an observation of air velocity the speed of revolution of the pointer is measured by a stopwatch and a calibration chart is referred to which relates air speed to pointer revolutions per second. *Roberts, I, p. 54.*

owharoite. The name offered as a substitute for wilsonite which had been used as a mineral name previously. Owharoite is a creamy-gray rhyolitic igneous rock with peculiar phenocrysts and lenses of streaked glass occurring in colorless to brown glass. Possibly a rhyolitic tuff. *Hess.*

owl-eye agate. An eye agate with only two eyes, and those resembling the eyes of an owl. *Shipley.*

owner's account men. Corn. Workmen paid by the day. *Fay.*

own filling. Filling material obtained in the mine being mined. *Stoces, v. 1, p. 271.*

owyheeite. A light, steel-gray to silver-white sulfantimonite of silver and lead, possibly, $2Ag_2S.8PbS.5Sb_2S_8$. Acicular crystals or fibrous masses; probably orthorhombic. Formerly called silver jamesonite. From Owyhee County, Idaho. *English.*

oxacalcite. Synonym for whewellite. *Tomkeieff, 1954.*

oxalic acid; ethanedioic acid. Colorless; transparent; anhydrous, HO_2CCO_2H; hydrate,

$HO_2CCO_2H.2H_2O$; anhydrous, orthorhombic; hydrate, monoclinic tablets or prisms; molecular weight (anhydrous), 90.04; poisonous; specific gravity (anhydrous), 1.90 (at 17° C, referred to water at 4° C); specific gravity (hydrate), 1.653 (at 19° C, referred to water at 4° C); the hydrate loses $2H_2O$ at 101° to 102° C; melting point (anhydrous), 189.5° C with decomposition; sublimes at 157° C; soluble in water; very soluble in alcohol; slightly soluble in ether; insoluble in benzene, in chloroform, and in ligroin. Used as a bleach, in dyeing, and as a precipitating agent for rare earths. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-443; Crispin; CCD 6d, 1961.*

oxalite. Synonym for humboldtine. *Tomkeieff, 1954.*

oxammite. A yellowish-white, transparent, orthorhombic ammonium oxalate, $(NH_4)_2C_2O_{4.2}H_2O$, found in guano. *Tomkeieff, 1954.*

ox-blood coral. A dark, rich, deep-red coral; very desirable. *Shipley.*

oxbow. A crescent-shaped lake formed in an abandoned river bend which has become separated from the main stream by a change in the course of the river. *Fay.*

oxeye. Labradorite with a dark reddish change of color. *Shipley.*

oxeye agate. An eye agate with only two eyes, and those resembling the eyes of an ox in coloring. Same as owl-eye agate. *Shipley.*

Oxford clay. A clay of the Upper Jurassic system providing raw material for 30 percent of the building bricks made in the United Kingdom; the Fletton brick industry of the Peterborough area is based on this clay, which contains so much carbonaceous material that the dry-pressed bricks can be fired with very little additional fuel. *Dodd.*

Oxfordian. Lowermost Upper Jurassic. *A.G.I. Supp.*

ox gall. This material (an indefinite mixture of fats, glycocholates, and taurocholates) has been added to glaze suspensions to prevent crawling. *Dodd.*

oxialyphite. A variety of aliphite hydrocarbon containing oxygen. It is light yellow in color and soft. *Tomkeieff, 1954.*

oxicarbonite. A carbonite bitumen rich in oxygen and devoid of nitrogen. *Tomkeieff, 1954.*

oxicyclite. A cyclite bitumen containing oxygen. *Tomkeieff, 1954.*

oxidates. Sediments formed by the precipitation of the oxidized form of iron and manganese; ferric oxide and manganese dioxide sediments. *A.G.I.*

oxidation. a. The firing of a kiln in such a manner that combustion is complete and in consequence the burning gases are amply supplied with oxygen which causes metals in clay and glazes to give their oxide colors. *ACSG.* b. Combination with oxygen; increase in oxygen content of molecular compound; increase in valency of electropositive part of compound, or decrease in valency of electronegative part. *Pryor, 3.* c. A reaction in which there is an increase in valence resulting from a loss of electrons. Contrast with reduction. *ASM Gloss.* d. In fuel practice, the combination of oxygen with a substance, with or without the production of flame. *Francis, 1965, v. 2, p. 436.*

oxidation of coal. The absorption of oxygen from the air by coal, particularly in the crushed state; this engenders heat which can result in fire. Ventilation, while dispersing the heat generated, supports oxidation which increases rapidly with a rise in temperature. Fresh air should not gain access to the coal. *See also* gob fires. *Nelson.*

oxidation period. The stage in the firing of clayware during which any carbonaceous matter is burned out, that is, the temperature range 400° to 850° C. It is important that all the carbon is removed before the next stage of the firing process (the vitrification period) begins, otherwise a black core may result. *Dodd.*

oxidation-reduction potential. The difference of potential measured in a cell having the oxidized and reduced form of an element on one side and the H_2—H^+ couple on the other. At the hydrogen electrode the H_2 gas must be maintained at 1 atmospheric pressure and the H^+ at a concentration of 1 mole per liter, and the temperature must be 25° C. Same as oxidation potential; redox potential; symbol, E or Eh. If simliar standards are used for both electrodes (all gases at 1 atmosphere and all concentrations 1 M), and if the temperature is maintained at 25° C, the potential obtained is the standard oxidation-reduction potential (symbol, E°). *A.G.I.*

oxide ceramics. Special ceramics made from substantially pure oxides, usually by dry-pressing or slip-casting followed by sintering at high temperature. The most common oxide ceramics are Al_2O_3, BeO, MgO, ThO_2, and ZrO_2. *Dodd.*

oxide discoloration. Discoloration of the metal surface caused by oxidation during thermal treatment. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

oxide mineral. A mineral formed by the direct union of an element with oxygen; for example, ice, corundum, hematite, magnetite, cassiterite. *Leet.*

oxide of iron. An iron ore with oxygen as its main impurity; also iron rust. *Mersereau, 4th, p. 383.*

oxides. a. Compounds of oxygen with another element. Oxides are formed by the combination of oxygen with most other elements, particularly at elevated temperatures, but not with those of group O in the periodic system, the inert gases: Helium, neon, argon, krypton, xenon, and radon. *C.T.D.* b. Materials added to the mill to produce color in the porcelain enamel. *Bryant.*

oxidimetry. Titration with oxidizing agent. *Pryor, 3.*

oxidize. To combine with oxygen. *Kinney.*

oxidized asphalt; blown asphalt. Asphalt which has had certain of its natural characteristics changed or modified by air blown through it at an elevated temperature. This type has a higher melting point than steam-refined asphalt of the same consistency. *Shell Oil Co.*

oxidized deposits. Those deposits that have resulted through surficial oxidation. *Bateman.*

oxidized ores. The alteration of metalliferous minerals by weathering and the action of surface waters, and their conversion, partly or wholly, into oxides, carbonates, or sulfates. These compounds are characteristic of metalliferous deposits at the surface and often to a considerable depth. *Nelson.*

oxidized zone. Portion of ore body near surface, which has been leached by percolating water carrying oxygen, carbon dioxide or other gases, or in which sulfide minerals have undergone some alteration leading to their partial dissolution and redeposition at depth, the residual portion changing to oxides, carbonates, sulfates, *Pryor, 3.*

oxidizing. a. Conditions prevail in a kiln when surplus air makes a complete combustion of the gases, carbon particles and heavy oils possible. *Rosenthal.* b. Blowing air through molten copper to remove hydrogen, carbon monoxide, and sulfur compounds. *Mersereau, 4th, p. 506.*

oxidizing agent. A material that causes oxidation of an atom or ion and is reduced in the process; oxygen is the most common oxidizing agent in ceramic products technology. *ACSG, 1963.*

oxidizing condition. The presence of air in a kiln in excess of that needed for complete combustion. *ACSG, 1963.*

oxidizing flame. a. A gas flame produced with excess oxygen. *ASM Gloss.* Also called cutting flame. b. The outer cone of the blowpipe flame, characterized by the excess of oxygen of the air over the carbon of the gas. *Fay.*

oxidizing fusion. An oxidation process used for fire refining bismuth, gold, and silver; the crude metals are melted down with oxidizing fluxes, so that the impurities are oxidized during the melting period and become part of the slag. *Newton, p. 379.*

oxidizing smelting. *See* pyritic smelting.

oxidizing temperature. Temperature at which the rate of oxidation of carbon in a clay product becomes appreciable. *ACSG, 1963.*

oxiduction. Alternative oxidation and reduction. *HW.*

oxiolefinite. An olifinite bitumen containing oxygen. *Tomkeieff, 1954.*

Oxland-Hocking furnace. A revolving, cylindrical furnace used in Sardinia for calcining sulfide ore. *Fay.*

oxonite. An explosive prepared by dissolving picric acid in nitric acid. *Fay.*

oxonium ion. Name suggested for the hydrated hydrogen ion, H_3O^+. Other names include hydroxonium and hydronium ion. Modern usage refers to the stripped H^+ ion as a proton and to the hydrated form found in aqueous solution as the H ion. *Pryor, 3.*

oxophitic. *See* basiophitic. Obsolete. *A.G.I.*

oxter. Scot. The armpit. The apex of a reentrant, or reentering angle in a working face of coal. *Fay.*

oxyacetylene. A mixture of oxygen (O_2) and acetylene gas (C_2H_2) in such proportions as to produce the hottest flame known for practical use. Oxyacetylene welding and cutting is used in almost every metalworking industry. *Crispin.*

oxyacetylene cutter. An appliance for cutting metals by means of a flame obtained from acetylene and compressed oxygen, which are stored in separate steel cylinders. Oxyhydrogen and oxycoal gas flames are also used. *Nelson.*

oxyacetylene cutting. Oxygen cutting in which the initiation temperature is attained with an oxyacetylene flame. *ASM Gloss.*

oxyacetylene flame. Flame obtained from the combustion of compressed oxygen and acetylene, fed from separate steel cylinders. It is used for cutting metals. *Ham.*

oxyacetylene welding. a. Welding with an oxyacetylene flame. *ASM Gloss.* b. Widely used method of welding in the porcelain enamel industry. In this method two gases, oxygen and acetylene, are combined in a blowpipe and used to heat the metals to be welded to the desired temperature. *Enam. Dict.*

oxybasiophitic. *See* basiophitic. Obsolete. *A.G.I.*

oxychloride cement. A plastic cement formed by mixing finely ground caustic magnesite with a solution of magnesium chloride. *A.G.I.*

oxycoal gas. A mixture of oxygen and coal gas. *Standard, 1964.*

oxygen. A nonmetallic, chiefly bivalent element; normally colorless; odorless; tasteless; nonflammable; diatomic gas (O_2). It is the most abundant of the elements on earth, occurring uncombined in air to the extent of about 21 percent by volume and is combined in water, in most common rocks and minerals (as oxides, silicates, and carbonates), and in a great variety of organic compounds (as alcohols, acids, fats, carbohydrates, and proteins). Oxygen has three naturally occurring nonradioactive isotopes of masses 16, 17, and 18 of relative abundance 2,494 to 1 to 5. It is obtained industrially from liquid air by distilling off the nitrogen; or from water by electrolysis; or in the laboratory by decomposition by heat of various oxides, peroxides, or salts (such as chlorates or permanganates). Oxygen combines with all other elements except those of the group of inert gases. Used chiefly in oxyacetylene and oxyhydrogen flames in welding and in cutting metals, in making steel and in other metallurgical processes, in making glass, in the chemical industry (as in producing synthesis gas), in medicine, in aviation, and in diving to aid respiration, and usually in the form of air in many combustion and oxidation processes. Symbol, O; valence, 2; hexagonal when solid; atomic number, 8; atomic weight, 15.9994 (was 16.000 until 1961); molecular weight, 31.9988 (was 32.000 until 1961); density of gas, 1.429 grams per liter (at 0° C); specific gravity of liquid, 1.149 (at −183° C); specific gravity of solid, 1.426 (at −252.5° C); melting point, −218.4° C; boiling point, −183.0° C (at 760 mm); and slightly soluble in water and in alcohol. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-124, B-200.*

oxygen-Bessemer. A steelmaking process in which the air blown through the bottom tuyeres is enriched with oxygen. If oxygen alone is used, tuyere wear is excessive. Oxygen plus steam or oxygen plus carbon dioxide can be used. Also called oxy-Thomas. *See also* O.L.P. steel process. *Nelson.*

oxygen concentration cell. A cell established on a metal surface caused by a difference in oxygen concentration in the solution at one point as compared to another. *H&G.*

oxygen consumption. A man working hard requires about 10 cubic feet per minute of air to supply him with adequate oxygen. *Ham.*

oxygen cutting. Metal cutting by directing a stream of oxygen upon a hot metal. The chemical reaction of oxygen and the base metal furnishes heat for the localized melting, hence, cutting. *ASM Gloss.*

oxygen deficiency. *See* anoxia. *H&G.*

oxygen deficiency indicator. This indicator is used by utilities, refineries, contractors, etc., to determine whether the atmosphere in a confined space, such as a tank, manhole, or sewer, contains sufficient oxygen to support life. A rubber tube and aspirator bulb introduce air samples into a flame safety lamp which is set up outside the tank or manhole. Extinguishment of the flame indicates that the atmosphere is too oxygen-deficient to be entered. *Bests, p. 588.*

oxygen-flash smelting process. Employed by the Internation Nickel Company as an autogeneous matte smelting process for smelting copper-nickel concentrate. *Newton, p. 345.*

oxygen-free copper. Electrolytic copper free from cuprous oxide, produced without the use of residual metallic or metalloidal deoxidizers. *ASM Gloss.*

oxygen gouging. Oxygen cutting in which a chamfer or groove is formed. *ASM Gloss.*

oxygen impingement process. A process in which pure oxygen is blown down onto the bath in a converterlike vessel. It is claimed that the process refines pig iron so that blown steel needs no deoxidizing additions, and that it is cheaper than the usual open-hearth process. *Osborne.*

oxygen index. Volumetric ratio of oxygen to the total gases in a mixture. *I.C. 8137, 1963, p. 76.*

oxygen indicator. An instrument for measuring the amount of oxygen in inert gases or combustible atmospheres, including fuel gas analysis. Oxygen depolarizes a primary cell and increases the current output of the cell proportionately. Oxygen concentration is read directly from a dial scaled to one of four standard ranges: 0 to .5 percent, 5 percent, 10 percent, or 25 percent. Recording devices can be attached for continuous records. *Bests, p. 587.*

oxygen lance. A length of pipe used to convey oxygen to the point of cutting in oxygen-lance cutting. *ASM Gloss.*

oxygen poisoning. A condition usually brought on among workers engaged in underwater work or mine rescue work and caused by breathing pure oxygen at a depth in excess of 33 feet below the surface of the water. When diving to depths of more than 33 feet, the oxygen in the cylinders of the diving apparatus must be diluted with nitrogen to make an oxygen/nitrogen breathing mixture which will be safe to breath at the maximum depth of the dive. Preliminary symptoms of oxygen poisoning are twitching of the muscles of the face, fingers, and legs, followed by excessive sweating and a feeling of nausea. Final symptoms are convulsions and unconsciousness. First-aid treatment is fresh air, warmth, rest, and drinks of hot, sweet tea. *McAdam, p. 162.*

oxygen process. A process for making steel in which oxygen is blown upon or through molten pig iron, whereby most of the carbon and impurities are removed by oxidation. *HW.*

oxygen ratio. The figure expressing the following ratio, calculated from the molecular proportions of the constituents of a mineral or rock:

$$\frac{\text{Number of atoms of oxygen in the basic oxides}}{\text{Number of atoms of oxygen in } SiO_2}$$

Compare coefficient of acidity. *Holmes, 1928.*

oxygen standard. For practical purposes it has been found convenient to fix the atomic weight of oxygen arbitrarily at the value 16 exactly. On the basis of oxygen equals 16.000, the atomic weight of hydrogen equals 1.0078. It should be noted that the adopted standard is that of the oxygen isotope O^{16} and not that of the ordinary mixture of isotopes generally found. *Miall.*

oxygen steel. The use of oxygen instead of air to convert molten pig iron into steel. The oxygen is used in different ways in different furnaces, but the fastest ones utilize the direct oxidation effects of a relatively pure (99.5 percent) oxygen. *See also* L.D. steel process. *Nelson.*

oxygen toxicity. Pure oxygen cannot be breathed indefinitely at pressures greater than atmospheric. Following a safe period which becomes shorter as diving depth increases, symptoms of oxygen toxicity occur. These include involuntary fine twitches around the eyes and mouth that later extend to include larger muscle groups including the diaphragm, causing abruptness of inspiration. Anxiety, and apprehension may occur and some times loss of lateral visual fields and ringing in ears. These preliminary symptoms are followed by general convulsions and unconsciousness. *H&G.*

oxygen-want. *See* asphyxia. *McAdam, p. 152.*

oxyhemoglobin. A bright red compound formed by the combination of oxygen and hemoglobin in the lungs. *Cooper, p. 168.*

oxyhydrogen. Of, relating to, or utilizing a mixture of oxygen and hydrogen. *Webster 3d.*

oxyhydrogen blowpipe. A blowpipe in which hydrogen is burned in oxygen. Streams of the two gases in the proportion to form water are forced under pressure from separate reservoirs, and issue together from a jet, and igniting just as they issue. The temperature produced which has been estimated at 5,000°F, is sufficient to fuse very refractory substances. *Standard, 1964.* Also called compound blowpipe. *Fay.*

oxyhydrogen cutting. Oxygen cutting in which the initiation temperature is attained with an oxyhydrogen flame. *ASM Gloss.*

oxyhydrogen welding. Welding with an oxyhydrogen flame. *ASM Gloss.*

oxymagnite. A name suggested for oxydized magnetite; also called ferromagnetic ferric oxide and maghemite. From the Bushveld igneous complex, Republic of South Africa. *English.*

oxymethylene. *See* formaldehyde. *CCD 6d, 1961.*

oxymimetite. The hypothetical compound $Pb_{10}(AsO_4)_6O$. *Hey, M.M., 1964.*

oxyphyre. Pirsson's general name for the acidic rocks. Oxyphyre is contrasted with lamprophyre, a corresponding name for basic rocks. The two are complementary. *See also* lamprophyre; complementary rocks. *Fay.*

oxypyromorphite. Artificial $Pb_{10}(PO_4)_6O$; apatite family. *Hey, M.M., 1964.*

oxyvanadinite. The hypothetical compound $Pb_{10}(VO_4)_6O$. *Hey, M.M., 1964.*

oysanite. A name given by Lameth to the titanium mineral anatase. *Fay.*

oyster shells. Shells of Ostrea virginica, taken principally from the Gulf of Mexico coast in Texas and Louisiana; also from the Chesapeake Bay. An average analysis is 93 to 97 percent $CaCO_3$, 1 percent $MgCO_3$, 0.5 to 2.0 percent silica, and 0.3 to 0.4

percent SO_4 (as $CaSO_4$). Used in drilling muds and in roadbeds. A source of lime. *CCD, 6d, 1961.*

oz Abbreviation for ounce. *BuMin Style Guide, p. 61.*

Ozarkian. System between Cambrian and Canadian. Obsolete. *A.G.I. Supp.*

ozarkite. A white, massive variety of thomsonite, from Arkansas. *Fay.*

oz ft Abbreviation for ounce-foot. *BuMin Style Guide, p. 61.*

oz in Abbreviation for ounce-inch. *BuMin Style Guide, p. 61.*

ozocerite. A mineral paraffin wax, of dark yellow, brown, or black color with a melting point of 55 to 110°C and a specific gravity of from 0.85 to 0.95. Is soluble in petrol, benzene, and turpentine and is found near the Caspian Sea region and in Utah as narrow seams in sandstone. Also called mineral wax; fossil wax; native paraffin; earth wax. Spelled also ozokerite. *C.T.D.*

ozokerine. *See* yellow ozokerine. *Fay.*

ozokerite. *See* ozocerite.

ozone. a. An allotropic, triatomic form of oxygen (O_3); a faintly blue, irritating gas with a characteristic pungent odor but at −112° C it condenses to a blue magnetic liquid. It occurs in minute quantities in the air near the earth's surface and in larger quantities in the stratosphere as a product of the action of ultraviolet light of short wavelengths on ordinary oxygen (O_2). Ozone is generated usually in dilute form by a silent electric discharge in oxygen or air. It decomposes to oxygen (as when heated) and it is a stronger oxidizing agent than oxygen. Used chiefly in disinfection and in deodorization (as in water purification and in air conditioning), in oxidation and bleaching (as in the treatment of industrial wastes), and in ozonolysis (as in the manufacture of azelaic acid from oleic acid). *Webster 3d.* b. Molecular weight, 47.9982 (was 48.000 until 1961); colorless gas; blue liquid; blue crystals; liquid and solid forms are magnetic; density of gas, 2.144 grams per liter (at 0°C); density of liquid, 1.614 grams per liter (at −195.4° C); melting point, −192.1° ± 1.0° C; boiling point, −111.9° C; soluble in cold water, in alkaline solutions, and in oils. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-124, B-200.*

ozonizer. Electrical apparatus which converts atmospheric oxygen to ozone; used in sterilizing water for drinking purposes, and for purifying air. *Pryor, 3.*

oz t Abbreviation for troy ounce. *Zimmerman, p. 77.*

P

p a. Symbol for pressure. *BuMin Style Guide, p. 61.* b. Symbol for porosity. *Zimmerman, p. 83.* c. Abbreviation for page. *Webster 3d.* d. Abbreviation for per, which is also indicated by a solidus (/) or by the negative exponent (−1). *BuMin Style Guide, p. 61.* e. Abbreviation for pico used as a prefix to units of measure, indicating multiplication of the basic unit by 10^{-12} or division by 1 trillion. *BuMin Style Guide, p. 62.*

p a. Symbol for pressure, vapor pressure, partial pressure, osmotic pressure, varying pressure. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.* b. With subscript *a*, symbol for intensity of atmospheric pressure. *Zimmerman, p. 186.* c. Symbol for standard pressure of the atmosphere. *Zimmerman, p. 426.* d. Symbol for gage pressure. *Zimmerman, p. 175.* e. With subscript c, as p_c, symbol for critical pressure. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.* f. Symbol for magnetic pole strength. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.* g. Symbol for porosity. *BuMin Style Guide, p. 61.*

p- Abbreviation for para- as a prefix. *CCD 6d. 1961.*

P a. Chemical symbol for phosphorous. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.* b. Symbol for pressure. *Zimmerman, p. 84.* c. Symbol for the period of an oscillation. *Zimmerman, p. 80.*

P a. Symbol for total pressure when *p* is vapor pressure. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.* b. Symbol for power. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.* c. Symbol for perimeter, wetted of sectional area. *Zimmerman, p. 186.* d. Symbol for probability. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.*

Pa Chemical symbol for protactinium (protoactinium). *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

pac; pack. a. A moccasin with the sole turned up and sewed to the upper; also a heavy felt half boot worn by loggers in winter. Also used by miners in the far north. *Fay.* b. A laced heelless sheepskin or felt shoe worn inside a boot or overshoe in cold weather. *Webster 3d.*

pachnolite. A white mineral with a distinct cleavage, $NaF.CaF_2.AlF_3.H_2O$; Mohs' hardness, 3; specific gravity, 2.98; alteration of cryolite. *Larsen, p. 95.*

Pachuca tank. A cylindrical tank with a conical bottom. It contains a pipe that is coaxial with the leaching tank and open at both ends; compressed air is introduced at the lower end of this pipe, which behaves as an air lift. The density of the pulp within the pipe is less than that of the pulp surrounding it because of the column of air bubbles contained in the pipe, and the pressure of the denser pulp causes the pulp in the central pipe to rise and overflow, thus circulating the entire charge. They are widely used in slime leaching. *Newton, p. 420.* Also called Brown tank.

Pacific series; Pacific province; or Pacific suite. One of two great groups of igneous rocks (the other being the Atlantic group) based on their tectonic setting. Originally described as occurring on the margins of the Pacific basin; hence, the Circum-Pacific province. Characterized by the tholeiitic magma types, yielding saturated or oversaturated residues. *See also* Atlantic series. *A.G.I.*

Pacific type of coast. *See* longitudinal coast. *Schieferdecker.*

pacite. Bol. Arsenical sulfide of iron, near arsenophyrite. *Fay.*

pack. a. A pillar, constructed from loose stones and dirt, built in the waste area or roadside to support the roof. *See also* double packing; solid packing; strip packing; wire pack. *Nelson.* b. A pack built on a longwall face between the gateside packs is called an intermediate pack. *SMRB, Paper No. 61.* c. Waste rock or timber support for roof of underground workings or used to fill excavations. Also called fill. *Pryor, 3.* d. Used in the anthracite regions synonymously with the English term chocks or nogs. *Fay.* e. To occasion the speedy subsidence of the ore in the process of washing by beating the keeve or tub with a hammer. *Fay.* f. To fill in mine stopes or old mine workings with waste rock to support the roof. *Webster 3d.* g. Eng. A measure of coal equal to 3 bushels. *Standard, 1964.* h. A bundle of iron plates ready to be heated or rolled. *Fay.* i. The quantity of ware packed. *ASTM C162-66.* j. The ratio of packed ware to theoretical. *ASTM C162-66.*

package-coal molding machine operator. *See* fuel-briquettes machine operator. *D.O.T. 1.*

packaged brick. One or more brick enclosed as a unit for protection and ease of handling. *ACSG, 1963.*

package power reactor. A small, nuclear power plant designed to be crated in packages small enough for transportation to remote locations. *L&L.*

pack annealing. *See* box annealing.

pack builder. a. One who builds packs or pack walls. *See also* pack. *Fay.* b. In anthracite and bituminous coal mining, one who fills worked out rooms, from which coal has been mined, with rock, slate, or other waste to prevent caving of walls and roofs; builds rough walls and columns of loose stone, heavy boards, timber, or coal along haulageways and passageways and in rooms where coal is being mined to prevent caving of roof or walls during mining operations. Also called packer; pillar man; timber packer; waller. *D.O.T. 1.*

pack cavity system. *See* methane drainage. *Roberts, I, p. 81.*

pack drawer. In anthracite and bituminous coal mining, a laborer who draws (tears down) stone or timber packs (pillars constructed by pack builders in the working place to support the roof during extraction of coal) to permit the roof to cave behind as the mining of the coal recedes toward the entrance of the working area. *D.O.T. 1.*

packed tower. In chemical engineering, a vertical column, used for distillation, absorption, extraction, etc., containing packing; for example, Raschig rings, Berl saddles, or crushed rock, which provides a large area for contact between the phases. *NRC-ASA N1.1-1957.*

packer. a. One who builds packs. *Mason.* b. A piece of stone suitable for a pack wall. *Mason.* c. A miner employed in stowing or packing the waste area. He also builds the pack walls where required. Also called gobber. *Nelson.* d. U.S.; Aust. A person who transports goods by pack animals; a carrier. *Webster 3d.* e. Aust. A pack animal. *Webster 3d.* f. A device lowered into a borehole, which automatically swells or can be made to expand at the correct time by manipulation from the surface to produce a watertight joint against the sides of the borehole or the casing. *Long.*

packet texture. A close grouping of quartz crystals in pegmatite. *A.G.I. Supp.*

packfong. Chinese. A silver-white alloy of copper, zinc, and nickel; German silver. *Fay.*

pack hardening. Case carburizing, using a solid carburized medium, followed by a hardening treatment. *C.T.D.*

pack hole. The space adjacent to a gate end at the face and between the face end of a gate-side pack and the coal face into which packs will be inserted when the gate is ripped or dinted. *TIME.*

pack ice. Any large area of floating ice which has been driven closely together. *Hy.*

packing. a. The method of giving support to the roof by the insertion of waste material placed or built into space from which the coal has been extracted. *TIME.* b. Any material, usually rock, packed between the rock roof of a tunnel and the top of the arch masonry. *Stauffer.* c. The filling of the waste area with stones and dirt. *See also* solid stowing. *Nelson.* d. Occurs in crushing plants when the material in the chamber is so compacted as to be nearly without voids. It occurs when free downward movement is inhibited. With gyratories the term also refers to an accumulation of sticky fines on the diaphragm. *South Australia, p. 101.* e. The spacing or density pattern of the mineral grains in a rock. *Compare* fabric. *A.G.I.* f. A Cornish term for the final dressing of tin or copper ore in a large vat or keeve filled with water. *Fay.* g. Filling, as of mortar containing small stones. *Fay.* h. *See* blocking, h. *Pryor, 4.* i. A general term relating to a yielding material employed to effect a tight joint. A common example is the sheet rubber used for gaskets. The term is also applied to the braided hemp or metallic rings used in some joints, that allow considerable or incessant motion. *Fay.*

packing density. The bulk density of a granular material, for example, grog or crushed quartzite, when packed under specified conditions. A common method of test, particularly for foundry sands, involves the use of an AFA rammer. *See also* AFA rammer. *Dodd.*

packing factor. Ratio of true volume to bulk volume. Also (1.0—porosity). *VV.*

packing gland. An explosion-proof entrance for conductors through the wall of an explosion-proof enclosure, to provide compressed packing completely surrounding the wire or cable, for not less than one-half inch measured along the length of the cable. *ASA C42.85: 1956.*

packing material. In powder metallurgy, any material in which compacts are embedded during the presintering or sintering operations. *ASM Gloss.*

pack road. A road or trail suitable for pack animals, but not for vehicles. *Fay.*

pack rolling. Hot-rolling a pack of two or more sheets of metal; scale prevents their being welded together. *ASM Gloss.*

packsaddle. Any of various saddles (as one with a high frame or a large mat-covered pad stuffed with hay or wool) designed to support loads on the backs of pack animals. *Webster 3d.*

packsand. A very fine-grained sandstone so loosely consolidated by a slight calcareous cement as to be readily cut by a spade. *Standard, 1964.*

pack trail. A term used in the Western United States for a path or narrow road for the passage of packtrains only. *Standard, 1964.*

packtrain. A train of pack animals. *Standard, 1964.*

packungstheorie. The theory that faceted pebbles have been made by rubbing against each other. *Hess.*

pack wall. a. A dry-stone wall built along the side of a roadway, or in the waste area, of a coal or metal mine. The wall helps to support the roof and also to retain the packing material and prevent it spreading into the roadway. *Nelson.* b. In metal mining, a permanent roof support built of timber with or without stone filling—a cog or chock. *Nelson.*

Pactolian. Of or relating to the Pactolus river, in Lydia, or its gold-bearing sands. *Webster 3d.*

pad. a. Ground contact part of a crawler-type track. *Nichols.* b. *See* wall plate. *Nelson.* c. The refractory brickwork below the molten iron at the base of a blast furnace. *Dodd.*

padded bit. Synonym for castellated bit. *Long.*

paddle. a Numbered wooden markers which shovelers put in the cans of ore that they load. *Hess.* b. A straight iron tool for stirring ore in a furnace. *Standard, 1964.* c. A bat or pallet, as used in tempering clay. *Standard, 1964.* d. A scoop for stirring and mixing, as used in glassmaking. *Standard, 1964.*

paddle and anvil. Archeol. A technique for shaping vessels by compaction when they are still somewhat plastic. At times, a cord-wrapped paddle or a textile-wrapped paddle is used for this purpose. Occasionally designs are carved on paddles. The resultant surface impressions on the vessels finished with several possible types of paddles are frequently used as surface finish categories in pottery classification. *ACSG, 1963.*

paddle conveyor. *See* paddle-type mixing conveyor. *ASA MH4.1-1958.*

paddle loader. A belt loader equipped with chain-driven paddles that move loose material to the belt. *Nichols.*

paddle mixer. A form of worm conveyor having two noncontinuous spirals which form paddles; the shafts are contrarotating and the spirals opposite hand. *B.S. 3552, 1962. See also* paddle-type mixing conveyor. *ASA MH4.1-1958.*

paddle-type mixing conveyor. A type of conveyor consisting of one or more parallel paddle conveyor screws. *ASA MH4.1-1958.*

paddle washer. A type of conveyor consisting of one or two inclined parallel paddle conveyor screws in a conveyor trough having a receiving tank and an over flow weir at the lower end and a discharge opening at the upper end. *ASA MH4.1-1958.*

paddle-wheel agitator. A simple stirring apparatus by which the solids are kept in suspension by paddles. It is difficult to start if the sand packs around the blades and expensive, both in operating and in repair costs. *Liddell 2d, p. 392.*

paddle-wheel fan. A centrifugal fan with radial blades. *Strock, 10.*

paddling. The rough shaping of a piece of glass in a furnace by means of paddles or tools preparatory to the pressing operation for making optical glass blanks. *ASTM C162-66.*

paddock. a. A section of a large area of alluvial, being worked by hydraulicking. *Nelson.* b. A small dump of ore held by tributors. *Nelson.* c. Flooded excavation in which an alluvial dredge floats, and which it digs for itself as it works along the deposit. Also called pond. *Pryor, 3.* d. Aust. An enclosure for exercising horses. The Australians being keen horsemen, took to using the word in mining. Thus when ore is in bins, stores, or stacked on the surface, it is said to be in the paddock. *Fay.* e. A way of working a claim, the whole mass being taken out in the form of a large square pit. *Fay.* f. A space or platform near the mouth of a shaft or excavation for temporary storage of ore or wash dirt. *Webster 3d.* g. Aust. An excavation for wash dirt in shallow alluvium. *Webster 2d.* h. Aust. To store ore in a paddock. *Webster 2d.*

paddy. a. York. An open lamp used by miners. *Fay.* b. A borehole drill bit having cutters that expand on pressure. Also called expansion bit; paddy bit. *Long.*

paddy bit. *See* paddy, b. *Long.*

paddy lamp. A portable battery-operated lamp attached to the front or rear of a man-riding train. *B.S. 3618, 1965, Sec. 7.*

paddy pan. Leic. A skip (box) formerly used in a swinging bant for carrying miners. *See also* bant; bont, a; tacklers, b; skep. *Fay.*

pad foundation. An independent foundation for a column or pier. *See also* strip foundation. *Ham.*

padlock sheave. a. The bucket sheave on a dipper or hoe shovel. *Nichols.* b. A sheave set connecting inner and outer boom lines. *Nichols.*

padmaradschah. Synthetic corundum of various shades of yellow produced by the use of nickel oxide. From the Sinhalese word padmaragaya, lotus color. *Hess.*

Padmos method. A comparative method for the determination of the coefficient of thermal expansion of a glass; the glass being tested is fused to a glass of known expansion and similar transformation temperature. From the birefringence resulting from the consequent stress at the junction of the two glasses, the difference in expansion can be calculated. *Dodd.*

page. a. A small wooden wedge used in securing the timbering for excavations. *Ham.* b. In brickmaking, a track carrying the pallets bearing newly molded bricks. *Standard, 1964.*

pagoda stone. A Chinese limestone showing in section figures fancifully likened to pagodas, due to fossil orthoceratites. *Standard, 1964.*

pagodite. Ordinary massive pinite in its amorphous compact texture and other physical characters, but containing more silica. The Chinese carve the soft stone into miniature pagodas and images. Also called agalmatolite. *C.T.D.*

paha. A low ridge or hill of glacial deposits capped by loess, determined by the configuration of the subterrane, molded by and marking the direction of ice flows of the Glacial epoch; characteristic of northeastern Iowa. *Standard, 1964.*

pahoehoe. A Hawaiian term for basaltic lava flows typified by a smooth, billowy, or ropy surface. Varieties include corded, elephant hide, entrail, festooned, filamented, sharkskin, shelly, and slab pahoehoe. *Compare* aa. *USGS Bull. 994, 1953, p. 32.*

Pahrump. Precambrian series. *Bureau of Mines Staff.*

paid crier. A professional mourner among Irish mining people, usually a woman; a keener. *Korson.*

paigeite. A coal-black hydrous borate of ferrous and ferric iron and tin, $30FeO.5Fe_2O_3.SnO_2.6B_2O_3.5H_2O$. An aggregate of fibers, appearing foliated. May be a mixture of hulsite and iron borate. From Brooks Mountain, Seward Peninsula, Alaska. *English.*

painite. Mixed oxide, near $Al_{20}Ca_4BSiO_{37.5}$. A single, small, transparent, dark-red, hexagonal crystal from gem gravel at Mogok, Burma. *Compare* hibonite. *Spencer 21, M.M., 1958.*

paint. a. A mixture of pigment with vehicle, intended to be spread in thin coats for decoration or protection, or both. *Bureau of Mines Staff.* b. A term used in the Western United States for an earthy, pulverulent variety of cinnabar. *USGS Bull. 922-L, 1940, p. 338.*

paint clay. Irony or manganiferous clay which mixes well with linseed oil. The color ranges from light yellow to dark reddish-brown. *CCD 3d, 1942, p. 195.*

Painted Desert beds. A series of orange-colored clayey sandstones followed by irregularly bedded, brightly colored variegated sandstones belonging to the Triassic system in Arizona. This lower group is followed by the Upper Painted Desert beds, probably of Jurassic age. *C.T.D.*

painter, hand. One who paints designs on pottery or porcelain ware freehand, using small hand brushes. Also called decorator, hand; filler-in; tinter. *D.O.T. 1.*

paint gold. A very thin coating of gold on minerals. *Fay.*

painting; sizing. The painting of the mine roof with a coal-tar paint that seals the bottom strata of the roof to prevent the air from entering the crevices of the roof. *Kentucky, p. 145.*

paint mill. A machine for grinding mineral paints. *Fay.*

paint pot. A type of mud pot containing variegated, highly colored boiling mud, usually of cream, pink, or reddish tones. *A.G.I.*

paint rock. A soft, incompetent, fine-grained mass of quartz, pyrolusite, and kaolin with subangular fragments of chert, hematite, and goethite. *Woodruff, v. 3, p. 557.*

paint thinner. *See* turpentine substitutes. *Fay.*

pair. A party of men working together; a gang. *Webster 2d.* Also spelled pare. *Fay.*

paired electrons. Said of two valence electrons when they form a nonpolar bond between two atoms. *Pryor, 3.*

paired terraces. Terraces that face each other across a stream at the same elevation. *Leet.*

pair of gears. N. of Eng. *See* gears. *Fay.*

pair of timbers. S. Wales. *See* gears. *Fay.*

pair production. The transformation of a high-energy gamma ray into a pair of particles (an electron and a positron) during its passage through matter. *L&L.*

pairs. S. Staff. Two shafts about 100 yards apart, sunk to the thick coal seam. *Fay.*

paisanite. An alkali-quartz porphyry containing phenocrysts of microperthite and quartz in a finely granular, saccharoidal, greenish groundmass of the same minerals and riebeckite. *Webster 2d.* A riebeckite granite aplite. *A.G.I. Compare* comendite. *Fay.*

paktong. *See* packfong. *Fay.*

palaeo-. A prefix used, particularly by Continental authors, to indicate the pre-Tertiary age, and generally altered character, of the rock to the name of which is added; for example, palaeopicrite. By some writers, the term palaeo has been further restricted to pre-Carboniferous rocks, those of pre-Tertiary and post-Devonian age being indicated by the prefix meso-. *Holmes, 1928.*

palaeophyre. Proposed by Gumbel for certain porphyritic dike rocks corresponding to quartz-mica-diorites in mineralogy. They cut the Silurian strata of the Fichtel Gebirge in Germany. *Fay.*

palaeophyrite. Proposed by Stache and von John for certain porphyrites in whose strongly prevailing groundmass are phenocrysts of plagioclase, hornblende, and augite. *Fay.*

palaeopicrite. Proposed by Gumbel for picrites which were considered by him to be similar to the rocks from the Cretaceous formation, originally named picrite by Tschermak. Gumbel called his specimens palaeopicrites because they occurred in Paleozoic strata. They are chiefly olivine and augite. More or less brown hornblende and biotite also occur. *Fay.*

palagonite. A yellow or orange isotropic mineraloid formed by hydration and other alteration (devitrification, oxidation) of sideromelane (basaltic glass), and constituting a characteristic part of palagonite tuffs. Also found as amygdule fillings in some basaltic lavas and as an alteration of the glassy skins of the pillows in pillow basalts. Two types, gelpalagonite and fibropalagonite, have been recognized. *A.G.I.*

palagonite tuff. An indurated deposit of glassy basaltic ash in which the constituent particles are largely altered to palagonite. *A.G.I.*

palanthropic. According to Dawson, the earlier part of the anthropic, the post-glacial Pleistocene, during which man appeared and there was an extensive emergence of land. *Standard, 1964.*

palasome. a. A term for host rock in a replacement deposit. b. A mineral which is being substituted by another, the metasome. *Schieferdecker.*

Palatinian orogeny. Post-Permian diastrophism. *A.G.I. Supp.*

palatinite. Applied to basaltic and dioritic rocks containing orthorhombic pyroxenes. *Holmes, 1928.*

palau. An alloy of gold and palladium, commonly in the ratio of 80:20. Used as a substitute for platinum in laboratory ware and jewelry. *Bennett, 2d, 1962.*

pale brick. Brick which are underfired. *Fay.*

pale glass. Glass of a pale green color. *Dodd.*

paleo-; palaeo-. From the Greek palaio-; a combining form meaning old or ancient; used to denote: (1) remote in point of time, and (2) early; primitive; archaic. *Webster 3d.*

paleobotany. The study of plants of past geological ages through the investigation of fossils. *A.G.I. See also* paleontology. *A.G.I. Supp.*

Paleocene epoch and series. The earliest epoch of the Tertiary period and the rocks formed during that time. The Paleocene epoch is succeeded by the Eocene epoch. Most American geologists have until quite recently (1939) included rocks of this series in the Eocene, so that the term Paleocene appears very infrequently in older writings. Paleocene rocks are found on the continental margins and interior basins. Fossils are much like those of the Eocene epoch. *Stokes and Varnes, 1955.* Considered by some to be part of the Eocene and by others to be transitional between Cretaceous and Tertiary. *A.G.I. Supp.*

paleochannel. Buried stream channel. *A.G.I. Supp.*

paleoclimatology. The branch of science which treats of the climatological conditions during the geological periods in the past history of the earth. *Schieferdecker.*

paleocurrent. Current, generally of water, that influenced sedimentation or other processes or conditions in the geologic past. *A.G.I. Supp.*

paleoecology. The science of the relationship between ancient organisms and their environment. *A.G.I.*

Paleogene. The earlier of the two periods comprised in the Cenozoic era, in the classification adopted by the International Geologic Congress and used by many European geologists; it includes the Paleocene (if that be accepted), Eocene, and Oligocene epochs. Also the system of strata deposited during that epoch. *Compare* Neogene. Not used in the United States. *Fay.*

paleogeography. The geography of an area at some specified time in the past. *A.G.I.*

paleogeologic map. Areal pattern of ancient outcrops (sub-crops) at a buried erosion surface (unconformity). *Wheeler.*

paleogeology; paleogeologic. A term used for maps and studies made of geologic conditions and events in some former period of geologic time. *A.G.I.*

Paleolithic. Of or relating to the second period of the Stone Age following the Eolithic and preceding the Mesolithic and characterized by rough or chipped stone implements. *Webster 3d.*

paleolithologic map. A map showing lithologic variations at some buried horizon or within some restricted zone. *A.G.I. Supp.*

paleomagnetism. Faint magnetic polarization of rocks that may have been preserved since the accumulation of sediment or the solidification of magma whose magnetic particles were oriented with respect to the earth's magnetic field as it existed at that time and place. *A.G.I. Supp.*

paleontological facies. a. The paleontological aspect of a particular sedimentary deposit, for example, nummulitic facies, crinoid facies, etc. *Schieferdecker.* b. Facies differentiated on the basis of fossils. *A.G.I. Supp.*

paleontologist. A scientist who searches in rock layers, gravel pits, and other places to find fossils. *MacCracken.*

paleontology. A science that deals with the life of past geological periods, is based on the study of fossil remains of plants and animals, and gives information especially about the phylogeny and relationships of modern animals and plants and about the chronology of the history of the earth. *Compare* paleobotany; paleoclimatology; paleogeography. *Webster 3d.*

paleoplain. In geology, an ancient plain of degradation, buried under later deposits. *Fay.*

paleotypal. A general term applied to aphanitic and porphyritic igneous rocks having the habit or suite of characteristics typical of altered volcanic and hypabyssal rocks, such as many of those of pre-Tertiary age. By decomposition, feldspars have lost their original luster, and glass, where present, has become dull through devitrification. Rocks having the younger-looking aspect of fresh volcanic rocks are described as cenotypal. *Holmes, 1928.* A similar idea is expressed by the terms paleovolcanic and neovolcanic. The usage of all these terms is obsolete. *A.G.I.*

paleovolcanic. *See* paleotypal.

Paleozoic. One of the eras of geologic time that, between the Late Precambrian and Mesozoic eras, comprises the Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian, and Permian systems. The beginning of the Paleozoic was formerly supposed to mark the appearance of life on the earth, but that is now known to be incorrect. Also, the group of rocks deposited during the Paleozoic era. *A.G.I.*

paleozoology. The science of fossil animals; its two subdivisions are invertebrate and vertebrate paleontology. *A.G.I.*

palermoite A mineral, $(Li,Na)_4SrAl_9(PO_4)_8$-$(OH)_9$, orthorhombric prisms in pegmatite from Palermo mine, North Groton, N. H. Named from the locality. *Spencer 20, M.M., 1955.*

paligorskite. Original spelling of palygorskite. *Hey 2d, 1955.*

palimpsest. *See* palimpsest structure.

palimpsest structure. A structure of metamorphic rocks due to the presence of remnants of the original texture of the rock. Synonym for palimpsest. *Holmes, 1928.*

palingenesis. a. The process of formation of new magma by the melting or fusion of country rocks with heat from another magma, with or without the addition of granitic material. *A.G.I.* b. The differential melting, in the root parts of folded mountains, to form a pore liquid or ichor; same as anatexis. *A.G.I.* c. In paleontology and biology, the young stages of an organism recapitulate, without change, the characters of their ancestors. *A.G.I.*

palisade. A line of bold cliffs; especially, one showing a columnar face weathered along vertical joints; usually used in the plural. *Webster 3d.*

palisades sill. A massive intrusive sheet of dolerite (diabase) intruded during the Triassic period of vulcanicity in the Hudson Region. *C.T.D.*

Palisadian disturbance. Post-Triassic diastrophism. *A.G.I. Supp.*

palladinite. Palladium oxide, PdO. *Dana 6d, p. 210.*

palladium. A soft, ductile, silvery-white or steel-white metallic element in group VIII of the periodic system. The least dense and lowest melting of the platinum-group metals. Used as a catalyst in hydrogenation. Native palladium occurs mostly in grains and is frequently alloyed with platinum and iridium. Symbol, Pd; valences, 2, 3, and 4; atomic number, 46; atomic weight, 106.40; isometric; melting point, 1,550° C; boiling point, 2,927° C; specific gravity, 12.02 (at 20° C); insoluble in water; soluble in aqua regia, in hot nitric acid, and in sulfuric acid; and slightly soluble in hydrochloric acid. *C.T.D.; Handbook of Chemistry and and Physics, 45th ed., 1964, pp. B-125, B-200.*

palladium amalgam. Synonym for potarite. *Spencer 15, M.M., 1940.*

palladium chloride; palladous chloride; palladium dichloride. Dark red; deliquescent; crystals; $PdCl_2$; molecular weight, 177.31; specific gravity, 4.0 (at 18° C); soluble in water, in hydrochloric acid, in hydrobromic acid, in alcohol, and in acetone; and melting point, 501° C with decomposition. Used in electroplating with palladium, in detecting carbon monoxide gas, and in the manufacture of porcelains. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-200.*

palladium chloride dihydrate. Dark brown; molecular weight, 213.34; deliquescent; crystals; $PdCl_2.2H_2O$; and soluble in water, in hydrochloric acid, in alcohol, and in acetone. Used in electroplating with palladium, in detecting carbon monoxide gas, and in the manufacture of porcelains. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-200.*

palladium gold. Same as porpezite, or gold, containing palladium up to 10 percent. *Fay.*

palladous chloride. See palladium chloride. *CCD 6d, 1961.*

pallas iron. *See* pallasite. *Fay.*

pallasite. A group name for siderolites, containing fractured or rounded crystals of olivine in a network of nickel iron. *Rice.* Originally proposed by Gustav Rose for a meteorite that fell near Pallas, U.S.S.R. It has been used by Wadsworth in a wider sense for both meteoric and terrestrial, ultrabasic rocks, which in the former average about 60 percent iron and in the latter have at least more iron oxides than silica. Cumberlandite is the chief example. Also called pallas iron. *Fay.*

pallet. a. A board, small platform, or packaging unit sometimes used, for example, in the transport of refractories or building bricks. *Compare* stillage. *Dodd.* b. A potters' wheel. *Standard, 1964.* c. A paddle for mixing and shaping clay for crucibles, etc. *Standard, 1964.* d. A flat or shaped wheelless load carrier of a pallet conveyor. *ASA MH4.1-1958.*

palleting. A light platform in the bottom of powder magazines to preserve the powder from dampness. *Fay.*

pallet inspector. One who inspects pallets (trays) on which green brick is stacked and transferred, and straightens those that are warped. *D.O.T.1.*

pallet molding. A method of forming bricks in sanded molds, from which they are dumped on a board called a pallet; distinguished from slop-molding. *Standard, 1964.*

pallette. *See* battledore. *Dodd.*

pallet-type conveyor. A series of flat or shaped wheelless carriers propelled by and attached to one or more endless chains or other linkage. *ASA MH4.1-1958.*

palm. A piece of stout leather fitting the palm of the hand, and secured by a loop to the thumb; this has a flat indented plate for forcing the needle; used in sewing heavy canvas. *Fay.*

Palmer water-spray apparatus. A dust sampling instrument that consists essentially of a motor with an exhaust fan to which is connected a pear-shaped glass bulb, at the base of which is a water trap. Approximately 40 cubic centimeters of distilled water is placed in the trap. When the motor is started, air is drawn through the water seal, thus breaking the water into a spray, which washes the dust from it. A Pitot tube registers the rate of airflow, which is controlled by means of an outlet valve at the top of the instrument. After a suitable quantity of air has been sampled, the water is removed to a flask and sent to the laboratory for analysis. *R.I. 2392, September 1922, p. 1.*

palmierite. A white sulfate of potassium, sodium, and lead, $(K,Na)_2Pb(SO_4)_2$. Rhombohedral. Microscopic plates. Eruption of April 1906, Vesuvius, Italy. *English.*

palmitic acid. Saturated fatty acid ,C_{15}.H_{31}.-COOH. *Pryor, 3.*

palm needle. A straight triangular-sectioned needle used for sewing canvas. *Fay.*

palong. A Malayan term for a long tin sluice. *Pryor.*

Palo-Travis analyser. A sedimentation apparatus for the determination of particle size, based upon the settling of powder through a long sedimentation tube filled with liquid. The instrument consists of the sedimentation tube, a smaller reservoir at the top joined to the tube through a large bore stopcock, and a calibrated capillary mounted concentrically at the bottom of the tube. An initially concentrated suspension of powder is allowed to settle in the sedimentation tube and a small portion of the powder is diverted into the capillary. Particle size distribution data may be calculated from observations of the height of powder in the capillary at a predetermined time schedule based on Stokes' law. Large samples are required. *Osborne.*

paludal. Pertaining to swamps or marshes, and to material deposited in a swamp environment. *See also* palustrine. *A.G.I.*

paludification. Process of formation of peat bog. This requires a steady growth of new peat-forming plants in phase with a steady general sinking of the depression in which this occurs. *Pryor, 3.*

paludrine. Synthetic drug used to treat malaria (paludism) in place of quinine. *Pryor, 3.*

palustrine. Pertaining to material deposited in a swamp environment. *See also* paludal. *A.G.I.*

palygorskite. A group of clay minerals, hydrous magnesium aluminum silicates, characterized by a distinctive rodlike shape. Same as attapulgite. *A.G.I.*

palynology. a. The study of the fossilized spores and pollen grains of the plants whose remains contributed to the formation of coal seams. *Nelson.* b. Used to aid in dating rock formations. *Pryor, 3.*

pan. a. A shallow, circular, concave steel or porcelain dish in which drillers or samplers wash the drill sludge to gravity concentrate and separate the particles of heavy dense minerals from the lighter-density rock powder as a quick visual means of ascertaining if the rocks traversed by the borehole contain minerals of value. *Long.* b. The act or process of performing the above operation. *Long.* c. S. Afr. A dish for washing sand, clay, etc., from gold or tin. *Beerman.* d. Used for testing placer deposits, and for working pockets and small placer deposits. A circular steel dish from 10 to 16 inches in diameter at the top, from 2 to 2½ inches deep, and with sides sloping at 35° to 40° to the horizontal. A pan of gravel is placed in water and stirred by hand to break up lumps of clay. Larger stones are picked out and the pan is given a gyratory motion to settle the heavier particles. From time to time the pan is tilted and the surface layer of material is washed off. At the end of the operation a little black sand (if the placer contains black sand) is left with the gold, which can be collected by adding a little mercury, or the material can be dried and the sand removed by a magnet. An experienced man can pan about 1 cubic yard of gravel in 10 hours. *Lewis, pp. 379-380.* e. S. Afr. An amalgamating pan is a steel cylinder with a strong wearing base, above which a steel disc (the muller) revolves. Gold-bearing concentrates, mercury, and water are fed centrally, ground together, and discharged peripherally. *Pryor, 3.* f. S. Afr. In prospecting and field testing, panning is the operation of an 8-inch-diameter gold pan. Lighter sands are washed away from the finely divided mineral. *See also* dulong; batea; plaque. *Pryor, 3.* g. *See* panning, a. *Fay.* h. A cylindrical vat of iron stone, or wood, or these combined, in which ore is ground with mullers and amalgamated. *Fay. See also* amalgamation pan. i. A copper or galvanized iron utensil used for washing gold ore and gravel so as to separate the heavy gold by a shaking motion. It corresponds to the Cornishman's vanning shovel. Also called dish. *Fay.* j. To wash earth, gravel, or other material in a pan, in searching for gold. *Webster 3d.* k. to yield precious metal, as gold, in the process of panning. *Webster 3d.* l. The solid stratum of clay, pebbles, etc., underlying soil; hardpan; used chiefly in Great Britain. *Standard, 1964.* m. Fire clay or underclay of coal seams. *Fay.* n. Mid. Sheet-iron vessels holding one-fourth hundredweight, into which fillers rake the small coal. *Fay.* o. *See* prospecting dish. *Nelson.* p. A trough or section of a chain conveyor, gravity conveyor, or shaker conveyor. *Nelson.* q. A carrying scraper. *Nichols.* r. The framework of a belt or chain conveyor. *Mason.* s. S. Afr. A natural depression in ground, usually containing standing water, mud, or salt crusts. *Pryor,* 3. t. Shallow depression in the marsh surface unoccupied by higher plants. Also called saltpan; marsh pan. *Schieferdecker.*

panabase. Same as tetrahedrite, $Cu_8Sb_2S_7$. *Fay.*

pan amalgamation. Amalgamation of silver or gold with mercury by grinding in a pan. *Fay.*

pan-amalgamation process. Method of recovering silver and gold from their ores, in which a cast-iron pan or barrel is used for contacting a slurry of the crushed ore with salt, copper sulfate, and mercury; the released silver and gold form an amalgam with the mercury. *Bennett 2d, 1962.*

Pan-American jig. Mineral jig developed in first instance for treatment of alluvial sands. The jig cell is pulsated vertically on a flexible diaphragm seated above the stationary hutch. *Pryor, 3.*

pan breaker. *See* subsoil plow.

pancake. The same as ribbon. *Fay.*

pancake auger. An auger having one spiral web, 12 to 15 inches in diameter, attached to the bottom end of a slender central shaft. This type of auger is used as a removable deadman to which a drill rig or guy line is anchored. *Long.*

pancake forging. A rough, forged shape which may be obtained quickly with a minimum of tooling. It usually requires considerable machining to attain the finish size. *ASM Gloss.*

pancake ice. Pieces of newly formed ice usually between 1 and 6 feet in diameter. *Hy.*

pancakes. Concrete discs used in stope support. They are cast at the surface, and are usually 30 inches in diameter by 4 inches thick with reinforcement from wire rope. They are piled one on top of the other to form concrete columns for support. *Higham, p. 122.*

panclastite. An explosive composed of liquid nitrogen tetroxide mixed with carbon disulfide or other liquid combustible, in the proportion of 3 volumes of the former to 2 of the combustible. *Fay.*

pan coal. Scot. Small coal suitable for use at saltworks, as under saltpans. *Fay.*

pan conveyor. a. A conveyor comprising one or more endless chains or other linkage to which usually overlapping or interlocking pans are attached to form a series of shallow, open-topped containers. Some pan conveyors have been known also as apron conveyors. *ASA MH4.1-1958.* b. Jigging conveyor; trough down which coal slides after severance and loading in dipping seams, motion being aided by shaking action. *Pryor, 3.* c. A trough conveyor or gravity conveyor. *Nelson.*

pandaite. A member of the pyrochlore group containing Ba and Sr, with only small amounts of other bases, and much water. *Hey, M.M., 1961.*

pandermite. a. Firm, compact, porcelainlike masses of colemanite. *Fay.* b. Synonym for priceite. *Hey 2d, 1955.*

pane. a. A variant and seldom-used spelling of peen. *Long.* b. S. Staff. A quantity of coal measuring 2 feet 6 inches high, 6 feet in width, and 6 feet under or forward. *Fay.*

pan-edge. A runner mill for grinding or mixing granular material; steel supporting plates on which furnace bottom refractories are placed. *Bureau of Mines Staff.*

panel. a. A system of coal extraction in which the ground is laid off in separate districts or panels, pillars of extra size being left between. *Fay.* b. A large rectangular block or pillar of coal. *Fay.* c. A group of breasts or rooms separated from the other workings by large pillars. *Fay.* d. A small portion of coal left uncut. *Webster 3d.* e. A method of working whereby the workings of a mine are divided into sections, each surrounded by solid strata and coal with only the necessary roads through the coal barrier. Also spelled pannel. *Mason.* f. A group of working places, usually operated as a unit, and separated from other by large pillars of coal. *Hudson.* g. Eng. A division or main district of workings in a seam. *SMRB, Paper No. 61.* h. Eng. A bed of stone. *SMRB, Paper No. 61.* i. York. Any thin band of hard rock. *Nelson.* j. The working of coal seams in separate panels or districts, for example, single unit panel. *See also* panel working. *Nelson.* k. Rectangle of lode ore, defined by means of levels and winzes, and then considered to be proved as regards volume for valuation purposes. In stoping, panel slicing is the process of mining out a panel either from above, below, or one side as described by a qualifying term. *Pryor, 3.* l. A heap of dressed ore. *Fay.*

panel barrier. The pillar of coal left between the adjacent panels. These pillars are often worked on the retreat after the coal in the panels has been extracted. In the panel system of bord-and-pillar mining, the panel barrier may be 22 yards (minimum) wide and about 300 yards apart. In longwall panel mining, the barriers may be made of sufficient width for extraction by a conveyor face on the retreat. Also called panel pillar. *See also* Bolsover experiment. *Nelson.*

panel brick. A special, long, silica, refractory shape laid stretcher fashion in the wall of a coke-oven. *Dodd.*

paneling. Wood, etc., made into panels; also, panelwork. *Webster 2d. See also* panel, a. *Fay.*

panel point. A node on a truss chord, where a vertical member intersects with the chord. *Ham.*

panel slicing. a. In stoping, the process of mining out a panel either from above, below, or one side as described by a qualifying term. *Pryor, 3, p. 286.* b. *See* top slicing and cover caving. *Fay.*

panel spalling test. A test for the spalling resistance of refractories. A panel of the bricks to be tested is subjected to a sequence of heating and cooling cycles and the loss in weight due to the spalling away of fragments is reported. *Dodd.*

panel working. a. Working laid out in districts or panels, which are then extracted as single units. The panel system of working may be adopted with pillar-and-stall and longwall methods. *See also* pillar methods of working. *Nelson.* b. A system of working coal seams in which the colliery is divided up into large squares or panels isolated or surrounded by solid ribs of coal of which a separate set of breasts and pillars is worked, and the ventilation is kept distinct, that is, every panel has its own circulation, the air of one not passing into the adjoining one, but being carried direct to the main return airway. *Zern.*

pan feeder. *See* conveyor-type feeder. *ASA MH4.1-1958.*

pan-feeder operator. *See* mill feeder. *D.O.T. Supp.*

panhead. A head to a rivet or screw having the shape of a truncated cone. *Ham.*

pan ice. Labrador. Ice formed along the shore and subsequently loosened and driven by winds and currents. *Fay.*

panidiomorphic. A textural term proposed by Rosenbusch in 1888 for those rocks in which all or almost all of the mineral constituents are idiomorphic or euhedral. *A.G.I.*

panman. a. A man who places in position and tends the operation of underground trough conveyors for the transportation of coal or other minerals. These conveyors are built in sections and the principal task of the panman is to move the sections from one position to another. *Hess.* b. One engaged in dismantling or building conveyors. Also called panner. *Mason.*

pan mill. Term sometimes applied to an edge-runner mill but more properly reserved for the old type of mill (also known as a block mill) for grinding flint for the pottery industry. It consists of a circular metal pan paved with chert stones over which are moved heavy blocks of chert (runners) chained to paddle arms. *See also* edge-runner mill. *Dodd.*

Pannetier's reds. Brilliant on-glaze ceramic colors, based on iron oxide, developed in the early 19th century by Pannetier in Paris. *Dodd.*

panning. a. Aust.; Pac. Washing earth or crushed rock in a pan, by agitation with water, to obtain the particles of greatest specific gravity which it contains (chiefly practiced for gold, but also for quicksilver, diamonds, and other gems). *Fay.* b. Use of plaque, vanning shovel, pan to fractionate finely ground mineral into light and heavy portions for visual assessment. *Pryor, 2.*

Pannonian. Lower Pliocene. *A.G.I. Supp.*

pan out. To give a result, especially as compared with expectations; as, in mining, the gravel pans out well. *See also* pan, j and k. *Fay.*

pan-packed splittings. Disks or plates made up of splittings held together by forces resulting from pressing freshly cleaved mica surfaces together. *Skow.*

panplain. A very level plain with a general seaward inclination. *Stokes and Varnes, 1955.*

pan scale. A product which settles out during the crystallization of salt from brine. It is composed, chiefly, of calcium sulfate but also contains some NaCl and various mineral impurities. Used for cattle feed and as fertilizer. *CCD 3d, 1942.*

pan shifter. A conveyor shifter. *Nelson.*

pantellerite. A felsophyric or vitrophyric igneous rock, virtually a sodic quartz trachyte, containing essential anorthoclase aegirite, and quartz, and perhaps diopside and cossyrite. Applied to a group of rocks intermediate between the rhyolites and trachytes on one hand, and the dacites on the other. They differ from all these in having anorthoclase as the principal feldspar. Cossyrite, a rare and probably titaniferous amphibole, occurs at the original locality on the Island of Pantelleria, in the Mediterranean. *Fay.*

pantile. Structural units molded in open-half cylinders shaped in an ogival curve accentuated at one side so as to interlock with the next tile. *ACSG, 1963.*

pantograph. A type of drawing instrument consisting of rods linked together in the form of a parallelogram, used for copying a drawing to any required scale. The term also applies to the hinged diamond-shaped structure mounted on the roof of an electric locomotive in order to collect electric power from an overhead wire. *Ham.*

pan-type cars. The most successful car ever developed for average heavy duty quarry service in combination with power shovel loading is the famous pan type doorless two-way side dump design, built in capacities from 4 to 10 cubic yards. The car body is reversible and may be dumped to either side. Dumping is accomplished by means of an external hoist at the dumping point. *Pit and Quarry, 53rd, Sec. A, p. 112.*

Panzer conveyor. *See* armored flexible conveyor. *Nelson.*

Panzer-Forderer snaking conveyor. A very strong, armored conveyor that is moved forward behind the coal plough by means of a traveling wedge pulled along by the plough or by means of jacks or compressed-air-operated rams attached at intervals to the conveyor structure. The conveyor is driven by 50-horsepower electric motors at each end with a 50-horsepower compressed-air engine in reserve. *Sinclair, V, p. 289.*

papa. a. A bluish New Zealand clay like indurated pipe clay used for whitening fireplaces. *Webster 3d.* It is often as hard as stone and is then called papa rock. *Webster 2d.* b. Sp. A nugget of gold or silver. *Fay.* c. A nodule of mineral. *Fay.*

papagoite. A mineral, near $CaCuAlSi_2O_6(OH)_3$; monoclinic blue crystals from Ajo, Pima County, Ariz. Named from the tribe that formerly inhabited the region. *Hey, M.M., 1961.*

papan. A plank, from Mayala. *Hess.*

paper clay. A fine-grained, white, kaolin-type clay, very low in free silica, has high retention and suspending properties, and high color reflectants. Used for coating or filling paper. Most paper clays are beneficiated before marketing. *Bureau of Mines Staff.*

paper coal. a. Coal in which cuticular matter may be prominent. *A.G.I.* b. A variety of brown coal deposited in thin layers like sheets of paper. *Fay.*

paper-lead cable. A cable suitable for high temperatures and it will carry more current than bitumen cables of the same copper section. Each conductor is wrapped in manila paper impregnated with resin oil, and the whole again wrapped in paper. Around this is a sheath of lead surrounded by jute braid, and the whole is steel-armored. Paper cables are liable to serious deterioration from moisture. *Mason, V. 2, p. 433.*

paper peat. Thinly laminated peat. *Tomkeieff, 1954.*

paper resist. Resist pattern formed by using cut paper to block out areas. *ACSG, 1963.*

paper shale. A highly carbonaceous shale that splits in thin, tough, somewhat flexible sheets. *A.G.I. Supp.*

paper spar. A crystallized variety of calcite found in thin lamellae or paperlike plates. *Standard, 1964.*

paphos diamond. Quartz. *Shipley.*

par. a. The nominal value of securities or certificates of value. Also called nominal par; face par. *Webster 3d.* b. The value or price at which securities or certificates of value are issued. *Webster 3d.*

para-; par-. a. In chemistry, these prefixes indicate: (1) an isomeric or polymeric modification; as, paracyanogen, paraldehyde, etc.; (2) a modification or a similar compound that is not necessarily isomeric or polymeric; as, paramorphine; (3) a benzene di- derivative in which the substituted atoms or radicals are directly opposite each other on the benzene ring; that is, occupying the positions 1 and 4; as, paraxylene; or (4) an inactive isomer produced by a combination of its dextro- and levo- modifications; as, paratartaric acid. Abbreviation, p-. *Standard, 1964; Webster 3d.* b. A Greek prefix meaning beside. In the name of a metamorphic rock, such as paragneiss, it means derived from an original sediment. *Webster 3d.*

parabituminous coal. Bituminous coal containing 84 to 87 percent carbon (ashless, dry basis). *Tomkeieff, 1954.*

parabola. The shape taken by the curve of a bending moment diagram for a uniformly distributed load on a beam simply supported. *Ham.*

parabolic dune. A dune with a long, scoop-shaped form which, when perfectly developed, exhibits a parabolic shape in plan, with the horns pointing upward. Characteristically covered with sparse vegetation, and often found in coastal belts. *Compare* barchan. *Leet.*

parabutlerite. Hydrated basic ferric sulfate, $Fe(SO_4)(OH).2H_2O$, orange-colored, orthorhombic, as an alteration product of copiapite, from Chile. Diamorphous with butlerite. *Spencer 15, M.M., 1940.*

paracelsian. A pale yellow barium and aluminum silicate, $BaAl_2Si_2O_8$; grains. A variety of celsian. From Candoglia, Piedmont, Italy. *English.*

parachrosis. Discoloration in minerals from exposure to weather. *Standard, 1964.*

parachute. a. A kind of safety catch for shaft cages. *Fay.* b. In rod boring, a cage with a leather cover to prevent a too rapid fall of the rods in case of accident. *Fay.*

paraclass. Rock fracture along which displacement has occurred. Synonym for fault. *A.G.I. Supp.*

paraconformity. Unconformity at which which strata are parallel and the contact is a simple bedding plane. *A.G.I.*

paraconglomerate. Sedimentary rocks containing sparse pebbles or cobbles, generally less than 10 percent of the whole mass. *A.G.I. Supp.*

paracoquimbite. A pale violet hydrous sulfate of iron, dimorphous with hexagonal coquimbite, $Fe_2(SO_4)_3.9H_2O$. A rhombohedral form of coquimbite from Chile. A siskin-green incrustation on phyllite at Troja, near Prague, Czechoslovakia, is given the same name. *English.*

paracrystalline deformation. The deformation and the recrystallization of the rock were contemporaneous. *Schieferdecker.*

parada. a. Sp. A relief, or change of men, horses, or mules; a shift. Paradas de busca (Mex.), miners working on a tribute; p. a la carga, miners working for so much per ton or carga of ore broken down or extracted; p. a destajo, miners on contract, at so much per meter, etc.; p. a partido, miners receiving as pay a share of the ore they mine; p. de hacienda, or p. de obra, miners working by the day. *Fay.* b. In the Southwestern United States, means steep. *Hess.*

paradamite. Zinc arsenate, Zn_2AsO_4OH, triclinic, dimorphous with adamite and isomorphous with tarbuttite. From Mexico. *Spencer 21, M.M., 1958.*

paradise jasper. A local trade name for a variegated red jasper from Morgan Hill, Calif. *Shipley.*

parado. In the Southwestern United States, means steep; vertical. *Hess.*

paraffin. a. A white, tasteless, odorless, and chemically inert waxy substance composed of saturated hydrocarbons with a boiling point greater than 572° F. It is obtained from petroleum oil, principally Eastern crudes. *Shell Oil Co.* b. Any saturated hydrocarbon of chain structure whose general formula is C_nH_{2n+2}. *A.G.I. Supp.*

paraffin-asphalt petroleum. A combination of paraffin-base and asphalt-base petroleums. *Fay.*

paraffin base. Applied to a crude oil containing paraffin wax in solution; such oil is relatively high in hydrogen and low in carbon. *A.G.I.*

paraffin-base petroleum. Crude oil which carries solid paraffin hydrocarbons and practically no asphalt. *Barger.*

paraffin butter. A variety of native paraffin. *Standard, 1964.*

paraffin coal. A light-colored bituminous coal used for the production of oil and paraffin. *Fay.*

paraffin dirt. The paraffin, or sour dirt of the Gulf Coast fields; a yellow, waxy substance resembling beeswax, which has often been regarded as indicating the proximity of an oil or gas reservoir. The term paraffin is probably a misnomer, and many have questioned the supposed relationship with petroleum. *BuMines Bull. 201, 1922, pp. 29-30.*

paraffin fluxes. The residuals obtained from paraffin-base petroleums are characterized by containing 14½ to 4 percent of hard paraffin scale, consisting to a predominating degree of saturated hydrocarbons (85.6 to 74.1 percent) and having a specific gravity of 0.92 to 0.94. In general, it may be said that paraffin fluxes yield only a small percentage of residual coke and contain but little sulfur. *Fay.*

paraffin oil. a. Lubricating oil made by the dry distillation method. *Fay*. b. A proprietary name for liquid petrolatum. *Fay*. c. *See* kerosine. *C.T.D.*

paraffin series. Hydrocarbons having the general formula C_nH_{2n+2}, which form a large proportion of American petroleums; chemically inert, stable, and flammable. *See also* butane; ethane; methane; propane. *Nelson.*

paraffin shale. Another name for oil shale. *Tomkeieff, 1954.*

paraffin wax. a. A wax substance obtained by pressing the heavy distillate of petroleum in a very low temperature. *Mersereau, 4th, p. 199.* b. *See* paraffin. *Tomkeieff, 1954.*

paragenesis. A general term for the order of formation of associated minerals in time succession, one after another. To study the paragenesis is to trace out in a rock or vein the succession in which the minerals have developed. *Fay.*

paragenetic. a. Refers to the chronological order of the crystallization of minerals, as in a vein. *A.G.I. Supp.* b. Refers to the genetic relations of sediments in laterally continuous and equivalent facies. *A.G.I. Supp.*

paragneiss. a. In petrology, a gneiss formed by the metamorphism of a sedimentary rock. *Fay.* b. A gneiss formed from a sedimentary rock by the intermediary action of an igneous magma to such an extent that a virtually new rock is formed. *Fay. Compare* orthogneiss.

Paragon. Trade name for a nonrotating rope of 12 x 6 over 3 x 24 construction. *Ham.*

Paragon clay. Hydrous aluminum silicate; white powder; and specific gravity, 2.60. Used as rubber and paper filler. *Bennett 2d, 1962.*

paragonite. A mineral corresponding to muscovite, but with sodium instead of potassium, $NaAl_2(AlSi_3)O_{10}(OH)_2$, member of the mica group. Monoclinic; has yellowish or greenish color. *A.G.I.; Webster 3d.*

paragonite schist. A variety of schist in which paragonite replaces the mica biotite. *Standard, 1964.*

paraguanajuatite. Rhombohedral paramorphs after natural and artificial orthorhombic guanajuatite, $Bi_2(Se,S)_3$. *Spencer 18, M.M., 1949.*

Paragutta. Deproteinized rubber, gutta percha hydrocarbon, and wax; used for submarine cables. *Bennett 2d, 1962.*

parahilgardite. Triclinic-pedial crystals dimorphous with hilgardite. *Compare* hilgardite. *Spencer 15, M.M., 1940.*

parahopeite. A colorless hydrous zinc phosphate, $Zn_3P_2O_8.4H_2O$, triclinic. Minute tabular or prismatic crystals; fan-shaped aggregates. From Broken Hill, Northern Rhodesia; Salmo, British Columbia. *English.*

paraison. The bubble of glass formed by the blower on his tube. *Haggar.*

parajamesonite. A mineral dimorphous with jamesonite, $4PbS.FeS.3Sb_2S_3$, distinguished by the X-ray pattern. *Spencer 18, M.M., 1949.*

paralaurionite. A white oxychloride of lead, $Pb(OH)_2.PbCl_2$; monoclinic. Usually in pseudo-orthorhombic, prismatic crystals. Found in the ancient slags of Laurium, Greece. Rafaelite is the same mineral, but from Chile. *English.*

paralic. By the sea. For deposits laid down on the landward side of a coast, in shallow water subject to marine invasions. Thus marine and nonmarine sediments are interdigitated; typically, as exemplified in the lower part of the Coal Measures, the nonmarine (paralic) predominate, with relatively thin marine bands. Krumbein and Sloss adopt a usage according to which interfingered marine and continental sediments are all paralic. *Challinor.*

paralic coal basin. A coal basin originated near the sea—as opposed to limnic coal basin. *A.G.I.*

paralic environment. On the marine borders, such as lagoonal, littoral, shallow neritic, etc. *Schieferdecker.*

parallax. a. In survey work, incorrect reading of graduation on instrument if observer's eye is not truly normal to the graduated plate. *Pryor, 3.* b. The change in bearing or apparent position of an object produced by a change in the observer's position. *NCB.* c. The apparent displacement, or change in position, of the crosshairs of a focusing telescope with reference to the image of an object, as the eye is moved from side to side, when the focus of the eyepiece or objective is imperfect. *Seelye, 2.* d. In astronomy, the difference in direction of a heavenly body as seen from some point on the earth's surface and as seen from some other conventional point, as the center of the earth. *Seelye, 2.*

parallel. a. An arrangement of electric blasting caps in which the firing current passes through all of them at the same time. *Nichols.* b. One of two or more equidistant lines or planes. *Kinney.*

parallel circuit. A term used, for example, when two positive wires are extended side by side for a considerable distance and are then connected together. *Compare* loop circuit. *Kentucky, p. 250.*

parallel circuit firing. A method of connecting together a number of detonators which are to be fired electrically in one blast. The electric detonators are connected to two common points. Each detonator offers a path for the electric current independent of all the other detonators in the circuit, and therefore calls for a higher amperage than a series circuit in which there is but one path. A parallel circuit is not normally permitted underground in Great Britain. However, firing in parallel has been introduced in sinking shafts. *Nelson.*

parallel connection. If the various pieces of apparatus in a circuit are connected so that all the positive terminals are joined to one point and all the negative terminals are joined to another and the current divides between the several pieces, they are said to be connected in parallel. *Mason, V.2, pp. 388-389.*

parallel cut; burn cut. Group of parallel holes, not all charged with explosive, creates the initial cavity to which the loaded holes break in blasting a development round. *Pryor 3, p. 48.*

parallel displacement fault. A fault in which all straight lines on opposite sides of a fault and outside of the dislocated zone, that were parallel before the displacement, are parallel afterward. *A.G.I.*

parallel drum. A cylindrical form of drum on which the haulage or winding rope is coiled. The drum roll may be plain or grooved. For deep winds, multilayering of rope is often used to reduce the drum size required. Also, for deep winding (3,000 feet or more) a balance rope is almost essential with a parallel drum. *See also* winding drum. *Nelson.*

parallel entry. Usually an intake airway parallel to the haulageway. *I.C. 8001, 1960, p. 1.*

parallel faults. A group of faults having essentially the same dip and strike. *A.G.I.*

parallel firing. The firing of detonators in a round of shots by dividing the total supply current between the individual detonators. *Compare* series firing. *B.S. 3618, 1964, sec. 6.*

parallel flow. Flow in the same direction of two or more streams within a stream system. *NRC-ASA N1.1-1957.*

parallel fold. A fold in which each bed maintains the same thickness (assuming it was initially of uniform thickness) throughout all parts of the fold. Contrasts with similar folding, in which each bed thins on the limbs and thickens towards the anticlinal and synclinal axes. Synonym for concentric fold. *A.G.I.*

parallel growth. Two or more crystals with corresponding faces parallel. *Fay.*

parallel lines. Lines which lie in the same plane and are equally distant from each other at all points. The term is ordinarily applied to straight lines. *Jones, 2, p. 81.*

parallelogram. Quadrilaterals which have opposite sides parallel and opposite angles equal. *Jones, 2, p. 98.*

parallelogram of forces. If two forces acting at a point be represented in both magnitude and direction by two adjacent sides of a parallelogram, the resultant of these two forces will be represented in magnitude and direction by the diagonal of the parallelogram drawn from that point. *Morris and Cooper, p. 175.*

parallel-plate plastometer. *See* Williams' plastometer. *Dodd.*

parallel ripple mark. Ripple mark with relatively straight crests. Crests may be asymmetrical in cross-section. *Pettijohn.*

parallel roads. A series of terraces at different levels, especially those of Glen Roy, Scotland. *Webster 3d.*

parallel series. Two or more series of electric blasting caps arranged in parallel. *Nichols. See also* multiple series. *Fay.*

parallel series circuit. A method of connecting together a number of detonators to be fired electrically in one blast. The circuit consists of a number of series circuits connected in parallel. *See also* series parallel circuit. *Nelson.*

parallel-throw switch. A switch lever which is thrown parallel to the track of which the switch forms a part. Originally switch levers were thrown at right angles to the track and the man who threw the switch might lose his balance and fall in front of the trip. *Zern.*

parallel wire method. An electrical prospecting method using equipotential lines or curves in prospecting for ore bodies. In the parallel wire method two bare copper wires about 3,000 feet long, placed about 2,000 feet or more apart, are used as electrodes. Current is supplied from the generator, and the electrodes are connected to the earth at 100 foot intervals by iron grounding pins. Equipotential lines are located by two electrodes or wooden rods to one end of which are fastened metal spikes about 6 or 7 inches long. The electrodes are connected by some 150 feet of wire which runs down the rods to the spikes. If a head telephone is placed in the circuit, the absence of sound in the telephone indicates that the two electrodes are at the same potential. By this method the equipotential lines can be traced. *Lewis, p. 318.*

paramagnetic. Applied to substances such as iron, which, when freely suspended between two magnetic poles, arranges itself in the line between them. Opposite of diamagnetic. *Fay.* Having a magnetic permeabilty greater than unity. *Webster 2d.*

paramagnetic material. A material whose specific permeability is greater than unity and practically independent of the magnetizing force. *ASM Gloss.*

paramagnetism. a. The magnetism of a paramagnetic substance. That property by which the north pole of a magnet that is magnetized by induction is repelled to 180° by the north pole of the inducing magnet. *Standard, 1964.* b. The property possessed by a substance of producing a higher concentration of magnetic lines of force within itself than in the surrounding magnetic field when it is placed in such a field. *Miall.* c. A property of many substances, related to ferromagnetism, by virtue of which, when placed in a nonuniform magnetic field, they tend to move toward the strongest part. Permanent magnetism is practically absent and the susceptibility, which is much less than that of iron, is constant at any given temperature, but in most substances it is nearly inversely proportional to the absolute temperature. *Compare* diamagnetism. *Holmes, 1920.*

paramelaconite. An oxide of copper occurring as a secondary mineral at the Copper Queen mine, Bisbee, Ariz. *Dana 7, v. 1, p. 511.*

parameter. In crystallography, that rational multiple of the unit length of any crystallographic axis intercepted by a crystal plane which determines its position with reference to the fundamental form. *Standard, 1964.* A quantity constant in a special case but variable in different cases. *A.G.I. Supp.*

parameter (lattice). In a crystal, the length, usually in angstrom units, of the unit cell along one of its axes or edges; also called lattice constant. *ASM Gloss.*

parametric equations. A set of equations containing controllable constants which define a set of curves or boundaries. *BuMines 587, 1960, p. 2.*

paramontroseite. Vanadium dioxide V_2O_4, orthorhombic, as an oxidation product of montroseite, $(V,Fe)O(OH)$ from Paradox Valley, Colo. *Spencer 21, M.M., 1958.*

paramorph. A pseudomorph with the same composition as the original crystal, as calcite after aragonite. *A.G.I.*

paramorphism. The alteration of one mineral into another without change of composition, as augite into hornblende in uralitization. It is also used in connection with metamorphism to describe such thorough changes in a rock that its old components are destroyed and new ones are built up. *Fay.*

paramudras; paramoudras. Flint nodules of exceptionally large size and doubtful significance occurring in the chalk exposed on the East Coast of England. *C.M.D.*

parapet walls. That part of any wall entirely above the roof line. *ACSG, 1961.*

paraplegia. A condition in which there is a paralysis of the lower trunk and body. It is manifest by loss of sensation and power of movement and loss of bladder and bowel control, arising as a result of disease or injury to the spinal cord or nerve roots, and its effects are usually permanent. Formerly, the condition was known as a broken back resulting from an accident underground, often a fall of roof. *See also* mining diseases. *Nelson.*

pararammelsbergite. Material recently described as rammelsbergite, $NiAs_2$, from Ontario, is found to give X-ray data differing from those for rammelsbergite from Germany, and it is now named pararammelsbergite. *Spencer 15, M.M., 1940.*

para-ripples. A term applied to large symmetrical and asymmetrical ripples in limestone. *Pettijohn.*

para rocks. Metamorphic rocks that have been derived from sediments, for example, paragneiss. *Stokes and Varnes, 1955.*

paraschist. Denotes a schist derived from a sedimentary rock. *See also* orthoschist; schist. *A.G.I.*

paraschoepite. Almost identical with schoepite in physical and chemical properties but the formula is $5UO_3.9\frac{1}{2}H_2O$. It is further differentiated from schoepite by the presence of zonal growth. *Crosby, p. 41.*

parasepiolite. An acid silicate of magnesium, $H_8Mg_2(SiO_4)_3$. A fibrous variety of sepiolite. From Malagasy Republic; Tuscany, Italy; Styria, Austria; Grant County, New Mex. *English.*

parasitic capture. In a reactor, the undesirable capture of neutrons in reactions which do not cause further fission or the production of new fissionable material. *L&L.*

parasitic cone. a. The products of eruption, instead of escaping through the one central opening of the terminal cone, may find avenues of discharge through a number of minor ones situated on the flanks of the volcano, parasitic cones, either preexistent or formed during progress of the last eruption. *A.G.I.* b. One or more cinder cones which form their position upon the flanks of the larger volcano. *A.G.I.* c. *See* adventive cone; lateral cone. *A.G.I.*

parasitic crater. *See* adventive crater. *Fay.*

parasymplesite. A mineral, $Fe_3(AsO_4)_2.8H_2O$, monoclinic, dimorphous with triclinic symplesite; from Japan. *Spencer 20, M.M., 1955.*

paratacamite. A hexagonal rhombohedral mineral, $Cu_2(OH)_3Cl$, occurring as one of the corrosion products of copper and brass exposed to salt-containing air and as an alteration product of nantokite $(CuCl)$ and eriochalcite $(CuCl_2.2H_2O)$. *American Mineralogist, v. 36, No. 3-4, March-April 1951, p. 384.*

paratectonic recrystallization. A recrystallization that accompanies deformation. *A.G.I.*

paratellurite. The tetragonal modification of TeO_2, found at Cananea, Sonora, Mex. *Hey, M.M., 1961.*

parathine. Hauy's name for scapolite. *Fay.*

paratime rock units. Paratime rock units express chronology and should approach synchrony; whereas time rock units express chronology and absolute synchrony. *A.G.I.*

paratomous. Having planes of cleavage inclined to the axis; also, abounding with facets of cleavage. *Standard, 1964.*

parautochthonous. In alpine orogeny, applied to folds and nappe structures which can be connected by their facies and tectonic features with the sedimentary mantle of an autochthonous massif and which have been relatively little displaced. *Schieferdecker.*

parautochthonous granite. A mobilized portion of an autochthonous granite which has moved higher in the crust or, more usually, into tectonic domains of lower pressure. The resulting parautochthonous granite shows variable marginal relations, in some places migmatitic, in others characterized by an aureole of thermal type. *Schieferdecker.*

paravauxite. A colorless basic, hydrous phosphate of iron and aluminum. The formula is $FeO.Al_2O_3.P_2O_5.5H_2O \pm 5H_2O$. Triclinic. Small, prismatic crystals. From Llallagua, Bolivia. *English; American Mineralogist, v. 30, No. 7-8, July-August 1945, p. 550.*

parawollastonite. Calcium metasilicate, $CaSiO_3$. Monoclinic. Wollastonite, with same composition, has been shown to be triclinic. Found in ejected blocks at Vesuvius, Italy; Crestmore, Calif. *English.*

parcel. a. A number of diamonds enfolded in a specific manner inside two tough sheets of paper for shipment. *Long.* b. *See* take, a. *B.S. 3618, 1963, sec. 1.* c. Corn. A heap of dressed ore ready for sale. *Fay.*

parchettite. A light-gray, highly porphyritic, extrusive igneous rock with phenocrysts of leucite and augite (25 percent), in a groundmass of andesine, leucite, augite, orthoclase, magnetite, and apatite. The name is restricted to mesocratic extrusive rocks with more leucite than feldspar and more plagioclase than orthoclase. *Johannsen, v. 4, 1938, p. 291.*

pare. Corn. A gang or party of men. *See also* pair. *Fay.*

parental magma. That magma from which some other magma was derived. *A.G.I.*

parent hole. *See* main hole. *Long.*

parent material. Of soils, the horizon of weathered rock or partly weathered soil material from which the soil is formed. Horizon C of the soil profile. *A.G.I.*

parent rock. a. The original rock from which sediments were derived to form later rocks. *A.G.I.* b. The rock from which parent materials of soils are formed. *A.G.I.*

pargasite. An amphibole including green and bluish-green kinds of hornblende, occurring in stout lustrous crystals, or granular, $Ca_4Na_2Mg_9Al_4Si_{13}O_{44}(OH,F)_4$. Monoclinic. *Dana 17.*

parget. a. Plaster, whitewash, or roughcast for coating a wall. *Webster 3d.* b. A plaster of cow's dung and lime for lining chimney flues. *Webster 3d.* c. Synonym for gypsum. Obsolete. *Webster 3d.*

pargeting. The process of applying a coat cement mortar to the back of the facing material or the face of the backing material; sometimes referred to as parging. *ACSG.*

Parian. A feldspathic, white, semitransparent body resembling Paros marble; usually cast. *C.T.D.*

Parian biscuit. A hard, fine, half-vitreous porcelain resembling Paros marble; used for objects of art and ornament. *Standard, 1964.*

Parian cement. *See* gypsum cements. *CCD 6d, 1961.*

parianite. Asphalt from the Pitch lake, Trinidad. *Fay.*

Parian marble. One of the most famous of ancient statuary marbles; from the island of Paros, Greece. *Fay.*

Parian ware. A porcelain type body high in feldspar, usually unglazed, resembling white marble from the Island of Paros. Used for statuetes and bas-reliefs. First made in England about 1840. *Bureau of Mines Staff.*

Paris green. See copper acetoarsenite. *Bennett 2d, 1962.*

parisite. A brownish-yellow, fluocarbonate of the cerium metals in acute double hexagonal pyramids. *Fay.* A rare, weakly radioactive mineral, $(Ce,La)_2Ca(CO_3)_3F_2$, usually found in pegmatites in granite, commonly associated with riebeckite, pyrite, fluorite, albite, microcline, and aegirite. *Crosby, p. 105.* It has no cleavage when unaltered and perfect cleavage on alteration. *Larson, p. 73.*

parison. A piece of glass that has been given an approximate shape in a preliminary forming process ready for its final shaping. The word is from the French paraison which derives from parer meaning to prepare. *Dodd.*

parison mold. *See* blank mold. *ASTM C162-66.*

Paris top. White clay. *Bennett 2d, 1962.*

Paris white. A fine grade of washed chalk. *Hess.*

parka. An outer garment made of the skins of bird or mammals, or of cloth, worn by the Eskimos. Also worn by prospectors and travelers in Alaska in extreme cold weather. *Fay.*

parkerite. An orthorhombic mineral, $Ni_3Bi_2S_2$, from Sudbury, Ontario, Canada, found in grains and cleavable fragments; perfect cleavage; uneven fracture; bright bronze, tarnishing darker; polished sections light cream-colored; metallic luster. The Sudbury mineral can be identified with parkerite. (Scholtz, 1936, from Republic of South Africa on the basis of X-ray powder data). *American Mineralogist, v. 28, No. 6, June 1943, p. 343.*

Parkerizing. Treatment of steel in hot aqueous solution of free phosphoric acid and manganese dihydrogen phosphate, other salts sometimes being used as accelerators. A fine-grained insoluble film of ferric phosphate is formed in a few minutes, which is corrosion-resistant. *Pryor, 3.*

Parker prenamel. A process for the treatment of steel prior to enameling. *Dodd.*

Parker process; Coalite process. A method for producing low-temperature coke in which each retort is a monobloc iron casting 9 feet high, containing 12 tubes, which taper from 4½ inches at the top to 5¼ inches at the bottom. A battery contains 36 retorts in two rows of 18. Retorts and combustion chambers are arranged alternately, so that each retort is located in a radiation chamber formed by the walls of adjacent combustion chambers. The retorts are heated only by radiation from these walls, so that there is no overheating and the inside temperature of the retorts can be maintained accurately at 600° C (1,112° F). A cooling chamber is fitted below each pair of retorts, of size sufficient to hold the coke from both. The pairs of retorts are charged and discharged every 4 hours. *Francis, v. 1, 1965, p. 160.*

Parkes process. A process used to recover precious metals from lead. It is based on the principle that if 1 to 2 percent of zinc is stirred into the molten lead, a compound of zinc with gold and silver separates out and can be skimmed off. *ASM Gloss.*

parliamentary pit. Scot. A mine outlet or shaft, required by an act of parliament. *Fay.*

parmalee wrench. A wrench that has a smooth segmented sleeve, which when tightly clamped around the tube of a core barrel will not mar or distort the thin tube when the core barrel is taken apart. *Long.*

parmazo marble. A marble of northern Italy having a coarse network of dark veins on a white or grayish ground. *Webster 3d.*

Parol. Trade name for a fuel used in internal-combustion engines. Made from paraffin by a chemical process without the use of heat. *Fay.*

parolyting. Canvas-wiping method of applying a bituminous coating to underground pipe. *Bennett 2d, 1962.*

parophite. A name given by Hunt to a rock or mineral simlar to dysyntribite. The name means 'like serpentine.' *Fay.*

paroptesis. The changes produced in rocks by dry heat; a baking. *Johannsen, v. 1, 2d, 1939, p. 190.*

paroxysm. In geology, any violent or sudden natural occurrence, as a volcanic eruption, a sudden flood, etc. *Fay.*

parpoint. Eng. A stone used for various purposes, most commonly for paving floors, Yorkshire and Lancashire. *Arkell.*

parral agitator. An agitator using a number of small air lifts disposed about a circular, flat-bottomed tank in such a way, as to impart a circular swirling motion to the pulp. *Liddell 2d, p. 392.*

Parr calorimeter. Similar to the Mahler bomb but uses sodium peroxide or a similar oxygen-producing salt instead of gaseous oxygen. *Porter.*

Parr formula. The simplest method for determining the amount of mineral matter present in a coal is to determine the ash and sulfur contents and to make corrections for the changes taking place in these during combustion. The Parr formula for doing this is: Total Inorganic Matter= Moisture+1.08 Ash+0.55 Sulfur where moisture, ash, and sulfur represent the percentages of these substances found by analysis of the coal. *Francis, v. 1, 1965, pp. 29-30.*

Parrish arm. Long arm made of a flexible board for the suspension of a shaker screen. *Zern.*

Parrish shaker. A widely used screening shaker with flexible wooden hangers and flexible drive arms. It has come to be standard equipment for sizing anthracite. *Mitchell, pp. 129, 148.*

parrot coal. Scot. A variety of cannel coal. *Nelson.*

Parr's classification of coal. This is based on the proximate analysis and calorific value of the ash-free, dry coal. The heating value of the raw coal is obtained, and from these data a table is drawn up at one end of which are the celluloses and woods of about 7,000 B.t.u.'s per pound. Parr then plots these figures against the percentage volatile matter in unit coal. *Hess.*

parsettensite. A copper-red hydrous silicate of manganese, $3MnO.4Sio_2.4H_2O$; massive, somewhat micaceous. From Parsettens Alp, Val d'Err, Grissons, Switzerland; Italy. *English.*

parsonsite. A very rare, strongly radioactive monoclinic, pale citron-yellow or pale brown mineral, $Pb_2(UO_2)(PO_4)_2.2H_2O$, found associated with torbernite, kasolite, dewindtite at Kasolo, Katanga; also occurs with autunite and phosphuranylite and with fluorite and uranocircite. *Crosby, pp. 32-33.*

part. In founding, a section of a mold or flask specifically distinguished (in a three-part flask) as top part, middle part, and bottom part. *Standard, 1964.*

part candles. Eng. The use of candles as well as safety lamps in a mine. *Fay.*

part-face blasts. Blasting a face in two stages when the height of the rock face is too great to blast in one operation. *McAdam II, p. 155.*

partially fixed. An end support to a beam or a column which cannot develop the full fixing moment is defined as partially fixed. *Ham.*

partially trimmed mica. Rifted mica that is part-trimmed to any degree up to, but not including, full-trimmed. *Skow.*

partial node. The point, line, or surface in a standing wave system where some characteristic of the wave field has a minimum amplitude differing from zero. *Hy.*

partial pressure. a. That part of the total pressure of a mixture of gases contributed by one of the constituents. *Strock, 10.* b. *See* Dalton's law. *H&G.*

partial pyritic smelting. Blast furnace smelting of copper ores in which some of the heat is provided by oxidation of iron sulfide and some by combustion of coke. *See also* pyritic smelting. *C.T.D.*

partial roasting. Roasting carried out in order to eliminate some but not all of the sulfur in an ore. In copper smelting, the sulfur left after roasting combines with copper and some iron to form a matte. *C.T.D.*

partial subsidence. Any amount of subsidence which is less than full subsidence; as with solid or strip packing. *Nelson.*

particle. a. In mineral technology a single piece of solid material which can be defined as regards its size by triaxal measurement; by its mesh if below some 0.25 centimeter in average width and above some 50 microns; and by micromeasurement down to the resolving limits of a given magnifying system. Such a particle is not necessarily homogeneous. Also, in physics, the particle may be a molecule, atom or atomic component. Particle size distribution, assessed by screen analysis of sample through series of laboratory sieves, describes the percentage by weight of each size of particle in the range of screens used. *Pryor, 3.* b. A minute constituent of matter having a measurable mass, such as a neutron, a proton, or a meson. *L&L.*

particle accelerator. Modern machines which accelerate subatomic particles to such great velocities that as these particles strike atoms, the nucleus of the atom may be altered or split. Among those now in use are the cyclotron, the linear accelerator, the Van de Graaff generator, Proton synchrotron, and the Bevatron. *H&G. See also* accelerator.

particle diameter. The projected diameter is that of a circle which has the same area as the projected profile; the equivalent surface diameter is that of a sphere with the same effective surface under stated conditions; the equivalent volume diameter is that of a sphere of like effective volume. The equivalent free-falling diameter is that of a sphere of the same free-falling velocity through a specific fluid. The Stokes diameter is the equivalent free-falling diameter within the range of velocity of Stoke's law (Reynold's No. minus 0.2). *Pryor, 3.*

particle mean size. *See* particle size. *Dodd.*

particle size. a. In powder metallurgy, the controlling lineal dimension of an individual particle, as determined by analysis with screens or other suitable instruments. *ASM Gloss.* b. A concept used in the study of powders and defined as the dimensions of a hypothetical particle such that, if a material were wholly composed of such particles, it would have the same value as the actual material in respect of some stated property. Also called particle mean size. *Compare* equivalent particle diameter. *Dodd.*

particle-size analysis. The process of determining the proportions of particles of defined size fractions in a granular or powdered sample; the term also refers to the result of the analysis. The methods of determination available include; absorption, in which the particle size is assessed on the basis of surface area; the diver method; the use of a centrifuge; elutriation; turbidimeter; the Andreasen Pipette; and, for coarser particles, a sieve. *Dodd. See also* mechanical analysis.

particle-size distribution. In powder metallurgy, the percentages, by weight or number, of each fraction into which a powder sample has been classified with respect to sieve number or particle size (microns). Preferred usage: particle-size distribution by weight or frequency. *ASM Gloss.*

particle-size reduction. The process of crushing or grinding the sample to reduce the particle size. *B.S. 1017, 1960, Pt. 1.*

particle sorting. Separation of solid particles, in a fluid, because of different densities. *Bennett 2d, 1962 Add.*

particolored stones. Transparent stones with zones of different color, as wide pink and green zones often seen in tourmaline and also the very thin yellow and blue or red and blue zones in corundum which blend to produce green and purple overall colors, respectively. *Shipley.*

particulate fluidization. Progressive separation of solid particles which remain individually and uniformly dispersed. *Bennett 2d, 1962 Add.*

partido. Mex. Division of ores between partners. Working a mine by partido is when the miners agree with the owners to take a certain part of the ores in place of wages. Usually the mine owner provides candles, powder, and steel, and keeps the drills sharpened, and receives, in payment of royalty and supplies, two-thirds or more of the ore taken out. This contract is renewed weekly or monthly and the proportion of ore retained by the miners is greater or smaller according to the richness of the stopes where they work. It is generally bought from them by the mine owner himself, for various reasons. *Fay.*

partimensurate ore bodies. Those in which prospects for ore in addition to proved reserves remain a substantial element until the later stages of the life of the mines based on them. *McKinstry, p. 477.*

parting. a. A small joint in coal or rock, or a layer of rock in a coal seam. *Fay.* b. A side track or turnout in a haulage road. Entry parting, the parting at the beginning of an entry in a slope mine. Inside or swing parting, a parting some distance from the mouth of an entry, from which the cars are hauled out by a special mule or team. Rope parting or motor parting, a parting on which trips of cars are collected for hauling out by a rope-haulage system, or electric motor. *Fay.* c. Scot. The manner in which a seam parts from its roof or pavement; it is a bad parting when they do not separate readily, a good parting when they do. *Fay.* d. A side track or turnout in a haulage system, having a track for loads and a track for empties. *B.C.I.* e. The line of demarcation between bedding planes. The term is also used to denote a thin layer of dirt occurring in a coal seam. *TIME.* f. A plane, usually parallel to the bedding, at which a bed readily separates. *B.S. 3618, 1964, sec. 5.* g. A band of waste material dividing the mineral stratum. *Austin.* h. A natural, usually smooth, separation between strata. *Hudson.* i. A lamina, for example, ankerite or fusain, occurring on or at an angle to the bedding plane of a seam of coal; usually less than 1/8 inch (3.2 millimeters) thick. *B.S. 3552, 1962.* j. Eng. *See* back; band. *S.M.R.B., Paper No. 61.* k. The final process after cupellation to remove the silver from the bullion bead. The bead is flattened to a thickness of about 0.5 millimeter and dissolved in warm nitric acid. If the bullion contains sufficient silver it is dissolved leaving only gold. Inquartation may be necessary if the bullion contains less than 4 parts of silver to 1 of gold. *Nelson.* l. The zone of separation between cope and drag portions of mold or flask in sand-casting. *ASM Gloss.* m. A composition sometimes used in sand-molding to facilitate the removal of the pattern. *ASM Gloss.* n. Cutting simultaneously along two parallel lines or along two lines which balance each other in the matter of side thrust. *ASM Gloss.* o. A shearing operation used to produce two or more parts from a stamping. *ASM Gloss.* p. The tendency of crystals to separate along certain planes that are not true cleavage planes, but which have become directions of minimum cohesion through gliding, secondary twinning, etc. *Standard, 1964.*

parting and connection man. In bituminous coal mining, a laborer who directs movement of mine cars from parting (a side track on which empty or loaded cars are collected for distribution to points for loading or for haulage to surface or to shaft or slope bottom for hoisting). Also called connection man; parting boy. *D.O.T. 1.*

parting boy. *See* parting and connection man. *D.O.T. 1.*

parting-bung man. One who breaks apart roofing tiles which have been burned together in pairs (bungs) by grasping pair of tiles firmly in both hands and striking them sharply against parting block at junction of two tiles. *D.O.T. 1.*

parting cast. a. Sand-filled tension cracks due to creep on sea bottom; possibly related to pull-apart structure. *Pettijohn.* b. Pseudo-mud cracks. *Pettijohn.*

parting cleaner. In bituminous coal mining, one who only picks out seam partings (layers of rock) in the coal working face prior to blasting, using long-handled pick. *D.O.T. 1.*

parting density. That maintained in the bath in dense media separation. *Pryor, 4.*

parting flask. In assaying, a flask used for parting. *Webster 3d.*

parting glass. The same as parting flask. *Fay.*

parting line. a. A plane on a pattern or a line on a casting corresponding to the separation between the cope and drag portions of a mold. *ASM Gloss.* b. Line or seam on glassware or slip-cast ceramicware resulting from joint of two mold parts. *ASTM C162-66.*

parting lineation. A structure characteristically found on bedding planes of horizontally laminated sandstones. *Pettijohn.*

parting liquids. Liquids, such as tetrabromethane, ethylene dibromide, pentachlorethane, and trichlorethylene, that are used in the DuPont mineral separation process. *See also* DuPont process. *Mitchell, pp. 475, 478.*

parting-plane lienation. Sub-parallel linear shallow grooves and ridges of low relief (generally less than 1 millimeter) on lamination surfaces. *Pettijohn.*

parting powder. A powder made from chalk, bone meal, or similar nonsiliceous material, suitably waterproofed, which is applied to the pattern to insure a clean strip from the molding sand. *Osborne.*

parting sand. Fine sand for dusting on sand-mold surfaces that are to be separated. *ASM Gloss.*

parting slate. A term applied to a thin layer of slate between two seams of coal. *Fay.*

parting-step lineation. a. This structure is characterized by subparallel step-like ridges where the parting surface cuts across several adjacent laminations. Also called current lineation; primare Richtung. *Pettijohn.* b. Further described as a peculiar linear graining on the surface of horizontal beds. *Pettijohn.*

parting wheel. *See* cutting-off wheel. *Dodd.*

partition. In a cave, a rock in its natural position spanning a passage from floor to ceiling and inclining more than 45° to the horizontal (not a fallen block). *Schieferdecker.*

partition curve; distribution curve. A curve indicating, for each specific gravity (or size) fraction, the percentage of it which is contained in one of the products of the separation; for example, the reject. *B.S. 3552, 1962.*

partition density; tromp cut point. The density corresponding to 50 percent recovery as read from a partition curve. *B.S. 3552, 1962.*

partition factor; distribution factor. The percentage of a specific gravity (or size) fraction recovered in one of the products of the separation; for example, the reject. *B.S. 3552, 1962.*

partitioning method. A resistivity method in which a special electrode configuration is used, consisting of five electrodes, instead of the usual number of four, to provide a check on the observations. *Schieferdecker.*

partition size. The separation size corresponding to 50 percent recovery as read from a size partition curve. *B.S. 3552, 1962.*

partition tile. Tile for use in building interior partitions, subdividing areas into rooms, or similar construction, and carrying no superimposed loads. *ASTM C43-65T.*

partiversal. Refers to the attitude of beds dipping in different directions through approximately 180° in compass direction, as at the end of a plunging anticline. *Stokes and Varnes, 1955.*

partly filled stope. *See* square-set stoping. *Fay, p. 641.*

parts of line. Separate strands of the same rope or cable used to connect two sets of sheaves. *Nichols.*

part-swing shovel. A power shovel in which the upper works can rotate through only part of a circle. *Nichols.*

party. A group of men performing the geophysical field work necessary for a specific project or prospect, ordinarily using a single method, as a gravity party. *A.G.I.*

party chief. In seismic prospecting, the man who supervises the personnel of the crew and generally is in charge of interpretation of the data. *Dobrin, p. 55.*

party foreman. In seismic prospecting, the man who supervises the work of a field party. Subordinate to a nonresident party chief, who is responsible for the interpretation of the data. *A.G.I.*

party manager. a. In seismic prospecting, his function is to handle the operational phases of the work, particularly those involving logistics and access in difficult or remote areas, giving the party chief more time for interpretation of the data. *Dobrin, p. 55.* b. In gravity and magnetic prospecting, the man in charge of the operations of a field party. *A.G.I.*

Pasadenian orogeny. Mid-Pleistocene diastrophism. *A.G.I. Supp.*

Pascal's law. The component of the pressure in a fluid in equilbrium that is due to forces externally applied is uniform throughout the body of fluid. *Webster 3d.*

pascoite. A very rare, weakly radioactive, triclinic, dark red-orange to yellow-orange mineral, $Ca_2V_6O_{17}.11H_2O$, found as an efflorescence associated with montroseite, melanovanadite, and other vanadium minerals. *Crosby, pp. 130-131.* A vanadium ore. *Osborne.*

pass. a. An opening in a mine through which coal (or ore) is delivered from a higher to a lower level. The pass may be in solid coal (or ore) or more frequently in the waste area. At the lower end the pass may be provided with a chute through which the material is discharged into cars or trams. *See also* chimney; chute. *Nelson.* b. A passage left in old workings for men to travel in from one level to another. *Zern.* c. A treatment of the whole sample in a sample divider. *B.S. 1017, 1960, Pt. II.* d. A working trip or passage of an excavation or grading machine. *Nichols.* e. In surface mining, a complete excavator cycle in removing overburden. *B.C.I.* f. In rolling mills, the passage of the bar between the rolls. When the bar passes on the flat it is called a flatting pass; if on the edge, an edge pass. *Fay.* g. The open space between two grooved rolls through which metal is processed. *ASM Gloss.* h. The weld metal deposited in one trip along the axis of a weld. *ASM Gloss.* i. A gap, defile, or other relatively low break in a mountain range through which a road or trail may pass; an opening in a ridge forming a passageway. *A.G.I.* j. A navigable channel, especially at a river's mouth. *A.G.I.* k. A narrow connecting channel between two bodies of water; an inlet. *A.G.I.* l. An opening through a barrier reef, atoll, or sandbar. *A.G.I.*

passage. a. A cavern opening having greater length than height or width, large enough for human entrance and larger by comparison than a lead. *A.G.I.* b. *See* pass. *A.G.I.* c. An underground tunnel or roadway in metalliferous mines. *See also* drive, d. *Nelson.*

passage beds. The general name given to strata laid down during a period of transition from one set of geographical conditions to another; for example, the Downtonian stage consists of strata intermediate in character (and in position) between the marine Silurian rocks below and the continental Old Red Sandstone above. *C.T.D.*

passauite. A variety of wernerite; also called porcelain spar. *Fay.*

passby; passbye. a. The double-track part of any single-track system of transport. *Mason.* b. Eng. A passage round the working part of a shaft. A bypass. *Fay.* c. A siding in which cars pass one another underground: a turnout. *Zern.* d. Eng. *See* flat, a. *SMRB, Paper No. 61.*

passing boss. *See* motor boss. *D.O.T. 1.*

passing point. a. On haulage roads, the point at which the loaded trams going outbye pass the empty trams going inbye. *Nelson.* b. In shafts, the point at which the loaded ascending cage or skip passes the empty descending cage or skip. *See also* rubbing ropes. *Nelson.*

passing track. A sidetrack with switches at both ends. *Kentucky, p. 225.*

passing water. Scot. When a pump bucket is worn, or otherwise not tight, it is said to be passing water. *Fay.*

pass-into. A transition of one mineral into another without any sudden change. *Fay.*

passivation. The changing of the chemically active surface of a metal to a much less reactive state. Contrast with activation. *ASM Gloss.*

passivator. A type of inhibitor which changes the electrode potential of a metal, causing it to become more cathodic or electropositive. *BuMines Bull. 619, 1964, p. 206.*

passive coefficient of earth pressure. The maximum ratio of the major principal stress to the minor principal stress. This is applicable where the soil has been compressed sufficiently to develop an upper limiting value of the major principal tsress. *ASCE P1826.*

passive earth pressure. The maximum value of earth pressure. This conditon exists when a soil mass is compressed sufficiently to cause its internal shearing resistance along a potential failure surface to be completely mobilized. *ASCE P1826.*

passive fault. One not liable to further movement. *Compare* active fault. *Carson, 2, p. 74.*

passive iron. Iron which has been immersed in concentrated nitric acid. It does not dissolve when subsequently immersed in dilute acid. Bismuth, cobalt, chromium, and nickel also exhibit this passivity to a lesser degree. *Camm.*

passive metals. Metals on which an oxide film that prevents further attack on the metal is readily formed. When metals other than noble metals have a high resistance to corrosion, it is because of passivity; for example, chromium, nickel, aluminum, tin, and various alloys. *See also passivity. C.T.D.*

passive sonar. The method or equipment by which information concerning a distance object is obtained by evaluation of sound generated by the object. *Hy.*

passive state. State of a metal active in the electromotive force series, or an alloy composed of such metals, when it exhibits an appreciably greater resistance to corrosion and behaves similarly to those having a noble potential in a galvanic series. Chromium and stainless steel are passive in certain environments. *H&G.*

passive state of plastic equilibrium. Plastic equilibrium obtained by a compression of a mass. *ASCE P1826.*

passive transducer. A transducer whose output waves are independent of any sources of power controlled by the actuating waves. *Hy.*

passivity. a. May be defined in two ways: (1) A metal which is normally active according to its position in the emf series is said to be passive whenever its electrochemical behavior is that of a less active metal; and (2) A metal is passive when it is relatively resistant to corrosion in an environment where a large decrease in free energy is associated with the corrosion reaction. *BuMines Bull. 619, 1964, p. 206.* b. Indifference of metal or mineral to chemical attack such as would occur with a fresh and clean surface. It can occur after long exposure of gold to cyanidation, when it is only removed by fusion of the metal which leads to recrystallization and surface reenergization. Passivating agents are used to render specific minerals indifferent to collector agents in flotation process. *Pryor, 3.* c. A condition in which a piece of metal, because of an impervious covering of oxide or other compound, has a potential much more positive than where the metal is in the active state. *ASM Gloss.*

passometer. A pocket-size instrument which registers the number of steps taken by the pedestrian carrying it. *A.G.I.*

pass pipe. An iron pipe connecting the water at the back of one set of tubbing with that of another, or a pipe only in communication with one tub and open to the interior of the shaft. *Fay.*

paste. a. The mineral substance in which other minerals are embedded; groundmass (as of a porphyry) *Webster 2d.* b. An imitation gem stone made from a certain type of lead glass. Loosely applied to all glass imitation gem stones. *Anderson.* c. A white clay body. *ACSG, 1963.* d. In magnetic-particle inspection, finely divided ferromagnetic particles in paste form used in the wet method. *ASM Gloss.* e. A slurry of sulfur and water, usually containing 30 to 50 percent of finely divided elemental sulfur. *BuMines Bull. 630, 1965, p. 903.* f. Material of which porcelain body is formed. Hard paste (pâte dure), composed of china stone and china clay, is true porcelain. Soft paste (pâte tendre), composed of glass or frit with white, is artificial porcelain. *C.T.D.* g. Comparatively concentrated dispersion (greater than 10 percent by volume) of fine-solid or semisolid particles in a liquid; often shows an elastic or plastic behavior. *Bennett 2d, 1962 Add.*

Paste golds. Heavy compositions of powdered gold and flux; suitable for printing by tissue transfer method or can be diluted for brush application. Fired to matt surface which is burnished to develop true gold texture. Used in decorating high-grade chinaware. *CCD 6d, 1961, p. 546.*

pastel color. The term applied to a very pale, weak, or nearly white color. *Hansen.*

paste mold. A mold lined with adherent carbon, used wet for blown ware. *ASTM C163-66.*

paste-mold blowing machines. A machine for blowing light-walled holloware. As a good finish is needed, the molds are coated with paste and are wetted before each blowing operation. *C.T.D.*

paste-mold process. *See* paste-mold blowing machines. *C.T.D.*

paster. *See* luterman. *D.O.T. 1.*

pastillage. Dot and line designs made with colored slip, which is dribbled from a container with a flexible base and a spout. *C.T.D.*

pasting. The operation of mudcapping. *Fay.*

pat. In brickmaking, to remove the rough edge of green bricks with a stamper. *Standard, 1964.*

patale. In Ceylon, means pit. *Hess.*

Patapsco formation. The highest division of the Comanchean of the Eastern United States, consisting of brightly colored, often sandy clays with fossil plants. *C.T.D.*

patch. a. A mine village, usually built and owned by a coal company. *Korson.* b. A small placer property. *Fay.*

patcher. a. An inhabitant of a mine patch. *Korson.* b. A mule driver's helper who sprags mine cars and performs other duties along the gangway. *Korson.* c. A driver's assistant or helper; a brakeman or triprider. *Zern.* d. One who repairs broken brattices, doors, stoppings, etc., in a mine. *Fay.* e. See brakeman. *D.O.T.1.* f. One who repairs parts of coke ovens, such as oven jambs, floors, walls, and roofs, regenerator walls, standpipe joints, and linings with refractory materials, using hand tools, spray gun, and sandblast machine. *D.O.T. Supp.*

patcher helper. A laborer who assists this patcher in mixing slurries and making repairs to coke ovens and auxiliary equipment. Also called helper, patcher. *D.O.T. Supp.*

patching. S. Wales. Workings carried out on the outcrop. called patchwork in Derbyshire. *Fay.*

patch reef; shoal reef; open-shoal reef. Any reef growing on a shelf of less than 70 miles depth; their dimensions vary from single coral heads (chapeiros) to vast stretches of reef flat several kilometers across. *Schieferdecker.*

patchy. Distributed in patches or in an irregular manner as when ore occurs in bunches or sporadically. *Fay.*

pat coal. Scot. The bottom, or lowest, coal sunk through in a shaft. *Fay.*

pâte. Fr. Paste; particularly porcelain paste. *Standard, 1964.*

pâte dure; hard paste. A French term designating high-fired china of which one of the main body elements is feldspar. The term is limited to china. *ACSG, 1963.*

patent. A document which conveys title to the ground, and no further assessment work need be done; however, taxes must be paid. The procedure of obtaining patent is divided into five steps: (1) a mineral surveyor is paid to make a patent survey, to adjust boundaries and correct errors, in which case an amended location should be made; (2) at least $500 worth of improvement must have been made per claim; (3) the presence of valuable mineral must be proven beyond reasonable doubt; (4) the matter is taken up with the local land office, and the proper notices must be published in the papers for a specified time; and (5) the purchase price of the land is paid, and the patent is received. *Lewis, pp. 29-31.*

patent ax. A type of surfacing machine employed to remove irregularities from the surface of blocks of stone. *Fay.*

patented claim. A claim to which a patent has been secured from the Government, by compliance with the laws relating to such claims. *See also* patent. *Fay.*

patented rope. Galvanized steel rope. *Pryor, 3.*

patent fuel. Eng. The fuel produced by the agglomeration of coal slack into lumps. *See also* briquette, a. *Fay.*

patenting. In wiremaking, a heat treatment applied to medium-carbon or high-carbon steel before the drawing of wire or between drafts. This process consists in heating to a temperature above the transformation range and then cooling to a temperature below Ae_1 in air or in a bath of molten lead or sale. *ASM Gloss.*

patent leveling. The same as stretcher leveling. *ASM Gloss.*

patent plate. Plate glass that has been ground and polished on each side. *C.T.D.*

patent survey. An accurate survey of a mineral claim by a U.S. deputy surveyor as required by law in order to secure a patent (title) to the claim. *Fay.*

patent yellow. *See* basic lead chloride.

Patera process. A metallurgical process consisting of a chloridizing roasting, leaching with water to remove base metals (some silver is dissolved and must be recovered), leaching with sodium hyposulfite for silver, and the precipitation of silver by sodium sulfide. The process was first carried out by von Patera at Joachimstal (Jachymov), Czechoslovakia. *See also* Joachimstall process. *Liddell 2d, p. 495; Fay.*

paternoite. A white hydrous borate of magnesium, $MgB_8O_{13}.4H_2O$. Orthorhombic. Minute plates; fine granular. From Monte Sambuco, Sicily, Italy. *English.*

paternoster lakes. A chain of lakes resembling a string of beads along a glaciated valley where ice plucking and gouging have scooped out a series of basins. *Leet.*

paternoster pump. A chain pump; named from fancied resemblance of the disks and endless chain to a rosary. *Standard, 1964.*

pâte sur pâte. Fr. A decoration for pottery, made of white porcelain paste on a dark ground, so applied as to produce effects of light and shade. *Standard, 1964.*

pâte tendre (soft paste). A French term designating ceramic whitewares fired at relatively low temperatures. *ASTM C242-60.*

pathfinder. A mineral or element found in close association with the element being sought, which can be more readily found or which has more obviously anomalous features than the element which is the main object of search. *Hawkes.*

path of percolation. *See* line of creep. *ASCE P1826.*

patina. Strictly, the green film formed on copper and bronze after long exposure to the atmosphere. By extension, the term is applied to a film of any sort formed on wood, marble, chert, or other material after weathering or long exposure. *See also* desert varnish. *Stokes and Varnes, 1955.*

patinated chert. Chert nodules with weathered or case-hardened surface layer. *A.G.I. Supp.*

patio. a. Mex. Cloth used by miners. *Fay.* b. Sp. Place where minerals are concentrated. The patio floor is one on which silver and/or gold ore is amalgamated. The patio process, dating back to the sixteenth century, was a crude chemical method of reducing silver from its ores, followed by amalgamation. *See also* arrastre. *Pryor, 3.*

patio process. A process for the recovery of silver by amalgamation in low heaps with the aid of salt and copper sulfate (magistral). Thorough mixing is obtained in the usual form by having horses or oxen treat the mass. *Liddell 2d, p. 495.*

patronite. An impure sulfide of vanadium, V_2S_5, found in considerable quantities in Peru, and used as a source of vanadium. *Dana 17.*

pattern. a. A form of wood, metal, or other material, around which molding material is placed to make a mold for casting metals. *ASM Gloss.* b. A full-scale reproduction of a part used as a guide in cutting. *ASM Gloss.* c. A regular array of characters, such as an X-ray diffraction pattern. *ASM Gloss.* d. As applied to diamond bits, the design formed by spacing and distributing the diamonds in conformance with a predetermined geometric arrangement on the crown of a bit. *See also* concentric pattern; eccentric pattern. *Long.* e. The system followed in spacing boreholes. *See also* checkerboarded. *Long.*

pattern burnishing. A term referring to special effects obtained in burnishing the surfaces of clay vessels. *ACSG, 1963.*

patternmaker. In the stonework industry, one who makes sheet metal patterns of shapes to which stone is to be cut for building purposes. *D.O.T. 1.*

pattern molder. One who makes sand molds for castings; a molder. *Standard, 1964.*

pattern mounter. One who assembles ceramic tiles in patterns and mounts them on heavy paper to preserve the arrangement for permanent installation. *D.O.T. 1.*

pattern shooting. In seismic prospecting, the firing of explosive charges arranged in a definite geometric pattern. *A.G.I.*

Patterson agitator. An agitator of the Pachuca-tank type in which the air is replaced by solution or water, under pressure from a centrifugal pump. *Liddell 2d, p. 392.*

pat test. A qualitative method for assessing the soundness of hydraulic cement. Pats of cement are made about 3 inches in diameter, ½ inch thick at the center but with a thin circumference. They are immersed in cold water for 28 days or in boiling water or steam for 3 to 5 hours. Unsoundness is revealed by distortion or cracking. *Dodd.*

Pattinson process. A process for separating silver from lead, in which the molten lead is slowly cooled so that crystals poorer in silver solifidy out and are removed, leaving the melt richer in silver. *ASM Gloss.*

Pattinson's pots. A series of pots for separating silver and lead by making use of the fact that the melting point of their alloys is higher in proportion as the percentage of silver is greater. *Standard, 1964.*

Patuxent beds. The lowest group of Comanchean beds lying unconformably on older strata in the Eastern United States. They consist of arkosic sands with clays, and contain plant remains. *C.T.D.*

Paul floc test; Paul water test. *See* floc test. *Dodd.*

Paulin altimeter. This instrument weighs the air and is quite accurate for a portable instrument. It can be used for finding the difference in pressure between points at various elevations without checking the setting of the pointer, or it can be checked against a mercury barometer and then used as a portable barometer. It is useful in making a survey of the drop in ventilating pressure throughout a mine. *Lewis, pp. 692-693.*

paulingite. A cubic zeolite, froming rhombic dodecahedra, from the Columbia River, Rock Island Dam, Wenatchee, Wash. Chemical analyses unsatisfactory. *Hey, M.M., 1961.*

Pauling's rule. A principle of mineral chemistry. If the valency of a given positive ion is divided by the number of surrounding negative ions the resulting fraction is the contribution of the positive ion toward satisfying the valency of each negative ion. If a given negative ion is considered, it is found that the sum of the contributions from its neighboring positive ions is equal to, or approximately equal to, its valency. For alternative structures which obey this law remain open to a mineral of given composition and one of these always turns out to be the actual structure. It also often accounts for the nonexistence of certain types of compounds otherwise possible according to the ordinary laws of valency. *Hess.*

Pauli's exclusion principle. No two electrons in an atom can have the same four quantum numbers. *Pryor, 3.*

paulite. Same as hypersthene. *Shipley.*

paulopost. A general term applied to changes that take place in igneous rocks immediately after their formation, the changes being a direct consequence of the consolidation of the magma, for example, albitization, serpentinization. Synonymous with deuteric. *Holmes, 1920.*

Paul water test. *See* floc test. *Dodd.*

pavement. a. A layer immediately underlying coal or any other workable material. *Arkell.* b. The floor of a mine. *Fay.* c. Any construction superimposed on a subgrade to reduce loading stresses and to protect it against the abrasive effects of traffic and weather. *Nelson.* d. *See* base rock, b. *Long.*

pavement pumping. Ejection of soil and water mixtures from joints, cracks, and edges of rigid pavements, under the action of traffic. *ASCE P1826.*

pavers. Unglazed porcelain or natural clay tile formed by the dust-pressed method and similar to ceramic mosaics in composition and physical properties but relatively thicker with 6 square inches or more of facial area. *ASTM C252-60T.*

pavey. Dev. Glossy and unctuous slate, Devonian. *Arkell.*

pavilion facets. The main facets on the pavilion of any cut stone. In the brillant cut, the eight main large five-sided facets; although some diamond cutters further distinguish four of these by the name of quoin or bottom corner facets. *Shipley.*

pavilions. The undersides and corners of the brillant-cut gem, which lie between the girdle and the collet. *Hess.*

paving. Eng. Stone used for floors. *Arkell.*

paving block cutter. In the stonework industry, one who splits large blocks of granite into smaller blocks for paving purposes, using an airhammer and drilling bit. Also called blockmaker. *D.O.T. 1.*

paving breaker. An air hammer which does not rotate its steel. *Nichols.*

paving brick. A vitrified brick especially suitable for use in pavements where resistance to abrasion is important. *ACSG, 1963.*

paving brick clay. Usually impure shales and fire clays are used for this purpose. Desirable qualities in a paving brick clay are a fair degree of plasticity, good tensile strength, and suitable temperature viscosity characteristics. Found in Ohio, Pennsylvania, Indiana, Illinois, New York, Maryland, Colorado. *CCD 6d, 1961.*

paving flag. A square hard stone slab, 2 inches or more thick, used for surfacing a footway. Hydraulically pressed precast reconstructed stone or concrete slabs are in common general use. *Ham.*

paving sand. A type of commercial sand which is divided into three general classes, that for concrete pavements, that for asphaltic pavements, and that for grouting. Sand for concrete pavements, according to the U.S. Bureau of Public Roads, should all pass through a ¼-inch screen, 5 to 25 percent should be retained on a No. 10 sieve, from 50 to 90 percent on a No. 50 sieve, and not more than 10 percent should pass through a No. 100 sieve. Not more than 3 percent of the weight should be matter removable by elutriation. For asphaltic pavement small amounts of organic matter are not objectionable in the sand. All should pass through a ¼-inch screen, 95 to 100 percent through a No. 10 sieve, and not more than 5 percent through a No. 200 sieve. Grouting sand should all pass through No 10 sieve, 80 percent through a No. 20 sieve, and 5 percent through a No. 200 sieve. *See also* building sand. *Brady, p. 121.*

paving stone. Stone prepared, or suitable, for paving; stone used in pavements. *Standard, 1964.* Usually in large flat slabs, or square blocks, such as Belgian block. *Fay.*

paving tile. Tile used for floors. *Standard, 1964.*

pavior. A term applied to clamp-fired stock bricks that are not of first quality but are nevertheless hard, well-shaped and of good color. *Dodd.*

pavonazetto marble. *See* pavonazzo. *Fay.*

pavonazzo; pavonazetto marble. A siliceous limestone of various shades of green, blue, or gray alternating with bands of white. Formerly, often used in southern Italy. So called from its resemblance to the plumage of a peacock; also called Phrygian marble. *Fay.*

pavonite. $AgBi_3S_5$, monoclinic, for a Bolivian mineral previously referred to alaskaite and to benjaminite. *Spencer 20, M.M., 1955.*

pawdite. A fine granular, melanocratic, igneous dike rock, homogeneous, black or gray, composed of magnetite, titanite, biotite, hornblende, basic plagioclase, and traces of quartz. The texture of thin laths and needles of hornblende between the feldspar tablets is characteristic. *Johannsen, v. 3, 1937, p. 319.*

pawl. A tooth or set of teeth designed to lock against a ratchet. *Nichols.*

pawn. Derb. A security put up by a miner when he makes claim to a vein discovered by or in the possession of another. The claim is settled by trial at a barmote court. *Fay.*

paxillose. In geology, resembling a little stake. *Fay.*

paxite. A mineral, Cu_2As_3, probably orthorhombic and isostructural with Sb_2S_3, in intergrowths with novakite, koutekite, and arsenic; from Bohemia, Czechoslovakia. *Hey, M.M., 1964; Fleischer.*

pay. a. That portion of a formation in which valuable mineral, oil, or gas is found in commercial quantity. *Long,* b. Profitable ore. *See also* pay dirt. *Fay.* c. Eng. The day upon which or the place where, wages are made up or paid. *Fay.*

pay bill; pay sheet. Scot. A statement showing details of workmen's wages for a stated period, usually a fortnight. *Fay.*

payday gait. A fast walk. *Korson.*

pay dirt. a. Gravel. Of alluvial deposits, sand rich enough to be excavated and treated to recover its valuable contents. A pay streak. *Pryor, 3.* b. S. Afr. The same as payable ore, but in an alluvial deposit. *Beerman.* c. Earth, rock, etc., that yields a profit to the miner. *Webster 3d.* d. S. Afr. Auriferous gravel rich enough to pay for washing or working. *Fay.* Also called pay rock. *Fay.*

pay formation. A layer or deposit of soil or rock whose value is sufficient to justify excavation. *Nichols.*

pay gravel. a. Gravel containing sufficient heavy mineral to make it profitable to work. *Nelson.* b. In placer mining, a rich strip or lead of auriferous gravel. *Fay.*

pay limit. S. Afr. Grade below which the mining of ore is considered to become unpayable. There has been much discussion about mining below the pay limit for technical reasons, as a result of taxation, or to conserve natural resources. *Beerman.*

pay load. a. In any winding or haulage system, the pay load is the weight of coal, ore, or mineral handled as distinct from dirt, stone, or gangue. *Nelson.* b. The mineral raised up the shaft from an underground mine. *Sinclair, V, p. 15.*

pay material. The mineral to be recovered. *Austin.*

Payne's process. A process for preserving timber and rendering it incombustible by impregnating it successively with solutions of sulfate of iron and calcium chloride in vacuo. Paynize. *Webster 2d.*

pay ore. Ore which, at current cost of exploitation, can be mined, concentrated and/or smelted profitably at ruling market value of products. Ore below this value or cut (the marginal value) is unpay. Also called pay rock. *Pryor, 3. Compare* pay streak. *See also* pay dirt; pay gravel.

pay out. To slacken or to let out rope. *Fay.*

pay rock. Synonym for pay ore. *A.G.I.*

pay shoot. A portion of a deposit composed of pay ore. *Fay.*

pay streak. a. The areas of concentration of gold in placer deposits. *Bateman.* b. That portion of a vein which carries the profitable or pay ore. *Fay. See also* pay dirt. a.

Pb Chemical symbol for lead. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

PCE *See* pyrometric cone equivalent. *VV.*

pcf Abbreviation for pounds per cubic foot. *BuMin Style Guide, p. 61.*

pcu Abbreviation for pond centigrade unit. *See also chu. NRC-ASA N1.1-1957.*

Pd Chemical symbol for palladium. *Hand-*

book of Chemistry and Physics, 45th ed., 1964, p. B-1.

P.D.R. method. *See* potential-drop ratio method. *Schieferdecker.*

pea beach. Eng. Gravel composed of small, quite black, round pebbles with little sand, probably only a few feet thick at base of Blackheath beds, Croydon, Surrey. *Arkell.*

peach. A dark blue or green altered rock; aggregate of quartz, accessory minor tourmaline and ore minerals, often with fluorite. *A.G.I.*

peach bloom. A glaze effect on pottery produced by the Chinese; it is achieved by the addition of copper oxide to a high-alkali glaze but requires very careful control of the kiln atmosphere. The bloom results from incipient devitrification of the glaze surface. *Dodd.*

peachblow. a. A light-purple glaze inclining to pink, seen on some Oriental porcelain. *Standard, 1964.* b. A kind of ware thus glazed or tinted. *Standard, 1964.*

peach stone. Corn. A greenish-colored soft stone; a chloritic schist. *Fay.*

peachy lode. Corn. A lode filled with a greenish chlorite, of peachy luster and loose cellular texture. *Fay.*

pea coal. In anthracite only, coal small enough to pass through a mesh three-fourths to one-half inch square, but too large to pass through a 3/8-inch mesh. When buckwheat coal is made, the size marketed as pea is sometimes larger than the above; known also as No. 6 coal. *Fay. See also* anthracite coal sizes.

peacock blue. A ceramic color made from a batch such as: 33 percent cobalt oxide, 7 percent standard black, 45 percent china stone, and 15 percent flint. *See also* standard black. *Dodd.*

peacock coal. Iridescent coal, the iridescence of which is due to a thin film of some substance deposited on the surface of the coal along minute cracks. *Arkell.*

peacock copper. A synonym for bornite; chalcopyrite. *Fay.*

peacock ore. Bornite (and sometimes chalcopyrite) when it exhibits a colorful and lustrous tarnish. *Pryor, 3.*

peacock stone. Banded malachite cut to exhibit an eye. *Shipley.*

pea grit. Pea grit has been used for a coarse pisolitic limestone. Such usage should be discontinued, it is erroneous. The term grit should be reserved for a coarse-grained sandstone composed of angular particles. *Rice.*

pea iron ore. *See* pea ore.

peak. a. Peaks and domes are individual mountains or mountain summits, produced in the majority of instances by erosion, but in many cases due to volcanic eruptions. Similar topographic forms may originate from the upheaval of the corner, so to speak, of a tilted block of the earth's crust, as is instanced by Mount Saint Elias. *A.G.I.* b. A pointed mountain summit; a compact mountain mass with single conspicuous summit; the topmost point; summit; also, a headland or promontory. *A.G.I.*

Peake ripper. An experimental ripping machine for roadheads, named after its inventor. It consists of a rotating drum, traveling from side to side along an arched frame, which cuts a semicircular ripping. Encouraging results have been obtained in trials. *Nelson.*

peakless pumping. Spreading the pumping load over the entire day. *Coal Age, v. 71, No. 8, August 1966, p. 216.*

peak level. The maximum instantaneous level that occurs during a specified time interval. In acoustics, peak sound pressure level is to be understood, unless some other kind of level is specified. *H&G.*

peak load. Maximum permitted power draft from an electric supply main. *Pryor, 3.*

peak loading. The maximum number of tons of a specified material to be carried by a conveyor per minute in a specified period of time. *NEMA MB1-1961.*

peak power. *See* demand power.

peak sound pressure. The peak sound pressure for any specified time interval is the maximum absolute value of the instantaneous sound pressure in that interval. *Hy.*

peak stope. Flat stope advanced (overhand if deposit is inclined) in slanted steps, each flat forming a separate working place. *Pryor, 3.*

peak-to-peak value. For an oscillating quantity, the algebraic difference between the extremes of the quantity. *Hy.*

peal. *See* peel coal. *Tomkeieff, 1954.*

pealite. A variety of geyserite. *Dana 6d, p. 196.*

pean. A variant and seldom-used spelling of peen. *Long.*

peanut roof. A local term used to describe a laminated shaly sandstone roof which has impressions at the laminations or partings, similar to peanut shells. The sizes of the indentations vary from about ½ to 2 inches. *Hess.*

pea ore. a. Eng. Rounded grains of hydrated peroxide of iron, or silicate of iron, commonly found in cavities of Jurassic limestone. *See also* bean ore. *Fay.* b. Limonite occurring in round grains about the size of a pea. *Webster 3d.*

pearceite. A black sulfarsenite of silver and copper, $9Ag_2S.As_2S_3$, or $8(Ag,Cu)_2S.As_2S_3$. Monoclinic. Pseudorhombohedral, tabular crystals, or massive. The arsenical variety of polybasite. From Aspen, Colo.; Marysville and Neihart, Mont.; Tintic District, Utah; Cohuila, Mex. *English.*

Pearce turret furnace. A furnace consisting of a narrower hearth, bent around a circle, the circumference of which is a little greater than the length of the hearth, so that the two ends do not quite meet; used for calcining sulfide ores. *Fay.*

pear cut. Any style of cutting resembling a pear, or more loosely the outline of one, such as a pendeloque. *Shipley.*

pearl. A gem composed of calcium carbonate, formed in the pearl oyster. *Crispin.*

pearl ash. Potassium carbonate (K_2CO_3); especially, an impure product obtained by partial purification of potash from wood ashes. *Webster 3d.*

pearl compass. In determinative gemmology, an apparatus for discriminating between genuine and cultured pearls. A pearl is hung between the poles of a powerful electromagnet. A cultured pearl tends to rotate and orient itself according to the structure of its core, while a genuine pearl tends to remain stationary. *Shipley.*

pearl corundum. Corundum with bronzy iridescent luster. *Shipley.*

pearl diabase. *See* variolite. *Fay.*

pearl endoscope. *See* endoscope. *Shipley.*

pearl gage. A scale arranged as to various diameters and the corresponding estimated weights of fine spherical pearls. *Shipley.*

pearl garnet. A dark amber-brown variety of andradite. *Shipley.*

pearlite. The lamellar mixture of ferrite and cementite in the microstructure of slowly cooled iron-carbon base alloys occurring normally as a principal constituent of both steel and cast iron. *Webster 3d.*

pearlite iron; perlite iron. In general, pearlite iron is gray cast iron consisting of graphite in a matrix of pearlite, that is, without free ferrite. In particular, perlite iron is a German proprietary name denoting an iron of low silicon content, which is caused to solidify gray by the use of heated molds. *C.T.D.*

pearlitic malleable. *See* malleable cast iron. *ASM Gloss.*

pearl mica. Same as margarite, b. *Fay.*

pearl opal. An opaque, bluish-white, porcelain-white, pale-yellowish or reddish, variety of opal. Same as cacholong. *Fay.*

pearl radiogram. The record on a photographic film or plate of X-rays transmitted through a pearl; an X-ray photograph of a pearl. *Shipley.*

pearl sinter. A variety of opal. *Fay.* Synonym for fiorite.

pearl spar. Dolomite occurring in rhombohedrons having a pearly luster. *Fay.* Synonym for ankerite.

pearlstone. Same as perlite, a. *Fay.*

pearl white. *See* bismuth oxychloride. *Bennett 2d, 1962.*

pearly. Applied to minerals having a luster like a pearl, such as talc, brucite, stilbite, etc. *Fay.*

pearlyite. A variety of obsidian. *Schaller.*

pearly luster. A luster like that of a pearl and shown by some easily cleavable minerals. *Hurlbut.*

pearlyte. A mixture of ferrite and cementite having a pearly appearance when lamellar. *See also* pearlite. *Fay.*

Pearson air elutriator. A downblast type of elutriator and used for determining the fineness of Portland Cement. *Dodd.*

peas. Eng. *See* pea coal. *Fay.*

peastone. Same as pisolite. *Fay.*

peasy. a. Applied to small pieces of ore, the weight of which may be estimated by the hand. *Fay.* b. N. of Eng. Lead ore in grains about the size of peas. *Standard, 1964.*

peat. There are two types of peat, low moor (Flachmoor) and high moor (Hochmoor) peat. Low moor peat is the most common starting material in coal genesis. It therefore constitutes a caustobiolith of low diagenetic degree. Peat is formed in marshes and swamps from the dead, and partly decomposed remains of the marsh vegetation. Stagnant ground water is necessary for peat formation to protect the residual plant material from decay. Peat has a yellowish brown to brownish black color, is generally of the fibrous consistency, and can be either plastic or friable; in its natural state it can be cut; further, it has a very high moisture content (above 75 percent, generally above 90 percent). It can be distinguished from brown coal by the fact that the greater part of its moisture content can be squeezed out by pressure (for example, in the hand). Peat also contains more plant material in a reasonably good state of preservation than brown coal. Individual plant elements, such as roots, stems, leaves, seeds, etc., can commonly be seen in it with the unaided eye. Failing that, treatment of peat with dilute alkali will make visible many of these plant tissues. Further, peat is richer in cellulose than brown coal (reaction with Fehling's solution). Unlike brown coal, peat still contains cellulose, protected by lignin or cutin, which gives a reaction with chlor zinc iodide. Correspondingly, peat shows under the microscope tissues which have not undergone either lignification, suberinization or cutinization; this is not the case in brown coal. The reflectance of peat is low (about 0.3 percent). Microscopic examination is best undertaken with transmitted light. *IHCP, 1963, part I.*

peat bed. An accumulation of peat. *Fay.*

peat blasting. A method enabling a road to be built across peat deposits. Hard filling is first dumped over the route to a height equal to the ascertained depth of the peat, into which blasting charges are inserted. By the action of blasting the peat is displaced outwards, the hard fillings sink into place and can then be consolidated. *Ham.*

peat bog. A bog containing peat; an accumulation of peat. *Webster 3d.*

peat breccia. a. Peat redeposited after being broken up. *A.G.I. Supp.* b. Same as peat slime. *Tomkeieff, 1954.*

peat charcoal. Charcoal made from peat. *Standard, 1964.*

peat, charred. *See* charred peat. *Bennett 2d, 1962, Add.*

peat coal. a. A natural product intermediate between peat and lignite. *Webster 3d.* b. An artificial fuel made by carbonizing peat. *Webster 3d.*

peat coke. Same as peat charcoal. *Standard, 1964.*

peat cutter. A parring plow for cutting peat. *Standard, 1964.*

peatery. A peat bog or peat bank. *Webster 3d.* Also called petary. *Fay.*

peat formation. A process of decomposition of vegetable and animal substances intermediate between moldering and putrefaction, or rot, during which first the former and then the latter process occurs. It occurs in stagnant water under the influence of small amounts of oxygen and leads to the formation of humus. *Compare* disintegration; moldering; putrefaction. *Tomkeieff, 1954.*

peat gas. Gas made by carbonizing peat. *Webster 3d.*

peat hag. A pit or quag formed by digging out peat. *Standard, 1964.*

peat machine. A machine for grinding and briqueting peat. *Webster 3d.*

peatman. A digger or seller of peat. *Webster 3d.*

peat moor. Same as peat moss. In the United States, such deposits are called swamps or bogs. *Fay.*

peat moss. a. Any moss from which peat has formed or may form. *Webster 3d.* b. Eng. Peat bog. *Webster 3d.*

peat press. A machine for making bricks of peat fuel. *Standard, 1964.*

peat-reek. The smoke of burning peat. *Webster, 3d.*

peat-sapropel. A product transitional between peat and sapropel. *Tomkeieff, 1954.*

peat slime. Peat broken up by water and afterwards redeposited. *Tomkeieff, 1954.* Synonymous with peat breccia. *A.G.I. Supp.*

peat soil. A rich dark soil containing peat, especially the soil of a reclaimed peat bog. *Standard, 1964.*

peat spade. A spade with an L-shaped blade for cutting out peat in blocks. *Webster 3d.*

peat tar. A tar obtained from the distillation of peat. The distillates obtained contain from 2 to 6 percent of tar. *Fay.*

peat-to-anthracite theory. The theory that there were progressive stages in the conversion of vegetable matter into the various grades of coal of the Carboniferous system. Thus, peat forms an early stage in coal formation, and lignite an intermediate stage, and by further compression and alteration the bituminous and anthracite coals were formed. *See also* Hilt's law. *Nelson.*

peaty. Resembling or containing peat; having the nature of peat. *Standard, 1964.*

peaty earth. Soil rich in peat or humus. *Tomkeieff, 1954.*

peaty fibrous coal. Same as fibrous peat. *Tomkeieff, 1954.*

peaty pitch coal. Same as pitch peat; dopplerite. *Tomkeieff, 1954.*

peau d' orange. In ceramics, a decoration or finish of a surface such that it resembles in roughness the skin of an orange. *Standard, 1964.*

peavey; peavy. A stout lever used in lumbering that is like a cant hook, but has the end armed with a strong sharp spike. *Webster 3d.*

peaw. Old English name for peacock coal. *Tomkeieff, 1954.*

pebble. a. A small usually round stone, especially when worn and rounded by the action of water. *Webster 3d.* b. A mass of material obtained in a form resembling pebbles. *Webster 3d.* c. Transparent and colorless quartz; rock crystal, as Brazilian pebble. *Webster 3d.* d. A smooth rounded stone ranging in diameter from 2 to 64 millimeters. *A.G.I.* e. Grinding media for enamel mills. As a rule, these are either hard-flint pebbles or hard-burned white porcelain balls. The latter have been finding much greater use during the last several years. *Enam. Dict.* f. The same as orangepeel. *ASM Gloss.* g. Eng. Joints in slate accompanied by shattering of the rock, Denbighshire. *Arkell.* h. Synonym for gravel. *Long.*

pebble armor. a. The pebble armor of the desert. It was Penck who first suggested the name of armoring (panzerung) of the desert as a result of lighter and finer materials being carried away through deflation or wind transportation, while coarser or heavier fragments are left behind. It was Walther, however, who by full descriptions and many excellent photographs showed the great importance of the process over vast areas in the arid regions. *A.G.I.* b. A concentration of pebbles coating a desert area. The pebbles are usually the residual product of wind erosion and are closely fitted together so as to cover the surface in the manner of a mossaic. Also called desert pavement. *See also* lag gravel. *Stokes and Varnes, 1955.*

pebble-bed reactor. A nuclear reactor in which the fissionable fuel (and possibly also the moderator) is in the form of packed or randomly placed pellets, which are cooled by gas or liquid. *L&L.*

pebble coal. Coal composed of rounded masses of coal cemented by coal material. *Tomkeieff, 1954.*

pebble crystal. A waterworn or similarly rounded crystal. *Shipley.*

pebble gravel. Gravel consisting mainly of rounded rock fragments of pebble size. *A.G.I. Supp.*

pebble heater. A heat exchanger in which refractory pebbles (which may be made of mullite, alumina, zircon, or zirconia) are used as heat carriers. One type of pebble heater consists of two refractory lined chambers joined vertically by a throat; both chambers are filled with pebbles, which descend at a steady rate, being discharged from the bottom of the lower chamber and returned to the top of the upper chamber. In the latter they are heated by a countercurrent of hot gasses; in the lower chamber they give up this heat to a second stream of gas or air. *Dodd.*

pebble jack. Zinc blende in small crystals or pebblelike forms not attached to rock, but found in clay openings in the rock. *Fay.*

pebble lime. A physical shape of quicklime. *Boynton.*

pebble mill. Horizontally mounted cylindrical mill, charged with flints or selected lumps of ore or rock. Usually long and high discharge. *Pryor, 3. See also* ball mill.

pebble peat. Peat accumulating beneath translucent quartz and chalcedony pebbles embedded in the surface of well-drained soils in semiarid regions. Pebble peat is formed by moss and algae and varies in thickness from a thin film to about one-fourth of an inch. *Tomkeieff, 1954.*

pebble phosphate. Varieties of natural phosphate that are concretionary or alluvial in origin, hence gravellike. *A.G.I.*

pebble powder. A gunpowder or black powder pressed and cut into large cubical grains so as to make it slow-burning. *Webster 3d.*

pebbles. Grinding media for ball mills. As a rule, these are either hard flint pebbles or hard burned white porcelain balls. The latter have been finding much greater use during the last several years. *Enam. Dict.*

pebblestone. *See* pebble, a. *Webster 3d.*

pebbleware. A ware having different colored clays in the paste. *Standard, 1964.*

pebbly sandstone. Scot. A term used to describe conglomerate material. *Nelson.*

pechkohle. Ger. Name for pitch coal. *Tomkeieff, 1954.*

pecking up. S. Staff. Elevating or propping up with rough stones, bricks, rubbish, etc. *Fay.*

pecopteris. A fernlike tree of the coal forest, with small ovate pinnules which are attached to the pinnate axis by their whole breadth. *See also* alethopteris; maripoteris. *Nelson.*

Pecos diamond. Quartz from the Pecos River, Tex., or from New Mexico. *Shipley.*

Pecos ore. a. A gossan containing lead and silver. *Fay.* b. Tasmania. A yellowish, earthy mixture of oxides of iron, lead, and antimony containing silver; mostly massicot. *Fay.*

pectinate. Comblike or pinnatified with very close narrow divisions or parts; also used to describe spine connections in cacti when small lateral spines radiate like comb teeth from areole. *A.G.I.*

pectolite. An acid sodium calcium silicate, $Ca_2NaH(SiO_3)_3$. It is a whitish or grayish triclinic mineral in crystal aggregates or fibrous masses. *Dana 17; Webster 3d.*

pectolite jade. An incorrect name for pectolite, a semitranslucent to opaque, white or grayish mineral; tough, compact, and fibrous. It has been carved as ornaments and tools by native Alaskans. Monoclinic. Mohs' hardness, 5; specific gravity, about 2.87. *Shipley.*

pedalfer. The soil of humid regions, enriched in alumina and iron. Accumulates in regions of high temperature and humid climate that are marked by forest cover. *Compare* pedocal. *A.G.I.*

pedancarn. Corn. Tin ore interspersed in sparks in the strata of growan. *Arkell.*

Pedersen process. A process devised in 1944 by H. Pedersen, a Norwegian, for the extraction of alumina from siliceous bauxite; the bauxite is first melted in an electric furnace with limestone and coke, the reaction product then being leached with NaOH. *Dodd.*

Pedesis. Brownian movement. *Pryor, 3.*

pedestal. A supporting or basic structure. Bermuda is an example. *MacCracken.*

pedestal boulder. a. A class of blocks, the mode of occurrence of which requires some exceptional explanation. These are what may be called pedestal boulders, that is, blocks perched on pedestals of limestone. *See also* perched boulder. *A.G.I.* b. Isolated masses or rock above and resting on a smaller base or pedestal. *USGS Bull. 790, 1927, p. 1.*

pedestal riveter. A jam riveter and fixed dolly which are carried respectively on opposite jaws of a frame mounted on a stand. *Ham.*

pedestal rock. A residual mass of weak rock capped with harder rock. *See also* pedestal boulder, b. *A.G.I.*

pedestrain-controlled dumper. A small dumper controlled by a man walking alongside it. *Ham.*

pedial class. In crystallography, the class without any symmetry. *Fay.*

pediment. a. Steep rock slopes having roughly triangular shapes resembling architectural pediments. *A.G.I.* b. Gently sloping plains eroded at the foot of steep slopes or cliffs. *A.G.I.* c. A planed rock surface adjoining a rugged-faced mountain mass, partly covered with a veneer of alluvium, which merges with the alluvial valley plain. *A.G.I.* d. A smooth rock plain which forms the higher portion of the far-spreading lowland plain which inclines gently away from the larger mountain masses; a zone several miles broad, in which bedrock is abundantly exposed at the surface and the alluvium is restricted to a thin and discontinuous veneer. *A.G.I.* e. That portion of the surface of degradation at the foot of a receding slope, which is underlain by rocks of the upland and is either bare or mantled by a layer of alluvium not exceeding in thickness, the depth of stream scour during flood; it is essentially a surface of transportation, experiencing neither marked vertical downcutting nor excessive deposition, and displays a longitudinal profile normally concave, but which may be convex at its head in later stages of development. The pediment may be found in regions of rising, stationary, or lowering baselevel. *A.G.I.* f. A sloping plain which lies at the foot of mountains in arid regions, not essentially of alluvial material. *See also* mountain pediment; rock pediment. *A.G.I.* g. Gently inclined planate erosion surfaces carved in bedrock and generally veneered with fluvial gravels. They occur between mountain fronts and valley or basin bottoms and commonly form extensive bedrock surfaces over which the erosion products from the retreating mountain fronts are transported to the basins. *A.G.I.*

pedimentation. The process of pediment formation. *Stokes and Varnes, 1955.*

pediment passes. The narrow, flat, rock-floored tongues extending back from the general pediment, but still penetrating along the mountain sufficiently to meet another pediment slope extending into the mountain front from the other side. *A.G.I.*

pediplane. Broad, rock-cut, thinly alluviated surface formed by the coalescence of adjacent pediments and desert domes. *A.G.I. Supp.*

pedis possessio. The actual possession of a piece of mineral land to the extent needed to give the locator room to work and to prevent probable breaches of the peace, but not necessarily to the extent of a mining claim. *Fay.*

pednan. a. A deposit of ore detached from a lode. *Fay.* b. Corn. The upper part of a buddle. *Fay.*

pedn-cairn-tin. Corn. Tin found by itself apart from a lode. *Arkell.*

pedocal. The soil of arid or semiarid regions, enriched in lime, accumulating in regions of low temperature and rainfall and prairie vegetation. *Compare* pedalfer. *A.G.I.*

pedogenesis. The formation of soil from parent material. *Schieferdecker.*

pedogeochemical prospecting. Synonymous with geochemical soil survey. *Hawkes.*

pedologist. One who studies soils. *Hess.*

pedology. The science which treats of soils, their origin, character, and utilization. *A.G.I.*

pedosphere. The part of the earth in which soil-forming processes occur. *Schieferdecker.*

pedregal. southwestern U.S. A stony tract; a lava field. *Standard, 1964.*

pee. a. Two veins crossing each other obliquely. *Fay.* b. Derb. A piece of lead ore. A variation of pea. *Fay.*

peel coal; peal coal, pill coal. Term used by British miners for cannel coal interstratified with shale. *Tomkeieff, 1954.*

peeler. a. One of a set of blades that pick up and channel water moved outward by the impeller of a centrifugal pump. *Nichols.* b. An iron implement with flattened end and ring handle, used by a baller in placing blooms, ingots, etc., in a reheating furnace. *Standard, 1964.* c. *See* calk, d. *Long.*

peeling. a. The detaching of one layer of a coating from another or from the basis metal, because of poor adherence. *ASM Gloss.* b. An infrequent defect sometimes encountered in cast-iron enamel when large pieces of enamel coating loosen and separate from the metal leaving the latter bare. Also called lifting. *Enam. Dict.* c. The breaking away of glaze from ceramic ware in consequence of too high a compression in the glaze layer; this is caused by the glaze being of such a composition that its expansion coefficient is too low to match that of the body (a certain degree of compression in the glaze is desirable, however). *Dodd.* d. A similar effect sometimes occurs on the slagged face of a refractory. *Dodd.*

peening. a. Mechanical working of metal by hammer blows or shot impingement. *ASM Gloss.* b. *See* calking, a. *Long.*

peephole. Any of the small openings in a furnace or smelter through which the interior of a furnace is viewed during operation. *Enam. Dict.*

peerless clay. Domestic china clay; used as rubber filler. *Bennett 2d, 1962.*

Peerless explosive. High explosive; used in mines. *Bennett 2d, 1962.*

peevy. Same as peavey; peavy. *Fay.*

peg. a. N.S.W. To mark out a claim or lease. *New South Wales.* b. To mark out a miner's claim at the four corners by pegs bearing the claimant's name. *Webster 3d.* Sometimes used as peg out. *Fay.* c. A surveyor's mark. *Fay.* d. Forest of Dean. *See* notch stick. *Fay.*

peg adjustment. A method of adjusting a spirit-leveling instrument to make the line of sight parallel to the axis of the level tube. The difference in elevation between two pegs, or turning points, is determined by direct leveling, first with the instrument set up near one of these points; and second, with the instrument set up near the other point. This causes the error of adjustment to have its maximum possible effect on the observed difference in elevation, since the lengths of the foresights and backsights have been made as unequal as possible. The discrepancy between the two results is a measure of the error of adjustment and forms the basis for correcting it. *Seelye, 2.*

peggies. Slates, 10 inches to 14 inches long. *Pryor, 3.*

pegging. Aust. Act of marking by pegs. *Webster 2d.*

peggy. York. Synonymous with pick. *Fay.*

pegleg. An abrupt change or sharp bend in the course of a borehole. Also called dogleg. *Long.*

pegmatite. Those igneous rocks of coarse grain found usually as dikes associated with a large mass of plutonic rock of finer grain size. The absolute grain size is of lesser consequence than the relative size. Unless specified otherwise, the name usually means granite pegmatites, although pegmatites having gross compositions similar to other rock types are known. Some pegmatites contain rare minerals rich in such elements as lithium, boron, fluorine, niobium, tantalum, uranium, and the rare earths. First used by Hauy. *A.G.I. See also* complex pegmatite; simple pegmatite.

pegmatite deposits. These deposits are found in or near igneous rocks and at the outer margins of intrusive masses. They have the composition of igneous rock but contain a smaller range of minerals; consequently they are derived from very thin fluids. Pegmatites are usually coarsely crystalline. They frequently contain valuable gem minerals, such as garnet, topaz, beryl, emerald, tourmaline, and sapphire. *Louis, p. 274.*

pegmatitic; pegmatoid. Characteristic of, pertaining to, formed of, containing, or occurring in pegmatite. *Fay.*

pegmatitic stage (or phase). A stage in the normal sequence of crystallization of a magma containing volatiles, at which time the residual fluid is sufficiently enriched in volatile materials to permit the formation of coarse-grained rocks more or less equivalent in composition to the parent rock (pegmatite). The relative amounts of silicate and volatile materials in the fluid, the temperature range, and the relationship of these fluids to the hydrothermal fluids are in dispute. *A.G.I.*

pegmatitization. The process of formation of, introduction of, or replacement by pegmatite. *A.G.I.*

pegmatitoid. The felsic segregation associated with dolerite. *A.G.I. Supp.*

pegmatoid. Suggested to denote very coarse-grained facies of igneous rock having a pegmatite habit, but differing from pegmatite proper by the absence of graphic texture. *Holmes, 1928.*

pegostylite. A pillar-, cone-, or dome-shaped formation of calcite or aragonite built up from ascending water. ***Schieferdecker.***

peg point; steady point. A pointed bar in a slide clamp. Used to brace a machine during work. *Nichols, 2.*

peg structure. A structure characterized by tiny peg-shaped cavities; some with intricate profiles, penetrating the interior of crystals; typical of melilite. *A.G.I. Supp.*

Pehrson-Prentice process. A method of producing steel direct from ore. The crushed ore or iron sand, after removal of gangue by magnetic concentration, is mixed with an adequate quantity of carbon to effect reduction. After drying and preheating, the charge enters the end of the center portion of the furnace, where it is quickly reduced into a metallic state at a temperature of 950° to 1,000° C. The grain iron is then directly melted and suitable additions made according to the grade of steel required. *Osborne.*

PEI Abbreviation for Porcelain Enamel Institute. *Dodd.*

Peirce-Smith converter. A cylindrical-type converter having a basic (magnesite) lining; used for treating copper. *Newton, p. 348.*

Peirce-Smith process. A basic converting process for copper matte in a magnesite-lined converter. The iron of the matte is fluxed by silica added before the process begins. *Liddell 2d, p. 495.*

peiroglyph. A cross-cutting structure, such as a sandstone dike. *Pettijohn.*

Peissenberg ram. *See* ram scraper. *Nelson.*

pelagic. a. Related to water of the sea as distinct from the sea bottom. *A.G.I. Supp.* b. Related to sediment of the deep sea as distinct from that derived directly from the land. *A.G.I. Supp.*

pelagic deposits. Those deposits found in deep water far from shore and may be predominantly either organic or inorganic in origin. They are light-colored, reddish or brown, fine-grained, and generally contain some skeletal remains of plankton organisms. The inorganic deposits are referred to as red clay and the organic deposits as oozes. *H&G, pp. 72-73.*

pelagic division. A primary division of the sea which includes the whole mass of water. This division is made up of the neritic province which includes the water shallower than 200 meters, and the oceanic province which includes the water deeper than 200 meters. *Hy.*

pelagic limestone. A rock formed chiefly by the accumulation of the calcareous tests of pelagic or floating organisms. Normally, pelagic limestone is the product of calcium carbonate accumulation in relatively deep water (though not necessarily abyssal). *A.G.I.*

pelagic organisms. Pertaining to all organisms inhabiting the open sea, except bottom dwellers. *Hy.*

pelagic sediments. Pelagic sediments are found in deep water, far from shore. They are generally fine grained and range in color from white to a dark reddish-brown. These sediments may be either inorganic or organic in origin. Those which contain less than about 30 percent of organic remains are called red clay; those which contain more than about 30 percent of organic remains are known as oozes. *Mero, pp. 106-107.*

pelagite. A name given to certain manganese nodules obtained in deep-sea soundings. *Fay.*

pelagochthonous. A term applied to coal deposits formed from submerged forests and driftwood. *Tomkeieff, 1954.*

Pelatan-Clerici process. A continuous process of dissolving silver or gold in cyanide solution and simultaneously precipitating the precious metals with mercury in the same vessel, an electrical current assisting precipitation. *Liddell 2d, p. 495.*

Pelatan furnace. A furnace for the calcination of fine pyritic or other sulfide ores. *Fay.*

peldon. S. Staff. A very hard sandstone. *Nelson.*

peldon pebbly. Eng. A conglomerate, Shropshire coalfield. *Arkell.*

peleeite. A hypersthene-labradorite dacite similar to bandaite. *A.G.I.*

Pelee type. In volcanology, activity characterized by production of a crater dome and an exploding cloud of gas and rock fragments. *Hess.*

Pele's hair. Rock material consisting of threads of volcanic glass (generally basaltic) drawn out from the lavas by explosion or by bursting of bubbles on lava lakes. The capillary ejecta of Lacroix. *A.G.I.*

Pele's tears. Small drops of volcanic glass (generally basaltic) with pendant threads, or pairs of drops arranged in dumbbell fashion, thrown out during eruptions of fluid lava and measuring a few millimeters in length. Common in Hawaii. *A.G.I.*

pelhamine. A variety of light gray-green precious serpentine from Pelham, Mass. *Shipley.*

pelinite. Similar to clayite but differing from it in being highly plastic, and to some extent, of a colloidal nature. Obtained from plastic clays. *A.G.I.*

peliom. Cordierite. *Schaller.*

Pelion coal. *See* pelionite. *Fay.*

pelionite. A name proposed by W. F. Petterd for a bituminous coal (Pelion coal) resembling English cannel coal, from near Monte Pelion, Tasmania. *Fay.*

pelite. A general term for clastic sediments composed of clay, minute particles of quartz, or rock flour. A volcanic ash of corresponding grade is called pelitic tuff. *Holmes, 1928.*

pelitic. Pertaining to, characteristic of, or formed of pelite; composed of fine argillaceous sediment or clay. *Fay.*

pelitic gneiss. A gneissose rock derived from the metamorphism of argillaceous sediments. *C.T.D.*

pelitic hornfels. A fine-grained, nonfissile metamorphic rock derived from a pelitic aluminous sediment. *See also* hornfels. *A.G.I.*

pelitic schist. A schistose metamorphic rock derived from a pelitic (aluminous) sediment. *See also* schist. *A.G.I.*

pelitomorphic limestone. An aggregate of calcite grains (.002 to .005 mm in diameter) whose boundaries cannot be recognized except in polarized light. *A.G.I.*

pella. a. Sp. A mass of metal in its crude state. *Fay.* b. Mex. Amalgam left after the mercury has been squeezed out. *Fay.* c. Mex. Silver amalgam. Also called plata pella. *Fay.*

pell clay. Northumb. Pure and tough clay, also called ball clay. *Arkell.*

pelletizing. a. A method in which finely divided material is rolled in a drum or on an inclined disk, so that the particles cling together and roll up into small, spherical pellets. *Newton, p. 281.* b. The moulding, by the application of pressure, of fine coal into artifacts, smaller in size than briquettes and weighing not more than one-half ounce (15 grams). Also called tabletting. *B.S. 3552, 1962.*

Pelletol. A waterproof, free-running blasting agent. Pelletol is a high explosive, but is not considered cap sensitive and normally cannot be initiated with a cap except under perfect confinement in small diameter boreholes. *Dupont, 1966, p. 59.*

pellet powder. Black powder pressed into cylindrical pellets 2 inches in length and varying from 1¼ to 2 inches in diameter. Each pellet has a ⅜-inch hole through its center to permit fuse insertion. *Carson, p. 306.*

pellet structure. A feature commonly shown by clays, formed of small rounded aggregates of clay minerals and fine quartz scattered through a matrix of the same material. The pellets may be separated from the matrix by a shell of organic material. In size, the pellets are 0.1 to 0.3 millimeter in diameter, and in a few cases, several millimeters in length. *A.G.I.*

pellet texture. A concretionary texture characterized by minute pellets either of colloidal or replacement origin and closely resembling oölites. *Schieferdecker.*

pellite. Soft "hidelike" variety of bitumen partly soluble in organic solvent and fusing at 120° C. It may be considered as a variety of polyelaterite. *Tomkeieff, 1954.*

pell-mell structure. Coarse deposits of water-worn materials in which there is an absence of bedding. *A.G.I.*

pellodite. Water-laid sandy clay, usually seasonally banded with lighter (summer) and darker (winter) material, the particles being angular with granular feldspar, calcite, and other easily dissolvable minerals present. Each pair of such bands constitutes a varve. *A.G.I.*

pelmicrite. Limestone similar to pelsparite except that microcrystalline matrix exceeds calcite cement. *A.G.I. Supp.*

pelconite. A varietal form of lampadite, a copper-bearing earthy form of manganese oxide. *Weed, 1918.*

pelsparite. A limestone similar to biosparite except that the ratio of fossils and fossil fragments to pellets is less than 1 to 3. *A.G.I. Supp.*

pelt. a. A term in use among Scottish miners for impure cannel coal. *Tomkeieff, 1954.* b. Scot. Carbonaceous stone associated with a coal seam. Waste; rubbish. *See also* bone. *Fay.* c. *See* pelter. *C.T.D.*

pelter. A man employed in a coal mine to take down pelt (shaly stone) from the roof of a narrow seam, in order to make height for a coal cutting machine. *C.T.D.*

peltogen. Sulfonated sperm whale oil, used as emulsifier and secondary collector in flotation of oxidic uranium minerals. *Pryor, 3.*

Pelton wheel. An impulse water turbine with buckets bolted to its periphery which are struck by a high velocity jet of water.

This turbine is most efficient under a head of from 900 to 1,000 feet or more. *See also* impulse turbine. *Ham.*

pelyte. Pelytes are rocks composed of more or less hydrated aluminum silicates with which are mingled other small particles of various minerals. Webster defines the term as a rock composed of fine mud. Rosenbusch states that Naumann referred to pelyte as those sediments composed of the finest detritus, which in some cases are clayey, in others calcareous, and in still others are mixtures of clayey and calcareous materials. Synonym for pelite; mudstone. *A.G.I.*

pen. a. Scot. In longwall working, a narrow airway, more particularly an airway formed along the solid coal. *Fay.* b. A device to dam the water in a stream; a dam. *Webster 3d.*

pena. Sp. A large stone or rock in its natural state. Rock; cliff; a term used in Southwestern United States. *Fay.*

penalty. In connection with contract for purchase of mineral concentrates by custom smelter, deduction from agreed price for failure to reach agreed assay value or to eliminate specified contaminants; charged at so much per unit of mineral or metal concerned. In construction contract, a penalty clause is one which imposes a penalty for failure to complete work to agreed time, specification, etc. *Pryor, 3.*

Penang tin. Pig tin of about 99.95 percent purity, obtained from the Penang mines in the Straits Settlements. *Bennett 2d, 1962.*

Penberthy anoloader. A very simple powder loader with a high air velocity. It consists of an open-feed tank and an ejector at the bottom. The AN-oil flows by gravity to the ejector intake and is emitted through 5/8-inch opening with an annular ring of air jets. The apparatus has been widely used in Canada in underground work for charging holes with a depth of up to 4 meters (14 feet). It is ordinarily used for prilled AN and gives a loading rate of 2 to 4 kilograms per minute (4 to 8 pounds per minute). With crystalline AN the loading rate is higher, as is also, however, the percentage of AN that returns with the outflowing air. *Langefors, p. 103.*

pencatite. A crystalline limestone which contains brucite and calcite in approximately equal molecular proportions. *C.T.D.*

pencil. a. A bluestone quarryman's term for interbedded shale in bluestone deposits. *Fay.* b. Pencil slate in Wales, Ireland, and Northumberland, England. *Arkell.* c. N. of Eng. *See* consideration. *Trist.*

pencil alloy. Metallic composition used as a pencil core; consists of 70 parts lead, 90 parts bismuth, and 8 parts mercury. *Camm.*

pencil cave. Drillers' term for hard closely jointed shale that caves into wells in pencil-shaped fragments. *A.G.I. Supp.*

pencil-core bit. The very-thick-wall medium-round nose bit that cuts a pencil-size core. The bit is essentially a noncoring bit, and in most instances no attempt is made to recover the very-small-diameter core as a sample. *Long.*

pencil-coring crown. Synonym for pencil-core bit. *Long.*

penciled firestone. Eng. Sandstone with rootlets, Coal Measures, Durham. *Compare* pipe-rock. *Arkell.*

pencil edging. The process of rounding the edges of flat glass. *Dodd.*

pencil ganister. Ganister characterized by fine carbonaceous markings so called from the likeness of these traversing marks to pencil lines. They are often recognizable as roots and rootlets of plants. *Raistrick and Marshall, p. 38.*

penciling. Reduction in fireface area of the brick, in which slag erosion at the joints is pronounced. *Bureau of Mines Staff.*

pencil mark. Aust. A thin bed of dark slate about the thickness of the lead of a carpenters pencil, which is parallel with the indicator, from Ballarat. *See also* indicator, c. *Fay.*

pencil ore. Hard, fibrous masses of hematite that can be split up into thin rods. *C.M.D.*

pencil points. Name applied to the tapered shapes of the hexagonal crystals, the form in which sapphires are usually found. *New South Wales, p. 52.*

pencil stone. A compact pyrophyllite used for making slate pencils. *Webster 3d.*

pencil structure. A very pronounced lineation, such as that produced by intersecting bedding and cleavage planes in slate. *A.G.I. Supp.*

pendent formation. Applicable to all formations hanging from the ceiling of a cavern. *Schieferdecker.*

pendle. Eng. A quarrymen's rock term in many parts of the country. In some quarry districts (as at Headington and Wheatley, near Oxford) it is always applied to the topmost beds in the quarries, irrespective of their geological horizon. From their position immediately below the soil, the topmost beds are always rotten or shattered. On this account the term has come to be used for fissile, friable, or flaggy rock of any kind. *Arkell.*

pendulum. a. In mechanized mining, the arm which extends between the fulcrum jack and the swivel or angle trough or turn. *Jones.* b. A swinging instrument used for measuring differences in the earth's gravitational field. The pendulum is very seldom used in geophysical prospecting, its chief application being in geodetic and scientific surveys to determine the absolute value of the earth's gravity field. *Nelson.* c. A body so suspended from a fixed point as to swing freely to and fro under the combined action of gravity and momentum. Also called a physical pendulum. *A.G.I.* A vertical bar so supported from below by a stiff spring as to vibrate to and fro under the combined action of gravity and the restoring force of the spring. Also called an inverted pendulum. *A.G.I.*

pendulum buffer. In Vermont, large wooden blocks covered with felt pads that are propelled back and forth by means of a crank and pitman. Used for polishing monumental stone. *Fay.*

pendulum mill. *See* Griffin mill; Huntington mill. *Pryor, 3.*

penecontemporaneous. A term used in connection with the formation of a sedimentary rock, such as a cherty limestone or a concretionary shale. It implies that in the opinion of the user, the chert or the concertion was formed at almost the same time as the deposition of the material of the surrounding rock. *A.G.I.*

penecontemporaneous structures. Small folds and thrusts that form in sediments shortly after they are deposited. *A.G.I.*

peneplain. A surface of slight relief and very gently slopes, formed by the subaerial degradation of the land almost to baselevel; the penultimate state of the old age of the land produced by such degradation. By extension, such a surface uplifted to form a plateau and subjected to renewed degradation and dissection. *Fay.*

peneplanation. The subaerial degradation of a region approximately to baselevel, forming a peneplain. *Fay.*

peneseismic region. Area in which earthquakes are not frequent. *Schieferdecker.*

penetrameter. A device for indicating or calibrating the apparent sensitivity of a radiographic technique. It usually consists of a strip of material of a thickness equal to a specified percentage of the thickness of the material under examination and containing holes with diameters having a specified relation to the thickness of the strip. *ASM Gloss.*

penetrant. A liquid with low surface tension used in penetrant inspection to flow into surface openings of parts being inspected. *ASM Gloss.*

penetrant inspection. A method of nondestructive testing for determining the existence and extent of discontinuities that are open to the surface in the part being inspected. The indications are made visible through the use of a dye or fluorescent chemical in the liquid employed as the inspection medium. *ASM Gloss.*

penetrating pulley. A pulley around which a wire cable runs in cutting marble. Its thickness is less than the diameter of the wire and consequently, it can follow the wire as the latter cuts into the stone. *Fay.*

penetration. a. In founding, a defect on a casting surface caused by metal running into voids between sand grains. *ASM Gloss.* b. In welding, the distance from the original surface of the base metal to that point at which fusion ceased. *See also* joint penetration. *ASM Gloss.* c. In construction, the entrance of bituminous material into the interstices of the metal of the roadway. *Fay.* d. The consistency of a bituminous material expressed as the distance that a standard needle vertically penetrates a sample of the material under known conditions of loading, time, and temperature. Where the conditions of test are not specifically mentioned, the load, time, and temperature are understood to be 100 grams, 5 seconds, and 25° C (77° F), respectively, and the units of penetration to indicate hundredths of a centimeter. *Urquhart, sec. 2, p. 81.*

penetration factor. In a nuclear reaction, the probability that an incident particle will pass through the barrier of the nucleus. *NCB.*

penetration feed. *See* feed rate. *Long.*

penetration hardness. Same as indentation hardness. *ASM Gloss.*

penetration log. The penetration speed of a drill related to size of hole and bit, mud pressure, speed of rotation, weight on bit, and so on. From the results, which are plotted as penetration curves, the thickness of coal and dirt bands in the borehole can be determined with reasonable accuracy. *Nelson.*

penetration macadam. Screened gravel or crushed stone aggregate, bound by bituminous grouting, the binder being introduced after compaction of the aggregate. *Nelson.*

penetration per blow. The distance a drive-type soil sampler, casing, drivepipe, pile, or penetrometer is driven into the formation being tested by each blow delivered by a specific-size drivehammer allowed to fall a specific distance. *Long.*

penetration rate. a. The actual rate of penetration of drilling tools. *B.S. 3618, 1963, sec. 3.* b. *See* feed rate. *Long.* c. *See* drilling rate. *Fraenkel.*

penetration resistance; standard penetration resistance; proctor penetration resistance. a. The number of blows of a hammer of specified weight falling a given distance required to produce a given penetration into soil of a pile, casing, or sampling tube. *ASCE P1826.* b. The unit load required to maintain constant rate of penetration into soil of a probe or instrument. *ASCE P1826.* c. The unit load required to produce a specified penetration into soil at a specified rate of a probe or instrument. For a proctor needle, the specified penetration is 2½ inches and the rate is ½ inch per second. *ASCE P1826.*

penetration resistance curve; proctor penetration curve. The curve showing the relationship between the penetration resistance and the water content. *ASCE P1826.*

penetration speed. The speed at which a drill can cut through rock or other material. It depends on (1) the hardness of the rock; (2) the energy per blow, or rotation, of the drill; (3) number of blows per minute or speed of rotation; (4) the diameter and depth of the hole; and (5) the type and sharpness of the bit. Handheld and air-leg percussive drills (2½-inch-diameter bore) give a speed of about 2 feet per minute in soft to medium Coal Measures rocks, and about 1 foot per minute in medium to hard rocks. A drill rig (3½-inch-diameter bore) will give about 2 feet per minute in medium to hard rock and about 1 foot per minute in very hard rock. *See also* overall drilling time. *Nelson.*

penetration test. A test to determine the relative values of density of noncohesive sand or silt at the bottom of boreholes. The standard penetration test is made by determining the number of blows required by a standard weight dropped through a standard height to produce a standard penetration of 12 inches. The dynamic penetration test is used to determine the relative density of successive deposits by recording the penetration per blow or per a specified number of blows. *Nelson.*

penetration twin. A twin crystal in which the two parts interpenetrate each other. *Compare* contact twin. *Fay.*

penetrometer. a. A cone penetrator having the assemblage of a deflection dial indicator mounted inside a proving ring, which is coupled to the drill rod projecting above the ground. Force is applied to the top of the proving ring, and the amount required to drive the cone into the formation being tested registers, in pounds, on the dial indicator. *See also* cone penetrator. *Long.* b. An instrument which automatically records the depth of drilling and the penetration rate. *B.S. 3618, 1963, sec. 3.* c. An instrument for determining penetrability or ability to penetrate; as (1) an instrument for measuring the consistency of semisolids (as pitch or grease) from the depth to which a needle penetrates under given conditions, or (2) a penetrameter. *Webster 3d.*

penetrometer, coal. An instrument to assess the strength of a coal seam, its relative workability, and the influence of roof pressure. It consists of a steel rod of one-fourth square inch sectional area which is pushed into the coal, normal to the coal face, under the action of a light hydraulic ram. The ram is braced against lightweight props erected at the face. When in position, the penetrometer gives a graph of load against penetration at a particular point. Readings are taken at a number of points laterally and vertically along the face and these can be correlated with the performance of plough-type machines. Thus the probable performance of a machine in a seam can be estimated without the need for costly trials. *Nelson.*

penetrometer, soil. A sounding instrument which may be used to supplement the vane test. It consists essentially of a rod inside a tube. When the appliance is mechanically jacked into the ground, the point or cone of the rod records all differences in resistance to penetration. It thus determines quickly the soil strength profile in depth and detects any soft beds in advance of the vane tests. *See also* penetration log. *Nelson.*

penfieldite. A white oxychloride of lead, $Pb(OH)_2.3PbCl_2$, in hexagonal prisms. Hexagonal. Formed by action of sea water on ancient slag at Laurim, Greece; Sierra Gorda, Chile. *American Mineralogist, v. 26, No. 4, April 1941, p. 293.*

penikkavaarite. A dark, greenish-gray, uniformly medium-grained igneous rock probably representing a schlier in an ijolite massive. Consists of 2.6 percent potassium feldspar, 6.5 percent sodium feldspar, 10.4 percent calcium feldspar, 20.8 percent barkevikite, 20 percent green hornblende, 20.4 percent augite, 9.8 percent chlorite, 5.2 percent ilmenite, and 0.6 percent apatite. *Johannsen, v. 4, 1938, p. 52.*

peninsula. A land mass nearly surrounded by water and connected to a larger body of land, usually by a neck or isthmus. *Schieferdecker.*

Penistone series. Eng. The lower division of the Coal Measures, consisting of sandstone and shales with coal and ironstone. *Fay.*

Penjabian. Lower Upper Permian. *A.G.I. Supp.*

pennant flags. Unproductive grits and sandstones between the Lower and Upper Coal Measures, South Wales and Bristol, England coalfield. Largely quarried for paving and building. Also called pennant grit; pennant stone. *Arkell.*

pennanite. A manganese-rich chlorite, $(Mn,Al)_6(Si,Al)_4O_{10}(OH)_8$, as orange-colored optically uniaxial scales from Benallt manganese mine, Wales. Analogous to thuringite with MnO 39 percent in place of FeO. *Spencer 17, M.M., 1946.*

Pennant sandstone. A type of sandstone common in the Upper Coal Measures of South Wales and Bristol, England. *B.S. 3618, 1964, sec. 5.*

Pennine system. Eng. The original and typical series of Carboniferous rocks, comprising the Upper Old Red Sandstone, the Mountain limestone, the Millstone grit, and the coal measures. *Standard, 1964.*

penning gate. Regulating device used to govern draft of water from a dam; may incorporate arrangements for holding back sediment or floating detritus. *Pryor, 3.*

penninite. A green crystallized chlorite from the Penninie Alps. Composition essentially the same as clinochlore, $H_8(Mg.Fe)_5Ai_2Si_3O_{18}$. *Fay.*

penning. *See* cribbing, a *Fay.*

Pennsylvania anthracite. *See* anthracite. *Barger.*

Pennsylvania diamond. Iron pyrite. *Shipley.*

Pennsylvania method. *See* barrel-day valuation.

Pennsylvanian. Formerly, the upper of two epochs into which Carboniferous was subdivided. Recently, the Am. Comm. on Strat. Nomenclature recommended advancement to period rank, and that is now accepted by the U.S. Geological Survey. In the United States, the Pennsylvanian is sixth of seven periods in the Paleozoic era. Also, the system of rocks formed during the period. *A.G.I.*

Pennsylvania oil. Oil refined by Pennsylvania methods from crude petroleum produced in Western Pennsylvania, Southwestern New York, Eastern Ohio, and West Virginia. *Bennett 2d, 1962 Add.*

Pennsylvania rottenstone. *See* rottenstone. *Barger.*

Pennsylvania-type petroleum. Paraffin-base petroleum, containing paraffin wax but little or no asphalt. *Bennett 2d, 1962.*

pennvernon process. *See* Pittsburgh process. *Dodd.*

pennyearth. a. Eng. Marl crowded with Ostea hebridica, in the Great Oolite Series of Northamptonshire and Bedfordshire. *Arkell.* b. Coal Measures shales with small round flattish modules of ironstone; as opposed to cylindrical nodules called pins. *Arkell.*

pennyrib. York. Thin vein no thicker than a penny, carrying lead ore. *Arkell.*

pennyshale. Derb. Shale which on weathering produces durable flakes like pennies. *Arkell.*

pennystone. a. band of clay ironstone. *Fay.* b. Eng. *See* Penistone series. *Fay.*

pennyweight. One-twentieth troy ounce. Used in the United States and in England for the valuation of gold, silver, and jewels. Abbreviations, dwt; pwt. *Standard, 1964.*

penroseite. A lead-gray selenide, chiefly of nickel and copper (with lead and cobalt), $5(Ni,Co)Se_2 2PbSe_2.3CuSe$. Radiating columnar. Isometric. From Colquechaca, Bolivia. *English.*

Pensky-Marten tester. An instrument somewhat similar to the Abel apparatus, largely employed for determining the flashing point of lubricating oils by the close test. *Fay.*

penstock. a. A sluice or gate for restraining, deviating, or otherwise regulating the flow of water, sewage, etc.; a floodgate. *Webster 3d.* b. The barrel of a wooden pump. *Fay.* c. A closed conduit for supplying water under pressure to a water wheel or turbine. *Seelye, 1.*

penta. Prefix denoting compound containing five of a given constituent. *Pryor, 3.*

pentaborane. A liquid, B_5H_9, with a heating value of 29,000 to 30,400 Btu per pound. *Bull. 630, 1965, p. 151.*

pentacalcium trialuminate. A compound formerly believed to have the composition $5CaO.3Al_2O_3$ and to occur in high alumina hydraulic cement; it is now known that the compound in question is dodecacalcium heptaluminate ($12CaO.7Al_2O_3$). *See also* dodecacalcium heptaluminate. *Dodd.*

pentachloroethane; pentalin. Dense; high-boiling; colorless; liquid; $CHCl_2CCl_3$; specific gravity, 1.685 (at 15° C, referred to water at 4° C); boiling point, 159.1° C; freezing point, —22° C; refractive index, 1.503 (at 24° C); and insoluble in water. Used as a solvent for oil and grease in metal cleaning and for the separation of coal from impurities by density difference. *CCD 6d, 1961.*

pentaerythritol tetranitrate; nitropenta; pentrit; pentrite; penthrite; pentaryt; pentyl. White; tetragonal; $C(CH_2ONO_2)_4$; molecular weight, 316.15; specific gravity, 1.773 (at 20° C, referred to water at 4° C); melting point, 140° C; explodes at 205° to 215° C; insoluble or slightly soluble in water; slightly soluble in alcohold and in ether; soluble in benzene; and very soluble in acetone. Used as an explosive. Abbreviation, PETN. *Bennett 2d, 1962; CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-449.*

pentagon. A polygon having five sides. *Jones, 2, p. 109.*

pentagonal dodecahedron. In the isometric system, a form, of pyritohedral symmetry, enclosed by twelve five-sided faces, each parallel to one axis and cutting the other two axes at unequal distances; a pyritohedron. *Fay.*

pentahydrite. Magnesium sulfate pentahydrate, $MgSO_4.5H_2O$, triclinic, artificial, but occurring naturally in mixed crystals. Analogous to hexahydrite, $MgSO_4.6H_2O$. Same as allenite and magnesium chalcanthite. *See also* comstockite; kellerite. *Spencer 19, M.M., 1952.*

pentahydroborite. A mineral, $CaB_2O_4.5H_2O$, in granular masses from a skarn deposit in the Urals, U.S.S.R. *Hey, M.M., 1964; Fleischer.*

pentahydrocalcite. A hydrous calcium carbonate, $CaCO_3.5H_2O$. Moldlike incrustations on chalk marl. From Nova-Alexandria, Poland. *English.*

pentalin. *See* pentachloroethane. *CCD 6d, 1961.*

pentane. A liquid hydrocarbon, C_5H_{12}, of the paraffin series. *A.G.I.*

pentaryt. *See* pentaerythritol tetranitrate. *Bennett 2d, 1962.*

pentasol xanthate. Collector agent use in flotation, in which the hydrocarbon group is crude and unfractionated amyl alcohol. Symbol, Z-6. *Pryor, 3.*

pentavalent; quinquevalent; quinquivalent. a. Having a valence of 5. *Webster 3d.* b. Having five valences. Tungsten has five valences which are 2, 3, 4, 5, and 6. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-142.*

Pentelic marble. One of the most famous of ancient statuary marbles; from Mount Pentelicus, Greece. *Fay.*

penthouse; penthus. *See* pentice, c. *Fay.*

penthrinite; pentrinit. A mixture of pentaerythritol tetranitrate and nitroglycerin. An extremely powerful explosive. *Bennett 2d, 1962.*

penthrit. *See* penthritrate.*Bennett 2d, 1962.*

penthrite. Pentaerythritol tetranite. Used as an explosive. Synonym for penthrit; niperyth. *Bennett 2d, 1962.*

pentice. a. A rock pillar left, or a heavy timber bulkhead placed, in the bottom of a two or more compartment deep shaft through which to sink it further. A small, auxilliary steam or air hoist, dumping apparatus and pocket or bin are installed above the pentice; through an opening in it sinking by short lifts is carried on while the shaft is in use above the pentice. Practiced in the Michigan copper country. *Hess.* b. A cover, protection, or roof over a sinking shaft. The cover contains a trapdoor through which the rope and bowk pass. *Nelson.* c. Penthouse. Overhead covering for workers at bottom of shaft. *See also* Galloway stage. *Pryor, 3.* d. In shaft sinking, a solid rock pillar left in the bottom of the shaft for overhead protection of miners while the shaft is being extended by sinking. *Bureau of Mines Staff.*

pentlandite. A sulfide of iron and nickel, (Fe,Ni)S, which crystallizes in the cubic system. It commonly occurs intergrown with pyrrhotite, from which it can be distinguished by its octahedral cleavage. Also called nicopyrite. *C.T.D.; Dana 17.*

pentrinit. *See* penthrinite. *Bennett 2d, 1962.*

pentrite. *See* pentarythritol tetranitrate. *Bennett 2d, 1962.*

pentritol. A mixture of pentaerythritol tetranitrate and trinitrotoluene. Used as a high explosive in bombs and shells. *Bennett 2d, 1962.*

pentrough. The trough in which the penstock of a water wheel is placed. *Fay.*

penytl. *See* pentaerythritol tetranitrate. *Bennett 2d, 1962.*

peon. a. Mex. Helper; a common laborer. P. suelto, roustabout. *Fay.* b. The movable vertical post of an arrastre. *Fay.* c. A prop, post, or stall. *Fay.*

peperino. A kind of volcanic rock, formed by the cementing together of volcanic sand, cinders, scoriae, etc. *Fay.*

peperite. A fragmental volcanic rock consisting essentially of small angular fragments of basaltic glass set in a matrix of calcite or indurated marl. Abundant in the Auvergene region of France and recognized by Michel-Levy as the result of rapid chilling and disruption of basaltic magma intruded into wet Oligocene sediments. Somewhat similar breccias have been described in Annam, at the Marysville Buttes, Calif., and on Santa Cruz Island, Calif. *A.G.I.*

pepper-and-salt texture. The texture which characterizes disseminated ores, the valuable mineral grains being mostly shapeless. *Shieferdecker.*

peptization. a. Liquefaction of a gel; deflocculation and dispersion of solids in a pulp; conversion of substance to its colloidal state by subdivision. Chemicals aiding this are peptizing agents. *Pryor, 3.* b. A dispersion due to the addition of electrolytes or other chemical substances. *Brantly, 1.*

peptize. To bring into colloidal solution; to convert into a solution. *Webster 3d.*

peptizer. A reagent for deflocculating clay or other finely divided material in a water suspension. *Hess.*

per. a. Through; beyond. b. Chemically, of more than usual strength or concentration. *Pryor, 3.*

per-. In chemistry, a prefix signifying the higher degree of valence in two similar compounds; as, iron peroxide, as distinguished from iron protoxide. Also used to indicate the highest degree of combination among similar compounds; as, perchloric acid, contrasted with chloric acid. *Standard, 1964.*

peralkaline. In the Shand classification of igneous rocks, a division embracing those rocks in which the molecular proportion of alumina is less than that of soda and potash combined. *A.G.I.*

peraluminous. In the Shand classification of igneous rocks, a division embracing those rocks in which the molecular proportion of alumina exceeds that of soda, potash, and lime combined. *A.G.I.*

perbituminous coal. Bituminous coal containing over 5.8 percent hydrogen (ashless, dry basis).*Tomkeieff, 1954.*

percentage capture value. Gr. Brit. A suggested basis of comparison of different firedamp drainage installations. The figure gives, as a percentage, the ratio of volume rate of firedamp extracted in the gas main to the total volume of firedamp flowing in the district. The latter figure represents the sum of the firedamp in the district return and the firedamp flowing in the gas main. The percentage capture varies from 30 to 85 percent. *Nelson.*

percentage extraction. The proportion of a coal seam which is removed from the mine. The remainder may represent coal in pillars or coal which is too thin or inferior to mine or lost in mining. Shallow coal mines working under townships, reservoirs, etc., may extract only about 50 percent of the entire seam, the remainder being left as pillars to protect the surface. Under favorable conditions, longwall conveyor mining may extract from 80 to 95 percent of the entire seam. With pillar methods of working, the extraction ranges from 50 to 90 percent depending on local conditions. *Nelson.*

percentage ore. N.S.W. In most cases is understood to be the percentage of the metallic element present in the ore. *New South Wales, p. 188.*

percentage subsidence. The measured amount of subsidence expressed as a percentage of the thicknes of coal extracted. *See also* full subsidence. *Nelson.*

percentage support. This term means the percentage of the total wall area which will actually be covered by supports. *Spalding, pp. 106-107.*

percent compaction. The ratio, expressed as a percentage, of dry unit weight of a soil to maximum unit weight obtained in a laboratory compaction test. *ASCE P1826.*

percent of consolidation. *See* degree of consolidation. *ASCE P1826.*

percent ripple voltage. The ratio in percent of the effective (root-means-square) value of the ripple voltage in the pulsating voltage to the average value of the pulsating voltage. *Coal Age, 1.*

percent saturation; degree of saturation. The ratio, expressed as a percentage, of the volume of water in a given soil mass to the total volume of intergranular space (voids). *ASCE P1826.*

perch. a. Any of various units of measure (as 24¾ cubic feet representing a pile 1 rod long by 1 foot by 1½ feet, or 16½ cubic feet, or 25 cubic feet) for stonework. *Webster 3d.* b. A measure of length equal to 5½ yards or 16½ feet; a rod, or pole; also, a square rod. *Webster 2d.*

perched beach ridge. A shallow based beach ridge having its base at or near high tide level. *Schieferdecker.*

perched block. *See* perched rock. *Fay.*

perched boulder. Many large erratics that lie on the tops of hills or bosses in such unstable positions that they are easily dislodged. A boulder, believed deposited by a glacier, lying in an unstable position. *A.G.I.*

perched ground water. Ground water separated from an underlying body of ground water by unsaturated rock. Its water table is a perched water table. *A.G.I.*

perched rock. A large mass of rock which, after glacial transportation, has been lodged in some conspicuous isolated position. *Standard, 1964.* Also called perched block. *Fay.*

perched water. Water lodged over an impervious stratum of restricted dimensions at a higher level than the water table. *B.S. 3618, 1964, sec. 5.*

perched water table. A water table usually of limited area maintained above the normal free-water elevation by the presence of an intervening relatively impervious confining strata. *ASCE P1826.*

perchloroethane. *See* hexachloroethane. *CCD 6d, 1961.*

percolate. To pass through fine interstices; to filter; as, water percolates through the sand. *Standard, 1964.*

percolating filter. A bacteria bed for sewage treatment. *Ham.*

percolation. a. In leach treatment of minerals, arrangement whereby dissolving liquor flows gently either upward or downward through a bed of ore sufficiently coarse-textured to permit this flow. *Pryor, 3. See also* sand leaching; still leaching. b. Movement, under hydrostatic pressure of water through interstices of the rock or soil, except movement through large openings, such as caves. *A.G.I.* c. The slow seepage of water through soils or porous deposits. *Nelson.*

percolation leaching. The selective removal of a mineral by causing a suitable solvent to seep into and through a mass or pile of material containing the desired soluble mineral. *Bureau of Mines Staff.*

percolation rate. The rate, usually expressed as a velocity, at which water moves through saturated granular material. *Schiefferdecker.*

percrystalline. Cross, Iddings, Pirsson, and Washington divided igneous rocks that are partly glassy and partly crystalline into five groups, depending on the relative proportion of the two constituents. Percrystalline is defined as extremely crystalline, with some glass, the ratio of crystals to glass being greater than 7:1. *See also* docrystalline; dohyaline. *A.G.I.*

percussion bit. A rock-drilling tool with chisellike cutting edges, which when driven by impacts against a rock surface drills a hole by a chipping action. *Long.*

percussion cap. *See* detonator; primer. *Fay.*

percussion drill. a. One in which the drilling bit falls with force onto the rock. Also, a pneumatic drill in which a piston delivers hammer blows rapidly on drill shank. *Pryor,* 3. b. Synonym for churn drill. *Long.* c. A drilling machine usually using compressed air to drive a piston that delivers a series of impacts to the shank end of a drill rod or steel and attached bit. *Long.* d. Sometimes limited to large blast hole drills of the percussion type. *Nichols.*

percussion drilling. a. Drilling method employing a string of drilling tools that are raised and lowered by a cable. *Mersereau, 4th, p. 199.* b. Also a method in which hammer blows are transmitted by the drill rods to the drill bit. *Bureau of Mines Staff.*

percussion figure. A figure consisting of radiating lines formed in such minerals as mica and chlorite by a blow with the point of a somewhat sharp instrument. Also called strike figure. *Fay.*

percussion machine. Synonym for percussion drill. *Long.*

percussion mark. Crescentic chatter or percussion marks on the finer grained and well-rounded pebbles, especially porphyries, quartzites, and the like. These have much the form and size of impressions made by the end of a fingernail in soft clay, and are due to the violent impact of one rounded pebble upon another. *A.G.I.*

percussion powder. Powder so composed as to ignite by a slight percussion; fulminating powder. *Fay.*

percussion sieve. An apparatus in which ore is sorted according to size. It consists essentially of superimposed, oppositely inclined sieves, both mechanically agitated by vertical lever and having water sluices. *Fay.*

percussion system. Applicable to drill machines and/or the methods used to drill boreholes by the chipping action of impacts delivered to a chisel-edged bit. *See also* churn drill, a; percussion drill, b and c; drilling. *Long.*

percussion table. Early form of shaking table. *See also* concussion table; shaking table. *Pryor, 3.*

percussion welding. Resistance welding simultaneously over the entire area of abutting surfaces with arc heat, the pressure being applied by a hammerlike blow during or immediately following the electrical discharge. *ASM Gloss.*

percussive. Of, or pertaining to, percussion; operative or operated by striking, such as a percussive drill. *Webster 2d.*

percussive boring. A system of boring using solid or hollow rods or ropes, and may be used for exploratory drilling and for blasting purposes. *Nelson.*

percussive drill. A pneumatic drill which is used widely in mining for exploration and for blasting purposes. *See also* rotary-percussive drills. *Nelson.*

percussive drilling. a. A method of drilling whereby repeated blows are applied by the bit, which is repositioned by intermittent rotation. *B.S. 3618, 1964, sec. 6.* b. A form of drilling in which the rock is penetrated by the repeated impact of a reciprocating drill tool. *Fraenkel.*

percussive drilling theory. *See* Simon's theory. *Lewis, p. 98.*

percussive machines. These include heading machines, air picks and the numerous types of percussive drills. *Mason, v. 2, p. 384.*

percylite. A pale blue mineral with 1 cleavage, $PbO.CuCl_2.H_2O$; specific gravity, 5.25; Mohs' hardness, 2. *Larsen, p. 61.*

peredell topaz. Light green to yellowish-green topaz. *Shipley.*

perennial stream. a. A stream which flows throughout the year, and from source to mouth. It receives water not only from the rain but also from underground sources at springs and seeps, and owes its permanency to the fact that the level at which groundwater stands in the regions adjoining the streams is higher than the stream beds. *A.G.I.* b. One which flows continuously. *A.G.I.*

perfect combustion. A theoretical condition when all the combustible constituents in a fuel are completely burned without any excess air. *See also* complete combustion. *Nelson.*

perfect-discharge elevator. In the so-called perfect-discharge elevator, there is an extra set of traction or sprocket wheels on the discharge side, so set that they bend the chains back under the head wheels. As a consequence the discharging chute may be directly under the buckets. This elevator will also handle material that packs, and both types of gravity-discharge elevators may be run much slower than the centrifugal type. Another type making use of two small buckets mounted on a single wide chain is said to be an improvement as three wheels and one strand of chain are eliminated in the elevator assembly. *Pit and Quarry, 53rd, Sec. C, p. 34.*

perfect frame. A structural frame which is stable under loads imposed upon it from any direction, and which would become unstable were one of its members to be removed, or one of its fixed ends to become hinged. *See also* hinge. *Ham.*

perfect gas. A perfect or ideal gas is one which follows Charles' law, or in other words fits the PV=RT gas equation. *Strock, 10.*

perforate. To penetrate casing with holes by bullets or explosive charges by a perforating gun run in the hole on a wire line. *Wheeler.*

perforated brick. A building brick made lighter in weight by its being pierced with numerous, relatively small (¼ to ½ inches in diameter) holes, usually in the direction of one of the two short axes. In the United Kingdom, the total volume of the perforations does not usually exceed 15 percent of the volume of the brick; on the Continent of Europe, the proportion is higher and in the United States, it is normally over 25 percent. *See also* hollow clay blocks. *Dodd.*

perforating. Piercing holes of desired shapes and arranged in a definite pattern in sheets, blanks, or formed parts. *ASM Gloss.*

perforator. An appliance to perforate the well casing at depth to allow oil to be released. It consists of a steel cylinder with short gun barrels and explosive charges which are detonated at the required depth to pierce the casing and thus allow the oil to enter the well. Also called gun perforator. *Nelson.*

perforator loader. *See* gun perforator loader. *D.O.T. 1.*

performance curve. Any curve used to show the relation between properties of coal and results of a specific treatment. *B.S. 3552, 1962.*

perhydrous coal. a. Coal of hydrogen content above average for the rank of coal, for example, cannel coal. *B.S. 3323, 1960.* b. Coal containing over 6 percent hydrogen (ashless, dry basis). *Tomkeieff, 1954.*

perhydrous macerals. Macerals having a high hydrogen content, such as exinite and resinite. *Tomkeieff, 1954.*

peri-. A prefix meaning around or beyond. *A.G.I.*

periblain. A subvariety of provitrain in which the cortical origin of the cellular structure is evident. *Compare* suberian; xylain, a. *A.G.I.*

periblinite. a. A variety of provitrinite. The micropetrological constituent, or marceral, of periblain. It consists of cortical tissue almost jellified in bulk but still showing indications of cell structure under the microscope. *A.G.I.* b. A distinction of telinite based on botanical origin (cortical tissue). *A.G.I.*

periclase. Natural magnesium oxide, MgO, found in some marbles. Easily alters to brucite. Colorless to grayish white, yellow, brown, green to black; luster vitreous; hardness 5.5; specific gravity 3.56. Found in California, New Mexico; Europe. Used in refractories (specially prepared grade). *CCD 6d, 1961.*

periclinal. Dipping in all directions from an elevated center. *See also* quaquaversal. *Fay.*

periclinal structure. a. Dipping on all sides from a central point or apex. Synonym for dome; quaquaversal. *A.G.I.* b. Beds dipping radially outward from or inward towards a center, to form a dome or basin. *A.G.I.*

pericline. a. A variety of albite. *Fay.* b. A dome structure. *Nelson.*

pericline law. Triclinic crystal system twinning in which the basal pinacoids of the twins are parallel, the crystallographic *b* axis acting as the twinning axis. *Hess.*

pericline ripple mark. Usually arranged in orthogonal pattern parallel and transverse to current direction with wave length up to 80 centimeters and up to 30 centimeters high. *Pettijohn.*

pericline twin. A twin crystal, in the monoclinic system, whose twinning axis is the orthoaxis of the crystal. *Fay.*

periderm. The periderm consists of three layers of tissue: (1) the phellogen, the initiating or meristematic layer; (2) the phellem or cork layer, formed from the phellogen on the outside; and (3) the phelloderm, a layer formed from the phellogen on the inside, often woody and of considerable thickness. *Hess.*

peridot. The gem variety of olivine. *Fay.*

peridotite. A general term for essentially nonfeldspathic plutonic rocks consisting of olivine, with or without other mafic minerals. The other mafic minerals may be amphiboles, pyroxenes, or in some examples, micas. Minerals of the spinel group are common constituents. *A.G.I.*

peridot of Ceylon. *See* Ceylonese peridot.

perigem. Trade name for light yellow-green synthetic spinel. *Shipley.*

periglacial. Refers to areas, conditions, processes, and deposits adjacent to the margin of a glacier. *A.G.I. Supp.*

perilith. A volcanic bomb consisting of a fragment of old rock coated with a skin of congealed new lava. *Schieferdecker.*

perimagmatic. Close to the magma. *A.G.I.*

perimagmatic deposit. A mineral deposit developed mainly beyond the rim of its eruptive rock. *Schieferdecker.*

perimeter. The outer boundary of any plane figure. *Kinney.*

perimeter blasting. A method of blasting in tunnels, drifts, and raises, designed to minimize overbreak and leave clean-cut solid walls. The outside row of holes are loaded with very light continuous explosive charges and firing them simultaneously, so that they shear from one hole to the other. *Nelson.*

perimeter of airway. In mine ventilation, the linear distance in feet of the airway perimeter rubbing surface at right angles to the direction of the airstream. *BuMines Bull. 589, 1960, p. 2.*

perimorph. A crystal of one species enclosing one of another species. *Webster 3d.*

period. a. A major, worldwide, standard geologic time unit corresponding to a system. *A.G.I. Supp.* b. An interval of time characterized in some particular way. *A.G.I. Supp.* c. Time required for a recurrent motion or phenomenon to complete a cycle and begin to repeat itself. *A.G.I. Supp.* d. The duration of one complete cycle of a periodic function; the reciprocal of the frequency of such a function. The independent variable is limited to time. *ASM Gloss.* e. The elements between an alkali metal and the rare gas of next highest atomic number, inclusive, occupying one (a short period) horizontal row or two (a long period) horizontal rows in the periodic system. *C.T.D.* f. The time required for the power level of a reactor to change by the factor 2.718, which is known as e. *L&L.*

periodic arrangement. An arrangement of elements in the order of their increasing atomic numbers. As a result of this arrangement the elements fall into nine natural groups (group O through group VIII), the members of each resembling each other very strongly. *Crispin. See also* periodic law; periodic system; periodic table.

periodic drier. A drier in which ware is placed, dried, and then removed; in contrast to a continuous drier. *ACSG, 1963.*

periodic kiln. A kiln filled with ware, fired, and cooled before it is fired again; or any type of kiln which must be loaded, fired, cooled, and unloaded to complete the cycle; two types of periodic kilns are updraft and downdraft. *ACSG, 1963.*

periodic law. a. A law in chemistry discovered by Mendeleev. The physical and chemical properties of the elements are periodic functions of their atomic weights. *Webster 3d.* b. The physical and chemical properties of the elements depend on the structure of the atom and are for the most part periodic functions of the atomic number. *Webster 3d. See also* periodic arrangement; periodic system; periodic table.

periodic reverse. Pertains to periodic changes in direction of flow of the current in electrolysis. It applies to the process and also the machine which controls the time for both directions. Symbol, PR. *ASM Gloss.*

periodic system. A classification of the elements, in nine groups (group O through VIII), which demonstrates that the physical and chemical properties of an element and its compounds vary periodically with the atomic number of the element. The system was perfected, as far as possible, from 1869 onwards, by Meyer and Mendeleev. *C.T.D. See also* periodic arrangement; periodic law; periodic table.

periodic table. An arrangement of elements based on the periodic law and proposed in various forms that are usually either short with only short periods (as in Mendeleev's original table) or long with long as well as short periods (as in most modern tables). *Webster 3d See also* periodic arrangement; periodic law; periodic system.

periodic time. *See* period, d.

peripheral clearance angle. *See* clearance angle. *ASM Gloss.*

peripheral faults. Faults along the periphery of a geologically elevated or depressed region. *A.G.I.*

peripheral milling. Milling a surface parallel to the axis of the cutter. *ASM Gloss.*

peripheral moraine. A minor terminal moraine, marking only a temporary halt of the glacier during recession. *Standard, 1964.* Also called moraine of recession. *Fay.*

peripheral speed. a. The distance a given point on the perimeter of a rotating circular object travels, expressed in feet per second; sometimes incorrectly called lineal travel by some drillers. Also called surface speed. *Long.* b. The speed at which any point on the face of a wheel is traveling when the wheel is revolving, expressed in feet per minute. *ASCG, 1963.* c. That of particle or point at extreme radius of system as part of which it rotates, for example, ball in mill, tip of impeller. *Pryor, 3.* d. *See* cutting speed, a. *ASM Gloss.*

peripheral-turbine pump. This pump—sometimes called a regenerative pump—is classified with centrifugal pumps, but is designed to develop several times the head obtained from a centrifugal pump having the same diameter impeller and speed. The maximum head developed does not have the same relation to the impeller diameter and speed of the centrifugal, and involves size and spacing of the impeller vanes, fluid channels, and other factors. *Pit and Quarry, 53rd, Sec. E, p. 89.*

peripheral ventilation. A mine ventilation system in which the upcast shaft for taking air out of the mine is situated at the limits of the mining field or away from the downcast shaft. *Also called* transverse or one-way ventilation. *Stoces, v. 1, p. 528.*

perish. To disintegrate as a result of slow hydration on exposure to moist air; calcined dolomite disintegrates in this manner if stored for more than a short period. *Dodd.*

peristerite. A whitish, adularialike albite, slightly iridescent. *Fay.*

perite. A mineral, $PbBiO_2Cl$, small orthorhombic plates with hausmannite, calcite, etc., from Langban, Sweden. Artificial. *Hey, M.M., 1961.*

peritectic. An isothermal reversible reaction in which a liquid phase reacts with a solid phase to produce another solid phase on cooling. *ASM Gloss.*

peritectic reactions. The reactions between solid phases and still unsolidified portions of the liquid melt. *Rice.*

peritectoid. An isothermal reversible reaction in which a solid phase reacts with a second solid phase to produce yet a third solid phase on cooling. *ASM Gloss.*

Perkiewicz method for preventing kiln scum. A process in which clay bricks, prior to their being set in the kiln, are coated with a combustible, for example, tar or a mixture of gelatin and flour; should sulfur compounds condense on the bricks during the early stages of firing, the deposit will fall away when the combustible coating subsequently burns off. *Dodd.*

perkins. An imperfectly fired brick; a place brick. *Fay.*

perknite. A name from the Greek word for dark, and proposed by Turner as a collective term for the rocks usually called pyroxenites and amphibolites, but not including the peridotites. Mineralogically, the perknites consist chiefly of monoclinic pyroxene and amphibole with subordinate orthorhombic pyroxene, olivine, and feldspar. Chemically they are lower in alumina and alkalies than the diorites and gabbros, and lower in magnesia than the peridotites. *Fay.*

perlite. A volcanic glass having numerous concentric cracks which give rise to perlitic structure. Most perlites have a higher water content than obsidians. A high proportion of all perlites are rhyolitic in composition. *A.G.I.* Usually contains 65 to 75 percent SiO_2, 10 to 20 percent Al_2O_3, 2 to 5 percent H_2O, and smaller amounts of soda, potash, and lime. When perlite is heated to the softening point, it expands to form a light fluffy material similar to pumice. Found in California, Colorado, New Mexico, Nevada, Oregon. Used as lightweight concrete aggregate; as insulation for liquid fuels; catalyst support. *CCD 6d, 1961.*

perlite iron. *See* pearlite iron. *C.T.D.*

perlitic. Resembling perlite; concentrically lamellar; applied to a microscopic structure in glassy rocks resembling that of an onion. *Standard, 1964.*

perlitic structure. A structure produced in homogeneous material by contraction during cooling, and consisting of a system of irregular, convolute, and spheroidal cracks; generally confined to natural glass, but occasionally found in quartz and other noncleavable minerals and as a relict structure in devitrified rocks. *Holmes, 1920.*

permafrost. A permanently frozen layer of soil, subsoil, or other deposit sometimes including the bedrock and occurring at variable depth below the earth's surface in arctic or subarctic regions. *Webster 3d.*

permafrost drilling. Boreholes drilled in subsoil and rocks in which the contained water is permanently frozen. *Long.*

permalloy. An iron-nickel alloy with high magnetic permeability. The metal causes only small losses of energy due to hysteresis and is therefore used in electrical parts which are subject to alternating magnetic fields. *See also* stalloy. *Nelson.*

permanent adjustment. The adjustment of a surveying instrument which is made infrequently and not at each setup. *See also* temporary adjustment. *Ham.*

permanent deformation. *See* set, z. *Ro.*

permanent expansion. Increase in bulk volume as a result of decrease in specific gravity. *Bureau of Mines Staff.*

permanent flow. *See* steady flow, a. *Nelson.*

permanent hardness. Of water, that due to substances not precipitated or modified by boiling, notably the sulfates and chlorides of calcium and magnesium. Measured in accordance with its ability to combine with sodium-based soap and destroy lathering power (Clark's test). *Pryor, 3.*

permanent hardness of water. Water hardness which cannot be removed by boiling. *See also* hard water. *Nelson.*

permanent hard water. Hard water which cannot be softened by boiling; water containing magnesium sulfate or calcium sulfate. *Bennett 2d, 1962.* Also called permanent hardness as opposed to temporary hardness. *Bureau of Mines Staff.*

permanent linear change. The percent dimensional change in length (based on original length) of a refractory specimen free of externally applied stresses, after being subjected to a prescribed heat treatment. *ASTM C71-64. See also* reheat test. *A.R.I.*

permanent magnet. *See* magnet, d.

permanent magnetism. Magnetic property of substance maintained without external excitation. *Pryor, 3.*

permanent mold. A metal mold (other than an ingot mold) of two or more parts that is used repeatedly for the production of many castings of the same form. Liquid metal is poured in by gravity. *ASM Gloss.*

permanent monument. A monument of a lasting character for marking a mining claim. It may be a mountain, hill, ridge, hogback, butte, canyon, gulch, river, stream, waterfall, cascade, lake, inlet, bay, arm of the sea, stake, post, monument of stone or boulders, shafts, drifts, tunnels, open cuts, or well known adjoining patented claims. *Fay.*

permanent pumps. Permanent main pumps are those on which the mine depends for the final disposal of its drainage. As they usually are not moved during the life of the mine, their location, installation, and design require careful consideration. A permanent main pump may discharge on the surface, into an underground sump, or into some other part of a mine. In the anthracite region of Pennsylvania permanent pumps may be classed as surface or relay pumps. *ASA M6.1-1955, p. 3; BuMines Bull. 570, 1967, p. 3.*

permanent set. The permanent change of shape of a plastic substance due to its imperfection of elasticity, that is, to the incompleteness of its recovery after being stressed. *Holmes, 1928.*

permanent shaft support; shaft lining. After a certain depth has been sunk, the final or permanent lining is inserted. This may consist of (1) brick walling; (2) concrete blocks shaped to the curvature of the shaft; (3)concrete lining put in liquid form behind shuttering; (4) brick coffering; and (5) cast-iron tubbing. The permanent lining is generally built up in sections, during which operation the temporary lining (such as skeleton tubbing) is removed. A feature of the last few decades has been the widespread trend towards concrete as a permanent shaft support. *Nelson.*

permanent shuttering. A lining to formwork such as certain types of fiber insulating board, wood-wool slabs, or aluminum sheeting, which contains the concrete for the life of a structure. It is frequently used as soffits for suspended floors or roofs, when it fulfills the double function of containing the poured concrete and of thermal or sound insulation. *Ham.*

permanent tendem electric mine locomotive. *See* electric mine locomotive, permanent tandem.

permanent thermocline. Frequently used in geophysics to describe the decrease in temperature which always occurs at great depths. *H&G.*

permanent way. The completed assembly of rails, sleepers, fixings, and ballast forming the finished track for a railway. *Ham.*

permanent white. *See* blanc fixe.

permanganate. A salt of permanganic acid of the type, MnO_4. They are of dark purple color, good oxidizing agents, and many of them are used as disinfectants. *Enam. Dict.*

Permanite. Trademark for purified natural magnetic iron ore for use in radio cores, shields, etc. *CCD 6d, 1961.*

permeability. a. The permeability (or perviousness) of rock is its capacity for transmitting a fluid. Degree of permeability depends upon the size and shape of the pores, the size and shape of their interconnections, and the extent of the latter. It is measured by the rate at which a fluid of standard viscosity can move a given distance through a given interval of time. The unit of permeability is the darcy. *See also* millidarcy. *A.G.I.* b. In geophysics, the ratio of the magnetic induction to the magnetic intensity in the same region. In paramagnetic matter, the permeability is nearly independent of the magnetic intensity; in a vacuum, it is strictly so. But in ferromagnetic matter, the relationship is definite only under fully specified conditions. *A.G.I.* c. *See* coefficient of permeability. *ASCE P1826.* d. In founding, the characteristics of molding materials which permit gases to pass through them. Permeability number is determined by a standard test. *ASM Gloss.* e. In powder metallurgy, a property measured as the rate of passage under specified conditions of a liquid or gas through a compact. *ASM Gloss.* f. In magnetism, a general term used to express various relationships between magnetic induction and magnetizing forces. These relationships are either absolute permeability, which is the quotient of a change in magnetic induction divided by the corresponding change in magnetizing force, or specific (relative) permeability, the ratio of the absolute permeability to the permeability of free space. *ASM Gloss.*

permeability test. a. Measurement of the resistance to fluid flow offered by a known volume of particles, as a measure of their packing or voids. *Pryor, 4.* b. A procedure usually followed to determine the watertightness of the foundation and abutment rocks, as one phase of foundation test drilling done before the construction of dams. *Long.*

permeable. Pertaining to a rock or soil having a texture that permits passage of liquids or gases under the pressure ordinarily found in earth materials. Same as pervious. *Stokes and Varnes, 1955.*

permeable rock. Rock having a texture that permits water to move through it. *Hy.*

permeameter. A device for measuring the permeability of soils or other material. It usually consists of two reservoirs or tanks, connected by a conduit containing the material under investigation, water being passed from one reservoir under varying conditions of head, etc., through the connecting conduit. *A.G.I.*

permeation. Used specially for the intimate penetration of country rock by metamorphic agents, particularly of an already metamorphosed rock by, for instance, granitizing agents so that the rock becomes completely recrystallized. Hence permeation gneiss. *Challinor.*

Permian. Formerly the last of the three epochs in the Carboniferous period. In recent years advanced to period rank by U.S. Geological Survey. Now considered by the Am. Comm. on Strat. Nomenclature as last of seven periods in the Paleozoic era. Also, the system of rocks formed during the period. *A.G.I.*

Permigel. Gelatinous permissible explosive.

Used in mining. *Bennett 2d, 1962.*

permineralization. The process of fossilization wherein the original hard parts of an animal have additional mineral material deposited in their pore spaces. *A.G.I.*

permissible. a. Means completely assembled and conforming in every respect with the design formally approved by the United States Bureau of Mines for use in gassy and dusty mines. *BuMines Bull. 514, 1952, p. 3.* b. A machine or explosive is said to be permissible when it has been approved by the United States Bureau of Mines for use underground under prescribed conditions. All flameproof machinery is not permissible but all permissible machinery is flameproof. *B.C.I.* c. A low-flame explosive used in gassy and dusty coal mines. *Nichols.* d. That may be permitted; allowable; admissible. *Webster 3d.*

permissible blasting device. Any device, other than explosives, for breaking down coal, that is approved by the U.S. Bureau of Mines. *Grove.*

permissible blasting unit. An electrical device for firing blasts, approved by the U.S. Bureau of Mines. *Grove.*

permissible dose. *See* maximum permissible dose. *L&L.*

permissible dustiness. *See* dust-free conditions.

permissible explosive. a. An explosive similar in all respects to samples that passed certain tests by the United States Bureau of Mines, and used in accordance with the following conditions: (1) that the explosive is in all respects similar to the sample submitted by the manufacturer for test; (2) that detonators—preferably electric detonators—are used of not less efficiency than those prescribed, namely, those consisting by weight of 90 parts of mercury fulminate and 10 parts of potassium chlorate (or their equivalents); (3) that the explosive, if frozen, shall be thoroughly thawed in a safe and suitable manner before use; and (4) that the quantity used for a shot does not exceed 1½ pounds (680 grams), and that it is properly tamped with clay or other noncombustible stemming. After an explosive has passed the required tests and its brand name has been published in a list of permissible explosives, it is not a permissible explosive if one or more of any of the following conditions prevail: (1) if kept in a moist place until it undergoes a change in character; (2) if used in a frozen or partly frozen condition; (3) if used in excess of 1½ pounds (680 grams) per shot; (4) if the diameter of the cartridge is less than that designated in the column smallest permissible diameter; (5) if fired with a detonator or electric detonator of less efficiency than that prescribed; (6) if fired without stemming; and (7) if fired with combustible stemming. For use in gaseous and dusty coal mines. *U.S. BuMines Tech. Paper 169, 1917, p. 6.* b. Explosives that have been tested for safety in handling and approved for use in mines by the U.S. Bureau of Mines. *Grove.*

permissible hydraulic fluids. Commercially available, fire-resistant fluids developed by the oil industry in cooperation with the U.S. Bureau of Mines. They are water-in-oil emulsions, and can be substituted for flammable hydraulic fluids by users of large machinery, whether the equipment is operated underground or on the surface. *Bureau of Mines Staff.*

permissible lamp. Any electric or flame safety lamp that is similar in all respects to a lamp tested and approved by the U.S. Bureau of Mines. *Hess.*

permissible machine. Any drill, mining machine, loading machine, conveyor, or locomotive that is similar in all respects to machines tested and approved by the U.S. Bureau of Mines for use in gassy mines. *Grove.*

permissible mine equipment. Permissible mine equipment is that formally approved by the U.S. Bureau of Mines after having passed the inspections, the explosion tests, and other requirements specified by the Bureau. (All equipment so approved must carry the official approval plate required as identification for permissible equipment. *ASA M2.1-1963.*

permissible mine locomotive. *See* electric permissible mine locomotive.

permissible motors. A motor the same in all respects as a sample motor that has passed certain tests made by the Federal Bureau of Mines and installed and used in accordance with the conditions prescribed by the Bureau. *See* explosion-proof motors. *Fay.*

permissible velocity. The highest velocity at which water may be carried safely in a canal or other conduit; the highest velocity throughout a substantial length of a conduit that will not scour. *Seelye, 1.*

permit man. A member of a geophysical field party whose duty is to obtain permission from landowners for the party to work on their lands, or from public officials for the party to work along highways. *A.G.I.*

permitted explosives; permitteds. a. Explosives that have passed the Buxton tests and placed on the British list of authorized explosives, implying that they are reasonably safe to manufacture, handle, transport, and use in safety lamp mines. Upon detonation, a permitted explosive (1) gives off the minimum possible quantity of noxious gases, and (2) produces a flame of the lowest possible temperature and shortest possible duration, to lessen the risk of firedamp ignition. The explosive contains cooling agents, such as sodium chloride and sodium bicarbonate. The first British permitted list of explosives was published in 1899. *Nelson.* b. A permitted explosive is one which has been approved for use in coal mines where there is any possible risk of igniting firedamp or coal dust. In Great Britain, an explosive is approved by the Minister of Power and placed on the Permitted List after it has passed the official gallery tests prescribed for the particular class of explosives to which it belongs. These tests are carried out at the Safety in Mines Research Establishment's Testing Station at Buxton. *McAdam II, p. 34.* c. Permitted explosives are divided into four groups: P.1. normal permitted explosives; P.2. sheathed explosives; P.3. eq.s. explosives; P.4. permitted explosives which have passed additional and more stringent tests. *B.S. 3618, 1964, sec. 6.* d. The term permissible is used in the United States. *Fay.*

permitted lights. Locked safety lamps and any other means of lighting, the use of which below ground in British coal mines is authorized by Regulations under the Act. *See also* safety lamp mine. *Nelson.*

permitteds. *See* permitted explosives. *Nelson.*

permittivity. Specific inductive capacity. Dielectric constant of a substance. *Pryor, 3.*

Permocarboniferous. Strata not differentiated between the Permain and Carboniferious systems particularly in regions where there is no conspicuous stratigraphic break and fossils are transitional. *A.G.I. Supp.*

Permotriassic. Strata not differentiated between the Permian and Triassic systems particularly in regions where the boundary occurs within a nonmarine red beds succession. *A.G.I. Supp.*

Permount. A solution of a naphthalene polymer in toluene. Used as a permanent cement for cover glasses. *Bennett 2d, 1962 Add.*

permutite. An artificial sodium aluminum silicate, $Na_2Al_2H_6Si_2O_8$, (zeolite), obtained by melting aluminum silicate, sodium carbonate, and sand. A granular powder used for softening of water, as the sodium can be replaced by calcium, magnesium, iron, or manganese. *Enam. Dict.*

permutite process; permutit process. *See* base exchange process.

pernetti. It. a. In ceramics, iron or hard pottery pins or tripods to support an article in a kiln, stilts, spurs. *Standard, 1964.* b. The marks left on a baked article of pottery by the supporting pins; pernetti marks. *Standard, 1964.*

Pernot furnace; post-Pernot furnace. A reverberatory puddling or smelting furnace having a circular, inclined, revolving hearth; used in making steel. *Fay.*

perofskite. Synonym for perovskite. *Hey 2d, 1955.*

Perosa process. A process by which beryllium is extracted from beryl. *Bureau of Mines Staff.*

perovskite; perofskite. A yellow, brown, or grayish-black calcium titanate, $CaTiO_3$, usually crystallizing in the cubic system. The mineral's optical characters conform to the orthorhombic system. It is weakly radioactive; most commonly found in chlorite, talc, or serpentine rocks; also found in melilite, nephelite, and leucite basalts. *Webster 3d; Fay; Crosby, p. 106.*

peroxide. Peroxide compounds contain more oxygen per molecule than the oxide compounds—or than would be expected from the normal valency of the other elements present. Peroxides, when treated with dilute acids, yield hydrogen peroxide. *Cooper.*

perpatic. Used by Cross, Iddings, Pirsson, and Washington to denote the relative amounts of phenocrysts and groundmass in porphyritic rocks, the ratio of the groundmass to phenocrysts being greater than 7:1. *Johannsen, v. 1, 2d, 1939, p. 227.*

perpend. a. A header extending through a wall so that one end appears on each side of it; a perpendstone; border, bondstone; throughstone; through-binder. Also called parping; perpender; perpent. *Fay.* b. A vertical joint, such as in a brick wall. *Standard, 1964.*

perpendicular separation. The perpendicular distance between the corresponding planes in the two parts of a single body available as a criterion (such as a sedimentary bed), when this body has been separated by a fault, the planes on each side of the fault being projected for the purpose of measuring, if necessary.

Stokes and Varnes, 1955.

perpendicular slip. The component of the net slip perpendicular to the trace. *Schieferdecker.*

perpendicular throw. The distance between the two parts of a disrupted bed, dike, vein. or of any recognizable surface, measured perpendicularly to the bedding plane or to the surface in question. It is measured, therefore, in a vertical plane at right angles to the strike of the disrupted surface. *Fay.*

perpetuity. An annuity whose payments are supposed to continue foreover. *Fay.*

perrierite. a. Titanosilicate of Yt, Ce, with some Th, Fe, Ca, P_2O_5 (near chevkinite); monoclinic (orthite habit). *Spencer 19, M.M., 1952.* b. Perhaps identical with tscheffkinite. *Crosby, p. 82.*

Perrin's process. Process of dephosphorizing steel by lowering the carbon to about 0.05 percent, removing the normal, first high-phosphorous slag on the metal, and then agitating the steel with a fresh highly-basic slag. *Bennett 2d, 1962.*

persemic. Used by Cross, Iddings, Pirsson, and Washington to denote the relative amounts of groundmass and phenocrysts in porphyritic rocks, the ratio between groundmass and phenocrysts being less than 1:7. *Johannsen, v. 1, 2d, 1939, p. 227.*

Pershbecker furnace. A continuously working shaft furnace for roasting quicksilver ores having two fireplaces at opposite sides. The fuel is wood. *Fay.*

Persian red. *See* Indian red. *Fay.*

persilicic. a. Containing more than 60 percent silica; said of some igneous rocks; same as, and much preferred to, acid and acidic, which it is replacing. *Fay.* b. Suggested to replace the term acid as applied to igneous rocks; for intermediate and basic the corresponding terms are mediosilicic and subsilicic. *Rice.*

persistence; afterglow. Of a cathode-ray tube, the decaying luminescence of the screen after the stimulus has been reduced or removed. *NCB.*

persistent. Continuous; ore bodies are often persistent in depth and metal contents. *von Bernewitz.*

personal equation. Systematic error arising with the observer; usually due to time lag between event and recording. *Pryor, 3.*

personal error. Usually a biased error, but may be random, occurring under special conditions. *Pryor, 3, p. 159.*

personnel management. The maintenance of good relationships within an organization. By consideration of the well-being of the individual, it enables all those engaged in the undertaking to make their maximum contribution to the effective working of that undertaking. *Nelson.*

personnel officer. A specialist adviser to mine management and officials on all questions affecting relations between the workers and the management. *Nelson.*

personnel proximity survey. A survey of radiation conditions at positions occupied by personnel working near apparatus emitting radioactivity. *NCB.*

persorption. Deep sorption of gas by liquid. *Pryor, 3.*

perspex. Polymerized transparent methyl acrylate plastic. *Pryor, 3.*

persuader. A common term for crowbar, lever, or some such article used as a manual aid in moving heavy objects. *Crispin.*

perthite. a. Potash-rich feldspar containing intergrown plagioclase probably crystallized as a product of exsolution. *Schieferdecker.* b. An intergrowth of soda feldspar and potash feldspar. *AIME, p. 341.*

perthitoid. A perthitic texture shown by nonfeldspathic minerals, for example, symplektic intergrowths of chondrodite calcite, epidote quartz, plagioclase hornblende. Myrmeki perthitoid, when one of the components is vermicular. *Spencer 15, M.M., 1940.*

perthorite. A deep-seated igneous rock consisting of alkali feldspar with less than 3 percent dark minerals. Feldspar, both orthoclase and albite, may be perthitically intergrown as cryptoperthite or as anorthoclase. *Hess.*

perthosite. A leucocratic monzonite consisting almost entirely of perthitic feldspars (microperthite and antiperthite) plus accessory aegirine augite, sphene, zircon, and opaque oxides. *A.G.I.*

pervibration. A name given to the internal vibration of concrete. *Ham.*

pervious. *See* permeable. *A.G.I.*

pervious bed. A bed or stratum that contains voids through which water will move under ordinary hydrostatic pressure. *Fay.*

pervious rocks. Porous or fissured rocks through which water can filter. *Pryor, 3.*

pestle. a. A usually club-shaped implement for pounding, crushing, or grinding substances, especially in a mortar. *Webster 3d.* b. As a verb, to beat; to crush; to pound; to pulverize, or to mix with, or as if with, a pestle. *Webster 3d.* c. Any of various devices for pounding, stamping, or pressing. *Webster 3d.*

petalite. A colorless, white, gray, or occasionally pink mineral, $LiAl(Si_2O_5)$ or $Li_2O.Al_2O_3.8Si0_2$; white streak; vitreous luster; monoclinic. Resembles spodumene in appearance. Contains 4.9 percent lithia, sometimes with partial replacement by sodium or, less often, by potassium. Insoluble in acids. Specific gravity, 2.39 to 2.46; Mohs' hardness, 6 to 6.5. Found in Massachusetts, Maine; Sweden. Used in ceramics and glass; a source of lithium salts. *CCD 6d, 1961; Dana 17.*

petaloid. Resembling a flower petal in form, appearance, or texture. *Webster 3d.* Applied to the structure seen in minerals that split up into pieces with a smooth polished concave-convex surface which fit into one another somewhat like the petals of an unopened flower bud. *Fay.*

petanque; petlanque. Mex. Ruby silver. Tetrahedrite, and other rich silver minerals. *Fay.*

petary. *See* peatery. *Fay.*

petcock. A small drain valve. *Nichols.*

peter; peter out. a. To fail gradually in size, quantity, or quality; for example, the mine has petered out. Also called peter out. *Fay. See also* nip out. b. *Eng.* Tough bright-green clay with rusty spots, with some earthy fragments and ironstone concretions. *Arkell.*

petering out. The gradual thinning of a vein until it disappears. *Statistical Research Bureau.*

peters. York. Flagstones of unusual width. *Arkell.*

Petersen air elutriator. An upblast elutriator that has found some use in determining the fineness of portland cement. *Dodd.*

Petersen grab. In the Petersen (or van Veen) type of grab two semicircular buckets of varying sizes are hinged along a central axis. The buckets are held apart for lowering to the bottom by some form of catch. On striking the bottom this is released so that on hoisting, the buckets move around on their axis, take a bite out of the sediment, and come together to form a closed container. With this configuration, the rate at which the grab hits the bottom affects the bite and when the ship is drifting a poor sample may be obtained if the grab does not hit the bottom vertically. *H&G.*

petit coke. Belg. Broken coke for household use. *Hess.*

petit granite marble. A bluish marble studded with innumerable fine, white points caused by fossil crinoids and polyps; from Ecausines, Belgium. *Fay.*

PETN Abbreviation for pentaerythritol tetranitrate. *See also* pentaerythritol tetranitrate; penthrite. *Bennett 2d, 1962.*

Petoskey agate. Fossil coral from Petoskey, Mich. Also called Petoskey stone. *Shipley.*

petra. Rock material produced in a specific sedimentary-organic environment. *A.G.I. Supp.*

petra dura. It. Hard and fine stones in general, as those used for inlay and the like, in distinction from the softer stones used in building. *Fay.*

petralite. An explosive compounded of ammonium carbonate, nitrated wood or charcoal, and saltpeter. *Standard, 1964.*

petralogy. *See* petrology. *Fay.*

petrean. Of or pertaining to rock; rocky. *Webster 2d.*

petrescence. The process of changing into stone; petrifaction. *Standard, 1964.*

petrical. Fletcher's name for the coarser structural features of rocks. *See also* lithical. *Fay.*

petri dish. Shallow flat glass dish, circular; useful, among other things, in microexamination of minerals underwater. *Pryor, 3.*

petrifaction. The process of petrifying; specifically, the conversion of organic matter into stone or a substance of stony hardness through the infiltration of water containing dissolved mineral matter (as calcium, carbonate, or silica) that replaces the organic material particle by particle with the original structure sometimes retained. *Webster 3d.*

petrified asbestos. A name for either tigereye, hawk's eye, or quartz cat's-eye. *Shipley.*

petrified honeycomb. Beckite. *Schaller.*

petrified roses. Aggregates or clusters of tabular crystals of barite, which form chiefly in sandstones, enclosing the sandy matrix within the crystals. *A.G.I.*

petrified wood. *See* wood, b.; silicified wood. *Fay.*

petrify. To become stone. Organic substances, such as shells, bones, wood, etc., embedded in sediments become converted into stone by the gradual replacement of their tissues, particle by particle, with corresponding amounts of infiltrated mineral matter. Thus, not only the outward forms but even the minutest details of the organic tissues are preserved. *Fay.*

petro. A stone or rock. *Fay.*

petrocene. A greenish-yellow hydrocarbon with a pearly luster and needlelike crytals, obtained by the distillation of petroleum residue at a red heat. *Fay.*

petrochemicals. a. Chemical compounds made with a petroleum hydrocarbon as one of their basic components; for example, ammonia, synthetic rubber, and carbon black. *BuMines Bull. 556, 1956, p. 608.* b. Chemicals present in, or derived from, natural gas or crude petroleum by physical refining or by chemical reaction. *Bennett 2d, 1962 Add.*

petrochemistry. a. The chemistry of rocks. *A.G.I. Supp.* b. The chemistry of petroleum; disapproved by some geochemists. *A.G.I. Supp.*

petrofabric analysis. Synonym for petrofabrics. *A.G.I.*

petrofabrics. The study of spatial relations, especially on a microscale, of the units that comprise a rock, including a study of the movements that produced these elements. The units may be rock fragments, mineral grains, or atomic lattices. *A.G.I.*

petrogenesis. A branch of petrology which deals with the origins of rocks, and more particularly with the origins of igneous rocks. *A.G.I.*

petrogenic elements. Those elements that are characteristically concentrated in the ordinary rock types, as opposed to those concentrated in ore deposits (metallogenic). *A.G.I.*

petrogeny. *See* petrogenesis. *A.G.I.*

petrographer. One who is versed in or engaged in petrography, or the study of rocks. *Fay.*

petrographic; petrographical. Pertaining to the study of rocks. *Stokes and Varnes, 1955.*

petrographic microscope. A microscope specially fitted with optical and mechanical accessories for identifying and studying the properties of minerals in granular form or in thin sections of rock. *Sinkankas.*

petrographic province. A natural region within which some or all of the igneous rocks present certain well-marked peculiarities in their mineralogical and chemical composition; structure, texture, etc., that set them apart from rocks of other petrographic provinces. Consanguineous, comagmatic. *Schieferdecker.*

petrography. A general term for the science dealing with the description and systematical classification of rocks, based on observations in the field, on hand specimens and on thin sections. Petrography is thus wider in its scope than lithology, but more restricted than petrology, which implies interpretation as well as description. *Holmes, 1928.*

petrol. The term used particularly in England to designate petroleum or its derivatives. It is gasoline or motor spirits. *Shell Oil Co.*

petrolatum. A neutral unctuous substance that is practically odorless and tasteless and is insoluble in water, that is obtained from petroleum, and differs chemically from paraffin wax in containing unsaturated hydrocarbons or naphthenes as well as hydrocarbons of the methane series, and that is produced in several forms: as (1) a yellowish to light amber semisolid mass obtained in various ways (as by purifying the residue from the distillation of petroleum or by dewaxing heavy lubricating oils), and used chiefly as a base for ointments and cosmetics, as a protective dressing (as for burns), and in lubricating greases; also called petroleum jelly; yellow petrolatum; yellow soft paraffin; and (2) a white or faintly yellowish mass obtained by decolorizing yellow petrolatum and used similarly to it; also called white petrolatum; white petroleum jelly; white soft paraffin; and (3) liquid petrolatum.*Webster 3d.*

petrolatum liquidum. The medicinal high-boiling petroleum oil of the United States pharmacopoeia. *See also* petrolatum. *Fay.*

petrolene. A liquid hydrocarbon mixture obtained from bitumen or asphalt. *Fay.*

petrol engine. An internal-combustion reciprocating engine powered by motor spirit, which is ignited by an electrical spark. *See also* diesel engine. *Ham.*

petroleum. Material occurring naturally in the earth composed predominantly of mixtures of chemical compounds of carbon and hydrogen with or without other nonmetallic elements, such as sulfur, oxygen, nitrogen, etc. Petroleum may contain or be composed of such compounds in the gaseous, liquid, and/or solid state, depending on the nature of these compounds and the existent conditions of temperature and pressure *API Glossary.*

petroleum asphalt. An asphalt refined directly from petroleum. Most asphalt used in highway work is of this type. *Shell Oil Co.*

petroleum briquet. A briquet made of petroleum, soft soap, resin, and soda-lye wash. The mixture is heated, allowed to solidify, run into molds, and then heated in a furnace for about 15 minutes. *Fay.*

petroleum car. A railroad car carrying a tank or tanks, designed for the transportation of petroleum in bulk. A tank car. *Fay.*

petroleum coke. a. The residue obtained by the distillation of petroleum. It usually shows the following composition: 5 to 10 percent volatile and combustible matter, 90 to 95 percent fixed carbon, from a trace to 0.3 percent ash, and from 0.5 to 1 percent sulfur. On account of its purity, it has found application in metallurgical processes and in making battery carbons and carbon pencils (electric carbons). *Fay.* b. Cokelike material found in cavities of igneous rocks intrusive into carbonaceous sediments. *Tomkeieff, 1954.*

petroleum coke base carbon refractory. A manufactured refractory comprised substantially of calcined petroleum coke. *ASTM C71-64.*

petroleum engineer. In petroleum production, one who performs engineering work concerned with drilling of wells and production of oil or gas. May be known as gas engineer if worker is concerned only with natural gas production. *D.O.-T. 1.*

petroleum ether; ligroin; benzine. a. The terms petroleum ether and benzine are obsolete terms for ligroin. *See also* ligroin. *CCD 6d, 1961.* b. A mixture of hydrocarbons boiling from 40° to 60° C; a mixture of low-boiling liquid alkanes. *Handbook of Chemistry and Physics, 42d ed., 1960, p. 1,581.*

petroleum geologist. A geologist engaged in petroleum exploration or exploitation or in research pertaining to petroleum. *A.G.I.*

petroleum geology. That branch of economic geology which deals specifically with the problems of location, origin, migration, and accumulation of natural oil and gas. *Stokes and Varnes, 1955.*

petroleum lubricating grease. A combination of a petroleum product and a soap or a mixture of soaps, suitable for certain types of lubrication. *Hess.*

petroleum naphtha. A generic term applied to refined, partly refined, or unrefined petroleum products and liquid products of natural gas, not less than 10 percent of which distills below 347° F (175° C) and not less than 95 percent of which distills below 464° F (240° C), when subjected to distillation in accordance with ASTM Method D 86, Test for Distillation of Gasoline, Naphtha, Kerosine, and Similar Petroleum Products. *ASTM D 288-57.*

petroleum-oil cannel coal. Another name for oil shale. *Tomkeieff, 1954.*

petroleum pitch. *See* pitch, p. *Fay.*

petroleum reservoir. A natural structural trap containing an exploitable concentration of hydrocarbons. *Bennett 2d, 1962 Add.*

petroleum series. The petroleum series embraces gases, liquids, and solids. The chemistry is very complex, but most of the members belong to the marsh gas or paraffin series of compounds, C_nH_{2n+2}. Up to C_4H_{10}, they are gases at ordinary temperatures; from $C_{20}H_{42}$ up they are solids. The gases are called natural gas; the liquids, petroleum; the thick, black tarry liquids, maltha; the solids at ordinary temperature, of tough leathery character, asphalt; the brittle coallike substances, asphaltite; and the natural paraffins, ozocerite. *Stokes and Varnes, 1955.*

petroleum spirits; mineral spirits. A refined petroleum distillate with volatility, flash point, and other properties, making it suitable as a thinner and solvent in paints, varnishes, and similar products. The term turpentine substitute as applied to petroleum spirits is to be condemned as false and misleading. In Great Britain, the term petroleum spirits is applied to a very light hydrocarbon mixture having a flash point below 32° F (0° C). *ASTM D 288-57.*

petroleum still. A still for separating the hydrocarbon products from crude petroleum. *Standard, 1964.*

petroleum tar. A viscous black or dark brown product obtained in petroleum refining, which will yield a substantial quantity of solid residue when partially evaporated or fractionally distilled. The term tar should never be applied to materials derived from crude petroleum or fractions thereof, without the prefix petroleum. *ASTM D 288-57.*

petroleum tar sands. Native asphalt, solid and semisolid bitumen, and bituminous rock (including oil-impregnated rock or sands from which oil is recoverable only by special treatment after the deposit is mined or quarried). *Williams.*

petroliferous. Containing or yielding petroleum. *Standard, 1964.*

petrolize. To treat or impregnate with petroleum, or a petroleum product. *Webster 3d.*

petrologen. a. Another name for kerogen. *Tomkeieff, 1954.* b. A term proposed to cover the substances in shale, coal, etc. that form oil when heated out of contact with air. *Hess.*

petrologist. A geologist who specializes in petrology. *Webster 3d.*

petrology. A general term for the study, by all available methods, of the natural history of rocks, including their origins, present conditions, alterations, and decay. Petrology comprises petrography on the one hand, and petrogenesis on the other, and properly considered, its subject matter includes ore deposits and mineral deposits in general as well as rocks in the more limited sense in which that term is generally understood. *Holmes, 1928.*

petrolo-shale. Another name for oil shale. *Tomkeieff, 1954.*

petromorphology. The megascopic and microscopic form and structure of rocks considered with special reference to their genesis. *A.G.I. Supp.*

petrophysics. The physics of rock behavior; in petroleum geology, the study of the physical properties of reservoir rocks. *Schieferdecker.*

petroshale. A little-used term for oil shale. *Hess.*

petrosilex. An old name for extremely fine crystalline porphyries and quartz porphyries and for those finely crystalline aggregates we now know to be devitrified glasses; also for the groundmasses of the former which though not glassy are yet not resolvable by the microscope into definite minerals. It was practically a confession by the older petrographers that they did not know of what the rock consisted. *See also* felsite; microfelsite. Also called hornstone. *Fay.*

petrotectonics. *See* structural petrology. *A.G.I.*

petrotome. A machine for slicing rocks. *Hess.*

petrous. Hard, like stone; as, petrous phosphates or petrous marl. *Standard, 1964.*

petty; pitty. Eng. Beds of ironstone nodules formerly worked in the Weald. *Arkell.*

petuntze. A variety of feldspar that is mixed with kaolin, and used by the Chinese in the manufacture of porcelain. Also spelled petuntse. *Standard, 1964.*

petzite. A telluride of silver and gold, $(Ag,Au)_2Te$. The gold content ranges from 18.2 to 25.6 percent and the silver from 40.7 to 46.8 percent. *Sanford.*

pewter. a. A marble worker's polishing material, made by calcining tin. *Standard, 1964.* b. An alloy containing 80 to 90 percent tin and 10 to 20 percent lead; now little used. *C.T.D.*

pewterer's solder. Hard pale solder or middling pale solder. *Standard, 1964.*

pewter mill. A lapidary's wheel used for stones of the hardness of amethyst or agate. *Webster 3d.*

PFA Abbreviation for pulverized fuel ash. *See also* pulverized fuel ash. *Dodd.*

Pfalzian orogeny. Synonym for Palatinian orogeny. *A.G.I. Supp.*

pH. a. The negative logarithm of the hydrogen-ion activity. It denotes the degree of acidity or of basicity of a solution. At 25° C, 7 is the neutral value. Acidity increases with decreasing values below 7, and basicity increases with increasing values above 7. *ASM Gloss* b. The logarithm, to the base 10, of the reciprocal of the concentration of hydrogen ions in an aqueous solution. It is a convenient method of expressing small differences in the acidity or alkalinity of nearly neutral solutions. Such differences are of great importance in many biological and electrolytic processes. *See also* hydrogen-ion concentration. *C.T.D.*

phacellite; phacelite. Synonym for kaliophilite. *Hey 2d, 1955.*

phacoidal structure. Having the shape of a lens. *A.G.I.*

phacolite. A colorless variety of chabazite in twins of lenticular shape; also, a phacolith. *Webster 2d.*

phacolith. A concordant intrusive in the crest of an anticline and trough of a syncline, hence in cross section, it has the shape of a doubly convex lens. *A.G.I.*

phaocolithic. a. Pertaining to a lens-shaped mass of igneous rock intruded between adjacent competent beds at the axial region of a fold. *Bureau of Mines Staff.* b. Pertaining to an igneous rock intrusion in the shape of a phacolith. *Bureau of Mines Staff.*

phanerite. A general term applied to wholly crystalline rocks, the constituents of which may be distinguished with the unaided eye. The adjective form phaneritic is currently used more frequently than the noun. *A.G.I.*

phaneritic. A textural term applied to igneous rocks in which all the crystals of the essential minerals can be distinguished with the unaided eye; that is, megascopically crystalline. *Compare* cryptocrystalline; microcrystalline. Opposite of aphanitic. *Stokes and Varnes, 1955.*

phanerocrystalline. *See* phaneritic. *A.G.I.*

Phanerozoic. Comprises the Paleozoic, Mesozoic, and Cenozoic; eon of evident life. *A.G.I. Supp.*

Phanerozoic eon. Time of more or less abundant visible fossil remains. *Compare* Cryptozoic eon. *Bureau of Mines Staff.*

phanoclastic. An even-grained or uniformly sized clastic sediment. *A.G.I.*

phantom crystal. A crystal in which an earlier stage of crystallization is outlined in the interior. *Fay.*

phantom horizon. Horizon on a reflection profile that is obtained by averaging the dips of the reflections within a band, thus indicating the trend of the dip but not necessarily coinciding with an actual boundary plane. *Schieferdecker.*

pharmacites. Used by Wadsworth to include all minerals employed in medicine. *Fay.*

pharmacolite. A white, hydrous arsenate of calcium, probably $HCaAsO_4+2H_2O$; monoclinic. *Fay.*

pharmacosiderite. A hydrous, iron arsenate commonly occurring in green or yellowish-green cubic crystals. Also called iron sinter. *C.T.D.; Webster 3d.*

phase. a. A variety differing in some minor respect from the dominant or normal type; a facies; ordinarily used in the detailed description of igneous rock masses. *Fay.* b. Geologic time unit smaller than an age; uncommon. *A.G.I. Supp.* c. Rock facies identified by both original and secondary characters of the strata; uncommon. *A.G.I. Supp.* d. In physical chemistry, a homogeneous, physically distinct portion of matter in a nonhomogeneous (that is, heterogeneous) system, as the three phases—ice, water, and aqueous vapor. *A.G.I.* e. Said of alternating current; there are in three-phase alternating current three distinct conductors, each carrying current alternating out of step with the others. Each is called a phase. *Mason.* f. In triangulation, error in apparent horizontal direction of a signal due to unequal or one-sided illumination of the signal. *Seelye, 2.* g. The point or stage in a period in uniform circular motion, simple harmonic motion, or the periodic changes of any magnitude varying according to a simple harmonic law (as sound vibrations, alternating currents, or electric oscillations) to which the rotation, oscillation, or variation has advanced considered in its relation to a standard position or an assumed instant of starting and expressed in angular measure with one cycle or period being 360°. *Webster 3d.* h. A homogeneous, physically distinct, and mechanically separable portion of matter that is present in a nonhomogeneous physical-chemical system and that may be either a single compound or a mixture. *Webster 3d.* i. The sum of all those portions of a material system that are identical in chemical composition and physical state. *C.T.D.*

phase angle. An angle expressing phase or phase difference. *Webster 3d.*

phase-balance relays. Relays which protect an electrical system from faults occurring in any phase of a three-phase system. Quite often a fault current will not be large enough to trip the overcurrent relay but will operate the phase-balance mechanism. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

phase change. The appearance or disappearance of one or more phases. *A.G.I.*

phase contrast microscopy. An optical system in which the phase difference between an incident and a diffracted light wave is increased from about 90° to about 180° so that the two waves cancel out, causing a transparent object to appear to some extent light absorbing. *Pryor, 3.*

phase control. The process of varying the point within the cycle at which anode conduction is permitted to begin. *Coal Age, 1.*

phase converter. A machine for converting an alternating current into an alternating current of a different number of phases and the same frequency. *Webster 3d.*

phase detection. The derivation of a signal whose amplitude is a function of the deviation in phase of a single frequency-alternating quantity (voltage or current) from a similar quantity of fixed phase. *ASM Gloss.*

phase diagram. a. A graph in which two or more of the variables' temperatures, pressure, and concentrations are plotted against one another, designed to show the boundaries of the fields of stability of the various phases of a heterogeneous system. *A.G.I.* b. The same as constitution diagram. *ASM Gloss.*

phase disengagement. In processing of uranium ores the step following alkaline leach, in which the organic solvent emulsified with the pregnant aqueous liquor, having transferred to itself the uranium, is separated from the emulsified state. *Pryor, 3.*

phase displacement. The angle by which the amount of difference of phase between two alternating-current magnitudes is expressed. *Standard, 1964.*

phase inversion. In the Convertol process, replacement of the film of water covering a coal particle by a film of oil. *B.S. 3552, 1962.*

phasemeter. A device for measuring the difference in phase of two alternating currents or electromotive forces. *Webster 3d.*

phase rule; Gibbs' phase rule. a. The number of degrees of freedom of a system in equilibrium is equal to the number of components minus the number of phases plus the constant 2 (as in the system ice—liquid water—water vapor consisting of the one chemical component water and its three physical phases there are no degrees of freedom and the system can exist at only one temperature and pressure). *Webster 3d.* b. The mathematical expression of Gibbs' phase rule is $F= C+2-P$. F is the number of degrees of freedom of a system (the number of variable factors, such as temperature, pressure, and concentration, of the components, which must be arbitrarily fixed in order that the condition of the system may be perfectly defined). C is the number of components of the system. P is the number of phases of the system. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-43.*

phase shifter. A device employed to alter the phase of a wave. *NCB.*

phassachate. A lead-colored agate. *Standard, 1964.*

phenacite; phenakite. A natural beryllium silicate, Be_2SiO_4; colorless or yellow, red, or brown in color. White streak; vitreous luster; specific gravity, 2.5 to 2.8; Mohs' hardness, 5 to 6.5; rhombohedral. Found in Colorado, Montana, New Hampshire; U.S.S.R.; France; Norway; Mexico; Brazil. Used in gem stones. *CCD 6d, 1961; Dana 17.*

phenakite. *See* phenacite.

phengite. a. A transparent or translucent stone, probably selenite or crystallized gypsum, used by the ancients for windows. *Webster 3d.* b. A variety of muscovite with substitution of aluminum for magnesium and silicon. *Webster 3d.*

phenhydrous. a. Applied to certain conditions under which coal was formed, namely those of open waters into which the plant debris was swept from the adjoining land. *Tomkeieff, 1954.* b. Refers to vegetable matter deposited under water in contrast to that laid down on a wet substratum. *Compare* crypthydrous. *A.G.I.*

phenix stone. An artificial stone in which furnace slag is used in place of sand. *Fay.*

phenoclast. Phenoclasts are the larger, more conspicuous fragments in a rudaceous rock, a conglomerate or breccia, as distinct from the fine rock material (the matrix) in which they are embedded. *Challinor.*

phenoclastic. Containing materials having a wide range in size and either rounded or angular. *A.G.I.*

phenocryst. A name suggested by Iddings for one of the relatively large and ordinarily conspicuous crystals of the earliest generation in a porphyritic igneous rock. It has proved an extremely convenient one, although its etymology has been criticized. It may be best to change to phanerocryst, just as in botany, phenogam has yielded to phanerogam; but one form or the other is a necessity. *Fay.*

phenocrystalline. Same as phanerocrystalline. *Fay.*

phenocrystic. Containing, characterized by, or pertaining to phenocrysts. *Standard, 1964.*

phenol; benzenol; hydroxybenzene; carbolic acid. A soluble, crystalline acidic compound; C_6H_5OH; turns pinkish on exposure to light and air; and has a characteristic odor. It is present in coal tar and in wood tar; occurs in urine, especially that of herbivorous animals; and is synthesized by various methods (as from sodium benzenesulfonate by alkaline fusion). It is a powerful caustic poison and in a dilute solution, a useful disinfectant. Used chiefly in making resins and plastics, dyes, pharmaceuticals (as aspirin), other products (as picric acid 2, 4-D) and as a solvent for refining lubricating oils. *Webster 3d.* Molecular weight, 94.11; specific gravity, 1.0722 (at 20° C, referred to water at 20° C); melting point, 43° C; boiling point, 182° C; and soluble in water, in alcohol, in ether, in chloroform, in carbon disulfide, and in glycerol. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-466; CCD 6d, 1961.*

phenomenon. In gemmology, an optical effect in visible light occurring in certain, but not in all, specimens of a species. *See also* adularescence; asterism. *Shipley.*

phenomenonal gem. A gemstone exhibiting an optical phenomenon. *See also* phenomenon. *Shipley.*

phenyldi-iodoarsine. A highly refractive liquid, $C_6H_5AsI_2$; refractive index, 1.85; used for making optical contact between stone and dense glass of refractometer, and as an immersion fluid. *Shipley.*

Phi grade scale. *See* grade scale, Phi. *A.G.I.*

Philadelphia rod. A leveling rod in which the hundredths of feet, or eighths of inches, are marked by alternate bars of color the width of the measurement. *Nichols.*

philadelphite. A pearly, brownish-red, micaceous vermiculite that occurs in contorted and wrinkled plates. *Standard, 1964.*

phillipite. A compact, blue, hydrated copper and iron sulfate, $Fe_2Cu(SO_4)_4.12H_2O$, produced by decomposition of chalcopyrite. *Standard, 1964.*

phillipsite. a. A fibrous zeolite; hydrated silicate of potassium, calcium, and aluminum, usually grouped in the monoclinic system. Formula, $KCa(Al_3Si_5O_{16}.6H_2O$. Some twinned forms possess pseudosymmetry. *Dana 17.* b. Synonym for bornite. *Hey 2d, 1955.*

philosopher's wool. An old name given to the flocculent zinc oxide produced when zinc is burnt in air. *C.T.D.*

phlebite. A general term for a variety of mixed rock or chorismite in which one ingredient of the fabric forms veins in the other. These veins may thicken to lenses, ramify, or assume forms that are apparently folded; they may also combine to form a network. Phlebites are commonly transitional to stromatites. *A.G.I.*

Phleger corer. Designed to obtain cores up to about 4 feet in length, the Phleger corer is utilized where only the upper layers of the sea bottom are to be analyzed. Coring tubes 12 and 36 inches in length, a main body weight, an upper tube, a check valve, and tailfin assembly account for the overall length of 3 to 5 feet. *H&G.*

phloem. In coal, the outer conducting part of the central cylinder or vascular tissues. It consists primarily of sieve tubes and companion cells, phloem fibers or bark fibers, stone cells, and parenchymatous cells. *Hess.*

phlogopite. A brown magnesium mica, near biotite in composition, but containing little iron. *Fay.*

pH modifiers. Proper functioning of a cationic or anionic flotation reagent is dependent on the close control of pH. Modifying agents used are soda ash, sodium hydroxide, sodium silicate, sodium phosphates, lime, sulfuric acid, and hydrofluoric acid. *Fuerstenau, p. 434.*

phoenicochroite. A cochineal to hyacinth-red mineral with 1 perfect cleavage, $3PbO.2CrO_3$; Mohs' hardness, 3 to 3.5; specific gravity, 5.75; may be same as crocoite. *Larsen, p. 146.*

pholerite. A claylike mineral closely related to or identical with kaolinite. *Fay.*

pholidoide. The group of aluminous glauconites grading into normal (ferruginous) glauconite and occurring in sedimentary rocks. Includes skolite and bravaisite. Distinct from pholidolite of Nordenskiold. *English.*

pholidolite. A grayish-yellow, hydrous silicate of potassium, magnesium, iron, and aluminum in minute crystalline scales. *Webster 2d.*

phonolite. The extrusive equivalent of nepheline syenite. The principal mineral is soda orthoclase or sanidine. Other major minerals are nepheline and aegirine diopside usually with other feldspathoidal minerals as sodalite or haüyne. Accessory apatite and sphene. *A.G.I.* It is an uncommon rock, but is an important ore carrier at Cripple Creek, Colo. *von Bernewitz.*

phonon. Quantized atomic vibrations. The main mechanism of thermal conductivity in ceramic materials. *VV.*

phosgenite. A chlorocarbonite of lead, $Pb_2Cl_2CO_3$, crystallizing in the tetragonal system. It is a rare mineral found in association with cerussite. Also called corneous lead; horn lead. *Fay; Dana 17.*

phosphalite. Deposits of phosphate of lime which occur at times as beds of small concretions which rest on clay surfaces or are scattered in sands and limestone. *A.G.I.*

phosphate. a. An ore of any metal or metals with which phosphorus and oxygen are chemically united. *Weed, 1922.* b. A salt or ester of phosphoric acid; a compound containing the radical PO_4^{-3}. *A.G.I.*

phosphate crown glass. An optical crown glass containing a substantial quantity of phosphorus pentoxide, (P_2O_5). *ASTM C 162-66.*

phosphate glass. A glass in which the essential glass former is phosphorus pentoxide instead of silica. *ASTM C 162-66.*

phosphate lands. In mining law, a leased area for phosphate lands may not exceed 2,560 acres. A certain expenditure for mine development and operations is required. A royalty of not less than 2 percent of the gross value of the output must be paid, and an annual rental, similar to that for coal lands, is imposed. *Lewis, p. 34.*

phosphate of lead. Synonym for pyromorphite. *Dana 6d, p. 770.*

phosphate of lime. *See* apatite. *Fay.*

phosphate recovery process. A process developed by the U.S. Bureau of Mines for recovering phosphate from low-grade phosphorus-bearing shales in Idaho, Montana, Utah, and Wyoming. The process works in several steps. First, phosphate-bearing shales are subjected to crushing, roasting, attrition grinding, and screening to recover the 32.5-percent acid-grade concentrate. Then, by a combination of desliming and flotation, a mixture of fine particles and waste obtained as a byproduct of the earlier operations is processed to recover the 28-percent grade concentrate. *Bureau of Mines Staff.*

phosphate rock. A rock that consists of calcium phosphate largely in the form of apatite usually together with calcium carbonate and other minerals, that is useful in fertilizers and is a source of phosphorus compounds, and that occurs in large beds in the southeastern United States and in extensive deposits in Arkansas and the northwestern United States. *Webster 3d.*

phosphates. Salts formed by combining phosphoric acid with an alkali. Sodium, potassium, ammonium, and calcium phosphates are used in fertilizers. *See also* phosphate rock. *Fay.*

phosphatic. Pertaining to or containing phosphate minerals. *A.G.I.*

phosphatic deposits. Beds containing calcium phosphate which are formed especially in areas of low rainfall, and which may be exploited as sources of phosphate. *C.M.D.*

phosphatic nodules. Black to brown, rounded masses, variable in size from a few millimeters to 30 or more centimeters. Usually consist of caprolites, corals, shells, and bones, more or less enveloped in crusts of collophane. Found in many horizons of marine origin. Also covering the ocean floors at many locations around the world. *Bureau of Mines Staff.*

phosphatic slag. Same as basic slag. *Standard, 1964.*

phosphatizing. Forming an adherent phosphate coating on a metal immersed in a suitable aqueous phosphate solution. *ASM Gloss.*

phosphide. An oxygen-free compound of a metal with phosphorus. *Bennett 2d, 1962.*

phosphine; hydrogen phosphide; triphosphorus hydride. Colorless; poisonous; evil-smelling gas; PH_3; analogous to ammonia; and usually burns spontaneously in air to form phosphorus pentoxide (P_2O_5). It has reducing properties and precipitates phosphides from solutions of many metallic salts. *C.T.D.* Molecular weight, 34.00; melting point, −133° C; boiling point, −87.7° C; and slightly soluble in cold water. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-201.*

phosphochalcite. Synonym for pseudomalachite. *Dana 6d, p. 794.*

phosphoferrite. A white, pale green, or yellow hydrous phosphate of iron, manganese, and magnesium, $3(Fe,Mn,Mg)O.P_2O_5.3H_2O$. Columnar crystalline. Orthorhombic. An iron-rick variety of reddingite. From Hagendorf, Bavaria, Germany. *English.*

phosphophyllite. A hydrous phosphate of zinc, iron, and manganese, $3(Zn,Fe,Mn)O.P_2O_5.4H_2O$, colorless to pale blue-green crystals. Monoclinic. From Hagendorf, Bavaria, Germany. *English.*

phosphor. Any material which has been prepared artificially and has the property of luminescence is called a phosphor, regardless of whether it exhibits phosphorescence. *CCD 6d, 1961.* Used in some porcelain enamels to provide colors, for instance, zinc sulfide for green, molybdic acid for yellow fluorescent colors. *Lee.*

phosphorate; phosphorize. a. To combine or to impregnate with phosphorus; as, phosphorated oil. *Standard, 1964.* b. To make phosphorescent. *Standard, 1964.*

phosphor bronze. An elastic, hard and tough alloy, composed of 80 to 95 percent copper, 5 to 15 percent tin, with phosphorus up to 2.5 percent. *Nelson.*

phosphor copper. An alloy made by fusing granulated copper with bone ash and charcoal; used in making phosphor bronze. *Standard, 1964.*

phosphore. Any of various phosphorescent or fluorescent materials (as zinc sulfide activated with silver or copper or zinc silicate activated with manganese) that may occur as minerals (as wurtzite or willemite) but are now usually produced synthetically. Used chiefly in fluorescent lamps, in cathode-ray tubes (as for television and radar), in instruments for detecting various radiation, and in luminous paints and inks. *Webster 3d.*

phosphorescence. a. Luminescence that is perceptible with characteristic rate or decay after the exciting cause ceases to act. *Compare* fluorescence. *Webster 3d.* b. A misnomer for property of emitting light without sensible heat; luminescence. Although light is produced by a biochemical reaction involving phosphorus, bioluminescence is the preferred term. *Hy.*

phosphoric acid. a. A clear, colorless, sparkling liquid or a transparent orthorhombic crystal; H_3PO_4 (orthophosphoric acid), depending on the concentration and the temperature. At ordinary atmospheric temperature (20° C), the 50-percent and 75-percent acids are mobile liquids, the 85-percent acid is syrupy, and the 100-percent acid is in crystals; specific gravity, 1.834 (at 18° C); melting point, 42.35° C; boiling point, 260° C; soluble in water and in alcohol; and very corrosive to ferrous metals and alloys. Used as a binder for ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-201.* b. Any of several other hydrated forms of phosphorus pentoxide (P_2O_5) (as metaphosphoric acid, HPO_3, or pyrophosphoric acid, $H_4P_2O_7$). *Webster 3d.* c. Phosphorus pentoxide in combined form, as determined by analysis, especially in soils and fertilizers. *Webster 3d.*

phosphorite. A sedimentary rock composed chiefly of phosphate. *Bateman.*

phosphorize. *See* phosphorate. *Standard, 1964.*

phosphorized copper. A general term applied to copper deoxidized with phosphorus. The most commonly used deoxidized copper. *ASM Gloss.*

phosphorizing. Combining or treating with phosphorus. *Bennett 2d, 1962.*

phosphorogen. A substance which promotes phosphorescence in a mineral or other compound. *Hess.*

phosphorolite. Wadsworth's name for phosphatic rocks, guanophosphorite, apatite, etc. *Fay.*

phosphoroscope. Basically, a closed chamber in which specimens may be observed for phosphorescence after having been exposed to X-rays, cathode rays, or ultraviolet rays, or after having been rubbed, heated, etc. *Shipley.*

phosphor rosslerite. Hydrous acid magnesium phosphate, $MgHPO_4.7H_2O$, as monoclinic crystals isomorphous with rosslerite ($MgHAsO_4.7H_2O$). From Salzburg, Austria. *Spencer 15, M.M., 1940.*

phosphor tin. An alloy made by heating phosphorus (6 parts) with tinsponge (94 parts); used in making phosphor bronze. *Standard, 1964.*

phosphorus. A nonmetallic element of the nitrogen group, which is group V of the periodic system. Phosphorus occurs in minerals as phosphates and in all living matter. Used in the manufacture of matches and incendiary bombs. Symbol, P; valences, 3 and 5; atomic number, 15; and atomic weight, 30.9738. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-125.* The vapor density shows that the phosphorus molecule is tetraatomic; P_4; molecular weight, 123.8952. There are three allotropic forms of phosphorus (P_4): (1) white phosphorus or yellow phosphorus, isometric; (2) red phosphorus, isometric; and (3) black phosphorus or violet phosphorus, monoclinic. Red phosphorus may be a mixture of white phosphorus (yellow phosphorus) and black phosphorus (violet phosphorus). (1) white phosphorus or yellow phosphorus; colorless and transparent or white to yellowish; isometric; waxlike; undergoes slow, luminous oxidation (phosphoresces) in moist air at room temperature; specific gravity of solid, 1.82 (at 20° C), and of liquid, 1.745 (at 44.5° C); ignites spontaneously in moist air, burning to phosphorus pentoxide (P_2O_5); ignition point, 34° C; must be kept under water; very poisonous; must be handled with forceps to avoid severe skin burns; converts to red phosphorus in sunlight or when heated to 250° C in its own vapor; melting point, 44.1° C; boiling point, 280.5° C; insoluble in cold water; slightly soluble in hot water and in alcohol; soluble in benzene, in ammonia, in alkalies, in ether, in chloroform, and in toluene; and very soluble in carbon disulfide. (2) red phosphorus; obtained by heating white phosphorus (yellow phosphorus) at 250° C; reddish-brown or violet-red; isometric; specific gravity, 2.20 to 2.34; more stable than white phosphorus (yellow phosphorus); nonpoisonous; ignition point, 260° C; melting point, 280° C; sublimes at 417° C (at 1 atm); very slightly soluble in cold water; soluble in absolute alcohol; and insoluble in hot water, in carbon disulfide, in ether, and in ammonia. (3) black phosphorus or violet phosphorus; obtained by heating white phosphorus (yellow phosphorus) under high pressure; violet to black; monoclinic; specific gravity of violet phosphorus, 2.36, of black phosphorus, 2.70, and of the range, 2.25 to 2.70; incombustible; melting point, 590° C; and insoluble in water, in concentrated sulfuric acid, and in carbon disulfide and other organic solvents. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-125, B-201; CCD 6d, 1961.* Red phosphorus; crystalline black phosphorus; and so-called "amorphous" black phorphorus have also been considered to be orthorhombic and possibly the same because they produce similar X-ray patterns. Metallic phosphorus is hexagonal rhombohedral. *Handbook of Chemistry and Physics, 42d ed., 1960, p. 2,680.*

phosphorus copper. Copper that contains about 15 percent phosphorus. Used chiefly as a deoxidizer for molten metals. *Henderson.*

phosphorus disease. A disease of workers in phosphorous, marked especially by necrosis of the jawbone. *Webster 2d.* Also called phosphornecrosis. *Fay.*

phosphorus glass. Glass made with phosphorus pentoxide instead of sand (silica); used where exposure to hydrofluoric acid is encountered. *Bennett 2d, 1962 Add.*

phosphorus steel. Steel in which phosphorus is the principal hardening element. Good steel may contain 0.3 percent phosphorus, but the carbon must be very low. *Fay.*

phosphosiderite. A pinkish-red mineral with 1 perfect and 1 distinct cleavage, $2Fe_2O_3.2P_2O_5.7H_2O$; Mohs' hardness, 3.5; specific gravity, 2.724. *Larsen, p. 193.*

phosphuranylite. A very rare, strongly radioactive, orthorhombic, deep yellow to golden yellow mineral, $3UO_3.P_2O_5.6H_2O$, found in the weathered zone of uraninite-bearing granitic pegmatites. It is a secondary mineral associated with autunite, and less commonly with uranophane, betauranophane, hydrated uranium oxides and opal. Appears to be structurally related to dewindtite. *Crosby, p. 33; Larsen, p. 192.*

photicite. Described as altered rhodonite; carbonated rhodonite. *Dana 6d, pp. 380-381.*

photoceramics. The art or practice of photographing on china or pottery. *Standard, 1964.*

photoclinometer. *See* Schlumberger photoclinometer. *Sinclair, III, p. 107.*

photoelastic. Pertaining to a method of determining stress concentrations by optical means. *BuMines Bull. 587, 1960, p. 2.*

photoelasticity. A property of certain transparent substances which enables the presence of strain to be detected by examination in polarized light. If models of complicated engineering structures are made of such a substance, the stress distribution in the structure may be resolved. *See also* model analysis; isochromatic lines. *Ham.*

photoelectric cell. a. A device which registers changes in the amount of light falling on it by converting it to electricity. Used to monitor processes and aid automatic control systems. Three types include the emission cell, the semiconductor, and the conductivity cell. *Pryor, 3.* b. An electronic tube in which one of the electrodes emits electrons under the influence of light or other electromagnetic radiation. *NCB.* c. Broadly, any device in which the incidence of light causes a change in the electrical state. In mining, the device may be used to operate ventilation doors when coal or ore journeys approach them; for counting mine cars or men passing a certain point, etc. Also called electric eye. *Nelson.*

photoelectric densitometer. A dust-sampling instrument, containing a filter clip, as used in the P.R.U. hand pump. A miner's cap lamp provides the light source, which enables the dust sample to be evaluated on the spot and any dust suppressive measures can be undertaken immediately. *See also* dust sampling. *Nelson.*

photoelectric effect. The complete absorption of a photon by an atom with the emission of an orbital electron (photoelectron). The term is sometimes used to characterize photodisintegrations which are ascribed to the electric (rather than the magnetic) vector of the photon. *NCB.*

photoelectric pyrometer. A device for measuring high temperatures on the basis of the electric current generated by a photoelectric cell when it receives focused radiation from a furnace or other hot body. Instruments have been designed for the measurement of temperatures exceeding 2,000° C, but others are available for use at lower temperatures, for example, for checking the temperature of the molten glass used in lamp-bulb manufacture. *Dodd.*

photofluorography (photoradiography, photoroentgenography, miniature radiography). The photography of images produced on a fluorescent screen by X-rays. *ASM Gloss.*

photogeology. a. The geologic interpretation of aerial photographs. *A.G.I.* b. The study and interpretation of photographs, normally aerial, for the purpose of obtaining geologic information, and includes presentation of such information in appropriate form. *A.G.I.*

photogeomorphology. Study of earth forms as revealed by aerial photographs. *A.G.I. Supp.*

photogoniometer. In photographic mapping, an instrument for obtaining the direction of a ray from the nodal point of the camera lens to the image of any point on the photograph, by measuring the horizontal and vertical angles with reference to two perpendicular planes. *Seelye, 2.*

photogrammetry. The art of making surveys or measurements by the aid of photography. Methods utilizing horizontal, vertical, and oblique views are in use, with and without the aid of the stereoscopic principle. *See also* stereophotogrammetry. *Seelye, 2.*

photographic borehole survey. A method of checking verticality and/or orientation of a long borehole. A compact camera inserted at a known depth takes a photograph of a magnetic needle and/or a clinometer. Instruments have been developed by Oehman, Owen, and Wright. *Pryor, 3.*

photographic density. A measure of the opaqueness of a processed film; specifically, log I_0/I, where I_0 is the intensity of the light incident upon processed film and I is the intensity of the light transmitted. *ASM Gloss.*

photographic-paper recorder. A small device for registering photographically the passage of flame. This must not be confused with the photographing of the flame on the manometer record. *Rice, George S.*

photointerpretation. The detailed and expert study of aerial photographs with the object of gaining knowledge regarding the geological structure of the area. *See also* aerial mapping. *Nelson.*

photomacrograph. *See* macrograph. *ASM Gloss.*

photomagnetic borehole surveying. A method of borehole surveying, consisting essentially of a timing clock, batteries and light bulb, a floating light-transparent compass, an inclination unit, and a photographic film for recording both the position of the compass and the crosshairs of the inclinometer. The instrument is enclosed in a nonmagnetic casing. *See also* multishot gyroscopic instrument. *Nelson.*

photometer. An instrument for measuring the intensity of light, or for comparing intensities from two sources. The more accurate types are built around photoelectric cells. *Shipley.*

photometric method. A dust-sampling method in which samples of dust are collected on filter paper and then placed in a photometer. The instrument shows the intensity of a beam of light after it has passed through the paper, and the fall in intensity is a direct measure of the dust concentration. With dark dust, such as in coal mines, a rough indication of the dustiness may be obtained by comparison of the depth of tone with a graded series of samples which have been calibrated against some other instrument. There are two methods of collecting samples for photometric estimation: (1) by passing the air through a filter paper as for gravimetric estimation, or (2) by impingement, as in the konimeter. *Spalding, p. 329.*

photomicrograph. A photograph of a magnified image of a small object; a micrograph made by photography. *Webster 3d.*

photomosaic. An assemblage of individual photographs, or segments thereof, matched to form a single picture of an area too large to be covered by a single photograph, for example, aerial photographs, photomicrographs, etc. *Bureau of Mines Staff.*

photomultiplier. A sensitive detector of light in which the initial electron current, derived from photoelectric emission, is amplified by successive stages of secondary electron emission. *NCB.*

photomultiplier tube. A device for measuring light at depths as great as 600 meters. *Hy.*

photon. A discrete quantity of electromagnetic energy. Photons have momentum but no mass or electrical charge. *L&L.*

photopic vision. When the process of seeing takes place through the operation of the retinal cones we are able to fixate on the object of vision, that is, we can bring its image onto the fovea to see it clearly, and we can also distinguish color. In brief, we are in conditions normally experienced in daylight and vision is said to be photopic. *Roberts, II, p. 77.*

photosensitive. Name applied to certain minerals that are visibly injured by light. *Pearl, p. 108.*

photosensitive glass. A glass containing small amounts (less than 0.1 percent) of gold, silver, or copper, which render the glass sensitive to light in a manner similar to photographic films; the image is developed by heat treatment. *Dodd.*

photostat printing. A method of reproducing a drawing on opaque paper by printing from a photographic negative, and which enbles the original drawing to be enlarged or reduced. *See also* contact printing. *Ham.*

photosynthesis. The process by which carbohydrates are compounded from carbon dioxide and water in the presence of sunlight and chlorophyll. *Leet.*

phototheodolite. In terrestrial photographic mapping, a combination of a camera and a theodolite mounted on a tripod. *Seelye, 2.*

phototropism. The reversible change in color of a substance produced by the formation of an isomeric modification when exposed to radiant energy (such as light). *Webster 3d.*

photovoltaic photometers. Generally of the selenium cell type and well known having a wide variety of applications. When used as a photometer for laboratory work, the output of the cell is fed into a galvanometer, usually of the reflecting type. *Roberts, II, p. 29.*

photoxylin. A variety of nitrocellulose made by the action of nitric acid on wood pulp, and used in surgery and microscopy as a substitute for collodion. Also spelled photoxylon. *Standard, 1964.*

phragmites peat. Peat composed of reed grass and other grasses. *Tomkeieff, 1954.*

phreatic. Generally regarded as an exact synonym of ground water—pertaining to all water in the zone of saturation. *A.G.I.*

phreatic explosion. A volcanic explosion, ordinarily of extreme violence, caused by the conversion of ground water to steam. Such steam explosions have a low temperature and do not expel essential ejecta. *A.G.I.*

phreatic gases. Those vapors and gases of atmospheric or oceanic origin which, coming into contact with ascending magma, may provide the motive force for volcanic eruptions. *C.T.D.*

phreatic line. *See* line of seepage. *ASCE P1826.*

phreatic surface. *See* free-water elevation. *ASCE P1826.*

phreatic water. Applied both to water that occurs under water table conditions and to all water in the zone of saturation. *A.G.I.*

phreatophyte. A plant that habitually obtains its water supply from the zone of saturation, either directly or through the capillary fringe. *A.G.I.*

pH regulators. Substances used in flotation processes to control the hydrogen-ion concentration. *See also* pH. *Hess.*

Phrygian marble. *See* pavonazzo. *Fay.*

Phrygian stone. A light pumice like stone, anciently used in dyeing. *Standard, 1964.*

phtanite. Synonym for phthanite. *A.G.I.*

phthanite; phtanite. a. Applied to compact, cryptocrystalline, silicified shales and other siliceous rocks, such as lydite, hornstone, etc. *Holmes, 1928.* b. Radiolarian chert; a fine-grained, siliceous rock made up of the skeletons of radiolarians. *Hess.* c. Synonym for Lydian stone. *Hey 2d, 1955.*

phthisis. Miner's occupational disease, a form of lung consumption associated with or aggravated by work in dusty surroundings such as badly ventilated underground workings. *See also* pneumokoniosis. *Pryor, 3.*

Phurnacite process. In the Phurnacite process, ovoid briquettes are first made and the ovoids are then carbonized at 750° to 850° C in narrow ovens, similar to coke ovens, except that they have an inclined floor to enable the briquettes to be discharged readily after firing. The ovens use a waste heat or recuperative system of fuel economy instead of the more general regenerative system of modern coke oven practice. Gas is removed in two stages, the first stage representing the initial distillation of the pitch, and the second stage being the main gas evolution from the residue. The pitch gas is scrubbed before use as fuel gas. *Francis, 1965, v. 1, p. 148.*

phyllite. a. A general term used by some French authors for the scaly minerals, micas, chlorites, and clays and more recently applied to minerals with a layered crystal structure. *English.* b. Synonym for pholidoide. *Hey 2d, 1955.* c. An argillaceous rock intermediate in metamorphic grade between slate and schist. The mica crystals impart a silky sheen to the surface of cleavage (or schistosity). *A.G.I.* d. An aluminosilicate of Fe‴, Mg, and K. Usually regarded as identical with ottrelite. *Hey 2d, 1955.*

phyllite mylonite. Synonym for phyllonite. *A.G.I.*

phyllite slate. a. Clay slate (called also muscovite phyllade), or, restrictedly, clay slate rendered subcrystalline by minute superinduced scales of mica (called phyllite alone). *Fay.* b. Clay slate containing lamellae of the mineral phyllite, and related to ottrelite. *Fay.*

phyllitic cleavage. Rock cleavage in which flakes are produced that are barely visible to the unaided eye. Coarser than slaty cleavage, finer than schistose cleavage. *Leet.*

phyllitization. The development of phyllitic rocks. *A.G.I. Supp.*

phyllofacies. Facies differentiated on the basis of bedding characters. *A.G.I. Supp.*

phyllonite. A phyllitic rock formed by mylonitization followed or accompanied by recrystallization and growth of new minerals. Many phyllonites are diaphthoretic. The term is extended to rocks of diverse composition which have undergone mylonitization and recrystallization; for example, quartz phyllonite, phyllonitic calcite marble. *See also* augen schist; autoclastic schist; diaphthorite; hartschiefer; kakirite; mylonite; mylonite gneiss; phyllite mylonite. *A.G.I.*

phyllonitization. Sericitization. *Hess.*

phylloretin. Crystalline hydrocarbon similar to fichtelite and extracted along with fichtelite from fossil pine wood. *Tomkeieff, 1954.*

phyllosilicates. Silicate structure in which the SiO_4 tetrahedra occur linked together in infinite two-dimensional sheets. An example is mica. *A.G.I.*

phyllovitrinite. Vitrain in which the plant remains are discernible under the microscope. *Tomkeieff, 1954.*

phyre. A suffix used in naming rocks that are porphyritic, as vitrophyre, orthophyre, granophyre, etc. *Fay.*

phyric. Porphyritic. *Hess.*

physalite. A coarse, nearly opaque variety of topaz. Same as pyrophysalite. *Fay.*

physic. To treat (molten iron) with an oxidizing compound capable of combining with the sulfur and phosphorus. *Standard, 1964.*

physical adsorption. Adsorption through secondary bonds. *VV.*

physical change. A change which does not affect the composition of a body, although the substance may change its state; for example, ice to water or water to steam. *Cooper.*

physical chemistry. Relations between physical properties, energy, and chemical change. *Pryor, 3, p. 80.*

physical geography. The branch of geography which treats of the exterior physical features and changes of the earth, in land, water, and air. *Schieferdecker.*

physical geology. A broad subdivision of the science of geology which includes such aspects as the composition and occurrence of rocks and minerals, the original and secondary structures that they may possess, and the changes that result in their metamorphism and decay. The surface features of the earth and the agencies that modify them are also included. Distinguished from historical geology, which treats of the chronological development of the earth and its living inhabitants. *Stokes and Varnes, 1955.*

physical metallurgy. *See* metallurgy. *ASM Gloss.*

physical mineralogy. That branch of mineralogy which treats of the physical properties of minerals. *Fay.*

physical oceanography. That marine science which treats of the water mass as a fluid and studies its physical properties of motion, density, temperature, etc. *Hy.*

physical pendulum. A rigid body so mounted on a horizontal axis through its center of suspension that when the body is displaced it vibrates freely about its position of equilibrium. *Webster 3d.*

physical properties. The properties, other than mechanical properties, that pertain to the physics of a material; for example, density, electrical conductivity, heat conductivity, and thermal expansion. *ASM Gloss.*

physical shock. A state of collapse that interferes with the normal heart action, respiration, and circulation. This condition is probably due to derangement or lack of proper balance within the sympathetic nervous system and may be caused by any number of things, such as serious injury, loss of blood, severe burns, fright, and many others. It is important to look for shock when rendering first aid since it may cause death even when the injury may not be serious. *Kentucky, p. 376.*

physical testing. Determination of physical properties. *ASM Gloss.*

physical tests. Determinations based on the observation or the measurement of physical properties. *ASTM STP No. 148-D.*

physical time. Time as measured by any physical phenomenon or process. *A.G.I. Supp.*

physics. The science, or group of sciences, that treats of the phenomena associated with matter in general, esepcially in its relations to energy, and of the laws governing these phenomena, excluding the special laws peculiar to living matter (biology) or to special kinds of matter (chemistry). Physics treats of the constitution and properties of matter, mechanics, acoustics, heat, optics, electricity, and magnetism. More generally, it includes all the physical sciences. *Standard, 1964.*

physiofacies. The total inorganic characteristics of a sedimentary rock. *A.G.I.*

physiographic province. A region that has unit structures, any specified kind, and unit geomorphic history. *Stokes and Varnes, 1955.*

physiography. Physical geography; a description of the natural features of the surface of the earth. *Fay.*

physiological properties. Those affecting the functions and tissues of the living body. *Cooper.*

phyteral. The term phyteral was introduced by G. H. Cady in 1942, to designate plant forms or fossils in coal as distinguished from the material of which the fossils may be composed. Phyterals are identified in general botanical terms which are usually morphological, such as spore coat, sporangium, cuticle, resin, wax, wood substance, bark, etc. The initial composition of the phyterals differed; these or other differences produced during diagenesis may or may not be perpetuated by and during carbonification (coalification). Phyterals are recognized with increasing difficulty in high rank coals. In contrast to macerals which represent a purely petrographical concept, the concept phyteral demands strict correlation with certain organs of the initial plant material. *IHCP, 1963 part I.*

phytocollite. A black gelatinous hydrocarbon, related to dopplerite; found below a peat bed at Scranton, Pa. *Fay.*

phytogenic dam. A dam consisting of plants and plant debris, may account for ponds and lakes in tundra regions. *A.G.I. Supp.*

phytogenic dune. A genetic term for any dune, the form of which is controlled by the interaction of growing vegetation with eolian sand drifting; for example, upsiloidal dunes and foredunes. *A.G.I.*

phytogenous rocks; phytogenic rocks. Rocks formed from plant remains. *Tomkeieff, 1954.*

phytoleims. Coalified remains of plants. They are divided into meroleims and haloleims. *Tomkeieff, 1954.*

phytolith. A rock formed by plant activity or composed chiefly of plant remains. The term was applied by Grabau to a large group including coal, peat, lignites, and some types of reef limestones, oölites. *A.G.I.*

phytophoric rocks. Rocks formed from plant remains. *Tomkeieff, 1954.*

phytoplankton. The plant life division of plankton, including diatoms and algae. Unattached plants which are at the mercy of the currents. *Hy.*

pi Abbreviation for productivity index. Also abbreviated PI. *BuMin Style Guide, p. 61.*

Pi A number, approximately 3.1416 or 3-1/7, which, when multiplied by the diameter of a circle, will give the circumference. Symbol, π. *Nichols.*

piano wire screen. A screen formed by piano wires stretched tightly, lengthwise, on a frame 2 to 3 feet wide and 4 to 8 feet high. The screen is set up at an angle of about 45° and crushed material is fed to it from above. The mesh size varies from about 4 to 16. Because there are no cross wires, and because the taut wires can vibrate, there is less tendency for blinding, but some elongated particles inevitably pass the screen. *Dodd.*

picacho. A peak or sharply pointed hill or mountain. Because of the steep slopes of mountains in the desert region, picacho appears as the name of numerous mountains in southwestern Arizona. *USGS Bull. 730, 1923, p. 89.*

Piccovol. A coal-tar-type product. Used as a rubber softener. *Bennett 2d, 1962 Add.*

pick. a. The steel cutting points used on a coal-cutter chain. *See also* coal-cutter picks. *Nelson.* b. A miner's steel or iron digging tool with sharp points at each end. It weighs from 3 to 6 pounds and has a wood handle, fitted to the center or head, from 2 to 3 feet in length. *Nelson.* c. To dress the sides of a shaft or other excavation. *Fay.* d. To remove shale, dirt, etc., from coal. *Fay.* e. To select good ore out of a heap. *Fay.* f. In seismic prospecting, the selection of an event on a seismic record. Also used as a verb, as to pick reflections. *A.G.I.* g. In seismic prospecting, any selected event on a seismic record. *A.G.I.*

pick-a-back conveyor. A short conveyor which takes the coal from, and advances with, a face power loader or continuous miner. It delivers the coal onto the gate conveyor over which it runs on a bogey. *See also* long piggyback conveyor. *Nelson.*

pick and dip. A method of laying brick by which the bricklayer simultaneously picks up a brick with one hand and, with his other hand, enough mortar on the trowel to lay the brick. Sometimes called the eastern or New England method. *ACSG, 1961.*

pick-and-shovel miner. *See* pick miner. *D.O.T. 1.*

Pickard core barrel. A double-tube core barrel in X-group sizes. The distinguishing feature of the Pickard barrel is that when blocked the inner barrel slides upward into the head, closing the water ports and stopping the flow of the circulating liquid, and no additional drilling can be done without irreparably damaging the bit until the barrel is pulled and the blocked inner tube cleared. *Long.*

pick boy. In bituminous coal mining, one who carries sharpened picks or bits for coal-cutting machines to the machineman in underground working places. Also called pick carrier. *D.O.T. 1.*

pick breaker. A breaker developed as the mechanical equivalent of the miner's pick. In the modern type, the picks are mounted on alternating arms, the primary and secondary picks being at different spacings so that breaking is performed in two stages. The breaker and plate belt are usually supplied as a standard unit driven from a common motor. *Nelson.*

pick carrier. *See* pick boy. *D.O.T. 1.*

pick dressing. In stone cutting, a tooling of the face of a stone with a sharp pick. *Standard, 1964.*

picker. a. A small tool used to pull up the wick of a miner's lamp. *Fay.* b. An employee who picks or discards slate and other foreign matter from the coal in an anthracite breaker or at a picking table. *B.C.I.; Fay.* c. A mechanical arrangement for removing slate from coal. *Fay.* d. A hand chisel for dzhuing, held in one hand and struck with a hammer. *See also* dzhu. *Fay.* e. Eng. A sharp-pointed cutting tool used as an accessory to a mizer. *Fay.* f. A sharp-pointed steel rod used in lifting wooden patterns from the sand after they have been rammed therein. *Fay.* g. A tool for piercing a mold; a piercer. *Fay.* h. A miner's needle, used for picking out the tamping of a charge that has failed to explode. *Fay.* i. A laborer who removes high-grade ore, scrap wood, or iron from ore as it passes on a conveyor belt to crushers. *D.O.T. Supp.* j. In brickmaking, a spike-toothed shaft for breaking up clay to be fed to the hopper. *Standard, 1964.*

picker attendant. In anthracite coal mining, one who tends a mechanical separator that removes slate and rock from coal at a breaker, regulating flow of coal, checking output to see that impurities are properly removed, and making adjustments and minor repairs to the machine. Also called mechanical-picker attendant. *D.O.T. 1.*

pickeringite. A mineral, $MgAl_2(SO_4)_4.22H_2O$, composed of a hydrous magnesium aluminum sulfate occurring in white to faintly colored fibrous masses. *Webster 3d.*

picket. a. A sighting hub. *See also* backsight hub; foresight hub. *Long.* b. A surveying pole. *Mason.* c. A short ranging rod about 6 feet long. *C.T.D.* d. *See* range pole. *Fay.* e. An iron rod, pointed at one end, and usually painted alternately red and white at 1-foot intervals; used by surveyors as a line of sight. *Fay.*

pick hammer. A hammer with a point, used in cobbing. *Fay.*

picking. a. Operation performed between mine and mill in which waste rock, wood, detritus, steel (tramp iron), or any specially separated mineral is removed from the run-of-mine ore. Hand sorting. Usually done during transit of ore on belt conveyors, preferably after very large lumps and smalls have been screened off and the ore to be picked has been sufficiently washed to display a true surface. Also done on picking table, a rotating circular disc around which stand or sit the hand sorters who remove part of the ore fed radially from central point. Picking is also mechanized by such means as the LaPointe picker, and is aided by special lighting, radioactive detection, etc. *Pryor, 3.* b. S. Afr. Selective mining for high-grade ore, or in reference to mine ore, the picking of waste in order to reduce unproductive work in the later stages. *Beerman.* c. The falling of particles from a mine roof about to collapse. *Fay.* d. Picking the eyes out of a mine is to extract over a prolonged period an undue proportion of the richest ore, thus lowering the average grade of the remaining ore reserves. *Fay.* e. Rough sorting of ore. *Webster 2d.* f. A soft or not fully fired brick. *Webster 3d.*

picking belt; picking table. A continuous conveyor (for example, in the form of a rubber belt or of a steel apron, steelplate, or link construction) on which raw coal or ore is spread so that selected ingredients may be removed manually. *B.S. 3552, 1962.*

picking chute. A chute along which workers are stationed to pick the slate from the coal. *Fay.*

picking conveyor. A belt or apron conveyor used to carry a relatively thin bed of material past pickers who hand sort, or pick the material being conveyed. *ASA MH4.1-1958. See also* picking belt.

picking out eyes. Mining in which only the high-grade spots are taken out. *Hoov, p. 36.*

picking rod. A 1¼-inch steel rod about 20 feet long used to ram into the taphole, while casting, to dislodge obstructions preventing a good run. *Fay.*

picking room. Same as screen room. *Korson.*

picking station. *See* recovery plant. *I.C. 8200, 1964, p. 149.*

picking table. A flat, or slightly inclined, platform on which the coal or ore is run to be picked free from slate or gangue. *Fay. See also* picking conveyor. *ASA MH4.1-1958.*

picking-table bay. *See* slate picker, a. *D.O.T. 1.*

picking table, circular. An apparatus used for the same purpose as a picking belt and consisting of a flat horizontal rotating annular plate. *B.S. 3552, 1962.*

picking-table man. *See* slate picker, a. *D.O.T. 1.*

picking-table man, head. *See* slate-picker boss. *D.O.T. 1.*

pick lacing. The pattern to which the picks are set in a cutter chain. In this respect, it may be a balanced or unbalanced cutter chain. The pick lacing is important as it has a bearing on the stability of the machine, on dust formation, and even on dangerous sparking. *Nelson.*

pickle. a. An acid dip used to remove oxides or other compounds from the surface of a metal by chemical action. *Lowenheim.* b. To treat with or steep in pickle. *Fay.*

pickle basket. A skeleton or perforated container usually made of acid-resisting alloys such as monel metal used to hold articles during the pickling process. *Enam. Dict.*

pickle liquor. A spent acid pickling bath. *ASM Gloss.*

pickle patch. A tightly adhering oxide or scale coating not properly removed during the pickling process. *ASM Gloss.*

pickle pills. Small gelatin capsules containing chemicals used for testing the strength of pickling solutions. *ASTM C286-65.*

pickle procedure. Generally the complete cleaning operation performed in tanks or by sprays. *Bryant.*

pickle stain. Discoloration of metal due to chemical cleaning without adequate washing and drying. *ASM Gloss.*

pickling. The process of chemically removing scale or oxide from metal objects to obtain a chemically clean surface prior to galvanizing or painting. This is usually done by immersion in an acid bath. For steel, the acids generally used are sulfuric and hydrochloric to which is added an inhibitor, the latter an organic material such as glue, starch, or one of the various proprietary compounds which are often organic derivatives containing nitrogen, oxygen, sulfur, or other elements of the fifth and sixth periodic groups. The addition is often about 0.05 percent in order to reduce or restrain the attack of acid on the metal and thus effect the removal of scale with a minimum loss of metal. *See also* descaling. *Ham.*

pickling of timber. Usually carried out by means of Bethell's full-cell process of creosoting. *Ham.*

pick machine; puncher. Coal-cutting machine which acts percussively, and cuts with a large chisel fixed at the end of a piston reciprocated by compressed air in much the same way as a rock drill is operated. *Kiser, 1, p. 2.*

pickman. Scot. A man who digs coal with a pick; a hewer; a miner. *Fay.*

pick method. A method of ore dressing developed at Montanische Hochschule at Leoben, Austria. *Osborne.*

pick miner. In anthracite and bituminous coal mining, one who uses hand tools to extract coal in underground working places; also, cuts out a channel under the bottom of the working face of coal (undercutting) with a pick, working several feet back into the seam, and breaks down coalface with pick, or bores holes with an augerlike drill for blasting, and inserts and sets off explosives in holes to break down coal; also, shovels coal into cars and pushes them to a haulageway. Also called hand cutter; hand miner; hand pick miner; pick-and-shovel miner. *D.O.T. 1.*

pick mines. Mines in which coal is cut with picks. *Kiser, 1, p. 1.*

pick money. An earlier practice whereby miners made a payment to the blacksmith for sharpening their picks. *Nelson.*

pick-off. An automatic device for removing the finished part from the press die after it has been stripped. *ASM Gloss.*

pick ore. Eng. Iron ore that can be worked with a pick; that does not require blasting. *Arkell.*

pickrose hoist. A small haulage engine used for pulling light loads over short distances; used at junctions, loading points, and haulage transfer points. *See also* spotting hoist. *Nelson.*

pick sharpener. In mining and quarrying, a blacksmith who sharpens digging picks. *D.O.T. 1.*

pick tongs. Tongs for handling hot metal. *Webster 3d.*

pickup. a. Synonym for lift, as applied to hoisting drill rods from a borehole. *Long.* b. Mid. To reduce the stock of coal. *Fay.* c. Applied to an angular crosscut, through which coal is hauled from one entry to another. *See also* shoo-fly, b. *Hess.* d. Transfer of metal from tools to part or from part to tools during a forming operation. *See also* galling, d. *ASM Gloss.* e. Same as detector. *A.G.I.* f. A light truck. *A.G.I.* g. The amount of vitreous enamel slip (expressed in terms of dry weight per unit area) after the dipping and draining process. For ground coats, the pickup is usually 1.2 to 1.5 ounces per square foot. *Dodd.*

pickups. In Alaska, nugget gold picked up during mining operations prior to sluicing. *Fay.*

pickup test. Valuable laboratory procedure used in investigating floatability of minerals. A few grains, sized between 60 and 120 mesh, are placed, after suitable surface cleansing, under water in an observation cell which is controlled for pH, reagent concentration, temperature, and conditioning time. An air bubble is pressed down on the particles and then raised, the degree and tenacity with which they cling to it being observed. *Pryor, 3.*

pickwork. Cutting coal with a pick, as in driving headings. *Fay.*

picky poke bar. A steel bar, usually of ⅞-inch stock and about 4 feet long, with each end sharpened, bent out at an angle of 45°, the bends being 3 to 6 inches from each end. *Hess.*

pico-. A prefix that divides a basic unit by 1 trillion (10^{12}) or multiplies the unit by 10^{-12}. Same as micromicro-. Abbreviation, p. *L&L.*

picotite. A brown variety of spinel containing chromium and iron. *Fay.*

picral. An etching reagent consisting of a 2 percent to 5 percent solution of picric acid in ethyl alcohol. It may be used for plain carbon and low alloy steels. *Osborne.*

picric acid. A yellow crystalline compound, $C_6H_3N_3O_7$, obtained variously, as by the action of nitric acid on phenol. It is used in dyeing and is an ingredient in certain explosives. *Standard, 1964.* Also called carbazotic acid; chrysolepic acid; trinitrophenic acid. Sterilized gauze treated with a weak solution of the acid is used generally around mines in the first-aid treatment of burns, scalds, etc. *Fay.*

picrite. First used by Tschirmak for a rock of the composition of olivine teschenite. It was later used by Rosenbusch for an olivine-rich diabase. The adjectival form picritic is now used to connote an olivine-rich rock. *See also* picrite basalt. *A.G.I.*

picrite basalt. Olivine-rich basalt as is often formed by the settling of olivine in thick flows and sills, etc. These often contain 50 or more percent of olivine. *See also* picrite. *A.G.I.*

picrochromite. Magnesium chromite, $MgO.$-Cr_2O_3; melting point, 2,250° C; specific gravity 4.41. This spinel can be synthesized by heating a mixture of the two oxides at 1,600° C; it is formed (usually with other spinels in solid solution) in fired chrome-magnesite refractories. Picrochromite is highly refractory but when heated at 2,000° C, the Cr_2O_3 slowly volatilizes. *Dodd.*

picrolite. A columnar or fibrous variety of serpentine. *Standard, 1964.*

picromerite. A hydrous sulfate of magnesium and potassium from the salt mines of Stassfurt, Germany. *Fay.*

pictite. Synonym for titanite; sphene. *Dana 6d, p. 712.*

picture. A screen to keep off falling water from men at work. *Zern.*

picurite. Another name for pitch coal. *Tomkeieff, 1954.*

Pidgeon process. A process for the production of magnesium by the reduction of magnesium oxide with ferrosilicon. *ASM Gloss.*

piece. Scot. Food taken by a workman to his work. A lunch. *See also* bait, a. *Fay.*

piecemeal stoping. A process by which magma eats into its roof by engulfiing relatively small isolated blocks, which presumably sink to depth where they are assimilated. *See also* magmatic stoping. *A.G.I.*

piece time. Scot. Meal time. *Fay.*

piece wage. A wage paid to the worker at so much per piece, or unit of product. *Webster 2d.*

piece weight, effective. *See* effective piece weight. *Mitchell, p. 102.*

piecework. a. Work paid for in accordance with the amount done rather than the hours taken. *Pryor, 3.* b. The performance of underground work on the basis of an agreement between a miner and the mine manager. Payment may be made by the yard of advance of a heading or tunnel or per ton or cubic yard of coal or ore removed. In ripping work, payment may be made by the yard advance of excavation to a specified width and height; strip packing may be built at a certain sum per yard advance or cubic yard of filling. Mine managers prefer piecework as it requires less supervision and the incentive enables essential work being done quickly. Miners also prefer piecework as it usually means wages well above day wage. *See also* contract work. *Nelson.*

piedmont. Lying or formed at the base of mountains; a piedmont district, plain, or glacier. *Webster 3d.*

piedmont alluvial plain. Alluvial fans may become alluvial slopes of many square miles in area, and a continuous supply of material may result in uniting these slopes and covering an entire lowland with the debris of mountain torrents, thus converting the isolated fans or slopes into great piedmont alluvial plains. All river-made plains are, of course, alluvial but the term is restricted here for the sake of distinctness. *A.G.I.*

piedmont glacier. That part of a glacier that debouches and spreads out at the base of a mountain, or a range which feeds its sources. *Standard, 1964.*

piedmont ice. A piedmont glacier. *A.G.I.*

piedmontite. *See* piemontite. *Dana 6d, p. 521.*

piedmont scarp. A small fault scarp at the foot of a mountain range and essentially parallel to the range. *A.G.I.*

piel. An iron wedge for piercing stone. *Standard, 1964.*

piemontite. A reddish-brown variety of epidote containing manganese. Monoclinic. *Dana 17.* Also called manganepidote.

pienaarite. A melanocratic variety of aegirine foyaite characterized by exceptional richness in sphene. *Holmes, 1928.*

pier. A rectangular or sometimes circular form of column, constructed usually of concrete, hard brickwork or masonry, and designed to support heavy concentrated loads from arches or a bridge superstructure. *Ham.*

pier cap. The upper or bearing part of a bridge pier usually of concrete or hard stone, designed to distribute concentrated loads evenly over the area of the pier. *Ham.*

piercement. Salt plug that rises and penetrates rock formations to shallow depths. *Wheeler.*

piercement dome. A salt dome in which the salt core has broken through the overlying strata until it reaches or approaches the surface. *A.G.I.*

piercement fold. Synonym for piercing fold; diapir fold. *A.G.I.*

piercer. a. A blasting needle. *See also* picker, g. *Fay.* b. In founding, a wire for venting a mold. *Standard, 1964.*

piercing. A prospecting method used in soft soil free from stones, in which small drivepipes are used to secure samples of underlying material or to determine the thickness of the soil. *Lewis, p. 279.*

piercing fold. Same as piercement fold; diapir fold. *A.G.I.*

piercing process. *See* Mannesmann process. *Bennett 2d, 1962.*

piercing shot. Scot. A shot in the roof, or brushing, designed to bring down an increasing thickness of stone. *Fay.*

pierdam; wing dam. Dam or jetty to influence the current. *Schieferdecker.*

pierre-a-coton. Cotton stone or fiber rock (ore) in France. *Sinclair, W. E., p. 484.*

pier stone. Scot. A hard variety of freestone. *Fay.*

pies. A local term for intermediate packs without supporting walls. *T.I.M.E.*

pietra. It. Stone; used in phrases, as pietra dura. *Standard, 1964.*

pietra della raja. It. A fine-grained Permian sandstone suitable for sawing finishing. *Hess.*

pietra dura. Hard and fine stones as those used for inlay and the like. *Crispin.*

pietra serena. It. A gray sandstone quarried near Fiesole, Italy. *Standard, 1964.* Used for building in Florence and other Italian cities. *Fay.*

pietricikite. The correct spelling of zietrisikite, a name originally applied to a waxlike natural hydrocarbon. *Tomkeieff, 1954.*

pietrokristallisation. Crystallization during powerful lateral pressure (applied to the formation of the central granite of the Alps). *Holmes, 1928.*

piezocrystallization. In petrology, the crystallization of magmas during orogenic deformation and thus under a condition of stress. *A.G.I.*

piezoelectric. a. Having the ability to develop surface electric charges when subjected to elastic deformation, and conversely. *A.G.I.* b. Oscillates in alternating current circuits with frequencies harmonic with the stimulating frequency. *A.G.I.*

piezoelectric axis. One of the directions in a crystal in which either tension or compression will cause the crystal to develop piezoelectric charges. *Gaynor.*

piezoelectric detector. In seismic prospecting, a type of detector which depends upon the piezoelectric effect by which an electric charge is produced on the faces of a properly cut crystal of certain materials, particularly quartz and Rochelle salt, when the crystal is strained. The detector is constructed from a pile of such crystals with intervening metal foil to collect the charge. An inertia mass is mounted on the top of the crystal stack which is included in a vacuum-tube circuit. *A.G.I.*

piezoelectricity. The property exhibited by some asymmetrical crystalline materials which when subjected to strain in suitable directions develop electric polarization proportional to the strain. Inverse piezoelectricity is the effect in which mechanical strain is produced in certain asymmetrical crystalline materials when subjected to an external electric field; the strain is proportional to the electric field. *H&G.*

piezometer. An instrument for measuring pressure head, usually consisting of a small pipe tapped into the side of a closed or open conduit and flush with the inside, connected with a pressure gage, mercury, water column, or other device for indicating pressure head. *Seelye, 1.*

piezometric surface. a. In hydrology, an imaginary surface that coincides everywhere with the static level of the water in the aquifer. *A.G.I.* b. The surface to which the water from a given aquifer will rise under its full head. *A.G.I.*

pig. a. A crude casting of metal (as iron or lead) convenient for storage, transportation, or melting; especially one of standard size and shape for marketing run directly from the smelting furnace. Compare ingot. *Webster 3d.* b. A mold or channel in the pig bed. *Webster 3d.* c. Pig iron, pig lead. *Webster 3d.* d. A flask having two or more tubulures to which smaller flasks may be attached, and used especially to collect fractions during fractional distillation. *Webster 3d.* e. A metal casting used in remelting. *ASM Gloss.* f. A heavily shielded container (usually lead). Used to ship or to store radioactive materials, usually radioisotopes. *L&L.* g. An air manifold having a number of pipes which distribute compressed air coming through a single large line. *Nichols.* h. A rest for blowpipe or punty during the gathering operation. *ASTM C162-66.*

pig aluminum. Raw aluminum cast into pig form as it comes from the furnace. *Mersereau, 4th, p. 515.*

pig and ore process. Modification of the open-hearth process of steel manufacture with pig iron and iron ore as the charge. *Bennett 2d, 1962.*

pig and scrap process. Modification of the open-hearth process of steel manufacture with pig iron and steel as the charge. *Bennett 2d, 1962.*

pig back. To add pig iron to a molten charge too much decarburized in the acid openhearth process. *Fay.*

pig bed. A series of molds for iron pigs, made in a bed of sand. Connected to each other and to the taphole of the blast furnace by channels, along which the molten metal runs. *C.T.D.*

pig bed sand. Eng. Molding sand. *Arkell.*

pig boiling. Wet puddling. *Standard, 1964.*

pig caster. One who pours molten magnesium into hand ladles, and from ladles into molds to form ingots. *D.O.T. 1.*

pigeon blood. A deep clear red; the gem color of the most highly prized specimens of the ruby. *Hess.*

pigeon blood agate. Local name for carnelian or red and white agate from Cisco, Utah. *Shipley.*

pigeonhole. a. A room driven directly into the coal seam from the edge of a strip pit. *Fay.* b. Any small poorly equipped coal mine. *Fay.* c. A hole in the shaft house floor through which the bucket or skip is raised or lowered. *Hess.* d. An opening left at the meeting of two sections of arch work, permitting the workmen to close the arch and to come out. The pigeonhole itself is closed from below. *Stauffer.*

pigeonhole checker. An arrangement of checkerbrick such that each course of brick is laid in spaced parallel rows with the brick end to end and each alternate course above and below has its parallel rows at right angles to the intervening course. *A.R.I.*

pigeonite. A pyroxene intermediate between clinoenstatite and diopside. A mixture of the molecules, $(Mg,Fe)SiO_3$ and $CaMg(SiO_3)_2$. A similar compound may occur in the series between clinoenstatite and hedenbergite. It has a small and variable axial angle. From Pigeon Point, Minn. *English.*

pig foot. a. An iron clamp shaped like a pig's foot used to attach the jack to the feed chain of a continuous electric coal cutter. *Fay.* b. A pipe jack with a pig foot at one end. *Fay.*

pig furnace operator. One who melts and refines magnesium crystals into pure magnesium in a crucible furnace. Also called furnace tender. *D.O.T. Supp.*

Piggot corer. A device for sampling bottom sediments. A core barrel is driven into unconsolidated material by an explosive charge. *A.G.I. Supp.*

piggyback conveyor. *See* long piggyback conveyor. *Nelson.*

pig handler. A laborer who removes magnesium pigs from molds manually or with a crowbar, wearing asbestos gloves; also, he stamps heat numbers on pigs with hammer and punch. *D.O.T. 1.*

pig hole. A hole in a steel furnace through which to put, in a crucible, an extra charge of pig iron. *Standard, 1964.*

pig iron. a. High-carbon iron made by reduction of iron ore in the blast furnace. *ASM Gloss.* b. Cast iron in the form of pigs. *ASM Gloss.*

pig lead. Commercial lead in large oblong masses or pigs. *Fay.*

pigment minerals. The most important are the red and yellow ochers and brown sienna, which consists of iron oxides with some impurities, and the brown umbers in which manganese oxide is also present. When the iron-oxide content is high the term oxide is used in preference to ocher. *Nelson.*

pigments. Insoluble colored substances used as bases in compounding ceramic colors, inks, paints, etc. The term is more particularly applied to mineral bases as distinct from organic coloring matters such as dyes or stains, which are soluble in the vehicle used. *Enam. Dict.*

pig metal. Metal, as brass or copper, in its first rough casting. *Standard, 1964.*

pigotite. A salt of alumina and organic acid, $4Al_2O_3.C_{12}H_{10}O_8.27H_2O$, formed on the surface of granite under the influence of wet vegetation. *Tomkeieff, 1954.*

pigskin. A surface defect characterized by a texture similar to that of pigskin. *ASTM C286–61T.* Similar to alligator hide.

pigsticker. A man delegated to the duty of punching or knocking pig iron out of chills or molds at a blast-furnace, pig-casting machine. *Fay.*

pigsty. a. Timber support used in stopes to hold up the roof. Consists of square frame of chocked round timbers and is filled with waste rock. *See also* cog. Pryor, *3.* b. Aust. A timber crib or chock used in timbering wide seams or lodes. *Fay.*

pigsty timbering. Hollow pillars built up of logs laid crosswise for supporting heavy weights. *Zern.*

pig tailer. A laborer who helps pusher to push loaded mine cars over long distances and up inclines where mechanical or mule haulage is not used. Also called helper-up. *D.O.T. 1.*

pig tin. Tin cast for pigs. *Webster 3d.*

pike. a. A pick or pickax. *Webster 2d.* b. The horn or beak of an anvil. *Webster 2d.* c. One of various sharp-pointed tools or implements. *Webster 3d.* d. A mountain or hill having a peaked summit; used especially in place names; a peak. *Webster 3d.*

pikeite. An obsolete name for an augite-bearing phlogopite peridotite from Pike County, Ark. *A.G.I.*

pikeman. S. Staff. One who uses a pick or pickax, as a miner; a pickman. *Webster 2d.*

pike pole. A pole usually 12 to 20 feet long with a pike in one end, used in directing floating logs. *Webster 3d.* Also frequently used in raising structural timbers, as in raising the frame of a building. *Fay.*

Pike process. A method for the direct production of steel by passing reducing gases over iron oxide ore, carburizing the reduced ore, and alloying it in an electric furnace. Thus, a reducing gas, heated to 900° C is passed over iron oxide ore to produce metallic iron, and spent gas. Part of the spent gas is cooled, dehumified and freed of CO_2, and again passed through the hot, partially reduced iron oxide which converts CO to CO_2+C. Inert gas is used to cool the carburized iron which contains about 90 percent of metallic iron with sufficient C to effect reduction of the remaining iron oxide. The carburized, partially reduced metal is melted, reduced and alloyed in the electric furnace. *Osborne.*

piking. *See* cobbing, c. *Fay.*

pilandite. A variety of porphyry characterized by the abundance of anorthoclase as phenocrysts and in the groundmass; the porphyritic equivalent of hatherlite. *Holmes, 1928.*

pilarite. An aluminous variety of chrysocolla. *Standard, 1964.*

pilbarite. a. Altered mackintoshite high in Pb. A canary-yellow, amorphous (and pseudomorphous) mineral, $ThO_2.UO_3.PbO.\text{-}2SiO_2.2H_2O+2H_2O$; differs from thorogummite and mackintoshite in the relative proportions of these constituents. It is found as earthy nodules in the Pilbara goldfield, Western Australia. *Crosby, p. 48.* b. A discredited mineral term since it is a mixture consisting of thorogummite and kasolite. *American Mineralogist, v. 43, No. 5-6, May-June 1958, p. 626.*

pilch. a. Corn. A portion of the lode let to miners to work on tribute. *Fay.* b. A thick apron worn by peat diggers. *Standard, 1964.*

pile. a. A timber, steel, or reinforced concrete plate or post which is driven into the ground to carry a vertical load (bearing pile) or a horizontal load from earth or water pressure (sheet pile). *Nelson.* b. A spiked or sharped-edged plank, beam, or even pipe or girder which is forced forward or downward (sinking) into running ground with a view to support. *Mason.* c. A stack of ore or stones. *Gordon.* d. A prop of timber. *Gordon.* e. Long thick laths, etc., answering in shafts in loose or quick ground, the same purpose as spills in levels, piles being driven vertically. *Fay.* f. A fortune. A miner who has made money has made his pile. *Fay.* g. The fagot or bundle of flat pieces of iron prepared to be heated to weld heat and then rolled. *Fay.* h. To make up into piles or fagots. *Fay.* i. An early term for nuclear reactor. This term was introduced because the first reactor was built by piling up natural uranium and graphite blocks. *L&L.*

pile bridge. A bridge supported by piles. *Ham.*

pile cap. a. A reinforced or mass concrete top or connecting beam cast around the head of a group of piles so that they will act as a single unit to support the load imposed upon them. *Ham.* b. A dolly. *C.T.D.*

pile dam. A dam made by driving piles and filling the interstices with stones. The surfaces are usually protected with planking. *Fay.*

piled foundation. A foundation transferred down on piles to solid bearing ground at a considerable depth below the surface. *Ham.*

pile drawer. *See* pile extractor. *Ham.*

pile driver. a. A machine for driving down piles usually consisting of a high frame with appliances for raising and dropping a pile hammer or for supporting and guiding a steam or air hammer. Also called pile engine. *Webster 3d.* b. An operator of a pile driver. *Webster 3d.*

pile-driving equipment. An excavator base machine fitted with jib, leaders, and hammer. *Nelson.*

pile extractor. A sheet piling extractor that works on the same principle as the pile-driving hammer, except that the force of the blow is upward rather than down. *Carson, p. 270.*

pile group. A number of piles driven or cast in situ, will sustain a much heavier load than a single pile can carry, especially when connected by a pile cap. *Ham.*

pilehammer. This may be a drophammer, a steam hammer, or a diesel hammer of which the last two are completely automatic. Steam hammers are also able to operate on compressed air. *See also* hammerman; jetting. *Ham.*

pile head. The top of a precast concrete pile, protected during driving by packing under a pile helmet and sometimes by a timber dolly. The top of a timber pile is protected by a driving band. *See also* follower. *Ham.*

pile helmet. A cast-steel cap covering and protecting the head of a concrete pile during driving. *See also* drophammer. *Ham.*

pile hoop. An iron band put around the head of a timber pile to prevent splitting. *Fay.*

pile ring. *See* driving band. *Ham.*

pile shoe. The iron or steel point fitted to the foot of a pile to give it strength to pierce the earth and so assist driving. *C.T.D.*

pile sinking. A method of sinking a circular or rectangular shaft through 20 to 30 feet of sand or mud at the surface. It cannot be used for greater depths as each ring of piles reduces the inside dimensions of the shaft. *See also* pile; piling. *Nelson.*

Pilger tube-reducing process. *See* tube reducing. *ASM Gloss.*

piling. a. A method of supporting soft ground of a quicksand nature in a sinking pit. Sharpened timbers or steel strips are driven in advance of the sinking to provide temporary support to the sides before the shaft has been walled or concreted. The method is only suitable for short lengths of loose ground near the surface. *See also* forepole. *Nelson.* b. Large timbers or poles driven into the ground or the bed of a stream to make a firm foundation. *Crispin.*

Pilkington twin process. A continuous process for the production of polished plate glass; a continuous ribbon of glass is rolled, annealed, and then simultaneously ground on both faces. *See also* float glass process. *Dodd.*

pill. a. A loosely rolled cylinder of burlap and ¼-inch-mesh hardware cloth pushed down into a borehole ahead of a string of drill rods to the point where a large crevice or small cavity has been encountered. At this point the cylinder tends to unroll partially, forming a mat that acts as a barrier against which other hole-plugging agents may collect and help seal off the opening. *Long.* b. *See* peel coal. *Tomkeieff, 1954.*

pillar. a. An area of coal or ore left to support the overlying strata or hanging-wall in a mine. Pillars are sometimes left permanently to support surface works or against old workings containing water. Coal pillars, such as those in pillar-and-stall mining, are extracted at a later period. *See also* barrier pillar; shaft pillar. *Nelson.* b. A solid block of coal, etc., varying in area from a few square yards to several acres. *Fay.* c. The part of coal left between the individual rooms and entries in room-and-pillar mining. *Kentucky, p. 332.* d. A block of ore entirely surrounded by stoping, left intentionally for purposes of ground control or on account of low value. *Spalding.* e. A column of rock remaining after solution of the surrounding rock. *See also* hoodoos; earth pillars. *A.G.I.* f. In situ rock support between multiple openings. *BuMines Bull. 587, 1960, p. 2.*

pillar-and-breast. A system of coal mining in which the working places are rectangular rooms usually five or ten times as long as they are broad, opened on the upper side of the gangway. The breasts usually from 5 to 12 yards wide, vary with the character of the roof. The rooms or breasts are separated by pillars of solid coal (broken by small cross headings driven for ventilation) from 5 to 10 or 12 yards wide. The pillar is really a solid wall of coal separating the working places. When the object is to obtain all the coal that can be recovered as quickly as possible, the pillars are left thin; but where this plan is likely to induce a crush or squeeze that may seriously injure the mine, larger pillars are left and after the mine has been worked out, the pillars are "robbed" by mining from them until the roof comes down and prevents further working. In the steeply inclined seams of the anthracite regions the pillar-and-breast system is employed by working the bed in "lifts". Also called pillar-and-stall; post-and-stall; bord-and-pillar. *Fay.*

pillar-and-chamber. A pillar method of working often adopted in extracting a proportion of thick deposits of salt or gypsum. The method may be adopted where the value of the mineral in the pillars is less than the cost of setting artificial supports. *Nelson.*

pillar-and-room. A system of mining whereby solid blocks of coal are left on either side of miner's working places to support the roof until first-mining has been completed, when the pillar coal is then recovered. *Hudson. See also* room-and-pillar.

pillar-and-stall. a. A system of working coal and other minerals where the first stage of excavation is accomplished with the roof sustained by coal or ore. *See also* pillar-and-breast; post-and-stall. *Fay.* b. One of the earliest methods of working coal seams in Great Britain. It is employed in thick seams and where valuable surface buildings require protection from damage by subsidence. A number of narrow roadways are driven in the coal seam to a predetermined boundary. There are two sets of roadways, driven at right angles to each other, and thus the seam is divided into a large number of square or rectangular pillars. These pillars are extracted at a later period. The driving of the narrow roadways is termed working the whole while pillar working is known as working the broken. The width of the roadways and their distance apart are governed by the thickness and nature of the coal seam and the type of roof and floor. The main headings are driven forward and connected at intervals by crosscuts or stentons for ventilation and as a second exit. The bords are driven off the main headings at fixed distances apart, and are connected at intervals by walls. The width of the main headings, crosscuts, and bords varies from 3 to 5 yards. The bords are driven from 15 to 60 yards apart. The walls are about 2 to 3 yards wide and driven at similar or greater intervals according to the size of pillars to be formed. Modern pillar-and-stall mining is highly mechanized. *See also* mechanized heading development. Also called bord-and-pillar. *Nelson.*

pillar-and-stope. *See* square-set stoping. *Fay.*

pillar boss. In bituminous coal mining, a foreman who supervises the work of robbers in removing pillars of coal which were left to support the roof of working places during mining operations. Also called rib boss. *D.O.T. 1.*

pillar bursts. Failures of remnants, promontories, as well as pillars, by crushing. *Spalding, p. 68.*

pillar caving. Ore is broken in a series of stopes or tall rooms, leaving pillars between. Eventually the pillars are forced or allowed to cave under the weight of the roof. *McKinstry, p. 635.*

pillar coal. Coal secured in pillar robbing. *Fay.*

pillar drive. A wide irregular drift or entry, in firm dry ground, in which the roof is supported by pillars of the natural earth, or by artificial pillars of stone, no timber being used. *Fay.*

pillar extraction. The recovery or working away of the pillars of coal which were left during the first operation of working in the pillar-and-stall method. Also called pillar mining. *See also* jenkin; jud; pillar robbing. *Nelson.*

pillaring. a. Aust. The process of extracting pillars. Also called robbing pillars; pulling pillars. *Fay.* b. Jointing in slates, Denbighshire, Wales. *Arkell.*

pillaring back. a. The operation of extracting coal pillars, on the retreating system, in a pillar method of working. *Nelson.* b. *See* drifting back. *Fay.*

pillar line. Air currents which have definitely coursed through an inaccessible abandoned panel or area or which have ventilated a pillar line or a pillared area, regardless of the methane content or absence of methane in such air. *I.C. 8149, 1963, pp. 8-9.*

pillar man. a. A man who builds stone packs in mine workings. *Fay.* b. *See* pack builder. *D.O.T. 1.*

pillar methods of working. Methods of working coal seams, which have been given different names in different coalfields, such as stoop-and-room in Scotland; bord-and-pillar in Durham, England; and single and double stalls in South Wales. There are many modifications of pillar mining, but in general, there are two stages: (1) the driving of narrow roadways and thus forming a number of coal pillars, and (2) the extraction of the pillars—often on the retreating system. Pillar methods of mining are widely used in the United States, while the longwall method is favored in Great Britain. Pillar methods are also used for working stratified deposits of ironstone, rock salt, slate and other layered minerals. *Nelson.*

pillar mining systems. These include the room-and-pillar system, the block system, and the bord-and-pillar system. *Woodruff, v. 3, p. 18.*

pillar roads. a. Roadways formed in coal pillars. *Nelson.* b. Working roads or inclines in pillars having a range of longwall faces on either side. *Fay.*

pillar robber. *See* robber, a. *D.O.T. 1.*

pillar robbing. a. The systematic removal of the coal pillars between rooms or chambers so as to regulate the subsidence of the roof. Also called pillar drawing. *Fay.* b. The removal of ore pillars in sublevel stoping, or slicing. *Fay.* c. Formerly, in pillar-and-stall mining, the coal pillars left were too small, and the old miners were satisfied to gain some coal by robbing the pillars, usually from middle portions, the coal remaining was too dangerous to extract. *Nelson.*

pillar robbing and hand filling. *See* sublevel stoping, b. *Fay.*

pillars. a. The natural supports left in a mine for the purpose of supporting the roof. Also called stumps. *Ricketts, I.* b. Eng. Masses of marl full of fibrous gypsum, up to 15 feet thick, Keuper, Derbyshire, and Staffordshire. Also called balls; bullets. *Arkell.* c. Eng. *See* rolleyway pillars. *SMRB, Paper No. 61.*

pillar split. An opening or crosscut driven through a pillar in the course of extraction. *Grove.*

pillar strength. The formula for pillar strength can be expressed as follows:

$$S = C \left(\frac{L}{T}\right)^{\frac{1}{2}}$$

where the coefficient, C, is directly dependent upon friction, L is the least pillar width, and T is the thickness. *Coal Age, v. 71, No. 8, August, 1966, p. 198.*

pillar working. Working coal in much the same manner as with the pillar-and-stall system. *Fay.*

pillion. Corn. Tin left in the slag after the first smelting. *Webster 3d.*

pillow basalt. Basalt in which large rounded masses of pillows of firm rock are abundant; the spaces between the masses are filled with friable rock in which cavities containing crystals are often present; commonly forms when lava flows meet water. *Sinkankas.*

pillow block. A metal-cased rubber block that allows limited motion to a support or thrust member. *Nichols.*

pillow lavas. A general term for lavas that exhibit pillow structure, occurring mostly in basic lavas (basalts and andesites) and especially in the sodium-rich basalts known as spilites. *A.G.I.*

pillow structure. a. The peculiar structure exhibited by some basic lavas (especially spilites) which consist of an agglomeration of rounded masses that resemble pillows, bolsters, or filled sacks. The rounded masses or pillows fit closely upon one another, the hollows of one matching the prominences of another, and intervening spaces are usually filled with such sedimentary materials as chert, limestone, or hardened shale. In general, the individual pillows have a fine-grained or glassy skin, are vesicular within, and in cross section exhibit a banded concentric structure. The pillow structure is generally believed to be the result of subaqueous deposition. *A.G.I.* b. A structure assumed by some sandstones resembling balls or pillows; most characteristic of lower portions of sandstone resting on shales. Also called pseudonodules; slump balls; flow structure. *See also* ball-and-pillow structure. *Pettijohn.*

pill press. In powder metallurgy, a press for making small compacts. *Bennett 2d, 1962.*

pilolite. A name given to certain minerals previously called mountain cork and mountain leather. *Fay.* Many, but not all, pilolites are palygorskite. *Hey 2d, 1955.*

pilot. a. A cylindrical steel bar extending through and about 8 inches beyond the face of a reaming bit. It acts as a guide that follows the original unreamed part of the borehole and hence forces the reaming bit to follow and be concentric with the smaller diameter, unreamed portion of the original borehole. *Long.* b. The cylindrical diamond-set plug, of somewhat smaller diameter than the bit proper, set in the center and projecting beyond the main face of a noncoring bit. *See also* pilot bit. *Long.*

pilotaxitic. A textural term proposed by Rosenbusch and applied to the groundmasses of holocrystalline, a glass-free (volcanic) rocks consisting of a feltlike interweaving of lath-shaped microlites (ordinarily plagioclase), commonly in flow lines. *See also* felty. *A.G.I.*

pilotaxitic texture. *See* pilotaxitic.

pilot bearing. A small bearing that keeps the end of a shaft in line. *Nichols.*

pilot bit. a. A noncoring bit with a cylindrical diamond-set plug of somewhat smaller diameter than the bit proper set in the center and projecting beyond the main face of the bit. *Long.* b. *See* plug bit; drag bit. *B.S. 3618, 1963, sec. 3.*

pilot bob. The weight attached to a shaft plumbline for the purpose of lowering the line down the shaft. *B.S. 3618, 1963, sec. 1.*

pilot burner. A small burner kept lighted to rekindle the principal burner when desired (as in a flash boiler). *Webster 3d.* The light so maintained is called a pilot light or pilot flame. *Fay.*

pilot cable. A cable similar in construction to the pliable armor cable, having two, three, or more cores as required, the thickness of the insulation being appropriate to the lower working voltage. *Mason, V.2, p. 434.*

pilot core protection. A feature of a remote control circuit which opens the control relay, and prevents it from closing, in the event of an open circuit or a short-circuit. *B.S. 3618, 1965, Sec. 7.*

pilot drill. A small drill used to start a hole in order to insure a larger drill running true to center. *Crispin.*

pilot hole. a. A small hole drilled ahead of a full-sized, or larger borehole. *Long.* b. A borehole drilled in advance of mine workings to locate water-bearing fissures or formations. *Long.* c. A small tunnel driven ahead of, and subsequently enlarged to the diameter required in the following full-size tunnel. *Long.*

pilot-hole cover. *See* cover, b. *Long.*

pilot lamp. A small electric bulb which lights when power is turned on in a circuit. *Ham.*

pilot method. The method of excavating a tunnel by driving a small tunnel ahead, and then enlarging its dimensions. *Webster 3d.*

pilot mill. A comparatively small mill created at a mine to work out the technique of operation before erecting the permanent plant. *Hess.*

pilot plant. A small-scale mill in which representative tonnages of ore can be tested under conditions which foreshadow (or imitate) those of the full-scale operation proposed for a given ore. *Pryor, 4.*

pilot reamer. An assemblage of a pilot, a pilot reaming bit, and a reaming barrel. *See also* pilot; pilot reaming bit. *Long.*

pilot reaming bit. A box-threaded, diamond-set, annular-shaped bit designed to be coupled to a pilot and used to ream a borehole to a specific casing size. *See also* pilot, a for a description of the pilot to which the reaming bit is attached. *Long.*

pilot sampling. The taking of preliminary samples of a mineral deposit to study its mode of occurrence and its detailed structure, sometimes termed reconnaissance sampling. *Nelson.*

pilot sequence. Sequence control by means of a pilot cable is effected by means of a low-voltage supply from one contactor panel to the next, or by means of a line voltage pilot cable. Each contactor has an auxiliary contact which controls the supply to the next contactor. In the low-voltage system, the secondary of each potential transformer is earthed at the preceding panel through an auxiliary switch which closes with the contactor. Until these secondary potential transformer circuits are completed, by closing the auxiliary contact, the next conveyor cannot start. The disadvantage of this system is the cost of the pilot cables. *Sinclair, V, p. 306.*

pilot shaft. *See* pilot tunnel. *Nelson.*

pilot switch. *See* remote control switch. *B.S. 3618, 1965, Sec. 7.*

pilot tests. *See* testing.

pilot tunnel; pilot shaft. A small tunnel or shaft excavated in the center and in advance of tthe main drivage to gain information about the ground, create a free face and thus simplify the blasting operations. *Nelson.*

pilot valve. a. A small hand-operated valve to admit liquid to operate a valve difficult to turn by hand. *Fay.* b. A relay valve that controls the operation of another valve. *Webster 3d.* c. A small balanced valve, operated by a governor or by hand, which controls a supply of oil under pressure to the piston of a servometer or relay connected to a large control valve, which it is desired to operate. Also called relay valve. *C.T.D.* d. In a compressor, an automatic valve which regulates air pressure. *Nichols.*

pilot wedge. A half-cylinder member, about 5 inches long, coupled to the lower end of a Hall-Rowe deflection wedge, by means of which the deflection wedge may be oriented in a specific manner in reference to a matching half-cylinder surface on the upper end of the wedge (drive wedge). This is driven into the wooden plug placed about 8 feet below the point in a borehole where a deflection is to be made. Also called wedge pilot. *Long.*

Pilz furnace. A circular or octagonal shaft furnace, maintaining or increasing its diameter toward the top, and having several tuyeres; used in smelting lead ores. *Fay.*

pimelite. a. A massive or earthy apple-green hydrous silicate, containing magnesium, nickel, aluminum, and iron; named from its unctuous quality. *Standard, 1964.* b. Synonym for alipite. *Hey 2d, 1955.*

pi-meson. *See* pion. *L&L.*

pimple metal. Crude copper matte of about 78 percent copper, obtained from the smelting of sulfide copper ores. *Bennett 2d, 1962.*

pimplestone. Pebblestone. *Fay.*

pimpley. Coal with small nodules of ironstone running through it. *Nelson.*

pimp rock. Shrop. Conglomerate. *Arkell.*

pin. a. Scot. A tally for counting tubs or cars of ore or coal. Pins were formerly made by the miners, each miner's pins having a distinguishing device, initial, or number. *Fay.* b. *See* wedge rock. *Fay.* c. Eng. A thin bed of ironstone in the coal measures. *Fay.* d. The currently accepted term for that part of a cylindrical or tubular member threaded on its outside surface. *Long.* e. As used by handsetters, to build up or repair a worn spot on a bit by insetting a metal pin peened into a hole drilled into the metal of the bit face at the worn or eroded spot. *Long.* f. A sharp metal shaft used to fasten two or more objects together; a coupling or dowel. *Long.* g. An item of kiln furniture; it is a small refractory saddle for use in conjunction with a crank. *See also* kiln furniture; saddle; crank. *Dodd.*

pinacoid. In crystallography, a crystal form consisting of exactly two parallel faces. In the hexagonal and tetragonal systems, only a basal pinacoid is possible, parallel to the lateral axes and cutting the vertical *c* axis at right angles. In the orthorhombic system, basal, side or brachy, and front or macro pinacoids are possible; in the monoclinic system, basal, front or ortho, side or clino, and an indefinite number of inclined pinacoids parallel to the orthoaxis *b* are possible; in the triclinic systems, pinacoidal class, only pinacoids are possible. In an obsolete nomenclature, only those pinacoids that are parallel to planes containing two crystallographic axes are so designated, others being called hemiprisms, etc., according to their orientation. *A.G.I.*

pinakiolite. A black mineral with 1 perfect cleavage and metallic luster, $3MgO.B_2O_3.MnO.Mn_2O_3$; Mohs' hardness, 6; and specific gravity, 3.88. *Larsen, p. 208.*

pin boy. One who cleans broken pins (triangular prism-shaped pieces of fired clay) out of pinholes in saggers so that new pins may be inserted to support plates or other glazed ware that is being placed in saggers by glost-kiln placer for firing. *D.O.T.1.*

pinch. a. The binding action caused when borehole walls close in before casing is emplaced, resulting from rock failure when drilling in formations having a low compressional strength. *Long.* b. To caulk a diamond unevenly or too tightly in handsetting, causing the stone to break. *Long.* c. To force a diamond bit into an undersize hole, thereby squeezing the bit and possibly damaging the outside or gage stones. *Long.* d. Eng. *See* pinch bar. *SMRB, Paper No. 61.* e. A compression of the walls of a vein, or the roof and floor of a coal bed, which more or less completely displaces the ore or coal. Also called pinch-out. *Standard, 1964.* f. A thin place in a mineral zone or where the zone itself almost or quite disappears and in other places widens out into extensive bodies of ore. *Fay.* g. A kind of crowbar for breaking down coal. *Fay.* h. To move (heavy machinery, etc.) short distances at a time by means of short holds with a crowbar or pinch bar. *Fay.*

pinchbar. a. A kind of crowbar with a short projection and a heel or fulcrum at the end; a pinch. Used to pry forward heavy objects. *Standard, 1964.* b. Eng. A steel bar, about 5 feet long, used for getting down stone or coal. Also called pinch. *SMRB, Paper No. 61.*

pinchbeck metal. An alloy of 80 percent copper and 20 percent zinc. *Fay.*

pinchcock. A clamp used on a flexible tube to regulate the flow of a fluid through the tube. *Webster 3d.*

pinched. Where a vein narrows, as if the walls had been squeezed in. When the walls meet, the vein is said to be pinched out. *Fay. See also* pinching out; pinch, e.

pincher. In glass making, a nipping tool for shaping at one operation the outside and inside of the neck of a bottle. *Standard, 1964.*

pinchers. Surface disturbances which result from the rolling processes and which ordinarily appear as fernlike ripples running diagonally to the direction of rolling. *ASM Gloss.*

pinches. The narrow portions of lodes. *See also* makes. *Nelson.*

pinching. The continued thinning of a stratum in a given direction until it vanishes, and the formations it once separated are in contact. *A.G.I.*

pinching out. When a lode or stratum narrows down and disappears. *See also* pinch, e. *B.C.I.*

pinching tongs. In glassmaking, a pair of tongs on the jaws of which are two dies that, when closed, form a mold for ornamental pendants, which are thus made from molten glass. The eye in the end of a pendant is made by a pin between the jaws of the tongs. *Standard, 1964.*

pinch out. A trap formed by the disappearance or wedging out of a porous, permeable rock between two layers of impervious rock. *Williams. See also* pinch, e; nip out.

pinch pass. A pass of sheet material through rolls to effect a very small reduction in thickness. *ASM Gloss.*

pinch spalling. Mechanical spalling. *A.I.S.I. No. 24.*

pinch trimming. Trimming the edge of a tubular part or shell by pushing or pinching the flange or lip over the cutting edge of a stationary punch or over the cutting edge of a draw punch. *ASM Gloss.*

pin cracks. Leic. Small fissures in coal seams filled with water and gas. *Fay.*

pinder concentrator. A revolving table on which are tapering spiral copper cleats on a linoleum cover. The tailings are washed over the riffles and off the edge, while the concentrates are delivered at the end of the riffles. *Liddell 2d, p. 388.*

pin disk mill. A type of rotary disintegrator sometimes used (more particularly on the Continent and in the United States) for the size reduction of clay. *Dodd.*

pindy. Corn. A carbonaceous shale. *Fay.*

pineapple. a. A cast roller, designed to keep the haulage rope centered between rail tracks. Helicospiral grooves on the sides return a straying rope to the central grooves. Works in one direction only. *Pryor, 3.* b. Synonym for line oiler. *Long.*

pine oil. Commercial distillate of wood widely used as frothing agent in flotation process. *Pryor, 3.*

pine tar. A vegetable tar made from the resin of pines or other conifers. Used as a lubricant when adherence is one of the important features; hence quite frequently, it is mixed with petroleum greases and waxy substances to make an adherent lubricant commonly used as a rod dope. *Long.*

pine-tar oil. *See* tar oil, wood. *CCD 6d, 1961.*

pine tree crystal. A type of dendrite. *ASM Gloss.*

pin expansion test. A test for determining the ability of tubes to be expanded or for revealing the presence of cracks or other longitudinal weaknesses, made by forcing a tapered pin into the open end of a tube. *ASM Gloss.*

pin fire opal. Opal exhibiting pinpoint color flashes smaller and usually less regularly spaced than the patches in harlequin opal. *Shipley.*

ping. An acoustic pulse signal projected by an echo-ranging transducer. *Hy.*

pingos d'agoa. A Brazilian name, meaning 'drops of water,' for perfectly colorless and water-clear pebbles of topaz. *C.M.D.*

pinguite. A soft oil-green variety of the hydrous silicate, chloropal. *Fay.*

pinhead blister. *See* blister, c. *ASM Gloss.*

pinhole. a. A fault in vitreous enamelware. It is the result of a blister that has burst and partially healed; the usual sources of the gas that gave rise to the blister are a hole in the base metal or a speck of combustible foreign matter in the cover coat. *Dodd.* b. Pinholes in glazes also result from burst bubbles; here, most of the gas has its origin in the air between the particles of powdered glaze becoming trapped as the glaze begins to mature. *Dodd.* c. A frequent source of pinholes in pottery biscuit ware, and in subsequent stages of processing, is air occluded in the clay during its preparation. *Dodd.* d. Pinholes in plaster molds originate in air attached to the particles of plaster during blending; this can be eliminated by blending the plaster in a vacuum. *Dodd.*

pinhole box. An instrument used to illuminate etched sections of quartz from below through a small hole for the purpose of obtaining light figures. *AM, 1.*

pinhole porosity. Porosity, in either castings or metal formed by electrodeposition, resulting from numerous small holes distributed throughout the metal. *ASM Gloss.*

pin in. To fill the interstices of masonry with small pieces of stone. *Standard, 1964.*

pinion. Smaller of pair of toothed wheels, for example, the pinion geared to the driven crown wheel of ball mill. *Pryor, 3.*

pinion gear. A drive gear that is smaller than the gear it turns. *Nichols.*

pinite. a. A general term used to include a large number of alteration products of iolite, spodumene, nephelite, scapolite, feldspar, and other minerals. A hydrous silicate of aluminum and potassium. *Dana 17.* b. A variety of muscovite used in ceramics. *CCD 6d, 1961.*

pink ash. Penn. An anthracite which, when burned, leaves a pink ash. *Fay.*

pink beryl. Same as morganite. *Shipley.*

pinked topaz. Pink topaz artificially colored by heating yellow or brown varieties. *See also* heated stone. *Shipley.*

pinking. Heating topaz to change its color to pink. *Shipley.*

pink moonstone. Pink girasol scapolite. *Shipley.*

pink sapphire. Pale to light-red corundum as distinguished from full red or dark red which is ruby. As yet there is no standard of determining the dividing line between these, the more highly transparent stones of light to full color being often classed as sapphire while more often a much paler stone is called Ceylon ruby. *Shipley.*

pink topaz. Topaz either naturally pink or artifiically colored pink by heating yellow or brown varieties. *See also* pinked topaz. *Shipley.*

pink wollastonite. Lilac-colored pyroxene (diopside) from the region of San Francisco, Calif. *Schaller.*

pinmaker. One who makes potter's pins for supporting glazed ware in saggers for firing in glost kiln. *D.O.T.1.*

pin mark; point mark. A visible imprint on the back of ware left by processing tools; sometimes synonymous with burning tool mark. *ASTM C286-65. See also* burning marks.

pinnacle. a. Any high tower or spire-shaped pillar of rock, alone or cresting a summit. A tall, slender, pointed mass; especially, a lofty peak. *A.G.I.* b. A sharp pyramid or cone-shaped rock under water or showing above it. *A.G.I.* c. In alluvial mining, a limestone bedrock of an irregular and serrated type, difficult for dredge buckets to work in while trying to clean the deposit down to bedrock. *Pryor, 3.*

pinnate. A compound leaf having leaflets arranged in two ranks, one on each side of the rachis. *See also* stigmaria. *Nelson.*

pinnately veined. A type of net venation in which the secondary veins branch out in parallel fashion from the single midrib of a leaf blade. *A.G.I.*

pinned coupling. A drill-rod coupling that has been permanently attached to the body of the rod by a metal dowel (or pin) driven into a small hole drilled at the point in the rod where the coupling is screwed into the body of the rod. *Long.*

pinnel. a. Boulder clay, from Cumberland, Northumberland, and Lancashire, England, and North Wales. *Arkell.* b. Coarse gravel or sandstone conglomerate. *Arkell.*

pinning. a. N. Staff. Bratticing in headings. *Fay.* b. Small stones for filling in masonry interstices. *Webster 3d.* c. The process of fixing pins in kiln furniture. *See also* pin, g. *Dodd.*

pinning stone. a. Eng. A hard calciferous grit, used for roads and rough paving, Wealden beds, Stammerham, near Horsham. *Arkell.* b. Small stones used for filling the interstices of masonry, especially as in dry stone walls. *Arkell.*

pinnock. Eng. Sticky red clay, mixed with small stones, unkindly soil; from Kent. *Compare* pinny clay. *Arkell.*

pinnoite. A yellowish, tetragonal mineral, $MgO.B_2O_3.3H_2O$; Mohs' hardness, 3 to 4; and specific gravity, 2.29. *Larsen, p. 70.*

pinnule. One of the lobes or segments when a leaflet of a pinnate leaf is itself more or less divided into parts in a pinnate manner. *Nelson.*

pinny clay. A bluish sort of clay, very hard, brittle and rugged. *Compare* pinnock. *Arkell.*

pinny land. Eng. Arable land where chalk comes close to the surface, as opposed to the deeper clay land, Wiltshire. *Arkell.*

pinolite. A metamorphic rock containing crystals of magnesite in a schistose matrix. *Holmes, 1920.*

pin puller. A laborer who removes studs from aluminum reduction pots by operating a motor-driven hydraulic jack. *D.O.T.1.*

pins. a. S. Wales. Thin and irregular ironstone beds or nodules. *See also* mine, g. *Nelson.* b. Bowl pins, triangular supports used in placing glost ware in saggers. *ACSG, 1963.*

pins, burning. Referring to burning pins. *See* burning bars. *Hansen.*

pin scratch. A pattern formed by scratching lines through the raw glaze with a sharp point. *ACSG, 1963.*

pintadoite. a. A green hydrous vanadate of calcium, $2CaO.V_2O_5.9H_2O$. An efflorescence on sandstone. From Canyon Pintado, Utah. *English.* b. A vanadium ore. *Osborne.*

pin thread. The thread on the outside surface of a cylindrical or tubular member. *Long.*

pin timbering. A roof support method following two basic principles: (1) that of drilling holes vertical or at an angle into the roof and anchoring roof bolts into a strong firm structure above the lower weak layers thereby suspending the weak roof on bolts from the strong roof above, and (2) the binding of several layers of weak strata into a beam strong enough to support its weight across the working place. The advantage of pin timbering is that support can be provided at the face without posts being in the way of equipment and more freedom is provided for shuttle cars and other equipment in tramming. *See also* roof bolting. *Kentucky, p. 145.*

pintle. A vertical pin fastened at the bottom that serves as a center of rotation. *Nichols.*

pintle hook. A towing device consisting of a fixed lower jaw, a hinged and lockable upper jaw, and a socket between them to hold a tow ring. *Nichols.*

pin-to-box. The currently accepted term for a coupling, one end of which is threaded on the outside (pin) and the opposite end threaded on the inside (box). Formerly designated as a male-to-female coupling. *See also* sub. *Long.*

pin-to-pin. The currently accepted term for a coupling, both ends of which are threaded on the outside. Formerly designated as a male-to-male coupling. *See also* sub. *Long.*

pin-type slat conveyor. Two or more endless chains to which crossbars are attached at spaced intervals, each having affixed to it a series of pointed rods extending in a vertical plane on which work is carried. Used principally in spraying or washing operations where the least amount of area of the product is contacted. *ASA MH4.1-1958.*

pinwheel garnet. A garnet crystal that has been rotated during metamorphic movement. *A.G.I. Supp.*

Piobert lines. The same as Lüders lines. *ASM Gloss.*

pion. An elementary particle; the contraction of pi-meson. The mass of a charged pion is about 273 times that of an electron. An electrically neutral pion has a mass 264 times that of an electron. *L&L.*

pioneer. Corn. An able pickman; a tin miner. *Fay.*

pioneer bench. The first bench in a quarry which is blasted out. It is usually at the top of the rock to be quarried. *Fay.*

pioneering. The first working over of rough or overgrown areas. *Nichols.*

pioneering wave. Synonymous with advance wave. This term is used in British reports of coal-dust explosions. *Rice, George S.*

pioneer road. A primitive, temporary road built along the route of a job, to provide means for moving equipment and men. *Nichols.*

pioneer wave. The advance vibration set up by a colliery explosion. *See also* shock wave. *Nelson.*

pip. a. An identation provided in the surface of a bit mold or die in which a diamond is set. *Long.* b. An echo trace on an electronic indicator screen. *Hy.* c. A small refractory button with a point on its top surface; ware is supported on the point. Also, an item of kiln furniture. *See also* kiln furniture. *Dodd.*

pipage. a. The carriage of oil, gas, water, etc., through pipes; also, a system of pipes for this purpose. *Standard, 1964.* b. The charge for such carriage. *Standard, 1964.*

pipe. a. An elongated body of mineral; a narrow portion of rich ore extending down the lode. *Fay.* b. The name given to the fossil trunks of trees found in coalbeds. *Fay.* c. One of the vertical cylindrical masses of volcanic agglomerate in which diamonds occur in the Republic of South Africa. *Webster 3d.* d. A roughly cylindrical and vertical geological formation, such as a firn pipe or a sand pipe. *Webster 3d.* e. The eruptive channel opening into the crater of a volcano. *Webster 3d.* f. N.S.W. A cylindrical siliceous intrusion formed as an offshoot from a larger igneous intrusion often containing such minerals as tin, copper, molybdenum, bismuth, tungsten, gold, etc. *New South Wales.* g. Formed where the structural control guides the mineralization along channels of marked vertical continuity, but of relatively small horizontal dimensions. Fault intersections are typical. Also caller chimney. *Lewis, p. 410.* h. The central cavity formed by contraction in metal, especially ingots, during solidification. *ASM Gloss.* i. The defect in wrought or cast products resulting from such a cavity. *ASM Gloss.* j. An extrusion defect due to the oxidized surface of the billet flowing toward the center of the rod at the back end. *ASM Gloss.* k. A tubular, metal product, cast or wrought. *ASM Gloss.* l. A tube of common steel, usually threaded externally on each end to permit joining two or more lengths together by means of internally threaded coupling. *Compare* drill pipe. *Long.* m. To throw water upon from a hydraulic pipe. *Webster 3d.* n. *See* field-drain pipe; sewer pipe. *Dodd.* o. A cavity at the top of a fusion-cast refractory resulting from the contraction of the molten material as it cools. *Dodd.*

pipe amygdules. Amygdules of pipelike form extending upwards with swellings or bifurcations from the base of a lava flow, to which they may be normal or inclined. The form and location of these amygdules are probably due to the flow of lava over a moist floor. *Holmes, 1928.*

pipe bit. A bit designed for attachment to standard coupled pipe for use in socketing the pipe in bedrock. Can be set with diamonds or other abrasive materials. *Long.*

pipe blister. A large bubble sometimes produced on the inside of handmade glassware by impurities or scale on the blowpipe. *Dodd.*

pipe clamp. a. A device similar to a casing clamp, used in the same manner on a pipe as a casing clamp is used on casing. *See also* casing clamp. *Long.* b. A pipe wrench constructed like a parmalee wrench. *Long.*

pipe clay. a. Clay forming the surface of bedrock and upon which the gravel of deep leads frequently lies. *Nelson.* b. Originally any clay suitable for making tobacco pipes, but the term is now used to include all white-burning clays of considerable plasticity. *Nelson.* c. Masses of fine clay, generally of lenticular form, found embedded in hydraulic gravel banks. *Fay.*

pipe coil. a. A device which measures only the density of the magnetic components of a slurry. This electromagnetic sensing unit is mounted on a section of rubber of stainless-steel pipe which is installed as a section of the slurry-carrying pipeline. All components are exterior to the pipe, and there is no obstruction to flow. The pipe coil is used widely in magnetic taconite and heavy-media plants. By combining this device with other instruments, it is possible to continuously measure the ore-to-media ratio. *See also* automation. *Nelson.* b. Pipe used for heating, usually in (1) parallel lines connected to heaters at the end, forming a grid; or (2) in parallel lines with ends alternately connected to adjacent lines by bends, forming a so-called continuous coil. *Strock, 10.*

pipe collar. Synonym for pipe coupling. *Long.*

pipe constant. *See* pipe factor. *Nelson.*

pipe coupling. An internally threaded, short, sleevelike member of ordinary steel used to join lengths of pipe. Sometimes incorrectly called pipe collar; pipe sleeve. *Long.*

pipe cutter. A tool for cutting wrought iron or steel pipes. The curved end which partly encircles the pipe carries one or more cutting disks. Freed of the cutter is regulated by a screw as the tool is rotated around the pipe. *Crispin.*

piped air. Air conducted to workings or tunnel face through air pipes. *See also* auxiliary ventilation. *Nelson.*

pipe dog. A handtool that is used to rotate a pipe whose end is accessible, consisting of a small, short steel bar whose end is bent at right angles to the handle, and then quickly returned, leaving only enough space between the jaws to slip over the wall of pipe. *Fay.*

pipe drivehead. A drivehead that is coupled to a pipe. *See also* drivehead, b. *Long.*

pipe drive shoe. Synonym for drivepipe shoe. *Long.*

pipe elevator. A device similar to a casing elevator, used to raise and lower outside-coupled pipe in a borehole. *Long.*

pipe factor. a. Correction made when drilling running ground, alluvial gravels, and sands. The volume actually extracted over a measured depth is compared with that which would be obtained over the true drill pipe area and distance, any discrepancy being due to inrush of sands or forcing out of sand by the pumping action during drilling. *Pryor, 3.* b. The assumed cross-sectional area of a length of borehole when estimating the in situ volume of a core sample. Also called pipe constant. *Nelson.*

pipe finisher. One who finishes the socket and spigot ends of moist clay sewer pipe sections. Also called corrugator; finisher, pipe. *D.O.T. 1.*

pipefitter. *See* pipeman, a. *B.S. 3618, 1963, sec. 4.*

pipe fittings. A general term referring to ells, tees, various branch connectors, etc., used in connecting pipes. *Crispin.*

pipe friction. The drag created on the outside of a pipe being driven into overburden material pressing and rubbing against the outside surface of the pipe and its couplings. *See also* skin friction, d. *Long.*

pipe grab. A clutch for catching and raising a well pipe. *Standard, 1964.*

pipe grip. In steamfitting and pipefitting, an implement consisting of an iron bar with a curved end and provided with a chain of square links to hook onto the jaws of the curved end. *See also* chain tongs. *Fay.*

pipe jack. An iron pipe with a clamp or pigfoot upon one end and a curved point upon the other. It is wedged between the floor and roof of a mine room to hold the feed chain of a continuous electric coal mining machine. *Fay.*

pipeline. a. A line or conduit of pipe, sometimes many hundred miles long, through which petroleum is conveyed from an oil region to a market or to reservoirs for refining. *Standard, 1964.* b. A line of pipe with pumping machinery and apparatus for conveying a liquid, or gas. *Fay.*

pipeline gager. *See* gager. *D.O.T. 1.*

pipeline transport. Long distance pipelines used for hydraulic transport of coal, gilsonite, copper concentrates and similar materials. Local transport in mines has been utilized in France. A 108 mile 10 inch pipeline of the Pittsburgh Coal Company has been operating since 1958 carrying 4,000 tons per day. *Lewis, p. 235. See also* hydraulic transport.

pipeman. a. A man engaged in laying or repairing pipelines. Also called pipefitter. *B.S. 3618, 1963, sec. 4.* b. Mine worker who repairs, lengthens, and maintains the pipelines for air and water in mines. *Stoces, v. 1, p. 649.* c. A workman in charge of a pipe, especially in hydraulic mining. *Webster 2d.* d. One who inspects and repairs the air brakes of railroad cars. *Webster 3d.*

pipe metal. An alloy of tin and lead, and sometimes zinc, for making organ pipes. *Webster 3d.*

pipe opal. a. Long, narrow cigar-shaped opalized fossils. *Shipley.* b. Aust. Local name for sandstone opal. *Shipley.*

pipe ore. Iron ore (limonite) in vertical pillars, sometimes of conical or hourglass form, imbedded in clay. Probably formed by the union of stalactites and stalagmites in caverns. *Fay.*

pipe oven. A hot-blast oven in which the air passes through pipes exposed to the heat of burning gas in brick conduits. *Fay.*

pipe passer. One who transfers green clay sewer pipe from skidman II at entrance of kiln to setter inside kiln. Also called kilnman. *D.O.T. 1.*

pipe press. The name commonly applied to the machine used for molding sewer pipe. *Fay.*

pipe prover. An apparatus for testing the tightness of a pipeline or system, usually by hydraulic pressure. *Standard, 1964.*

piper. a. Lanc. A feeder of gas in a coal mine. *Fay.* b. Sometimes applied to a blower of gas in coal mines. *Nelson.*

pipe-rack drier. A drier in which pallets of ware are placed on neated pipes. *ACSG, 1963.*

piperno. A local Italian name applied to the trachytic tuffs of the Phlegraean fields in the vicinity of Naples, Italy. The rock is characterized by a eutaxitic structure and the presence of numerous stringers and lenticles of dark glass (fiamme) in a light-colored, porous, glassy matrix and generally considered to be a type of welded tuff. *A.G.I.*

pipe-rock. Scot. Quartzite perforated by vertical wormcasts and burrows, Lower Cambrian. *Compare* pencil ganister; penciled firestone. *Arkell.*

pipe roller. One who rolls finished sewer pipe, or carries it on shoulder if it is too large, from storage yard to trucks or boxcars and rolls it up inclined skid for stowing within conveyance. *D.O.T. 1.*

pipes. a. Ore shoots of comparatively small area which generally occur at the intersection of two veins which are otherwise valueless. The diamond-bearing ultrabasic breccia (blue ground) at Kimberley, Union of South Africa, occurs in pipes in black shale. *Nelson.* b. Tubular columns for conducting fluids, for example, air pipes. *Nelson.*

pipe sampler. A device for sampling a pile of ore, consisting simply of a small iron pipe which is driven into the pile and which, when withdrawn, brings a core of ore with it. *Fay.*

pipe sampling. a. Sampling by means of a drivepipe in accumulations of crushed residues or of material where the larger pieces are not usually greater than 2 inches. The advancing end of the pipe is generally sharpened to provide a cutting edge, and sometimes contracted in diameter so that material once entered will not readily fall out when the pipe is lifted. Also called gun sampling. *Truscott, p. 149.* b. *See* drivepipe. *Nelson.*

pipe sampling for soils. *See* sampling pipe. *Nelson.*

pipe shoe. Synonym for pipe drive shoe. *Long.*

pipe-shoe bit. A bit similar to a pipe bit, except that the set inside diameter is larger. Generally, it is used in a one-shot attempt to drill pipe through overburden into bedrock. A pipe-shoe bit is recovered only when the drivepipe is pulled out of the completed borehole. *Long.*

pipe sleeve. Synonym for pipe coupling. *Long.*

pipestone. A pink or mottled pink-and-white argillaceous stone carved by the Indians into tobacco pipes. *Compare* catlinite. *Webster 3d.*

pipe string. The total amount of any given size of pipe used as standpipe, drivepipe, or casing in a borehole. *Long.*

pipe tap. A tap for making internal threads within pipe fittings. *ASM Gloss.*

pipe-thread protector. Synonym for thread protector. *Long.*

pipe tongs. a. A handtool for gripping or rotating pipe. *Fay.* b. Synonym for chain tongs. *Long.*

pipette. a. A small piece of apparatus with which fluids are transferred, measured, or absorbed (as in chemical operations) and which in the simplest form consists of a narrow glass tube into which the liquid is drawn up by suction and in which it is retained by closing the upper end. *Webster 3d.* b. As a verb, to transfer, to draw off, to measure, or to apply with a pipette. *Webster 3d.*

pipette analysis. The size analysis of fine-grained sediment made by removing samples from a suspension with a pipette. *A.G.I. Supp.*

pipette method. A method for the determination of particle size. *See also* Andreasen pipette. *Dodd.*

pipe turner. One who removes sections of green sewer pipe from pipe press, turns them socket end up to protect sockets from damage in handling, and places them on hand trucks for removal. Also called turner. *D.O.T. 1.*

pipe vein. a. A mass of ore, generally parallel to the stratification, but quite irregular. *Ricketts, p. 127.* b. Derb. An ore body of elongated form. *See also* pipe, a. *Fay.*

pipe wiper. A device built similar to a rod wiper but designed to be used on a drill pipe. *See also* rod wiper. *Long.*

pipe wrench. An instrument or device having one fixed and one adjustable jaw, both serrated and attached to a handle. When the handle is pulled the jaws grip a cylindrical object with increasing firmness. *Long.* There are many forms, such as Alligator, Stillson, Trimco, etc. *Fay.*

piping. a. In hydraulic mining, discharging water from the nozzles on the auriferous gravel. *Fay.* b. The act or process of driving standpipe, drivepipe, or casing into overburden. *Long.* c. The flow of water under or around a structure built on permeable foundations which will remove material from beneath the structure. *See also* water creep. *Nelson.* d. The movement of soil particles by percolating water leading to the development of channels. *ASCE P1826.* e. The tubular depression caused by contraction during cooling, on the top of iron and steel ingots. *See also* pipe, a. *Fay.*

piracy. The diversion of the upper part of a stream by the headward growth of another stream. Same as beheading; stream capture; stream robbery. *Fay.*

pirate stream. One of two streams in adjacent valleys that has been able to deepen its valley more rapidly than the other, has extended its valley headward until it has breached the divide between them, and has captured the upper portion of the neighboring stream. *Leet.*

pirn. Scot. A flat-rope winding drum. *Fay.*

pirssonite. A colorless to white hydrous carbonate of sodium and calcium, $Na_2CO_3.CaCO_3.2H_2O$. Prismatic crystals. Orthorhombic hemimorphic. From Borax Lake, Calif. *English.*

pisanite. A blue, iron sulfate in which part of the iron is replaced by copper, $(FeCu)SO_4+7H_2O$. *Sanford.*

pisée. *See* touf. *ACSG, 1963.*

pisolite. a. A spherical or subspherical, accretionary body over 2 millimeters in diameter. *A.G.I.* b. Applied to volcanic pellets formed by the accretion of fine ash or dust around raindrops or around a nucleus fragment which rolls along the ground. Obsolete. *See also* accretionary lapilli. *A.G.I.*

pisolith. A small spheroidal particle with concentrically laminated internal structure, ranging from 1 to 10 millimeters in diameter. The unit particle in the rock, pisolite. *A.G.I.*

pisolitic. Consisting of rounded grains like peas or beans. *Fay.*

pisolitic tuff. An indurated pyroclastic deposit made by chiefly of accretionary lapilli or pisolites. *A.G.I.*

pisosparite. A limestone similar to oösparite except that it contains pisolites rather than oölites. *A.G.I. Supp.*

pissasphalt; pissasphaltum. A soft bitumen of the consistency of tar, black and possessing a strong smell. *See also* maltha. *Fay.*

pissasphaltum. *See* pissasphalt. *Fay.*

pisselaeum. A variety of bitumen. *Fay.*

pissophane. Wax-impregnated hydrophane. *See also* pyrophane. *Shipley.*

pistacite. A variant spelling of pistazite. A synonym for epidote. *C.M.D.; Rice.*

pistazite. Synonym for epidote; more current in Europe than in the United States. Used in rock names for epidote. *Fay.*

pistol pipe. In metalworking, the tuyere of a hot-blast furnace. *Fay.*

pistols. Eng. Thin tilelike stone, rubbish, Lower Lias, Keinton Mandeville. *Arkell.*

piston. The working part of a pump, hydraulic cylinder, or engine that moves back and forth in the cylinder; it is generally equipped with one or several rings or cups to control the passage of fluid. It ejects the fluid from the cylinder, as in a pump, or receives force from the fluid, which causes a reciprocating motion, as in an engine. *Long.*

piston clearance. The space remaining at the end of a cylinder when the piston has reached the position of its extreme travel toward that end. *Long.*

pisotn displacement. a. A volume in cubic inches, gallons, or other units of measure swept out of a cylinder per stroke, or during a given period, by a piston. *Long.* b. The amount of air displaced by moving all pistons of an engine or compressor from the bottom to the top of their stroke. *Nichols.*

piston drill. A heavy drill mounted either on a horizontal bar or on a short horizontal arm fastened to a vertical column. On the end of the rod is a chuck in which the drill steel is clamped. The pistons have a stroke of from 4 to 6 inches and deliver from 300 to 600 blows per minute. The cylinder is mounted on a carriage which can be moved back and forth by a feed screw. *Lewis, p. 86.* Piston drills have now been superseded by hammer drills.

piston drive-sampler. *See* piston sampler. *Long.*

piston extruder. *See* stupid. *Dodd.*

piston motor. An engine or motor in which the power derived from air or steam is used to drive one or more reciprocating pistons connected to a crank shaft to produce rotational movement to drive a shaft, pulley, or gearing connected to a device to be driven. Not to be confused with an internal-combustion-type reciprocating engine or motor. *Long.*

piston rod. A rod or shaft, rigidly coupled to a piston, that moves parallel to the piston and its enclosing cylinder. A rod by which the piston is moved or by which the movement of the piston is transmitted to an attached mechanism. Sometimes confused with connecting rod. *Long.*

piston sampler. A drive sampler equipped with either a free or a retractable-type piston that retreats up into the barrel of the sampler in contact with the top of the soil sample as the sampler is pressed into the formation being sampled. *Compare* drive sampler. *Long.*

piston speed. Total feet of travel of a piston in 1 minute. *Nichols.*

piston stroke. The extreme distance traveled by the piston at each stroke. *Long.*

piston-type sampler. *See* piston sampler. *Long.*

pit. a. Loosely speaking, a coal mine. Not commonly used by coal men, except in reference to surface mining where the workings may be known as a strip pit. *B.C.I.* b. Any mine, quarry, or excavation area worked by the open-cut method to obtain material of value. *Nichols, 2.* c. The shaft of a mine; a shaft mine; a trial pit. *Nelson.* d. A colliery; a quarry. *Pryor, 3.* e. A place where minerals are dug. *C.T.D.* f. The underground portion of a colliery, including all workings. Used in many combinations, as pit car, pit clothes, etc. *Fay.* g. In hydraulic mining, the excavation in which piping is carried on. *Fay.* h. A stack of wood, prepared for the manufacture of charcoal. *Fay.* i. A large hole from which some mineral deposit is dug or quarried, or the mine itself, as a gravel pit; stone pit. *Fay.* j. A hole in the ground in which to burn something; as, a lime pit; a charcoal pit. *Webster 3d.* k. Synonym for sump; cellar. *Long.* l. A small hole or indentation in a metal surface caused by corrosion or erosion. *Long.* m. A deep hole, generally circular in outline, with vertical or nearly vertical walls. *A.G.I.* n. Small holes made in cave fills by cave beetles. *A.G.I.* o. An excavation on the surface of the earth, that is, open-pit mine, sample pit, etc. *Bureau of Mines Staff.* p. An excavation in the earthen floor of a foundry to receive molten metal. *Standard, 1964.* q. A defect similar to a dimple but slightly smaller. *ASTM C286-65.*

pit amber. A name for mined amber in contrast to sea amber. *Shipley.*

pit-and-mound structure. a. A term describing small circular pits and mounds which sometimes mark the surfaces of sedimentary strata. *Pettijohn.* b. Pit-and-mound structure may resemble some rain-drop impressions but it tends to have a small pit surrounded by a raised mound. *Pettijohn.*

pit ash. Ash in coal derived from the dirt bands, adjoining shales or cleat minerals. *Tomkeieff, 1954.*

pit bank. a. Scot. The surface of the ground at the mouth of a pit, or shaft. *Fay.* b. Eng. The raised ground or platforms upon which the coal is sorted and screened at surface. *Fay. See also* heapstead; pit brow; pithead; pit hill.

pit bar. One of the wooden props bracing the sides of a pit. *Standard, 1964.*

pit barring. Scot. Timbers supporting the sides of a shaft. *Fay.*

pit boss. a. One who has charge of the surface work at a mine as well as that in a mine. A mine foreman. *Fay.* b. In anthracite and bituminous coal mining, a foreman who is in direct charge of men in a specific portion of a mine. Synonymous with shift boss, in metal mining. Also called inside foreman; underground foreman. *See also* pit foreman. *D.O.T. 1.* c. One in charge of all operations at a strip coal mine. *Webster 3d.*

pit bottom. a. The bottom of a shaft and all the equipment and roadways around it. *See also* loop-type pit bottom. *Nelson.* b. Scot. The bottom or lowest landing in a shaft. *Fay.* c. Eng. The entrance to a mine and the underground roads, in the immediate vicinity, whether at the bottom of the shaft or at any point in it beneath the surface at which the cages are loaded. Also called pit eye. *Fay.*

pit bottomer. A miner employed in the pit eye. *Standard, 1964.*

pit-bottom stoop. Scot. A large solid block or pillar left around and to support the mine shaft. *Fay.*

pit brow. a. The pithead, and in particular, the mouth of the shaft. *Nelson.* b. Lanc. The pit bank, at or near the top of a shaft. *Fay.* c. *See* brow. *Pryor, 3.* d. The edge or brow of a pit. *Standard, 1964.*

pit cage. The structure used in mine shafts for transport purposes. *See also* cage. *Nelson.*

pit-car cleaner. *See* car cleaner. *D.O.T. 1.*

pit-car loader. A short, electrically powered, lightweight elevating conveyor designed for use in working places, to facilitate the loading of large cars or to aid in shoveling long distances. The loader shovels into the hopper end and the conveyor carries the coal to the car. *Jones.*

pit-car-loader operator. In bituminous coal mining, one who operates a machine to load coal in mine (pit) cars. *D.O.T. 1.*

pit-car oil. *See* summer black oil. *Fay.*

pit-car repairer. *See* mine-car repairman. *D.O.T. 1.*

pitch. a. The angle at which a coal seam inclines below a horizontal line. *Korson.* b. The grade of an incline or the rise of a seam. *B.C.I.* c. The solid or semisolid residue from the partial evaporation of tar. Strictly, pitch is a bitumen with extraneous matter such as free carbon, residual coke, etc. *Nelson.* d. The angular inclination or an ore shoot with respect to the surface, measured in the direction of the strike. *Nelson.* e. Of lode, angle of deviation from the vertical taken by a section of ore having some special characteristic, such as enhanced value. *Pryor, 3.* f. The angle which a directional feature, for example, slickensides, in a plane makes with a horizontal line within the plane. *B.S. 3618, 1964, sec. 5.* g. The grade, rise, or incline. *Hudson.* h. Corn. The ground assigned to a tributer. *Webster 3d.* i. *See* pitch of fold. *Fay.* j. In dredging, the distance between the center of any pin and that of the pin in the next adjacent bucket. *Fay.* k. Synonym for dip. *Long.* l. The slope or incline of a roof expressed as the number of inches vertical rise per horizontal foot. *A.S.T.M. D1079-54.* m. Old vernacular name for petroleum. A name which may be confused with mineral pitch. *Tomkeieff, 1954.* n. The slope of a surface or tooth relative to its direction of movement. *Nichols.* o. In a roller or silent chain, the space between pins, measured center to center. *Nichols.* p. The amount of advance of a single-thread screw in one turn, expressed in lineal distance along or parallel to the axis, or in turns per unit of length. *Standard, 1964.* q. The distance between tooth centers, measured on the pitch line, or the number of teeth per unit of diameter, as in a gearwheel. *Standard, 1964.* r. The distance between corresponding points on adjacent projections produced on work by a cutting tool. *ASM Gloss.*

pitch arms; pitch braces; pitch rods. Rods, usually adjustable, which determine the digging angle of a blade or bucket. *Nichols, 2.*

pitch bag. Corn. A bag covered with pitch, in which powder is enclosed for charging damp holes. *Fay.*

pitchblende. A massive variety of uraninite or uranium oxide, found in metallic veins. Contains 55 to 75 percent UO_2; up to 30 percent UO_3; usuually a little water, and varying amounts of other elements. Thorium and the rare-earths are generally absent. Color black; streak brownish black; luster pitchy to dull; hardness 5.5; specific gravity 6.5 to 8.5; radioactive. Found in Colorado; Canada, Europe, Republic of the Congo. Most important ore of uranium. *CCD 6d, 1961.*

pitch circle. The circle passing through the chain joint centers when the chain is wrapped on the sprocket. *J&M.*

pitch coal. a. A brittle lustrous bituminous coal or lignite. *Webster 3d.* b. A kind of jet. *Standard, 1964. See also* bituminous lignite.

pitch coke. Coke made by the destructive distillation of coal-tar pitch. *Hess.*

pitch diameter. The diameter of a circle which passes through the points of average contact between the teeth of two gears running in mesh, or between the teeth of a sprocket and the roller of its companion chain, or between a male and a female thread which are engaged. *Brantly, 2.*

pitched work. Stone-faced revetment for the slopes of a reservoir or river bank. It is sometimes described as pitching, the term also applied to the consolidated broken stones forming a road foundation. *Ham.*

pitcher. a. N. of Eng. A loader in the pit, and one who takes up and relays the rails at the working faces. *Fay.* b. One who picks over dumps for pieces of ore. *Webster 3d.* c. A fired earthenware mold formed from a block mold. *C.T.D.* d. *See* tosser. *D.O.T. 1.*

pitcher bass. Shrop. Bituminous shaly clay from the coal measures. *Tomkeieff, 1954.*

pitcher brasses. Eng. Indurated schistose clay, from Shropshire. *Fay.*

pitcher molding. In ceramics, a method of molding by pouring thin slip into a mold, which is then emptied, leaving part of the mixture adhering. As it dries more is poured to adhere and dry until the required thickness is obtained. *Standard, 1964.*

pitchers. Pottery that has been broken in the course of manuufacture. Biscuit pitchers are crushed, ground and reused, either in the same factory or elsewhere; the crushed material is also used in other industries as an inert filler. Because of the adhering glaze, glost pitchers find less use. *Dodd.*

pitches. a. A deposit which follows dipping joint planes. Usage confined largely to upper Mississippi valley lead-zinc deposits. *A.G.I.* b. Black or dark-brown solid cementitious materials which gradually liquefy when heated and which are obtained as residua in the partial evaporation or fractional distillation of tar. *Urquhart, sec. 2, p. 81.*

pitches and flats. Combined horizontal and highly inclined cracks in sedimentary beds, caused by gentle slumping. *Bateman.*

pitch-faced. Having a rough quarry finish along the vertical surface except for edges faced cleanly with a pitching chisel. *Webster 3d.*

pitch garnet. Very dark yellow andradite. *Shipley.*

pitching. a. A stone facing on a slope of ground. *Webster 3d.* b. A layer of coarse stone on a road. *Webster 3d.*

pitching bar. A kind of pick used, especially by miners, in beginning a hole. *Webster 2d.*

pitching chisel. A chisel used for making an edge on the face of a stone. Also called pitching tool. *Webster 3d.*

pitching ferrules. Short lengths of galvanized steel pipe set into a reinforced concrete pile and used for handling it. Their position is calculated so as to give a minimum bending moment when the pile is lifted. *Ham.*

pitching seam. A highly inclined seam. *See also* edge coal, a. *Nelson.*

pitching stable. A Cornish paving granite. *Standard, 1964.*

pitch lake. The asphalt lake on the island of Trinidad. *Mersereau, 4th, p. 206.*

pitch lap. A metal or other rigid lap whose surface has been covered with pitch, useful in obtaining better polish on soft gemstones. *Shipley.*

pitch length. The length of an ore shoot in its greatest dimension. *A.G.I.*

pitch line a. The line on which the pitch of gear teeth is measured; an ideal line, in a toothed gear or rack, bearing such a relation to a corresponding line in another gear with which the former works that the two lines will have a common velocity as in rolling contact. *Webster 3d.* b. The line along which the pitch of a rack is marked out, corresponding to the pitch circle of a spur wheel. *C.T.D.*

pitchman. *See* tosser. *D.O.T. 1.*

pitch mineral. Bitumen; asphalt. *Standard, 1964.*

pitch off. A quarryman's term for trimming an edge of a block of stone with a hammer and set. *See also* pitch-faced. *Fay.*

pitch of fold. The angle between the horizontal and an axial line passing through all the highest or lowest points of a given stratum of a syncline or anticline. *Fay.*

pitch of tar. The black solid of low melting point as a residue in the distillation of coal tar. *Hess.*

pitch-of-tar coke. A cokelike substance left by total distillation of coal tar. *Hess.*

pitch of threads. The pitch of threads, sprocket teeth, or gear teeth is the distance between the centers of, or corresponding points on, adjacent threads or teeth, measured along the pitch circle on sprockets and spur gears. *Brantly, 2.*

pitch opal. An inferior quality of common opal. *Standard, 1964.*

pitch ore. Synonym for pitchblende. *See also* pitchy copper ore. *Fay.*

pitch peat. a. A variety of peat resembling asphalt. *Standard, 1964.* b. English translation of the German term Pechtorf later named dopplerite. *Tomkeieff, 1954.*

pitch pocket. A local shake that is filled with pitch; generally it is not extensive enough to affect the shearing strength of the wood greatly. However, if a large number of pitch pockets are found in one stick, the shearing strength of the wood is reduced. *Lewis, p. 39.*

pitch polishing. Polishing operations in which pitch rather than felt is the resilient carrier for the polishing agent. *ASTM C162-66.*

pitchstone. A volcanic glass characterized by a pitchy rather than glassy luster. They may be almost any color and have compositions equivalent to a wide range of volcanic rocks. They contain a rather high percentage of water compared to other glassy rocks. *A.G.I.*

pitchwork. In coal mining, work done on shares. *Standard, 1964. See also* pitch, h. *Fay.*

pitch workings. Mine workings in steeply inclined seams. *Fay.*

pitchy copper ore. An early name (pecherz) for a dark-colored oxide of copper which looks like pitch. *Fay.*

pitchy iron ore. a. An old synonym for pitticite. *Fay.* b. Synonym for triplite. *Hey 2d, 1955.*

pitchy luster. Resembling the luster of a fresh surface of pitch. *Shipley.*

pitchy rock. Eng. Rock impregnated with bitumen found in Shropshire coalfield. *Tomkeieff, 1954.*

pit coal. Coal obtained by mining, as distinguished from charcoal. *Fay.*

pit committee. a. A joint committee of employer and workers dealing with the labor problems of a mine. *Webster, 3d.* b. A local term for mine committee. *B.C.I.*

pit crater. A circular or ellipsoidal, steep-walled depression sunk below the gently sloping surface of a volcano and surrounded by no mound of accumulated lava. Such craters are the result of collapse and have never been filled to overflowing with molten lava. They are commonly located along rift zones on the flanks of shield volcanoes, such as the Mauna Loa and Kilauea, in Hawaii. Synonym for volcanic sink. *USGS Bull. 994, 1953, p. 17.*

pit efficiency. In order to allow for the friction of the skips on the guides and between the air and the skips in the shaft and for other small losses, it is usual to divide the total static torque at any point of the wind by 0.9 for a new shaft with rope guides, or 0.85 for an old shaft with rigid guides. This factor is generally referred to as pit efficiency. *Sinclair, V, pp. 166-167.*

pit eye. a. Bottom of pit shaft from which sky is visible. *Pryor, 3.* b. Eng. The bottom of the shaft of a coal mine; also the junction of a shaft and a level. *Fay.* Also called pit bottom, especially with regard to the lower levels. *Standard, 1964.*

pit-eye pillar. A barrier of coal left around a shaft to protect it from caving. *Fay.*

pit flints. Flints dug from chalk as opposed to gravel. *Arkell.*

pit foreman. In bituminous coal mining, a foreman who is in immediate charge of all mining operations in a strip mine. Also called pit boss. *D.O.T. 1.*

pit frame. a. The framework carrying the pit pulley. *See also* headframe. *Fay.* b. The framework in a coal mine shaft. *Standard, 1964.* c. Superstructure of shaft, which supports winding gear; headframe. *Pryor, 3.*

pit gate. York. Any place in the immediate vicinity of a colliery at which miners hold meetings of their own in reference to wages, etc. *Fay.*

pit guide. An iron column that guides the cage in a mine shaft. *Standard, 1964.*

pith. a. The parenchyma (usually) tissue occupying the central portion of a stem inside the sylem. *A.G.I.* b. Eng. The soft part of the lode. *Fay.*

pit hand. In the iron and steel industry, a general term applied to workers who perform varied duties around the processing furnaces. *D.O.T. 1.*

pithead. a. Landing stage at top of shaft. *Pryor, 3.* b. The top of a mine shaft including the buildings, roads, tracks, plant, and machines around it. *See also* pit brow. *Nelson.*

pithead baths; changehouses. A building situated convenient to the miners leaving the pithead, with washing facilities, accommmodation for changing and drying clothes, and a canteen. In Great Britain, responsibility for pithead baths and colliery canteens rests with the National Coal Board. *Nelson.*

pithead frame. Scot. *See* headframe, a; pit frame, a. *Fay.*

pithead man. Scot. The man in charge of the unloading of the cages and weighing of the mineral at a pithead. *Fay.*

pithead manshift per thousand tons. The number of manshifts worked at the face for the production of each thousand tons of pithead output of coal. *Nelson.*

pithead output. The total tonnage of raw coal produced at a colliery, as distinct from saleable output. It is the tonnage of coal as weighed before it enters the coal-preparation plant. *See also* run-of-mine coal. *Nelson.*

pitheap. The refuse piled near the opening of a mine; hence, all the surface works. *Standard, 1964. See also* heapstead. *Fay.*

pit hill. Eng. *See* pit bank, b. *Fay.*

pit kiln. a. A kiln sunk in the ground, as on a hillside. *Fay.* b. An oven in which coke is made. *Standard, 1964.*

pit lamp; pit light. An open lamp worn on a miner's cap as distinguished from a safety lamp. *Fay.*

pit limits. The vertical and lateral extent to which the mining of a mineral deposit by open pitting may be economically carried. Cost of removing overburden or waste material versus the minable value of the ore so exposed is usually the factor controlling the limits of a pit. *Bureau of Mines Staff.*

pitman. a. A man who examines regularly the condition of the shaft, guides, etc. He usually selects the weekends for his inspection when winding is at a minimum. *Nelson.* b. An earlier term for the man in charge of the pumps in the shaft. *Nelson.* c. A laborer who inspects refined copper emerging from crusher for size and the presence of foreign materials. *D.O.T. Supp.* d. In the Blake type of jaw crusher, an eccentrically driven vertical link between the driving wheels and the toggles which move the crusher's swing jaw. *Pryor, 3.* e. Old term for connecting rod. *Sandstrom.*

pitman arm. An arm having a limited movement around a pivot. *Nichols.*

pitmen. Men employed in shaft shinking or shaft inspection and repair. *C.T.D.*

pit mining. Surface mining in which the material mined is removed from below the surrounding land surface. *American Institute of Mining and Metallurgical Engineers. Technical Publication No. 604, 1935, p. 6.*

pit mouth. Scot. The opening of a shaft at the surface of the ground. *Fay.*

pitometer. An instrument that consists essentially of two pitot tubes one of which is turned upstream and the other downstream and that is used to record autographically the velocity of a flowing liquid or gas. *Webster 3d.*

Pitot's gage. *See* Pitot tube. *Fay.*

Pitot-static tube. When the Pitot tube and static tube are combined, they form the Pitot-static tube, and as such they can be used as an anemometer. The tubes are usually arranged concentrically. When they are connected to the opposite sides of a manometer the dynamic or velocity pressure will be measured directly. *Roberts I, p. 40.*

Pitot tube. Consists of two concentric tubes bent in an L shape. In operation, the instrument is pointed in the direction of air flow: the inner tube, open at the end directed upstream, measures total head, and the outer tube, perforated with small openings transverse to the air flow, records static head. Each tube is connected to a leg of a manometer, when reading velocity head. *Hartman, p. 112.*

pit pony. A pony used for packing or haulage in a mine. *Webster 3d.*

pit prop. a. A piece of timber used as a temporary support for the mine roof. *Zern.* b. Lengths of timber used as roof supports in longwall mining. Modern variants include expandable steel props which can be hydraulically or mechanically lengthened; used in stratified deposits. *Pryor, 3.*

pit pumps. Scot. Pumps used in a mine shaft. *Fay.*

pit quarry. a. An open-pit quarry sunk below ground level. Access is gained by stairs, ladders, or mechanical hoists, and material is conveyed from the quarry by inclined tracks, trucks, derricks, or cableway hoists. These pits may reach depths of several hundred feet. *AIME, p. 325.* b. A drainage scheme will in most cases be necessary, as the pit will form a natural sump for both surface and subsoil water. This type of quarry is often used for gravel or soft rock which can be extracted by some form of digging. *See also* hillside quarry. *Nelson.*

pit rails. Eng. Iron or steel rails upon which trams or tubs run in a mine. *Fay.*

pit room. a. The number of working places, or length of longwall face, available in a mine for coal production. *Nelson.* b. The extent of the opening in a mine; pit space. *Fay.*

pit rope. Eng. Winding rope; a hoisting rope. *Fay.*

pits. a. Depressions produced in a metal surface by nonuniform electrodeposition or by corrosion. *Lowenheim.* b. So. Wales. Long, open-air fires for converting coal into coke for blast-furnace purposes. *Fay.* c. Excavations to hold quantities of water and drilling fluids. *Wheeler.*

pit sampling. a. Use of small untimbered pits to gain access to shallow alluvial deposits or ore dumps for purpose of testing or valuation. *Pryor, 3.* b. Sampling shallow deposits by means of trial pits, usually about 2 to 3 feet in diameter. In reasonably dry ground, depths of 50 feet or more may be reached. Pit sampling is often used to assist site investigations as it provides the maximum of information regarding nature of deposits and bedrock. *Nelson.*

pit sand. a. Sand usually composed of grains that are more angular; it often contains clay and organic matter. When washed and screened it is a good sand for general purposes. *Zern, p. 145.* b. Sand from a pit, as distinct from river or sea sand. *Arkell.*

pit shaft. Eng. Same as shaft. *Fay.*

pit shale. The name given to the shale from a drift opened in the side of the ravine at a level 62 feet below that of the Pittsburgh coal seam. *Rice, George S.*

pit shoveler. *See* bankman, a. *D.O.T. 1.*

pit slope. The angle at which the wall of an open pit or cut stands as measured along an imaginary plane extended along the crests of the berms or from the slope crest to its toe. *Compare* slope, j. *Bureau of Mines Staff.*

pittasphalt; pissasphalt. An old name given to viscid bitumen. *Tomkeieff, 1954.* Synonym for maltha.

pitted outwash plain. A plain whose surface is marked by shallow pits and ponds, which are interpreted as the depressions left by the melting of isolated blocks of ice that had been partly or entirely buried in the outwash material. *Stokes and Varnes, 1955.*

pitter. A horse or pony suitable for pit or underground work. *Nelson.*

pitticite. a. A hydrous sulfarsenate of iron, found in yellowish, reddish, and brownish reniform masses. Also spelled pittizite. *Fay.* b. Synonym for glockerite. *Hey 2d, 1955.*

pitting. a. The act of digging or sinking a pit. *Fay.* b. Scot. Mining on the outcrop by means of shallow pits. *Fay.* c. In prospecting and valuation of shallow deposits, use of pits, usually untimbered and temporary, to expose the minerals. *Pryor, 3.* d. Testing an alluvial deposit by the systematic sinking of small shafts, the material recovered being subsequently tested. The practice is confiined to shallow depths, that is, down to about 50 feet in fairly dry soft ground. *Nelson.* e. A type of corrosion that develops cavities or pits in highly localized areas on a metal surface that is not particularly affected elsewhere. These pits may vary from deep cavities of small diameter to relatively shallow depression. *H&G.* f. Depressed symmetrically shaped areas in the surface of enamel. May have a black speck at the center. *Bryant.*

pitting corrosion. Passive metals are resistant to a wide variety of corrosive media, but under certain conditions breakdown of the passive film may occur at various points. Depending on conditions, this may lead to complete breakdown of the passive film or the attack may concentrate at these initial areas, leading to rapid failure by pitting. *Ham.*

pit tip. Eng. A bank or heap upon which mine waste is tipped or dumped. *Fay.*

pit top. a. Eng. The mouth of a mine shaft. *Fay.* b. Aust. The structure about the mouth of a shaft. *Fay.*

Pittsburgh bed. The Pittsburgh coal which outcrops prominently in the vicinity of Pittsburgh and extends under a large area of western Pennsylvania and northern West Virginia. It belongs in the Carboniferous system, Pennsylvanian series, at the base of the Monongahela formation. *Rice, George S.*

Pittsburgh process. A process for the vertical drawing of sheet glass invented by the Pittsburgh Plate Glass Company. The sheet is drawn from the free surface of the molten glass, the drawing slot being completely submerged; the edges of the sheet are formed by rollers. This process has also been referred to as the Pennvernon process. *Dodd.*

pit water. a. Water from the underground workings of a mine. *B.S. 3552, 1962.* b. Aust. The moisture contained in freshly mined coal, which is lost by exposure to ordinary atmospheric conditions. *Fay.*

pit wood. The various kinds of timber used at a mine mainly as supports. The advent of steel has reduced considerably the use of timber for support purposes. *Nelson.*

pitwork. Cornish pumps and other engineering appliances in and near mine shaft. *Pryor, 3. See also* pit top. *Fay.*

pitwright. a. Scot. An engineer who attends to pit pumps, etc. *Fay.* b. *See* pumping engineer; mine carpenter. *D.O.T. 1.*

pivot. A nonrotating axle or hingepin. *Nichols.*

pivotal fault. See hinge fault; rotational fault.

pivoted-bucket carriers. The highest type of combined elevator and conveyor. It consists of two long-pitch roller chains joined by crossbars on which are hung the buckets in such a way that they can be completely turned over. *Pit and Quarry, 53rd, Sec. C, p. 26.*

pivoted-bucket conveyor. A type of conveyor using pivoted buckets attached between two endless chains which operate in suitable guides or casing in horizontal, vertical, inclined or a combination of these paths over drive, corner and takeup terminals. The buckets remain in the carrying position until they are tipped or inverted to discharge. *ASA MH4.1-1958.*

pivot shaft. A tractor dead axle, or any fixed shaft which acts as a hinge pin. *Nichols.*

pivot tube. A hollow hinge pin. *Nichols.*

pk Abbreviation for peck. *BuMin Style Guide, p. 61.*

place. a. *See* in place; in situ. *Fay.* b. The part of a mine in which a miner works by contract is known as his "place" or "working place." A point at which the cutting of coal is being carried on. *Fay.* c. Eng. A kind of cabin in which tools are kept in the mine, and in which a deputy eats his lunch. *Fay.*

place brick. *See* salmon brick, *ACSG, 1963.*

placer. a. A place where gold is obtained by washing; an alluvial or glacial deposit, as of sand or gravel, containing particles of gold or other valuable mineral. In the United States mining law, mineral deposits, not veins in place, are treated as placers, so far as locating, holding, and patenting are concerned. Various minerals, besides metallic ores, have been held to fall under this provision, but not coal, oil, or salt. *Webster 2d.* b. Valuable alluvial deposit, the commonest being of gold, cassiterite, or gem stones. Formed by attrition by river action of the lighter rocks leaving relatively inert, tough, and heavy minerals in a concentrated layer. *Pryor, 3.* c. S. Afr. Shallow alluvial gold deposit. *Beerman.* d. In the mining act, ground within defined boundaries chiefly valuable for its deposits, metallic or nonmetallic, in earth, sand, or gravel, not in place, that is, in a loose state, upon or near the surface or occupying the bed of ancient rivers or valleys and may, in most instances, be collected by washing or amalgamation without milling. In other words, the term includes all forms of deposit excepting veins or lodes of quartz or other rock in place. *Ricketts, I.* e. Designating one who engages in placer mining. *Craigie, v. 3, p. 1756.*

placer brown coal. Brown coal broken up and redeposited. *Tomkeieff, 1954.*

placer claim. a. A mining claim located upon gravel or ground whose mineral contents are extracted by the use of water, by sluicing, hydraulicking, etc. The unit claim is 1,320 feet square and contains 10 acres. *Fay.* b. Ground with defined boundaries which contains mineral in the earth, sand, or gravel; ground that includes valuable deposits not fixed in the rock. *See also* claim; lode claim. *Fay.* c. The maximum size of a placer claim is 20 acres. Association claims of two or more persons may be located up to an area of 160 acres for eight persons. Placer claims must have a discovery. They should be staked, a location notice posted, and recorded in the same manner as for lode claims, stating the mineral for which the location is made. *Lewis, p. 28.*

placer deposit. a. A mass of gravel, sand, or similar material resulting from the crumbling and erosion of solid rocks and containing particles or nuggets of gold, platinum, tin, or other valuable minerals, that have been derived from rocks or veins. *Fay.* b. Deposits of heavy minerals concentrated on the surface by moving water or air. *Bateman.* c. An alluvial deposit of ore, usually as mineral-bearing gravel or sand. *Pryor, 2. See also* alluvial deposit. *Bureau of Mines Staff.*

placer digging. a. The action of mining by placer methods. *Craigie, v. 3, p. 1756.* b. A place at which placer mining is or may be carried on. *Craigie, v. 3, p. 1756.*

placer gold. Gold occurring in more or less coarse grains or flakes and obtainable by washing the sand, gravel, etc., in which it is found. *Craigie, v. 3, p. 1756. See also* stream gold. *Bennett 2d, 1962.*

placer ground. Ground where placer mining can be done, that is, where gold can be obtained in digging up the earth and washing it for the gold. *Craigie, v. 3, p. 1757.*

placer location. A location of a tract of land for the mineral-bearing or other valuable deposits upon or within it that are not found within lodes or veins in rock in place, and is a claim of a tract of land for the sake of the loose deposits on or near its surface. *Ricketts, I.*

placer mine. a. A deposit of sand, gravel, or talus from which some valuable mineral is extracted. *Hess.* b. To mine gold by washing the sand, gravel, etc. *Craigie, v. 3, p. 1757.*

placer miner. One who mines gold at a placer mine. *Craigie, v. 3, p. 1757.*

placer mining. a. The extraction of heavy mineral from a placer deposit by concentration in running water. It includes ground sluicing, panning, shoveling gravel into a sluice, scraping by power scraper and excavation by dragline. *Nelson.* b. Extracting the gold or other mineral from placers, wherever situated—in dry channels and in channels for the time filled with water. It does not make the process any the less placer mining that the mineral is found in deep channels, in navigable streams, or in estuaries or creeks and rivers where the sea ebbs and flows. *Ricketts, I.* c. That form of mining in which the surficial detritus is washed for gold or other valuable minerals. When water under pressure is employed to break down the gravel, the term hydraulic mining is generally employed. There are deposits of detrital material containing gold which lie too deep to be profitably extracted by surface mining, and which must be worked by drifting beneath the overlying barren material. To the operations necessary to extract such auriferous material the term drift mining is applied. *See also* dredge, a. *Fay.*

placing plant. Equipment for placing wet concrete into the appointed position, and which may consist of conveyors, cableways, cranes, concrete pumps, hoists, dumpers, and hand barrows. *Ham.*

placing sand. Sand, usually quartz, placed between brick or tile before firing to prevent sticking and to allow for movement in the setting during firing. *ACSG, 1963.*

placing work. Eng. The distribution of work among trammers. *Fay.*

plaffeiite. A fossil resin found in Switzerland. *Tomkeieff, 1954.*

plagiaplite. A dioritic aplite containing oligoclase to andesine with or without green hornblende. With increasing quartz, content grades into gladkaite. *Bureau of Mines Staff.*

plagioclase. An isomorphous series of triclinic feldspar minerals, $(Na,Ca)Al(Si,Al)Si_2O_8$, ranging from albite, $NaAlSi_3O_8$, to anorthite, $CaAl_2Si_2O_8$. The name has reference to the oblique cleavage of these feldspars as compared with the potassium feldspars. *A.G.I.*

plagioclase feldspars. A group of feldspars containing a mixture of sodium and calcium feldspars, distinguished by their extinction angles; crystal; triclinic; Mohs' hardness, 6; and specific gravity, 2.6 to 2.7. *Bennett 2d, 1962.*

plagioclase rhyolite. A porphyritic extrusive rock with phenocrysts of plagioclase and quartz in a groundmass of orthoclase and quartz. Also called dellenite; plagioliparite. *Webster 2d.*

plagioclastic. Having the cleavage of plagioclase; breaking obliquely. *Standard, 1964.*

plagiohedral; plagihedral. Having an oblique spiral arrangement of faces; specifically, being a group of the isometric system characterized by 13 axes of symmetry but no center or planes. *Webster 3d.*

plagioliparite. Synonym for rhyolite. *A.G.I.*

plagionite. A sulfide of lead and antimony, $Pb_5Sb_8S_{17}$; color, blackish, lead-gray; luster, metallic; monoclinic. *Webster 3d; Dana 17.*

plagiophyre. A term for rocks resembling orthophyres in texture, but containing plagioclase instead of orthoclase. The type example contains laths of andesine with interstitial chloritic minerals, iron ores, and in places, orthoclase. *Compare* leucophyre. *Holmes, 1928.*

plain. a. An extent of level, or nearly level, land; a region not noticeably diversified with mountains, hills, or valleys. *Fay.* b. A flat, gently sloping or nearly level region of the sea floor. *H&G.* c. Relatively free from bubbles and seed during the melting process. *ASTM C162-66.*

plain clinometer. A clinometer having only its upper end threaded to fit drill rods. Also called end clinometer. *See also* clinometer. *Compare* line clinometer; wedge clinometer. *Long.*

plain, coastal. A plain fronting the coast and generally representing a strip of recently emerged sea bottom. *A.G.I.*

plain concrete. Concrete with no reinforcement. *See also* mass concrete. *Ham.*

plain core barrel. Synonym for single-tube barrel. *Long.*

plain detonator. A detonator for use with a safety fuse. *B.S. 3618, 1964, sec. 6.* It consists of an aluminum tube closed at one end and partly filled with a sensitive initiating explosive. The tube is only partially filled because a plain detonator is always used in conjunction with a safety fuse, and the empty space enables the fuse to be inserted into the tube until it comes into contact with the detonating composition. The safety fuse is then secured in position by indenting the detonator tube, this process being known as crimping. The combination of safety fuse and plain detonator is called a capped fuse. *McAdam II, p. 52.*

plaining. Freeing bubbles in molten glass. *Bennett 2d, 1962 Add.*

plain of formation. Formed by the undisturbed extension of beds which retain the original horizontality of deposition. River deltas, alluvial flats, fens, marshes, and silted-up lakes are instances of such plains. *A.G.I.*

plain of marine abrasion. A plain formed beneath the sea by the erosive powers of the latter. Synonym for marine-cut terrace; plain of marine denudation; plain of marine erosion; plain of submarine denudation; wave-cut plain; wave-cut terrace. *A.G.I.*

plain of marine denudation. The sea level to which a mass of land has been reduced mainly by the subaerial forces; the line below which further degradation became impossible because the land was thereafter protected by being covered by the sea. Undoubtedly the last touches in the long process of sculpturing were given by the waves and currents, and the surface of the plain corresponds with the lower limit of the action of these forces. Synonym for marine-cut terrace; plain of marine abrasion; plain of marine erosion; plain of submarine denudation; wave-cut plain; wave-cut terrace. *A.G.I.*

plain of marine erosion. Synonym for marine-cut terrace; plain of marine abrasion; plain of marine denudation; plain of submarine denudation; wave-cut terrace; wave-cut plain. *A.G.I.*

plain of marine gradation. In the course of development of such a peneplain the sea may encroach upon the area. To the limits of the encroachment the waves cut away all low hills and fill hollows, producing a plain which is even more uniform than any stage of peneplain of erosion, except perhaps the extreme case of a base level. Such a wave-smoothed surface is called a plain of marine gradation. *A.G.I.*

plain of submarine denudation. a. Sir Arthur Ramsey and Mr. Davison had described in general terms the abrasive work of the breakers, and shown how as the level of land became degraded by subaerial forces of denudation, the margin next to the sea arrived at its base level of erosion, and sank as a denuded plain before the advancing sea. Such a plain was called by Ramsey a plain of submarine denudation. Von Richthofen adopted the term abrasion and used the expression a plain of abrasion to signify more particularly a submarine platform whose surface had been abraded during subsidence of the land by the destructive action of marine breakers and currents. *A.G.I.* b. Evidently, the original usage implied that the plain was first formed by nonmarine agencies and was then submerged, a minor role being assigned to wave erosion. However, according to present usage, as the term suggests, it is defined as a plain made by the erosive work of waves. Synonym for marine-cut terrace; plain of marine abrasion; plain of marine denudation; plain of marine erosion; wave-cut plain; wave-cut terrace. *A.G.I.*

plain pilot. A pilot in the surface of which no cutting points, such as diamonds or slugs, are inset. *See also* pilot. *Long.*

plain press. A mechanical press having the flywheel mounted directly on the main crank or eccentric shaft. *ASM Gloss.*

plain shale. Scot. Oil shale not foliated. *Fay.*

plain tile. *See* roofing tile. *Dodd.*

plain tract. The lower portion of a stream course characterized by low gradient and a wide flood plain. *A.G.I. Supp.*

plaiting. A texture seen in some schists and due to intersection of stratification and cleavage planes where the latter are well developed. *A.G.I.*

plan. a. A map showing features such as mine workings or geological structures on a horizontal plane. *See also* colliery plane. *Nelson.* b. A scheme or project for mine development. *See also* planning. *Nelson.* c. The system on which a colliery is worked, as longwall, pillar-and-breast, etc. *Zern.* d. A map or plan of a colliery showing outside improvements and underground workings. *Zern.* e. Sp. The lowest working in a mine. *Fay.* f. Sp. P. del tiro, the sump of a shaft. *Fay.* g. Sp. An inclined plane. *Fay.* h. Sp. A survey plan. *Fay.* i. Colom. An artificial surface, slightly inclined, constructed on bedrock or sand for the deposition of alluvium. *Fay.* j. Sp. Trabajar de plan, to sink vertically or on an incline. *Fay.*

planar. Arranged as a plane or in planes, spread out; usually, more or less parallel planes are implied, such as bedding or cleavage. *Challinor.*

planar cross-bedding. Cross-bedding characterized by planar foresets. *Pettijohn.*

planar cross-stratification. Lower bounding surface of cross-stratified unit has a planar surface of erosion. *Pettijohn.*

planar flow structure. Any planar structure that develops during the intrusion of magma. May be expressed by the parallel arrangement of platy minerals (giving a foliation), by slablike inclusions, by schlieren, or by bands of different mineralogy or texture. Synonym for planar structure; platy flow structure. *A.G.I.*

planar gliding. Uniform slippage along the plane surfaces. *A.G.I. Supp.*

planar structure. *See* planar flow structure. *A.G.I.*

planation. a. The widening of valleys through lateral corrasion by streams after they reach grade and begin to swing, and the concurrent formation of floodplains. Also, by the extension of the above processes, the reduction of divides and the merging of valley plains to form a peneplain; peneplanation. *Fay.* b. The grading of an area or district by any erosive process, either subaerial or marine. *Fay.*

planch. A slab of firebrick in an enameling furnace, to support the work while baking. *Standard, 1964.*

planchet. A metal disk with edges milled ready for coining. *ASM Gloss.*

plancheta. Sp. A planetable used in surveying. *Fay.*

planchette. A drafting board varying in size from about 15 x 15 to 24 x 30 inches. On the upper side means are provided for attachment of drawing paper, and on the lower a plate threaded for attachment to the tripod head. *A.G.I.*

plane. a. Any roadway, generally inclined but not necessarily so, along which coal, ore, or men are conveyed by mechanical means. *See also* bedding plane; fault plane. *Nelson.* b. A road on the natural floor of the seam. *Mason.* c. An inclined transportation road down which loaded cars travel from one bed to another or to a lower elevation in the same bed. *See also* slope. *Hudson.* d. Any incline on which a track is laid for the purpose of lowering or hoisting coal in or outside a mine, or on a gravity railroad. *Korson.* e. Scot. A working room driven at right angles to or facing the joint planes. *Fay.* f. In metal working, a gage or test for a true surface; a surface plate. *Standard, 1964.* g. A level surface bounded by straight lines, as the faces of crystals. *Gordon.* h. A real or imaginary plane surface, which means that every point on this surface lies in the same plane. *Jones, 2, p. 90.* i. In brickmaking, a trowellike tool for striking off clay that projects above the mold. *Standard, 1964.* j. A flat or level surface. *Webster 3d.*

plane angle. *See* angle, a. *Webster 3d.*

planear. Mex. To extract gold from fissures, cracks, etc., in soft uneven bedrock. *Fay.*

plane course; on plane. Scot. In the direction facing the joint planes. *Fay.*

plane engineer. *See* slope engineer. *D.O.T. 1.*

plane fault. The fault surface being a flat plane. *Schieferdecker.*

plane figure. A plane surface bounded either by straight lines or curved lines or by a combination of straight and curved lines. *Jones, 2, p. 91.*

plane frame. A structural frame where the center lines of all members are in the same vertical plane. *Ham.*

plane man. *See* incline man. *D.O.T. 1.*

plane of rupture. The surface in retained earth along which the material is assumed to fail when a retaining wall is being designed on the wedge theory. *See also* slip surface of failure. *Nelson.*

plane of saturation. *See* water table. *Nelson.*

plane of stretching. Low angle gravity (normal) fault resulting from stretching of the solidified top of an igneous intrusion. *A.G.I.*

plane of symmetry. a. A plane to which a crystal is symmetrical; that is, for each face or angle of the crystal there is a similar face or angle in such position on the opposite side of the plane that the line joining the two faces or angles is perpendicular to the plane. *Fay.* b. An imaginary plane dividing a crystal so that one part of the crystal is the mirror image of the other part. *Hurlbut.*

plane or rectangular coordinates. The perpendicular distances of a point from a pair of rectangular coordinate axes. *Seelye, 2.*

plane polarized light. Light emerging from a polarizer, its vibrations therefore being restricted to one wave direction. *Pryor, 3.*

planer. a. First developed as a fixed-blade device for continuous longwall mining of narrow seams of friable coal. It is operated in much the same manner that a common wood plane is used to dress the edge of a horizontal table top; the machine is palled along the coal face, planing a narrow cut from the solid coal as it travels. Similarly operating vibrating-blade planers were designed later in an attempt to apply the technique to harder coal. Vibrating-blade planers have also been experimented with in the phosphate beds in western Montana. *Bureau of Mines Staff.* b. A machine provided with a cutting tool having lateral and vertical adjustment. Is widely used in stone strimming. As the block of stone is carried beneath it on a traveling bed or platen, a thin layer of stone is scraped from the surface. Both sides and tops of blocks may be planed to desired dimensions. Some planers may be adjusted to cut curved forms. *AIME, p. 329.* c. A machine fitted with milling cutters and used to smooth a road surface, which is first softened by heating. *Ham.*

planer hand. *See* planer, stone. *D.O.T. 1.*

planerite. a. An erroneous name for vashegyite. *Hess.* b. An amorphous green mineral, $3Al_2O_3 \cdot 2P_2O_5 \cdot 18 \pm H_2O$. *Larsen, p. 50.* c. Planerite equals cuprian coeruleolactite and calcian turquoise. M. Fleischer states that the name should be dropped. *American Mineralogist, v. 43, No. 11–12, November-December 1958, p. 1224.*

planer man. *See* planer, stone. *D.O.T. 1.*

planer operator. *See* planer, stone. *D.O.T. 1.*

planer, stone. In the concrete products and stonework industry, one who shapes, smooths, squares, and removes excess material from the surfaces of blocks or slabs of building or ornamental stone (limestone, slate, sandstone, marble, and such concrete work as imitation marble) on a planer. Also called planer hand; planer man; planer operator; planing machine operator. *D.O.T. 1.*

plane schistosity. A type of schistosity in crystalline schists characterized by the arrangement of the tabular and prismatic crystals in parallel planes. *Schieferdecker.*

plane shear. One of four types of slope failure. Plane shear failure results when a natural plane of weakness such as a fault, a shear zone, or bedding plane exists within the slope and has a direction such as to provide a preferential path for failure. Large intact portions of the slope rock may slide along this plane surface. *Woodruff, v. 3, p. 539.*

plane strain. Condition where all deformations are within one plane. *BuMines Bull. 587, 1960, p. 2.*

plane stress. State of stress in which tractions (stresses) involving the intermediate principal stress vanish. *A.G.I.*

plane surveying. Ordinary field and topographic surveying in which the curvature of the earth is disregarded. *Webster 3d.*

planetable. a. An instrument for plotting the lines of a survey directly from the observations and consisting essentially of a drawing board mounted on a tripod and fitted with a ruler that is pointed at the object observed usually with the aid of a sighting device (as a telescope). *Webster 3d.* b. An inclined ore-dressing table. *Standard, 1964.*

planetable method. A mine roadway area measurement method in which a sheet of paper pinned to a drawing board is set up on a tripod, in the plane of the section to be measured. From a central point on the paper offsets are made to the roadway perimeter, using a tape. The measured distances are then sealed off on the paper, along each respective offset line. *Roberts, I. p. 59.*

planetary geared drum. The drum containing planetary gearing which is used to control the motion of the rope drums on certain types of mining machines. In planetary gearing, which is used when a large ratio of speed reduction with only a few operating gears is required, some or all of the gear wheels in the train of mechanism have a motion about an axis and a revolution about that same axis. *Jones.*

planetary lap. A type of machine lap employing a number of geared workholders which rotate with an epicyclic motion between two stationary lapping plates. The crystals, when contained in pentagonal holes in the workholder, have an imposed rotatory motion. Also known as the Hunt-Hoffman lap or Bendix lap. *AM, 1.*

planetary mills. Mills used for making very large reductions on slabs by one pass through the mill. The mill consists of two large plain rolls, each surrounded by many small work rolls. *Osborne, p. 357.*

planetary set gear. A gearset consisting of an inner (sun) gear, an outer ring with internal teeth, and two or more small (planet) gears meshed with both the sun and the ring. *Nichols.*

plane tender. *See* slope engineer. *D.O.T. 1.*

planetesimal. One of numerous, small, solid planetary bodies which, according to the planetesimal hypothesis, had individual orbits about the sun and of which the planets were formed by aggregation. *Fay.*

planetesimal hypothesis. The hypothesis that the earth and the other planets were formed by the collision and coalescence of planetesimals and have never been wholly molten. *Fay.*

planet gearing. Gearing in which one gear wheel revolves round another. *Mason.*

plane trigonometry. Trigonometry that treats of the solution of plane triangles. *Zern, p. 54.*

planform. The outline or shape of a body of water as determined by the stillwater line. *A.G.I.*

planimeter. An instrument for measuring the area of any plane figure by passing a tracer around its boundary line. *Webster 3d.*

planimetric analysis. Analysis of patterns in a fabric diagram based on distribution of points and areal comparisons. *A.G.I. Supp.*

planimetric map. A map which presents the horizontal positions only for the features represented; distinguished from a topographic map by the omission of relief in measurable form. *A.G.I.* Often called line map. *Seelye, 2.*

planimetric method. A method of measuring grain size in which the grains within a definite area are counted. *ASM Gloss.*

planimetry. a. The determination of horizontal distances, angles, and areas by measurements on a map. *A.G.I.* b. The plan details of a map. *Seelye, 2.*

planing. Producing flat surfaces by linear reciprocal motion of work and the table to which it is attached, relative to a stationary, single-point cutting tool. *ASM Gloss.*

planing machine operator. *See* planer, stone. *D.O.T. 1.*

planish. To condense, smooth, and toughen, as metal, by hammer blows. *Standard, 1964.*

planisher. A device for flattening thin sections cut for microscopic examination. *Standard, 1964.*

planishing. Producing a smooth surface finish on metal by a rapid succession of blows delivered by either highly polished dies, a hammer designed for the purpose, or rolling in a planishing mill. *ASM Gloss.*

plank. a. S. Wales. Strata drained of gas. *Fay.* b. Eng. Any coarse flaggy stone that can be used for paving; for example, in the Great Oölite at Minchinhampton, and in the Northampton Sands of Worton. Also called planking. *Compare* boarding. *Arkell.* c. Eng. Supports set horizontally to the roof. Planks and crowntrees are either rectangular in section or made from props cut in two longitudinally. Steel planks are generally called straps. In Cumberland bars are round or squared timber used at the face. Also called crowntree; bar; strap. *SMRB, Paper No. 61.* d. A board over 1 inch in thickness. *Jones, 2, p. 57.*

plank dam. Eng. A watertight stopping fixed in a heading, and constructed of plank placed across the passage. *Fay.*

plank hook. In mining, a form of cant hook used for shifting planks. *Standard, 1964.*

plank timbering. a. The lining of a shaft with rectangular plank frames. *Fay.* b. *See* box timbering. *Pryor, 3.*

plankton. The whole community of drifting small plants and animals in the upper layers of the water. This term is frequently used to describe all life forms, regardless of size, which have no means of significant self-locomotion. This community can be divided into the phytoplankton (plants) and the zooplankton (animals). *Hy.*

plankton bloom. The rapid growth and multiplication of plankton, usually plant forms, producing an obvious change in the physical appearance of the sea surface, such as coloration or slicks; also called sea bloom and florescence. *Hy.*

planktonic. Relating to the chiefly simple types of floating and surface-dwelling forms of organisms of the ocean waters. *Schieferdecker.*

plank tubbing. The lining of a shaft with planks, spiked on the inside of curbs. *Fay.*

planning. The predesign of the detailed layout, main roadways, and workings of a mine or group of mines. The scheme usually involves the introduction of mechanical equipment for the working and transport of the coal or mineral. The selection of mining methods and machines properly adapted to the local conditions is part of planning. *See also* strategic planning; tactical planning. *Nelson.*

planning department. In the coal industry, a department which is concerned with future coal production. It designs and delineates development work as far as 20 years ahead, such that the seams are exploited with efficiency, safety, and economy. *Nelson.*

planning engineer. A mining engineer responsible for mine planning. He is attached to the planning department of a large mine or a group of smaller mines and is qualified by training, experience, and technical qualifications to envisage new development work and coordinate the ideas of other experts such as the mechanization engineer, ventilation engineer, mining geologist, etc. *Nelson.*

planometric projection. Pictorial view of an object showing it in plan with oblique lines showing the front, side, and thickness. *See also* projection. *Ham.*

planophyre. A rock in which the phenocrysts are arranged in layers. *Fay.*

planophyric. Applied to porphyritic rocks in which the phenocrysts are arranged in layers. *Holmes, 1928.*

planorasion. Working in conjunction with the processes of desert disintegration, the wind acts as an abrading and eroding agent which, unlike running water, works uphill. This process, termed by Keyes planorasion, in the early stages of its action, may grade a slope as steep as 4°. *A.G.I.*

planosol. An intrazonal group of soils with eluviated surface horizons underlain by B horizons more strongly illuviated, cemented, or compacted than associated normal soils, developed upon a nearly flat upland surface under grass or forest vegetation in a humid or subhumid climate. *A.G.I.*

plans. Maps or drawings representing on a smaller scale the workings of the mine in their exact position and proper proportion. *Peel.*

plant. a. The shaft or slope, tunnels, engine houses, railways, machinery, workshops, etc., of a colliery or other mine. *Fay.* b. To place gold or any valuable ore in the ground, in a mine, or the like to give a false impression of the richness of the property. To salt, as to plant gold with a shotgun. *See also* salting a mine. *Fay.* c. In mining, the mechanical installations, machines, and their housings. Earthworks are sometimes loosely included. *Pryor, 3.* d. Used to include the machinery, derricks, railway, cars, etc., employed in tunnel work. *Stauffer.*

plant bed. A shale roof overlying a coalbed and being usually rich in plant fossils. *Raistrick and Marshall, pp. 32–33.*

Plante battery. A type of lead-acid storage battery. *Webster 3d.*

plant indicators. *See* indicator plant; local plant indicators; universal plant indicators.

plant mix. The process of soil stabilization in which the soil is carried to a stationary mixer, returned to the site after mixing and then spread. *See also* mix-in-place. *Ham.*

plant-mixed concrete. Concrete which is mixed at a central mixing plant and delivered to the site in special equipment designed to prevent its segregation. *See also* ready-mixed concrete. *Ham.*

plant-mix method. A method of preparing aggregates for bituminous surfaces in which aggregates and bitumen are combined in a plant situated at the road or at a relatively long distance from the road. Also known as the premixed method. *Pit and Quarry, 53rd, sec. E, p. 70.*

plant scrap. Scrap metal produced in the plant itself; for example, sprues and gates in a foundry or defective ingots and hot tops in a steel mill. Also called home scrap. *Newton, p. 38.*

plant symptom. An abnormal growth habit of a plant indicative of a peculiarity in the chemical composition of the supporting soil. *Hawkes.*

plant tester. In petroleum production, one who analyzes natural gas and gas byproducts at a compressor station and makes or recommends changes in operating conditions to maintain products to specifications. *D.O.T. 1.*

plaque. Shallow white-enameled disk of saucer shape, used to separate finely ground minerals by panning action. Much used in pulp testing in concentrating plants for checking products, for which purpose it has largely replaced the Cornish vanning shovel. Also known as Vanning plaque. *Pryor, 3.*

plasma. a. A variety of chalcedonic quartz. *Fay.* b. Gas comprising equal amounts of positively and negatively charged particles, so that in bulk it is electrically neutral; a fourth state of matter (solid, liquid, gas, plasma) capable of conducting magnetic force. *Pryor, 3.*

plasma fuel. This is the white-hot substance that is the principal ingredient of suns and stars. Neither solid, liquid, nor gaseous, could become the great energy-thrust provider of the future. The heavy hydrogen of the oceans may be the best source for this fusion-type power. *Hy.*

plasma jet. a. The maximum temperature obtainable from hydrocarbon/oxygen mixtures is insufficient to melt most minerals. A much higher temperature can be obtained using a gas plasma jet heated to high temperatures by an electric discharge in which temperatures in excess of 10,000° C can be obtained. The jet is formed by passing a high-speed current of nitrogen or a mixture of nitrogen and hydrogen over a tungsten electrode placed in a specially designed narrow orifice in the cutting torch. An arc is struck between this electrode and the earthed nozzle of the torch, which is cooled by a water jacket. When a plasma jet is used to cut rock, two separate zones of action can be expected. *Mining and Minerals Engineering, v. 1, No. 5, January 1965, p. 182.* b. Ionized gas produced by passing an inert gas through a high-intensity arc, causing temperatures up to tens of thousands degrees centigrade. *HW.*

plasma spraying. The process of coating a surface (of metal or of a refractory) by spraying it with particles of oxides, carbides, silicides, or nitrides that have been made molten by passage through the constricted electric arc of a plasma gun; the temperature of the plasma arc flame can be as high as 30,000° C. The usual purpose of a refractory coating applied in this way is to protect a material, for example, molybdenum or carbon, from oxidation when used at high temperature. *Dodd.*

plaster. A material or mixture of materials that is applied in substantial thickness to surfaces for protective or decorative coating purposes. It is designated as gypsum, lime, gypsum-lime or cement-lime plaster, according to composition. *Taylor.*

plaster base finish tile. Tile whose surfaces are intended for the direct application of plaster. *ASTM C43–65T.*

plaster cement. More or less dehydrated calcium sulfate. *Bennett 2d, 1962.*

plaster, hard-finished. Plaster made from overburned gypsum, which is dipped in alum solution and calcined a second time. Keene's cement and Parian cement are examples. *See also* gypsum cements. *CCD 6d, 1961.*

plastering. Same as mudcapping. *Fay.*

plaster man. *See* clay dauber. *D.O.T. 1.*

plaster mill. a. A machine consisting of a roller or set of rollers for grinding lime or gypsum to powder. *Fay.* b. A mortar mill. *Fay.*

plaster molding. Molding, wherein a gypsum-bonded aggregate flour in the form of a water slurry is poured over a pattern, permitted to harden, and, after removal of the pattern, thoroughly dried. The technique is used to make smooth nonferrous castings of accurate size. *ASM Gloss.*

plaster of Paris. A plaster made from gypsum by grinding and calcining; so called from its manufacture near Paris, France. With water, it forms a paste which soon sets. In Canada, this term has been adopted for gypsum in any form. *Fay.* Has a number of ceramic uses; probably the most important is in making models, molds, and dies. Also used as a glass batch material to replace part or all of the salt cake in combination with soda ash, as an additive to certain glazes, and as a mounting medium for optical glass. *Lee.*

plaster pit. Derb. A gypsum mine. *Fay.*

plaster retarder. Any substance used to slow the setting of plaster. Blood, glue, dextrin, and hair are among the retarders used. *CCD 6d, 1961.*

plaster shooting. a. A surface blasting method used when no rock drill is available or is not necessary. It consists of placing a charge of gelignite, primed with safety fuse and detonator, in close contact with the rock or boulder and covering it completely with stiff damp clay. The charges vary from 8 to 16 ounces per cubic yard of rock. *See also* popping; snakeholding. *Nelson.* b. A form of secondary blasting in which the explosive is detonated in contact with the rock without the use of a shothole. *B.S. 3618, 1964, sec. 6. See also* secondary blasting. c. *See* mudcapping. *Fraenkel.*

plaster stone. Gypsum. *Fay.*

plastic. a. Capable of being deformed continuously, and permanently, in any direction, without rupture. *Bureau of Mines Staff.* b. A general term referring to synthetic or natural resins with or without additives, which can be molded by heat or pressure, or both, and to the finished product. *BuMines R.I. 5971, 1962, p. 2.*

plastic and semiplastic explosives. Many of the explosives used for commercial purposes belong to this group. The consistency is such that the explosive can be shaped by moderate pressure to fill the drill hole. The difference between plastic and semiplastic form is primarily dependent on the difference in equipment which has been found necessary in manufacturing cartridges of the explosive. The viscosity of the plastic type makes it possible to produce cartridges by a process of extrusion through tubes. *Fraenkel, v. 3, Art. 16:01, p. 31.*

plastic art. Ceramics or sculpture in which things are modeled. *Crispin.*

plastic bronze. Bronze containing a high proportion of lead; used for bearings. It has a composition of 72 to 84 percent copper, 5 to 10 percent tin, and 8 to 20 percent lead, plus zinc, nickel, and phosphorus. *C.T.D.*

plastic chrome ore. An air-setting ramming material having a base of refractory chrome ore and shipped in plastic form ready for use. *HW.*

plastic clay. Eng. Name formerly used by geologists for the Woolwich and Reading beds. *Arkell.*

plastic deformation. A permanent change in shape of a solid that does not involve failure by rupture. In the narrowest sense, the change is accomplished largely by gliding within individual grains; but it also involves rotation of grains. In a large sense, it includes deformation that is related to recrystallization. *A.G.I.*

plastic design. The design of steel or reinforced-concrete structural frames which is based on the assumption that plastic hinges form at points of maximum bending moment. *See also* elastic design; plastic modulus. *Ham.*

plastic equilibrium. The state of stress within a soil mass or a portion thereof, which has been deformed to such an extent that its ultimate shearing resistance is mobilized. *ASCE P1826.*

plastic explosives. *See* plastic and semiplastic explosives.

plastic fiber. Type of asbestos occurrences common in Europe. *Sinclair, W. E., p. 484.*

plastic firebrick. A common term for both high duty and super-duty fire clay plastic refractories. *Bureau of Mines Staff.*

plastic fire clay; bond fire clay. A fire clay of sufficient natural plasticity to bond nonplastic materials. *ACSG, 1963.*

plastic flow. a. Flow which does not commence until the stress required to deform the system reaches its yield value. If, on reduction of this applied stress, the system again gels, it is thixotropic. In mining, the permanent set after relief of a deforming stress. *Pryor, 3.* b. When a material is strained beyond the elastic limit but not to the extent of complete failure, it becomes plastic and behaves as a viscous liquid. Extension under stress is then a function of time. Such movement is known as plastic flow. *Spalding*. c. A phenomenon in which the bottom sediments under pressure of a weight flow out from under the weight allowing partial or complete burial. *Hy*. d. The permanent deformation, or change in shape without rupture, of a solid body subjected to a continuous force. *A.G.I*. e. In a glacier, the movement of glacier ice that takes place without shearing and cracking of the ice. *A.G.I*. f. The deformation of a metal by movement along the slip planes and at the grain boundaries, the effects varying according to the temperature at which the process is performed. *Rolfe*. g. The same as plastic deformation. *ASM Gloss*.

plastic fracture. The breakage of a metal under tensile load when being drawn out. *See also* cup-and-cone fracture; necking. *Ham*.

plastic igniter cord. A corklike device for lighting a safety fuse. When the cord is ignited an intense flame passes along its length at a uniform rate and ignites the blackpowder core of an ordinary safety fuse. Two types are made: The fast has a nominal burning speed of 1 second per foot; the slow, a nominal speed of 10 seconds per foot. *Nelson*.

plasticity. a. The property of changing shape permanently without movement on any megascopically visible fractures. *A.G.I*. b. The property of a material that enables it to undergo permanent deformation without appreciable volume change or elastic rebound, and without rupture. *Stokes and Varnes, 1955*. c. A complex phenomenon which appears to be induced primarily by the pressure of gases causing surface flow at the moment, when under the action of heat, the molecules at the surface have attained a degree of freedom comparable with that obtained in a liquid. In the case of coal, a certain degree of plasticity is essential for the production of coke. *A.G.I*. d. *See* plastic flow; plastic limit; plastic soil; plastic state; plasticity index. *ASCE P1826*.

plasticity index; index of plasticity. The range over which the soil is plastic and is represented by the difference between the liquid and plastic limit. *See also* plastic limit. *Nelson*.

plasticizer. a. A material, usually organic, capable of imparting plastic properties to nonplastics or improving the plasticity of ceramic mixtures. *ACSG, 1963*. b. A compound added to a lacquer to counteract the tendency of the finished surface to become brittle. *Shell Oil Co*. c. An additive to improve the workability of concrete. *Taylor*.

plastic limit. a. The water content corresponding to an arbitrary limit between the plastic and the semisolid states of consistency of a soil. *ASCE P1826*. b. Water content at which a soil will just begin to crumble when rolled into a thread approximately ⅛-inch in diameter. *ASCE P1826*. c. The lowest water content at which the soil becomes plastic. *A.G.I*.

plastic making. This term includes all processes of shaping clay in the plastic condition, that is, pressing, extrusion, jiggering, jolleying, and throwing. *Dodd*.

plastic modulus. A factor used in the plastic design of steel structures. It is a constant for each particular shape of section. *See also* modulus of section. *Ham*.

plastic pressing. *See* wet pressing. *ACSG, 1963*.

plastic range. The range of temperature during the coking process within which the coking mass of coal is in a semifused or plastic state. *Hess*.

plastic refractory. A refractory material, tempered with water, that can be extruded and that has suitable workability to be pounded into place to form a monolithic structure. *ACSG, 1963*.

plastics. All synthetic resinlike materials which can be molded under the influence of heat or pressure. *Anderson*.

plastic shaping. *See* plastic making. *Dodd*.

plastic sillimanite. An air-setting kyanite-base mixture, ready to use for patching walls, molding shapes, etc. *Bureau of Mines Staff*.

plastic soil. a. A soil that can be rolled into 1/8-inch diameter strings without crumbling. *Nichols*. b. A soft, rubbery soil. *Nichols*. c. A soil that exhibits plasticity. *ASCE P1826*.

plastic solid. A solid that undergoes change of shape continuously and indefinitely after the stress applied to it passes a critical point. *Leet*.

plastic state. The range of consistency within which a soil exhibits plastic properties. Also called plastic range. *ASCE P1826*.

plastic strain. a. In the case of a single mineral, the term connotes permanent deformation accomplished by gliding within the crystal lattice without loss of cohesion. *A.G.I*. b. In rocks, which are composed of many crystals often belonging to several mineral species, the term is conveniently applicable to any permanent deformation throughout which the rock maintains essential cohesion, and strength, regardless of extent to which local microfracturing and displacement of individual grains may have entered into the process. *A.G.I*. c. A term variously used but most commonly to designate the finished quartz body used in an oscillating circuit. *See also* crystal. *AM, 1*. d. *See* set, z. *Ro*.

plastic tamping rod. A tamping rod or stemmer, of a rigid nature, made from plastic possessing suitable dielectric properties. A plastic conducive to the building up of heavy charges of static electricity is unsuitable. *Nelson*.

plastic tooling. Dies, jigs, and fixtures for metal forming, boring, assembly, and checking, made at a saving of time and labor, of laminated and cast components, and cemented into highly stable industrial tools, chiefly with epoxy and some with polyester resins. Epoxies are strong adhesive resins, particularly useful because of their low shrinkage factor. Polyesters have a cost advantage and are easy to handle. *Crispin*.

plastic welding. Welding with steel or iron in the plastic state as in the case in forge and pressure welding. *Ham*.

plastic yield. The term commonly applied to plastic deformation. *Ham*.

plastic zone. In explosion-formed crater nomenclature, this zone differs from the rupture zone by having less fracturing and only small permanent deformations. There is no distinct boundary between the rupture and plastic zones. *Mining and Minerals Engineering, v. 2, No. 2, February, 1966, p. 65*.

plastometer. A machine for the determination of the stress/strain properties of metals at high temperatures and various rate of strain. *Gaynor*.

Plast-Sponge. High quality iron powder made by reduction of iron oxide; used in powder metallurgy. *Bennett 2d, 1962*.

plat. a. A platform, floor, or surface in or about a mine used especially for loading and unloading ore, etc. *Webster 3d*. b. A swinging or revolving door used intermittently to connect two trackways. *Fay*. c. The map of a survey in horizontal projection, as of a mine, townsite, etc. *Fay*. d. A diagram drawn to scale showing land boundaries and subdivisions, together with all data essential to the description of the several units. A plat differs from a map in that it does not show additional cultural, drainage, and relief features. *Seelye, 2*. e. N.S.W. The floor of a level near its intersection with a shaft. *New South Wales*.

platalargan. *See* alargan. *Hess*.

plate. a. Scot. A flat cast-iron or malleable-iron sheet laid at the shaft bottom or at any landing to enable the cars to be easily turned and moved about. A cast-iron plate with a circular ridge on which cars are turned at junction of roads. *Fay*. b. Eng. Black shale; a slaty rock. *Fay*. c. A horizontal timber laid on a wall to receive a framework. *Standard, 1964*. d. A sheet of copper coated with mercury for collecting gold. *See also* amalgamation, b. *Fay*. e. A lead miner's term for shale. *Nelson*. f. Eng. A rail, 4 feet long, used at and near the face for the tubs. *SMRB, Paper No. 61*. g. A flat-rolled metal product of some minimum thickness and width arbitrarily dependent on the type of metal. *ASM Gloss*. h. To cover over with gold, silver, or other metal, either mechanically or chemically. *Webster 3d*. i. A term variously used, but most commonly to designate the finished quartz body used in an oscillating circuit. *AM, 1*. j. Plate glass. *Standard, 1964*.

plate amalgamation. Use of copper or copper-alloy plates coated with enough mercury to form a soft adherent film, in order to trap gold from crushed ore pulp as it flows over the plates. The resulting amalgam, containing up to some 40 percent of metallic gold, is periodically scraped off and more mercury is added to the film. *Pryor, 3*.

plate-and-frame filter. A filter press consisting of plates with a gridiron surface alternating with hollow frames, all of which are held by means of lugs, on the press framework. The corners of both frames and plates are cored to make continuous passages for pulp and solution; the filter cloth is placed over the plates. The pulp passage-way connects with the large, square opening in the frame; the solution and passageways connect with the gridiron surface of the plate. The Dehne and the Merrill are well-known types. *Liddell 2d, p. 392*.

plate apron feeder. An automatic arrangement by which coal or ore is fed forward on steel plates forming segments linked together in an endless chain. *See also* plate feeders, a. *Nelson*.

plateau. a. An upland, tableland, or elevated plain having a fairly smooth surface and bounded, on at least one side, by an escarpment separating it from lower country. *Fay*. b. A district or region of considerable extent and somewhat diverse surface, not dominantly mountainous but commonly including some mountains, which lies in general, distinctly higher than the surrounding or adjacent country; an extensive upland region. *Fay.* c. A formerly smooth upland or elevated plain now so much dissected that only traces of the former surface remain on flat-topped hills and ridges of nearly uniform altitude; more properly called a dissected plateau. *Fay.* d. A very extensive but ill-defined elevation of the deep sea floor, the top of which may be diversified by lesser features of elevation and depression. *Schieferdecker.* e. A comparatively flat-topped elevation of the sea floor greater than 60 nautical miles across the summit and normally rising more than 100 fathoms on all sides. *H&G.*

plateau basalt. Applied to those basaltic lavas that occur as vast composite accumulations of horizontal or subhorizontal flows and which, erupted in rapid succession over great areas, have at times flooded sectors of the earth's surface on a regional scale. They are generally believed to be the product of fissure eruptions and tend to conform to either one of two standard compositions, distinguished as the tholeiitic and olivine basalt magma types respectively. In most parts of the world the two magma types have developed as distinct and separate associations, but there are some important provinces (for example, the Thulean or Brito-Arctic province of western Scotland, northeastern Ireland, and Iceland) in which lavas having affinities with both magma types are mutually associated. The Columbia Plateau of the Northwestern United States and the Deccan Plateau of southeastern India are classic examples of tholeiitic plateau basalt provinces. Synonym for flood basalt. *A.G.I.*

plateau eruptions. Volcanic eruptions by which extensive lava flows are spread in successive sheets over a wide area and eventually build a plateau; as in Idaho. *C.T.D.*

plateau glacier. An ice sheet that occupies a more or less flat, plateaulike area. *A.G.I.*

plateau gravel. Deposits of sandy gravel occurring on hilltops and plateaus at heights above those normally occupied by river terrace gravels. Originally deposited as continuous sheets, plateau gravel has been raised by earth movements to its present level and deeply dissected. Of Pliocene or early Pleistocene age in the main. *C.T.D.*

plateau plain. An extensive area of plain surmounted by a sublevel summit area and bordered more or less completely by an escarpment. *A.G.I.*

plate bearing test. A method by which the load bearing capacity of a soil may be estimated. *See also* ultimate bearing pressure. *Ham.*

plate cleaner. A device for cleaning raw coal which uses the difference in the coefficient of resilience or friction between clean coal and an inclined plate, commonly of steel, and that between refuse and the plate to allow the clean coal to jump over a gap while the refuse falls through. *B.S. 3552, 1962.*

plate conveyor. A conveyor in which the carrying medium is a series of steel plates, each in the form of a short trough, joined together with a slight overlap to form an articulated band. The plates are attached either to one center chain or to two side chains. The chains connect rollers running on an angle-iron framework and transmit the drive from the driveheads which can be installed at intermediate points as well as at the head or tail ends. A plate conveyor can negotiate bends down to about 20 feet radius; available in widths 400, 540, and 640 millimeters with running speeds from 3 to 4 feet per second with a carrying capacity from 100 to 400 tons per hour. *Nelson.*

plate coordinates. In photographic mapping, rectangular coordinates measured on a photograph with reference to the principal point as origin. *Seelye, 2.*

plated crystal. A crystal with a conductive surface film of gold, silver, aluminum, or other metal produced by cathode sputtering, evaporation, or chemical methods. The films, to which lead wires may be soldered, take the place of the conventional clamped metal electrodes. *AM, 1.*

plate feeders. a. Short plate conveyors which are sometimes used instead of the usual measuring chutes in skip winding. They serve the same dual purpose, namely to measure a predetermined load of coal and discharge it into the skip. The feeders are placed side by side, adjacent to the shaft. The loading and discharge into the skip is automatically controlled. Plate feeders are used for a variety of purposes in mines, on the surface and underground. *Nelson.* b. The mechanical plate feeder is a device for feeding material at a fixed and uniform rate. It is generally applied at the tail end of the conveyor or elevator which feeds a plant, but may be applied to feeding any other single unit. It relieves the pressure and drag, with the consequent unnecessary wear on the belt, which is ordinarily experienced if feeding from a hopper directly to a belt. It not only cuts maintenance costs by eliminating uneven wear, but increased output can be obtained by steady feeding. This type of feeder also handles wet aggregate. *Pit and Quarry, 53rd, sec. B, p. 70. See also* disk feeder; reciprocating feeder. *ACSG, 1963.*

plate formers. Plate formers are used for lining shafts, winzes, and rises. They are usually constructed of comparatively thin steel sheeting, stiffened around the edges with angles. Plates should be of such size that they can be conveniently handled in the skips or buckets used for sinking. *Spalding, p. 154.*

plate girder. A built-up riveted or welded steel girder, having a deep vertical web plate, with a pair of angles riveted along each edge to act as compression and tension flanges. For heavier loads, flange plates in addition are riveted or welded to the angles. *Ham.*

plate glass. Flat glass formed by a rolling process, ground and polished on both sides, with surfaces essentially plane and parallel. *ASTM C162–66.*

plate machine. An improved form of potter's wheel for forming porcelain plates for table use. *Standard, 1964.*

plateman. In anthracite coal mining, a laborer who works on the platform of a breaker, picking out rock and oversize lumps from coal before it enters conveyors that transport it to points for further treatment or for loading. Also called platform man. *D.O.T. 1.*

plateman I. *See* amalgamator I. *D.O.T. 1.*

plateman II. A laborer who spreads samples of crushed ore evenly on steel plates with a shovel, so that they will dry thoroughly before being pulverized for chemical analysis. *D.O.T. 1.*

plate mark. A special mark put on articles made of precious metal to show the place of manufacture, fineness of the metal, etc. *Standard, 1964.*

plate metal. Refined iron run in molds and broken up for remelting or for use in a mix. *Webster 3d.*

plate mounted. A bonded abrasive product attached to a steel plate, which plate is designed for attachment to a machine. *ASCG, 1963.*

platen. a. The sliding member or slide of a hydraulic press. *See also* slide, 1; ram, 1. *ASM Gloss.* b. A part of a resistance welding, mechanical testing, or other machine with a flat surface to which dies, fixtures, backups, or electrode holders are attached and which transmits pressure. *ASM Gloss.*

plate nail. Eng. A nail or spike to fasten tram plates and rails to the sleepers. *Fay.*

plate oven. A double oven, one part of which is used for heating split cylinders of sheet or cylinder glass before flattened into sheets and the other chamber for annealing the sheets. *Webster 3d.*

plater. One who plates articles with a coating of precious or lustrous metals; usually in composition; as, a silver plater. *Standard, 1964.*

plate rail. *Scot.* A flat cast-iron rail with a flange on one side. *Fay.*

plate roll. A smooth roll for making sheet iron or plate iron, as distinguished from one having grooves for rolling rails, beams, etc. *Standard, 1964.*

plates. a. Copper or muntz metal plates, covered with mercury, used for amalgamating free gold. *Nelson.* b. In powder metallurgy, flat powder particles having considerable thickness. Contrast with flake powder. *ASM Gloss.*

plate shale. A hard, argillaceous shale. *Fay.*

plate tongs. Tongs for grasping and handling iron or steel plates. *Standard, 1964.*

plate vibrator. A self-propelled mechanical vibrator having a flat base, which consolidates hard fill prior to construction. *Ham.*

platform. a. A wooden floor on the side of a gangway at the bottom of an inclined seam, to which the coal runs by gravity, and from which it is shoveled into mine cars. *Fay.* b. A scaffold. *Fay.* c. A plank or mesh steel-covered level area at the base of a drill tripod or derrick, used as a working space in front of a drill machine around the collar of the borehole. Sometimes the platform is large enough to act as a foundation and anchor for the drill machine. Also a similar floored area in the tripod or derrick on which a man stands while working in the tripod or derrick. *See also* floor; drill floor. *Long.* d. The place on top of a breaker where the freshly mined coal is weighed by a weigh boss just before it is dumped into the machinery. In the breaker, a flat or slightly inclined floor covered with iron plates onto which coal is run from the main screen bars and cleaned by platform men. *Korson.* e. A wood mat used in sets to support machinery on soft ground. Also called a pontoon. *Nichols.* f. An operator's station on a large machine, particularly on rollers. *Nichols.*

g. A bench in a glass furnace for receiving pots. *Standard, 1964.*

platform gantry. A gantry constructed for carrying a portal crane or similar structure. *Ham.*

platform hoist. A power-driven hoist having a lifting capacity ranging from 200 pounds to about 2½ tons, which can be raised on a loading platform to a height of up to 200 feet. *See also* mobile hoist. *Ham.*

platform reef. *See* bank reef. *Schieferdecker.*

platform truck; rack body truck. A truck having a flat open body. *Nichols.*

platina. a. Same as platinum. *Standard, 1964.* b. Twisted silver wire. *Standard, 1964.*

platina mohr. Same as platinum black. *Standard, 1964.*

plating. Forming an adherent layer of metal upon an object. *ASM Gloss.*

plating hammer. A trip-hammer for working on heavy metal plates for armored vessels. *Standard, 1964.*

plating rack. A fixture used to hold work and conduct current to it during electrodeposition. *ASM Gloss.*

platinic. Of, pertaining to, or containing platinum, especially in its higher valence; as, platinic chloride. *Compare* platinous. *Standard, 1964.*

platinic gold. Said to be a native alloy containing 84.6 percent gold, 2.9 percent silver, 0.2 percent iron, 0.9 percent copper, and the remainder platinum. *Hess.*

platiniferous. Containing or yielding platinum. *Standard, 1964.*

platiniridium. A mineral consisting of a natural alloy of iridium and platinum and other related metals occurring usually in silver-white grains. Mohs hardness, 6 to 7; specific gravity, 22.6 to 22.8. *Webster 3d.*

platinite. An alloy containing 54 to 58 percent iron and 42 to 46 percent nickel. It has the same coefficient of expansion as platinum, and is used to replace it in electric light bulbs. *C.T.D.*

platinize; platinate. To coat or combine with platinum, especially by electroplating. *Standard, 1964.*

platinized asbestos. Platinum powder deposited on asbestos, and employed in such form on account of its chemical activity. It is prepared by soaking good-quality asbestos fiber in a solution of platinum chloride and then strongly heating it. *Camm.*

platinocyanide. A cyanide of platinum and some other element or radical. *Standard, 1964.*

platinoid. a. An alloy containing 60 percent copper, 24 percent zinc, 14 percent nickel, and 2 percent tungsten. It has high electrical resistance, and is used for resistances and thermocouples. *C.T.D.* b. Resembling platinum. *Standard, 1964.* c. A platinum metal. *Standard, 1964.*

platinous. Of, pertaining to, or containing platinum, especially in its lower valence. *Compare* platinic. *Standard, 1964; Fay.*

platinum. A silvery-white metallic element in group VIII of the periodic system. It is the most important metal of a group of six closely related rare metals; the others being iridium, osmium, palladium, rhodium, and ruthenium. Isometric; heavy; malleable; ductile; immune to attack by most chemical reagents; and immune to oxidation at high temperatures. Uncombined platinum occurs in nature. The most important district yielding native platinum is the Ural Mountains, U.S.S.R. Symbol, Pt; valences, 1 ?, 2, 3, and 4; atomic number, 78; atomic weight, 195.09; specific gravity, 21.45 (at 20° C); specific electrical resistivity, 9.97 microhms per cubic centimeter (at 20° C); hardness, 47 Brinell; melting point, 1,769° or 1,773.5° C; boiling point, 3,827° ±100° C or 4,300° C; insoluble in water, in hydrochloric acid, and in nitric acid; soluble in aqua regia and in fused alkalies; and does not oxidize in air at any temperature. Used in wire and in vessels for laboratories, as thermocouple elements, for electrical contacts, in corrosion-resistant apparatus, with cobalt in magnetic alloys, for resistance wires in high-temperature electric furnaces, for coating the nose cones of missiles, for coating the fuel nozzles of jet engines, and in finely divided form as a catalyst. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B–126, B–202; CCD 6d, 1961.*

platinum black. A finely divided form of platinum of a dull black color, usually but not necessarily produced by the reduction of salts in aqueous solution. *ASM Gloss.*

platinum family. See platinum metals. *Bennett 2d, 1962.*

platinum luster. A silvery luster given by a platinum glaze. Also known as silver luster. *Standard, 1964.*

platinum metal. Any of the six precious metallic elements including platinum and elements resembling it in chemical and physical properties that belong to group VIII of the periodic table and are often subdivided into two triads one of which is composed of ruthenium, rhodium, and palladium whose specific gravities are about 12 and the other of which is composed of osmium, iridium, and platinum whose specific gravities are over 21. *Webster 3d.*

platinum minerals. Platinum, ruthenium, rhodium, palladium, osmium, and iridium are members of a group characterized by high specific gravity, unusual resistance to oxidizing and acidic attack, and high melting point. Platinum, the most common of these, occurs naturally as metal and as the arsenide sperrylite ($PtAs_2$). Osmiridium and iridosmine are minor sources, found alloyed in Rand ores. Palladium arsenide and selenide occur in the nickel-copper ores of Sudbury, Canada. *Pryor, 3.*

platinum S. Platinum having increased strength at high temperatures. *Bennett 2d, 1962 Add.*

platinum sponge. Metallic platinum in a gray, porous, spongy form that is obtained by reducing ammonium chloroplatinate that occludes large volumes of oxygen, hydrogen, and other gases; used as a catalyst. *Webster, 3d.*

platnik. See alargan. *Hess.*

platt. Corn. An enlargement of a level near a shaft, where ore may await hoisting, wagons pass each other, etc. Same as plat, a. *Fay.*

platten. In glassmaking, to flatten out; make into sheets or plates; specifically, to make (a blown cylinder) into a sheet. *Standard, 1964.*

plattenkohle. Ger. A laminated sapropelic coal containing numerous animal remains. It is of Permian age and it is found in the Pilsen coal basin. *Tomkeieff, 1954.*

platting. Brick laid flatwise on top of a kiln to keep in the heat. *Fay.*

plattman. In bituminous coal mining, a colloquialism of English origin for a pusher who pushes loaded mine cars onto a cage from a platt (an enlarged underground opening at the shaft where cars are gathered prior to hoisting). *D.O.T. 1.*

plattnerite. Error for planerite. *Hey, M.M., 1961.*

Plattner's process. A process for extracting gold in which a charge of gold-bearing pulp is placed in a revolving iron drum lined with lead, and a stream of chlorine gas is conducted through the pulp, producing chloride of gold, which is soluble in water. *See also* chlorination process. *Fay.*

platy-flaggy. Hard to split, a measure of ease of splitting of shale. *A.G.I.*

platy flow structure. *See* planar flow structure. *A.G.I.*

platynite. A sulfoselenite of lead and bismuth, $PbS.Bi_2Se_3$. Thin plates. Like graphite. Rhombohedral. From Falun, Sweden. *English.*

platy structure. A structure due to differential contraction during cooling, occurring in lavas and intrusions as a series of fractures parallel to the cooling surface. Igneous rocks may thus be cracked into thin plates or tabular sheets, which give them a stratified appearance, especially as seen in the field when the structure has been developed by weathering. *Holmes, 1928.*

plauenite. a. The type syenite of Plauen, near Dresden, Germany. *Holmes, 1928.* b. Those members of the syenite series which are rich in potash and have some plagioclase with the predominant orthoclase. *Rice.*

play. Idle, said of a mine not at work. *See also* playday. *Fay.*

playa. Sp. a. A shore, strand, beach, or bank of a river. Generally sandy, and sometimes auriferous. *Fay.* b. The shallow central basin of a desert plain, in which water gathers after a rain and is evaporated. *Fay.* c. A dried-up lake basin in an arid region. *Bateman.*

playa lake. Wind-scoured basins are shallow, but they may cover large areas. They are characteristic of deserts. At irregular intervals, they become the seats of broad, shallow sheets of water called playa lakes, which quickly gather and almost as quickly evaporate, leaving mud flats or playas to mark their sites. *A.G.I.*

playday. Eng. A day on which, on account of accident, or other causes, mines are not worked. *See also* play. *Fay.*

play in. Leic. To commence holing or undercutting a face of coal at the side of a heading. *Fay.*

play of color. The optical phenomenon consisting of flashes of different prismatic colors due to interference of light at thin films within or near the surface of a gem, and seen in rapid succession when the gem is moved, as in opal. It partly causes the orient of pearls, but differs from change of color, dispersion, fire, and opalescence. *Shipley.*

Pleiocene. *See* Pliocene. *Fay.*

Pleistocene. The earlier of the two epochs comprised in the Quaternary period in the classification generally used. Also called Glacial epoch, and formerly Ice Age, post-Pliocene, and post-Tertiary. The series of sediments deposited during that epoch, including both glacial deposits and ordinary sediments. Some geologists formerly used Pleistocene as synonymous with Quaternary and included it in all post-Tertiary time and deposits. *Fay.*

plenemensurate ore bodies. Those capable of being fully measured and sampled at an early stage in the operations. *McKinstry, p. 477.*

plenum. a. A system of ventilation in which air is forced into an inclosed space, as a room or a caisson so that the outward pressure of air in the space is slightly greater than the inward pressure from the outside, and leakage is outward instead of inward. *Fay.* b. A mode of ventilating a mine or a heading by forcing fresh air into it. *Fay.* c. Use of compressed air to hold soil from slumping into an excavation. *Nichols.*

Plenus marls. Gray marls found in the Lower Chalk of Great Britain, containing the belemnite, Actinocamax plenus. They are of Cretaceous age. *C.T.D.*

pleochroic. *See* pleochroism.

pleochroic halos. Dark-colored zones around small inclusions of radioactive minerals that are found in certain crystals, notably biotite. *C.M.D.*

pleochroism; dichroism. a. The property of exhibiting different colors in different directions by transmitted polarized light. *A.G.I.* b. More precisely, the property of absorbing differently, light that vibrates in different directions in passing through a crystal. If the crystal is uniaxial the change of color is called dichroism; if the crystal is biaxial, the change of color is called pleochroism. *A.G.I.* c. The property of birefringent crystals (minerals) to absorb various wavelengths of light differentially depending on the vibration direction of the light within the crystal. Thus a mineral displaying pleochroism shows various colors or tints when it is traversed by plane polarized light and the orientation of the crystal is varied with respect to the plane of polarization. It is a common and diagnostic property of many minerals, and is easily observed under the petrographic microscope or a dichroscope. *A.G.I.*

pleomorphism. Snyonym for polymorphism. *Webster 3d.*

pleomorphous. Synonym for polymorphous. *A.G.I.*

pleonaste. Same as ceylonite. See also spinel. *Dana 17.*

pleonastite. An igneous rock having a diabasic structure composed of pleonaste hercynite and clinochlore enveloping crystals of corundum. Its origin is obscure. *Hess.*

Pleospongia. A group of Lower and Middle Cambrian fossils generally having the form of corals but structures suggesting relationships to sponges. *A.G.I. Supp.*

plesiomorphism. *See* polymorphism.

Plessy's green; chromium phosphate. Impure $CrPO_4$ with 2 to 6 H_2O. *CCD, 6d, 1961.*

Plews process. Obtaining antimony values from sulfide ores by heating the ore in a rotary furnace; antimony oxide volatilizes from the mass and is condensed. *Bennett 2d, 1962.*

Plexiglass. A trade name for transparent methyl-methacrylate plastic; specific gravity, 1.19; refractive index, 1.49. *Shipley.*

pliable armored cable. *A* flexible cable having collective armor comprising stranded groups of fine, galvanized, steel wires. *B.S. 3618, 1965, Sec. 7.*

pliable support. A support composed of elastic materials which either yields to the roof pressure, or which permits the subsidence of the roof without the support being completely destroyed and losing its significance. *Stoces, v. 1, p. 140.*

plicated. Folded together, as in highly inclined and contorted strata. *Fay.*

plication. a. A fold; usually applied to the more intensive crumpling and corrugations of layered rocks. *Stokes and Varnes, 1955.* b. A coarse, radial ridge on the exterior surface of certain shells. *Stokes and Varnes, 1955.*

Pliensbachian. Lower Charmouthian. *A.G.I. Supp.*

plies. Scot. Successive thin layers of coal or rock. *See also* ply. *Fay.*

Pliocene. The latest of the epochs comprised in the Tertiary period, in the classification generally used. Also, the series of strata deposited during that epoch. *Fay.*

Plio-Pleistocene. Strata transitional across the Pliocene-Pleistocene boundary where distinction cannot be recognized outside of glaciated regions. *A.G.I. Supp.*

plique-a-jour enameling. A type of artistic enameling in which the divisions are made with small metal strips, and no metal base is used. When held to light, this type of enamel appears as a miniature stained glass window. *Enam. Dict.*

ploat. Eng. To dress down or remove loose stone from the roof or sides. *SMRB, Paper No. 61.*

plodding. Scot. Uncertain; irregular; that is, a plodding band or seam of ironstone. *Fay.*

plombierite. $Ca_5Si_6O_{16}(OH)_2.11(?)H_2O$. *Hey 2, 1955.* A gelatinous material from Ballycraigy, Larne, Antrim County, Ireland; a mineral having the approximate molar ratio, $H_2O:SiO_2=2.0$, and the 002 spacing equals 14.6 angstroms. The analysis is very close to that of plombierite of Daubrée (1858). *American Mineralogist, v. 39, No. 11–12, November-December 1954, pp. 1038–1039.*

plosophoric. Giving explosive properties to a compound. *Bennett 2d, 1962 Add.*

plot. a. Corn. "To cut a plot" is to make room, or square out a piece of ground by the side of the lode or shaft, for holding the broken ore or waste for other convenient purposes. *Fay.* b. To place survey data upon a map or plat. In past use, no clearly defined difference existed between plat and plot. It is suggested that a difference be established by limiting plat to the graphical representation of a survey, and plot to the cartographic operations involved in the construction of a map or plat. *A.G.I.*

plot mark. A mark made in a bit mold, bit die, or blank bit where a pip or hole is drilled to receive or to encompass a diamond. *Long.*

plotting instrument. A large drawing machine by means of which stereoscopic pairs of vertical photographs can be viewed in conjunction with their ground control points and mechanically translated into making accurate maps. *Ham.*

plotting scale. A scale used for setting off the lengths of lines in surveying. *Fay.*

plough. a. A cutter loader with knives or blades, which is pulled along the longwall face by a powerful chain. The broken coal is loaded onto an armored flexible conveyor which, with the aid of hydraulic rams, holds the plough up to the coal face and causes the knives to bite into the coal as they are pulled along. The plough is a continuous mining machine. *See also* plough-type machines. *Nelson.* b. Applied to V-shaped belt scrapers which are attached to the belt conveyor frame and which press against the return belt. They are intended to remove coal or other material which might stick to the return belt and be crushed as the belt passes over the driving rolls or the return pulley. *Jones.*

plough cut. Same as V-cut. *Langefors,* p. *190.*

plough deflector. a. A steel plate attached to the end of a cutter loader for deflecting the cut coal onto the face conveyor. *Nelson.* b. A device for removing or diverting the dust and dirt off a belt conveyor and thus prevent it being carried back along the return belt. *Nelson.*

ploughs. N. of Eng. Vertical and horizontal cutting blades which remove a thin slice of coal from the face and guide it onto an armored face conveyor on which the machine runs (other forms of cutter loader may travel also on such a heavy scraper chain type of conveyor). *Trist.*

plough steel. A steel suitable for the production of wire for prestressed concrete and for the manufacture of steel ropes, etc. *Nelson.*

plough-type machines. Ploughs may be divided into two classes: (1) Where the machine peels the coal to a depth of from 1 to 12 inches by knives of various designs and the cut coal is then loaded onto a heavy type scraper chain conveyor; and (2) where the machine peels a thin slice up to 2 inches in thickness, by knives attached to each end of a steel box and the coal is dragged along the face inside the box. From the speed of travel aspect, ploughs may be divided into (1) fast-moving types (about 80 feet per minute) which take a relatively thin slice, and (2) slow-moving types (10 to 20 feet per minute) which remove a thicker slice. The trend is towards the rapid plough working on the solid face. *See also* Anbauhobel; continuous mining, b; Lobbe Hobel. *Nelson.*

plowman. One who breaks up hard-packed clay in an open clay pit by operating a tractor which draws the plow over the bed of the pit. *D.O.T. 1.*

Plowshare. The Atomic Energy Commission's program of research and development on peaceful uses of nuclear explosives. Possible uses include large-scale excavation, such as for canals and harbors; crushing ore bodies; and producing heavy transplutonium isotopes. *L&L.*

plow steel. A high tensile steel used in the manufacture of hoisting ropes. *Fay.*

pluck. To loosen and carry away in large pieces; said of glaciers operating on solid rock. *Standard, 1964.*

plucking. a. Term used to describe the sudden jerking or plucking on heavy endless-rope haulage when the rope again takes the load, following rope coils. Instead of slipping smoothly sideways, the rope tends to stick until the pressure of oncoming coils overcomes the friction; these slip suddenly, producing a momentary slackening followed by a sudden jerk or pluck as the rope again takes the load. This may loosen chains or clips and cause derailments and runaway sets. *Sinclair, V, p. 329.* b. The disruption of blocks of rock by a glacier or streams. *Standard, 1964.*

pluck me. Nickname for a company store; given because of a tendency to overcharge. *Korson.*

plucky. Applied to stones that, under the chisel, break away in irregular conchoidal chips, thus making it difficult to secure a smooth face. *Fay.*

plug. a. A watertight seal in a shaft formed by removing the lining and inserting a concrete dam, or by placing a plug of clay over ordinary debris used to fill the shaft up to the location of the plug. *B.S. 3618, 1963, sec. 4.* b. Small wooden pins driven into holes driven in the rock roof of a tunnel. The axis of the tunnel is marked on these plugs by tacks, or by small iron hooks from which a plummet lamp may be suspended for sighting upon. *Stauffer.* c. To plug a well by cementing a block inside casing or capping the well with a metal plate. *Wheeler.* d. Any block installed within casing to prevent movement of fluids. *Wheeler.* e. Synonym for hoisting plug. *Long.* f. A cylindrical piece of wood or an expandable apparatus placed in a borehole to act as a watertight or gastight seal or as a base into which the drive wedge of a borehole deflection device is driven. *Long.* g. A steel cylinder placed inside the annular opening in a coring bit to convert it for use as a noncoring bit. The face of the plug may or may not be provided with serrations, inset diamonds, or other types of cutting edges. *Long.* h. Synonym for pilot and/or the pilot section of a pilot-type noncoring bit. *Long.* i. The act or process of inserting a plug in a borehole; also, to fill a borehole with cement or cap it with a long plug. *Long.* j. To fill or seal off cracks, cavities, or other openings in the walls of a borehole. *Long.* k. Synonym for block. *See also* block, i. *Long.* l. *See* cartridge, e. *Nelson.* m. A hammer closely resembling the bully. *Fay.* n. *See* plug-and-feathers. *Fay.* o. A stoppage in the discharge line of a dredge, or in an underground drain. *Nichols.* p. The male or female device for closing an open pipe. Also called a cap. *Kentucky, p. 119.* q. A rod or mandrel over which a pierced tube is forced. *ASM Gloss.* r. A rod or mandrel that fills a tube as it is drawn through a die. *ASM Gloss.* s. A punch or mandrel over which a cup is drawn. *ASM Gloss.* t. A protruding portion of a die impression for forming a corresponding recess in the forging. *ASM Gloss.* u. A false bottom in a die. Also called a peg. *ASM Gloss.* v. A mass of igneous rock formed in the vent of a volcano; dome, spine, or aiguille. *Fay.* w. A reference peg driven in flush with the surface of the ground. *Webster 3d.*

plug-and-feather driller. *See* quarryman, b. *D.O.T. 1.*

plug-and-feather hole. A hole drilled for the purpose of splitting a block of stone. These holes are usually in rows. The plug is a slightly wedge-shaped piece of iron driven between two L-shaped irons, or feathers, inserted in the hole. *Stauffer.*

plug-and-feather method. A method used in quarrying to reduce the larger masses of stone to smaller size. By using a hammer drill, a row of shallow holes is made along the line where a break is desired. The feathers consist of two iron strips flat on one side for contact with the wedge, and curved on the other to fit the wall of the drill hole. They are placed in the hole and the plug (a steel wedge) is placed between them. They are sledged lightly in succession until a fracture appears. Wherever possible, such fractures are made parallel with the rift of the stone. *AIME, p. 327.*

plug and feathers. A multiple wedge used for cutting out rock masses without shattering the ground. Machines are often used for large scale work. *See also* channeler, a. *Nelson.*

plug-back. To cement off lower section of casing; to block fluids below from rising in casing to a higher section being tested. *Wheeler.*

plug bit. a. A diamond bit that grinds out the full width of the hole. *Nichols.* b. A noncoring diamond-set bit which can be in the form of a bullnose bit, pilot bit, or concave bit. Also called bullnose bit; concave bit; noncore bit; pilot bit. *B.S. 3618, 1963, sec. 3.*

plug box. Eng. A wooden water pipe used in coffering. *Fay.*

plug drill. A stonecutter's percussion drill *Webster 3d.*

plug-drill operator. See jackhammer operator. *D.O.T. 1.*

plugged. a. A borehole that has been filled or capped with a long plug, or in which a plug has been inserted. *Long.* b. Cracks or openings in the rocks in the walls of a borehole that have been filled or sealed with cement or other substances. *Long.* c. A borehole that has been drilled with a plug or noncoring bit. *Long.* d. A blocked core barrel or bit. *Long.* e. A coring bit in which a plug has been inserted. *See also* plug, g. *Long.*

plugged bit. a. Synonym for noncoring bit. *See also* plug, g. *Long.* b. A core bit, the annular opening of which is tightly closed or blocked by a piece or the impacted fragments of a core. *Long.*

plugged crib. A curb supporting the walling in a shaft and is itself supported on plugs or bolts driven into the ground around the shaft. The crib may be removed when the walling from below is carried up to it. *See also* strata bolts. *Nelson.*

plugger drill. See sinker drill, a. *Lewis, p. 87.*

pluggerman. In metal mining, one who keeps ore moving in large chutes in raises (underground openings driven upward from one level to another) when ore is being drawn or loaded into cars at a lower level. Also called chute blaster. *D.O.T. 1.*

plugging. a. The stopping of the flow of water into a shaft by plugs of clay. *Zern.* b. Eng. Supporting a crib upon iron bars fixed in the wall of a shaft. *Fay.* c. Scot. Blasting by means of plug shots. *Fay.* d. The material used, the act, or the process of inserting a plug in a borehole to fill it or the cracks and openings in the borehole sidewalls. *Long.* e. The act or process of drilling a borehole with a noncoring bit. *See also* noncore drilling. *Long.* f. The practice of filling holes and cavities in castings with porous silicate mixture (cast-iron filler) before the application of cover coats. The filler must be firmly forced into the casting holes, since any entrapped air beneath the filler will expand during firing and force the material out causing "blowholes." *Enam. Dict.*

plugging clay. A wad used as a stopper in the taphole of a smelter. *Enam. Dict.*

plugging compound. A puttylike mixture of inorganic materials used to fill holes in iron castings to ensure an even surface for porcelain enameling. *ASTM C286–65.*

plughole. a. A passageway that is left open while working on an explosion-proof stopping for the purpose of maintaining the ventilation of the fire area at as near the normal quantity as possible to prevent any increase in the firedamp content in the air. After the stopping is completed, this plughole is plugged up with sandbags in order to complete the seal of the sealed-off mine area. The plughole is generally a tapered passageway of about 3 feet 6 inches square at the inby side of the stopping and 2 feet 6 inches square at the outby side. *McAdam, p. 143.* b. Same as block hole. *Fay.*

plughole stopping. A stopping in which the floor and the sidewalls of the passage are built of sandbags and the roof may be the roof of the roadway or covering boards used between the webs of steel arches, or preferable, corrugated steel sheeting used as lagging behind steel arches. The plughole or passage is generally made tapering from the inby end from 3 feet to 3 feet 6 inches square to 2 feet 6 inches square so that, in the event of an explosion, the plug of sandbags in the passage is subjected to a wedging action assisting to retain the plug in place. The plughole may be placed in the most convenient position and although this is often at the top, it is sometimes placed to the side and reasonably near the floor. *Sinclair, I, pp. 297–298.*

plugman. a. Newc. The man in charge of the pumping engine. *Fay.* b. *See* pumping engineer. *D.O.T. 1.* c. A laborer who fastens iron stoppers (plugs) in bottoms of billet molds to retain molten copper cast into molds. *D.O.T. 1.*

plug polisher. In metallurgy, one who polishes tube drawing plugs (metal die used to govern internal diameter of metal tubes during drawing operations), using a polishing machine. *D.O.T. Supp.*

plug shot. Scot. A small charge exploded in a hole to break up a stone of moderate size. *Fay.*

plug tap. A tap with chamfer extending from three to five threads. *ASM Gloss.*

plug valve. A valve or cock opened or closed by the turning of a plug, usually conical in shape. Not to be confused with needle valve or glove valve. *Long.*

plug weld. A circular weld made by either arc or gas welding through one number of lap or tee joint. If a hole is used, it may be only partially filled. Neither a fillet welded hole nor a spot weld is to be construed as a plug weld. *ASM Gloss.*

plum. a. A large random-shaped stone dropped into large-scale mass concrete to economize on the volume of the concrete. *Ham.* b. An old form of plumb. *Fay.*

plumasite. A coarse, granular dike rock containing oligoclase and corundum plus accessory garnet, muscovite, apatite, and opaque oxide. *A.G.I.*

plumb. a. Synonym for vertical. *Webster 3d.* b. A plumb bob; a plummet. *Webster 3d.* c. To carry a survey into a mine through a shaft by means of heavily weighted fine wires hung vertically in the shaft. The line of sight passing through the wires at the surface is thus transferred to the mine workings. An important piece of work in mine shafts, and in transferring courses or bearings from one level to another. *Fay.*

plumb-; plumbo-. Combining form meaning containing lead; for example, plumbojarosite and calcium orthoplumbate. *Webster 3d.*

plumbaginous. Containing plumbago, as plumbaginous schists; some crystalline limestones are also plumbaginous. *Fay.*

plumbago. A special quality of powdered graphite used to coat molds, and in a mixture with clay, to make crucibles. *ASM Gloss.*

plumbago bricks. Clay-graphite bricks. *Bureau of Mines Staff.*

plumbago crucibles. Highly refractory crucibles composed of a mixture of about equal parts of refractory clay and graphite. In the crucible process, these were more generally used in the United States than in the United Kingdom. *Osborne.*

plumbate. Anion of tetravalent lead, with oxygen. Hydroxoplumbate is $Pb(OH)^{-}_{6}$, metaplumbate $Pb(OH)^{-}_{3}$, and orthoplumbate PbO^{-}_{4}. *Pryor, 3.*

plumb bob. a. A small weight or bob, hanging at the end of a cord, which under the action of weight takes up a vertical direction. Also called a plummet. *C.T.D.* b. A pointed weight hung from a string. Used for vertical alinement. *Nichols.*

plumbean. Consisting of or resembling lead. *Fay.*

plumbeous ware. Earthenware with a lead glaze. *Standard, 1964.*

plumber's dope. A soft sealing compound for pipe threads. *Nichols.*

plumber's wiping solder. A soft solder containing about 1½ percent antimony. Also called wiping solder. *See also* solder. *Hess.*

plumb hole. Scot. A hole at the surface caused by the extraction of mineral from underneath. *Fay.*

plumbic. Of, pertaining to, or containing lead, especially in its higher valence; as, plumbic chloride. *Standard, 1964.*

plumbic ocher. Same as massicot. *Standard, 1964.*

plumbiferous. Containing lead. *Webster 3d.*

plumbing. Transferring a point at one level to a point vertically below or above it by means of a weight (plumb bob or plummet) suspended at the end of a string or wire (plumbline). *See also* centering of shaft. *Nelson.*

plumbing fixtures, sanitary. *See* china sanitary ware; sanitary ware (sanitary plumbing fixtures). *ACSG, 1963.*

plumbism. Lead poisoning. *Standard, 1964.*

plumbite. The anion PbO_1. *Pryor, 3.*

plumbline. A device used to produce a vertical line between a survey instrument and the reference point over (or sometimes under in underground work) which it is set. Special plumblines are used in a vertical shaft to transfer a fixed or an azimuth angle from surface to underground workings for purpose of orientation. Also known as plumb bob; plummet. *See also* Weisbach triangle, a. *Pryor, 3.*

plumbocalcite. A variety of calcite containing a small amount of lead carbonate. *Fay.*

plumboferrite. A hexagonal, nearly black mineral, $PbFe_4O_7$, occurring commonly in cleavable masses at Örebro, Sweden. *Dana 7, v. 1, pp. 726–727.*

plumbogummite. A hydrous phosphate of lead and aluminum. *Fay.*

plumbojarosite. A hydrous sulfate of lead and iron, $PbFe_6(OH)_{12}(SO_4)$. *Sanford.*

plumbomicrolite. A mineral, $(Pb,Na,Ca)_{2-x}(Ta,Nb,Ti)_2(O,OH)_7$, with x about 0.9; greenish-yellow and orange crystalline masses and octahedra; from Kivu, Republic of the Congo. *Hey, M. M., 1964.*

plumbous. Of, pertaining to, or containing lead, especially in its lower valence; as plumbous chloride. *Standard, 1964.*

plumbous oxide. *See* litharge.

plumbous sulfide. *See* lead sulfide. CCD 6d, *1961.*

plumb pneumatic jig. Mineral concentrator in which air is pulsed upward through a porous deck by means of a rotary valve. *Pryor, 3.*

plumb posts. The vertical posts at the side of a tunnel, resting on sills and carrying the wallplates; the whole supporting the tunnel roof by means of centering. *Stauffer.*

plumb bulking. Scot. The full dip of the coal seam. *Fay.*

plumbum. *See* lead. *C.T.D.*

plume agate. Same as flower agate. *Shipley.*

plum hatching. Scot. The full rise of a coalbed. *Fay.*

plumites. Same as jamesonite. *Dana 6d, p. 122.*

plummet. *See* plumbline. *Fay.*

plumos antimony. An early name for jamesonite, which is also called feather ore. *Fay.*

plumose. Having a feathery appearance. *Fay.*

plumose mica. A variety of muscovite mica *Fay.*

plumose ore. Variant of jamesonite and plumosite. *Dana 6d, p. 122.*

plumosite. Synonym for jamesonite. *Fay.*

plump. Corn. A corruption of the word pump. *Fay.*

plum pitch. Brist. The full rise or full dip of the strata. *Fay.*

plum-pudding stone. A conglomerate rock; pudding stone. *Webster 3d.*

plums. Large stones embedded in mass concrete. *Taylor.*

plunge. a. In surveying, to set the horizontal cross wire of a theodolite in the direction of the grade. *Webster 3d.* b. To turn over (as the telescope of a transit) on its horizontal transverse axis. *Webster 3d.* c. Called pitch or rake by many authors when applied to ore bodies, it is the vertical angle between a horizontal plane and the line of maximum elongation of the body. *Fay.* d. The inclination of the crest of an anticline or the trough of a syncline. *B.S. 3618, 1964, sec. 5. See also* dip. e. The acute angle that the axis of a folded rock mass makes with a horizontal plane. *Leet.*

plunge a grade. To establish a grade between two points of known level by sighting a target setup at either point through a theodolite fixed at the other point, clamping the instrument, and then bringing the target into the fixed line of sight at any desired intermediate points on the grade. *Webster 3d.*

plunge grinding. Grinding where the only relative motion of the wheel is radially toward the work. *ASM Gloss.*

plunge hole. Eng. The piston rod or pump rod of a pumping engine; a plunger. *Standard, 1964.*

plunger. a. The piston of a force pump. *Fay.* b. A reckless gambler or speculator. *Webster 3d.* c. In blasting, a rod designed for thrusting into a drill hole and ascertaining the position of the cartridge. *Standard, 1964.* d. A piston and its attached rod. *Long.* e. The end of the pump rod which dips into the water. *Gordon.* f. The reciprocating metal part which forces glass into the contours of a mold, or which, in a blank mold, forms the initial cavity for subsequent blowing. *ASTM C162–66.* g. A tank in which clay is worked with water to the proper consistency. *Webster 3d.*

plunger bucket. A piston without a valve in a pump. Also called plunger lift. *Webster 3d.*

plunger case. The pump barrel, or cylinder, in which a solid piston or plunger works. Also called pole case. *Fay.*

plunger controller. A type controller used at loading points. It consists of a pair of vertical plungers placed in the rail track and operated by a hand lever. The plungers when raised intercept the tub axle. *Mason, v. 2, pp. 526–527.*

plunger jig washer. A washer in which water is forced upwards and then downwards through a screen by the action of a plunger in an adjoining compartment. Although these machines are still in use, the term jig washer is now applied to the fixed-screen, air-pulse jig which is directly descended from the first Baum washer used in 1892. *Nelson.*

plunger lift. Scot. A pump and column of pipes attached, raising water by means of a ram or piston. *Fay.*

plunge rod. A leveling rod or a pointed steel rod used in plunging a grade. *Webster 3d.*

plunger press. A press in which the pressure is applied by a plunger with a reciprocating motion to charges of feed contained in molds in a vertical or horizontal table. *B.S. 3552, 1962.*

plunger pump. a. Reciprocating pump used for moving water or pulps, in which a solid piston displaces the fluid. *Pryor, 3.* b. A displacement type pump may be of various types, such as: (1) the triplex pump, a vertical or horizontal, single-acting plunger type for small heads with three single-acting cylinders in the pump frame driven by a motor mounted on the outside of the frame and connected to the crankshaft of the pump through gearing; (2) the quadruplex or quintuplex pump, a pump having four or five cylinders; and (3) the duplex pump, a crank and flywheel type for high heads, with double-acting plungers. *Lewis, pp. 634-635.*

plunger-type washbox; piston-type washbox. A washbox in which the pulsating motion is produced by the reciprocating movement of a plunger or piston. *B.S. 3552, 1962.*

plunging breaker. A breaker which tends to curl over and break with a crash. *Schieferdecker.*

plunging cliff. A cliff bordering directly on deep water; a shallow sea on a wave-cut platform is lacking as a result of a rapid relative subsidence of the land. *Schieferdecker.*

plus distance. Fractional part of 100 feet used in designating the location of a point on a survey line; as, 4+47.2, meaning 47.2 feet beyond Station 4, or 447.2 feet from the initial point, measured along a specified line. *Seelye, 2.*

plush copper; plush copper ore. A Cornish name for chalcotrichite, probably alluding to its appearance. A fibrous red oxide copper mineral. *Fay.*

plush copper ore. *See* plush copper. *Fay.*

plus mesh. The particles of a powder sample retained on a screen of stated size. *Osborne.*

plus minerals. Applied to minerals, such as feldspars, whose molecular volumes are greater than the sum of the molecular volumes of the constituent oxides. In the case of allotropic modifications of the latter, that having the larger molecular volume is used in the calculation. *Compare* minus minerals. *Holmes, 1928.*

plus sieve. In powder metallurgy, the portion of a powder sample retained on a standard sieve of specified number. Contrast with minus sieve. *ASM Gloss.*

plus sight. See backsight. *Seelye, 2.*

pluton. In the strictest sense, a body of igneous rock that has formed beneath the surface of the earth by consolidation from magma. In a broader sense, may include bodies composed of pseudoigneous rock that formed beneath the surface of the earth by the metasomatic replacement of an older rock. *A.G.I.*

plutonic. a. Of igneous origin. A general name for those rocks that have crystallized in the depths of the earth, and have therefore assumed, as a rule, the granitoid texture. *Fay.* b. A general term denoting one of the three great subdivisions of rocks under a classification proposed by Read. It includes the granitic, migmatitic, and metamorphic rocks; the great granitic complexes, the gneisses, and schists. *See also* neptunic; volcanic rock. *A.G.I.*

plutonic cognate ejecta. Coarsely crystalline fragments consanguineous with the lavas of a given volcano, which solidified in depth, generally as dikes and sills, but were brought to the surface by pyroclastic eruption. These are equivalent to the materiaux homoeogenes of Lacroix. *A.G.I.*

plutonic earthquakes. Deep-seated earthquakes, the origin of which is not well understood. They occur less frequently than tectonic and volcanic earthquakes and originate below the earth's crust to a depth of about 400 miles. *Stokes and Varnes, 1955.*

plutonic igneous rocks. See plutonic. *A.G.I.*

plutonic intrusions. Applied to large intrusions which have cooled at great depth beneath the surface of the earth. *Compare* minor intrusions. *C.T.D.*

plutonic metamorphism. The changes which are produced in rocks by great heat and uniform pressure. These changes necessarily take place at depth, wherein directed pressure becomes less and less pronounced, and finally becomes a practically negligible factor in metamorphism. *Stokes and Varnes, 1955.*

plutonic ore deposits. The major group of ore deposits of magmatic origin which have been formed under abyssal conditions. *Schieferdecker.*

plutonic rocks. Igneous rocks formed deep within the earth under the influence of high heat and pressure, hypogene rocks; distinguished from eruptive rocks formed at the surface. *Hess.*

plutonic series. A series of different rocks that evolved from the same original material through various metamorphic stages until final crystallization ceased. *A.G.I. Supp.*

plutonism. The obsolete belief that all of the rocks of the earth solidified from an original molten mass. *Compare* neptunism. *A.G.I.*

plutonites. All rocks occurring in major (plutonic) intrusions. More precisely, igneous rocks of the coarse-grain size group. *C.T.D.*

plutonium. a. A radioactive metallic element of the actinide series. Similar chemically to uranium, and usually produced in nuclear reactors as the long-lived isotope of mass number 239 (plutonium 239; half-life, 24,360 years) by spontaneous emission of an electron from neptunium obtained in turn from uranium 238. It is also found in minute quantities in pitchblende and other uranium-containing ores. It undergoes very slow disintegration with the emission of a helium nucleus to form uranium 235, and is fissionable with slow neutrons to yield atomic energy for power plants or atom bombs. Symbol, Pu; valences, 3, 4, 5, and 6; and atomic number, 94. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B–88, B–126.* b. The second transuranium element of the actinide series to be discovered. Seaborg, McMillan, Kennedy, and Wahl produced plutonium 238 in 1940 by bombarding uranium with deuterium nuclei (deuterons) in a cyclotron. Natural plutonium in trace quantities occurs in uranium ores where it was formed by the irradiation of the uranium with the neutrons present. Plutonium is the most important transuranium element, and the most important of its 15 known radioactive isotopes is plutonium 239. Plutonium is readily fissionable with neutrons; is available in quantity; and 1 pound equals about 10 million kilowatt hours of heat energy. Used as an important material in the industrial applications of nuclear power and as an ingredient in nuclear weapons. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B–88, B–126.* c. Silvery-white metal; atomic mass or mass number given as about 239 and as 242; warm to the touch because of energy released by alpha decay; specific gravity, 15.92 to 19.84 depending on allotropic form; melting point, 639.5°±2° C; boiling point, 3,235° ±19° C; soluble in concentrated hydrochloric acid, in hydroiodic acid, and perchloric acid; and insoluble in nitric acid and in concentrated sulfuric acid. There are six allotropic forms: (1) alpha plutonium; monoclinic; specific gravity, 19.84 (at 25° C); and stable below 122°±2° C; (2) beta plutonium; monoclinic; specific gravity, 17.70; and stable from 122° ±2° C to 206° ±3° C; (3) gamma plutonium; orthorhombic; specific gravity, 17.14; and stable from 206°±3° C to 319° ± 5° C; (4) delta plutonium; isometric; specific gravity, 15.92; and stable from 319° ±5° C to 451° ±4° C; (5) delta-prime plutonium; tetragonal; specific gravity, 16.00; and stable from 451° ±4° C to 476° ±5° C; and (6) epsilon plutonium; isometric; specific gravity, 16.51; and stable from 476° ±5° C to 639.5° ±2° C (the melting point). *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B–126, B–203, B–204.*

pluvial. a. Of a geologic change, resulting from the action of rain or sometimes from the fluvial action of rainwater flowing in stream channels. *Webster 3d.* b. Refers to a rainy period, particularly one outside of the Pleistocene glaciated region corresponding in time to a glacial age; also such a period. *A.G.I. Supp.*

pluvial period. A period in which rainfall or precipitation is relatively abundant. Periods of less plentiful precipitation are called interpluvial periods. *Stokes and Varnes, 1955.*

ply. a. One of several layers of fabric or of other strength-contributing material. *Nichols.* b. S. Staff. A thin band of shale, lying immediately over a coal seam. *Arkell.* c. Scot. A rib or successive ribs, for example, of clayband with very thin partings. *Arkell.* d. Scot. Limy ply, a limestone bed, Breich quarries, Edinburgh. *Arkell.*

ply glass. Glassware, particularly for lamp shades and globes, made by covering opal glass (usually on both sides) with transparent glass of matched thermal expansion. *Compare* cased glass. *Dodd.*

plymetal. Sheet consisting of bonded layers of dissimilar metals. *ASM Gloss.*

Pm Chemical symbol for promethium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B–1.*

PM Abbreviation for permanent magnet, per thousand. *Zimmerman, p. 80; Webster 3d.*

pneumatic. Set in motion or operated by compressed air. *Nelson.*

pneumatic blowpipe. A long ¾-inch diameter metal pipe, connected to the air supply, to blow out dust and chippings from vertical blast holes at quarries. The blowpipe is generally used for holes exceeding about 12 feet in depth. A stream of water is sometimes used instead of an air jet. *Nelson.*

pneumatic caissons. Closed casings in which air pressure is maintained equal to the pressures of the water and soils on the outside. The deeper the caisson, the higher the pressure that must be maintained. *Carson, p. 142.*

pneumatic cartridge loader. A cartridge loader widely used for underwater blasting, for blasting without removing the overburden, and for long-hole blasting. It is also being used increasingly for tunneling and other sorts of rock blasting. *Langefors, p. 91.*

pneumatic cleaning. Cleaning in an air current. *B.S. 3552, 1962.*

pneumatic coal cleaning. Coal cleaning by machines which utilize air currents as the primary separating medium. The air machines can generally be divided into three types: (1) pneumatic jigs where the air current is pulsated; (2) pneumatic tables where the refuse is diverted from the direction of flow of the clean coal by a system of riffles fixed to the deck; and (3) pneumatic launders where the products are flowing in the same direction, and the clean coal is skimmed off the top of the bed and/or the refuse is extracted from the bottom in successive stages. *Mitchell, pp. 532–533.*

pneumatic concentrator. Gravity jig, shaking table, or other device in which the suitably ground minerals are separated by gravity during their exposure to a continuous or pulsating current of air. *Pryor, 3.*

pneumatic conveyor. a. A pipe or tube through which granular material is transported by airblast. It is used for pulverized coal, crushed rock (pneumatic stowing), cement, etc. The term could also be applied to a conveyor operated by compressed air. *Nelson.* b. An arrangement of tubes or ducts through which bulk material or objects are conveyed in a pressure and/or vacuum system. *ASA MH4.1–1958.*

pneumatic drill. Compressed-air drill worked by reciprocating piston, hammer action, or turbo drive. *Pryor, 3.*

pneumatic drill leg. See air-leg support. *Nelson.*

pneumatic filling. A filling method in which compressed air is utilized to blow the filling material into the mined-out stope.

Stoces, v. 1, p. 272.

pneumatic flotation cell. Machine in which the air used to generate a mineralized froth is blown into the cell, either through a porous septum at or near the bottom, or by pipes which bring low-pressure air to that region. *Pryor, 3.*

pneumatic friction clutches. This clutch transmits power through friction shoes carried on the tube of cord and rubber construction. The pneumatic clutch is self-adjusting for wear due to the natural resilience of the rubber tube. Disengagement is complete and automatic when the air under pressure is released. The clutch is controlled by finger pressure on a valve. The valve can be installed at the place most convenient for the operator. *Pit and Quarry, 53rd, Sec. D, p. 71.*

pneumatic hammer. A hammer in which compressed air is utilized for producing the impacting blow. *Bureau of Mines Staff.*

pneumatic hoist. A device for hoisting operated by compressed air. *Standard, 1964.*

pneumatic injection. A method for fighting underground coal fires developed by the U.S. Bureau of Mines. This air-blowing technique involves the injection of incombustible mineral, like rock wool or dry sand, through 6-inch boreholes drilled from the surface to intersect underground passageways in the mines. *Bureau of Mines Staff.*

pneumatic jig. a. Air jig, such as plumb, used in desert countries for concentrating ore. *Pryor, 3.* b. A jigging machine in which an air blast performs the work of separation of minerals. *Standard, 1964.* c. *See* Kirkup table; plunger jig washer. *Nelson.*

pneumatic lighting. a. Underground lighting produced by a compressed-air turbomotor driving a small dynamo. *Pryor, 3.* b. The use of compressed air to generate electric light. *See also* air turbolamp. *Nelson.*

pneumatic lubricator. Synonym for line oiler. *Long.*

pneumatic method. In flotation, a method in which gas is introduced under slight pressure near the bottom of the flotation vessel, the device used for introduction being either a submerged pipe or a porous cloth, frit, or rubber surface forming the wall of a wind box. *Gaudin 2d, p. 416.*

pneumatic mortar. Mortar applied to a surface with a cement gun in the same manner as gunite. Such mortar has a cube crushing strength of 3,000 pounds per square inch at 7 days and of 6,000 pounds per square inch at 28 days, with a water/cement ratio of 0.45. *See also* preload tank; prestressed concrete. *Ham.*

pneumatic pick; coal puncher. A compressed-air-operated hand tool used to excavate coal, ore, and rock, with a punching action. Without the pick steel, its length is about 18 inches and weight about 24 pounds. It delivers about 2,500 blows per minute. The latest type is the water-controlled pick, so designed that the air valve is operated by water pressure. The water assists in suppressing the dust made during cutting. *Nelson.*

pneumatic ram. A ram fed by a compressed-air pipeline. The piston is about 8 inches in diameter giving an area of 50 square inches and exerts a pushing force of up to 4,000 pounds. *Nelson.*

pneumatic riveter. A compressed air tool used for driving rivets. *Ham.*

pneumatic rod puller. An air-driven rod puller. *See also* rod puller. *Long.*

pneumatics. That branch of physics that treats of the mechanical properties of gases, such as their pressure, elasticity, density, and also of pneumatic mechanism; sometimes it includes acoustics. *Standard, 1964.*

pneumatic sewage ejector. A compressed air displacement pump for moving sewage. *Ham.*

pneumatic shaft sinking. a. Shaft sinking with the aid of a drop shaft fitted with an airtight deck to form a working chamber. *See also* man lock. *Ham.* b. The caisson sinking process now largely obsolescent in mining practice. *Nelson.*

pneumatic stamp. Free-falling crushing weight, similar to stamp of stamp battery, save that the stem of each stamp forms part of a compressed-air cylinder through which it is raised. *See also* stamp battery. *Pryor, 3.*

pneumatic stowing. A system of filling mined cavities in which the crushed rock is carried along a pipeline by compressed air and discharged at high velocity into the space to be packed, the intense projection ensuring a very high density of packed material. For stowing shallow workings—up to 200 yards in depth—the stowing plant may be installed on the surface. The air pressure is about 60 pounds per square inch. For deeper workings, the plant may be installed underground, and the crushed rock taken down from the surface. The stowing pipes are about 5 to 6 inch diameter. The system is often employed if important surface structures require protection. The material used is from old dirt heaps, screen dirt and washery rejects. The material is crushed to minus 2½ inch and preferably without the minus ½ inch material. *See also* low-pressure air stower. *Nelson.*

pneumatic table. An appliance for the dry cleaning of ore or coal. It consists of a perforated deck, with vertical ribs or riffles, which is reciprocated and the motion keeps the bed of raw coal sufficiently mobile for the blast of air from below to effect a process of stratification (or layering). The coal rises to the surface, with dirt at the base and a central layer of middlings. *See also* Birtley contraflow separator; Vee table; air table. *Nelson.*

pneumatic tamper. Essentially a long-stroked piston with a mushroom-shaped foot about 4 inches in diameter. It operates on compressed air drawn from an air compressor. The compressed air is used to lift the piston and footpiece, and their combined weight, in falling, supplies the impact. *Carson, p. 380.*

pneumatic tools. Tools operated by air pressure. *Crispin.*

pneumatic water barrel. A special type of water barrel invented by Galloway, for removing water from a shaft sinking. By means of a hose connection to an air pump at the surface, a partial vacuum is created inside the barrel and the water lifts the valve and fills the barrel. The hose is then detached and the barrel hoisted to the surface and discharged. Various types of sinking pumps are now used. Also called vacuum tank. *Nelson.*

pneumatogen apparatus. A breathing apparatus developed about 1906. The oxygen for breathing is generated by the reaction between the carbon dioxide and moisture in the exhaled air with the peroxides of sodium and potassium. It did not prove satisfactory as the air for rebreathing became unbearably hot. *Nelson.*

pneumatogenic. In geology, derived from or modified by substances in a gaseous condition; said of ores and other mineral deposits. *Compare* hydatogenic. *Standard, 1964.*

pneumatolitic metamorphism. Contact metamorphism in which the composition of rock has been altered by introduced magmatic material. *A.G.I. Supp.*

pneumatolysis. The alteration of rocks and the formation of minerals during or as a result of the emanation of gases and vapors from solidifying igneous rocks. *Fay.*

pneumatolytic. A term used in different connotations by various authors and perhaps best abandoned. It has been used to describe such processes as surface effects of gases near volcanoes; contact-metamorphic effects surrounding deep-seated intrusives without any knowledge of gas against the liquid state; that stage in igneous differentiation between pegmatitic and hydrothermal, which is supposed to be characterized by gas-crystal equilibria; and (very loosely) any deposit containing pneumatolytic minerals or elements, such as tourmaline, topaz, fluorite, lithis, and tin, and hence presumed to have formed from a gas phase. *A.G.I.*

pneumatolytic alteration. Rock alteration, that is, mineral substitution of rock resulting from pneumatolysis; between 400° and 600° C, according to European authors. *Schieferdecker.*

pneumatolytic clay. Clay that has been subjected to hot gases and liquids during its natural formation process. *ACSG, 1963.*

pneumatolytic hornfels. A fine-grained, nonfissile rock, the product of contact metamorphism and pneumatolytic modification. *See also* calc-flinta; calc-silicate hornfels; hornfels; limurite; skarn; tactite. *A.G.I.*

pneumatolytic metamorphism. Contact metamorphism in which the mineralogic changes are largely the result of chemical activity of gases emanating from igneous bodies. *Stokes and Varnes, 1955.*

pneumatolytic ore. An ore deposit formed by pneumatolysis. *Nelson.*

pneumatolytic stage. One of the successive stages of consolidation of magma during which there is equilibrium between crystalline and gas phases. *Schieferdecker.*

pneumo-. A combining form taken from the Greek meaning lung, and used in connection with the terminology of geologic processes and effects involving gases and vapors. *Stokes and Varnes, 1955.*

pneumoconiosis; pneumokoniosis. A disease of the lungs caused by habitual inhalation of irritant mineral or metallic particles. It occurs in any work places where dust is prevalent, such as mines, quarries, foundries, and potteries. Also called miner's asthma; miner's consumption; miner's lung. Also spelled pneumonoconiosis; pneumonokoniosis. *Compare* anthracosis; silicosis, b. *Webster, 3d.*

pneumokoniosis. See pneumoconiosis. *Webster, 3.*

pneumonoultramicroscopicsilicovolcanoconiosis. A pneumoconiosis caused by the inhalation of very fine silicate or quartz dust and occurring especially in miners. *Webster 3d.*

pneumotectic. The processes attending the squeezing of solutions from a freezing magma and the products formed by the solutions. Those processes and products of magma consolidation, (next following the crystallization of igneous rocks), in which fundamental influences of a sort that was magmatic in the strictest sense were recognizably modified and to some extent controlled by gaseous constituents or so-called mineralizers which accumulated in relative concentration, by elimination, when in the preceding orthotectic stage and major portion of the magma crystallized without incorporating more than a minor proportion of these volatile substances that had been components of the initial molten solution. *Hess.*

pneumotectic deposit. A transitional form between straight magmatic and hydrothermal ore (mineral) deposits, in which the effects of mineralizers are very apparent. *Schieferdecker.*

Po Chemical symbol for polonium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B–1.*

pocket. a. Broadly, a localized enrichment; a crevice in the bedrock containing gold; a rich patch of gold in a reef. *Nelson.* b. A bin, of a capacity equal to the skip, used at the shaft bottom for quick and accurate skip loading. *See also* shaft pocket; measuring chute. *Nelson.* c. A rich deposit of mineral, but not a vein. *Gordon.* d. S. Afr. A mass or body of rich ore, of small extent. *Beerman.* e. A receptacle, from which coal, ore, or waste is loaded into wagons or cars. *Fay.* f. A ganister quarryman's local term for masses of rock, 30 to 50 feet in width, that are worked out and loaded, buttresses of untouched rock being left between them to support the upper masses. *Fay.* g. A hole or depression in the wearing course of a roadway. *Fay.* h. A local accumulation of gas. *Hudson.* i. A bulge, sop, or belly in a lode or bed. *Arkell.* j. A cavity, whether filled with air, water, mineral, or gravel. *Arkell.* k. A small body of ore; an enlargement of a lode or vein; an irregular cavity containing ore. *Fay.* l. A natural underground reservoir of water. *Fay.* m. A glen or hollow among mountains. *Fay.* n. In pegmatites, the central openings lined with crystals, including those of gem species. *Sinkankas.*

pocket-and-fender method. In pillar extraction, a method in which lifts are mined in the same way as in the open-end method, except that a fender of coal or a series of small coal stumps is left adjacent to the gob as the lift is advanced. After the lift is completed, the fender or stumps of coal are blasted, and sometimes part of this coal is recovered. *Woodruff, v. 3, p. 61.*

pocket-and-stump method. A method of mining pillars in which a narrow pillar of coal, called the stump, is left along the goaf (worked-out space) to support the roof while driving the pocket. This coal acts as a protection for the miners. When the pocket has been completed the stump is worked back, then another pocket is driven, and so on. *Lewis, pp. 542–543.*

pocket clay. A highly siliceous clay sometimes found in large pockets in carboniferous limestone. In England, it is found, typically, in Derbyshire and is worked as a refractory raw material at Friden, about 10 miles S. W. of Bakewell; a quoted composition is 78 percent SiO_2, 13.5 percent Al_2O_3, 2.0 percent Fe_2O_3, 0.7 percent TiO_2, 0.2 percent CaO, 0.3 percent MgO, 1.6 percent K_2O, 0.1 percent Na_2O, and 3.9 percent loss on ignition. *Dodd.*

pocket compass. A magnetic needle enclosed in a nonmagnetic case, the needle being free to swing over a graduated face or dial. The compass is useful for experimental purposes or for direction-finding in desolate parts of the countryside, or during darkness and foggy weather. *Morris and Cooper, p. 205.*

pocket conveyor. A continuous series of pockets formed of a flexible material festooned between crossrods carried by two endless chains or other linkage which operate in horizontal, vertical and inclined paths. *ASA MH4.1–1958.*

pocket hunter. A term used in California for a miner or prospector who searches for small gold deposits which occur on the surface in the mother lode and other districts of the State. *Fay.*

pocket of gas. A small accumulation of firedamp in a roof cavity, where it is beyond the reach of the ventilating air current. *See also* deflector sheet; firedamp layer; hurdle sheet. *Nelson.*

pockets. Local term in New York for the occurrence of garnet as crystals, most of which are imperfectly developed. *AIME, p. 11.*

pocket setting. *See* boxing in. *Dodd.*

pockety. Containing only occasional bunches of good ore. *Fay.*

Pocono sandstone. A sandstone of the Mississippian system in the northern Appalachians, especially in Pennsylvania. It is oil- and gas-bearing in West Virginia, and is called by the drillers Big Injun sand. *Webster 2d.*

pod. a. A rudely cylindrical ore body that decreases at the ends like a cigar. *See also* lens. *Stokes and Varnes, 1955.* b. A very shallow depression up to more than 10 kilometers in diameter of the south Russian steppes containing temporary lakes, may reflect uneven loess deposition, preloess topography, deflation, solution, etc. *A.G.I. Supp.*

poder. Corn. Copper ore treated as refuse. *Standard, 1964.* Sometimes spelled podar. *Fay.*

Podmore factor. A factor proposed to indicate the intrinsic solubility of a frit: Podmore factor = (solubility × 100) ÷ (specific surface). The solubility of any given frit is approximately proportional to the surface area of frit exposed to the solvent, that is, to the fineness of grinding; the Podmore factor is independent of this fineness. *Dodd.*

pods. Irregular cavities containing high-grade uranium ore of very limited extent. *Ballard.*

podsol. Synonym for podzol.

podzol. A zonal soil having an organic mat and a very thin organic mineral layer above a leached layer which rests upon an illuvial dark brown layer; developed under coniferous or mixed forest or under heath vegetation in a temperate to cold moist climate; iron oxide, alumina, and perhaps organic matter have been removed from the A-horizon and deposited in the B-horizon. Synonym for podsol. *A.G.I. Supp.*

podzolization; podsolization. A general term referring to that process (or those processes) by which soils are depleted of bases, become acid, and have developed eluvial A-horizons (surface layers of removal) and illuvial B-horizons (lower horizons of accumulation). Specifically, the term refers to the process by which a podzol is developed, including the more rapid removal of iron and alumina than of silica, from the surface horizons, but it is also used to include similar processes operative in the formation of certain other soils of humid regions. *A.G.I.*

poecilitic. *See* poikilitic. *C.T.D.*

poecilitic texture. *See* poikilitic. Holmes, *1928.*

poeciloblastic. Synonym for poikiloblastic. *A.G.I.*

Poetsch process. a. The original freezing process of shaft sinking developed by F. H. Poetsch in 1883. *See also* freezing method. *Nelson.* b. One in which brine at subzero temperature is circulated through boreholes to freeze running water through which a shaft or tunnel is to be driven, during development of waterlogged mine. *Pryor, 3.*

poge. A tool formerly used for lifting the balls of ball clay. *Dodd.*

Pohlé-Croasdale process. Recovering gold, silver, copper, and lead from ores by roasting with salt at a temperature of about 1,900° F., usually with sulfur as an additional constituent; the smoke, containing the volatilized chlorides, is electrically precipitated and the mixed chlorides are then treated for metal recovery by fusion or electrolysis. *Bennett 2d, 1962.*

poicilitic. *See* poikilitic. *Fay.*

poidometer. An automatic weighing device for use on belt conveyors. The device feeds the material from a hopper in a uniform stream onto a short independent belt conveyor and from there onto the main belt or bin. The weight of material on the measuring belt actuates a scale beam which raises or lowers a gate controlling the rate of flow from the feed hopper to a certain predetermined load per foot of measuring belt. A meter records the travel of measuring belt and this figure multiplied by the weight per foot of belt as fixed by the scale beam adjustment gives the weight of material handled in any given period. *See also* weightometer. *Nelson.*

poikilit; poikilopyrite. Same as bornite. *Fay.*

poikilitic; poicilitic. Said of a texture in igneous rocks in which small crystals of one mineral are irregularly scattered without common orientation in larger crystals of another, for example, small olivines embedded in larger pyroxenes, as in some peridotites. Such rocks have a mottled luster. Also applied to rocks of the Permian and Triassic systems. An alternative spelling is poecilitic. *C.T.D.*

poikilitic texture. *See* poikilitic.

poikiloblastic. A metamorphic texture due to the development, during recrystallization, of a new mineral around numerous relics of the original minerals, thus simulating the poikilitic texture of igneous rocks. When the included relics also reveal the original texture of the rock, the new texture is helicitic. *Holmes, 1928.*

poikilophitic texture. Suggested for a variety of ophitic texture in which the pyroxenic matrix completely includes laths of plagioclase, and is not merely penetrated by them. *Holmes, 1928.*

point. a. A predetermined direction for driving a roadway underground. The point is fixed by roof plugs in the roadway. *See also* alignment. *Nelson.* b. One one-hundredth (0.01) part of a carat. When less than one carat the weight of a diamond is usually expressed in points, for example, 20 points equals 1/5 carat. *I.C. 8200, 1964, p. 149.* c. The tip of an angle between two rails in a railroad frog; a railroad switch. *Webster 3d.* d. A drivepipe through which steam or water is introduced into frozen gravel to thaw it for mining or dredging. *Webster 3d.* e. Eng. The bearing or direction, in reference to the magnetic meridian in which an underground road is driven. *Fay.* f. In quarrying, a type of wedge that tapers to a narrow, thin edge. *Fay.* g. The end or bottom of a borehole, as distinguished from the the mouth or collar. *Fay.* h. The extreme terminal usually sharp or narrowly rounded part of something, as a pin, indicator, etc. that is usually formed by the gradual or abrupt decrease in width or thickness of the body which it terminates and that is typically used for piercing, pricking, indicating, or for some similar function; a usually sharp, tapering, or otherwise narrowly converging end; tip. *Webster 3d.* i. A projecting usually tapering part of something: as (1) a piece of land, as a promontory, cape, projecting into a body of water; (2) a sharp prominence; apex; peak. *Webster 3d.* j. A tool used in trimming and smoothing rough stone surfaces. *Webster 3d.* k. A place considered as position only. It is a spot, or a place having a definite position but no dimensions; that is, it has no width or thickness. *Jones, 2, p. 80.* 1. The extreme end of a cape, or the outer end of any land area protruding into the sea. *Schieferdecker.* m. To finish (as a wall) by filling the joints with cement, mortar, or other material. *Webster 3d.* n. To scratch out the old mortar from the joints of (as a wall) and fill in with new material; often used with up. *Webster 3d.*

point agate. Same as point chalcedony. *Shipley.*

point angle. In general, the angle at the point of a cutting tool. Most commonly, the included angle at the point of a twist drill, the general purpose angle being 118 degrees. *ASM Gloss.*

point bar. One type of support for vitreous enamelware used during the firing process. *Dodd. See also* burning bar.

point-bar sharpener. A small handtool used to sharpen the pins on point bars and somewhat similar to a pencil sharpener, but a great deal stronger. *Hansen.*

point bearing pile. *See* end-bearing pile. *Ham.*

point chalcedony. White or gray chalcedony flecked with tiny spots of iron oxide, the whole surface assuming a uniform soft red color. *Shipley.*

point driver, thawing. In metal mining, one who drives steam or water points (specially made pipe with a chisel bit at one end) into the frozen ground of a placer deposit in advance of dredging operations, to thaw the ground so that it can be worked by the dredge for recovery of the gold. *D.O.T. 1.*

pointed box. A box, in the form of inverted pyramid or wedge, in which minerals, after crushing and sizing, are separated in a current of water. *See also spitzkasten. Fay.*

pointed prop. Eng. *See* tapered prop. *SMRB, Paper No. 61.*

pointer. In masonry, a tool for clearing the mortar from old joints in order to point them. *Standard, 1964. See also* point, m. *Fay.*

pointer operator. One who points or tapers the ends of metal bars, rods, tubes, and wire to permit insertion into die of drawing machine, using a turn pointer or swaging machine. Also called pointer, swager, and swaging operator. *D.O.T. 1.*

point gage. A sharp-pointed rod attached to a graduated staff or vernier scale for measuring the elevation of the surface of flowing water. The point is lowered until the tip barely touches the water, forming a streak. *Seelye, 1.*

pointing. a. Reducing the diameter of wire, rod, or tubing over a short length at the end by swaging or hammer forging, turning, or squeezing to facilitate entry into a drawing die and gripping in the drawhead. *ASM Gloss.* b. The operation of chamfering or rounding in automatic machines the threaded end or the head of a bolt. *ASM Gloss.* c. The finishing of joints in a brick or masonry wall. *Crispin.* d. Eng. *See* wall, f. *SMRB, Paper No. 61.*

pointing trowel. A small trowel used by bricklayers for pointing and striking up joints and for removing mortar from the face of the wall. *Crispin.*

point mark. *See* pin mark. *ACSB, 3.*

point metal. Metal used for pointing pens and other instruments. Tasmania is the sole producer on a large scale of point metal osmiridium. *Hess.*

point of attack. *See* portal, b. *Fraenkel.*

point of compound curvature (P.C.C.). The point of tangency common to two curves of different radii, the curves lying on the same side of the common tangent. *Seelye 2.*

point of curvature (P.C.). The point where the alinement changes from a straight line or tangent to a circular curve; that is, the point where the curve leaves the first tangent. *Seelye, 2.*

point of decalescence. *See* decalescence. *Lewis, p. 95.*

point of frog. The intersection of the gagelines of the main track and the turnout. *Kiser, 2, p. 34.*

point of intersection. a. The point where intersecting lines cross one another. *Jones, 2, p. 81.* b. The point where the two tangents to a circular curve intersect. Abbreviation, P.I. Also called vertex. *Seelye, 2.*

point of recalescence. *See* recalescence. *Lewis, p. 95.*

point of switch. That point in the track where a car passes from the main line on to the rails of a turnout. *Kiser, 2, p. 34.*

point of tangency (P.T.). The point where the alinement changes from a circular curve to a straight line or tangent; that is, the point where the curve joins the second tangent. *Seelye, 2.*

point of the horse. The point where a lode splits or divides into two parts. *Fay.*

point out. Said of a well in which the bore of the hole becomes reduced to a size too small to permit further work. *Fay.*

point plotting. Procedure in reflection interpretation in which depth points are computed and plotted for each seismogram trace separately. *Schieferdecker.*

points. The tapered rails at a turnout which can be adjusted to direct a set of mine cars from a straight rail track to another branching off at an angle. *Nelson. See also* catch points; turnout.

point source (of light). A single point from which light emanates, such as the sun, the filament of an electric lamp or other superheated metal, etc. The term is often extended to include as well the reflections of such point sources as seen in mirrors, or the facets of gemstones. Some objects are designed to reflect multiple images of a point source, and each of such images is also popularly known as a point source. *Shipley.*

point tender. *See* switchman, a. *D.O.T. 1.*

point: turning. A point on which a foresight is taken from one instrument station in a line of survey and on which a backsight is taken from the next instrument station. *A.G.I.*

poise. a. The unit of absolute viscosity, equal to one dyne-second per square centimeter. Named from the physicist Poiseuille. *A.G.I.* b. Centimeter, gram, second unit of fluid viscosity. *See also* Poiseuille's equation. *Pryor, 3.*

Poiseuille's equation. $\frac{V}{t} = \frac{\pi r^4 p}{8\eta l}$, where V is the volume of liquid flowing in time, t, and at pressure, p, through a tube of radius, r, and length, l; η is the coefficient of viscosity in poises (dynes times seconds times cm^{-2}). $\eta = \frac{\pi r^4 p t}{8Vl}$. *Pryor, 3.*

Poiseuille's law. A law stating that the rate of flow of liquid through a narrow tube is inversely proportional to the fourth power of the radius of the tube. *Pryor, 3.*

poison. Any material that readily absorbs neutrons and thus removes them from the fission chain reaction in a reactor, decreasing the reactor's reactivity. *L&L.*

poisoning. In ion-exchange terminology, loading of resin sites with unwanted ions, thereby eliminating them as locations for uranium-ion loading. Also, fouling of an organic solvent used in stripping pregnant leach liquor with molybdenum, cobalt, titanium, thorium or ferric ions. *Pryor, 3.*

poison tower. A chamber in which the fumes of sulfur and arsenic are condensed in the manufacture of arsenic in Saxony and Silesia. *Standard, 1964.*

Poisson's ratio. a. The absolute value of the ratio of the transverse strain to the corresponding axial strain, in a body subjected to uniaxial stress; usually applied to elastic conditions. *ASM Gloss.* b. When a compressive force is applied to a body in one direction, other forces are induced in that body in directions at right angles to it. The ratio of the induced forces to the applied force is given by Poisson's ratio, which depends on the elastic constants for the body in question. *Spalding.* c. The ratio of lateral strain to corresponding axial strain for a material subjected to axial loading. Poisson's ratio for an isotropic material at a stress below the proportional limit may be calculated: $r = \frac{E}{2G} 1$ where r = Poisson's ratio, E = modulus of elasticity in tension or compression, G = modulus of elasticity in shear, psi. *H&G.*

poker. *See* picker. *Fay.*

poker man. A laborer who removes blue powder and ash residue from retorts after molten zinc has been tapped. Also called scraper. *D.O.T. Supp.*

poker vibrator. The name by which internal concrete vibrator is commonly known. *See also* internal vibrator. *Ham.*

poke welding. The same as push welding. *ASM Gloss.*

pokkers and jetters. Eng. Blocks or pulleys, which carry or support the connecting rods of pumps or engines. *Fay.*

polar. Due to mutual attraction between charged lattice points on mineral surface and counter-ions in solute. Can therefore be anionic or cationic. *Pryor, 3, p. 7.*

polar adsorption. Sorption of anions or cations. *Pryor. 3.*

Polar Ajax. A high-strength, high-density, nitroglycerin gelatin explosive, supplied in both unsheathed and sheathed forms. *McAdam II, p. 47.*

polar bond. Electrostatic bond between two atoms, arising from transfer from one to the other of one or more electrons. A polar compound is an electrolyte, a substance which dissociates into ions when fused or in aqueous solution. *Pryor, 3.*

polar compound. A compound, such as water, with a molecule that behaves like a small bar magnet with a positive charge on one end and a negative charge on the other. *Leet..*

polar curve. A graph showing the distribution of light in a flame safety lamp obtained by plotting the values obtained at intervals of 10 degrees around the full circle. *Mason, V. 1, p. 247.*

polar explosives. Explosives containing an antifreeze ingredient and distinguished by the prefix polar. Polar and nonpolar explosives of equal grade possess similar characteristics. Explosives which contain nitroglycerin tend to freeze when stored at low temperatures for lengthy periods. *Nelson.*

polar glacier. A glacier formed in the high latitudes. *Fay.*

polar ice. Extremely heavy sea ice, up to 3 meters or more in thickness, or more than one winter's growth, heavily hummocked (may ultimately be reduced by weathering to a more or less even surface. *Schieferdecker.*

polarimetry. Measurement of rotation of plane of vibration of polarized light by optically active transparent or translucent substances or liquids. *Pryor, 3.*

polariscope. An instrument for studying the properties of or examining substances in polarized light consisting essentially of two Nicol prisms or other polarizing devices. *Webster 3d.*

polarity. In crystallography, the property of having differing types of termination at the two ends of a prismatic crystal. May be reflected in pyroelectric properties, conduction of electric current, etc. *Shipley.*

polarization. a. The process by which ordinary light is changed into polarized light. The plane at right angles to the plane of transverse vibration is called the plane of polarization. *Fay.* b. The difference between the equilibrium value of the potential of an electrode and the value attained when an appreciable current flows through the system. It is said to be caused by the slowness of one or more of the processes taking place at the electrode. *BuMines Bull. 619, 1964, p. 206.* c. In electrolysis, the condition in the vicinity of an electrode, such that the potential necessary to get a desired reaction is increased beyond the reversible electrode potential. *ASM Gloss.* d. The separation of the positive and negative charges of a molecule. *C.T.D.*

polarization (dielectric). Displacement of the centers of positive and negative charges. *VV.*

polarization, electrolytic. Electrolytic decomposition of a solution due to the application of electromotive force at immersed electrodes. The decomposition voltage must suffice to set up current flow in accordance with Faraday's law. *Pryor, 3.*

polarization of electrode. Chemical reaction that takes place at the electrode and causes an electrochemical potential. *Schieferdecker.*

polarized light. Light vibrating in one plane only. Polarized light can be produced by means of reflection from glass plates at certain angles, by absorption of one of the two polarized rays passing through dark-colored tourmaline plates or Polaroid sheets, or by means of a Nicol prism. *Anderson.*

polarizer. That one of two Nicol prisms in a polarizing microscope through which the light passes and is polarized. *Fay.*

polarizing prism. Any prism so constructed as to produce polarized light; usually made of sawn and recemented calcite. *See also* Nicol prism. *Shipley.*

polar molecule. One in which the electrical charges of its constituent atoms or groups produce a dipole. *See also* dipole. *Pryor, 3.*

polar moment of inertia. a. The second moment of area about an axis perpendicular to its plane is known as the polar moment of inertia of a plane section. *Ham.* b. *See* moment of inertia. *Ro.*

polarography. Method of chemical analysis which measures ionic change. It records the changes in electrical current which take place as voltage is increased while globules of mercury are being dropped through the ionized solution under test. *Pryor, 3.*

Polaroid. Sheets of plastic material containing ultramicroscopic crystals of quinine idosulfate or other material which have the property of transmitting only one polarized ray, the other being almost entirely absorbed by the crystals. Polaroid sheets provide a light and inexpensive substitute for Nicol prisms in the production of polarized light. *Anderson.*

polar solvent. One which contains molecules having polar groups, for example, a hydrocarbon with substituted oxygen, nitrogen or a halogen. *Pryor, 3.*

Polar Viking. A typical nitroglycerin powder explosive which is now supplied only in the sheathed form. *McAdam II, p. 47.*

polder. *See* diked land. *Schieferdecker.*

polders. Dutch. Low fertile lands, reclaimed from the sea by vast systems of dikes and embankments. *Fay.*

pole. a. A means of designating the orientation of a crystal plane by stereographically plotting its normal; for example, the north pole defines the equatorial plane. *ASM Gloss.* b. Either of the two regions of a permanent magnet or electromagnet where most of the lines of induction enter or leave. *ASM Gloss.* c. To work, as molten copper, with a pole to lessen the amount of copper oxide present. *See also* poling. *Standard, 1964.* d. The negative electrical pole in a circuit is the cathode, and the positive the anode. A magnetic pole is a point toward which a freely suspended ferromagnetic rod aligns itself. *Pryor, 3.* e. Ranging pole in surveying. *Mason.* f. In glassmaking, to work (as molten glass) with a pole, to diminish the lilac color due to the presence of a low manganese oxide. *Standard, 1964.* g. Either extremity of an axis of a sphere. *Webster 3d.* h. Generally, the axis or pivot on which anything turns. One of the ends of the axis of a sphere, especially of the earth. *C.T.D.*

pole case. Eng. *See* plunger case. *Fay.*

pole chain. A surveyor's chain. *Standard, 1964.*

Polectron. Synthetic mica substitute; used in electrical condensers. *Bennett 2d, 1962.*

pole drill. A churn drill used to drill shallow holes. The drill stem is rigidly connected (by rods or coupled poles) to the reciprocating beam. *Long.*

pole figure. A stereographic projection representing the statistical average distribution of poles of a specific crystalline plane in a polycrystalline metal, with reference to an external system of axes. In an isotropic metal, that is, in one having a completely random distribution of orientations, the pole density is stereographically uniform; preferred orientation is shown by an increased density of poles in certain areas. *ASM Gloss.*

poleman. *See* locomotive brakeman. *D.O.T. 1.*

pole piece. A specially shaped piece of magnetic material forming an extension to a magnet, for example, the salient poles of a generator or motor. *C.T.D.*

pole star. The star which marks the approximate position of true north. It is a valuable survey point, since the local latitude is the height of the pole star above the northern horizon, and is easily located by following the two tail stars of Ursa Minor (Charles's Wain, the Plough, the Big Dipper) for some five times their distance apart. *Pryor, 3.*

pole strength. In measurement of magnetic strength, the number of unit poles in the measured field. One unit pole (centimeter, gram, second) is the strength in a vacuum required to exert one dyne in a one centimeter gap between poles. *Pryor, 3.*

pole tools. The tools used in drilling with rods. *See also* cable tools. *Fay.*

polianite. A steel-gray dioxide of manganese, MnO_2, crystallizing in the tetragonal system. It is distinguished from pyrolusite by its hardness and anhydrous character. *C.M.D.; Dana 17.*

policeman. a. Scot. A movable guard over or around a shaft mouth or at midworkings; safety gates. *Fay.* b. Eng. *See* temporary prop. *SMRB, Paper No. 61.* c. A stirring rod used in the laboratory. *Shell Oil Co.*

polierschiefer. *See* tripoli.

poling. a. The act or process of temporarily protecting the face of a level, drift, cut, etc., by driving poles or planks along the sides of the yet unbroken ground. Used especially for holding up soft ground. *See also* forepoling. *Fay.* b. Eng. *See* lofting. *SMRB, Paper No. 61.* c. A step in the fire refining of copper to reduce the oxygen content to tolerable limits by covering the bath with coal or coke and thrusting greenwood poles below the surface. There is a vigorous evolution of reducing gases that combine with the oxygen contained in the metal. If the final oxygen content is too high, the metal is underpoled; if too low, overpoled; and if just right, tough pitch.

ASM Gloss.; C.T.D.

poling back. Carrying out excavation behind timbering already in place. *Ham.*

poling boards. In mining, forepoling boards, driven horizontally ahead to support roof when tunneling through running ground. In trenching, side boards wedged apart in pairs. *Pryor, 3. See also* forepoling.

polings. Poles used instead of planks for lagging. Also spelled pollings. *Fay.*

polirschiefer. Tripoli slate. Also called polishing slate. *Dana 6d, p. 196.*

polish. *See* glaze, c. *Long.*

polished. *See* glazed, a. *Long.*

polished off. a. A diamond bit that has been dulled. *Long.* b. Finished or completed. *Long.*

polished plate glass. *See* plate glass. *ASTM C162–66.*

polished section. A section of material that has been ground and plane polished on one face for examination, under a microscope, by reflected light. *Compare* thin section, a. *Dodd.*

polished specimens. Selected pieces of ore or metal, or briquettes of particles bonded with lucite or other material, which have one surface ground smooth by means of abrasive powders and polishing laps. The powders include emery, aluminum oxide and diamond dust. Electrolytic polishing is also used for preparing metal surfaces by making the metal the anode in an electrolytic bath. *Pryor, 3.*

polished wire glass. Wire glass, ground and polished on both sides. *ASTM C162–66.*

polisher. One who removes color spots from decorated ware by grinding with an abrasive wheel and polishing. *D.O.T.1.*

Polish frame. A support frame that has all the beams unweakened by joints, and keeps the props at the right distance by a sprag placed between them. *Stoces, v. 1, pp. 148–149.*

polishing. Smoothing metal surfaces through the use of abrasive materials. *ASM Gloss. See also* acid polishing; pitch polishing. *ACSG, 1963.*

polishing bed. An apparatus in which stone slabs, etc., are polished usually with felt-covered blocks charged with a powder. *Standard, 1964.*

polishing cask. A barrel in which grained gunpowder is tumbled with graphite to glaze it. *Standard, 1964.*

polishing machine operator. *See* granite polisher; marble polisher. *D.O.T.1.*

polishing mill. A lap of metal, leather, or wood used by lapidaries in polishing gems. *Fay.*

polishing rouge. Fine red-colored polishing abrasive consisting of hydrated iron oxide. *Bennett 2, 1962.*

polishing slate. A gray or yellow slate, consisting of siliceous organisms, used for polishing; found chiefly in the coal measures of Bohemia and Auvergne, France. *Standard, 1964.*

polishing snake. A serpentine found near the Ayre, in Scotland, used formerly in polishing lithographic stones. *Standard, 1964.*

polishing stone. Polishing slate. *Standard, 1964.*

polishing wheel. Rotating disc, usually cloth-covered, for polishing and buffing. *Bennett 2d, 1962.*

polish off. a. To dull a diamond bit. *Compare* glaze, c; glazed, a. *Long.* b. To finish or complete. *Long.*

polissoir. a. In glassmaking, a hardwood block with a long iron handle by which to flatten glass cylinders newly opened out; a flattener. *Standard, 1964.* b. A polishing pad used in polishing plate glass after the grinding process. *C.T.D.*

poljes. A type of landform found in some areas of Karst topography. *Stokes and Varnes, 1955.*

polka-dot agate. Local name for translucent, almost colorless, chalcedony, with yellow, red, or brown circular dots. From Oregon. *Shipley.*

poll. a. Corn. The head or striking part of a miner's hammer. *Fay.* b. S. Wales. To clean the shale off ironstone. *Fay.*

polled stone. Som. Stone hewn into shape and faced ready for building. Building stone with one side rough-faced, as opposed to hammer- and punch-dressed. *Arkell.*

pollenite. A variety of trachyte. An olivine-bearing phonolite vitrophyre. *Bureau of Mines Staff.*

pollen peat. Peat rich in pollen grains. *Tomkeieff, 1954.*

poll pick. A pick with a head for breaking away hard partings in coal seams or knocking down rock already seamed by blasting. *Fay.*

pollucite. A rare, hydrous cesium aluminum silicate, $Cs_4Al_4Si_9O_{26}.H_2O$, crystallizing in cubes or massive. Colorless; transparent; used as a gem stone. Found in pegmatite. *Sanford; Dana 17.*

pollux. Same as pollucite. *Standard, 1964.*

polonium; radium F. A radioactive metallic element that is chemically similar to tellurium and bismuth. It occurs in pitchblende and in other uranium-containing ores, in radium-lead residues, and in old radon ampules, but it can be produced in much larger quantities by bombarding bismuth with neutrons in nuclear reactors. It emits a helium nucleus to form an isotope of lead. Symbol, Po; atomic number, 84; atomic mass, about 210; and valences, 2, 4, and 6. Also called radium F. Only about 100 micrograms of polonium occur in 1 ton of uranium ore, and its abundance is about 0.2 percent that of radium. All 27 known isotopes are radioactive; their atomic masses range from 192 to 218; and polonium 209 is the most stable isotope, having a half-life of 103 years. Two allotropic forms: (1) alpha polonium; isometric; and specific gravity, 9.32; and (2) beta polonium; hexagonal rhombohedral; and specific gravity, 9.4. Extremely toxic; glows blue; melting point, 254° ± 5° C; boiling point, 962° ± 2° C; slightly soluble in cold water; soluble in dilute mineral acids; and very slightly soluble in potassium hydroxide and in other alkalies. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B–127, B–204.*

polrose. Same as polroz. *Fay.*

polstean. Corn. A tin pit. *Fay.*

poly-. A prefix signifying many. Used in many mineral names such as polybasite, polycrase, polyhalite, polyaugite, etc. *CCD, 6d, 1961; Spencer 20, M.M. 1955.*

polyacrylamide. A good dispersing agent. Sometimes used as a substitute for natural gums as a binder and a thickening agent. *Lee.*

polyadelphite. A variant of aplome. *Hey 2d, 1955.*

polyargyrite. Described as a gray to black metallic opaque mineral with cubic cleavage, $12Ag_2S.Sb_2S_3$; considered to be a mixture of argentite and tetrahedrite. *Dana 6d, p. 146.*

polybasite. A natural silver sulfantimonide, $Ag_{16}Sb_2S_{11}$; color steel gray to iron black; streak black; luster metallic; hardness 2 to 3; specific gravity 6.0 to 6.2. Found in Nevada, Colorado, Idaho; Mexico, Chile, Europe. An ore of silver. *CCD 6d, 1961.*

polychroilite. Altered cordierite. *Dana 6d, p. 421.*

polychroite. Same as iolite. *Shipley.*

polychromatic. Showing a variety or a change of colors. *Webster 3d.*

polychrome decoration. A multicolor decoration. *ASTM C242–60T.*

polyconic map projection. A map projection having the central geographic meridian represented by a straight line, along which the spacing for lines representing the geographic parallels is proportional to the distances apart of the parallels; the parallels are represented by arcs of circles which are not concentric, but whose centers lie on the line representing the central meridian, and whose radii are determined by the lengths of the elements of cones which are tangent along the parallels. All meridians except the central one are curved. This projection is neither conformal nor equal area, but it has been much used for maps of small areas because of the ease with which it can be constructed. It is the map projection used for the topographic map of the United States (U.S. Geological Survey), and in a modified form is used for maps of large areas. Devised by F. R. Hassler, organizer and first superintendent of the U.S. Coast Survey (now the U.S. Coast and Geodetic Survey. *A.G.I.*

polycrase. An end-member of the euxenite-polycrase series. *See also* euxenite. *Crosby, pp. 19–20.*

polycrystal. An apparently single crystal consisting of a regular intergrowth of different minerals. *Spencer 20, M.M., 1955.*

polycrystalline. Composed of many crystals; an aggregate, as distinct from a single crystal. *Rolfe.*

polydymite. A nickel sulfide, Ni_3S_4. *Dana 7, v. 1, p. 262.*

polyelaterite. Soft elastic bitumen which differs from elaterite by a nontacky consistency, more intensive fluorescence and complete insolubility in organic solvents. It is believed that these properties are due to a higher state of polymerization. *Tomkeieff, 1954.*

polyester resins. Thermosetting resins. Used as bonding agents for fibrous glass products. *Lee.*

polyethylene glycols. These water-soluble materials serve as binders for colors, body and glaze slips, and in extrusion. *Lee.*

polygenetic. Originating in various ways or from various causes; formed at different places or times, or from different parts: said specifically, in geology, of mountain ranges; opposite of monogenetic. *Standard, 1964.*

polygenous; polygenic. Composed of or containing several kinds of material; heterogeneous in composition; as, polygenous conglomerate. *Standard, 1964.*

polygon. A plane figure bounded by straight lines. *Jones, 2, p. 91.*

polygonal. Having straight sides; usually more than four, in contrast to a parallelogram. *Shipley.*

polygonal masonry. Masonry formed of polygonal stones, or of stones strictly not coursed, whose joints exhibit any other than a right angle, but which are carefully fitted together. *Standard, 1964.*

polygonal method. An ore reserve computation method in which an assumption is made that the area of influence of each drill hole extends halfway to the neighboring drill holes. Therefore, thickness and grade must vary uniformly in opposite directions and in such cases errors tend to be compensating. Where the thickness and grade vary in the same direction the errors will accumulate and cause erroneous results. *Krumlauf, p. 80.*

polygorski; pilolite. Freak amphibole occurrences like mountain wood or cork. *Sinclair, W. E., p. 484.*

polyhalite. A naturally occurring potash salt, $2CaSO_4.MgSO_4.K_2SO_4.2H_2O$, found in the United States (Texas and New Mexico) and in Germany. Source of potash for fertilizer. *CCD 6d, 1961.*

polyhydrite. Described as an amorphous liver-brown mineral containing Fe_2O_3,FeO,SiO_2 with Al_2O_3,MnO and water; a doubtful mineral possibly thuringite. *Dana 6d, p. 710.*

polyion. A complex ion consisting of several strongly bound atoms, for example, SO_4^{--}. *A.G.I. Supp.*

poly-irvingite. A lithia-mica much richer in silica than irvingite, occurring as an alteration product of amblygonite in Sweden. *Spencer 15, M.M., 1940.*

polykras. Original spelling of polycrase. *Dana 6d, p. 744.*

polylite. Possibly a variety of pyroxene; a mixture containing fayalite. *Dana 6d, p. 1045.*

polylith. A megalithic structure of several or many stones, as a dolmen or stone circle. *Webster 3d.*

polymer. a. A compound formed by the union of two or more molecules of a simple substance. *Standard, 1964.* b. In the plural use, compounds that are identical in composition but which vary in molecular weight, as ethylene (ethene), C_2H_4; propylene (propene), C_3H_6; and butylene (butene), C_4H_8. *Standard, 1964.*

polymer bitumens. Term applied to bituminous matter present in coal. *Tomkeieff, 1954.*

polymeric. Of, relating to, or consisting of a polymer. *Webster 3d.*

polymeric cements (inorganic). A cement which sets with an additive polymerization reaction. *VV.*

polymerization. Union of two or more molecules of given structure to form a new compound with the same elemental proportions but with different properties and a higher molecular weight. *Pryor, 3.*

polymerize. To combine (small molecules) chemically into larger or especially very large molecules; to subject to polymerization; to form larger molecules from small molecules; to undergo polymerization. *Webster 3d.*

polymetamorphic rock. A rock altered by more than one episode of metamorphism. *A.G.I. Supp.*

polymetamorphism. A rock which has been subjected to metamorphism more than once is said to have undergone polymetamorphism. *Schieferdecker.*

polymictic rocks. Rocks characteristic of geosynclinal regions and including arkoses and graywackes. *A.G.I.*

polymignite. A very rare, weakly to moderately radioactive, orthorhombic, black mineral, (Ca,Fe^2,Y,etc.,Zr,Th)(Cb,Ti,Ta)O_4, found in granite pegmatites associated with soda-orthoclase, barkevikite, magnetite, nephelite, zircon, and pyrochlore; also found in syenitic rocks associated with magnetite and knopite; from Frederiksvarn, Norway. *Crosby, p. 34.*

polymignyte. Another spelling of polymignite. *Spencer 17, M.M., 1946.*

polymineralic rocks. Distinct from monomineralic rocks. *Spencer 20, M.M., 1955.* Composed of aggregates of several minerals. *Bureau of Mines Staff.*

polymnite. A stone marked with dendrites and black lines, that have a fancied resemblance to rivers, marshes, and ponds. *Standard, 1964.*

polymorph. A polymorphous organism; also, one of the several forms of such an organism. *Webster 3d.*

polymorphism. The property of having or presenting many forms; especially, in crystallography, the ability of certain substances to crystallize with different axial ratios without change of chemical composition; thus, carbon as diamond crystallizes in the isometric system, and as graphite in the hexagonal system. *Standard, 1964. See also* allotropy. *ASM Gloss.*

polymorphous. Having the same chemical composition but crystallizing in different crystal systems or classes. *See also* allotropic; dimorphous; trimorphous. Synonym for pleomorphous. *A.G.I.*

polynigritite. Variety of nigritite found in a fine-dispersed state in argillaceous rocks. *Tomkeieff, 1954.*

polynite. A montmorillonoid clay mineral in soils. *Spencer 21, M.M., 1958.*

polynya. Any sizable water area (not just a crack or a lead) surrounded by sea ice. *Schieferdecker.*

Polyphant stone. An impure soapstone from the village of Polyphant, near Launceston, Cornwall, England. Composition: 28 to 36 percent SiO_2, 6 to 9 percent Al_2O_3, 10 to 12 percent $FeO + Fe_2O_3$, 4 to 5 percent CaO, 23 to 27 percent MgO, and 10 to 12 percent loss on ignition. The melting point is 1,300° to 1,400° C. Blocks of this stone are used as a refractory material in alkali furnaces. *See also* soapstone. *Dodd.*

polyphase; multiphase. In electricity, having or producing two or more phases, as a polyphase current. *Webster 3d.*

polysomatic. Having a texture consisting of numerous small grains; said of minerals. *Standard, 1964.*

polysulfides. Binary sulfur compounds which carry excess sulfur with respect to valency requirement of the combining base. *See also* poly-. *Pryor, 3.*

polysyngony. A condition in which the space lattice of two related minerals is somewhat changed, although the density and cleavage properties are so little changed that the type of structure is maintained. This is illustrated by the alpha quartz and beta quartz relations. *Compare* polytypy; polytropy. *Hess.*

polysynthetic twinning. Successive twinning of three or more individuals according to the same twinning law and with the composition planes parallel. Often revealed by striated surfaces. *A.G.I.*

polysynthetic twinning structure. A mineral structure caused by two systems of lamellar twinning making an angle with each other. *Schieferdecker.*

polytelite. a. A silver-lead tetrahedrite found in Germany. *Standard, 1964.* b. Synonym for freibergite. *Hey 2d, 1955.*

polythene. Alkathene; polyethylene. Polymerized ethylene, C_2H_4. Tough and thermoplastic material. *Pryor, 3.*

polythionic acids. Series related to sulfurous and thiosulfuric acid, believed to have the structure

$$S_{n-2} < \begin{matrix} SO_2OH \\ SO_2OH \end{matrix}$$

Formula of dithionic acid is $H_2S_2O_6$, of trithionic acid $H_2S_3O_6$ and tetra- $H_2S_4O_6$. *Pryor, 3.*

polytropy. A condition in which there is no change in the geometrical symmetry of the crystal structure of two related minerals, but a change to permit a variant in the resultant mineral. This is illustrated by orthoclase microcline. *Compare* polytypy; polysyngony. *Hess.*

polytypism. A condition in micas and similar clay minerals in which they show growth spirals which are due to lamellae of different orientations. *A.G.I.*

polytypy. A condition in which the space lattice of two related minerals is completely altered to a new type. This is illustrated by the quartz-tridymite relationship. *Compare* polysyngony; polytropy. *Hess.*

polyvinyl acetate. Water emulsions of this material are used extensively as adhesives for ceramics. In a plasticized form these resins are used in glass textile sizes to bond the individual filaments together. *Lee.*

polyvinyl butyral. A resin, with a plasticizer. Provides the interlayer in standard laminated glass made from either polished plate glass or window glass. *Lee.*

polyxene. Native platinum, steel gray to silver white, containing 80 to 90 percent platinum and 6 to 11 percent iron, with more or less iridium and palladium. *Hess.*

polzenite. A variety of melilite basalt. *Holmes, 1928.*

pommel. A restrained cable plug. *B.S. 3618, 1965, sec. 7.*

Pompeiian brick. A loosely used term, but it is probably most frequently applied to bricks 12 by 1½ by 4 inches in size, of medium dark shade, with a brownish body covered with iron spots. *Fay.*

pompom. Stoper rock drill. *Pryor, 3.*

Poncelet wheel. A kind of undershot waterwheel suitable for falls of less than 6 feet, having the buckets curved so that the water presses on them without impact. *Fay.*

pond. a. A small lake. *Nichols.* b. In dredge work, an area where discharge water is held long enough to allow fine soil particles to settle. *Nichols.*

pond clays. Formed in small lakes or ponds scattered over northern states, north of the line of terminal moraine. Moraine deposits, of irregular size and often lens-shaped, occurring in moraines or glacial till. River-terrace deposits, commonly sandy beds, representing mud and clay deposited by streams during periods of overflow. *USGS Prof. Paper 11, 1903, p. 19.*

ponded lava. A thick accumulation of lava at the base of a steep slope or in a depression. *A.G.I. Supp.*

ponding. The natural formation of a pond or lake in a watercourse; chiefly, by a transverse mountain uplift whose rate of elevation exceeds that of the stream's corrosion, or by a dam caused by glaciers, volcanic ejecta, landslips, or alluvial cones of stronger streams. *Standard, 1964.*

pondlet. A little pond; in geology, such a pond formed by ponding. *Standard, 1964.*

Ponsard furnace. A furnace in which the escaping combustion gases, passing through tubular flues, heat the incoming air contiunously through the flue walls. *Fay.*

pontalite. Methyl methacrylate, found satisfactory for the mounting of small metallurgical specimens. Originally in the form of powdered resin, under temperature and pressure it becomes as transparent as glass. It is tough, hard and resistant to the action of etching reagents, and adheres excellently to the specimen. *Osborne.*

Pontar. Refined coal tar. *Bennett 2d, 1962.*

Pontian. Upper lower Pliocene. *A.G.I. Supp.*

pontil. An iron rod used in glassmaking to carry and manipulate hot bottles, etc., and having a projection at the end varying in shape according to the character of the ware carried. *Standard, 1964.* Also called snap, pontee, ponto, ponty, puntee, puntil, punty.

pontoon. a. A float supporting part of a structure, such as a bridge. *Nichols.* b. A wood platform used to support machinery on soft ground. *Nichols.*

pontoon bridge. A temporary or permanent bridge so constructed as to float on pontoons which are moored to the bed of a river or lake. *Ham.*

ponty sticker. A workman who fixes a quantity of blown glass to the ponty or pontil. *See also* pontil. *Fay.*

pony lamp. A portable battery-operated lamp designed to be attached to the front harness of a pit pony. *B.S. 3618, 1965, sec. 7.*

pony putter. N. of Eng. A boy who drives a pony in the mine workings. *Fay.*

pony set. A small timber set or frame incorporated in the main sets of a haulage level to accommodate an ore chute or other equipment from above or below. *Nelson.*

ponzite. A pyroxene trachyte with or without subsidiary biotite and amphibole. *Bureau of Mines Staff.*

pood; poud; pud. A Russian unit of weight that equals about 36.11 pounds. *Webster 3d.*

pool. a. To cut (a hole); to insert a wedge for splitting (as in mining or quarrying). *Webster 3d.* b. To undercut or undermine (as coal), especially in excavating. *Webster 3d.* c. A continuous area of porous sedimentary rock that yields petroleum or gas on drilling. *Webster 3d.*

pool deposit. A crystalline or other deposit formed in an isolated pool. *Schieferdecker.*

Pooles tile. An interlocking clay roofing tile. *Dodd.*

pool reactor. A reactor in which the fuel elements are suspended in a pool of water which serves as the reflector, moderator, and coolant. Popularly called a swimming pool reactor. It is usually used for research and training. *L&L.*

pool washing screen. A screen which is divided into alternate transverse screen cloth panels and metal plate pool sections. Water is directed to the pools, setting up a swirling motion that agitates fines into suspension. The use of washing pools saves up to 50 percent of the water required, increases screen capacity and cloth life, and reduces blinding. *Nelson.*

poor. Sometimes used to designate low-quality drill diamonds. *Long.*

poor fumes. Toxic or irritating chemicals produced by an explosion. *Nichols.*

poor lime. Lime containing more than 15 percent of acid-insoluble substance. *Bennett 2d, 1962.*

poorly graded soil. A soil in which the particle-size distribution has an excess in some sizes and a deficiency in others. *Nelson.*

poor rock. A term used in Michigan for the more or less barren part of the material taken down in mining. *Fay.*

pop. A short, secondary drill hole blasted to reduce larger pieces of rock or to trim a working face. Also called pophole; pop shot. *Pryor, 3.*

pop a boulder. To place and explode a stick of dynamite on a boulder so as to break it for easy removal from the mine. *Fay.*

pophole. A secondary drill hole. *See also* pop. *Fay.*

pophole blasting. Breaking down large pieces of asbestos by means of short blastholes judicially placed. *Sinclair, W. E., p. 484.*

popo. Afr. A green jasper highly prized in Guinea, perforated beads of it passing as money. *Standard, 1964.*

pop off. a. A synonym for pressure-relief valve. *Long.* b. The reduction in pressure effected by release of part of the confined liquid or gas through a pressure-relief valve. *Long.* c. In dry process enameling, a defect appearing as a small conical piece of porcelain enamel, either partially or entirely separated from the ware. *ASTM C286-65.* d. *See* lift, w. *ACSG, 1963.*

pop-off valve. Synonym for pressure-relief valve. *Long.*

poppers. A defect characterized by randomly occurring, relatively small, circular shaped areas of ground coat appearing in the first cover coat sheet steel porcelain enamel. *ASTM C286-65. See also* jumping.

poppet; puppet. a. A pulley frame or the headgear over a shaft. A headframe. *Fay.* b. A valve that lifts bodily from its seat instead of being hinged. *Fay.*

poppet head. a. Corn. A timber frame over a shaft to carry the hoisting pulley. A headframe. *Fay.* b. The top of a derrick where the pulley is situated. *Gordon.* c. *See* headgear. *Nelson.*

poppet leg. Eng. Any of the supporting legs of a poppethead. *Webster 2d.*

poppet valve. A valve shaped like a mushroom, resting on a circular seat, and opened by raising the stem. Standard automotive equipment. *Nichols.*

popping. The drilling, charging, and firing a hole in the center of a boulder at quarry and opencast mines. The hole is charged at the rate of 2 to 3 ounces of explosive per cubic yard of rock. The charge is pushed to the bottom of the hole and then filled with sand or soil. Also called pop shooting. *See also* snakeholing. *Nelson.*

popple rock. Dev.; Som. Triassic conglomerate. *Arkell.*

poppy stone. Red orbicular jasper popular with mineral collectors for cutting cabochon. From California. *Shipley.*

pops. Explosions in sealed areas of a mine. Manometers may record sudden pressure rises due to these explosions. *Sinclair, I, p. 300.*

pop-shooting. A method of drilling a hole just beyond the center of the boulder to be broken so that the charge is centrally situated. Stemming is used. Pop-shooting is economical in explosives but drilling is required. It is a little difficult to control the throw of broken material, but there is little noise to cause annoyance to near-by property owners. *Fraenkel, v. 2, Art. 8:40, p. 9. See also* secondary blasting.

pop shot. a. In mining, a shot fired for trimming purposes. *B.S. 3618, 1964, sec. 6.* b. In quarrying, a method of secondary blasting. *B.S. 3618, 1964, sec. 6.* c. A shot by which a boulder in a mine is broken up by placing a stick of dynamite on top of the boulder and exploding it. *Ricketts, I.* d. In blasting, when the explosion of the charge simply blows out the tamping. *Stauffer.* e. Same as block hole shot. *See also* pop. *Fay.*

pop valve. Synonym for pressure-relief valve. *Long.*

porcelain. a. A glazed or unglazed vitreous ceramic whiteware used for technical purposes. This term designates such products as electrical, chemical, mechanical, structural, and thermal wares when they are vitreous. *See also* alumina porcelain; cordierite porcelain; forsterite porcelain; steatite porcelain; titania porcelain; zircon porcelain. *ASTM C242-60.* b. A translucent kind of ceramicware, usually glazed, existing in many varieties, according to its composition and method of manufacture, but generally characterized by a glassy fracture, clear ring when struck, homogeneity throughout its thickness, and resistance to fire, water, and acids but hydrofluoric. Porcelain includes chiefly three varieties: (1) hard porcelain, (2) natural soft porcelain, and (3) artificial soft porcelain. *Standard, 1964.*

porcelain balls. Spheres of fired clay body used as grinding media in ball mills. Porcelain balls must be hard, tough, very low in porosity and preferably, white. Balls wear down during use and should be replaced periodically. *Enam. Dict.*

porcelain bricks. Hard fired white porcelain molded into bricks which are cemented on the inside of the steel shell of an enamel mill. The bricks used on the sides of the mill are so shaped as to closely conform with the contour of the steel shell. *Enam. Dict.*

porcelain clay. *See* kaolin; kaolinite. *Fay.*

porcelain color. A pigment such as is used in decorating porcelain. *Standard, 1964.*

porcelain dishes. As used to hold temperature cones during checking of furnace temperatures, are small glazed porcelain saucers about 1½" in diameter. *Hansen.*

porcelain earth. Synonym for koalinite. *Hey 2d, 1955.*

porcelain enamel. Not to be confused with paint enamels or "baked-on enamels", such as are used on automobile fenders, etc. Porcelain enamel is a glassy composition applied to metal and fused thereon at a low-red to bright-red heat. Although it is a glass, it must adhere to metal and resist punishment, both by impact and by rapid changes in temperature. *Enam. Dict.*

porcelain enameling commercial quality steel sheet. Steel sheet, ordered or sold on the basis of specifications governing the use as a base for enameling or other vitreous coatings. *Bennett 2d, 1962.*

porcelain enameling deep drawing quality steel sheet. Steel sheet, ordered or sold on the basis of specifications governing use as a base for enameling or other vitreous coatings, and also on the basis of deep drawing qualities. *Bennett 2d, 1962.*

porcelain enamel sanitary ware. *See* sanitary ware. *ACSG, 1963.*

porcelain gilding. A process of applying gold to china, usually with turpentine, and firing it, resulting in the adherence of the metallic gold to the china and the volatilization of the less permanent ingredients. The gold is then burnished. *Standard, 1964.*

Porcelainite. A trade term for white stoneware, jasper, or the like. *Standard, 1964.*

porcelainized. Resembling potter's clay that has been fired; specifically in geology, applied to certain altered clays, shales, etc., which by the influence of heat have come to resemble clay ware or porcelain. *Standard, 1964.*

porcelain jasper. Burnt clay. *See also* porcelainite. *Fay.*

porcelain lace. A decorative material formed by soaking lace in porcelain slip and firing it. The threads of the fabric are consumed, leaving the pattern in a fine lacelike porcelain ware. *Standard, 1964.*

porcelain lined. A pump equipped with a ceramic-coated cylindrical shell lining the pump cylinder. *See also* porcelain liner. *Long.*

porcelain liner. A cylindrical shell, coated with a special abrasion-resistant, porcelain-like ceramic material, used as the liner of a pump cylinder to resist the abrasive and/or corrosive effects of a recirculated or mud-laden drill fluid, grout, etc. *Long.*

porcelain mill. A mill for grinding materials for porcelain. *Standard, 1964.*

porcelain opal. Milky white opal more opaque than milk opal. *Shipley.*

porcelain oven. The firing kiln used in baking porcelain. *Fay.*

porcelain printing. The transfer of a printed picture to an unglazed article. *Standard, 1964.*

porcelain process. The method of producing glazed ware by which a ceramic body and glaze are matured together in the same firing operation. *ASTM C242-60T.*

porcelain tile. A ceramic mosaic tile or paver that is generally made by the dust-pressed method, of a composition resulting in a tile that is dense, fine-grained, and smooth with sharply formed face, usually impervious. Colors of the porcelain type are usually of a clear, luminous type or granular blend thereof. *ASTM C242-60T.*

porcelaneous. Having the appearance of porcelain. *A.G.I.*

porcelaneous smooth chert. A type of smooth chert which has a smooth fracture surface, hard, opaque to subtranslucent, typically china-white resembling chinaware or glazed porcelain, grades to chalky. *A.G.I.*

porcelanite; porcellanite. a. Fused shales and clay, that occur in the roof and floor of burned coal seams. The rock is quite common in the lignite districts of the West, where apparently spontaneous combustion has fired the seams in the past. Also called porcelain jasper, especially when red. *Fay.* b. A light-colored, porcelaneous rock resulting from the contact metamorphism of marls. *A.G.I.* c. Siliceous or cherty shale. *A.G.I. Supp.*

porch. York. The arching of the station or landing at the bottom of a shaft. *Fay.*

porcupinitic. As shown in section, sharp spinelike minerals protruding from another. *Hess.*

pore. a. A space in rock or soil not occupied by solid mineral matter. Synonym for interstice; void. *A.G.I.* b. In blastoids, an opening at margin of an ambulacrum leading to one of the hydrospires. *A.G.I.* c. In cystoids, horizontal tubes or slits occupying parts of two adjoining plates. *A.G.I.* d. In echinoids, a pit for attachment of a ligament which fastens spine to tubercle. *A.G.I.* e. A minute opening, especially in an animal or vegetable by which matter passes through a membrane. *Webster 3d.* f. In powder metallurgy, a minute cavity in a compact, formed either intentionally or unintentionally. *Rolfe.*

pore-forming material. A substance included in a powder mixture which volatilizes during sintering and thereby produces a desired kind and degree of porosity in the finished compact. *ASTM B243-65.*

pore pressure. *See* neutral stress. *ASCE P1826.*

pores. a. Small voids in the body of a metal. *ASM Gloss.* b. In powder metallurgy, minute cavities in a compact, sometimes intentional. *ASM Gloss.* c. Minute perforations in an electroplated coating. *ASM Gloss.* d. The minute cavities between the separate particles in soils or solid rocks. *See also* voids, a. *Nelson.* e. As applied to refractories, the small voids between solid particles. Pores are described as open if permeable to fluids; sealed if impermeable. *HW.* f. The voids between the grains in the grinding wheels. *ACSG, 1963.* g. As applied to lightweight aggregate, the voids in expanded clay, shale, or slate particles produced by gases entrapped during heat treatment. *Bureau of Mines Staff.*

pore-size distribution. The range of sizes of pores in a ceramic product and the relative abundance of these sizes. This property is usually expressed as a graph relating the percentage volume porosity to the pore diameter in microns. Pore-size distribution is difficult to determine, the most generally satisfactory methods are the mercury penetration method and the bubble-pressure method. *See also* bubble-pressure method. *Dodd.*

pore space. The open spaces or voids of a rock taken collectively. It is a measure of the amount of liquid or gas that may be absorbed or yielded by a particular formation. *Stokes and Varnes, 1955.*

pore-space filling. The deposition of valuable minerals in the voids or rocks or between the grains of loose sediments. *Nelson.*

pore water. a. In soil technology, free water present in the soil. Normally, its pressure is hydrostatic, corresponding to its depth below the water table. The shear strength of adjacent soil depends on this pore pressure, which reduces frictional resistance and soil stability. *Pryor, 3.* b. The part of the water used for tempering clays which contributes to open-pore structure within the clay ware. *ACSG, 1963.* c. Free water in the pores of unfired ceramics (not adsorbed). *VV.*

pore-water pressure. The pressure of water existing in a saturated soil, often measured both during and after construction of an earth dam. *See also* neutral pressure; neutral stress. *Ham.*

pore-water pressure cells. Sensitive instruments used to measure pore-water pressures arising from load changes such as the rise and fall of a tide. *Ham.*

porfido rosso antico. The withamite-bearing hornblende porphyrite of Djebel Dokhan in Egypt. *Holmes, 1928.*

Porifera. Includes the sponges, of which the stony parts are preserved. The body has tubes or canals. *Mason, v. 1, p. 26.*

pork knockers. Name applied to the local miners in British Guiana who carry on diamond mining generally by pick and shovel. *I.C. 8200, 1964, p. 62.*

pork-pie furnace. *See* Maerz-Boelens furnace. *Dodd.*

porman. An iron ore occurring in Carthagena. It sometimes contains magnetite, and usually has a low phosphorus content. Its iron content is about 55 percent, the gangue consisting chiefly of silica. *Osborne.*

porodic. Of, or pertaining to, uncrystalline or amorphous substances. *Standard, 1964.*

porodine. Breithaupt's name for amorphous rocks, such as are derived from gelatinous silica. *Fay.*

porodite. Wadsworth's name proposed in 1879 for all the altered, fragmental forms of eruptive rocks, commonly called diabase tuff, schalstein, etc. *Fay.*

Porosil. A British term for ground kieselguhr; used as filler and in insulators. *Bennett 2d, 1962 Add.*

porosimeter. An instrument used to determine the porosity of a rock sample by comparing the bulk volume of the sample with the aggregate volume of the pore spaces between the grains. Porosimeters are of various designs, some using liquids and some using gases, at known pressures, to find the volume of openings. *A.G.I.*

porosity. a. The ratio, p, expressed as a percentage of the volume, Vp, of the pore space in a rock to the volume, Vr, of the rock, the latter volume including rock material plus the pore space, $P = 100\ Vp/Vr$. *Holmes, 1928.* b. The ratio, usually expressed as a percentage, of the volume of voids of a given soil mass to the total volume of the soil mass. *ASCE P1826.* c. A measure of the proportion of pores in a ceramic material, defined as: (1) apparent porosity, the ratio of the open pores to the bulk volume expressed as a percentage; (2) sealed porosity or closed porosity, the ratio of the volume of the sealed pores to the bulk volume expressed as a percentage; and (3) true porosity, the ratio of the total volume of the open and sealed pores to the bulk volume, expressed as a percentage. *Dodd.* d. The amount of void space in a reservoir usually expressed as percent voids per bulk volume. Absolute porosity refers to the total amount of pore space in a reservoir, regardless of whether or not that space is accessible to fluid penetration. Effective porosity refers to the amount of connected pore spaces that is, the space available to fluid penetration. *Brantly, 1.* e. Fine holes or pores within a material. *ASM Gloss.*

porosity, apparent. The relationship of the open pore space to the bulk volume, expressed in per cent. *ASTM C242-60.*

porosity coefficient. Evolved by Professor H. Briggs in 1931 to express the conductance of a waste to air leakage, per foot length of the roadway per foot width of the leakage zone. *Roberts, I, p. 92.*

porosity of refractories. The ratio of the volume of the pores or voids in a body to the total volume, usually expressed as a percentage. The true porosity is based upon the total pore volume; the apparent porosity upon the open pore volume only. *HW.*

porosity of rock. The relative volume of the pore spaces between mineral grains as compared to the total rock volume. Thus porosity measures the capacity of the rock to hold oil, gas, and water. The usual range of porosities is from 15 to 20 percent, but they may be as high as 43 percent or higher in highly fractured and cavernous limestones. *Williams.*

porosity sample. A sample for which the porosity or ratio of the volume of all pore space to the total bulk volume of the sample may be determined. *Long.*

porosity trap. The condition under which oil or gas is caught and retained in an underground reservoir as a result of decreased porosity on one or more sides of the reservoir. *A.G.I.*

poro udella. In gem mining, a Ceylonese term for a mamoty or hoe with a handle about 6 feet long and a broad blade so curved that it can be dragged through river gravel and will hold some of the finer material. *Hess.*

porous. Containing voids, pores, cells, interstices, and other openings, which may or may not interconnect. *See also* porosity. *Long.*

porous formation. Synonym for porous ground. *Long.*

porous graphite. Graphitic carbon. Used for filtration. *Bennett 2d, 1962.*

porous ground. Any assemblage of rock material as a result of fracturing, faulting, mode of deposition, etc., contains a high percentage of voids, pores, and other openings. *Long.*

porous-pot electrode. Nonpolarizable electrode consisting of a metal bar immersed in a saturated electrolytic solution that is contained in a porous pot. *Schieferdecker.*

porous stones. Those crystalline or cryptocrystalline aggregates which permit the entrance of solutions, such as dyes between particles. *See also* stained stone. *Shipley.*

porous wheel. A grinding wheel having an open or porous structure and a vitrified or resinous bond. *ASM Gloss.*

porpezite. A native alloy of argentiferous gold with palladium, the palladium content varying up to 10 percent. From Porpez, Brazil. Also called palladium gold. *Fay.*

porphyrite. a. A term which has been variously used for pre-Tertiary andesitic rocks, altered andesite rocks, and hypabyssal rocks of marked porphyritic texture and andesitic composition. The last usage is now customary. The phenocrysts are generally plagioclase (average composition that of andesine) and mafic minerals, and the groundmass is holocrystalline and more coarsely grained than in andesite. To avoid confusion, some writers prefer terms such as diorite porphyry and andesite porphyry. *Compare* porphyry. *Holmes, 1928.* b. A quartz-free porphyry of andesitic composition. The phenocrysts are generally plagioclase. Although the term is nearly obsolete, it is sometimes used for plagioclase dike rocks. *Stokes and Varnes, 1955.*

porphyritic. A textural term for those rocks which have larger crystals (phenocrysts) set in a finer groundmass, which may be crystalline, glassy, or both. Rosenbusch has sought to define it as the texture due to the recurrence of the period of crystallization of the same or similar minerals. While, except for porphyritic rocks with a glassy groundmass, this practically amounts to the same thing as the textural definition just given, it is idle for any writer to try to change a conception so old, well-established, and indispensable. *Fay.*

porphyritic obsidian. Obsidian resembling porphyry in appearance. *Shipley.*

porphyritic texture. *See* porphyritic.

porphyrization. The process of porphyrizing, or the state of being porphyrized. *Standard, 1964.*

porphyroblast. a. A term given to the pseudoporphyritic crystals of rocks produced by thermodynamic metamorphism. The corresponding texture is called porphyroblastic. *Holmes, 1920.* b. Large grains or crystals, commonly perfect, developed in schists resulting from deformation of rocks originally containing phenocrysts. Also called metacryst. *A.G.I.*

porphyroblastic. The texture of a recrystallized rock in which coarse grains, often euhedral or subhedral, are distributed in a finer grained matrix. *A.G.I.*

porphyroclast. A large rock fragment contained in mylonite. *A.G.I. Supp.*

porphyroclastic structure. *See* mortar structure. *Holmes, 1928.*

porphyrogenetic. Producing porphyry. *Standard, 1964.*

porphyro-granulitic. A textural term given by Judd to dolerites which carry large porphyritic crystals of feldspar and augite in a base composed of a mixture of lath-shaped feldspar crystals and small, irregular grains of augite. *Johannsen, v. 1, 2d, 1939, p. 230.*

porphyro-granulitic texture. *See* porphyro-granulitic.

porphyroid. A term used for porphyroblastic metamorphic rocks whether of igneous or sedimentary origin. *See also* halleflinta; halleflintgneiss; hornfels; knotted slate; leptite; maculose. *A.G.I.*

porphyry. A term first given to an altered variety of porphyrite (porphyrites lapis) on account of its purple color, and afterwards extended by common association to all rocks containing conspicuous phenocrysts in a fine-grained or aphanitic groundmass. The resulting texture is described as porphyritic. In its restricted usage, without qualification, porphyry usually implies a hypabyssal rock containing phenocrysts of alkali feldspar, though in the field, it is generally allowed a wider scope, and commercially, it is used for all porphyritic rocks. *A.G.I.*

porphyry copper. a. Disseminated replacement deposit in which the copper minerals occur as discrete grains and veinlets throughout a large volume of rock, which commonly is a porphyry. It is a large-tonnage, low-grade deposit. *Bateman.* b. In the commercial sense, the term is not restricted to ore in porphyry but is applied to deposits characterized by huge size, particularly with respect to horizontal dimension, uniform dissemination, and low-average-per-ton copper content. *A.G.I.*

porphyry copper ore. *See* porphyry copper.

porphyry ware. A variety of Wedgwood ware. *See also* pebble ware. *Fay.*

porporino. It. A glaze of mercury, tin, and sulfur, imitating gold; used by artists of the middle ages for decorative purposes. *Standard, 1964.*

port. a. A cylindrical opening through the bit shank from which the circulating fluid is discharged at the bit face into the waterways. *Long.* b. Any opening designed as an inlet, outlet, or short passageway for a working gas or fluid. *Long.* c. An opening in a nuclear research reactor. Through a port, objects are inserted for irradiation or beams of radiation emerge from it for experimental use. *L&L.* d. Left side of a ship or boat. *Nichols.* e. Any opening in a furnace or kiln through which fuel or flame enters or exhaust gases escape. *ASTM C162-66.*

portable aggregate plant. Portable aggregate plants vary in their design and construction and in the functions they perform. There are portable plants which perform all the operations of a stationary plant, including crushing, scalping, secondary crushing, screening, washing, and sand separation. Other portable plants include different combinations of the above operations. Some of these complete plants are mounted on one chassis, others have the more common operations on one chassis with the supplementary equipment on separate portable mountings. Many of these plants load the material direct into trucks while others deliver to storage bins or stockpiles. Occasionally a semipermanent plant will be built around a portable unit by adding large bins, extra conveyors, and special units. Only a plant mounted so that it can be moved over the highways on its own mounting is a truly portable plant. *Pit and Quarry, 53rd, sec. E, p. 56.*

portable apparatus. Designed to be moved while it is in use. *B.S. 3618, 1965, sec. 7.*

portable bucket loaders. Several types of self-propelled multibucket loaders are considered suitable for miscellaneous light excavating work. These loaders dig their own path, and, in order to do this, have various means of gathering the material to a point where it will be picked up by the buckets as they pass over the lower tumbler. While these loaders are usually used for reclaiming from stockpiles, they can, under favorable conditions, excavate from deposits. These machines always are mounted on crawler treads. *Pit and Quarry, 53rd, Sec. A, p. 101.*

portable concentric mine cable. A double conductor cable with one conductor located at the center and with the other conductor strands located concentric to the center conductor with rubber or synthetic insulation between conductors and over the outer conductor. *ASA C42.85:1956.*

portable conveyor. a. Designed to be moved as a unit. It is commonly wheel-mounted and may or may not be sectional. *NEMA MB1-1961.* b. Any type of transportable conveyor, usually having supports which provide mobility. *See also* boxcar loader; bucket loader; car unloader; loading conveyor; portable drag conveyor; roller conveyor; trimmer conveyor; unloading conveyor; wheel conveyor. *ASA MH4.1-1958.*

portable crane. A hoisting device carried by a frame mounted on wheels. It is particularly useful for quick moving about in a shop for the handling of parts too heavy for a man to lift. *Crispin.*

portable drag conveyor. A portable conveyor upon which endless drag chains are used as the conveying medium. Also a term sometimes applied to a portable flight conveyor. *See also* drag-chain conveyor. *ASA MH4.1-1958.*

portable drill. a. Any size drill outfit that is wheel-, skid-, or track-mounted so that it can be moved readily as a unit. *Long.* b. Very small lightweight drills having two to three readily disassembled parts, each weighing not more than 60 pounds and hence readily carried by one man. *Long.*

portable electric lamps. Portable electric lamps are self-contained lamps (such as battery-operated lamps) that may be worn on the person or carried about freely. *ASA M2.1-1963.*

portable equipment. Portable equipment means nonself-propelled equipment so constructed or mounted as to facilitate moving or transporting it from place to place. *ASA M2.1-1963. See also* transportable equipment.

portable flame-resistant cable. A flame-resistant cable is a portable cable that will meet the flame tests of the U. S. Bureau of Mines. *ASA M2.1-1963.*

portable grinding. Grinding wherein the sole support of the grinder is done manually by the operator. *ACSG, 1963.*

portable loader. A loading machine mounted on wheels or crawler tracks. *See also* shovel loader. *Nelson.*

portable mine blower. A motor-driven blower to provide secondary ventilation into spaces inadequately ventilated by the main ventilating system and with the air directed to such spaces through a duct. *ASA C42.85:1956.*

portable mine cable. A portable mine cable is an extra flexible cable, used for connecting mobile or stationary equipment in mines to a source of electric energy when permanent wiring is prohibited or impractical. (A portable cable for mining service is not always extra flexible and is used also with portable as well as with mobile and stationary equipment.) *ASA M2.1-1963.*

portable motors. Motors that are intended for service here and there as occasion requires and that are so constructed or mounted as to facilitate moving them from place to place. *Fay.*

portable parallel duplex mine cable. A double or triple conductor cable with conductors laid side by side without twisting, with rubber or synthetic insulation between conductors and around the whole. The third conductor, when present, is a safety ground wire. *ASA C42.85:1956.*

portable pneumatic core sampler. This device, which weighs 700 pounds, was developed by the United States Navy Ordnance Laboratory for sampling coral and sand bottoms. It consists of a 4-legged pyramidal frame about 8 feet high, a pneumatic hammer with air supply and exhaust hosing, 400 pounds of lead weight, an anvil, and a 4-foot long aluminum barrel with a driving head for cutting through coral. *H&G.*

portable shunt. A tub-changing arrangement for a tunnel face. *See also* double-track portable switch. *Nelson.*

portable substation. *See* transportable substation. *B.S. 3618, 1965, sec. 7.*

portable trailing cable. A portable cable is a flexible cable or cord used for connecting mobile, portable, or stationary equipment in mines to a trolley system or other external source of electric energy where permanent mine wiring is prohibited or is impracticable. *I.C. 7962, 1960, p. 22.*

portage. Can. Trail between waterways. *Hoffman.*

Portage group. Marine strata of Upper Devonian age typically exposed at Portage, N.Y., where they comprise gray and black shales capped by sandstones; equivalent to the nonmarine Oneonta group. *C.T.D.*

portal. a. Any entrance to a mine. *B.C.I.* b. The rock face at which tunnel driving is started. Also called point of attack. *Fraenkel.* c. A nearly level opening into a tunnel. *Nichols.* d. The surface entrance to a drift, tunnel, adit, or entry. *Fay.* e. The concrete or masonry arch, retaining wall, etc., erected at the opening of a drift, tunnel, or adit. *Fay.* f. A gap in a borderland by which an epicontinental sea communicated with the permanent ocean. *A.G.I. Supp.*

portal crane. A type of jib crane carried on a four-legged portal frame, which runs along rails. *See also* Goliath crane; platform gantry. *Ham.*

portal-to-portal. A term now frequently encountered in disputes over what constitutes compensable "working time" under Federal laws. Portal literally means "entrance" and, in underground coal mining, portal refers to mine mouth or entry at surface. Hence, portal-to-portal as a descriptive term means strictly elapsed time from entry through the portal to exit on return. Colloquially this term is being applied in other industries to denote time spent on company premises, in getting to and from, and preparing for, work. *B.C.I.*

port crown. Port roof of a tank. *Bureau of Mines Staff.*

porte et gardin plough. *See* scraper plough. *Nelson.*

porter. A long iron bar attached to a forging, or a piece in process of forging, by which to swing and turn it. *Standard, 1964.*

porthole. The opening or passageway connecting the inside of a bit or core barrel to the outside and through which the circulating medium is discharged. *Long.*

porthole die. A type of extrusion die consisting of two or more sections used to extrude specially contoured hollow shapes. The metal is extruded in separate streams through each section and welded before it leaves the die to form tubing and intricate closed shapes without requiring the use of separate mandrels. *ASM Gloss.*

Portland beds. *See* Portland limestone. *Fay.*

portland blast-furnace cement. Cement made to conform with B.S. 146 by grinding together at least 35 percent of portland cement clinker with not more than 65 percent of blast-furnace slag. It is particularly suited for underwater work. *Ham.*

portland cement. A calcium aluminate silicate produced by fusing or clinkering limestone and clay; the clinker is ground very fine and, when mixed with water, will recrystallize and set. *ACSG, 1963.*

portland cement mortar. A mixture of portland cement, sand, and water. *See also* cement mortar. *Nelson.*

Portlandian. Upper Upper Jurassic. *A.G.I. Supp.*

portlandite. Calcium hydroxide, $Ca(OH)_2$, occurring as hexagonal plates in the chalk-dolerite contact zone at Scawt Hill, County Antrim, Ire. Occurs also in portland cement, hence the name. *C.M.D.*

Portland limestone; Portland beds. A series of limestone strata, belonging to the upper part of the Oölite group, found chiefly in England, on the Isle of Portland, on the coast of Dorsetshire. The great supply of the building stone used in London is from these quarries. *Fay.*

portland pozzuolana cement. A cement composed of about 20 percent of finely ground burnt clay or shale added to portland cement to combine with its free lime, thereby increasing resistance to attack by sulfate-bearing water or by fire. *Ham.*

Portland stone. a. A yellowish-white oölitic building limestone from the Isle of Portland, England. *Webster 3d.* b. A purplish-brown sandstone from Portland, Conn. *Webster 3d.*

porto marble. A black siliceous limestone that is traversed by gold-colored veins, from Porto Venere and the Isle of Palmeria in the Gulf of La Spezia, Italy. Also called black and gold marble. *Fay.*

portrait stone. A flat diamond, sometimes with several rows of facets around its edge, for covering very small portraits. *Standard, 1964.*

port walker. A workman who observes the sheet of glass issuing from a fourcault tank-furnace and gives warning of faults. *Dodd.*

posepnyte. An oxygenated hydrocarbon from the Great Western mercury mine, Lake County, Calif. It occurs in plates and nodules, sometimes brittle, occasionally hard; the color is light green to reddish-brown; and the specific gravity ranges from 0.85 to 0.985. *Fay.*

positional efficiency. The positional efficiency of a mine air conditioning plant is defined as follows:

$$\text{P.E.} = \frac{\text{decrease in heat units per unit weight of dry air at the working faces}}{\text{heat units per unit weight of dry air extracted at the plant}}$$

x 100 percent. *Roberts, I, p. 153.*

positional stability. A basis employed at the Westinghouse Research Laboratories to describe the behavior of vacuum arcs. The cathode spot(s) of positionally stable arcs operate at the tips of cathodic electrodes. The cathode spot(s) of positionally unstable arcs operate up and down the sides of cathodic electrodes. *BuMines Bull. 625, 1965, p. VII.*

position blocks. Mining claims that are in a position to contain a lode if it continues in the direction in which it has been proved in other claims, but which themselves have not been proved. *Fay.*

positioned weld. A weld made in a joint which has been oriented to facilitate making the weld. *ASM Gloss.*

position head. The static head of a liquid. *Ham.*

positioning line. A line on a Hall-Rowe deflecting-wedge clinometer used as the reference line from which the deflection angle on the wedge may be set. *Long.*

positive. Electrically, a point at a relatively high potential with respect to another point. A positive ion is one in which a particle, molecular or atomic, has ceased to be neutral owing to loss of one or more electrons. Positive ore is ore which has been proved to exist by being blocked out in panels sampled at close intervals on all four sides so as to establish its quality and quantity beyond reasonable doubt. *Pryor, 3.*

positive confining bed. One that prevents or retards upward movement of ground water where the underlying water has a higher static level than the overlying water and where there is, therefore, a resultant upward pressure. Artesian head is maintained by confining beds of this class. *Stokes and Varnes, 1955.*

positive crystal. An optically positive crystal. *A.G.I.*

positive derail. A device installed in or on a mine track to derail runaway cars or trips. This device is held open by a spring, necessitating that a workman hold it closed while a trip passes over it. *Hess.*

positive-discharge bucket elevator. A spaced bucket type elevator in which the buckets are maintained over the discharge chute for a sufficient time to permit free gravity discharge of bulk materials. *See also* bucket elevator. *ASA MH4.1-1958.*

positive drive. A driving connection in two or more wheels or shafts that will turn them at approximately the same relative speeds under any conditions. *Nichols.*

positive element. A large structural feature or area that has had a long history of progressive uplift; also, in a relative sense, one that has been stable or has subsided much less than neighboring negative elements. *A.G.I. Supp.*

positive gradient. Layer of water where temperature increases with depth. *Hy.*

positive mineral. A doubly refractive mineral in which the index of refraction for the extraordinary ray is greater than for the ordinary ray, the former being refracted nearer to the normal than the latter, as in quartz. *Shipley.*

positive movement. A relative rise of sea level with regard to the land. *Schieferdecker.*

positive ore. a. Ore exposed on four sides in blocks of a size variously prescribed. *See also* ore developed; proved ore. *Fay.* b. Ore which is exposed and properly sampled on four sides, in blocks of reasonable size, having in view the nature of the deposit as regards uniformity of value per ton and of the third dimension, or thickness. *Fay.*

positive rake. The orientation of a cutting tool in a manner, so that the angle formed by the leading face of the tool and the surface behind its cutting edge does not exceed 90°. (Example: Teeth in a ripsaw.) Also called gouge rake. *Long.*

positive rays; canal rays. Streams of positively charged atoms or molecules which take part in the electrical discharge in a rarefied gas. They have been studied by allowing them to pass through a perforated cathode onto a photographic plate, being deflected by magnetic and electrostatic fields (Thomson's parabola method) and by means of Aston's mass spectrograph. *C.T.D.*

positive temperature coefficient. *See* temperature coefficient. *L&L.*

positron. Positive electron of same mass as negative electron; has only transitory existence. *Pryor, 3.*

possession. Derb. When a windlass or frame is placed on a vein, it is said to be in possession. *Fay.*

possession house. A house placed on mining lands in early days to hold a tract against squatters. *Korson.*

possessio pedis. The actual possession of a mining claim by the first arrival. *Fay.*

possessory title. Title vested in the locator of a mining claim by compliance with the State and Federal mining laws. *Fay.*

possible crystal face. A face which, because of the known crystal system to which a mineral belongs, might be, or has been, present on a crystal, but which may not now be existent on it. *Shipley.*

possible ore. a. A class of ore whose existence is a reasonable possibility, as based primarily upon the strength and continuity of geologic-mineralogic relationships and upon the extent of ore bodies already developed, and a measure of whose continuity is therefore available as a criterion of what may be expected as mining excavations progress into further reaches. Because of the comparative absence of mine workings which would reveal assay values, possible ore cannot be assigned a grade with any practicable certainty nor can the quantity be expressed as a definite absolute amount. Also called extension ore. *Forrester, p. 554.* Called future ore by some engineers. b. Ore exposed on only one side, its other dimensions being a matter of reasonable projection. Some engineers use an arbitrary extension of 50 to 100 feet. Others assume extension for half the exposed dimension. *McKinstry, p. 470.* c. Ore which may exist below the lowest workings, or beyond the range of actual vision. *Fay.*

post. a. A mine timber, or any upright timber, but more commonly used to refer to the uprights which support the roof crosspieces. Commonly used in metal mines instead of leg which is the coal miner's term, especially in the Far West regions of the United States. *B.C.I.; Fay.* b. The support fastened between the roof and floor of a coal seam used with certain types of mining machines or augers. *Fay.* c. A pillar of coal or ore. *Fay.* d. Eng. Limestone strata divided horizontally with very thin beds of slate. *Fay.* e. A charge of ore for a smelting furnace. *Webster 3d.* f. Any of the distance pieces to keep apart the frames or sets in a shaft; a studdle. *Webster 3d.* g. To bring the survey and maps of a mine up to date. *Fay.* h. N. of Eng. Thick beds of limestone or sandstone are called posts. In the coal mines in some districts, and in descriptions of the Yoredale series, post is also synonymous with bed. *Arkell.* i. A general term for sandstone. *Nelson.* j. Eng. *See* sandstone rock. *SMRB, Paper No. 61.* k. The gather of glass after it has received preliminary shaping and is ready to be hand drawn into tube or rod. *Dodd.* l. An item of kiln furniture. Posts, also known as props or uprights, support the horizontal bats on which ware is set on a tunnel kiln car. *See also* kiln furniture. *Dodd.* m. A discrete portion of bond between abrasive grains in a grinding wheel or other abrasive article. When the abrasive grain held by a post has become worn, the post should break to release the worn grain so that a fresh abrasive grain will become exposed. *Dodd.*

post-and-stall. A mode of working coal, in which a certain amount of coal is left as pillar and the remainder is taken away, forming rooms or other openings. The method is also called bord-and-pillar; pillar-and-breast; etc. *Fay.*

post brake. A type of brake sometimes fitted on a steam winder or haulage. It consists of two upright posts mounted on either side of the drum and operating on brake paths bolted to the drum cheeks. *See also* curved brakes; winder brake. *Nelson.*

post clay. N. E. Eng. A term sometimes used for an impure siliceous fireclay. *Dodd.*

postcrystalline deformation. The deformation (tectonic movements) following the recrystallization of the rock. *Schieferdecker.*

post drill. An auger (or drill) supported by a post. *Fay.*

postemulsification method. Penetrant inspection in which an emulsifier is required to render the penetrating agent water washable. *ASM Gloss.*

post girdles. Eng. Thin layers of sandstone interbedded in another kind of rock, from Northumberland and Durham. *Nelson.*

postglacial. Occurring after a period of glaciation (as the Pleistocene). *Webster 3d.*

postheating. Heating weldments immediately after welding, for tempering, stress relieving, or providing a controlled rate of cooling to prevent formation of a hard or brittle structure. *ASM Gloss.*

post hole. A shallow borehole. *Long.*

post-hole auger. A hand-rotated drilling tool which enables bores to be sunk down to about 20 feet in unsupported holes and deeper in cased holes. *See also* shell-and-auger boring. *Ham.*

post-hole digger. a. Large auger, rotated mechanically or by hand, used for digging in unconsolidated ground and retrieving a sample. *Pryor, 3.* b. Synonym for Iwan-pattern earth auger. *Long.*

posthumous. In tectonics, used in the case of a recurrence of forces and movement along lines or over areas affected by similar forces in a previous period. *Challinor.*

posthumous folds. Anticlinal folds that rise on the site of earlier anticlines of a mountain system that has been worn down. *A.G.I.*

posting. York. Extracting the post or pillars; pillar robbing. *Fay.*

posting hole. York. *See* bolt, d. *Fay.*

post jack. A jack for pulling posts. *Standard, 1964. See also* post puller. *Fay.*

postmineral movement. The movement along a fault may pulverize some of the rock into a fine-grained gouge, which often looks and feels like clay. Postmineral movement along a mineralized zone forms a gouge containing pulverized minerals from the vein itself. The planes thus formed constitute structural weaknesses in the rock, which in turn result in a condition of instability when openings are made in or near them. *Lewis, pp. 596-597.*

postorogenic granite. Granite, the emplacement of which took place after an orogeny. *Schieferdecker.*

post panels. Eng. Relatively thin beds or bands of sandstone, from Northumberland and Durham. *Nelson.*

post-Pernot furnace. *See* Pernot furnace. *Fay.*

post-Proterozoic. Comprises the Paleozoic, Mesozoic, and Cenozoic. Synonym for Phanerozoic. *A.G.I. Supp.*

post puller. An electric vehicle having a powered drum handling wire rope used to pull mine props after coal has been removed, for the recovery of the timber. *ASA C42.85: 1956.*

post puncher. A coal-mining machine of the puncher type supported by a post. *Fay.*

posts. The four vertical timbers of a square set. *Lewis, p. 43.*

post stone. Any fine-grained sandstone or limestone. *Arkell.*

posttectonic recrystallization. A recrystallization which is imprinted on a tectonite subsequent to deformation. *A.G.I.*

post-tensioning. The application of a load to prestressed wires in a prestressed concrete structure. *Ham.*

post-Tertiary. The name assigned to geological events which took place after the close of the Tertiary era; that is, during Pleistocene and Recent times. *C.T.D.*

pot. a. A rounded mass of roof slate resembling an iron pot and easily detached. It is separated from the other slate by old mud cracks. Smaller than a bell mold or a kettle bottom. *Fay.* b. The mass of consolidated material often filling a pothole. *See also* pothole, a. *Standard, 1964.* c. Mud-filled stump of Sigillaria in an upright position in the roof of certain coal seams. The stump became hollow by decay of the central pithy part, the hollow being filled by mud. This stump is now a separate mass of shale and is liable to collapse without warning. *See also* caldron bottom, a. *Nelson.* d. A steam boiler. *Long.* e. Synonym for line olier. *Long.* f. A vessel for holding molten metal. *ASM Gloss.* g. The electrolytic reduction cell used to make such metals as aluminum from a fused electrolyte. *ASM Gloss.* h. A crucible, usually of fireclay, often of graphite. *Standard, 1964.* i. Lanc. A hematite deposit in a swallow hole. Also called a sop. *Bureau of Mines Staff.* j. A usually rounded metal or earthen container of varying size. *Webster 3d.* k. A large fireclay crucible used for melting and refining special types of glass.

A pot may either be open (the surface of the glass being exposed to the furnace gases) or closed by an integrally molded roof, a mouth being left for charging and gathering; a closed pot is also known as a covered or hooded pot. *Dodd.*

potable. Drinkable. *Webster 3d.* Said of water and beverages. *Fay.*

potamic transport. Transportation by rivers and marine currents. *A.G.I. Supp.*

potamology. The science of rivers, which may be called potamology. *A.G.I.*

pot annealing. *See* box annealing.

pot arch. A furnace for firing or preheating a pot. *ASTM C162-66.*

potarite. A silver-white natural alloy of palladium and mercury, PdHg. Octahedral points on fibrous mass; isometric. From the Potaro River, Guinea. *English.*

potash. a. Potassium oxide, K_2O. Loosely, a carbonate of potassium. *ASTM C162-66.* b. Originally applied to potassium carbonate recovered from wood ashes. Often used in trade in connection with any material containing the element potassium. The potash value is expressed as the equivalent amount of the oxide K_2O. Sources of potassium are Stassfurt and Alastian deposits of carnallite, kainite, and sylvinite; the Carlsbad, N. Mex., deposits of sylvinite and polyhalite; the Searles Lake, Calif., brines (4.7 percent KCl); Utah, alunite. Other sources are dust from cement kilns, dust from blast furnaces, ashes from molasses, sugar beet pulp residues, kelp and wood. *CCD 6d, 1961.*

potash alum. *See* kalinite; alum.

potash bentonite. Synonym for metabentonite. *Compare* potash montmorillonite. *Spencer 19, M.M., 1952.*

potash feldspar. A silicate of aluminum and potassium, $KAlSi_3O_8$, occurring in two distinct crystalline forms, orthoclase (monoclinic) and microcline (triclinic). Both are widely distributed in acid and intermediate rocks, especially in granites, syenites, and the fine-grained equivalents. *C.T.D.*

potash fixation. The retention of potassium in clays either by chemical combination in clay minerals or by adsorption. *A.G.I. Supp.*

potash mica. Muscovite. Double silicate of potassium and aluminum. $K_2O.2Al_2O_3.6SiO_2.2H_2O$. *Pryor, 3.*

potash montmorillonite. A clay of the metabentonites with high potash (K_2O, 4.60 percent) and low water. From Missouri. *English.*

potash regulations. These regulations entitle the holder of a prospecting permit to explore land thought to contain potash for a period of two years. If potash is discovered, the holder of the permit is entitled to a lease not to exceed 2,560 acres per lease, but an association or corporation may hold 15,360 acres in one state. A royalty of not less than 2 percent of the quantity or gross value of the potassium compounds at point of shipment to market is imposed, and rentals similar to those for coal lands are to be paid. *Lewis, pp. 34-35.*

potash spar. A feldspar containing more than 10 percent K_2O. *AIME, p. 341.*

potash syenite. A syenitic rock characterized by a large excess of potash feldspar or feldspathoid over soda feldspar. *C.M.D.*

potassic. Of, pertaining to, or containing potassium; relating to or containing potash. *Standard, 1964.*

potassium. A highly reactive metallic element of the alkali group (group I) of the periodic system. It is soft; light; and silvery. It occurs abundantly in nature but is always combined. Its salts are used extensively. Symbol, K; valence, 1; isometric; atomic number, 19; atomic weight, 39.102; and specific gravity, 0.862 (at 20° C). Except for lithium, potassium is the lightest known metal. Melting point, 62.3° C or 63.65° C; boiling point, 760° C or 774° C; decomposes in water evolving hydrogen and forming potassium hydroxide; ignites spontaneously in water; decomposes in alcohol; and soluble in acids, in mercury, and in ammonia. *C.T.D.; Fay; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-128, B-204.*

potassium acetate. White; crystalline; deliquescent; $KC_2H_3O_2$; saline slightly alkaline taste; soluble in water and in ethyl alcohol; insoluble in ether; and melting point, 292° C. Used in crystal glass. *CCD 6d, 1961.* Molecular weight, 98.15; specific gravity, 1.57 (at 25° C); soluble in methyl alcohol and in liquid ammonia; and insoluble in acetone. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-204.*

potassium alum. A hydrous sulfate of aluminum and potassium, crystallizing in the cubic system. It is found in connection with volcanoes and also as a result of the action of ascending acid waters. *C.M.D.*

potassium aluminosilicate. *See* feldspar.

potassium amylxanthate. $C_5H_{11}O.CS_2K$; molecular weight, 202.3; pale yellowish-green; and soluble in water and in ethyl alcohol. Used as an ore-flotation agent. *Bennett 2d, 1962.*

potassium-apatite. Artificial $Ca_4K(PO_4)_3$; apatite family. *Hey, M.M., 1964.*

potassium aurichloride. *See* gold-potassium chloride. *CCD 6d, 1961.*

potassium bicarbonate. Colorless, odorless, transparent crystals or white powder, $KHCO_3$; slightly alkaline, salty taste. Soluble in water and potassium carbonate solution; insoluble in alcohol; specific gravity, 2.17; melting point, decomposes between 100 and 120° C. Used in the manufacture of pure potassium carbonate; fire extinguishing agent for jet, petroleum, and chemical fires. *CCD, 6d, 1961.*

potassium bifluoride; potassium acid fluoride. Colorless; isometric; KHF_2; deliquescent; molecular weight, 78.11; decomposes at about 225° C; corrosive; specific gravity, 2.37; soluble in dilute alcohol and in water; and insoluble in absolute alcohol. Used in etching glass and as a flux in metallurgy. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-207; Bennett 2d, 1962.*

potassium bisulfide. *See* potassium hydrosulfide. *CCD 6d, 1961.*

potassium bromide. A compound used as a nerve sedative in medicinal preparations and for the preparation of silver bromide emulsions used on photographic films, plates, and papers. Also used in process and laboratory reagents. *BuMines Bull. 585, 1960, p. 151.*

potassium butylxanthate. $C_4H_9O.CSSK$; molecular weight, 193.3; pale yellowish-green; and soluble in water and in ethyl alcohol. Used as an ore-flotation agent. *Bennett 2d, 1962.*

potassium carbonate; potash; pearl ash. White; deliquescent; translucent; K_2CO_3; alkaline reaction; soluble in water; insoluble in alcohol; and it is volatile at white heat. Used in ceramics and in explosives. *CCD 6d, 1961.* Molecular weight, 138.21; colorless; monoclinic; hygroscopic; specific gravity, 2.428 (at 19° C); melting point, 891° C; no boiling point because it decomposes; and insoluble in acetone. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-205.* K_2CO_3 is commonly used to introduce K_2O into glasses, glazes, and enamels. For glass manufacture, it is supplied in both calcined and hydrated form. The behavior of colorants in colored glass is often better in potash glass than in soda glass, this is especially true with the use of manganese, nickel oxide, and selenium. In glazes, potassium carbonate appears as an ingredient when it is desirable to modify the effect of a colorant, such as copper oxide, which may thus be brought through tints of green toward yellow. In enamels, potassium carbonate tends to produce high brilliance, but it decreases strength and elasticity, making the enamel soft. In general, enamels containing potassium are more readily fusible than those with sodium. *Lee.*

potassium carbonate hemihydrate. Colorless or white; monoclinic; deliquescent; translucent; $2K_2CO_3.H_2O$ or $K_2CO_3.\frac{1}{2}H_2O$; alkaline reaction; soluble in water; and insoluble in alcohol. Used in ceramics and in explosives. *CCD 6d, 1961.*

potassium carbonate monohydrate. Colorless or white; monoclinic; deliquescent; translucent; $K_2CO_3.H_2O$; alkaline reaction; soluble in water; and insoluble in alcohol. Used in ceramics and in explosives. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-205.*

potassium chlorate. A white crystalline salt, $KClO_3$, with a pleasant cooling taste; crystallizes in the anhydrous form, that is, without any water of crystallization. Slightly soluble in cold water; highly soluble in hot water. Molecular weight, 146.5. Used in the preparation of oxygen in the laboratory; in certain explosives where it acts as an oxygen supplier. *Cooper, pp. 322-323.*

potassium chloride; sylvite. Colorless; isometric; KCl; molecular weight, 74.56; specific gravity, 1.984; melting point, 776° C; sublimes at 1,500° C; Mohs' hardness, 2; soluble in water, in ether, in glycerol, and in alkalies; and slightly soluble in alcohol. Occurs as the mineral sylvite in cubic crystals ranging from colorless to white to bluish or to yellowish-red. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-206, B-246.* Used in porcelain enamels as a setting-up agent in titanium cover coats. In general, the quantities of potassium chloride, when used as an electrolyte, will be approximately the same as sodium nitrate, which it replaces. The main advantage in using potassium chloride is freedom from yellowing or creaming when used in a blue-white enamel. *Lee.*

potassium chromate. Yellow crystals, K_2CrO_4; specific gravity, 2.7319; melting point, 971° C; soluble in water; insoluble in alcohol; used as reagent in analytical chemistry; making chromium compounds. *CCD, 6d, 1961.*

potassium cobaltinitrite. *See* cobalt-potassium nitrite. *Bennett 2d, 1962.*

potassium-columbium oxyfluoride; potassium-niobium oxyfluoride. *See* columbium-potassium oxyfluoride (niobium-potassium oxyfluoride. *CCD 6d, 1961.*

potassium cyanide. Colorless or white; isometric; delinquescent; very poisonous; KCN; molecular weight, 65.12; faint odor of bitter almonds; soluble in water, in ethyl alcohol, in methyl alcohol, and in glycerol; specific gravity, 1.52 (at 16° C); and melting point, 634° C. Used in the extraction of gold and silver from ores, in the heat treatment of steel, and as a reagent in analytical chemistry. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-206.*

potassium dichromate; potassium bichromate. Bright, yellowish-red; transparent; $K_2Cr_2O_7$; triclinic becoming monoclinic at 241.6° C.; molecular weight, 294.19; bitter, metallic taste; soluble in water; insoluble in alcohol; specific gravity, 2.676 (at 25° C, referred to water at 4° C); melting point, 396°; and it decomposes at 500° C. Used in electroplating, in alloys, and in ceramic products. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-206.* In glazes it produces chrome-tin pinks, low-fire reds, greens, and purplish-red colors. It may be mixed with material for a stain and calcined at a temperature equal to, but preferably higher than, the maturing point of the glaze in which it is used. *Lee.*

potassium diuranate; orange uranium oxide. $K_2U_2O_7$; molecular weight, 666.47; orange; insoluble in water; and soluble in acid. Used for painting on china. *Bennett 2d, 1962.*

potassium ethyldithiocarbonate. *See* potassium xanthogenate. *Bennett 2d, 1962.*

potassium ethylxanthogenate. *See* potassium xanthogenate. *Bennett 2d, 1962.*

potassium ferrocyanide; yellow prussiate; yellow prussiate of potash. Lemon-yellow; monoclinic; $K_4Fe(CN)_6.3H_2O$; molecular weight, 422.41; specific gravity, 1.853 (at 17° C); dehydrates losing $3H_2O$ at 60° C or 70° C; anhydrous form decomposes when heated to red heat; soluble in water and in acetone; and insoluble in alcohol, in ether, and in ammonia. Used in tempering steel, in explosives, and in manufacturing potassium cyanide and potassium ferricyanide. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-207.*

potassium fluoride. Colorless or white; isometric; molecular weight, 58.10; deliquescent; KF; sharp saline taste; soluble in water, in hydrofluoric acid, and in ammonia; insoluble in alcohol; specific gravity, 2.48; melting point, 846° C; and boiling point, 1,505° C. Used in etching glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-207.*

potassium fluoride dihydrate. Colorless or white; monoclinic prisms; deliquescent; $KF.2H_2O$; sharp saline taste; soluble in water and in hydrofluoric acid; insoluble in alcohol; melting point, 41° C; molecular weight, 94.13; specific gravity, 2.454; and boiling point, 156° C. Used in etching glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-207.*

potassium fluosilicate; potassium silicofluoride. Colorless or white; isometric or hexagonal; K_2SiF_6; specific gravity, 3.0; and slightly soluble in water. Used in vitreous enamel frits, in synthetic mica, in ceramics, and in the metallurgy of aluminum and magnesium. Molecular weight, 220.25; specific gravity (hexagonal), 3.08, and (isometric), 2.665 (at 17° C); no melting point because it decomposes on heating; soluble in hydrochloric acid; very slightly soluble in alcohol; and insoluble in ammonia. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-207.*

potassium 40. A radioactive potassium; half-life about 1.42 x 10^8. *A.G.I. Supp.*

potassium hydrosulfide; potassium bisulfide. Colorless; crystals; $(KSH)_2.H_2O$; hydrogen sulfide odor; turns yellow when exposed to air and forms the polysulfide; hygroscopic; and soluble in alcohol and in water. Used in the separation of heavy metals. *CCD 6d, 1961.* Molecular weight, 72.17; yellow; orthorhombic; KHS; deliquescent; specific gravity, 1.68 to 1.70; melting point, 455° C; decomposes in water; and soluble in alcohol. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-211.*

potassium hydroxide; caustic potash. White, deliquescent solid having corrosive properties, KOH. Soluble in water; absorbs carbon dioxide; has alkaline properties; melting point, 360° C; molecular weight, 56. Used in the solid as a drying agent for gases, and as an agent for absorbing acid gases; as an absorbent for carbon dioxide in mine-air analysis apparatus and in self-contained mine rescue apparatus. *Cooper, pp. 319-320.*

potassium iodide. White crystals, granules, or powder, KI; strong bitter saline taste; soluble in water, alcohol, and glycerol; specific gravity 3.123; melting point 723° C; boiling point 1420° C; used as reagent in analytical chemistry. *CCD 6d, 1961.*

potassium-iridium chloride. *See* iridium-potassium chloride. *CCD 6d, 1961.*

potassium magnesium chloride. *See* carnallite.

potassium mica. *See* muscovite. *C.M.D.*

potassium niobate. $KNbO_3$; a ferroelectric compound having a perovskite structure at room temperature. The Curie temperature is 420° C. *Dodd.*

potassium nitrate; saltpeter; niter; nitre. Transparent; colorless or white; orthorhombic becoming hexagonal trigonal at 129° C; KNO_3; molecular weight, 111.11; slightly hygroscopic; cooling, pungent, saline taste; specific gravity, 2.109 (at 16° C); melting point, 334° C or 337° C; decomposes at about 400° C; soluble in liquid ammonia and in water; slightly soluble in alcohol and in glycerol; and insoluble in dilute alcohol and in ether. Used in explosives, in glass manufacture, and in metallurgy. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-209.* Also used in many glasses, glazes, and enamels because of its oxidizing and fluxing value. *Lee.*

potassium perchlorate. $KClO_4$; molecular weight, 138.55; colorless; orthorhombic; specific gravity, 2.52 (at 10° C); melting point, 610° ± 10° C; and soluble in water. Used in explosives. Decomposes at 400° C; very slightly soluble in alcohol; and insoluble in ether. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-205.*

potassium permanganate; chameleon mineral. Purple rhombic; $KMnO_4$; molecular weight, 158.03; specific gravity, 2.703; soluble in water; decomposes below 240° C; used as bleaching agent, disinfectant. *Bennett 2d, 1962.*

potassium pyrophosphate; tetrapotassium pyrophosphate. Colorless or white; $K_4P_2O_7.3H_2O$; somewhat hygroscopic in air being deliquescent above a relative humidity of 40 to 45 percent; specific gravity, 2.33; dehydrated, below 300° C; melting point, 1,090° C; soluble in water; and insoluble in alcohol. Used in tin plating, in the purification of china clay, and in drilling muds. *CCD 6d, 1961.* Molecular weight, 384.40; and it loses $2H_2O$ at 180° C and all $3H_2O$ at 300° C. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-209.*

potassium silicate (glass). Colorless; anhydrous lump, shattered or granular material; weight ratio, SiO_2 to K_2O equals 2.5; molar ratio, SiO_2 to K_2O equals 3.87 (approximately); and is soluble in water only at elevated temperatures and pressures. Used in the manufacture of glass and refactory material. *CCD 6d, 1961.*

potassium-sodium tartrate; Rochelle salt. $KNaC_4H_4O_6.4H_2O$; colorless; orthorhombic; molecular weight, 282.23; specific gravity, 1.790; melting point, 70° to 80° C; loses $4H_2O$ at 215° C; soluble in water; and very slightly soluble in alcohol. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-210.* Used as a cement for joining two metal surfaces together by applying in the hot plastic condition. *C.T.D.* Also used in silvering mirrors. *Merriman.*

potassium sulfate. Colorless or white; orthorhombic or hexagonal; K_2SO_4; bitter saline taste; soluble in water; insoluble in acetone, carbon disulfide, and in alcohol; specific gravity, 2.662; melting point, 1,069° C or 1,072° C; molecular weight, 174.27; transformation temperature between the orthorhombic and hexagonal forms, 588° C; and boiling point, 1,689° C. Used in alum manufacture and in glass manufacture. *CCD 6d, 1961. Handbook of Chemistry and Physics, 45th ed., 1964, p. B-211.*

potassium tantalate. $KTaO_3$; a ferroelectric material having a dielectric constant exceeding 4000 at the Curie temperature (−260° C). *Dodd.*

potassium-tantalum fluoride. *See* tantalum-potassium fluoride. *CCD 6d, 1961.*

potassium titanate. This compound, which approximates in composition to $K_2Ti_6O_{13}$ and melts at 1,370° C, can be made into fibers for use as a heat-insulating material. *Dodd.*

potassium xanthogenate; potassium ethylxanthate; potassium xanthate; potassium ethylxanthogenate; potassium ethyldithiocarbonate. $KS_2COC_2H_5$; molecular weight, 160.30; colorless, white to pale yellow; prisms; specific gravity, 1.558 (at 21.5° C); decomposes above 200° C; soluble in water and in ethyl alcohol; and insoluble in ether. An ore-flotation agent. *Bennett 2d, 1962; CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-212.*

potato. Synonym for line oiler. *Long.*

potato stone. A potatolike geode of quartz, having a central cavity lined with crystals. Synonym for geode. *Fay.*

pot bank. N.Staff. Old term for a pottery factory. *Dodd.*

pot bottom. a. A circular mass, usually in the roof of a coal seam, composed of material similar to that of the roof stone, but separated from it by coaly or glazed parting. *Arkell.* b. A large boulder in the roof slate, having the appearance of the rounded bottom of a pot, and which easily becomes detached. *Zern.* c. *See* pot; bell mold. *Fay.*

potch. Aust. Miners' term for an opal which may be colorful, but without fine play of color. *Shipley.*

pot clays. Refractory clays used for making the pots in which glass is produced. *CCD 6d, 1961.*

pot die forming. Forming products from sheet or plate through the use of a hollow die and internal pressure which causes the preformed workpiece to assume the contour of the die. *ASM Gloss.*

pot ears. Eng. Bluish-gray calcareous grit, quarried for troughs. *Arkell.*

potential. The words potential and voltage are synonymous and mean electrical pressure. The potential or voltage of a circuit, machine, or any piece of electrical apparatus means the potential normally existing between the conductors of such circuit or the terminals of such machine or apparatus. In Bureau of Mines practice: (1) any potential less than 301 volts shall be deemed a low potential; (2) any potential greater than 301 volts but less than 651 volts shall be deemed a medium potential, and (3) any potential in excess of 651 volts shall be deemed a high potential. *Fay.*

potential ash. Mineral matter in coal before incineration. *Tomkeieff, 1954.*

potential crater zone. This is the region in which, if a sufficient quantity of explosive is used, the rock will be shattered and projected outward to form a crater. *Leet, 2, p. 104.*

potential-determining ions. Those which leave the surface of a solid immersed in aqueous liquid before equilibrium (saturation point) has been reached, while an electrical double layer is building up and zeta-potential develops. *Pryor, 4.*

potential difference. The difference in pressure between any two points in an electrical circuit, measured in volts. *Morris and Cooper, p. 256.*

potential drop. The difference in pressure head between two equipotential lines. *ASCE P1826.*

potential drop ratio method; P.D.R. method. A variant of the resistivity method in which the ratio of the potential differences between two pairs of points in the ground is measured. *Schieferdecker.*

potential energy. The form of mechanical energy a body possesses by virtue of its position. If a body is being dropped from a higher to a lower position the body is losing potential energy, but if a body is being raised, then it gains potential energy. *Morris and Cooper, p. 146.*

potential energy of deformation. *See* strain energy, c. *Ro.*

potential gradient. Potential gradient means an ascending or descending value of voltage related to a linear measurement, as a distance along the earth surface or ground. *I.C. 7962, 1960, p. 23.*

potential heat. The heating value of the fuel, or of unburnt material in waste products. *Francis, 1965, v. 2, p. 697.*

potential ore. Ore that is presumed to exist. Obsolete. *A.G.I.*

potential temperature. The temperature a parcel of water would have if it were lifted from its position in the water column to the sea surface. The water would have a lower temperature due to the fact that it would undergo an adiabatic temperature change, as a result of changed pressure conditions, without any exchange of heat with its surroundings. *Hy.*

potentiometer. a. A variable voltage divider. *H&G.* b. Apparatus used to measure minute potential differences. *Pryor, 3.*

potentiometric titration. Quantitative analysis in which changes of electromotive force are measured during titration, a technique especially useful where color change would be masked. Much used in investigation of precipitation reactions. *Pryor, 3.*

potentiostat. A device used for the direct study of corroding metals where both anodic and cathodic reactions are taking place simultaneously. *H&G.*

potette. A hood shaped like a pot, but with no bottom, which is placed in a tank furnace so that it reaches below the glass level. It protects the man gathering glass on his pipe or iron from furnace gases; also, the glass here is somewhat cooler than that in the main part of the furnace, where melting is taking place. *C.T.D.*

pot floor. *See* hollow tile. *Ham.*

pot furnace. a. A furnace for melting glass in pots. *ASTM C162-66.* b. Any of the small vertical furnaces used to smelt batches (2 to 4 pounds) of enamel in a crucible. The crucible of molten material is removed from the furnace with aid of tongs, and the molten enamel poured from the pot into water for fritting purposes. *Enam. Dict.*

pot glass. a. Glass melted in a pot as distinct from a tank. *ASTM C162-66.* b. Glass suitable for pot melting. *ASTM C162-66.*

pot growan. Corn. Soft decomposed granite. *Fay.*

pothole. a. The occurrence in the nether roof of a coal seam of an irregularly shaped mass, generally broader at its base than elsewhere, and with smooth sides (slickensides). *T.I.M.E.* b. A circular or funnel-shaped depression in the surface caused by subsidence. *Hudson.* c. A small steep-sided hole, usually with underground drainage. *Nichols.* d. A hole extending below the wearing course in a roadway. *Fay.* e. Lanc. A small temporary ledge in a sinking pit. *Fay.* f. A rounded cavity in the roof of a mine caused by a fall of rock, coal, ore, etc. *Fay.* g. Eng. *See* caldron bottom. *SMRB, Paper No. 61.* h. A kettlelike or circular hole generally deeper than wide, worn into the solid rock at falls and strong rapids by sand, gravel, and stones being spun around by the force of the current. Also called kettle hole; swallow hole. *Fay.* i. In Death Valley, Calif., a circular opening 2 to 4 feet in diameter, filled with brine and lined with salty crystals. *AGI.* j. A rounded, steep-sided depression resulting from downward surface solution. *AGI.* k. An underground system of pitches and slopes. Applied in some cases to single pitches reaching the surface. *AGI.* l. A vertical pitch open to the surface. *Schieferdecker.* m. A hole in the ground from which clay for pottery has been taken. Also called pot. *Webster 3d.*

pot kiln. A small limekiln. *Webster 3d.*

pot lead. An obsolete term for graphite or black lead. *A.G.I.; Fay.*

potlid. A concretion found in sandstone or shale of the Jurassic. *Standard, 1964.*

potlids. Eng. Flattened oval doggers of flaggy sandstone; so called because sometimes the upper or under layers when split off resemble potlids. *Arkell.*

pot life. Length of time, at room temperature, before a catalyzed resin has polymerized to an unworkable state. *Phillips.*

pot liquation. Liquating the antimony values from sulfide ores by heating the pot containing the ore and permitting the easily-molten sulfide to run out through a hole in the bottom of the pot. *Bennett 2d, 1962.*

pot maker. One who shapes clay pots for use in the manufacture of glass. *D.O.T. Supp.*

potman. a. One who reduces aluminum oxide to aluminum by tending a battery of aluminum reduction pots; rakes specified quantity of aluminum oxide over crust formed by cooling of electrolytic bath in pots and breaks crust into solution with a crowbar; and stirs bath with a rake to eliminate gas assimulations. Also called pot puncher. *D.O.T. 1.* b. A steam-boiler tender or fireman. *Long.*

pot metal. a. A copper-lead alloy that sometimes may contain small amounts of tin or zinc; a generic term for a low grade of brass. *Henderson.* b. A cast iron used for making pots and other hollow ware. *Webster 3d.* c. Glass that is melted in a pot. *Webster 3d.* d. Stained glass whose colors are incorporated with melted glass in the pot. *Webster 3d.* e. Glass colored throughout while fused; potmetal glass. *Standard, 1964.*

pot mizer. Eng. A boring tool occasionally used in clays mixed with pebbles. It is made in the form of a spiral cone, that is open at the top to receive the pebbles carried up by the worm. Also spelled pot miser. *Fay.*

Potomac series. A series of beds, nowhere marine, composing the Lower Cretaceous deposits of the Atlantic borders and part of the ancient Gulf border of the United States from Nantucket to Arkansas. *Standard, 1964.*

pot ore. Foliated galena. *Arkell.*

pot ring. *See* ring. *Dodd.*

Potsdam formation. A member of the Upper Cambrian of the United States and Canada, especially the original typical strata on the north and east sides of the Adirondack Mountains, N. Y. *Fay.*

Potsdam sandstone. The basal member of the Croixian series, consisting of sand, derived from the Precambrian, redeposited by the waters of the Upper Cambrian seas in the interior of the United States, and in Canada. *C.T.D.*

pot setting. In glassmaking, the placing of a pot in a furnace for the purpose of melting metal. *Standard, 1964.*

potsherds. The remains of old glass-melting pots which are ground and added to the new clay used in the making of new pots. *C.T.D.*

pot spout. A refractory block used in the glass industry to connect the working end of a glass tank furnace to a revolving pot. *Dodd.*

potstone. Impure talcose rock. *A.G.I. Supp.*

pot stones. Eng. Large flint nodules, paramoudras. *Arkell.*

potter. A skilled craftsman who fabricates ceramic ware using various forming techniques. *See also* thrower; jiggerman. *Bureau of Mines Staff.*

potter artist. A highly skilled craftsman who designs, fabricates, decorates ceramic artware. *Bureau of Mines Staff.*

Potter-Delprat process. A pioneer method of froth flotation of sulfide minerals, approximately 1902. Ore was mixed with acid, agitated and heated. CO_2 from carbonates in the ore was freed and bubbled up, carrying with it sulfides which were skimmed off or overflowed. Later, oil was also used. *Pryor, 3.*

potter helper. *See* jiggerman helper. *D.O.T. 1.*

pottern ore. A term used in early metallurgical practice for an ore that becomes vitrified by heat, like the glazing of earthenware. *Standard, 1964.*

potters' asthma. *See* potters' consumption.

potter's bronchitis. *See* potter's consumption.

potter's clay; pipe clay. a. A pure plastic clay, free from iron, and consequently white after burning. *Fay.* b. A clay adapted for use on a potter's wheel, for the manufacture of pottery. *A.G.I.*

potter's consumption. An acute bronchitis often occurring among pottery employees, eventually affecting the lungs. Also called potter's asthma; potter's bronchitis. *Standard, 1964.*

potter's flint. *See* flint, potter's.

potter's horn; kidney. A thin kidney-shaped piece of horn or metal used, until the early 20th century, by pottery pressers. To make dishes, a bat of prepared body was placed on a plaster mold and hand-pressed to shape with a piece of fired ware; the horn was used for final smoothing of the surface. *Dodd.*

potter's lead. *See* alquifou.

potters' ore. *See* alquifou.

potter's red cement. A pozzolana type of cement consisting of crushed fired clay mixed with portland cement. *See also* pozzolana. *Dodd.*

potter's wheel. A rotating circular table, mounted on a vertical pillar, on which holloware is made by the thrower. *C.T.D.*

pottery. a. A shop or factory where ceramic-ware is made. *Fay.* b. All fired ceramic wares that contain clay when formed, except technical, structural, and refractory products. *ASTM C242-60T.* c. As a generic name, all fired clayware produced by a potter (a clay worker). *ACSG, 1963.* d. As a specific name, the low-fired porous colored body ware (in contrast to white- or buff-colored earthenware). *ACSG, 1963.*

pottery body stains. Calcined oxide finely ground pigments for coloring ceramic bodies. Used as colors or designs for tile, terra cotta, chinaware, etc., where the pigment becomes part of the ceramic body. *CCD 6d, 1961.*

pottery-decoration designer. One who sketches and makes finished drawings in color of patterns to be used in decorating pottery and porcelain ware. *D.O.T. 1.*

pottery kiln. A kiln for firing pottery. *Standard, 1964.*

pottery spar. A 200-mesh feldspar produced for use by the manufacturers of chinaware, sanitary ware, ceramic tile, frits, enamel, glazes, electrical insulators, and vitrified grinding wheels. *AIME, p. 341.*

pottery tree. Any one of various South American trees of the rose family, the hard and brittle bark of which contains a great quantity of silex, which the Indians obtain by burning and mingle with clay to form pottery. *Standard, 1964.*

potting. The placing of pots, containing either potassium nitrate or sodium nitrate and sulfuric acid, in the kilns used in the manufacture of sulfuric acid from sulfurous acid obtained from the combustion of sulfur in air. *Fay.*

potting material. A material for the protection of electrical components, for example, transformers. The use for this purpose of sintered alumina powder, within hermetically sealed cans, has proved successful. *Dodd.*

Pottsville conglomerate. A conglomeratic formation at the base of the Pennsylvanian (Upper Carboniferous) in the northern Appalachian region. *See also* Millstone grit. *Webster 2d.*

Pottsvillian. Lower Pennsylvanian. *A.G.I. Supp.*

potty. Containing pots. *See also* pot, a. Also applied to any roof in a coal mine which falls down in thick blocks. *Fay.*

potty ore. Som. Brown iron ore, Brendon Hills. Apparently a color term, since the two varieties of ore are black and potty. *Arkell.*

pot wagon. A vehicle used for transferring a pot from a pot arch to a pot furnace. *ASTM C162-66.*

potwork. a. Pottery or pottery ware. *Standard, 1964.* b. Eng. A place where common pottery is made. *Standard, 1964.*

Poulter method. Another seismic technique which dispenses with the need for drilling shotholes. In this air shooting method, dynamite is exploded in arrays of simultaneous blasts with charges several feet above the ground. The principal difficulty involves the hazard of working with aboveground explosives and the damage to property or to the peace of mind of nearby inhabitants. *Dobrin, pp. 66-67.*

poulticing. Another name for mudcapping. *Carson, p. 332.*

pounceon; pounson. S. Wales. Underclay. Apparently a survival of the obsolete form of puncheon (punchin) a supporting timber in a coal mine, or (in building) floor timber. *Arkell.*

pouncil; pouncil bat. Staff. Miners' term for carbonaceous shale. *Tomkeieff, 1954.*

pound. a. Any of various units of mass and weight ranging from about 300 grams to 1,070 grams. For example, (1) a unit, formerly used but now having only theoretical existence, equal to 5,760 grains or 373 grams; also called the troy pound, and (2) a unit now in general use among English-speaking peoples that equals 7,000 grains or 453 grams; also called the avoirdupois pound. *Webster 3d.* Twelve ounces (troy weight); 16 ounces (avoirdupois weight). *Crispin.* b. An underground reservoir of water. *See also* lodge, b. *Fay.* c. A large natural fissure or cavity in the strata. *Fay.* d. *See* tamp, b and c. *C.T.D.*

poundage. a. Scot. Interest sometimes paid for money advanced before payday. *Fay.* b. Weight in pounds; specifically, the number of pounds of salt in a gallon or cubic foot of brine. *Webster 3d.*

poundal. Unit of force; that force which, acting on a mass of 1 pound, will impart to it an acceleration of 1 foot per second per second. *Nelson.*

pound-calorie. a. A hybrid term between the English and metric units and defined as the amount of heat required to raise 1 pound of water 1° C. *Newton, p. 122.* b. An engineering heat unit, often called centigrade heat unit (chu). Defined as 1/100 of the heat required to raise the temperature of 1 pound of water from 0° to 100° C approximately equal to 1.8 British thermal units. *C.T.D.*

pounder. An ore-mill stamp. *Standard, 1964.*

pound-foot. Unit of bending moment being the moment due to a force of 1 pound applied at a distance of 1 foot. *Ham.*

pound force. A force which, when acting on a body of mass one pound, gives it an acceleration equal to that of standard gravity. *Taylor.*

poundstone. a. A stone, pebble, or large echinite, weighing a pound, used as a weight. *Webster 2d.* b. Shrop. Black clay resembling bass, Coal Measures. Dirt lying next under the coal; the coal floor. The same as pounceon. Also called pounstone. *Arkell.*

pounson. N. Wales. Dense, soft clay underlying coalbeds. *Fay.*

pour. In founding: (1) the amount of material, as melted metal, poured at a time and (2) the act, process, or operation of pouring melted metal; as, make a pour at noon. *Standard, 1964.*

poured fitting. A connecting device which is fastened to the end of a cable (wire rope) by inserting the cable end in a funnel-shaped socket, separating the wires and filling the socket with molten zinc. *Nichols.*

pouring. Transferring molten metal from a furnace or a ladle to a mold. *ASM Gloss.*

pouring basin. A basin on top of a mold to receive the molten metal before it enters the sprue or downgate. *ASM Gloss.*

pouring gate. A channel in a mold through which to pour molten metal. *Fay.*

pouring pit refractories. In the steel industry, refractories used for the transfer of steel from furnace to ingot. These include ladle brick, nozzles, sleeves, stopper heads, mold plugs, hot tops, and mortars used for the brickwork involved. *AIST, No. 24.*

pour point. a. Temperature at which an oil commences to flow under stated conditions. *Pryor, 3.* b. The lowest temperature at which an oil can be poured. *Shell Oil Co.*

pout. Eng. An implement used when withdrawing timber. Also called punch. *SMRB, Paper No. 61.*

pouty. In glassmaking, a long iron rod for either drawing out glass or twisting it to a fine thread. *Bureau of Mines Staff.*

powder. a. Gunpowder or black powder; a miner's term for any explosive used for shotfiring in coal mines. *Nelson.* b. A general term for explosives including dynamite, but excluding caps. *Nichols.* c. The fine particles to which any dry substance is reduced by pounding, grinding, etc. *Fay.* d. In powder metallurgy, particles of matter characterized by small size, currently within the range of 0.1 to 1,000 microns. *ASM Gloss.* e. Collection of discrete particles of air-dry material, each less than 1 millimeter in maximum length. *Pryor, 3.*

powder barrel. A barrel made for the conveyance of gunpowder, usually containing 100 pounds. *Standard, 1964. Compare* powder keg. *Fay.*

powder blue. *See* smalt. *Dodd.*

powder box. A wooden box in a miner's breast or chamber in which were kept black powder, cartridge paper, cartridge stick, squibs, lampwick, chalk, and tools. *Korson.*

powder carrier. *See* powder monkey, c. *D.O.T. 1.*

powder compact. *See* compact. *Rolfe.*

powder density. *See* true density. *Dodd.*

powdered coal. Coal which has been crushed fine; may be transported by air to fire a boiler or industrial heating furnace. *B.C.I.*

powdered emery. Powdered, dark crystalline alumina (Al_2O_3). Used as an abrasive in grinding and in polishing. *Bennett 2d, 1962.*

powdered ore. Aust. Ore disseminated with veinstuff. *Fay.*

powder explosives. These explosives contain still smaller quantities of liquid products, compared with plastic and semi-plastic explosives, so that the spaces between the solid particles are not filled out entirely. As the result of this the density of the mass is 20 to 40 percent lower than that of plastic and semi-plastic explosives. *Fraenkel, v. 3, Art. 16:02, p. 9.*

powder factor. Another name for loading ratio. *Leet, 2, p. 107.*

powder flowmeter. In powder metallurgy, a device for determining the flow rate of a powder. *ASM Gloss.*

powder house. A magazine for the temporary storage of explosives. *Fay. See also* magazine.

powder jack. *See* jack, d. *Fay.*

powder keg. A small metal keg for black blasting powder, usually having a capacity sufficient for 25 pounds of powder. *Fay.*

powder lubricant. In powder metallurgy, an agent mixed with or incorporated in a powder to facilitate the pressing and ejecting of the compact. *ASM Gloss.*

powderman. a. A man in charge of explosives in an operation of any nature requiring their use. *Fay.* b. In bituminous coal mining and metal mining, one who handles proper storage of explosives in powder house at mine and issues powder, dynamite, caps, detonators, and fuses to miners as needed. At smaller mines, may deliver explosives to miners at working places. Also called powder monkey; powder nipper; powder supply man. *D.O.T. 1. See also* blaster.

powderman helper. *See* powder monkey, c. *D.O.T. 1.*

powder metal; powdered metal. As used in the diamond-drilling industry, the finely divided particles of iron, copper, nickel, zinc, tungsten-carbide, etc., which, when mixed with a suitable binding material and subjected to processing by heat and pressure, may be used as a matrix material to form a bit crown. *Long.*

powder-metal bit. Any diamond bit, mechanically set, in which finely divided metal powders are used as a matrix to hold the diamonds in place. Also called powder-pressed bit; powder-set bit; sinter bit; sintered-metal bit. *Long.*

powder metallurgy. In powder metallurgy, the art of producing and utilizing metal powders for the production of massive materials and shaped objects. *ASM Gloss.*

powder-metallurgy techniques. Titanium sponge is ground to powder and pressed into the desired shape. *BuMines Bull. 619, 1964, p. 206.*

powder-metal process. The process of mechanically setting diamonds in a bit in a matrix of finely divided metal powders. The metal powder is first cold-pressed to compact it in a bit mold or die and then is heated to allow the bonding alloy to melt and bind the powder to the diamonds and bit blank. Hot pressing or coining follows heating of the powder in some modifications of the process. *Long.*

powder-metal process bit. *See* powder-metal bit. *Long.*

powder method. A method for recording the planes in which a finely powdered crystalline specimen selectively scatters X-rays of a single wavelength. Widely used for mineral identification. *A.G.I.*

powder mine. An excavation filled with powder for the purpose of blasting rocks. *Fay.*

powder monkey. a. A person employed at the powder house of a coal mine whose duty it is to deliver powder to the miners. *Fay.* b. In some metal mines, the person who distributes powder, dynamite, and fuse to the miners at the working faces. This is a nautical term, but is frequently used in the mining industry. *Fay.* c. In the quarry industry, one who carries powder or other explosives to blaster and assists him by placing prepared explosive in hole, connecting lead wire to blasting machine, and performing other duties as directed. Also called blaster helper; powder carrier; powderman helper. *D.O.T. 1. See also* blaster; powderman.

powder nipper. *See* powderman, b. *D.O.T. 1.*

powder of Algaroth. Mixture of antimony oxychloride and antimony oxide; used in manufacturing tartar emetic. *Bennett 2d, 1962.*

powder photograph. An X-ray diffraction photograph of a fine powder. *Hurlbut.*

powder pin. A term formerly used in the anthracite regions to identify a wooden stick, similar to a rolling pin, with a knob on one end only, this stick was used to roll paper around in order to form a cartridge to receive the loose black powder used in blasting. *Hess.*

powder porosity. Ratio of volume of voids between particles, plus the volume of pores, to the volume occupied by the powder, including voids and pores. *Pryor, 3.*

powder-pressed bit. See powder-metal bit. *Long.*

powder-set bit. *See* powder-metal bit. *Long.*

powder spreader. *See* bulk spreader.

powder supply man. See powderman, b. *D.O.T. 1.*

powellite. Natural calcium molybdate ($CaMoO_4$) or $Ca(Mo,W)O_4$, in which a portion of the molybdenum is replaced by tungsten. Bluish-green crystals contain 1.65 to 10.28 percent WO_3; specific gravity 4.35 to 4.52. Pearly-gray scales are more common and contain only traces of tungsten. Specific gravity 4.25. Found in Idaho, Michigan, Texas, Nevada, California; Siberia. A minor ore of molybdenum. *CCD 6d, 1961.*

powellizing process. A wood treatment consisting of impregnating the wood with a saccharin solution. It hardens the wood, and renders it fireproof to some extent. *Liddell 2d, p. 495.*

power. a. Any form of energy available for doing any kind of work; for example, steampower and waterpower. Specifically, mechanical energy, as distinguished from work done by hand. *Standard, 1964.* b. Used to indicate the electric current in a wire; as, to turn on the power. *Fay.* c. Rate of doing work. The foot-pound-second (fps) unit of power is the horsepower (hp), which is a rate of working equal to 550 foot-pounds per second. The electrical power unit, the watt, equals 10^7 centimeter-gram-second (cgs) units, that is, 10^7 ergs per second or 1 joule per second. One horsepower equals 746 watts. *C.T.D.*

power-and-free conveyor. A conveying system wherein the load is carried on individual trolleys which are conveyor-propelled through part of the system and are gravity or manually-propelled through the free line. The purpose of this arrangement is to provide a means of switching the free trolleys into and out of other adjacent lines. *ASA MH 4.1-1958.*

power arm. The part of a lever between the fulcrum and the point where force is applied. *Nichols, 2.*

power barrow. *See* pedestrian-controlled dumper. *Ham.*

power control unit. One or more winches mounted on a tractor and used to manipulate parts of bulldozers, scrapers, or other machines. *Nichols, 2.*

power control winch. A high speed tractor mounted winch with one to three drums; used chiefly for operation of bulldozers, scrapers, and rooters. *Nichols.*

power density. The rate of heat generated per unit volume of a nuclear reactor core. *L&L.*

power distillate. The untreated kerosine condensates and still heavier distillates down to 28° Bé from Mid-Continent petroleum. Used as fuel in internal-combustion engines. *Fay.*

power-divider. A nonspin differential. *Nichols.*

power dragscrapers. Either pit or bank excavation can be handled economically by a power dragscraper. This machine consists of: (1) a bottomless scraper bucket; (2) a two-drum hoist; (3) two long cables that attach to the front and rear of the scraper; (4) a movable tail-block; (5) a short, guyed mast located behind a ground hopper or other delivery point, and (6) two sheave blocks mounted on the mast to guide the operating cables to the hoist. The tail-block is shifted manually from time to time, swinging the scraper in a wide arc until all the material within the operating radius has been taken out. *Pit and Quarry, 53rd, Sec. A, p. 99.*

power drill. A drill actuated by steam, compressed air, or electricity. *Hudson.*

power driller. *See* driller, machine. *D.O.T. 1.*

power-driven compressor. A compressor which is driven either by a belt or through gearing. *Lewis, p. 671.*

power earth auger. A mechanically operated auger for exploring and testing deposits which are not very hard. The drilling rig may be mounted on a lorry or caterpillar tracks when greater depths may be reached. *Nelson.*

powered supports. In fully mechanized coal mining, a system of pit props connected to a flexible armored conveyor by means of hydraulic rams. Roof beams mounted above the props are held by hydraulic pressure to the working roof. They are cantilevered forward to protect a working passage adjoining the coal face above the conveyor and the cutting machine. The conveyor is pressed (snaked) forward section by section behind the advancing cutter, and the props are then drawn forward by manipulating hydraulic valves. *Pryor, 3.*

power equation. The power required to drive the air through a mine circuit is consumed mechanically in lifting water out of the mine, is lost in the kinetic energy of the air leaving the upcast, and is converted into heat in overcoming friction. This may be expressed as an equation: (Natural ventilating power) + (Effective fan power) = (Power used in lifting water) + (Power lost as kinetic energy) + (Power converted into heat against friction. *Spalding, p. 303.*

power excursion. *See* excursion. *L&L.*

power factor. a. The ratio of the mean actual power in an alternating-current circuit measured in watts to the apparent power measured in volt-amperes, being equal to the cosine of the phase difference between electromotive force and current. *Webster 3d.* b. The ratio of the total watts input to the total root-mean-square volt-ampere input to the rectifier or rectifier unit. *Coal Age, 1.* c. A clause frequently found in electric power contracts which sets forth that if a customer permits the average power factor of his load to fall below a specified value, a penalty charge will be made. This clause can readily increase the power cost for an unfavorable month by as much as 20 to 30 percent. Power factor is often defined as the ratio of actual power to apparent power and is expressed usually as a percentage. *Kentucky, p. 260.*

power-factor meters. Meters which indicate the relation of the phase between the line current and the line voltage which actually is the same as the power factor of the load. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

power gain. The amount by which the output power level in decibels exceeds the input power level in decibels. Thus, if the output power of a device is ten times that of the input, the power gain is ten decibels. On the other hand, if the output is one hundred times that of the input, the gain is twenty decibels. *Hy.*

power gas. A cheap gas (as Mond gas) made for producing power, especially for driving gas engines. *Webster 3d.*

power grizzlies. Power-operated machines mainly for removing dirt and fines from material to be crushed. There are three main types—the live-roll grizzly, the vibrating-bar grizzly, and the bar grizzly feeder. *Nelson.*

power house. The building in which the equipment for generation of the electricity used in the mine is housed. Power plant generally is used when the building houses the boilers in which steam is generated for driving the turbines or engines which furnish the mine power. *Jones.*

power level. Ten times the logarithm to the base 10 of the ratio of a given power to a reference power, in decibels. The reference power must be indicated. *Hy.*

power loader. A generic term for any power-operated machine for loading coal or any other material into mine cars, conveyors, road vehicles, or bins. The term is also applied loosely to the man in charge of such a machine. Today, in Great Britain's coal mines, more than 50 percent of the deep-mined output comes from some 1,400 power loaders mostly working on longwall faces with prop-free fronts. *Nelson.*

power meters. Power is measured in watts and watt-hours, and when large quantities are consumed the units of measurement are kilowatts (kw.) and kilowatt-hours (kw.-hr.) and are derived by dividing the basic units by 1,000. Actually these meters consist of a voltmeter and ammeter combined. The voltage and current values are converted to power by means of voltage and current coils in the meter. They indicate the average power delivered to the system, and are connected in the same manner. *Coal Age, v. 71, No. 8, August, 1966, p. 270.*

power-operated supports. *See* self-advancing supports. *Nelson.*

power pack. a. In general, an electrically operated hydraulic pump, placed at the gate end, to supply power to face equipment, for example, self-advancing supports. The system forms a closed circuit with the oil returning to a reservoir containing about 212 gallons of oil. The pump can supply 2½ gallons of oil per unit at 2,000 pounds per square inch, which allows a setting load of about 9 tons per prop. *Nelson.* b. A unit which converts AC or DC current to AC or DC voltages suitable for the operation of electronic equipment. *NCB.*

power per unit band. The limit approached by the quotient obtained by dividing (1) the power of the energy being transmitted by a given system, at a given time and in a given frequency band, by (2) the width of this band as the width of this band approached zero. *H&G.*

power plant. *See* power house. *Jones.*

power press. Any press for making power pressed brick. *Bureau of Mines Staff.*

power press feeder. *See* brick-press feeder. *D.O.T. 1.*

power pressing. The forming of ceramic shapes by means of a power-driven press. *Bureau of Mines Staff.*

power-pulling. N. of Eng. Normal pulling of the face conveyor requires the belt to be broken into convenient lengths, rolled up, and pulled in the new track. In power-pulling, each half of the face belt is pulled around a prop at one end of the face by means of a rope attached to a small electric winch. *Trist.*

power rammer. A manually operated compacting machine weighing about 200 pounds, raised by an intrinsic internal-combustion mechanism and allowed to fall by gravity. *See also* frog rammer; mechanical rammer. *Ham.*

power ratio. The ratio of fan power to the power which would be required for leakless conditions is the square of the volume ratio. *Roberts, I, p. 227.*

power reactor. A nuclear reactor designed for use in a nuclear power plant, as distinguished from reactors used primarily for research or for producing radiation or fissionable materials. *L&L.*

power reel. A reel that is driven by an electric motor or some other source of power, used to wind or coil strip or wire as it is drawn through a continuous normalizing furnace, through a die, or through rolls as in certain types of cold mills in which the work rolls are not driven. *ASM Gloss.*

power saw operator. *See* gang sawyer. *D.O.T. 1.*

power sequence. A sequence control system that is suitable for a group of conveyors in tandem. The trunk conveyor contactor is first closed; after a delay of from 3 to 15 seconds, sufficient for its motor to come up to speed, power is switched on to the contactor of the second conveyor; finally, after a similar delay, power is switched on to the third conveyor or conveyors. All power comes through number 1 conveyor contactor, so that if this conveyor is stopped all other conveyors in tandem stop as well. *Sinclair, V, p. 306.*

power shovel. An excavating and loading machine consisting of a digging bucket at the end of an arm suspended from a boom, which extends cranelike from that part of the machine which houses the powerplant. When digging the bucket moves forward and upward so that the machine does not usually excavate below the level at which it stands. *Bureau of Mines Staff. See also* shovel loader.

power-shovel mining. Power shovels are used for mining coal, iron ores, phosphate deposits and copper ores. The shovels may be used either for mining or for stripping and removing the overburden or for both types of work, although at some coal mines the shovels used for stripping are considerably larger than those used for mining. *Lewis, p. 397.*

power station. An assemblage of machines and equipment, including the necessary housing, where electrical energy is produced from some other form of energy. The steam boilers are fed with coal or oil and the heat generated is used to produce high-pressure steam. The steam then passes to turbines which drive the generators and thus produce electricity. *See also* nuclear power station; substation. *Nelson.*

power takeoff. A place in a transmission or engine to which a shaft can be so attached as to drive an outside mechanism. *Nichols.*

power tongs. A mechanically powered wrench used to make up or break out a drill rod, casing, or pipe string. *Long.*

power train. All moving parts connecting an engine with the point where work is accomplished. *Nichols.*

power unit. a. Generally applied to any device used to drive or operate machinery around a mine. Specifically, it is used for the motor-speed reducer combination used to drive belt and chain conveyors. *Jones.* b. That part of a mining belt conveyor which consists of a power unit base, an electric motor, an electric controller, a speed reducer with a flexible coupling between motor and speed reducer, a power transmission device to power the drive pulley or pulleys, suitable covers for all moving parts and, if the power unit is of the detachable type, a device for attaching it to the conveyor. *NEMA MB 1-1961.*

power upon the air. In coal mine ventilation, the horsepower applied is often known as the power upon the air. This may be the power exerted by a motive column due to the natural causes, to a furnace, or it may be the power of a mechanical motor. The power upon the air is always measured in the foot-pounds per minute. *Kentucky, p. 81.*

pox stone. A hard stone of a gray color found in some Staffordshire mines in England. *Fay.*

pozzolana; pozzolan; pozzuolana; pozzuolane. A leucitic tuff quarried near Pozzuoli, Italy, and used in the manufacture of hydraulic cement. The term is now applied more generally to a number of natural and manufactured materials, such as ash, slag, etc., which impart specific properties to cement. Pozzolanic cements have superior strength at a late age and are resistant to saline and acidic solutions. *A.G.I.*

pozzolana cement; Santorin cement; trass cement. A cement produced by grinding together portland cement clinker and a pozzolana, or by mixing together a hydrated lime and a pozzolana. A pozzolana is defined as a material which is capable of reacting with lime in the presence of water at ordinary temperature to produce a cementitious compound. Natural pozzolanas are silicious material of volcanic origin. They include trass and Santorin earth. Blast furnace slag is used to produce artificial pozzolanas. *CCD 6d, 1961.*

ppb Abbreviation for parts per billion. *BuMin Style Guide, p. 61.*

***p* pct** Abbreviation for porosity, percent. *BuMin Style Guide, p. 61.*

PPG ring-roll process. PPG = Pittsburgh Plate Glass Company. *See also* ring-roll process. *Dodd.*

ppm Abbreviation for parts per million. *BuMin Style Guide, p. 61.*

P/Q ratio. In study of stress around underground openings in the rock, the ratio between the vertical stress P and the lateral Q. *Pryor, 3.*

Pr Chemical symbol for praseodymium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

practical shot. In coal mining, a shot for which the hole has been drilled in a direction selected with reasonable care, and that has been filled with powder and tamped with the same degree of care. *Fay.*

prairie soils. Transitional soils between pedalfers and pedocals. *Leet.*

prall mill. An impact mill consisting of an impeller rotating clockwise at 1,000 revolutions per minute, a baffle plate moving anti-clockwise at 1,500 revolutions per minute, and a second baffle plate that is stationary. *Dodd.*

prase. A translucent and dull leek-green variety of chalcedonic quartz. *Fay.*

praseodymium. A pale yellowish metallic element of the rare earth group that occurs usually with cerium, lanthanum, and neodymium, and forms green salts. Used chiefly in the form of its salts in coloring glass greenish-yellow. Symbol, Pr; valences, 3 and 4; atomic number, 59; and atomic weight, 140.907. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-128.* Soft; malleable; ductile; melting point, 935° C; boiling point, 3,127° C; decomposes in cold water; and soluble in acids. Two allotropic forms: (1) alpha praseodymium; hexagonal; specific gravity, 6.782; stable up to 798° C; and (2) beta praseodymium; isometric; specific gravity, 6.64; stable from the transformation temperature of 798° C to the melting point of 935° C. Obtained with other rare earth metals from monazite and bastnaesite. Used with other rare earth metals as a core material for carbon arcs. Misch metal used in cigarette lighters contains about 5 percent praseodymium metal. Praseodymium salts are used to color glasses and enamels. A component of didymium glass which is used to color welder's goggles. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-129, B-212.*

praseodymium oxide. A rare earth that, together with zirconia and silica, produces a distinctive and stable yellow color for pottery decoration. *Dodd.*

praseodymium yellow. A ceramic color made by calcining a stoichiometric mixture of ZrO_2 and SiO_2 with 5 percent PrO_2. This clean, bright yellow can be used in glazes firing at any temperature from about 1,100° to 1,300° C; the presence of zircon acts as a stabilizer. *Dodd.*

praseolite. A green alteration product of iolite. *Fay.*

prase opal. Same as prasopal. *Shipley.*

prasinite. A metamorphosed spilitic rock composed essentially of albite, chlorite, epidote, and glaucophane. *See also* basic schist; cucalite; epidiorite; green schist; greenstone; lavialite; metabasite; ophidite; ophite; timazite. *A.G.I.*

prasoid. Resembling prase. *Standard, 1964.*

prasopal. Green common opal colored by chrome. From Australia, Hungary, and Brazil. *Shipley.*

Pratt isostasy. A suggested type of hydrostatic support for the earth's solid outer crust in which the crustal density is supposed to be greater under mountains than under oceans. *A.G.I.*

Pratt truss. *See* N-truss. *Ham.*

pravdite. Altered britholite. *Fleischer.*

preaeration. Aeration of water or ore pulp before treatment, notably by froth flotation where deoxygenated water is used (for example, from under frozen lake). Also used to stabilize ore pulps containing unstable sulfides before cyanidation. *Pryor, 3.*

preboring for piles. The process of boring holes to take piles in hard ground, where driving would damage them. *Ham.*

Precambrian. All rocks formed before Cambrian time are now called Precambrian in Canada and by many geologists in the United States. The Am. Comm. on Strat. Nomenclature recommends that the Canadian spelling be used and that the terms Early Precambrian era and Late Precambrian era be substituted for Archean and Proterozoic. *A.G.I.*

Precambrian shield. Rocks older than the Cambrian age. With the Cambrian sediments, evidence of life first appeared. Name applied to the great shield shaped area of ancient mineral-bearing rocks in northern Canada and parts of the northern United States. These ancient rocks are evident in many other parts of the world. *Cumming.*

precast concrete. Concrete blocks, etc., which are molded or cast before they are fixed in position, as shaft or tunnel lining or for heavy structures and works on the surface. Precast concrete gives a better surface finish, reduces shrinkage, and construction is easier. *See also* concrete blocks; permanent shaft support; cast in situ; pretensioning; concrete roofs. *Nelson.*

precast concrete blocks. *See* reinforced concrete lining. *Nelson.*

precementation process. Grouting the strata to control ground water prior to the start of construction or excavation, such as shaft sinking. Precementation has been used in the Republic of South Africa to depths of 4,000 feet and considerable savings resulted. *See also* cementation sinking. *Nelson.*

precharge. In forming, the pressure introduced into the cavity prior to forming the part. *ASM Gloss.*

precious. Used by mineralogists to imply the finest variety of gems or minerals; for example, precious garnet, precious beryl, etc. *Fay.*

precious cat's-eye. Chrysoberyl cat's-eye. *Shipley.*

precious coral. Coral of reddish hues and tones distinguished from common coral and black coral. *Shipley.*

precious garnet. Synonym for pyrope; almandine. *Fay.*

precious jade. True jadeite or nephrite, more often the former. *Shipley.*

precious metals. The relatively scarce and valuable metals; such as gold, silver, and the platinum-group metals. *ASM Gloss.*

precious olivine. Peridot. *Shipley.*

precious opal. Precious opal is of two principal types, white opal and black opal. Both types have the typical play of color and fire of opal but the body color of the former is milky white while in the latter the colors are displayed against a dark-colored base. Names such as harlequin, pinfire, and flash are used to describe the pattern of colors in precious opal. The colors are fiery red, orange, yellow, blue, and green, in iridescent ever-changing hues, seen as the stone is turned in the light. *New South Wales, p. 52.*

precious scapolite. Gem quality scapolite. *Shipley.*

precious serpentine. A pale or dark oil-green, massive, translucent serpentine. *Dana 6d, p. 670.*

precious stones. Produced domestically in Oregon and Washington. Some turquoise is produced in Nevada and Colorado. Most precious stones used in making jewelry, and for industrial purposes, are imported. *Barger.*

precious topaz. a. Term still applied, by some jewelers, to genuine topaz to distinguish it from topaz-colored quartz, known as jeweler's topaz. *Shipley.* b. Incorrect term for yellow to brown sapphire. *Shipley.*

precious tourmaline. Tourmaline which, like many other gem minerals, occurs most frequently in dark-colored non-gem varieties. *Shipley.*

precipice. A very steep, perpendicular, or overhanging place (as the face of a cliff); an abrupt declivity. *Webster 3d.*

precipitant. Any agent, as a reagent, that when added or applied to a solution causes a precipitate of one or more of its constituents. *Standard, 1964.*

precipitate. To separate a solid form from a solution by chemical means. *Mersereau, 4th, p. 515.*

precipitated sulfur. Sulfur precipitated from calcium polysulfide solutions by hydrochloric acid and washed to remove all calcium chloride. *BuMines Bull. 630, 1965, p. 903.*

precipitation. a. The process of separating mineral constituents from a solution by evaporation (for example, halite and anhydrite) or from magma to form igneous rocks. *A.G.I.* b. In hydrology, the discharge of water, in liquid or solid state, out of the atmosphere, generally upon a land or water surface. The quantity of water that has been precipitated (as rain, snow, hail, sleet) measured as a liquid. *A.G.I.* c. The ejection of a solid substance from a solution, either liquid or solid, the result of insolubility that has developed, usually from a lowering of temperature. *Henderson.*

precipitation barrier. Metal-rich water, as it moves away from the source of the metal, ordinarily comes into an environment where changing conditions of some kind cause precipitation of part or all of the metal from the water. Precipitation barriers account for the more than normal decay of hydrochemical anomalies than can be accounted for by simple dilution. They characteristically occur in spring and seepage areas where ground waters coming to the surface encounter an environment of increased availability of oxygen, sunlight, and organic activity. *Hawkes, 2, p. 233.*

precipitation hardening. Hardening caused by the precipitation of a constituent from a supersaturated solid solution. *See also* age hardening and aging. *ASM Gloss.*

precipitation heat treatment. Artificial aging in which a constituent precipitates from a supersaturated solid solution. *See also* artificial aging, interrupted aging, and progressive aging. *ASM Gloss.*

precipitation naphtha. A naphtha suitable for determination of the precipitation number of lubricating oils. *ASTM D 288-57.*

precipitation process. The treatment of lead ores by direct fusion with metallic iron or slag, or ore rich in iron; performed generally in a shaft furnace, rarely in a reverberatory. It is often combined with the roasting and reduction process. *Fay.*

precipitator. In ore dressing, smelting, and refining: (1) one who tends zinc boxes in which gold or silver, that has been dissolved in a cyanide solution, is precipitated and (2) one who precipitates gold from cyanide solution except that the cyanide solution is agitated with zinc dust in a mixing cone and precipitate, then turned into a filter press where the precipitate is recovered prior to the drying and refining to secure the gold. *D.O.T. 1.*

precise leveling. Determination of the difference of level between two points which do not differ more than $0.02\sqrt{L}$, where L is the distance apart in miles. The allowable difference in ordinary leveling is 0.2 to $0.1\sqrt{L}$. *Ham.*

precision. The closeness of approach of each of a number of similar measurements to the arithmetic mean, the sources of error not necessarily being considered critically. Accuracy demands precision, but precision does not require accuracy. *ASM Gloss.*

precision-bore tubing. Special glass tubing made by heating ordinary glass tubing until it is soft and then shrinking it on to a steel mandrel. *Dodd.*

precision casting. A metal casting of reproducible accurate dimensions regardless of how it is made. *ASM Gloss.*

precision depth recorder. A device for recording a sonic depth trace. Abbreviation, pdr. *Hy.*

precision grinding. Machine grinding to specified dimensions and low tolerances. Contrast with offhand grinding. *ASM Gloss.*

precision idler bearing. A bearing having ground races and in which the bore and outside diameter tolerances are held to ten-thousandths of an inch and the width tolerance to thousands of an inch. *NEMA MB 1-1961.*

precoat. a. A special refractory slurry applied to a wax or plastic expendable pattern to form a thin coating which serves as a desirable base for application of the main slurry. *ASM Gloss.* b. Making the thin coating. *ASM Gloss.* c. The thin coating itself. *ASM Gloss.*

precoated chippings. *See* coated chippings. *Ham.*

preconsolidation load. If the curve of compression of a clay is measured in a consolidation press, an estimate can be made of the maximum load to which the clay has been subjected in the past. *Ham.*

preconsolidation pressure. The greatest effective pressure to which a soil has been subjected. *ASCE P1826.*

precooler load. The amount of sensible heat, in British thermal units per hour, removed from the air in precooling. *Hartman, p. 327.*

precrystalline deformation. Nonruptural deformation in a tectonite where recrystallization continued after deformation ceases. *A.G.I. Supp.*

precutting. Used in machine mining where a coal cutter makes a cut along the face in front of a cutter loader. It may be adopted in hard coal seams or where an improvement in the +2-inch coal product is required. *Nelson.*

precutting blade. A special blade attached to a plough which operates a little in advance of the main blades of the machine. It may be used in hard coals or to prevent the climbing of the machine which leaves a layer of coal on the floor. *Nelson.*

predazzite. A marble containing calcite and brucite, the molecular proportion of MgO to CaO, being less than in pencatite; that is, less than 1:1. *A.G.I.*

predicted four-hour sweat rate. An index devised by the Medical Research Council of Great Britain which is based on the rate of loss of sweat from the body. It is designed to measure the physiological effect of work in near limiting conditions in hot working places, and is based on the assumption that heat stress is a function of the rate of sweating. *Roberts, I. p. 137.*

predimensioning. *See* dimensioning. *AM, 1.*

preemption act. An act providing for a patent to agricultural lands. The act does not include mineral deposits, as they are expressly reserved. *Fay.*

prefabricated masonry. Panels or beams of specially designed hollow clay blocks formed by the insertion of metal reinforcing wires through a number of the blocks, laid side by side, followed by infilling with cement. Many designs of such prefabricated panels and sections have been developed to accelerate building construction. *Dodd.*

preference. A familiar term under the public land laws meaning exclusive. *Ricketts, I.*

preferential flotation. A name applied to a special type of differential flotation in which a mixture of two flotative, sulfide minerals is given a slight roast in order that one may be oxidized, and therefore not float, and the other remain unchanged. *Fay.*

preferential replacement. See selective replacement.

preferential wetting. Applied to froth flotation when separating fine coal from coal washery slurries. The slurry or mixture is treated with a reagent which has an affinity for the material to be recovered and which will lend itself to subsequent stages in the separation process. *Nelson.*

preferred orientation. In structural petrology, a rock in which the grains are more or less systematically oriented by shape or in which the atomic structure shows a more or less systematic arrangement. A rock in which the mica plates are parallel to one another shows a preferred orientation. Similarly, a hornblende schist in which the long axes of the hornblende crystals are parallel shows a preferred orientation. May be produced by growth, deposition, or deformation. *A.G.I.*

preform. a. In wire rope, to shape the wires so that they will lie in place. *Nichols.* b. The process whereby cut strands of roving are drawn by suction onto a shaped screen, sprayed with binder, and cured in an oven. Also, the article made by this process. *Phillips.*

preformed rope. Wire rope in which the strands are bent to their correct lay before being laid up, so that the rope is unlikely to spin or kink. *Pryor, 3.*

preforming. In powder metallurgy, the initial pressing of a metal powder to form a compact that is to be subjected to a subsequent pressing operation other than coining or sizing. Also, the preliminary shaping of a refractory metal compact after presintering and before the final sintering. *ASM Gloss.*

preglacial. Prior to a period of glaciation; specifically, prior to the Pleistocene. *Webster 3d.*

preglacial drift. Loose sand and gravel lying beneath the till in Iceland. *Fay.*

pregnant solution. A value-bearing solution in a hydrometallurgical operation. *See also* cyanide. *Pryor, 4.*

pregnant solvent. In solvent extraction, the uranium-bearing solvent produced in the solvent extraction circuit. *Newton, p. 440.*

pregs. The liquor resulting from leaching of ore to dissolve a valuable constituent. Term used to connote such a solution when it has reached a loading sufficient to justify its removal from contact with the ore, for separate treatment to reclaim the contained values (by precipitation, ion exchange or stripping). After this treatment the now barren solution is returned to work or, if foul, is run to waste or regenerated. Also called pregnant solution; royals. *Pryor, 3.*

preheat. To heat beforehand; as (1) to heat (an engine) to an operating temperature before operation and (2) to heat (metal) prior to a thermal or mechanical treatment. *Webster 3d.*

preheating. Heating before some further thermal or mechanical treatment. For tool steel, heating to an intermediate temperature immediately before final austenitizing. For some nonferrous alloys, heating to a high temperature for a long time, in order to homogenize the structure before working. *ASM Gloss.*

preheat zone. That portion of a continuous furnace through which the ware passes before entering the firing zone. *ASTM C268-65.*

prehnite. A hydrated silicate of calcium and aluminum, $Ca_2Al_2(Si_3O_{10})(OH)_2$. The crystals are pyroelectric. The mineral occurs in association with zeolites and is usually white or pale green in color. Orthorhombic; Mohs' hardness, 6 to 6½; specific gravity, 2.8 to 2.95. *Dana 17.*

prehnitoid. a. A variety of mizzonite resembling prehnite. *Dana 6d, pp. 471, 532.* b. Impure prehnite. *Dana 6d, pp. 471, 532.*

preliminary exploration. An investigation carried out along certain broad features of a coal or mineral area, with the object of deciding whether the proposition is such as to warrant a detailed or final exploration which is often costly. *Nelson.*

preliminary prospecting. Prospecting undertaken after scout prospecting has disclosed the existence of values. Preliminary prospecting helps to determine approximately the extent of the payable ground. *Griffith, S. V., p. 2.*

preliminary soil survey. A quick investigation of surface or near-surface conditions; no special equipment is employed. Tests are carried out on site for approximate classification of soil and are limited to visual or other simple tests. *See also* general soil survey. *Nelson.*

preloaded. Containing or combined with the full complement of resin before molding. *Phillips.*

preload tank. A circular concrete tank prestressed by winding around the walls a single post-tensioned wire of high-tensile steel in a continuous spiral. *See also* pneumatic mortar. *Ham.*

prelubricated sealed bearings for idler rolls. Ball or roller bearings that have the lubrication sealed into the wearing parts of the bearing during the process of assembling the bearing. There are two types of prelubricated sealed bearings: (1) prelubricated life sealed bearings, these bearings have no provision for cleaning or relubrication after manufacture, and (2) prelubricated renewable seal bearings, these bearings have provision for cleaning, relubrication, and renewing of seals after manufacture. *NEMA MB1-1956.*

premature blast. The detonation of an explosive charge earlier than warranted. It may occur with blackpowder and a safety fuse but is very unlikely with exploders. *See also* hangfire. *Nelson.* Premature explosion may be due to carelessness, accidental percussion, faulty fuse, or degenerated explosives. *Pryor, 3.*

premature block. An obstruction or block in a core barrel or bit that prevents the entry of core into the barrel before the bit can be advanced far enough to cut a length of core to fill the barrel. *Long.*

premature set. The hardening of cement in a shorter time than normal or estimated. *Long.*

premium. a. The consideration paid in money or otherwise for a contract of insurance. *Webster 3d.* b. The excess in purchasing power, or exchange value, of one form of money over another of the same nominal value, as of gold dollars over paper ones (gold premium), or of silver dollars over paper ones (silver premium). *Webster 2d.*

premium tin. Tin of such high purity as to rate for a special bonus in the metal market. *Pryor, 3.*

premix. Aggregate which has been coated with bituminous binder before spreading. *See also* penetration macadam; tar macadam. *Nelson.*

premixed method. *See* plant-mix method.

preobrazhenskite; preobrazhensquite. Magnesium borate, $3MgO.5B_2O_3.4.5H_2O$, monoclinic (?). From the salt deposit at Inder, Kazakhstan. *Spencer 21, M.M., 1958.*

prepacked coal; minicoal. A coal product which has been mechanically weighed and packed for household use. Usually, strong paper-stitched bags are used. The National Coal Board of Great Britain has commenced producing prepacked coal, each bag holding 28 pounds of fuel. *Nelson.*

prepacked concrete. Concrete made by injecting Portland cement and sand grout under pressure into the bottom voids of a compacted mass of clean, graded coarse aggregate of at least 1 inch maximum gage. *Taylor.*

preparation. a. The treatment of ore or coal to reject waste. *See also* concentration, a; ore dressing, a; preparation plant. *Fay.* b. The process of preparing run-of-mine coal to meet market specifications by washing and sizing. *Jones.*

preparation boss. In bituminous coal mining, a foreman who is in charge of the operations of washing and sizing coal for market at the washery plant. *D.O.T. 1.*

preparation coal. Physical and mechanical processes applied to coal to make it suitable for a particular use. *B.S. 3552, 1962.*

preparation-getting machines. N. of Eng. Any machine which combines the preparation and getting phases of the cycle. *Trist.*

preparation plant. Strictly speaking, a preparation plant may be any facility where coal is prepared for market, but by common usage it has come to mean a rather elaborate collection of facilities where coal is separated from its impurities, washed and sized, and loaded for shipment. *B.C.I. See also* coal-preparation plant; coal washer, b.

preparation shift. The shift on a conventional machine mining face during which the coal is machine cut, broken down, and the conveyor, etc., advanced in readiness for the coaling shift. Sometimes there are two preparation shifts preceding the coaling shift. *Nelson.*

preparatory work. Mining operations to facilitate mining proper after having explored the deposit and having made it accessible both in strike and dip. This work is executed almost entirely within the deposit and includes: (1) inclines and transfer stations with manways, (2) sublevel drives between the levels, and (3) various crosscuts, chutes, minor shafts, raises, winzes, and other works. *Stoces, v. 1, p. 215.*

prepare. a. To shear or undermine the coal so that it can be readily blasted loose. *Fay.* b. (Ark.) To make a cartridge for a blast. *Fay.* c. (Ark.) To charge a blasthole. *Fay.*

prepared calcium carbonate; prepared chalk; drop chalk; whiting. White cones or powder. Used in manufacturing polishing powders and in ceramics. *Bennett 2d, 1962.*

prepared chalk. See prepared calcium carbonate. *Bennett 2d, 1962.*

prepared dolomite. Dead-burned dolomite, suitable for use in maintaining openhearth bottoms, banks, tap holes, etc. *Bureau of Mines Staff.*

preparing salt. See sodium stannate. *CCD 6d, 1961.*

preplaning. The lead or stagger that exists between planing blades in the same vertical plane of a plough. *Nelson.*

prereduced iron-ore pellets. A semimetallized pellet developed by the U.S. Bureau of Mines from taconite concentrates. The process involves rolling the concentrates into pellets of about the same size and shape as those produced commercially, then drying, calcining, and roasting the pellets in a reducing (oxygen-deficient) atmosphere. During the heat-hardening stage the pellets are partly converted to metal. Use of these pellets causes a considerable increase in pig-iron production. *Bureau of Mines Staff.*

prerelease. The act of discharging steam or air from an engine cylinder before the piston has reached the end of its stroke. *Fay.*

preselective. An arrangement by which a gear level can be moved, but the resulting speed shift will not take place until the clutch or the throttle is manipulated. *Nichols.*

presents. Eng. Stones of suitable thickness for shaping into tile stones without frosting, Stonesfield slate series and Chipping Norton limestone of the Cotswolds. *Arkell.*

present value. a. The present value of a mine may be considered to be a sum of money that may be allowed for the purchase, development, and equipment of a mine, with the expectation of receiving for this capital expenditure, during the estimated life of the mine, the return of this capital plus a substantial profit commensurate with the risk involved in the venture. *Hoov, p. 154.* b. The present value of a property is the amount which if invested now in its purchase would find its repayment with commensurate profit in the estimated series of annual dividends. Actuarially, it is the discounted sum of each and all those dividends, after allowance for any estimated further capital expenditure on necessary works and equipment. *Truscott, p. 234.*

preservatives. For mine timbers which are exposed to severe conditions of damp, ventilation and stress, chemicals used to impregnate them and resist dry or wet rot. These include copper sulfate, creosote, salt, sodium fluoride and silicofluoride, and zinc as chloride or sulfate. *Pryor, 3.*

President Press. Trade name for a dry-press brickmaking machine of a type that gives two pressings on both the top and bottom of the mold, a short pause between the pressings allowing any trapped air to escape. *Dodd.*

presintering. In powder metallurgy, the heating of a compact to a temperature lower than the normal temperature for final sintering, usually to increase the ease of handling or forming the compact, or to remove a lubricant or binder before sintering. *ASM Gloss.*

presplitting. A smooth blasting method in which cracks for the final contour are created by blasting prior to the drilling of the rest of the holes for the blast pattern. Instantaneous electric ignition or ignition with detonation fuse with no or a minimum of time scatter can then be used. Once the crack is made it screens off the surroundings to some extent from ground vibrations in the main round. The charging of the holes should be the same as in ordinary smoothing. Presplitting works in loose as well as in hard rock, but in hard granite the crack created for the contour is rather tight. No cracks are formed at the bottom of the holes perpendicular to them. In hard rock this means that the holes for the breakage of the rock must be placed rather close to the presplit row or that the presplit holes have to be charged once more with bottom charges and ignited in the main round. This is a drawback for the method compared with ordinary smoothing and so is the fact that in presplitting more holes are required. *Langefors, p. 305.*

press. a. A machine in which prepared coal, with or without binder, is subjected to pressure so that it is molded to the desired size and shape of a briquette. *B.S. 3552, 1962.* b. A machine tool having a stationary bed and a slide or ram which has reciprocating motion at right angles to the bed surface, the slide being guided in the frame of the machine. *ASM Gloss.* c. A machine used in the forming of ware from sheet metal. The types and capacities of presses vary according to the type of ware being pressed. Most presses are belt driven and are capable of great production. *Enam. Dict.*

press-and-blow-machine operator. See bottle-machine operator. *D.O.T. 1.*

press-and-blow process. A process of glass manufacture in which the finish and parison are pressed and the parison is subsequently blown to form the final shape. *ASTM C162-66.*

press brake. An open-frame, single-action press used to bend, blank, corrugate, curl, notch, perforate, pierce, or punch sheet metal or plate. *ASM Gloss.*

press cake. The incorporated gunpowder or millcake, pressed and ready for granulation. *Fay.*

press cloth. *See* filter cloth. *Dodd.*

pressed amber. An amber substitute produced by consolidating fragments of amber under pressure, usually with linseed or other oil as a binder. Also called reconstructed amber. *Shipley.*

pressed bar. A compact in the form of a bar; a green compact. *ASTM B243-65.*

pressed brick. A high-grade brick used for exposed surface work. *Crispin.*

pressed brick clay. A better grade clay than that usable for common brick. It must have a uniform color, must not warp or crack, be fairly hard and have low absorption when burned at a moderate temperature, and must be free from soluble salts. *CCD 3d, 1942, p. 195.*

pressed cameo. Similar to molded cameo, but pressed. *Shipley.*

pressed coal. Coal recemented after being crushed by tectonic movements. *Tomkeieff, 1954.*

pressed copal. Made like pressed amber, from fragments of copal. *Shipley.*

pressed density. In powder metallurgy, the density of an unsintered compact. Sometimes called green density. *ASM Gloss.*

pressed distillate. The oil left in petroleum refining after the paraffin has been separated from the paraffin distillate by cooling and pressing. *Webster 3d.*

pressed fuel. An artificial fuel prepared from coal dust, waste coal, etc., incorporated with other ingredients, as tar, and compressed in molds into blocks; briquettes. *Fay.*

pressed glass. Glassware formed by pressure between a mold and a plunger. *ASTM C162-66.*

presser. In ceramics, the workman who molds the handle, ears, and decorative reliefs to be applied to a pottery vessel before firing. *Fay.*

press fit. An interference or force fit made through the use of a press. *ASM Gloss.*

press forging. Forging metal, usually hot, between dies in a press. *ASM Gloss.*

pressing. a. In metalworking, the product or process of shallow drawing sheet or plate. *ASM Gloss.* b. In powder metallurgy, forming a powder-metal part with compressive force. *ASM Gloss.* c. In pottery making, any hand operation in which masses of clay are formed into the finished article with the use of the potters' wheel. *Hess.* d. The operation of forming pressed glass. *ASTM C162-66.* See also dry-pressing; hot-pressing; wet-pressing.

pressing area. The clear distance (left to right) between housings, stops, gibs, gibways, or shoulders of strain rods, multiplied by the total distance from front to back. *ASM Gloss.*

pressing crack. In powder metallurgy, a rupture in the pressed compact which develops during the ejection of the compact from the die; *see also* capping and lamination. Sometimes referred to as a slip crack. *ASM Gloss.*

pressing machine. a. A machine which forms ceramic shapes by forcing plastic or semiplastic raw materials into a die or mold. *Bureau of Mines Staff.* b. A machine in which the whole forming operation is carried out by pressing the plastic glass by a plunger forced into a die or mold. The machine may be operated by hand or it may be fully automatic. *C.T.D.*

press-pipe inspector. One who inspects green sewer pipe, as it comes from the press, for dimensional accuracy and consistency of clay. Also called green-pipe inspector. *D.O.T. 1.*

press-to-log operator. In the fuel briquettes industry, one who tends an automatic machine that compresses sawdust into short artificial logs for use as domestic fireplace fuel. *D.O.T. 1.*

pressure. a. The load divided by the area over which it acts. *ASCE P1826.* b. Force per unit area applied to outside of a body. *A.G.I.* c. Force exerted by air per unit area, either gage or absolute. Atmospheric pressure is measured by a barometer. Measured in pounds per square inch or inch (mercury). *Hartman, p. 8.* d. As used in mine ventilation terminology, it is sometimes defined in a rather vague manner as the available energy content of the air, and the pressure difference between two points in a ventilation current as the energy lost due to friction between two points. *Roberts, I, p. 163.*

pressure anemometer. a. An instrument for measuring the velocity of ventilating air currents in mines. *Fay.* b. An anemometer indicating wind velocity by means of the pressure exerted. *Standard, 1964.*

pressure arch. The driving of a narrow roadway results in the development of a pressure arch over the excavation. The strata within the arch bend slightly and cease to support the overlying beds, and the load is transferred to the solid coal or rock along the sides. The wider the roadway, the greater is the span of the arch and its height at the crown. A similar but larger pressure arch is formed across a longwall face, with one leg resting on the solid coal and the other on the solid pack behind the coal face. *See also* abutment. *Nelson.*

pressure arch theory. The pressure-arch theory in roof action suggests that when a narrow heading is advanced the layers of rock in the immediate roof deflect slightly and relieve themselves of the load of the overlying strata by transferring it to the sides of the opening by means of a pressure arch. The width of arch just short of that which the higher strata cannot span and transfer the load to the sides of the opening is called the maximum-pressure arch. The depth mainly influences the minimum width of the pressure arch, although the type of overburden also plays a part. The following formula has been developed for approximating the minimum width of the maximum-pressure arch (W=minimum width of arch, in feet; D=depth of coal from surface, in feet):

$$W = 3\left(\frac{D}{20} + 20\right)$$

The equation does not apply for overburden less than 400 feet thick or more than 2,000 feet. *Coal Age, v. 71, No. 8, August 1966, p. 198.*

pressure balancing. When an area of a mine has been sealed off from the remainder of the workings by barriers or stoppings inserted at suitable points, it is important to prevent the circulation of air within the sealed area. This means that external air pressures must be equalized on all the seals. The object of equalizing the atmospheric pressures on the seals is attained by inserting or removing doors or brattice cloths at appropriate places. It is possible to make all the seals contiguous with a common airway by this means, so that, if they are not widely separated, they will be subjected to the same external atmospheric pressure. *Roberts, I, p. 99.*

pressure belt. An area of barren ground in a coal seam. A characteristic feature is the deposit of very thick coal along one fringe of the disturbance. This thick coal was caused by the flowage and slippage of the coal originally deposited over the barren area. Prolonged low hade earth pressure was probably responsible for the deformation. *Nelson.*

pressure block. Pressure formed over the workings by masses of rock being severed from the surrounding formations creating pressure on the pillars, walls, or other supports. Pressure blocks of large size may result from natural geological phenomena, such as faults, or may occur as a result of mining operations. *Lewis, p. 408.*

pressure blower. A machine or blower having either pistons, cams, or fans for furnishing an airblast above atmospheric pressure. *Standard, 1964.*

pressure box. An elevated cistern fed by a flume, ditch, or pipe, and supplying water under a head. *Webster 3d.*

pressure bulb. The zone in a loaded soil mass bounded by an arbitrarily selected isobar of stress. *ASCE P1826.*

pressure bump. An occurrence when a coal pillar suddenly fails on becoming overloaded by the weight of the rocks above it. Generally, the coal is forced with some violence into the roadways and other open spaces. *See also* rock bump; rock burst; shock bump; bumps. *Nelson.*

pressure casting. a. Making castings with pressure on the molten or plastic metal, as in injection molding, die casting, centrifugal casting, and cold-chamber pressure casting. *ASM Gloss.* b. A casting made with pressure applied to the molten or plastic metal. *ASM Gloss.*

pressure chamber. a. A method of driving tunnels and sinking shafts through running sand by holding back the loose material by compressed air. The technique is not now applied to any great extent in mining. *See also* caisson sinking. *Nelson.* b. An enclosed space arranged on the access side of a stopping, which seals off an area and is furnished with means of raising or lowering the air pressure within it. *B.S. 3618, 1963, sec. 2.* c. If the mine area to be sealed off is extensive, and the seals are widely scattered, the fact that they are subject to different pressures may be unavoidable. In this event, pressure chambers may be required on the outby side of seals. Pressure chambers are also of value when the seals cannot be made tight, due to broken or fissured ground. The principle consists of building an outer chamber by erecting a second stopping on the outby side of the seal. The air pressure in the intervening space is then controlled to prevent movement of air across the seal. *Roberts, I, pp. 99-100.*

pressure check. An imperfection; a check or crack in a glass or ceramic article resulting from too much pressure in forming. *ASTM C162-66.*

pressure component. Any change in velocity with depth not accounted for by a change in temperature or in salinity may best be described as the pressure component of the velocity gradient. *H&G.*

pressure cracking. Cracking of the compacted semidry powder immediately after it has been shaped in a dry-press; the cause is sudden expansion of air that has been trapped and compressed in the pores of the compact. The fault has been largely eliminated by designing presses so that the plunger descends twice to its lowest level, the trapped air having time to escape between the first and second pressings. *Dodd.*

pressure creosoting. The most effective method of preserving timber by impregnation with creosote under pressure in tanks. *Ham.*

pressure die casting. The usual die casting process in which the molten metal is forced into highly finished molds under heavy pressure by plungers, compressed air, or combined methods. *See also* precision casting. *Ham.*

pressure dome. a. Synonym for air dome. *Long.* b. The bonnet on a steam boiler. *Long.*

pressure drilling. A process of rotary drilling in which the drilling fluid is kept under pressure in an enclosed system. *Brantly, 1.*

pressure drop. The decrease in pressure at which a liquid or gas is made to move between the intake and discharge of a pipeline or drill stem. *Long.*

pressure equalizer. a. A diaphragm connected to the fluid column by a series of ports incorporated in the design of some core barrels and preventing the entry of drilling fluids into the core-barrel-head bearings. *Long.* b. A dampener. *Long.*

pressure fan. a. A fan supplying air under pressure. *Webster 3d.* b. A fan that forces fresh air into a mine as distinguished from one that exhausts air from the mine. *Fay.*

pressure figure. A figure produced by intersecting lines of parting, due to gliding when certain minerals, like mica, are compressed or indented by a blunt point. They are similar in character, but not in position, to the so-called percussion figures produced by a sharp point. *Standard, 1964.*

pressure filter. a. A machine for removing solids from tailings, and the effluent can be reused in the washery or plant. The tailings are pumped into the filter under pressure, filtration takes place and solids are deposited in the chambers. Gradually the resistance increases until a pressure of 100 pounds per square inch is necessary to force more tailings into the press. At this stage, the chambers are almost full of solids. The feed is cut off and the press opened to allow the cakes to fall onto the conveyor beneath the chambers. The output of the pressure filter is low. *Nelson.* b. A filter in which pressure is applied to increase the rate of filtration. *B.S. 3552, 1962.* c. A filter in which the liquid to be filtered is forced through filtering material by a pressure greater than its own weight in the filter. *Fay.* d. *See* filter. *Pryor, 3.*

pressure fluctuations. Changes in water pressure caused by wave action. *Hy.*

pressure forging. Forging done by a steady pressure, as in a hydraulic press. *Standard, 1964.*

pressure gage. An instrument used to measure the force per unit area exerted by a confined fluid or gas. *Long.*

pressure gradient force. The vertical pressure gradient force balances the force of gravity, that is, on any particle, the force of gravity is opposed by an equal and opposite pressure gradient force. Smaller horizontal pressure gradient forces act whenever there is an intersection of inclined isobaric surfaces and local geopotential surfaces. *Hy.*

pressure gradient hydrophone. A hydrophone in which the electric output substantially corresponds to a component of the gradient (space derivative) of the sound pressure. *Hy.*

pressure-gradient transducer. Transducer, such as a moving-ribbon hydrophone, in which the moving element responds to pressure difference rather than to pressure. *H&G.*

pressure grouting. a. The act or process of injecting, at high pressures, a thin cement slurry or grout through a pipeline or borehole to seal the pores or voids in the rock or to cement fragmented rocks together. *Long.* b. Forcing a slurry of cement and sand into subgrade or embankment either by use of compressed air or by hydraulic pressure. *Urquhart, sec. 2, p. 31.*

pressure head. a. Hydrostatic head; column of water required to balance the fluid pressure being measured. *Pryor, 3.* b. The head on any point in a conduit represented by the height of the hydraulic gradeline above that point. *Seelye, 1.* c. Height of column of water equivalent to pressure exerted by air. Commonly employed rather than pressure, particularly for differences which cause airflow. Measured in inches (water). Also called head. *Hartman, p. 8.*

pressure hydrate. The most common variety of ASTM designated Type S hydrated lime. Synonymous with autoclaved lime. *Boynton.*

pressure hydrophone. A hydrophone in which the electric output substantially corresponds to the instantaneous sound pressure of the impressed sound wave. *Hy.*

pressure leaching. In chemical extraction of valuable ore constituents, use of autoclave to accelerate attack by means of increased temperatures and pressures. *Pryor, 3.*

pressure liner. A cylindrical liner, the inside diameter of which is smaller than standard, so that when installed in a pump with matching pistons it permits the pump to operate against higher discharge pressures without increasing the horsepower required. *Long.*

pressure lubricated bearings for idler rolls. Ball or roller bearings which are so arranged that the lubrication, through pressure fittings, can reach all wearing surfaces of the bearing. *NEMA MB1-1961.*

pressure method. In flotation, a method in which the pulp is saturated with dissolved air under pressure, and the pressure is released suddenly by passing the pulp through expansion nozzles, gas precipitating out. *Gaudin 2d, p. 417.*

pressure packer. *See* packer, b. *Long.*

pressure per diamond. The feed pressure or load applied per diamond in a bit. The total load supported by the bit divided by the number of stones set in the bit face expresses the pressure per stone in numerical values. Also called diamond pressure; stone pressure. *Long.*

pressure per stone. Synonym for pressure per diamond. *Long.*

pressure plate. In a clutch, a plate driven by the flywheel or rotating housing, which can be slid toward the flywheel to engage the lined disk or disks between them. *Nichols.*

pressure process. Treatment of mine timber to prevent decay by forcing a preservative into the cells of the wood. Preservatives used are creosote, zinc chloride, sodium fluoride, and other chemicals. *Lewis, p. 71.*

pressure-quantity survey. *See* ventilation survey. *Nelson.*

pressure-reducing valve. A valve using a diaphragm on the low-pressure side to actuate a gate or plug to regulate the flow of fluids or gases to decrease pressure. The low pressure of the low side acting on a larger area balances the force exerted by a high pressure acting on a small area to close the valve. *Long.*

pressure regulator. A balanced valve equipped with a diaphragm, used to control or restrict the flow of fluid or gas and designed so that the pressure of the fluid plus the force exerted by a spring or lever is sufficient to close the valve against the pressure exerted by the fluid or gas on the high-pressure side, thereby restricting its flow. *Long.*

pressure-release valve. Synonym for pressure-relief valve. *Long.*

pressure-relief valve. A safety valve used on pressure vessels or pump discharge lines to release pressures exceeding a preset limit. After the excessive pressure has been released or blown down, the valve usually will close automatically. Also called pop off; pop-off valve; pop valve; pressure-release valve; safety valve. *Long.*

pressure ridge. a. A long ridge in sea ice caused by horizontal pressure. *A.G.I.* b. A ridge of glacier ice caused by horizontal pressure associated with glacial flow. *A.G.I.* c. An elongate upbowing of the crust of a lava flow, apparently due to a compressive force imparted by the viscous drag of slowly moving subcrustal lava. *A.G.I.* d. Long, sharp ridges, a few feet to several hundred feet in length, formed in lava flows. *Lewis, p. 599.*

pressure ring. A ring about a large excavated area, evidenced by distortion of the openings near the main excavation. Shear cracks appear and minor slabbing of the rock takes place. *Lewis, pp. 622-623.*

pressure shadows. The name sometimes applied to the fringes or halos differing from the groundmass that often accompany porphyroblasts in schistose rocks. *Hess.*

pressure sleeves. Synonym for pressure liner. *Long.*

pressure suppression. See vapor suppression. *L&L.*

pressure survey. An investigation to determine the pressure distribution or pressure losses along consecutive lengths or sections of a ventilation circuit. *See also* ventilation planning; ventilation survey. *Nelson.*

pressure tank. a. A pressurized tank into which timber is inserted for impregnation with creosote, zinc chloride, or other preservative. *Ham. See also* open-tank method. b. A container from which slip is removed by air pressure. *ASTM C286-65.*

pressure test. Synonym of permeability test. *Long.*

pressure testing. An indirect method of testing porosity and permeability of formations at elevations of proposed structures. With the method a "packer" is attached to the end of the drill string and the string is run into the hole so that the packer is located at the top of the portion to be pressure tested. The packer is then expanded to block off the hole and water is pumped through the drill string at constant pressure, the quantity being measured. The water passes through the drill string and into the open hole below the packer. If rock is tight and unfractured no water can be pumped. The quantity which can be pumped, at any given pressure, is indicative of the degree of fracturing and permeability of the rock below the elevation of the packer. The quantity is also a function of the groundwater surface elevation. *Woodruff, v. 1, p. 33.*

pressure tight. Leakproof under pressure. *ASM Gloss.*

pressure-tube anemometer. *See* pitot-static tube.

pressure-tube reactor. A nuclear reactor in which the fuel elements are located inside numerous tubes containing coolant circulating at a high pressure. The tube assembly is surrounded by a tank containing the moderator at a low pressure. Higher pressures and temperatures can be attained than with a pressure vessel. *L&L.*

pressure unloading. Use of air pressure to remove contents of a ball mill, tank, or receptacle. *Enam. Dict.*

pressure vessel. A strong-walled container housing the core of most types of power reactors. Usually it also contains moderator, reflector, thermal shield, and control rods. *L&L.*

pressure-void ratio curve. A curve representing the relationship between effective pressure and void ratio of a soil as obtained from a consolidation test. The curve has a characteristic shape when plotted on semilog paper with effective pressure on the log scale. The various parts of the curve and extensions to the parts have been designated as recompression, compression, virgin compression, expansion, rebound, and other descriptive names by various authorities. *ASCE P1826.*

pressure water loader. A cartridge loader in which compressed water, rather than compressed air, is used for loading underwater. *Langefors, p. 101.*

pressure wave. a. A pressure produced by expanding gases moving at high velocity, the side component of which, equivalent to static pressure, may be recorded by a manometer at the side of the entry or mine passage. *Rice, George S.* b. Synonym for P-wave; compressional wave. *A.G.I.; A.G.I. Supp.*

pressure welding. Welding where pressure is used to complete the weld. *ASM Gloss.*

pressure wires. Wires leading from various points of an electric system to a central station, where a voltmeter indicates the potential of the system at those points. *Webster 2d.*

pressurized. a. Any structure, area, or zone fitted with an arrangement that maintains nearly normal atmospheric pressure. *Nelson.* b. Any structure or area in which the pressure within is held higher than the pressure without. *Bureau of Mines Staff.*

pressurized stoppings. Stoppings erected in the intake and return roadways of a district to isolate an open fire or spontaneous heating and in which the pressures on both sides of each stopping are made equal by the use of auxiliary fans. By making the air pressures equal, fresh air does not reach the fire through one stopping and foul gases are not expelled at the other. A small regulator is used in the auxiliary fan ducting to maintain equal pressures at all times. *Nelson.*

pressurized water reactor. A power reactor in which heat is transferred from the core to a heat exchanger by water kept under high pressure to achieve high temperature and to prevent boiling in the core. Steam is generated in a secondary circuit. *L&L.*

Preston density comparator. An instrument designed for use in the routine quality control of glass on the basis of an observed relationship, for any specific glass, between any change in composition and the associated change in density; the sink-float method is employed. *Dodd.*

prestressed concrete. The stressing of concrete before it is required to sustain a load. If precompression is introduced in concrete it offsets the theoretical tension produced by loading flexure and cracking is reduced or eliminated. The conditions required are (1) highly stressed steel tendon to reduce the effect of creep, (2) high strength concrete, (3) steel capable of attaining a very high stress, and (4) means of tensioning and anchoring steel tendons in the concrete. *Nelson.*

prestressing. The application of load to a structure so as to deform it in such a manner that the structure will withstand its working load more effectively or with less deflection. *Ham.*

pretectonic recrystallization. Recrystallization in a tectonite that ceased before deformation was completed. *A.G.I. Supp.*

pretensioning. The Hoyer method of prestressing concrete beams, precast in a workshop with the tensioned wires embedded in them and firmly anchored. *See also* precast concrete. *Ham.*

pretesting. The name adopted by White and Prentis to describe their patented method of underpinning tall structures in New York. Steel cylindrical piles are sunk by jacking or grabbing to the hard underlying stratum of rock and then filled with concrete. By a gradual process of jacking and underpinning, the weight of the structure is safely transferred through the piles to new and deeper foundations. *Ham.*

prevailing currents. The predominant or usual movement of water. *Hy.*

preventable accident. An accident due to carelessness. Such carelessness may be due to the nature of the worker, bad lighting, or fatigue. *Spalding, p. 362.*

preventive maintenance. A system of plant and equipment inspections made at regular intervals and the condition of the items recorded and marked on a chart. A system which enables breakdowns to be anticipated and arrangements made to perform the necessary overhauls and replacements in good time. *Nelson.*

previtrain. The dense woody lenses in lignite that are equivalent to the vitrain in coal of higher rank. *A.G.I.*

Priabonian. Upper Eocene. *A.G.I. Supp.*

prian. Corn. Soft white clay. *Pryor, 3.*

price. The amount of money asked or given in exchange for anything. *Hoov, p. 184.*

priceite. A hydrous borate of calcium, $5CaO.6B_2O_3.9H_2O$, from Furnace Creek, Inyo County, Calif.; possibly triclinic; white; earthy to porcelainous luster; conchoidal fracture. *American Mineralogist, v. 24, No. 11, November 1939, p. 728.*

price list. A comprehensive list or schedule in the form of an agreement, signed by management and workmen's representatives, which sets out in detail the rates of payment for each separate item of work performed by the miners in a district or seam. In general, there is a price list for each seam worked. *Nelson.*

pricked. In ceramics, ornamented with dotted depressions made with a single point or with a comb. *Standard, 1964.*

pricker. a. A thin brass rod, once used to make a hole through the tamping of a charged shothole, through which the blasting fuse could then be inserted. *Pryor, 3.* b. A nonferrous tool for making a hole in the primer cartridge to receive the detonator. *B.S. 3618, 1964. sec. 6.* c. S. Staff. A long iron rod or poker used for loosening coal from overhead. *Fay.* d. A piece of bent wire by which the size of the flame of a safety lamp is regulated without removing the top of the lamp. It passes up into the lamp through the oil reservoir in a tube. *Fay.* e. An iron rod for probing or sounding as in a bog, quicksand, etc. *Webster 3d.*

pricking. a. Hand-holing in a layer of soft clay at the bottom of a coal seam. *See also* sloom. *Nelson.* b. The act of lifting or loosening with a lever or a pick. *Fay.* c. Scot. A thin stratum suitable for holing. *Fay.*

pricking bar. a. A bar used in opening the taphole of a furnace. *Fay.* b. A rod used for removing obstructions from tuyeres and blowpipes. *Fay.*

pricking dirt. Same as holing coal. *Tomkeieff, 1954.*

pride of the country. A term sometimes given to rich bodies of ore discovered near the surface. *Nelson.*

priderite. A mineral, $(K,Ba)_{1.3}(Ti,Fe''')_8O_{16}$, minute red tetragonal crystals, previously mistaken for rutile in leucite rocks from Kimberley, Western Australia. Related structurally to cryptomelane. *Spencer 19, M.M., 1952.*

prill. a. Eng. A nugget of virgin metal. *Webster 2d.* b. *See* button, a. *Fay.* c. Corn. The best ore after cobbing. *Fay.* d. In assaying, the bullion bead resulting from cupellation of an auriferous or argentiferous lead button. *Pryor, 3.* e. Spherical particle about the size of a buckshot. *Bennett, 2d, 1962.* f. Globular, porous particle obtained by spraying a 95 percent solution of ammonium nitrate into a rising current of warm, dry air. It is usually coated with about 3 percent by weight of kieselguhr to prevent sticking. Prills vary in density, size, and size mixtures according to brand and specification. *Nichols, pp. 9-8.*

prilling. Spray solidifying of molten salts, for example, ammonium nitrate, to form small spheroids. *Bennett 2d, 1962, Add.*

prillion. Tin extracted from slag. Also spelled prillon. *Standard, 1964; Fay.*

Primacord. A fuse composed of an explosive core within a textile or plastic covering. It detonates every explosive that is in direct contact with it. *Streefkerk, p. 44.*

Primacord-Bickford fuse. A detonating fuse having an explosive of pentaerythritetetranitrate (PETN). Used in large-scale blasting work, especially in quarries. *Lewis, pp. 118-119.*

Prima Oil. Trade name for a shale oil with a low density and low boiling point. *Fay.*

primarrumpf. Applied by Penick to an upwarped, progressively expanding dome, with a rise so slow that degradation keeps pace with uplift. *A.G.I.*

primary. a. Characteristic of or existing in a rock at the time of its formation; said of minerals, textures, etc., of rocks; essentially, the same as original and contrasted with secondary, a. *Fay.* b. Formed directly by solidification from fusion or deposition from solution; said of igneous rocks and chemical sediments and contrasted with derivative (little used). *Fay.* c. Originally, the same as the present Precambrian, then extended to include the present Paleozoic, and later restricted Paleozoic; finally abandoned and now obsolete. *Fay.* d. Of ore, not enriched or oxidized by supergene processes. *Ballard.* e. A substance which is obtained directly, by extraction and purification, from natural raw material; for example, benzene, phenol, and anthracene are coal-tar primaries. *C.T.D.*

primary air. a. In combustion, a current of air which serves to disperse the coal and form an intimate mixture of coal and air; this mixture issues from the burner into the furnace, where it burns. Also called converter air. *Newton, p. 259.* b. Air which flows up and through the fire bed, by opening the grids in the fire doors, to supply oxygen necessary for proper combustion of fuel to take place in a furnace. *Cooper, p. 261.*

primary aluminum. The product of smelting alumina in an electric furnace that reduces the oxide to aluminum metal, which is cast into ingots for further processing. *Nelson.*

primary anomaly. See geochemical anomaly. *Lewis, p. 296.*

primary basalt. A presumed original magma, from which all other rock types are obtained by various processes. *A.G.I.*

primary blasting. a. Applied to the blasts by means of which the original rock ledge is broken into fragments. *Fay.* b. The blasting of solid rock, ore, or coal; blasting in situ. *See* also secondary blasting. *Nelson.*

primary boiling. a. The evolution of gas during the initial firing of porcelain enamel; sometimes a defect. *ASTM C286-65.* b. *See also* boiling; reboiling.

primary bonds. Covalent, ionic, and metallic bonds. These have energies of the order of magnitude of 100 kcal/mole. *VV.*

primary breaker. A machine which takes over the work of size reduction from blasting operations, and may be a gyratory or jaw breaker. Its capacity must be greater than the overall crushing plant capacity. In mines, primary ore crushing to about 7 inches may be performed underground. *See also* reduction ratio. *Nelson.*

primary breaking. A stage in bituminous-coal crushing which occurs at the entrance to the plant and consists of raw feed flowing into the primary breaker for reduction to a maximum top size of 4, 5, 6, or 8 inches either for washing or other preparation purposes. *Mitchell, p. 194.*

primary cell. a. A cell which generates or makes its own electrical energy from the chemical action of its constituents. Examples of primary cells are the voltaic cell, Daniell cell, LeClanche cell, and the dry cell. *Morris and Cooper, p. 233.* b. A group of flotation cells in which the raw feed is given a preliminary treatment, either or both of the products being subsequently retreated. *B.S. 3552, 1962.*

primary chemical. A chemical obtained directly by extraction and purification from a natural raw material; for example, toluol from coal tar. *Bennett 2d, 1962.*

primary clay; residual clay. A clay still remaining in the geographical location where it was formed; in the United Kingdom such a clay is typified by the china clay of Cornwall. *Compare* sedimentary clay. *Dodd.*

primary coil. a. The coil through which the inducing current passes in an induction coil or transformer. *Webster 3d.* b. A coil, forming part of an electrical machine or piece of apparatus, in which flows a current setting up the magnetic flux necessary for the operation of the machine or apparatus. *C.T.D.*

primary consolidation. The reduction in volume of a soil mass caused by the application of a sustained load to the mass and due principally to a squeezing out of water from the void spaces of the mass and accompanied by a transfer of the load from the soil water to the soil solids. Also called primary compression; primary time effect. *ASCE P1826.*

primary creep. *See* creep. *ASM Gloss.*

primary crusher. a. In comminution of ore, a heavy-duty dry crushing machine capable of accepting run-of-mine coarse ore and reducing it in size to somewhere between 6 or 4 inches. Heavy-duty connotes both the ability to handle large tonnages daily and to withstand very rough treatment. *Pryor, 3.* b. The first crusher in a series for processing shale or other rocks. *See also* secondary crusher. *ACSG, 1963.*

primary crushing. In ore dressing, the first stage in which crushers take run-of-mine ore and reduce it to a size small enough to be taken by the next crusher in the series. Ordinarily, the Blake jaw crusher or a gyratory crusher is used. *Newton, p. 53.*

primary crystal. The first type of crystal that separates from a melt on cooling. *ASM Gloss.*

primary current distribution. The current distribution in an electrolytic cell that is free of polarization. *ASM Gloss.*

primary deposit. A deposit formed directly from a cooling magma. *Stokes and Varnes, 1955.*

primary detecting element. In flotation, that portion of the feedback elements which first either utilizes or transforms energy from the controlled medium to produce a signal which is a function of the value of the directly controlled variable. *Fuerstenau, p. 542.*

primary dip. The dip or attitude assumed by a bedded deposit at the time of its formation. *See also* original dip. *Stokes and Varnes, 1955.*

primary dispersion. a. Geochemical dispersion of elements by processes originating within the earth; opposite of secondary dispersion. *Hawkes.* b. A pattern formed at depth by igneous or metamorphic processes. *Lewis, p. 297.* c. At depth the physical chemistry of geochemical processes is controlled by temperature, pressure, and the composition of materials. Three types of primary dispersion patterns (anomalies) recognized as being of importance in prospecting are: (1) the geochemical province within the mass of which the chemical composition can be correlated with certain types of ores; (2) dispersion patterns formed by the fluids associated with ore deposition; and (3) dispersion patterns produced by the migrating gaseous phase at low temperature. Primary dispersion patterns may include the end products of the processes of metamorphism, metasomatism and magmatic differentiation (separation of minerals in a molten magma). *Lewis, pp. 299-300.*

primary drilling. The process of drilling holes in a solid rock ledge in preparation for a blast by means of which the rock is thrown down. *Fay.*

primary environment. See geochemical environment. *Hawkes, 2, p. 10.*

primary excavation. Digging in undisturbed soil, as distinguished from rehandling stockpiles. *Nichols.*

primary explosive; initiating explosive. Explosive or explosive mixture sensitive to shock and friction; used in primers and detonators to initiate explosion. *Bennett 2d, 1962.*

primary flat joints. *See* L-joints. *A.G.I.*

primary flow structures. Structures of either linear or platy nature developed in igneous rocks prior to or during consolidation. *Stokes and Varnes, 1955.*

primary foliation. That variety of platy flow structure that forms during crystallization of a magma and is due to the parallelism of platy minerals. *Stokes and Varnes, 1955.*

primary gneiss. Applied to a rock that exhibits foliation, lineation, or other planar or linear structures, such as are generally characteristic of metamorphic rocks, but which because of the absence of observable granulation or recrystallization is considered to be igneous. The qualifying adjectives trachitoid or gneissoid for coarse-grained rocks and trachytic for felsitic rocks are regarded as preferable, for the term gneiss should properly be employed only for metamorphic rocks. *A.G.I.*

primary gneissic banding. Exhibited by certain igneous rocks of heterogeneous composition produced by the admixture of two magmas only partly miscible; or, in other cases, by magma intimately admixed with country rock into which it has been injected, along bedding or foliation planes. *C.T.D.*

primary haulage; face haulage. A short haul in which there is no secondary- or main-line haulage. For example, a mine is started into a hillside, using mine cars, track and hand loaders. An empty car is placed for the loader and the loaded car is taken to the dump by motor or manpower, repeating the process for each loader. *Kentucky, p. 210.*

primary heat poles. The Sahara, Arabian and other low altitude deserts. *MacCracken.*

primary igneous gneiss. See gneissose granite. *Holmes, 1928.*

primary metal. a. Metal extracted from ores, natural brines, or ocean water. Also called virgin metal. *Newton, p. 1.* b. Ingot cast from reduced and perhaps refined metal as distinct from ingot containing recirculated scrap metals. *Pryor, 3.*

primary mill. A mill for rolling ingots or the rolled products of ingots to blooms, billets, or slabs. This type of mill is often called a blooming mill and sometimes a cogging mill. *ASM Gloss.*

primary mineral; original mineral. A mineral which was formed at the same time as the rock in which it is found, in contradistinction to a secondary mineral formed later than the rock. For example, biotite in a granite is a primary mineral. If the biotite is altered to chlorite, the chlorite is termed a secondary mineral, since its formation was later than that of the granite in which it occurs. *Nelson. Compare* secondary mineral.

primary mineral deposits. Mineral deposits formed from magmas; subdivided into syngenetic and epigenetic deposits. They are subjected to alteration through weathering, both chemical and mechanical, and give rise to secondary deposits, which are divided into three groups: sedimentary rocks, secondarily enriched ore deposits, and residual or detrital ore deposits. *Lewis, p. 273.*

primary openings. Openings or voids existing when the rock was formed. In sedimentary rock, primary openings are usually the result of the arrangement and nature of the original sediment. *A.G.I.*

primary ore. Ore that has remained practically unchanged from the time of original formation. *Stokes and Varnes, 1955.*

primary ore minerals. Ore minerals are classed as primary or hypogene, and secondary or supergene. The former were deposited during the original period or periods of metallization; the latter are alteration products of the former as a result of weathering or other surficial processes resulting from descending surface waters. It has also been used to designate the earliest of a sequence of ore minerals as contrasted with later minerals of the same sequence, which some writers have called secondary. This gave rise to some confusion, and to avoid this, Ransome proposed the terms hypogene and supergene. Primary and hypogene are generally considered synonymous, but hypogene, as the word implies, indicates formation by ascending solutions. All hypogene minerals are necessarily primary, but all primary ore minerals are not hypogene; sedimentary hematite, for example, is of primary deposition but has been formed from ascending solutions. Similarly, confusion has arisen with the use of the word secondary, which is eliminated by the better term supergene. *Stokes and Varnes, 1955.*

primary phase. The first crystalline phase to appear when a liquid is cooled. For example, in the Al_2O_3-SiO_2 system, if a liquid is formed containing 40 percent Al_2O_3, and if this liquid is then cooled, the primary phase, when solidification begins, will be mullite; if the liquid contains 80 percent Al_2O_3, however, it can be seen that the primary phase will be corundum. *Dodd.*

primary pressure instruments. Manometers and gages which can be calibrated without reference to another pressure measuring instrument. The mercury barometer and dead weight scale are examples of such primary pressure instruments. *H&G.*

primary radiation. Radiation coming directly from the radioactive source. *NCB.*

primary recrystallization. A process by which nucleation and growth of a new generation of strain-free grains occur in a matrix which has been plastically deformed. *See also* secondary recrystallization. *ACSG,* 1963.

primary reject elevator. A refuse elevator which extracts the first or heavier reject; usually situated at the feed end of the washbox. *B.S. 3552, 1962.*

primary relict. A relict that was a constituent of the original rock, whether igneous or sedimentary. *Schieferdecker.*

primary relief. Includes the continental platforms and ocean basins which were evolved during the early stages of the earth when it was solidifying from the molten state. *Stokes and Varnes, 1955.*

primary salinity. Salinity of the soil due to alkali salts of strong acids; for example, sodium chloride. *Bennett 2d, 1962.*

primary screen. A screen used to divide coal (usually raw coal) into sizes more suitable for the subsequent cleaning of some or all of them. *B.S. 3552, 1962.*

primary settling. The surface subsidence that manifests itself after a few months and that usually constitutes 60 to 90 percent of the total subsidence. It varies according to the depth and thickness of the seam, the nature of the overburden, the mining method and the thoroughness of the filling in the mined-out areas. The primary period is followed by the secondary period in which the surface subsides gradually for a period of many years or even decades. *Stoces, v. 1, p. 497.*

primary shaft. The shaft from surface in which the first stage of hoisting is carried out. *Spalding.*

primary situation. A mineral found in the rock in which it was formed. *Hess.*

primary slime. Most ores and rocks as mined contain both earthy secondary minerals that distintegrate in water to colloidal sizes, and suitable electrolytes to furnish the ions necessary to stabilize dispersion of fine particles. The viscosity and density of this disperse system are such, that coarser particles, which would settle in water, are suspended, if any turbulence exists at all; thus, primary slime is formed. *Taggart, p. 973.*

primary solid solution. A constituent of alloys that is formed when atoms of an element B are incorporated in the crystals of a metal A. In most cases, solution involves the substitution of B atoms for some A atoms in the crystal structure of A, but in a few instances the B atoms are situated in the interstices between the A atoms. *C.T.D.*

primary source. If an operation produces or creates dust, it is termed a primary source. *Hartman, p. 59.*

primary structure. a. The structure of a sedimentary rock which is dependent on the conditions of deposition, mainly current velocity and rate of sedimentation. *A.G.I.* b. Those structural features that are contemporaneous with the first stages in the formation of a rock. A banding or foliation that develops in a plutonic rock while it is consolidating from magma is primary. *A.G.I.*

primary-type coal. The types of coal which compose the banded and unbanded coalbeds. Also called banded ingredients or rock types, that is, vitrain, clairain, durain, and fusain. *See also* banded ingredients. *A.G.I.*

primary washbox. The first of a series of washboxes which receives the feed and from which one product at least is given further treatment. *B.S. 3552, 1962.*

primary washer. The first of a series of washers, receiving raw feed, from which at least one product is retreated. *B.S. 3552, 1962.*

primary water supply. The principal or original source from which drilling water is obtained, as opposed to recirculated water. *Long.*

primary wave. Same as longitudinal wave. *A.G.I.*

primary zinc. Zinc produced by direct smelting from its ore. *Camm.*

primary zone. Portion of lode below that changed by leaching and secondary enrichment, and characteristic of the type of ore most likely to persist into the deeper levels of the mine. *Pryor, 3.*

prime. a. To add water to displace air and promote suction, such as in an intake on a pump. *Long.* b. In blasting, to place a detonator in a cartridge or charge of explosive. *Nichols.*

prime cost. Term used in contracting when provisional sums are included in a bill of quantities. Prime cost items normally include a 5 percent cash discount, packing and delivery. They must be paid for by the contractor to the supplier as part of his contract. Abbreviation, P.C.. *Pryor, 3.*

prime mover. a. A machine which converts fuel or other natural energy into mechanical power. *Nelson.* b. A tractor or other vehicle used to pull other machines. *Nichols.* c. Any machine which is capable of producing power to do work. *Shell Oil Co.*

primer. a. A contrivance, as a cap, tube, or wafer containing percussion powder or other compound, for igniting an explosive charge and itself ignited by friction, percussion, or electricity. *Webster 3d.* b. The cartridge or that portion of a charge which carries a detonator or is coupled to Cordtex fuse and which detonates or sets off the remainder of the charge. The primer cartridge is placed at one end of the charge with the detonator pointing towards the charge and not away from it. *See also* direct initiation. *Nelson.* c. In blasting, the cartridge in which the cap is placed. *Streefkerk, p. 48.* d. Usually the combination of a dynamite cartridge and a detonating cap. *Nichols.* e. The first stage of explosion in rock-breaking with high explosive is the firing of a detonator embedded in a primer cartridge. *Pryor, 3.*

primer cartridge. The explosive cartridge into which the detonator has been inserted. *B.S. 3618, 1964, sec. 6.*

primer charge. A boosting charge placed in contact with a detonator to ensure detonation of the main charge. *B.S. 3618, 1964, sec. 6.*

primes. Metal products, principally sheet and plate, of the highest quality and free from visible defects. *ASM Gloss.*

prime strata. In mine subsidence, the undisturbed strata lying outside the littoral zone. *Briggs, p. 61.*

prime virgin mercury. A term used for mercury produced by the mines. *BuMines Bull. 630, 1965, p. 574.*

prime western spelter. *See* prime western zinc. *Bennett 2d, 1962.*

prime western zinc. Low grade of virgin zinc containing about 98 percent zinc, 1.60 percent lead, 0.08 percent iron, with no limitations on cadmium or aluminum. *Bennett 2d, 1962.*

priming. a. Filling a pump, siphon, or pipe column with water before starting the appliance. *Nelson.* b. The act of adding water to displace air, thereby promoting suction, as in a suction line of a pump. *Long.* c. Water used to promote initial suction in a centrifugal or reciprocating pump. *Pryor, 3.* d. Act of placing detonator in explosive charge. *Pryor, 3.* e. In a boiler, the excessive carryover of fine water particles with the steam due to insufficient steam space, faulty boiler design, or faulty operating conditions. *Strock, 10.*

priming cartridge. *See* primer. *Nelson.*

priming coat. A coating of binder applied to a surface of natural compacted or stabilized soil before surface dressing. *Nelson.*

priming horn. A miner's or quarryman's powder horn. *Fay.*

priming powder. Detonating or fulminating powder. *Standard, 1964.*

priming tube. A tube containing fulminating powder for firing a charge. *Standard, 1964.* A detonator. *Fay.*

priming valve. a. A safety valve on the working cylinder of a steam engine to discharge the priming. *Standard, 1964.* b. A valve connected with the discharge pipe of a force pump through which the pump may be primed. *Fay.*

primitive circle. In crystallography, the great circle in the plane of a stereographic projection. *Fay.*

primitive form. A crystal form from which other forms may be derived. *Fay.*

primitive period. With a periodic quantity, the smallest increment of the independent variable for which the function repeats itself. *Hy.*

primitive rocks. Rocks supposed to be first formed and containing no organic remains, being irregularly crystallized and aggregated without a cement, such as granite, gneiss, and the like. *See also* primary. *Fay.*

Prince Rupert's drops. Drops of glass that have been highly stressed by quenching; when the tail of one of these drops is broken the glass explodes to dust, but the drop itself is immensely strong. These drops were first made by Prince Rupert, nephew of King Charles I. *Dodd.*

princess. Roofing slate 24 by 14 inches. *Pryor, 3.*

principal. a. Primary, or leading function. A principal axis is the longest one in a crystal. The principal valence is that at which an element forms the greatest number of stable compounds. *Pryor, 3.* b. The money lent or due. *Hoov, p. 156.*

principal axes. The principal axes of an area for a given point in its plane are the two mutually perpendicular axes, passing through the point and lying in the plane of the area, for one of which the moment of inertia is greater, and for the other less, than for any other co-planar axis passing through that point. If the point in question is the centroid of the area, these axes are called principal central axes. *Ro.*

principal axes of strain. In elastic theory, the principal axes of the reciprocal strain ellipsoid. The extensions of lines drawn in these directions, in the unstrained state, are stationary for small variations of direction. One of them is the greatest extension, the other is the smallest. *A.G.I.*

principal axes of stress. The coordinate axes along which no shearing stresses exist. *A.G.I.*

principal axis. a. In the tetragonal and hexagonal systems, the vertical crystallographic axis; hence what is the same thing in uniaxial crystals, the optic axis. *Fay.* In the orthorhombic and triclinic crystals, the axis of the principal zone; the axis with the shortest period, often the axis of the principal zone. In monoclinic crystals, the axis *c,* usually the axis of the principal zone excluding the symmetry axis; the symmetry axis *b. A.G.I.* b. In a transducer used for sound emission or reception, a reference direction for angular coordinates used in describing the directional characteristics of the transducer. It is usually an axis of structural symmetry or the direction of maximum response, but if these do not coincide, the reference direction must be described explicitly. *Hy.*

principal earthquake. The strongest of a consecutive number of earthquakes. *Schieferdecker.*

principal meridian. a. A meridian line accurately located, and used as a basis from which to construct interior lines of monuments, called guide meridians, for the use of surveyors. *Standard, 1964.* b. In public land surveys, the meridian established through the initial point of a system of coordinated township boundary lines. *See also* base line. *Seelye, 2.*

principal moment of inertia. The moment of inertia of an area about either principal axis. *Ro.*

principal plane. Each of three mutually perpendicular planes through a point in a soil mass on which the shearing stress is zero. *See also* intermediate principal plane; major principal plane; minor principal plane. *ASCE P1826.*

principal point. That point on an air survey photograph which is the intersection between the optical axis of the camera and the center of the photograph. *Ham.*

principal section. In crystallography, the plane passing through the optical axis of a crystal. *Standard, 1964.*

principal stresses. The normal stresses on three mutually perpendicular planes on which there are no shear stresses. *ASM Gloss.*

principal tectonic. Synonym for synorogenic. *A.G.I.*

principle of Archimedes. See Archimedes' principle. *Ham.*

principle of moments. a. The algebraic sum of any number of forces with respect to a point, equals the moment of their resultant about that point. *Crispin.* b. A body will be in equilibrium when the sum of the clockwise moments equals the sum of the anticlockwise moments, or the algebraic sum of all the moments is zero. *Morris and Cooper, p. 153.*

principle of superposition. In order to determine the stress in a member due to a system of applied forces, the system can be split up into several component forces and their moments and reactions added in order to calculate the total stress. *Ham.*

principle of uniformity. Synonym for uniformitarianism. *A.G.I.*

pringap. Eng. The distance between two mining possessions in Derbyshire. An odd piece of mining ground of less than half a mere. *Fay.*

Prins process. A dense-media process in which large-size coal is separated from the refuse in a flowing bed of small coal in a reciprocating launder. Refuse sinks to the bottom. The small coal is screened from the coarse refuse and returned to the head of the launder by a drag conveyor. The floating large coal passes over skimmers in the trough to the discharge chute. *Mitchell, p. 530.*

Prins washer. A combination trough washer and jig in which the feed enters the unit through the central launder where stratification takes place. The stratified material overflowing the stationary trough is divided at the first opening in the shaking jig, allowing the upper stratum of the material to flow onto the top deck of the jig while the lower stratum enters the jig reclean chamber. *Mitchell, p. 431.*

print. a. In founding, a projection on a core, by which it is placed and held in proper position in a mold; a core point. *Standard, 1964.* b. An impression of a pattern or of a part thereof, as in molding sand. *Standard, 1964.*

print decorator. One who applies designs to chinaware. Cuts design from sheet of paper, using glass cutter. Positions design around ware, cutting off excess with scissors and smoothing with soaped brush. Redecorates ware by removing defective portions of design with chemical solution and fitting in patch cut from design. *D.O.T. Supp.*

printed ware. Pottery, the decoration of which is effected by means of transfer printing. *Standard, 1964.*

printer's bit. A small piece of refractory material for use as a distance-piece in the stacking of decorated pottery ware before and during firing; an item of kiln furniture. *See also* kiln furniture. *Dodd.*

printies. Circular or oval depressions cut into glass vessels. They are usually arranged in rows, but sometimes cover the entire surface. *Haggar.*

printing. Printing on the enamel is done with a rubber or composition stamp having raised letters or design. The ink for this work is composed of a suitable mixture of oils as a vehicle and a ceramic printing oxide. *Hansen.*

printing body. In ceramics, pottery when in condition to be printed; biscuit. *Standard, 1964.*

printing ink. *See* ceramic ink. *ACSG, 1963.*

print inspector. One who looks for defective decoration of printed pottery and porcelain ware. *D.O.T. 1.*

priorite. A titanoniobate of yttrium, cerium, and other rare-earth minerals $(\mathrm{Y,Er,Ca,Fe^{2}Th})(\mathrm{Ti,Cb})_2\mathrm{O}_6$. An end-member of the isomorphous eschynite-priorite series; orthorhombic, moderately to strongly radioactive; black, but dark brown to yellow by alteration; occurs in granite pegmatites with euxenite, zircon, monazite, xenotime, allanite, and other rare-earth minerals; it is also found as detrital crystals in placers. *Dana, 7, v. 1, p. 793; Crosby, pp. 18-19.*

prism. a. In crystallography, an open form of three or more similar faces parallel to a single axis; the shape of its cross section is generally used as a modifier, as trigonal prism, rhombic prism, or dihexagonal prism. *A.G.I.* b. In crystallography, any prism that is parallel to the vertical axis *c.* Obsolete. *A.G.I.* c. The liquid mobile volume of a stream. The volume of a length of embankment or excavation. *Seelye, 1.* d. A solid with ends that are similar, equal and parallel polygons, and with sides that are parallelograms. *Jones, 2, p. 116.*

prismatic. a. In optics, resembling the colors formed by the refraction of light through a prism. *Shipley.* b. In crystallography, having elongation in one direction, commonly parallel to one of the crystallographic axes; also parallel to the faces of a crystal, as prismatic cleavage. *Shipley.*

prismatic compass. Surveyor's compass, usually portable and handheld in which the graduated rotating scale to which the needle is attached is read through a prism while sighting. *Pryor, 3.*

prismatic glass. Glass that has been pressed or rolled to produce a pattern of prisms; these refract light passing through the glass. The term is sometimes, erroneously, applied to lens fronted tubing. *See also* lens-fronted tubing. *Dodd.*

prismatic layer. A layer, in pearl or mother-of-pearl, composed of minute crystals of aragonite arranged with their principal axes perpendicular to the surface of the layer. *Shipley.*

prismatic moonstone. Clouded chalcedony. *Shipley.*

prismatic plane. In noncubic crystals, any plane that is parallel to the principal *c* axis. *ASM Gloss.*

prismatic quartz. Iolite. *Shipley.*

prismatic sulfur. *See* monoclinic sulfur. *Cooper, p. 277.*

prismatic system. See orthorhombic system. *C.M.D.*

prismatic telescope. A telescope having an eyepiece fitted with a prism which reflects at 90°. *See also* diagonal eyepiece. *Ham.*

prism level. A kind of dump level with a mirror over the level tube, and a pair of prisms so placed that the position of the level bubble can be determined by the levelman without moving his head from the eyepiece. *Webster 3d.*

prismoid. Any solid, bounded by planes, whose end-faces are parallel. It is usually understood to include also figures whose bounding surfaces are warped surfaces. *Seelye, 2.*

prismoidal. A figure resembling a prism. *Gordon.*

prismoidal formula. A formula used in the calculation of earthwork quantities. It states that the volume of any prismoid is equal to one-sixth its length multiplied by the sum of the two end-areas plus four times the mid-area. *C.T.D.*

prism square. An optical square in which the fixed right angle is obtained by reflection from a prism. *Ham.*

private coal car. One having other than railroad ownership which is marked with the name of the owner or lessee; bears his permanent reporting marks (or initials), and car number; is equipped as required for railroad operation; is under control of the owner or lessee as to use; and is subject to the provisions of the agency mileage tariff of the carriers as to payment therefore. *Hess.*

prize. Leic. To lift or loosen with a lever or a pick. *Fay.*

proactinium. *See* protactinium.

probability. Mathematically, for an event which can occur in a ways and fail in b ways, the probability of occurrence is

$$\frac{a}{a + b} \text{ and of failure } \frac{b}{a + b}$$

Pryor, 3.

probable error. For a series of measurements, the range inside which half the observations are contained. *Pryor, 3.*

probable ore. a. A class of ore whose occurrence is to all essential purposes reasonably assured but not absolutely certain. A definite grade can be assigned to the tons thus classified, but mining excavations have not progressed to the stage where the probable tons are available to current mining, although the tonnage could become ready for withdrawal in a relatively short time. The grade assigned to many probable ore blocks may be the grade determined for contiguous developed blocks. Some probable ore thus distinguished may be the essential counterpart of some measured ore as classified under the governmental plan. *Forrester, p. 554.* b. Ore partly exposed by development, sampling, driving, or drilling, but not fully blocked out (that is, exposed in panels). Usually such ore ranks as probable when exposed and sampled on two or three sides. *Pryor, 3.*

probable performance curve. A performance curve showing the expected results of a coal-preparation treatment. *B.S. 3552, 1962.*

probable reserves. Areas of coal or mineral lying beyond the developed reserves but still close enough to be considered proved within ordinary probability. Where the acreage of probable reserves is known from maps or surveys, the tonnage of coal may be calculated as: (1) Theoretical tonnage = 101.37 x specific gravity of coal = tons per inch per acre; and (2) workable tonnage—deduct 10 to 20 percent or more according to geological report and the area's known consistency. *See also* economic coal reserves. *Nelson.*

probe. a. A small tube containing the sensing element of electronic equipment, which can be lowered into a borehole to obtain measurements and data. *Long.* b. To conduct a search for mineral-bearing ground by drilling or boring. *Long.* c. To lower drill rods, etc., to locate obstructions and/or to determine the attitude of a piece of junk in a borehole. *Long.* d. Electrode used in measuring a potential difference. *Schieferdecker.*

probertite. A colorless hydrous borate of sodium and calcium, $Na_2O.2CaO.5B_2O_3.10H_2O$; columnar, radiated; monoclinic. From Kramer District, Kern County, Calif. Locally known as boydite. Independently described as kramerite. *English.*

probing. Thrusting a pointed steel rod down through sand or soft clays to contact the seam or ore body. The point of the rod is examined for traces of coal or mineral. *See also* auger. *Nelson.*

probing a hole. Using a probe attached to a Geiger counter to detect radioactivity in a drill hole. *Ballard.*

probitumen. Spores, algae, and resins contained in coal—potential source of coal bitumen. *Tomkeieff, 1954.*

proceedings. The term proceedings is broader than the term action, yet in the mining law it is used in the sense of action and refers to the commencement of an action. It is used to enable a party to institute such proceedings under the different forms of actions allowed by the state and federal courts. *Ricketts, I.*

procello. In glassmaking, a pair of spring tongs with flat jaws, used to reduce the external diameter of a glass object as it is rotated by the pontil. Also spelled procellas; pucellas. *Standard, 1964.*

process. a. A series of chemical or metallurgical operations conducted to an end. *Webster 3d.* b. As term is used in mineral processing, large-scale beneficiation of ores. Processing, or dressing, operations may include crushing, sorting, sizing, grinding, classification, dewatering, leaching, amalgamation, gravity treatment flotation, magnetic and electrostatic treatment, and pyrometallurgy. *Pryor, 3. See also* dry process; gob process; wet process. *ACSG, 1963.*

process annealing. In the sheet and wire industries, heating a ferrous alloy to a temperature close to, but below, the lower limit of the transformation range and then cooling, in order to soften the alloy for further cold working. *ASM Gloss.*

process companies. Companies formed for the purpose of exploiting patented processes. Many of these have some bearing on mining and metallurgy. *Hoov, p. 255.*

process fishscaling. Fishscaling that appears during the drying or firing cycle of cover coat application. *ASTM C286-65.*

process flowsheet. A basic flowsheet indicating the main operational steps within the plant, the movement of the various materials between the steps, and the final products obtained, and often also the quantities of material with which the plant must be capable of dealing at various points. *B.S. 3552, 1962.*

process heat reactor. A nuclear reactor that produces heat for use in manufacturing processes. *L&L.*

processing. a. The various artificial methods adopted for strengthening a soil, such as compaction, treatment with bitumen, lime, cement, etc. *See also* soil stabilization. *Nelson.* b. The methods employed to clean, process, and prepare coal and metallic ores into the final marketable product. *Nelson. See also* plant mix.

process inspector. One who repairs flaws, such as blisters, bruises, and other surface marks, on enameled metal parts. Removes enamel from broken surfaces, using a metal probe, and fills cavities with thick enamel undercoat applied to surfaces with fingers. Also called patcher; touchup man. *D.O.T. 1.*

processioner. An official land surveyor. *Standard, 1964.*

processioning. The official inspection of boundaries and maintenance of surveyors' marks, as in North Carolina and Tennessee. *Standard, 1964.*

process lag. In flotation, process lag is the delay or retardation in the response of the controlled variable at a point of measurement to a change in value of the manipulated variable. *Fuerstenau, p. 545.*

process metallurgy; production metallurgy. a. That branch of metallurgy that deals with the recovery or extraction of metals from their ores. *Henderson.* b. Usually synonymous with extractive metallurgy. *ASM Gloss.*

process of mining. The prospecting or developing of ground by shaft, tunnel, or other opening, whether mineral is extracted at a profit or at all; by quarrying; or by dredging the bed or banks of a waterway for the purpose of obtaining mineral therefrom. *Ricketts, I.*

process scrap. The scrap arising during the manufacture of finished articles from iron and steel, and usually returned to steelworks after sorting and processing by scrap merchants. *See also* circulating scrap. *Nelson.*

process tolerance. The dimensional variations of a part characteristic of a specific process, once the setup is made. *ASM Gloss.*

prochlorite. One of the chlorite group. A green silicate of magnesium and aluminum with chemically combined water; ferrous iron substitutes partially for magnesium. Monoclinic, occurring in metamorphic rocks. *C.T.D.*

Proctor compaction curve. *See* compaction curve. *ASCE P1826.*

Proctor compaction test. A method of compacting soils in a laboratory so as to give comparative results. By weighing different compacted samples of the same soil, optimum moisture content can be determined. *See also* compaction. *Ham.*

Proctor dryer. The original Proctor dryer of the early 1920's was a tunnel dryer for heavy clay and refractory bricks; drying was achieved by air recirculating over heated steam coils, or over pipes carrying hot waste gases. Today, Proctor dryers still operate on the same principle but are made in a variety of types suitable for all kinds of ceramic product. *Dodd.*

Proctor penetration curve. *See* penetration resistance curve. *ASCE P1826.*

Proctor penetration needle. A quick and convenient method for testing the resistance of a fine-grained soil to penetration at a standard rate of one-half inch per second. Needles from 1 to 0.05 square inch area are used and a spring balance indicates the pressure required for the needle to penetrate the soil. *See also* penetrometer, soil. *Nelson.*

Proctor penetration resistance. *See* penetration resistance. *ASCE P1826.*

Proctor plasticity needle. An approximate measurement of the resistance of a soil to penetration at a standard rate of ½ inch per second. *See also* California-bearing ratio. *Ham.*

prodelta clays. The fine muds or silts which make up the bottomset portion of cross-bedding. These are deposited in the sea offshore from a river delta. *A.G.I.*

prod mark. A short ridge, parallel to the current, which unlike flute casts, rises down-current and ends abruptly. *Pettijohn.*

produce. a. The marketable ores or minerals produced by mining and dressing. *Fay.* b. Corn. The amount of fine copper in one hundred parts of ore. *Fay.*

producer. a. One who extracts ore or coal from mines, rock from quarries, metals from ore by metallurgical processes, etc. *See also* production. *Fay.* b. A producing well. *A.G.I. Supp.* c. A furnace or apparatus that produces combustible gas to be used for fuel and is usually of the updraft type which forces or draws air or a mixture of air and steam through a layer of incandescent fuel (as coke) with the resulting gas consisting chiefly of carbon monoxide, hydrogen, and nitrogen. *Webster 3d.*

producer gas. Obtained by the partial combustion of coal or coke in air. It consists mainly of carbon monoxide and nitrogen, with small proportions of hydrogen (obtained by the "water gas" reaction), methane (obtained by the partial carbonization of coal), and carbon dioxide (resulting from conditions unfavorable for the complete conversion of carbon to carbon monoxide). *Francis, 1965, v. 2, p. 376.*

producing horizon. Rock from which oil or gas is produced. *Institute of Petroleum, 1961.*

producing sand. A rock stratum that contains recoverable oil or gas. Strictly, the term would apply only to a sandstone, but in loose usage it also applies to other sedimentary rocks. *Williams.*

producing well. A well from which oil or gas is obtained in commercial quantities. *A.G.I. Supp.*

producing zone. The part of a sandstone or other reservoir rocks that yields oil and/or gas. *Stokes and Varnes, 1955.*

product. Percent of metal in ore. *Gordon.*

production. That which is produced or made; any tangible result of industrial or other labor. *Standard, 1964.* The yield or output of a mine, metallurgical plant, or quarry. *Fay.*

production checker. In metal mining, one who keeps a record of the number of containers (cars, buckets, or skips) raised to the surface, and the amount of ore contained in each, estimating or weighing the contents. *D.O.T. 1.*

production gang. A team of men employed at the face on production, covering all face operations, maintenance, and supplies. *See also* development gang. *Nelson.*

production reactor. A reactor designed primarily for large-scale production of plutonium by neutron irradiation of uranium 238. Also, a reactor used primarily for the production of isotopes. *L&L.*

productive. Yielding payable ore. *Fay.*

productive development. The headings, and levels excavated in a coal seam, preparatory to opening out working faces, may be termed productive development. These drivages are planned to prove and render accessible the maximum area of coal for the minimum yardage of development work. The modern trend is to make in the seam development as productive as possible with the aid of machines. *See also* unproductive development. *Nelson.*

productive land. That which has produced farm crops within the five previous years. *Woodruff, v. 3, p. 447.*

productivity. a. A term closely allied to, and may be expressed as the O.M.S. of a face or colliery or metal mine. Productivity will vary with the degree of mechanization and multishift working; it is also a function of the horsepower, of a suitable nature, at the disposal of each miner. *See also* intensive machine mining. *Nelson.* b. The efficiency with which economic resources (men, materials, and machines) are employed to produce goods and services. *Crispin.*

product of inertia of an area. The product of inertia of an area with respect to a pair of rectangular axes in its plane is the sum of the products obtained by multiplying each element of the area dA by its coordinates with respect to those axes, x and y; it is therefore the quantity $\int dA.xy$. *Ro.*

profile. a. A vertical section of a soil showing the nature and sequence of its various zones. *Webster 3d.* b. A drawing used in civil engineering to show a vertical section of the ground along a surveyed line or graded work. *Webster 3d.* c. A graph showing as ordinate the variation of some geophysical quantity along a straight line against horizontal distance on this line as abscissa, for example, a gravity profile. *A.G.I.* d. In seismic prospecting, the data resulting from a single series of observations made at one geographic location with a linear arrangement of seismometers. Also used as an adjective or verb, as profile shooting, continuous profiling. *A.G.I.* e. *See* soil profile. *ASCE P1826.* f. An outline, contour, or drawing showing the outline of a vertical section through a bit, borehole, etc. As applied to diamond bits, the profile serves to illustrate the shape of the bit crown. *Compare* double-round nose; flat face bit; single-round nose. *Long.* g. In ceramics, a metal plate giving in hollow section the exterior outline of half of the object to be made, so that when placed against the clay on the rotating throwing wheel it will shape it to the desired form. *Standard, 1964.*

profile flying. The technique of flying at a constant height above the ground during airborne mineral exploration. Generally, the aircraft maintains a height of 300 or 500 feet above ground. This often involves a series of skillfully controlled climbs and dives over rolling ground. *See also* geophysical prospecting. *Nelson.*

profile of equilibrium (shore). a. There is a profile of equilibrium which the water would ultimately impart, if allowed to carry its work to completion. The continual change of shoreline and the supply of new drift are everchanging conditions with which no fixed form can be in equilibrium. There are, however, certain adjustments of current slope, and load which when once attained, are maintained with some constancy. The form involved in these adjustments is commonly known as the profile of equilibrium. *A.G.I.* b. A (shore) profile on which the incoming and outgoing of beach gravel and sand is balanced. *A.G.I.* c. A marine platform consisting of a wave-cut platform which extends to shore and a built platform farther seaward whose slope has become smooth and nearly uniform. At all points on the slope there is a balance between erosion and deposition. This profile, termed a graded profile or profile of equilibrium, is slightly concave, being steepest near the shore. *A.G.I.* d. A profile of equilibrium, or graded profile, is a river profile in which the slope at every point is just sufficient to enable the stream to carry its load of sediment, neither depositing sediment nor eroding the riverbed. *A.G.I.*

profile paper. Paper ruled horizontally and vertically with equidistant lines to scale, for convenience in drawing engineering profiles in either direction. *Standard, 1964.*

profile shooting. A refraction type of seismic shooting in which the shots and detectors are laid out on long lines. Successive shots are taken at uniform or almost uniform intervals along each line, and successive detector spreads are shifted about the same distance as the corresponding shot points so as to keep the range of shot-detector distances approximately the same for all shots. Generally, shots are received from opposite directions on each detector spread. The distance range is chosen so that the first, or where desired the second, arrivals will be refracted from a particular formation such as the basement or a high-speed limestone marker. The proper distance is usually determined from time-distance plots based on experimental shooting at the onset of the program. *Dobrin, p. 89.*

profiling. Any operation which produces an irregular contour on a workpiece, a tracer or template-controlled duplicating equipment usually being employed. *ASM Gloss.*

Profilm. The trade name for a specially prepared paper consisting of a thin coating of shellac on a waxed paper backing. In silk screen work, profilm paper is used for stencils, the design being cut from the material before fusing into the silk mesh and removing the paper backing. *Enam. Dict.*

profilograph. An appliance for plotting the perimeter profile of an airway on a reduced scale, and primarily used when taking air measurements underground. It consists of a pivoted arm mounted on a chart board and arranged to align itself with the direction of a cord extending to successive points around the airway. A marking pointer moves to a radial position proportional to the radial length of the extended cord. A slight pressure causes the pointer to make a dot on the chart and thus by moving the cord from point to point the perimeter profile is plotted on a reduced scale. *Nelson.*

profilometer. a. An exceedingly accurate instrument for measuring the smoothness or roughness of a surface. As a diamond-pointed tracer arm is moved across a surface, the arm, by moving a coil in an electric field, causes the generation of a current in proportion to the roughness of the surface, which is registered by an indicating needle. *Crispin.* b. *See* M.R.E. profilometer. *Roberts, I, p. 61.*

profit. When one speaks of the interest on a mining investment, the rate mentioned ordinarily consists of the normal rate plus a substantial additional rate that represents the profit that should accrue in proportion to the hazardous nature of the mining business. In this sense, the rate of interest in most forms of mining should be high; to be satisfied with less than 10 percent annually would show a lack of acumen. *Hoov, p. 157.*

profit-and-loss account. Form used in presenting accounts which shows the gross balance over a working or trading period, plus the net balance and the expenditure. *Pryor, 3.*

profit-and-loss statement. A statement showing in detail the sum to be added to, or subtracted from, the net worth of a business as a result of operations during the fiscal period. *Hoov, p. 448.*

profit in sight. Probable gross profit from a mine's ore reserves, as distinct from the ground still to be blocked out. *Fay.*

proforma invoice. One which does not charge for goods marked, but shows cost details. *Pryor, 3.*

proglacial deposit. A deposit laid down beyond the outer limit of a glacier but made of material, or laid down by waters, derived from the glacier. Outwash deposits and glacial-lake deposits are examples. *Stokes and Varnes, 1955.*

proglacial lake. A lake occupying a basin in front of a glacier generally in direct contact with the ice. Varves commonly formed in such lakes. *A.G.I. Supp.*

proglyph. Term applied to a cast of markings such as grooves. *Pettijohn.*

prograde. To build a beach outward. *Hess.*

prograded coast. *See* shoreline of progradation. *Schieferdecker.*

prograding. *See* accretion. *Schieferdecker.*

program. Sequence of steps to be performed. Preparation is called programming, done by a programmer. *Pryor, 3.*

progress. The rate of penetration, usually stated in terms of feet drilled per shift of depth of hole at a stated time. *Long.*

progress chart. A chart or graph forming a continuous record, which is kept up to date, of the amount of work done on a major project. It may take the form of a bar graph, divided into sections representing different jobs to be done, estimated and actual completion dates, etc. The chart covers the entire project from the initial site preparation or drivage to completion. *Nelson.*

progression. Usually known as traversing, in which a traverse is carried out with a plane table set up at each survey station, in turn, using an alidade to align the backsight and foresight, and measuring either by tape or by stadia the distance between the stations. The traverse lines are recorded on the plane table as they are made. *Ham.*

progressive aging. Aging by increasing the temperature in steps or continuously during the aging cycle. *See also* aging. *Compare* interrupted aging. *ASM Gloss.*

progressive die. A die in which two or more sequential operations are performed at two or more positions, the work being moved from station to station. *ASM Gloss.*

progressive failure. Failure in which the ultimate shearing resistance is progressively mobilized along the failure surface. *ASCE P1826.*

progressive forming. Sequential forming at consecutive stations either with a single die or with separate dies. *ASM Gloss.*

progressive powder. A gunpowder made so that it burns slowly until the projectile moves, and then with increasing rapidity, to avoid the extreme pressure caused by the explosion of powders in which the combustion is instantaneous. *Webster 3d.* A slow-burning explosive. *Compare* propellant explosives. *Fay.*

progressive sand waves. Sand waves that migrate down-current. *Pettijohn.*

progressive wave. Wave motion in which water particles are in maximum motion in one direction when at the high point of the wave, a maximum in the opposite direction at the low point of the wave, and exhibit no motion at the midpoints between. *Hy.*

project. In operational procedures, any set of actions directed toward a specific aim or objective. *Taylor.*

project data. Basic information needed by engineers concerned with design, site development, machine and housing assembly, plant erection, contract supervision and coordination when planning, erecting and bringing into operation a new mine and its attendant services, including the ore treatment plant. *Pryor, 3.*

projected diameter. Of a particle, that of circle which has the same area as the projected profile. *Pryor, 3.*

projected pipe. A pipe laid on the surface before building a fill that buries it. *Nichols.*

projection. a. A plan showing the proposed direction and location of entries, rooms, shafts, fans, and watercourses. Such projections frequently cover the entire property to be worked by any mine and all completed work, though the latter is not strictly projection. *Zern.* b. Synonym for exposure. *See also* exposure, a. *Long.* c. Synonym for outcrop. *Long.* d. In mapping, a geometric (or mathematical) system of constructing the true meridians and parallels, or the plane rectangular coordinates on a map. *Seelye, 2.* e. A geometrically or mathematically derived portrayal of the surface of the geoid on a plane surface. The requirement for a particular projection is that it show the features of the surface of the earth with a minimum of distortion of distances, directions, shapes, and areas. *Hy.* f. The act or result of constructing a figure upon a plane or other two-dimensional surface that corresponds point for point with a sphere, a spheroid, or some other three-dimensional form. *Fay.*

projection balance. Shows movement of pointer by means of an illuminated scale. *Pryor, 3, p. 35.*

projection welding. Resistance welding in which the welds are localized at projections, embossments, or intersections. *ASM Gloss.*

projector. An underwater acoustic transmitter. *Hy.*

project plans. A series of plans of a proposed new mine or reconstruction which are drawn up for the purpose of obtaining approval of the project. *B.S. 3618, 1963, sec. 1.*

prokaolin. A term that has been applied to an amorphous intermediate product in the process of kaolinization. *See also* kaolinization. *Dodd.*

prolapsed bedding. A series of flat folds with near-horizontal axial planes contained entirely within a bed with undisturbed boundaries. *Pettijohn.*

prolong. Secondary condenser used in zinc industry. *Bureau of Mines Staff.*

promethium. A rare earth element discovered in the fission products of uranium. It is prepared in a cyclotron by bombarding neodymium with protons and from nuclear reactor fuels by ion-exchange separations. Fourteen isotopes, promethium 141 to promethium 154, have been made; the longest lived isotope, promethium 145, has a half-life of 18 years; and the most useful isotope, promethium 147, has a half life of 2.5 years. Symbol, Pm; valence, 3; atomic number, 61; melting point, 1,035° C; and boiling point, 2,730° C. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-51, B-129.*

promising. Looking as if likely to turn out well; as in mining, a promising prospect. *Fay.*

promontory. a. A projecting tongue of lode surrounded on three sides by stoped ground. *Spalding.* b. A cape of comparatively high land. Also called headland; head. *Schieferdecker.*

promoter. a. Entrepreneur; introducer of finance for a mining venture. *Pryor, 3.* b. A reagent used in froth-flotation process, usually called the collector. *See also* collector. *Pryor, 3.* c. A substance which increases the activity of a catalyst. *C.T.D.*

prompt criticality. The state of a reactor when the fission chain reaction is sustained solely by prompt neutrons; that is, without the help of delayed neutrons. *L&L.*

prompt neutrons. Neutrons that are emitted in less than one-millionth of a second following nuclear fission, as distinct from delayed neutrons, which are emitted at appreciable time intervals after fission has occurred. Prompt neutrons comprise about 99 percent of fission neutrons. *L&L.*

prong. Eng. The forked end of the bucket-pump rods for attachment to the traveling valve and seat. *Fay.*

prongs. The fingerlike springs on a basket core lifter. *See also* basket core lifter. *Long.*

Prony's dynamometer. A dynamometer for obtaining data for computing power delivered by turbines and other waterwheels, or from the flywheel of an engine, or transmitted by shafting. *Fay.*

proof. *See* rod proof. *ASTM C162-66.*

proof load. A predetermined load, generally some multiple of the service load, to which a specimen or structure is submitted before acceptance for use. *ASM Gloss.*

proof spirit. Old standard of alcoholic content of liquid, based on that strength of the alcohol to water mixture which, when poured on to gunpowder, just permitted ignition. Now, 57.1 percent ethanol. Therefore, 70 percent proof is 70 x 57.1/100 or 40 percent alcohol. Official Great Britain definition requires a spirit which at 51° F weighs 12/13 of an equal weight of distilled water at the same temperature. *Pryor, 3.*

proof stress. a. The stress that will cause a specified small permanent set in a material. *ASM Gloss.* b. A specified stress to be applied to a member or structure to indicate its ability to withstand service loads. *ASM Gloss.*

prop. a. Underground supporting post set across the lode, seam, bed, or other opening. *Pryor, 3.* b. In mining, a roof support, usually temporary. *B.C.I.* c. A timber set upright or at right angles to the dip, to support the roof rock. *Fay.* d. A strut or post in tunnel construction work, either vertical or raking, usually of round timber, used as a support, or stay. A raking prop is sometimes called a raker. *Fay.* e. *See* post, b.; steel prop. *Nelson.*

propagate. To transmit or spread from place to place; as coal dust propagates a mine explosion. *Fay.*

propagated blast. A blast consisting of a number of unprimed charges of explosives and only one hole primed, generally for the purpose of ditching, where each charge is detonated by the explosion of the adjacent one, the shock being transmitted through the wet soil. In this method, one detonator fired in the middle of a line of holes is capable of bringing about the explosion of several hundred such charges. *Fay.*

propagation. In general, propagation is said to occur when the flame of an explosion travels over considerable areas of a mine in such manner as might result in loss of life were men in the mine. In standard propagation tests, propagation is said to occur when the flame travels to the end of the prepared dust zones. If the flame stops short of the end of the zone, propagation is not obtained. *Rice, George S.*

propagation anomaly. The difference between the actual propagation loss for a given length of water path and the nominal value of propagation loss identified with the distance covered by that path. *Hy.*

propagation loss. The transmission loss associated with any given length of ray path in the water. *Hy.*

propagation test. *See* standard propagation test. *Rice, George S.*

propane. A saturated hydrocarbon containing three carbon atoms, gaseous at normal temperature and pressure, but generally stored and transported as a liquid under pressure. Used for domestic heating and cooking, and for certain industrial purposes, such as metal cutting. *See also* bottle gas. *Institute of Petroleum, 1961.*

prop ax. Eng. An iron ax, with a wooden handle, used by the deputies in drawing or setting props. *Fay.*

prop-crib timbering. Shaft timbering with cribs kept at the proper distance apart by means of props. *Fay.*

prop cutter. *See* timber cutter. *D.O.T.1.*

prop drawer. a. A sylvester or other appliance for withdrawing props from the waste area in coal mining. *See also* monkey winch. *Nelson.* b. A workman who withdraws props and allows the roof to collapse. Props are withdrawn when caving of the roof is adopted. *Nelson.* c. *See* timber robber. *D.O.T. 1.*

propellant. *See* low explosive. *Bennett, 2d, 1962.*

propellant explosives. Those explosives in which the velocities of combustion are regulated, either by chemical composition or by preparing the explosive in various shapes. *Fay.*

propeller. The rotating curved blade of a rotary pump or fan. *See also* impeller. *Nelson.*

propeller fan. a. Axial-flow ventilating fan used to blow fresh air into mine workings or to extract foul air. *Pryor, 3.* b. A fan having an impeller other than of the centrifugal-type rotating in an orifice, the air flow into and out of the impeller not being confined by any casing. *B.S. 3618, 1963, sec. 2.*

propeller pump. This type of pump, often called axial-flow, develops most of its head by the propelling or lifting action of the vanes upon the liquid. The impeller is single-inlet with the flow entering axially and discharging nearly axially into a guided case. The specific speed is usually above 9,000. The impeller closely resembles a ship's propeller. These pumps are built in horizontal or vertical casings, and are primarily used in handling sludge, dewatering pits, sewage pumping, and similar duties requiring large capacities and heads under 100 feet. *Pit and Quarry, 53d, Sec. E, p. 88.*

propeller shaft. Usually a main drive shaft fitted with universal joints. *Nichols.*

propel shaft. In a revolving shovel, a shaft which transmits engine power to the walking mechanism. *Nichols.*

proper proportion (of a cut gemstone). In a transparent stone, the proportion of the mass above and below the girdle, as well as the angles of the facets in relation to the girdle, which will produce the greatest brilliancy from the particular species. These proportions vary with the refractive index of the gem species. *Shipley.*

properties. Term loosely used to mean the physical properties and optical properties of a gemstone or its substitute. *Shipley.*

properties of sections. These include the cross-sectional area of a structural member, its moment of inertia, section modulus, and other geometrical properties essential for accurate design calculations. *Ham.*

property man. In bituminous coal mining, one who keeps record of location and has charge of distribution of coal cutting machines, drills, loaders, and other mechanical equipment in and about the mine. *D.O.T. 1.*

proper working load. The maximum load that a rope should be permitted to support under working conditions. *See also* working load. *Zern.*

prop-free. In longwall mining of a coal seam, a face with no posts between the coal and the conveyor used to remove it. *Pryor, 3.*

prop-free front. a. In coal mining, longwall working in which support to the roof is given by roof beams cantilevered from behind the working face. This leaves unobstructed room for digging and conveying equipment in a mechanized working. *Pryor, 3.* b. Such a face is necessary where armored flexible conveyors are used to carry a coal cutter or power loader. *See also* link bar; self-advancing supports. *Nelson.*

prophylene-glycol dinitrate explosive. A term used by Dr. Charles E. Munroe to define an explosive containing the liquid ingredients named, in contradistinction to dynamite, which contains nitroglycerin. In commerce the term dynamite is loosely used to include any mixture containing a liquid explosive. *Fay.*

proplatinum. A trade name of a white alloy, 72.0 percent nickel, 23.6 percent silver, 3.7 percent bismuth, and 0.7 percent gold; used as a substitute for platinum. *Brady, p. 404.*

proportion. A statement of equality between two ratios. When one ratio is equal to another ratio, they are said to be in proportion. *Jones 2, p. 63.*

proportional action. Movement of a regulating unit directly in proportion to the magnitude of the error in the system under control. *Pryor, 3, p. 32.*

proportional control action. As used in flotation, action in which there is a continuous linear relation between the output and the input. *Fuerstenau, p. 549.*

proportional counter. A gas-filled, radiation-detection tube in which the pulse produced is proportional to the number of ions formed in the gas by the primary ionizing particle. *ASM Gloss.*

proportional limit. The greatest stress which a material is capable of developing without any deviation from proportionality of stress to strain (Hooke's law). In the case of rocks, this term and elastic limit are restricted to short-time tests as in tests of long duration they slowly and permanently deform, even at stresses below the short-time proportional limit. *Stokes and Varnes, 1955.*

proportional plus integral control action. As used in flotation, action in which the output is proportional to a linear combination of the input and to the time integral of the input. *Fuerstenau, p. 549.*

proportional plus integral plus derivative control action. As used in flotation, action in which the output is proportional to a linear combination of the input, to the time integral of input, and to the time rate of change of input. *Fuerstenau, p. 549.*

proportioning. Measuring by weight or by volume the constituents, before mixing of concrete, mortar, or plaster. *See also* batching plant. *Ham.*

proposition. A project plan, undertaking, or situation requiring action (as dealing with, managing, operating, carrying out) with reference to it. *Webster 3d.*

propping. The setting of timber props in mine workings. *Nelson.*

propping agent. A name given to sand or other granulated rock material used to prop the artificial crevice formed when underground formations are hydraulically fractured. *See also* hydraulic fracturing. *A.G.I.*

prop retriever. *See* prop drawer.

props. a. N. of Eng. Timber or steel supports for the roof. Steel props may be adjustable. *Trist.* b. Kiln shelf supports made of refractory material. *ACSG, 1963.*

prop sawyer. *See* timber cutter. *D.O.T.1.*

prop setter. In anthracite and bituminous coal mining, one who installs props (posts) to support the roofs of underground working places, placing and wedging them at the most effective points. *D.O.T. 1.*

prop slicing. See top slicing and cover caving. *Fay.*

prop stay. A stay used to strengthen tubes and water spaces, in steam boilers, or large tubes and annular spaces, in air tanks, and resist pressure tending to collapse or rupture. The opposite of tie rod, which resists tension. *Fay.*

propulsive. A term applied to the kind of force exerted by an explosive that tends to push out masses of rock rather than to break them up. *See also* progressive powder. *Fay.*

prop wall. Props that are fastened together in a group, like a fence, and placed against the walls to prevent the roof from caving into the stope. *Stoces, v. 1, p. 147.*

prop wood. Eng. Timber suitable for cutting, or already cut into props. *See also* prop. *Fay.*

propylite. Originally, andesites formed at the beginning of Tertiary time. In recent literature, andesites and similar rocks that have undergone extensive alteration so that green minerals such as chlorite and epidote have developed. Calcite, pyrite, and quartz are also commonly present, chiefly as pseudomorphs after original minerals. Propylites are usually green or greenish gray in color. They are abundantly represented in the mining districts of the Western United States. *Stokes and Varnes, 1955.*

propylitic. Applied to any kind of a vein, meaning that the ore solution which has furnished the vein filling has also effected a decomposition or alteration of the wall rock as well, so that the walls of the vein consist of clay, talc, etc. *Fay.*

propylitic alteration. A rock alteration consisting of the abundant development of chlorite and pyrite; sometimes also epidote; in places also by the development of carbonates and a little sericite. *A.G.I.*

propylitization. The introduction of, or replacement by, an assemblage of minerals including carbonates, epidote, secondary quartz, and chlorites. Other minerals, such as pyrite zeolites, alkali feldspars, or sericite may also be formed. Most characteristic of the hydrothermally altered, fine-grained, intermediate rocks, such as andesites. *A.G.I.*

prosopite. A colorless, tabular mineral with 1 distinct cleavage, $CaF_2.2Al(F,OH)_3.H_2O$; Mohs' hardness, 4.5; specific gravity, 2.88. *Larsen, p. 99.*

prospect. a. A mineral property, the value of which has not been proved by exploration. *Lewis, p. 20.* b. To search for minerals or oil by looking for surface indications, by drilling boreholes, or both. *Long.* c. A plot of ground believed to be mineralized enough to be of economic importance. *Long.* d. Territory under examination for its mineral wealth. Prospecting is the search for deposits and is performed by aerial survey, magnetometry, surface examination, pitting, trenching, use of prospector's pan, geochemical test of soil, drilling (shallow or deep), seismic probe and resistivity survey. *Pryor, 3.* e. The name given to any mine workings the value of which has not yet been made manifest. A prospect is to a mine what mineral is to ore. *Fay.* f. A place showing signs of containing a mineral deposit. *Webster 3d.* g. The gold or other mineral obtained by working a sample of ore. *Fay.* h. A formation that may be capable of development into a mine, but which is untested. *See also* favorable locality. *Nelson.* i. To search for mineral occurrences. *Nelson.* j. A sample of gold obtained in panning off. *Nelson.* k. Can. Nonproducing mining property under development or considered worthy of such attention. *Hoffman.* l. A specimen or sample of mineral obtained from a small amount of paydirt or ore. *Craigie, v. 3, p. 1843.* m. To work (a mine, ledge, etc.) experimentally in order to ascertain its richness in precious minerals. *Craigie, v. 3, p. 1843.*

prospect drilling. The exploratory drilling of boreholes in the search for minerals and petroleum. *Long.*

prospect drill panner. In metal mining, one who with a cable drill rig drills down through gravel to bed rock along a present or an old creek bed that usually has been prospected by a hand-dug hole. Saves the drillings and pans them to discover the possible presence of paydirt (gold bearing gravel), and weighs gold particles recovered. In the event of the discovery of gold in quantities sufficient for profitable removal, moves drill and continues operations to determine the boundaries of the gold bearing strata. *D.O.T. 1.*

prospect hole. a. Any shaft, pit, drift, or drill hole made for the purpose of prospecting the mineral-bearing ground. *Fay.* b. A prospect hole adds nothing to the value of the land but only tends to show its actual condition. *Ricketts, I.*

prospecting. a. The search for outcrops or surface exposure of mineral deposits. *BuMines Bull. 419, 1939, p. 2.* b. Searching for new deposits; also, preliminary explorations to test the value of lodes or placers already known to exist. *Fay.* c. The basic meaning of the term prospecting is search and the objective is discovery. The surface discovery of coal or mineral only proves its superficial existence and further work is necessary to establish its quality and extent. The term exploration is sometimes applied to this extension of the discovery work. *See also* exploration. *Nelson.* d. The examination or exploration of an area by means of geophysical instruments or methods, for example, gravity prospecting uses the torsion balance or gravimeter, magnetic prospecting, either land or airborne magnetometers. Seismic prospecting uses reflection or refraction techniques, while electrical prospecting makes measurements of electric potential, resistivity, or electromagnetic field. *A.G.I.*

prospecting and mining. Generic terms which include the whole mode of obtaining metals and minerals. *Ricketts, I.*

prospecting claim. Aust. A claim larger than the average allotted to the miner who is the first in a district to discover the presence of gold. *Standard, 1964.*

prospecting club. A small group organized for the purpose of staking a prospector and sharing in the development of any claims he may discover. *Hoov, p. 251.*

prospecting dish; pan; dolley pot. A simple appliance used in the search for gold and other heavy minerals. By means of water washing, the lighter, worthless material is separated from the valuable, heavier minerals, which are made visible by concentration and retention in the dish. Standard dishes with sloping sides are made in sizes varying from 10 to 18 inches top diameter and from 2 to 4 inches deep, with riffles or grooves to retain the heavy minerals. *Nelson.*

prospecting driller helper. In petroleum production, one who raises and lowers drill pipe and casing, mixing mud to be circulated in the bore hole, to drill shallow bore holes used in petroleum exploration activities. Also called driller helper. *D.O.T. 1.*

prospecting hole. A borehole drilled for the purpose of obtaining information on the occurrence of minerals and petroleum. *Long.*

prospecting license. Authorization granted by a government to an individual in some countries, permitting him to prospect for minerals and to register (stake) a claim. *Pryor, 3.*

prospecting pan. Same as gold pan. *Craigie, v. 3, p. 1844.*

prospecting tour. A tour or journey of exploration made in seeking regions or deposits rich in minerals, especially gold or silver. *Craigie, v. 3, p. 1844.*

prospective ore. Ore that can not be included as proved or probable nor definitely known or stated in terms of tonnage. *See also* possible ore; ore expectant. *Fay.*

prospector. A person engaged in exploring for valuable minerals, or in testing supposed discoveries of the same. *Fay.*

prospect shaft. A shaft sunk in connection with prospecting operations. *Craigie, v. 3, p. 1844.*

prospect tunnel; prospect entry. A tunnel or entry driven through barren measures, or a fault, to ascertain the character of strata beyond. *Zern.*

prospectus. A preliminary printed statement describing a business or other enterprise, and distributed to prospective buyers, investors, or participants; such as a description of a new security issue supplied to prospective purchasers and giving detailed information concerning the company's business and financial standing. *Webster 3d.* Common in mining. *Fay.*

protactinium; protoactinium. A shiny, gray, metallic radioactive element that is formed in nature by the loss of an alpha particle and a beta particle from uranium 235. Protactinium 231 disintegrates into actinium 227 and ultimately into lead 207. Predicted as eka-tantalum, protactinium shows close chemical resemblance to tantalum but differs from it in that the pentoxide (Pa_2O_5) is exclusively basic with no acidic characteristics. Symbol, Pa; valences, 4 and 5; tetragonal; atomic number, 91; atomic weight, 231; specific gravity, 15.37; melting point, possibly about 1,230° C; and boiling point, unknown. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-129, B-212; Glasstone, 2, p. 135.*

protaxis. In geology, the oldest of the mountain ranges in a mountain chain. *Standard, 1964.*

protean stone. An alabasterlike artificial stone made from gypsum. *Standard, 1964.*

protecting magnet. Electromagnet or permanent one installed ahead of crushing machinery to remove tramp iron which otherwise might enter and damage the appliances. *See also* guard magnet. *Pryor, 3.*

protection, electrical. *See* electrical protection.

protection screen deck. A screen plate with large apertures mounted over the screening deck in order to reduce the load and wear thereon. *B.S. 3552, 1962.*

protective alkali. In cyanidation process, the use of dissolved lime to maintain a slightly alkaline pulp, therefore ensuring that the cyanide salt retains its potency and does not acidify to hydrocyanic acid (H.CN.) which cannot dissolve gold or silver. *See also* cyanide process. *Pryor, 3.*

protective boots. Strong and tough footwear for miners; usually provided with green or black grain uppers, external steel toecaps, and lipped tip and heel plates to minimize foot injuries. In steel works, protective boots must be worn whenever danger from molten or corrosive materials exists. *Nelson.*

protective clothing. The special items of clothing worn by miners to protect vulnerable parts of the body, such as protective boots, miners' helmets, knee pads, and shinbone protectors. Occasionally, leather protective gloves and goggles may also be used. *Nelson.*

protective colloid. A colloid of considerable stability which is unaffected by small concentrations of electrolytes; referred to as hydrophilic. Hydrophobic sols are protected from the coagulating influence of electrolytes by the addition of very small quantities of the protective or hydrophilic colloid. Used in flotation to improve the depression of minerals which are not wanted in the floated portion. *Hess.*

protective equipment. Electrical circuits and apparatus which provide protection against overloads or faults and include such devices as circuit breakers, earth leakage protection, overload trips, and relays. *Ham.*

protective filter. *See* filter, c. *ASCE P1826.*

protector block. A protector block is a lightning protective device used on telephone, telegraph, and signal systems to protect persons and equipment against lightning and foreign currents of a hazardous character. (The common form of protector block includes a fuse for each side of the line and a small gap between each line and the ground.) *ASA M2.1-1963.*

protector lamp. Eng. A safety lamp, the flame of which it is impossible to expose to the outside atmosphere, as unlocking, or rather unscrewing it, extinguishes the light. *Fay.*

proteolite. A general term for hornfelsic rocks introduced by Boase, in 1832, and used by Bonney, in 1886, for andalusite hornfels. *Compare* cornubianite. *Fay.*

proterobase. An altered doleritic or basaltic rock containing purple-brown augite and primary brown hornblende, and characterized by the presence of secondary green hornblende and other alteration products. *Holmes, 1928.*

Proterozoic. a. The younger of two Precambrian systems or eras. Synonym for Algonkian. *A.G.I. Supp.* b. The entire Precambrian, as recognized by the U.S. Geological Survey. *A.G.I. Supp.*

protest. An objection to the patent proceeding and when made calls for a hearing on the matter in the local land office. *Lewis, p. 31.*

protestant. A person who has filed no adverse claim during the period of publication and comes forward and presents objections to the granting of a patent. *Ricketts, I.*

protium. Hydrogen isotope of mass number 1. *Bennett 2d, 1962.*

protoactinium. a. Synonym for protactinium. *Merriman.* b. The first name given to element 91 when discovered in 1917. It was subsequently contracted to protactinium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-130.*

protoamphibole. A name for a series of artificial orthorhombic fluoramphiboles having only half the a-dimension of anthophyllite. The presence of lithium and absence of calcium appears to be essential to their formation. Named because of a structural relation to protoenstatite. *Hey, M.M., 1961.*

Proto apparatus. A self-contained, compressed oxygen type breathing apparatus weighing about 39¼ pounds when fully charged. A steel cylinder, in which the oxygen is stored, is attached on the back and a reducing valve regulates the flow to the wearer. A breathing bag containing caustic soda absorbs the carbon dioxide from the mouth. *Sinclair, I, pp. 311-314.* The breathing bag and oxygen cylinder are attached to a harness that enables the whole apparatus to be comfortably carried. *Nelson.*

protobitumen. a. A generic term introduced in 1926 by R. Potonie for petrographic constituents, from which bitumen is derived. The protobitumens are sporinite, cutinite, resinite, pollinite, alginite. Chemically, the protobitumens are composed mainly of sporinites, pollenines, cutines, suberins, resins, waxes, fats, and oils of plant and animal origin. *IHCP, 1963, part I.* b. An unaltered or little altered plant and animal product, such as fat, oil, wax, and resin, which forms the original material from which fossil bitumen is derived. Protobitumens are subdivided into labile protobitumens and stabile protobitumens. *Tomkeieff, 1954.*

protoclase. A rock possessing cleavage originally developed during sedimentation under water or cooling from magma, such as bedding, flow structure, etc. *Compare* metaclase. *Fay.*

protoclastic. Applied to a structure of igneous rocks in which the constituent minerals show granulation and deformation, produced by differential flow of the magma before complete consolidation. *A.G.I.*

protoclastic gneiss. A rock in which gneissose structure was produced by differential flow of partly consolidated magma. *See also* augen gneiss; autoclastic schist; gneiss; granite gneiss; orthogneiss. *A.G.I.*

protoclastic structure. A structure produced by the granulation of minerals of early formation, the granulation being due to differential flow of the partly consolidated magma from which the fractured minerals separated. *Holmes, 1928.*

protodolomite. A crystalline calcium-magnesium carbonate in which the metallic ions occur in the same crystallographic layers instead of in alternate layers as in dolomite. *A.G.I. Supp.*

protoenstatite. Replacing the name metatalc for an artificially produced modification of $MgSiO_3$. *Spencer 18, M.M., 1949.*

protogene. *See* protogine. *Hess.*

protogenic. a. Capable of supplying a hydrogen ion (proton). *C.T.D.* b. Of or pertaining to a first origin or production; specifically, of or pertaining to those crystalline rocks supposed to be formed by igneous action. Also called protogenetic. *Standard, 1964.*

protogenous. A group name for original rocks as opposed to derived rocks, and including saline deposits, coal, igneous rocks, and ore deposits. The term is no longer used. *Holmes, 1928.*

protogine. Applied to alpine gneissose granites which are considered to be either protoclastic or composite in origin. *A.G.I.*

protoklase. A German term for the process producing protoclastic structure. *Schieferdecker.*

protomylonite. a. A coherent crush breccia made of megascopically visible particles which are commonly lenticular in shape and which preserve faintly the primary structures (stratification, schistosity) of the original rock. Resembles conglomerate or arkose on weathered surfaces. Commonly shows innumerable megascopic gliding surfaces. Backlund clearly emphasizes the coarse brecciation, pointing out the resemblance of the rock to conglomerate, and implying in the prefix proto that the rock is first in a series of rocks of which mylonite and ultramylonite are representatives. *A.G.I.* b. Used for contact metamorphic rocks which have been mylonitized by movements on thrusts controlled by the contact surfaces between the intrusion and the country rocks. *See also* mylonite. *A.G.I.*

proton. An elementary particle with a single positive electrical charge and a mass approximately 1,847 times that of the electron. The atomic number of an atom equals the number of protons in its nucleus. *L&L.*

protopetroleum. a. A name for a hypothetical material which eventually gave rise to petroleum. *Tomkeieff, 1954.* b. The primary source material of petroleum. *A.G.I.*

protoquartzite. Sandstone intermediate between orthoquartzite and subgraywacke. *A.G.I. Supp.*

protore. a. In older writings, any primary material too low in tenor to constitute ore but from which ore may be formed through enrichment. As commonly employed today, a protore is one that cannot be produced at a profit under existing conditions but that may become profitable with technological advances or price increases. *Stokes and Varnes, 1955.* b. Metalliferous material before it becomes ore through enrichment. *Webster 3d.* c. The unchanged portion of any primary material that locally has been concentrated into ore, and that which by weathering may be so concentrated. *Ballard.*

protoset. Fleuss breathing apparatus, weighing some 40 pounds. It incorporates an oxygen cylinder, breathing bag with chemicals for absorbing carbon dioxide, a demand valve, and mouthpiece and goggles. It is used in mine rescue work in foul air. A lighter form is the Salvus set. *Pryor, 3.*

protosorb. A compound used in the breathing bag of a rescue apparatus to remove carbon dioxide from the expired air and, together with oxygen form two of the most important items of supplies to be kept at a rescue station using compressed oxygen breathing apparatus. *See also* regenerative apparatus. *Nelson.*

prototectites. Suggested by Loewinson-Lessing for one of three types of igneous rocks, subdivided according to their genesis. Protectites are products of the crystallization of the primary magmas. They are characterized by their great uniformity in composition and their relatively large volume. *Compare* syntectites. *Schieferdecker.*

prototype. The stage following the basic idea for a new machine. It is an experimental model which assists the inventor and manufacturer in solving the difficult details. The prototype may cover only the basic new principles or features of the machine but is adequate to conduct tests. The final stage is the production of parts, fitting assembly and factory testing before the first production models leave the works. *See also* lead time. *Nelson.*

protoxide. The oxide of any metal containing the least proportion of oxygen. *Weed, 1922.*

Protozoa. The lowest of all animals, and have no definite organs. They are just like a piece of jelly in a strong case. *Mason, V. 1, p. 25.*

Protozoans. Minute one-celled animals, most of which are invisible to the naked eye and occur universally in the surface layers of the sea and other waters. Several genera are capable of producing bioluminescence, usually of the sheet type. *Hy.*

protractor. a. A device for measuring angles on drawings. *Nichols.* b. Any one of several goniometerlike devices used to determine the etch angle inside an acid tube. *See also* goniometer. *Long.*

proud. A South African term for an extreme diamond or slug exposure. *See also* diamond exposure. *Long.*

proud coal. Scot. Coal that naturally splits off in flakes or slabs when worked in a particular manner, producing waste by deterioration. *Fay.*

proustite. A light ruby, silver-arsenic sulfide mineral, Ag_3AsS_3. Trigonal. It is commonly associated with other silver-bearing minerals. Also called ruby silver; light red silver ore. *Compare* pyrargyrite. *C.T.D.*

prouty kiln. A tunnel kiln of small cross-section suitable for rapid firing of pottery ware, which is carried through the kiln on bats. *Dodd.*

prove. a. Eng. To ascertain by boring, driving, etc., the position and character of a coal seam, a fault, etc. *Fay.* b. Scot. To examine a mine in search of firedamp, known as proving the pit. *Fay.* c. To determine, by boring from the surface or driving a passageway underground, the location and character of a coalbed or the nature of rock strata. *Hudson.*

proved ore. Ore where there is practically no risk of failure of continuity. *See also* positive ore. *Fay.*

proved reserves. Ore deposit which has been reliably established as to its volume, tonnage and quality by approved sampling, valuing and testing methods supervised by a suitably qualified person. The proved reserve is the over-ridingly important asset of the mine, and by its nature is a wasting one from the start of exploitation save insofar as it is increased by further development. *Pryor, 3.* See also developed reserves. *Nelson.*

provenance. Has to do with origin or birth, and as applied to a sedimentary deposit, has to do primarily with the source rocks from which these materials were derived. *Pettijohn, 2d, 1957, p. 499.*

prove up. a. To show that the requirements for receiving a patent for government land have been satisfied. *Webster 3d.* b. Can. To establish economic value of a property. *Hoffman.*

provincial alteration. The recurring cyclic variation of mineral associations in the border area of two mineral provinces. *Schieferdecker.*

provincial succession. A succession occurring in mineral provinces due to changes in supply of a certain mineral association. *Schieferdecker.*

proving hole. a. A borehole drilled for prospecting purposes. *Fay.* b. Advance bore or heading into a mineral deposit, made either to check the quality of the ore being approached or to relocate a deposit which has been distorted or dislocated by faulting. *Pryor, 3.*

proving ring. A steel ring which has been accurately turned, heat treated, and polished. It is precisely calibrated in a testing machine by measuring its deflection for different loads and can be used for measuring applied loads on a structure. *See also* dial gage. *Ham.*

proving the area. The establishment of the quantity and grade of coal or ore available for working by means of geological surveys, exploratory drilling, or exploring headings. *Nelson.*

provitrain. a. Vitrain with a ghostly or indistinct indication of structure as manifest by plant tissues (telite, periblain, phyllovitrite, and structural vitrain). *Tomkeieff, 1954.* b. Vitrain in which it is shown microscopically that gelatinization of plant cell units has not taken place completely, wherein some cell structure remains discernible under the microscope and sometimes macroscopically. It can be further differentiated into three subvarieties on botanical basis. *Compare* euvitrain. *See also* periblain; suberain; xylain. *A.G.I.*

provitrinite. A variety of the major maceral vitrinite. The micropetrological constituent, or maceral, of provitrain. Further divisible into four subvarieties—periblinite, suberinite, xylinite, and resinite. *See also* telinite. *A.G.I.*

prowersite. A variety of minette richer in orthoclase and biotite than a normal minette. *A.G.I.*

proximate analysis. a. The determination of the compounds contained in a mixture as distinguished from ultimate analysis, which is the determination of the elements contained in a compound. *Standard, 1964.* Used in the analysis of coal. *Fay.* b. In the case of coal and coke, the determination, by prescribed methods, of moisture, volatile matter, fixed carbon (by difference), and ash. Unless otherwise specified, the term proximate analysis does not include determinations of sulfur or phosphorus or any determinations other than those named. *ASTM D121-62. See also* chemical constitution of coal.

proximity log. A Schlumberger log based on the principle of shallow investigation, and as its name implies is markedly affected by material which lies in its immediate proximity. It depends for its operation on the forcing of a more or less horizontal beam of current into the formation. Its vertical resolution is about 6 inches and it is almost impervious to the presence of a mud cake on the formation wall. *Wyllie, pp. 92, 106.*

proximity switch; magnetic switch. A contactless device for detecting the presence of another metallic body, generally in movement. *NCB.*

P.R.U. hand pump and densitometer. A dust sampling instrument comprising a D.V.P. Mark 11 pump with a swept volume of 90 cubic centimeters. A filter paper is inserted into a bridge behind the inlet nozzle of the pump such that a circle of 1 centimeter diameter of the filter paper is exposed to the dust. The dust, while passing through the filter paper, produces a stain. The optical density of the stain is determined photoelectrically in a densitometer by the light that falls upon a galvanometer. The dust particle concentration is evaluated by a calibration factor. Its main disadvantage is that it underestimates the number of fine particles. *See also* photoelectric densitometer. *Nelson.*

prunt. A seal or button of glass impressed with a pattern, added as an ornament to the stems of glass vessels. *Haggar.*

Prussian blue; ferric ferrocyanide. Made by the action of potassium ferrocyanide on ferric salt. $Fe_4[Fe(CN)_6]_3$; an intense blue precipitate. Used as a pigment and in dyes. Mixed in oil, it is used in the fitting of bearings to indicate high spots which must be removed by scraping. *Crispin.* Molecular weight, 859.25; dark blue; crystalline; no melting point because it decomposes on heating; insoluble in water, in alcohol, and in ether; and soluble in hydrochloric acid and in sulfuric acid. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-182.*

Prussian blue, native. Synonym for vivianite. *Dana 6d, p. 815.*

prussic acid. *See* hydrocyanic acid. *Standard, 1964.*

pry; pryan. Corn. Miners' term for soft white clay. *Arkell.*

pryan. Ore in small pebbles mixed with clay. *Fay.*

pryany lode. A lode in which the ore is mixed with gossan or flucan. *Arkell.*

prypole. A pole that forms the prop of a hoisting gin and stands facing the windlass. *Webster 3d.*

psammite. a. Fine-grained, fissile, clayey sandstones. *See also* arenite. *A.G.I.* b. A rock composed of sandy particles; sandstone. *Webster 3d.*

psammitic. A textural term meaning sandy; the synonymous term, arenaceous, is more widely used. *Stokes and Varnes, 1955.*

psammitic gneiss. A gneissose rock which has been produced by the metamorphism of arenaceous sediments. *C.T.D.*

psammitic schists. Schists formed from arenaceous sedimentary rocks. *Compare* pelitic gneiss; pelitic schist. *C.T.D.*

psammyte. Synonym for psammite. *A.G.I.*

psatyrite. Same as hartite. *Tomkeieff, 1954.*

P.S. carbon monoxide detector. A portable and highly efficient apparatus for estimating the amount of carbon monoxide in mine atmospheres. It consists of a small rubber pump to draw a fixed amount of the air under test through the testing tube. The central part of the tube contains silica gel impregnated with potassium palladosulfite. If the sample of air being tested contains carbon monoxide, the color of the palladosulfite changes from light yellow to brown, and the length of the brown stain gives the percentage of carbon monoxide. *McAdam, pp. 153-154.*

PSD Abbreviation for pore size distribution. *See also* pore size distribution. *Dodd.*

P.S. detector tube. A device to estimate the proportion of carbon monoxide in mine air. It consists of a glass tube containing a plug of silica gel impregnated with Pallado sulfite and enclosed between two plugs of purified silica gel which have no reaction with CO. When a sample of air containing CO is passed slowly through the tube the color of the central plug changes from yellow to brown for a certain distance from the inlet end according to the percentage of CO in the air. The length of the brown stain is measured in millimeters and on reference to a table the percentage of CO is obtained. *See also* electronic CO detector. *Nelson.*

psephicity. The degree of roundness characterizing pebbles or sand grains. The coefficient of psephicity is the ratio of specific gravity to hardness, and roughly expresses the relative facility with which minerals can be rounded. *Holmes, 1928.*

psephite. A coarse, fragmental rock composed of rounded pebbles; for example, conglomerate. *Stokes and Varnes, 1955.*

psephitic. Made up of small stones. *Fay.*

pseudamygdule. A mineral nodule that replaces a primary constituent of a crystalline eruptive rock, so as to appear like a true vesicular filling or amygdule. *Standard, 1964.*

pseudo-. As a prefix, implies something false, its meaning is modified by the subject to which it applies. *Fay.*

pseudoanticline. An upward buckling of the superficial layers of the ground due either to changes in volume brought about by pedogenic processes or to some other cause. *Challinor.*

pseudoatoll; bank atoll; shelf atoll. Atoll which rises back from the outer margin of rimless shoals. *Schieferdecker.*

pseudobinary system. a. A three-component or ternary alloy system in which an intermediate phase acts as a component. *ASM Gloss.* b. A vertical section through a ternary diagram. *ASM Gloss.*

pseudoboleite. Probably a basic oxychloride of lead and copper, $3PbCl_2.3Cu(OH)_2.AgCl$. Tetragonal. Found only in parallel growth on boleite, frequently as raised crystalline masses. From Boleo, Lower California; Mexico. *English.*

pseudobreccia. a. An apparent breccia that develops as a result of weathering. *A.G.I.* b. An apparent breccia found in some dolomitic limestones, probably formed by algal crusts. *A.G.I.* c. Particles of irregular shapes surrounded by a matrix of lighter color and coarser texture. The matrix is more argillaceous than the fragments and the carbonate in the matrix may be wholly or partly dolomite. *A.G.I.*

pseudobrookite. A titanium-iron oxide resembling brookite, occurring in cavities of some volcanic rocks, as andesite. *Fay.*

pseudocannel coal. Also called humic cannel coal. A nonbanded coal consisting largely of a mixture of translucent humic and sapropelic material. *A.G.I.*

pseudocarburizing. See blank carburizing. *ASM Gloss.*

pseudochrysolite. Synonym for moldavite (of Zippe). *Fay.*

pseudoconglomerate. a. A rock so broken up into displaced fragments and interpenetrated by intrusive or precipitated material as to appear like a conglomerate. *Fay.* b. A rock made up of rounded fragments and formed by catalysis. *A.G.I.*

pseudocrocidolite. Quartz pseudomorphous after crocidolite. Same as tiger eye; hawk's eye. *English.*

pseudo cross-stratification. Inclined bedding which by unusual sorting, commonly in response to ripple mark migration, produces foreset beds that appear to dip into the current. *Pettijohn.*

pseudocrystalline. Composed of detrital crystalline grains little worn and solidly compacted by siliceous or other mineral accretion, so as to strongly resemble true crystalline rock. *Standard, 1964.*

pseudodiabase. Proposed by Becker for certain metamorphic rocks in the coast ranges of California that are supposed to have been derived from sediments, but have the minerals and texture of diabase. *Compare* metadiabase, which means the same thing and has precedence. *Fay.*

pseudodiamond. Quartz crystal. *Shipley.*

pseudodiorite. Dioritic rocks produced as described under pseudodiabase. *Fay.*

pseudoemerald. Malachite. *Shipley.*

pseudoeutectic textures. The peculiar intergrowths of sulfide minerals which more or less closely simulate the eutectic texture in metals. *See also* graphic granite. *A.G.I.*

pseudofaults. Bold escarpments resulting from the action of disintegrating forces acting along joint or shrinkage planes splitting the rocks along lines approximately vertical. *Engineering and Mining Journal, v. 110, No. 18, October 30, 1920, p. 851.*

pseudofibrous peat. Peat, which, in spite of its fibrous condition, is soft, noncoherent, plastic, and on drying, shows great shrinkage. *See also* fibrous peat; amorphous peat; woody peat; mixed peat. *Tomkeieff, 1954.*

pseudogalena. Sphalerite. *Standard, 1964.*

pseudohexagonal. Of a crystal or axis, approximating in form to the hexagonal type. *Webster 3d.*

pseudojade. A name that may be applied to any mineral resembling jade in appearance, for example, bowenite. *English.*

pseudojadeite. a. A mineral similar to jadeite. From Tawmaw, Upper Burma. *English.* b. Name given to the molecule, $(Ca,Mg,Fe)Al_2(SiO_3)_4$, assumed to be present sometimes in isomorphous replacement with the normal jadeite molecule, $NaAl(SiO_3)_2$. *English.*

pseudoleucite. Pseudomorphs of a mixture of nepheline, orthoclase, and analcime after leucite, found in the syenites of Arkansas, Montana; Brazil. *Dana 17.*

pseudomalachite. A hydrous phosphate of copper occurring ordinarily in massive forms of bright green color, $5CuO.P_2O_5.2H_2O$, resembling malachite; monoclinic or triclinic. *Larsen, p. 135.*

pseudomorph. a. A crystal, or apparent crystal, having the outward form proper to another species of mineral, which it has replaced by substitution or by chemical alteration. *Fay.* b. One mineral that has replaced another and has retained the form and size of the replaced mineral. *Bateman.*

pseudomorphous quartz. Quartz under the forms of many of the mineral species, which it has taken through either the alteration or replacement of crystals of those species. The most common quartz pseudomorphs are those of calcite, barite, fluorite, and siderite. Silicified wood is quartz pseudomorph after wood. *Fay.*

pseudomorphous tonstein. A type tonstein characterized by numerous pseudomorphs of kaolinite-feldspar or kaolinite-mica within a kaolinite groundmass. *IHCP, 1963, part I.*

pseudo mud cracks. *See* parting cast. *Pettijohn.*

pseudonitriding. *See* blank nitriding. *ASM Gloss.*

pseudonodules. *See* ball-and-pillow structure. *Pettijohn.*

pseudophite. A green mineral resembling serpentine and mentioned as a possible jade substitute. Classified by Dana as a variety of penninite. Monoclinic. Mohs' hardness, 2.5; specific gravity, 2.6 to 2.8; refractive index, 1.57 to 1.58; birefringence, 0.003. From Switzerland, Italy, Austria, and Scandinavia. *Shipley.*

pseudoporphyritic. Proposed by Lasaulx for a texture in which larger crystals occur in a finer megacrystalline matrix or groundmass; for example, large orthoclase crystals in a granite. As applied to metamorphic rocks, the term is synonymous with porphyroblastic. *A.G.I.*

pseudo ripple marks. A type of deformation attributed to lateral pressure, characterized by regularly spaced corrugations or small-scale similar folds; occurs in beds immediately beneath slump sheet. Term also applied to tectonic corrugations. *Pettijohn.*

pseudosparite. Limestone consisting of relatively large, clear, calcite crystals that have grown by recrystallization. *A.G.I. Supp.*

pseudospherulite. A spherulite in which the rays are composed of two different determinable substances, usually quartz and feldspar. *Fay.*

pseudostratification. Occasionally till deposits which have been overridden by ice (drumlins, etc.) exhibit a structure concentric with their surfaces and somewhat resembling stratification. This is not true bedding. It is caused in part by the plastering of layer on layer by the ice and in part by shearing of the till by the great pressure of the ice. *Stokes and Varnes, 1955.*

pseudostromatism. A rock structure approximately resembling false bedding produced by numerous minor thrust fault planes. *Standard, 1964.*

pseudosuccinite. Variety of amber differing from the Baltic amber in its reaction to solvents. *Tomkeieff, 1954.*

pseudosymmetrical. Crystal structures in which the atoms are only slightly displaced from positions which would be in accord with a higher symmetry. Thus, a monoclinic, pseudotetragonal mineral contains atoms only slightly displaced from positions of tetragonal symmetry. *Hess.*

pseudosymmetry. Apparent symmetry of higher grade than that proper to the mineral, generally due to twinning. Also called mimetry. *Fay.*

pseudotachylyte. a. A black vein rock externally resembling tachylyte but produced by extreme mylonitization. *See also* buchite; flinty crush rock; hartschiefer; mylonite; trap-shotten gneiss; ultramylonite. *Billings, 1954, p. 151.* b. A massive microbreccia that lacks streaky or platy structure and superficially resembles tachylyte (a black glass of basaltic composition). *Billings, 1954, p. 151.*

pseudotektite. A tektite that contains crystallites. *Hess.*

pseudothuringite. A mineral very similar to thuringite, but with the composition $Al_4Fe''_4Mg_2Si_3O_{18}.5aq$. *Spencer 17, M.M., 1946.*

pseudotopaz. Quartz simulating topaz. From Striegau, Silesia, Poland. *English.*

pseudoviscosity. Viscous resistance offered by a slurry, sludge, mud or suspension of minerals in water as a pulp, due to the specific surface involved, with possibly an element of thixotropy under stated conditions of pH value, agitation, flow, temperature and solid to liquid ratio. The pseudoviscous effect is distinct from viscosity due to molecular shear. *Pryor 3.*

pseudo-viscous flow. Flow in which deformation is at a constant rate. *Lewis, p. 579.*

pseudovolcano. Applied to a large, circular hollow or crater generally not associated with any positive indication of recent volcanic activity; for example, a crater of doubtful meteoritic origin which is thought to be the result of phreatic explosion or caldron subsidence. *A.G.I.*

pseudowollastonite. Wollastonite heated above 1,180° C develops a basal cleavage, becoming a pseudohexagonal calcium metasilicate dimorphous with wollastonite, $CaO.SiO_2$. Also called betawollastonite; earlier called bourgeoisite. *Larsen, p. 71; Mineralogical Magazine, v. 17, No. 82, April 1916, p. 356.*

psf Abbreviation for pounds per square foot. *BuMin Style Guide, p. 61.*

psi Abbreviation for pounds per square inch. *BuMin Style Guide, p. 61.*

psia Abbreviation for pounds per square inch, absolute. *BuMin Style Guide, p. 61.*

psig Abreviation for pounds per square inch, gage. *BuMin Style Guide, p. 61.*

psilomelane. A natural oxide of variable composition, $BaMn_9O_{16}(OH)_4$. Calcium, nickel, cobalt, and copper are frequently present. The name sometimes refers to mixtures of manganese minerals. Color, black; streak, brownish-black; luster, submetallic; Mohs' hardness, 5 to 6; and specific gravity, 3.7 to 4.7. Found in the United States (Arkansas, Virginia, and Georgia), India, Republic of South Africa, Cuba, and the U.S.S.R. An important ore of manganese. *CCD 6d, 1961.*

psilomelanite. Same as psilomelane. *English.*

psychrometer. An instrument for measuring the vapor pressure and the relative humidity of the air or the quantity of moisture in the air. It consists of a dry-bulb thermometer and a wet-bulb thermometer, the latter having its bulb covered with a layer of muslin kept moist with water. The rate of evaporation from the moist muslin depends upon the quantity of moisture in the air. The more rapid the evaporation the greater the cooling, and hence the greater the difference in the temperature readings of the two thermometers. *Standard, 1964.* Another name for hygrometer.

psychrometric chart. a. A graph showing the properties of air stream mixtures and used in air conditioning. *Strock, 10.* b. A graphical representation of the relationship between the relative humidity, specific volume, weight ratio of moisture to air, dry-bulb temperature, vapor pressure, total heat, and dew point of moist air. The chart finds use in the ceramic industry, particularly in the control of dryers. *Dodd.*

psychrometry. a. Study of atmospheric humidity and its effect on workers. The psychrometer, or hygrometer, measures the difference between dry-bulb and wet-bulb thermometer readings. *Pryor, 3.* b. The determination of the psychrometric properties of air at a given state point. *Hartman, p. 306.* c. Measurement of the humidity of air. *Nelson.*

pt Abbreviation for pint. *BuMin Style Guide, p. 61.*

Pt Chemical symbol for platinum. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

P.T. Pipe thread. *Nichols.*

pteridosperms. These Coal Measures fernlike trees include the well represented foliage neuropteris, alethopteris, maripteris, pecopteris, and sphenopteris. They carried their fructifications on their leaves and not on cones or catkins. *Nelson.*

Pterocerian. Lower Kimmeridgian. *A.G.I. Supp.*

pteropod ooze. A fine-grained pelagic deposit with more than 30 percent calcium carbonate of organic origin, of which pteropods are an important constituent. *A.G.I.*

ptygmatic. *See* ptygmatic folding. *Hess.*

ptygmatic folding. Proposed for the primary folding in migmatites (injection gneisses, etc.), caused by the processes to which the migmatites owe their origin and composite character. Synonym for flow folding. *Holmes, 1928.*

Pu Chemical symbol for plutonium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

public domain. All lands and waters in the possession and ownership of the United States, including lands owned by the several states, as distinguished from lands owned by individuals and corporations. *Fay.*

public land. In the United States, the portion of the public domain to which title is still vested in the Federal Government. *A.G.I.*

public land and public use. There is a clear distinction between public lands and lands that have been severed from the public domain and reserved from sale or other disposition under general laws. Such reservation severs the land from the mass of the public domain and appropriates it to a public use. *Ricketts, I.*

public limited liability company. An association of individuals, at least seven in number, who together subscribe the necessary means or capital, that is, money, property, or other credit, to engage in a joint undertaking. *Truscott, pp. 250-251.*

public mineral land. Land belonging to the United States containing a deposit of mineral in some form, metalliferous or nonmetalliferous, in quantity and quality sufficient to justify expenditures in the effort to extract it and subject to occupation and purchase under the mining laws. *Ricketts, I.*

pucella. A tool for widening the top of a wine glass in the handmaking process; from Italian word meaning a virgin. *Dodd.*

pucherite. A reddish-brown tabular or acicular orthorhombic mineral with 1 perfect cleavage, $Bi_2O_3.V_2O_5$; Mohs' hardness, 4; and specific gravity, 6.25. *Larsen, p. 212.* A vanadium ore. *Osborne.*

puck. A wall or pillar built of waste rock to support the roof. *Fay.*

puckering. Producing wrinkles or buckles in a drawn shell in an area originally inside the draw ring. *ASM Gloss.*

pucking. S. Wales. A term for creep, or the lifting of the floor in a coal mine. *Nelson.*

pucking cutter. A man employed in a coal mine to cut the floor in cases of creep or upheaval towards the roof. *C.T.D.*

pudding; raw pudding. Eng. A soft stone in the Purbeck beds, Swanage. *Arkell.*

pudding balls. *See* armored mud balls. *Pettijohn.*

pudding stone. a. A conglomerate in which the pebbles are rounded. *Compare* breccia. *Fay.* b. A siliceous rock, cut into blocks for furnace linings. *Bureau of Mines Staff. See* conglomerate. *ACSG.*

pudding stone jade. Nodules of nephrite cemented together by a darker olive-green variety of nephrite. *Shipley.*

puddle. a. To compact loose soil by soaking it and allowing it to dry. *Nichols.* b. Earthy material as a mixture of clay, sand, and gravel, placed with water to form a compact mass to reduce percolation. *Seelye, 1.* c. To place such material. *Seelye, 1.* d. The molten portion of a weld. *Webster 3d.* e. To work (metal) while molten. *Webster 3d.* f. To form (molten metal) into a desired shape. *Webster 3d.* g. To subject (iron) to the process of puddling. *Webster 3d.* h. A small pool. *Webster 3d.*

puddle ball. The lump of pasty wrought iron taken from the puddling furnace to be hammered or rolled. *Webster 3d.*

puddle bar. An iron bar made at a single heat from a puddle ball by hammering and rolling. *Webster 3d.*

puddled steel. Steel made in a puddling furnace, a type of reverberatory furnace in which the flame plays down upon the metal. *Camm.*

puddle panning. A pan operation used at the Kimberly mines in South Africa in which the millfeed contains fine clay and slimes that form a puddle as the pan is operated. In effect, it is a heavy medium form of gravity separation in which the medium is a water-and-slime pulp. This puddle is kept at a density of 1.25 by adding more slimes or water as required. The efficiency of this method relies on keeping the puddle at the correct composition and pulp density. The maximum particle size of pan feed is 31.7 mm, and diamond recovery is reported to be plus 98 percent. *I.C. 8200, 1964, p. 66.*

puddler. a. One who converts cast iron into wrought iron by puddling. *Webster 3d.* b. A rabble used in puddling. *Webster 3d.* c. A puddling furnace. *Webster 3d.* d. A system of small pipes admitting compressed air to a tank of water and zinc chloride, to effect a thorough solution for use as a timber preservative. *Webster 2d.* e. A machine for breaking up alluvial wash, consisting of a shallow tank in which arms rotate slowly. The coarse stones are forked out and the pulp passed down sluice boxes along which the gold settles. *Nelson.*

puddle rolls. The roughing rolls through which puddle balls are passed to be converted into bars. *Standard, 1964.* Also called puddle train. *Fay.*

puddler's mine. In metallurgy, a fixing or fettling for finishing the lining of a puddling furnace, consisting of red hematite ore made to a paste with water. *Standard, 1964.*

puddle train. A train of rolls for reducing squeezed puddle balls to puddle or muck bars. *Fay.*

puddling. The agitation of a bath of molten pig iron by hand or by mechanical means, in an oxidizing atmosphere, in order to oxidize most of the carbon, silicon, and manganese and thus produce wrought iron. *C.T.D.*

puddling furnace. A reverberatory furnace for puddling pig iron. *Standard, 1964.*

puddling machine. U.S.; Aust. A machine used for mixing auriferous clays with water to the proper consistency for the separation of the ore. *Fay.*

puddling process. Production of wrought iron from molten pig iron, in an oxidizing atmosphere in a reverberatory furnace of special design. Manganese and sulfur are oxidized and slagged off. Roll scale or oxidic iron ore is added and worked into the charge, which becomes first pasty and then workable into balls which are removed by tongs, hammered into blooms and then rolled into puddle bars, the slag being squeezed out. In the concentration of diamondiferous heavy particles from blue ground (weathered kimberlite), the puddling process is one which slurries the blue clay at a controlled solid to liquid ratio at which the lighter fraction overflows the circular pan in which stirring rakes revolve, while the heavy fraction containing the values sinks and is periodically removed. *Pryor, 3.*

puddock. Scot. Cast-iron plate forming the crossing of flanged mine-car rails. *Fay.*

Pudlo. Trade name for waterproofing agent added to cement used to seal back water, for example, in concrete tanks. *Pryor, 3.*

puff blowing. Blowing chips out of a hole by means of exhaust air from the drill. *Nichols.*

puffed bar. In powder metallurgy, a cored bar expanded by internal gas pressure. *Rolfe.*

puffed compact. A compact expanded by internal gas pressure. *ASTM B 243-65.*

puffer. a. A small stationary engine used for hoisting material on construction work, in operating a haulageway, or for hoisting at shallow mines, especially in prospecting and development work. *Fay.* b. *See* puffer man. *D.O.T. 1.*

puffer boy. a. A person employed to operate an engine used for hauling loaded mine cars through haulageways. Also the operator of any small stationary hoisting engine. *Fay.* b. *See* puffer man. *D.O.T. 1.*

puffer man. In bituminous coal mining, one who operates a small hoisting engine used for hauling loaded mine cars through haulageways in a mine, or operates a small stationary engine used for hoisting coal or rock in a shallow shaft, especially for prospecting or development work. Also called puffer; puffer boy; puffer tender. *D.O.T. 1.*

puffer tender. *See* puffer man. *D.O.T. 1.*

puffler. N. of Eng. A member of a shift or task group informally recognized by the group as a spokesman. Takes up matters with management on behalf of the team. (In some pits, used as a term of abuse.) *Trist.*

puffstone. Eng. Travertine, hard enough to use for building, so called from its cavernous structure. *Arkell.*

pug. a. Crushed strata or clay. *See also* flucan. *Nelson.* b. The coal left on the floor by a coal cutter. *Nelson.* c. In metalliferous mining, the parting of soft clay which sometimes occurs between the walls of a vein and the country rock. *C.T.D.* d. A vessel in which the coal and binder are agitated and heated, usually by live steam, to facilitate the spread of binder. Also called fluxer. *B.S. 3552, 1962.* e. To prevent leakage by packing cracks with clay; the material so used. *C.T.D. Supp.* f. N.Z. Selvage; clay. *See also* pugs. *Fay.* g. A pug mill. *Webster 3d.* h. A large lump of tempered clay for making pottery. *Webster 3d.* i. To wedge (clay) for making bricks or pottery. *Webster 3d.* j. A compacted mass of plastic substance, especially a large lump of tempered clay for making pottery. *Webster 3d.* k. To plug or pack with compacted substances (as clay or mortar). *Webster 3d.* l. A machine for consolidating plastic clay or body into a firm column. It consists of a steel cylinder (barrel) which tapers at one to a die, through which the clay or body is forced by knives mounted on a shaft which rotates centrally to the barrel. *Dodd.*

pug engine. Scot. A small locomotive. *Fay.*

pugger. *See* pug-mill operator. *D.O.T. 1.*

pugging. The process of mixing clay, shales, etc., with water to achieve the plasticity necessary for forming clay products. Also called tempering. *Bureau of Mines Staff.*

puglianite. A phanerocrystalline rock composed essentially of augite, leucite, and anorthite. *Holmes, 1928.*

pug lifter. One who removes coal left adhering to the floor by a coal-cutting machine. *C.T.D.*

pug lifting. The breaking and clearing of the coal left adhering to the floor by a longwall coal cutter. *Nelson.*

pug mill. a. A machine for mixing water and clay which consists of a long horizontal barrel within which is a long longitudinal shaft fitted with knives which slice through the clay, mixing it with water which is added by sprays from the top. The knives are canted to give some screw action, forcing the clay along the barrel and out one end. *AISI, No. 24.* b. *See* paddle-type mixing conveyor. *ASA MH 4.1-1958.*

pug-mill operator. a. One who prepares ground, sifted, and filtered clay for molding by mixing it with water in a rotary-type mixer called a pug mill. This machine is frequently operated in conjunction with an auger mill and a cutting machine, the same worker tending the operation of all three machines simultaneously. Also called clay pugger; mixing-mill operator. *D.O.T. 1.* b. One who mixes ground preheated magnesia and carbon with hot asphalt in a pug mill to form a viscous mixture suitable for processing into pellets. Also called mixer tender; pug miller; pug-mill tender. *D.O.T. 1.*

pugs. Scot. A stratum of hard coal in a free coal seam, for example, in the Main coal seam of Lanarkshire. *See also* pug, f. *Fay.*

pug tub. *See* settler. *Fay.*

pulaskite. A foyaitic igneous rock, occurring in dikes, and composed of cryptoperthite, barkevikite, biotite, and augite, and accessory nepheline, sodalite, etc. It is a nepheline syenite, poor in nepheline. *Webster 2d.*

pull. a. The linear advance resulting from the firing of a round of shots. *B.S. 3618, 1964, sec. 6.* b. The unit advance during the firing of each complete round of shotholes in a tunnel. A pull of 6 to 7 feet is common. With the burn cut, a tunnel pull of up to 9 feet has been achieved. In British coal shafts, pulls of about 6 feet are common, while the trend is towards deeper pulls up to about 8 feet. In South Africa, the drag cut is used widely and pulls of 8 feet are obtained. *Nelson.* c. To wind; to hoist. *Mason.* d. To loosen the rock around the bottom of a hole by blasting. Usually used with a negative to describe a blast which did not shatter rock to the desired depth. *Nichols.* e. To hoist drill-stem equipment from a borehole. *Long.* f. The amount of core obtained each time the core barrel is removed from a borehole. *Long.* g. Eng. To subside or settle. *See also* creep, a. *Fay.* h. Strata movements over large excavated areas will extend to the surface and the disturbed surface area is almost always larger than the area of the underground excavation. The extent of this pull or draw depends on the depth of the workings, the nature of the strata, the thickness of the seam being mined, and the degree of packing support. *Lewis, p. 622.* i. The drag in ventilation of mines. *Fay.* j. To draw or remove the coal pillars, or pillars of ore. *Fay.* k. The quantity of glass delivered by a furnace in a given time, usually 24 hours. *ASTM C162-66.*

pull-apart structure. Beds which have been stretched and torn apart into shapes similar to those of boudinage. *Pettijohn.*

pull cracks. In a casting, cracks that are caused by residual stresses produced during cooling and that result from the shape of the object. *ASM Gloss.*

pulldown. A system of pulleys or sheaves reeved with cable or chains attached to the drive rod or kelly and used to increase the cutting pressure on the bit when the weight of the rod is insufficient. *Long.*

pull drift. A small crosscut through barren ground to connect two ore bodies. *Hess.*

pulled. The extraction of any object or equipment, such as pipe, casing, core, or the drill stem, from a borehole. *Long.*

pulled back. Applicable when casing, drill string, or rods retreat or lift a short distance from the bottom of a borehole. *Long.*

pulled stem. *See* stemware.

puller. a. N. of Eng. One who moves forward the face conveyor equipment and withdraws and rebuilds chocks and face supports as the coal face advances. *Trist.* b. A laborer who withdraws metal parts from a heat-treating furnace with tongs, by use of a hoist, or by pulling a loaded car from the furnace. Also called furnace puller; heat-treat puller. *D.O.T. 1.*

puller-off. Mid. A man who takes the loaded trams off the cages at the surface, or who withdraws the empties from them at the bottom. *Fay.*

puller-out. The operator who charges, pulls out, and otherwise manipulates the crucibles. *Mersereau, 4th, p. 459.*

puller rod. The rod used between the crank arm or drive arm of the drive unit and the panline of a shaker conveyor. Also called connecting rod. *Jones.*

pulley. a. A cylinder, with a shaft for mounting it so that it may rotate, used to change the direction or plane of belt travel. If the shaft is designed to be mounted so that it will not rotate, a pulley includes the bearings that provide for rotation of the cylinder on the shaft. *NEMA MB 1-1961.* b. A sheave or wheel with a grooved rim, over which a winding rope passes at the top of the headframe. *Fay.* c. A wheel that carries a cable or belt on part of its surface. *Nichols.*

pulley box. The bearings on or in which the crown-block-axle ends are supported. *Long.*

pulley brae. Scot. A self-acting incline. *Fay.*

pulley frame. A gallows frame or headframe. *Fay.*

pulleying. Eng. Overwinding or drawing up a cage or bucket into the pulley frame. *Fay.*

pulley man. *See* rollerman. *D.O.T. 1.*

pulley oiler. In bituminous coal mining, a laborer who oils and greases the pulleys on which run the cables that are used to raise and lower cars along haulage roads underground and at the surface of mines. *D.O.T. 1.*

pulley repairman. *See* rollerman. *D.O.T. 1.*

pulley stone. The common name for a hollow cast, or mold, of the joints and stems of encrinites. *Fay.*

pull holes. In sublevel stoping, term applied to raises along the haulage level put up to the first sublevel. These raises are enlarged at the bottom into grizzly chambers immediately over the haulage level and at the top are widened into funnel-shaped openings. As the ore is broken, it drops directly into these pull holes.

Lewis, pp. 444, 447.

pulling back. Eng. *See* posting. *Fay.*

pulling casing. Removing pipe from a drilled well. *Hess.*

pulling-over rope. Eng. A short, light hemp rope for drawing the ends of winding ropes over the pulleys. *Fay.*

pulling pillars. The common expression used for mining the coal in the pillars of a mine; robbing pillars. *See also* pulling stumps. *Fay.*

pulling stumps. The process of taking out the pillars of a coal mine. *See also* pulling pillars. *Fay.*

pulling the plug. Can. Withdrawal of market support in a given stock by the once-interested broker promoter. *Hoffman.*

pulling up. One phase of forming clay objects on the potters' wheel in which a plastic clay lump is raised into a column by applying pressure with the hands. *Bureau of Mines Staff.*

pull lift. A modern sylvester used on construction work, which curves a maximum pull of 5 tons. It can be carried by one man. *Ham.*

pull-over mill; drag-over mill. A two-high mill in which the piece is rolled in one direction only, and after traveling between the rolls has to be passed back over the top roll for rerolling. *Osborne, p. 357.*

pull pin. A device for throwing mechanical parts in or out of gear, or for readily shifting in or away from a fixed relative position. *Crispin.*

pull rope; main rope. The rope that pulls a journey of loaded cars on a haulage plane; the rope that pulls the loaded scoop or bucket in a scraper loader layout. *See also* tail rope. *Nelson.*

pull shovel; dragshovel; hoe. A shovel with a hinge- and stick-mounted bucket that digs while being pulled inward. *Nichols.*

pull-up stakes. To strike camp; to remove from one place to another, as in search of new diggings, etc. *Fay.*

pullway. The path from the face to the loading point taken by the scraper of a scraper loading unit. *Jones.*

pull wheel. A large driving wheel or sprocket. *Nichols, 2.*

pulmonary dusts. Dusts harmful to the respiratory system. They include silica (quartz, chert); silicates (asbestos, talc, mica, sillimanite); metal fumes (nearly all); beryllium ore; tin ore; iron ores (some); carborundum; coal (anthracite, bituminous). *Hartman, p. 41.*

pulmotor. A mechanical device designed to perform artificial respiration, in cases of asphyxia, electric shock, drowning, etc., by exhausting the lungs and filling them with oxygen-enriched air. *Fay.*

pulp. a. A mixture of ground ore and water capable of flowing through suitably graded channels as a fluid. Its dilution or consistency is specified either as solid-liquid ratio (by weight) or as a percentage of solids (by weight). *Pryor, 2.* b. Pac. Pulverized ore mixed with water; also applied to dry, crushed ore. *Fay.* c. To reduce to a soft mass. *Gordon.*

pulp assay. Pac. The assay of samples taken from the pulp after or during crushing. *Fay.*

pulp balance. Weighs ore pulps in a container of known volume and is graduated to show pulp density direct. *Pryor 3, p. 35.*

pulp climate. In mineral processing, indicates the general physical and chemical conditions of a pulp in which the pH, added chemicals, solid-liquid ratio, temperature, particle size range, and ionization of a flotation pulp are being held within controlled limits while a considerable number of associated factors of less direct importance to the surface chemistry of the process are, at best, only indirectly monitored. *Pryor, 3.*

pulp density. a. In flotation, the amount of solids in a pulp, ranging from 10 to 25 percent, by weight. It has a marked effect on the recovery and grade of concentrate. *Taggart, p. 862.* b. The weight of a unit volume of pulp, for example, if one cubic centimeter of pulp weighs 2.4 grams, then the pulp density is 2.4. *Newton, p. 112.*

pulp dilution. The ratio of water to solids by weight. It is expressed as a ratio; for example, a pulp dilution of 3 to 1 means that a pulp contains 3 tons of water for each ton of solids. *Newton, p. 112.*

pulpit. The special platform upon which the operator of the Bessemer converter stands. *Mersereau, 4th, p. 408.*

pulpit man. One who operates the complex controls of a rolling mill in which iron and steel ingots or billets are rolled into such shapes as bars, T's, rails, and sheets by throwing the correct electric switches when signaled or by personal observation. Also called manipulator operator and mill control operator. *D.O.T. 1.*

pulpstone. a. A very large grindstone employed in pulp mills for crushing or grinding wood into fiber. *Fay.* b. *See* burring. *ACSG, 1963.*

pulpwood. Wood to be used in making paper. *Nichols.*

pulsate. *See* surge, b. *Long.*

pulsation dampener. *See* dampener. *Long.*

pulsation welding. Sometimes used as a synonym for multiple-impulse welding. *ASM Gloss.*

pulsator. a. That which beats or throbs in working; as: (1) a pulsometer pump; (2) a kind of shaking machine used in diamond mining to separate the stones from the earth; or (3) a device for producing pulsations in a reaction chamber by periodic discharges of gas or vapor. *Webster 2d.* b. A motor-driven air compressor that supplies compressed air to an electric channeler. It receives the exhaust from the channeling machine cylinder and thus utilizes the pressure of the exhaust. *Fay.* c. In mineral processing, a jig of the Harz type. *See also* Harz jig. *Pryor, 3.*

pulsator jig. A gravity concentrator utilizing vertical pulsations in a hydraulic medium to separate particles due to specific gravity differences. *Bureau of Mines Staff.*

pulse. A disturbance propagated in a medium in a similar manner as a wave, but not having the periodic nature of a wave; it may represent the envelope of a small wave group. *ASM Gloss.*

pulsed infusion. A variation of water infusion that has been effective in reducing both explosives consumption and airborne dust concentrations during mining. Water is introduced under pressure into long holes containing the explosive charge and forced into the coal seam by detonation of the charge. *Hartman, p. 65. See also* infusion shot firing.

pulsed infusion shot firing. A coal blasting technique which consists of firing an explosives charge in a borehole filled with water under pressure. The water is introduced through an infusion tube which also seals the hole. When the charge is fired, it produces in the water a high-pressure impulse which is transmitted into the numerous water-filled cleavage planes and slips and thus breaks the coal. The energy from the explosive is used more efficiently than when blasting in the conventional manner, and better coal preparation is obtained. *McAdam II, pp. 107-108.*

pulsed reactor. A type of research reactor with which continual, short, intense surges of power and radiation can be produced. The neutron flux during the surge is much higher than could be tolerated during steady state operation. *L&L.*

pulse-echo method. A nondestructive test in which pulses of energy are directed into a part, and the time for the echo to return from one or more reflecting surfaces is measured. *ASM Gloss.*

pulse-height discriminator. An electronic circuit which accepts only those pulses having amplitudes greater than a preset level and produces an output pulse of fixed amplitude (and sometimes of fixed width) for each input pulse accepted. *NCB.*

pulse rise time. The interval of time required for the leading edge of a pulse to rise from some specified small fraction to some specified larger fraction of the maximum value. *H&G.*

pulsion stroke. In ore concentration by wet jigging, the stroke of the plunger device which controls the hydraulic lift of water through the bed of ore particles. *Pryor, 3.*

pulsometer. a. A steam pump in which an automatic ball valve (the only moving part) admits steam alternately to a pair of chambers, so forcing out water which has been sucked in by condensation of the steam after the previous stroke. It can deal with very dirty water and has been used widely for shaft sinking and miscellaneous pumping duties. *Nelson.* b. A displacement pump with valves for raising water by steam, partly by atmospheric pressure, and partly by the direct action of the steam on the water, without intervention of a piston. Also called a vacuum pump. *Webster 3d.* c. A type of steam siphon frequently used on construction work for pumping out cofferdams. *Crispin.*

pulsometer pump. One with two chambers which are alternately filled and discharged. An automatic ball valve admits steam which forces out the charge from the filled chamber while the other is filling as its steam condenses. *Pryor, 3.*

Pulvazon. Vermiculite. *Bennett 2d, 1962 Add.*

pulverite. A textural term designating a silt- or clay-sized constituent of sedimentary rocks of constructional but nonclastic origin. It corresponds to the term lutite of the clastic textural terms. *A.G.I.*

pulverization. a. In soil stabilization work, pulverization means the separation of particles from each other rather than the breaking up of individual particles as suggested. Separation of the particles is the first step towards good dispersion of stabilization additives and moisture. *Nelson.* b. The reduction of metal to fine powder by mechanical means. Disintegration and comminution are terms also used. *Rolfe.*

pulverize. To reduce (as by crushing, beating, or grinding) to very small particles (as in fine powder or dust). *Webster 3d.*

pulverized coal. Coal that has been crushed to a fine dust by grinding mills. The latter are often air swept, the velocity of the air being so regulated that particles of coal, when sufficiently reduced, are carried away. Pulverized coal particles of which about 99 percent are below 0.01 inch in diameter will burn very rapidly and efficiently. Low-grade coal may be pulverized and conveyed from the mill by air into the boiler plant. *Nelson.*

pulverized dust. Dust of which 95 to 98 percent will pass a 100-mesh screen and of which 75 to 95 percent will pass a 200-mesh screen, the intermediate size depending on the hardness of the material used. Pulverized Pittsburgh coal dust will run 75 to 85 percent through 200 mesh. *Rice, George S.*

pulverized fuel. Finely ground coal or other combustible material, which can be burned as it issues from a suitable nozzle through which it is blown by compressed air. *Pryor, 3.*

pulverized fuel ash. Finely divided ash carried over from coal-fired power station boilers. It has found some use in the manufacture of building materials, for example, thermalite ytong, lytag, and to a less extent in clay building bricks. The composition of the ash is 43 to 50 percent SiO_2, 24 to 28 percent Al_2O_3, 6 to 12 percent Fe_2O_3, 2 to 4 percent CaO, 2 to 3 percent MgO, 3 to 5 percent alkalies, and 2 to 10 percent loss on ignition. In the United Kingdom, the Central Electricity Generating Board Specification is, not less than 35 percent SiO_2, not greater than 4 percent MgO, not greater than 3 percent SO_3, and not greater than 12 percent loss on ignition. *See also* thermalite ytong; Lytag. *Dodd.*

pulverized lime. Quicklime which will pass a fine sieve of specified size. The size of the sieve is usually ¼ inch. *ASTM C 51-47.*

pulverized silica. Finely ground quartz. *Bureau of Mines Staff.*

pulverizer. *See* fine grinder; grinder; glaze maker.

pulverizing mixer. A mixer used in soil stabilization which pulverizes with revolving tines the ground over which it passes. *See also* processing, a. *Ham.*

pulverulent. That which may easily be reduced to powder. *Weed, 1922*; said of certain ores. *Fay.*

pumice. A highly porous igneous rock, usually containing 65 to 75 percent SiO_2 and 10 to 20 percent Al_2O_3; with a glassy texture. Potassium, sodium, and calcium are generally present in small amounts. Insoluble in water; not attacked by acids. Found in New Mexico, California, Idaho, Oregon, Nebraska; Italy; New Zealand. Used as an abrasive; lightweight concrete aggregate. *CCD 6d, 1961.*

pumiceous. Applied to the foamy structure of pumice. *Schieferdecker.*

pumiceous structure. A structure akin to that of a coarse froth, due to the extreme vesiculation of a lava by expanding gases and vapors. *Holmes, 1928.*

pumicite. A very finely divided volcanic ash or volcanic dust. It varies in color from white to gray and buff. It is widely distributed in Kansas, Nebraska, Colorado, and other states in and adjacent to the Rocky Mountains, where it occurs interstratified with clays and sandstones of the Tertiary period. Pumicite is used with Portland cement in concrete work as a substitute for cement to the extent of 10 to 20 percent, without reducing the strength of the concrete. It is said to increase the density of the concrete and to reduce its absorption of water. Also used in making a cement similar to the pozzuolana of Europe. The principal use of pumicite is in cleansing compounds and abrasive soaps. *Stokes and Varnes, 1955.*

pumilith. Lithified volcanic ash. *See also* pumicite. *Hess.*

pumisoil. Soil formed from volcanic ash. *See also* pumicite. *Hess.*

pump. a. A machine used to impart flowing motion or to accelerate a fluid stream (gas, water, pulp, slurry). The main types are the reciprocating pump, the air compressor (reciprocating or centrifugal), the diaphragm pump, the monopump, the injector and the centrifugal pump (single or multistage). *Pryor, 3.* b. Following the classification given in the standards of the Hydraulic Society, pumps may be divided into two general classes: displacement and centrifugal. The plunger type of displacement pump and the centrifugal pump are the two types most used in mining. *Lewis, p. 634. See also* centrifugal pumps; plunger pumps; LaBour centrifugal pump; reciprocating pumps; sinking pumps; direct-acting pump; feed pump; force pump; lift pump; submersible pump.

pumpage. The amount raised by pumping; as, the pumpage of an oil well. *Standard, 1964.*

pump bob. The balance weight used to bring up the plunger in a Cornish pumping engine. *Standard, 1964.*

pump bucket. a. A packed piston having an aperture, in its center, covered by a clack or valve opening upwards. *Fay.* b. Synonym for cup leather. *Long.*

pump capacity. The volume of fluid, at a specified pressure, that a pump can transfer or lift when powered by an engine or motor of any given horsepower. Pump capacity also depends on fluid viscosity, pump condition, line friction, etc. *Long.*

pump chamber. An underground pumping station. *Fay.*

pump cup. Synonym for cup leather. *Long.*

pump-cup leather. The leather cup-shaped packing used on the pistons of certain classes of pumps. Same as cup leather. *Long.*

pump discharge. a. The port through which a fluid is ejected as it is acted upon by the pump. *Long.* b. The hose or length of pipe transferring a fluid from a pump after the fluid has been acted on by the pump to the point where fluid is to be used or discarded. *Long.*

pump disk; pump disc. Synonym for cup leather. *Long.*

pumpellyite. A bluish-green, hydrous silicate of calcium and aluminum, $6CaO.3Al_2O_3.7SiO_2.4H_4O$; orthorhombic; minute fibers or plates. From Keweenaw County, Mich.; New Zealand; Haiti; and California. *English.*

Pumpelly's rule. The generalization that the axes and axial planes of minor folds are parallel to the axes and axial planes of the major folds in the same region. *A.G.I.*

pumper. a. An instrument or machine used in pumping. *Webster 3d.* b. An oil well that has to be pumped. *Webster 3d.* c. The man who maintains the pumps in a mine. *Bureau of Mines Staff.*

pumper, hand. In bituminous coal mining, one who works a hand pump to force water, accumulated underground in low places, into a drainage ditch flowing to a natural outlet or pumping station. *D.O.T. 1.*

pump fist. Eng. The lower end of a plunger case of a pump. *Fay.*

Pumpherston shale. A Scottish oil shale which yields 16 to 22 gallons of crude oil per ton, together with 50 to 60 pounds of ammonium sulfate. *Fay.*

pumping. a. The operation of filling a sludge pump by an up-and-down motion of the rods or rope. Also called pumping the sludger. b. The act of raising or transferring a liquid or gas by means of a pump. *Fay.* c. In scraper operation, raising and lowering the bowl rapidly to force a larger load into it. *Nichols, 2.* d. Mechanical transfer of fluids. *Nichols.* e. Alternately raising and lowering a digging edge to increase the volume of dirt being transported. *Nichols.* f. The motion of mercury in a barometer arising from the movement of a ship or from fluctuations of air pressure in a varying wind. *C.T.D.*

pumping engine. An engine used for pumping; as a steam engine and pump combined for raising water. *Webster 3d.*

pumping engineer. In mining and in the quarry industry, one who operates one or a battery of pumps to force excess water from a lower level to the surface or to a drainage tunnel. Also called pitwright; plugman. *D.O.T. 1.*

pumping head. In an air lift, the distance from the surface to the level of the water during pumping; it equals static head plus drop. *Lewis, p. 687.*

pumping jack. A device for transmitting power to an oil-well pump. *Institute of Petroleum, 1961.*

pumping of pavement (pumping). *See* pavement pumping. *ASCE P1826.*

pumping out. The procedure of maintaining circulation of drilling mud through the drill stem while withdrawing the drill stem from the hole. *Hess.*

pumping plan. A plan which shows, in addition to the workings of a mine and the seam contours, the position of pumps, dams, and waterlogged areas. *B.S. 3618, 1963, sec. 1.*

pumping shaft. The shaft containing the pumping machinery of a mine. *Standard, 1964.*

pumping station; relay station. A station on a pipe line supplied with a pump for forcing the crude oil along from one station to the next. *Mersereau, 4th, p. 199.*

pumping water level. *See* depressed water level. *B.S. 3618, 1963, sec. 4.*

pumping well. A borehole from which oil is being extracted by pumps. As the pressure in the oil pool diminishes, a flowing well becomes a pumping well. *Nelson.*

pump intake. a. The port and/or point at which the suction hose passes a fluid into a pump so that the fluid can be acted on by the pump pistons. *Long.* b. The source from which a fluid is fed to a pump. *Long.*

pump intake pressure. The pressure in the casing opposite the pump under producing conditions. *American Petroleum Institute. Drilling and Production Practice, 1963, p. 149.*

pump kettle. A convex perforated diaphragm fixed at the bottom of a pump tube to prevent the entrance of foreign matter; a strainer. *Fay.*

pump leather. Synonym for cup leather; pump-cup leather. *Long.*

pump lift. a. The vertical distance that a pump can suck up water. Theoretically, this should be about 34 feet at sea level; practically, the limit is about 26 feet. *Long.* b. The vertical distance a pump can force water to flow. *Long.*

pump liner. A replaceable cylindrical or ceramic-coated metal sleeve installed in a pump cylinder inside of which the piston works. *Long.*

pump lining. Synonym for pump liner. *Long.*

pump load. The back pressure and/or resistance to flow of fluids that a pump must overcome to force a fluid to flow through a pipeline, drill string, etc. *Long.*

pumpman. Mineworker who operates mine pumps. *Bureau of Mines Staff.*

pump packing. The material placed around drill rods, piston rods, and similar moving parts that, when compacted under a packing gland, serves to prevent leakage of fluids without materially restricting the rotation of the vertical or reciprocating movement of the rod, etc. *Long.*

pump pressure. The force per unit area or pressure against which the pump is acting to force a fluid to flow through a pipeline, drill string, etc.; also, the pressure imposed on the fluid ejected from a pump. *Long.*

pump ring. A flat iron ring that, when lapped with tarred baize or coarse cloth, secures the joints of water columns. *Fay.*

pump rod. The rod or system of rods (usually heavy beams) connecting the steam engine at the surface, or at a higher level with the pump piston below. *See also* balance bob. *Fay.*

pump-rod plates. Scot. Spear plates; strips or plates of iron bolted to wooden pump rods at the joints for the purpose of making the connection. *Fay.*

pump slip. The leakage past the valves and the plunger in a reciprocating pump which should not be greater than 2 or 3 percent for a pump in good condition. Pumps showing 5 percent or more slip are in poor condition and should be repaired. *Lewis, p. 636.*

pump slope. A slope in which pumps are operated. *Fay.*

pump sollar. A platform to give access to the door-piece and working parts of a lift or set of pumps. *Standard, 1964.*

pump station. a. In mining, chamber near shaft at depth, where pump is installed. *Pryor, 3.* b. An enlargement made in the shaft, slope, or entry to receive the pump. Also called pumproom. *Fay.* c. The site at which one or more pumps are installed along a pipeline for the purpose of forcing a fluid through the line. *Long.*

pump stock. Lanc. *See* pump tree. *Fay.*

pump stroke. The linear distance through which the piston in a pump travels from one extreme position to the other within the cylinder. *Long.*

pump sump. A tank into which the circulating water gravitates and from which it is recirculated by means of a pump. *B.S. 3552, 1962.*

pump surge. The pulsating effect transmitted to a pipeline or drill string at the completion of each compression stroke of a reciprocating-piston pump. *Long.*

pump tree. Eng. A cast iron (wrought iron was formerly used) pipe, generally 9 feet in length, of which the water column or set is formed. *Fay.*

pun. The action of ramming wet concrete or earth to drive the air out of it and thus to consolidate it. *Ham.*

punch. a. A tool (ram) for knocking out timbers in coal workings. *Standard, 1964.* b. Same as leg or prop. Also called puncheon. *See also* punch prop. *Fay.* c. The member of a tool that forces the metal into the die during blanking, coining, drawing, embossing, forging, powder molding, or similar operations. *ASM Gloss.*

punch-and-thirl. S. Staff. A kind of pillar-and-stall system of mining coal. *Fay.*

punched screen. Thin plates through which holes have been punched. These may be round, rectangular, or slotted. *Pryor, 3.*

puncheon. a. A pointed tool for piercing or for working on stone. *Webster 3d.* b. Eng. A prop or post set up between lines of waling in shaft sinking. *See also* studdle. *Stauffer.*

puncher. An early model pick machine used to undermine or shear coal by heavy blows of sharp steel points attached to a piston driven by compressed air. *Fay.*

punching. a. A method of cold extruding, cold heading, hot forging, or stamping in a machine whereby the mating die sections control the shape or contour of the part. *ASM Gloss.* b. The operation of cutting out blanks for the various pieces of ware. A punch press is generally used for this work. *Hansen.*

punching machine. A machine tool used for punching holes in metals or other material. *Fay.*

punching shear. If a heavily loaded column punches a hole through the base on which it rests, the base has failed in punching shear. This is prevented either by thickening the base or by enlarging the foot of the column so as to ensure that the allowable shear stress is not exceeded. *Ham.*

punch mica. Thumb-trimmed block mica less than 1.5 by 2 inches but of sufficient area to yield a disk at least 1.5 inches in diameter free of cracks and open areas. The term now has been broadened to include circle mica and washer mica. *Skow.*

punch mining. a. Mining in which the rooms are opened off the strip mine highwall. *I.C. 8149, 1963, p. 26.* b. An underground method of extracting coal from finger-shaped areas of reserves not amenable to other mining methods. Openings are driven by continuous mining machines back and forth across the fingers from outcrop to outcrop leaving a pillar of coal between each cut. *Bureau of Mines Staff.*

punch press. a. In general, any mechanical press. *ASM Gloss.* b. In particular, an endwheel gap-framepress with a fixed bed, used in piercing. *ASM Gloss.*

punch-press operator. One who makes lenses for switchboard lights, glass novelties, or other glass products in a molding press. Removes heated glass rods from the oven, and places them under ram of press and turns valve or depresses pedal to lower ram and stamp out objects. Also called fireman; molding-machine operator; power-punch operator; puncher; punch man; punch operator. *D.O.T. 1.*

punch prop. a. A short timber prop for supporting coal in holing or undercutting; a sprag. *Standard, 1964.* b. Eng. A short prop set to carry a roof support. *SMRB, Paper No. 61.*

punch radius. The radius on the bottom end of the punch over which the sheet is bent in drawing. *ASM Gloss.*

punch test. A simple test to determine whether the glaze on a piece of fired pottery is in tension or compression. A steel center punch with a blunt end 1/32 to 1/16 inches in diameter is placed on the glazed surface and hit sufficiently hard with a hammer to break the glaze. If the latter was in tension, one or more cracks will be found to have radiated from the point of impact; if the glaze was in compression a circular crack will have formed around the punch mark or a conical piece of glaze will have become detached. *Dodd.*

punch ware. Handmade, thin, blown glassware, especially tumblers. *ASTM C162-66.*

pungernite. Yellowish-brown organic matter from the Silurian of the U.S.S.R. *English.*

punning. a. A form of light ramming. *Taylor.* b. Consolidation of earth by ramming with a hand or mechanical punner, a heavy dropping weight, or a special vehicle such as the sheepsfoot punner, which is towed over the surface treated, its heavy load being brought to bear by way of projections on its wheels. *Pryor, 3.*

punt. The bottom of a glass container. *Dodd.*

punt code. A mark of identification on the base of a glass bottle. *Dodd.*

punty. a. A gathering iron of solid cross section. *ASTM C162-66.* b. A device to which ware is attached for holding during fire polishing or finishing. *ASTM C162-66.* c. In glass blowing, a pontil. Also called punty rod. *Fay.*

punty rod. *See* punty, c.

pup. a. Synonym for guide coupling. *Long.* b. A pilot and/or sub. *Long.* c. A brick (particularly a refractory brick) of a shape and size based on that of a standard square but with the end faces square (or nearly square). This shape of brick is also known as a soap or closer. *Dodd.*

pup joint. A reaming-bit pilot to which a reaming bit can be coupled. *See also* guide coupling. *Long.*

puppet. *See* poppet. *Fay.*

puppet head. Eng. *See* poppet head, a. *Fay.*

puppet valve. A valve that, in opening, is lifted bodily from its seat by its spindle instead of being hinged at one side. *Fay.*

puppy. An underground set of pumps. *Fay.*

Purbeck beds. Eng. A freshwater deposit consisting of various kinds of limestone and marls, immediately above the Portland beds. *Fay.*

Purbeckian. Upper Portlandian. *A.G.I. Supp.*

pure bending. In mine subsidence, bending without fracture. *Briggs, p. 205.*

pure culture. A collection of microbial cells of the same species in a container that is devoid of any other form of life. *I.C. 8075, 1962, p. 64.*

pure gold. *See* fine gold. *Newton, p. 19.*

pure iron. The product of a basic open-hearth furnace refined to a point where the impurities are reduced to the lowest practicable minimum, after which copper and molybdenum are added in correct proportions. *Mersereau, 4th, p. 482.*

pure metal. Theoretically, an absolutely pure metallic element; but as such is not obtainable, the term is applied in practice to metals of high purity. *C.T.D.*

pure metal crystals. The crystals of which a solid pure metal is composed. *C.T.D.*

pure oxide ceramics. Ceramic products made from the pure oxides of nonmetallic materials, that is, Al_2O_3, MgO, SiO_2, etc. *Bureau of Mines Staff.*

pure oxides. A group of refractories. These include: alumina (2,050° C), magnesia (2,800° C), thoria (3,050° C), zirconia (2,700° C), beryllia (2,500° C), and ceria (2,800° C). The figures in parentheses represent their melting points. *Osborne.*

pure shear. A strain in which the body is elongated in one direction and shortened at right angles to this of such an amount that the volume remains unchanged. *A.G.I.*

Puretha gas mask. An all-service gas mask that can be used in atmospheres containing up to 2 percent of carbon monoxide for a period of 2 hours. *McAdam, pp. 62-64.*

purifiers. In the destructive distillation of coal, iron vessels containing several layers of bog iron ore (ferric oxide, Fe_2O_3) in granular form, mixed with moist sawdust to make the whole porous; used to remove impurities, such as ammonia gas, sulfur dioxide, and hydrogen sulfide from coal gas. *Cooper, pp. 390-391.*

purlins. Timbers spanning from truss to truss, and supporting the rafters of a roof. *Crispin.*

puron. High purity iron. *Osborne.*

purple blende. An old synonym for kermesite. *Fay.*

purple copper ore. Same as bornite. *Fay.*

purple of Cassius. Produced by adding a mixture of stannic and stannous chlorides to a very dilute solution of gold chloride; hydrated stannic oxide is precipitated, and the gold chloride is reduced to gold. The red to violet color is due to the precipitation of the finely divided gold on the stannic hydroxide. *C.T.D.* Used in painting and staining porcelain and glass. *Fay.*

purple ore. Sintered pyritic ore. *Bureau of Mines Staff.*

purple slate. *See* colored slates. *AIME p. 793.*

purple stone. *See* Cornish stone. *Hess.*

purpling. A fault liable to occur with chrome-tin pink ceramic color if the amount of alkali and borax is too high and the amount of lime too low. *See also* chrome-tin pink. *Dodd.*

purpurin. Same as hematinon. *Shipley.*

purpurite. A deep red or reddish-purple mineral; essentially a hydrous ferric-manganic phosphate, $(Mn,Fe)_2O_3.P_2O_5.H_2O$. An alteration product of lithiophilite and triphylite. Orthorhombic. Small, irregular masses. From Pala, Calif.; Hill City, S. Dak.; Newry, Me.; Erongo Mountains, Southwest Africa. *English.*

purser. Corn. A paymaster and accountant at a mine. *Fay.*

push bench. Equipment used for drawing moderately heavy-gage tubes by cupping sheet and forcing it through a die by pressure exerted against the inside bottom of the cup. *ASM Gloss.*

pushbutton. Relay switch worked by pressure of finger, to initiate switch movement which controls an operating motor. *Pryor, 3.*

pushbutton coal mining. A fully automatic and remotely controlled system of coal cutting, loading, and face conveying, including self-advancing roof support systems. *See also* manless coal face. *Nelson.*

pushbutton winding control. A system in which the operation of the winder is similar to automatic cyclic winding, but the starting is instigated by the onsetter and banksman. When everything is ready for winding, the onsetter and banksman press their respective start pushbutton and the winder starts, accelerates and banks automatically without the intervention of the winding engineman. With this form of control, loading and discharging of the skips is fully automatic. *See also* manual winding control. *Nelson.*

push-down cullet. A fault occasionally found in sheet glass as a result of the presence of cullet in the zone of the furnaces from which the glass was drawn. *See also* cullet. *Dodd.*

pushed-bat kiln; sliding-bat kiln. A tunnel kiln, of small cross-section, through which the ware is conveyed on sliding bats instead of on the usual cars; when there are a number of such tunnels in a single kiln, it is known as a multipassage kiln. *See also* multipassage kiln. *Dodd.*

pushed punt. The concave bottom of a glass wine bottle or other container. *Dodd.*

pusher. a. In mining, a laborer who pushes loaded mine cars on tracks from underground working places to haulage roads where they are picked up by a locomotive (motor) and hauled to the surface, shaft, or slope bottom for hoisting. May, at bituminous mines, shift empty and loaded cars in and about the tipple where coal is prepared for market. Also called car puller; car shifter, headsman; mule; putter; trailer; trammer; wheeler. *D.O.T. 1.* b. In mining parlance, one who is engaged for the purpose of encouraging or hastening the miners. Also called jigger boss. *Ricketts, I.* c. A tractor that pushes a scraper to help it pick up a load. *Nichols.*

pusher bar conveyor. Two endless chains cross-connected at intervals by bars or rotablepushers which propel the object along the bed or trough of the conveyor. *ASA MH 4.1-1958.*

pusher chain conveyor. One or more endless chains with attachments which move or retard the movement of packages, objects, trucks, dollies, or cars along stationary wood, metal or roller beds, troughs, rails or tracks. *ASA MH 4.1-1958.*

pusher grades. *See* helper grades.

pusher man. One who operates an electric pusher that discharges coke from ovens; also, supervises charging of ovens with coal and levels the coal, using an electrically driven leveling bar. Also called pusher doorman, pusher engineer, and pusher operator. *D.O.T. 1.*

pusher on. The man in charge of haulage hands in a coal mine. Also called master hauler (haulier). *C.T.D.*

pusher operator. *See* pusher man. *D.O.T. 1.*

pusher tractor. A bulldozer exerting pressure on rear of scraper loader while the loader is digging and loading unconsolidated ground being excavated and moved during opencast mining. *Bureau of Mines Staff.*

push fit. A fit similar to a snug or slip fit probably comparable to one or more of 11 classes of clearance locational fits listed in ASA B4.1-1955. *ASM Gloss.*

push hole. A hole through which glass is introduced to a flattening furnace. *Standard, 1964.*

pushing jack. An implement for moving a large and heavy object a short distance, such as a railroad car. *Fay.*

push moraine; shoved moraine. A kind of terminal moraine consisting of material pushed along and piled into a marginal ridge. *Standard, 1964.*

push-plate conveyor. A scraper conveyor in which the depth of the flights is much greater than that of the chain. *B.S. 3552, 1962.*

push-pull support system. A method of advancing power-operated supports on a longwall face. Double-acting hydraulic jacks are used in conjunction with supports which slide forward on the floor and provide their own abutments for both their forward movement and that of the conveyor. *Nelson.*

push-pull wave. A wave that advances by alternate compression and rarefaction of a medium, causing a particle in its path to move forward and backward along the direction of the wave's advance. In connection with waves in the earth, also known as primary wave, compressional wave, longitudinal wave, or P-wave. *Leet.*

push-up. Alternative name for pushed punt. *See also* pushed punt. *Dodd.*

push wave. Synonym for P-wave. *A.G.I.*

push welding; poke welding. Spot or projection welding in which the force is applied manually to one electrode, and the work or a backing bar takes the place of the other electrode. *ASM Gloss.*

put. a. To haul by hand. *Mason.* b. To haul. *Mason.* c. Newc. To convey coal from the working face to the tramway. This is usually done by young men called putters. *Fay.* d. Som. A box having a capacity of from 3 to 6 hundredweights of coal, used in thin seams. *Fay.* e. Eng. To haul a tub to and from the face. When the tub is pushed by hand, it is called hand putting; when drawn by a pony, pony putting. In Cumberland, to push a tub by hand is called trailing. Also called trail. *SMRB, Paper No. 61.* f. S. Afr. A pit or well. *Hess.*

Putnam clay. A fine-grained, plastic, Florida kaolin; it fires to a good white color. *Dodd.*

putrefaction. A process of decomposition of organic substances which occurs in the presence of water and with the complete exclusion of air. It is a kind of slow distillation whereby chiefly methane and smaller quantities of other gaseous products, such as H_2, NH_3, and H_2S, are formed. *Compare* disintegration; moldering; peat formation. *Stutzer and Noe, 1940, p. 91.*

putter. a. A coal miner who takes empty tubs from a nearby junction to the working face and brings back the loaded ones. Except in small mines, man handling of tubs is now obsolete. *See also* drawer. Also called hurrier; hutch runner; kibbler. *Nelson.* b. One who hauls by hand. *Mason.* c. A small hauling machine or engine. *Mason.* d. Underground worker who conveys coal by tram from working face to main underground haulage. *Pryor, 3.* e. Eng. A man or boy who conveys coal from the working place to the tramway. Same as haulier; trammer; drawer, a. *Fay.* f. N. of Eng. In single place systems a man, usually a young lad, who conveys tubs between the workings and a flat. He may have a pony. *Trist.* g. *See* pusher. *D.O.T. 1.*

putter and filler. A miner who fills his tub, pushes it back to the nearest junction, and returns with an empty tub. Obsolete except in small mines near outcrop. *Nelson.*

putter-out. *See* hanger-on, a. *C.T.D.*

putti. A gold-washing tray used in Madras. *Fay.*

putting. a. Eng. Same as hauling. *Fay.* b. *See* manual haulage. *Sinclair, V, p. 350.*

putting ponies. Eng. Ponies 10 or 11 hands high used in mines for hauling mine cars. *Fay.*

put-to-stand. S. Staff. Stoppage of coal mining on account of fire stink. *Fay.*

putty. a. Tin oxide, sometimes mixed with lead oxide, used for polishing glass, metals, jewelry, etc. *Standard, 1964.* Also called jewelers' putty; putty powder. b. In ceramics, glazing-slip. *Standard, 1964. See also* iron putty. *Fay.* c. A white polishing compound. *ASTM C162-66.* d. A composition of whiting and linseed oil, used for filling small holes in woodwork, and securing panes of glass in sash. *Crispin.*

putty powder. Crude oxide of tin, used for giving opaque whiteness to enamels or for grinding glass. *See also* putty, b. *Fay.*

putty stones. Soft pieces of decomposed rock found in placer deposits. *Fay.*

put work. *See* tutwork, b. *Fay.*

putzen. a. Ger. Small, irregularly deposited spots or bunches of ore. *Fay.* b. Xenoliths or cognate inclusions. *Holmes, 1928.*

puy. A conical hill of volcanic origin, especially in Auvergne, France, either (1) of volcanic ashes or scoria with or without intervening sedimentary strata, (2) sedimentary or granitic with a cap of basalt, or (3) sedimentary, with or without volcanic ash, traversed by a dike of basalt or trachyte. *Standard, 1964.*

P.V.C. Abbreviation for polyvinyl chloride, a nonflammable substance, used widely for mine belt conveyors, ducting, etc. *Nelson.*

P.V.C. belt. There are two main types, namely (1) solid woven carcass impregnated and covered with polyvinyl chloride, and (2) normal multiple construction which has polyvinyl chloride interlayers and covers. P.V.C. belts are now used widely in coal mines, being not only fire resistant but equal, if not better, in quality than normal rubber belting. It is now possible to use up to 300 horsepower with 36-inch-wide belts and up to 400 horsepower with 42-inch-wide belts. *See also* conveyor. *Nelson.*

PVT Abbrevation for pressure-volume-temperature. *BuMin Style Guide, p. 61.*

P-wave. A seismic body wave advancing by alternating compressions and rarefactions in an elastic medium. It is the type which carries sound. Synonym for compressional wave; dilatational wave; irrotational wave; longitudinal wave; pressure wave; push wave. *A.G.I.*

pychite. A columnar variety of topaz. *Fay.*

pycnite. A variety of topaz, occurring in columnar aggregations. *Fay.*

pycnocline. A steep vertical gradient of density. *Hy.*

pycnometer; pyknometer. a. A device for weighing and thus determining the specific gravity of small quantities of oil or other liquids. *Hess.* b. A small bottle for determining the specific gravity of grains or small fragments. *Fay.*

pycnotrope. A compact mineral near serpentine; probably an alteration product. *Fay.*

pyknometer. *See* pycnometer. *Pryor, 3.*

pyrabol; pyrabole. Same as pyribole. *A.G.I. Supp.*

pyralmandite. A contraction of pyrope and almandite for garnets of intermediate composition. *English.*

pyramid. a. In crystallography, strictly in the tetragonal, hexagonal, and orthorhombic systems, an open form of three, four, six, eight, or twelve faces which meet the vertical axis in a common point; in the monoclinic and triclinic systems, an open form of one, two, or four faces which cut all three axes. *Fay.* b. As generally used, a form enclosed by all the faces answering the above description whose intercepts have the same ratio; hence, a double-ended pyramid having both ends alike; better called a bipyramid. *Fay.* c. A solid with a polygon for a base, and with triangular sides that meet at a common point called the vertex. *Jones, 2, p. 119.*

pyramidal. Possessing the form of or pertaining to the pyramid; a crystal form, the faces of which commonly intersect three crystallographic axes. *Shipley.*

pyramidal garnet. Same as idocrase; a variety of vesuvianite. *Fay.*

pyramidal plane. In noncubic crystals, any plane that intersects all three axes. *ASM Gloss.*

pyramidal stoping. *See* rill stoping, b. *Fay.*

pyramidal system. *See* tetragonal system. *C.M.D.*

pyramid cut. a. In tunnel driving or shaft sinking, a pattern of shotholes drilled so that the middle holes converge and outline a pyramid-shaped volume of rock. These holes are fired first, and thus create a free face or relieving cut. *Pryor, 3.* b. This cut has received its name from the shape of the initial opening. The three or four holes are so directed that they meet at a point furthest in. The pyramid cut is mainly employed in raises and for shaft sinking but is not recommended for horizontal tunnels where a machine setup for a definite direction of the four holes cannot easily be obtained. Also called German cut. *Fraenkel, v. 1, Art. 6:02, p. 27.* c. This type of cut usually consists of four holes drilled to meet at a common apex in the center of the face. This arrangement permits a high concentration of explosive to be used, and the pyramid cut is therefore particularly suitable for breaking hard ground. In very hard ground the number of holes forming the cut may be increased to six. The main disadvantage of this type of cut is the difficulty in drilling the holes at the correct angles so that they will meet at the back of the cut. As in the case of the wedge cut, therefore, a hole director should be used. Also called diamond cut. *McAdam II, p. 122.* d. In underground blasting, a type of cut employed in which the three cut holes in the center may be drilled to form a pyramid. Also applied to four holes meeting in a point. The simultaneous firing of these holes is somewhat equivalent to using a very heavy charge of explosive and makes a powerful blast. *Lewis, p. 165.* e. A cut in which four central holes are drilled towards a focal point, and when fired break out a tetrahedral section of strata. *B.S. 3618, 1964, sec. 6.*

pyramid-set. A bit crown, the face of which is covered with a series of stubby pyramids, each apex of which is set with a diamond. *Long.*

pyramid structure. In crystallography, that of a crystal in which three or more inclined faces cut the three crystal axes. *Pryor, 3.*

pyrargyrite. A mineral, Ag_3SbS_3, commonly associated with other silver-bearing minerals; trigonal. Also called ruby silver; dark red silver ore. *Compare* proustite. *C.T.D.; A.G.I.; Dana 17.*

pyrene. A tetracyclic hydrocarbon obtained from the coal-tar fraction boiling above 360° C. Colorless; monoclinic; soluble in ether; slightly soluble in alcohol; and insoluble in water. *C.T.D.* Pale yellow; molecular weight, 202.26; $C_{16}H_{10}$; melting point, 149° to 150° C; boiling point, 260° C (at 60 mm); specific gravity, 1.271 (at 23° C, referred to water at 4° C); and soluble in carbon disulfide, in toluene, and in ligroin. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-517.*

Pyreneean orogeny. Post-Eocene diastrophism. *A.G.I. Supp.*

pyreneite. A variety of grossularite garnet which is birefracting, $3CaO.Al_2O_3.3SiO_2$; colorless; hardness 7; specific gravity 3.5; fusibility 3; insoluble in acid. *See also* garnet. *Larsen, p. 135.*

Pyrex. Trade name; a borosilicate glass with a high thermal endurance and much used for making chemical ware. *Dodd.*

pyrheliometer. The general term for the class of actinometers which measure the intensity of direct solar radiation. The instrument consists of a radiation sensing element enclosed in a casing which is closed except for a small aperture, through which the direct solar rays enter, and a recorder unit. *H&G.*

pyribole; pyrobole. A general term for minerals belonging to either the pyroxene or amphibole groups, suggested for field use. *Holmes, 1928.*

pyricaustates. A general name for fossil combustible substances. *Tomkeieff, 1954.*

pyridine operator. In the coke products industry, one who produces pyridine sulfate from tar oils by controlling movement of materials through interconnected units of processing equipment. Also called pyridine-recovery operator. *D.O.T. Supp.*

pyrite; fool's gold. Iron disulfide, FeS_2, often with small amounts of copper, arsenic, nickel, cobalt, gold, selenium. Brass-yellow or brown tarnished mineral, greenish- or brownish-black streak; metallic luster; isometric; contains 46.7 percent iron, 53.3 percent sulfur; specific gravity, 4.9 to 5.2; Mohs' hardness, 6 to 6.5. Found in Virginia, New York, Massachusetts, Connecticut, New Jersey, Colorado, Utah; Norway, Germany, France, Italy, Spain, Portugal, England, Hungary, Sweden, Canada, North Africa. Used in copperas; recovery of gold, silver, and copper. An ore of iron. An important ore of sulfur. Also called iron pyrite; mundic. *CCD 6d, 1961; Dana 17.*

pyrites. The term pyrites as frequently used, literally, means a mineral that strikes fire. It is applied to any of a number of metallic-looking sulfides, of which iron pyrites (pyrite) is the commonest; as copper pyrites (chalcopyrite), tin pyrites (stannite), etc. The term pyrite applies only to the iron disulfide, FeS_2. *Fay.*

pyrites of copper. Common name for chalcoypyrite. *Weed, 1918.*

pyritic. Of, pertaining to, resembling, or having the properties of pyrites. *Standard, 1964.*

pyritic smelting. Smelting of sulfide copper ores, in which heat is mainly supplied by oxidation of iron sulfide. *C.T.D.*

pyritic sulfur. The part of the sulfur in coal which is in the form of pyrites or marcasite. *B.S. 1016, 1961, Pt. 16.*

pyritiferous. Containing or producing pyrite. *Webster 3d.*

pyritization. Conversion into pyrite either by simple replacement or by alteration, or both. *Standard, 1964.*

pyritize. To convert into pyrite; to introduce pyrite into. *Webster 3d.*

pyritohedron. A pentagonal dodecahedron that is a hemihedral form of the isometric system of crystalline symmetry common to pyrite. *Webster 3d.*

pyritology. The science of analyzing compounds by means of the blowpipe. *Standard, 1964.*

pyro. A common expression for the compound tetrasodium pyrophosphate, ($Na_4P_2O_7$), either hydrous or anhydrous. *ASTM C286-65.*

pyroantimonite. *See* kermesite. *Bennett 2d, 1962.*

pyroaurite. A mineral of the hydrotalcite group occurring in goldlike submetallic scales also brownish with pearly to greasy luster, $6MgO.Fe_2O_3.CO_2.12H_2O$; Mohs' hardness, 2 to 3; specific gravity, 2.07; a silvery-white variety is known as igelstromite. *Larsen, p. 80.*

pyrobelonite. A fire-red basic vanadate of manganese and lead, $4(Mn,Pb)O.V_2O_5.H_2O$. Orthorhombic; minute acicular crystals. From Langban, Sweden. *English.* A vanadium ore. *Osborne.*

pyrobitumen. a. A dark-colored, solid, infusible, natural hydrocarbon complex, often associated with a mineral matrix, insoluble in water and relatively insoluble in carbon disulfide, benzol, etc. *Fay.* b. Solid, or semisolid, hydrocarbons found in kerogen shales and which yield liquid and gaseous hydrocarbons only when heated. *A.G.I.*

pyrobituminous. Yielding bituminous products on heating. *Webster 3d.*

pyrobituminous shale. Another name for oil shale. *Tomkeieff, 1954.*

pyrobole. *See* pyribole. *A.G.I.*

Pyroceram. Trade name for the original commercially available devitrified glass; the equivalent material made in the United Kingdom under license is known as Pyrosil. *See also* devitrified glass; Pyrosil. *Dodd.*

pyrochlore. A complete oxide of sodium, calcium and niobium, $NaCaNb_2O_6F$. Tantalum, rare-earth metals, and other elements may be present. Isometric. Color, brown to black; streak, light brown; Mohs' hardness, 5 to 5.5; specific gravity, 4.2 to 6.4. Forms a series with microlite. Koppite is a variety of pyrochlore. Found in Maine, California, Colorado; Africa; Europe. An ore of niobium. *Dana 17; CCD 6d, 1961.*

pyrochroite. Manganese hydrate, a mineral occurring in foliated forms with pearly luster, resembling brucite. It is white when fresh, but changes to bronze and black upon exposure. Trigonal. *Fay.*

pyroclastic. Produced by explosive or aerial ejection of material from a volcanic vent. Applied to the deposits as well as the textures so formed. *Stokes and Varnes, 1955.*

pyroclastic deposits. Deposits made up mainly of rock material that has been expelled aerially from a volcanic vent, such as agglomerate, tuff, and ash. The fragments range in size from great blocks to the finest dust or ash. Such deposits are usually designated according to the lavas to which they correspond in composition. *Stokes and Varnes, 1955.*

pyroclastic rocks. a. A general term for indurated deposits of volcanic ejecta, including volcanic agglomerates, breccias, tuff breccias, tuffs, conglomerates, and sandstones. *A.G.I.* b. Any rock consisting of unreworked solid material of whatever size explosively or aerially ejected from a volcanic vent. *A.G.I. Supp.*

pyroclasts. a. A general term for fragmental deposits of volcanic ejectamenta, including volcanic conglomerates, agglomerates, tuffs, and ashes. *Holmes, 1920.* b. The term is not strictly the equivalent of fragmental volcanic since much of the superficial material of certain types of flows, such as the aa lavas of Hawaii, is fragmental. Neither is pyroclastic material always the product of explosive eruptions, for much Pele's hair and also large amounts of pumiceous cinders are produced during the most quiet volcanic activity of the Kilauean type. It appears that the most careful usage would limit the term to detrital material which has been expelled aerially from a volcanic vent. *A.G.I.*

pyrocrystalline. Crystallized from a molten magma. *Webster 3d.*

pyroelectricity. Positive and negative charges of electricity which simultaneously develop on different parts of the same crystal when its temperature is suitably changed, for example, in tourmaline. *C.T.D.*

pyroemerald. Green fluorite. *Shipley.*

pyrogallic acid. White, lustrous crystals; turn gray on exposure to light; $C_6H_3(OH)_3$; specific gravity, 1.463; melting point, 132.5° C; boiling point, 309° C; soluble in water, alcohol, and ether. A solution of pyrogallic acid acquires a brown color on exposure to air. Used as a protective colloid in preparation of metallic colloidal solutions; analysis of free oxygen in air and other gas mixtures. *CCD 6d, 1961.*

pyrogen. A substance produced by the action of heat. *Webster 3d.*

pyrogenetic. A term introduced to designate minerals developed at high temperature in melts containing only a small proportion of volatile (hyperfusible or fugitive) constituents. The first stage of consolidation of magma, during which only pyrogenetic minerals are formed, is referred to as the orthomagmatic stage. Synonym for pyrogenic. *Schieferdecker.*

pyrogenetic minerals. The anhydrous minerals of igneous rocks, usually developed at high temperature in magmas containing only a small proportion of volatile components. Examples are the feldspars, pyroxenes, and olivines. *A.G.I.*

pyrogenic. A term essentially equivalent to igneous; formed through the effects of high temperature. *A.G.I.*

pyrogenic ore minerals. Ore minerals which crystallized as primary magmatic minerals of igneous rocks. *Schieferdecker.*

pyrogenic rocks. Used by Grabau for all rocks resulting from cooling of a molten magma. *See also* pyrolith. Synonym for igneous rock. *A.G.I.*

pyrogenous. Formed by fusion; igneous, as pyrogenous rocks. *Standard, 1964.*

pyrognostics. The characteristics (as the degree of fusibility or the flame coloration) of a mineral observed by the use of the blowpipe. *Webster 3d.*

pyrolite. An explosive resembling gunpowder in composition. *Webster 2d.*

pyrolith. Proposed by Grabau for igneous rock. *A.G.I.*

pyrolusite. Native manganese dioxide, MnO_2; a soft, iron-black or dark steel-gray mineral. Tetragonal. The principal ore of manganese. Also used as an oxidizer and a decolorizer. *C.T.D.; Webster 3d.*

pyrolysis. Chemical decomposition by the action of heat. *Bureau of Mines Staff.*

pyrolytic coatings. Pyrolysis is the decomposition of a material by heat; a pyrolytic coating is a thin coating produced by the breakdown of a volatile compound on a hot surface. Some types of resistor are made by the pyrolytic coating of an electroceramic rod with carbon. Pyrolytic coatings of BN, SiC, and Si_3N_4, have been applied to components for their protection during exposure to high temperatures. *Dodd.*

pyrolytic graphite. Graphite formed by pyrolysis of a carbonaceous gas. *VV.*

pyromagnetic. Of, or relating to, the effects of heat upon the magnetic properties of substances. *Webster 3d.*

pyromeride. An anglicized French term for nodular rhyolite. It is a quartz felsite or devitrified rhyolite containing spherulites up to several inches in diameter which impart a nodular appearance to the rock. *C.T.D.*

pyrometallurgy. Metallurgy involved in winning and refining metals where heat is used, as in roasting and smelting. Practically all iron and steel, nickel and tin, most copper, and a large proportion of zinc, gold, and silver, as well as many of of the minor metals are won from their ores and concentrates by pyrometallurgical methods. It is the most important and oldest of the extractive processes. *ASM Gloss.; Newton, p. 275.*

pyrometamorphism. Metamorphism produced by heat. *Compare* hydrometamorphism. *Standard, 1964.*

pyrometasomatic. Formed by metasomatic changes in rocks, principally in limestone, at or near intrusive contacts, under influence of magmatic emanations and high temperature and pressure. *A.G.I.*

pyrometasomatic deposits. Closely allied to hypothermal deposits is the group known as pyrometasomatic. This group includes contact metamorphic deposits in limestone near the margins of granular intrusives, but the inclusive term, pyrometasomatic, recognizes the fact that the group is not restricted to the vicinity of contacts. Although carbonate rocks are the typical hosts, a few pyrometasomatic deposits occur in schists and gneisses which may or may not originally have contained alkaline earth carbonates. Calcium and magnesium, if not supplied by the host rock, must have been introduced by ore solutions, as the distinguishing trait of the deposits is the presence of silicates of these elements. But most pyrometasomatic deposits may be regarded as hypothermal deposits whose host rock was limestone. *McKinstry, p. 389.*

pyrometasomatism. Contact metamorphism. *Hess.*

pyrometer. An instrument for measuring temperatures beyond the range of thermometers usually by the increase of electric resistance in a metal when heated; by the generation of electric current by a thermocouple when acted upon by direct heat or focused radiation; or by the increase in intensity of light radiated by an incandescent body as its temperature increases. *Webster 3d.*

pyrometric cone. A small, slender three-sided pyramid made of ceramic or refractory material for use in determining the time-temperature effect of heating and in obtaining the pyrometric cone equivalent (P.C.E.) of refractory material. *A.R.I.* Pyrometric cones are made in series, the temperature interval between successive cones usually being 20°C. The best known series are Seger cones (Germany), Orton cones (United States), and Staffordshire cones (United Kingdom). *Dodd.*

pyrometric cone equivalent. The number of that standard pyrometric cone whose tip would touch the supporting plaque simultaneously with a cone of the refractory material being investigated when tested in accordance with the Method of Test for Pyrometric Cone Equivalent of Refractory Materials. *ASTM Designation: C24.* The terms fusion point, softening point, deformation point, and melting point have heretofore been loosely used for pyrometric cone equivalent. Abbreviation, PCE. *ASTM C71-64.*

pyrometry. The techniques and methods of measuring high temperatures; especially, the art of using a pyrometer. *Webster 3d.*

pyromorphite; green lead ore. A chlorophosphate of lead, $Pb_5Cl(PO_4)_3$, a member of the apatite group. Hexagonal. It is a mineral of secondary origin; weakly radioactive; yellow, brown, green, gray, or white; found in the oxidized zone of lead deposits. Some specimens of pyromorphite have been reported containing uranium. *A.G.I.; Dana 17; Crosby, p. 131.*

pyromorphous. Crystallizing from a molten state. *Webster 3d.*

pyronome. An explosive containing the ingredients of gunpowder, and also antimony, potassium chlorate and chromate, and flour. *Fay.*

pyrope. The fiery-red garnet; a silicate of magnesium and aluminum, $Mg_3Al_2(SiO_4)_3$, crystallizing in the cubic system. It is often perfectly transparent and then prized as a gem, being ruby red in color. *C.T.D.*

pyrophane. A variety of opal that by the absorption of melted wax is made translucent when hot, but becomes opaque again on cooling. *Standard, 1964.* Synonym for fire opal.

pyrophanite. A deep blood-red scaly mineral with 1 perfect and 1 less perfect cleavage, $MnO.TiO_2$; Mohs' hardness, 5; specific gravity, 4.54. *Larsen, p. 94; Dana 6d, p. 1045.*

pyrophoric alloys. Alloys capable of producing sparks when struck sharply at a certain angle; used as flints in lighters. *Nelson.*

pyrophoric sphalerite. A variety of sphalerite that gives off sparks or glows when abraded. Some pieces are so sensitive that the effect is obtained by scratching them with a fingernail. *Hess.*

pyrophyllite. A natural hydrous aluminum silicate, $Al_2Si_4O_{10}(OH)_2$, found in metamorphic rocks; monoclinic. Color, white, green, gray, brown; luster, pearly to greasy; good micaceous cleavage; specific gravity, 2.8 to 2.9; Mohs' hardness, 1 to 2. Found in North Carolina, California; Newfoundland; Japan. Used in ceramics, slate pencils; substitute for talc. Also called pencil stone. *Fay; Dana 17; CCD 6d, 1961.*

pyrophysalite. Same as physalite. A coarse, nearly opaque, variety of topaz. *Fay.*

pyropissite. Yellowish-white resin and wax coals found in the mining district of Zeitz-Weissenfels, Germany. Brown coal and pyropissites are frequently closely mixed, and are called pyropissitic brown coal. *Stutzer and Noe, 1940, p. 120.*

pyropissitic brown coal. Closely mixed resin and wax coal and brown coal. *See also* pyropissite. *Stutzer and Noe, 1940, p. 120.*

pyroplastic deformation. The irreversible deformation suffered by many ceramic materials when heavily stressed at high temperatures. The term has been applied more particularly to the slow deformation of fireclay refractories when loaded at high temperatures. *Dodd.*

pyroplasticity. The physical state induced by soaking heat which permits a refractory body to be readily deformed under pressure or by its own weight. *HW.*

pyroradiation pyrometer. A self-contained instrument with the millivoltmeter mounted in the pyrometer tube, and the radiant energy is concentrated by means of an objective lens (quartz or fluorite) rather than by a reflecting mirror. *Newton, Joseph, Introduction to Metallurgy, 1938, p. 359.*

pyroretin. A brittle, brownish-black resin that occurs in brown coal, near Aussig, Bohemia; specific gravity, 1.05 to 1 18. *Fay.*

pyroschist. A schist or shale containing sufficient hydrocarbons to burn with a bright flame, or one yielding volatile hydrocarbon or inflammable gas when heated. *Fay.*

pyroscope. A device that, by a change in shape or size, indicates the temperature or, more correctly, the combined effect of time and temperature (which has been called heat work). The best known pyroscopes are pyrometric cones, bullers' rings, Holdcroft bars, and Watkin heat recorders. *See also* pyrometric cone; Holdcroft bars; Watkin heat recorders. *Dodd.*

Pyrosil. Trade name for ceramic ware consisting of devitrified glass; it is the British equivalent of Pyroceram. *See also* devitrified glass; Pyroceram. *Dodd.*

pyrosmalite. A colorless, green or brownish mineral with 1 perfect and 1 poor cleavage, $9(Fe,Mn)O.8SiO_2.FeCl_2.7H_2O$; Mohs' hardness, 4; and specific gravity, 3.1. *Larsen, p. 86.*

pyrosphere. *See* barysphere. *Fay.*

pyrostat. A thermostat; especially, one for use with high temperatures. *Webster 3d.*

pyrostibite. An old synonym for kermesite. *Fay.*

pyrostibnite. Same as pyrostibite. *C.M.D.*

pyrostilpnite. A hyacinth-red variety of pyrargyrite, $Ag_2S.Sb_2S_3$. *Fay.*

pyrosulfuric acid; fuming sulfuric acid. a. A heavy, oily, strongly corrosive liquid that consists of a solution of sulfur trioxide in anhydrous sulfuric acid. It fumes in moist air and reacts violently with water with the evolution of heat. Used chiefly in sulfonation and sulfation processes, in mixed acid in nitration, and in petroleum refining. *Webster 3d.* b. H_2SO_4-SO_3; specific gravity, 1.90 (at 20° C); melting point, 35° C; and decomposes water and alcohol. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-228.* c. A solution of sulfur trioxide in sulfuric acid; $H_2S_2O_7$. Colorless to dark brown depending on purity and hygroscopic. Used in explosives and in petroleum refining. *CCD 6d, 1961.*

pyroxene. A mineral group, $ABSi_2O_6$, where A is chiefly Mg,Fe", Ca, or Na, and B is chiefly Mg,Fe", or Al. Silicon may be replaced in part by aluminum. The group includes diopside, hedenbergite, augite, pigeonite, and many other rock-forming minerals. Although members of the group fall into different systems (orthorhombic, monoclinic, and triclinic), they are closely related in form, composition, and structure. *Fay; A.G.I. See also* acmite; aegirite; diallage; enstatite; hypersthene.

pyroxene perthite. Lamellar intergrowths of pyroxene of different kinds, as with the feldspars. Also pyroxene microperthite, pyroxene cryptoperthite. *English.*

pyroxenite. A coarse-grained, holocrystalline igneous rock consisting chiefly of pyroxenes. It may contain biotite, hornblende, or olivine as accessories. *C.T.D.*

pyroxenoid. A group name for minerals of the rhodonite and wollastonite series, as distinct from the pyroxene group. *Spencer 15, M.M., 1940.*

pyroxenolite. A general term for phanerocrystalline rocks of igneous origin, consisting predominantly of pyroxenes; pyroxenite (French usage) being restricted to metamorphic rocks of the same mineral composition. *Holmes, 1928.*

pyroxmangite. A brown manganese pyroxene; a metasilicate of iron and manganese, $[(FE,Mn)SiO_3]$; triclinic. Cleavage masses. Sobralite is identical, also iron rhodonite from slag. Found near Iva, South Carolina; Homedale, Idaho; Sweden; and Scotland. *English.*

pyrrhotine. *See* pyrrhotite. *Nelson.*

pyrrhotite; magnetic pyrites. A mineral, $Fe_{n-1}S_n$, with n ranging from about 5 to 16. Hexagonal. Usually in brown to reddish-brown masses, magnetic. Commonly associated with pentlandite. Often contains nickel, and therefore mined as a nickel ore. *A.G.I.; Fay.*

pysc. a. A package of coins selected for testing. *Hess.* b. A receptacle for coins to be tested. *Hess.* c. To test the weight and fineness of coins. *Hess.*

pysc jury. A jury called to determine whether the minted coin is of the legal weight and fineness. *Hess.*

Pythagoras ware. Trade name; a gas-tight mullitic porcelain that can be used at temperatures above 1,400° C; pyrometric cone equivalent, 1,825° C; thermal expansion (20° to 1,000° C), 5.7×10^{-6}. Tensile strength, 7,000 pounds per square inch; crushing strength, 98,000 pounds per square inch. *Dodd.*

pyx. Trial of the pyx is the periodic test of coins minted for Great Britain's sterling. *Pryor, 3.*

PZT. Lead zirconite-titanate, $Pb(Zr,Ti)O_3$; used as a ceramic component in piezoelectric transducers. *Dodd.*

Q

q a. Abbreviation for quintal. *See also* quintal. *Zimmerman, p. 87.* b. Symbol for quantity. *Zimmerman, p. 87.*

q. a. Symbol for quantity rate in general. *Zimmerman, p. 175.* b. Symbol for volume rate in general, volumetric rate of flow. *Zimmerman, pp. 146, 176.* c. Symbol for quantity of heat flow, rate of heat transfer, heat entering a system, quantity of heat per unit time, quantity of heat per unit weight. *Zimmerman, pp. 147, 157, 179, 367.* d. Symbol for discharge rate of flow per unit width. *Zimmerman, p. 185.* e. Symbol for electric charge, quantity of electric charge, quantity of electricity. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100; Zimmerman, p. 163.*

Q a. Symbol for Quaternary. *USGS Supp., p. 86.* b. Symbol and a unit to express very large energy figures. One Q equals 10^{18} British thermal units. *L&L.* c. Symbol for quantity by volume. *Zimmerman, p. 87.* d. Symbol for quantity of fluid, quantity of water, quantity of gas. *Zimmerman, p. 87.*

Q. a. Symbol for quantity in general. *Zimmerman, p. 175.* b. Symbol for total water discharge. *Zimmerman, p. 185.* c. Symbol for quantity of heat, quantity of heat per mole, quantity of heat transferred, quantity of heat energy. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100; Zimmerman, pp. 147, 175, 179, 367.* d. Symbol for quantity of light and for luminous energy. *Zimmerman, p. 163.* e. Symbol for electric charge, quantity of electric charge, quantity of electricity in coulombs. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100; Zimmerman, pp. 163, 259.* f. Symbol for volume rate in general, volumetric flow rate or rate of flow by volume. *Zimmerman, pp. 174, 175, 176.* g. Symbol for Q-factor or quality factor of a reactor. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.*

qanaat. A small capacity water tunnel commonly used in the Middle East. *Sandstrom.*

Q factor. Q, the factor of merit, is the ratio of reactance to resistance and indicates the relative effectiveness of capacitor reactance with respect to resistance. It increases as the effective series resistance of the capacitor decreases. A high Q value thus indicates high capacitor quality. For values greater than 10, Q is almost equal to the reciprocal of the power factor. *Skow.*

q shell. Seventh (outermost) electron shell surrounding large atomic nucleus. *Pryor, 3.*

qt Abbreviation for quart. *BuMin Style Guide, p. 61.*

quadrant. a. A quarter of a circle; an arc of 90°. *Webster 3d.* b. Any of the four parts into which a plane is divided by rectangular coordinate axes lying in that plane. *Webster 3d.* c. An instrument for measuring altitudes. *Webster 3d.* d. A unit of length that equals 10,000 kilometers. *Webster 2d.* e. One-fourth part of the perimeter of the face of a bit crown. *Long.* f. A curved guide for a lever. *Nichols.* g. A curved scale for measuring angles. *Nichols.*

quadrantal bearing. A horizontal angle or bearing less than 90°, measured to north, south, east, or west from a survey line. *Ham.*

quadrant cutter. A machine which will make a shear cut as well as a horizontal cut. The central column is wedged tightly between roof and floor and operates similar to a radial percussive coal cutter. *Nelson.*

quadratic system. The tetragonal system. *C.M.D.*

quadrature. The two opposite points in the orbit of the moon at which its longitude differs by 90° from that of the sun, relative to the earth; points of first and last quarters. *Hy.*

quadrature component. Component of an electrical or magnetic quantity that is 90° out of phase as compared to the primary quantity. *Schieferdecker.*

quadrel. a. A square brick, tile, or stone; especially, a whitish air-dried brick made of chalky earth. *Standard, 1964.* b. Prov. Eng. A square of peat or turf. *Standard, 1964.*

quadrilateral. A four-sided plane figure of any shape, having an area equal to the product of the diagonals multiplied by half the sine of the angle between them. *Ham.*

quadrivalent; tetravalent. a. Having a valence of 4. *Webster 3d.* b. Having four valences; for example, chlorine which has a valence of 1, 3, 5, and 7. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-106.*

quadrune. A gritstone with a calcareous cement. *Fay.*

quadruple block. A pair of blocks, each having four sheaves, reeved with rope or cable and used to increase the lifting capacity of a drill-hoisting mechanism; a four-sheave block and tackle. *Long.*

quagmire. Soft, wet, miry land that shakes or yields under the foot. *Webster 3d.*

quake sheet. A product of seismic shock quake (quake load-casting) without horizontal slip. Probably transitional to true slump sheets. *Pettijohn.*

quaking bog. A bog that shakes under foot, consisting of growing peat saturated with water. *Standard, 1964.*

qualifications, deputy. *See* deputy's qualifications. *Nelson.*

qualitative. Pertaining to the nature of the components rather than to the quantity of such components present. *ASTM STP No. 148-D.*

qualitative analysis. In chemistry, the process of finding how many and what elements are present. *Standard, 1964.*

qualitative test. A test determining the nature or presence of the constituents of a compound or mixture. *API Glossary.*

quality. a. Refers to the nature, and not the amount, of material. In the case of a coal seam, its quality is closely linked with its rank and its chemical composition. In the case of metals, average unit values are determined by systematic sampling and therefore, represent a known quantity. *See also* ventilation standards. *Nelson.* b. Native values of a gem irrespective of color and cut. *Hess.* c. The designation of the characteristics of sheet mica according to visual, electrical, or temperature standards. *Skow.* d. The ratio by weight of vapor to liquid plus vapor in a mixture, as in steam. *Strock, 10.*

quality control. a. Systematic setting, check and operation designed to maintain steady working conditions in continuous process such as mineral concentration; to forestall trouble; to check condition of ore, pulp or products at important transfer points. *Pryor, 3.* b. Graphic method of exposing abnormalities in sets of figures produced by measurement of repetitive operations or as variances from operating norms. *Pryor, 3.* c. The maintaining of air within desired limits of purity. *Hartman, p. 15.*

quantitation. Once a dust sample has been collected, it must be evaluated. Of principal concern is quantitation: how much dust or how many particles. Certain methods of quantitation are favored for the various sampling methods. The number basis is preferable for evaluating a pulmonary hazard, while the weight basis is preferred for toxic, radioactive, or explosive hazards. Number quantitation is usually employed for impinger, konimeter, molecular filter, and thermal precipitator samples. Weight quantitation is used for filter paper and electrostatic samples. *Hartman, p. 54.*

quantitative. In testing ore, how much of each metal is present. *von Bernewitz.*

quantitative analysis. In chemistry, the process of finding the quantity of each element present. Also called elementary analysis. *Standard, 1964.* Both volumetric and gravimetric methods are included. *Fay.*

quantitative survey. *See* ventilation survey. *Sinclair, I, p. 133.*

quantitative test. A test showing the amounts of the constituents present in a compound or a mixture. *API Glossary.*

quantity. a. Deals with the amount, and not the nature, of a substance. In the case of a coal seam, quantity refers to its workable thickness and acreage. In the case of ore, the quantity determines its commercial importance. Unit ore values without the quantity factor have only a qualitative significance. *Nelson.* b. Volumetric flow rate of air per unit time. Measured in cubic feet per minute. *Hartman, p. 8.*

quantity control. The control of air movement, its direction, and its magnitude. *Hartman, p. 73.*

quantometer. An electronic instrument specifically designed for the rapid analysis of metallic samples. This instrument utilizes electric excitation of the sample placed in the analytical gap, and separates and measures the individual intensities of specified wavelengths emitted by the constituent elements in the percent composition of the elements which comprise the sample. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

quantum. a. The unit amount of a quantity (for example, action, angular momentum, or energy of a harmonic oscillator) which, according to the quantum theory, can change by integral multiples only of that unit amount. *NCB.* b. A photon. *NCB.* c. The minimum discrete quantity of those physical parameters, like energy and momentum, which are observed to be noncontinuous in nature. *L&L.*

quaquaversal. Dipping outward in all directions from a central point, as a dome in stratified rocks. *Fay.*

quar. a. S. Wales. Sandstone. *Arkell.* b. Forest of Dean. An indurated clay. *See also* bind, a. Also called cliff quar. *Fay.*

quarey lode. *See* quarry lode. *Fay.*

quarfeloids. A portmanteau word from quartz, feldspar, and feldspathoids. *Compare* feloids. *English.*

Quarigel. A nonpermitted gelatinous explosive suitable for all surface operations where the rock is to be well shattered. It has high strength, high density, and fair water resistance. *Nelson.*

quarl; quarle. A large brick or tile; especially, a curved firebrick used to support melting pots for zinc and retort covers. *Webster 3d.*

quarl block. A refractory shape forming the whole, or a segment, of a gas- or oil-fired burner, particularly in a boiler furnace or glass tank furnace. *Dodd.*

quarman. A quarryman. *Standard, 1964.*

quarpit. An obsolete term for a quarry. *Fay.*

quarrel. a. A stone quarry. *Standard, 1964.* b. Materials from a quarry. *Standard, 1964.*

quarrier. A workman in a stone quarry; a quarryman. *Standard, 1964.*

quarry. a. An open or surface working, usually for the extraction of building stone, as slate, limestone, etc. *Fay.* b. Eng. An underground excavation formed in the roof, or fault, for the purpose of obtaining material for pack walls. *Fay.* c. In its widest sense, the term mines includes quarries, and has been sometimes so construed by the courts; but when the distinction is drawn, mine denotes underground workings and quarry denotes superficial workings. Open workings for iron ore, clay, coal, etc., are called banks or pits rather than quarries. *Webster 2d*. d. In its proper significance, a quarry is a stone mine and may be located as a placer claim. It is distinguished from a mine in the fact that usually it is open at the top and front, and in the ordinary acceptation of the term, in the character of the material extracted. *Ricketts, I*. e. An open pit, mine, or excavation, where stone, sand, gravel, or mineral is obtained from open faces, with or without a waste rock overburden. *See also* opencast. *Nelson*. f. Day work pit. Also called opencast; quarpit. *Pryor, 3*. g. S. Afr. A large open working with a road into it. *Beerman*. h. A rock pit. *Nichols*. i. An opencut mine in rock chosen for physical rather than chemical characteristics. *Nichols*. j. *See* floor quarry.

quarry bar. A horizontal bar supported at each end by legs and used to carry machine drills. *Fay*.

quarry bed. Quarry face. *Webster 3d*.

quarry body. A dump body with sloped sides. *Nichols*.

quarry checker. An important member of the quarry office organization. He is concerned with factual records of (1) labor employed each day; (2) vehicles in and out; (3) stone or other material exported; (4) output of stone; and (5) accidents. *Nelson*.

quarry drainage. Arranging the quarry layout so that pools of water do not collect in the working area. One-half percent grade away from the face will generally keep the floor free of mud and water. *Nelson*.

quarry drill. A blasthole drill. *Nichols*.

quarry face. The freshly split face of ashlar, squared off for the joints only, as it comes from the quarry, and used especially for massive work. Distinguished from rock face. *Webster 3d*.

quarry-faced masonry. That in which the face of the stone is left unfinished just as it comes from the quarry. *Crispin*.

quarry floor; base level. The lowest level on which stone is loaded. *Streefkerk, p. 14*.

quarry flowsheet. A diagrammatic representation of the sequence of quarry processes in producing the finished marketable product. The details of the flowsheet will differ according to the product required, the type of stone, size of quarry, plant available, and other factors. *See also* flowsheet. *Nelson*.

quarry hand. *See* mucker, h. *D.O.T. 1*.

quarrying. a. The surface exploitation of stone or mineral deposits from the earth's crust. *Nelson*. b. Removal of rock which has value because of its physical characteristics. *Nichols, 2*. c. One of the effects of glaciation whereby blocks of stone, bounded mainly by joint planes, are lifted from the bedrock and carried away by ice. Also called plucking. *Stokes and Varnes, 1955*.

quarrying machine. Any machine by which to drill holes or cut tunnels in native rock; a gang drill, or tunneling machine, but most commonly a small form of locomotive, bearing rock-drilling mechanism, and operating on a track laid temporarily along or opposite the ledge to be cut. *Standard, 1964*.

quarry lode. a. A lode which is jointed and rocky in character. *Nelson*. b. Corn. A lode or stratum that breaks in large hard blocks, by reason of joint planes. *Fay*.

quarry machine. *See* quarrying machine. *Fay*.

quarryman. a. A man employed at the face of a quarry, stripping, drilling, excavating, and loading rock or economic product. Quarrying is a skill which can only be learned by experience. *Nelson*. b. One who operates a jackhammer to drill holes in quarry stone, and drives wedges into the holes to break or split off slabs or blocks of stone. Also called hammerman; plug-and-feather driller; rockman; rock splitter. *D.O.T. 1*. c. In crushed rock quarries, a laborer who performs any one or combination of such duties as: loading rock into boxes to be hoisted out of quarry pit; assisting in moving power shovel from one loading position to another; dumping rock from cars into crusher or storage bins; feeding rock into a crusher; tending belt conveyor that transports crushed rock from crusher to storage bins; loading crushed rock from storage bins into trucks or railroad cars. *D.O.T. 1*. d. In building stone quarries, a laborer who performs any one or combination of such duties as: cleaning dirt and mud from surface and sides of stone deposits; chipping irregularities from surface of granite blocks; breaking large pieces of stone into smaller sizes suitable for building purposes with a sledge hammer; attaching hoisting cable hooks or slings to blocks of stone to be hoisted from quarry; guiding and steadying blocks of stone as they are loaded at the quarry surface on trucks or railroad cars by a derrick. *D.O.T. 1*.

quarrymaster. Scot. The owner of a quarry. *Fay*.

Quarry Monobel. A nonpermitted, nongelatinous explosive; high strength but with no water resistance; used in soft-medium hardness rocks where a heaving action is required. *See also* A.N. gelatine dynamite 75. *Nelson*.

quarry powder. Ammonium nitrate dynamites intended to replace the more costly gelatin dynamites used in quarrying, where blasts of several tons of explosives are used. Cartridges up to 8 inches in diameter by 21 inches in length, can be enclosed in metal cans to protect against water damage. *Lewis, p. 112*.

quarry-rid. Overburden. *Compare* ridding. *Arkell*.

quarry sap; quarry water. The moisture contained in newly quarried stone. *Arkell*.

quarrystone bond. Rubblework. *Webster 3d*.

quarry tile. a. A vitreous unglazed tile, usually 6 square inches or more in surface area and ½ to ¾ inches in thickness, made by the extrusion process from natural clay of shales. *ASTM C242-60T*. b. *See* floor quarry. *Dodd*.

quarry water. a. Water that fills the pore spaces of a rock as it lies in its original bed. *See also* ground water. *Fay*. b. *See* quarry sap. *Arkell*. c. Synonym for water of imbibition, a. *A.G.I.*

quarry waste. Material discarded after crushing, as being too fine, irregular, or flaky for constructional work. *Nelson*.

quart. Quarter gallon (69¼ cubic inches). Reputed quart is two-thirds of this and is standard content of bottle of wine. *Pryor, 3*.

quartation. The separation of gold from silver by dissolving out the latter with nitric acid. It requires not less than three-fourths of silver in the alloy, whence the name, which is also applied to the alloying of gold with silver, if necessary, to prepare it for this method of parting. *Fay*.

quarter. a. The act or process of dividing sludge, core, and other pulverized or granular samples into four equal parts. *See also* quartering, b. *Long*. b. Synonym for quadrant as applied to a drill-bit crown. *Long*.

quarter coal. York. Same as colliers' coal. *Fay*.

quarter cord. a. Derb. A cord or chain one-quarter of a mere in length (about 7½ yards), used in measuring mineral ground. *Fay*. b. Seven yards and a quarter which the miner has crossways of his vein on either side; used for piling waste rock and for washing and dressing ore. *Hess*.

quarter hard. *See* temper. *ASM Gloss*.

quartering. a. The reduction in quantity of a large sample of material by dividing a heap into four approximately equal parts by diameters at right angles, removing two diagonally opposite quarters and mixing the two remaining quarters intimately together so as to obtain a truly representative half of the original mass. The process is repeated until a sample is obtained of the requisite size. *Taylor*. Also called coning. b. To split a piece of core longitudinally into four equal parts. *Long*.

quartering in. Lanc. A plan of building or putting together tubbing plates from the top downward, the rings and segments being bolted together as the work of excavation proceeds. *Fay*.

quartering way. a. The direction of the natural joints in a quarry rock. *See also* rift. *Nelson*. b. Grain, second way, bate, hem, sheeting plane. *Arkell*. c. Corn. A quarry term to designate a direction in which a rock cleaves with moderate facility. *Fay*.

quarter line. Western U.S. The original survey line by which a section of government land is divided into four parts. *Standard, 1964*.

quarterly survey. An underground survey required by law to be undertaken at least once every three months for the purpose of bringing the working plans and other plans up to date. *B.S. 3618, 1963, sec. 1*.

quarter octagonal. A square shaft with corners cut back. *Nichols*.

quarter points. The points at which the face of a bit is divided into quadrants. *See also* quadrant. *Long*.

quarter-point veins. N. of Eng. Small veins having an intermediate bearing between strike and cross veins. *Fay*.

quarter post. A half-way post between two section corners on the same line of a surveyed section of land. *Standard, 1964*.

quarter sawing. Signifies that the log is first cut into quarters. In sawing into boards, the cuts are made parallel with the medullary rays. *Crispin*.

quarter section. A fourth of a section; a piece of land 160 acres in area in a U.S. public-land survey. *Webster 3d*.

quartz. a. A crystallized silicon dioxide, SiO_2. Amethyst is a variety of the well-known amethystine color. Aventurine is a quartz spangled with scales of mica, hemitite, or other minerals. False topaz or citrine is a yellow quartz. Rock crystal is a watery clear variety. Rose quartz is a pink variety. Rutilated quartz contains needles of rutile. Smoky quartz is a brownish variety, sometimes called cairngorm. Tigereye is crocidolite (an asbestoslike mineral) replaced by quartz and iron oxide and having a chatoyant effect. *Sanford*. The name of the mineral is prefixed to the names of many rocks that contain it, as quartz porphyry, quartz diorite.

Fay. b. Pac. Any hard, gold or silver ore, as distinguished from gravel or earth. Hence, quartz mining, as distinguished from hydraulic mining, etc. *Fay*.

quartz, alpha. *See* low quartz. *Bennett 2d, 1962 Add.*

quartz-barytes rock. A rock composed of about 30 percent barytes, 70 percent quartz, and considered to be of magmatic origin, occurring in the Salem District of Madras, India, as a network of pegmatite-like veins. *Holmes, 1928.*

quartz battery. A stamp, or series of stamps, for crushing quartz ore. *Mathews, v. 2, p. 1340.*

quartz, beta. *See* high quartz. *Bennett 2d, 1962 Add.*

quartz boil. An outcrop of a quartz reef. *Fay*.

quartz bucket. A bucket for hoisting quartz. *Fay*.

quartz camp. A camp of quartz miners. *Craigie, v. 3, p. 1873.*

quartz cat's eye. Light to dark grayish-green quartz with good cat's eye effect resulting from fibrous mineral inclusions. *See also* Bavarian cat's eye; Harz cat's eye; Hungarian cat's eye. *Shipley*.

quartz claim. In the United States, a mining claim containing ore in veins or lodes, as contrasted with placer claims carrying mineral, usually gold, in alluvium. *Fay*.

quartz conglomerate. A rock made of pebbles of quartz with sand. The pebbles are sometimes of jasper and chalcedony, and make a beautiful stone when polished. *Osborne*.

quartz crusher. A machine for crushing or pulverizing quartz. *Craigie, v. 3, p. 1873.*

quartz diorite. A plutonic rock containing major plagioclase, quartz, and hornblende and/or biotite, with accessory apatite, zircon, and opaque oxides. A small amount of orthoclase may be present. The plagioclase is usually andesine or oligoclase. With an increase in orthoclase, the rock passes into granodiorite. Synonym for tonalite. *A.G.I.*

quartz dolerite. An oversaturated variety of dolerite containing interstitial quartz. The latter mineral is frequently associated with orthoclase in micropegmatite and when this is present, the rock is described as granodolerite. *Holmes, 1928.*

quartz drift. Any loose rock material containing quartz fragments as a prominent constituent. *See also* drift, t. A mine opening in a quartz-bearing rock. *Fay*.

quartz felsite. A rhyolite or quartz porphyry having a cryptocrystalline or devitrified groundmass; in the older usage of the name, it was synonymous with quartz porphyry, but the latter term is now more commonly used, especially when conspicuous phenocrysts are present. *Holmes, 1928.*

quartz glass. Applied to silica glass made by fusing vein quartz. *ASTM C162-66.*

quartz gold. Gold that is not rounded and waterworn, but irregular and frequently twisted in form, usually very bright, and always of fine quality. *Craigie, v. 3, p. 1873.*

quartzic. Same as quartziferous. *Fay*.

quartziferous. Consisting chiefly of quartz. *Fay*.

quartz index. A derived quantity (qz) in the Niggli system of rock classification, which may be either positive or negative, and is a valuable indicator of the minerals to be expected. *A.G.I.*

quartz itabirite. *See* banded quartz-hematite ore. *Hess*.

quartzite. a. A quartz rock derived from sandstone, composed dominantly of quartz, and characterized by such thorough induration, either through cementation with silica or through recrystallization, that it is essentially homogeneous and breaks with vitreous surfaces that transect original grains and matrix or interstitial material with approximately equal ease. Such a stone possesses a very low degree of porosity and the broken surfaces are relatively smooth and vitreous as compared with the relatively high porosity and the dull, rough surfaces of sandstone. *ASTM C119-50.* There are two types (1) metaquartzite, a metamorphic rock usually derived from sandstone, and (2) orthoquartzite, a sedimentary rock consisting of grains of silica sand, cemented together by at least 10 percent of precipitated silica. *HW*. b. Stone composed of silica grains so firmly cemented by silica that fracture occurs through the grains rather than around them. *BuMines Bull. 630, 1965, p. 876.* c. As used in a general sense by drillers, a very hard, dense sandstone. *Long*. d. A granulose metamorphic rock consisting essentially of quartz. *Holmes, 1920.* e. Sandstone cemented by silica which has grown in optical continuity around each fragment. *Holmes, 1920.*

quartzitic. Of, pertaining to, or consisting of quartzite or quartz. *Fay*.

quartz jacutinga. *See* banded quartz-hematite ore. *Hess*.

quartz keratophyre. A type of soda trachyte carrying accessory quartz. *C.T.D.*

quartz latite. The extrusive equivalent of a quartz monzonite. The principal minerals are quartz, sanidine, biotite, sodic plagioclase, and often hornblende usually occurring as phenocrysts in a groundmass of potash feldspar and quartz (or tridymite cristobalite), or glass. Accessory minerals are magnetite, apatite, and zircon. With an increase in silica and alkalies, the rock passes into a rhyolite and with a decrease in these constituents it passes into a dacite. *A.G.I.*

quartz lead. A lode or vein of mineral-bearing quartz. *Mathews, v. 2, p. 1340.*

quartz liquefier. In metallurgy, an apparatus for extracting gold from its ore, in which, by the action of an alkali and high-pressure steam, gold bearing quartz is converted into a soluble silicate from which gold may be separated by washing. *Standard, 1964.*

quartz-mesh limestone. Limestone containing a reticulated network of quartz veinlets. *Hess*.

quartz mill. A machine or establishment for pulverizing quartz ore, in order that the gold or silver it contains may be separated by chemical means; a stamp mill. *Standard, 1964; Fay.*

quartz mine. A mine in which the deposits of ore are found in veins or fissures in the rocks forming the earth's crust. Usually applied to lode gold mines, but not to placers. *See also* quartz mining. *Fay*.

quartz miner. A miner who does quartz mining. *Mathews, v. 2, p. 1340.*

quartz mining. The mining on veins or ore bodies in place, as distinguished from surface digging or washing (alluvial or placer mining); underground mining in rock. *Webster 3d.* So called because quartz is the chief mineral associated with gold in such deposits. *Webster 2d.*

quartz monzonite. A plutonic rock containing major plagioclase, orthoclase, and quartz, with minor biotite, hornblende, and accessory apatite, zircon, and opaque oxides. With an increase in plagioclase and femic minerals, the rock passes into granodiorite and with an increase in orthoclase it passes into granite. Synonym for adamellite. *A.G.I.*

quartzoid. A crystal having the form of two six-sided pyramids base to base. *Standard, 1964.*

quartz on the brain. Same as gold fever. *Mathews, v. 2, p. 1340.*

quartz ore. A rock containing a large quantity of quartz. *Gordon*.

quartzose. Containing quartz as a principal ingredient. *Fay*.

quartz porphyrite. A porphyrite carrying quartz as an accessory constituent; the representative in the medium-grain size group of the fine-grained dacite. *C.T.D.*

quartz porphyry. A medium-grained igneous rock of granitic composition occurring normally as minor intrusions, and carrying prominent phenocrysts of quartz. Differs from rhyolite only in the coarser grain of the groundmass. *C.T.D.*

quartz projectors. X-cut quartz crystals are laid flat on a steel plate, arranged in a mosaic so that the plate is adequately covered. An identical plate is then laid on top of the crystals, forming a sandwich. Insulating washers make it possible to connect the plates to the terminals of the alternating current source. When the potential of the upper face of the crystal is positive, the thickness increases. Simultaneously, the other two dimensions shrink. Since the plate will be compressed during one-half of the cycle of an alternating current field, and extended the same amount during the other half, it will vibrate with the same period as that of the field. If this is the natural period of the crystal, the amplitude of the vibrations will be a maximum. *H&G.*

quartz reef. A lode or vein of quartz. *See also* reef, a and b. *Fay*.

quartz reefer. Aust. One engaged in mining for gold in a quartz reef or vein. *Fay*.

quartz rock. *See* quartzite. *Fay*.

quartz schist. A schist in which the foliation is due to the presence of streaks and lenticles of nongranular quartz. Mica is usually present, but in less amount than in mica schist. *Holmes, 1928.*

quartz, silica (SiO_2). A raw material used as a refractory in the manufacture of sheet steel and cast iron porcelain enamels. *Hansen*.

quartz sinter. Siliceous sinter. *Fay*.

quartz syenite. A potash syenite or soda syenite carrying quartz as an accessory constituent, and hence on the borderline between true syenite and granite. *C.T.D.*

quartz topaz. *See* citrine. *C.M.D.*

quartz trachyte. Synonym for rhyolite. *A.G.I.*

quartz vein. A deposit of quartz in the form of a vein. Auriferous veins are often called quartz veins, and mining for gold in the rock is called quartz mining. *Fay*.

quartz wedge. In mineralogy, a wedge-shaped piece of quartz used in optical work. *Fay*.

quasibinary system. In a ternary or higher-order system, a linear composition series between two substances, each of which exhibits congruent melting, wherein all equilibriums, at all temperatures or pressures, involve only phases having compositions occurring in the linear series, so that the series may be represented as binary on a phase diagram. *ASM Gloss.*

quaternary. Consisting of four components. *Rolfe.*

Quaternary. The younger of the two geologic periods or systems in the Cenozoic era. Quaternary is subdivided into Pleistocene and Recent epochs or series. It comprises all geologic time and deposits from the end of the Tertiary up to and including the present. It has also been called post-Tertiary and Pleistocene, but Pleistocene is now generally restricted to the earlier part of the Quaternary. *A.G.I.*

quaternary alloy. An alloy containing four principal elements. *Rolfe.*

quaternary steel. Steel composed of the usual iron and carbon with two other alloying elements, as nickel and chromium. *Webster 2d.*

queanes. *See* quenes. *Hess.*

Quebec City series. Same as Quebec group. *Fay.*

Quebec diamond. Quartz crystal. *Shipley.*

Quebec group. A series of strata near Quebec, Canada, formerly supposed to be intermediate in age between the Calciferous and the Chazy, but now known to include beds from the Precambrian to the Lower Silurian. *Fay.*

Quebec standard asbestos testing machine. This well-known machine consists essentially of a nest of three screens and a box or pan resting on a table driven by an eccentric, thereby imparting an elliptical motion to the set of screens. To make a test, a sample of asbestos weighing 16 ounces is put in the machine and run through a series of boxes (four in number) the first three of which contain screening material consisting of wire mesh of different sizes. They are superimposed one above the other. A regular shaking movement results in the shortest fibers in the sample dropping through from the top box to either box 2 or 3 according to its length, while the finest material falls into the bottom pan. After a two-minute test, the fiber in each tray is weighed and the results indicate the proportionate lengths of fiber contained in the product. *Sinclair, W. E., pp. 254-255.*

quebracho. Aqueous extract of a bark of quebracho tree, contains up to 65 percent tannin. Used in froth-flotation as depressant for oxidized minerals. *Pryor, 3.*

queen. Slate measuring 36 by 24 inches. *Pryor, 3.*

queen closer. A cut brick having a nominal 2-inch horizontal face dimension. *ACSG, 1963.*

Queensland opal. Australian opal with light yellowish color. *Shipley.*

Queensland sapphire. Sapphire from near Anakie, Queensland, Australia, which is usually the dark blue of the typical Australian sapphire. Often green, sometimes yellow, pink, or purplish. Rarely lighter and more desirable blue. Many bluish star sapphires also have been found here. *Shipley.*

queen's metal. Corn. An alloy consisting of nine parts tin and one part each of antimony, bismuth, and lead. *Fay.*

queenstownite. Tasmanian tektite. *A.G.I. Supp.*

queensware. Glazed English earthenware of a cream color; cream-colored Wedgwood ware. *Webster 3d.*

queer. a. Prov. Eng. A fissure, joint, or small cavity, as in a rock or vein of quartz. Also spelled quere; queere; qweear. *Fay.* b. Corn. Loose earth in a mine. *Arkell.*

queer creek. A fine-grained sandstone found in Ohio and used in the manufacture of inexpensive sharpening stones. *Fay.*

queery. Corn. When the lode or rock on which the miner is driving partakes of the character of quarry stone, namely, in detached lumps by natural divisions, it is called queery ground, and is frequently worked with crowbars and levers instead of being blasted or gadded. A "queer of ground" is a detached rock. Also called quarry lode. *See also* queer. *Fay.*

queluzite. A manganese-garnet (spessartite) rock, in some varieties containing amphiboles, pyroxenes, or micas with or without free manganese oxides. Residual deposits derived from this rock constitute valuable manganese ores. *Holmes, 1928.*

quench. a. To cool suddenly (as heated steel) by immersion especially in water or oil. *Webster 3d.* b. To produce a crust or a succession of crusts on (molten metal), each crust being removed as it is formed. *Standard, 1964.*

quench aging. Aging induced by rapid cooling after solution heat treatment. *ASM Gloss.*

quench annealing. Annealing an austenitic ferrous alloy by solution heat treatment. *ASM Gloss.*

quench hardening. Hardening a ferrous alloy by austenitizing and then cooling rapidly enough so that some or all of the austenite transforms to martensite. The austenitizing temperature for hypoeutectoid steels is usually above Ac_3 and for hypereutectoid steels usually betwen Ac_1 and Ac_{cm}. *ASM Gloss.*

quenching. a. Generally means cooling steel from above the critical range by immersing in oil or water, in order to harden it. Also applied to cooling in salt and molten-metal baths or by means of an air blast, and to the rapid cooling of other alloys after solution treatment. *See also* oil hardening and tempering. *C.T.D.* b. Rapid cooling; when applicable, the following more specific terms should be used: direct quenching, fog quenching, hot quenching, interrupted quenching, selective quenching, spray quenching, and time quenching. *ASM Gloss.* c. Cooling the hot coke as it comes from the oven by means of water. *Mersereau, 4th, p. 364.* d. Passing of the molten glaze or enamel from the hot smelter into cold water. Also called fritting. *ACSB, 3.* e. The act of terminating a pulse of ionization current in a Geiger-Muller counter. This may be effected internally (internal quenching or self-quenching) by the use for example of an appropriate gas or vapor filling, or externally (external quenching) by momentary reduction of the applied potential difference. *NCB.*

quenching carman. One who operates power equipment which handles the car used to transfer hot coke from ovens to wharf or other loading platform. Also called hot carman; hot car motorman; hot car operator. *D.O.T. 1.*

quenching of frit. Molten glaze-firt or enamel-frit is quenched to break it up, thus making it easier to grind. The simplest method is to allow the stream of molten frit to fall into water, but this does not give uniform quenching and fracture. Better methods are to expose the stream of molten frit to a blast of air and water, or to pass the stream between water-cooled rolls; the latter process gives a flaky product. *Dodd.*

quenching oils. Oils used in heat treating. Fish oils are much used but have offensive odors. Minerals, fish, vegetable, and animal oils are often compounded and sold under trade names. *Crispin.*

quenching pit. A pit filled with water in which graphite, a residue of iron, and slag from hot-metal ladles is granulated, so that it will pass through bin doors when it is recharged into furnace. *Fay.*

quenching steel. The rapid cooling and hardening of steel by immersion in water, or oil. *See also* air-hardening steel. *Nelson.*

quenching tub. A tub of water in which to cool, harden, or temper iron or steel. *Standard, 1964.*

quench time. In resistance welding, the time from the finish of the weld to the beginning of temper. Also called chill time. *ASM Gloss.*

quenes; queanes. Crevices in lodes or veins. *Hess.*

quenselite. A hydrous basic manganite of lead (the only basic manganite known), $2PbO.Mn_2O_3.H_2O$; has a very perfect cleavage; pitch-black crystals; monoclinic. From Langban, Sweden. *English.*

quenstedtite. *See* copiapite. *Larsen, p. 263.*

quergestein. Ger. Strata crossed at right angles by a lode. *Fay.*

quernstone. Millstone. *Arkell.*

questal bentonite. A colloidal bond which, when added to molding sands in amounts up to 3 percent, increases porosity and strength (green and dry), and reduces the amount of water needed. *Osborne.*

quick. a. Applied to a productive vein as distinguished from dead or barren. An ore or pay streak is said to be quickening when the associated minerals indicate richer mineral ahead. *Fay.* b. Pac. A local term for quicksilver. *Fay.* c. Soft water-bearing strata, such as running sand. *Fay.* d. S. Staff. Solid or ungotten coal forming the roof of a roadway in a "thick coal" colliery. *Fay.* e. Blasting powder is said to be "quick" when it burns or goes off very rapidly. *Fay.* f. In electroplating, to wash with quicksilver or other substance that ensures the adhesion of a coating of silver. *Standard, 1964.*

quick condition (quicksand). A condition in which water is flowing upwards with sufficient velocity to reduce significantly the bearing capacity of the soil through a decrease in intergranular pressure. *ASCE P1826.*

quickening liquid. A solution of a salt of mercury, in which articles to be plated with silver are plunged before being put into the silver bath. A thin film of mercury is formed which ensures a perfect adhesion of the silver coating. *See also* quick. *Webster 3d; Fay.*

quick ground. Ground in a loose, incoherent state. *Fay.*

quick-leveling head. A ball-and-socket type of fitting for a dumpy level used instead of the normal three leveling screws to facilitate setting up. *Ham.*

quicklime. A common name for an oxide of calcium made by calcining calcium carbonate. Sometimes added to portland cement as a setting accelerator. *Compare* lime; slaked lime. *Long.*

quicklime sizes. Quicklime may be obtained in different sizes depending upon the type of limestone, kind of kiln used, or treatment subsequent to calcining. The sizes commonly recognized are as follows: (1) large lump—8 inch and smaller, (2) pebble or crushed—2½ inch and smaller, (3) ground, screened, or granular—¼ inch and smaller, (4) pulverized—substantially all passing a No. 20 840-micron sieve. *ASTM C51-47.*

quick match. Rapid burning fuse, burning on its surface only, used to ignite pyrotechnics. *Bennett 2d, 1962 Add.*

quickness. The property of an explosive by virtue of which it exerts a sharp blow or shattering effect on the material with which it is in contact. The quickest explosive of the dynamite class is the 60 percent straight dynamite. Quick explosives are the ones particularly desired for mudcapping. For maximum effect for this purpose, they should be of high density and sensitiveness. *See also* quick, e. *Fay.*

quicksand. a. Sand saturated with water; (1) underground, quicksand tends to run into any opening and must be well supported at all points. Forepoling with closely placed faceboards and the use of bottom boards is required; in major jobs freezing is adopted, and (2) at the surface, quicksand has no bearing capacity, but can be improved in this respect by thorough draining. *Nelson.* b. Sand which is (or becomes, upon the access of water) quick, that is, shifting, easily movable, or semiliquid. *Fay.* Also called running sand.

quicksandy. Containing or abounding in quicksands. *Fay.*

quicksetting cement. A hydroalumina-calcium silicate- or calcium sulfate-base cement that, because of its special composition and fineness of grind, sets in a shorter period of time than ordinary builder's or portland-type cements. *Long.*

quicksetting level. A level which has a quick-leveling head. *Ham.*

quicksilver. a. A common name for mercury; one of the metallic elements, remarkable for its low melting point, being liquid down to minus 40° F. *Fay.* b. To overlay with, or as if with quicksilver, especially to coat (glass) with an amalgam of quicksilver and tin in making mirrors. *Webster 3d.* c. An amalgam of tin used for the reflecting surface of looking glasses. *Standard, 1964.*

quicksilver cradle. A wooden box placed in a sloping position, and fixed upon rockers, in which gold-bearing gravel is washed, the gold being caught by mercury in the lower part of the cradle. *Fay.*

quicksilvering. The process of coating with mercury. *See also* quicksilver, c. *Standard, 1964; Fay.*

quicksilver rock. An altered serpentine consisting mainly of dark opal and chalcedony and commonly associated with the ore in mercury deposits in serpentine. *Webster 3d.*

quicksilver water. *See* quickening liquid. *Fay.*

quick test. A shear test of a cohesive soil without allowing the sample to drain. *See also* drained shear test; unconsolidated-undrained test. *Nelson.*

quickwater. A dilute solution of nitrate of mercury and gold, used in the process of water gilding. *Fay.*

quiebra. a. Sp. A fault, fracture, or break in rocks. *Fay.* b. Sp. The breaking or crushing of ore by hand or machinery. *Fay.*

quiet periods. Periods during which short-period magnetic fluctuations do not exceed specified magnitudes. *Hy.*

Quigley gun. An air gun which mixes dry, granular, refractory materials with water. *Bureau of Mines Staff.*

quilate. a. Sp. The degree of purity of gold or precious stones. *Fay.* b. Sp. A carat. *Fay.* c. Sp. A unit used by assayers in weighing gold and equal to 4 grains. *Hess.*

quill. a. A slow-burning fuse made formerly of the quill of a feather filled with powder. *Standard, 1964.* b. A sleeve-shaped bushing fitting around and splined or keyed to the drive rod or screw in a drill swivel head. It transmits power received from the drill motor to the drive rod and causes the drive rod to be rotated. *Long.* c. Sometimes incorrectly used as a name for drive rod and/or drivescrew. *Long.* d. A sleeve or hollow shaft that slides over, or revolves upon, a solid shaft; used in the design of some clutches or in a flexible coupling of the driving shaft and the driven shaft of two machines. *Long.* e. A hollow or tubular shaft, designed to slide or revolve, carrying a rotating member within itself. *ASM Gloss.* f. Removable spindle projection for supporting a cutting tool or grinding wheel. *ASM Gloss.*

quill shaft. A light drive shaft inside a heavier one, and turning independently of it. *Nichols.*

quincite. Light carmine-red particles found in a limestone near Quincy, France; color apparently organic; a doubtful mineral. *Dana 6d, p. 710.*

quinhydrone electrode. A half cell with a platinum or gold electrode in contact with a solution saturated with quinhydrone, [$C_6H_4O_2.C_6H_4(OH)_2$]. *Lowenheim.*

quinquevalent; quinquivalent; pentavalent. a. Having a valence of 5. *Webster 3d.* b. Having five valences. Tungsten has five valences which are 2, 3, 4, 5, and 6. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-142.*

quinquivalent. *See* quinquevalent. *Webster 3d.*

quintal. a. A metric unit that equals 100 kilograms. *Webster 3d.* Abbreviation, q. *Zimmerman, p. 87.* b. Any of various units of weight, used especially in Latin American and Mediterranean countries, that equals from 100 pounds to about 130 pounds; a hundredweight. *Webster 3d.*

quitclaim. a. A release of a claim; a deed of release; specifically, a legal instrument by which some right, title, interest, or claim by one person in or to an estate held by himself or another is released to another, and which is sometimes used as a simple but effective conveyance for making a grant of lands whether by way of release or as an original conveyance. *Webster 3d.* b. In the United States, a document in which a mining company sells its surface rights but retains its mineral rights. *Nelson.*

quoiceneck. Shrop. Grayish-black clay with streaked shining surfaces. *Fay.*

quoin. a. The keystone or a voussoir of an arch. *Webster 3d.* b. A wedge to support and steady a stone. *Fay.* c. A large square ashlar or stone at the angle of a wall, to limit the rubble and make the corner true and strong. *Standard, 1964.* d. One of the four facets on the crown, on the pavilion, or on the base of a gem. *Standard, 1964.* e. An exterior masonry corner. *ACSG.*

Q-wave. Synonym for Love wave. *A.G.I.*

R

r a. Abbreviation for roentgen or roentgen unit. *BuMin Style Guide, p. 61.* b. Abbreviation for ratio, rod. *Webster 3d.* c. Abbreviation for resistance. *Zimmerman, p. 91.* d. Symbol for refraction. *Webster 3d.*

r. a. Symbol for angle of refraction. *Handbook of Chemistry and Physics, 45th ed., 1964,* p. *F-100.* b. Symbol for angle of reflection, radius, radii, radial distance, nuclear radius. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100; Zimmerman, pp. 163, 183, 192.* c. Symbol for electric resistance, specific resistance. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100; Zimmerman, p. 171.* d. Symbol for specific gas constant. *Handbook of Chemistry and Physics, 45th ed., 1965, p. F-100.* e. Symbol for relative humidity. Also given as r. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100; Zimmerman, p. 157.* f. Symbol for polar coordinates. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.*

R a. Abbreviation for Range or range. *Zimmerman, p. 89.* b. Abbreviation for radius. Also abbreviated r. *Zimmerman, p. 89.* c. Symbol for Réaumur temperature scale. *BuMin Style Guide, p. 61.* d. Symbol for universal gas constant. *Zimmerman, p. 49.* e. Symbol for Reynold's number. *Zimmerman, p. 92.* f. Abbreviation for River or river. Also abbreviated r. *Zimmerman, p. 93.* g. Abbreviation for resistor. *Zimmerman, p. 91.* h. Symbol for ohm. *Zimmerman, p. 76.* i. Abbreviation for rain. Also abbreviated r. *Zimmerman, p. 88.* j. In earthquake seismology, a phase designation applied to Rayleigh waves. Synonym for L_R. *A.G.I.*

R. a. Symbol for resistance, electric resistance, thermal resistance, radiation resistance. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100; Zimmerman, pp. 171, 260.* b. Symbol for radius and for radii. *Zimmerman, pp. 183, 192.* c. Symbol for gas constant, universal gas constant, standard gas constant for air. *Zimmerman, pp. 145, 174, 424.* d. Symbol for range radioactivity. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.* e. Symbol for Reynold's number. *Zimmerman, p. 367.* f. Symbol for Rydberg constant. *Zimmerman, p. 169.* g. Symbol for production rate. *Zimmerman, p. 148.*

Ra. Chemical symbol for radium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

RA Abbreviation for radioactive. *Webster 3d.*

rab. a. S. Wales. Mudstone. *Arkell.* b. Killas fragments. *Arkell.* c. Corn.; Northumb. Broken roadstone. *Arkell.*

rabat. Imperfectly fired potters' clay; used as a polishing material. *Standard, 1964.*

rabatage. A system of working steep seams of any thickness. *See also* rearer workings. *Nelson.*

rabban. Corn. A dry yellowish gossan. *Fay.*

rabbit. A device used for the rapid insertion of irradiation samples into reactors and for their subsequent fast transfer to nearby laboratories. *L&L.*

rabbit ear. Recess in the corner of a die to allow for wrinkling or folding of the blank. *ASM Gloss.*

rabbit-eye. York. Limestone in the Coralline Oolite. *Compare* toad's-eye, a rock with smaller gastropods. *Arkell.*

rabbittite. A very rare, strongly radioactive, monoclinic, pale greenish-yellow mineral, $Ca_3Mg_3(UO_2)_2(CO_3)_6(OH)_4.18H_2O$, found as an efflorescence on mine walls associated with gypsum, sphaerocobaltite, bieberite, and uranium sulfates. *Crosby, pp. 34-35.*

rabble. a. An iron scraper serving for a rake in removing scoriae from the surface of melted metal. *Fay.* b. A charcoal burner's shovel. *Webster 3d.* c. A mechanical rake for skimming the bath in a melting or refining furnace or for stirring the ore in a roasting furnace by hand or mechanically. *Webster 3d.*

rabbler. a. *See* rabble. *Standard, 1964.* b. One who uses a rabble, as in puddling iron. *Standard, 1964.* c. A scraper. *Standard, 1964.*

rabbling. Stirring molten metal, ore, or other charge, using a hoelike tool or other device. *ASM Gloss.*

rabbling rake. Device shaped like a rake; for rabbling by hand. *Bennett 2d, 1962.*

rabbling tool. A rabble of simple construction for use by hand. Also called rabble rake. *See also* rabble, a. *Standard, 1964.*

rabdopissite. Rods of brown bituminous material found in coal from Siberia. *Tomkeieff, 1954.*

rabot. A hardwood block used in polishing marble. *Standard, 1964.*

race. a. An aqueduct or channel for conducting water to or from the place where it performs work. The former is termed the head race, and the latter the tail race. *Gordon.* b. Scot. *See* journey, a. *Fay.* c. Eng. The space in which a winding drum revolves. *Fay.* d. To scrape or clean, as a grindstone, to make it rounder and more abrasive. *Standard, 1964.* e. A small thread of spar or ore. *Fay.* f. Scot. A set or train of hutches coupled together. *Fay.* g. *See* flume. *B.S. 3618, 1963, Sec. 4.* h. A groove along which some part of a machine moves, such as the annular ring in a ball bearing that guides and holds the balls in place. *Long.* i. The excessive speed at which an engine runs when the governor fails to control its speed. *Long.*

raceway. The term is applied to conduits, moldings, and other hollow material, often concealed, through which wires are fished from one outlet to another. *Crispin.*

rachill. Derb. Loose weathered rock at surface. Same as ratchel. *Arkell.*

racing. In S. Wales, a term for topping. *Nelson.*

racing sand. a. Practically the same as molding sand, the difference being one of refinement in the bond property. *Hess.* b. *See* foundry sand. *Hess.*

rack. a. An inclined trough for washing or separating ore. *Nelson.* b. A toothed or notched drill-base-slide and meshing-gear pinion used to facilitate the moving of a drill to clear the borehole when hoisting or lowering the drill string; generally limited to larger, skid-mounted machines. *Long.* c. A framework of wood or metal for the orderly storage of core, pipe rods, etc., in a horizontal position. *Long.* d. Tilting table on which concentrates are separated from passing flow of finely ground pulp, system being arranged to be periodically self-flushing. Racking is old term for concentration in sluice boxes. Also called reck; ragging frame. *Pryor, 3.* e. A screen composed of parallel bars to catch floating debris. *Seelye, 1.* f. In plating, a frame used for suspending and conducting current to one or more cathodes during electrodeposition. *Loweheim.*

rack-and-pinion. *See* rack, b. *Long.*

rack-a-rock. Mining explosive based on mixture of potassium chlorate and nitrobenzene. *Pryor, 3.*

rack back. To move the drilling machine away from the borehole collar by sliding it on its base, using the rack-and-gear pinion to facilitate moving the machine. *See also* rack, a. *Long.*

rack bar conveyor. *See* reciprocating beam conveyor. *ASA MH 4.1-1958.*

rack car. A drier car containing racks to support the greenware without stacking. *ACSG, 1963.*

racked timbering. Timbering braced diagonally as stiffening against deformation. *Ham.*

racker. One who removes green or fired brick, tile, or pipe from hand trucks or conveyor belts and stacks them on rack-drier cars. Sometimes designated according to material racked, as brick racker; shape-brick racker; tile racker. Also called hacker. *D.O.T. 1.*

racker and cleaner. One who wipes dust, grease, or oil from sheet-metal utensils with cloth dipped in benzene and hangs them on racks preparatory to dipping in enamel. Also called cleaner; racker. *D.O.T. 1.*

rack frame. Inclined table used to treat slimes. *Pryor.*

rack gear. A toothed bar. *Nichols.*

racking. a. The setting back slightly of the end of each course of brick or stone as it is laid near the junction with another wall so that each course is shorter than the one below. *Webster 3d.* b. The process of separating ores by washing on an inclined plane. *Fay.* c. The same as ragging. *Standard, 1964.* d. In approaching a corner where two walls meet, racking is the making of each course shorter than the course below it, in order that the workmen on the walls may tie in their courses in the easiest manner. *Crispin.*

racking table. A table on which to wash ore slimes. *See also* rack, a. *Standard, 1964; Fay.*

rack mark. A surface blemish on rolled glass resulting from a mechanical defect in the drive actuating the former roller. *Dodd.*

rack railroad. A cog railway; cog tramway. *Fay.*

rack railway. A mountain cog railway which can be used safely on gradients ranging from 8 up to 15 percent at which steepness the rack system becomes uneconomical and haulage by ropes is to be preferred. *Ham.*

rack up. a. To move the drilling machine forward into alinement with the borehole, using the rack-and-gear pinion to facilitate moving the machine. *Long.* b. To stack and arrange the drill rods in an orderly fashion in the tripod, mast, or derrick, or horizontally on a rack provided on the ground. *Long.* c. To place core on a rack. *Long.*

rad. *See* rem. *ASM Gloss.*

raddle. a. Lanc. Ironstone, or deeply iron-stained rock. *Nelson.* b. York. Earthy hematite occurring in the coal measures. *See also* reddle. *Fay.* c. A rabble. *Standard, 1964.*

raddle balls. Lanc. Ironstone nodules. *Nelson.*

Radenthein process. *See* Hansgirg process.

radial. Lines converging at a single center. *Nichols.*

radial arm. The movable cantilever which supports the drilling saddle in a radial drilling machine. *Crispin.*

radial brick. A brick with the two end faces curved to form parts of concentric cylinders. *Compare* circle brick. *Dodd.*

radial crushing strength. The relative capacity of a plain sleeve specimen of sintered metal to resist fracture induced by a load applied between flat parallel plates in a direction perpendicular to the axis of the specimen. *ASTM B 243-65.*

radial dikes. A descriptive term specially used by Pirsson for those dikes that radiate outward from a center. *Fay.*

radial drainage pattern. In radial drainage, the streams radiate from a central area, like the spokes of a wheel. Volcanoes furnish the most perfect examples of this type of drainage pattern, owing to the marked symmetry of form which usually characterizes them and to the conical nature of their internal structures. *A.G.I.*

radial draw forming. Forming metals by the simultaneous application of tangential stretch and radial compression forces, the operation being done gradually by tangential contact to the die member. This type of forming is characterized by very close dimensional control. *ASM Gloss.*

radial drill. a. A heavy drilling machine in which the drilling head is capable of radial adjustment along a rigid horizontal arm carried by a stand. *See also* radial percussive coal cutter. *Nelson.* b. A small diamond drill having a drilling head that can be adjusted radially along a rigid horizontal arm radiating from a vertical column; usually driven by air and used to drill radial blastholes underground. *See also* radial drilling. *Long.*

radial drilling. The drilling of a number of holes in a single plane and radiating from a common point. *Compare* horadiam. *Long.*

radial drilling machine. A heavy drilling machine, so constructed that the position of the drill can be adjusted to the work without moving the latter. *Crispin.*

radial drill operator. *See* drill press operator. *D.O.T. 1.*

radial faults. a. A group of faults that radiate out from a common center. *Billings, 1954, p. 141.* b. Faults with dominantly vertical displacement. *A.G.I.*

radial flow. Having the working fluid flowing mainly along the radii of rotation. *Webster 3d.*

radial-flow fan. A mine fan in which the air enters along the axis parallel to the shaft and is turned through a right angle by the blades and discharged radially. There are three main types: (1) With backwardly inclined blades; (2) with radial blades; and (3) with forward curved blades. In (2) and (3) the blades are made of sheet steel, while in (1) the present tendency is to replace curved sheet-steel blades by blades of aerofoil section. The aerofoil bladed radial-flow fan has an efficiency of about 90 percent. *See also* axial-flow fan. *Nelson.*

radial gate. A sluice gate having a curved upstream face, mounted on a horizontal pivot axis. Also known as a tainter gate. *Ham.*

radial line plot. In aerial photographic mapping, plot constructed from vertical aerial photographs in which lines radiating from the principal points of the photographs are used as horizontal directions to plot the image points by graphic triangulation. *Seelye, 2.*

radial machineman. In bituminous coal mining, one who operates a radial type coal cutter. The machine remains stationary at the center of the working place and undercuts or shears the coal in an arc rather than making a straight cut by moving across the working face. Also called arcwall machineman. *D.O.T. 1.*

radial percussive coal cutter. A heavy coal cutter for use in headings and rooms in pillar methods of working. The machine weighs about 12 hundredweight and is usually mounted on a light carriage to suit the mine track. A percussive drill, with extension rods, makes a horizontal cut about 5½ feet deep and 15 feet wide at any height in the heading. The central column is tightened between roof and floor about 4½ feet from the face. The machine can also be used for drilling shotfiring holes. *Nelson.*

radial pressure. The radial pressure of wire rope is a function of the rope tension, rope diameter, and tread diameter. The radial pressure can be determined by the following eqution: $P = \frac{2T}{Dd}$, where P equals radial pressure in pounds per square inch; T equals rope tension in pounds; D equals tread diameter of sheave or drum in inches; and d equals rope diameter in inches. *ASA M11.1-1960, p. 35.*

radial rake. The angle between the tooth face and a radial line passing through the cutting edge in a plane perpendicular to the cutter axis. *ASM Gloss.*

radial runout. The total variation in the radial distance of all cutter teeth in a plane of rotation. *ASM Gloss.*

radial slicing. A method of caving by which all the ground around a central raise might be worked in a series of slices arranged like the spokes of a wheel. *Lewis, p. 505.*

radial strain. The change in length per unit length in a direction radially outward from the charge. *R. I., 5356, 1957, p. 4.*

radial stress. Stress normal to the tangent to the boundary of any opening. *BuMines Bull. 587, 1960, p. 2.*

radial velocity. In a fan, the quantity of air delivered in cubic feet per second divided by the outlet area of the fan at the periphery. *Lewis, p. 724.*

radial ventilation. A ventilation system in which a number of downcast shafts arranged around the periphery of the working area are served by a common upcast shaft within the area, or vice versa. Sometimes known as compound ventilation. *B.S. 3618, 1963, sec. 2.*

radian. A unit of plane angular measurement equal to the angle at the center of a circle subtended by an arc equal in length to the radius. One radian equals about 57.29°. *Webster 3d.*

radiant energy. Energy that radiates or travels outward in all directions from its source. *MacCracken.*

radiant heating. Usually a system of heating by surfaces at higher than body temperatures whereby the rate of heat loss from human beings by radiation is controlled. *Strock, 10.*

radiant puncher. One who further indents the more inaccessible designs on the die-impressed surfaces of decorative clay grilles of radiant gas heaters with a steel pick, preparatory to firing. *D.O.T. 1.*

radiant tube furnace. A type of furnace deriving its heat from the radiation of tubes in which the fuel is burned. *Enam. Dict.*

radiate. Emission and diffusion of light and heat. *von Bernewitz.*

radiated. Applied to crystal aggregates that radiate from a center without producing stellar forms. *Fay.*

radiated pyrite. Same as marcasite. *Fay.*

radiate mud cracks. Mud cracks that display an incomplete radiate pattern and lack normal polygonal development. *Pettijohn.*

radiating. A mineral with crystals or fibers arranged around a center point, for example, stibnite. Also called divergent. *Nelson.*

radiation. a. The process of emitting radiant energy in the form of waves or particles; also, the combined processes of emission, transmission, and absorption of radiant energy. *Webster 3d.* b. A term which embraces electromagnetic waves, in particular X-rays, and gamma rays, as well as streams of fast-moving charged particles (electrons, protons, mesons, etc.) and neutrons of all velocities. *See also* primary radiation; secondary radiation. *NCB.*

radiation absorbed dose. The basic unit of absorbed dose of ionizing radiation. One radiation absorbed dose (abbreviation, rad) equals the absorption of 100 ergs of radiation energy per gram of matter. *L&L.*

radiation chemistry. That branch of chemistry that is concerned with the chemical effects (including decomposition) of high-energy radiation and particles on matter. *NRC-ASA N1.1-1957.*

radiation damage. A general term for the alteration of properties of a material arising from radiation exposure to X-rays, gamma rays, neutrons, heavy-particle radiation, or fission fragments in nuclear fuel material. *ASM Gloss.*

radiation detector. A device used either on the surface or in drill holes to detect and/or indicate the occurrence or the nearby presence of radioactive minerals. Also called electronic logger; gamma-ray detector; Geiger counter; Geiger-Mueller counter; Geiger-Mueller probe; scintillation counter; scintillometer. *Long.*

radiation dose. Accumulated exposure to radiation during a specified period of time. *ASM Gloss.*

radiation energy. The energy of a given photon or particle in a beam of radiation, usually expressed in electron volts. *ASM Gloss.*

radiation gage. An instrument for measuring the intensity and quantity of radiation. *ASM Gloss.*

radiation hazard. The danger to living things resulting from the presence of radiation; generally refers to the danger to health from exposure to radiation. *Ham.*

radiation intensity. In general, the quantity of radiant energy at a specified location passing perpendicularly through unit area in unit time. It may be given as number of particles or photons per square centimeter per second or in energy units, as ergs per square centimeter-second. *ASM Gloss.*

radiation monitoring. The continuous or periodic measurement of the intensity of radiation received by personnel or present in any particular area. *ASM Gloss.*

radiation physicist. A person who, through formal education or training and applicable experience, is especially qualified concerning (1) applications of penetrating electromagnetic radiation, as well as atomic particles and (2) the hazards involved and the safety precautions connected with use of such radiations or particles. *ASM Gloss.*

radiation process. Any process giving rise to the production and/or emission of ionizing radiation. *NCB.*

radiation protection guide. The total quantities of ionizing radiation dose over certain periods of time that may be safely permitted to exposed industrial groups. These standards, established by the Federal Radiation Council, are equivalent to what was formerly called the maximum permissible exposure. *L&L.*

radiation pyrometer. a. A device for ascertaining the temperature of a distant source of heat, such as a furnace. A concentrated group of thermocouples, called a thermopile, is used. Radiant heat from the furnace or object is focused by a lens onto the thermopile. Radiation pyrometers may be used for measuring temperatures to 7,000° F. The device is used in automatic control systems in mineral dressing and other processes. *See also* automation. *Nelson.* b. One which determines temperature by measuring the intensity of radiation from the hot body. *Bureau of Mines Staff.*

radiation quality. A term describing roughly the spectrum of radiation produced by a radiation source, with respect to its penetrating power or its suitability for a given application. *ASM Gloss.*

radiation source. A quantity of radioactive material used as a source of ionizing radiation; by extension, any piece of radioactive material. Alpha, beta, and gamma sources are those used primarily to yield the radiations specified, though often other radiations also will be present. *NCB.*

radiation survey. A study of factors in any process or device involving radiation which could cause danger to any persons working near the process or device. *NCB.*

radiation survey meter. An instrument to measure radiation units in the concentration of alpha particles emitted from radon gas and its daughters (particulate decay products which attach themselves to dust particles and water droplets drawn into the instrument and adhering to a molecular filter). *Hartman, p. 54.*

radiation-type gage. An instrument for measuring the density or percentage of solids in slurries flowing through pipes. It normally uses a gamma-ray source, usually cesium 137 or cobalt 60, which is mounted in a lead-shielded holder on one side of the pipe. A radiation detector is mounted on the opposite side. Since the absorption of the gamma radiation, as it passes through the slurry, varies as a function of the density of the slurry, the change in radiation received by the radiation detector is representative of the specific gravity or percentage of solids in the slurry. *See also* differential pressure flowmeter. *Nelson.*

radical. An atom or an element, or a group of atoms or elements, that is the chief constituent of the molecules of a given compound or that will not decompose in the ordinary chemical reactions to which a compound is liable. More specifically, a group of different atoms acting as a single element in a compound and incapable of independent existence, as NH_4 (ammonium) in NH_4Cl (ammonium chloride), or C_2H_5 (ethyl) in C_2H_5OH (ethyl alcohol). *Standard, 1964.*

radio-. A combining form denoting radioactivity or a relationship to it. *NRC-ASA N1.1-1957.*

radio-acoustic range finding. Used to determine position of a ship by measuring the time required for the impulse of a bomb explosion to travel to 2 or more hydrophones at known locations. Abbreviation, rar. *Hy.*

radioactinium. A short-lived radioactive element of the actinium disintegration series. Formed by the degradation of actinium 227; isotopic with thorium (being thorium 227); emits alpha rays and has a half-life of 18.17 days, degrading to actinium X (radium 223); symbol, RdAc; atomic number, 90; and atomic mass, 227. *Hess; Glasstone, 2, p. 135; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-84.*

radioactive. a. Generally, the property possessed by certain elements, such as uranium minerals, of spontaneously emitting alpha, beta, and/or gamma rays by the disintegration of the nuclei of their atoms. *Long.* b. Of, relating to, caused by, or exhibiting radioactivity. Abbreviation, RA. *Webster 3d.*

radioactive dating; radiocarbon dating. a. A technique for measuring the age of an object or a sample of material by determining the ratios of various radioisotopes in it. For example, the ratio of carbon 14 to carbon 12 reveals the approximate age of bones, pieces of wood, and other archeological or geological specimens. *L&L.* b. A method of finding the age of carbon-containing materials by measuring the radioactivity of carbon in the materials. *MacCracken.*

radioactive decay. The change of one element to another by the emission of charged particles from the nuclei of its atoms. *A.G.I.*

radioactive dusts. Dusts which are injurious because of radiation. They include ores of uranium, radium, and thorium. *Hartman, p. 41.*

radioactive element. Applied to certain unstable atoms, the nuclei of which spontaneously disintegrate emitting particles and rays, eventually reverting through a series of such emissions into an atom having a stable nucleus and a different atomic number. For example, radium becomes lead 207. *MacCracken.*

radioactive fallout. *See* fallout. *A&L.*

radioactive indicator; radiothor. A radioactive substance used to detect small quantities of its nonradioactive isotope in chemical analysis. It is mixed in minute quantities with the isotope, and the resulting mixture behaves as a single chemical substance, although the radioactive indicator may always be detected by its radioactivity. *Hackh's Chem. Dict.*

radioactive isotope. *See* radioisotope. *L&L.*

radioactive lead; radiolead. Any of the radioactive isotopes of lead: Lead 194; lead 195; lead 196; lead 197 (isomer); lead 198; lead 199 and isomer; lead 200; lead 201 and isomer; lead 202 and isomer; lead 203 and isomer; lead 204 and isomer; lead 205 and isomer; lead 207 (isomer); lead 209; lead 210; lead 211; lead 212; and lead 214. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-76, B-77.*

radioactive metal. *See* radioactive element. *Bennett 2d, 1962.*

radioactive minerals. Six radioactive elements occur in nature: potassium, rubidium, thorium, uranium, samarium, and lutecium. Thorium, uranium, and associated radium are the only ones of present commercial importance. Thorium usually occurs in monazite, a sparsely scattered accessory mineral of certain granites, gneisses, and pegmatites. However, it is concentrated sometimes by weathering processes in sands and gravels as commercial placer deposits along rivers and beaches. The most important primary uranium ore minerals are uraninite and the massive variety of this mineral, the pitchblendes, and davidite. These are of rather underspread occurrences in certain granites and pegmatites and occur as secondary minerals in metallic vein deposits. However, the secondary uranium ore minerals are more underspread and more numerous than the primary uranium ore minerals. Secondary uranium minerals are found in weathered and oxidized zones of primary deposits and, also, in irregular flat-lying deposits in sedimentary beds primarily sandstones, as in the Colorado plateau where the uranium mineralization was formed by precipitation from solutions. Carnotite, a potassium uranium vanadate of conspicuous yellow color is, perhaps, the most important of the secondary uranium ore minerals. Others are tyuyamunite, closely related to carnotite, and the torbernites and autunites uranium minerals. *Bureau of Mines Staff.*

radioactive series; radioactive disintegration series; radioactive decay series. A succession of nuclides, each of which transforms by radioactive disintegration into the next until a stable nuclide results. The first member is called the parent, the intermediate members are called daughters, and the final stable member is called the end-product. *NRC-ASA N1.1-1957.* Four radioactive series are the uranium series, the thorium series, the actinium series, and the neptunium series. *Glasstone, 2, p. 132.*

radioactive tracer element. A radioactive isotope of an element used to study the movement and behavior of atoms by observing the intensity of radioactivity. *ASM Gloss.*

radioactivity. The spontaneous decay or disintegration of an unstable atomic nucleus, accompanied by the emission of radiation. *L&L.*

radioactivity age method. A method for the determination of the age of formation of certain rock-forming minerals, and thus of the rocks in which they were originally formed, by finding the proportions in them of a certain kind (isotope) of an element to a certain kind (isotope) of another element from which it is known that it must have been derived by radioactive change at a known half-life rate. *Challinor.*

radioactivity concentration guide. The concentration of radioactivity in an environment that results in doses equal to those in the radiation protection guide. This Federal Radiation Council term replaces the former maximum permissible concentration. *L&L.*

radioactivity logs. Logs of boreholes obtained through the use of gamma logging, neutron logging, neutron-neutron logging, or combinations of the several radioactivity logging methods. *A.G.I.*

radioactivity prospecting. The exploration for radioactive minerals utilizing various instruments, generally the Geiger counter or scintillation counter, by measuring the natural radioactivity of earth materials. *Dobrin, p. 7.*

radioaltimeter. Equipment carried in survey aircraft to ensure constant height above ground (not sea) level of 300 or 500 feet—a critical factor in certain airborne geophysical prospecting and aerial mapping surveys. *See also* profile flying. *Nelson.*

radioassay unit. An automatic scanning device for determining radioactivity of diverse types of ore samples. Sufficient accuracy for general character of uranium ore. Service available at AEC installations. *Ballard.*

radio autograph. Photograph of mineral which contains either radioactive isotopes or carries sorbed layers or zones of radioactive tracers. The mineral exhibits its excitation by making a record on photographic film. *Pryor, 3.*

radiobiology. The study of the scientific principles, mechanisms, and effects of the interaction of ionizing radiation with living matter. *L&L.*

radiocarbon. Carbon 14; a radioactive isotope of carbon; it has a half-life of 5,770 years. *MacCracken; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-7.*

radiochemistry. The aspects of chemistry connected with radionuclides and their properties, with the behavior of minute quantities of radioactive materials by means of their radioactivity, and with the use of radionuclides in the study of chemical problems. *NRC-ASA N1.1-1957.*

radio direction finding. Use of directional receivers to estimate position by intercepting and obtaining the bearings of radio transmissions. Abbreviation, rdf. *Hy.*

radioelement. A form or sample of an element containing one or more radioactive isotopes. The combining form radio- before the name of an element indicates a particular radioelement; for example, radiocarbon or radiolead. To avoid ambiguity, the combining form radio- should not be used to indicate radiogenic; thus, radiolead should not be used as a synonym for radiogenic lead. In chemistry, an element with no stable isotopes; for example, polonium or radium. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-127, B-130.*

radio frequency heating. *See* induction heating. *Dodd.*

radiogenic. Produced by radioactive transformation. Thus, uranium minerals contain radiogenic lead and radiogenic helium. The heat produced within the earth by the disintegration of radioactive nuclides is radiogenic heat. *NRC-ASA N1.1-1957.*

radiogenic lead. A stable isotope of lead or a radioactive isotope of lead derived from the disintegration of radioactive isotopes of other elements. Nonradioactive lead 206, the stable end-product of the uranium disintegration series, is radiogenic lead derived ultimately from uranium 238. Radioactive lead 214 and radioactive lead 210 in the uranium disintegration series are also radiogenic lead derived ultimately from uranium 238. *Glasstone, 2, p. 133; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-77.*

radiogold. A radioactive colloidal concentrate of gold 198 (half-life, 64.8 hours) in the particle-size range, 0.003 to 0.007 micron in diameter. Stable to heat but not to autoclaving under pressure; and miscible with many solvents and solutions but flocculated by metallic ions. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-72.*

radiograph. a. A photographic shadow image resulting from uneven absorption of radiation in the object being subjected to penetrating radiation. *ASM Gloss.* b. A picture produced upon a sensitive surface (as a photographic film), by a form of radiation other than light; specifically, an X-ray or a gamma-ray photograph. *Webster 3d.*

radiographic contrast. The difference in density between an image, or part of an image, and its immediate surroundings on a radiograph. Radiographic contrast depends upon both subject contrast and film contract. *ASM Gloss.*

radiographic equivalence factor. The reciprocal of the thickness of a given material that has the same radiographic absorption as a unit thickness of a material taken as a standard. It not only depends on the standard, but also on the radiation quality. *ASM Gloss.*

radiographic sensitivity. A measure of quality of radiographs whereby the minimum discontinuity that may be detected on the film is expressed as a percentage of the base thickness. It depends on subject and film contrast and on geometrical and film graininess factors. *ASM Gloss.*

radiography. a. A nondestructive method of internal examination in which metal or other objects are exposed to a beam of X-ray or gamma radiation. Differences in thickness, density, or absorption, caused by internal discontinuities, are apparent in the shadow image either on a fluorescent screen or on a photographic film placed behind the object. *ASM Gloss.* b. The use of penetrating ionizing radiation to examine solid material. When the source of radiation is internal, such as an implanted radioactive tracer, the technique is known as autoradiography. *L&L.*

radiohalos. *See* pleochroic halos. *Holmes, 1928.*

radioisotope; radioactive isotope. a. An unstable isotope of an element that decays or disintegrates spontaneously, emitting radiation. More than 1,300 natural and artificial radioisotopes have been identified. *L&L.* b. Radioisotope is loosely used as a synonym for radionuclide. *NRC-ASA N1.1-1957. See also* cesium 137; cobalt 60; iridium 192; radium; radon; strontium 90; thulium 170. *ASM Gloss.*

radioisotopic generator. A small power generator that directly converts the heat released during radioactive decay into electricity. Such generators generally produce only a few watts of electricity and use thermoelectric and thermionic converters. *L&L.*

Radiolaria. a. Subclass of the Sarcodina consisting of marine protozoans that possess complex internal siliceous skeletons. *A.G.I. Supp.* b. Silica rock formers. *Mason, V. 1, p. 25.*

radiolarian ooze. Deposits of siliceous ooze which are made up largely of radiolarian skeletons and which are formed at depths between 13,000 and 25,000 feet. *A.G.I.*

radiolarite. a. A siliceous earth composed of fragments of radiolaria. *A.G.I.* b. Indurated radiolarian ooze. *A.G.I.*

radio link. Radio signal unit used to control or communicate between scattered sections of mine, or to link isolated camp with other places. *Pryor, 3.*

radiolite. a. A variety of natrolite, especially that from southern Norway. *Dana 6d, p. 600.* b. Synonym for radiolite survey instrument. *Long.*

radiolite survey instrument. A one-shot borehole-surveying instrument having the horizontal (compass) and vertical indicator markings painted with a radioactive substance, such as that on the luminous dial of a watch. The positions of these markings are recorded on small, circular, photographic film. *Long.*

radiolitic. Proposed by Loewinson-Lessing for a texture of igneous rocks that is not truly spherulitic, but which shows only a radial, fanlike grouping of needles, like sectors of spherulites. *Johannsen, v. 1, 2d, 1939, p. 230.*

radiology. The science of radioactive substances, X-rays, and other high-energy radiations. Specifically, the use of sources of radiant energy in the diagnosis and treatment of disease. *Webster 3d.*

radiolysis. The dissociation of molecules by radiation; for example, a small amount of water in a reactor core dissociates into hydrogen and oxygen during operation. *L&L.*

radiometal. An alloy of permalloy type. It contains 50 percent iron, 45 percent nickel, and 5 percent copper; used because of high magnetic permeability and low hysteresis loss. *C.T.D.*

radiometallography. The application of X-rays to the study of the internal structure of various materials, especially metals. *Fay.*

radiometer. Essentially a heat-flow meter used to measure long-wave radiation as well as solar radiation. It can be used both for daytime and nighttime measurements and to measure the net heat transfer through a surface. *H&G.*

radio methods. Electrical exploration methods based on the passage of radio waves through the ground. *Schieferdecker.*

radiometric assay. A test with a radioassay unit to determine the indicated quantity of uranium. The actual uranium present may be more or less than the radiometric assay shows. *See also* equilibrium, c; inequilibrium. *Ballard.*

radiometric ore sorter. A device for separating gangue from uranium-bearing ore, after primary crushing. Each sorter head comprises a light source and detection unit, and scintillation counter. Each rock piece first falls in front of the light source and the amount of light intercepted produces a signal proportional to the area of the piece. It then falls in front of the scintillation counter head which generates a signal proportional to the radiation received from the rock. The sorter compares these signals and all ore worth processing is passed on while the waste rock is deflected to the waste bin. An in-line feeder is necessary for maximum efficiency. *Nelson.*

radiometric prospecting. Use of portable Geiger Muller apparatus for field detection of emission count in search for radioactive minerals. *Pryor, 3.*

radionuclide. *See* radioisotope. *L&L.*

radio opal. Common opal of a smoky color caused by organic inclusions or impurities. *Shipley.*

radiophone. An F.M. apparatus using the mine haulageway trolley wire for power and antenna, that permits the dispatcher to talk back and forth with his motor crews as they are moving throughout the mine. This saves stopping and starting trips to make telephone calls. *Kentucky, p. 225.*

radiophyllite. a. A white, hydrous calcium silicate, $CaSiO_3.H_2O$. Spheres showing radial platy structure. From Rhineland, Germany. *English.* b. A discredited term equal to zeophyllite. *American Mineralogist, v. 44, No. 3-4, March-April 1959, p. 470.*

radiore method. An electromagnetic method in which a high-frequency current is used, ranging from 30,000 to 50,000 cycles but, if necessary, a frequency as low as 50 to 3,000 can be made available. The detecting or direction-finding coil, mounted on a tripod, has the form of a pair of spectacles and is equipped with an amplifier and head telephone. When the exciting coil is energized, a current is caused to flow in the conductor and a secondary electromagnetic field is set up around the conductor. The detecting coil is affected by both the primary field from the exciting coil and the secondary field. *Lewis, p. 320.*

radiosonde. Apparatus consisting of a free balloon filled with hydrogen and equipped with a self-recording instrument for measuring atmospheric temperature and pressure, as well as with a radio transmitter. The latter transmits readings of temperature and pressure at various heights to the ground. This equipment can be used for weather forecasting under all weather conditions and at considerable heights. *Ham.*

radiothorium. A name for thorium 228; half-life, 1.91 years; and symbol, RdTh. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-84.*

radium. A radioactive metallic element in group II of the periodic system; one of the alkaline-earth metals. The metal is silvery-white and resembles barium in its chemical properties. It occurs in pitchblende, in carnotite, and in other uranium minerals and it is separated from these minerals to obtain the radium salts of commerce. All 13 known radium isotopes (radium 218 to radium 230) are radioactive. The most common and most stable isotope is radium 226 which has a half-life of 1,620 years. Symbol, Ra; valence, 2; atomic number, 88; mass number of the most stable isotope (atomic weight), 226; specific gravity, 5 (?); melting point, reported as 700° C and as 960° C (?); and boiling point, reported as 1,140° C (?) and as below 1,737° C. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-82, B-130, B-212.*

radium A. A very short-lived radioactive element of the uranium disintegration series, of the seventh generation from uranium 238, and formed by the degradation of radon 222. Symbol, RaA; atomic number, 84; atomic mass, 218; isotopic with polonium (being polonium 218); emits alpha particles; half-life, 3.05 minutes; and degrades to radium B (lead 214). *Hess; Glasstone, 2, p. 133.*

radium B. A short-lived radioactive element formed by the degradation of radium A (polonium 218) and eighth in the series of elements formed in the degradation of uranium 238 through the uranium disintegration series. It is isotopic with lead (being lead 214) and with uranium-lead or radium G (lead 206); with actinium-lead or actinium D (lead 207); with thorium-lead or thorium D (lead 208); with radium D (lead 210); with actinium B (lead 211); and with thorium B (lead 212). It emits beta particles and gamma rays; and has a half-life of 26.8 minutes, disintegrating to radium C (bismuth 214). Radium B (lead 214) and radium C (bismuth 214) produce the gamma rays of radium preparations which give radium its value in therapeutics. Symbol, RaB; atomic number, 82; and atomic mass, 214. *Hess; Glasstone, 2, pp. 133, 198.*

radium C. A name for bismuth 214, a member of the uranium disintegration series; symbol, RaC; and half-life, 19.7 minutes. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-79.*

radium C′. A name for polonium 214, a member of the uranium disintegration series; symbol, RaC′; and half-life, 1.64 X 10^{-4} seconds. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-80.*

radium C″. A very short-lived radioactive element of the uranium disintegration series, formed by the degradation of 0.04 percent of the atoms of radium C. It is of the 10th generation of elements formed in the degradation of uranium 238. Symbol, RaC″; atomic number, 81; atomic mass, 210; isotopic with ThC″ (thallium 208), AcC″ (thallium 207), and thallium (being thallium 210); emits beta particles and gamma rays; half-life, 1.32 minutes; and degrades to radium D (lead 210). *Hess; Glasstone, 2, p. 133.*

radium D. A name for lead 210, a member of the uranium disintegration series; symbol, RaD; and half-life, 21 years. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-77.*

radium E. A name for bismuth 210, a member of the uranium disintegration series; symbol, RaE; and half-life, 21 years. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-78.*

radium E″. A name for thallium 206, a member of the uranium disintegration series; symbol, RaE″; and half-life, 4.20 minutes. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-75.*

radium F. A name for polonium 210, a member of the uranium disintegration series; symbol, RaF; and half-life, 138.40 days. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-80.*

radium G. A name for lead 206, the stable end-product of the uranium disintegration series. Natural lead contains 23.6 percent of lead 206. Symbol, RaG. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-77.*

radiumite. A mixture of black pitchblende, yellow uranotile, and orange gummite. *Schaller.*

radium minerals. *See* uranium minerals. *Pryor, 3.*

radius. Horizontal distance from the center of rotation of a crane to its hoisting hook. *Nichols.*

radius and safe load indicator. A freely suspended pendulum hanging from a crane jib over a board on which are marked the crane radius for any angle, together with the safe load for each radius. *Ham.*

radius of curve. A term used in laying mine track and is the calculated radius of an arc which will connect two pieces of track (at a desired angle of direction from each other) with a smooth curve section. *Bureau of Mines Staff.*

radius of gyration. The value used when calculating the slenderness ratio of pillars and struts. If A is the cross-sectional area in inches of the pillar or strut and I is its moment of inertia, the radius of gyration is $\sqrt{\frac{I}{A}}$, generally known as K. *Ham.*

radius of influence of a well. The distance from the center of the well to the closest point at which the piezometric surface is not lowered when pumping has produced the maximum steady rate of flow. *ASCE P1826.*

radius of rupture. In crater tests, the average distance from the center of the explosive charge to the periphery of the crater at the surface. *R.I. 5356, 1957, p. 4.*

radius ratio. The ratio of the radius of the smaller ion to that of the larger ion. It may not exceed 1. *Hurlbut.*

radome. A protective cone for the radar equipment in the nose of an aircraft, rocket, or space vehicle. At high speeds the skin temperature may exceed 500° C and ceramic radomes become necessary; alumina and devitrified glass ceramics have been used. *Dodd.*

radon; radium emanation. a. A heavy, radioactive, zerovalent gaseous element; in group O (inert gases) of the periodic table formed by the disintegration of radium. Used similarly to radium in medicine. Symbol, Rn; atomic number, 86; mass number of the most stable isotope (atomic weight), 222; density of gas, 9.73 grams per liter; melting point, −71° C; and boiling point, −61.8° C. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-130.* b. Radon is the heaviest known gas. Colorless as a gas; yellow to orange-red, phosphorescent, opaque crystals; specific gravity of liquid, 4.4 (at −62° C); and of solid, 4.0; soluble in water; and slightly soluble in alcohol and in organic liquids. All 18 known isotopes from radon 204 to radon 224 are radioactive. Radon 222; emanates from radium; half-life, 3.823 days; and an alpha particle emitter; radon 220 or thoron; emanates from thorium; half-life, 54.5 seconds; and an alpha particle emitter; and radon 219 or actinon; emanates from actinium; half-life, 3.92 seconds; and an alpha particle and a gamma ray emitter. One part of radon exists in 1 sextillion parts of air. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B81, B-131.*

Radstockian. A subdivision of the Coal Measures—based mainly on the contained floras. In part it is represented by the Upper Coal series with coal seams of S. Wales; no coal seams in the Midland and N. Wales coalfields. *Nelson.*

raff. The coarse ore after crushing by Cornish rolls. *Fay.*

raffain. Corn. Poor ore. *Fay.*

raffinite. The aqueous solution remaining after uranium has been extracted by the solvent; the tailing of the solvent extraction system. *Newton, p. 440.*

raff wheel. A revolving wheel with side buckets for elevating the raff. *Fay.*

raff yard. N. of Eng. A walled-in yard on the surface, in which the smiths, wrights, carpenters, etc. work. *Fay.*

raft. *See* float coal. *A.G.I.*

rafter timbering. A method of mine timbering in which the timbers appear like roof rafters. *Fay.*

raft foundation. Continuous slab of concrete, usually reinforced, laid over soft ground or where heavy loads are involved, to form a foundation for the whole extent of a structure. *Ham.*

rafting. a. The transporting of sediment, rocks, silt, and other matter of land origin out to sea by ice, logs, etc., with subsequent deposition of the rafted matter when the carrying agent disintegrates. *H&G.* b. Matting or agglomerating of powdered coal. *Bennett 2d, 1962 Add.*

rag. a. Eng. Flaggy sandstone, Lancashire and Yorkshire. *Nelson.* b. Any of various hard rocks, as a quartzose mica schist used for whetstones or a hard limestone used in building. *Webster 3d.* c. A large roofing slate left rough on one side. *Webster 3d.* d. To break (ore) into lumps for sorting; to cut or dress roughly (as a grindstone). *Webster 3d.*

rag-and-chain pump. Eng. An early type of chain pump in which rags were tied on the chain in place of rubber or metal buttons. Used in draining coal pits. *Fay.*

rag bolt. *See* Lewis bolt. *Pryor, 3.*

rag-burn. Corn. To subject the product of the first dressing of tin ores to a first or partial roasting. *Fay.*

rag frame. A broad, slightly inclined wooden frame for the rough concentration of slimes; used in series. *Nelson.*

ragged coast. A sharply indented coast with numerous peninsulas and islands. *Schieferdecker.*

ragged robins. Shrop. A very irregular ore of iron. *Arkell.*

ragged rolls. Rolls with rough surfaces to facilitate the gripping of the steel in the first stages of rolling as distinguished from the smooth-finishing rolls. *Mersereau, 4th, p. 426.*

ragging. a. The rough washing or concentration of ore or slimes on a rag frame. *Nelson.* b. In roll crushers, grooves cut in surface to improve grip on feed, and increase angle of nip. Also, in ore concentration in jigs, oversized bedding placed on jig screens. *Pryor, 3.* c. *See* bedding, f. *Pryor, 4.*

ragging-off. Pulling down loose coal at the face before loading or setting supports. *Nelson.*

raggle. A groove or channel in a mortar joint or in a special masonry unit (raggle block), to receive roofing, flashing, or other material which is to be sealed in the masonry. *ACSG, 1961.*

raggling. Scot. A channel cut in the side of a mine and covered with boarding to serve as an airway. *Fay.*

raggy stone. Thin-bedded or flaggy sandstone. *TIME.*

raglanite. A facies of nepheline syenite containing, in order of abundance, oligoclase, nepheline, and corundum, with small quantities of micas, calcite, magnetite, and apatite. *Holmes, 1928.*

rag line. A rope or cable the strands of which are made of twisted plant fibers, such as hemp. *Long.*

ragman. A kind of paving stone. *Arkell.*

rag pump. a. A chain passing through a pipe, with pieces of rag here and there, which act as buckets or suckers. *Gordon.* b. Corn. A chain pump. Also called rag-wheel pump. *Fay.*

rag roofing felt. An absorbent sheet of felted fibers of vegetable or animal origin, or mixture thereof, suitable for use in the manufacture of bituminous saturated felt, roll roofing, siding, and shingles. *ASTM D1079-54.*

ragstone. a. Scot. Dark hard sandstone. *Nel-*

son. b. Any hard, coarse textured rock quarried in thin slabs as for pavement. *Bureau of Mines Staff.*

rag wheel. a. A sprocket wheel. *Webster 3d.* b. A polishing wheel made of disks of cloth clamped together. *Webster 3d.*

ragwork. A term applied to wall construction in which undressed flat stones of about the thickness of a brick are built up into a wall the outer faces of which are left rough. *C.T.D.*

rail. The chain or inner surface of a crawler. *Nichols.*

rail bender. A portable appliance for bending rails to make curves and turnouts for mine track or for straightening bent or curved rails. *See also* Jim Crow. *Bureau of Mines Staff.*

rail blocks, chocks and skids. A variety of stopping and holding devices which can be mounted on the rails as needed for slowing railroad cars or holding them in place. Blocks or chocks are basically wedges that prevent rolling of the wheels and may also have a flag or sign attachment to indicate their use. Skids are also placed on the rails and are designed to slide along the rail, braking the car to a stop. *Bests, p. 371.*

rail bonder. *See* bonder, b. *D.O.T. 1.*

rail chair. A type of cast-iron support for a rail, now superseded by a rail fastening. *Ham.*

rail clamp. A device for connecting a conductor or a portable cable to the track rails which serve as the return power circuit in mines. *ASA C42.85: 1956.*

rail fastening. A cast-iron plate (having holes for track spikes) placed between the base of the rail and top of the tie before spiking rail in place. *Bureau of Mines Staff.*

rail gage; track gage. The distance or width between the inner edges of the heads of the rails; (1) in coal mining, the rail gage for tub and car tracks ranges from 2 to 3 feet, and 2⅓ feet is considered a satisfactory compromise; (2) the standard gage for railway tracks is 4 feet, 8½ inches and, (3) in metal mining, the rail gage ranges from 1½ to 2½ feet. *Nelson.*

rail haulage system. A materials transportation system consisting of gondola cars, and the steel rails on which the cars are moved about with a suitably powered traction unit as a locomotive. *Bureau of Mines Staff.*

rail riffles. These may be either longitudinal or transverse and consist of rails of various sizes, placed in sets usually upside down, either longitudinally in the sluice box, or transversally across the box. They wear well, are rigid, and give some security against theft of gold from the sluice boxes. *Griffith, S. V., p. 62.*

railroad-car cleaner. *See* car cleaner. *D.O.T. 1.*

railroad-car loader. *See* chute puller. *D.O.T. 1.*

railroad-car shifter. *See* car pincher. *D.O.T. 1.*

railroad powder. An explosive consisting of assorted grains, similar to gunpowder, made in such a way that the grains are not porous, having nitroglycerin on the surface not absorbed by the grain. Abbreviated, R.R.P. *Fay.*

rails. a. Specially shaped steel bars which when laid parallel on crossties and fastened thereto form a track for vehicles with flanged wheels. *Bureau of Mines Staff.* b. A unit measure of deadwork in circular longwall mining where face track was used (a rail being 20 feet which was equivalent to length of a 12 pound rail used in the track). *Bureau of Mines Staff.* c. Unit measure of a room in circular longwall mining where track was used on the face (a room usually was 3 rails or 60 feet). *Bureau of Mines Staff.*

rail steel. The steel used for making rails for mine tracks; generally either low carbon steel or high carbon steel. Chrome and manganese steel which have a much higher resistance to wear are also used. *Nelson.*

rail track. Normally, parallel steel rails laid to track gage on sleepers to form a track for the running of railway wagons or mine cars. *Nelson.*

rail track ballast. Material placed around and between track ties and tamped under sides and ends of the ties to bring the track to proper grade thus filling the space between the bottom of the ties and the graded roadbed. *Bureau of Mines Staff.*

rail train. A train for rolls for reducing iron or steel ingots or blooms to rails. *Fay.*

railway (railroad) curves. A set of templates comprising thin sheets of wood or celluloid cut out to arcs or spirals of differing radii and used for drawing railway curves to scale. *Ham.*

railway wagon. *See* wagon. *Nelson.*

rain. Mid. Water dropping freely from the mine roof. *Fay.*

rainbow chalcedony. Eng. A variety of chalcedony of thin concentric layers, which, when cut across, exhibit an iridescence resembling the colors of the rainbow. *Fay.*

rainbow obsidian. An American Indian name for iridescent obsidian. From Lake County, Ore. *Shipley.*

rainbow quartz. *See* iris. *C.M.D.*

rain casts. *See* rain prints. *Pettijohn.*

rain chamber. A chamber in which fumes, as from molten metal, may be condensed by a water shower. *Standard, 1964.*

rain channel. In geology, a miniature furrow on a rock surface carved by the rain. *Standard, 1964.*

rain-drop impressions. *See* rain prints. *Pettijohn.*

rainfall. The total amount of rain deposited over a given area as measured in a rain gage. Melted snow and hail are included with rain, this precipitation from clouds composing the greater proportion of rainfall. Very small additions are derived from dew and hoar frost. There are three different types of rainfall: orographic, cyclonic, and convectional. The heavy rainfall on the mountains of western Scotland is mainly orographic; cyclonic rainfall caused by depressions occurs in eastern England and on the Continent; convectional rainfall is typical of equatorial regions. Rainfall in any particular place depends largely upon the prevailing winds and may vary seasonally. *Ham.*

rain gage. An instrument which collects and measures rainfall, comprising a funnel, generally from 5 to 8 inches in diameter at the mouth, held in a glass vessel which contains the rain that has fallen upon the funnel. Water cannot evaporate from the vessel. When it has been collected for a period, it is measured in another vessel graduated in relation to the area of the mouth of the funnel. Rainfall is expressed in inches or centimeters of depth, representing that depth to which the ground would have been covered with rain, assuming that none could escape from the gage since the last time it was read. A measurement of 1 inch represents the equivalent of 100 tons of water on 1 acre. *Ham.*

Rainier. The first completely contained nuclear explosion, code name Rainier, of 1.7 kiloton energy release (TNT equivalent) fired at the Nevada Test Site of the Atomic Energy Commission on September 19, 1957. Although one of the prime purposes of the blast was to test the depth of solid rock necessary to contain a nuclear explosion, the rock breakage, seismic waves generated and local effects on the rock were also of vital interest. *Lewis, pp. 141, 143.*

rain pillars. Minor erosional forms composed of upward projecting pillars of soil or soft rock capped and protected by pebbles or concretions. The soil around the pillars is cut away by the impact of falling rain. *Stokes and Varnes, 1955.*

rain prints; rain casts; rain-drop impressions. Small circular pits formed in soft sediment, usually mud, generally preserved as casts on underside of superjacent sandstone bed. *Pettijohn.*

rain-spot slate. A mottled Lower Silurian slate of Wales. *Standard, 1964.*

rain stone. Pebbles of waterworn quartz. *Shipley.*

rainwash. a. On exposed mountainous countries the light matters thus formed are washed away by rain, or roll down the hillsides by their own weight. These accumulations of rainborne decomposed rock go by the general term of rainwash. *A.G.I.* b. On more gentle slopes, even where no bare rock projects into the air, the fall of rain gradually washes down the upper parts of the soil to lower levels. Hence, there arise thick accumulations of what is known as rainwash. *A.G.I.* c. The water from rain, after it has fallen on the surface of the ground and before it has been concentrated into definite streams; the work done by this water in striking the earth's surface and in transporting debris. *USGS Bull. 730, 1923, p. 89.*

rain water. The purest form of naturally-occurring water on earth. It is described as soft water because it easily lathers with soap. The nitrous and nitric acids present in the air and contained in rain water are produced from the oxides of nitrogen formed by electrostatic charges in the atmosphere. Rain water has a definite chemical action on metals and rocks in addition to its erosive or mechanical action. *Cooper, p. 359.*

raise. a. A vertical or inclined opening driven upward from a level to connect with the level above, or to explore the ground for a limited distance above one level. After two levels are connected, the connection may be a winze or a raise, depending upon which level is taken as the point of reference. *Lewis, p. 21.* b. A mine opening, like a shaft, driven upward from the back of a level to a level above, or to the surface. *Cumming.* c. To cause to rise, or expand upward. *Fay.* d. Eng. To wind coal, etc., to the surface. *Fay.* e. To take up the floor or bottom rock in a room, gangway, or entry to increase the height for haulage. *Fay.* f. A vertical or inclined opening or passageway driven to connect one mine working place with another at a higher level. Also called rise; riser. *Webster 3d.*

raised bank. *See* natural levee. *Schieferdecker.*

raised beach. A shelf or terrace of shingle, gravel, and sand elevated above the present level of the lake or sea in which it was formed, and indicating a change in the relative level of land and water surface. *Fay.*

raised coast. *See* raised shoreline. *Schieferdecker.*

raise driller. a. In metal mining, one who works in a raise (passageway driven from a lower level upward into the ore or to an upper level of the mine). Also called raiseman. *D.O.T. 1.* b. *See* roof bolter. *D.O.T. Supp.*

raised shaft. *See* raise. *Fraenkel.*

raised shoreline; raised coast. A coast having undergone an absolute raise. *Schieferdecker.*

raiseman. *See* raise driller. *D.O.T. 1.*

raising. Excavating a shaft or steep tunnel upwards. *See also* rise. *Nelson.*

rait; rate. Mid. To split off the walls or sides of underground workings. Called rosh in Leicestershire. *Fay.*

rake. a. A train of mineral trucks. *Pryor, 3.* b. A timber placed at an angle. Also called raker. *Sandstrom.* c. Shale containing ironstone nodules. *B.S. 3618, 1964, Sec. 5.* d. Can. Direction of ore below surface. Also called plunge. *Hoffman.* e. As used by diamond drillers and bit manufacturers, rake is the angle, measured in degrees, formed by the leading face of a cutting tool and the surface behind the cutting edge. *Compare* negative rake; positive rake. *Long.* f. Scot. A journey of trams. *Nelson.* g. Derb. An irregular vein of ironstone or any transverse fissure vein. *Nelson.* h. A forked hand tool for loading coal underground, especially for loading large coal only. *Nelson.* i. A batter or angle of inclination. *Nelson.* j. Mid. To smother a ventilating furnace with fuel, so that it smolders for many hours. *Fay.* k. Mid. An iron rake with a short handle, with which fillers fill baskets or pans. *Fay.* l. Derb. A series of beds of clay ironstone lying within a few feet or yards of one another, making a workable ironstone. *Fay.* m. Derb. A fissure vein crossing the strata. Also called rake vein. *Fay.* n. The inclination of anything from the vertical; said of mineral veins, faults, etc. *Fay.* o. *See* race, f. *Fay.* p. The angular relationship between the tooth face, or a tangent to the tooth face at a given point, and a given reference plane or line. *ASM Gloss.* q. *See* block reek. *ACSG, 1963.*

rake bind; rake shale. York. Shale containing ironstone nodules. *Arkell.*

rake blade. A dozer blade or attachment made of spaced tines. *Nichols.*

rake classifier. A type of mechanical classifier utilizing reciprocal rakes on an inclined plane to separate coarse from fine material contained in a water pulp, overflowing the fine material and discharging the coarse material by means of an inclined raking system. *Bureau of Mines Staff.*

rake of skips. Aust. A number of skips connected that form a set or train. A trip. *See* race, f. *Fay.*

rakers. a. Slanting props placed at the end of a drift set to keep the timbers steady when blasts go off. *Fay.* b. Eng. Shots placed round a sumper shot. *Fay.*

rake thickener. Equipment for thickening in which the concentrated suspension settles in a container of circular section and is delivered mechanically to one or more discharge points by a series of arms revolving slowly around a central shaft. *B.S. 3552, 1962.*

rake vein. a. Rake vein and gas vein are synonymous; it is said that they are lodes filling distinct fissures. Their course is irregular, their dip, as a rule, vertical. *Ricketts, p. 127.* b. A steeply inclined metalliferous lode or vein. *B.S. 3618, 1964, sec. 5.* c. Derb. In lead mining, a vertical or highly inclined vein, as distinguished from a flat vein or a pipe vein. *See also* rake, m. and n. *Fay.* d. A vein or lode cutting through the strata. *Fay.*

raking bond. One characterized by diagonal headers—either all parallel or laid in herringbone pattern. *Bureau of Mines Staff.*

raking coal. Eng. A large lump of hard coal placed upon a fire or ventilating furnace, for the purpose of just keeping it burning, or rather smoldering, when a larger fire is not required. *Fay.*

raking pile. A pile which is not vertical; its purpose is to sustain thrust. *Ham.*

raking prop. An inclined timber prop. *Nelson.*

raking strut. A strut set at an angle to the vertical to support timbering during excavation. *Ham.*

raku. The name of a very soft lead-and-borax glazed Japanese ware chiefly used for the tea ceremony. *ACSG.*

raku ware. A type of pottery used in Japan for the tea ceremony. The ware is thick-walled, covered with a very soft lead borosilicate glaze, and is once-fired at about 750° C. *Dodd.*

Raky boring method. A method of boring somewhat similar to Fauck's. Hollow steel rods 2 inches in diameter are used with a mud flush. A walking beam, fitted with steel springs, imparts from 80 to 120 short blows to the chisel each minute. *Nelson.*

Raleigh's law. In 1909 Lord Raleigh established the general law of fluid flow:

$$R = wV^2(f)\frac{wVD}{m},$$

where R=resistance of flow, w=density of fluid, V=velocity of flow, D=diameter of pipe, m=viscosity of fluid, f=signifies function. For any particular value of (wVD)/m, using any combination of quantities, there will be a definite corresponding value of R/wV^2. *Lewis, pp. 708-709.*

ralstonite. A colorless, white or yellowish mineral crystallizing in octahedrous without cleavage, $(Na_2,Mg)F_2.3Al(F,OH)_3.2H_2O$; Mohs' hardness, 4.5; and specific gravity, 2.61. *Larsen, p. 47.*

Ralston's classification of coal. A classification based on the percentage of carbon, hydrogen, and oxygen in the ash-, moisture-, sulfur-, and nitrogen-free coal. These figures are plotted on trilinear coordinates giving well-defined zones of bituminous coals, lignites, peats, etc. *Miall.*

ram. a. To stem; tamp. *Mason.* b. Orc. Black ram, bog iron ore; gold ram, gold ore. *Compare* brockram. *Arkell.* c. The plunger of a pump. *Zern.* d. A device for raising water. *Zern.* e. *See* barney. *Fay.* f. A mechanical pusher for forcing (discharging) the coke from a byproduct coke oven. *Mersereau, 4th, p. 364.* g. A hydraulic cylinder. *Nichols.* h. The moving weight in a pile-driving hammer. *Nichols.* i. The movable part of a shaper which carries the tool. *Crispin.* j. The piston of a hydraulic press. *Crispin.* k. *See* hydraulic ram. *Crispin.* l. The moving member to which the forming punch is fastened. *ASM Gloss.*

Raman effect. A change in frequency undergone by a portion of the light that has been scattered in its passage through a transparent liquid, solid, or gas, the characteristics of which determine the amount of change. *Webster 3d.*

ramble. a. Eng. Used among Lancashire miners for roof coal or roof shale. *Tomkeieff, 1954.* b. Eng. A stratum lying immediately above a seam which often falls as the coal is worked. Also called following stone. *SMRB, Paper No. 61.*

ramblin stone. Northumb. A loose stone. *Arkell.*

ramdohrite. a. A dark gray sulfantimonite of silver and lead, $Ag_2S.3PbS.3Sb_2S_3$; prismatic to lance-shaped crystals. From Potosi, Bolivia. *English.* b. A discredited term equal to andorite. *American Mineralogist, v. 28, No. 3, March 1943, p. 214.*

ramilly clot. Indurated clay with sand intermixed. *Arkell.*

Ramix. Refractory of high magnesia content. *Bennett 2d, 1962.*

rammel; rumel. Loose stone, rubbish stone, loose sandy or hard stony barren soil. *Arkell.*

rammell. Eng. In the Midland counties, beds of shale or clay and sandstone. *Nelson.*

rammelly. Mid. Mixed argillaceous and sandy rocks. *Fay.*

rammelsbergite. A mineral, essentially nickel diarsenide, $NiAs_2$, like chloanthite, but with isomorphous iron diarsenide. Orthorhombic. *Fay.*

rammer. A rod for charging and stemming shotholes. *See also* stemmer. *Nelson.*

ramming. a. Stemming; tamping. *Mason.* b. Same as scaling. *Stoces, v. 1, p. 113.* c. Packing sand, refractory, or other material into a compact mass. *ASM Gloss.* d. The packing of molding sand around a pattern in a mold. *Freeman.*

ramming and patching refractories. Those which can be rammed to form a monolithic furnace lining or special shapes. *Bureau of Mines Staff.*

ramming bar. N. of Eng. A beater. A tamping or stemming bar or rod. *Fay.*

ramming material. A coarsely-graded refractory batch which, when moistened, can be rammed into position, in a furnace hearth for example. The rammed mass becomes strong and monolithic by vitrification or sintering in place. *Dodd.*

ramming mix. A ground refractory material which is mixed with water and rammed into place for patching shapes or for forming monolithic furnace linings. *HW.*

ramoff. A casting defect resulting from the movement of sand away from the pattern because of improper ramming. *ASM Gloss.*

ram, one way or single acting. A hydraulic cylinder in which fluid can be supplied to only one end so that the piston can be moved only one way by power. *Nichols, 2.*

ram operator. In bituminous coal mining, a laborer who tends operation of, adjusts, and repairs pumping devices (rams) used in low places in shallow mines to force a portion of the mine water to the surface by utilization of the flow of the entire amount. Nearly obsolete. *D.O.T. 1.*

ramp. a. A fault that is a gravity (normal) fault near the surface of the earth, but curves through the vertical to dip in the opposite direction at depth, where the displacement is that characteristic of thrusts. *A.G.I.* b. An accumulation of snow forming an inclined plane between land or land ice and sea or shelf ice. *A.G.I.* c. A long, gentle slope comprising most of the continental shelf. *A.G.I.* d. In a gastropod, the sloping surface of a whorl next below a suture. *A.G.I.* e. An inclined approach; used loosely when applied to a loading ramp. *See also* car slide. *Nelson.* f. Rerailer. *Mason.* g. An incline connecting two levels. *Nichols.*

ram pressing. A process for the plastic shaping of tableware and sanitary ware by pressing a bat of the prepared body between two porous plates or mold units; after the pressing operation, air is blown through the porous mold parts to release the shaped ware. *Dodd.*

ram pump. a. A pump consisting essentially of a plunger or ram which forces the contained water into the discharge pipe. *See also* force pump. *Nelson.* b. A single-acting reciprocating pump which has a ram instead of a piston. The ram has a constant diameter and does not fit closely in the cylinder, pumping only by displacement. *Ham.*

ramp valley. a. A valley produced by the ramping or upthrusting of two masses, one on either side of the intervening strip. *A.G.I.* b. A valley bounded by thrust faults. *A.G.I.*

rams; pushers. Appliances for exerting a pressure on face equipment such as steel supports, conveyors, or ploughs. There are two types available, hydraulic and pneumatic ram. *See also* hydraulic ram; pneumatic ram. *Nelson.*

ramsayite. A rare, dark brown to black, titanosilicate of sodium, $Na_2O.2SiO_2.2TiO_2$; orthorhombic. Large crystals. A variety of lorenzenite, partly lacking its zirconia. From Kola Peninsula, Russian Lapland, U.S.S.R. *English.*

ram scraper; Peissenberg ram. A plough-type machine hauled by endless chain at a speed of 6 feet per second. The ram scraper is pressed towards the face by the tension of the return strand, the return sheave being located inby for this purpose. *Nelson.*

ramsdellite. A mineral, orthorhombic, MnO_2, dimorphous with tetragonal pyrolusite. *Spencer 17, M.M., 1946.*

ram, two way or double acting. A hydraulic cylinder in which fluid can be supplied to either end, so the piston can be moved by power in two directions. *Nichols, 2.*

rance. a. Scot. A long narrow pillar of coal. *Fay.* b. A prop set against the coal face that is undermined. *Fay.* c. Fr. A dull red marble with blue and white markings. *Webster 2d.* From Belgium, and sold in the United States as Belgian marble. *Fay.*

rance marble. a. A white, hard, shining grit, striped red. *Arkell.* b. A kind of variegated marble from Hainault, Belgium. *Arkell.*

rance rag. Eng. Oölitic building stone quarried at Raunds, Northamptonshire. *Arkell.*

Rancholabrean. Upper Pleistocene. *A.G.I. Supp.*

rancid. A rank taste or smell resulting from decomposition. *API Glossary.*

rand. a. Dutch. A range of hills. *Fay.* b. S. Afr. A highland or the highlands on either side of a river valley. *Standard, 1964.*

Rand. An abbreviation of Witwatersrand, the gold field in the Republic of South Africa. The gold occurs in beds of conglomerate called banket, which is the Dutch name for almond rock. The mines are very deep and precooling of the air is necessary due to the high temperatures. *Nelson.*

randanite. Original spelling of randannite. *Hey 2d, 1955.*

randannite. A local variety of diatomaceous earth occurring in the neighborhood of the Puy-de-Dome, France. A synonym of kieselguhr. *Fay.*

Randolph process. A modification of the series process of copper refining in which the electrodes lie horizontally, the top surface of each one acting as anode, the lower as cathode. Theoretically, it has the advantage of extremely low metal losses and great purity of copper. Practically, it is difficult to right matters in a tank after a short circuit. *See also* Hayden process; Smith process. *Liddell 2d, p. 495.*

random. The direction of a rake vein. *Fay.*

random access. Giving of equal time to all memory locations. *Pryor, 3, p. 32.*

random ashlar. Structural unit for limestone that consists of blocks of several sizes that may be fitted together to make a wall having unequally spaced joints. *AIME, p. 330.*

random courses. Courses of masonry in which the stones are of different thickness, though dressed and fitted. *Standard, 1964.*

random error. Not biased, therefore may cancel out in a series carefully observed. *Pryor, 3, p. 159.*

random line. a. A trial line, directed as nearly as may be toward a fixed terminal point which is invisible from the initial point. *Seelye, 2.* b. A random traverse, that is, a traverse run from an initial to a terminal point to determine the direction of the latter from the former. *Seelye, 2.*

random noise. An oscillation, the instantaneous magnitude of which is not specified for any given instant of time. The instantaneous magnitudes of a random noise are specified only by probability distribution functions giving the fraction of the total time that the magnitude or some sequence of magnitudes lies within a specified range. *Hy.*

random orientation. Synonym for random set. *Long.*

random pattern. The setting of diamonds in a bit crown without regard to a geometric pattern—without regular and even spacing. Also called random set. *Long.*

random rubble. Uncoursed rubblework. *Standard, 1964.*

random sample. a. A chance sample taken without plan or pattern. *See also* systematic sampling. *Nelson.* b. Observation, or group based on samples drawn with the best available probability for exhibiting correctly the value under scrutiny. *Pryor, 3.*

random sampling error. Errors which lead to results which are sometimes higher and sometimes lower than the true figure. The magnitude of random errors are generally denoted by the variances (mean square deviations from the mean), and are additive. *See also* duplicate sampling. *Nelson.*

random sequence. A longitudinal sequence where the weld bead increments are deposited at random to minimize distortion. *ASM Gloss.*

random set. *a.* The setting of diamonds in a bit crown without regard to the attitude of their vector properties. Also called random orientation. *Long.* b. Synonym for random pattern. *Long.*

random setting. *See* random set; random pattern. *Long.*

random stone. A term applied by quarrymen to quarried blocks of any dimensions. *Fay.*

random thickness block. Unfabricated block mica not segregated into specified narrow thickness ranges. *Skow.*

random walk. Statistically, path taken by particle which moves by chance-directed steps as regards direction taken and magnitude of movement. May be limited by an absorbing barrier in sequential sampling processes. *Pryor, 3.*

random work. Stonework laid up in irregular order; as a wall built up of odd-sized stones. *Crispin.*

R & S plastometer. A device designed by ceramic consultants for the assessment of the rheological properties of a clay slip in terms of the time taken for a given volume of the slip to flow through a tube of known diameter. *Dodd.*

Randupson process. A system of molding in which the molds are made of a mixture of silica sand and cement with water added. *Osborne.*

rang. A division of igneous rocks considered after the division into orders, based (in classes I, II, and III) on the relative proportions of the molecules of salic K_2O and Na_2O to those of salic CaO. This division is analogous to the more general division of rocks into alkali and calc alkali types and usually fails to express the kind of feldspar present. In classes IV and V, the rangs are based on the relative proportions of the molecules of MgO, FeO, and femic CaO to those of femic K_2O and Na_2O. This is analogous to the division of perknites, peridotites, and similar rocks into normal and alkali types. *Holmes, 1928.* b. A Ceylonese term for gold, taken from rangwelle, meaning golden sand. *Fay.*

range. a. A chain of mountains or hills. *Fay.* b. A belt or strip of country within which certain economic minerals are supposed to occur or run. *Fay.* c. In the Lake Superior region, a term applied to a deposit of iron ore and the associated rocks. It originated from the finding of ridges or ranges formed by the wearing of the softer rocks while the hard rocks in which the iron ore is found made ridges, or low ranges. Now the term simply means deposits of iron ore, which are all known as ranges, even if the ground where they occur be low swamps. *Fay.* d. One of the north-south rows of a township in a U.S. public-land survey that are numbered east and west from the principal meridian of the survey. *Webster 3d.* e. An orderly arrangement or family of diamond-drill fittings, such as casing, core barrels, drill rods, etc., with diameters appropriately related to each other and intended to be used together. Ranges commonly are designated by letter names, using letters such as E, A, B, and N individually or as the first letter in two and three letter names. *Compare* group, f. *Long.* f. The prolongation (usually by eye) of any line to intersect a transit line, or other fixed line.

Example: The side of a building or the line of a fence may be ranged on to a transit line; or on to the line of the side of another building. The point of intersection is said to be in range with the fence, or with the sides of the two buildings. *Seelye, 2.* g. In hydrography, an established line along which soundings are taken. *Seelye, 2.* h. The difference between the greatest and least of a number of results. *B.S. 1017, 1960, Pt. 1.*

range coal. A term used in Iowa for a small lump coal. *Fay.*

range, geologic. Synonym for range, stratigraphic. *A.G.I.*

range line. In public land survey; any meridional township boundary line. *Seelye, 2.*

range of stress. The range between the upper and lower limit of a cycle of stress, such as is applied in a fatigue test. The midpoint of the range is the mean stress. *C.T.D.*

range pole; ranging rod. a. A 6 to 12 foot wooden pole painted in contrasting colors at one foot intervals. Used in surveying to mark lines of sight, stations, etc. *Pryor, 3.* b. *See* picket. *Fay.*

range, stratigraphic. The distribution of any given species, genus, or other taxonomic group or organisms throughout geologic time. Synonym for range, geologic. *A.G.I.*

range work. Ashlar laid in horizontal courses of even height. Also called range masonry. *Webster 3d.*

range zone. A biostratigraphic unit defined and identified by the actual occurrence of a single fossil or a group of fossils. *A.G.I. Supp.*

ranging. a. Scot. Searching for minerals by means of shallow pits across the outcrops. *Fay.* b. The English term for aligning a tunnel *Stauffer. See also* alignment. *Fay.*

ranging rod. *See* range pole.

rank. a. This term describes the stage of carbonification attained by a given coal. *IHCP, 1963, pt. 1.* b. The place occupied by a coal in a classification. Specifications of the American Society for Testing and Materials cover the classification of coals according to their degree of metamorphism, or progressive alteration, in the natural series from lignite to anthracite. The basic scheme of this classification is according to fixed carbon and calorific value (expressed in British thermal units per pound) calculated to the mineral-matter-free-basis. The higher-rank coals are classified according to fixed carbon on the dry basis; the lower-rank coals are classed according to calorific value on the moist basis. Agglomerating character is used to differentiate between certain adjacent groups. For a complete analysis of this classification consult ASTM Designation: D 388-64T. *American Society for Testing and Materials. 1966 Book of ASTM Standards, Part 19–Gaseous Fuels; Coal and Coke, p. 73.* c. When applied to coal, denotes its age in geological formation. Not necessarily denoting quality. *B.C.I.* d. The position of a coal relative to other coals in the coalification series from brown coal (low rank) to anthracite (high rank), indicating its maturity in terms of its general chemical and physical properties. *B.S. 3618, 1964, sec. 5.* e. Those differences in the pure coal material due to geological processes designated as metamorphic, whereby the coal material changes from peat through lignite and bituminous coal to anthracite or even to graphite. *A.G.I.* f. All fossil fuels form a continuous and progressive series, ranging from lignite, through the various bituminous coals, to anthracite. It is the position of a coal in this series that determines its rank. Therefore, lignite is a low-rank coal while anthracite is a high-rank coal. *See also* coalification; grade; Hilt's Law; coal rank. *Nelson.* g. A term primarily devised to indicate the position of a fuel in the series peat-anthracite, probably best measured by the percentage of carbon (ashless, dry basis). Thus rank depends on the degree of metamorphism of coal, and increase of rank is, in general, marked by the decrease of volatiles and moisture. *Tomkeieff, 1954.* h. The term rank may also be applied to other series, such as the sapropelic coal series or the bitumen series. *Tomkeieff, 1954.*

Rankine cycle. An ideal reversible heat-engine cycle approximated by the operating cycle of an actual steam engine. *Webster 3d.*

Rankine scale. A temperature scale in which the zero is absolute zero and the size of the degrees is that of the Fahrenheit scale, that is, the temperatures in degrees Rankine are equivalent to degrees Fahrenheit plus 459.6. *Osborne.*

Rankine's formula. An empirical formula giving the collapsing load for a given column. *C.T.D.*

Rankine's theory. The state of stress theory as developed by Rankine in 1860 for application to earth pressures. He formulated that the pressure on a vertical retaining wall restraining earth with a horizontal surface is $\frac{1-\sin\phi}{1+\sin\phi}$ multiplied by the soil density for each foot depth of soil retained, where ϕ is the angle of internal friction of the soil. The value $\frac{1-\sin\phi}{1+\sin\phi}$ is the coefficient of active earth pressure. *Ham.*

rankinite. Tricalcium disilicate, $3CaO.2SiO_2$, as monoclinic crystals in the dolerite-chalk contact at Scawt Hill, County Antrim, and in blast furnace slag. *Spencer 16, M.M., 1943.*

Rankin process. Recovering copper from its ores by treatment with nitric acid at about 250° F. *Bennett 2d, 1962.*

rank variety. Variety in coals brought about as a result of progressive metamorphism. More or less arbitrarily, although carefully, selected chemical criteria are used to differentiate coals of different rank. Physical criteria are also used but are more difficult of application. *A.G.I.*

ransomite. A sky-blue hydrous sulfate of copper, iron, and aluminum, $CuO.(Fe,Al)_2O_3.4SO_3.7H_2O$. Orthorhombic; slender prisms. From Jerome, Ariz. *English.*

Raoult's law. The fraction by which the vapor pressure of a liquid is lowered when a small amount of a substance that is nonvolatile, not dissociable, and usually not a high polymer is dissolved in it is equal to the mole fraction of the solute. *Webster 3d.*

Raoult's method. A method of determining the molecular weight of a dissolved substance by the extent to which it depresses the freezing point of the substance. *Webster 3d.*

rap. a. To warn men in an adjoining working place, of a blast when the working places are separated by only a small pillar, by knocking on the pillar with a tool or bar. *Fay.* b. To signal by knocking on a steam, water, or air pipe. *Fay.* c. To test the roof by tapping it with a stick or bar. *Fay.*

rapakivi. A hornblende-biotite granite containing large rounded crystals of orthoclase mantled with oligoclase. *Holmes, 1920.* The name has come to be used most frequently as a textural term where it implies plagioclase rims around orthoclase in plutonic rocks. *A.G.I.*

rapid blow drilling. A drilling method which utilizes a great number of short blows in quick succession rather than a few heavy blows from a relatively considerable altitude. In this method the bit is fixed either to a rod or to a rope, so that it pounds the bottom in quick succession with short blows and at the same time rotates. *Stoces, v. 1, pp. 79-80.*

rapid curing cutback. An asphalt cement thinned down with a gasoline or naphtha-type distillate. *API Glossary.*

rapid-hardening cement. A more finely ground grade of Portland cement which, although having the same setting time as ordinary Portland cement, develops its strength more rapidly and allows formwork to be struck earlier, a particular advantage in cold weather. *See also* high-alumina cement. *Ham.*

rapidity separator. A tangential disc type separator in which the sized ore is fed into hoppers, glass funnels being used to regulate the flow on to spreader baffles for uniform distribution over conveyor bands. The bore passes through intensified fields, the magnetics being extracted by a revolving disc and discharged. The disc, incorporating concentrating grooves, is magnetized by induction from powerful stationary magnets located beneath the bands. *Harrison, pp. 275-276.*

rapid plough. A fast moving plough with picks attached. The rapid plough is a continuous longwall cutter loader capable of working without manpower controlling it on the face. For this reason, it is one of the safest machines in operation. *Nelson.*

rapids. a. A term used by some writers for chute. *Seelye, 1.* b. Swift and turbulent flow, without pronounced falls. *Seelye, 1.*

rap-in. Som. To wedge down blocks of stone in underground quarries. *Fay.*

rappage. Excess in size of a casting because the mold is larger than the pattern when the latter is unduly rapped, as with the hand, for drawing. *Standard, 1964.*

rapper. a. A lever or hammer at the top of a shaft or inclined plane for signals from the bottom. *Fay.* b. *Mid.* The upper end of the vertical arm of a staff used for gaging the depth of holing. *Fay.*

rapping. In foundry work, loosening of pattern before its withdrawal from molding sand in flask. *Pryor, 3.*

rapping roller. An eccentric roller or a roller fitted with devices such as bars welded longitudinally along its outer casing, so arranged as to rap the belt and knock off fine coal or dust adhering to the return belt, or to centralize the coal on the carrying belt. *Nelson.*

rare earth deposits. Sources of cerium, lanthanum, thorium, yttrium, and related elements of the rare-earths group. *A.G.I.*

rare earth elements; rare earths. A group of rare metals very similar to one another and to aluminum in many properties. Thorium is closely associated in nature with this group and the source of thorium salts is monazite. *Nelson.*

rare earth hydrate. Yellow; hydrous rare earth oxide; containing tetravalent cerium; soluble in acids; and insoluble in water. Used in glass as a decolorizer and as an ultraviolet absorber. *CCD 6d, 1961.*

rare earth metals. A group of widely distributed metals, comprising scandium (atomic number 21), yttrium (atomic number 39), and 15 elements of atomic numbers 57 to 71, inclusive. These have the same arrangement of the two external shells of electrons in their atoms, and resemble one another very closely in chemical and physical properties, being thus most difficult to separate from each other. It is to this, rather than their actual rarity in nature, that they are so described. The metals are divided into three groups: the cerium metals (*see* cerium), the terbium metals (*see* terbium), and the yttrium metals (*see* yttrium). The divisions are based upon such methods as may be used to separate them from their ores. *Rolfe; Henderson.*

rare earth oxide. Brown; contains tetravalent cerium; soluble in acids; insoluble in water; and it readily absorbs moisture and carbon dioxide from the air. Used in coloring glass, in polishing glass, and in cores of arc carbons. *CCD 6d, 1961.*

rare earths. a. A series of widely distributed but relatively scarce minerals, principally oxides of the rare-earth metals. The names of the minerals are the same as the metals except for their ending in (a) instead of (um) as, for example, ceria, terbia, yttria, etc. The name is misleading as the elements are not earths and they are not really rare. *Henderson.* b. *See rare* earth elements. *Nelson.*

rare earth-sodium sulfate; pink salts. Small pink crystals; $(RE)_2(SO_4)_3.Na_2SO_4.2H_2O$, in which RE stands for rare earths; sparingly soluble in water and in acids. Used in the manufacture of ultraviolet-ray-absorbing glass and as an intermediate in the making of rare earth and cerium materials. *CCD 6d, 1961.*

rare element. Any element, the concentration of which in the earth's crust is less than 0.01 percent. *Hess.*

rarefaction. a. The process or act of making rare or less dense; increase of volume, the mass remaining the same: now usually of gases; also, the state of being rarified; as, the rarefaction of the atmosphere on a high mountain. *Standard, 1964.* b. Diminution of air pressure below normal, as in alternate half-cycles in the transmission of a sound wave past a point. *C.T.D. Supp.*

rare gases; inert gases; noble gases. The six gaseous elements, helium, neon, argon, krypton, xenon, and radon, which constitute group O of the periodic table. Each of these six elements at ordinary temperatures is a colorless, odorless gas. These elements are chemically inactive; zerovalent; and practically without any tendency to combine with each other or with any other element. They possess the highest excitation and ionization energies. Every rare gas except radon can be obtained from the atmosphere. *Gaynor.*

rare metals. A loose term for the less common and more expensive metallic elements. Included are the alkaline-earth metals barium, strontium, and beryllium, also bismuth, cadmium, cobalt, columbium (niobium), gallium, germanium, hafnium, indium, lithium, molybdenum, rhenium, selenium, tantalum, tellurium, thallium, thorium, titanium, tungsten, uranium, vanadium, and zirconium. Also sometimes included are boron and silicon; the platinum metals; the rare earths; manganese; and calcium, another alkaline-earth metal. *CCD 6d, 1961.*

Raschette furnace. A shaft furnace used in lead, copper, and iron smelting and having an oblong, rectangular, or oval horizontal section. *Fay.*

Raschig ring. A thin-walled hollow cylinder made of chemical stoneware, glass, carbon, or metal, for the packing of absorption towers. These rings are made in various sizes from about ½ X ½ inch (10,000 cubic feet) to 2 X 2 inches (170 cubic feet) and even up to 8 X 8 inches. *Dodd.*

rash. a. A substance grading about halfway between a coal and a shale and looks somewhat like an oil shale, which is characterized by a brown streak and leathery appearance with parting planes often smooth and polished, except that rash is more flexible. It usually occurs in very thin flakes or sheets at the bottom, the top, or within the seam. The color is usually dark but frequently grades into a lighter shade. *Kentucky, p. 26.* b. An impure and unmerchantable coal; coal mixed with clay, slate, or other foreign substance taken from the top or bottom of the seam. *Fay.*

rashing. a. Soft, scaly slate or earth beneath a coal seam, often containing much carbonaceous matter. *See also* rash. *Fay.* b. A thin layer of shale or inferior coal, sometimes found between the coal seam and the roof. *C.T.D.* c. In Illinois, the sloughing off of coal from ribs and faces. Many accidents are caused from such pieces falling on workmen. The coal along the ribs of entries and rooms has the appearance of pillars which have been compressed by weight of the overlying strata, however, the weight does not appear to be present in many cases. *Hess.*

rashings. a. A very friable carbonaceous clay, with numerous slickensides and sometimes streaks of coal. Rashings may underlie, overlie, or be interstratified with the coal; a very weak material and breaks up around the face supports. *Nelson.* b. *See* wild coal. *Fay.*

Rasorite. Identical with kernite, which name has published priority, but the borax company had earlier called the mineral Rasorite and has used that as a trade name. From Kramer, Kern County, Calif. *English.*

rasp. a. An instrument used in a borehole for fishing operations, for reducing the length of the box, or for coupling lost tools. Also called mill; rose bit. *Long.* b. A course file on which the cutting prominences are distinct points raised by the oblique stroke of a sharp punch instead of lines raised by a chisel (as on the true file). Also called rasp-cut file. *Webster 3d.* c. A machine or contrivance used for rasping or grating. *Webster 3d.*

raspberry spar. A form of rhodochrosite. *C.M.D.*

raspeso. Mex. A term used in Jalisco for ore containing native silver. *Fay.*

raspite. A brownish-yellow lead tungstate, $PbWO_4$, like stolzite. Intense adamantine luster; monoclinic; small, elongated, tabular crystals, usually twinned. From Broken Hill, New South Wales. *English.*

ratch. Prov. Eng. A subsoil of stone and gravel mixed with clay. *Standard, 1964. See also* ratchel, b.

ratchel. a. York. A cross-bedded sandstone in which the bedding planes have opened. *Nelson.* b. Eng. Stone in small fragments or gravel; also, gravelly subsoil. *Webster 2d.* Also spelled ratchell; rachel; rachen; rachill. *Fay.*

ratches. Lanc. Lifts of 5 yards in length along a working face. *Fay.*

ratchet. A set of teeth which are vertical on one side and sloped on the other which will hold a pawl moving in one direction, but allow it to move in another. *Nichols.*

ratchet-and-pawl mechanism. A cogwheel (ratchet) with which a single pivoted catch (pawl) engages, thereby preventing any backward turning. *Ham.*

ratchet drill. A hand drill in which the drill holder is revolved intermittently by a lever through a ratchet wheel and pawl. *Webster 3d.* A drill used for boring slate. *Fay.*

ratchet jack. *See* jack.

ratchet man. The man who operates the duckbill loader when mining with duckbill conveyors. *Lewis, p. 549.*

rate. *See* rait. *Fay.*

rate action (nonstandard). As used in flotation, the component or proportional plus rate action or of proportional plus reset plus rate action for which there is a continuous linear relation between the rate of change of the controlled variable and the position of a final control element. *Fuerstenau, p. 549.*

rate determining step. In any sequence of chemical reactions used to leach a product from its ore, the slowest in the chain. *Pryor, 3.*

rated horsepower. a. Theoretical horsepower of an engine based on dimensions and speed. *Nichols.* b. Power of an engine according to a particular standard. *Nichols.*

rated load. This is the kilowatt power output which can be delivered continuously at the rated output voltage. It may also be designated as the 100 percent load or full-load rating of the unit. *Coal Age, 1.*

rated output current. The current derived from the rated load and the rated output voltage. *Coal Age, 1.*

rated output voltage. The current specified as the basis of rating. *Coal Age, 1.*

rate of advance. a. The distance the bit penetrates a rock formation in a unit of time, such as inches per minute or feet per hour. *Long.* b. In coal mining. the number of feet between the coal face at the beginning and at the end of a workshift. *Bureau of Mines Staff.*

rate of decay. The time rate at which the sound pressure level or any other stated characteristic decreases at a given point in a given time. A commonly used unit to express the sound pressure level rate of decay is the decibel per second. *Hy.*

rate of feed. *See* feed rate. *Long.*

rate of grade; gradient. The inclination of profile gradeline from the horizontal, expressed as a percentage. *Urquhart, Sec. 2, p. 26.*

rate-of-oil-flow. The rate at which a specified oil will pass through a sintered, porous compact under specified test conditions. *ASTM B 243-65.*

rate of penetration. *See* feed rate; rate of advance. *Long.*

rate of set. The determination of the rate of set consists of measuring, by means of a stopwatch, the time required for a liquid enamel to stop draining from a test sheet after the steel test sheet is removed from the enamel slip and placed on the rack. This time of set varies over a fairly wide range and is in fair agreement with the mobility measurements. Thus, a slip of high mobility drains quickly, whereas one of low mobility drains slowly. *Hansen.*

rate of strain hardening. Rate of change of true stress with respect to true strain in the plastic range. *ASM Gloss.*

rates of reduction. In crushing practice, these rates are: (1) based on crusher dimensions, the idea of the largest cube that will enter compared with the largest that can be discharged, or

$$\frac{\text{receiving opening}}{\text{discharge opening}},$$

the receiving opening is measured from the top of the movable member to the top of the stationary member, and (2) based on actual products.

(a) overall reduction ratio

$$= \frac{\text{mean size of feed}}{\text{mean size of product}}$$

(b) individual reduction ratio

$$= \frac{\text{size most abundant in feed}}{\text{mean size of grading band concerned}}$$

South Australia, p. 101.

rathite. A lead-gray sulfarsenite of lead, $3PbS.2As_2S_3$. Monoclinic; twinned prismatic crystals. From Binnenthal, Switzerland. *English.*

rathole. a. A shallow auxiliary hole alongside the main borehole, in which the kelly is stored when not in use. *See also* dilly hole. *Long.* b. A hole drilled at an angle to the main hole by means of a deflection wedge. *Long.* c. A small-diameter pilot-type hole drilled a short distance ahead of a larger diameter hole to stabilize a smaller diameter bit and core barrel used to core a limited portion of the borehole. After core drilling is completed, the rathole is reamed out and the larger size hole advanced, usually by some noncoring method. *Long.* d. A small sump or settling pond in which the larger sized cuttings from a drill hole are collected between the top of the drill hole and the main settling pond. *Long.* e. A slanting hole, perhaps 25 feet deep, used for adjusting or lubricating the swivel on a grief stem. The start of a hole for rotary drilling. *Hess.*

rathole bit. A bit designed and used to drill the first portion of a deflected hole alongside and beyond the deflection wedge; also, a bit used to drill a rathole. *Compare* wedge bit. *See also* rathole, b and c. *Long.*

rat-holing. The act or process of drilling a deflected or pilot hole. *See also* rathole, b and c. *Long.*

ratholite. Same as pectolite. *Fay.*

ratine. The cottony or fuzzy appearance seen in a mixture of alcohol and water. The body appearance of most brilliant-cut zircons. *Shipley.*

rating. The maximum capacity of a drill hoist or a prime mover such as an engine, motor, or pump; generally the maximum economical capacity. *Long.*

rating curve. *See* duration curve. *Ham.*

rating flume. A flume used for purposes of control. *Ham.*

rating of a rectifier unit. The rating is the kilowatt power output, voltages, currents, number of phases, frequency, amount of phase control, etc., assigned to it by the manufacturer. *Coal Age, 1.*

ratio. The relation that one quantity or magnitude has to another of the same kind. *Hansen.*

ratiometer. Instrument to measure the ratio of two potential differences. *Schieferdecker.*

rational analysis. a. The mineralogical composition of a material as deduced from the chemical analysis. With materials whose general mineralogical composition is not already known, the calculation is made only after micro- and/or X-ray examination has shown what minerals are present and their approximate proportions. With pottery clays, the calculation is made without such guidance, either on the feldspar convention or the mica convention. The former is the older procedure and assumes that the minerals present are kaolinite, feldspar, and quartz. It is now known, however, that the alkali impurity in English pottery clays is present as mica and according to the mica convention the rational analysis is calculated on the basis of kaolinite, mica, and quartz. (The term proximate analysis is sometimes applied to the rational analysis of clays). *Dodd.* b. The resolution into chemical types of a mass of rock or coal. *Francis, 1965, v. 1, p. 38.*

rationality of intercepts, law of. The intercepts of the faces of a crystal upon the crystallographic axes are in a simple ratio to each other. Sometimes referred to as the law of rationality of indices. *Miall.*

ratio of absorption. a. The percentage by weight that the absorbed water bears to the dry weight of the stone. *Fay.* b. The ratio, A, expressed as a percentage of the volume, Vp, of the pore space in a rock to the weight, W, of the rock when dry, A=100 Vp/W. *Holmes, 1928.*

ratio of concentration.

$$\frac{\text{Weight of ore fed}}{\text{Weight of concentrate produced}}$$

Pryor, 3.

ratio of enrichment. The ratio of the percentage of valuable material in the concentrate to the percentage of the material in the original ore. *Bureau of Mines Staff.*

ratio of gears and sprockets.

(For two gears or sprockets:)

$$\frac{\text{rpm (of driver)}}{\text{rpm (of driven)}} = \frac{\text{radius (of driven)}}{\text{radius (of driver)}} =$$

$$\frac{\text{diameter (of driven)}}{\text{diameter (of driver)}} = \frac{\text{circumference}}{\text{circumference}}$$

$$\frac{\text{(driven)}}{\text{(driver)}} = \frac{\text{number of teeth (driven)}}{\text{number of teeth (driver)}}$$

(For train of gears:)

$$\frac{\text{rpm of first}}{\text{rpm of last}} = \frac{\text{number of teeth on first}}{\text{number of teeth on last}}$$

To calculate drum speed from engine speed: assume 400 revolutions per minute on engine, an 18-tooth engine sprocket driving a 23-tooth jack-shaft sprocket; a 16-tooth jack-shaft sprocket driving a 16-tooth line-shaft sprocket; a 12-tooth line-shaft sprocket driving a 36-tooth drum-shaft sprocket. The jack-shaft will turn 18/23 of 400 rpm=313 rpm; the line shaft will turn 16/16 of 313 rpm=313 rpm; and the drum shaft will turn 12/36 of 313 rpm=104⅓ rpm. Therefore, with an engine speed of 400 rpm and the high clutch on the jack-shaft and the low clutch on the drum shaft engaged, the latter will rotate at a speed of 104⅓ rpm. Without considering power losses, the horsepower delivery on both shafts is the same, but the torque on the drum shaft is almost four times that on the engine shaft (400 divided by 104⅓). *Brantly, 2.*

ratio of reduction. a. The relationship between the maximum size of the stone which will enter a crusher, and the size of its product. *Nichols.* b. The ratio of enrichment with respect to the sought mineral:

$$\frac{\text{Assay value in feed.}}{\text{Assay value in conc.}}$$

See also reduction ratio. *Pryor, 3.*

ratio of size reduction. Ratio of the upper particle size in the crushed material to the upper particle size of the feed material. *B.S. 3552, 1962.*

ratio of tidal ranges (height ratio). The ratio of the height of the tide at the secondary station to the height of the tide at the reference station. *Hy.*

rattail. A minor buckle, occurring as a small irregular line on a cast surface. *ASM Gloss.*

rat-tailing. Drilling or prospecting ahead in an oil well to sound out or test deeper formations before putting in casing. *Hess.*

rattle. a. Leic. To work with great vigor and energy, especially in driving or shaft sinking. *Fay.* b. *Eng.* A bed of limestone. *Arkell.*

rattle boxes. Limonite geodes from Chester County, Pa. *Schaller.*

rattlehead. Scot. A suction pipe. *Fay.*

rattle jack. Mid. Carbonaceous shale; hoo cannel. *Fay.*

rattler. a. York. Cannel coal. *Fay.* b. Scot. Inferior gas coal; sandy shale. *Fay.* c. *Eng.* A celebrated variety of gas coal which was used to fetch high prices and was reputed to be ignited with a match. It is hard, compact, uniform, bright, brittle, fine-grained, slightly sonorous when struck, resembling jet but not so brilliant. *Arkell.* d. A revolving steel drum, with a charge of metal spheres, used for testing the abrasive resistance of brick. *Bureau of Mines Staff.* e. A device for shaking out the cores from small castings, as a tumbling barrel. *Webster 3d.*

rattler test. A method for evaluating the resistance of paving bricks to impact and abrasion. A sample of 10 bricks is subjected to the action of 10 cast-iron balls 3.75 inches in diameter and 245 to 260 balls 1.875 inches in diameter in a drum (28 inches in diameter, 20 inches long) rotating at 30 revolutions per minute for 1 hour. The severity of abrasion and impact is reported as a percentage loss in weight. *Dodd.*

rattles. Dev. *See* scree, c. *Fay.*

rattlesnake ore. Mottled, gray, black and yellow carnotite, vanoxite ore. Spotted appearance resembles southwestern snake species from which it derives its name. *Ballard.*

rattling. a. Consists of tumbling small castings in a rotating cylindrical mill with small pieces of cast iron and sometimes sand. Fins, sprues, and other projections are thus removed from the castings after they have been shaken out of the molds and cooled. *Enam. Dict.* b. Tumbling. *Osborne.*

Rauracian. Synonym for Sequanian. *A.G.I. Supp.*

rauvite. A very rare, strongly radioactive, possibly amorphous, purplish- to bluish-black mineral, $CaU_2V_{12}O_{36}.2OH_2O$; fills cracks and impregnates sandstones in the Colorado Plateau area; found associated with carnotite, uvanite, hewettite, gypsum, and metatorbernite. On standing, fresh samples dehydrate partially and become cracked. *Crosby, pp. 35-36.*

raveling. a. Pulling material out of the ladle furnace or iron trough at the taphole of a blast furnace. *Fay.* b. *See* slope failure, c. *Lewis, p. 627.*

ravelly ground. Rock that breaks into small pieces when drilled and tends to cave or slough into the hole when the drill string is pulled, or binds the drill string by becoming wedged or locked between the drill rod and the borehole wall. *Long.*

raw glaze. A glaze compounded primarily from raw constituents, that is, containing no prefused materials. *ASTM C242-60.*

ravens. York. Miners' term for an inferior, sometimes pyritous, coal found in places at the top of Beeston Seam. *Tomkeieff, 1954.*

ravine. a. A deep, hollow, narrow excavation formed by the force of running water. The French use the two words ravin and ravine in different significations. The word ravin is used to express a place which has been hollowed out by a stream of running water and ravine is employed to denote a torrent of water. Sometimes, however, ravine is also used to signify the place worn by the torrent. *A.G.I.* b. A deep precipitous gorge; usually the narrow excavated channel of some mountain stream. *A.G.I.* c. Ravine and gorge are terms very closely resembling each other in meaning. As used at the present time, a ravine is something less precipitous and important as a topographical feature than a defile, and not so grand as a gorge. *A.G.I.* d. A gulch; a small gorge or canyon, the sides of which have comparatively uniform slopes. A depression worn out by running water, larger than a gully and smaller than a valley. *A.G.I.*

raw. a. In ceramics, fresh from a plastic process; unbaked. *Standard, 1964.* b. Not prepared for use by heat. *Webster 3d.*

raw batch. a. A glass charge without cullet. *ASTM C162-66.* b. An unfired mixture of ceramic materials. *See also* charge. *Bureau of Mines Staff.*

raw coal. a. Coal which has received no preparation other than possibly screening. *B.S. 3552, 1962.* b. Mineral as severed, before beneficiation. Run-of-mine ore. *Pryor, 3.*

raw coal screen. A screen used for dividing run-of-mine coal into two or more sizes for further treatment or disposal; usually employed to remove the largest pieces for crushing readdition to the run-of-mine coal. *B.S. 3552, 1962.*

raw cullet. A glass charge made totally of cullet. *ASTM C162-66.*

raw dolomite. a. Dolomite which has not been calcined. *A.R.I.* b. Crushed dolomite used for dressing of basic open hearth bottoms and banks. *A.I.S.I. No. 24*

raw edge. The sheared edge of metal not completely covered with porcelain enamel. *Bryant.*

raw feed coal. Coal supplied to a plant or machine, in which it undergoes some form of preparation. *B.S. 3552. 1962.*

raw fuel. A fuel which is used in the form in which it is mined or obtained, for example, coal, lignite, peat, wood, mineral oil, natural gas. *Nelson.*

rawhide hammer. A hand hammer having a rawhide head which serves to prevent bruising metal parts against which it is used. *Crispin.*

raw humus. Same as mor. *A.G.I.*

Rawlplug. A trade name for a bolt to provide a stronghold in masonry for light or heavy fixtures. It consists of chemically bonded jute fibers, rotproofed and weatherproofed and made in gages and lengths to suit any size of wood screw or coach screw. Under suitable conditions, a Rawlplug is claimed to take a load equal to a million times its own weight. *Nelson.*

raw material. The ingredients before being processed, which enter into a finished product. *Crispin.*

raw mica. A term commonly used for unmanufactured mica. *Skow.*

raw ore. a. Ore that is not roasted or calcined. *Fay.* b. *See* raw coal, b. *Pryor, 3.*

raw quartz. Quartz that has undergone no treatment, such as burning or reduction, prior to being placed under the stamp heads. *Fay.*

raw refractory dolomite. Natural limestone consisting predominately of $MgCO_3$ and $CaCO_3$ in approximately equal molecular ratio and which is suitable for use as a refractory material. *ASTM C71-64.*

raw shape. A metal part ready to be started through the porcelain enameling operation. *Bryant.*

Raybestos. Trademark for insulating material used in packings, heating panels, asbestos boards, etc. *Bennett 2d, 1962 Add.*

raydist. A radio system for medium range precision surveying in which the phases of two continuous-wave signals are compared. It is based on the heterodyne principle and uses low or medium frequencies. It requires a minimum number of frequencies and these frequencies usually need bear no fixed relationship with each other. *H&G.*

Rayleigh wave. A surface wave associated with the free boundary of a solid. The wave is of maximum intensity at the surface and diminishes quite rapidly as one proceeds into the solid. Therefore, it has a tendency to hug the surface of the solid. Such waves have been used quite effectively in detecting surface cracks and flaws in castings. *H&G.* Synonym for R-wave.

Raymond flash dryer. A suspension-type dryer that employs the principle of flash drying of fine coal. The coal is transported vertically through a drying column in a stream of hot gases. The source of heat for this system is usually an automatic stoker. In this system the hot gases are drawn into the drying column by the action of the fan connected to the cyclone collector vent. The coal to be dried is continuously introduced to the hot gas stream. Virtually instantaneous drying occurs. The dried coal and the moisture-laden gases are drawn into the cyclone collector. The dry coal drops to the bottom of the collector and the moisture-laden gases are discharged by the fan to the atmosphere. *Kentucky, p. 320; Mitchell, p. 683.*

Raymond mill. Grinding mill in which spring-loaded rollers bear against a horizontal rotating bowl—developed for coal pulverization. *Pryor, 3.*

Raymond standard test. A dynamic penetration test testing the bearing capacity of soil in which piles are to be driven. *Ham.*

Rayner refractometer. A pocket-size gemmological refractometer of fair accuracy (±.01), employing a small fixed prism of dense glass or, rarely, a prism of diamond. Suitable for use in the hand. *See also* Smith refractometer; Tully refractometer. *Shipley.*

ray path. The energy associated with a point on a wave front moves along an imaginary line known as a ray path. The ray paths encountered in acoustics, which are commonly called sound rays, are analogous to the light rays of optics. Ray paths and wave fronts are mutually perpendicular. *H&G.*

rays. Negatively charged particles which leave the cathod in an evacuated tube at between 10,000 and 90,000 miles per second, depending on voltage. Positive rays are gas ions (for example, N^+,O^+). X-rays are electromagnetic waves which travel at velocity of light and are not deflected by magnetic fields. Length between 0.1 and 100 angstrom (visible light lies between 4,000 and 8,000 angstroms). Short X-rays are soft and long ones hard. Rays emitted by radio-active substances are of three types, alpha, beta, and gamma. Alpha rays consist of He^{++} and move at some 10,000 miles per second. Beta rays are electrons with speeds between 50,000 and 180,000 miles per second; gamma rays are not charged. They move at speed of light, but are shorter than X-rays (0.01 to 1 angstrom). *Pryor, 3.*

raywork. A kind of rubble work; in the United States, any rubble work of thin and small stones. *Fay.*

raze. Variant of race. *Arkell.*

razorback. A sharp, narrow ridge. *Webster 3d.*

razor saw. A narrow saw used in excavating limestone. *Webster 3d.*

razor stone. *See* novaculite. *Fay.*

razumovskyn. A clay mineral described as near montmorillonite except for less water, and having the formula, $2Al_2O_3.H_8(SiO_2)_3$. *Dana 6d, p. 691.*

Rb. Chemical symbol for rubidium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

RBM Abbrevation for reinforced brick or clay masonry. *ACSG, 1963.*

rbp Abbreviation for reservoir bubble-point pressure. Also abbreviated RBP. *BuMin Style Guide, p. 61.*

Re. Chemical symbol for rhenium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

reach. A comparatively short length of a stream or channel. *Seelye, 1.*

reacher. A slim mine prop reaching from one wall to the other. *Fay.*

reactance. The part of the impedance of an alternating-current circuit that is due either to capacitance or inductance or to both and that is expressed in ohms. *Webster 3d.*

reactant. A substance which undergoes chemical change when in contact with another substance. *Osborne.*

reaction. Physically, a force opposing a given force in terms of Newton's laws. Chemically, either (1) change in pH value or, (2) molecular alteration. Type (1) is typified by the equation $A \ \ B+H^+$ and, (2) a redox reaction by $A=B+e$ (or

H+e), when e is an electron. Reaction velocity is rate of change in quantity of chemical reactant, the unit of measurement being molecules per second per cubic centimeter. Rate control depends on concentration of each reactant, and on energy relations (free, electromotive and potential). It can be modified by mechanical, thermal or electrical means. *Pryor, 3.*

reaction cements. Cements which set with a condensation polymerization (hydrolysis) reaction. *VV.*

reaction pair. Any two minerals, one of which is formed at the expense of the other by reaction with liquid, especially, any adjacent pairs in the discontinuous reaction series. *A.G.I.* Thus forsterite at high temperature is converted into enstatite at a lower temperature, by a change in the atomic structure involving the addition of silica from the magma containing it. Forsterite and enstatite form a reaction pair. *C.M.D.*

reaction principle. a. The statement that the common minerals of igneous rocks have a reaction relation to one another, in contrast to the subtraction relation of simple eutectic mixtures. The minerals can be arranged in two series, one of the feldspars and one of the ferromagnesian minerals, such that in each series, any number is derived from the preceding member by reaction with the magma and is capable of forming the following member by continued reaction with the magma. *See also* Bowen's reaction series. *A.G.I.* b. The conversion of one mineral species stable at high temperature into a different one at lower temperatures. *C.M.D.*

reaction process. *See* roasting and reaction process. *Fay.*

reaction rim. a. A term used mostly in microscopic work, for the curious rims of hypersthene, garnet, hornblende, biotite, magnetite, and perhaps other minerals, that surround grains of magnetite or of ferromagnesian silicates, wherever, as in many gabbros, they come next to feldspar. They are supposed to be produced by the reaction of these minerals on each other, probably in the crystallization of the rock. *Fay.* b. Applied to a peripheral zone of mineral aggregates formed around one mineral (for example, hypersthene) by reaction with another (for example, plagioclase) with which it would otherwise come into contact. *See also* corona. *Holmes, 1928.*

reaction series. Any series of minerals in an igneous rock, related in such a way, that each member of the series can be regarded as derived from the preceding member by reaction with the magma. The series may be continuous, like the plagioclase or forsterite-fayalite series, or discontinuous like the olivine-pyroxene-amphibole series. *See also* Bowen's reaction series. *A.G.I.*

reaction-sintering. A process in which sintering and chemical reaction between two or more components take place simultaneously. For example, Si and C can be reaction-sintered to produce SiC; compacted Si powder can be reaction-sintered in N_2 to form Si_3N_4. *See also* sintering. *Dodd.*

reaction turbine. A steam or water turbine in which the jets or nozzles are on the moving part, as distinct from an impulse turbine which has only fixed jets. *Ham.*

reaction velocity; velocity constant. The time rate at which molecules change or are transformed in a chemical reaction. *Hackh's Chem. Dict.*

reaction-zone width. In explosives, this width is the distance that detonation advances before the products of combustion expand by an appreciable percentage. Ideal detonation requires charges with diameters larger than the reaction-zone width. Effective confinement of the charge reduces this width. *Leet, 2, p. 12.*

reactive. Readily susceptible to chemical change. *Osborne.*

reactive reagent. Substance, solution or gas susceptible to chemical change, or used in influencing such change. *Pryor, 3.*

reactivity. a. A measure of the departure of a nuclear reactor from criticality. It equals the multiplication factor minus 1 and is 0 precisely at criticality. If there is excess reactivity (positive reactivity) the reactor power will rise. Negative reactivity will result in a decreasing power level. *L&L.* b. A measure of ease of ignition and response to the controls varying the rate of burning. It is used particularly in connection with fuels for transport gas producers and low volatile fuels used for open fires. *Nelson.* c. An assessment of the speed of reaction of a coal with oxygen under specified conditions. *B.S. 3323, 1960.*

reactor. a. In arc-welding circuits, a device used for the purpose of minimizing irregularities in the flow of welding current. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.* b. *See* nuclear reactor. *L&L.*

readily extractable metal; cold-extractable metal. As used in geochemical prospecting, refers to the content of a metal that can be extracted from weathered rock, overburden, or stream sediment, by weak chemical reagents. *Hawkes, 2, p. 151.*

Reading beds. A group of sands, mottled clays, and gravels of Eocene age, occurring in the London and Hampshire Basins; of fluviatile origin in the west, passing into deltaic deposits and ultimately into the marine Woolwich beds of the same age in the east. *C.T.D.*

Reading jig. A plunger-type jig of relatively simple design with only a single plunger being manually controlled. The hutch compartment is round, for good water distribution. *Mitchell, p. 429.*

trolled. The hutch compartment is round, for good water distribution. *Mitchell, p. 429.*

readout. Method of display of processed information. *Pryor, 3, p. 32.*

ready-mixed concrete. Concrete delivered at the site in a plastic condition and requiring no further treatment before being placed in the position in which it is to set. *Taylor.*

reagent. a. A chemical or solution used to produce a desired chemical reaction; a substance used in assaying or in flotation. *See also* catalyst. *Nelson.* b. A substance used for various purposes (as in detecting, examining, or measuring other substances, in preparing material, or in developing photographs) because it takes part in one or more chemical reactions or biological processes. *Webster 3d.*

reagent feeder. Appliance which controls rate of addition of reagent to mineral pulp undergoing treatment (notably during conditioning for flotation and in leaching). Solid feeders include miniature belt conveyors, slowly inched forward to delivery point; vertical drums set above rotating plates from which material is ploughed off; and conveying spirals (worms). Liquid feeders include tanks with notch-weir overflow control; syphons mounted on floats in tanks; nozzles adjustable for delivery aperture and feed rate from tanks or ring mains (lime slurry feeders); drip feeders with needle-valves; and, most in use, cups mounted on a disc, which dip into a reservoir and deliver a controllable percentage of their load on rising to turnover point. *Pryor, 3.*

reagent man. In ore dressing, smelting, and refining, one who mixes chemical solutions used in treating lead ores to separate lead-bearing minerals from waste minerals. *D.O.T. 1.*

real calorific value. The calorific value when determined by a calorimeter in the laboratory. *Kentucky, p. 411.*

realgar. Arsenic monosulfide, AsS, contains 70.1 percent elemental arsenic. *Sanford.*

realignment. Alteration to the lines of a road, which may also include widening or easing curves and gradients. *Ham.*

real property. Includes mining claims, dumps, water rights, and ditches. *Ricketts, I.*

ream. a. To enlarge the hole by redrilling with a special bit. *Wheeler.* b. An imperfection; nonhomogeneous layers in flat glass. *ASTM C162-66.*

ream back. The act or process of enlarging a squeezed or cave-obstructed borehole to its original size by reaming as the drill string is pulled. *Long.*

reamed extrusion ingot. A cast, hollow extrusion ingot which has been machined to remove the original inside surface. *ASM Gloss.*

reamer. a. A handtool or power tool for enlarging or smoothing a borehole. It has a conical or cylindrical shank with cutting edges, or in which separate teeth are fixed. *See also* diamond reamer; expanding reamer. *Nelson. Compare* expansion bit; paddy bit. *Long.* b. A kind of chisel for cutting two V-shaped grooves from a round blasthole in the line of the desired rift. *Webster 3d. See also* reaming, b. *Fay.* c. Synonym for reaming bit. *Long.* d. Synonym for reaming shell. *Long.* e. Synonym for gage stone. *Compare* kicker. *Long.* f. A rotary cutting tool with one or more cutting elements called teeth, used for enlarging a hole to size and contour. It is supported principally by the metal around the hole it cuts. *ASM Gloss.*

reamer bit. Synonym of reaming bit. *Long.*

reamer shell. a. A cutter just above a diamond bit, used to assure a full-size hole. *Nichols.* b. Synonym for reaming shell. *Long.*

reamer stone. *See* gage stone. *Long.*

ream, glass. *See* glass ream. *Bennett 2d, 1962 Add.*

reaming. a. The act or process of enlarging a borehole. *Long.* b. A quarryman's term for the process of cutting grooves on opposite sides of drill holes in order to promote straight splitting of a stone. *See also* reamer, b. *Fay.*

reaming barrel. A heavy-wall tube or rod, 5 to 10 feet long, acting as a connecting link between a reaming-bit assembly and the drill rods. The diameter of the reaming barrel is slightly smaller than that of the attached reaming bit. *Long.*

reaming bit. A bit used to enlarge a borehole. Also called broaching bit; pilot reaming bit; reamer; reamer bit. *Long.*

reaming diamond. *See* gage stone. *Long.*

reaming pilot. a. *See* pilot, a. *Long.* b. A smooth bar used to guide a reaming bit or casing bit in the hole. *B.S. 3618, 1963, Sec. 3.*

reaming pilot adapter. An adapter or coupling in a reaming pilot assembly attaching the flush-joint casing to the casing reaming shell and the reaming pilot horn by pin and box threads respectively. *Long.*

reaming pilot horn. An adapter or coupling in a reaming pilot assembly attached to the reaming pilot adapter. It passes through the reaming shell and casing bit to which is attached the pilot bit. *Long.*

reaming ring. Synonym of reaming shell. *Long.*

reaming shell. A short tubular piece designed to couple a bit to a core barrel. The outside surface of the reaming shell is provided with inset diamonds or other cutting media set to a diameter to cut a specific clearance for the core barrel. Also called core shell; reamer; reamer shell. *Long.*

reaming shell bit. A sleeve set with diamonds on the outer surface of the shell itself or in inserted strips. Usually placed between the core barrel and the drill bit and slightly larger in diameter than the latter to maintain the gage of the hole. A casing reaming shell is similar but larger in diameter. *See also* core shell; swelled coupling. *Cumming.*

reaming stone. *See* gage stone. *Long.*

ream out. To enlarge by reaming. *Long.*

rear-dump scraper. A two-wheel scraper that dumps at the rear. *Nichols.*

rear dump truck; end dump truck. A truck or semitrailer that has a box body that can be raised at the front so the load will slide out the rear. *Nichols.*

rearer. a. Vertical or nearly vertical strata. *Mason.* b. N. Staff. *See* edge coal. *Fay.*

rearer method of working inclined seams. *See* bord-and-pillar method. *Fay.*

rearer seam. N. Staff. A steeply inclined coal seam. *Nelson*

rearer workings. A method of working steep seams of any thickness at an earlier period in North Staffordshire. Its essential features are: (1) the waste is filled with dirt poured into it from a higher level, (2) the waste dirt forms the floor for the colliers at the face, and (3) the coal worked slides down over the dirt into the level below and loaded into tubs or cars. The method produces run-of-mine coal with a high dirt content. *See also* rabatage. *Nelson.* Also known as the heading-and drifting system.

rearing. a. Rising of the front of a tractor when pulling a heavy load. *Nichols.* b. The setting of pottery flatware on edge for the firing process. Compare dottling. *Dodd.*

Réaumur. Relating to or conforming to a thermometric scale on which under standard atmospheric pressure the boiling point of water is at 80° above the 0 of the scale and the freezing point of water is at 0. Symbol, R. *Webster 3d.* To convert to centigrade degrees, multiply degrees Réaumur by $\frac{5}{4}$. To convert to Fahrenheit degrees, multiply degrees Réaumur by $\frac{9}{4}$ and add 32° if above 0°R; and if below, subtract 32°. *Standard, 1964.*

Reaumur porcelain. A devitrified glass made in 1739 by Reaumur in St. Cloud, France, of the nature of artificial soft porcelain. *Standard, 1964.*

reboil. Reappearance of bubbles in molten glass after it previously appeared plain. *ASTM C162-66.*

reboiler; kettle; still pot. The heat-transfer equipment which generates vapor at the bottom of a continuous distillation unit. *NRC-ASA N1.1-1957.*

reboiling. Gas evolution occurring and recurring during repeated firing of the ground coat; sometimes a defect. *ASTM C286-65.*

recalescence. A phenomenon, associated with the transformation of gamma iron to alpha iron on the cooling (supercooling) of iron or steel, revealed by the brightening (reglowing) of the metal surface owing to the sudden increase in temperature caused by fast liberation of the latent heat of transformation. *ASM Gloss.*

recarburize. a. To increase the carbon content of molten cast iron or steel by adding carbonaceous material, high-carbon pig iron, or a high-carbon alloy. *ASM Gloss.* b. To carburize a metal part to return surface carbon lost in processing. *ASM Gloss.*

recarburizing. Introducing spiegeleisen into the converter after the blow to add the desired element. *Mersereau, 4th, p. 408.*

recast. To form anew by running, as molten metal, into a mold; cast again; as, to recast a cracked bell. *Standard, 1964.*

receiver. An apparatus which serves to equalize the pulsations of the air as it comes from the compressor and causes a more uniform flow of air through the pipeline. A receiver of proper size placed near the compressor will prevent the discharge pressure at the compressor from reaching an abnormally high figure and thus bringing a heavy strain on the machine. Another function of a receiver near the compressor is to collect moisture and oil carried in the air. A receiver at the end of the pipeline prevents the pressure from dropping to an abnormally low figure in case of a sudden draft on the pipeline. *Lewis, p. 682.*

receiving clack. Scot. The bottom clack or valve in a pump set. *Fay.*

receiving hopper. A hopper used to receive and direct material to a conveyor. *ASA MH4.1-1958.*

receiving pit. A shallow pit for containing material run into it. *Zern.*

receiving rods. Eng. Auxiliary cage guides at insets and at headframes. *Fay.*

receiving station. The location or device on a conveyor or conveyor systems where bulk material or objects are loaded or otherwise received onto the conveyor. *ASA MH4.1-1958.*

recemented glacier. A glacier formed by recompacted ice which has fallen down a cliff from a higher glacier. *Fay.*

Recent. The later of the two geologic epochs comprised in the Quaternary period, in the classification generally used; same as Holocene. Also the deposits formed during that epoch. The Holocene, or Recent, comprises all geologic time and deposits from the close of the Pleistocene or Glacial epoch until and including the present. *Fay.*

recent alluvials. The newest of the alluvial deposits. *New South Wales, p. 12.*

recess. A groove or depression in a surface. *ASM Gloss.*

recessed wheel. A wheel made with a central recess in one or both sides. *ACSG, 1963.*

recession. Going back; as, the gradual retreat of a waterfall, the retreat of an erosional escarpment, the melting back of a glacier, or the withdrawal of a body of water so that the shoreline moves successively farther away from the higher land. *Stokes and Varnes, 1955.*

recessional end moraines. Successive end moraines built during temporary halts or slight readvances of an ice front during a period of general recession of a glacier. *Stokes and Varnes, 1955.*

recharge. a. The processes by which water is absorbed and added to the zone of saturation, either directly into a formation or indirectly by way of another formation; also, the quantity of water that is added to the zone of saturation. *A.G.I.* b. Water that enters the ground and reaches the water table. *Legrand.*

recharge of water. Putting water back into the body of ground water to augment the ground water supply. *Bateman.*

rechuck. To loosen the chuck, return it to the initial position, and retighten in on the rods so that the bit again may be advanced the distance equal to the length of the feed screw or drive rod on a diamond-drill swivel head. *Long.*

reciprocal leveling. A method of leveling in which instrumental errors are eliminated by setting up the level at two places, one near each point leveled; the average of the differences in level represents the true difference. *Ham.*

reciprocal proportion law. *See* law of reciprocal proportion.

reciprocal strain ellipsoid. In elastic theory, an ellipsoid of certain shape and orientation which under homogeneous strain is transformed into a sphere, and any set of conjugate diameters of the ellipsoid is transformed into a set of orthogonal diameters of the sphere. The ellipsoid has the property that the length of a line, which has a given direction in the unstrained state, is increased by the strain in a ratio inversely proportional to the central radius vector of the surface drawn in the given direction. *A.G.I.*

reciprocating. Having a straight back-and-forth or up-and-down motion. *Nichols.*

reciprocating beam conveyor. One or more parallel reciprocating beams with tilting dogs or pushers, arranged to progressively advance object. *ASA MH4.1-1958.*

reciprocating drill. A piston drill often referred to as a hammer drill. *Ham.*

reciprocating engine. Any steam or internal-combustion engine, which has a piston moving under pressure within a cylinder. *Ham.*

reciprocating feeder. a. A feeder in which the material is carried on a plate subjected to a reciprocating motion and so constructed that when the plate moves in the reverse direction the material remains stationary. The rate of feed is normally varied by adjusting the stroke of the reciprocating plate. *B.S. 3552, 1962.* b. A device used to empty a bin or hopper from the bottom by horizontal reciprocating action of its parts, usually after primary crushing. *ACSG, 1963.*

reciprocating flight conveyor. A reciprocating beam or beams with hinged flights arranged to advance bulk material along a conveyor trough. *ASA MH4.1-1958.*

reciprocating pump. A pump consisting of a piston or plunger which lifts water to a higher level by a series of to-and-fro movements. *See also* pump. *Nelson.*

reciprocating rotating engine. A type of engine, from 5 to 50 horsepower, used for haulages, consisting of two double-acting cylinders with the cranks set at 90° to each other, and fitted with slide valves or piston valves. *Mason, v. 2, pp. 380-381.*

reciprocating screen dryer. Usually an inclined reciprocating screen on which the coal travels and through which the hot gases pass. The screen may eliminate moisture in coal up to 2½ inches in size. It may also serve as a fine coal dryer to treat coals down to ⅛ inch. *Nelson.*

reciprocating slide-valve engine. One of the best known types of steam engines; it consists of a cast-iron cylinder and valve chest provided with ends and cover. Inside the cylinder is a cast-iron piston attached to a forged steel piston rod which passes through a cylinder end by a gland and stuffing box. Steam is admitted to the valve chest by a pipe passing through the cover and enters either end of the cylinder alternately according to the position of the valve. The valve also controls the opening to exhaust through which the spent steam is discharged. The valve is moved backwards and forwards on its seat by a valve rod, which in turn is actuated by an eccentric working on the engine crankshaft. *Mason, v. 2, pp. 363-364.*

reciprocity theorem. The reciprocity theorem states that if, in any electric network composed of linear elements, a given electromotive force applied between two given terminals produces a current at a point in some branch of the network, then the same voltage acting at this second point in the network will produce the same current between the two original terminals if they are short-circuited. *H&G.*

recirculated air. Air returned from a space to be heated, conditioned, or cleaned then redistributed to the space. *Strock, 10.*

recirculating dip tank. A dip tank provided with a means for keeping the slip in constant circulation. *ASTM C286-65.*

recirculation. The continuous circulation of all or some part of the same air in part of a mine ventilation system. *B.S. 3618, 1963, sec. 2.*

recirculation of air. A term describing a condition in which the ventilating air current is returned to the face repeatedly along a circuitous path. It may happen in the case of auxiliary fans or booster fans. If the intake end of the air pipes of a blowing fan is not placed well to the intake side of the main air current, the foul air from the heading may be recirculated to the face again and again. With an exhausting auxiliary fan the end of the pipes is kept well to the return side of the main air current. *Nelson.*

recirculation of water. The water used in a condenser or in a washery or other wet process is often repumped into the system by means of a circulating pump. The practice is economical in water and in reagent consumption and also reduces pollution of local streams. Water which is recirculated is clarified to reasonable purity. *Nelson.*

reck. Lanc. Chips of wood and other debris hoisted with coal. *Fay.*

Reckna clay beams. Prefabricated beams made of specially designed hollow clay building blocks reinforced with steel rods; the load bearing capacity is about 40 pounds per square foot. *Dodd.*

reckoning. Wage. *Mason.*

reckoning day. Eng. The day on which the workmen receive a statement of wages due, usually 2 days before payday. *Fay.*

reclaim. a. Enamel or glaze which is removed from the spray booth and reconditioned for use. A great deal of enamel or glaze may be used again by this method, but its use is generally limited to first coat work. *Enam. Dict.* b. S. Afr. To obtain ore left standing during previous operations in an area. Also called reclamation. *Beerman.*

reclaimer. A device for saving waste enamel which results from the spraying or dipping of the ware. *Hansen.*

reclaiming. a. Digging from stockpiles. *Nichols.* b. Reprocessing previously rejected material. *Nichols.*

reclaiming conveyor. a. Any of several types of conveyors used to reclaim bulk materials from storage. *ASA MH4.1-1958.* b. The conveyor which receives material from the reclaimer in a blending system. *ASA MH4.1-1958.*

reclaim rinse. A nonflowing rinse used to recover dragout. *ASM Gloss.*

reclamation. The recovery of coal or ore from a mine, or part of a mine, that has been abandoned because of fire, water, or other cause. *Fay.*

reclosing circuit breaker. A circuit breaker that recloses automatically as soon as the demand for current becomes equal to or less than that for which the circuit breaker is set. *Zern.*

recomposed granite. Conglomerate recrystallized by excessive metamorphisms into a rock which simulates granite. Found in the Lake Superior region. *A.G.I.*

recomposed rock. Surface weathering of a rock may break it up into small fragments, which, if in place, and especially if cemented, might be called breccia. There are many uncommortable surfaces, particularly in the Precambrian, where it is very difficult to draw the line between the older brecciated surface of the lower formation and the conglomeratic base of the upper formation. The intermediate rock in some such cases has been called a recomposed rock. *Stokes and Varnes, 1955.*

reconcentration. Recleaning, in mineral processing, of a mineral product, either to remove residual gangue, to raise the assay grade, or to separate one valuable species from another. *Pryor, 3.*

reconnaissance. An exploratory or preliminary survey, inspection, or examination made to gain information; as (1) an engineering survey of a region (as in preparing for triangulation of the region) designed especially to yield information about its general natural features, or (2) a geological survey of a region. *Webster 3d.*

reconnaissance map. A map incorporating the information obtained in a reconnaissance survey, and data obtained from other sources. *A.G.I.*

reconnaissance sampling. *See* pilot sampling.

reconnaissance survey. Preliminary and rough survey of terrain prior to mapping in detail and with greater precision. *Pryor, 3.*

reconnoiter. To examine by the eye; survey; especially, to make a preliminary examination of for military, surveying, or geological purposes. *Standard, 1964.*

reconstituted feed; calculated feed. The composition (for example, relating to size or density) of the feed to a preparation plant (or to a component part) calculated by combining the properties of the products obtained in the appropriate weight proportions, in contrast to the analysis of the actual feed. *B.S. 3552, 1962.*

reconstituted mica. A paperlike material consisting of fine flakes of scrap mica deposited as a continuous mat. The sheet usually is impregnated with an organic material. *Skow.*

reconstructed. A term applied to an artificial gem composed of fused particles of a natural precious stone—reconstructed rubies—although not difficult to differentiate by tests, from the red corundum of gem quality from nature's laboratory, attain some commercial success. Also called scientific ruby. *Hess.*

reconstructed amber. Same as pressed amber. *Shipley.*

reconstructed emerald. A term which has been applied to various imitations of emerald, including glass, doublets, and especially smaragdolin. Emerald was never successfully reproduced as a reconstructed stone. *Shipley.*

reconstructed granite. Synonym for recomposed granite. *Compare* meta-arkose. *Pettijohn, 2d, 1957, p. 325.*

reconstructed ruby. Particles of genuine ruby fused together. The term is often used incorrectly for synthetic ruby. *Shipley.*

reconstructed sapphire. An incorrect name for synthetic sapphire. Blue corundum has never been reconstructed commercially, if at all. *Shipley.*

reconstructed stones. Stones made by fusing together small particles of the genuine stone. They differ from synthetic stones. *Shipley.*

reconstructed turquoise. An imitation turquoise made of finely powdered ivory which is deposited in a solution of copper. *Fay.*

reconstruction. The modernization of underground roadways, transport, ventilation systems and the layout of mine workings. It may include modernization of shafts and winding and also the improvement of surface handling and cleaning or washing equipment. *See also* mechanization. *Nelson.*

reconstructive transformation. Polymorphic phase change which requires bond breaking (as contrasted to displacive transformation). *VV.*

record. To enter in the book of the proper officer (usually a district or county officer) the name, position, description, and date of a mining claim or location. *See also* district. *Fay.*

record books. Official books required by some states as permanent signed reports of underground conditions. *B.C.I.*

record borehole. *See* record hole. *Long.*

recorder, gravity prospecting. *See* observer, gravity prospecting. *D.O.T. 1.*

record hole. The first borehole drilled in an area that is cored (all the way) so that a detail record of the formations penetrated can be obtained. Also called stratigraphic hole; test hole. *Long.*

recording gage. A gage which automatically records the level of water in a stream or tank, or velocity and pressure in a pipe. It is operated by a float or by a submerged air tank fitted with a rubber diaphragm. *Ham.*

record table. Heavy duty shaking table used to treat relatively coarse sands. Shaking is by double-link eccentric motion, with longer and slower throw than with Wilfley type of table. *Pryor, 3.*

recover. a. To restore a mine or a part of a mine that has been damaged by explosion, fire, water, or other cause to a working condition. *Fay.* b. *See* recovery, b. *Fay.*

recoverable grade. The mill-head grade less metallurgical losses. It must be determined by a metallurigcal test if a close calculation is necessary. For preliminary estimates, the experience with similar ores in the district will serve as a basis. *McKinstry, p. 463.*

recovered sulfur. Elemental sulfur produced from hydrogen sulfide obtained from the sour natural gas, petroleum refinery gas, water gas, and other fuel gases. *BuMines Bull. 630, 1965, p. 903.*

recovery. a. S. Afr. The amount of gold or metal, expressed in weight, money, pennyweights per ton, etc., which is obtained from the treatment of ore. *Beerman.* b. The proportion or percentage of coal or ore mined from the original seam or deposit. *Fay.* c. A general term to designate the valuable constituents of an ore which are obtained by metallurgical treatment; as, the recovery was 90 percent. Recovery is better used in connection with milling operations, while extraction is especially applicable to smelting or wet chemical methods and applies to the bullion actually obtained. The copper, for example, in a 2 percent ore is recovered in a 35 percent concentrate, but it is extracted in a 98 percent blister because this last is marketable as metal. The gold in a mill is recovered in the cyanide solution, but it is not extracted until precipitated in the zinc box. Like the amalgam in a stamp mill, the precipitate in a cyanide plant is a product so concentrated and so valuable as to be marketable. *Fay.* d. The work of reopening a mine after a disastrous fire or explosion. *See also* rescue; recover; reclamation. *Fay.* e. In ore sampling, the percentage of recovery may be calculated from the following formulas: Let a = assay of ore; b = assay of tailing; and c = assay of concentrates. Then percentage of recovery $= \frac{100c(a-b)}{a(c-b)}$ and ratio of concentration $= \frac{c-b}{a-b}$ *Hoov, p. 73.* f. The ratio of the footage of core acquired from core drilling a specific length of borehole, expressed in percent. *Long.* g. The carat weight of diamonds salvaged from a worn bit. *Long.* h. Reduction or removal of work-hardening effects, without motion of large-angle grain boundaries. *ASM Gloss.* i. Ability of stressed material to return to its prestressed state. *Pryor, 3.*

recovery oven. A byproduct oven. *Webster 3d.*

recovery pegs. In survey, markers set in easily located and described positions and tied in with the working station pegs. Purpose is to aid relocation in event of loss or displacement of a fixed station. *Pryor, 3.*

recovery plant. A plant designed for separating diamond particles from concentrate by various processes, usually including grease belts, jigs, electrostatic separators and flotation. Also known as picking station. *I.C. 8200, 1964, p. 149.*

recovery tap. A fishing tool. *Long.*

recrystallization. a. The formation of new mineral grains in a rock while in a solid state. The new grains may have the same chemical and mineralogical composition as in the original rock, as when a fine-grained limestone composed of calcite recrystallizes to a coarse-grained marble composed of calcite. On the other hand, entirely new minerals may be formed; some prefer to call this process neomineralization. *See also* paratectonic recrystallization; posttectonic recrystallization; pretectonic recrystallization. *A.G.I.* b. The process whereby the original microstructure of a shell is blurred or lost, and the shell is converted into a mosaic of interlocking crystals. *A.G.I.* c. A change from one crystal structure to another, generally by a change in temperature. *Bateman. See also* primary recrystallization; secondary recrystallization. d. The formation of a new, strain-free grain structure from that existing in cold-worked metal, usually accomplished by heating. *ASM Gloss.*

recrystallization annealing. Annealing cold-worked metal to produce a new grain structure without phase change. *ASM Gloss.*

recrystallization temperature. a. The approximate minimum temperature at which complete recrystallization of a cold-worked metal occurs within a specified time. *ASM Gloss.* b. The temperature of first welding of ceramic particles. This term also generally includes phase changes in the solid state, such as sintering, grain growth, and precipitation, or exsolution phenomena. *ACSG, 1963.*

recrystallize. To purify a substance by repeated crystallization. *Enam. Dict.*

recrystallized silicon carbide. A refractory made of about 98 to 99 percent SiC. *Bureau of Mines Staff.*

rectangle. A four-sided parallelogram having two opposite sides equal in length but differing in length from the other opposite sides and all its angles are right angles. *Bureau of Mines Staff.*

rectangular drainage pattern. The rectangular pattern is characterized by right-angled bends in both the main stream and its tributaries. It differs from the trellis pattern in that it is more irregular; there is not such perfect parallelism of side streams; these latter are not necessarily as conspicuously elongated; and secondary tributaries need not be present. Structural control is prominent, as the pattern is directly conditioned by the right-angled joining or faulting of rocks. *A.G.I.*

rectangular interference ripples. Interference ripples with rectangular pattern. *Pettijohn.*

rectangular kiln. A periodic kiln, rectangular in shape. *ACSG, 1963.*

rectangular shaft. a. A shaft excavated to the oblong shape. The majority of shafts sunk in the Republic of South Africa before 1948 were rectangular and timber lined. The shape lends itself to equipping concurrently with sinking; it provides a convenient in-line hoisting arrangement and can easily be divided into separate compartments. However, developments over the last 10 years or so have been towards the concrete lined circular shaft. *Nelson.* b. S. Afr. Vertical shafts can be made rectangular and circular. Among the advantages of the former is the fitting in of cages and compartments, and among those of the latter their suitability for ventilation purposes. *Beerman.*

rectangular weir. A measuring weir which has a rectangular notch. *Ham.*

rectification. a. The process by which electric energy is transferred from an alternating-current circuit to a direct-current circuit. *Coal Age, 1.* b. The purification of a liquid by redistillation. *C.T.D.*

rectifier. Equipment used in mines to convert alternating current to direct current. *Bureau of Mines Staff.*

rectifier anode. An electrode of the rectifier from which the current flows into the arc. *Coal Age, 1.*

rectifier cathode. An electrode of the rectifier into which the current flows from the arc. *Coal Age, 1.*

rectifier unit. An operative assembly consisting of the rectifier, or rectifiers, together with the rectifier auxiliaries, the rectifier trasnformer equipment, and the essential switchgear. *Coal Age, 1.*

rectifying device. An elementary device consisting of one anode and its cathode which has the characteristic of conducting current effectively in only one direction. *Coal Age, 1.*

rectorite. A pearly-white hydrated aluminum silicate, similar to kaolinite. *Standard, 1964.*

recumbent fold. One in which the axial plane is essentially horizontal. *McKinstry, p. 641.*

recuperative furnace. a. A furnace for the recuperation or recovery of heat from the waste gases of combustion. *Fay.* b. A furnace having a recuperator. *ASTM C162-66.*

recuperative heating. *See* recuperator.

recuperator. a. A continuous heat exchanger in which heat is conducted from the products of combustion to incoming air through flue walls. *ASTM C162-66.* b. A system of thin-walled refractory ducts used for the purpose of transferring heat from a heated gas to colder air or gas. *HW.* c. Preheating equipment for recovering sensible heat from hot spent gases from a furnace and using it for heating incoming charge or fuel gases; essentially, a low-pressure heat exchanger. *Henderson.*

recurrence horizon. A layer of peat marking a sharp change in the charatcer of the peat and resulting from a profound change in climate. *Tomkeieff, 1954.*

recurved spit. Under these and other similar conditions it often happens that the end of a spit is more or less strongly curved inward. When the growing embankment acquires this form it is called a hooked spit, or better, a recurved spit. *A.G.I.*

recycling. The reuse of fissionable material in irradiated reactor fuel which is recovered by chemical processing, re-enriched, and then refabricated into new fuel elements. *L&L.*

red. Prov. Eng. The waste in coal mining; attle. *See also* redd, e. *Fay.*

red antimony. *See* kermesite. *Fay.*

red arsenic. Synonym for realgar. *Fay.*

red-ash coal. a. Coal that leaves a reddish ash. *Fay.* b. In Pennsylvania, the name of an anthracite coal seam. *Bureau of Mines Staff.*

red beds. Applied to red sedimentary rocks, which usually are sandstones and shales, though in exceptional cases red limestone have been reported. The coloring of the red beds is ferric anhydride. *A.G.I.*

red bole. Same as red ocher. *Standard, 1964.*

red brass. A copper-zinc alloy containing less than 15 percent zinc. *Bureau of Mines Staff.*

red brick. Building brick of red color. *AISI, No. 24.*

red cake. The vanadium concentrate in a milling operation. *Ballard.*

red chalk. a. Red ocher mixed with more or less clay. *Fay.* b. Eng. A thin bed of brick-red chalk occurring in the Cretaceous rocks of Lincolnshire and Norfolk. It is equivalent in age to the gault clay of southern England, and separates the carstone from the white chalk above. *C.T.D.*

red clay; red mud. A more or less brown to red deep-sea deposit, which usually contains manganese nodules or a film of manganese. It is the finest divided clay suspension that is derived from the land and transported by ocean currents, accumulating far from land and at the greatest depths. It has a high proportion of volcanic material due to lesser dilution of this material owing to slowness of accumulation of the clay portion. The color is believed to be caused by oxidation. *A.G.I.* Also called brown clay.

red cobalt. An early name for erythrite. *Fay.*

red copper ore. Cuprite. *Fay.*

red copper oxide. *See* cuprite.

Red crag. a. Eng. A division of the Pliocene of East Anglia. *Arkell.* b. A local group of richly fossiliferous sands which accumulated as shell banks in landlocked bays in the Pliocene Sea; restricted in distribution to parts of Norfolk and Suffolk, England. *C.T.D.*

Red Cross explosives. A class of high explosives characterized by the low-freezing point. *Fay.*

Red Cross Extra. Trademark for a high-density, general-purpose ammonia dynamite of 20 to 60 percent strength. Used for quarrying, stripping, agricultural work, and general construction work. *CCD 6d, 1961.*

Red Crown. A nongelatinous permissible explosive. Used in mines. *Bennett 2d, 1962.*

redd. a. Eng. To clear away fallen stone or debris. Also called rid. *SMRB, Paper No. 61.* b. Northumb. Overburden. *Compare* rid; riddings. *Arkell.* c. Scot. To scour through, take down, or to rip. *Fay.* d. Scot. To clear out pillars of coal. *Fay.* e. Scot. Pit rubbish or debris. *See also* red, b. *Fay.*

redd bing. a. A pile of waste made of material brought direct from the mine, not waste from washery. *Zern.* b. Scot. A spoil heap on the surface. *Fay.*

red delph. N. Wales. A bed of shale, in the Carboniferous limestone, Hunts quarry, Porthywaen. *Arkell.*

reddingite. A hydrous phosphate of iron and manganese resembling scorodite in form. From Redding, Conn. *Fay.*

reddle. A variety of ocherous red iron ore used for marking, especially sheep; red ocher. Also called red chalk and spelled ruddle or raddle. *Standard, 1964.*

reddleman. A dealer in reddle or red chalk. *Fay.*

red dog. Material of a reddish color resulting from the combustion of shale and other mine waste in dumps on the surface. *Bureau of Mines Staff.*

reddsman. Scot. One who works at night cleaning up and repairing roadways, etc. *Fay.*

red earths. The characteristic soils of most tropical regions, and regarded as forming a group intermediate between the brown earths and the laterites. They appear to develop most readily from crystalline metamorphic or igneous rocks, and closely similar soils etxend over outcrops of these rocks beyond the normal limits of red earths into temperate regions. These soils are characterized by the presence of free aluminum and ferric oxides, mixed with an equal or greater quantity of aluminum silicate clay. Tropical red soils containing more than 50 percent of free sesquioxides in the clay fraction are usually regarded as impure laterites. *Stokes and Varnes, 1955.*

red edge. Numerous rouge pits located around the edges of a large sheet of polished plate glass. *ASTM C162-66.*

red glass. About 1 percent selenium may be added to the melt of soda-zinc glass containing a small amount of cadmium. Red may also be obtained by using cuprous oxide or gold chloride usually as purple of Cassius. *CCD 6d, 1961.*

red glassy copper ore. Common name for cuprite. *Weed, 1918.*

red ground. Eng. Old name for the Keuper marl. *Arkell, p. 53.*

Red H. Nongelatinous permissible explosive; used in coal mines. *Bennett 2d, 1962.*

red-hard. A term applied to some varieties of tool steels that will retain their hardness even when operating at a red heat. *Newton, p. 493.*

red heart. A harmless reddish core, sometimes found in fire clay refractories. *Bureau of Mines Staff.*

red hematite. A compact columnar variety of hematite with a brownish-red to iron-black color. So called to contrast it with limonite and turgite. *Fay.*

red horse. a. York. A red clay body in the Upper Magnesian Limestone. b. Eng. Decomposed ferruginous sandstone in the Yorkshire Coal Measures. *Arkell, p. 61.*

redingtonite. A hydrous chromium sulfate, occurring in fibrous masses having a pale purple color. *Fay.*

red iron froth. A variety of hematite. *Fay.*

red iron ore. *See* hematite. *Fay.*

red iron oxide. Dark red crystalline powder containing 96 to 98 percent ferric oxide, the balance being $CaSO_4$; specific gravity, 5.12 to 5.24; melting point, 1,565° C; insoluble in water; and soluble in boiling hydrochloric acid. Used as a pigment, a polishing powder, and in ceramics. *Bennett 2d, 1962.*

red iron trioxide. *See* ferric oxide. *CCD 6d, 1961.*

red iron vitriol. Same as botryogen. *Standard, 1964.*

redistillation. The process of distilling a product which has already been distilled. *API Glossary.*

redistilled zinc. Zinc from which the impurities have been eliminated by selective distillation. The process takes advantage of the different boiling points of zinc (907° C) and the impurities, lead (1,620° C) and cadmium (778° C). Metal over 99.99 percent zinc is produced. *C.T.D.*

red jasper. *See* jasper. *C.M.D.*

red lead ore. *See* crocoite.

red lead oxide. *See* lead oxide, red. *Bennett 2d, 1962.*

redledgeite. A mineral, $Mg_4Cr_6Ti_{23}Si_2O_{61}(OH)_4$, from Nevada County, Calif. Formerly called chromrutile. *Hey, M.M., 1964; Fleischer.*

red lime mud. a. A red mud to which lime has been added. The pH is usually 12.0 to 13.0. *Brantly,* 1. b. Mud treated with caustic soda, quebracho, and lime. Used as a well-drilling additive. *Bennett 2d, 1962 Add.*

red manganese; red manganese ore. Applied to both rhodonite and rhodochrosite, by reason of the reddish color of these two minerals. *Fay.*

redmanol. Name of a phenol resin molding composition and varnish somewhat similar to bakelite. *Shipley.*

red marl. A term often applied to the New Red Sandstone. *Fay.*

red measures. Eng. Generally refers to the strata of Permian or Triassic age. *Fay.*

red metal. a. A copper matte containing about 48 percent copper. *Fay.* b. Any one of several alloys used in the manufacture of silverware. *Fay.*

red mud. a. A reddish-brown terrigenous deep-sea mud which accumulates on the sea floor in the neighborhood of deserts and off the mouths of great rivers; contains calcium carbonate up to 25 percent. *H&G.* b. A clay-water-base drilling fluid containing sufficient amounts of caustic soda and tannates to give a pronounced red appearance. The pH is usually 10.0 to 13.0. *Brantly, 1.* c. A residue, containing a high percentage of iron oxide, obtained in purifying bauxite in the production of alumina in the Bayer process. *ASM Gloss. See also* red clay.

red-mud thickener operator. *See* thickener operator. *D.O.T. Supp.*

red oil. The commercial grade of oleic acid or cis-9-octadecenoic acid; $CH_3(CH_2)_7CH:CH(CH_2)_7CO_2H$. *See also* oleic acid. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-437.*

red ore. Hematite ore. *BuMines Bull. 630, 1965, p. 458.*

red orpiment. Same as realgar. *Standard, 1964.*

redox; electronation. Term is abbreviation of reduction-oxidation and is applied to reversible electrochemical reactions driven by oxidizing or reducing agents. Redox indicators are organic dyes which exhibit sharp color change between oxidized and reduced state (for example, methylene blue). Redox potentials are those of redox solutions when 50 percent oxidized, as indicated by the potential of an immersed platinum electrode. Redox oxidation is accompanied by liberation of electrons which are taken up by an oxidizing agent; redox reduction acts in the opposite way. Redox potential is the oxidation-reduction potential or voltage between an inert electrode and a normal hydrogen electrode in a given environment. *Pryor, 3.*

red oxide of copper. *See* cuprite.

red oxide of zinc. *See* zincite. *Fay.*

redox potential. a. The oxidation-reduction potential of an environment; in other words, the voltage obtainable between an inert electrode placed in the environment and a normal hydrogen electrode, regardless of the particular substances present in the environment. *A.G.I.* b. Same as oxidation-reduction potential. *A.G.I.*

red peat. Fibrous variety of peat forming the surface layer of a peat bog. *Tomkeieff, 1954.*

red phosphorus. *See* phosphorus. *Fay.*

red precipitate. *See* mercuric oxide, red.

red rab. Corn. Red killas, or slaty rock. *Fay.*

redrill; redrilled. To reopen a borehole by redrilling after it has been cemented, caved, or lost because of junk in the hole. Also called drill out, drilled out. *Compare* overlap. *Long.*

red roast. In fluidization roasting, conversion of iron from sulfides to red oxide. *Pryor, 3.*

red rock. a. Drillers' term for any reddish sedimentary rock; may be shale, sandstone, or limestone. *A.G.I. Supp.* b. A predominantly granophyric rock of red color intimately associated with some large gabbroic masses, such as the Duluth gabbro. *A.G.I. Supp.*

redruthite. Corn. Copper glance; same as chalcocite. *Fay.*

reds. High explosive; used in mines. *Bennett 2d, 1962.*

red schorl. Rutile. *Shipley.*

redsear. In ironworking, to break or crack when red-hot, as iron under the hammer. *Standard, 1964.*

red-short. Brittle at red heat. *Compare* cold-short. *Fay.*

red-shortness. In metallurgy, the quality or state of being red-short. *Fay.*

red silver ore. Pyrargyrite, proustite. *Pryor, 3.*

red slate. *See* colored slates. *AIME, p. 793.*

redstone. Consolidated red, sandy, or silty strata deposited on a flood plain. *A.G.I. Supp.*

Redstone. Trade name for a red sandstone. *Fay.*

Redston-Stanworth annealing schedule. A procedure for determining the optimum conditions for annealing small glass particles; it is based on the Maxwell model of stress release, modified to take account of the variation of viscosity with time. *Dodd.*

red top moss agate. Mocha stone with a red stain at base of the black dendritic inclusions. *Shipley.*

reduce. a. To deprive of oxygen. *Fay.* b. In general, to treat metallurgically for the production of metal. *Fay.*

reduced iron. Free iron in a fine state of division obtained by reducing ferric oxide by heating it in a current of hydrogen. Also called iron by hydrogen, iron powder, and spongy iron. *Standard, 1964; Fay.*

reduced level. Height above specified datum level of a surveyed point. *Pryor, 3.*

reduced natural frequency. The natural frequency of vibration of a foundation at an average ground pressure of unity is the reduced natural frequency divided by the square root of the ground pressure. This relationship has been established by Tschebotarioff. *Ham.*

reducer. a. A fitting having a larger size at one end than at the other. Some have tried to establish the term increaser—thinking of direction of flow—but this has been due to a misunderstanding of the trade custom of always giving the largest size of run of a fitting first; hence, all fittings having more than one size are reducers. They are always threaded inside, unless specifically flanged or for some special joint. *Strock, 3.* b. Threaded type, made with abrupt reduction. *Strock, 3.* c. Flanged pattern with taper body. *Strock, 3.* d. Flanged eccentric pattern with taper body, but flanges at 90° to one side of body. *Strock, 3.* e. Misapplied at times, to a reducing coupling. *Strock, 3.*

reducing agent. a. A chemical which, at high temperatures, lowers the state of oxidation of other batch chemicals. *ASTM C162-66.* b. One which readily parts with valence electrons and, by becoming oxidized, reduces the acceptor of these electrons. *Pryor, 3.* c. A substance that causes reduction. *ASM Gloss.*

reducing atmosphere. One having a deficiency of oxygen. *Bureau of Mines Staff.*

reducing bushings. Steel, fiber, plastic, or wood inserts used to reduce the arbor hole of a (grinding) wheel to fit a smaller spindle. *ACSG, 1963.*

reducing conditions. Prevail in the kiln if there is not enough air available to make a complete combustion of the carbon particles and carbon compounds in the flame possible. *Rosenthal.*

reducing fire. Smoky impure fire; opposite of oxidizing. *Noke.*

reducing flame. a. The inner cone of the blowpipe flame, characterized by the excess of carbon or hydrocarbons of the gas, which, at the high temperature present, tends to combine with the oxygen of a mineral brought into it. *Fay.* b. A gas flame produced with excess fuel. *ASM Gloss.*

reducing furnace. A furnace in which ores are reduced from oxides, or metal is separated from other substances by a nonoxidizing heat or flame; usually a shaft furnace. *Fay.*

reducing roast. The reduction of certain metallic oxides by heating in contact with coal or other reducing agents. *Newton, Joseph, Introduction to Metallurgy, 1938, p. 384.*

reducing roasting. Heating oxygen-containing ore below its melting temperature with a reducing agent. Used to obtain a compound of lower, or no, oxygen content or to obtain the free metal. *Bennett 2d, 1962.*

reducing scale. A form of scale used by surveyors to reduce chains and links to acres and rods by inspection, and also in mapping and drawing to different scales. *Fay.*

reduction. a. The extraction of any metal from its ore, and the offiical in charge of the mill and extraction plant is called the reduction officer. The term reduction is sometimes applied to the smelting process. *Nelson.* b. A chemical reaction in which electrons are added to the constitution of the reactant. More specifically, the addition of hydrogen or the abstraction of oxygen. A reaction which takes place at the cathode in electroylsis. *Lowenheim.*

reduction cell. A pot or tank in which either a water solution of a salt or a fused salt is reduced electrolytically to form free metals or other substances. *ASM Gloss.*

reduction factor. The factor relating the allowable stress on a long column with that on a short column in order to prevent buckling. *Ham.*

reduction furnace. A furnace for reducing ores. *See also* reducing furnace. *Fay.*

reduction gears. A system of gears designed to reduce the speed of shaft delivering power. *API Glossary.*

reduction of area. a. The difference between the cross-sectional area of a tension specimen at the section of rupture before loading and after rupture, expressed as a percentage of the original area. *Ro.* b. Percentage decrease in cross-sectional area of bar or wire after rolling or drawing. *Ham.*

reduction of levels. The calculation of reduced levels from the staff readings recorded in a field book. *Ham.*

reduction plant. A mill or a treatment place for the extraction of values from ore; the reduction officer is the plant superintendent. *Pryor.*

reduction ratio. A phrase commonly used in discussing crushing performances. It has no exact quantitative significance, but may convey useful qualitative information. As defined by Truscott in connection with rolls, it is the ratio of the size of the largest feed particle to the smallest distance between the roll faces, that is, the set. As used frequently in the field, it is the ratio of the smallest aperture passing all of the feed to that passing all of the product. Another basis of expression is the ratio of the average size of feed to the average size of product. *Taggart, p. 308. See also* overall reduction ratio.

reduction roasting. Lowering of oxygen content of ore by heating in reducing atmosphere, notably to render iron ore ferromagnetic. *Pryor, 3.*

reduction smelting. A pyrometallurgical process which produces an impure liquid metal and a liquid slag by heating a mixture of ore, flux, and reducing agent (usually coke). *Newton, Joseph. Introduction to Metallurgy, 1938, pp. 369-370.*

reduction to center. The offset of a side auxiliary telescope requires a correction to observed horizontal angles, and the offset of a top auxiliary telescope requires a correction to observed vertical angles. The process of computing the correct angle from the observed angle is called reduction to center. *Urquhart, Sec. 1, p. 106.*

reduction-type transmission. A transmission whose output shaft (usually the countershaft) always turns more slowly than the input shaft. *Nichols.*

reduction works. Works for reducing metals from their ores, as a smelting works, cyanide plant, etc. *Fay.*

redundant frame. A frame having more members than are required for it to be a perfect frame. *Ham.*

reduzate. A sediment formed in a strongly reducing environment; for example, coal, oil, sedimentary sulfides, and sedimentary sulfur. *A.G.I.*

red vitriol. Same as bieberite, $CoSO_4+7H_2O$. *See also* rose vitriol. *Fay.*

red ware. *See* Rockingham ware. *Dodd.*

Redwood-Baringer water finder. An instrument designed to ascertain the presence and quantity of water in a tank containing oil. *Fay.*

Redwood number. Viscosity, defined as rate of flow of oil from a Redwood viscometer. *Pryor, 3.*

Redwood viscometer. A viscometer that has been adopted for making viscosity determinations on petroleum products in the United Kingdom. *API Glossary.*

red zinc ore. *See* zincite. *CCD 6d, 1961.*

reed. a. Scot. Rift, first way, cleavage way. *Arkell.* b. A reed filled with powder to act as a fuse. Also called rush; spire. *Gordon.* c. Eng. A grass or other vegetable tube used for a train of gunpowder (fuse) in blasting. *See also* spire, a. *Fay.* d. A weakness in a sedimentary rock parallel with the bedding. *See also* cleat, a. *Fay.*

reed casts. A term used for vertical cylindrical sand-casts presumably of reed-roots. *See also* root cast. *Pettijohn.*

reeder. A frame of thatched reeds used to protect china clay from rain while drying. *Standard, 1964.*

reeding. The operation of forming serrations and corrugations by coining or embossing. *ASM Gloss.*

reedmergnerite. A mineral, $NaBSi_3O_8$; triclinic, small colorless crystals from oil wells in Duchesne County, Utah; a boron analogue of albite; occurs in stubby prisms with characteristic wedge-shaped ends.

American Mineralogist, v. 45, No. 1-2, January-February 1960, p. 188.

reed peat. Peat composed mainly of reeds. *Tomkeieff, 1954.*

reed sedge peat. Deposits of this type are formed mainly in shallow areas around the border of water-filled depressions, of which they gradually take possession, or in boggy meadows. Important constituents of this group are plants of the sedge family, cattail (typha), various grasses, and miscellaneous shore and swamp-loving plants of other families. Peats of this type are rather fibrous and somewhat felted or matted; they consist mainly of roots and rootlets of the plants mentioned and often contain the rootstocks or stems of the plants. They are light yellowish to reddish, rusty brown, or even blackish. *BuMine Bull. 556, 1956, pp. 446-447.*

reedy coal. Coal having alternate layers of splint and bright coal. *Fay.*

reef. a. Aust. A lode or vein. A word introduced into mining by sailors who left their ships to participate in the rush to Ballarat and Bendigo, in 1851. To them a rock projecting above the water was a reef, and the term was therefore applied to quartz outcrops on land. *Fay.* b. S. Afr. In the diamond mines, the barren shales, etc., limiting like an oval funnel, the soft diamantiferous breccia. *Fay.* c. Thick, lenticular limestone mass surrounded by distinctly different sedimentary formations. *Wheeler.* d. S. Afr. A vein, lode, banket, etc., containing ore. *Beerman.* e. A gold-bearing tubular depoist or quartz vein. *C.T.D.* f. A lode typically flattish. *Pryor 2.* g. Bedded deposits such as those of South Africa. *Hoov, p. 94.* h. A narrow ridge or chain of rocks either at the water surface or insufficiently submerged to permit safe passage of a vessel. Sometimes also applied to a similarly situated ridge or mound of sand or gravel more generally called a shoal or bank. *Stokes and Varnes, 1955.* i. A jagged ridge of generally upturned rock, especially in the Western United States; formerly used rather widely, but not much used today. *Stokes and Varnes, 1955.* j. A sedimentary rock aggregate, large or small, composed of the remains of colonial-type organisms that lived near or below the surface of water bodies, mainly marine, and developed relatively large vertical dimensions as compared with the proportions of adjacent sedimentary rocks. Also called bioherm. *Stokes and Varnes, 1955.*

reef cap. Fossil reef limestone covering or capping an island or mountain. *Schieferdecker.*

reef cluster; hermatopelago. This term is appropriate where a number of separate reefs of wholly or partially contemporaneous growth are found within a circumscribed area or geologic province. *Schieferdecker.*

reef core. The rock mass constructed in situ by the reef-building organisms. *Schieferdecker.*

reef drive. Aust. A cutting through the bedrock in alluvial mining for the purpose of seeking other underground, gold-bearing gravel channels. *Fay.*

reef edge. The seaward margin of the reef flat. Commonly marked by an algal ridge and surge channels. *Schieferdecker.*

reefer. One who reefs. *Webster 3d.*

reef flat. The summit of the reef above low water. *Schieferdecker.*

reef front. The upper part of the outer slope of the reef, above the dwindle-point of abundant living coral and coralline algae to the reef edge. *Schieferdecker.*

reefing. Working auriferous reefs or veins. *Fay.*

reef knoll. Applied by Tiddeman in 1889 to conical limestone masses, 200 to 300 feet high, more or less circular in ground plan and commonly surrounded by black shales. Also called knoll reef. It is more or less synonymous with bioherm. *A.G.I.*

reef limestone. Reef limestone differs from the majority of fragmental and organic deposits in the fact that it is largely built up in a solid coherent form from the first, and therefore constitutes a rock mass in the strict sense, without any process of cementation. *See also* coral rock. *A.G.I.*

reef rock. *See* bedrock, b.

reef wall. An elongated reef core. *Schieferdecker.*

reef wash. Aust. Gold-bearing drift. *Fay*

reel. a. A revolving rack used for storage of hose and cable. *Nichols.* b. In a churn drill, the winches are usually called reels. *Nichols.* c. Scot. A drum or frame on which winding or haulage ropes are coiled. *Fay.* d. In blasting, a device for winding the leading wire to avoid kinking and breaking the wire, and to keep it in good condition. *Fay.* e. To haul or bring in by winding an attached cable or rope on a drum. *Long.* f. A spool-shaped device (cathead) used as a hoist by winding or wrapping the attached rope or cable. *Long.* g. A device used for hoisting that has largely been replaced by round ropes. A flat rope is used for the reel, which is wound on an overlapping spiral like a clock spring. The reel is like a conical drum that increases in diameter by the thickness of the rope at each turn. Reels are more suitable for hoisting from a single level than from different levels. *Lewis, p. 245.*

reel boy. In bituminous coal mining, one who works on electric locomotive, power being transmitted through electric cable wound around reel on locomotive, tending cable to see that it is wound up and fed from reel so that it will not pull or break from point where electric current is supplied. Also called nipper. *D.O.T. 1.*

reel cutter. A type of cutting-off table in which the wires are stretched within a large circular frame, the axis of which is slightly above the line of the extruding clay column. This type of cutter can operate on a stiff clay and, if powered and automatic, has a high output. *See also* cutting-off table. *Dodd.*

reel locomotive. A trolley locomotive with a wire rope reel for drawing cars out of rooms. The rope end is pulled by a runner into the face of the room, attached to a car and reeled out by the locomotive. *Zern.*

reenforcing bars; reinforcing bars. Iron or steel bars of various cross-sectional shapes used to strengthen concrete. *Fay.*

Rees-Hugill flask. A 250 milliliter flask, with a neck graduated directly in specific gravity units, designed expressly for the determination of the specific gravity of silica and other refractories. *Dodd.*

Reese River process. Pan amalgamation with previous roasting. *Liddell 2d, p. 495*

Ree's torsion anemometer. Consists of a thin square aluminum vane centrally suspended from a horizontal wire mounted in a vertical frame. The velocity of the air current is obtained from the measurement of the torque which has to be applied to the wire to bring the vane back to its vertical position. The instrument is mounted on a tripod, and the arrangement is such that the torsion can be applied, at a point 2 feet away from the vane, by means of a shaft and bevel gearing. The instrument has been used to measure low air velocities in mines down to about 10 feet per minute and up to 180 feet per minute. *Robert, 1, p. 54.*

reeve. a. Can. A foreman of a coal mine. *Standard, 1964.* b. The orderly arrangement of a rope or cable on a system of pulleys or sheaves to assemble block-and-tackle equipment for handling heavy loads. Also called reeved. *Long.*

reeves. A North Carolina term for crossgrains. *Skow.*

reeving. Threading or placement of a working line. *Nichols, 2.*

reeving thimble. An oval-shaped thimble fitted to one end of a crane sling and through which an ordinary thimble at the opposite end can be passed. *Ham.*

reference axes. In structural petrology, three mutually perpendicular axes to which structural measurements are referred. ***A*** is the direction of tectonic transport, ***c*** is perpendicular to the plane along which the differential movement takes place, and ***b*** lies in this plane but is perpendicular to *a. A.G.I.*

reference electrode. Hydrogen electrode used to determine electrode potentials of half-cells. *Pryor, 3.*

reference input. *See* desired value. ***NCB***

reference mark. A selected distant point from which the bearings to other points can be measured at a survey station. *Ham.*

reference plane. a. The plane which contains the cutter axis and the point of the cutting edge. *ASM Gloss.* b. A plane from which measurements are made. ***ASB Gloss.*** c. In the use of descriptive geometry in solving structural problems, a plane on which data is plotted. *A.G.I.*

reference seismometer. In seismic prospecting, a detector placed to record successive shots under similar conditions, to permit overall time comparisons. Used in connection with the shooting of wells for velocity. *A.G.I.*

reference size. The separation size or the designated size or the control size used to define analyses of the products of a sizing operation. *B.S. 3552, 1962.*

reference standard. Taken or laid down as a standard for measuring, reckoning, or constructing. *Webster 3d.*

reference station. A station for which tidal constants have previously been determined and which is used as a standard for the comparison of simultaneous observations at a second station; also, a station for which independent daily predictions are given in the tide or current tables from which corresponding predictions are obtained for other stations by means of differences or factors. *A.G.I.*

referencing. The process of tying in points, that is, measuring horizontal distances and angles that will locate a point (such as an instrument station) definitely and accurately with reference to near-by permanent objects, for the purpose of finding or relocating the station if it becomes disturbed or lost. *Seelye, 2.*

refikite. A white, very soft resin, $C_{20}H_{16}O_2$, found in the lignite of Montorio, Abruzzes, Italy. *Fay.*

refine. a. To free from impurities; to free from dross or alloy: to purify, as metals; to cleanse. *Webster 3d.* b. To treat cast iron in the refinery furnace so as to remove the silicon. *Webster 3d.*

refined asphalt. Natural asphalt from which coarse mineral matter and water have been removed by heat treatment. *Nelson.*

refined coal tar. Coal tar from which moisture and more volatile constituents have been removed. *Bennett 2d, 1962 Add.*

refined iron. Wrought iron made by puddling pig iron. *C.T.D.*

refined tar. a. Tar freed from water by evaporation or distillation which is continued until the residue is of the desired consistency. *Hess.* b. A tar produced by fluxing tar residum with tar distillate. *Hess.*

refiner. A compartment of a glass tank furnace, for the purpose of conditioning the glass. *See also* nose, g. *ASTM C162-66.*

refinery. A term sometimes applied to the plant in which metal or valuable mineral is extracted from an ore or concentrate. Usually such a plant would be described as an extraction plant or chemical treatment plant. *Nelson.*

refinery gases. These consist mainly of C_3 and C_4 hydrocarbons, with smaller proportions of ethane, methane, hydrogen, and hydrogen sulfide. *Francis, 1965, v. 2, p. 415.*

refining. a. The purification of crude metallic products, as the refining of base bullion (silver lead) produces nearly pure lead and silver. *Fay.* b. *See* fining, c. *ASTM C162-66.*

refining heat. A medium orange heat, about 655°C, which imparts fineness of grain and toughness to steel that is raised to it and afterwards quenched. *Webster 2d.*

refining of metals. Operations performed after the crude metals have been extracted from their ores in order to obtain them in a condition of higher purity. *See also* electrolytic copper and Hoopes process. *C.T.D.*

refining temperature. A temperature, usually just higher than the transformation range, employed in the heat treatment of steel to refine the structure, particularly the grain size. *ASM Gloss.*

Refinite. Trade name for bentonite. *Hess*

refire. To reoperate by putting the ware through the firing operation a second time. *Enam. Dict.*

reflectance. The fraction of incident light reflected from an enameled surface, or other specimen. *Hansen.*

reflected light. Light that has been reflected from any surface; hence, any light not traveling directly from the sun, or lamp, or other source. *See also* reflection; transmitted light. *Shipley.*

reflected wave. A (gaseous) pressure wave resulting from a direct wave striking an obstacle or an opposing surface and being reflected backwards. *Rice, George S.*

reflecting level. Surveyor's level with mirror which hangs vertically and incorporates an unsilvered window by means of which the line of sight is referable to a horizontal line across the mirror. *Pryor, 3.*

reflection. a. The bounding back of light rays or ether rays as they strike a solid surface. *Shell Oil Co.* b. In seismic prospecting, the returned energy (in wave form) from a shot which has been reflected from a velocity discontinuity back to a detector; the indication on a record of reflected energy. *A.G.I.* c. A ray of light incident on a polished plane surface is reflected by it in such a manner that the angle of reflection is equal to the angle of incidence. The proportion of reflected to refracted light in transparent substances increases with the refractive index of the substance and with the angle of incidence. For example, 17 percent of the light falling at perpendicular incidence on the surface of diamond is reflected, whereas with quartz less than 5 percent is reflected under these conditions. *Anderson.*

reflection factor. a. The ratio of the reflected luminous flux to the incident luminous flux. For coal it is 4 to 7 percent, shale 20 to 25 percent, whitewashed or cement-washed roadway 40 to 75 percent. *Sinclair, I, p. 200.* b. The ratio of light reflected from a surface to the total incident light. *Hansen.*

reflection goniometer. In mineralogy, an instrument for measuring angles. *Fay.*

reflection loss. The transmission loss at the junction between an energy source and an energy load measured by the ratio of (1) the load power which would be measured if source and load were connected by a hypothetical transducer having an input impedance equal to the source impedance of the source, an output impedance equal to the load terminals as are developed at its source terminals, to (2) the actual load power when source and load are connected directly to each other. *Hy.*

reflection mechanism, blasting. A rule stating that rock breaks from the surface inward toward the explosive rather than from the explosive charge outward. *Lewis, p. 146.*

reflection method. *See* seismic reflection method.

reflection shooting. The seismic prospecting procedure which is based on the measurement of the travel times of waves which, originating from an artificially produced disturbance, have been reflected back to detectors from subsurface boundaries separating media of different elastic wave velocities. *A.G.I.*

reflection wave; reflexion wave. A wave that is propagated backward through the burned gas as the result of an explosion wave being completely or partly arrested against the closed extremity, or in a constricted portion of its path, as in a tube, gallery, etc. *Fay.*

reflectivity. a. The ratio of radiant energy reflected by a body to that falling upon it. *Strock, 10.* b. The reflectance of an enamel or other material. *Hansen.* c. The reflectance of a coating so thick that additional thickness does not change the reflectance. *ASTM C286-65.*

reflectometer. An apparatus for determining reflectance of an enamel or other materials. *Enam. Dict.*

reflector. A layer of material immediately surrounding a nuclear reactor core that scatters back (reflects) into the core the neutrons that otherwise would escape. The returned neutrons can then cause more fission and improve the neutron economy of the reactor. *L&L.*

reflet. Fr. a. Iridescent glaze; especially the metallic glaze in pottery. *Standard, 1964.* b. Pottery having metallic or iridescent luster; especially a brilliantly tinted tile. *Standard, 1964.*

reflex glass. Glass strip, for use in vessels containing liquids; made with prismatic grooves to facilitate the reading of the liquid level. *Dodd.*

reflowing. The melting of an electrodeposit followed by solidification. The surface has the appearance and physical characteristics of being hot-dipped (especially tin or tin-alloy plates). *ASM Gloss.*

reflux. A distillate fraction having a certain boiling range which is introduced into fractionating equipment to bring about a cooling effect, resulting in a more intimate contact between the vapors and thus in more efficient fractionation. *Shell Oil Co.*

reflux valve. An automatic nonreturn valve which opens freely to permit fluid to pass in one direction but closes under its own weight when motion ceases or when the fluid commences to flow in a reverse direction. Also called check valve; retaining valve. *B.S. 3618, 1963, sec. 4.*

reforming. The cracking of petroleum naphtha or of straight-run gasoline of low octane number usually to form gasoline containing lighter constituents and having a higher octane number. *Webster 3d.*

refraction. a. When a train of waves approaches a shoreline at an angle, the wave crests are bent because the first portion to reach shallow water travels more slowly than the portion still advancing in the deeper water. This process of bending wave crests is known as refraction. *A.G.I.* b. The bending of wave crests by currents. *A.G.I.* c. A change of direction of a ray of light when it passes from medium to another of different optical density. *A.G.I.* d. The deflection from a straight path undergone by a light ray or a wave of energy in passing obliquely from one medium (as air) into another (as water, glass) in which its velocity is different. *Webster 3d.* e. The refraction of light passing through the earth's atmosphere. Atmospheric refraction includes both astronomical refraction and terrestrial refraction. *A.G.I.*

refraction loss. That part of the transmission loss which is due to refraction in the medium. These losses arise from irregularities in the medium. *Hy.*

refraction method. A seismic method of geophysical prospecting. *Nelson.*

refraction shooting. The detonation of heavy charges of explosive in comparatively shallow holes or pits. The effects may be measured over a wide area. The firing creates the shock waves in the seismic method of prospecting. *Nelson.*

refractive index. Ratio of speed of heat, light or sound traversing a medium to that in air. Ratio of sine of angle of incidence to sine of angle of refraction of light refracted from vacuum into a medium, as measured in a refractometer. Property used in identification of translucent minerals by observation of their bending of an incident ray of light. *Pryor, 3.*

refractometer. a. A firedamp detector. *See also* interference methanometer. *Nelson.* b. An instrument designed for measuring the refractive indices of various substances. *Anderson.*

refractories. Nonmetallic materials suitable for use at high temperatures in furnace construction. While their primary function is resistance to high temperature, they are usually called upon to resist other destructive influences also, such as abrasion, pressure, chemical attack, and rapid change in temperature. *HW.* China clay, ball clay, and fire clay are all highly refractory, the best qualities fusing at about

1,700° C. Other materials are silica, magnesite, dolomite, alumina, and chromite. *See also* silica. *C.T.D.*

refractoriness. The capacity of a material to resist high temperature. In the refractories industry, the pyrometric cone equivalent is a comparative value used to determine the refractoriness of a material. *Henderson.*

refractoriness under load. A measure of the behavior of a small brick section when heated at a steady rate, normally 10° C per minute, while under a load of 28 or 50 pounds per square inch. The temperature is noted when the brick has lost 5 percent in height by subsidence or shear. *Francis, 1965, v. 2, p. 653.*

refractory. a. A material of a very high melting point with properties that make it suitable for such uses as furnace linings and kiln construction. *ASM Gloss.* b. The quality of resisting heat. *ASM Gloss.* c. S. Afr. Ore difficult of treatment, usually containing a second metallic constituent. For example, a gold sulfide ore must be roasted to reduce the ore to an oxide and permit the gold to be recovered. *Beerman.* d. A piece of pottery ware covered with a vaporable flux and placed in a kiln to form a glaze on other articles. *Fay.*

refractory alloy. *See* refractory metal.

refractory bonding mortars. High-temperature bonding mortars containing various materials and exhibiting various properties, but primarily intended for providing structural bond between refractory units in high-temperature industrial furnace construction. *Henderson.*

refractory brick. a. A brick made from refractory material such as fire clay, bauxite, diaspore, etc., used to withstand high temperatures. Refractory brick are made in various sizes and shapes; the most common sizes are 9 × 4-7/16 × 2½ inches, 9 × 6 × 2½ inches, and 13½ × 6 × 2½ inches. *Bureau of Mines Staff.* b. A brick which is used as a lining for the interior of fireboxes in furnaces and boilers.. Refractory brick is constructed so that it can withstand very high temperatures, but it is not a very good insulator. *API Glossary.*

refractory cement. *See* refractory mortar.

refractory clay. Any clay showing a pyrometric cone equivalent of not less than cone 27. *ACSB-1. See also* fire clay.

refractory chrome ore. A refractory ore consisting essentially of chrome-bearing spinel with only minor amounts of accessory minerals and with physical properties that are suitable for making refractory products. *ASTM C71-64.*

refractory coating. A refractory material for the protection of the surface of refractory brickwork or of metals (for example, pyrometer sheaths or aircraft exhaust systems). Examples of such coatings include Al_2O_3, $ZrSiO_4$, $MoSi_2$, and (for the protection of metals) refractory enamels. Refractory coatings for furnace brickwork are sometimes known as washes. *Dodd.*

refractory concrete. Concrete made with high-alumina or calcium-aluminate cement and a refractory aggregate to withstand very high temperature. *Taylor.*

refractory lime. An unreactive dolomitic quicklime, stabilized with iron, that is used primarily for lining refractories of open-hearth steel furnaces. Synonymous with dead-burned dolomite. *Boynton.*

refractory lining. A lining which has high refractory qualities and therefore suitable for furnace linings and boiler foundations. It is made from a good-quality refractory clay, fireclay, or gainister. *Nelson.*

refractory magnesia. A dead-burned refractory material consisting predominately of crystalline magnesium oxide. *ASTM C71-64.*

refractory material. A material which can be used at high temperatures. *Rosenthal.*

refractory metal; refractory alloy. a. A heat-resistant metallic material. *Bureau of Mines Staff.* b. An alloy having an extremely high melting point. *Bureau of Mines Staff.* c. A metal or alloy difficult to work at elevated temperatures. *Bureau of Mines Staff.*

refractory mortar. A finely ground preparation which becomes plastic and trowelable when tempered with water and is suitable for laying and bonding refractory brick. *A.R.I.* For various types, see entries under air-setting; grog fire clay; ground fire clay. *ACSG, 1963.*

refractory ore. Ore difficult to treat for recovery of the valuable substances. *A.G.I.*

refractory porcelain. That made to resist heat or acid, or both. *Bureau of Mines Staff.*

refractory stone. Consists of sandstone, quartzite, mica schist, soapstone, or other rock that will withstand a moderately high temperature without fusing, cracking, or disintegrating. It may be used in solid blocks or crushed and mixed with a binder to form bricks. *BuMines Bull. 630, 1965, p. 886.*

refractory ware. Usually hollow ware—as saggers, pyrometer tubes, crucibles, etc.; also refractory brick and shapes. *Bureau of Mines Staff.*

refrangibility. The capacity of being refracted. *See also* refraction. *Shipley.*

refrangible. Capable of being refracted, as rays of light. *Shipley.*

refrigerant. A substance which will absorb heat while vaporizing and whose boiling point and other properties make it useful as a medium for refrigeration. *Strock, 10.*

refrigeration. a. In special application to mining, cooling of air before release in lowest levels of deep, hot mine; also, expansion of compressed air for same purpose (an extravagant practice if used indiscriminately). *Pryor, 3.* b. The process of absorption of heat from one location and its transfer to and rejection at another place. Arbitrarily expressed in units of tons and is equal to the coil cooling load divided by 12,000 (a ton of ice in melting in 24 hours liberates heat at the rate of 200 Britain thermal units per minute, or 12,000 British thermal units per hour). *Hartman, pp. 327, 331.*

refrigeration plant. a. A surface plant to form the protective barrier of ice in the freezing method of shaft sinking. The cooling agent used is ammonia which, in its gaseous state, is compressed to about 120 pounds per square inch when it passes to the top of the condensers, emerging at the bottom as liquid ammonia under pressure. It then passes through a regulator valve into the coolers where it immediately evaporates. The latent heat of evaporation is extracted from the brine circuit—the brine being passed through the coolers by the brine pumps. The ammonia gas passes back for re-use. The brine emerges from the coolers at a temperature of —4° F and is pumped down the boreholes to freeze the water around the shaft sinking. *Nelson.* b. A surface plant to cool liquids. These liquids or ice are sent underground to cool the air current in heat exchangers. By this method, the air in deep mines is cooled considerably and the working environment is improved. *See also* deep mining. *Nelson.*

refrigeration ton. The heat required to melt one short ton (2,000 pounds) of ice in 24 hours. The latent heat of ice being 144 British thermal units per pound; 1 refrigeration ton $= \frac{144 \times 2,000}{24} = 12,000$ Btu/h. *Sinclair, I, p. 66.*

refuge hole. A place formed in the side of an underground haulageway in which a man can take refuge during the passing of a train, or when shots are fired. Also called refuge stalls. *Fay. See also* manholes. *Nelson.*

Refugian. Upper Oligocene. *A.G.I. Supp.*

refusal. A condition arrived at when driving pipe, casing, piling, etc., when it cannot be driven to a greater depth or made to penetrate the ground a distance of more than 1 foot per 100 blows delivered by a drive hammer. *Long.*

refuse. a. Waste material in the raw coal which it is the object of cleaning to remove. *B.S. 3552, 1962.* b. Notably used to describe colliery rejects; in washbox (jigging of coal) these may be removed by a screw conveyor called refuse worm. Also called tailings. *Pryor, 3.*

refuse conveyor. An adaptation of a drag chain conveyor. *ASA MH4.1-1958.*

refuse discharge pipes. Pipes used on some washboxes instead of a refuse worm. *B.S. 3552, 1962.*

refuse engineer. *See* dump motorman. *D.O.T. 1.*

refuse extraction chamber. That part of the washbox into which the refuse extractor discharges. *B.S. 3552, 1962.*

refuse extractor. A device used in a washbox to remove the reject from the washing compartments, operated manually or automatically. *B.S. 3552, 1962.*

refuse rotor; star wheel extractor. A reject gate in the form of a rotary (or star) valve. *B.S. 3552, 1962.*

refuse worm. A screw conveyor fitted at the bottom of some washboxes to collect the fine reject which has passed through the apertures in the screen plate. *B.S. 3552, 1962.*

regain. The ratio of normal moisture weight to the weight of material holding the moisture, expressed in percent. *Strock, 10.*

regalian doctrine. The old doctrine that all mineral wealth was the prerogative of the crown or the feudatory lord. The concession system, in which the state or the private owner has the right to grant concessions or leases to mine operators at discretion and subject to certain general restrictions, had its origin in this doctrine. Almost all mining countries of the world, except the United States, follow this system. *Hoov, p. 365.*

Regal Roof Coating. Trademark for asphalt coating for repair and preservation of roofs. *Bennett 2d, 1962 Add.*

regelation. a. A theory based upon the fact that broken ice heals under pressure, even at melting temperatures, holds that the movement of glaciers is accomplished by the repeated fracturing and later freezing together (regelation) of the surfaces of the fractures when they again come into contact. *A.G.I.* b. The freezing together of pieces of ice in contact under pressure. *A.G.I.* c. Refreezing of ice which has melted under pressure. *A.G.I.*

regenerated anhydrite. Anhydrite produced by the dehydration of gypsum. *A.G.I. Supp.*

regenerated crystal. A large crystal that has grown in a mass of crushed material like mylonite. *See also* integration. *A.G.I. Supp.*

regenerated dense medium; recovered dense medium. Medium obtained from the medium recovery system and purified (wholly or partly) from contaminating fine coal and clay. *B.S. 3552, 1962.*

regeneration. a. In mineral leaching, reconstitution of barren leach solution after it has completed its chemical attack on mineral and its values have been removed. In cyanidation, this may include bringing it back to working strength; addition of protective alkali; removal of salts and ions undesirable in leaching process. Regeneration of ion exchange (IX) resins is removal of poisoning elements or compounds from resin sites by special eluants. *Pryor, 3.* b. A reversing heat exchanger for preheating combustion air (and gaseous fuels) from waste heat of the exhaust gases. *VV.*

regeneration of cyanide solution. The partial regeneration of the cyanide solution used in gold reduction by sodium sulfide and by sulfuric acid. *Nelson.*

regenerative apparatus. Breathing apparatus in which the absorption of the carbon dioxide is carried out by causing the air breathed out to pass over caustic soda or other substance. Caustic soda has the property of absorbing carbon dioxide, the chemical action causing the absorbent to become heated with the formation of moisture. *See also* protosorb. *Nelson.*

regenerative braking. a. Use of electric motors to return power to supply system when the momentum of their driven system is reduced. *Pryor, 3.* b. Regenerative braking is used in both the Ward-Leonard and the Ilgner systems of winding and, as it returns energy to the supply during the braking period, is one of the advantages of these systems. If the driver's lever is returned towards the off position—and if need be to the other side—the winding motor becomes a generator driven by the overhauling load in the shaft and the variable-voltage generator becomes a motor driving the induction motor as an a.c. generator, which then returns power to the supply. By moving back the lever, the braking effort produced can be varied from a light to an extremely powerful retardation at any speed. *Sinclair, V, p. 136.*

regenerative chambers. Separate compartments connected with a furnace arranged for preheating the gas and the air used for fuel. *Mersereau, 4th, p. 414.*

regenerative furnace. A furnace in which the hot gases, usually waste combustion gases pass through a set of chambers containing firebrick structures, to which the sensible heat is given up. The direction of hot gas flow is diverted periodically to another set of chambers and cold incoming combustion gas or air is preheated in the hot chambers. *Bureau of Mines Staff.*

regenerative heating. *See* recuperative heating. *Pryor, 3.*

regenerative principle. Used in open-hearth furnaces to increase the furnace temperature by preheating the fuel gas and air previous to their combustion in the furnace. *Newton, p. 317.*

regenerator. *See* regenerative furnace.

regenerator checkers. Brick used in furnace regenerators to recover heat from hot outgoing gases, and later to release this heat to cold air or gas entering the furnace; so called because of the checkerboard pattern in which the bricks are arranged. *HW.*

regime. In hydraulics, the condition of a river with respect to the rate of its flow as measured by the volume of water passing different cross sections in a given time. *Webster 3d.*

regimen of a stream. The system or order characteristic of a stream, in other words, its habits with respect to velocity and volume, form of and changes in channel, capacity to transport sediment, amount of material supplied for transportation, etc. Also applied to a stream which has reached an equilibrium between corrosion and deposition, or, in other words, to a graded stream. *USGS Bull. 730, 1923, p. 89.*

regional. a. Extending over large areas in contradistinction to local or restricted areas. *Fay.* b. In gravity prospecting, contributions to the observed anomalies due to density irregularities at much greater depths than those of the possible structures, the location of which was the purpose of the survey. The term is also employed in an analogous sense in magnetic prospecting. *A.G.I.*

regional anomaly. The more localized departures in the earth's field from the values that would be predicted if the field were to originate with a single magnet oriented along the magnetic axis. These have maximums as great as 10,000 gammas, which is about a third the total intensity at the equator, and extend over areas as large as a million square miles. The locations of such features do not change with time as do anomalies associated with secular variation. *Dobrin, p. 298.*

regional correlation. The study and matching of beds of rocks over or across wide areas of the earth's surface. *Stokes and Varnes, 1955.*

regional dip. The general inclination of strata over a large area in which they dip in one direction with or without interruptions. *Compare* homocline; monocline; uniclinal. *A.G.I.*

regional geology. Geology covering a widespread area. *Schieferdecker.*

regional gradient. *See* regional, b. *A.G.I.*

regional gravity. *See* regional, b. *A.G.I.*

regional gravity map. Gravity map that shows only the gradual changes of gravity. *Schieferdecker.*

regional metamorphism. A general term for metamorphism due to the sum of the processes which have affected the rocks over extensive areas; contrasted with local metamorphism in which each area affected is restricted to an aureole of limited extent, and related to a definite intrusion of magma. Originally, the term covered changes due to deep burial and the action of heat and hot gases from the interior; by many writers, it has been used as synonymous with dynamic metamorphism, and by others in the sense defined above but with the proviso that the metamorphism is not genetically connected with the intrusion of magmas. This specified limitation would often be difficult to substantiate, for many of the features of regional metamorphism are not distinguishable from those of local or contact metamorphism, except in uniformity, depth, and extent. *Homes, 1928. See also* metamorphism. *Nelson.*

regional unconformity. Unconformity continuously present throughout an extensive region, recording an important interruption in sedimentary deposition and generally erosion of older strata. *A.G.I. Supp.*

registered premises. Premises registered with the local authority for the storage of not more than 60 pounds of explosive. *See also* licensed store; magazine. *B.S. 3618, 1964, sec. 6.*

reglette. A 12-inch scale divided into tenths and hundredths of a foot, used for accurate measurement in conjunction with a steel band which is graduated only in feet. *See also* band chain. *Ham.*

regolith. The layer or mantle of loose, incoherent rock material, of whatever origin, that nearly everywhere forms the surface of the land and rests on the hard rocks or bedrocks. It comprises rock waste of all sorts, volcanic ash, glacial drift, alluvium, windblown deposits, vegetal accumulations, and soils. *Fay.*

regosol. Soil without definite genetic horizons developing from deep unconsolidated rock or soft mineral deposits. *Schieferdecker.*

regradation. The process of forming a new gradation level of equilibrium in a land surface by streams when an old one has become deformed. *Fay.*

regression. a. Gradual contraction of a shallow sea resulting in the emergence of land as when sea level falls or land rises. *A.G.I. Supp.* b. The loss by organisms of advanced characters; a degeneration. *A.G.I. Supp.* c. *See* offlap. *A.G.I.*

regressive overlap. Synonym for offlap. *A.G.I.*

regressive ripples. A series of asymmetric current ripples with steep sides pointing into the current. *Pettijohn.*

regressive sand wave. A sand wave that migrates up-current. *See also* antidüne. *Pettijohn.*

regular. a. Sometimes used to designate medium-quality drill diamonds. *Long.* b. Mex. Average ore; ore of fair grade. *Fay.*

regular alumina. A product recrystallized from a molten bath where the alumina content is less than 95 percent and the crystal size is relatively large. *ACSG, 1963.*

regular lay. Wire rope or cable in which the individual wire or fibers forming a strand are twisted in a direction opposite to the twist of the strands. Also called ordinary lay; standard lay. *Long.*

regular-lay left lay. Synonym for left regular lay. *Long.*

regular-lay right lay. Synonym for right regular lay. *Long.*

regular polygon. A polygon having equal sides, and the angles between these sides are equal. *Jones, 2, p. 109.*

regulars. Eng. Phosphatic nodules with rough sandy surface comprising the main coprolite bed of the Lower Greensand at Upware, formerly worked for fertilizer. *Arkell.*

regular sampling. The sampling of the same coal or coke received regularly at a given point. There are two forms of regular sampling, namely, continuous sampling and intermittent sampling. *B.S. 1017, 1960, Pt. 1.*

regular system. The cubic system. *C.M.D.*

regular ventilating circuit. All places in the mine through which there is a positive flow of air without the aid of a blower fan or of ventilation tubing. *Grove.*

regulated feed. In contrast with choke feed, feed which is throttled back to a value below the full capacity of the crusher. *South Australia, p. 101.*

regulated split. In mine ventilation, a split where it is necessary to control the volumes in certain low-resistance splits to cause air to flow into the splits of high resistance. *BuMines Bull. 589, 1960, p. 18.*

regulating course. A layer of stone placed over an old road in order to restore its shape before surfacing. *Ham.*

regulating gate. A gate used to vary size of opening so as to control the flow of material through the opening. *See also* bin gate. *ASA MH4.1-1958.*

regulating rod. A nuclear-reactor control rod for making frequent fine adjustments in reactivity. See also shim rod. *L&L.*

regulating unit. One which converts the output signal of the controller into an appropriate proportional movement of the device which operates the process, usually by means of a relay. *Pryor, 3, p. 32.*

regulating wheel. A wheel used on a centerless grinder to regulate speed and pressure on the part being ground. *ACSG, 1963.*

regulator. a. An opening in a wall or door in the return airway of a district to increase its resistance and reduce the volume of air flowing. This increased resistance induces a greater volume of air to flow through the other districts. A regulator consists of a sliding shutter which can be adjusted to any proportion of the maximum aperture. *See also* ventilation splitting. *Nelson.* b. The shutter of a fan. *Fay.* c. A ventilating device, such as an opening in a wall or door, and usually placed at the return of a split of air to govern the amount of air entering that portion of the mine. A simple means of erecting a regulator is by building a stopping with a sliding door in it across the airway to adjust the amount of air that is permitted to pass through. If more air is needed the sliding door can be opened to permit the air to pass through. Mines that are properly ventilated usually have a regulator at the return of the splits so that the air can be properly proportioned to all parts of the mine. *Kentucky, p. 89.* d. A device for creating shock loss to restrict passage of air through an airway. They are usually set in doors as adjustable, sliding partitions that can be varied to the desired opening. In their simplest form, for temporary service in an untraveled part of the mine, regulators consist of doors propped partially open. When possible, regulators are located on the exhaust side of a split (in a return airway) to minimize interference with traffic. *Hartman, p. 252.* e. A device for controlling the delivery of gas or electricity at constant pressure (or voltage) or rate. *ASM Gloss.*

regulator door. *See* scale door. *B.S. 3618, 1963, sec. 2.*

regulators. *See* pH regulators. *Hess.*

regulus. Impure metal produced during smelting of ores or concentrates. *Pryor, 3.*

regulus of Venus. A violet alloy of copper and antimony, Cu_2Sb. *Webster 2d.*

regur. Hind. A dark-colored, loamy soil of the volcanic regions of India, a residual product, rich in organic matter that is not derived from forest growth: similar to the black earth of the U.S.S.R. Also spelled regar. *Standard, 1964.*

reh. Hind. A sterilizing salty efflorescence that forms on the surface of parts of the Valley of the Ganges in India, from the evaporation of water rising from beneath. *Standard, 1964.*

rehabilitation. A period of active exercise and suitably graduated work in order to restore certain injured miners to full working capacity. *See also* model coal face. *Nelson.*

reheat behavior. The changes in length or volume taking place in a fired refractory when subjected to a reheat test. *ASTM C71-64.*

reheater. An apparatus for reheating a substance, as ingot steel, that has cooled or partly cooled during some process. *Standard, 1964.*

reheater load. The amount of sensible heat in British thermal units per hour, restored to the air in reheating. *Hartman, p. 327.*

reheating furnace. The furnace in which metal ingots, billets, blooms, etc., are heated to bring them to the temperature required for hot-working. *C.T.D.*

reheat test. The heating of a refractory to a temperature usually higher than that to which it has previously been subjected to determine its linear or volume stability by measurements taken before and after the heating. *A.R.I.*

reheat treating; retreating. Heat treating of previously heat-treated products, either as a corrective measure or as a complete additional cycle. *Henderson.*

Rehisshakenhobel. A plough developed from the Anbauhobel machine and designed for cutting thin coal seams. The plough drives, instead of being on the face side of the conveyor, are on the waste side and the plough chains run in two tubes along the waste side of the conveyor chutes. *Nelson.*

rehoboam. A 6-quart wine bottle. *Dodd.*

Reid vapor pressure. One of the important specifications for gasolines. It is a measure of the vapor pressure of a sample at 100° F, and the test is commonly made in a bomb. The results are reported in pounds per square inch. *API Glossary.*

reinerite. Pale yellow-green orthorhombic crystals from Tsumeb, Southwest Africa, having the compostion, $Zn_3(AsO_3)_2$; a sea-blue variety contains 2 percent CuO. An unfortunate name, easily confused with renierite. *Hey, M.M., 1961.*

reinforce. Application of extra enamel in certain areas of the surface prior to firing. *Bryant.*

reinforced asbestos roving. Asbestos roving containing a core of other fibers. *Bennett 2d, 1962.*

reinforced brick masonry. Brick masonry in which steel reinforcing bars are embedded in such manner that the two materials act together in resisting forces. Abbreviation, RBM. *ACSG.*

reinforced brickwork. Brickwork embodying expanded metal, steel-wire mesh, hoop iron, or thin steel rods in the bed joints. Steel rods can also be bedded vertically through a properly bonded wall at the points where the vertical points intersect or, in conjunction with concrete grouting, at specially designed intervals. *Ham.*

reinforced center. Designating a wheel with steel rings molded into the wheel structure near the hole for additional strength. *ACSG, 1963.*

reinforced concrete; ferroconcrete. Concrete in which metal is embedded in such a way that the two materials act together in resisting forces or loads. Concrete alone is very weak in tension compared with its strength in compression. Approximate values for comparison being: tensile strength, 600 pounds per square inch; compressive strength, up to 8,000 pounds per square inch. The idea, therefore, of a reinforced concrete lining for shafts or tunnels is to reinforce the sides subject to tension loading with steel rods. Mild steel rods have a tensile strength of about 60,000 pounds per square inch. Stress calculations are usually made on the assumption that the steel takes all the tensile forces and the concrete all the compressive forces. *Nelson.*

reinforced concrete lining. A lining for roadways and shafts composed of reinforced concrete. It is not suitable for tunnels subjected to severe pressures as any distortion is costly and difficult to repair. (Wedge-shaped precast concrete blocks have been used to form dry wall arches which are very strong. These blocks are self-tightening and are fairly easy to take out for repairs. *Nelson.*

reinforced grouted brick masonry. Reinforced brick masonry in which the continuous longitudinal vertical or collar joint is filled with grout as the wall is built. No masonry headers are used in this type of construction. Abbreviation, RGBM. *ACSG.*

reinforced masonry. Masonry units, reinforcing steel, grout, and/or mortar combined to act together in resisting forces. *ACSG, 1963.*

reinforced products (abrasives). Bonded products with some type of mechanical addition as an integral part of the product to increase the strength of the product. *ACSG, 1963.*

reinforced wheel. A grinding wheel in which some type of mechanical addition has been made as an integral part of the wheel to increase its strength. *ACSG, 1963.*

reinforcement. rods, bars, or fabric, usually of steel, embeded in concrete for the purpose of resisting particular stresses. They are not used as tendons. *Taylor.* Among other materials used in reinforcement, bamboo has been applied successfully, and hessian is suitable for reinforcing molded plaster. *See also* reinforced brickwork; reinforced concrete. *Ham.*

reinforcement of weld. a. In a butt joint, weld metal on the face of the weld that extends out beyond the surface plane common to the members being welded. *ASM Gloss.* b. In a fillet weld, weld metal that contributes to convexity. *ASM Gloss.* c. In a flash, upset, or gas-pressure weld, the portion of the upset left in excess of the original diameter or thickness. *ASM Gloss.*

reinforcing steel. Steel bars of various shapes used in concrete construction to give added strength. *Crispin.*

reinite. Iron tungstate ($FeWO_4$) often associated with wolfram. *Pryor, 3.*

reins. The links of a pair of jars. *Long.*

Reinsch test. Qualitative test for arsenic in a solution. The liquid is added to a coil of bright copper foil suspended in concentrated HCl and warmed. Dark stains of copper arsenide show presence of arsenic. *Pryor, 3.*

reiteration. In surveying, angular measurement made first with vertical circle of theodolite to right of sighting telescope, then repeated after transiting this through 180°. Also called face right, face left observation. *Pryor, 3.*

reject. a. The material extracted from the feed during cleaning for retreatment or discard. *B.S. 3552, 1962.* b. The stone or dirt discarded from a coal preparation plant, washery, or other process, as of no value. *See also* middlings; residue; tailings. *Nelson.* c. Ore mineral removed and discarded at any stage of treatment. *Pryor, 4.*

reject elevator; refuse elevator. An elevator for removing and draining the reject from a washing appliance. *B.S. 3552, 1962.*

reject gate. The mechanism of the refuse extractor which may be manually or automatically operated to control the rate of removal of reject from the washbox. *B.S. 3552, 1962.*

rejections. a. Diamonds not worthy of cutting. *Hess.* b. *See* common goods. *I.C. 8200, 1964, p. 3.*

rejuvenate. a. To stimulate, as by uplift, to renew erosive activity; said of streams. *Webster 3d.* b. To develop youthful features of topography in an area previously worn down to a baselevel. *Webster 3d.* c. The process of relieving fatigue in drill rods. *See also* Bardine process. *Long.*

rejuvenation. A change in conditions of erosion that causes a stream to begin more active erosion and a new cycle. *Leet.*

relative age. The age of a given geologic feature, form, or structure stated in terms of comparison with its immediate surroundings; that is, not stated in terms of years or centuries. *Stokes and Varnes, 1955.*

relative biological effectiveness. The relative effectiveness of a given kind of ionizing radiation in producing a biological response as compared with 250,000 electron-volt gamma rays. Abbreviation, rbe. *L&L.*

relative compaction. a. For soil compaction, two types of tests are necessary: (1) determining the dry density of the soil after a standard amount of compaction has been applied, and (2) measuring the density of the soil in the field. The state of compaction is expressed as the relative compaction, and is the percentage ratio of the field density to the maximum density as determined by standard compaction. The percentages of relative compaction are high, since the initial relative compaction is about 80 percent. *Nelson.* b. The dry density of a soil in situ divided by the maximum dry density of the soil as established by the Proctor compaction test or any other standard test. *See also* loose ground. *Ham.*

relative consistency. The ratio of the liquid limit minus the natural water content to the plasticity index. *ASCE P1826.*

relative density. a. The ratio of the difference betwen the void ratio of a cohesionless soil in the loosest state and any given void ratio to the difference between its void ratios in the loosest and in the densest states. *ASCE P1826.* b. The relative density or specific gravity of a substance denotes the number of times the substance is heavier or lighter than water (for the same volume). Relative density and specific gravity mean the same thing. *Morris and Cooper, p. 88-89.* c. The number of individuals of a species present per unit of a submerged surface or per volume of liquid observed during a period of time compared with the numbers of other types of attaching organisms in the same fouling complex. *Hy.*

relative humidity. The amount of moisture contained by an atmosphere compared with the maximum amount that it could contain at the same temperature. A high relative humidity is detrimental to the efficient working of the human body, and becomes a problem in hot and deep mines. *See also* refrigeration plant, b. *Nelson.*

relative movement. In studying structural features, for example, faults, it is generally impossible to determine which block actually moved relative to some plane or point of reference, such as sea level, the equatorial plane, the North Pole, or center of the earth. Thus, most displacements can be discussed only in terms of relative movement. That is, block A moved north relative to block B. *A.G.I.*

relative permeability. The ratio of the effective and specific permeabilities. *Institute of Petroleum, 1961, p. 21.*

relative response. The amount, in decibels, by which a transducer's response, under some particular condition, exceeds the response under a reference condition which should be stated explicitly. *Hy.*

relative roughness. The dimensions ratio ϵ/d (where ϵ is the average height of the surface irregularities and d is the diameter of the pipe) is termed the relative roughness. The physical interpretation of this functional equation is that the friction factors of pipes are the same if their flow patterns in every detail are geometrically and dynamically similar. The term ϵ indicates the height of the irregularity above the boundary surface only, hence it is apparent that, dependent upon the thickness of the boundary layer adjacent to the surface, the projection can either lie submerged within the boundary layer or else project outside it. *Roberts, I, p. 12.*

relative settlement. *See* differential settlement. *Ham.*

relative time. Dating of events by means of their place in a chronologic order of occurrence rather than in terms of years. *Compare* absolute time. *Leet.*

relative water content. *See* liquidity index. *ASCE P1826.*

relativity. A principle that postulates the equivalence of the description of the universe, in terms of physical laws, by various observers, or for various frames of reference. A theory that utilizes such a principle is called a relativity theory. An example is Einstein's restricted theory of relativity, in which the relativity principle applies to all inertial frames of reference. *NRC-ASA N1.1-1957.*

relaxation. a. Relief of stress by creep. Some types of tests are designed to provide diminution of stress by relaxation at constant strain, as frequently occurs in service. *ASM Gloss.* b. The decrease of load support and of internal stress because of plastic strain at constant deformation. *A.G.I.*

relay. a. A valve or switch that amplifies or restores original strength to an air, hydraulic, or electrical impulse. *Nichols.* b. A device, operated by an electric current, and causing by its operation abrupt changes in an electrical circuit (making or breaking the circuit, changing of the circuit connections, or variation in the circuit characteristics. *NCB.*

relay earthquake. Occurring as an aftereffect of an earthquake happening elsewhere. *Schieferdecker.*

relay haulage. Single-track, high-speed mine haulage from one relay station to another. Each operator has his own track section between relay stations, and since no other haulage equipment is operating on this section, he can run his motor wide open without fear of anything getting in his way. Side track at each relay station permits the operator to pick up or drop off loads or empties then make the return run. *Kentucky, pp. 225-226.* Also called intermediate haulage.

relay motorman. See gathering motorman. *D.O.T. 1.*

relay station. *See* pumping station. *Mersereau, 4th, p. 199.*

release analysis. A procedure employed to determine the best results possible in cleaning a coal by froth flotation. *B.S. 3552, 1962.*

released mineral. A mineral formed during the crystallization of a magma as a consequence of an earlier phase failing to react with the liquid. Thus, the failure of earlier formed olivine to react with the liquid portion of a magma to form pyroxene may result in the enrichment of the liquid in silica, which finally crystallizes as quartz, the released mineral. *A.G.I.*

release fractures. Fractures that form perpendicular to the greatest principal stress axis in a specimen that is compressed and has yielded plastically while under hydrostatic pressure. On the assumption that these fractures form when the load is removed, they have been called release fractures. *A.G.I.*

release joints. Joints parallel to the axial planes of the fold; presumably formed at right angles to the greatest principal stress axis after the pressure was released. *A.G.I.*

release mesh. a. In liberation of specific mineral from its ore by comminution the optimum grind. *Pryor, 3.* b. Specified mesh-of-grind for best conditions for treatment to recover a specific mineral from the ore. *Pryor, 4.*

release valve. Synonom for pressure-relief valve. *Long.*

reliability of method. In geochemical prospecting, the reliability of a method refers to the probability of obtaining and recognizing indications of an ore body or mineralized district by the method being used. Reliability depends not only on whether a readily detectable target exists and how effective the exploration method is in locating it, but also on the extent to which the anomaly is specifically related to ore and the extent to which it is possible that nonsignificant anomalies may confuse the interpretation. *Hawkes, 2, p. 323.*

relic. When a block is stoped in such a manner that its remainder is at all times separated from solid ground by not more than the width of a level, winze, or rise, that remainder is termed a relic. *Spaulding.*

relict. (adj.). a. Relating to minerals that represent an earlier stage or assemblage, which have persisted in spite of processes tending to destroy them, as relict olivine grains in a serpentinized peridotite. *A.G.I.* b. Applied to a glacier that is remnant of an older and larger glacier and not a newly formed glacier. *A.G.I.* c. Belonging to a nearly extinct class or group of animals or plants. *A.G.I.*

reliction. The slow and gradual recession of the water by which the land is left dry. *Fay.*

relict texture. Preservation of any original texture when a mineral is replaced. *A.G.I.*

relief. a. The character of the surface of a mineral section as observed under the microscope. *Webster 3d.* b. The elevations or inequalities of a land surface. *Webster 3d.* On a topographic map these may be indicated by hachures, shading, or contour lines. The term may be used also to designate the difference in elevation between the hilltops or summits and the lowlands of a particular region. *Stokes and Varnes, 1955.* c. The result of the removal of tool material behind or adjacent to the cutting edge to provide clearance and prevent rubbing (heel drag). *ASM Gloss.*

relief angle. The angle formed between a relieved surface and a given plane tangent to a cutting edge or point on a cutting edge. *ASM Gloss.*

relief hole. a. A borehole that is loaded and fired for the purpose of relieving or removing part of the burden of the charge to be fired in the main blast. *Fay.* b. Holes drilled closely along a line, which are not loaded, and which serve to weaken the rock so that it will break along that line. *Nichols.* c. A port or passageway through which the core, as it advances into the inner tube of a double-tube core barrel, forces water out of the inner tube to the outside of the barrel through the inner-tube head. *Long.* d. A borehole drilled ahead of underground openings to tap and drain a water-bearing formation. Also called cover hole; pilot hole. *Long.*

relief limonite. Minutely craggy, cavernous, porous limonite occupying the site of a former grain of sulfide. *A.G.I.*

relief map. a. A map representing topographic relief by contour lines, hachures, coloring, shading, or similar graphic means. *Webster 3d.* b. Ordinarily used in the United States for hypsometric map. *Seelye, 2.*

relief valve. a. A valve which will allow air or fluid to escape if its pressure becomes higher than the valve setting. *Nichols.* b. Synonym for pressure relief valve. *Long.*

relief well. A borehole which is drilled at the toe of an earth dam as a relief for any high pore water pressure caused by the weight of the dam. *Ham.*

reliever. a. Synonym for gage stone. *Long.* b. Synonym for pressure-relief valve. *Long.* c. Relief hole. *See also* relief hole, d. *Long.*

relieving. Buffing or other abrasive treatment of an embossed metal surface to reveal the base-metal color on the highlights contrasted to that of the finish in the recesses. *ASM Gloss.*

relieving arch. An arch built over a lintel, or similar opening in a wall, and intended to divert the superimposed load above the opening to the piers or abutments on both sides, thus relieving the lintel or flat arch from excessive loading. Also known as discharging arch; safety arch. *ACSG.*

relieving cut. In a round of shots planned for sequential firing when shaft sinking or tunneling, holes fired after cut holes and before lifters and slippers. *Pryor, 3.*

relieving platform. A loading deck for lorries on the land side of a retaining wall contructed, for example, as a jetty of steel sheet piling, the relieving platform being supported as a rule partly by the wall and partly by bearing piles. *See also* surcharge, a. *Ham.*

relieving shot. A shot fired to dislodge or expose a misfire. *B.S. 3618, 1964, sec. 6.*

relieving timbers. Replacing broken timber sets with new ones. *Fay.*

relighter flame safety lamp. A locked spirit-burning lamp fitted with an internal relighting device. *B.S. 3618, 1963, sec. 2.*

relighting station. A place in a mine at which safety lamps can be relighted under controlled conditions. *B.S. 3618, 1965, Sec. 7.*

relinquishment. To turn the land back to the United States, and with it every right, possessory or otherwise, that the relinquisher enjoyed. *Ricketts, I.*

Relizian. Upper lower Miocene. *A.G.I. Supp.*

reluctance. Magnetic quality analogous to resistance in flow of electric current. *Pryor, 3.*

rem. The quantity of any ionizing radiation, such that the energy imparted to a biological system per gram of living matter has the same biological effectiveness as an absorbed dose of one rad of X-radiation. *ASM Gloss.*

remanence. Residual magnetism in ferrogmagnetic substance (its hysteresis) after removal of external magnetizing force. *Pryor, 3.*

remanent magnetization. Part of the magnetization of a body that does not disappear when the external magnetic field disappears. *Schieferdecker.*

remanie. Fr. a. Derived from or containing fossils derived from an older formation; as, remanie deposits. *Standard, 1964.* b. Recemented, as a glacier formed by the falling of fragments of ice (glacier remanie). *Standard, 1964.*

remilling. The practice of milling enamel or glaze reclaim collected from the spray booth. A further addition of clay is usually made to this material before remilling. *Enam. Dict.*

remingtonite. A hydrated carbonate of cobalt found in Maryland. *Fay.*

remnant. When a block of ground is stoped in such a way that at some time its remainder is surrounded on all sides by stoped ground, that remainder is termed a remnant. *Spalding.*

remolded soil. Soil that has had its natural structure modified by manipulation. *ASCE P1826.*

remolding. Disturbance of the interval structure of clay or silt; when remolded, such material will lack shearing strength and gain compressibility. In consequence driven piles are not recommended in certain clays. *See also* thixotropic fluid. *Ham.*

remolding index. The ratio of the modulus of deformation of a soil in the undisturbed state to the modulus of deformation of the soil in the remolded state. *ASCE P1826.*

remolding sensitivity. The ratio of the unconfined compressive strength of an undisturbed specimen of soil to the unconfined compressive strength of a specimen of the same soil after remolding at unaltered water content. Also called sensitivity ratio. *ASCE P1826.*

remolinite. Synonym for atacamite. *Dana 6d, p. 172.*

remote control. a. The control of plant operation by personnel housed under conditions which can be remote, safe, and convenient. This is a feature of both electrical and electronic automatic control. In the control room, various plants can be started up by pushbutton and the governing conditions can be set. Instrumentation records all relevant data; it also gives warning of unsafe conditions and shuts down the plant if no correction is made. Changeover switches can introduce different operations and sequences in the working of the plant. Indicating lights can show what plant is working and the progress made. Fault indication can show the reason in the event of a shutdown. Also called centralized control. *See also* automation. *Nelson.* b. A term applied to a switch, circuit breaker, starter, or similar apparatus, to denote that its operation can be controlled manually, from a distance, by electrical or other means. *B.S. 3618, 1965, sec. 7.* c. Regulation of machine, group of interdependent machines, or of progress by use of distant control gear, worked either manually or by sensing devices. *Pryor, 3.*

remote control support system. A self-advancing support system in which the chocks and/or props are advanced and reset on a longwall face from a point in the gate road leading to the face. Hydraulic pressure and valves are commonly employed and the system is largely in the experimental stage. *See also* push-button coal mining. *Nelson.*

remote control switch; pilot switch. A switch operating in a low voltage control circuit to open or close a contactor or other automatic switch in a main circuit. *B.S. 3618, 1965, Sec. 7.*

remote underwater manipulator. Used to study the ocean bottom (down to 20,000 feet) for prolonged periods (speed 3 mi/hr). It is equipped with television cameras and a mechanical arm and hand. *Hy.*

renardite. A very rare, strongly radioactive, orthorhombic, yellow mineral, $Pb(UO_2)_4(PO_4)_2(OH)_4.7H_2O$, found associated with dewindtite, dumontite, and tobernite. Isostructural with dewindtite and phosphuranylite. From Kasolo, Katanga, Republic of the Congo. *Crosby, p. 36.*

rendering. The application, by means of a trowel or float, of a coat of mortar. *Taylor.*

rending. The breaking of coal into lumps with a minimum of smalls. The relative slowness of low explosives makes them suitable for rending coal since they lack the greater shattering power of high explosives. *Mason, v. 1, p. 159.*

rendrock. A dynamite used in blasting and consisting of nitroglycerin, potassium nitrate, wood pulp, and paraffin or pitch. *Webster 3d.*

renierite. A mineral, $(Ca,Fe)_3(Fe,Ge,Zn,Sn)(S,As)$, reported to contain up to 8 percent germanium. Found in Republic of the Congo. Possible source of germanium. *CCD 6d, 1961.*

reniform. Kidney-shaped; applied to certain minerals. *Fay.*

renk. a. An average or standard distance for putting coal at a stated price. *Webster 2d.* b. Newc. The average distance coal is brought by the putters. *Fay.*

Renn-Walz process. A method of reclaiming iron and other metals from the waste materials produced in the smelting of zinc and lead ores. This material, which cannot be treated in the blast furnace because of the presence of other metals, is brought up to 1,000° C in the preheating zone of the kiln by the countercurrent gases, and this drives off CO_2 from the carbonates. The process differs from the Krupp-Renn method in that it is a volatilization process for recovering molten metals in oxide form. The metal vapors are oxidized by excess air and carried off in the flue gases from which they are subsequently filtered. *Osborne.*

rensselaerite. a. Waxlike masses of talc. Pseudomorphous after pyroxene. *Fay.* b. Talc of northern New York. It has a fibrous nature wtihout usual talc slip. *Brady, 4th ed., 1940, p. 474.*

rent and royalty. a. The amount paid by a coal mining operator to the owner of the coal for each ton of coal mined and usually expressed in cents per ton. *Bureau of Mines Staff.* b. In mining leases, words used interchangeably to convey the same meaning. *Ricketts, II.*

reos. Rare-earth oxides. *Bennett 2d, 1962 Add.*

rep Abbreviation for roentgen equivalent physical. *BuMin Style Guide, p. 61.*

repairer. a. A miner who repairs and enlarges underground roadways. He is a skilled man on excavation of roadways to neat lines and the setting of supports. The nature of his work usually means working on the afternoon or night shift, and he is paid either per shift or on piecework rates. He works with an assistant. *Nelson.* b. *See* repairman. *Fay.*

repairman. a. A workman whose duty it is to repair tracks, doors, brattices, or to reset timbers, etc., under the direction of a foreman. *Zern.* b. A repairer. *Fay.*

repeated twinning. In crystallography, three or more crystals united according to the same law. *Fay.*

repetition. In survey, repeating angular measurement by unclamping lower plate of theodolite after first measurement and resighting on back station; then clamping this and freeing azimuth plate and again sighting on foresight, therefore doubling the angular observation. *Pryor, 3.*

repetition of beds. The duplication of beds of rocks through faulting or intense folding. *Stokes and Varnes, 1955.*

Repettian. Lower Pliocene. *A.G.I. Supp.*

replaceable ferrule. Synonym for guide ring. *Long.*

replaceable hydrogen. Hydrogen atoms in acid molecule which can be replaced by those of metal. *Pryor, 3.*

replaceable insert. Diamond inset plates and other geometric forms fastened to and/or supported by the bit blank by brazing or mechanical locking so that they may be replaced when diamond wear exceeds a specified amount. *Long.*

replaceable pilot. A central interchangeable pluglike portion of a noncoring bit protruding or leading the outside portion of such bits. *See also* pilot, b. *Long.*

replacement. a. The process of practically simultaneous capillary solution and deposition by which a new mineral of partly or wholly differing chemical composition may grow in the body of an old mineral or mineral aggregate. *A.G.I.* b. Same as metasomatism. *Bateman.* c. In mineralogy, an ore body which has replaced the original country rock by means of deposition from circulating carrier fluids; hydataogenesis; pneumatolysis. *Pryor, 3.*

replacement bit. Synonym of reset bit. *Long.*

replacement deposit. a. A deposit formed by replacement; not infrequently is a disseminated deposit. *A.G.I.* b. Those formed by the replacement of rock by an equal volume of ore. *Bateman.* c. N.S.W. A mineral deposit which has been formed by mineral solutions taking the place of some earlier, different substance. *New South Wales.*

replacement lode. A fissure or fissures whose walls have been replaced by ore. *Bateman.*

replacement ore body. A mass of ore formed by the dissolution of previous minerals and their replacement by others. *Sinkankas.*

replacement series. A list of the metals arranged in order of the magnitudes of their oxidation potentials. *Gaynor.*

replacement vein. A vein in which certain minerals have passed into solution and have been carried away, while other minerals from the solution have been deposited in the place of those removed. The process is called metasomatic replacement. Also called substitution vein. *Fay.*

replacing switch. A device consisting of a united pair of iron plates hinged to shoes fitting over the rails to replace, on the track, derailed railway rolling stock. Also used for mine cars. *Fay.*

replica, natural. A filling of mineral material deposited by percolating ground waters in external molds, thus reproducing the original exterior of the fossil shell or other object, with its exact size and shape. *A.G.I.*

replicate sampling. Taking each sample in a number of subsamples by putting increments in turn into different containers, in order to estimate the sampling accuracy. The same total weight of sample is collected whether or not replicate sampling is employed. *B.S. 1017, 1960, Pt. 1.*

reportable injuries. Injuries caused by accidents, or dangerous occurrences, immediately reportable to the Inspector of Mines, either because of the severity of the injury or the nature of the occurrence. *Nelson.*

repose angle. The angle between the horizontal and the surface slope of any pile of material formed by free fall of the material. *Bureau of Mines Staff.*

representation work. Same as assessment work, on a mining claim. *Fay.*

representative fraction. The ratio of the distance between two points on a map and the actual distance between them; a map scale. *A.G.I. Supp.*

representative sample. In testing or valuation of a mineral deposit, sample so large and average in composition as to be considered representative of a specified volume of the surrounding ore body. Blended large samples from different exposures are not necessarily representative, since the mineral structure may have varied so as to introduce special problems from area to area in treatment. *Pryor, 3.*

repress. A machine for pressing stiff or soft clay blanks into brick shapes. *A.R.I.*

repressed brick. Brick formed by subjecting blanks of a clay mix to pressure in a mechanical press. *A.R.I.*

repressing. a. In powder metallurgy, the application of pressure to a previously pressed and sintered compact, usually for the purpose of improving some physical property. *ASM Gloss.* b. A second pressing sometimes given to bricks (both building and refractory) to improve their final shape; with building bricks, the purpose can also be to provide some special surface effect. *Dodd.*

repressing machine. A machine for making pressed bricks or for giving ordinary green bricks a second pressing. *Standard, 1964.*

repressuring. The injection of water, natural gas, or compressed air to increase the reservoir oil pressure. The oil flow in a well gradually diminishes as the gas pressure underground falls. The pressure may be increased by forcing air or gas into an input well and obtain flowing oil from output wells. *Nelson.*

reprocessing. *See* fuel reprocessing. *L&L.*

reproducibility. Quality of research or test which demonstrates that, provided specified procedures are used, results will be substantially repeatable. *Pryor, 3.*

reproduction. A term used to include reconstructed stones, synthetic stones, and, less accurately, cultured pearls, in a manner similar in its application to the use of the word for the finer copies of original works of art. Imitation stones are not reproductions as they differ structurally or chemically from the stones they imitate. *Shipley.*

rerailer. A small lightweight device, used in pairs that straddle and are locked to each of the rails to retrack railroad cars and locomotives. Of 'Y' shaped design, they permit both wheels to be retracked from either or both side of the rail at the same time. As the car is pulled across the device, the derailed wheels are channeled back onto the tracks. *Bests, p. 371.* Also called retracker.

rerun oil. Oil which has been redistilled. *API Glossary.*

res Abbreviation for resistivity. *BuMin Style Guide, p. 61.*

rescue. To move live men or dead bodies from a mine after a mine disaster. Sometimes called recover. The latter applies especially to putting the mine in shape for operation again. *Fay.*

rescue apparatus. a. The rescuing of miners overcome by a mine fire, or trapped in workings by an explosion, necessitates the use of apparatus that will enable the rescue team to work in irrespirable or poisonous gases. The equipment used is known as rescue apparatus. *See also* breathing apparatus; Proto apparatus. *Nelson.* b. *See* mine rescue apparatus. *Fay.*

rescue-car. *See* mine rescue car. *Fay.*

rescue crew. a. Composed of at least five men thoroughly trained in the use of the oxygen-breathing apparatus. Under ordinary conditions a crew can make a trip of 1,000 feet (2,000 feet round trip) in irrespirable gases. This distance may be exceeded if there is a reasonable chance of saving life. The men are directed by signals from one of their number who acts as the leader. *Lewis, pp. 761-762.* b. *See* mine rescue crew. *Fay.*

rescue man. A general term applied to a member of a mine rescue squad who is subject to immediate call in case of fire, explosion, or cave-in to go underground to effect the rescue of trapped workers. Also called helmet man. *D.O.T. 1.*

rescue station. Chamber in mine equipped with rescue gear, including oxygen apparatus, manned by trained rescue workers. *Pryor, 3.*

rescue team. A team of men, from five to eight strong, trained in the use of breathing apparatus and in rescue operations after colliery explosions or mine fires. The men train every week or so at a rescue station. *See also* miners rescue party; central rescue station. *Nelson.*

research. Word often misused. Two broad meanings are reexamination of previously accepted data in the light of current expansion of basic knowledge; and search in reality, specific to an entirely novel concept and calling for development of new approaches. Wrongly defined when descriptive of original rehash. *Pryor, 3.*

research reactor. A nuclear reactor primarily designed to supply ionizing radiation for experimental purposes. It may also be used for training, materials testing, and production of radioisotopes. In Atomic Energy Commission usage, the term is limited to reactors having a thermal power level of 10 megawatts or less. *L&L.*

resection. In surveying, fixing of station not necessarily occupied by means of two or more intersecting lines. *Pryor, 3.*

resequent. A term coined by combining parts of the terms recent and consequent. When applied to physiographic forms, it signifies resemblance or agreement with some feature of consequent origin but developed at a later date. *Stokes and Varnes, 1955.*

resequent fault-line scarp. a. After a fault, in which movement has completely ceased, has reached this stage of effacement, it will never again, with any amount whatever of further erosion, produce another scarp, except through the juxtaposition of beds of unequal resistance. Depending upon the position of these beds, the fault scarp may face in the same direction as before (resequent fault-line scarp) or in the opposite direction (obsequent fault-line scarp). *A.G.I.* b. A fault-line scarp in which the structurally downthrown block is also topographically lower than the upthrown block. *A.G.I.*

resequent stream. It was suggested a few years ago that streams, which after spontaneous development aside from an original consequent course, came again to follow it, should be called resequent streams. A stream which flows in a direction identical with that of the consequent drainage but which develops at a lower level than the initial slope, is called a resequent stream. We may think of such a stream as having retaken a consequent direction (hence reconsequent = re(con)sequent = resequent). The essential elements in the conception of this stream type are the renewed development of drainage in a consequent direction, after other drainage has intervened for a time, and the fact that this renewed development takes place at a lower horizon than that on which the drainage initially developed. *A.G.I.*

reserve. a. To keep back; to keep in store for future or other use. *Fay.* b. That which is held back, or in stock. Specifically, known ore bodies that may be worked at some future time, as ore reserves. *Fay.*

reserved coal. Scot. Coal not included in, but reserved from lease, as coal under buildings. *Fay.*

reserved minerals. Economic minerals that are not the property of the land owner but belong to the state. The state confers the right to prospect for and to mine these minerals on any one who applies for this right on the form prescribed and at the competent mining office. Such minerals as coal and iron ores are included in this group. *Compare* unreserved minerals. *Stoces, v. 1, pp. 654-655.*

reserve ore estimate. Is classified into measured ore, indicated ore, and inferred ore. *See also* measured ore; indicated ore; inferred ore. *Forrester, pp. 552-553.*

reserves. a. The quantity of mineral which is calculated to lie within given boundaries. It is described as total (or gross), workable or probable working, depending on the application of certain arbitrary limits in respect of deposit thickness, depth, quality, geological conditions, and contemporary economic factors. Proved, probable, and possible reserves are other terms used in general mining practice. *B.S. 3618, 1963, sec. 1.* b. Sampled ore, developed, blocked out, or exposed on not less than three sides. *C.T.D.* c. Unmined coal. *Hudson.* d. Solid blocks of coal left in the ground for support of shafts, gangways, surface improvements, or other specific purpose. *Hudson.* e. The amount of payable ore, developed and ready for extraction, or blocked out ahead of immediate requirements. *Weed, 1922.* f. *See* developed reserves; development sampling; economic coal reserves; ore reserves; probable reserves; workable. *Nelson.*

reserves, natural-gas. Gas in natural underground formation. Proved recoverable natural-gas reserves may be divided into that drilled, producible by existing operating practices and undrilled, underlying areas which, however, are so related to the developed acreage and to the known geology and structure that their productive ability is considered assured. *A.G.I.*

reservoir. a. A natural underground container of liquids, such as oil or water, and gases. In general, such reservoirs were formed by local deformation of strata, by changes of porosity, and by intrusions. These, however, are classifications in the broadest sense. *A.G.I.* b. Openings in the ground in which water is stored. *Legrand.* c. An artificially built, dammed, or excavated place for holding a reserve of water. *Zern.* d. Rock formations having productive possibilities, the pay section. *Wheeler.*

reservoir oil. Crude petroleum as its exists under reservoir conditions of temperature, pressure, and composition. *Bennett 2d, 1962 Add.*

reservoir oil pressure. The pressure within an oil pool. It may be sufficient to cause the oil to flow to the surface without pumping. Additional pressure may be created by injecting gas or compressed air as in repressuring. *Nelson.*

reservoir rock. A porous and permeable rock in which commercially important oil and gas accumulations are found. *See also* cap rock, b. *Institute of Petroleum, 1961.*

reset action (nonstandard). In flotation, the component of control action in which the final control element is moved at a speed proportional to the extent of proportional postion action. This term applies only to a multiple action including proportional position action. *Fuerstenau, p. 549.*

reset bit. A bit made by reusing the sound diamonds salvaged from a used bit and setting them in the crown attached to a new bit blank. Some new diamonds usually are added to those salvaged, since generally not all of the salvaged or recovered stones are reusable. Also called replacement bit. *Long.*

resettable; resettables. A salvaged diamond or used diamonds in good condition; hence, diamonds that can be used again by being reset in another tool or bit. Also called usable diamond; usables; usable stone. *Long.*

reset the chuck. Synonym for rechuck. *Long.*

resetting. a. The act or process of producing a reset bit. *See also* reset bit. *Long.* b. To rerun a casing string into a borehole by placing its bottom end at a lower point in the hole. *Long.*

resident engineer. An engineer employed, usually to work in the field office rather than the main office, to handle the employer's engineering work. *Bureau of Mines Staff.*

residual. a. Characteristic of, pertaining to, or consisting of residuum. Remaining essentially in place after all but the least soluble constituents have been removed; said of the material eventually resulting from the decomposition of rocks. *Fay.* b. Standing, as a remnant of a formerly greater mass of rock or area of land, above a surrounding area which has been generally planated; said of some rocks, hills, mountains, mesas, plateaus, and groups of such features. *Fay.*

residual ash. Mineral matter in coal remaining after complete incineration. *Tomkeieff, 1954.*

residual asphalt. Asphalt obtained by steam distillation of semiasphaltic or asphaltic petroleums. *Bennett 2d, 1962.*

residual bond. A chemical bond that occurs in the solid and liquid states and manifests itself as the cohesion that holds distinct molecules to each other. It is much weaker than any of the three kinds of primary bond (covalent, ionic, metallic) and is sometimes regarded as physical rather than chemical. *Gaudin, 2, p. 12.*

residual boulder. A boulder of local origin produced by weathering. *A.G.I. Supp.*

residual clay. a. A clay deposit formed by the decay of rock in place. This type is abundant in the Southern States. *Fay.* b. *See* primary clay. *Dodd.*

residual concentration. Concentration of a valuable mineral by solution and removal of valueless material. *A.G.I.*

residual deposits. a. By the removal of soluble material from the original substance the insoluble material remaining may form valuable residual deposits. Iron carbonates and silicates in the original rock may be converted into practically insoluble oxides, which form iron ores as rock weathers; silica may be leached from kaolin, leaving the insoluble hydrous aluminum oxide, bauxite, a most important aluminum ore. Such deposits are generally formed in warm moist climates and would not be found in areas which have been glaciated. *Lewis, p. 276.* b. *See* residual, a, as residual gravel, sand, clay, etc. *Fay.*

residual elements. Elements present in an alloy in small quantities, but not added intentionally. *ASM Gloss.*

residual errors. The differences between measured values and the most probable value. *Seelye, 2.*

residual field. The same as residual magnetic field. *ASM Gloss.*

residual fuel oils. Topped crude petroleum or viscous residuum obtained in refinery operation. *API Glossary.*

residual gravity. In gravity prospecting, the portion of a gravity effect remaining after removal of some type of regional; usually the relatively small or local anomaly components of the total or observed gravity field. *A.G.I.*

residual gravity map. *See* local gravity map. *Schieferdecker.*

residual liquids. Liquid of magma that remains after most mineral constituents have solidified. *Bateman.*

residual magma. Synonym for ichor. *A.G.I.*

residual magnetic field. The magnetic field that remains in a part after the magnetizing force is removed. *ASM Gloss.*

residual magnetism. a. In magnetic prospecting, the portion of a magnetic effect remaining after removal of some type of regional; usually the relatively small or local anomaly components of the total or observed magnetic field. *A.G.I.* b. The magnetism remaining in a substance after the magnetizing force has been removed. *C.T.D.* c. *See* remanence. *Pryor, 3.*

residual method. Method of magnetic-particle inspection in which the particles are applied after the magnetizing force has been removed. *ASM Gloss.*

residual minerals. The rock-forming minerals that are either stable in the surface environment or unstable but react so slowly that they are not appreciably broken down. *Hawkes, p. 268.*

residual ocher. Residual ochers are natural mineral pigments consisting of limonite, or hematite, mixed with varying proportions of clay. They range in color from yellow to chocolate brown and deep red; and in the trade are known as sienna, umber, and Indian red. They probably originate as colloid precipitates. *A.G.I.*

residual oil. a. The amount of liquid petroleum remaining in the formation at the end of a specified production process. *A.G.I.* b. Liquid or semiliquid products obtained as residues from the distillation of petroleum. They contain the asphaltic hydrocarbons. Residual oils are also known as asphaltum oil, liquid asphalt, black oil, petroleum tailings, and residuum. *CCD 6d, 1961.*

residual ore. Ore formed by the process of dissolving foreign materials combined with it, leaving only the ore. *Mersereau, 4th, p. 383.*

residual ore deposit. An accumulation of valuable minerals, formed by the removal of undesired constituents of rocks or lodes during weathering or by leaching. *Schieferdecker.*

residual placer. *See* residual ore deposit.

residuals. The elements ordinarily present in steel in small quantities without definite intent on the part of the steel maker. *Osborne.*

residual soil. Soil formed in place by the disintegration and decomposition of rocks and the consequent weathering of the mineral materials. Presumably developed from the same kind of rock as that on which it lies. *A.G.I.*

residual stress. The stress which exists in an elastic solid body in the absence of, or in addition to, stresses caused by an external load. Such residual stress may be due to: (1) deformation, caused by cold-working, as in drawing or stamping; (2) change in the specific volume due to thermal expansion, a phase change or magnetostriction; (3) by the joining together of structural parts by force, such as welding. *Ham.*

residual volume. In physiology—the amount of air that remains in the lungs even after the most forceful expiration. It normally amounts to between 1 and 1½ liters. Note that the sum of the vital capacity plus the residual volume equals the total lung capacity. *H&G.*

residuary. Resulting from local rock decay; said of deposits of disintegration that have not been transported. *See also* residual, a. *Fay.*

residue. a. That which remains after a part has been separated or otherwise treated. *ASTM STP No. 148-D.* b. The waste or final product from a hydrometallurgical plant which, at the time of operation, is valueless as far as metal content is concerned. *Fay.* c. S. Afr. The amount of valuable matter remaining in the ore after treatment, in percent or pennyweights per ton. *Beerman.* d. As applied to proximate analysis of coke, a calculated figure obtained by substracting the sum of the percentages of moisture in the analysis sample, volatile matter and ash from 100. *B.S. 1016, 1961, pt. 16.* e. *See* rock fracture. *Roberts, I, p. 111.*

residuite. a. The constituent petrological unit or maceral occurring as characteristic unresolvable granular and translucent groundmass in clarain. *A.G.I.* b. Same as residium, b. *Tomkeieff, 1954.*

residuum. a. That part remaining after any processing, such as separation. *Shell Oil Co.* b. Weathered material, including the soil, down to fresh, unweathered rock. *Legrand.* c. A name given to a very dense, blackish to deep reddish-brown material, without definite organic structure, which appears as somewhat granular interstitial matter between individual microscopic ingredients in certain coals. *See also* desmite. *Tomkeieff, 1954.* d. The finely comminuted matter unresolvable in the thinnest sections by the best illumination under the highest powers of the microscope. Essentially characteristic of durains, it is generally opaque but not always. The essential characteristic is its fineness of fragmentation into particles of one or two microns, or less. *A.G.I.* e. The material eventually resulting from the decomposition of rocks in place and consisting of the nearly insoluble material left after all the more readily soluble constituents of the rocks have been removed. *See also* residual, a. *Fay.* f. The residue left in the still after the distillation of crude oil has been completed, and not the residue from redistilled condensates. Also known as the cokings and tailings. *Fay.*

resilience. The work which a body can do in springing back after a deforming force has been removed. If a body is stressed beyond its elastic limit, the resilience equals that proportion of the total work of deformation which the body can give back upon removal of the forces. *A.G.I.* It is sometimes called elastic rebound. *Stokes and Varnes, 1955.*

resilient couplings. The resilient type of coupling has many designs but essentially has torsional response to application or variation of the transmitted load. For the all-metal types, the resilient element may be in the form of laminated spring packs or a cylindrical grid member, connecting the driver and driven hubs. Resilience damps shock loads and also provides means of keeping gear teeth in contact, compensating for small errors in gear cutting. Other types use rubber or rubberlike material which may be in the form of a spider, segmental blocks, a number of balls or a molded disk with metal inserts, providing the connection between the driver and driven hubs. *Pit and Quarry, 53rd, Sec. D, p. 67.*

resiliometer. A device for testing resilience. *Standard, 1964.*

resin. a. A solidified and mainly amorphous product of secretions and excretions of certain trees, produced by condensation of a fluid on a loss of volatile oils. Resins represent a complex mixture of aliphatic and cyclic organic compounds, such as terpenes and oxyterpenes, resin alcohols, resin acids, resenes (esters or lactones), etc. Resins are as a rule wholly or partly soluble in alcohol, ether, or volatile oils and in this respect are distinct from gums (carbohydrates) which are soluble in water. Fossil resins may be subdivided into: (1) amber group resins—usually containing succinic acids and found in clay and other sediments, and (2) retinite group resins—usually devoid of succinic acid and found in brown coal or peat. *Tomkeieff, 1954.* b. Ion exchange resins are water-insoluble polyelectrolytes with high capacity for adsorbing counter-ions (for example, U_3O_8) from pregnant or royal solutions. Resin acids are of two types—abietic and dextropimaric; both are unsaturated and can polymerize. Structurally they resemble sterols. *Pryor, 3.* c. A synthetic addition or condensation polymerization substance or natural substance of high molecular weight, which under heat, pressure, or chemical treatment becomes moldable. *BuMines R.I. 5971, 1962, p. 2.*

resin-anchored bolts. A roof bolting technique in which the bolt is anchored in the resin placed at the back of the hole in a glass cartridge, which ruptures when the bolt is inserted. The resin is permitted to set before tensioning the bolt with a plate and nut similar to the old split-rod-and-wedge method. *Coal Age, v. 71, No. 8, August, 1966, pp. 87-89.*

resiniferous shale. *See* tasmanite.

resin-in-pulp. An ion exchange process applied in acid-leach slurry from which abrasive particles of sand have been removed. Abbreviation, R.I.P. *Pryor, 3.*

resin-in-pulp (RIP) process. The method in which pulp is classified to remove the sands, and the resin adsorbs the uranium directly from the slime pulp without the necessity of thickening or filtering. It is especially adapted for those ores that do not settle readily, and where thickening and filtration are difficult. *Newton, p. 439.*

resinite. A constituent occurring as discrete small bodies of various shapes which, in cross section, are round, oval or rod-like; as diffuse impregnations or filling cell cavities in telinite. The properties of resinite are not yet known in detail. It is feasible to consider that they are similar to those of other members of the exinite group. *IHCP, 1963, part I.*

resinite coal. This coal consists of more than 50 percent of small resin bodies embedded in gelito-collinite, fusinito-collinite, or in collinite of fusinitic nature. The resin bodies differ in shape and may be angular, spheroidal or lenticular. Varying in size, they may be visible to the unaided eye in a hand spectrum of coal or only distinguishable under the microscope. Resinite coal may also contain small quantities of microspores, fine fragments of fusinized tissue and not infrequently, broad streaks of vitrinite. Hand specimens of resinite coal are matt or semmatt and in coals of low rank are brown or brownish-black. On fractures perpendicular to the bedding the resin bodies appear rounded, black and lustrous; in the bedding planes themselves they frequently appear as matt rodlets. Resinite coals frequently are high in ash. *IHCP, 1963, part I.*

resin jack. *See* rosin jack. *Fay.*

resinoid. A coal constituent similar to material derived from resin. *A.G.I. Supp.*

resinoid bond. An organic bond usually of the phenol formaldehyde resin type but can consist of other synthetic resins. *ACSG, 1963.*

resinoid wheel. A grinding wheel bonded with a synthetic resin. *ASM Gloss.*

resin opal. A honey- to ocherous-yellow variety of common opal with a resinous luster. *Shipley.*

resinous. Resembling resin, as opal, and some yellow varieties of sphalerite. *Fay.*

resinous cement. A term used in chemical engineering for an acid-proof cement, based on synthetic resin, for jointing chemical stoneware or acid-resisting bricks; the cement, when set, is impervious and very hard. *Dodd.*

resinous coal. Coal in which the attritus may contain a large proportion of resinous matter. Coals of this type are found more often among the younger coals. *A.G.I.*

resinous luster. The luster of resin. Zinc blende, amber, opal, are examples. *Nelson.*

resinous shale; resinoid shale. Another name for oil shale. *Tomkeieff, 1954.*

resin peat. Peat rich in resins. *Tomkeieff, 1954.*

resin rodlets. A constituent representing resinous secretion of plants; most resin rodlets have been formed by the secretion of resin into canals or ducts by the surrounding epithelial cells. Many of the rodlets were formed in the petioles of the Medullosans, although some may have been contributed from the stems of other gymnosperms. As the name implies, resin rodlets are cylindrical and rod shaped. They may occasionally be hollow but are usually solid except that they may be traversed by small vesicles or canals. They have infrequently been observed split lengthwise with an inner pattern of disklike forms inclined from either end toward a central flat-lying disk. When the rodlet is hollow, the space is commonly mineralized, kaolinite being a common filling. Common, but in relatively small quantity in banded bituminous coals. Rare in nonbanded coals. May occur genetically associated with anthraxylon or fusain, or be scattered and mixed at random with other constituents in the attritus, and in bands of highly mineralized coal. Synonym for resin rods; resin fibrils; resin needles; resin casts; resin canal casts. *IHCP, 1963, part I.*

resin tiff. A light-colored zinc blende. *Fay.*

resin tin. *See* rosin tin.

resist. a. A decoration formed by withholding the application of glazes, slips, or colors in certain areas by the use of wax or stencils. *See also* paper resist; wax resist. *ACSG, 1963.* b. A material applied to the work rack or a portion of the work itself to prevent chemical electrolytic action in the coated area. Also called stopoff. *ASM Gloss.*

Resistal. Trade name for a special glass used in the manufacture of goggles. *Fay.*

resistance. a. When an air current flows through a mine it meets with frictional resistance from the roof, sides, and floor. The amount of this resistance depends upon the extent and nature of rubbing surface, the area of the airways, and the velocity of the air. *See also* Atkinson. *Nelson.* b. In floatation, a property opposing movement of material or flow of energy, and involving loss of potential (voltage, temperature, pressure, and level). *Fuerstenau, p. 545.* c. In heat transfer, the reciprocal of conductance. *Strock, 10.* d. Electrical resistance (ohms) is measured by the fall of potential (volts) when current (amps) flows through the resistance. *Pryor, 3.* e. The property of an electrical circuit which opposes the flow of a current and is measured in ohms. It depends upon length, sectional area, material, etc. *Mason, v. 2, p. 388.*

resistance brazing. Brazing by resistance heating, the joint being part of the electrical circuit. *ASM Gloss.*

resistance furnace. An electric furnace in which heat is generated by electric resistance. *Bennett 2d, 1962.*

resistance methanometer. A new version of the catalytic methanometer with the addition of improved detector elements. Platinum may be used as the filament which both heats the detecting element and acts simultaneously as a resistance type thermometer. Gas is drawn through the instrument by a rubber suction bulb and the filaments are heated from a dry battery of the mercury type contained in the apparatus. Readings of methane concentration can be taken on the built-in electrical meter. *Nelson.*

resistance of detonator. As applied to electric blasting caps, the total resistance of the leg wires and the bridge wire. *Fraenkel, v. 3, Art. 16 : 10, p. 3.*

resistance strain gage. *See* electrical resistance strain gage. *Nelson.*

resistance test. A low voltage electrical test used in measuring the continuity of a nonconducting coating on a metallic base. *ACSB, 3.*

resistance to blasting; rock factor. Specific value of the resistance of the rock to the explosive force, determined by trial blasting. It is a function of maximum burden, hole depth, quantity of explosive (degree of packing) and throw. *Fraenkel.*

resistance welding. Welding with resistance heating and pressure, the work being part of the electrical circuit. Some examples are resistance spot welding, resistance seam welding, projection welding, and flash butt welding. *ASM Gloss.*

resistance welding die. The part of a resistance welding machine that is usually shaped to the work contour, with which the parts being welded are held and which conducts the welding current. *ASM Gloss.*

resistant mass. *See* mobile belt. *Challinor.*

resistivity. a. Resistance, R, of block of specified material in terms of units of length 1 and cross section a. Unit volume is 1 cubic centimeter of the mineral concerned, and resistivity measurement is made during electrical prospecting. Specific resistance $= \frac{Ra}{1}$. *Pryor, 3.* b. The electrical resistance offered to the passage of a current. Usually expressed in ohm meters which is the electrical resistance of a column of fluid one meter long and one square meter in cross section. *Brantly, 1.* c. The opposite of conductivity of an electrical current passing through fluid-bearing rock formations. *Wheeler.* d. The electrical resistance between opposite faces of a one-centimeter tube of a given substance. The unit of resistivity is ohm/centimeter. *Hy.* e. The reciprocal of conductivity. *Strock, 10.*

resistivity index. This quantity may be defined as follows: resistivity index $= \frac{\text{resistivity of rock containing oil or gas}}{\text{resistivity of same rock containing only water}}$, $I = \frac{R_t}{R_o}$, where I equals resistivity index, R_t equals true resistivity of a rock, and R_o equals resistivity of a rock that is 100 percent saturated with water of resistivity R_w. *Wyllie, p. 15.*

resistivity method. a. An electrical method of prospecting in which measurements are made directly by observing the ratio of voltage to current when a current is forced to flow through the section of ground to be tested. In the inductive method, the measurement of resistivity is indirect, the phase shifts or other electrical phenomena may be studied in the field. Resistivity surveys have been applied to several coal-mining problems. One in particular being the location of the base of drift and of buried drift-filled channels. This knowledge is important in some areas when conducting site investigations or when working shallow seams. *See also* expanding electrode test. *Nelson.* b. An electrical geophysical prospecting method used to determine lateral or vertical variations in conductivity within the earth. It is frequently used to measure depth to bedrock in connection with civil engineering projects, since there is normally a large contrast in conductivity between unconsolidated overburden material and the hard rock below. All resistivity techniques require the measurement of apparent resistivity. *Dobrin, pp. 8, 347.*

resistivity profile. A geophysical test by the resistivity method. An assembly of electrodes of constant distance, a, is moved along profiles, lateral variations in resistivity being shown. In favorable terrain, the test shows the existence of faults by throwing strata of different resistivity against each other; the same may apply to an anticline, a syncline or an underground channel. *Nelson.*

resistor. A device to provide resistance in an electric circuit, usually to limit the current, dissipate energy, or provide heat. *Kentucky, p. 263.*

resistor tube. a. A ceramic body wound with wire, used in electrical apparatus. *Enam. Dict.* b. A ceramic body wound with resistance wire. *Bennett 2d, 1962 Add.*

resoiling. The replacement of the original top soil at an opencast site on completion of operations to allow the growing of crops. *See also* surface reinstatement. *Nelson.*

resolution. a. The separation of a vector into its components. *A.G.I.* b. The sharpness with which the images of two closely adjacent spectrum lines, etc., may be distinguished. *A.G.I.* c. In gravity or magnetic prospecting, the indication in some measured quantity, such as the vertical component of gravity, of the presence of two or more close but separate disturbing bodies. *A.G.I.* d. In seismic prospecting, the ability to indicate separately two closely adjacent interfaces. *A.G.I.* e. The ability of an optical or radiation system to separate closely related form or entities; also, the degree to which they can be discriminated. *ASM Gloss.*

resolution limit. In gravity and magnetic prospecting, the separation of two disturbing bodies at which some obvious indication in a measured quantity of the presence of two separate bodies, ceases to be visible. *A.G.I.*

resolution of forces. When a single force can be replaced by two or more forces which together produce exactly the same effect, it is known as resolution of forces. *Morris and Cooper, p. 175.*

resolved-time method. A seismic reflection technique that involves the plotting of reflections in time and the representation of horizontal distances along the section in equivalent time units (obtained by dividing the true horizontal distance by the subweathering velocity as determined from first-arrival times). Once this transformation of the coordinate system is made, migration is accomplished by swinging arcs of reflection times from successive shot points and drawing lines which are tangent to the respective arcs for the same events from adjacent shot points. For the final mapping of migrated horizons in depth, the times are recorded directly beneath the shot points. These times are converted to depths by using the best available velocity information. *Dobrin, p. 139.*

resolving power. In optical viewing, minimum distance possible between two separately distinguishable objects. *Pryor, 3.*

resonance. A term denoting a variety of phenomena characterized by the abnormally large response of a system having a natural vibration period to a stimulus of the same, or nearly the same, frequency. *A.G.I.*

resonance method. A procedure in which a transducer is placed in contact with the test object and excited over an appropriate range of frequencies. A displacement-type resonance will be encountered at the frequency for which the thickness of the test object is equal to the half-wavelength of the ultrasound, and also at all other frequencies such that the thickness is a whole multiple of the half-wavelength. This method is used principally to measure thickness. *ASM Gloss.*

resonance screen. A high-speed vibrating screen in which the applied force has a frequency equal to the natural frequency of the suspended mass. In its basic form, the vibrating frame of the resonance screen is a mass oscillating between two compression springs, which alternately store and return this energy. The Flamrich screen is of the resonance type. The screen is used for screening out the large sizes from raw coal, final screening of washed coal, dewatering of products, etc. *Nelson.*

resorption. a. A partial refusing of phenocrysts in a porphyritic rock, followed by recrystallization in modified forms. *Standard, 1964.* b. Decrease or disappearance of a solid phase during cooling as a result of equilibrium changes. *VV.* c. Capture of migrant mineral, geologically, by one relatively fixed. *Pryor, 3.* d. In physics, absorption or adsorption of material which has previously been shed from the sorbing substance. *Pryor, 3.*

resorption border. A border of secondary minerals surrounding an original crystal constituent of a rock, produced by partial resorption and recrystallization. *Standard, 1964.*

respiration. The process of drawing air, or another breathing medium, into the lungs to supply oxygen and purify the blood. *H&G.*

respirator. a. A device (as a gas mask) for protecting the respiratory tract (as against irritating and poisonous gases, fumes, smoke, dusts) with or without equipment suppling oxygen or air. *Webster 3d.* b. A device for maintaining artificial respiration. *Webster 3d.* c. The mining type is a fitting which covers the nose and mouth to prevent the wearer inhaling excessive quantities of dust. Tunnel miners and men at sinter plants and blast furnaces are isssued with respirators for use where danger is known to exist. *See also* breathing apparatus; Martindale dust respirator. *Nelson. See also* supplied air respirator; filter-type respirator; chemical cartridge respirator.

respiratory cycle. One complete breath—an inspiration followed by an expiration, including any pause that may occur between the movements. *H&G.*

respiratory exhaustion. Resistance to underwater breathing has four components: (1) airway resistance caused by valves, length and diameter of tubing, and possibly inertial factors due to the density of the inspired gas at increased depth; (2) hydrostatic resistance caused by the difference in pressure between the level of the swimmer's center of breathing (most commonly believed to be at the bottom of his throat) and the level of the inlet or demand valve; (3) inerital resistance introduced by the inertia of water which must be displaced during respiratory movements of the chest; and (4) miscellaneous factors such as the resistance of breathing bag fabric to inflation and deflation. *H&G.*

respiratory minute volume. The total amount of air moved in and out the lungs in a minute. Multiplying the tidal volume times the rate gives the respiratory minute volume. Minute volume varies greatly with the body's activity. It is about 6 liters at complete rest and may be over 100 liters during very heavy work. Abbreviation, rmv. *H&G.*

respiratory quotient. a. The ratio of carbon dioxide expelled to oxygen consumed. It is a volume ratio. In other words, a miner working at a moderate rate would consume 0.07 cubic feet per minute of oxygen but liberate only 0.07 × 0.9 = 0.063 cubic feet per minute of carbon dioxide. *Hartman, p. 16.* b. The ratio between the amount of carbon dioxide produced and the amount of oxygen consumed in breathing. The average value for a working diver is 0.9. This means that 9/10's of every liter of carbon dioxide is produced for every liter of oxygen consumed. *H&G.*

respiratory rate. Indicates the number of complete respiratory cycles that take place in 1 minute. At rest, a normal adult will have a respiratory rate somewhere between 10 and 20 breaths per minute. The rate normally increases during work. *H&G.*

respiratory tract. The series of passages guiding the air into the lungs, that is, the nose and mouth, the pharynx, the larynx, the trachea, and bronchi. *McAdam, p. 82.*

resplendent. Shining with a brilliant luster; very bright. *Standard, 1964.* Applied sometimes to certain minerals. *Fay.*

response. In a device or a system, the motion or other output resulting from an excitation or stimulus under special conditions. *Hy.*

rest. A term distinguished from steady rest; that part of a floor stand or bench stand grinder which serves to support the work or the dressing tool applied to the wheel. *See also* steady rest. *ACSG, 1963.*

rest magma. A magmaticrest solution deprived of a great deal of its silicate content through crystallization and containing a concentration of volatile constituents, metals, and rare elements; it constitutes the mother substance which is held responsible for the creation of many economic mineral deposits of igneous origin. *Schieferdecker.*

restore circulation. The action taken to fill or seal the cracks or openings through which drill fluid is escaping from the borehole into the rocks forming the walls of the borehole and by which the drill fluid is made to return to and overflow the collar of the borehole. *Long.*

restrained cable plug and socket. a. A plug and socket designed to be held together by an operating bolt, or screwed union ring, or other equivalent device, the use of which enables the plug to be readily inserted or withdrawn. *B.S. 3618, 1965, Sec. 7.* b. A flameproof restrained plug and socket incorporates an interlock to ensure that the power connections are dead when they are separated or until they make contact; the design is such that the enclosure is flameproof at all times when there is contact between the pins and tubes. *B.S. 3618, 1965, Sec. 7.*

restrained plug and socket. These are used when the cable is removed from a machine or apparatus frequently. The most common type is the 100-amp British Standard plug and socket and is employed to connect the trailing cable to a coal cutter or face conveyor. The gland of the plug is arranged to grip the sheath of the cable and to make connection with the screen and earth core. Power and pilot conductors are connected to the appropriate contact tubes, which make connection with corresponding pins in the socket portion. *Mason, V.2, p. 436.*

restricted earth fault protection. As used in mining, a system of earth fault protection in which the fault current is limited, without requiring the use of sensitive earth fault protection. *B.S. 3618, 1965, Sec. 7.*

restriking. a. Striking a trimmed but slightly misaligned or otherwise faulty forging one or more blows to improve alignment, or surface, maintain close tolerance, increase hardness, or to effect other improvements. *ASM Gloss.* b. A sizing operation in which coining or stretching are utilized to correct or alter profiles and counteract distortion. *ASM Gloss.*

rests. The arrangement at the top and bottom of a shaft, or intermediate levels, for supporting the shaft cage while changing the tubs or cars. Also called chairs; keeps; catches; wings. *Fay.*

rest water level. a. The level of the water table at any particular point. *B.S. 3618, 1963, Sec. 4.* b. The level of water in a well or borehole when pumping is not in progress. *B.S. 3618, 1963, Sec. 4.*

resue. a. To mine or strip sufficient barren rock to expose a narrow but rich vein, which is then extracted in a clean condition. *Nelson.* b. To open up a stope, not in the vein but in the wall rock. *See also* resuing, a. *Fay.* c. In lode mining, separate removal of undercut barren rock immediately below a lode or vein too narrow for human entry. Following this, the lode is mined and separately removed. Used when the lode is less than 30 inches wide. *Pryor, 3.*

resuing. a. A method of stoping wherein the wall rock on one side of the vein is removed before the ore is broken. Employed on narrow veins, less than 30 inches, and yields cleaner ore than when wall and ore are broken together. *Fay.* b. A method of stoping in which the ore is broken down first and then the waste or vice versa; usually the one which breaks easier is blasted first. The broken waste is left in the stope as filling, and the ore is broken down on flooring laid on the fill to prevent admixture of ore and waste. Resuing is applicable where the ore is not frozen to the walls and works best if there is considerable difference between the hardness of the ore and of the wall rocks. *BuMines Bull. 390, 1936, p. 28.* c. S. Afr. A method of stoping a narrow reef by which only the payable ore is delivered to the reduction plant. *Beerman.*

resultant field. The magnetic field which is the result of two or more magnetizing forces impressed upon the same area of a magnetizable object. Sometimes called vector field. *ASM Gloss.*

resultant force. Two or more forces acting on a body may be replaced by a single force whose effect is exactly the same as the combined effect of the other forces. Such a force is called the resultant, while the other forces, to which it is equivalent, are called components. *Morris and Cooper, p. 174.*

resultant rake. The angle between the tooth face and an axial plane through the tooth point measured in a plane perpendicular to the cutting edge. The resultant rake of a cutter is a function of three other angles; the radial rake, axial rake, and corner angle. *ASM Gloss.*

resurfacing. *See* activation, c. *Pryor, 3.*

resurgent. Applied to magmatic emanations derived not from the magma itself (juvenile), but from entrapped country rock. *Holmes, 1928.*

resurgent gases. Gases such as water in a magma derived from assimilation or dissolving, either in place or in fragments, some wall rock that contained such gases. *A.G.I.*

resurgent water. Water derived from hydrated rocks engulfed by rising magma. *A.G.I.*

resurrected erosion surface. An erosion surface produced in the geologic past, covered by younger deposits, and finally exposed or uncovered by more recent erosion. *Stokes and Varnes, 1955.*

resurrected stream. The later river is a direct descendant of the one before, and has inherited its channel from its predecessor. After a period of nonexistence, such a stream is reformed and takes up the work of the earlier stream. *A.G.I.*

resuscitate. To restore to animation or life; especially, to restore from apparent death; revive; revivify; as, to resuscitate a drowned person. *Standard, 1964.* In cases of electric shock, asphyxiation from mine gases, etc., to revive by means of artificial respiration. *Fay.*

resuscitation. An act of resuscitating or the state of being resuscitated; restoration; revival; renewal (by means of artificial respiration or cardiac massage). *Webster 3d.*

resuscitator. An apparatus that delivers oxygen or a mixture of oxygen and carbon dioxide to and induces a renewal of respiration in the asphyxiated. *Webster 3d.*

retaining mesh. In sieving or screening, that at which division is made between oversize (arrested on screen) and undersize (passing through meshes). *Pryor, 3.*

retaining ring. a. A shoulder inside a reaming shell that prevents entry of the core lifter into the core barrel. *Long.* b. A term sometimes incorrectly applied to a core lifter. *Long.* c. A soft steel ring between the races of a ball bearing to maintain the correct distribution of the balls in the races. *Long.*

retaining screen. The screen which has retained the particles. *Pit and Quarry, 53rd, Sec. B. p. 115.*

retaining valve. *See* reflux valve. *B.S. 3618, 1963, Sec. 4.*

retaining wall. a. A thick wall designed to resist the lateral pressure of earth behind it. Retaining walls are often necessary at mine sites in valleys to gain space for sidings. *See also* plane of rupture; wedge theory. *Nelson.* b. A wall separating two ground levels. *Nichols.*

retard. To increase the time required for cement to set by mechanical agitation or chemically by the use of a retardant. *Long.*

retardant. A substance that, when added to cements, prolongs the setting time. *Long.*

retardation. Regressive evolution where certain members of otherwise progressive groups stop developing after reaching a certain age and thereafter never attain the perfection of development reached by their normal relatives. *Rice.*

retarder. a. An appliance for restraining the movement of surface wagons or mine cars. *See also* car retarder; wagon retarder. *Nelson.* b. A mineworker who works in the gravity inclines. *Stoces, v. 1, p. 648.* c. Any device used to slow the rate of travel of bulk material or objects on a conveyor. *ASA MH4.1-1958.* d. In the case of stucco, plaster, mortar, concrete, etc., a substance which will retard the set. *ASTM C11-60.* Sodium citrate, for example, is used to retard the setting of pottery plaster. *Lee.*

retarding conveyor. a. A chain-type conveyor used on steeply inclined faces, where the problem is not so much to move the coal but rather to restrain its movement downhill. It consists of link chains carrying 6 to 8 inch diameter discs at every yard. The endless chain runs in an open semicircular trough and the coal is lowered to the discharge end. The chain returns uphill, in an enclosed tube, to the driving unit at the top end. Its capacity is about 100 tons per hour. *Nelson.* b. Any type of conveyor used to retard the rate of movement of bulk materials, packages, or objects where the slope is such that the conveyed material tends to propel the conveying medium. *ASA MH4.1-1958.*

retempering. The remixing of concrete or mortar which has started to harden. *Taylor.*

retentivity. The capacity of a material to retain a portion of the magnetic field setup in it after the magnetizing force has been removed. *ASM Gloss.*

retgersite. Nickel sulfate hexahydrate, $NiSO_4.6H_2O$, tetragonal trapezohedral, long known as an artificial salt, has been recognized as a natural mineral at five localities, in association with morenosite (orthorhombic, $NiSO_4.7H_2O$). *Spencer, 18, M.M., 1949.*

Retger's salt. Thallium silver nitrate which, when melted at 75° C to a yellow liquid, has a specific gravity of 4.6; lower specific gravity if diluted. A heavy liquid. *Shipley.*

reticulate. a. In petrology, a term applied to a texture of crystals which are partly altered to a secondary mineral, the remnants of the original mineral lying in a network or mesh of the secondary mineral. *A.G.I.* b. To divide, mark, or construct so as to resemble or form network. *Webster 3d.*

reticulated. a. A mineral with cross meshes, like a net, for example, rutile needles. *Nelson.* b. Said of pottery having a surface decoration of false pierced work, produced either by impasto overclay (deep), addition of slip (shallow), or by stamping. *C.T.D.*

reticulated masonry. Same as herringbone bond. *Standard, 1964.*

reticulated veins. Veins that cross each other, forming a network. *Fay. See also* stockwork.

reticulate texture. A veined texture when veins follow cleavage or parting planes nearly at right angles, resembling network. Synonym for mesh texture. *Schieferdecker.*

reticulation. The leatherlike pattern or wrinkled appearance of a photographic emulsion, which may occur as the result of large and sudden changes in temperaure during processing. *ASM Gloss.*

reticule. A set of intersecting very fine lines, wires, etc., in the optical focus of an optical instrument. It is also referred to as graticule. *See also* collimation line. *Ham.*

reticulite. An extremely attenuate pyroclastic rock consisting of glass threads which join a series of points forming a polyhedral space lattice. It is formed from pumice by the collapse of the walls of adjacent vesicles and the retraction of the liquid into threads which form the perimeters of the former polygonal faces. The threads are usually of triangular cross section, indicating chilling, before rounding could take place. Such rock has generally been known by Dana's name, thread-lace scoria. *A.G.I.*

retiform. Netted; reticulate; said of the boundaries of some vein quartz (rare). *Hess.*

retigen. Bitumen contained in meteorites. The name indicates that this substance on distillation gives rise to resin, in contrast to "kerogen" which on distillation gives rise to oil. *Tomkeieff, 1954.*

retinalite. A resinous variety of massive serpentine. *Fay.*

retinasphalt. A light brown resinous substance found in brown coal in Devonshire, England. *Tomkeieff, 1954.*

retinite. a. A very large group of resins, characterized by the absence of succinic acid; composition very variable, 0.6 to 15 percent. Probably includes resins of various origins. *Hey 2d, 1955.* b. Synonym for pitchstone. *Hey 2d, 1955.* c. Synonym for retinasphalt. *Hey 2d, 1955.* d. Synonym for copalite. *Hey 2d, 1955.*

retinosite. A microscopical constituent of torbanite consisting of translucent orange-red discs. *Compare* gelosite; humosite; matrosite. *Tomkeieff, 1954.*

retire. To discontinue the use of a bit when it becomes dull or when the matrix metal is critically worn. *Long.*

retonation wave. A wave passing back through burned or burning explosion gases toward the origin, at the rate of a sound wave through gases of like temperature, from a point in the explosion wave, usually of high pressure, to an area of lower pressure. *Rice, George S.*

retort. a. A vessel used for the distillation of volatile materials, as in the separation of some metals and the destructive distillation of coal. *ASM Gloss.* b. A long semicylinder, now usually of fire clay or silica, for the manufacture of coal gas. *Webster 3d.* c. A vessel with a long neck, used for distilling the quicksilver from amalgam. *See also* amalgam retort. *Fay.* d. The vessel used in distilling zinc. *Fay.* e. To treat by heating in a retort, as gold amalgam, to drive off the mercury and recover the gold. *Fay.* f. A unit coke of the gas-house design. *Mersereau, 4th, p. 364.*

retort carbon. Retort carbon, or glance coal, is a very dense form of carbon, produced by the deposition of carbon in the upper part of the retorts in the manufacture of coal gas. It exhibits the luster of a metal, is sonorous when struck, and is a good conductor. Ordinarily it is rich in silica, the result of adhering fragments of brickwork and refractory pastes from the retorts. *Chemical and Metallurgical Engineering, v. 27, July 26, 1922, p. 163.*

retort clay. A semirefractory clay used for gas or zinc retorts. *CCD 3d, 1942, p. 195.*

retort coke. *See* coke. *Bennett 2d, 1962.*

retort gas. Gas resulting from the heating of coal in retorts, for example, in the by-product process of coke manufacture. *Bennett 2d, 1962.*

retort gas tar. Obtained as a condensation product in the hydraulic mains, scrubbers, or condensers in the manufacture of coal gas for illuminating purposes. It is less fluid and contains less of the lighter hydrocarbons, more naphthalene and anthracene, and their accompanying oils, and more free carbon than tars from other sources. Retort gas tar contains 20 to 40 percent of free carbon and yields on distillation from 50 to 75 percent of pitch, or, if the distillation is carried all the way, 45 to 65 percent of coke. *Chemical and Metallurgical Engineering, v. 27, No. 4, July 26, 1922, pp. 161-165.*

retort house. The building containing the gas retorts in which gas is manufactured. *Standard, 1964.*

retorting. a. Removing the mercury from an amalgam by volatizing it in an iron retort, conducting it away, and condensing it. *Fay.* b. In the sulphur industry, synonymous with sublimation. *Fay.*

retort kilnman. *See* kiln burner. *D.O.T. Supp.*

retort oven. A coke oven that conserves the gas evolved. *Zern.*

retort pressman. One who operates a hydraulic press in which fireclay retorts, used in smelting zinc ores, are made. *D.O.T. 1.*

retort scaler. A scraper for cleaning gas retorts. *Standard, 1964.*

retoucher, metal stampings. One who repairs defective coloring on metal stampings to bring out etched or embossed patterns. *D.O.T. Supp.*

retracker. *See* rerailer.

retract. The mechanism by which a dipper shovel bucket is pulled back out of the digging. *Nichols.*

retractable wedge. A type of deflecting wedge that can be retrieved after the deflected hole has been completed. *Long.*

retracting. *See* crowding. *Carson, p. 38.*

retreading roads. A process of repairing road surfaces which are breaking up. *Ham.*

retreat. a. To work rooms, rooms-and-pillars, or pillars to finish coal extraction in any area which has been penetrated to its limits by advance work; workings in the general opposite direction of advance work and which, when completed, will permit the area to be abandoned as finished. *B.C.I.* b. To treat over again; said of tailings from ore dressing plants. *Fay.*

retreatal moraine. *See* moraine of recession.

retreating. a. Robbing pillars in coal mines and working back toward the shaft. *von Bernewitz.* b. *See* reheat treating.

retreating longwall. a. First driving haulage road and airways to the boundary of a tract of coal and then mining it in a single face without pillars back toward the shaft. *Fay, p. 407.* b. *See* longwall retreating.

retreating system. a. A method of working a mine which is designed to allow a stope to cave soon after it is worked out, thus relieving the weight on the supports in adjacent stopes. *Lewis, p. 438.* b. A method of extracting coal or ore by driving a narrow heading to the boundary, then opening out a face and working the deposit backwards towards the shaft, drift, or main entry. *See also* longwall retreating. *Nelson.* c. A stoping system in which supporting pillars of ore are left while deposit is worked outward from shafts toward boundary, these pillars being removed (robbed) as the work retreats toward the shaft and the unsupported workings are abandoned and left to cave in. *Pryor, 3.* d. A system of robbing pillars in which the line of pillars being robbed retreats or moves from the boundary toward the shaft or mouth of the mine. *See also* longwall method. *Fay.*

retrievable inner barrel. The inner barrel assembly of a wire-line core barrel, designed for removing core from a borehole without pulling the rods. *Long.*

retrievable wedge. *See* retractable wedge. *Long.*

retrieve. To recover or remove from a borehole; to fish. *Long.*

retrieving ring. A catch ring on a retractable wedge that engages a lifting device on the deflection barrel or bit enabling the drill runner to remove a deflecting wedge from a borehole after deflection has been effected. *Long.*

retrograde metamorphism. The mineralogical adjustment of relatively high-grade metamorphic rocks to temperatures lower than those of their initial metamorphism. Synonym for retrogressive metamorphism; diaphthoresis. *See also* diaphthorite. *A.G.I.*

retrogressive metamorphism. Synonym for diaphthoresis; retrograde metamorphism. *See also* diaphthorite. *A.G.I.*

return. a. Any airway in which vapid air flows from the workings to the upcast shaft or fan. *See also* intake. *Nelson.* b. Any airway which carries the ventilating air outby and out of the mine. *B.S. 3618, 1963, sec. 2.* c. The rate of profit in a process of production per unit of cost. *Webster 3d.* d. Any surface turned back from the face of a principal surface. *ACSG.*

return air. a. Air traveling in a return. *B.S. 3618, 1963, sec. 2.* b. Air which has circulated the workings and is flowing towards the main mine fan; vitiated or foul air. *Nelson.* c. Air returning to a heater or conditioned from the heated or conditioned space. *Strock, 10.*

return aircourse. Portion of ventilation system of mine through which contaminated air is withdrawn and evacuated to surface. *Pryor, 3.*

return circulation. That portion of a circulated drill fluid flowing from the face of a bit toward the collar of a borehole. *Compare* return water. *Long.*

return drum. This consists of a boxlike structure containing the drum around which the return belt passes. As the belt is turned through 180° the drum should be as large a diameter as conditions allow. The drum may be of the self-cleaning type and a plough is incorporated to deflect anything on the return belt before it reaches the drum. The drum has a screw adjustment to center the belt accurately on it. Where no loop take-up is provided, anchor props are connected to the drum by chains after tension has been applied by two Sylvesters. The return drum should be kept very well guarded to prevent accidents. *Sinclair, V, p. 318.*

return idler. The idler or roller underneath the cover or cover plates on which the conveyor belt rides after the load which it was carrying has been dumped at the head section and it starts the return trip toward the foot section. *Jones.*

returning charge. Charge made per unit of ore or concentrate treated by smelter in custom smelting. In addition to a basic charge which allows for process costs and agreed percentage loss in recovery, extra charges may be specified, or remitted as premiums, in adjustment of variations from the normal makeup of the parcel treated. *Pryor, 3.*

returning fluid. The water, mud, or other circulated medium reaching the borehole collar after having been circulated past the drill bit. *Long.*

return-line corrosion tester. A tester developed by the U. S. Bureau of Mines for detecting and controlling corrosion in steam-condensate-return lines of large heating plants. This tester is superior to other devices for determining types and rates of corrosion because it can distinguish among various possible causes. Other advantages are that it is assembled from ordinary black iron pipe nipples and couplings, the linings are easily machined, and the corroded linings can be analyzed quickly in any laboratory. *Bureau of Mines Staff.*

return man. In anthracite coal mining, one who resets timbers, shovels up falls of slate, rock, or dirt, and keeps in general repair the airways by which mine air returns to the surface. *D.O.T. 1.*

return roller. A small roller supporting a belt on its return run, whether above or below the carrying belt; if supporting the bottom belt, it is often referred to as a bottom roller. *Nelson.*

returns. The drill fluid and entrained sludge that overflows the collar of a borehole. *Long.*

return sheave. A pulley placed at the extreme end of an haulage plane remote from the haulage drum. The tail rope from a main-and-tail haulage drum passes around it and is attached to the inbye end of the journey. *Nelson.*

return tunnel. Aust. A tunnel or adit used as a return airway. *Fay.*

return water. The drill fluid that reaches the surface and overflows the borehole collar after it has been circulated downward through the rods and past the drill bit. *Long.*

retzian. A very rare, weakly radioactive, orthorhombic, dark to light brown hydrated basic arsenate of Mn, Ca, and the rare earths; found with jacobsite in cavities in dolomite; from Sweden. *Crosby, p. 107.*

reussin. An impure Glauber's salt (mirabilite), found native. *Standard, 1964.*

reussinite. A resinlike, reddish-brown oxygenated hydrocarbon, soluble in boiling alcohol and in ether. Found in certain coal deposits. *Fay.*

rev Abbreviation for revolution. *BuMin Style Guide, p. 61.*

revdanskite; rewdanskite. An impure, hydrous nickel silicate from Revda (Revdinsk), Ural Mountains, U.S.S.R. Also spelled revdinite, revdinskite, rewdinskit, rewdjanskit, and refdanskite. *English; Hey 2d, 1955.*

reveal. That portion of a jamb or recess visible from the face of a wall back to the frame placed between jambs. *ACSG, 1961.*

revenue expenditure. That recurring expenditure directly to be written off against income. *Truscott, p. 281.*

reverberate. a. To deflect flame or heat, as in a reverberatory furnace. *Fay.* b. To reduce by reverberated heat; to fuse. *Fay.*

reverberation. a. The persistence of sound in an enclosed space as a result of multiple reflections after the sound source has stopped. *H&G.* b. The sound that persists in an enclosed space, as a result of repeated reflection or scattering, after the source of the sound has stopped. *H&G.*

reverberation index. Measure of the ability of an echo-ranging transducer to distinguish the desired echo from the reverberation. Computed from the directivity patterns as ratio in decibels of the bottom, surface, or volume reverberation response of a specific transducer to the corresponding response of a nondirectional transducer. *Hy.*

reverberation strength. The difference between the level of a plane wave producing in a nondirectional transducer a response equal to that produced by the reverberation corresponding to a range of one yard from the effective center of the transducer and the index level of the pulse transmitted, on any bearing, by the same nondirectional transducer. *Hy.*

reverberatory furnace. A furnace, with a shallow hearth, usually non-regenerative, having a roof that deflects the flame and radiates heat toward the hearth or the surface of the charge. Firing may be with coal, pulverized coal, oil, or gas. Two of the most important types are the open-hearth steel furnaces and the large reverberatories employed in copper smelting. *ASM Gloss; C.T.D.; Newton, p. 280.*

reverberatory roasting. Roasting conducted in a reverberatory furnace. *Bennett 2d, 1962.*

revergen kiln. Trade mark. *See also* Davis revergen kiln. *Dodd.*

reversal (of dip). A local change of approximately 180° in the direction of the regional dip. *A.G.I.*

reversal of ventilation. *See* ventilation, reversal of. *Nelson.*

reverse. To reverse the direction of flow of gas and air in a regenerative furnace. *ASTM C162-66.*

reverse bearing. In surveying, a sight taken backward for the purpose of verifying the foresight. *Standard, 1964. See also* backsight, b and c. *Fay.*

reverse bend. To bend a line over a drum or a sheave, and then in the opposite direction over another sheave. *Nichols.*

reverse book fashion. The manner in which core is laid in a core box, starting at the upper-right-hand corner of the box and laying core from right to left in each groove. *Long.*

reverse circulation. The circulation of bit-coolant and cuttings-removal liquids, drilling fluid, mud, air, or gas down the borehole outside the drill rods and upward inside the drill rods. Also called countercurrent; counterflush. *Long.*

reverse-circulation core barrel. A core barrel designed so that core tends to float within the barrel when the fluid is circulated down the outside of the rods and returned to the surface inside the rods. *Long.*

reverse classification. In jigging, stratification of particles by size with largest uppermost; in streaming, rolling effect of transporting current which arranges particles with smallest nearest feed end. *Pryor, 3.*

reverse-current braking. A method used in the braking of alternating-current winders. This method absorbs power equal to the energy destroyed and dissipates it in the liquid controller as heat. Two phases of the stator supply are interchanged by bringing back the driver's lever to the off position and then to that for the opposite direction of drum rotation. The amount of braking depends upon the position of the lever, since the lower the resistance in the controller, and therefore in the rotor circuit, the greater the rotor current and the braking torque produced. When the direction of rotation of the stator magnetic field is reversed, the voltage between the stator and the rotor is doubled and the insulation of both must be adequate to prevent breakdown. *Sinclair, V, p. 120.*

reverse-current cleaning. The same as anodic cleaning. *ASM Gloss.*

reverse curve. a. A continuous curve composed of the arcs of two circles of the same or different radii, the centers of which lie on opposite sides of the curve. *Zern, p. 455.* b. A curve formed of two arcs in the shape of the letter S. *Ham.*

reversed bratticing. A method of narrow heading ventilation in coal mines by means of a brattice partition. The air is led to the face along the wide section of the heading and the contaminated air returns from the face along the narrow section. In this way, men working in the heading are placed in relatively clean air. *Nelson.*

reversed flush boring. *See* counterflush boring. *B.S. 3618, 1963, sec. 3.*

reversed loader. A front-end loader mounted on a wheel tractor having the driving wheels in front and steering at the rear. *Nichols.*

reverse drawing. Redrawing in a direction opposite to that of the original drawing. *ASM Gloss.*

reversed stream. A stream that has had its direction of flow reversed by glacial action, landslides, gradual tilting of a region, or other cause. *Stokes and Varnes, 1955. See also* obsequent stream. *Fay.*

reverse face. In theodolite survey, transit of telescope from face right to face left or vice versa. *Pryor, 3.*

reverse fault. a. A fault where there is an overlapping of the ruptured beds, the rock mass on one side having been pushed over the rock mass on the other side. *See also* thrust fault; overthrust. *Nelson.* b. Where the hanging wall appears to have moved up with relation to the footwall. *Ballard. Compare* normal fault.

reverse feed. To move bit and drill stem backwards away from borehole bottom while drill stem is rotated. *Long.*

reverse-feed gear. System of gears in drill swivel head that can be engaged to move the bit and drill stem backwards away from the bottom of the borehole while the drill stem is rotated in a clockwise direction. Also called backup gear. *Long.*

reverse flange. A flange made by shrinking, as opposed to one formed by stretching. *ASM Gloss.*

reverse gear. *See* reverse-feed gear. *Long.*

reverse initiation. *See* inverse initiation. *B.S. 3618, 1964, sec. 6.*

reverse laid rope. A wire rope with alternate strands right and left lay. *H&G, p. 130.*

reverse polarity. Arc welding circuit arrangement in which the electrode is connected to the positive terminal. *ASM Gloss.*

reverse reaming. *See* ream back. *Long.*

reverse redrawing. A second drawing operation in a direction opposite to that of the original drawing. *ASM Gloss.*

reverse saddles. Bedded veins found in the trough of a fold between anticlines. Reverse saddles are seldom large or rich. *See also* saddle reef. *Nelson.*

reversible auxiliary ventilation. In this system a single duct is provided and normally operated by forcing. After blasting, airflow is reversed and the fumes and dust are exhausted. Ventilation is again reversed to forcing when the work at the face is resumed. The usual arrangement is to use two fans, one for forcing, one for exhausting, at the mouth of the heading. This arrangement is particularly suited to underground use as it allows clean air to be drawn from, and contaminated air to be discharged to, separate points in the main airways. The reversing system combines practically all the advantages of the forcing and exhausting system. A serious objection to it for mining use is that all fans must be concentrated at one point. *Roberts, I, p. 221.*

reversible endless-rope system. A haulage system in which a single rope is used passing around a surge wheel. A single track may be used or, if more than one train is hauled, a single track with passbys, or a three-rail system with passbys, which eliminates facing points, may be used. The system may be operated at higher speeds than normal endless systems since the trains are attached and detached from a rope at rest and has been used for the haulage of men at speeds up to 12 miles per hour. Extra rope must be spliced onto the rope and the return wheel moved forward when the system is extended. *Sinclair, V, pp. 339-341.*

reversible pick. *See* double-ended pick. *Nelson.*

reversible reaction. One which can be made to proceed in either direction by the alteration of the conditions of the experiment. *Cooper.*

reversible tramway. *See* jig-back. *Nelson.*

reversible transducer. *See* bilateral transducer. *Hy.*

reversing clutch. A forward-and-reversing transmission which is shifted by a pair of friction clutches. *Nichols.*

reversing contactors. Magnetically operated switches controlled through a master controller operated by a hand lever on the control platform or desk. They may be of the air break or the oil break type. *Sinclair, V, p. 111.*

reversing doors. The system of doors or shutters on or near a surface radial-flow fan for reversing the direction of the air passing through the mine. *B.S. 3618, 1963, sec. 2.*

reversing machine. A molding machine having a flask or flasks that may be turned over for ramming the sand. *Standard, 1964.*

reversing mill. A type of rolling mill in which the stock being mechanically worked by rolling passes backwards and forwards between the same pair of rolls, which are reversed between each pass. *See also* continuous mill; three-high mill, b. *C.T.D.*

reversing rolls. *See* three-high train. *Fay.*

reversing shaft. A shaft whose direction of rotation can be reversed by the use of clutches or brakes. *Nichols.*

reversing thermometer. A precise mercury-in-glass temperature measuring instrument constructed so that when the thermometer is suddenly inverted, a separation of the mercury column occurs. Subsequent reading at a known temperature permits computation of the temperature in situ. The protected thermometer gives a reading unaffected by pressure, an unprotected thermometer gives a reading influenced by pressure. The difference between the two corrected readings is a function of depth. *Hy.*

revet. To face, as with slabs of stone or with any kind of masonry; furnish with a revetment; as, to revet an embankment, wall, or building. *Standard, 1964.*

revet crag. In geology, one of a series of narrow, pointed outliers of eroded strata, inclining inwardly, like a revetment, against a mountain. *Standard, 1964.*

revetment. a. A facing, sheathing, or retaining wall, as of masonry or other materials, for protecting a mass or bank of earth, etc., as in fortifications and riverbanks. *Standard, 1964.* b. A retaining wall. *C.T.D.* c. A wall sloped back sharply from its base. *Nichols.*

reviewing. Eng. *See* toller. *Fay.*

revived. Having had its ability to cut down its bed renewed or augmented through increase of its gradient by deformation of the earth's crust by an uplift or tilt; said of certain streams. *Fay.*

reviving apparatus. Any of a series of products or equipment designed to aid patient resuscitation by giving him oxygen to breathe instead of fresh air. *See also* Novox reviving apparatus; Novita reviving apparatus. *McAdam, p. 93.*

revolution. A time of major crustal deformation when folds and faults are formed. Often accompanied by the emplacement of plutonic rocks. *A.G.I.*

revolution counter. *See* automatic counter. *Hansen.*

revolver press. A type of press for the shaping of clay roofing tiles. It consists of a pentagonal or hexagonal drum, mounted on a horizontal shaft and carrying bottom press molds on each flat surface. As the drum rotates, discontinuously, each mold in turn is brought beneath a vertical plunger which consolidates a clot of clay in the mold. While the drum is stationary (during pressing) a clot of clay is fed to the mold next due to arrive beneath the plunger. *Dodd.*

revolving pot. A rotating circular container from which the Owens machine gathers glass. *ASTM C162-66.*

revolving screen. A screen consisting of a cylindrical (sometimes conical) screening surface mounted on a revolving frame for sizing coarse material; it is still common in gravel-washing, coal-washing, and stone-treating plants, but is not widely used in ore dressing. Also called trommel. *Newton, p. 72.*

revolving shovel. a. A digging machine in which the upper works can revolve independently of the supporting unit. *Nichols.* b. A digging machine that has the machinery deck and attachment on a vertical pivot, so that it can swing independently of its base. *Nichols.* c. The most widely used machine for excavating and loading in pits and quarries. It is designed to operate a dipper against a face or bank, which it displaces as it moves forward, and power is applied so effectively that the dipper can be forced into hard materials. Taken altogether, the digging action is exactly suited to the average pit and quarry excavation problem. The revolving shovel, mounted either on crawlers or on rubber tire traction, is extremely mobile and a moveup takes only a few seconds. The digging, swinging, and dumping motions are coordinated into a speedy, flexible operating cycle. The front-end attachments give the machines versatility. Working range is limited only by the boom length. *Pit and Quarry, 53rd, sec. A, p. 91.*

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revolving tube. A hollow cylinder, concentric with the needle of a feeder, revolving in the glass. *ASTM C162-66.*

revolving washing screens. The rotary washing screen is cylindrical in shape and made of three sections—a scrubber, a sand jacket, and a gravel-screening section—mounted on a steel frame. *Pit and Quarry, 53rd, Sec. B, p. 174.*

reward claim. Aust. A prospecting claim; often shortened to reward. *Fay.* A tract grant to one who first discovers gold in paying quantities in an unworked district. *Webster 2d.*

rewash. a. To re-treat a product in the same or in another washer. *B.S. 3552, 1962.* b. The product from one washer to be re-treated in another. *B.S. 3552, 1962.*

rewash box. A washbox to which the product (or a portion thereof) of a previous washing operation is fed for additional treatment. *B.S. 3552, 1962.*

reworked. Said of components derived from an older formation and incorporated in a younger deposit. *Schieferdecker.*

Rexco process. A method for producing low temperature coke in which the retort is a brick-lined cylinder, 10 feet in diameter and 25 feet high. A charge of 34 tons of coal is carbonized downwards by burning gas at the top, passing the combustion products through the charge. Carbonization takes 6 hours, and cooling, by recirculating of combustion gases, a further seven hours. The process requires a careful selection of type and grading of the coal, which is a blend of 33 percent of doubles and 67 percent of cobbles of low caking power to reduce resistance to the flow of gases through the charge. *Francis, 1965, v. 1, pp. 160-161.*

Reynolds' criterion. In 1883 Reynolds found that as the velocity of flow of water was increased a filament of colored liquid remained axially in the stream until a certain velocity was reached, when the colored filament mixed with the water and the flow became confused. The velocity at which the flow turned from streamline to turbulent conditions is called the critical velocity. Reynolds deduced the general expression: $\frac{V_eDw}{m} = C$, where V_e equals the critical velocity, D equals diameter of pipe, w equals density of the fluid flowing or weight per cubic foot, m equals viscosity of the fluid, which depends on the temperature, and C equals a constant known as Reynolds' number or criterion. Thus Reynolds' number depends on the density, velocity, and viscosity of the fluid and the diameter of the pipe. *Lewis, p. 707.*

Reynolds' number. A dimensionless number proportional to the pipe diameter or the duct diameter and to the veloicty and the density of the fluid and inversely proportional to the viscosity of the fluid. A Reynolds' number above 2,500 indicates turbulent flow and below 2,500, streamline flow. *Strock, 10.* Symbols, R and *R. Webster 3d; Zimmerman, pp. 92, 367.* Used in fluid-flow calculations to estimate whether flow through a pipe or a conduit is streamline or turbulent. $R = \frac{DU\rho}{\mu}$; in which *R* is Reynolds' number; D is the inside diameter of the pipe or conduit; U is the average velocity of flow; ρ is the density of the fluid; and μ is the viscosity of the fluid. Different systems of units give identical values of Reynolds' number. Values below 2,100 correspond to streamline flow, and values above 3,000 correspond to turbulent flow. *CCD 6d, 1961.*

rezilite mastic. A preparation of elaterite containing asbestos fiber; it is used for surfacing floors. *Fay.*

Rf value. In paper-strip chromatography, ratio of distance moved by component in solution under test to that of transporting solvent. *Pryor, 3.*

Rh Chemical symbol for rhodium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

rhabdite. *See* schreibersite. *Dana 7, v. 1, p. 124.*

rhabdomancy. The alleged divination by rod or wand when searching for minerals. *Fay.*

rhabdophane. A very rare, weakly radioactive mineral, $(Ce,Y,La,Di)(PO_4).H_2O$; possibly tetragonal or hexagonal; brown, pinkish- or yellowish-white; found as thin incrustations in ore bodies. *Crosby, pp. 107-108.*

Rhaetian. Synonym for Rhaetic. *A.G.I. Supp.*

Rhaetic. Upper Upper Triassic, transitional into Jurassic. *A.G.I. Supp.*

Rhaetic beds. Certain fossiliferous shales and limestones of the Upper Trias of Europe. Also called avicula contorta zone. *Fay.*

rhegmagenesis. Process resulting in the development of joint systems in tectonically quiet regions. *A.G.I. Supp.*

rheid. Body of rock showing flow structure. *A.G.I. Supp.*

rheid folding. Folding accompanied by slippage along shear planes at an angle to the bedding or earlier developed foliation. *A.G.I. Supp.*

rheidity. Capacity of material to flow within the earth. *A.G.I. Supp.*

Rhenania furnace. A combination of the Hasenclever and O'Hara furnaces, with four hearths, and with a combination flue under the lowest hearth and one over the upper hearth. It has mechanical rabbles. *Fay.*

Rhenish furnace. A zinc distillation furnace which is a modified type of the Silesian furnace. *Fay.*

rhenium. A rare, silvery-white metal; resembles platinum; oxidizes only at high temperatures; and is very resistant to corrosion. It occurs in very small quantities in columbite and in platinum and molybdenum ores. *Rolfe.* Symbol, Re; atomic number, 75; and atomic weight, 186.2. *C.T.D.* Metallic luster; hexagonal; valences; —1, 2, 3, 4, 5, 6, and 7; melting point, 3,180° C or 3,167° ± 60° C; boiling point, 5,627° C (estimated) or 5,900° C (estimated); specific gravity, 21.02 (at 20° C); insoluble in water and in hydrochloric acid; slightly soluble in sulfuric acid; and soluble in dilute nitric acid and in hydrogen peroxide. Its density is exceeded only by that of platinum, iridium, and osmium, and its melting point is exceeded only by that of tungsten and carbon. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-131, B-212.*

rheoglyph. A heiroglyph produced by syngenetic deformation, slump and related processes, as oposed to turboglyphs which are current produced. *Pettijohn.*

Rheolaveur system; launder washer. A washer in which the raw coal and water is fed into the head of an inclined trough equipped with openings in the bottom for the discharge of the heavy, high-ash material, the lighter coal being discharged with the bulk of the water at the far end of the trough. The Rheolaveur has declined in popularity. *Nelson.*

Rheolaveur washers. Apart from the launder washer, there are three types of Rheolaveurs used in coal washing: (1) the sealed discharge type for coarse sizes, from which the reject falls against an upward current of water and is removed by an automatic gate which controls the feed to a drowned elevator; (2) a system of two, three or four superimposed troughs for washing fine coal below about ½ inch. The troughs are equipped with several bottom discharge devices. The separation of the heavy shale from coal and middlings takes place progressively until finally the pure shale is discharged from the lowest trough, and (3) a system for washing slurry consisting usually of two troughs one above the other and equipped with a number of Rheo boxes of the open discharge type but designed to minimize the loss of coal with the fine shale. *Nelson.*

rheology. Study of the flowage of materials, particularly plastic flow of solids and flow of non-Newtonian liquids. *A.G.I. Supp.*

rheomorphism. A process of at least partial fusion, such that the rock may be deformed viscously. *Kemp, 6d, pp. 208-209.*

rheopexic. Converse of thixotropic. *See also* dilatancy, e. *VV.*

rheopexy. The complex behavior of some materials, including a few ceramic bodies, which show dilatancy under a small shearing stress followed by thixotropy under higher stress. *Dodd.*

rheostat. a. An instrument for testing blasting machines by inserting definite resistance equal to a known number of electric blasting caps of a standard-length wire, using one electric blasting cap as an indicator. *Fay.* b. An instrument by which a variable or an adjustable resistance may be introduced into a circuit to regulate the strength of a current, as in the field coils of a motor or a generator. *Standard, 1964.*

rheostat rope. A small rope consisting of 8 strands of 7 wires each. *H&G, p. 130.*

rheotropic brittleness. That portion of the brittleness characteristic of nonface-centered cubic metals where tested in the presence of a stress concentration or at low temperatures or high strain rates, that may be eliminated by prestraining under milder conditions. *ASM Gloss.*

rhigolene. This term is archaic and should not be used. *ASTM D 288-57.*

Rhine diamond. Colorless beryl. *Shipley.*

rhinestone. a. A colorless imitation gem stone made of glass paste or strass, and cut, usually as a brilliant, to imitate the diamond. *Standard, 1964.* b. Water-clear quartz. *Hess.*

Rhinog grits. A group of massive bedded unfossiliferous grits, arkoses, and conglomerates; part of the Harlech series of the Cambrian system; seen typically in the Rhinog Mountains in Merioneth, North Wales. *C.T.D.*

rhm Abbreviation for 1 roentgen per hour at 1 meter. *ASM Gloss.*

Rhn Abbreviation for Rockwell hardness number. *BuMin Style Guide, p. 61.*

Rhodanian orogeny. Mid-Pliocene diastrophism. *A.G.I. Supp.*

rhodanite. Sulfocyanic acid, HCNS, as a natural gas. *Tomkeieff, 1954.*

rhodesite. A fibrous zeolitic mineral containtaining Al_2O_3 only 0.29 percent, $4(Ca,Na_2,K_2)O.10SiO_2.7H_2O$, unit-cell contents $(Ca,Na_2,K_2)_8Si_{16}O_{40}.11H_2O$, orthorhombic. Closely associated with mountainite; from Bultfontein mine, Kimberley, Republic of South Africa. *Spencer 21, M.M., 1958.*

rhodite. Same as rhodium gold. *Standard, 1964.*

rhodium. A rare element of the light platinum group in group VIII of the periodic system; found in platinum ores and separated as a silvery-white metal that is difficult to melt. Alloyed with platinum to form the positive wire of the platinum-rhodium-platinum thermocouple. Used for plating silver and silver plate to prevent tarnishing. Symbol, Rh; valences, 2, 3, 4, and 5; isometric; atomic number, 45; atomic weight, 102.905; specific gravity, 12.41 (at 20° C); melting point, 1,966° ± 3° C; boiling point, 3,727° ± 100° C; insoluble in water; slightly soluble in acids and in aqua regia; and soluble in sulfuric acid plus hydrochloric acid and in concentrated sulfuric acid. *C.T.D.; Fay; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-131, B-213.*

rhodium gold. Gold occurring naturally alloyed with rhodium. *Pryor, 3.*

rhodium plating. Coating metal objects, jewelry in particular, with rhodium. *Bennett 2d, 1962.*

rhodizite. A complex beryllium-aluminum borate, usually carrying apreciable amounts of the alkalies sodium and potassium with lesser amounts of both rubidium and cesium. *E.C.T., v. 11, p. 946.*

rhodochrome. Synonym for kammererite. *Dana 6d, p. 650.*

rhodochrosite. A mineral of the calcite group, $MnCO_3$, commonly containing some iron and calcium. Trigonal. Occurs as rose-pink rhombohedral crystals. A minor ore of manganese. *Dana 17; Fay; A.G.I.*

rhodoid. An artificial resin (cellulose acetate) used to imitate amber; specific gravity about 1.28; refractive index about 1.49. *Shipley.*

rhodoise. Synonym for erythrite. *Dana 6d, p. 817.*

rhodolite. A variety of garnet, $3(Mg,Fe)O.Al_2O_3.3SiO_2$; characterized by its rose-like color and brilliant luster. Composition corresponds to 2 molecules of pyrope and 1 of almandite. Isometric. *Sandford; Dana 17.*

rhodonite. A rose-colored, triclinic mineral, $MnSiO_3$, sometimes used as an ornamental stone. Also called manganese spar. *Dana 17; Fay.*

rhodotilite. Synonym for inesite. *Dana 6d, p. 564.*

rhoenite. *See* rhönite.

rholites. A word employed by Wadsworth to designate smelting materials or fluxes. *Fay.*

rhomb. In crystallography, a form bounded by three parallel pairs of lozenge-shaped faces. *Shipley.*

rhombarsenite. Synonym for claudetite. *Dana 6d, p. 199.*

rhombenglimmer. Synonym for biotite. *Dana 6d, p. 627.*

rhomben porphyries. Applied to certain Norwegian porphyries, whose phenocrysts of orthoclase resemble a rhombohedron. The orthoclase is rich in soda. *Fay.*

rhombic. Four-sided; each side of equal length but not at right angles to each other as a rhombic facet. *Shipley.*

rhombic dodecahedron. In the isometric system, the ordinary dodecahedron, formed by twelve faces, each parallel to one axis and having equal intercepts on the other two. *Fay.*

rhombic facet. *See* rhombic. *Shipley.*

rhombic mica. Synonym for phlogopite. *Fay.*

rhombic quartz. An old name for feldspar. *Fay.*

rhombic sulfur; octahedral sulfur. Sulfur in its native form; named according to the shape of its crystals. Prepared by allowing any form of sulfur to remain for a sufficient length of time at ordinary temperature, or by crystallizing sulfur below 95.5° C. Crystallizes in octahedra from a solution of sulfur in carbon disulfide. Melting point, 114.0° C; specific gravity, 2.06; soluble in carbon disulfide; insoluble in water; stable below 96.5° C at ordinary pressures. *Cooper, pp. 277 & 278.*

rhombic symmetry. *See* orthorhombic symmetry. *A.G.I.*

rhombic system. In crystallography, same as orthorhombic system. *Fay.*

rhomboclase. A colorless, gray hydrous acid ferric sulfate, $Fe_2O_3.4SO_3.9H_2O$. Rhombic plates; orthorhombic. From Smolnik, Czechoslovakia (formerly Szomolnok, Hungary). *English.*

rhombohedral. a. Of, pertaining to, forming, or crystallizing in rhombohedrons. *Fay.* b. Pertaining to or belonging in that group of the hexagonal system which is characterized by a vertical axis of threefold symmetry and three horizontal axes of twofold symmetry. *Fay.*

rhombohedral system. a. Same as the hexagonal system, except that the forms are referred to three axes parallel to the faces of the fundamental rhombohedron instead of to the usual four axes. *Fay.* b. The trigonal division of the hexagonal system, the forms being referred to the same three axes as above. Neither usage has been generally accepted. *Fay.*

rhombohedron. A crystal form bounded by six faces of rhombic outline. *Fay.*

rhomboid. A parallelogram that does not have any right angles, and one pair of opposite sides differ in length from the other pair of opposite sides. *Jones, 2, 99.*

rhomboidal. Shaped like a rhomboid, as a rhomboidal facet. *Shipley.*

rhomboid ripple mark. Ripple mark with a reticulate, rhomboid pattern. *Pettijohn.*

rhomb porphyry. A variety of syenite containing rhomb-shaped phenocrysts of alkalic feldspar. *A.G.I.*

rhomb spar. Synonym for dolomite. *Fay.*

rhombus. A parallelogram that does not have any right angles, but the sides are all equal in length. *Jones, 2, p. 99.*

rhone. a. Scot. A wooden channel for conveying water. *Fay.* b. Scot. A line of wooden boxes for conveying air. *Fay.* c. An eaves gutter. *C.T.D.*

rhönite. A dark brown titanosilicate of ferrous and ferric iron, aluminum, magnesium, calcium, and alkalies, $(Ca,Na_2K_2)_3Mg_4Fe''_2Fe'''_2Al_4(Si,Ti)_6O_{30}$. A constituent of basaltic rocks. Triclinic. It is a triclinic amphibole close to enigmatite. Found in various localities in Germany; also in Bohemia. *English.*

rhumb line. A curve on the earth's surface which cuts all meridians at the same angle. Its bearing is, therefore, constant. Also called loxodrome; Mercator track. *Seelye, 2.*

rhums. Scot. Bituminous shale. *Fay.*

rhyacolite. Sanidine. *Webster 3d.*

rhyobasalt. Suggested for rocks which are the effusive equivalent of granodolerite. *Holmes, 1928.*

rhyocrystal. Applied to crystals of idiomorphic outline which are arranged in streamlines. *Holmes, 1928.*

rhyodacite. The extrusive equivalent of a granodiorite. The principal minerals, sodic plagioclase, sanidine, quartz, and biotite (or hornblende), usually occur as phenocrysts in a glassy or finely crystalline groundmass of alkalic feldspar and silica minerals. Accessory minerals are apatite and opaque oxide. A small amount of pyroxene may occur in some varieties. With an increase of alkalic feldspar and quartz and a decrease of calcic feldspar and ferric minerals, rhyodacite passes into rhyolite, and conversely into dacite. *A.G.I.*

rhyodiabasic. A texture which resembles the ophitic except that the plagioclase laths are more or less parallel. *Rice.*

rhyolite. The general name for fine-grained igneous rocks having a similar chemical composition to granite, commonly occurring as lava flows, though occasionally as minor intrusions, and generally containing small phenocrysts of quartz and alkali feldspar set in a glassy or cryptocrystalline groundmass; sometimes called liparite. *C.T.D.*

rhyolite breccia. A rock composed of angular fragments of rhyolite embedded in finer material. *Stokes and Varnes, 1955.*

rhyolite glass. Obsidian. *Shipley.*

rhyolite-porphyry. A rhyolite in which some grains or crystals are visibly larger than others. *Sinkankas.*

rhythmic crystallization. A phenomenon exhibited by rocks of widely different composition but characterized by the development of orbicular structure. *See also* corsite. *C.T.D.*

rhythmic driving. In this type driving, the drilling, loading, and blasting are carried out in one shift and the mucking and transportation in the following one. This enables every man to specialize in his tasks and machines, which in a highly mechanized job is a necessary condition for making the best use of expensive equipment. It also reduces or eliminates the loss of time for ventilation that in rhythmic driving is carried out between two shifts. *Langefors, P. 205.*

rhythmic sedimentation. A regular interbanding of two or more types of sediment or sedimentary rocks due to a seasonal change in the conditions of sedimentation, such as alternation of wet and dry periods. *C.T.D. See also* varved clay.

rhythmic succession. The constant repetition of a definite unit in a vertical range of rocks; has been observed throughout the British Coal Measures. *See also* Coal Measure unit. *Nelson.*

rhythmites. a. Rhythmic laminations. *A.G.I.* b. Individual units of rhythmic beds. *A.G.I.* c. The couplet of distinct types of sedimentary rock, or the graded sequence of sediments, that form a unit bed or lamina in rhythmically bedded deposits. It implies no limit as to thickness of bed, lamina, or complexity, but the term should exclude groups of beds, such as cyclothems, and carries no time or seasonal connotation such as varve. *Compare* cyclothem; varve. *A.G.I.*

ria. a. A more or less wedge-shaped inlet, gradually widening and uniformly deepening from its head to the sea, showing no trace of an included basin. *A.G.I.* b. The term ria, from the Spanish, may be advantageously used to cover all types of subaerially carved troughs, including von Richthofen's fjord, ria, dalman, and liman types. *A.G.I.*

ria coast. *See* ria shoreline. *Schieferdecker.*

ria shoreline. Shorelines formed by the partial submergence of a landmass dissected by numerous river valleys, may be called ria shorelines, after the ria coast of northwestern Spain, which was produced by the drowning of normal river valleys along a mountainous coast; thus used, the term ria is not restricted to the narrow meaning assigned to it by von Richthofen, who first used it in a generic sense; but is employed in the broader sense in which it has been used by Gulliver and others. *A.G.I.*

rib. a. The side of a pillar or the wall of an entry. *B.C.I.* b. The solid coal on the side of a gallery or longwall face; a pillar or barrier of coal left for support. *Fay.* c. The solid ore of a vein; an elongated pillar left to support the hanging wall in working out a vein. *Fay.* d. Scot. A thin stratum, as of stone, in a seam of coal. Also spelled ribb. *Fay.* e. A stringer of ore in a lode. *Fay.* f. The termination of a coal face. Where solid coal is left, the term fast rib, end or side, is used; and where the coal face ends at the gob, the term used is loose rib, end or side. *T.I.M.E.* g. A side wall in an anthracite mine. *Korson.* h. *See* buttock. *Mason.* i. A hard zone, bed, or horizon within a formation; a silicified zone in a sedimentary stratum. *Long.* j. A ridge, paralleling the long axis of a drill string member, that acts as a wear-resistant surface. *Long.* k. The hard vector plane or direction in a diamond. *See also* hard vector. *Long.* l. A ridge projecting above grade in the floor of a blasted area. *Nichols.* m. A wooden or metal tool for smoothing the outside of a vase or bowl while it is being thrown. *Dodd.*

riband agate. A variety of banded agate with especially wide bands which are plane or uniformly curved, without indentures or prominences. *See also* banded agate. *Shipley.*

rib-and-furrow. The bedding plane expression of micro cross-stratification. Originally called schrägschichtungsbögen. *Pettijohn.*

riband jasper. A variety of jasper with colors arranged in parallel bands. *C.M.D.*

rib-and-pillar. S. Staff. A system upon which the "thick coal" seam was formerly extensively mined, being a kind of pillar-and-stall plan. *Fay.*

rib and stall working. N. of Eng. A gateway with a face to one side about 6 yards in length (the stall) is advanced for up to 50 yards. Another face (the rib) is then retreated down the other side of the gateway already made. Worked by a small group of men, usually one on shift at a time, doing all operations. *Trist.*

riband stone. Eng. Sandstone in thin layers alternating in color, generally light and dark gray. A variation of ribbon. *Fay.*

ribbed. Containing bone; said of coal. *Fay.*

ribbed rolls. A crusher in which the material passes between a moving set of rolls with ribs on their surfaces parallel to the axis of the rolls. *ACSG, 1963.*

ribbed roof. A furnace roof (particularly of an open hearth steel furnace) in which some of the refractory bricks, while conforming with the smooth internal surface of the roof, project outwards to form continuous ribs across the furnace; these ribs, because they remain cool, confer strength on the roof even when it has worn thin. *Dodd.*

ribbing. a. Lanc. A strip of coal 3 yards in width. *Fay.* b. Enlarging a heading or drift. *Fay.*

ribbon. a. A mass of soft or sticky material adhering to a roll during the process of crushing. *Fay.* b. Having parallel bands or streaks; as, ribbon jasper: in this sense commonly riband. *Standard, 1964.* When the lines of contrast are on a larger scale, they are said to be banded. *Fay.* c. A continuous strip of glass in process. *ASTM C162-66.*

ribbon agate. Same as riband agate. *Shipley.*

ribbon borer. A boring tool consisting of a twisted flat steel blade. *Fay.*

ribbon brake. A friction brake having a metal strap which encircles a wheel or drum and may be drawn tightly against it. *Standard, 1964.* A band brake. *Fay.*

ribbon courses. Successive courses of roofing tiles laid to alternately greater and lesser exposures. *Dodd.*

ribbon diagram. Geologic cross section drawn in perspective and joining control points along a sinuous course. *A.G.I. Supp.*

ribboned structure. It was noticed in some parts of the ice of a glacier, an appearance which cannot be more accurately described, than by calling it a ribboned structure, formed by thin and delicate blue and bluish-white bands or strata, which appeared to traverse the ice in a vertical direction or rather which, by their apposition, formed the entire mass of the ice. The direction of these bands was parallel to the length of the glacier and, of course, being vertical, they cropped out at the surface, and wherever that surface was intersected and smoothed by superficial watercourses, their structure appeared with the beauty and sharpness of a delicately veined chalcedony. *A.G.I.*

ribbon flight screw conveyor. A screw conveyor having a ribbon flight conveyor screw. *See also* screw conveyor. *ASA MH4.1-1958.*

ribbon jasper. *See* riband jasper. *Fay.*

ribbon process. A process whereby molten glass is delivered to a forming unit in a ribbon form. *ASTM C162-66.*

ribbon quartz. Quartz, usually from veins, a cross section of which is divided by more or less parallel lines of darker material so that the quartz appears to be in narrow bands or ribbons. *Hess.*

ribbon rock. Rock with varvelike layers of alternating brown weathering dolomite, sandy dolomite, and light weathering limestone. *A.G.I. Supp. See also* ribbon. *Fay.*

ribbons. a. Term applied to wavy or banded structures that appear in certain slates, notably those in Virginia and Pennsylvania. *Bull. 630, 1965, p. 882.* b. Bands that follow the natural bedding and cross the blocks of slate at various angles. They consist of minor beds differing in composition from the main body of the slate. In some deposits the ribbons are rich in carbonaceous matter and so are darker in color than the slate between them. They may weather more rapidly than the clear slate and accordingly may not be adapted for uses that expose them to the weather. *AIME, p. 792.* c. Mica that is separated into strips or ribbons by parallel ruling planes. *Skow.*

rib boss. *See* pillar boss. *D.O.T. 1.*

rib dust. Dust found on the side walls of a mine. The dust from the roof is generally included with this sample. *Rice, George S.*

rib holes. Final holes fired in blasting around at sides of shaft or tunnel. Also called trimmers. *Pryor, 3.*

rib lines; break lines. Continuous lines along which pillars are mined. *Lewis, p. 543.*

rib lining. In rod or ball mill, replaceable ribs which project longitudinally from shell liners so as to act as lifters for crop load as mill rotates. *Pryor, 3.*

rib marks. The marks found on the surface of broken glass; they are in the form of raised arcs perpendicular to the direction in which fracture occurred. *Dodd.*

rib mesh. Expanded metal stiffened at intervals with bent steel plates. *Ham.*

rib pillar. A pillar whose length is large compared with its width. *BuMines Bull. 587, 1960, p. 2.*

rib road. Scot. A road formed along the rib side. *Fay.*

ribs. a. The lines or ridges of cut gems which distinguish the several parts of the work, both of brilliants and roses. *Hess.* b. *See* ripples. *Skow.* c. War. Grayish limestone, Lower Lias, Binton. *Compare* bearer. *Arkell.*

rib shot. A shot in the face next to a rib. *Fay.*

rib side. a. Scot. The edge of solid mineral left by a longwall working. In longwall working, if one face or wall is considerably in advance of the next it is said to have a rib side. *Fay.* b. N. of Eng. Exposed coal flanking one side of a roadway. *Trist.* c. Eng. *See* fast side. *SMRB, Paper No. 61.*

rib-side gate; rib-side road. A gate road in longwall conveyor mining with a rib of solid coal along one side. *Nelson.*

rib-side pack. A pack formed by working 5 to 10 yards of coal along a rib-side of a road and packing the waste. *See also* roadside pack; skipping. *Nelson.*

rib-sides. The sides of a heading or roadway driven in the solid coal. *See also* fast; narrow stall. *Nelson.*

rice. *See* birdseye. *C.T.D.*

rice coal. a. Anthracite coal of a small size; No. 2 Buckwheat coal. *See also* anthracite coal sizes. *Webster 3d.* b. A steam size of anthracite. *Jones.*

rice grain. A decoration formed by pressing rice or other seeds in thin, raw clay objects, then glazing and firing. The seeds are burnt to ashes in the kiln, leaving transparent designs. *C.T.D.*

rice hulls; rice husks. The waste husks from rice consist, when calcined, of about 96.5 percent SiO_2, 2.2 percent CaO, and minor amounts of other oxides. Because this composition is highly refractory, and because the porosity of the calcined material is nearly 80 percent, this waste product has been used, particularly in Italy where rice is an important crop, as a raw material for the manufacture of insulating refractories. *Dodd.*

rice husks. *See* rice hulls. *Dodd.*

rice stone. A kind of stone spotted as with rice grains. *Standard, 1964.*

Richards' pulsator classifier. A classifier operating in such a manner that the pulp grains fall through a sorting column against an upward pulsating current of water. It has no screen. *Liddell 2d, p. 392.*

Richards' pulsator jig. An outcome of the pulsator classifier, in which a pulsating column of water is used in the jig. *See also* pulsator jig. *Liddell 2d, p. 388; Fay.*

Richards' shallow-pocket hindered-settling classifier. A series of pockets through which successively weaker streams of water are directed upward. The material that can settle does so, and is drawn off through spigots. *Leddell 2d, p. 392.*

richellite. A yellow, compact or foliated mineral; possibly $4FeP_2O_8.Fe_2OF_2(OH)_2.36H_2O$; from Richelle, Belgium. *Dana 6d, p. 852.*

richetite. A very rare, strongly radioactive, monoclinic, black mineral; hydrous (?) lead uranate; found embedded among fine needles of uranophane. *Crosby, p. 37.*

rich lime. *See* fat lime. *Bennett 2d, 1962.*

Richmondian. Upper middle Cincinnatian. *A.G.I. Supp.*

richmondite. A discredited mineral term since a number of specimens have proved to be mixtures containing, in order of abundance, argentian tetrahedrite, galena, sphalerite, chalcopyrite, pyrite, and perhaps stromeyerite. *American Mineralogist, v. 32, No. 11-12, November-December 1947, p. 702.*

rich ore. Ore that is of relatively high grade or value as compared with ore of low or medium grade or value from the same general area and mined at the same time. The terms rich and poor, as applied to ores, are used with great frequency, although most indefinite and often meaningless. Under very favorable conditions it is possible to work profitably an ore of given value in one locality, while if found under other less favorable conditions at another point it might be almost worthless. *Stokes and Varnes, 1955.*

richterite. A brown, yellow, or rose-red mineral of the amphibole group with perfect cleavages, $Ca_3Na_2(Mg,Mn)_{10}Si_{16}O_{44}(OH)_4$. *Larsen, p. 171.*

ricing. N. Staff. Lagging. *See also* lacing, b. *Fay.*

rick. Penn. An open heap or pile in which coal is coked. *Fay.*

rickardite. A deep purple copper telluride, Cu_4Te_3, massive. From Vulcan and Bonanza, Colo.; Warren, Ariz.; Salvador, Brazil. *English.*

ricket; ricketing. a. Mid. A narrow brattice for ventilation. *Fay.* b. Mid. A channel formed along the floor of a mine for drainage purposes. *Fay.* c. An airway along the side of an adit or shaft. *Fay.*

rickle. Scot. A heap or pile, as of stones or peat, loosely thrown together. Same as rick. *Fay.*

Ricolite. A trade name for a rich green banded serpentine. From New Mexico. *English.*

rid. Eng. *See* redd, a. *SMRB, Paper No. 61.*

ridar. Corn. A sieve; a riddle. *Fay.*

riddam. Eng. Water, reddish with iron; also scum. *Webster 2d.*

ridding. a. N. of Eng. Separating ironstone from coal shale. *Fay.* b. Clearing away fallen stone and debris. *Zern.* c. Eng. The highest 9 feet of the Great Oolite limestones at Coombe Down quarries, Bath. *Arkell.* d. Eng. Overburden above the freestone at Ham Hill. *Arkell.*

ridding pucking. S. Wales. Cutting up or removing a crept floor. *Fay.*

riddle. a. A barrel-shaped, revolving perforated drum in which blank coins are washed and dried after passing through a bath of sulfuric acid. *Standard, 1964.* b. A coarse sieve. *Webster 3d.* The large pieces of ore and rock picked out by hand are called knockings. The riddlings remain on the riddle; the fell goes through. *Fay.* c. A sieve used to separate foundry sand or other granular materials into various particle-size grades or free such a material of undesirable foreign matter. *ASM Gloss.*

riddle cloth. A type of screening material used for the separation of large pieces of particles from the smaller ones. *Enam. Dict.*

riddlings. a. Coarse material left in a riddle after shaking; siftings. *Webster 3d.* b. In metallurgy, pieces of broken ore that do not pass through the sieve; smaller than knockings and larger than fells. *Standard, 1964.*

ride over. Ark. A squeeze that extends into the workings beyond the pillar. It is said to ride over the pillar. *Fay.*

rider. a. A steel or iron crossbeam which slides between the guides in a sinking shaft. It is carried up and down by, but is not attached to, the hoppit. Its function is to guide and steady the hoppit during its movement up and down the shaft. *Nelson.* b. A man in charge of a rope haulage underground. *Nelson.* c. A thin coal seam above a workable seam, or a seam which has no name. *Nelson.* d. The rock lying between two lodes or beds. *Fay.* e. A mass of country rock enclosed in a lode; a horse. *Fay.* f. A person who rides with the trains of cars, to handle brakes, couple cars, signal, etc., as rope rider, trip rider. *Fay.* g. Eng. A guide frame for steadying a bucket in a sinking pit. *Fay.* h. An ore deposit overlying the principal vein. *Standard, 1964.* i. N. of Eng. A ferruginous veinstone, or a similar impregnation of the walls adjacent to the vein. *Fay.* j. *See* brakeman. *D.O.T. 1.* k. Shrop. Ribs of rock within a vein. Also called rither. *Arkell.* l. Staff. A small fault. *Arkell.* m. Eng. A crush fracture in a coal seam, Northumberland and Durham. *Arkell.* n. Eng. Lumps of gypsum connected up by strings of gypsum in marl, Nottinghamshire. *Arkell.* o. Eng. Calcite, Yorkshire lead mines. *Arkell.* p. A small movable piece of platinum wire on the beam of a chemical balance. It is moved to make the final adjustment in weighing. *C.T.D.*

rider arch. One of a series of arches which support the checkerwork in a regenerator. *ASTM C162-66.*

rider bricks. Refractory bricks, which may be solid, perforated, or arched, used in the base of a regenerator chamber to form a support for the checker bricks; in a coke-oven regenerator, also known as sole-flue port bricks or nostril blocks; in a glass tank regenerator, also known as the rider arch, bearer arch, or saddle arch. *Dodd.*

ridered. Relating to the country rock of a vein when impregnated by the vein materials in strings. *Standard, 1964. See also* rider, i. *Fay.*

ride-the-tow. Scot. To slip or slide down the shaft rope. *See also* run-the-tow, b. *Fay.*

ridge. a. A relatively narrow elevation which is prominent on account of the steep angle at which it rises. It is thus narrower than an extended rise, the distinction being clear where a rise assumes in some part the character of a ridge. *A.G.I.* b. A long elevation of the deep-sea floor having steeper sides and less regular topography than a rise. *A.G.I.* c. The narrow, elongated crest of a hill or mountain; an elongated hill; a range of hills or mountains. *A.G.I.* d. The area separating adjacent pairs of ambulacral pores (in the regular echinoids). *A.G.I.* e. Som. A fault filled with fault breccia. *Arkell.*

ridge and trough. A submerged ridge and trough which form approximately parallel to beaches having an abundant supply of sand and a gently sloping bottom. They are formed by the action of plunging breakers along relatively straight shorelines. *J. Geol., v. 48, No. 5, July-Aug., 1940, pp. 476-477.*

ridged ice. Pressure ice having readily observed surface roughness in the form of a ridge or many ridges. *Hy.*

ridge fault. Two sets of step faults, each set heading in a direction away from the other. *Nelson.*

ridge fillet. A runner or principal channel for molten metal. *Standard, 1964.*

ridge roll. A curved piece for covering the ridge of a roof laid with roofing tile. *Fay.*

ridges. *See* ripples. *Skow.*

ridge-T. Used in roof tiling to indicate a trimming piece for use at the intersection of two ridges. *Fay.*

ridge terrace. A ridge built along a contour line of a slope to pond rainwater above it. *Nichols.*

ridge tile. A special fired-clay or concrete shape for use along the ridge of a pitched roof. There are a number of varieties, for example, segmental, hog's back, wind ridge, etc. *Dodd.*

Ridgeway filter. A horizontal, revolving, continuous vacuum filter. The surface is an annular ring consisting of separate trays with vacuum and compressed air attachments. The filtering surface is on the underside, the trays being dipped into the tank of pulp to form the cake, and then lifted out of it. *Liddell 2d, p. 392.*

ridging. *See* cresting. *Fay.*

riding. a. Said of mine timbering when the sets are thrust out of line, or lean. *Fay.* b. Can. Voting district. *Hoffman.*

Ridley-Scholes bath. Dense-media system used to float coal away from shale, the latter falling to the bottom of a wedge-shaped pool of separating fluid and being withdrawn by a rising belt. *Pryor, 3.*

rid up. To clean out rubbish or waste from a mine, metallurgical plant, etc. *Fay.*

rid-up runners. To clean up after a cast, as when the scrap, slag, and iron is removed from runners, troughs, and skimmers, and they are freshly clayed, loamed, or sanded. *Fay.*

riebeckite. A blue to black amphibole mineral similar in composition and occurrence to arfvedsonite, $Na_2Fe_3^{+2}Fe_2^{+3}(Si_8O_{22})(OH)_2$; monoclinic. *Dana 17; Larsen, p. 125.*

Riecke's law. Synonym for Riecke's principle. *A.G.I.*

Riecke's principle. Mineral grains that are under stress have higher solubilities, that is, they dissolve in preference to unstressed grains of the same mineral. If a given grain is not stressed homogeneously (for example, there are point contacts), the grain will dissolve at these points and recrystallize at points of lower stress. Synonym for Riecke's law. *A.G.I.*

riemannite. Synonym for allophane. *Dana 6d, p. 693.*

Riemer formula. A formula used for calculating the thickness of tubbing:

$$t = \frac{130}{H} + \frac{0.43DH}{1,600},$$

where t is the thickness of tubbing required in inches, D is the internal diameter of the shaft in feet, and H is the head of water in feet. *Sinclair, II, p. 318.*

riffle. a. From the Danish rifle, a groove or channel. In mining, the lining of the bottom of a sluice, made of blocks or slats of wood, or stones, arranged in such a manner that clinks are left between them. The whole arrangement at the bottom of the sluice is usually called the riffles. In smaller gold-saving machines, as the cradle, the slats of wood nailed across the bottom are called riffle bars, or simply riffles. *Fay.* b. A groove or indentation set in the bottom of an inclined trough or sluice, for arresting gold contained in sands or gravels. *Standard, 1964.* c. A modification of the split shovel. *Fay.* d. A device used to reduce the volume or weight of a sample consisting of a thin metal plate on which is mounted a series of metal strips to guide or deflect a small portion of the sample material into a separate container. *Compare* Jones splitter; sample splitter. *Long.* e. Sample reducing device—full name being Clark riffler—which splits a batch sample of ground ore into two equal streams as it falls across an assembly of deflecting chutes. *Pryor, 3.* f. A shallow extending across the bed of a stream over which the water flows swiftly so that the surface of the water is broken in waves; also, any expanse of shallow bottom causing broken water. *Webster 3d.* g. A small wave or succession of small waves; a ripple. *Webster 3d.*

riffle bars. Slats of wood nailed across the bottom of a cradle or other gold-washing machine for the purpose of detaining the gold. *Fay.*

riffle blocks. Cross sections of timber set on the floor of a sluice, with irregular spaces between, in which the gold settles. Also called riffle bars. *See also* riffle. *Fay.*

riffle box. A device designed to reduce a sample of coal or ore to half its original size. The box contains about 12 chutes discharging alternately to opposite sides. The width varies according to the largest particle size. The volume reduction is rapid for dry material of suitable fineness. *Nelson.*

riffleman. In metal mining, a laborer who scoops accumulated concentrates of gold from behind riffles (cleats) in sluice boxes (gold-bearing gravel is washed with water or shoveled into sluice boxes where free gold particles sink and are caught behind the riffles). *D.O.T. 1.*

riffles. a. Transverse bars in a cradle or sluice to trap heavy minerals. Riffles are also fixed on concentrating tables to catch coarse gold, tin, or other heavy mineral. Also called ripples. *Nelson.* b. Raised projections at the bottom of a mechanical shovel (duckbill), which allow material to slide on easily, but opposes sliding in the other direction. *Mason.* c. Wooden cleats in the bottom of placer sluice boxes; natural riffles are bedrock irregularities that resemble riffles. *Bateman.* d. The raised portions of the deck of a concentrating table, which serve to trap the heaviest particles. *B.S. 3552, 1962.*

rifle; rifled. a. As used by drillers, a borehole that is following or has followed a spiral or corkscrew course; also said of a drill core that has spiral grooves appearing on its outside surface. *Long.* b. A drill hole, in rock, that has become three-cornered while drilling. *Fay.* c. Applied to the three-cornered section of a hole drilled by hand. Though the bit is supposed to be turned one-eighth after each blow, to insure a circular hole, the majority of hand-drilled holes are three-cornered. *Stauffer.*

rifle bar. A cylinder with curved splines. *Nichols.*

rifled pipe. A pipe used for conveying heavy oils. The pipe is rifled with helical grooves which make a complete turn through 360° in about 10 feet of length. *Fay.*

rifle nut. A splined nut that slides back and forth on a rifle bar. *Nichols.*

rifler. York. Miners' term for a mixture of hard and soft coal. *Tomkeieff, 1954.*

rifling. a. Working coal which was left behind over the waste. *Nelson.* b. S. Staff. Working the upper portion of a coal seam over waste or goaf. *Fay.* c. The spiral grooving in the walls of a drill hole and/or on the surface of a drill core. *Long.* d. A borehole following a spiraled course. *Long.* e. Forming a spiral thread on the wall of a drill hole, which makes it difficult to pull out the bit. *Nichols.*

rift. a. A large strike-slip fault parallel to the regional structure; specifically applied to to the San Andreas rift in California. *A.G.I.* b. The intersection of a fault plane with the surface. *A.G.I.* c. A planer property whereby granitic rocks split relatively easily in a direction other than the sheeting (parallel to the surface of the earth). *A.G.I.* d. A narrow cleft or fissure in rock. *A.G.I.* e. A shallow rocky place in a stream; used in northeastern states as a synonym for riffle. *A.G.I.* f. The shallow edge of the surf; the ripling washup on the beach after a wave has broken. *A.G.I.* g. In speleology, a long, narrow opening above or between underground channels. *A.G.I.* h. A term used in slate quarrying to describe a second direction of splitting less pronounced than slaty cleavage and usually at right angles to it. *BuMines Bull. 630, 1965, p. 883.* i. A quarryman's term for the natural joints in the quarry rock. The rift is the easiest direction for splitting or excavating the rock. *See also* grain. *Nelson*. j. In sedimentary rocks, the horizontal plane of stratification, or the bed of the rock. *Stauffer*. k. An obscure foliation, either vertical (or nearly so) or horizontal, along which a rock splits more readily than in any other direction. *See also* grain, a. *Fay*. l. *See* fault trace. *Fay*. m. A crack, as in the midocean ridges. *MacCracken*.

rifter-trimmer. One who separates blocks of mica into sheets and trims sheets preparatory to processing. Also called full trimmer. *D.O.T. Supp.*

rifting. The process of splitting hand-cobbed mica into sheets of usable thicknesses. *Skow.*

rift structure. Two faults, more or less parallel, with the region between them structurally depressed. Also called trough faulting; fault trough. *Challinor.*

rift valley. A relatively long and narrow troughlike valley formed by the sinking of a strip of the earth's crust between two approximately parallel and opposed normal faults or zones of faulting. *Fay.* Also known as graben and trough fault.

rift zone. A system of fractures in the earth's crust. Often associated with extrusion of lava. *Leet.*

rig. a. A derrick complete with enginehouse and other equipment necessary for operation that is used for boring and afterwards pumping an oil well; an oil derrick. *Webster 3d.* b. A drill machine complete with auxiliary and accessory equipment needed to drill boreholes. *Long.* c. To assemble and set up a tripod, derrick, and/or drill machine and put it in order for use. Also called rig up; set up. *Long.* d. A general term denoting any machine. More specifically, the front or attachment of a revolving shovel. *Nichols.*

rigaree trail. The appilcation of threads of glass to a vessel, and the tooling of them to form close parallel ribs with the edge of a small metal wheel. *Haggar.*

rig builder. In petroleum production, one of a crew of men who erect the steel or wooden structure used to support the tools, cable, and machinery, for drilling oil or gas wells. Also called derrick builder. *D.O.T. 1.*

Rigden's apparatus. An air-permeability apparatus for the determination of the specific surface of a powder; air is forced through a bed of the powder by the pressure of oil displaced from equilibrium in a U-tube. *Dodd.*

rigged. Drill machine and equipment in place at a drill site and ready to start drilling. *Long.*

rigger. One who, with special equipment and tackle, moves and transports heavy machinery, etc. *Crispin.*

rigging. a. Process of setting up a drill and its auxiliary equipment preparatory to drilling. *Long.* b. The cables or ropes anchoring a drill derrick, mast, or tripod. *See also* guys. *Long.* c. Sometimes used as a term for derrick, mast, or tripod complete with anchor, stay ropes, and cables. *Long.* d. Can. Bidding up the price of a stock to create illusion of favorable property results. *See also* jiggle. *Hoffman.* e. The equipment or gear such as hoists, tackle, winches, chains, or rope used by riggers in their work. *Bureau of Mines Staff.* f. The engineering design, layout, and fabrication of pattern equipment for producing castings; including a study of the casting solidification program, fedding and gating, risering, skimmers, and fitting flasks. *ASM Gloss.*

rigging bar. A long, extension-type jack bar or drill column for use underground, on which a drilling machine can be mounted. *Long.*

rigging-up. *See* rigging.

right-angled block. In quarrying, a block of stone bounded by three pairs of parallel faces, all adjacent faces meeting at right angles. *Fay.*

right ascension. Arc of equator intercepted between celestial meridian which passes through the first point of Aries and the declination circle which passes through the body concerned. It is measured from west to east, in hours, minutes and seconds of sidereal time. Abbreviation is R.A. *Pryor, 3.*

right bank. That bank of a stream which is on the right when one looks in the direction in which the current flows. *Seelye, 2.*

right hand. Drill rods or threaded fittings having right-handed threads. *See also* right-handed threads. *Long.*

right-hand cutting tool. A cutter, all of whose flutes twist away in a clockwise direction when viewed from either end. *ASM Gloss.*

right-handed threads. Threaded parts that can be coupled only by turning the upper piece in a clockwise direction. *Long.*

right-hand feed screw. A diamond-drill feed screw that rotates in a clockwise direction. *Long.*

right-hand lay. Rope or strand construction in which wires or strand are laid in a helix having a right-hand pitch. *See also* lay. *Ham.*

right hand rule. *See* Fleming's rule.

right lang lay. Wire or fiber rope or cable in which the individual wires or fibers forming a strand and the strands themselves are both twisted to the right. Also called right long lay. *Long.*

right lay. Wire or fiber rope or cable in which the strands formed from a group of individual wires or fibers are twisted to the right. *Long.*

right line. A straight line; the shortest distance between two points. *Chrispin.*

right long lay. *See* right lang lay. *Long.*

right-of-way. A grant by Act of Congress, to convey water over or across the public domain, for mining purposes. *Fay.*

right regular lay. Wire or fiber rope or cable in which the wires or fibers in the strand are twisted to the left and the strands to the right. Also called regular-lay right lay. *Long.*

right running. N. of Eng. a. Applied to a vein carrying ore in beds often unproductive. *Fay.* b. Rake veins extending approximately east and west. *Fay.*

right-running lode. A lode parallel to the axis of elevation of the district. *Standard, 1964.*

right twist. Corresponds to left lay, or to a left-hand screw thread. *H&G, p. 130.*

rigid arch. A continuous arch which is fully fixed throughout. *Ham.*

rigid coupling. A rod-to-feed-screw sub or rod-to-drive-rod sub by means of which the drill rods are coupled directly to the feed screw or drive rod of the diamond-drill swivel head, and the chuck is discarded or eliminated. Also called screw-to-rod adapter. *Long.*

rigid double tube. Synonym for rigid-type double-tube core barrel. *Long.*

rigid ducts. *See* ventilation ducts. *Roberts, I, p. 225.*

rigid foam. Formed by mixing isocyanate and a polyether polyol containing a halogenated hydrocarbon agent. Mixing releases heat, causing the foam to expand as much as 30 times the original volume of the liquid. The foam, which becomes cellular and rigid within minutes, is heat resistant and essentially impervious to air and water, and has substantial binding strength. Its characteristics suggest possible uses in mining for insulation, stoppings to control ventilation, and seals to control water and to consolidate broken ground. *Encyclopaedia Britannica. Britannica Book of the Year, 1964. p. 570.*

rigid frame. A framed structure having columns and beams rigidly connected; there are no hinged joints in this type of structure. *Ham.*

rigid guides. *See* fixed guides; winding guides.

rigid hammer crusher. A machine in which size reduction is effected by elements rigidly fixed to a rotating horizontal shaft mounted in a surrounding casing. *B.S. 3552, 1962.*

rigidity. The property possessed by solid bodies whereby they offer an elastic resistance to deformation. *See also* elasticity of form. *Holmes, 1928.*

rigidity modulus. The number that expresses a material's rigidity; for example, the number of pounds per square inch necessary to cause a specified change of shape. *Leet.*

rigid pavement. A road, taxitrack, or hardstanding constructed of concrete slabs. *See also* flexible pavement. *Ham.*

rigid side framed intermediate section. An intermediate section consisting of interchangeable increments in which the carrying idlers are supported by rigid side members. *NEMA MB1-1961.*

rigid side-framed intermediate-section increment. The basic interchangeable unit of the intermediate section. Normally the the length of this increment is 5 to 16 feet, inclusive. *NEMA MB1-1961.*

rigid solution. Applied to rock glass to connote its physical state, in contradistinction to a solid solution which implies a crystalline condition. *Holmes, 1928.*

rigid-type carrying idler. Consists of three cylindrical rolls mounted in a fixed relation to one another so as to form a troughed shape. The individual rolls may be in line or the center roll may be offset. *NEMA MB1-1961.*

rigid-type core barrel. Rigid-type double-tube core barrel. *Long.*

rigid-type double-tube core barrel. A double-tube core barrel in which both the outer and inner tubes are rigidly connected to a single headpiece. *Long.*

rigid urethane foam. *See* rigid foam.

rig time. a. The hours, days, etc., a drill rig is actually in use in actual drilling and other related borehole-drilling operations. *Long.* b. Time devoted to the operator's rather than the drilling contractor's interest. *Wheeler.*

rig up. Synonym for rig. *See also* rig, c. *Long.*

rig-up time. The time required to set up and make a drill rig ready for use at the site where a borehole is to be drilled. Also called setup time; rigging time. *Long.*

rijkeboerite. A mineral, $Ba_{1-x}(Ta,Nb)_2O_6(H_2O)_x$. *Fleischer.*

riliff. Shrop. Shivery sandstone. *Arkell.*

rill. a. The coarse ore at the periphery of a pile. *Fay*. b. To so mine ore that it runs down a slope to a chute or loading level. Ore is said to be rilled to a chute when it is rolled down a slope left in mining. *Hess*. c. A very small brook; a streamlet. *Webster 3d*.

rill-cast. Probably the same as furrow flute cast. *See also* furrow flute cast. *Pettijohn*.

rill-cut stoping. *See* rill stoping, b. *Fay*.

rill-cut vertical stopes. *See* rill stoping, b. *Fay*.

rill mark. Dendritic, bifurcating-upstream, rivulet commonly found on subaerial portion of beaches, sand bars, and sand flats formed by flow of thin sheet of water. Some rill marks show a distributary pattern of down-current bifurcation. *Pettijohn*.

rill stope. Overhand stope so shaped that miners can stand on the ore they have severed, and work horizontally along the side walls of unbroken ore which confine the excavation. The stope is carried as an inverted stepped pyramid, its apex ending in a winze which leads to the tramming level, down to which ore gravitates or is moved. *Pryor, 3*.

rill stoping. a. A method of stoping, such as overhand, inclined, or pyramidal, in which the miners can rise on the pyramidal heap of broken ore. Excavation proceeds from below upwards. *Nelson*. b. Stoping in which the ore is cut back from the winzes in such a way that an inverted pyramid-shaped room is created, with its apex in a winze and its base at the level. Sometimes called pyramidal stoping; inclined cut and filling; rill-cut vertical stopes; overhand stoping in inclined floors; rill-cut stoping. *Fay*. c. Cut-and-fill stoping in which slices are inclined to the horizontal. The slope of the slices is preferably such that both ore and waste will slide to the stope; otherwise these materials must be moved by scrapers or by shoveling. *Lewis, p. 470*.

rim. U.S. a. A cliff formed by a resistant sandstone. Hence, rimmed—caught in a place from which it is difficult to escape on account of cliffs or rims; also, rimrocker—a prospector for carnotite deposits, and rimrocking—prospecting for carnotite. *Hess*. b. A narrow zone of minerals generally arranged radially around a crystal. *A.G.I. Supp*. c. The canyon wall. *Ballard*.

rim flying. A reconnaissance method in which the plane follows an outcrop along steep canyon walls, keeping where possible within 50 feet of the face of the cliff. This type of prospecting has been successful in discovering new deposits in the Colorado Plateau region. *Dobrin, p. 392*.

rimmed steel. A low-carbon steel containing sufficient iron oxide to give a continuous evolution of carbon monoxide while the ingot is solidifying, resulting in a case or rim of metal virtually free of voids. Sheet and strip products made from the ingot have very good surface quality. *ASM Gloss*.

rimming steel; rimmed steel. Steel that has not been completely deoxidized before casting. Gas is evolved during solidification and bubbles are entraped. Ingots contain blowholes but no pipe. *Compare* killed steel. *C.T.D*.

rimrock. The bedrock rising to form the boundary of a placer or gravel deposit. *Fay*.

rimstone. Suggested by Davis to designate calcareous deposits formed around the rims of overflowing basins. *A.G.I*.

rimstone bar. The rim of a rimstone pool. *Schieferdecker*.

rimstone pool. A basin formed within a rim built-up of calcite precipitated from slowly overflowing water. *Schieferdecker*.

rim texture. A texture in ores where the metasome forms a narrow rim around grains of the host mineral. *A.G.I*.

rim walking. Prospecting the canyon rim with a Geiger counter. *Ballard*.

rincon. Sp. Recess in a mountain or cliff such as would be formed by a river bend. *Sinkankas*.

rine pan. A pan in which salt water is evaporated to obtain salt. *Fay*.

ring. a. A complete circle of tubbing plates around a circular shaft. *Fay*. b. Troughs placed in shafts to catch the falling water, and so arranged as to convey it to a certain point. *Fay*. c. Newc. A gutter cut around a shaft to catch and conduct away the water. *Fay*. d. S. Staff. A circular piece of wrought iron, about 8 inches deep, placed on the top of a skip of coal to increase its capacity. *Fay*. e. *See* wedging crib. *Pryor, 3*. f. A refractory ring that floats on the molten glass in a pot to keep any scum from the gathering area within the ring. *Compare* floater, d. *Dodd*. g. The part of the mold that forms the rim of pressed glassware. *Dodd*. h. An arch of refractory bricks forming part of a furnace roof and unbonded with the adjacent arches. *Dodd*. i. A saggar without a bottom. Sometimes called a ringer. *See also* saggar. *Dodd*. j. The sound produced when two bricks are struck together or when one brick is tapped with a hard object. *A.R.I*.

ring agate. Agate with concentric rings but with less distinct color contrasts than eye agate. *Shipley*.

ring and ball test. A method for determining the softening point of bituminous materials. *Institute of Petroleum, 1961*.

ring and circle shear. A cutting or shearing machine with two rotary-disk cutters driven in unison and equipped with a circle attachment for cutting inside circles or rings from sheet metal, where it is impossible to start the cut at the edge of the sheet. One cutter shaft is inclined to the other to provide cutting clearance so that the off-fall (or outside) section remains flat and usable. *See also* circle shear. *ASM Gloss*.

ring arch. One composed of a series of straight, unbonded, rows, one brick wide. *Bureau of Mines Staff*.

ring bit. Obsolete synonym for core bit. *Long*.

ring block. A fireclay shape used as the vent hole for exhaust gases in the top of the dome of a bee-hive coke oven. *Bureau of Mines Staff*.

ring coal. a. An old name for bituminous coal. *Tomkeieff, 1954*. b. Bituminous coal as opposed to stone coal or anthracite. *Arkell*.

ring complex. *See* ring dike. *C.T.D*.

ring crib. Eng. A wedging crib upon which tubbing is placed, having a gutter or ring cast round the inner edge, to collect any water that may run down the walls of the shaft. *Fay*.

ring crusher. a. A type of hammer mill with a high-speed horizontal shaft upon which a series of steel rings are swung. *ACSG, 1963*. b. Impact mill, beater mill, or hammer mill, in which the beaters are loosely swinging rings. *Pryor, 3*. c. *See* hammermill, c. *Mitchell, p. 198*.

ring-cut. Some six holes in a ring around one central hole used to carry cavity forward. *Pryor, 3, p. 49*.

ring dike. An arcuate, rarely circular dike with steep dip. Larger ring dikes may be many miles long, hundreds or thousands of feet thick; radius of arc is generally from one to 10 miles; although some ring dikes may form a nearly complete circle or ellipse, more commonly they encompass one-fourth to three-fourths of the circle or ellipse. *A.G.I*.

ring drilling. Synonym for radical drilling. *Compare* horadiam. *Long*.

ringed out. A diamond bit in the face of which has been gouged a circular groove deeper than, and at least as wide as, the diameter of one row of the inset diamonds. *Long*.

ringed roof. A furnace roof consisting of arches of bricks unbonded with adjacent arches. *Compare* bonded roof. *Dodd*.

Ringelmann chart. A chart divided into five (nos. 0-4) shades of darkness as a means of designating the blackness of smoke emitted from industrial chimneys. The charts have been standardized and are used in the ceramic industry in compliance with the Clean Air Act of 1955 in which dark smoke is defined as equal to, or denser than, shade 2 on the Ringelmann chart. *Dodd*.

ringer. a. Derb. A hammer for driving wedges. *Fay*. b. A crowbar. *Fay*.

ringer-and-chain. Mid. *See* dog-and-chain, a. *Fay*.

ring fault. A steep ring-shaped fault, complete or incomplete. *Challinor*.

ring gage. a. Synonym for gage ring. *Long*. b. Synonym for setting ring. *Long*.

ringhole. An opening in a tank through which glass is gathered. *ASTM C-162-66*.

ring holes. The group of boreholes radially drilled from a common-center setup. *See also* horadiam; radial drilling. *Long*.

ring-induction method. An inductive method in which the primary coil and the measuring coil are concentric. *Schieferdecker*.

ringing. The audible or ultrasonic tone produced in a mechanical part by shock, and having the natural frequency or frequences of the part. The quality, amplitude, or decay rate of the tone may sometimes be used to indicate quality or soundness. *ASM Gloss*.

ringite. A hybrid igneous rock formed by the mixture of silicate and carbonatite magmas. *A.G.I. Supp*.

ring kiln; sod kiln. A limekiln made by digging a conical pit, filling it with alternate layers of limestone and fuel, and covering the top with sods. *Standard, 1964*.

ring lifter. Synonym for core lifter. *Long*.

ring-lifter case. Synonym for lifter case. *Long*.

ring main. Closed loop of piping, including provision for entry of material, circulation boost and controlled withdrawal points; used for circulating solids such as pulverized fuel, or fluids such as lime slurry, continuously without settlement or chokeup. *Pryor, 3*.

ring-mark. Ringlike ridges commonly appearing in a line, the higher side is upcurrent. Incomplete rings, forming semicircles with concavities downcurrent are common. Considered a species of saltation mark produced by fish vertebrae. *Pettijohn*.

ring mold. *See* neck mold. *Dodd*.

ring ore. Fragments of gangue covered with regular deposits of other minerals. *See also* sphere ore. *Fay*.

ring pit. A circular pit in which a large wheel is revolved for tempering clay. *Fay*.

ring riser. A riser block with openings matching those in the press bed. *ASM Gloss*.

ring-roll crusher. A type of crusher in which high-speed rolls act on the inside circumference of a vertical cylinder to powder raw material like clay. *Enam. Dict.*

ring-roll grizzly. A sturdily built grizzly for handling large pieces of ore. This type transports its material across a series of grooved rollers moved mechanically or alternatively by the sliding ore. Undersize falls through the grooves. *Pryor, 3, p. 197.*

ring-roll press. A press consisting of rolls of unequal diameter, revolving one within the other and in the same direction. *B.S. 3552, 1962.*

ring-roll process. A method for the production of blanks for plate glass manufacture. Molten glass passes between a heated ring-roll casting table, of large diameter, and a smaller forming roll. *Dodd.*

Ringrose firedamp alarm. An alarm that gives warning automatically of the presence of methane. *Cooper, pp. 220-223.*

Ringrose methane recorder. A recorder which gives a continuous record in the range of 0 to 3 percent. *Roberts, I, p. 84.*

Ringrose pocket methanometer. A small instrument that is capable of estimating methane in the range of 0 to 2 percent. *Roberts, I, p. 84.*

ring section. Narrow, peripheral section cut from a glass article for optical examination. *ASTM C162-66.*

ring-shaped occurances. In some areas altered rock has been found as a halo over an ore body and thus serves as a geologic "target" for guiding prospecting operations. The ratio between the size of the ring and the ore body must not be too large for practical purposes. Such target rings are not always obvious and will only be recognized after much painstaking work and study. *Lewis, p. 286-287.*

ring size. Particle size where the piece of ore is too large for screening. It refers to the diameter of the gage or ring which can be slipped over it. *Pryor, 4.*

ring-small. Designating stones, as for roadmaking, broken small enough to pass through a ring of specified diameter. Ring-small stones. *Webster 2d.*

ring stone. a. A voussoir showing on the face of the wall. *Webster 3d.* b. Eng. Large oolitic grains in very hard crystalline matrix, above the slates at Collyweston. *Arkell.*

ring stress. The zone of stress, higher than that pre-existing in the rock, which surrounds all development excavations, is called the ring stress. *Spalding.*

ring-stress bursts. In stoping, the ring stresses around a level, rise, or winze are so increased by the influence of an approaching stope face that at some point on the periphery the rock fails. The stress ring is broken and the rock of sides, back, and bottom released thereby expands suddenly and violently into the excavation, causing a rock burst. This rock burst is identical in type with those occurring in development. It is usually extremely local in effect, though a heavy earth tremor is caused. *Spalding, p. 68.*

ring structures. *See* sorosilicates. *A.G.I.*

ring tension. That tension which develops in the wall of a circular tank containing liquid or solid material. *See also* hooping. *Ham.*

ring test. a. In the glaze fit test, the test pieces are hollow cylindrical rings 2 inches in diameter glazed on the outside only with the glaze to be tested. The glazed ring is fired and two grooves or holes are then cut in one edge of the ring, approximately ¼ inch apart and large enough to hold glass capillary tubes ⅛ inch long and 1/32 inch in diameter; these capillaries provide sharp reference marks, the distance between which is measured with a micrometer microscope. The ring is then cut open with a diamond saw and the distance between the reference marks is again measured. Similar measurements are made on unglazed rings so that the true expansion or contraction caused by partially releasing the stress between glaze and body can be determined. If the glaze is in tension, the ring will expand when cut open; if in compression, it will contract. *Dodd.* b. In the thermal shock test, a stack of ceramic rings, each 2 inches in outside diameter and 1 inch in inside diameter and ½ inch long, are heated from the inside by a heating element and cooled from the outside by a calorimetric chamber. Both thermal conductivity and thermal-shock resistance can be evaluated. *Compare* brittle-ring test. *Dodd.* c. The practice of tapping a (grinding) wheel while freely suspended from the arbor hold, or free standing to the periphery, to determine whether the wheel is cracked. *ACSG, 1963.*

ring-type reaming shell. A reaming shell the inset reaming diamonds of which are set into a cast- or powder-metal band encircling the outside surface of the shell. *Long.*

ring-type wedge. A deflecting wedge having a short metal sleeve attached to the uppermost end. The outside diameter of the sleeve is the same as that of the lower, full-circle part of the wedge. *Long.*

ring wall. The inner firebrick wall of a blast furnace. *Standard, 1964.*

rinkite. A very rare, weakly radioactive, monoclinic, yellow-brown to straw-yellow complex silicate of Na,Ca,Ce, and Ti with small amounts of Th; formulas have been given as $Na_2O.3CaO.(Ti,Zr)O_2.3SiO_2.(RE)_2(F,OH)_2$, and as $20CaO.6(RE)_2O_3.6TiO_2.20SiO_2.11\text{-}12NaF$; found in alkalisyenite with arfvedsonite, aegirite, eudialyte, lithia mica, and steenstrupine; from Kangerdluarsuk, Greenland, and the Khibine (Kola) Peninsula, U.S.S.R. Related to rinkolite; lovchorrite. *Crosby, p. 78.* M. Fleischer states that the name can be dropped in favor of mosandrite. *American Mineralogist, v. 43, No. 7-8, July-August 1958, pp. 795-796.*

Rinman scale. A Swedish standard scale for the estimation of slag inclusions in iron and steel. This scale consists of a series of micrographs, designed to show different typical fields of view, and arranged in groups according to the form and distribution of the inclusions and numbered according to their quantity. In the practical application, the appearance of the specimen under the microscope is compared with the micrographs in the scale. *Osborne.*

rinneite. A colorless, rose, violet, or yellow anhydrous chloride of ferrous iron, potassium, and sodium, $FeCl_2.3KCl.NaCl$. Coarse, granular masses. Rhombohedral. From the salt deposits of Harz Mountains, Germany. *English.*

rinsability. The relative ease of removing a substance from a metal surface with a liquid such as water. *ASM Gloss.*

rinse tank. A tank of flowing water into which the basket of ware is immersed during the cleaning and pickling operations. *Enam. Dict.*

rinsing. In the ion-exchange (IX) cycle, applied to pregnant leach liquors, the displacement wash used after the absorption cycle, which moves pregnant liquor still in the column onto the next absorption column in the series. Term also applied to water rinse used after elution cycle, and before acid rinse. *Pryor, 3.*

rinsing waters; spray water. Water used to remove fine particles from larger sizes. *B.S. 3552, 1962.*

rio. Sp. A river or stream. *Fay.*

rionite. A bismuthiferous variety of tennantite; contains 13 percent bismuth. *Weed, 1918.*

Rio tinto process. Heap leaching of cupriferous sulfides after their slow oxidation to sulfates on prolonged atmospheric weathering. *Pryor, 3.*

rip. a. To bring down rock in a roadway to increase headroom. *See also* dint. *Fraenkel.* b. Mid. To cut or blast down the roof or top; also, to take up the floor or bottom. *Fay.* c. *See* brush. *Mason.* d. Turbulent water produced by conflicting tides or currents; generally, a vertical oscillation. *See also* overfalls. *Hy.*

riparian. Of, pertaining to, situated, or dwelling on the bank of a river or other body of water. *ASTM STP No. 148-D.* A riparian owner is one who owns the banks; a riparian right is the right to control and use water by virtue of the ownership of the bank or banks. *Seelye, 1.*

riparian rights. The rights of a person owning land containing or bordering on a watercourse or other body of water in or to its banks, bed, or waters. At the common law a person owning land bordering a nonnavigable stream owns the bed of the stream and may make reasonable use of its waters. *Webster 2d.* b. Rights of a landowner to water on or bordering his property, including right to prevent diversion or misue of upstream water. *Nichols.*

ripbit; jackbit. A detachable cutting bit, screwed or driven onto shank of drill steel used in preparing ground for blasting. *Pryor, 3. See also* detachable bit.

rip current. A strong surface current of short duration flowing seaward from the shore. It usually appears as a visible band of agitated water and is the return movement of water piled up on the shore by incoming waves and wind. *Schieferdecker.*

ripe peat. Moor peat in the advanced state of decomposition. In its ripest form it is dopplerite. *Stutzer and Noe, 1940, p. 91.*

ripidolite. A mineral of the chlorite group. Monoclinic. It is essentially a hydrated silicate of magnesium and aluminum with ferrous iron. *See also* clinochlore; prochlorite. *C.T.D.*

rippability. A measure of the ease or difficulty with which a rock or earth material can be broken by tractor-drawn rippers or rigid steel tines into pieces that can be economically moved by other equipment, usually scrapers. *Bureau of Mines Staff.*

ripper. a. Coal miner who breaks down roof of gate road to increase headroom. Also known as brusher; stoneman; repairer. *Pryor, 3.* b. An experienced miner who breaks down the roof at the ripping lip, or where the roof has sagged on a roadway due to subsidence. He is often paid on yardage of ripping performed. *Nelson.* c. A tool for removing slates, or edging them.

Standard, 1964. d. *See* brusher. *D.O.T.1.* e. An accessory that is either mounted or towed at the rear of a tractor and generally used in place of blasting as a means of loosening compacted soils and soft rocks for scraper loading. The ripper has long, angled teeth that are forced into the ground surface, ripping the earth loose to a depth of 2 feet or more. *Carson, p. 75.* f. A rooter. *Nichols, 2.*

ripper step bit. Synonym for step-face bit. *Long.*

ripping. a. A machine for cutting stone into slabs by apssing it on a bed under a gang of saws. *Standard, 1964.* b. The act of breaking, with a tractor-drawn ripper or long-angled steel tooth, compacted soils or rock into pieces small enough to be economically excavated or moved by other equipment as a scraper or dozer. *Bureau of Mines Staff.* c. The breaking down of the roof in mine roadways to increase the headroom for haulage, traffic, and ventilation. *See also* brushing, d; second rippings. *Nelson.* d. Eng. *See* canch, b. *SMRB, Paper No. 61.*

ripping bed. A machine for cutting stone into slabs by passing it on a bed under a gang of saws. *Standard, 1964.*

ripping blasting. Where coal seams are worked by the longwall method it is necessary to maintain roadways leading to the face. These roadways should be of sufficient height to permit the easy passage of men and maetrials, and this invariably means that some of the stone above the coal must be removed. This operation is known as ripping, and, unless the roof strata are very soft, blasting will be required. The main considerations in ripping blasting are to keep the sides of the roadway square, and to obtain good fragmentation of the stone so that it can be removed easily. Therefore special care must be taken in the placing of the shot holes. However, the use of efficient breaking-off bars and props will greatly assist in squaring-up the sides of the roadway and the ripping lip. *McAdam II, p. 114.*

ripping face support. A timber, or timber and steel structure, to provide support at the ripping lip. There are various types; one consists of bent corrugated steel bars behind which wooden planks are wedged; another consists of adjustable stretchers which are fitted across the roadway. *See also* horsehead; S.M.R.E. Bar. *Nelson.*

ripping lip. a. The edge of the rippings at the face of a roadway. When enlarging a roadway, the ripping lip is the end of the enlarged section and where work is proceeding. *See also* forepoling girders. *Nelson.* b. The edge of the nether roof at a gate end at the point up to which the ripping has been taken. *T.I.M.E.*

ripping scaffold. A staging or platform erected over the moving conveyor at a ripping lip of a gate road, on which the men can stand and work. This implies that the coalface and conveyor loading point are some distance ahead. *Nelson.*

rip plates. A means of repairing damaged belting. They consist of two short plates, with teeth on one side to grip the belting, which are fastened on both sides of the belting across the rip or worn place. Short bolts and nuts serve to compress and hold the plates tightly against the belting. *Jones.*

ripple. a. A groove or bar across sluices for washing gold. *See also* riffle, a. *Fay.* b. In dry process enameling, a surface defect characterized by pronounced waviness, uniform over a considerable area. *ASTM C286-65.*

ripple bedding. Bedding surface characterized by ripple marks. *Pettijohn.*

ripple board. An inclined trough having grooves or strips across its bottom to catch fine gold. A riffle. *Fay.*

ripple cross-lamination. Cross-lamination of small thickness, usually less than 2 centimeter, formed by migrating ripple mark. *Pettijohn.*

rippled. *See* dragged. *Dodd.*

ripple drift. Current bedding; or marks made on the bed of a stream from ripples on the water surface. *Standard, 1964. See also* ripple mark. *Fay.*

ripple index. The ratio of wavelength to amplitude of a ripple mark. *A.G.I.*

ripple mark. a. The wavy surface of some beds of sandstone and mudstone, produced by gentle movements in shallow water when these rocks were in a soft condition. *Fay.* b. Periodic undulations of primary origin at interface between a fluid and granular material; usually on a small scale; many varieties. *See also* sand waves, c. *Pettijohn.*

ripple-mark index. The ratio of wavelength (horizontal distance from crest to crest, or from trough to trough) to twice the amplitude (vertical distance from trough to crest). For ripple marks due to water currents, the ratio varies from 3:6, whereas for those due to air currents (wind) the ratio varies from 20:30. The index, therefore, provides a criterion of the origin of the ripple mark. *Holmes, 1928.*

ripple marks of oscillation. Ripple marks formed by oscillating movement of water such as may be found along a sea coast outside the surf zone. They are symmetrical, with sharp or slightly rounded ridges separated by more gently rounded troughs. *Leet.*

ripples. a. Small waves on the surface of a liquid for which the controlling force is not gravity, as for large waves, but surface tension. The velocity of ripples diminishes with increasing wavelength, to a minimum value which for water is 23 centimeters per second for a wavelength of 1.7 centimeters. *C.T.D.* b. *See* riffles, a. *Nelson.*

ripple scour. A shallow, linear trough with transverse ripple mark. *Pettijohn.*

ripple surface. *See* shot-sawed surface. *AIME, p. 330.*

ripple voltage. The alternating component of a substantially unidirectional voltage. *Coal Age, 1.*

rippling. *See* ripple mark. *Fay.*

riprap. a. A foundation or sustaining wall of stones thrown together without order. *Webster 3d.* b. Consists of heavy, irregular rock chunks used chiefly for river and harbor work, such as spillways at dams, shore protection, docks, and other similar construction that must resist the force of waves, tides, or strong currents. It is also used to fill in roadways and on embankments. *BuMines Bull. 630, 1965, p. 886.*

ripsawyer. In the stonework industry, one who operates a long-bladed, diamond-toothed ripsaw to cut large, rough blocks of building stone, such as marble, limestone, and sandstone, into smaller blocks preparatory to milling. Also called draw sawyer or ripsaw operator. *D.O.T. 1.*

rip tide. *See* rip current.

rise. a. A vertical or inclined shaft from a lower to an upper level. In deep-lead mining, the rise is usually divided into two compartments, namely, a manway and a gravel chute. The gravel from the working faces in the deep lead is taken by cars to the top of rise and dumped into the chute. The loading of cars in the main reef drive at the bottom of the rise is controlled by a sliding door actuated by a lever. *Engineering and Mining J., v. 139, No. 4, April 1938, p. 55.* The completed excavation is also called a raise, upraise, or riser. *See also* raise. *Fay.* b. The inclination of the strata, when looking uphill. To the rise is directly uphill in an inclined coal seam. *Fay.* c. To dig upward, as from one level to that next above; opposite of sink. *Standard, 1964.* d. A shaft excavated from below upward. *Standard, 1964.* e. Upward inclination of a coal stratum. *Standard, 1964.* f. An ascending gallery at the end of a level. *Gordon.* g. Cornish for raise. A development or drivage excavated upwards from a level drive or crosscut. *Nelson.* h. A road inclined uphill. *Mason.* i. A long, broad elevation in the sea floor with gently sloping sides. *Hy.* j. The vertical distance between a plane connecting the spring lines and the highest point of the under surface of an arch. *A.R.I.*

rise and fall. A system of reduction of levels by working out the rise or fall of staff readings from each level point to the one following it. *See also* collimation method. *Ham.*

rise doors. Scot. The entrance from a shaft into upper workings. *Fay.*

rise face. A face advancing towards the rise of the seam. *Briggs, p. 23.*

rise heading. A heading driven to the rise in a long-way workings. *See also* heading, e. *Fay.*

rise level. Scot. The upper of two parallel level roads. *Fay.*

rise of archers. The vertical distance between the level of the spring lines and the highest point of the under surface of an arch. *HW.*

rise of tide. In oceanography, the vertical distance of high-water level, at a given place, above a fixed datum (usually low water of ordinary spring tides at the place). *C.T.D.*

riser. a. A shaft excavated from below upward. *Fay. See also* raise; rise. b. No. of Eng. An upthrow fault. *Fay.* c. A passage or channel from the interior of a mold, in which the molten metal rises and by its pressure keeps the mold full as the metal in the latter contracts. *Standard, 1964.* d. In mining, a rising main. *See also* column pipe. *Fay.*

riser brick; end runner. A runner brick with a hole near one end of its upper face and (generally) a short tubular projection from this hole to lead molten steel into the bottom of an ingot mold. *See also* runner brick. *Dodd.*

rise split. Eng. The proportion of the ventilating current sent into the rise workings of a mine. *Fay.*

rise up. Som. A sudden rise in the dip of a coal seam. *Arkell.*

rise workings. Eng. Underground workings carried on the rise or high side of the shafts. *Fay.*

rising. a. An excavation carried from below upward; a rise or riser. *Standard, 1964.* b. Eng. The horizontal division of the stratum, from which the blocks of stone are lifted; Portland quarries. *Arkell.* c. The boiling in the mold of molten steel after teeming. *Standard, 1964.* d. The honeycombing of a steel casting caused by such boiling. *Standard, 1964.*

rising column. *See* rising main, a.

rising current. The direction in which a drill circulation fluid is flowing after it has passed the bit and continues toward the collar of a borehole. *Long.*

rising-head test. A soil permeability test in which the level of water in a borehole is reduced and then the rate at which the water recovers is observed. *Institution of Mining and Metallurgy. Symposium on Opencast Mining, Quarrying, and Alluvial Mining. London, 16-19 November, 1964. Paper 17, p. 5.*

rising main; delivery column. a. The length of steel piping which conveys the water from a pump to the surface or to a higher pump in the shaft. The term rising main is obsolete, delivery column being preferred. *Nelson.* b. *See* column pipe. *Fay.*

rising shaft. Excavating a shaft upwards from mine workings. *See also* rise; staple shaft. *Nelson.*

rising tide. Synonym for flood tide. *Schieferdecker.*

Riss. Third Pleistocene glaciation. *A.G.I. Supp.*

rither. Eng. The matrix in which an ore occurs. *See also* rider, i and k. *Fay.*

rittingerite. Synonym for xanthoconite. *Dana 6d, p. 136.*

Rittinger ratio. The $\sqrt{2}$ ratio used in some series of sieves, for example, Tyler sieves. *Dodd.*

Rittinger's law. The energy required for reduction in particle size of a solid is directly proportional to the increase in surface area. *See also* Kick's law. *CCD 6d, 1961.*

Rittinger table. A side-bump table with plane surface, actuated by a cam, spring, and bumping post. *Liddell 2d, p. 388.*

rivelaine. A pick with one or two points, formed of flat iron, used to undercut coal by scraping instead of striking. *Fay.*

river. A stream of water bearing the waste of the land from higher to lower ground, and as a rule to the sea. A trunk stream and all the branches that join it constitute a river system. Stream is a general term, with little relation to size. Rill, rivulet, brook, and creek apply to streams of small or moderate size. River is generally applied to a trunk stream or to the larger branches of a river system. *A.G.I.*

river agate. Pebble of mocha stone or moss agate from a stream bed. *Shipley.*

river-bar placers. a. Gravel flats and terraces laid down by rivers when flowing at higher levels than at present. The deposits are sometimes gold or tin-bearing. *See also* bench placer. *Nelson.* b. A term used in Alaska for placers on gravel flats in or adjacent to the beds of large streams. *Fay.*

river bars. Ridges or mounds of boulders, gravel, sand, and mud found along or in stream channels at places where decrease in velocity causes deposition of sediment. *Stokes and Varnes, 1955.*

river brick. Low grade, wire-cut fire-brick, made along the Ohio River. *Bureau of Mines Staff.*

river claim. A claim that includes the bed of a river. *Fay.*

river drift. The gravel deposits accumulated by a river in its torrential stages. *Fay.*

river marble. *See* landscape marble. *Fay.*

river mining. Mining or excavating beds of existing rivers after deflecting their course, or by dredging without changing the flow of water. *Fay.*

river pebble. Applied in Florida to a certain class of phosphatic pebbles, or concretions, found in rivers as distinguished from land pebble phosphate. *Fay.*

river piracy. The diverting of the waters of one stream into another by natural means. *Stokes and Varnes, 1955.*

river quartz. A name given to rounded, waterworn masses of quartz found in stream gravels. *See also* unfaced quartz. *AM, 1.*

river right. Same as creek right. *Fay.*

river run gravel. Natural gravel as found in deposits which have been subjected to the action of running water. *See also* alluvial deposits. *Nelson.*

river sand. Sand generally composed of rounded particles, and may or may not contain clay or other impurities. It is obtained from the banks and beds of rivers. *Zern, p. 145.*

river sapphire. Light-colored sapphire from Montana. *Shipley.*

riversideite. a. A white hydrous calcium silicate, $2CaSiO_3.H_2O$, fibrous veinlets and compact. Orthorhombic (?). From Crestmore, Calif. *English.* b. A discredited mineral term since it is a mixture consisting of submicroscopic intergrowths of tobermorite and wilkeite. *American Mineralogist, v. 39, No. 3-4, March-April 1954, p. 405.*

river terrace. A river terrace always consists of a plain and an accompanying escarpment. The terrace plain is approximtaely horizontal and usually slopes both with the grade of the stream and away from the riverbed which it faces. On the side toward the stream, the plain is bounded by an escarpment, the two together making the terrace; the opposite side of the plain is usually bounded by more elevated land, either an older and higher terrace or the true valley wall. *A.G.I.*

river valley. The depression made by the stream, and by the various processes which precede and accompany the development of the stream. *Webster 2d.*

river water. Part surface water and part spring water; usually contains varying amounts of solid matter in solution, and also in suspension. *Cooper, p. 360.*

rives in. Eng. To crack open or produce fissures. *Fay.*

rivet. A round bar of mild steel having a conical, cup- or pan-shaped head, which is driven while red hot into a hole through two plates of steel which have to be joined together. Aluminum, copper, and other materials are also used for rivets. *See also* holder-up; pneumatic riveter. *Ham.*

rivet catcher. An appliance attached to the pump rods of oil wells to prevent damage to the pump from the dropping of rivets from the pump rods. *Fay.*

riveter. A man who forms the head of a rivet, generally with a pneumatic rivet hammer. *Ham.*

rivet forge. A portable forge, used by boilermakers and ironworkers, for heating rivets near the work for which they are required. *Crispin.*

rivet heater. A laborer responsible for heating rivets in a portable forge and throwing them with tongs to the rivet catcher. *Ham.*

riveting. Joining of two or more members of a structure by means of metal rivets, the unheaded end being upset after the rivet is in place. *ASM Gloss.*

rivet snap. A punch having a recess in its head shaped to the form of the rivet. *See also* pneumatic riveter. *Ham.*

rivet steel. A soft kind of mild steel, used especially for making rivets. *Fay.*

rivet test. A test on the steel used for rivets, in which a bar is bent through 180°; if any cracks are formed, the steel is rejected. *Ham.*

rivet tester. A trained workman who can detect sound or loose rivets by testing them with a hammer. *Ham.*

riving seams. Open fissures between beds of rock in a quarry. *Fay.*

rizzonite. Applied to a local variety of limburgite. *Holmes, 1928.*

R.K. process. A method for converting pig iron into a product with a low carbon content, which is suitable as a substitute for steel scrap for remelting in steel furnaces. The iron tapped from the blast furnace is granulated in the molten condition. The granulated iron is fed continuously into a rotary furnace, where it is decarburized without melting, in a gas mixture containing carbon dioxide and carbon monoxide in suitable proportions. Decarburization down to very low carbon contents is possible. *Osborne.*

rms Abbreviation for root mean square; also for square root of mean square. *BuMin Style Guide, pp. 61, 62.*

RMS (root-mean-square). Square root of the mean of the sum of the squares of the distances, in microinches, above or below a mean reference line, of corresponding points on a surface. A measure of surface roughness. *Lowenheim.*

Rn Chemical symbol for radon. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

roach. Eng. a. The upper and most valuable bed of Portland stone. *Standard, 1964.* b. A rock; refuse gritty stone. *Fay.*

Roach bed. A bed of cavernous limestone found in the Portlandian; full of fossil casts. *C.T.D.*

road. a. A roadway in a mine, for example, gate road, traveling road, dummy road. *Nelson.* b. Any mine passage or tunnel. *Mason.* c. Rail track. *Mason.*

roadbed. a. The material fundamental part of a road; primarily, the foundation of gravel, road metal, etc., constituting the bed, but by extension, especially in railway use, the superstructure also. *Standard, 1964.* b. The foundation carrying the sleepers, rails, chairs, points, and crossings, etc., of a railway track. *C.T.D.*

road binders. A group of products consisting of petroleum asphalt, properly fluxed with heavy petroleum oils that will not evaporate and of such qualities that they will bind the road materials together both in summer and winter. *Fay.*

road cleaner. *See* track cleaner. *D.O.T. 1.*

road dust. Dust found on the floor of a mine entry. *Rice, George S.*

roadhead. a. The face of a roadway, usually in longwall conveyor mining. The records indicate that the roadhead is the most dangerous place in a coal mine based on accidents from falls of ground. *See also* ripping face support; S.M.R.E. bar. *Nelson.* b. Scot. In longwall, the end of a road at the working face. *See also* gate end. *Fay.*

road heater. A machine used to heat a road surface by blowing a flame or hot air upon it before remaking the surface. *See also* planer. *Ham.*

roading. Eng. Repairing and maintaining roads. *Fay.*

roadlayer. Platelayer. *Mason.*

road-making plant. Various types of specialized plant used solely for road construction, including such machines as planers, scarifiers, rollers, pavers, finishers, gritters, and mixers. *Ham.*

roadman. a. A man employed on the laying and maintenance of rail tracks underground. *See also* block layer. *Nelson.* b. A person whose duty it is to keep the roads of a mine in order. *Fay.* c. In bituminous coal mining, a general term for men working along haulageways or airways (roads). Usually designated according to job, as repairman; wasteman. *D.O.T. 1.*

road material. *See* road metal. *Fay.*

road metal. Rock suitable for surfacing either dirt or macadamized roads, and for foundations for asphalt and concrete roadways. *Sanford.*

road-mix method. A method of preparing aggregates for bituminous surfaces in which the aggregates and bitumen are combined on the surface of the road, using the penetration or mixed-in-place method. *Pit and Quarry, 53rd, sec. E, p. 70.*

road-mix surface. A surface made by mixing aggregate and asphaltic binder mechanically in place on the road, spreading uniformly coated aggregate and compacting by rolling. *API Glossary.*

road oil. a. Oil or petroleum residue intended for cold application to road surfaces. *Institute of Petroleum, 1961.* b. An asphaltic residual oil or a blend of such oil with distillates which do not volatize readily. It is used for dust laying or in the construction of various types of highways. *Shell Oil Co.* c. Nonasphaltic road oil is a nonhardening petroleum distillate or residual oil used as a dust-laying oil. It has sufficiently low viscosity to be applied without preheating. *API Glossary.*

road roller. Power-driven roller of any weight from one-half to 12 tons. *Ham.*

roadside pack. A pack built alongside a roadway. *See also* ribside pack. *Nelson.*

roadstead. A tract of water near shore with good holding ground for anchors and some protection from heavy seas. *Hy.*

roadster. Low priced model of a scraper or a truck. *Nichols.*

roadstones. Stones used for road metal. *Fay.*

road tar. A product prepared by treating coal tar in such a manner that it conforms to a specification which defines its applicability for some branch of road work. *Bennett 2d, 1962.*

roadway. a. An underground drivage. It may be a heading, gate, stall, crosscut, level, or tunnel and driven in coal, ore, rock or in the waste area. It may form part of longwall or bord-and-pillar workings or an exploration heading. A roadway is not steeply inclined. *See also* roadway support. *Nelson.* b. Aust. An underground passage, whether used for haulage purposes or for men to travel to and from their work. *Fay.*

roadway cable. An electric cable designed for use in mine roadways. It may be either rubber insulated, sheathed, and armored or paper insulated. *Nelson.*

roadway consolidation. To bind the floor dust together with water and calcium chloride flakes, or other chemical, to form a firm plastic carpet. *See also* dust consolidation. *Nelson.*

roadway support. A timber, steel, concrete, or other erection in a roadway to: (1) ensure safety by preventing falls of ground, and (2) maintain the maximum possible roadway size by resisting the tendency of the roadway to contract and distort. *See also* steel arches. *Nelson.*

roak. A seam. *C.T.D.*

roaring. A term used in California for a disease among horses in which there is partial or complete paralysis of certain muscles of the neck and throat, often a result of lead poisoning. *Fay.*

roast. To heat to a point somewhat short of fusing, with access of air, as to expel volatile matter or effect oxidation; in copper metallurgy, applied specifically to the final heating which causes self-reduction to occur by the reaction between the sulfide and the oxide. *Fay.*

roaster. a. A contrivance for roasting or a furnace for drying salt cake. *Fay.* b. A reverberatory furnace or a muffle used in roasting ore. *Standard, 1964.*

roaster slag. Slag resulting from the calcination of the white metal in the process of copper smelting. *Standard, 1964.*

roasting. a. Heating an ore to effect some chemical change that will facilitate smelting. *ASM Gloss.* b. The operation of heating sulfide ores in air to convert to oxide. Sometimes the sulfur-bearing gases produced are used to make sulfuric acid. *C.T.D.* c. Calcination, usually with oxidation. Good, dead, or sweet roasting is complete roasting, that is, carried on until surfurous and arsenious fumes cease to be given off. Kernel roasting is a process of treating poor sulfide copper ores, by roasting in lumps, whereby copper and nickel are concentrated in the interior of the lumps. *Fay.* d. The heating of solids, frequently to promote a reaction with a gaseous constituent in the furnace atmosphere. *A.R.I. See also* magnetizing roast.

roasting and reaction process. The treatment of galena in a reverberatory, by first partly roasting at a low temperature and then partly fusing the charge at a higher temperature, which causes a reaction between the lead oxide formed by roasting and the remaining sulfide, producing sulfurous acid and metallic lead. *Fay.*

roasting and reduction process. The treatment of lead ores by roasting to form lead oxide, and subsequent reducing fusion in a shaft furnace. *Fay.*

roasting cylinder. A furnace with a rotating cylinder for roasting, amalgamating, or smelting ore. *See also* Bruckner furnace. *Standard, 1964; Fay.*

roasting furnace. a. A furnace in which ore is roasted. *Fay.* b. A furnace in which finely ground ores and concentrates are roasted to eliminate sulfur; heat is provided by the burning sulfur. The essential feature is free access of air to the charge. This is done by having a shallow bed which is continually rabbled. Many types have been devised; multiple hearth is the most widely used. *C.T.D.*

roasting kiln. A kiln for roasting ore. *Fay.*

roasting oven. An oven for roasting ores. *Fay.*

roast sintering. *See* blast roasting. *C.T.D.*

roast stall. A form of roasting furnace, built in compartments or stalls open in front, with flues running up the wall at the back for the purpose of creating a draft. *Fay.*

rob. a. To extract pillars previously left for support; or, in general, to take out ore or coal from a mine with a view to immediate product, and not to subsequent working. *Fay.* Referred to as second mining. *Hudson.* b. To remove ore pillars without regard to maintaining the mine workings; usually preparatory to closing a mine. *Ballard.* c. To get coal from where it should not normally be got. *Mason.* d. To remove part of an installation for use elsewhere. *Nichols.*

robbed out. Cumb. Work away; said of a mine or part of a mine from which the pillars have been removed. *See also* hollows. *Fay.*

robber. a. In anthracite and bituminous coal mining, one who breaks down and rips out with a pick, pillars of coal left to support the roof in rooms when the usual mining was being done. Also called pillar robber. *D.O.T. 1.* b. An extra cathode or cathode extension that reduces the current density on what would otherwise be a high current-density area on the work. *ASM Gloss.*

robbery. Eng. *See* brokens. *SMRB, Paper No. 61.*

robbery lift. Eng. *See* jud, b. *SMRB, Paper No. 61.*

robbing. a. Removing timber from a mined-out stope in order to use it again elsewhere. *Stoces, v. 1, p. 282.* b. Extraction of the pillars of ore left to support workings during original stoping. *Pryor, 3.* c. Scot. Reducing the size of pillars; taking as much as possible off pillars, leaving only what is deemed sufficient to support the roof. *Fay.*

robbing an entry. *See* drawing an entry. *Zern.*

robbing pilars. a. The cutting away of coal left to support the roof after breasts have been worked out, often resulting in cave-ins. *Korson.* b. Eng. *See* brokens. *SMRB, Paper No. 61.*

robble. Eng. A fault. *Fay.*

robble coal. Staff. Miners' term for a coal seam which varies considerably in thickness or in quality in a short distance. *Tomkeieff, 1954.*

Robertson kiln. Several types of tunnel kiln were designed by H. M. Robertson but that most commonly associated with his name is a tunnel kiln for salt-glazing; the salt is introduced via fireboxes in the side walls and the fumes are extracted in the cooling zone. *Dodd.*

Robey oven. A down-draft type of pottery bottle oven. *See also* bottle oven. *Dodd.*

Robiette process. A heat treatment process carried out in a substantially closed furnace, in which a fluid fuel is burnt to partial combustion with a gas containing 70 percent or more of oxygen to produce a non-oxidizing atmosphere. The treatment is effected continuously in the furnace through which the heating gas and metal are passed in opposed directions. The fuel and gas are partially burnt at the exit end of the furnace, and passed to the cooler, entry, end of the furnace and burnt to substantially complete combustion so as to preheat metal entering the furnace. *Osborne.*

Robins-Messiter system. A stacking conveyor system in which material arrives on a conveyor belt and is fed to one or two wing conveyors. This part of the system moves so as to form a long ridge; reclaimed by raking gear which works across the ridge, moving slowly forward and shifting material loosened and blended by the rake action by means of a spiral which pushes it to a reclaiming conveyor at the side of the ridge. Used to stockpile ore, concentrates, and coal. *Pryor, 3.*

Robinson and Rodger system. A method of obtaining sound steel by fluid compression of the ingot in the mold. The molds are divided in the center, a removable packing piece being placed between the halves of the mold. The packing piece is removed when the metal has set, and the mold is placed horizontally in the press, pressure being applied to the ingot at both ends. *Osborne.*

robinsonite. A lead sulfantimonite, $7PbS.6Sb_2S_3$, triclinic, and as artificial crystals, from Nevada. *Spencer 19, M.M., 1952.*

robot loader. A pneumatic loader for inserting cartridges into drill holes. *Bureau of Mines Staff.*

Robson and Crowder process. An early oil flotation process. The oil was added to several times its weight of ore and mixed in a slowly revolving drum or tube. The process at one time had quite a large application. The process used but little water, 25 to 30 percent and no acid. *Fay.*

Roburite. Smokeless and flameless safety explosive consisting of ammonium nitrate and dinitrobenzene or dinitrochloro benzene; used in mines. *Bennett 2d, 1962.*

roca. Sp. a. Rock standing out from the general surface. *Fay.* b. Rock or stone, whether in the ordinary or geological sense. *Fay.* c. A vein or bed of hard rock and stone. *Fay.*

rocaille flux. An alternative (now less common) name for strass. *See also* strass. *Dodd.*

roch coal. *See* rough coal. *Tomkeieff, 1954.*

roche. a. Prov. Eng. Refuse gritty stone. *Standard, 1964.* b. A rock. Also spelled roach. *Standard, 1964.*

roche alum. Synonymous with Roman alum. *Bureau of Mines Staff.*

rochelime. Eng. Lime in the lump after it is burned; quicklime. *Webster 2d.*

Rochelle copper. a. A copper electrodeposit obtained from copper cyanide plating solution to which Rochelle salt (potassium sodium tartrate) has been added for grain refinement, better anode corrosion, and cathode efficiency. *ASM Gloss.* b. The solution from which a Rochelle copper electrodeposit is obtained. *ASM Gloss.*

roches moutonnées. Rounded hummocks or bosses of rocklike whales' backs, smoothed and striated by glacial action. Also called dressed rocks; sheepback rocks. *Fay.*

rock. a. Strictly, any naturally formed aggregate or mass of mineral matter, whether or not coherent, constituting an essential and appreciable part of the earth's crust. Ordinarily, any consolidated or coherent and relatively hard, naturally formed mass of mineral matter; stone. In instances, a single mineral forms a rock, as calcite, serpentine, kaolin, and a few others but the vast majority of rocks consist of two or more minerals. *Fay.* b. A local term used in New York and Pennsylvania for the more massive beds of bluestone that are not jointed and are, therefore, well-suited for structural purposes. *Fay.* c. A usually bare cliff, promontory, peak, or hill that is one mass; as, the Rock of Gibraltar. *Webster 3d.* d. Eng. A big lump of ore, Cornwall. *Webster 2d.* e. In the geological sense, any natural deposit or portion of the earth's crust whatever be its hardness or softness, but used by miners to denote sandstone. *T.I.M.E.* f. In engineering, a natural aggregate of mineral particles connected by strong and permanent cohesive forces. In igneous and metamorphic rocks, it consists of interlocking crystals; in sedimentary rocks, of closely packed mineral grains, often bound together by a natural cement. Since the terms strong and permanent are subject to different interpretations, the boundary between rock and soil is necessarily an arbitrary one. *H&G.* g. In geology, the material that forms the essential part of the earth's solid crust, and includes loose incoherent masses, such as a bed of sand, gravel, clay, or volcanic ash, as well as the very firm, hard and solid masses of granite, sandstone, limestone, etc. Most rocks are aggregates of one or more minerals but some are composed entirely of glassy matter, or of mixtures of glass and minerals. *H&G.* h. Any material which requires blasting before it can be dug by available equipment. *Nichols, 2.* i. In the Lake Superior region, crude copper ore as it comes from the mines. The concentrate obtained is called mineral, and contains about 65 percent metallic copper. *Fay.*

rockallite. A mafic alkalic granite consisting of aegirine, quartz, albite and microcline. *A.G.I.*

rock amber. Same as block amber. *Shipley.*

rock-and-rig. a. S. Staff. A sandstone full of little patches and shreds of coal. *Fay.* b. S. Staff. Fine-grained, white sandstone in the form of thin beds and veins in coal. *Arkell.*

rock asphalt. Naturally occurring, consolidated calcareous rock impregnated with bitumen exclusively by a natural process. *Institute of Petroleum, 1961.*

rock-asphalt pavement. A wearing course composed of broken or pulverized rock asphalt, with or without the addition of other bituminous materials. *Fay.*

rock associations. The association of mineral deposits with certain rock types. If mineral producing localities are considered individually, valuable generalizations often can be made, but sweeping generalizations are unreliable. *Nelson.*

rock base. Synonym for bedrock. *Long.*

rock basin. A depression or basinlike excavation in the solid rock, sometimes of great extent. Nearly all lakes, even the largest of them, are entirely surrounded by solid rock or lie in rock basins. *Fay.*

rock bind. a. Eng. A banded or nonbanded siltstone, Lancashire and North Staffordshire coalfields and South Staffordshire. *Nelson.* b. Eng. Sandy shale. *Fay.*

rock bit. a. Any one of many different types of roller bits used on rotary-type drills for drilling large-size holes in soft-to-medium-hard rocks; also sometimes applied to drag-type bits. *See also* drag bit; roller bit. *Long.* b. In mining, a detachable-type chisel or cruciform bit used on percussive drills to drill small-diameter holes in rock. *Long.*

rock bluff. A bluff consisting chiefly of rock. *Mathews, v. 2, p. 1407.*

rock body. A dump body with oak planking set inside a double steel floor. *Nichols.*

rockbolt, explosively anchored. A device developed by the U.S. Bureau of Mines to give better support in underground mining operations. It can be anchored more firmly than conventional bolts because the principle of explosive forming enables the anchor to grip the sides of the borehole along its entire length, if necessary. The key to the design is a seamless steel anchoring tube, welded to the threaded end of the bolt. Exploding a small charge inside the tube makes it expand to fit tightly in the borehole. Water, wax, or a similar buffer surrounds the charge to distribute the force of the explosion evenly and prevent it from rupturing the tube. Its use may permit mining of mineral deposits formerly considered uneconomic because of the hazards encountered in loose rock formations. *Bureau of Mines Staff.*

rockbolt; roof bolt. A bar, usually constructed of steel, which is inserted into pre-drilled holes in rock and secured for the purpose of ground control. Rockbolts are classified according to the means by which they are secured or anchored in rock. In current usage there are mainly four types, namely: expansion, wedge, grouted, and explosive. *Bureau of Mines Staff.*

rock bolting. The process of rock bolting consists of: (1) anchoring the bolt in the hold; (2) applying tension to the bolt to place the rock under compression parallel to the bolt; and (3) placing the bolts in such a pattern that they will properly support the rock structure. Rock may be supported by bolts in five ways: (1) suspension; (2) beam building; (3) reinforcement of arched opening requiring support; (4) reinforcement of an opening otherwise self-supporting; and (5) reinforcement of walls against shear and compressive action. *Lewis, pp. 61-63. See also* roof bolting.

rock bottom. a. The very bottom; the fundamental basis. *Compare* bedrock. *Mathews, v. 2, p. 1407.* b. In well-digging, a stratum of rock preventing further excavation. *Standard, 1964.*

rockbound. Aust. A reef not accompanied by gangue stuff. *Fay.*

rock-bound coast. *See* rocky coast. *Schieferdecker.*

rock breaker. a. A jaw breaker or gyratory breaker. *Nelson.* b. *See* rock splitter; sledger. *D.O.T. 1.* c. Usually applied to a class of machines, of which Blake's rock breaker is a type, and in which the rock is crushed between two jaws, both movable, or one fixed and one movable. It is common to use a rock breaker instead of hand spalling to prepare ore for further crushing in the stamp mill. *See also* rock crusher. *Fay.*

rockbridgeite. A dufrenitelike mineral, $Fe''Fe'''_4(PO_4)_3(OH)_5$, orthorhombic, isomorphous with frondelite. Named from one of the localities. From Rockbridge County, Va. *Spencer 19, M.M., 1952; Spencer 20, M.M., 1955.*

rock bump. The sudden release of the weight of the rocks over a coal seam or of enormous lateral stresses due to structural or tectonic folds and thrusts and sometimes both. A rock bump may take the form of a pressure bump or a shock bump. *Nelson.*

rock burst. a. That phenomenon which occurs when a volume of rock is strained beyond the elastic limit and the accompanying failure is of such a nature that accumulated energy is released instantaneously. *Engineering and Mining J., v. 148, Sept. 1947, p. 62.* b. The sudden yielding, sometimes with explosivelike violence, of the rock in pillars, in the bottom of shafts being sunk, in stopes or at the face of drifts being driven to develop the mine. They are not likely to occur until a depth of 1,500 to 3,000 feet below the surface is reached. *Lewis, p. 37.* c. The occurrence of the rupture of a mass of strained rock in such a manner that a large portion of the local accumulated strain energy is released in a short period of time. Types of failures vary from splitting off of small slabs of rock from a mine wall or face to the collapse of large pillars, roofs, or other massive portions of the mine structure. The conditions which influence rockbursts in mines are: (1) the area of the excavation; (2) the shortest roof span; (3) stress pattern and concentration; (4) types of rock involved; (5) directions of planes of weakness in the rock; and (6) the dip of the mineral deposit. The heaviest rock bursts are attributable to pillar failure. *Lewis, pp. 622-623.*

rock butter. A soft yellowish mixture of alum with aluminum and iron oxides; a decomposition product of aluminous rocks. *Standard, 1964.*

rock car runner. *See* car runner. *D.O.T. 1.*

rock cement. Roman cement. *See also* Roman cement. *Dodd.*

rock channeler. A machine used in quarrying for cutting an artificial seam in a mass of stone. It is made in several forms, the principal types being the bar channeler (in which the cutters are mounted on a carriage that works along a heavy bar or bars) and the track channeler. *Standard, 1964.*

rock chute. *See* chute a; rock hole. Also called slate chute. *Fay.*

rock-chute mining. *See* bord-and-pillar method. *Fay.*

rock cleavage. As originally defined, rock cleavage is any structure by virtue of which a rock has the capacity to part along certain well-defined surfaces more easily than along others. Geologists usually employ the terms for secondary structures produced by metamorphism or deformation rather than for original structures, such as bedding or flow structures. *Stokes and Varnes, 1955.*

rock coal. *See* rough coal. *Tomkeieff, 1954.*

rock cone bit. Synonym for roller bit. *Long.*

rock contractor. In anthracite coal mining, one who contracts to mine rock, as distinguished from coal, at a certain price per ton or footage of advance. *D.O.T. 1.*

rock core. The cylindrical column of rock cut out by a rotary core drill. *See also* core. *Nelson.*

rock cork. A light colored variety of asbestos. *Standard, 1964.* Also called rock leather. *Fay.*

rock cover. Thickness of consolidated rock above the roof of an opening (equivalent to cover, minus depth of weathering or of other soil). *A.G.I.*

rock crusher. a. A machine for reducing rock or ore to smaller sizes. Three principal types are the jaw crusher, the gyratory, and the hammer crusher. *See also* rock breaker, c. *Fay.* b. *See* crusher man. *D.O.T. 1.*

rock crusher foreman. In quarry industry, a foreman who assists and supervises the operations of crushing to proper size rock removed from a quarry. *D.O.T. 1.*

rock crystal. a. Transparent quartz. *ASTM C162-66.* b. Highly polished blown glassware, handcut or engraved. *ASTM C162-66.*

rock cut. A way, especially for a railroad, cut through a rock or rocky formation. *Mathews, v. 2, p. 1407.*

rock cuttings. *See* cuttings; sludge. *Long.*

rock cycle. A concept of the sequences through which earth materials may pass when subjected to geological processes. *Leet.*

rock-defended terrace (marine). Soft, coastal plain sediments undergoing marine erosion are worn back rapidly until the waves encounter a buried resistant oldland mass at the base of the cliff cut in the coastal plain sediments. The resulting terrace is said to be rock defended and resembles similar terraces along river valleys. *A.G.I.*

rock drift. a. A horizontal mine passage cut in solid rock. *A.G.I. Supp.* b. Surface creep. *A.G.I. Supp.*

rock drill. a. A machine for boring relatively short holes in rock for blasting purposes. It may be a sinker, jackhammer, drifter, or stoper. *See also* percussive drill; rotary drill. *Nelson.* b. A machine for boring in rock, either by percussion, effected by reciprocating motion, or abrasion, effected by rotary motion. Compressed air is the usual motive power, but steam, electricity, and electricity in combination with compressed air are also used. The following are common types: Burleigh, the first rock drill manufactured in the United States. A term applied by miners to any heavy two-man drill; chippy, a name applied to small piston drills; jackhammer, a name given by the manufacturer to the first self-rotating drill made in the United States; Murphy, a hollow steel hand drill; also called jap or little jap; Waugh, a stoping drill; sometimes called a stoper; also known in the Southern States as a warrior; widowmaker, a name applied to stoping drills by reason of the unhealthy effect of the dust on the miner's lungs; wiggle tail, a name applied to a stoping drill, derived from its actions when in operation; Water Leyner, a type of drill using hollow steel through which water flows to remove and allay dust. *Fay.* c. A drag or roller bit. *Long.*

rock-drill bit. *See* rock bit. *Long.*

rock-drill dust exhauster. Design to collect dust produced in percussion rock drilling, this device has an exhauster operated with compressed air from the available air system. Air laden with dust and cuttings is drawn from the boreholes through the bit holes, the hollow drill steel, the adapter, and the suction hose into a filter. The filtered air is evacuated with the spent compressed air through an exhaust port, and dust and cuttings settle in a removable storage tank. *Bests, p. 597.*

rock driller. a. In bituminous coal mining, one who works in rock or slate as distinguished from coal. Also called rock shooter; slate driller. *D.O.T. 1.* b. *See* rock splitter; jackhammer operator. *D.O.T. 1.*

rock drilling. Drilling done in any rock formation underlying the overburden. *Long.*

rock drivage. A hard heading or stone drift. *Nelson.*

rock-dump hoistman. *See* dump hoistman. *D.O.T. 1.*

rock dust. a. The general name for any kind of inert dust used in rendering coal dust inert or in filling rock-dust barriers. Equivalent to the British stone dust. *Rice, George S.* b. The dust produced in mines by blasting, drilling, shoveling, and handling rock. Rock dust in suspension varies in particle size and composition. The most dangerous dusts are silica, sericite, and asbestos; but all fine dusts are health hazards when inhaled. The smaller sizes, 10 microns and less, are more dangerous than the larger sizes. Wet drills, sprays, water infusion, and ample ventilation are employed to reduce the dust menace. *See also* dust consolidation; dust-free conditions; stone dust; stone-dust barrier. *Nelson.*

rock-dust barrier. a. A device which releases a large quantity of inert dust in the air in the path of an explosion, extinguishing the flame. *Rice, George S.* b. A series of troughs or shelves laden with rock dust and so arranged that the air waves from an explosion will trip them and fill the air with rock dust and thus quench the flame of exploding coal dust. *Grove.*

rock-dust distributor. A portable rock-dusting unit designed to overcome the laborious work of moving dusting machinery from room to room in low roof mines. The unit is mounted on skids or can be equipped with rubber wheels. Hopper, blower, motor and winch are included with the unit and the hose can be connected or disconnected rapidly by means of a quick-acting clamp. Combats coal dust explosion hazard in active work areas of coal mines. Assures that a balanced blend of slurry discharge adheres to ribs and roof of mine. *Bests, p. 374.*

rock duster. a. A machine that distributes rock dust over the interior surfaces of a coal mine by means of air from a blower or pipeline or by means of a mechanical contrivance, to prevent coal dust explosions. Also called rock dust distributor. *ASA C42.85, 1956.* b. *See* rock dust man. *D.O.T. 1.*

rock dusting. a. The dusting of underground areas with powdered limestone to dilute the coal dust in the mine atmosphere thereby reducing explosion hazards. *B.C.I.* b. A very widespread control measure used in coal mines to combat explosive dusts. By machine, inert (combustible) dust is sprayed, dry or wet, on the roof, floor, and ribs in all working places and haulageways, to reduce the explosibility of settled coal dust. The U. S. Bureau of Mines requires rock dusting to within 40 feet of the face. The incombustible content of settled dust samples after rock dusting must constitute 65 percent or more by weight, with an increase of 1 percent for each 0.1 percent methane present. A dust as nearly inert, physiologically, as possible, should be employed in rock dusting; limestone (calcium carbonate) is most widely used. *Hartman, p. 67.*

rock-dusting machine. A machine consisting essentially of a flexible hose fed by a powerful blower. It is used in forcing rock dust, usually powdered limestone, onto the floor, walls or ribs, and rooms and entries of a mine, thereby making the coal dust nonexplosive. *Bureau of Mines Staff.*

rock-dust man. In bituminous coal mining, a laborer who sprinkles rock dust, by hand or with a machine, throughout mine workings as a precaution against explosions. Also called rock duster; rock-dust sprinkler. *D.O.T. 1.*

rock-dust sprinkler. *See* rock-dust man. *D.O.T. 1.*

rock-dust testing kit. This kit is designed to prevent coal-dust explosions. It helps to determine the explosion hazard prior to rock dusting, the fineness of the rock dust as it comes from the pulverizer, and the percentage of combustible matter present in rock and coal dust mixtures after rock dusting. *Bests, p. 374.*

rock-dust zone. A section of a mine entry the ribs, roof, and floor of which have been coated with rock dust. *Rice, George S.*

rocker. a. A small digging bucket mounted on two rocker arms in which auriferous alluvial sands are agitated by oscillation, in water, to collect gold. A shortened term for rocker shovel; rocker arm shovel. *Bureau of Mines Staff.* b. Used for testing placer deposits, and for working pockets and small placer deposits. The gold-bearing gravel is placed on the screen; gold and fine sand are washed through the screen, and the stones remaining are cleaned out. A chute directs the material to the upper end of the bottom, which may be covered with small transverse riffles or canvas. Waste material passes over a tailpiece at the end of the rocker. Rockers range in length from 6 to 12 feet, and in bottom width from 14 to 20 inches, with holes in the screens from ¼ to ½ inch in diameter. The slope of the rock should be adjusted to the nature of the gravel and is commonly 1 in 12, ranging from 1 in 8 to 1 in 20. Two men with a rocker can handle from 3 to 5 cubic yards of gravel in place in 10 hours if the ground is easily rocked. *Lewis, pp. 380-381.* c. A portable sluicebox used by prospectors and fossickers in treating alluvial mineral deposits. Also called rocking cradle. *Pryor, 3.* d. A glass bottle that has a faulty, convex bottom. *Dodd.*

rocker arm. a. A lever resting on a curved base so that the position of its fulcrum moves at its angle changes. *Nichols.* b. A bell crank with the fulcrum at the bottom. *Nichols.*

rocker arm shovel. *See* rocker shovel. *Bureau of Mines Staff.*

rocker bearing. A support for a bridge which is free to rotate but cannot move horizontally unless it is carried on rollers. *Ham.*

rocker bottom. *See* rocker. *ASTM C162-66.*

rocker dump cars. Among the smaller capacity cars, the most popular and most widely used are the gravity dump types, such as rocker dump and scoop cars, designed so that the weight of the load tips the body when a locking latch is released by hand. The body of this type is balanced to right itself after the load is discharged. Rocker dump cars range in capacity from 1 cubic yard handloaded types, to units of 10 cubic yards for power shovel loading. *Pit and Quarry, 53rd, Sec. A, p. 112. See also* mine cars.

rocker shovel; rocker arm shovel. A digging and loading machine consisting of a bucket attached to a pair of semicircular runners which when rolled, lifts and dumps the bucket load into a car or other materials transport unit behind the machine. *Bureau of Mines Staff.*

rocker shovel loader. *See* mechanical mucking. *Nelson.*

rocker sieve. A miner's cradle or rocker, a cradlelike device for washing out mud from the contents of a dredge. *Mathews, v. 2, p. 1409.*

rocket jet. A jet produced in a jet propulsion system in which the fluid jet consists of high-temperature gases produced in a combustion chamber by chemical reaction of a fuel and a chemical oxidizer. *Shell Oil Co.*

rocket motor. The apparatus in which the chemical reaction of the rocket jet takes place. It includes the discharge nozzle. *Shell Oil Co.*

rocket nozzle. The flame temperature in a rocket nozzle exceeds 2,500° C; in addition, thermal shock is very severe. Special refractory materials that have been used in rocket nozzles include silicon carbide (usually with graphite additions), silicon nitride, boron nitride, beryllia, and various refractory carbides. *Dodd.*

rock excavation. In situ removal of all firm, unaltered, and unweathered surface geological materials. *Bureau of Mines Staff.*

rock fabric. *See* fabric. *Stokes and Varnes, 1955.*

rock-face brick. Brick with surface chiseled to imitate cut stone. *Fay.*

rock factor. *See* resistance to blasting. *Fraenkel.*

rock failure. Up to a certain value of stress which is known as the elastic limit, the deformation is purely elastic and the mass will return to its original shape if the stress is removed. Above this stress value the material is permanently deformed; it acquires permanent set. Finally, if the stress is still further increased, the material ruptures or fails, and the value of stress required to cause failure is known as the ultimate strength of the material. *Rice.*

rockfall. The relatively free falling of a newly detached segment of bedrock of any size from a cliff, steep slope, cave, or arch. *A.G.I.*

rock fan. a. A cross section of any one of the ravines in its middle course shows a V-shaped profile, somewhat rounded at the lower angle; but near the base of the mountain front nearly all of the ravines broaden and their floors become distinctly convex, thus imitating the form well-known in alluvial fans, though rarely matched in an eroded surface of solid rock. These convex floors will be called rock fans. *A.G.I.* b. Forms closely resembling alluvial fans but developing by erosion on bedrock. *A.G.I.*

rock fault. Eng. A replacement of a coal seam over a greater or less area by some other rock, usually sandstone. *Fay. See also* washout.

rock-fill dam. An earth dam built of any broken rock or similar material which may be available. *Ham.*

rock filling. a. Waste rock, used to fill up worked-out stopes to support the roof. *Weed, 1922.* b. *See* overhand stoping, b. *Fay.*

rock flour. Very finely powdered rock material formed by the grinding up of rocks beneath a glacier, deposited as part of the till, and not washed or blown away and deposited elsewhere as stratified drift or loess. Also called glacier meal; rock meal. *Fay. See also* silt. *ASCE P1826.*

rock flow. a. The movement of solid rock when it is in a plastic state. *Leet.* b. The term given to a slope failure when there is a general breakdown of the rock mass. When such a rock mass is subjected to shear stresses sufficient to break down the cement or to cause crushing of the angularities and points of the rock blocks, the blocks will move as individuals and the mass will flow down the slope, or will slump into a more stable slope position. *Woodruff, v. 3, p. 539.*

rock formation. A part of the lithosphere that is more or less distinct (lithologically or structurally and hence, genetically) from other parts. To a considerable extent, a formation is an arbitrary unit. *A.G.I.*

rock forming. Refers to minerals occurring in ordinary rocks as opposed to minerals occurring only in veins, ore deposits, etc. *A.G.I. Supp.*

rock-forming mineral. A mineral that is common and abundant in the earth's crust; one making up large masses of rock. Authorities do not agree on any specific number but from 20 to 30 minerals are usually considered as being the most important. *Stokes and Varnes, 1955.*

rock foundation. A foundation which is carried down to the solid rock. The rock is cut and dressed level, loose and decayed portions are removed and holes filled with concrete. The crushing strength of the rock can be ascertained by tests and the bearing pressure should not exceed one-eighth of the value. *Nelson.*

rock fracture. When rock is broken by crushing or impact, the resulting fragments can be divided into two components: (1) the complement, comprising a wide-size distribution in accordance with a probability law, and (2) the residue of large incompletely broken pieces. The relative proportions of compliment and residue depend upon the mode of fracture. If the rock is completely crushed, only complement is formed, but if the rock is fractured by the impact of a point or wedge there may be more residue than complement. *Roberts, I. pp. 111-112.*

rock froth. Fused lava so inflated with gas bubbles or steam bubbles as to be foamy. When hardened it becomes vesicular or scoriaceous lava. *Standard, 1964.*

rock gas. Same as natural gas. *Fay.*

rock glacier. a. A tonguelike body of angular boulders, resembling a small glacier, generally occurring at high altitudes in rugged terrain. *A.G.I.* b. (Rock) streams in which the interstices between the pieces of rock are filled with ice. *A.G.I.* c. A glacierlike tongue of angular rock waste usually heading in cirques or other steep-walled amphitheaters and in many cases grading into true glaciers. *See also* talus glaciers; rock stream; rock river. *A.G.I.*

rock glass. Obsidian. *Shipley.*

rock gypsum. Massive coarsely crystalline to fine-grained gypsum. *Webster 3d.*

rock handler. *See* slate handler. *D.O.T. 1.*

rock hardness. The resistance of the rock to the intrusion of a foreign body. *Stoces, v. 1, p. 103.*

rockhead. a. The boundary between superficial deposits (or drift) and the underlying solid rock. *B.S. 3618, 1964, sec. 5.* b. Another name for bedrock. *Nelson.* c. Scot. In boring or sinking, the top of hard strata next to the surface. *Fay.* d. Ches. The uppermost stratum of the rock salt beds. *Fay.*

rock hoistman. *See* dump hoistman. *D.O.T. 1.*

rock hole. A short staple shaft driven from a lower to a higher coal seam and used for the gravity transfer of coal to the haulage road in the lower seam. *See also* roofing hole. *Nelson.* Also called rock chute. *Pryor, 3.*

rock hound. Same as rock sharp. *Mathews, v. 2, p. 1407.*

rock house. In the Lake Superior region, the building (usually the one over the shaft) where copper-bearing rock from the mine is dumped from the ore skip (or bucket) and is screened, crushed, and stored in a bin, ready for shipment to the mill. *Weed, 1922.*

rocking. a. The process of separating ores by washing on an incline trough. *See also* rocker. *Fay.* b. Pushing a resistant object repeatedly, and backing or rolling back between pushes to allow it to reach or cross its original position. *Nichols.*

rocking beam. *See* walking beam, a. *B.S. 3618, 1963, sec. 3.*

rocking bob. *See* bob. *Fay.*

rocking cradle. Short sluice, hand-oscillated; used in gold prospecting and fossicking. *Pryor. See also* rocker. *Pryor, 3.*

Rockingham ware. The term originally referred to the ornate porcelain made at a pottery at Swinton, Yorkshire, England. Ware with a brown manganese glaze was also produced and it is this type of glaze, which in the United Kingdom, is usually applied to teapots made from red clay, to which the term Rockingham ware now refers. In the United States, Rockingham ware was made at Bennington, Vermont. *Dodd.*

rocking lever. a. A beam to give the reciprocal motion in hand boring. *See also* spring pole. *Nelson.* b. Eng. A brakestaff. *Fay.*

rocking shear. A type of guillotine shear that utilizes a curved blade to shear sheet metal progressively from side to side by a rocker motion. *ASM Gloss.*

rocking stone. An often large stone so balanced upon its foundation that it can be rocked or slightly moved with but little force. *Webster 3d.* In some cases, it is left in this position by the weathering away of the softer material. *Webster 2d.* Also called loggan stone. *Fay.*

rocking stretcher. *See* Eve method. *McAdam, p. 88.*

rock in place. *See* in situ. *Fay.*

rock leather. Synonym for mountain leather. *Fay.*

rock loader. a. Any device or machine used specifically for loading slate or rock inside a mine. However, it is most frequently used with scraper loaders equipped for handling rock. *Jones.* b. In bituminous coal mining, one who loads rock, as distinguished from coal, into cars. Also called rock-loader operator. *D.O.T. 1.* c. *See* box loader. *D.O.T. 1.*

rock-loader operator. *See* rock loader, b. *D.O.T. 1.*

rock making. Synonym for rock forming. *A.G.I. Supp.*

rockman. In bituminous coal mining, a foreman who is in charge of the drilling of holes in rock or slate and the charging and tamping of explosives in the holes drilled by miners prior to blasting. *D.O.T. 1. See also* brusher; quarryman, a; slateman.

rockman helper. *See* slate-shooter helper. *D.O.T. 1.*

rock mantle. Synonym for regolith; rock waste. *A.G.I.*

Rockmaster. Trademark for a controlled system of blasting rock which produces pieces of convenient size with less disturbance. *Bennett 2d, 1962 Add.*

rock meal. a. A fine flourlike earth composed of shells of infusoria. *Fay.* b. A white, powdery variety of calcite, occurring as an efflorescence. *Fay. See also* rock flour; rock milk. *Fay.*

rock mechanics. An attempt at a mathematical analysis of the forces acting along the joints and bedding planes of natural rock in situ. *Nelson.*

rock melt. A liquid solution of rock-forming mineral ions. *Leet.*

rockmen. The slate-getters in slate mines, in which rock means the slate deposit. *Nelson.*

rock metal. Another name for rock milk. *Bureau of Mines Staff.*

rock milk. Soft pulverulent forms of calcite found in caves, or as an efflorescence. *Fay.*

rock miner. In anthracite and bituminous coal mining, a miner who works in rock as distinguished from coal. *D.O.T. 1.*

rock navvy. A cranelike loading machine used at opencast pits and quarries. *See also* power shovel. *Nelson.*

rock oil. Synonym for petroleum. *Fay.*

rock out. To separate (gold) from auriferous gravel by means of a rocker. *Mathews, v. 2, p. 1409.*

rock passer. *See* mucker, g. *D.O.T. 1.*

rock pediment. a. In some cases, the sloping margin of an intermontane basin is what it appears to be, namely, an assemblage of deep alluvial fans. In other cases, the fans are superficial forming a relatively thin covering on a sloping surface or pediment of solid rock. *A.G.I.* b. A flat zone of bedrock one to several miles in width at the base of many mountains and especially in arid regions, only slightly veneered with alluvium and which slopes away to the adjacent basins. Synonym for rock plane; conoplain. *A.G.I.*

rock pendant. A blade projecting down from the roof. *Schieferdecker.*

rock phosphate. Phosphatic limestones and guano, formed as result of seabird droppings; of random chemical composition. *Pryor, 3.*

rock picker. *See* slate picker, a. *D.O.T. 1.*

rock plane. *See* rock pediment. *A.G.I. Supp.*

rock pressure. a. In petroleum geology, the pressure under which fluids, such as water, oil, and gas, are confined in rocks. No particular cause or origin of the pressure is implied. Geophysicists and isostasists, however, have used, and are using, the term rock pressure in the primitive and more correct sense of the pressure exerted on underlying rocks by superincumbent strata. In order to avoid confusion it is desirable to substitute for the term rock pressure as now used in oil, gas, and underground water technology, the more appropriate term reservoir pressure. *Stokes and Varnes, 1955.* b. The compressive stress within the solid body of underground geologic materials. *Stokes and Varnes, 1955.* c. The pressure exerted by surrounding solids upon the supports of underground openings, including that due to the weight of the overlying material, residual unrelieved stresses, and pressures associated with swelling clays. *Stokes and Varnes, 1955.* d. Synonym for ground pressure. *Long.*

rock pressure burst. A sudden and violent failure of rock masses under stresses exceeding the elastic strength of the rock. The classification and nomenclature of these occurrences are not clear and are based largely on effects and not on the basic causation factor. *See also* pressure bump; rock bump; rock burst. *Nelson.*

rock pulverizer. A rock breaker; stone crusher. *Standard, 1964.*

rock quartz. The ordinary crystallized varieties of quartz, as Brazilian pebbles. Called also rock crystal. *Standard, 1964.*

rock rake. A heavy duty rake blade. *Nichols.*

rock riders. a. During the formation of a washout, the vegetable material may slip towards the erosion channel and the fissures so formed are filled with sandy sediment giving rise to wall-like masses of rock or rock riders within the seam. *Nelson.* b. A mass of rock overlying or enclosed in a (coal) seam. Usually somewhat continuous or repetitious in occurrence parallel with the seam. *Bureau of Mines Staff.*

Rockrite tube-reducing process. *See* tube reducing. *ASM Gloss.*

rock river. *See* rock glacier. *A.G.I.*

rock rolls. Inverted ridges of rock, usually sandstone, extending from the overlying strata into a coal seam; caused by localized streams active during the formation of the coal. *Nelson.*

rock rubble. Same as fault rock. *Standard, 1964.*

rock ruby. A fine red variety of garnet. *Webster 2d.*

rock salt. Common salt, NaCl, occurring naturally. Mohs' hardness 2.5; specific gravity 2.1 to 2.5. Some 35 percent of the annual output is made into soda-ash, soap, glass and chemicals. Other important uses are paper pulp, rayon, bauxite, hydrochloric acid, chlorination, ceramics, fertilizers and tanning industries. *See also* halite. *Pryor, 3.*

rock sediment. The combined cuttings and residue from drilling and sedimentary rocks and formations, commonly known as sand pumpings. *Williams.*

rock series. An assemblage of igneous rock types in a single district and belonging to a single period of igneous activity, characterized by a certain community of characters, chemical, mineral, and sometimes even textural. Not to be confused with series in the stratigraphic sense. *Stokes and Varnes, 1955. See also* igneous rock series.

rockshaft. A shaft made for sending down rock for filling the stopes, etc., generally kept nearly full, the rock being trammed away as needed. *Standard, 1964.*

rock sharp. A mineral expert. *Mathews, v. 2, p. 1407.*

rock shooter. *See* rock driller. *D.O.T. 1.*

rock shovel. A machine for loading broken rock. *See also* shovel loader. *Nelson.*

rock silk. A silky variety of asbestos. *Fay.*

rockslide. The downward and usually rapid movement of newly detached segments of the bedrock sliding on bedding, joint, or fault surfaces or any other plane of separation. Also, the rock mass that has attained its present condition by such a movement. *Stokes and Varnes, 1955.*

rock slip. A downward movement of hard rock and soil in valleys where the strata possess a dip in the same direction as the slope of the hill of which they form a part. Slippage usually occurs along bedding or cleavage planes. Heavy rain, or excavations at the base, may initiate the movement. *See also* landslide. *Nelson.*

rock slope. A slope driven through rock strata. *Fay, p. 625.*

rock soap. A pitch-black or bluish-black aluminum silicate, greasy to the touch, and which crumbles in water; used as a filler and for crayons. Also called mountain soap. *Standard, 1964.* Synonym for montmorillonite; saponite; oropion.

rock spar. Material filling fracture cleavages in coal, consisting of nonclay mineral matter, probably deposited from solution, and sand. *A.G.I. Supp.*

rock specimen. A representative sample of a larger rock mass. *BuMines Bull. 587, 1960, p. 2.*

rock splitter. In the stonework industry, one who splits large blocks of building granite, marble, and sandstone into slabs or smaller blocks, by drilling holes into the stone and then driving wedges into them until the stone breaks along the line of drilled holes. Also called rock breaker; rock driller. *D.O.T. 1. See also* quarryman. *D.O.T. 1.*

rock stream. Regarded as a landslide of special character, a rock mass which was completely broken up in falling and whose debris acquired a momentum so great that it became a rapidly flowing body and descended in a streamlike form far beyond the normal limit of a landslide mass. *See also* rock glacier. *A.G.I.*

rock stress. The problem of determining the stresses which exist in the earth's crust has long been of interest to engineers and geologists. Many mining problems are directly concerned with stresses which may cause mine openings to collapse. Two phases of occurrence of rock stresses are important: (1) the stresses existing in the rock before the excavation of the mine openings, that is, the free field stress, and (2) the indirect stresses caused by the mine openings. *See also* free field stress. *Lewis, p. 611.*

rock surface. Means an exposed surface of rock, whether or not this surface is structurally significant. *See also* surface. *Challinor.*

rock tar. Crude petroleum. *Standard, 1964.*

rock temperature. a. The formational temperature at depth. The rate of increase of temperature with depth is highly variable over the earth, but averages 1° F per 100 feet of depth. *Long.* b. The temperature of the rock in a mine can be measured by enclosing a maximum recording thermometer within a metal tube of proper diameter for placing in a drill hole. The tube is left in the borehole for 3 or 4 hours until the thermometer has reached the temperature of the rock. The tube is then removed and the thermometer reading noted. Another method is to fill an insulated tube with water only. After the tube is removed from the drill hole, the temperature of the water is quickly read with an accurate thermometer of small size. *Lewis, p. 703.*

rock-tram engineer. In anthracite coal mining, one who operates an aerial tram for hauling rock, slate, and refuse from surface of mine to dump. *D.O.T. 1.*

rock tunnel. A tunnel, drift, or crosscut driven through rock, usually connecting one coalbed with another; also through barren rock in metal mines. *Fay.*

rock turquoise. A matrix of turquoise with small grains of turquoise embedded in it. *Fay.*

rock type. The megascopically recognizable ingredients of the coal rock, that is, vitrain, clarain, durain, fusain; being names explicitly applied to visible portions of the bituminous coal rock and applicable only to hand specimens. *A.G.I.*

rock vein. A quartz vein containing gold deposits. *Mathews, v. 2, p. 1407.*

rock waste. a. Material making up a talus or scree. *A.G.I.* b. Fragments of bedrock produced by weathering. *Mather.*

rock weight. S. Afr. One ton of rock in place equals about 12 cubic feet. Horizontally, therefore, the weight of an ore reserve covering a claim over a stoping width of 3 feet is $\frac{64,000 \times 3 \text{ tons}}{12}$, or 16,000 tons at 100 percent payability. In case the reef dips downward, the resulting amount must be divided by the cosine of the angle of dip. *Beerman.*

Rockwell. A unit of hardness as determined by a Rockwell hardness tester. *See also* Rockwell hardness. *Compare* Knoop hardness. *Long.*

Rockwell hardness. A measurement of metal hardness which interprets resistance to penetration by indentation. *Bureau of Mines Staff.*

Rockwell hardness test. A method of determining the relative hardness of metals and case-hardened materials. The depth of penetration of a steel ball (for softer metals) or of a conical diamond point (for harder metals) is measured. *See also* scleroscope hardness test. *Nelson.*

Rockwell hardness tester. A machine for testing the indentation hardness of materials by means of a diamond point. *See also* Brinell hardness tester. *ACSG, 1963.*

Rockwell machine. Trade name for an apparatus that measures the hardness of metals and alloys, in which a diamond-pointed cone is pressed under a specific load into the metal. The relative resistance to penetration (Rockwell hardness) is indicated by a number (Rockwell number) on a dial. The operation is called a Rockwell test. *Long.*

Rockwell test. *See* Rockwell machine. *Long.*

Rockwell tester. Synonym for Rockwell machine. *Long.*

Rockwood. a. A brown, compact variety of asbestos, resembling fossil wood. *Standard, 1964.* Synonym for mountain wood. *Fay.* b. A locality in Tennessee where sedimentary iron ore is mined, therefore, a name for a type of ore. *A.G.I.*

rock wool. A fibrous insulating material produced by blowing steam or hot air through a molden mass of rock, such as argillaceous limestone. According to the U. S. Bureau of Standards, rock wool is the most efficient fireproof, chemically stable insulator known today. *Compare* mineral wool, slag wool, and glass wool. *CCD, 3d, 1942, p. 442.*

rocky coast; rock-bound coast. A coast consisting of rocks. *Schieferdecker.*

Rocky Mountain ruby. Garnet. *Shipley.*

rod. a. A bar, the end of which is slotted, tapered, or screwed for the attachment of a drill bit. *B.S. 3618, 1964, sec. 6.* b. Guide; cage conductor. *Mason.* c. *See* drill rod. *Long.* d. A unit of brickwork, 306 cubic feet (11½ cubic yards) containing about 4,500 bricks. *Pryor, 3.*

rod adapter. Synonym for sub. *Long.*

rod bit. A noncoring bit designed to fit a reaming shell that is threaded to couple directly to a drill rod, thus eliminating the core barrel in blasthole drilling, designated as 1¼ XRT, 1½ E, 1⅞ A, $2\frac{5}{16}$ B, and $2\frac{15}{16}$ N. Also called blasthole bit. *Long.*

rod clamp. *See* safety clamp. *Long.*

rod clearance. *See* clearance. *Long.*

rod coupling. a. Name for a double-pin-thread coupling used to connect two drill rods together. *Long.* b. A clasp or other device for uniting the rods that carry the tools used in boring artesian wells, oil wells, etc. *Fay.*

rod cover; rod sleeve. A cylindrical fireclay shape having an axial hole and terminating in a spigot at one end and a socket at the other. These refractory sleeves are used to protect the metal stopper-rod in a steel-casting ladle. (In the United Kingdom, six sizes of rod cover are standardized in B.S. 2496; in the United States, three qualities are specified in ASTM-C435. *Dodd.*

rodding. a. Cleaning and descaling of piping by means of scrapers attached to series of jointed rods. *Pryor, 3.* b. Eng. The operation of fixing or repairing wooden cage guides in shafts. *Fay.*

rodding structure. Structure characterized by the development of small parallel rods of quartz generally oriented parallel to the fold axes of the containing highly deformed rocks. *A.G.I. Supp.*

rodding up. The act of coupling and lowering a drill string into a borehole. *Long.*

rod dope. Grease or other material used to protect or lubricate drill rods. Also called gunk; rod grease. *Long.*

rod drag. The rubbing of the rods or drill string on the sidewalls of the borehole. Also called rod friction. *Long.*

rod drop. The distance of slump or sag in a long string of rods when released from the drill chuck. *Long.*

rod elevator. Synonym for elevator; elevator plug. *See also* elevator, i; elevator plug. *Long.*

rod float. A wooden rod with a weight at its lower end and designed to float vertically with most of its length submerged, for the purpose of measuring the average velocity of flow of a stream or river. *Ham.*

rod friction. a. The drag created in the flow of the drilling liquid by contact and constrictional effects created by the inside surface of the drill rods and couplings. *Compare* skin friction; wall friction, a and b. *Long.* b. Synonym for rod drag. *Long.*

rod grease. Synonym for rod dope. *Long.*

rod guide. a. An appliance attached to the drilling rod in oil wells that serves to prevent the rod from oscillating or knocking against the sides of the borehole. *Fay.* b. A swelled coupling and/or other mechanical device for centering the drill rod string in a borehole. *Long.*

rod gun. Synonym for rod puller. *Long.*

rodingite. A coarse-grained, gabbrolike rock associated with dunite, containing diallage and grossularite. Altered varieties containing prehnite and/or serpentine are recognized. *Holmes, 1928.*

Rodio-Dehottay process. A method of shaft sinking by the freezing method. It is based on the direct cooling effect of expanding highly compressed carbon dioxide in the freezing pipes. *See also* Koch freezing process. *Nelson.*

rod iron. Iron made in the form of round iron rods for commercial use. *Standard, 1964.*

rodite. A brecciated achondritic meteorite composed of bronzite and olivine with small amounts of oligoclase and iron, rich in nickel. *Holmes, 1928.*

rodman. a. One who uses or carries a surveyor's leveling rod. Also called rodsman.

Standard, 1964. b. A staffman. *C.T.D.* c. *See* chainman. *D.O.T. 1.*

rod mill. a. A mill for rolling rod. *ASM Gloss.* b. A mill for fine grinding, somewhat similar to a ball mill, but employing long steel rods instead of balls to effect the grinding. *ASM Gloss.*

rod millman. One who grinds clinker, phosphate rock, or ore in a revolving cylinder partially filled with round steel rods; also, he tests a product for fineness by observing how much material is left on sieve of determined mesh, and regulates amount of material entering the mill accordingly. *D.O.T. 1.*

rodney. Eng. A rude platform near the shaft's mouth for a night fire. *Fay.*

rodometer. An instrument devised by Prof. Cady of Wesleyan University to find the hand and piezoelectric axes of quartz by focusing a beam of light upon an etched Z or other section. *AM,1.*

rod plug. Synonym for elevator plug. *Long.*

rod proof. A test specimen taken from the melt on an iron rod. *ASTM C162-66.*

rod puller. Various mechanisms, essentially a double-acting air-actuated piston equipped with a rod-gripping device, commonly used to pull drill rods from a borehole in underground workings where a small drill without a hoist is used. *Long.*

rod pulling. The removal of the drilling rods from a borehole. *Long.*

rod pulls. a. The number of borehole round trips made in a unit of time. *Long.* b. The number of lengths of drill rod (two or more standard 10-foot lengths coupled together and handled and stacked as unit lengths) needed to reach the bottom of the borehole. *Long.*

rod reaming shell. A reaming shell designed to be coupled directly to a drill rod. *See also* rod bit. *Long.*

rod reducing bushing. A pin-to-box sub used to connect one size rod in a string to a larger or smaller size. *Long.*

rod reducing coupling. A pin-to-pin sub used to connect one size rod to a larger or smaller size. *See also* sub. *Long.*

rods. a. Eng. Vertical or inclined timbers for actuating pumps. *Fay.* b. Long bars of Swedish iron of the toughest quality, for boring through rocks, etc. *Fay.* c. *See* cage guides, a. *Fay.*

rod sag. The bending of a long drill string due solely to its own weight. Also called rod slack. *Long.*

rod shaft. The mine shaft containing the pump rods. *Fay.*

rod shell. Synonym for rod reaming shell. *Long.*

rod slack. *See* rod sag. *Long.*

rod slap. The impact of drill rods with the sides of a borehole, occurring when the rods are rotating. *Long.*

rod slide. A wooden guide running from above the swivel head to a few feet below the sheave of the tripod. Used to aline drill rods when drilling an angle borehole. *Long.*

rod snap. A sudden acceleration in rotational speed of the rods followed immediately by a sudden return to the former speed. *Long.*

rod spear. A long, tapered, four-sided fishing tool. Used to remove a lost drill rod or other tubular piece of drill equipment from a borehole. *Long.*

rod stabilizer. Synonym for rod guide. *Long.*

rod stand. a. The length of drill rod handled and stacked in the tripod or derrick as a unit piece during round trips. *See also* double; treble. *Long.* b. *See* off-take. *B.S. 3618, 1963, sec. 3.*

rod stock. Round steel rod. *Nichols.*

rod string. The drill rods coupled to form the connecting link between the core barrel and bit in the borehole and the drill machine at the collar of the borehole. *Long.*

rod stuffing box. An annular packing gland fitting between the drill rod and the casing at the borehole collar. It allows the rod to rotate freely but prevents the escape of gas or liquid under pressure. Especially utilized when drilling with counterflow; when drilling in an area where a high hydrostatic pressure or flow of water may be encountered, as in drilling a cover or pilot hole; or when drilling up holes from an underground drill site. *Long.*

rod tools. a. Those used in rod drilling. *See also* cable tools. *Pryor, 3.* b. *See* pole tools. *Fay.*

rod up. To couple and lower an assembled drill string into a borehole. *Long.*

rod vibration. The eccentric and oscillatory movements of the drill string while being rotated in a borehole. *Compare* rod slap. *Long.*

rod wax. A light yellow, pasty mass consisting of an emulsion of high-boiling oils with solid hydrocarbons; it collects in considerable quantities around the rods and casing in some of the Pennsylvania wells. *Fay.*

rod whip. *See* rod slap; rod vibration. *Long.*

rod wicking. The soft twisted cotton string used as a packing material to seal the joints of drill rods (when coupled) against leakage of drilling fluid. *See also* wick; wicking. *Long.*

rod wiper. An annular rubber disk for wiping mud from rods as they are pulled from the borehole. *Long.*

roeblingite. A white, basic hydrous silicate and sulfate of lead and calcium, $2PbSO_4.(Ca,Mn,Sr)_7H_{10}(SiO_4)_6$. Compact, fibrous. Orthorhombic (?). Analogous to hauynite. From Franklin, N.J.; Langban, Sweden. English.

roemerite; römerite. A rust brown to yellow hydrated sulfate of ferrous and ferric iron, $[Fe''Fe'''_2(SO_4)_4.14H_2O]$; hardness 3 to 3.5; specific gravity 2.15±. *Dana 7d, v. 2, pp. 520-521.*

roentgen. The quantity of X-ray or gamma-ray radiation, such that the associated corpuscular emission per 0.001293 grams of air produces, in air, ions carrying one electrostatic unit of charge of electricity of either sign. *ASM Gloss.*

roentgen equivalent man. A unit of absorbed radiation dose in biological matter. It is equal to the absorbed dose in rads multiplied by the relative biological effectiveness of the radiation. *Abbreviation, rem. L&L.*

roentgen equivalent physical. An obsolete unit of radiation dosage, superseded by the rad. *Abbreviation, rep. L&L.*

roentgenogram; roentgenograph; radiograph. A photograph made with X-rays. *Webster 3d.*

roentgenograph. *See* roentgenogram. *Webster 3d.*

Roesing lead pump. An automatic apparatus for discharging lead from the kettle; used in the Parkes process. *Fay.*

Roesing wires. Wires suspended in a dust chamber to assist in settling and condensing dust and fumes from furnace gases. *Fay.*

Roesler process. A process for separating copper, and in part silver, from gold by fusing with sulfur or with antimony sulfide, obtaining copper or silver sulfide. *Fay.*

roestone. A fine-grained oölite resembling the roe of a fish. *Fay.*

RO fusion-cast refractory. A fusion-cast refractory made in an inclined mold designed to concentrate the shrinkage cavity in one corner of the block; such blocks are made in France. (RO = retassure orientée, that is, oriented cavity). *Dodd.*

rogenstein. Ger. Oolite in which the spherules are united by argillaceous cement. Also spelled roggenstein. *Standard, 1964.*

roggan. A rocking stone. *Fay.*

roggenstein. Ger. Oölite or roestone. *Holmes, 1928.*

rogueite. A local trade name for greenish jasper from gravels of the Rogue River, Ore. *Shipley.*

Roheisenzunder process. A method which makes use of an airstream at a pressure of 4 atmospheres for atomizing molten pig iron into minute particles. The molten metal falling into an air stream formed by an annular slit in a steel cyclone is atomized, the particles falling into a water bath and subsequently dried. *Osborne.*

Rohrbach solution. An aqueous solution of mercuric-barium iodide; clear, yellow liquid; very refractive; and specific gravity, 3.5. Used in separating minerals by their specific gravity, and in microchemical detection of alkaloids. *CCD 6d, 1961.*

roke. Prov. Eng. A vein of ore. *Standard, 1964.* A variation of rake. See rake 3 and 4. *Fay.*

Rokicky group. A type of meteorites belonging to the pallasites. *See also* pallasite. *Hess.*

Rokide C. Silicon carbide; refractory. *Bennett 2d, 1962 Add.*

Rokide process. Trade name; a process for the production of a refractory coating, on metal or on ceramic, by atomizing directly from the fused end of a rod of the coating material, for example, Al_2O_3, or ZrO_2; the molten particles are blown against the cool surface that is to be coated. *Dodd.*

Rolands' cement. Trade name; a high-alumina cement. *See also* high-alumina cement. *Dodd.*

roll. a. A local thickening of roof or floor strata, causing thinning of a coal seam. *B.S. 3618, 1964, sec. 5.* b. Variously used to describe minor deformations or dislocations of a coal seam, for example, faults with small displacement to small monoclinal folds, to welts or ridges projecting from either the roof or floor into the coal, and to fillings of stream channels or low areas extending downward into the coal. *A.G.I.* c. A lenticular mass of shale, usually covered by a thin layer of coal, extending downward from the overlying strata into a coalbed and sometimes almost completely replacing the coal. *A.G.I.* d. The appearance of other types of mineral deposits in places where the bed or vein thickens or thins. *Stokes & Varnes, 1955.* e. Washout; partial washout. A downward irregularity in the roof causing a thinning of a seam of coal. *Mason.* f. An inequality in the roof or floor of a mine. *Fay.* g. S. Wales. The drum of a winding engine. *Fay.* h. *See* bump. *Fay.* i. A roughly cylindrical distribution of uranium mineralization occurring usually in the Salt Wash sandstone. There is some question whether the feature is structural or sedimentary. *Ballard.* j. The wheel of a roller. *Nichols.* k. A cylinder, with a shaft for mounting it so that it may rotate, used to support or guide a portion of the conveyor belt. If the shaft is designed to be mounted so that it will not rotate, a roll includes the bearings that provide for rotation of the cylinder on the shaft. *NEMA MB1-1956.* l. A cylindrical body set in bearings (usually fixed) and used singly or in pairs or sets for crushing or squeezing. *See also* rolls. *Webster 3d; Fay.* m. One of two cylinders or grooved rollers between which material is drawn, for reducing its thickness, as the finished rolls of a rolling mill. *Fay.* n. A heavy metal cylinder for flattening molten plate glass into a sheet. *Fay.*

rollback. *See* crawling. *Bryant.*

roll bending. Curving sheets, bars, and sections by means of rolls. *See also* bending rolls. *ASM Gloss.*

roll compacting. The progressive compacting of metal powders by the use of a rolling mill. *ASTM B 243-65.*

roll crusher. A type of secondary or reduction crusher consisting of a heavy frame on which two rolls are mounted. These rolls are driven so that they rotate toward one another in the manner of the rollers in a clothes wringer. Each roll shaft has its own pulley and is driven independently, but both rolls should have the same peripheral speed. Rock fed in from above is nipped between the moving rolls, crushed, and discharged at the bottom. *Newton, p. 61. See also* double-roll crusher; single-roll crusher.

rolled asphalt. A road surface consisting of asphalt mixed with coarse aggregate, laid hot and rolled until it is quite solid. *See also* mastic asphalt. *Ham.*

rolled compact. A compact made by passing metal powder continuously through a rolling mill, so as to form relatively long sheets of pressed material. *ASTM B 243-65.*

rolled edge. The edge of a plate or saucer is said to be rolled if its diameter is greater than the general thickness of the rim of the ware. *Dodd.*

rolled glass. a. Flat glass that has been rolled so that one surface is patterned or textured. *Compare* roughcast, b. *Dodd.* b. A term also applied to optical glass that has been rolled into plates at the time of manufacture, as distinct from transfer glass *Compare* transfer glass. *Dodd.*

rolled gold. The same as gold filled except that the proportion of gold alloy to the weight of the entire article may be less than 1/20th. Fineness of the gold alloy may not be less than 10K. *See also* gold-filled. *ASM Gloss.*

rolled metal. Refers to metal such as silver or stainless steel which has been clad with a precious metal and rolled to reduce the thickness of the coat. *BuMines Bull. 630, 1965, p. 713.*

rolled pebbles. Pebbles which have been worn by transportation in water to a comparatively smooth and round shape. *Shipley.*

rolled plate. A thin plate of gold spread upon a layer of base metal by soldering the metals in the bar and then rolling the whole out into plate, forming a thinner plate of gold than that of the ware known as gold-filled. Also called rolled gold. *Fay.*

rolled-steel joist. An I-beam made from a single piece of steel passed through a hot rolling mill. *Ham.*

rolled steel sections. Steel sections which have been produced by hot rolling at the steelworks, for example, rolled steel joists, channels, angle sections, etc. *See also* steel arches. *Nelson.*

roller. a. A broad pulley or wheel fixed to the floor, roof or sides of roadways to prevent a haulage rope running against the ground which would cause excessive friction and wear of rails and sleepers. The roller consists of a high carbon quality tubular steel barrel with a pressed steel or malleable iron frame with end castings which contain a reservoir of oil. *Nelson.* b. A heavy vehicle used for compacting soil, earth fill, and top layers of spoil dumps to increase the density and bearing capacity of the material. *See also* compaction. *Nelson.* c. A round part free to revolve about its center and roll on its outer surface. The face may be straight, tapered, crowned, concave, or flanged. *ASA MH4.1-1958.* d. A component part of a roller chain in which it may serve only to reduce frictional loss occurring as the chain negotiates sprockets. Rollers may also serve as the rolling support for the chain and the load being conveyed. *ASA MH4.1-1958.* e. An indefinite term, sometimes considered to be one of a series of long-crested, large waves which roll in upon the coast, as after a storm; also, a long, high swell. *Schieferdecker.* f. A blown cylinder for making window glass by the nearly obsolete hand process. *ASTM C162-66.* g. A small, soft rubber roller used for applying transfers and decalcomanias to enamelware. *Enam. Dict.*

roller-bat machine. A machine for making, from stiff-plastic clay, bats for a final pressing process in one method of roofing-tile manufacture. *Dodd.*

roller bearings. Hard steel cylinders in bearings which have very low frictional resistance. *Ham.*

roller bit. a. A rotary boring bit consisting of two to four-cone-shaped, toothed rollers which are turned by the rotation of the drill rods. They are used in hard rock in oil well boring and other deep holes down to 15,000 feet and more. Although their penetration speed is somewhat slow, roller bits last longer which is a very important factor in deep drilling. *See also* drag bit. *Nelson.* b. A type of rock-cutting bit used on diamond and rotary drills. The bit consists of a shank with toothed, circular, or cone-shaped cutter parts affixed to the head of the bit in such a manner that the cutters roll as the bit is rotated. Generally used for drilling 3⅞-inch-size or larger holes in soft to medium-hard rocks such as shale and limestone. Usually noncoring and not diamond set. Also called cone bit; rock bit; roller cone bit; roller rock bit; roller cutter bit. *Long.*

roller-bit drilling. *See* crushing drilling.

roller chain. a. Generally, any sprocket-driven chain made up of links connected by hinge pins and sleeves. *Nichols.* b. Specifically, a chain whose hinge sleeves are protected by an outer sleeve or roller that is free to turn. *Nichols.*

roller cone bit. Synonym for roller bit. *Long.*

roller-cone core bit. A type of roller bit with cutter cones arranged to cut an annular ring leaving an uncut section in the center as core. *Long.*

roller conveyor. A series of rolls supported in a frame over which objects are advanced manually, by gravity or by power. *ASA MH4.1-1958.*

roller-cutter bit. Synonym for roller bit. *Long.*

roller elutriator. An air-type elutriator designed for the determination of fineness of portland cement. *Dodd.*

roller gate. Hollow cylindrical crest gate controlling a dam spillway. *See also* sector gate; sliding gate. *Ham.*

roller grip. A device for clutching a traction cable between grooved sheaves or rollers. *Fay.*

roller-head machine. A machine for the shaping of pottery flatware on a rotating mold, as in a jigger, but with a rotary shaping tool instead of a fixed profile. The rotary tool is in the form of a shallow cone of the same diameter as the ware and shaped to produce the back of the article being made. The ware is completely shaped in one operation at the rate of about 12 pieces per minute. *Dodd.*

roller-hearth kiln. A tunnel kiln through which the ware, placed on bats, is carried on rollers. Such kilns are rare in the ceramic industry. *Dodd.*

roller leveling. Leveling by passing flat stock through a machine having a series of small-diameter staggered rolls. *ASM Gloss.*

rollerman. In mining, a laborer who inspects idler rollers or pulleys over which cable passes along inclined haulageways, oiling or greasing rollers, resetting displaced ones, and repairing or replacing damaged ones. Also called pulley man; pulley repairer; pulley repairman; roller repairman; sheaveman; wheelman. *D.O.T. 1.*

roller mark; roller scratch. A surface blemish on vertically drawn sheet glass caused by contact with the rollers. *Dodd.*

roller mill. *See* Chilean mill. *Pryor, 3.*

roller repairman. *See* rollerman. *D.O.T. 1.*

roller rock bit. a. A rotary bit fitted with two or more hardened steel or tungsten-carbide-tipped rollers of cylindrical or conical form. Variously known as two-cone bit, three-cone bit, four-cutter bit, etc. *B.S. 3618, 1963, sec. 3.* b. Synonym for roller bit. *Long.*

roller scratch. *See* roller mark. *Dodd.*

roller screen. *See* revolving screen.

Roller's equation. A relationship between the percentage weight and the size of powders: $w=a\sqrt{d}.\ \exp(-b/d)$, where w is the weight percent of all material having diameters less than d, and a and b are constants. Other equations were deduced relating to specific surface and to the number of particles per gram of powder. *Dodd.*

roller slat conveyor. A slat conveyor employing rollers for slats. *ASA MH4.1-1958.*

roller spiral. An assembly of curved sections of roller conveyor arranged helically and over which objects are lowered by gravity. *ASA MH4.1-1958.*

Roller's plasticity test. A method for the assessment of plasticity on the basis of the stress/deformation relationship when clay cylinders are loaded. *Dodd.*

roller stamping die. An engraved roller used for impressing designs and markings on sheet metal. *ASM Gloss.*

roller straightening. A process for straightening rod, tubing, or extruded shapes which uses one pair or more of staggered rolls to correct minor deviations in the section as the material passes through. The process is essentially a series of banding operations. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

rolley. N. of Eng. A kind of truck running upon wheels for carrying tubs or boxes, and drawn by horses along underground roadways. *Fay.*

rolley man. *See* incline repairman. *D.O.T. 1.*

rolleyway. N. of Eng. The underground road along which rolleys are conveyed. A gangway. *Fay.*

rolleyway man. Eng. A man who attends the rolleyway and keeps it in order. He also supervises the movement of cars at shaft landings. *Fay.*

rolleyway pillars. Eng. Pillars usually of larger size than the ordinary ones, formed to support a haulage road. *SMRB, Paper No. 61.*

roll feeder. a. A smooth, fluted, or cleated roll or drum which rotates to deliver packages, objects or bulk materials. *ASA MH4.1-1958.* b. A circular drum, plain or ribbed, rotating on a horizontal shaft and situated at the mouth of a bunker or hopper to control the rate of discharge of material therefrom. *B.S. 3552, 1962.*

roll flattening. Flattening of sheets, that have been rolled in packs, by passing them separately through a two-high cold mill, there being virtually no deformation. Not to be confused with roller leveling. *ASM Gloss.*

roll forging. Forging with rotating dies that are not full round, the desired shape, either straight or tapered, being produced by a groove in the dies. *ASM Gloss.*

roll forming. Metal forming by the use of power-driven rolls whose contour determines the shape of the product. Sometimes used to denote power spinning. *See also* flospinning. *ASM Gloss.*

roll grinding machine. A special type of cylindrical machine for grinding cylindrical rolls to be used in rolling metals, paper, or rubber. *ACSG, 1963.*

roll hammerer. One who punches designs on polished steel rolls used in fabricating decorative sheet glass. *D.O.T. Supp.*

rolling. Reducing the cross-sectional area of metal stock or otherwise shaping metal products through the use of rotating rolls. *ASM Gloss. See also* roll train. *Fay.*

rolling and quartering. A sampling method in which the sample is formed into the requisite flat heap by placing it upon a rubber or other smooth sheet and, by lifting the corners of this sheet in proper rotation, rolling the material to and fro. The resultant heap is then quartered and alternate quarters are taken. This method is used with smaller bulk and smaller sizes of material. *Truscott, p. 40.*

rolling chain conveyor. One or more endless roller chains on which packages or objects are carried. *ASA MH4.1-1958.*

rolling cradle. A rod slide equipped with rollers that contact the rods and over which the rods roll on being pulled or lowered into an angle borehole. *Long.*

rolling cutter bit. Synonym for roller bit. *Long.*

rolling friction. a. The resistance offered by a tub wheel as it rolls over the steel rails, or the resistance offered by a shaft turning in the ball or roller bearing. *Morris and Cooper, p. 188.* b. The resistance developed when a spherical or cylindrical body is rolled over a plane surface. Rollers and ball bearings are used to reduce rolling friction. *Crispin.*

rolling ground. A land surface much varied by many hills and valleys. *Fay.*

rolling incline-bedding. Small scale cross-bedding related to ripple-mark migration; asymmetrical with more pronounced lee-side accumulation than in unilateral rolling strata. *See also* unilateral rolling strata. *Pettijohn.*

rolling mill. a. An establishment in which metal is made into sheets, bars, rails, or rods by working it between pairs of rolls. *Standard, 1964.* b. A pair or set of rolls between which metal is reduced in thickness or formed into beams, rails, etc.; a roll train. *Standard, 1964.* c. Machines used to decrease the cross-sectional area of metal stock and produce certain desired shapes as the metal passes between rotating rolls mounted in a framework comprising a basic unit called a stand. Cylindrical rolls produce flat shapes; grooved rolls produce round, square, and structural shapes. Among rolling mills may be listed the billet mill, blooming mill, breakdown mill, plate mill, sheet mill, slabbing mill, strip mill, and temper mill. *ASM Gloss.*

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rolling of glaze. A term sometimes used instead of crawling. *Dodd.*

rolling plant. A rolling mill or establishment for rolling metal into forms. *Standard, 1964.*

rolling resistance. a. The tractive resistance caused by friction between the rails and wheels, and forms the major resistance on level tracks. *See also* tractive force. *Nelson.* b. The sum of the external forces opposing motion over level terrain. *Carson, p. 72.*

rolling strata. A little-used term for ripple cross-lamination. Also called wavy bedding. *Pettijohn.*

rolling-up curtain weir. A type of frame weir, the frame of which remains upright, being rolled up from the bottom. *Ham.*

roll jaw crusher. A crusher of the same general type as the Blake or Dodge, but the moving jaw has a rolling instead of an oscillating motion. *Liddell 2d, p. 357.*

roll latten. Sheet brass polished on both sides. *Standard, 1964.*

rollman. In ore dressing, one who tends rolls that are used to crush ore, which has already been broken into small pieces in a crusher, to a fine size preparatory to the extraction of the valuable minerals. *D.O.T. 1.*

roll-mark. A series of similar marks appearing in line in direction of flow made by a rolling object. Rolling is commonly combined with saltation. *Pettijohn.*

roll operator. One who operates conical rolls that separate stone from clay, preventing machine from jamming by regulating flow of clay into it. *D.O.T.1.*

roll out. When a diamond in a coring bit is retained by less than 50 percent of its volume by the bit matrix material, it frequently is pulled, in toto, from the matrix and is said to roll out. *Long.*

roll quenching. *See* quenching of frit. *Dodd.*

rolls. a. Cast-iron or steel cylinders, either plain or fitted with steel teeth, used to break coal and other materials into various sizes. Applies to the type of crushing machinery in which the ore is broken between cylindrical rolls which rotate in a vertical plane. *See also* roll train. *Fay.* b. Two cylinders, with faces much less than the diameters, revolving toward each other, drawing the material in between the crushing peripheries. One roll at least usually runs in fixed bearings, the other may or may not run in movable bearings held by springs. *Liddell 2d, p. 357.* c. In powder metallurgy, a machine used to apply pressure progressively to form a compact. *Rolfe. See also* crushing rolls; ribbed rolls; smooth rolls.

roll scale. The same as mill scale. *Standard, 1964.*

roll screen. A screen consisting of a number of horizontal rotating shafts, fitted with elements arranged to provide screening apertures. *B.S. 3552, 1962.*

roll shell. The casing or tire of specially hardened steel forming the wearing surface of a crusher roll. *Fay.*

roll spot welding. Spot welding with rotating circular electrodes. *ASM Gloss.*

roll-spuren. *See* roll-mark. *Pettijohn.*

roll straightening. Straightening of metal stock of various shapes by passing it through a series of staggered rolls, the rolls usually being in horizontal and vertical planes. *ASM Gloss.*

roll sulfur. a. A commercial name for sulfur that has been purified and cast into rolls or sticks. *Standard, 1964.* b. *See* brimstone. *Nelson.*

roll table. A conveyor table where rolls furnish the contact surface. *ASM Gloss.*

roll threading. Making threads by rolling the piece between two grooved die plates, one of which is in motion, or between rotating, grooved, circular rolls. *ASM Gloss.*

roll train. The set of plain or grooved rolls through which iron or steel piles, ingots, blooms, or billets are passed to be rolled into various shapes. *Fay.*

roll-up structure. *See* convolutional ball. *Pettijohn.*

roll welding. Forge welding by heating in a furnace and applying pressure with rolls. *ASM Gloss.*

rolok. *See* rowlock. *ACSG.*

rom Abbreviation for run-of-mine coal (or ore). *Nelson.*

Roman alum. Alum crystallized in cubes; especially, alum formerly made from alumite at Tolfa near Rome that was reddish because of a very small amount of iron oxide though otherwise very pure. *Webster 3d.*

Roman brick. Term for a building brick of nominal size 12 x 4 x 2 inches. *Dodd.*

Roman cement. A cement capable of setting under water with rapidity and of acquiring a great degree of hardness within a very short space of time. *Nelson.* Also known as rock cement.

romanite. A yellow, black, or green amber from Romania. Also spelled rumanite. *English.*

romanium. An alloy consisting of aluminum having an admixture of less than one percent of tungsten together with a little copper, nickel, antimony, and tin. *Webster 3d.*

Roman lime. Synonymous with hydraulic lime, but of the more impure and highly hydraulic type. *Boynton.*

Roman ocher. A native ocher of a deep orange-yellow color. *Standard, 1964.*

Roman pearl. A sphere of opalescent glass with interior coated with essence d'orient and then filled with wax. *Shipley.*

Roman tile. A roofing tile that is channel shaped and tapered; the roof is built of alternate descending lengths of tiles placed channelwise and tiles placed ridgewise over the junction of adjacent channels. *Dodd.*

Roman vitriol. Same as blue vitriol. *Fay.*

romanzovite. Dark-brown grossularite garnet; from Finland. *Shipley.*

rombly limestone; rombly post. Northumb. Limestone and sandstone containing pebbles. *Compare* rumble. *Arkell.*

romeite. Essentially a pyroantimonate of calcium with the ideal formula, $Ca_2Sb_2O_7$. Color usually pale yellow to yellowish brown; also reddish brown, dark brown. Mohs' hardness, 5.50 to 6.50; Specific gravity, 4.7 to 5.4. *Dana 7, v. 2, p. 1020.*

römerite. *See* roemerite. *English.*

romometer; roof movement meter. An instrument for measuring changes in vertical height and lateral movements of the roof relative to the floor at the coalface. *See also* convergence recorder. *Nelson.*

rondle; rondelle. The crust or scale that forms upon the surface of molten metal in cooling. *Fay.*

rontgen; R. The unit of exposure dose of X- or gamma radiation. One rontgen is an exposure dose of X- or gamma radiation such that the associated corpuscular emission per 0.001 293 g of air produces, in air, ions carrying 1 electrostatic unit of quantity of electricity of either sign. *NCB.*

rontgenite; roentgenite. Minute wax-yellow to brown, trigonal pyramidal crystals, intergrown with synchysite, parisite, and bastnasite, from Narsarsuk, Greenland. From X-ray and optical data the composition is deduced as $3CeFCO_3.2CaCO_3$. *Spencer 20, M.M., 1955.*

roof. a. The rock immediately above a coal seam. It is commonly a shale and is often carbonaceous in character and softer than similar rocks higher up in the roof strata. The roof shale may contain streaks and wisps of coaly material which tends to weaken the deposit. Roof in coal mining corresponds to hanging wall in metal mining. *Nelson. See also* roof stone. b. The stratum of hardened clay or sandstone that lies over the coal and forms a protection for the miner at his work. *Korson.* c. Overhead in a mine. *Gordon.* d. The ceiling of any underground excavation. *Hudson.* e. In mine timbering there are two classifications of roof, the immediate roof and the main roof. The immediate roof lies directly over the coal, and may be a single layer or several layers of rock material of the same, or different consistencies, and from a few inches to several feet in thickness. This roof requires timbering to support it as the coal is removed. The main roof is the roof above the immediate top, and may vary from a few feet to several hundred, or even thousands of feet in thickness. This roof is generally controlled by leaving pillars of solid coal that will support its weight. *Kentucky, p. 134.* f. N. Wales. A passage excavated in slate quarrying from below upwards; a raise. *Webster 3d.*

roof bolter. In bituminous coal mining, one who reinforces roofs of mine haulageways, side drifts, and working places with metal or timber to prevent rock and slate falls. Also called raise driller; stoperman; timberman. *D.O.T. Supp.*

roof bolting. A system of roof support in mines. Boreholes from 3 to 8 feet long are drilled upward in the roof and bolts of 1 inch diameter or more are inserted into the holes and anchored at the top by a split cone or similar device. The bolt end protrudes below roof level and is used to support roof bars, girders, or simple steel plates pulled tight up to the roof by a nut on the bolthead. The bolts are put up to a definite pattern. The idea is to clamp together the several roof beds to form a composite beam with a strength considerably greater than the sum of the individual beds acting separately. *See also* slot-and-wedge bolt; rock bolting. *Nelson.*

roof bolts. a. Long steel bolts driven into walls or roof of underground excavations to strengthen the pinning of rock strata. They are inserted in a drilled hole and expanded by means of a wedge which opens a sleeve surrounding it (the sleeve bolt), or which slides in a half-sleeve (the sliding wedge bolt). Used at about 4 feet spacing and pin steel beams to roof. *Pryor, 3.* b. Steel bolt units are used to support mine shaft roof, preventing and limiting the extent of roof falls. The unit consists of the bolt (up to 4 feet long), steel plate, expansion shell, and pal nut. Use of roof bolts eliminates the need for timbering. *Best, p. 374.* Same as rock bolt.

roof coal. a. Scot. That part of a seam of coal left for a roof. *Fay.* b. Used among British miners for inferior coal found near the roof of a seam. *Tomkeieff, 1954.*

roof control; strata control. The scientific study of rock behavior when undermined by mining operations and the most effective measures to control movements. The subject is comprehensive and includes the systematic measurement of the movement of strata and the forces and stresses involved. An attempt is made to correlate the data with rock types and nature of excavation. Effective roof control means higher productivity and safer mining operations. *See also* rock mechanics. *Nelson.*

roof cut. A machine cut made in the roof immediately above the seam. A roof cut is sometimes made in a soft band of dirt over the coal which gives increased height in thin seams. The cut is made with a turret coal cutter. *Nelson.*

roof cutting; gas cutting. It is a common occurrence to hear miners talk of gas cutting the top and causing it to weaken; however, this condition is seldom encountered. There are some seams where gas does cut the roof, generally where top coal is left in gassy seams. The most common cause of roof cutting is its exposure to air. Gunite or painting of the top helps a condition of this kind. *Kentucky, p. 145.*

roof drill. Various hydraulically operated mechanized units designed to install roof bolts. Two men can fasten up to 200 bolts per shift. Units are available in both standard and special design to satisfy requirements in different mines. *Bests, p. 374.*

roofers. Lanc. Miners' term for the upper part of a coal seam. *Tomkeieff, 1954.*

roof-framy. A roof which is tenacious, and when allowed to fall breaks down in large blocks or frames of stone. *Peel.*

roofing. a. Ches. The upper 5 or 6 feet of the rock salt beds. *Fay.* b. The wedging of a loaded wagon or horse against the top of an underground passage. *Fay.*

roofing granule. a. A particle of rock or fired clay about 9 mesh in size, used to manufacture asphalt roofing shingles. *ACSG, 1963.* b. See granule, b. *A.G.I.*

roofing hole; roof-up. In West Wales, a small, steeply inclined stone drivage from a lower to an upper coal seam or for exploration in disturbed ground. *Nelson.*

roofing slate. A finely fissile, compact, homogeneous argillite or clay slate, yielding thin slabs, used for roofing. The prevailing colors are nearly black, though sometimes greenish, purple, or red. *Standard, 1964.* Regular roofing slate ranges in size from 7 by 9 to 16 by 24 inches and are commonly three-sixteenths of an inch thick. The so-called architectural grades are much thicker and heavier. *AIME, p. 798.*

roofing tile. a. Fired clay tile used for covering roofs. *Fay.* b. A structural unit with overlapping or interlocking design to be used for roofing. *ACSG, 1963.*

roof jack. A screw- or pump-type extension post used as a temporary roof support. *B.C.I.*

roof layer. a. Uniformly thick layer of rock supported or clamped at the edges by pillars. *BuMines Bull. 587, 1960, p. 2.* b. A layer of firedamp under the roof of mine workings. *B.S. 3618, 1963, sec. 2.*

roof loosener. *See* roof trimmer. *D.O.T. 1.*

roofman. *See* roof trimmer. *D.O.T. 1.*

roof movement meter. *See* ronometer.

roof pendant. Older rocks projecting down from the roof into a batholith. On a map, the roof pendant is completely surrounded by the rocks of the batholith. *A.G.I.*

roof pressure. The pressure which the overlying rocks exert on the support of the mine workings. *See also* ground pressure. *Stoces, v. 1, p. 137.*

roof rock. The rock forming the ceiling of a cave passage, chamber, etc. *A.G.I.*

roof shale. The layer or seam of shale occurring immediately above the Pittsburgh coal seam. This shale or slate has to be taken down in mining operations. *Rice, George S.*

roof station. A survey station fixed in the roof of a mine roadway or working face. *B.S. 3618, 1963, sec. 1.*

roof stone. Scot. The stone immediately above a coal seam. *See also* roof, a. *Fay.*

roof stringer; lagging bar. Used in a weak or scaly top in narrow rooms or entries which have short life. It is done by placing the lagging bars running parallel with the working place above the header. It has limited uses due to necessary additional height and causing the weight to rest on the center of the header. *Kentucky, p. 141.*

roof testing; top testing. In the simple testing of roof, the roof is struck by a hammer or a heavy object. The loose roof will give off a dull or hollow sound as compared with solid top which has a clear ring. Good roof that has a clear ringing sound is called "bell top." Also known as sounding, sounding the roof, sounding the top, and jowling. *Kentucky, p. 133.*

roof-testing tool. Usually a wooden pole with a metallic ball at the upper end. *Grove.*

roof trimmer. In metal mining and in the quarry industry, a laborer who inspects roofs and walls of working places in underground mines and quarries after blasting, and knocks or pries down any loose lumps or blocks of stone or rock with a bar to prevent danger of their falling and injuring workmen. Also called bar loosener; barman, roof loosener; roofman. *D.O.T. 1.*

roof-up. *See* roofing hole. *Nelson.*

roof work. A term applied to a vein worked overhead. *Fay.*

room. a. A place abutting an entry or airway where coal has been mined and extending from the entry or airway to a face. *I.C. 8001, 1960, p. 1.* b. Space driven off an entry in which coal is produced. Rooms may vary in width from 14 to 45 feet and in depth from 50 to 300 feet, depending on depth of overburden, underground conditions, and seam thickness. *B.C.I.* c. A wide working place in a flat mine corresponding to stope in a steep vein. A chamber. *Compare* stope. *Fay.* d. A heading, or short stall. *Fay.* e. A weight of 7 tons of coal, or 5½ chaldrons by measure. *Fay.*

room-and-pillar. A system of mining in which the distinguishing feature is the winning of 50 percent or more of the coal or ore in the first working. The coal or ore is mined in rooms separated by narrow ribs or pillars. The coal or ore in the pillars is won by subsequent working, which may be likened to top slicing, in which the roof is caved in successive blocks. The first working in rooms is an advancing, and the winning of the rib (pillar) a retreating method. The rooms are driven parallel with one another, and the room faces may be extended parallel, at right angles, or at an angle to the dip. This method is applicable to flat deposits, such as coal, iron ore, lead, zinc, etc., that occur in bedded deposits. Modifications of this method are: County of Durham system; double-entry room-and-pillar mining; double-room system; double-stall working; heading and stall; pillar-and-stall; post-and-stall; room-and-stoop; single-entry room-and-pillar mining; single-stall working; square work; stall-and-breast; and triple-entry room-and-pillar mining. *Fay.*

room-and-pillar mining. In coal and metal mining, supporting the roof by pillars left at regular intervals. *Lewis, p. 424.*

room-and-pillar with waste filling. *See* overhand stoping, b. *Fay.*

room-and-rance. Scot. A system of working coal with long narrow pillars; less usually a system of working with extra large pillars and narrow rooms. Similar to pillar-and-stall. *Fay.*

room-and-stoop. Scot. *See* room-and-pillar. *Fay.*

room boss. In bituminous coal mining, a foreman who inspects the working face in working places (rooms) to determine whether mining operations are being carried on properly and safety regulations are being observed. Also called wall boss. *D.O.T. 1.*

room conveyor. a. Any conveyor which carries coal from the face of a room toward the mouth. Normally, a room conveyor will deposit its coal into a car or another conveyor at the mouth of the room, but occasionally it will dump into a cross conveyor at some point between the face and the mouth. *Jones.* b. Generally 100 to 500 feet in length. It is used in room and pillar mining to transport material from the face to the room entry. *NEMA MB1-1961.* c. *See underground mine conveyors. ASA MH4.1-1958.*

room drier. A heated room used to dry clayware. *ACSG, 1963.*

room entry. a. Name applied to pairs of headings that are especially provided for stowing of ripping dirt when road ripping or dinting is necessary. These headings are driven from which pillars are formed to the rise and then extracted on the retreat. *Mason, v. 1, p. 109.* b. Any entry or set of entries from which rooms are turned. A panel entry. *U.S. BuMines Federal Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. I Underground Mines, October 8, 1953.*

room neck. A short passageway, from the mine entry, to the room in which the miner works. *Fay.*

room system with caving. *See* bord-and-pillar. *Fay.*

Rooseveltite. Bismuth arsenate, $BiAsO_4$, as a white coating on wood-tin from Santiaguillo, Bolivia. *Spencer 18, M.M., 1949.*

rooster coal. *See* cube coal, a. *Fay.*

root. a. A geologic term meaning the part of a mountain which extends below the surface of the earth's crust. *MacCracken.* b. Of an orogene, a low density sialic mass projecting downward into the basaltic layer formed by downbuckling or downsucking movements, or by physicochemical processes (hypodifferentiation). *Schieferdecker.*

root buttress. A root that is above ground where it joins the trunk. *Nichols.*

root cast. Slender, tubular, near-vertical and commonly downward-branching structure formed by filling of tubular openings left by roots. Many resemble some organic borings. *Pettijohn.*

root clay. Same as underclay. *A.G.I.*

root crack. A crack in either the weld or heat-affected zone at the root of a weld. *ASM Gloss.*

root deposit. A lode or vein from which alluvial tin may have been derived. *Fay.*

rooter. a. A towed scarifier; sometimes used to break up a hard surface and prior to the use of bulldozers in removing overburden at quarries and opencast pits. *Nelson.* b. A towed machine equipped with teeth, used primarily for loosening hard soil and soft rock. *Nichols, 2.* c. A heavy-duty ripper. *Nichols.*

Rootes blower. Low-pressure rotary air compressor with large capacity. Two specially shaped leaves rotate so as to entrain and compress air. Used with cupolas, pneumatic flotation cells, etc. *Pryor, 3.*

root face. The unbeveled portion of the groove face of a joint. *ASM Gloss.*

root hook. A very heavy hook designed to catch and tear out big roots when it is dragged along the ground. *Nichols.*

rootlet bed. See seat earth, a. *B. S. 3618, 1964, sec. 5.*

root-mean-square value. The root-mean-square value of an alternating current or voltage. It is the square root of the mean value of the squares of the instantaneous values taken over a complete cycle. When an alternating current or voltage is specified, it is almost invariably the root-mean-square value that is used. Also used of quantities which alternate over longer periods, for example, month or year. Also known as effective value. Abbreviation, R.M.S. *CTD.*

root of joint. The location of closest approach between parts of a joint to be welded. *ASM Gloss.*

root of weld. The points, as shown in cross section, at which the bottom of the weld intersects the base-metal surfaces. It may be coincident with the root of joint. *ASM Gloss.*

root opening. The distance between the parts at the root of the joint. *ASM Gloss.*

root pass. The first bead of a multiple-pass weld. *ASM Gloss.*

root penetration. The depth to which weld metal extends into the root of a joint. *ASM Gloss.*

root sealer bead. Same as root pass. *ASM Gloss.*

root zone. a. The place where the axial plane of a recumbent fold becomes steeper and dips beneath the surface of the earth. *A.G.I.* b. The place where a low angle thrust fault becomes steeper and disappears beneath the surface of the earth. *A.G.I.*

roove. Eng. To rub or knock against the roof. *Fay.*

rope. a. A winding or hoisting; a draw. *Mason.* b. Rope is designated by its lay, material of construction (steel, fiber, etc.), maximum diameter across strands, and strands. A rope of 1 inch diameter has 6 strands and 19 wires per strand. Patented rope is made of galvanized wire. *See also* lay. *Pryor, 3.* b. *See* fiber rope; wire rope. *Nelson.*

rope and button conveyor. a. A series of buttons or flights attached to an endless wire rope or cable for the purpose of conveying or retarding the movement of bulk materials or objects along a stationary trough. *ASA MH4.1-1958.* b. A conveyor consisting of a rope with disks or buttons attached at intervals, the upper flight running in a trough. The coal or other material is dropped into the trough, and the conveyor is either actuated by the weight of the coal in the trough when the trough is inclined forming a retarding conveyor, or moves the coal along the trough where the gradient is insufficient or adverse. In the one case a brake is provided; in the other, the sprockets are actuated by a motor. *Zern.*

rope boring. In this system, rigid rods are replaced by a steel rope to which the boring tools are attached and allowed to fall by their own weight. The surface set-up is practically the same as for rod drilling, the difference being in the attachment to the end of the walking beam. The rope passes from a drum over a pulley in the derrick and through a rope clamp, above which is a temper screw which is in turn attached to a walking beam. The temper screw allows the drill to fall as the boring proceeds and is then run back and the rope reclamped higher up. No device is necessary with rope boring to give the twist to the chisel in the borehole between each blow. The lay of the stranded rope accomplishes this. As the tools are being raised the rope is in tension and its spiral lay tends to straighten out and stretch, but when the chisel strikes the bottom of the hole the tension is off, the rope assumes its natural spiral and imparts a twist to the chisel. *Mason, V.1, p. 54.*

rope cappel. The attachment between the winding rope and the bridle chains of the cage. *See also* cappel. *Nelson.*

rope conductor. See brakeman, c. *D.O.T. 1.*

rope core. An important component of stranded ropes is the core, which may be either of fiber or of wire. In winding ropes it is generally made of manilla, sisal, or hemp. The function of the core is to support the strands and prevent them from bearing hard against one another. An even more important function is as a store for lubricant for the interior of the rope and during manufacture it is saturated with lubricant. *Sinclair, V, p. 8.*

rope crab. An appliance used in cable drilling for recovering ropes that may have been accidentally dropped in the borehole. *Fay.*

rope cutter. See hook tender, a. *D.O.T. 1.*

rope diameter. The diameter of a steel wire rope is the maximum obtainable measurement across the outer edges of the strands. The size of fiber ropes is usually specified by their circumference. Modern steel wire winding ropes are large and heavy and may be 2¼ inches in diameter locked coil for a moderately deep shaft. *Nelson.*

rope drilling. a. Percussive method in which a string of tools is raised in the drill hole by a rope which is given a loose turn or two around a powered horizontal windlass, and is eased to let the tools fall free. Drills vertically, if necessary, to considerable depths. Usually employed for relatively shallow alluvial bores with portable rig. *Pryor, 3.* Sometimes called jump drilling, as the rope with the bit is raised and dropped. *Fay.* b. Synonym for churn drilling. *Long.*

rope drive. A replacement of belts by ropes for driving machinery. *Fay.*

rope driver. In bituminous coal mining, a foreman who looks after the haulage cable and the equipment of trains of cars by which coal is hauled from the mine. He superintends attaching of cars to cable by clipper and directs movement of cable by signaling slope engineer through a buzzer system. *D.O.T. 1.*

rope driving. The transmission of power by means of rope gearing, as distinguished from belt drive. *Crispin.*

rope drum. Any drum, powered or otherwise, on which rope is wound; for example, mining machine rope drums, room hoist rope drums, etc. *Jones.*

rope fastening. The most suitable fastening between a wire rope and its socket is a white metal capping. Haulage ropes are generally doubled back on themselves around a steel thimble and secured with bulldog clips. *Ham. See also* cappel.

rope grab. A three-prong fishing tool with barbs on the inner sides of the prongs, designed to recover rope or wire cable from a borehole. *Long.*

rope guides. Steel ropes suspended in vertical shafts to prevent excessive swinging of the cages or skips. Eight rope guides are generally used for the shaft, four for each cage, and two additional rubbing ropes are installed to prevent possible collision between the cages or skips. The ropes are suspended from girders fixed on the safety hook catch-plate platform and kept taut in the shaft by means of weights in the shaft bottom sump. The clearances between the cages, and also between the cage corners and the shaft wall, should be about 12 inches. *See also* fixed guides. *Nelson.*

rope haulage. a. Means of moving loaded and empty mine cars by use of wire rope; generally used on steep inclines where use of electric mine locomotives is inefficient. *B.C.I.* b. Any transportation system employing a steel wire rope to haul the mine cars or trams. *See also* direct rope haulage; endless rope haulage; main-and-tail haulage; tail-rope haulage. *Nelson.*

rope haulage systems. Systems of rope haulage may be classified as: (1) self-acting or gravity planes; (2) engine planes; (3) tail-rope haulage; (4) endless-rope haulage; and (5) aerial tramways, which are frequently considered by themselves, since they are not applied to transporting material underground. *Lewis, p. 225.*

ropehouse. In salt manufacturing, an evaporating house. *Fay.*

rope lay. A rope lay is that length of rope in which one strand makes one complete revolution about the core. *ASA M11.1—1960, p. 31.*

ropemaker. In the asbestos products industry, one who make asbestos wicking and square braided rope using carding machine, roper, and braider. *D.O.T. 1.*

rope plucking. The sudden jerking or twitching of a haulage rope due to the rope laps slipping to a smaller diameter on the drum. A severe plucking of a rope may be felt faintly more than 800 yards distance from the engine. *See also* overhaul. *Nelson.*

rope rider. a. Rope haul trip rider. *Hess.* b. Train attendant. *Mason.* c. An employee whose duty it is to see that cars are coupled properly, and to inspect ropes, chains, links, and all coupling equipment. A trip rider. *Fay.* d. *See* brakeman. *D.O.T. 1.*

rope roll. Eng. The drum of a winding engine. *Fay.*

rope roof bolt. A steel wire rope, with wedge heads fixed to its ends, used instead of the normal steel rod in roof bolting. The rope has a diameter of about ⅞ inch and a length from 15 to 20 feet. The method is largely in the experimental stage. *Nelson.*

rope socket. A drop forged-steel device, with a tapered hole, than can be fastened to the end of a wire cable or rope and to which a load may be attached. It may be either the open- or closed-end type. *Long.*

rope spear. A fishing tool having a shaft upon which are projected barbs used in cable and rotary drilling for fishing up a rope or broken wire line or cable. *Long.*

rope speed. Synonym for cable speed. *Long.*

rope-system drill. Synonym for churn drill. *Long.*

rope trip. A trip of cars handled by a rope. *Fay.*

ropeway. a. A line or double line of suspended ropes, usually wire, along which articles of moderate weight may be transported on slings, either by gravity or power; much used in mining districts for transportation to watercourses or to steam-railway lines. *Standard, 1964.* An aerial tramway. *Fay.* b. *See* aerial ropeway. *Nelson.*

Ropp furnace. A long reverberatory furnace over the hearth of which a series of plows or rakes is drawn by a continuous cable, moving the ore steadily from the feed to the discharge end. *Fay.*

ropy lava. Same as pahoehoe. *Fay.*

roquesite. A sufide of copper and indium, $CuInS_2$, isostructural with chalcopyrite, as small inclusions in bornite; from Charrier, Allier, France *Hey, M.M., 1964; Fleischer.*

roquetta. The name under which the ashes of sea plants, used as an alkali, were traded in Egypt. *Haggar.*

rosaline. Thulite. *Shipley.*

rosasite. A pale to bright green or sky-blue basic carbonate of copper and zinc, $(Cu,Zn)CO_3.(Cu,Zn)(OH)_2$. A zinciferous malachite, or an orthorhombic modification of $RCO_3.R(OH)_2$, dimorphous with malachite. Fibrous masses or coatings, minute botryoidal to mammillary. Orthorhombic. From Rosas mine, Sulcis, Sardinia. *English.*

Röschen method. A firedamp drainage method utilizing controlled drainage from the coal seams as they are being mined. This method, which is also known as the pack cavity method, was devised to extract gas from the mined out areas of advancing longwall mining systems by leaving corridors or cavities at regular intervals in the pack. *Virginia Polytechnic Institute. Mineral Industries Journal, v. 7, No. 1, March 1960, p. 3.*

roscherite. A dark brown basic hydrous phosphate of aluminum, manganese, calcium, and iron, $(Ca,Mn,Fe)_3Be_3(PO_4)_3(OH)_3.2H_2O$. Crystals; monoclinic. From Ehrenfriedersdorf, Saxony, Germany. *English; American Mineralogist, v. 43, No. 9-10, September-October 1958, p. 824.*

roscoelite. A mineral member of the mica group, $K_2V_4Al_2Si_6O_{20}(OH)_4$. It is essentially muscovite in which vanadium has partly replaced the aluminum. Monoclinic. Very rare, weakly radioactive; green, gray, tan, or brown; found with corvusite, hewettite, carnotite, and tyuyamunite; impregnates sandstone and replaces clay pellets and stringers. Also called vanadium hydromica. *A.G.I.; Dana 17; Crosby, p. 133.*

rose. a. Scot. The perforated nozzle of a water pipe. *Fay.* b. A diamond so small that it can be cut little if at all. *Webster 3d.*

rose agate. Local name for a gray and rose banded agate from Brewster County, Tex. *Shipley.*

roseaker. An old name for realgar. *Fay.*

rose beryl. Same as morganite. *Shipley.*

rose bit. A hardened steel or alloy noncore bit with a serrated face to cut or mill out bits, casing, or other metal objects lost in the hole. Also used to mill off the rose-bit dropper on a Hall-Rowe wedge. Also called mill; milling bit. *Long.*

rose-bit dropper. The annular-shaped ring at the top of the deflection wedge, the outside diameter of which is the same as the diameter of the borehole in which it is installed, by means of which the wedge is attached to a rose bit and drill-rod string when lowered into position in the borehole. *Long.*

rose-bit pilot. A plug to keep a rose bit concentric while milling off Hall-Rowe deflecting wedge top ring or rose-bit dropper. *Long.*

rose copper. The same as rosette copper. *Fay.*

rose-cut. A form of gem cutting, which, in its most symmetrical shape, consists of a hemisphere covered with 24 regularly disposed, triangular facets and a flat base. Variations include Dutch rose, half Dutch rose, Antwerp rose, double Dutch rose, cross-rose, and the briolette which may be considered a modified double rose. *Hess.*

rose diagram. A circular or semicircular diagram for ploting strikes (or dips) of planar features, such as joints, dikes, etc. *A.G.I.*

rosehead. A perforated nozzle, as for a sprinkler, spreading the water. *Standard, 1964. See also* rose, a. *Fay.*

rose kunzite. Pink synthetic sapphire or spinel. *Shipley.*

roselite. A rose-red triclinic mineral with perfect cleavage, $3(Ca,Co,Mg)O.AS_2O_52H_2O$;

Mohs' hardness, 3.5; specific gravity, 3.5 to 3.6. *Larsen, p. 132.*

rose moonstone. Pink scapolite. *Shipley.*

rosenbuschite. A complex zirconium silicate mineral; it is a sodium-calcium-titanium-zirconium fluoride silicate. *E.C.T., v. 15, p. 309.*

Rosenbusch's law or rule. A statement of the sequence and crystallization of minerals from magmas, proposed by Rosenbusch (1882), to which many exceptions have been taken. *A.G.I.*

Rosendale cement. A name given to natural cement because it was first discovered and made from rock found near Rosendale, N. Y. *Mersereau, 4th, p. 236.*

Rosenstiehl's green. *See* barium manganate.

rose of cracks. The system with radial cracks issuing from the center of the hole as a result of the tangential stresses. *Langefors, p. 18.*

rose opal. A variety of opaque common opal having a fine red color. *C.M.D.*

rose porcelain. Chinese hard porcelain brilliantly decorated with a red enamel. *Standard, 1964.*

rose quartz. Crystalline quartz with a rose pink color, due probably to titanium in minute quantity. The color is destroyed by exposure to strong sunlight. Used as a gem or an ornamental stone. *See also* Bohemian ruby. *Fay.*

rose ring. Synonym of deflector-wedge ring. *Long.*

rose steel. A steel that shows a peculiar fracture and texture in the interior, different from that near the surface. *Standard, 1964.*

rose topaz. The yellow-brown variety of topaz changed to rose pink by heating. These crystals often contain inclusions of liquid carbon dioxide. *C.M.D.*

rosette. a. A form of cutting in which the stone's base is a single face; the general form is pyramidal and the several varieties each possess a different number of facets; a double rosette, also called pendeloque, is the form of two rosettes joined at their bases. *Hess.* b. A flowerlike crystal growth of gypsum. Synonym for oulopholite; gypsum flower. *A.G.I.* c. A symmetrical growth form, resembling a rose, assumed by an accretionary body. Barite and pyrite take this form in some rocks. *See also* petrified roses. *A.G.I.* d. A disklike crust or plate of metal purposely formed on the surface of molten metal by chilling it suddenly with water. *Standard, 1964. See also* rosette copper. *Fay.* e. Rounded configuration of microconstituents arranged in whorls or radiating from a center. *ASM Gloss.* f. Strain gages arranged to indicate at a single position strains in three different directions. *ASM Gloss.*

rosette copper. Disks of copper (red from the presence of suboxide) formed by cooling the surface of molten copper through sprinkling with water. Also called rose copper. *Fay.*

rosette texture. Rounded somewhat scalloped aggregates of one or more minerals. *A.G.I.*

rose vitriol. Cobalt sulfate; bieberite. Also called cobalt vitriol; red vitriol. *Standard, 1964.*

rosh. Leic. *See* rait. *Fay.*

rosin. a. The hard, amber-colored residue which is left after distilling off volatile oil from pine pitch. *API Glossary.* b. To met a resin and apply a coat to the right-handed threads of heated rod couplings; the coating sets when cooled which permits the rods to be used in the same manner as left-hand-threaded rods in fishing operations. Also called rosining. *Long.*

rosin blende. A yellow variety of zinc blende, ZnS. When dark in color it is called black-jack. *Bureau of Mines Staff.*

rosined joints. Drill-rod or casing couplings to which hot rosin was applied and which were joined before the rosin cooled. *Long.*

rosing. The act or process of milling a metal object in a borehole with a rose bit. *Long.*

rosin jack; resin jack. A yellow variety of sphalerite. *Fay.*

rosin oil. An oil obtained from destructive distillation of rosin. *API Glossary.*

Rosin-Rammler equation. An equation relating to fine grinding: for most powders that have been prepared by grinding, the relationship between R, the residue remaining on any particular sieve, and the grain size in microns (x) is exponential:

$$R = 100e^{-bx^n}$$

where e is the base of the naural logarithm and b and n are constants. *Dodd.*

rosin tin; resin tin. A reddish or yellowish variety of cassiterite. *Fay.*

rosin zinc. Sphalerite of a rosiny appearance. *Hess.*

rosite. Synonym for chalcostibite. *Hey 2d, 1955.*

Rosiwal method. A method used in quantitative petrography involving the estimation of the volumes of the component minerals in a rock by the measurement of aggregate intercepts on a polished surface or on a microscope slide. *C.T.D.*

Roslin sandstone. A yellow sandstone found in the Midland Valley of Scotland; of Carboniferous age, falling partly in the Lower and partly in the Upper Carboniferous; it is the Scottish equivalent of the English Millstone grit. From Roslin Glen, south of Edinburgh, Scotland. *C.T.D.*

rosolite. A rose-pink variety of grossulatire garnet. Also called landerite and x̣alostocite. From Xalostoc, Morelos, Mex. *English.*

Ross and Welter furnace. A multiple-deck roasting furnace of the annular type; used in Germany. *Fay.*

Ross feeder. Mechanism for control of rate of feed of coarse ore in the primary and secondary crushing system. Several heavy loops of chain lie above and bear on ore which rests in the delivery chute at just above its natural angle of repose. When the shaft from which the loops are suspended is rotated by its small motor, ore slides under control. *Pryor, 3.*

Rossie furnace. An American variety of hearth for the treatment of galena, differing from the Scotch hearth in using wood as fuel, working continuously, and having hollow walls, to heat the blast. *Fay.*

Rossi-Forel intensity scale. A scale for rating earthquake intensities. Devised in 1878 by de Rossi (Italy) and Forel (Switzerland). No longer in general use, having been supplanted by Wood and Neumann's Modified Mercalli intensity scale of 1931. *A.G.I.*

rossite. A very rare, weakly radioactive, triclinic, yellow mineral, $CaV_2O_6.4H_2O$, found in thin seams in sandstone or shale with metarossite in Colorado; clear, glassy; has one excellent cleavage so that it splits like gypsum. *Crosby, p. 133-134; Larsen, p. 136.*

rosso antico. A red unglazed stoneware; a refinement of the red ware previously made in N. Staffordshire, England. *Dodd.*

rosso antico marble. A red marble used by the Estruscans and ancient Romans; said to have been obtained from Cynopolis and Damaristica. It has white markings and fine black veins. *Fay.*

rosso levanto marble. See verde antique. *Fay.*

rosterite. A variety of pale rose-red beryl found in the granite of the Island of Elba, Italy. *Fay.*

rosthornite. A brown to garnet-red resinous material forming lenticular masses in the coal of Carusthia. *A.G.I.*

rotacore. A special drill used in soft rocks in oil well prospecting to drill three inch holes. *Cumming.*

rotameter. A tapered float rises or falls in a transparent tube in accordance with the velocity of the rising liquid. Variations include spinning floats, and magnetic or radioactive ones for use with opaque fluids. Rate-of-flow indicator. *Pryor, 3.*

rotap. Laboratory screen shaker widely used in screen sizing analysis. Up to seven 8-inch round screens are nested on the appliance, and given a shaking, rotary and tapping motion. *Pryor, 3.*

rotary. a. In a rotary drill, the unit that turns the kelly and drill string. *Nichols.* b. Synonym for rotary table; rotary-drill rig. *Long.*

rotary air valve. A washbox air valve that rotates on a central axis. *B.S. 3552, 1962.*

rotary belt cleaner. A series of straight or spiral blades symmetrically spaced about the axis of rotation and caused to scrape or beat against the belt for the purpose of cleaning. *See also* brush cleaner. *ASA MH4.1-1958.*

rotary bit. As used in a broad sense by drillers, a roller bit. *Long.*

rotary blower. An air compressor suitable for developing pressures up to 10 pounds above atmospheric. Its impellers are lobed and meshed together, sweeping the air before them. *See also* Rootes blower. *Ham.*

rotary boring. A system of boring, using usually hollow rods, with or without the production of rock cores. Rock penetration is achieved by the rotation of the cutting tool. The method is used extensively in exploration, particularly when cores are required. It is the usual method in oil well boring with holes from 6 to 18 inches in diameter. *See also* diamond drilling; rotary drill. *Nelson.*

rotary breaker. A breaking machine for coal or ore. It consists of a trommel screen with a heavy cast steel shell fitted internally with lifts which progressively raise and convey the coal and stone forward and break it. As the material is broken the undersize passes through the apertures, so that excessive degradation does not occur. *See also* Bradford breaker. *Nelson.*

rotary bucket. A 12- to 96-inch-diameter posthole augerlike device, the bottom end of which is equipped with cutting teeth similar to those on a flat-spiral auger shoe. The device is used to rotary-drill large-diameter shallow holes to obtain samples of soil lying above the ground-water level. *Long.*

rotary bucket drill. A rotary-type drill on which a rotary bucket is fastened to the kelly bar. The bucket is equipped with a hinged bottom, which has straight-edged cutting blades or teeth. When rotated by the kelly bar the bucket loads from the bottom; when filled it is withdrawn from the hole and dumped by unlatching the bottom. Holes 12 to 96 inches in diameter can be drilled with this machine in soft, boulder-free ground. Also called bucket rig; cesspool digger; dry-hole digger; rathole rig. *See also* bucket auger. *Long.*

rotary car dumper. In the United States, a car or wagon tippler. *Nelson.*

rotary compressor. A compressor designed for a delivery pressure of 100 pounds per square inch and ranging in capacity from 60 to 300 cubic feet per minute. *Lewis, p. 672.*

rotary derrickman. *See* derrickman. *D.O.T. 1.*

rotary disk feeder. *See* disk feeder. *Dodd.*

rotary drier. A drier in the shape of an inclined rotating tube used to dry loose material as it rolls through. *ACSG, 1963.*

rotary drill. Broadly, various types of drill machines that rotate a rigid, tubular string of rods to which is attached a bit for cutting rock to produce boreholes. The bit may be a roller cone bit, a toothed or fishtail drag bit, an auger bit, or a diamond bit. *Bureau of Mines Staff. Compare* diamond drill; shot drill.

rotary-drill cuttings. The chips and pulverized rock produced by the abrasive and chipping action of either a drag, roller bit, or diamond bit when used on a diamond- or rotary-drill machine to drill a borehole. *Compare* cuttings. *Long.*

rotary driller. The person in charge of the actual operation of a rotary drill; a driller; a runner. *Long.*

rotary driller helper. In petroleum production, one who works in a crew of men (usually four) who assist in drilling operations and in running the drill pipe and casing in and out of a well. Also called floorman. *D.O.T. 1.*

rotary drilling. a. The act or process of drilling a borehole using a rotary-drill machine and equipment. *Compare* diamond drilling; shot drilling. *Long.* b. The hydraulic process of drilling which consists of rotating a column of drill pipe, to the bottom of which is attached a drilling bit, and, during the operation, circulating down through the pipe a current of mud-laden fluid, under pressure, by means of special slush pumps. The drilling mud and cuttings from the bit are forced upward and outside the drill pipe to the surface. *A.G.I.*

rotary drill motor. The space available in the casing of a rotary rock or coal drill is necessarily limited, and precludes the use of a reciprocating engine. The power unit used instead is similar in design to the vane compressor. The rotor runs at a very high speed, between 3,500 and 4,000 revolutions per minute, and this is reduced by gearing to give a drill spindle speed of about 650 revolutions per minute. It is claimed that with air at a pressure of 80 pounds per square inch shotholes can be drilled in coal 4 feet deep in 20 seconds. *Mason, V. 2, p. 383.*

rotary-drill pipe. Drill rods used by oilfield-type rotary drills. Drill pipe is usually of larger diameter than the largest size diamond-drill rod and is equipped with tapered modified-V-thread couplings that are generally inside flush and outside upset. *Long.*

rotary-drill rig. A rotary drill complete with accessory tools and equipment necessary to drill boreholes. *Long.*

rotary dump. An apparatus for overturning one or more mine cars simultaneously to discharge coal. They may rotate either 180° or 360°. *B.C.I.*

rotary dump cars. A standard small car in which the car body, of about 2 cubic yards capacity, is mounted on a turntable in the car frame. The car body may be swung by hand to dump over either side or either end. *Pit and Quarry, 53rd, Sec. A, p. 112.*

rotary dumper. A steel structure which revolves a mine car and discharges the contents, usually sideways, into a bunker or on to a screen. *See also* tippler. *Nelson.*

rotary excavator. Earth-moving machine with vertical wheel which carries digging buckets peripherally. These loosen soil and deliver to short conveyor loader, the assembly being mounted on caterpillar track. Capacity up to 5,000 tons hourly. Also called wheel excavator. *Pryor, 3.*

rotary fault. A fault in which some straight lines on opposite sides of the fault and outside of the dislocated zone, parallel before the displacement are no longer parallel, that is, where one side has suffered rotation relative to the other. *A.G.I.*

rotary feed table; disk feeder. A feeder comprising a horizontal rotating circular plate mounted under the mouth of a hopper and arranged with an adjustable plough to control the rate of flow of material over the edge of the plate. *B.S. 3552, 1962.*

rotary furnace. Horizontally mounted cylinder rotating between trunnions through which gas or oil flame is introduced. *Pryor, 3.*

rotary-hearth kiln. A circular tunnel with a slowly rotating platform for conveyance of the ware through the kiln. An early example was the Woodhall-Duckham kiln. The principle has since been adapted in the Clark circle system of brick making introduced in Australia in 1953, and in some modern pottery decorating kilns. (This type of kiln is sometimes also known as a rotating-platform kiln.) *Dodd.*

rotary hose. The flexible pressure hose connecting the drill pump to the water or mud swivel. *Long.*

rotary kiln. A kiln in the form of a long cylinder, usually inclined, and slowly rotated about its axis; the kiln is fired by a burner set axially at its lower end. Such kilns are used in the manufacture of Portland cement and in the dead-burning of magnesite, calcination of fire clay, etc. *Dodd.*

rotary kiln block. A modified circle brick, usually with a 9-inch outside chord and a smaller inside chord, 6 or 9 inches in radial length and 4 inches in thickness. *A.R.I.*

rotary machine. Synonym for rotary drill. *Long.*

rotary men. Men trained to operate a rotary drill. *Long.*

rotary meter. A current meter for measuring the speed of flow of a river or stream. *Ham.*

rotary mud. *See* drill mud; drilling mud. *Long.*

rotary outfit. Synonym for rotary-drill rig. *Long.*

rotary-percussive drill. A drilling machine which operates as a purely rotary machine to which is added a percussive action. The specially designed rotary-percussive drilling bit not only gives a greater penetration rate, but is also able to operate longer without deterioration of the cutting edges. A disadvantage is the great size of the air-operated machine which is usually mounted on a carriage. *See also* Hausherr DK9/51 drilling machines. *Nelson.*

rotary percussive drilling. A method of drilling in which repeated blows are applied to the bit which is continually rotated under power. *B.S. 3618, 1964, sec. 6.*

rotary-percussive drills. The drilling effect of these machines is obtained by a combination of percussion and cutting action, which implies high-pressure feed and a powerful rotating movement. Bits are either of the regular chisel type or in a modified version raked negatively to the direction of rotation. The drilling method in question should not be confused with that employed in the United States, particularly in drilling for oil which is called rotary percussion drilling, but uses a roller-type bit. *Fraenkel, v. 1, Art. 8:30, p. 19.*

rotary press. In powder metallurgy, a machine fitted with a rotating table carrying multiple dies in which a material is pressed. *ASM Gloss.*

rotary puddler. A mechanical puddler in which the treatment of molten metal is effected by the rotation of the furnace. *Fay.*

rotary pump. A positive-displacement pump in which the liquid-propelling parts are cams, gears, impeller wheels, etc., rotating within a case, as distinguished from those pumps that move liquids by means of the to-and-fro motion of a piston within a cylinder. *Compare* centrifugal pump. *Long.*

rotary rig. Synonym for rotary drill. *Long.*

rotary rig engineman. In petroleum production, one who supplies power for draw works (power distribution center for raising and lowering or rotating drill pipe or casing in a well), pumps, and other mechanical equipment of a rotary rig for drilling gas and oil wells, and assists in setting up rigs and in drilling wells. Also called gas or diesel engine engineer. *D.O.T. 1.*

rotary screen. a. A screen for sizing aggregate and similar material; it is a pierced rectangular plate bent into a cylinder. *Ham.* b. *See* trommel, a. *Nelson.*

rotary shear. A sheet metal cutting machine with two rotating disk cutters mounted on parallel shafts driven in unison. *ASM Gloss.*

rotary shoe. Synonym for washover shoe. *Long.*

rotary shot drill. a. Any rotary drill used to drill blastholes. *Long.* b. Synonym for seismograph drill. *Long.*

rotary smelter. Any of the cylindrical smelters that depend on slow rotation about a horizontal axis for agitation of the molten mass. *ASTM C286-65.*

rotary snowplough. A snowplough with a rotating blade which throws the snow well clear of the machine. *Ham.*

rotary sorting table; circular grading table. A circular plate conveyor to effect a preliminary grading of coals and removal of stone by hand. A screened-out fraction of the run-of-mine coal is delivered to the table by chute from a conveyor. As the stream of coal revolves on the table, the various grades of coal and the dirt are raked into positions where they are diverted by ploughs into chutes. The operators are positioned on the inner and outer edges of the table and the coal is not handled but only raked. *See also* picking conveyor. *Nelson.*

rotary speed. The speed at which the drill stem is turned, usually measured in revolutions per minute. *Long.*

rotary squeezer. A puddle-ball squeezer having a rotating drum mounted out of center in a cylindrical case. *Standard, 1964.*

rotary swager. A swaging machine consisting of a power-driven ring that revolves at high speed causing rollers to engage cam surfaces and force the dies to deliver hammerlike blows upon the work at high frequency. Both straight and tapered sections can be produced. *See also* swaging. *ASM Gloss.*

rotary swivel. Synonym of water swivel or mud swivel. *Long.*

rotary system. Synonym of rotary drilling. *Long.*

rotary table. a. The geared rotating table that propels the kelly and the drill stem when drilling a borehole with an oilfield-type rotary rig. Also called rotary; table; turntable. *Long.* b. The mechanism used in some forms of rotary drilling to rotate the drilling column. *B.S. 3618, 1963, sec. 3.*

rotary table feeder. A rotating horizontal circular table to which material flows from a round bin or hopper opening and from which it is discharged by a plow. *ASA MH4.1-1958.*

rotary tiller. A machine that loosens and mixes soil and vegetation by means of a high speed rotor equipped with tines. *Nichols.*

rotary tippler. *See* tippler. *Nelson.*

rotary tool; rotary tools. Drilling equipment used on rotary and/or diamond drills; the commonly accepted usage of the term is that applied to equipment used on drills having a rotary table, such as the rigs normally used in oilfield work. *Long.*

rotary vane feeder. A rotor of cylindrical outline with radial, spaced plates or vanes rotating on a horizontal axis, for controlling the flow of bulk materials. *ASA MH 4.1-1958.*

rotary vibrating tippler. A tippler designed to overcome the tendency for coal or dirt to stick to the bottom of the tubs or mine cars. When the tippler is in the inverted position, the car rests upon a vibrating frame which gives it a high-speed vertical jolting motion which frees any material tending to stick inside the car. *Nelson.*

rotating-armature generator. A generator having stationary field magnets, and the a.c. current is collected from slip rings connected to the windings of the armature or rotor. This machine is used normally in small sizes only, and either permanent magnets used for the field or an external d.c. supply obtained from mains or batteries. *Mason, V. 2, p. 423.*

rotating casing screw conveyor. A screw conveyor in which the tubular casing rotates at a different speed or in an opposite direction to the conveyor screw. *See also* screw conveyor. *ASA MH4.1-1958.*

rotating field alternator. An alternating-current generator that is very convenient for modern power generation on a large scale. The main current which is normally at high voltage, is conveyed through fixed connections, the sliprings carrying only the low-voltage direct-current field current. The main windings are insulated and braced against normal or excessive mechanical forces due to the load. *Mason, v. 2, p. 423.*

rotating-platform kiln. *See* rotary hearth kiln. *Dodd.*

rotating sampler. A soil sampler that rotates to cut and obtain a sample, as opposed to a drive sampler that is pressed into the material to be sampled. *Long.*

rotational cylindroidal folding. Subsequent folding that has distorted the axial planes of cylindroidal folds without destroying their cylindroidal character. *A.G.I. Supp.*

rotational failure. *See* slope failure, c. *Lewis, p. 627.*

rotational fault; hinge fault; pivotal fault; scissors fault. A fault where there has been pronounced rotation of the fault blocks. *Nelson.*

rotational flow. Turbulent flow involving all parts of a moving liquid. *A.G.I. Supp.*

rotational shear. One of four types of slope failure. Failure by rotational shear produces a movement of an almost undisturbed segment along a circular or "spoon-shaped" surface and occurs in comprehensive, uniform material. This material would not be affected by geological planes of weakness. Failure of this type can occur from causes which either increase the shear stresses or which decrease the shear strength of the material. *Woodruff, v. 3, p. 539.*

rotational slide. A slide of homogeneous earth or clay in which the slip surface of failure closely follows the arc of a circle. *Nelson.*

rotational speed. The speed at which a drill string and attached bit is turned. *Long.*

rotational wave. *See* shear wave, b. *Hy.*

rotation diagram. A petrographic diagram in which the fabric axes are rotated to some desired position. Rotation is generally done in order to similarly orient the fabric of different diagrams for comparison purposes. *Bureau of Mines Staff.*

rotation firing. Crushing a small piece of rock with a first explosion, and timing other holes to throw their burdens toward the space made by that and other preceding explosions. Also called row shooting. *Nichols.*

rotation recorder. An instrument for measuring any slight rotation of a bridge support under load. *See also* spread recorder. *Ham.*

rotation speed. Same as rotational speed. *Long.*

rotator. A revolving or rotary furnace. *Fay.*

rotch. *See* rotche. *Fay.*

rotche; roche. S. Staff. A soft and moderately friable sandstone. Also called roach; rotch. *Fay.*

Rotex. A reciprocating-type screener used in the tail screening operation in rock salt mining. *Kaufmann, p. 134.*

rothoffite. A yellowish- to liver-brown, magnesian calcium-iron garnet. *Fay.*

Rotliegendes. Lower and middle Permian. *A.G.I. Supp.*

rotobelt filter. Drum-type vacuum filter in which membrane is a belt, which leaves the drum at discharge point and is returned via pulleys. This arrangement facilitates washing of filter cake from both sides, also discharge. *Pryor, 3.*

roto finish. A tumbling method using special chips and chemical compounds. *Osborne.*

Rotalec. Trade name; a circular electric decorating kiln for pottery ware. *Dodd.*

Rotomixair. Trade name; a reciprocating air-jet system of drying bricks and tiles. *Dodd.*

rotor. Any unit that does its work in a machine by spinning, and does not drive other parts mechanically. *Nichols.*

rotor steel process. A steel making process using the principle of rotation as in the Kaldo. It has two lances, one above the bath surface using low-pressure oxygen to burn CO from the bath, while the other blows oxygen on to the bath at high pressure to obtain similar fast oxidation as in the L. D. It was developed at Oberhausen in Germany. *Nelson.*

rotospray. A rotary spray screening device which sieves enamel by centrifugal force. *Enam. Dict.*

rotten ice. Ice having become honeycombed in the course of melting and which is in an advanced state of disintegration. *Schieferdecker.*

rotten reef. S. Afr. Decomposed, soft country rock found in connection with auriferous conglomerates. *Fay.*

rottenstone. A soft, light, earthly substance consisting of silica in fine grains, resulting from the decomposition of siliceous limestone. *Fay.* Used for polishing. *Gordon.*

rouge. Finely divided, hydrated iron oxide, used in metal buffing and polishing. *Bennett 2d, 1962.* Used as a pigment and for polishing glass, metal, or gems. *Crispin.* Also used in the final polishing operation on plate glass. The average grain size lies between 1 and 10 microns. *Lee.*

rouge antique marble. *See* rosso antico marble. *Fay.*

rouge flambé. A red glaze first made by the Chinese; the color is due to collodial copper produced in the glaze by firing under reducing conditions. *Dodd.*

rougemontite. A phanerocrystalline rock containing anorthite and titanaugite, with small amounts of olivine and iron ores. *Holmes, 1928.*

rouge pits. An imperfection; traces of rouge remaining in an incompletely polished glass surface. *ASTM C162-66.*

rough. a. Difficult. *Long.* b. Work done under adverse conditions. *Long.* c. Highly fractured, broken, or cavey ground. *Long.* d. A new-condition or uncut diamond. *Long.*

roughbacks. Term used in the dimension stone industry for ends of blocks that are used as byproducts. *BuMines Bull. 585, 1960, p. 796.*

roughcast. a. A coating of pebbles set in cement on a wall. *Arkell.* b. A descriptive term for glass that has been rolled so that one surface is textured. *Compare* rolled glass. *Dodd.* c. A plastering made of lime mixed with shells or pebbles and used for covering buildings, usually by being thrown from a trowel forcibly against the wall. *Webster 3d.* d. To roughen the surface of (pottery) before firing. *Standard 1964.*

rough coal. Term used among Scottish miners for black, free coal of good quality. Also called roch coal; rock coal. *Tomkeieff, 1954.*

rough diamond. A diamond in its natural state. *Long.*

roughened finish tile. Tile whose plane die surfaces are entirely broken by mechanical means, such as wire cutting or wire brushing, to give increased bond for mortar, plaster, or stucco. *ASTM C43-65T.*

rougher cell. Flotation cells in which the bulk of the gangue is removed from the ore. *Fay.*

rougher man. In ore dressing, one who operates a rougher jig which separates coarse gravel from ore. *D.O.T. 1.*

rough glass. A glass obtained by cutting the original sheet of rolled glass into workable sizes. *ASTM C162-66.*

rough grinding. Grinding without regard to finish, usually to be followed by a subsequent operation. *ASM Gloss.*

rough ground. Highly fractured, fragmented, or cavey rock formations. *Long.*

roughing. Upgrading of run-of-mill feed either to produce a low-grade preliminary concentrate or to reject valueless tailings at an early stage. Performed by gravity on roughing tables, or in flotation in rougher circuit. *Pryor, 3.*

roughing hole. A hole to receive slag from a blast furnace, or molten iron when it is undesirable to let it run into pigs. *Standard, 1964.*

roughing mill. a. A metal disk charged with an abrasive, used for the first work in grinding gems. *Standard, 1964.* b. A set of roughing rolls. *Standard, 1964.*

roughing rolls. The rolls of a train which first receive the pile, ingot, bloom, or billet, and partly form it into the final shape. Also called breaking-down or roughing-down rolls. *Fay.*

roughing stand. The first stand of rolls through which the reheated billet passes, or the last stand in front of the finishing rolls. *ASM Gloss.*

roughing tool. The ordinary tool used by machinists for removing the outer skin and generally for heavy cuts on cast iron, wrought iron, and steel. *Crispin.*

rough lumber. Lumber undressed as it comes from the saw. *Crispin.*

rough machining. Machining without regard to finish, usually to be followed by a subsequent operation. *ASM Gloss.*

roughneck. a. One who performs unskilled manual duties on a drilling operation or leasehold. *A.G.I.* b. A laborer employed in oilfield work, sometimes in connection with drilling operations. Also called bully; roustabout. *Long.* c. Workman in a rotary drilling crew. *Wheeler.* d. A member of a drilling crew who works on the derrick floor. *Brantly, 2.*

roughneckproof. Equipment so ruggedly constructed as to be able to withstand abusive use. *Long.*

roughness. a. Relatively finely spaced surface irregularities, the height, width, and direction of which establish the predominant surface pattern. *ASM Gloss.* b. A value entering into every formula for calculating flow through pipes. *Ham.*

roughness-width cutoff. The maximum width in inches of surface irregularities to be included in the measurement of roughness height. *ASM Gloss.*

rough plate. Plate glass that has not been ground and polished after the rolling operation. *C.T.D.*

roughs; rows. Corn. Coarse, poor sands, resulting from tin dressing. *Fay.*

rough sand. Eng. Coarse grit, Buxton. *Arkell.*

roughsetter. A stonemason employed on coarse work. *Standard, 1964.*

rough stone. a. Same as ragstone. *Arkell.* b. Synonym for rough diamond. *Long.*

roughway. Corn. A quarry term to designate a direction along which there is no natural cleavage in a rock. *See also* cleaving way; quartering way. *Fay.*

round. a. A series of shots; also, the muck pile obtained when the round is blasted. *Fraenkel.* b. A number of shots intended to be fired either simultaneously or with delay periods between shots. *B.S. 3618, 1964, sec. 6.* c. A set of holes drilled and charged in a tunnel or shaft sinking which are fired instantaneously or with short delay detonators. A round generally consists of cut holes, easers, and trimmers. *See also* drill-hole pattern; shot-firing in rounds. *Nelson.* d. The holes drilled for a blast, the advance from a blast, or the ore, or rock from a single blast. *Ballard.* e. Planned pattern of drill holes fired in sequence in tunneling, shaft sinking, or stoping. First the cut holes are fired, followed by relief, lifter, and rib holes. *Pryor, 3.* f. A blast including a succession of delay shots. *Nichols.* g. In the operation of a blast furnace, one complete charge of ore, coke, and limestone. *Henderson.*

roundabouts. *See* circuits. *Stoces, v. 1, p. 237.*

round coal. Large coal, or large coal which has passed through the preparation plant and become more or less rounded. *Nelson.*

round-edge slip. *See* slip stone.

rounded stone. A carbon the sharp corners and edges of which have been worn off through use so that the stone is rounded. *Long.*

rounder. a. *See* reamer, a. *Fay.* b. An indented cylindrical tool for rock boring. *Standard, 1964.*

round-face bit. A bullnose bit; also, any bit the cutting face of which is rounded, such as a single- or double-round nose bit. *Long.*

round-headed buttress dam. A mass concrete dam constructed of parallel buttresses thickened at the upstream end until they conjoin. *See also* multiple-arch dam. *Ham.*

roundheads. York. Well-sinkers' term for boulders of coral, usually Thamnasteria concinna, in the Coral Rag. *Arkell.*

round hook; slip hook. A hook that has a smooth inner surface, and will slide along a chain. *Nichols.*

rounding tool. A forming or swaging tool having a semicylindrical groove; a blacksmith's swage or collar tool. *Standard, 1964.*

round kiln; beehive kiln. An intermitten kiln, circular in plan, with fireboxes arranged around the circumference. Such kilns find use in the firing of blue engineering bricks, pipes, some refractory bricks, etc. *Dodd.*

round-kiln drawer. *See* bisque-kiln drawer. *D.O.T. 1.*

round ore. Same as leap ore. *Standard, 1964.*

round-point shovel. *See* shovel, b. *Carson, p. 134.*

round ree. Scot. A space at the shaft bottom where coal is stored. *Fay.*

roundstone. a. Small, roundish stones collectively, used for paving; cobblestone. *Fay.* b. A rounded rock fragment of any size larger than a sand grain; a group name for pebbles, cobbles, or boulders, any or all of these. *Stokes and Varnes, 1955.* c. A diamond crystal with an arched facet. *Hess.*

round strand rope. A rope composed of a number of strands, generally six in number, twisted together or laid to form the rope around a core of hemp, sisal, or manilla, or, in a wire-cored rope, around a central strand composed of individual wires. *Sinclair, V, p. 5.*

round table. A type of laying table used for supporting plate glass for grinding and polishing, now largely superseded by the continuous system. *ASTM C162-66.*

'round the clock. Drilling operations maintained on a 24-hour basis. *Long.*

round trip. The process of pulling the drill string from a borehole, performing an operation on the string (such as changing a bit, emptying the core barrel, etc.), and then rerunning the drill string into the borehole. *Long.*

Rouse-Shearer plastometer. *See* R & S plastometer. *Dodd.*

roustabout. a. One who does odd jobs around a mine or other places. *Hess.* b. A name applied to one who is called upon to do any of the unskilled manual assignments in an oilfield. *A.G.I.* c. *See* roughneck. *Long.*

routivarite. A fine-grained igneous rock composed of orthoclase, plagioclase, quartz, and garnet. *Holmes, 1928.*

rouvillite. A leucocratic variety of theralite, containing about 53 percent labradorite and 27 percent nepheline, with small amounts of titanaugite, brown hornblende, pyrite, and apatite. *Holmes, 1928.*

roving. One or more staple-fiber slivers with a very small amount of twist. An intermediate stage between sliver and yarn. *Phillips.*

roving asbestos. Strand composed of chrysotile asbestos and cotton or other organic fiber. *Bennett 2d, 1962.*

row. a. Row or streek, that is, strike. *Arkell.* b. Corn. Coarse, undressed tin ore; refuse from the stamping mills. *Arkell.* c. N. Staff. A seam or bed of coal. *Fay.* d. Corn. Large, rough stones. *Fay.*

roweite. A light brown hydrous borate of manganese and calcium, $H_2MnCa(BO_3)_2$. Lath-shaped crystals. Orthorhombic. Differs from sussexite in containing calcium and in its optical properties. From Franklin, N.J. *English.*

rowlandite. A yttrium silicate, $2Yt_2O_3.3SiO_2$. *Sanford.* Possibly a metamict thalenite; massive and drab, dark green when fresh, brick red by alteration. *Crosby, p. 80.*

rowlock. A form of brickwork which includes courses of headers laid on edge. *See also* header. *Dodd.*

rowlock backwall. A wall made with the bricks of the exterior face laid flat, and the bricks of the backing laid on edge. *Crispin.*

rowlock course. A course of brick laid on edge with their longest dimensions perpendicular to the face of a wall. *HW.*

rows. *See* roughs. *Fay.*

row shooting. In a large blast, setting off the row of holes nearest the face first, and other rows behind it in succession. *Nichols.*

Roxite. A nonpermitted gelatinous explosive; medium strength, high density, and good water resistance. Used in tunneling in nongassy mines in rocks of medium hardness. *Nelson.*

royal agate. A mottled variety of obsidian. *Fay.*

royal barren. Solution overflowed from first ion-exchange column in a series which is receiving and stripping pregnant uranium liquor; contains some uranyl. *Pryor, 3.*

royal blue. *See* mazarine blue. *Dodd.*

royal green. Paris green. *Webster 3d.*

royal topaz. Blue topaz. *Shipley.*

royalty. a. As used in an oil and gas lease, a share of the product or profit reserved by the owner for permitting another to use the property. *Ricketts, II.* b. A lease by which the owner or lessor grants to the lessee the privilege of mining and operating the land in consideration of the payment of a certain stipulated royalty on the mineral produced, creates the relation of landlord and tenant and when that relation is created whatever is paid for the occupation and use of the premises, whether it be in money or kind, is equally in substance rent, and under such circumstances the royalties received are rentals. *Ricketts, II.* c. *See* overriding royalty. *Ricketts, II.* d. Usually refers to the $\frac{1}{8}$ free interest in oil and gas production held or conveyed by the land owner. *Wheeler.* e. Ownership of mineral rights under restricted terms. *Wheeler.* f. Eng. The mineral estate or area of a colliery, or a portion of such property. A field of mining operations. *Fay.* g. A seigniorage on gold and silver coined at the mint. *Webster 3d.* h. A percentage paid to the British crown, of gold or silver taken from mines, or a tax enacted in lieu thereof. *Webster 3d.* i. *See* acreage rent. *Fay.* j. The amount paid by the lessee, or operator, to the owner of the land, mineral rights or mine equipment, based on a certain amount per ton or a percent of total mineral production. *Fay.* k. The take or area embraced by a colliery lease from the landowner. *Nelson.* l. In Great Britain, a sum of money paid by the mine owner to the landlord for the purchase of a specified quantity of mineral or coal, which is extracted from the earth and removed once and for all. The right to work coal is usually conceded in return for an annual rent and a royalty which is covered by, or merged in, the rent as far as the rent extends. The minimum rent may be fixed at 1,000 pounds per annum, and the royalty rent averages about 6 pence per ton of coal. *See also* minimum rent. *Nelson.*

royer. In foundry work, centrifugal belt thrower. Short length of conveyor belting travels at 2,000 to 4,000 feet per minute and conditions molding sands by discharging them vigorously so as to mix and partially dry them. Similar arrangement also used in forming storage piles and loading small material to ships. *Pryor, 3.*

Rozan process. Luce-Rozan process. Pattinsonizing with steam; an improvement of the Pattinson process. *Fay.*

rozenite. A mineral, $FeSO_4.4H_2O$, isomorphous with ilesite and leonhardtite, from Ornak, western High Tatra, Poland, and from the Staszic mine, Rudki, Poland. Optical data show that it is identical with siderotile, the water content of which has hitherto been uncertain. An unnecessary name. *Hey, M.M., 1961.*

rp Abbreviation for reservoir pressure. Also abbreviated RP. *BuMin Style Guide, p. 61.*

rpm Abbreviation for revolutions per minute. Also rev min^{-1}. *BuMin Style Guide, p. 61.*

rps Abbreviation for revolutions per second. Also rev sec^{-1}. *BuMin Style Guide, p. 61.*

R.S.J. Abbreviation for rolled steel joist. *Pryor, 3.*

Ru Chemical symbol for ruthenium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

rub. *See* brick, c. *ACSG, 1963.*

rubasse. a. Fr. A crystalline variety of quartz containing, distributed through it, spangles of hematite which reflect a ruby red. Also spelled rubace. *Standard, 1964.* Also known as Ancona ruby; Mont Blanc ruby. *Fay.* b. Quartz, stained red in cracks to imitate ruby. *Hess.*

rubbed joint. A very thin mortar joint, made with very thin mortar, and with the brick rubbed together as installed. *Bureau of Mines Staff.*

rubber. a. Guide; binder; conductor. *Mason.* b. Scot. A piece of wood for pump rods to slide on, or for hutches to rub on going round sharp curves. *Fay.* c. A bucking iron or bucking hammer. *See also* bucking. *Fay.* d. A gold-quartz amalgamator in which the slime is rubbed against amalgamated copper surfaces. *Fay.* e. Derb. Fine scythestone; micaceous sandstone. *Arkell.* f. A building brick made from a sandy clay and lightly fired so that it can be readily rubbed to shape for use in gaged work. The crushing strength of such a brick is about 1,000 pounds per square inch. *Dodd.*

rubber belt. A belt for conveying coal or other pay load. It consists essentially of a rubber cover, impregnation and fabric. The fabric may be cotton fabric multiply, solid woven fabric, cord, nylon, or other synthetic fiber, with steel wire reinforcement. *See also* conveyor. *Nelson.*

rubber blanket. A sheet of rubber used as an auxiliary tool in forming. *ASM Gloss.*

rubber bond. A bonding material whose principal constituent is natural or synthetic rubber. *ACSG, 1963.*

rubber-bushed couplings. Consists of two flanged hubs, one equipped with rubber-bushed holes, the other equipped with pins which mesh with the rubber bushings. To prevent excessive wear, the rubber bushings are bushed with nonferrous bushings which provide satisfactory contact and wearing surfaces. *Pit and Quarry, 53rd, Sec. D, p. 66.*

rubber clay. A fine grain, white to light colored clay used as a filler in rubber. Rubber clays must be very low in free silica, and certain compounds of manganese, iron, and copper. *Bureau of Mines Staff.*

rubber conveyor belt. A conveyor belt consisting of a central stress-bearing carcass for transmitting power enclosed in rubber covers to protect the carcass from abrasion and atmospheric changes. The carcass usually consists of plies of cotton duck fabric, but other constructions used are cotton cords, steel cables, and woven fabrics of synthetic fibers, such as rayon, nylon, orlon, dacron, glass, and asbestos. The rubber covers are furnished in various thicknesses and qualities of rubber compounds. *ASA MH4.1-1958.*

rubber-covered steel conveyor. A steel conveyor band with a covering of rubber which is vulcanized to the steel with a special bonding agency. The thickness of rubber on the underside is 2 millimeters and on the carrying side it may vary from 3 to 10 millimeters. The conveyor is relatively cheap and normally used for heavy work on trunk roadways. *Nelson.*

rubber forming. Forming where rubber is used as a functional die part. Processes in which rubber is employed only to contain the hydraulic fluid should not be classified as rubber forming. *ASM Gloss.*

rubber-lined pipes. Pipes prepared for handling corrosive liquids in such processes as acid leaching. Also, pumps and impellers handling ore pulps. *Pryor, 3.* *See also* hydraulic stowing pipe.

rubber-lined skip. A skip with a rubber lining over the bottom. When the ore or coal is discharged the rubber expands and releases the sticky fragments. *Nelson.*

rubber return idlers. Return idlers utilizing a roll or rolls covered with or composed of a rubber material to aid in the cleaning or shock absorption of the return belt. *NEMA MB1-1961.*

rubberstone. A sharp-gritted Ohio or Indiana sandstone used for sharpening shoe knives; also known as shoe stone. *Fay.*

rubber-tired haulage. The underground use of tractors and dump truck haulage, of battery or diesel type, and battery driven shuttle cars. *Nelson.*

rubber wheel. A grinding wheel made with a rubber bond. *ASM Gloss.*

rubbing bars. Aust. Bars placed on the side of a cage nearest to the other cage when rope guides are used. The buffer ropes are placed outside for rubbing bars. *Fay.*

rubbing bed. In quarrying, a bed consisting of a circular disk of cast iron of varying diameters, rotating on a vertical axis. Marble slabs or blocks held on the surface of this rotating disk, to which sand and water are applied, are worn down to desired dimensions and smoothness. *AIME, p. 332.*

rubbing bed man. *See* bed rubber. *D.O.T. 1.*

rubbing bed polisher. *See* bed rubber. *D.O.T. 1.*

rubbing block. A shaped block of abrasive material used in the grinding of blocks of marble or other natural stones. *Dodd.*

rubbing brick. A heavy, coarse-grained stone generally artificial, used principally for rubbing down rough castings, smoothing concrete work, and for dressing marble and granite. *Fay.*

rubbing ropes. Special guide ropes to prevent possible collision between cages or skips at the passing point. *Nelson.*

rubbing stone. a. Stone used for rubbing, smoothing, or sharpening; in particular for facing building stones by removing toolmarks. *Arkell.* b. A block of fine-grained abrasive, for example, corundum, for the stoning of vitreous enamel. *See also* stoning, b. *Dodd.*

rubbing surface. The total area of a given length of airway; that is, the area of top, bottom, and sides added together, or the perimeter multiplied by the length. *Fay.*

rubbing up. N. Staff. A process whereby when flatware is placed in a bung for biscuit firing, the spaces between the rims of the ware are filled with sand (if the ware is earthenware) or calcined alumina (if the ware is bone china); this is done by taking handfuls of sand, or alumina, from a heap around the bung and allowing it to fall between the rims of the ware. *Dodd.*

rubbish. a. Eng. Fallen stone from the roof; holing debris made in sinking, drifting, etc. Waste. *Fay.* b. *See* common goods. *I.C. 8200, 1964, p. 3.*

rubble. a. Loose, unconsolidated overburden consisting mostly of large angular rocks intermixed with a small amount of soil or earthy material. *Long.* b. Rough, irregular pieces of broken stone, partly trimmed, squared, or irregular. *BuMines Bull. 630, 1965, p. 877.* c. Waterworn or rough broken stones or bricks used in coarse masonry or to fill up between the facing courses of walls. *Webster 3d.* d. Rough stone as it comes from the quarry. *Webster 3d.* e. The upper fragmentary and decomposed portion of a mass of stone especially in a quarry; brash. *Webster 3d.*

f. Eng. A hard chalk used in making paths. *Webster 2d.* g. In roadbuilding, rough stones of irregular shapes and sizes, broken from larger masses either naturally or artificially, as by geological action, in quarrying, or in stone cutting or blasting. *Hess.* h. Aust. Ore as it is broken from the deposit. *Hess.*

rubble ashlar. Ashlar with rubble backing. *Webster 3d.*

rubble concrete. Concrete in which large blocks of stone, roughly squared, are placed and arranged roughly in courses, so that they break joint both horizontally and vertically. The stones are placed with not less than 6 inches of space between them so that the concrete may be properly rammed. Care is taken that all voids are filled with concrete. *Nelson.*

rubble drain. A trench filled with stones selected so as to fill the trench, yet to allow the flow of water through it. *Ham.*

rubble drift. A coarse agglomeration of angular debris and large blocks set in an earthy matrix of glacial origin. *Fay.*

rubble ice. Any solid material in irregular fragments; specifically, a collection of broken fragments of floe ice. *Standard, 1964.*

rubbleman. In the quarry industry, a foreman who directs and supervises the work of drilling and splitting stone. *D.O.T. 1.*

rubble masonry. a. Uncut stone, used for rough work, foundations, backing, etc. *Crispin.* b. Rough, unsquared stone laid in irregular courses. *Fay.*

rubble-mound breakwater. A breakwater which is composed of stones weighing up to 5 tons dumped on top of one another at a flat slope. Stone rubble immersed in water is often stabilized by grouting with fluid bitumen and sand injected at 200° C. *See also* blockwork. *Ham.*

rubble-mound structure. A mound of random-shaped and random-placed stones protected with a cover layer of selected stones or specially shaped concrete armor units. (Armor units in primary cover layer may be placed in orderly manner or dumped at random.) *H&G.*

rubbles. Eng. Slack or small coal. *Fay.*

rubblestone. a. Eng. A name given by Kirwan to graywacke. *Fay.* b. *See* rubble. *Fay.*

rubblework. Masonry composed of irregular or broken stone, or fragments of stone mingled with cement or clay. *Standard, 1964.* Also called rubble masonry. *Fay.*

rubbly reef. Aust. A vein much broken up. *Fay.*

rubellite. A dark pink or red tourmaline. *Fay.*

Ruben's brown. Another name for Cassel brown. *Bureau of Mines Staff.*

ruberite. Same as cuprite. *Fay.*

rubicelle. A yellow or orange-red variety of spinel; an aluminate of magnesium. *C.M.D.*

rubidium. A soft, silvery-white, metallic element in group I (the alkali group) of the periodic system. An alkali metal closely resembling potassium in general properties. The element is widely distributed in small quantities in nature. The chief source is carnallite. Slightly radioactive. Symbol, Rb; valences, 1, 2, 3, and 4; atomic number, 37; atomic weight, 85.47; specific gravity of solid, 1.532 (at 20° C), and of liquid, 1.475 (at 39° C); melting point, 38.89° C; boiling point, 688° C; ignites spontaneously in air; decomposes water violently and sets fire to the liberated hydrogen; decomposes alcohol; and soluble in acids. *C.T.D.; Fay; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-132, B-213.*

rubinblende. Synonym for pyrargyrite; proustite; miargyrite. *Dana 6d, pp. 116, 131.*

rubio. Sp. Limonite or brown hematite. *Fay.*

ruble. The Russian monetary unit in gold, coined in silver at a value of about 51.5 cents. *Standard, 1964.*

Ruble hydraulic elevator. A device by which coarse material in placer gravel is separated from the fines and elevated onto a dump. It consists of a chute about 100 feet long inclined at an angle of 17° to the horizontal. The lower 20 feet has a solid bottom; the upper section is fitted with transverse grizzly bars on the bottom set 2½ inches apart. Underneath the grizzly is a closed bottom which leads to a sluice set at right angles to the elevator. A working giant drives gravel and boulders to the foot of the elevator, and a second giant, set in line with the elevator, drives the material over the grizzly, care being taken not to wash the large boulders over the top until after the gold and fine gravel have been sent through the grizzly. *Lewis, p. 388.*

rubman. One who guides and breaks angles (bent) sewer pipe or tile as it emerges from press. *D.O.T. 1.*

rub marks. A minor form of scratching consisting of areas made up of a large number of very fine scratches or abrasions. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

rubolite. A variety of red common opal. From Texas. *Shipley.*

rubstone. A whetstone; also, a stone suitable for making whetstones. *Standard, 1964.*

ruby. Gem variety of corundum, Al_2O_3; transparent, red. Mohs' hardness 9; specific gravity 4. *Pryor, 3.*

ruby, almandine. A violet colored magnesium spinel. Synonym for ruby spinel. *Dana 6d, p. 221.*

ruby alumina. An abrasive similar to white alumina except ruby red in color due to the presence of chromic oxide. *ACSG, 1963.*

ruby arsenic. An early name for realgar. *See also* ruby sulfur. *Fay.*

ruby, balas. A rose-red magnesium spinel. *Dana 6d, p. 221.*

ruby blende. A red or brownish-red variety of transparent, crystallized sphalerite. *Standard, 1964. See also* ruby zinc. *Fay.* Synonym for rubinblende.

ruby cat's eye. A term applied to girasol ruby with a chatoyant effect. Although a true cat's eye is theoretically possible in a ruby, as well as in any gem species yielding asterias, a well-defined single band of light occurs rarely. *See also* girasol. *Shipley.*

ruby copper. An early name for cuprite, from its color. *Fay.*

ruby copper ore. *See* cuprite.

ruby glass. Glass having a characteristic red color resulting from the presence of colloidal gold, copper, or selenium. To produce gold ruby, a batch containing a small quantity of gold is first melted and cooled; at this stage it is colorless, but when greatly heated, it develops a red color as colloidal gold is formed. For copper ruby, produced in the same manner but with copper substituted for the gold, the batch must contain zinc and must be melted in a non-oxidizing atmosphere. The most common ruby glass today is selenium ruby; a recommended batch contains 2 percent Se, 1 percent CdS, 1 percent As_2O_3, and 0.5 percent C; the furnace atmosphere must be reducing. *Dodd.*

ruby juice. Transparent red lacquer sometimes used for coating pavilion of stones. *See also* lacquer back. *Shipley.*

ruby luster. In ceramics, any red or reddish metallic luster. *Standard, 1964.*

ruby matrix. Any rock embedded with red corundum; especially that which consists of smaragdite and red corundum found in Clay County, N.C., and sometimes cut cabochon. *Shipley.*

ruby mica. An old synonym for goethite. *Fay.*

ruby, oriental. Corundum. *Dana, 6d, pp. 210, 1031.*

ruby sand. Sand, colored red by garnets. Beach sands at Nome, Alaska, have been so called. *Hess.*

ruby sapphire. A term sometimes used for almandine sapphire or amethystine sapphire. *Shipley.*

ruby silver. Dark ruby silver is pyrargyrite and light ruby silver is proustite. *Dana 17.*

ruby spinel. That variety of magnesian spinel, $MgAl_2O_4$, which has the color but none of the other attributes, of true ruby. Also called spinel ruby, a deceptive misnomer. *C.M.D.*

ruby sulfur. Same as realgar. *Standard, 1964.* Also called ruby arsenic; ruby of arsenic; ruby of sulfur. *Fay.*

ruby tin. Red cassiterite. *Shipley.*

ruby zinc. A popular name for transparent sphalerite of a deep red color, and also for zincite with the same characteristics. *Fay.*

ruck. a. Scot. A line of crushing and faulting, Paisley. *Arkell.* b. A crease, fold, wrinkle, or ridge. *Arkell.* c. Lanc. The stock of coal on the bank. *Fay.* d. A streak of pyrite in roofing slates. *Fay.*

ruckle. Eng. Loose heap of stones, Yorkshire lead mines. *Arkell.*

rud. Prov. Eng. Red ocher. *Standard, 1964.*

rudaceous. a. The texture of the rubble rocks in which the grain is larger than that of a sand grain. Consolidated rocks of this type are rudites. Synonym for psephite. *A.G.I.* b. Applied to coarse-grained, fragmental sedimentary rocks of gravel or rubble texture. The term is broader than pebbly, bouldery, or the like, since it implies no special size or shape of fragments throughout the gravel range. *A.G.I.*

rudding. N. of Eng. The act of clearing away refuse rock. *Fay.*

ruddle. Eng. A common term meaning red, for a red variety of iron ore. *Fay.*

Rudista. A division of Eulamellibranchia comprising extinct chiefly Cretaceous bivalve mollusks with one valve elongate, conical, and thick-shelled and the other small and fitting like a lid on the first. *Webster 3d.*

rudite. Suggested by Grabau for fragmental sedimentary rocks composed of fragments coarser than sand grains. Synonym for rudyte; psephite. *A.G.I.*

rudyte. Synonym for rudite. *A.G.I.*

Rueping process. An empty-cell process of pressure creosoting. *Ham.*

ruffled groove cast. A groove cast with a feather pattern, that is, a groove with lateral wrinkles that join the main cast in the downcurrent direction at an acute angle. *Pettijohn.*

Ruggles-Coles dryer. Rotary drier or kiln, in which material is worked through a horizontal cylinder counter to drying or heating gas blown through by fan. *Pryor, 3.*

ruggstones. Eng. Ferruginous nodules produced by oxidation of iron pyrites with the formation of selenite and brown powder, in the Gault at Barnwell near Cambridge. *Arkell.*

Ruhrstahl-Heraeus (R-H) method. *See* vacuum degassing.

ruin. Eng. A term occasionally employed in familiar description for certain minerals whose sections or cut faces exhibit the appearance of ruined buildings, as ruin agate, ruin marble, etc. *Fay.*

ruin agate. Varient of agate. *See also* ruin. *Dana 6d, p. 188.*

ruin aragonite. Brecciated Mexican onyx (aragonite). *Schaller.*

ruiniform. Having the form or appearance of ruins, as certain minerals. *Fay.*

ruin marble. A variety of marble. *See also* ruin. *Dana 6d, p. 267.*

RuL Abbreviation for refractoriness under load. *See also* refractoriness under load. *Dodd.*

ruled structure. In mica, regular sharply defined parting planes that intersect the basal cleavage plane at about 67°. Also known as ruling structure. *Skow.*

rule of approximation. Applicable to placer mining locations and entries upon surveyed lands, to be applied on the basis of ten-acre legal subdivisions. *Ricketts, I.*

rule of thumb. A statement or formula that is not exactly correct, but is accurate enough for use in rough figuring. *Nichols.*

ruling grade. The grade which determines tonnage that can be handled by a single locomotive over a particular engine district. *Urquhart, Sec. 2, p. 26.*

ruling gradient. *See* limiting gradient. *Ham.*

ruling wage. The wage rate payable to each category of worker in a mine. The rate naturally increases with the skill and responsibility attached to the work, for example, miners, heading and tunnel men receive higher rates than trammers, packers, and general laborers. *Nelson.*

rull. Eng. To wheel or trundle, as ore. *Webster, 2d.*

ruller. Corn. A workman who wheels ore in a wheelbarrow underground. *Fay.*

rumanite. A yellow amberlike resin obtained from Romania. *Fay.*

rumble; rumel. *See* rammel. *Arkell.*

rumbling. *See* scouring. *Dodd.*

Rumford's photometer. A photometer consisting of a rod standing vertically in front of a white screen on which are cast shadows of it by the two light sources whose intensities are to be compared. When the shadows are of equal darkness the ratio of the intensities of the sources equals the square of the ratio of their distances from the screen. *C.T.D.*

rumpled texture. A texture showing folded or rumpled minerals often with platy forms, such as specularite. *Schieferdecker.*

rumples. Eng. A bed of sofish limestone beneath the White Lias, with thin clayey partings, to which the wells of the Radstock district are sunk. It contains muscles in abundance. *Arkell.*

run. a. The direction in which a vein of ore lies. *Webster 3d.* b. A caving in of a mine working. *Webster 3d.* c. A fall of a cage in a mine shaft. *Webster 3d.* d. An inclined passage between levels in a mine. *Webster 3d.* e. A settling trough for slimes used in working ore. *Webster 3d.* f. An irregular body of ore having an approximately horizontal direction. *Webster 3d.* g. The horizontal distance to which a mine drift is or may be carried. *Webster 3d.* h. A direction of secondary or minor cleavage; grain. *Compare* rift. *Webster 3d.* i. The length of time reduction works or a mine is kept in operation without stopping to clean up, make repairs, or for other purposes. *Fay.* j. By the run. A method of paying coal miners per linear yard of breast excavated instead of by the amount of clear coal produced. *Fay.* k. A journey. *Fay.* l. A word commonly made use of to express the degree of leverage or breaking-down power of a shot. *Fay.* m. Eng. To work a winding, or other engine. *Fay.* n. Soft ground is said to run when it becomes mud and will not hold together or stand. *Fay.* o. Corn. To quit a piece of work before it is quite finished. *Fay.* p. Train, set. *Mason.* q. Course of the lode or rich gutter (a run of gold). *Gordon.* r. The escape of any flowing material into the tunnel area; it may be sand, gravel or mud. *Stauffer.* s. *See* grain. *AIME, p. 326.* t. Eng. The grain of stone, Northamptonshire. *Arkell.* u. Copper pyrites, blister ore. *Arkell.* v. Derb. & N. Wales. A branch that flies out of a vein or pipe. *Arkell.* w. The distance or route covered by a conveyor. *ASA MH4.1-1958.* x. The length of feed or the advance made by a bit before it becomes necessary to rechuck the rods. Feeds on diamond drills are 1 to 3 feet long; thus a 3-foot advance on a machine equipped with a 3-foot feed screw or quill would be one run. *Compare* pull, f. *Long.* y. Sometimes used as a synonym for round trip. *Long.* z. To operate a drill or other machine. *Long.* aa. As used by churn drillers, the footage of a borehole from which the cuttings are collected as a single sample. *Long.* bb. A length of pipe that is made of more than once piece of pipe. *Strock, 3.* cc. The portion of any fitting having its ends in line or nearly so, in contradistinction to the branch or side opening, as of a tee. The two main openings of an ell also indicate its run, and when there is a third opening on an ell, the fitting is a side outlet or back outlet elbow, except that when all three openings are in one plane and the back outlet is in line with one of the run openings, the fitting is a heel outlet elbow or a single sweep tee, or sometimes a branch tee. *Strock, 3.* dd. Continuous production, operation of any furnace between major repairs. *Bureau of Mines Staff.* ee. In ore testing, series of treatments in more or less continuous sequence, made to give information as to effects of a given method of concentration. *Pryor, 3.* ff. To make by pouring melted metal into molds; mold; found. *Standard, 1964.* gg. An act of flowing, or that which flows; especially, (1) the quantity that flows at one time or during one operation or period; as, a run of iron in a melting furnace or (2) a single operation of pouring or casting in a foundry. *Standard, 1964.* hh. A test made of a process or material such as an ore. *Webster 3d.* ii. A term employed in the Central United States for a lead-zinc deposit (in Paleozoic limestone or dolomite) following a certain line in the plane of stratification parallel to a joint or fault system. *Schieferdecker.*

runaround. a. A passage driven in the shaft pillar to enable men and animals to pass safely from one side of the shaft to the other side. *See also* bypass, a. *Fay.* b. A conveyor in the form of a circuit as distinguished from a shape in which the carrying and return runs travel substantially the same path. *ASA MH4.1-1958.*

runaway. The uncontrolled downward rush of trams when the haulage rope breaks or becomes detached while the set is being hauled up an incline. Safety devices are provided to arrest or derail such trams. *Nelson.*

runaway switch. Catch points or other automatic diverting switch gear; acts when a mine car runs downgrade or out of control by diverting it to a siding. *Pryor, 3.*

runback. a. To retract feed mechanism to its starting position when rechucking. *Long.* b. To drill slowly downward toward the bottom of the hole when the drill string has been inadvertently or deliberately lifted off-bottom during a rechucking operation. *Long.*

runback water. Scot. Water from a set of pumps that is run back and pumped up again in order to keep the pump from going "on air" while the other pumps are at work. *Fay.*

run coal. Term used by British miners for soft bituminous coal. *Tomkeieff, 1954.*

rundown. A fault in vitreous enameling resulting from an excessive amount of covercoat becoming concentrated in one area of the ware. *Dodd.*

run dry. To drill without circulating a drilling fluid or mud. *Compare* dry block. *Long.*

rung; rundle; round. A step or crossbar of a ladder. *Zern.*

runic texture. Suggested by Johannsen as an alternative to graphic texture, since the intergrown quartz and feldspar resemble runic characters. *C.T.D.*

run in. a. To lower the assembled drill rods, core barrel, and bit, or other types of pipe, casing, or drill string into a borehole. *Long.* b. To drill the first few inches slowly at the beginning of a core run or when collaring a borehole. *Long.* c. The initial period of operation of any mechanism during which the component parts seat themselves. *J&M.*

run-in table. *See* entry table. *ASA MH4.1-1958.*

runite. Suggested by Johannsen as an alternative to graphic granite. *C.T.D.*

run levels. To survey an area or strip to determine elevations. *Nichols.*

runnel. A rivulet or small brook. *Fay.*

runner. a. A transportation employee who runs loaded mine cars by gravity from the working places to the gangway and assists in the delivery of empty cars. *Hudson.* b. An operator. *Austin.* c. Bearer or carrier girder, beam, or bar. *Mason.* d. Eng. A movable bridge or platform over the mouth of a shaft. Also called jiddy. *Fay.* e. A fault slip. *Fay.* f. A crowfoot. *Fay.* g. York. A flat piece of timber placed above bars, and connecting them. *Fay.* h. Leic. The piece of timber placed in a horizontal position between two inclined sprags in cokermegs. *Fay.* i. Scot. A man or boy who goes with a train of cars in mechanical haulage. *Fay.* j. A steel-shod poling board, driven into unbroken but loose ground as excavation progresses. *Webster 2d.* k. One who operates or manages anything, as a machine, especially, the driver of a locomotive. *Standard, 1964.* l. A stone slab or rubber moved over a stone surface to polish it. *Standard, 1964.* m. A horizontal channel in the sand of a mold from the bottom of the gate to the space left by the pattern. *Standard, 1964.* n. Any pouring gate. *Standard, 1964.* o. S. Staff. A runaway cage or skip, due to failure of brakes or breaking of cable. *Fay.* p. Synonym for driller. *Long.* q. *See* car runner. *D.O.T. 1.* r. A channel through which molten metal flows from one receptacle to another. *ASM Gloss.* s. The portion of the gate assembly that connects the downgate, sprue, or riser with the casting. *ASM Gloss.* t. Parts of patterns and finished castings corresponding to the described portion of the gate assembly. *ASM Gloss.*

runner bar. Iron casting attached to a circular grinding runner or head for abrasive grinding of plate glass. *ASTM C162-66.*

runner box. A distribution box that divides the molten metal into several streams before it enters the mold cavity. *ASM Gloss.*

runner brick. A fireclay shape, square in section and about 1 foot long, with a hole about 1 inch in diameter along its length and terminating in a spigot at one end and a socket at the other end. A number of such refractory pieces, when placed together, form a passage through which, during the bottom pouring of steel, the molten metal can pass from the center brick to the base of the ingot mold. *See also* center brick. *Dodd.*

runner brick press. A press for forming shapes having holes through them, particularly for open-hearth runner brick. *A.R.I.*

runner cut. An imperfection in plate glass resulting from rupture of the surface by the runner bar. *ASTM C162-66.*

runner-on. *See* bottomer, b. *Fay.*

runners. a. Vertical timber sheet piles driven to protect an excavation from collapse. *See also* guide runner; cross poling. *Ham.* b. English term for sheet piling. *Stauffer.*

runner stick. A slightly tapering, round stick, used as a pattern for the opening through which molten metal is to be poured into the mold. *Standard, 1964.*

running. a. The act or process of operating a drill, drilling with a bit, or lowering casing, drivepipe, or drill string into a borehole. *Long.* b. Earth and rock that will not stand, especially when wetted, and falls, flows, or sloughs into a borehole or a workplace in a mine. *Long.* c. A trade term used to cover the overall process of converting quicklime to a milk or putty. It comprises slaking, sieving, and maturing. *Stowell.*

running amain. Scot. The running of a winding rope down into the shaft, due to failure of brake or other appliances. *Fay.*

running balk. Eng. A set of timbers in the direction of a drift (at its side instead of across it) to form a support for the crosspieces. A running balk at each side, with balks or planks supported by them, is the common method of timbering through an old bord or place where the roof has fallen badly. *Fay.*

running bar. Eng. *See* stringer, g. *SMRB, Paper No. 61.*

running batch. The regular batch formulated to produce the desired composition when used with its own cullet. *ASTM C162-66.*

running block. *See* traveling block. *Long.*

running bond. A term applied to overlapping stretchers, and also to English and American bond. *Bureau of Mines Staff.*

running bridge. Aust. A platform, on wheels, that serves as a cover for a shaft in process of sinking, and on which buckets or skips are landed. *See* runner, d. *Fay.*

running coal. A term applied to bituminous coal on account of its tendency to soften and cohere when burning. It is also applied to a very friable coal which disintegrates and flows into the workings. *Nelson.*

running dry. The act of drilling without circulating a drilling fluid. *Long.*

running fit. Any clearance fit in the range used for parts which rotate relative to each other. Actual values of clearance resulting from stated shaft and hole tolerances are given for nine classes of running and sliding fits for 21 nominal shaft sizes in ASA B4.1-1955. *ASM Gloss.*

running ground. a. Insecure or easily caved wall of excavation. *Pryor, 3.* b. Ground which is incoherent, for example, soils, sand, peat, moss, or waterlogged material. It may be semiplastic or plastic, such as wet clays. All such deposits deform readily under pressure and relief is obtained by squeezing into openings, such as mine workings. The miner uses the term running ground to indicate the difficulty of support and sometimes of danger. *See also* forepoling; quicksand; mudrush. *Nelson.* c. Superincumbent material that breaks off readily and falls into the mine openings. *Weed, 1922.* d. Earth and rock that falls, runs, or caves in. *Standard, 1964.*

running gug. Som. A self-acting incline. *Fay.*

running head. Eng. *See* stringer, g. *SMRB, Paper No. 61.*

running in. a. Preliminary runs made with new machines or groups, during which they are gradually worked up to their rated performance. *Pryor, 3.* b. The act or process of lowering a casing, drivepipe, or drill string into a borehole. Synonym for break in. *See also* run in, b. *Long.*

running kiln. A lime kiln that is fed from above, and delivers continually below. *Standard, 1964.*

running lift. Light mine pump used in sinking which can be raised or lowered in shaft as required. *Pryor, 3.*

running measures. Eng. Sand and gravel containing much water. *Fay.*

running off. In founding, the opening of the taphole of a blast furnace and allowing of the molten metal to flow out to the molds. *Standard, 1964.*

running on. *See* afterrunning. *Institute of Petroleum, 1961.*

running-out machine. Name sometimes applied to a batch type extrusion machine of the type more commonly called a stupid. *See also* stupid. *Dodd.*

running roll. A cylinder used in plate-glass manufacturing for spreading the soft glass on the casting table. *Standard, 1964.*

running rope. A flexible rope of 6 strands, 12 wires each, and 7 hemp cores. *H&G., p. 130.*

running sand. a. An unconsolidated sand. *See also* run, e. *Long.* b. Quicksand. *Fay.*

running sheave. A sheave used as a single-pulley traveling block. *Long.*

running stone. A diamond that cuts well with the grain. *Hess.*

running the drum. Eng. The lowering or sinking of a cylinder or drum through quick ground, to secure the upper part of a mine shaft. *Fay.*

runoff. a. That portion of the rainfall that is not absorbed by the deep strata; is utilized by vegetation or lost by evaporation or may find its way into streams as surface flow. *Nelson.* b. The collapse of a coal pillar in a steeply pitching seam, caused either naturally or by a small shot placed in it. This occurs in connection with pillar robbing, and the pillar is said to have run off. *Fay.*

runoff coefficient. *See* impermeability factor. *Ham.*

runoff pit; spill pit. Catchment to which spillage can gravitate should it be necessary to dump contents of such mill machines as classifiers, thickeners, slurry pumps. Provided with reclaiming pump so that contents can be returned to appropriate part of flow line. *Pryor, 3.*

run-of-kiln quicklime. Unclassified quicklime as discharged from a kiln. *Boynton.*

run of lode. Corn. Its direction or course. *Fay.*

run-of-mill; mill-head ore. Ore finally accepted by mill for treatment, after waste rejection, dense media rejection. Original mined ore (run-of-mine) is ore as severed and hoisted. *Pryor, 3.*

run-of-mine. a. The raw coal (or ore) as it is delivered by the mine cars, skips, or conveyors and prior to treatment of any sort. *See also* rom. *Nelson.* b. *N.S.W.* Average grade of ore produced from a mine. *New South Wales.*

run of ore. *See* shoot of ore. *Fay.*

run-of-the-furnace. A term used to mean a furnace campaign. *Bureau of Mines Staff.*

run of the rock. Same as run, h. A direction of easy splitting in a rock, but subordinate in ease to the rift direction. *Fay.*

runout. a. The unintentional escape of molten metal from a mold, crucible, or furnace. *ASM Gloss.* b. The defect in a casting caused by the escape of metal from the mold. *ASM Gloss.* c. In mineral processing, dumping of pulp before contained solids have packed down and choked stalled mechanism in event of breakdown or power failure. *Pryor, 3.*

runout fire. A forge in which cast iron is refined. *Fay.*

runout table. a. Any conveyor carrying material from the discharge end of a processing machine, such as metal from a rolling mill. *ASA MH4.1-1958.* b. A roll table used to receive a rolled or extruded section. *ASM Gloss.*

run rider. Eng. A lad who goes with a train (trip) on an engine plane. A trip rider. *Fay.*

runs. a. Purchases from a producing lease usually computed in a monthly statement or run ticket. *Wheeler.* b. Eng. Percentage of metal in the ore. The ore runs (contains) ten percent copper. *Fay.*

run splent coal. Term used by Scottish miners for a variety of splint coal of a clear and glossy black color. *Tomkeieff, 1954.*

run steel. Malleable castings. *Fay.*

run-the-tow. a. Scot. To cause the cages to traverse the shaft preparatory to allowing men to descend. *Fay.* b. Scot. Sliding down the shaft on the winding rope. *Fay.*

run-to-waste. Drill cuttings that are not collected or saved as a sludge sample and are allowed to collect in the sump; also, the return drill-circulation fluid not returned to a sump for recirculation. *Long.*

Ruoss jig. A jig used chiefly on tin dredges to treat the undersize from the main revolving screen. It differs from the Harz jig in that there is no longitudinal division and the screening compartment extends over the whole surface of the jig; the plungers are located in the hutch below the screen, are set in a vertical plane and reciprocate horizontally. The screening area of this jig is double that of a Harz and great saving in space results from the location of the plungers within the hutch and below the screen. *Harrison, p. 125.*

Rupelian. Middle Oligocene. *A.G.I. Supp.*

Rupert's drop. A piece of molten glass dropped into water, so that it is rapidly chilled outside. Great stresses are set up inside, but are more or less balanced. If, however, the tail of the drop is pinched off, the release of stress causes such a violent readjustment that the drop is shattered with a loud report. *C.T.D.*

rupture. Deformation characterized by loss of cohesion. Frequently flow grades into rupture, with a progressive loss of cohesion, until complete separation occurs. *Challinor.*

rupture envelope. *See* Mohr envelope. *ASCE P1826.*

rupture factor. The term is used with reference to brittle materials, that is, materials in which failure occurs through tensile rupture rather than through excessive deformation. For a member of given form, size, and material, loaded and supported in a given manner, the rupture factor is the ratio of the fictitious maximum tensile stress at failure, as calculated by the appropriate formula for elastic stress, to the ultimate tensile strength of the material as determined by a conventional tension test. *Ro.*

rupture line. *See* Mohr envelope. *ASCE P1826.*

rupture strength. *See* strength. *Billings, 1954, p. 17.*

rupture zone. In explosion-formed crater nomenclature, the region of excessive in-place crushing and fracturing. With increased distance from the shot site, the plastic zone becomes dominant. *Mining and Minerals Engineering, v. 2, No. 2, February, 1966, p. 65.*

rupturing capacity. a. The ability of a switch, in a particular situation, to clear safely the heaviest fault current which can flow, and which depends upon the amount of power available in the system, size of cables, transformers, etc. *Mason, v. 2, pp. 437-438.* b. *See* breaking capacity. *C.T.D.*

rush. a. An old-fashioned way of exploding blasts by filling a hollow stalk with slow powder and then igniting it. *Zern.* b. *Can.* Stampede of prospectors into a new discovery area. *Hoffman.* c. A moving forward with rapidity and force. *Webster 3d.* d. *Scot.* The sudden weighting of the roof when robbing the pillars begins. *Fay.* e. A sudden movement of a large number of miners to some new locality. *See also* stampede. *Fay.* f. *See* spire, a. *Fay.* g. A place where gold is found in abundance. *Standard, 1964.*

rush coal. Lignite composed mainly of rushes and similar plants. *Tomkeieff, 1954.*

rusher. One of the persons who rush into a region when it is first opened to settlement, or, on a discovery of precious metal. *Standard, 1964.* A stampeder. *Fay.*

rush gold. Gold coated with oxide of iron or manganese; rusty gold. *Fay.*

rusks. N. of Eng. Small slack, or that coal next larger than dust. *Fay.*

russellite. Yellow pellets approximating in composition to $Bi_2O_3.WO_3$. X-ray examination suggests that it is a mixed (tetragonal) crystal of Bi_2O_3 and WO_3, rather than a bismuth tungstate. Occurs as an alteration product with native bismuth and wolframite in Cornwall, England. *Spencer 15, M.M., 1940.*

Russell process. A metallurgical process similar to the Patera process, except that cuprous-sodium hyposulfite is used in addition to the sodium hyposulfite. *Liddel 2d, p. 495.*

Russell shaker. Laboratory screen machine, also commercial screen, operated by out-of-balance drive which imparts rotary motion to load in circular sieve. *Pryor, 3.*

Russia iron. A high-grade, smooth, glossy sheet iron, not liable to rust: once made by a process that was long a secret with Russian manufacturers. The sheets were subjected to severe hammering in piles with powdered charcoal between them. *Standard, 1964.*

Russian alexandrite. Alexandrite from the Ural Mountains which occurs in smaller sizes than Ceylon alexandrite. Also more bluish. *Shipley.*

Russian crystal. Colorless selenite. *Shipley.*

Russian jasper. Red flecked jasper. *Shipley.*

russkohle. Ger. Name for sooty coal. *Tomkeieff, 1954.*

rust. a. A corrosion product consisting of hydrated oxides of iron. Applied only to ferrous alloys. *ASM Gloss.* b. A mixture of iron filings, ammonium chloride, and sometimes sulfur, moistened and placed between iron surfaces, where it hardens by oxidation, and forms a solid joint called a rust joint. *Standard, 1964.* c. Porous red-brown oxide of iron produced by action of oxygen, moisture, and electrolysis of the metal. Rustless irons are special alloys, usually containing 12 percent or more chromium. Rust prevention is procured by use of special grease coatings, galvanizing, storage with low humidity or use of sacrificial anodes, or applied electric current. *Pryor, 3.*

rust ball. a. A lump of yellow iron ore found in the chalk, in Cambridgeshire, England. *Standard, 1964.* b. Such material collectively. *Standard, 1964.*

rusticating. A mechanical process for the roughening of the facing surface of a clay building brick, while it is still moist, to give it a rustic appearance when fired; wire combs or brushes, or roughened rollers are used. *Dodd.*

rustic brick. A fired clay facing brick with a rough textured surface; this effect can be obtained by stretching a wire across the top of the die so that it removes a thin slice of clay from the moving column. *Dodd.*

rustic ware. Brown, glazed, buff, or light-brown terra cotta, sometimes green mottled. *Standard, 1964.* Used for ornament in construction. *Fay.*

rusting. The formation of brown, rust spots, on the surface during the drying of a coat of wet enamel on a ferrous metal base. This condition may be avoided by the use of proper drying conditions or by adding an antirust chemical such as sodium nitrite to the mill addition. *Hansen.*

rust inhibitors. A substance or process used on iron-base materials which prevents or significantly retards rusting. *Bennett 2d, 1962.*

rust joint. Employed to secure rigid connection. The joint is made by packing an intervening space tightly with a stiff paste which oxidizes the iron, the whole rusting together and hardening into a solid mass. It generally cannot be separated except by destroying some of the pieces. One recipe is 80 pounds cast-iron borings or filings, one pound sal ammoniac, two pounds flowers of sulfur, mixed to a paste with water. *Strock, 3.*

rustle. In brickmaking, to increase the heat of (a kiln). *Standard, 1964.*

rustler. In anthracite and bituminous coal mining, a general term applied to any worker who looks after the haulage system, performing the necessary work by which mine cars are raised and lowered to and from the mine surface. May be designated according to job, as clipper; rollerman. *D.O.T. 1.*

rustless process. A process for the manufacture of stainless steels in an electric furnace which uses a chrome ore as a source of chromium with or without the addition of silicoferrochromium, conjointly with stainless steel scrap. The hearth of the furnace is lined with chromite bricks. The hearth temperature is 1,780° C. *Osborne.*

rust spotting. A fault in vitreous enameling; the appearance of rust colored spots in ground coats of high $Na_2O:B_2O_3$ ratio. It can often be cured by the addition of 0.05 to 0.10 percent of sodium nitrate to the enamel slip. *Dodd.*

rusty. a. Affected by or coated with rust. *Webster 3d.* b. Having or tinged with the color of iron rust; of the color rust. *Webster 3d.* c. Applied to coal discolored by water or exposure, as well as to quartz, etc., discolored by iron oxide. *Fay.*

rusty gold. Cal. Free gold, that does not readily amalgamate, the particles being covered with a siliceous film, thin coating of oxide of iron, etc. *Fay.*

rute. a. In mining, threadlike veins of ore. *Standard, 1964.*

ruthenium. A hard, brittle, silvery-white, polyvalent, rare metallic element in group VIII of the periodic system. It is one of the platinum metals and resembles osmium but is more resistant to corrosion (as by oxidizing acids). It occurs in platinum ores, especially in iridosmine. Used chiefly in hardening platinum and palladium alloys. Symbol, Ru; valences, 0, 1, 2, 3, 4, 5, 6, 7, and 8; atomic number, 44; atomic weight, 101.07; specific gravity, 12.41 (at 20° C); hexagonal (alpha); four allotropic crystal forms: (1) alpha ruthenium; (2) beta ruthenium; (3) gamma ruthenium; and (4) delta ruthenium; transformation temperatures, 1,035° C, 1,200° C, and 1,500° C; melting point, 2,250° C or 2,450° C; boiling point, 3,900° C or 4,150° C; insoluble in water, in aqua regia, in acids, and in alcohol; and soluble in fused alkalies. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-132, B-215; Bureau of Mines Staff.*

rutherfordine. A very rare, strongly radioactive, possibly orthorhombic, yellow mineral, $(UO_2)(CO_3)$, in earthy masses and in cubic pseudomorphs after uraninite composed of aggregates of minute fibers; from east Africa; found associated with mica. Most specimens of rutherfordine are mixtures containing uranium silicates and oxides. Not to be confused with rutherfordite. *Crosby, p. 37.*

rutilated quartz. Quartz penetrated by needles of rutile. *Fay.*

rutile. A weakly radioactive, tetragonal mineral consisting of titanium dioxide, TiO_2, commonly in prismatic crystals; reddish-brown to red; sometimes yellowish, bluish, violet, or black; columbian and tantalian varieties are black. It is found commonly in gneiss and schist; an accessory mineral in igneous rocks, especially those rich in hornblende; also found in pegmatites and in metamorphosed limestone; a common detrital mineral. Another tetragonal, TiO_2, with different facial angles is called anatase or octahedrite. Orthorhombic TiO_2 is known as brookite. *Crosby, p. 132; Larsen, p. 77.*

rutile, ceramic. Trade designation for 92 percent TiO_2; light brown powder; specific gravity, 4.2 melting point, 1,790° C; particle size (average), 44 microns maximum; insoluble in water and in alkalies; slightly soluble in dilute mineral acids; and soluble in hot concentrated sulfuric acid. Used in glazes, in floor tile, and in artware and dinnerware bodies. *CCD 6d, 1961.*

rutterite. An equigranular, medium-grained, dark pink igneous rock composed essentially of feldspar, microperthite, microline, and sodaclase, with minor amounts of nepheline, biotite, graphite, magnetite, and amphibole. There is 42 percent microcline, 46 percent sodaclase, ± nepheline, 12 percent hornblende, and traces of titanite and apatite. *Johannsen, v. 4, 1938, p. 46.*

rutting the dog. Can. Loafing or soldiering on a job. *Hoffman.*

ruttles. Broken strata found in close proximity to a fault. *See also* fault smash. *Nelson.*

R-value. The partial dispersion ratio of a glass expressed as $(n_d\text{-}n_c)(n_f\text{-}n_c)^{-1}$ where n_c, n_d, and n_f are the refractive indices at wavelengths equivalent to the spectral lines C, D, and F. *Compare* Abbe number. *Dodd.*

R-wave. Synonym for Rayleigh wave. *A.G.I.*

R.W.F. lamp. Essentially a flame safety lamp with an inlet tube through which a sample of mine air may be introduced through an aspirator. A probe enables a sample of air to be drawn from a height of up to 11 feet with the lamp held at eye level. A small magnifying glass is fitted to facilitate the estimation of the gas cap. It may be used to detect a firedamp layer near the roof. *Nelson.*

ryder. *See* rider. *Arkell.*

ryolex. A volcanic rock product consisting of about 70 percent silica, the remainder being principally alumina. Its main use, after a heat treatment, is in lightweight thermal insulation. *Lee.*

Rziha's theory. A mine subsidence theory that is a variant or extension of the vertical theory. In this theory, allowance is made for movements beyond the undermined area, but the dip of the beds is considered to be of little or no influence. Rziha maintained that if rock is undercut, it will stay undisturbed if cohesion exceeds gravity and will fall if gravity exceeds cohesion. *Briggs, p. 37.*

S

s a. Symbol for surface area, specific surface. *Zimmerman, p. 104.* b. Symbol for entropy per unit weight. *Zimmerman, p. 42.* c. Symbol for linear distance. *Zimmerman, p. 37.* d. Symbol for linear displacement. *Zimmerman, p. 159.* e. Abbreviation for second, especially in submultiples such as ms for millisecond and μs for microsecond. *Zimmerman, p. 131.* f. Abbreviation for solubility. *Zimmerman, p. 99.* g. Abbreviation for sol, solid, solidus. *Webster 3d.* h. As a subscript, a symbol for sublimation. *Zimmerman, p. 103.* i. Abbreviation for stere. *USGS Sugg., p. 203.* j. Abbreviation for sphere, spherical, speed, silver, silicate, standard, small. *Webster 3d.* k. Abbreviation for steel. *Zimmerman, p. 102.* l. Abbreviation for series. *Zimmerman, p. 96.* m. Abbreviation for snow. *Zimmerman, p. 99.*

s a. Symbol for surface area, specific surface. *Zimmerman, pp. 148, 170.* b. Symbol for entropy per unit weight or per unit mass, specific entropy, entropy per atom, per molecule, or per mole. *Zimmerman, pp. 145, 155, 368.* c. Symbol for linear distance. *Zimmerman, p. 154.* d. Symbol for displacement. *Zimmerman, p. 154.* e. Symbol for solubility. *Zimmerman, p. 170.* f. Symbol for slope of cuts and embankments. Also given as s. *Zimmerman, p. 186.* g. Symbol for stress, normal; stress, shear. *Zimmerman, p. 184.* h. Symbol for sensitivity of phototube, dynamic. *Zimmerman, p. 165.* i. Symbol for scattering coefficient (turbidity). *Zimmerman, p. 164.* j. Symbol for spin. *Zimmerman, p. 165.*

s- a. An abbreviated prefix meaning symmetrical in the names of organic compounds. For example, *s*-dichloroethylene. *Webster 3d.* b. An abbreviated prefix meaning secondary, especially in the names of organic radicals. For example, *s*-butyl. *Webster 3d.*

S a. Chemical symbol for sulfur. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.* b. Abbreviation for south. *Zimmerman, p. 100.* c. Symbol for Silurian. *USGS Sugg., p. 86.* d. Symbol for surface area, cross-sectional area. *Zimmerman, pp. 32, 104.* e. Symbol for entropy. *Zimmerman, p. 42.* f. Abbreviation for solubility. *Zimmerman, p. 99.* g. Abbreviation for sand, science. *Zimmerman, p. 94.* h. Abbreviation for snow. *Zimmerman, p. 99.*

S a. Symbol for area, surface area, cross sectional area, projected area. *Zimmerman, pp. 145, 151, 365.* b. Symbol for entropy, entropy per mole, total value of entropy, total value of entropy per mole. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100; Zimmerman, pp. 145, 155.* c. Symbol for solubility. *Zimmerman, p. 148.* d. Symbol for slope of energy grade line. Also given as S. *Zimmerman, p. 186.* e. Symbol for sand. *Zimmerman, p. 341.* f. Symbol for sensitivity of phototube, static. *Zimmerman, p. 164.* g. Symbol for total spin. *Zimmerman, p. 165.*

sa Abbreviation for semianthracite. *BuMin Style Guide, p. 61.*

Saalian orogeny. Mid-Permian diastrophism. *A.G.I. Supp.*

Sabalite. A trade name for a banded variscite. Same as trainite. May be banded vashegyite and laubanite (?). From Manhattan, Nev. *English.* Used as a gem stone. *Hess.*

sabotage. a. Destruction of property (as tools of production or materials) or deliberate slowing down of work or interference with production in any way during a labor dispute. *Webster 3d.* b. Willful effort by indirect means to hinder, prevent, undo, or discredit (as a plan or activity); deliberate subversion. *Webster 3d.*

sabugalite. A mineral, $HAl(UO_2)(PO_4)_2 \cdot 16H_2O$, pseudotetragonal, isostructural with fully hydrated autunite. Crusts of minute platy yellow crystals in pegmatite. Named from locality, Sabugal, Beira, Portugal. *Spencer 19, M.M., 1952.*

saccharoidal. Having a granular texture resembling that of loaf sugar; said of some sandstones and marbles. *Fay.*

saccharoidal marble. Any marble having a granular crystalline structure like that of loaf sugar. *Fay.*

sacred turquoise. Pale-blue smithsonite. *Shipley.*

sacrificial anodes. The anodes used in cathodic protection against corrosion. *Ham.*

sacrificial protection. Reducing the extent of corrosion of a metal in an electrolyte by coupling it to another metal that is electrochemically more active in the environment. *ASM Gloss.*

sacrificial red. Old Chinese name for the ceramic colors known as rouge flambe and sang de boeuf. *See also* rouge flambe; sang de boeuf. *Dodd.*

saddle arch. *See* rider bricks. *Dodd.*

saddle. a. A ridge connecting two higher elevations; a low point in the crestline of a ridge. A minor upfold along the axis of a syncline; a minor downfold along the axis of an anticline. *Webster 3d.* b. A gold-bearing quartz vein of anticlinal form, occurring especially in Australian saddle reefs. *Webster 2d.* c. A peculiar formation of sand slate found in shale or sand rock and may be surrounded by soapstone. The under or exposed side of a saddle looks like natural rock, but its upper side is smooth, having no particular bond with the sand rock with which it is embedded, and is liable to fall out of its place; a fall, however, producing no other derangement of the surrounding parts of the room from which it falls. *Ricketts, I.* d. A hump-shaped piece of roof rock with a smooth back, insecurely attached to adjacent strata. Also called saddleback. *Hudson.* e. A steel block over one of the towers of a suspension bridge or aerial ropeway providing a bearing surface for the suspension rope passing over it. *Ham.* f. An item of kiln furniture. It is a piece of refractory material in the form of a bar of triangular cross section. *See also* kiln furniture. *Dodd.* g. The upper part of a two-piece low tension porcelain insulator of the Callender-Brown type. *Dodd.* h. Synonym for cradle. *Long.*

saddleback. a. Eng.; Scot. A roll or undulation in the roof or pavement of a seam. *See also* saddle, e. *Fay.* b. Two timbers placed so as to form an inverted V and used as a support for a load above. *Fay.* c. A hill or ridge having a concave outline at the top. *Webster 3d.*

saddle back reef. A lode or reef bent archwise. Anticline. *Pryor, 3.*

saddleback tip. *See* concave bit. *Nelson.*

saddle block. In a dipper shovel, the boom swivel block through which the stick slides when crowded or retracted. *Nichols.*

saddle joint. Huckle joint. *Arkell.*

saddler. A man employed to make and repair harnesses, etc., for the draft animals at a mine. *Fay.*

saddle reef. a. Aust. A bedded vein that has the form of an anticline; an inverted saddle has the form of a syncline. *See also* saddle, b. *Fay.* b. An opening at the crest of a sharp fold in sedimentary rocks, occupied by ore. *Bateman.*

saddles. a. Supports placed in saggars for holding articles to be fired in the glost oven. *C.T.D.* b. Clay props used between plates when packed on edge in a kiln. *ASCG, 1963.*

saddle-shaped. Having the form of an anticlinal fold. *Webster 3d.*

saddle vein. Saddle-shaped ore deposit formed between sedimentary beds in the crests of, mostly sharply folded, anticlinal structures. *Schieferdecker.*

saddling. Forming a seamless ring by forging a pierced disk over a mandrel (or saddle). *ASM Gloss.*

sadler clay. *See* Albany clay. *Dodd.*

S.A.E. number. Relative viscosity of oil as measured by the Saybolt system. *Pryor, 3.*

safe appliances. The term safe when used in respect to appliances to be furnished by an employer to an employee means reasonably safe, and reasonably safe means such tools as are in general use among employers of ordinary caution and prudence in the same line of business under the same circumstances. *Ricketts, I.*

safe circuit. *See* flameproof enclosure; intrinsically safe machine. *Nelson.*

safeguards. The precautions taken to prevent men from being injured; guardrails, automatic signals, warning signs, etc. *Fay.*

safe place. The rule that a mine operator or other employer must exercise reasonable care to furnish a miner or an employee with a safe place in which to work does not apply where the miner or employee is himself creating the place in which he works, or where the danger was such as was created by the miner or employee in the progress of his work. *Ricketts, I.*

safety. a. A safety lamp that can be carried into flammable gases without igniting them. *Korson.* b. As applied to mining, means freedom from danger, injury, or damage. *Kentucky, p. 413.*

safety arch. *See* relieving arch. *ACSG.*

safety belt. a. A workman's belt attachable to some fixed object to safeguard against falls. *Grove.* b. A protective belt or harness with remote anchorage, worn by a workman, for example, a quarryman, working on a face at height. Since the belt allows a drop of about 6 feet a shock absorber is provided. *Nelson.* c. A belt worn by a derrickman or tripodman to prevent injury due to accidental falls from the top of the derrick. Also called belly buster. *Long.* d. A belt to which tools are attached to prevent risk of their falling into machines, thickeners, etc. *Pryor, 3.*

safety board. a. A board placed in a derrick for a man to stand on when handling drill rods at single, double, triple, or quadruple levels, which means that the boards are placed at suitable heights to handle a stand of drill rods for that number of joints. *Long.* b. A bulletin board placed on surface, near the lamphouse, on which bulletins, posters, cartoons, slogans etc. having to do with safety education are in full view of workman going to work. Usually enclosed with glass and well-lighted at all times and having the posters changed at frequent intervals. *Bureau of Mines Staff.*

safety cable. This mining machine cable reduces the chance of shock hazard and arcing when a break occurs. The cable is designed to cutoff the power when the positive conductor insulation is damaged. It is used in conjunction with a ground trip relay which, when energized, cuts the power off. *Bests, p. 373.*

safety cage. A cage, box, or platform used for lowering and hoisting miners, tools, etc., into and out of mines, and which is provided with a "safety clutch," an automatic device for preventing the fall of the cage if the supporting cable breaks. *Fay.*

safety car. a. Any mine car or hoisting cage provided with safety stops, catches or other precautionary devices. *Fay.* b. Penn. A barney; a small car used on inclined planes and slopes to push up a mine car. *Fay.*

safety catch. A safety appliance which transfers the weight of the cage onto the guides if the winding rope breaks. This device is a legal requirement in certain countries. *Nelson.*

safety chain. Scot. A chain connecting the first and last cars of a trip to prevent separation, if a coupling breaks. *Fay.*

safety check. A check valve to slow the excessive travel speed of a piston in a hydraulic cylinder. *Long.*

safety chuck. Any drill chuck on which the heads of the set screws do not protrude beyond the outer periphery of the chuck. *Long.*

safety clamp. Any of several types of rod clamps used at the collar of a borehole to hold the drill rods while they are being pulled or lowered. Also called alligator; automatic spider; floor clamp; foot clamp. *Long.*

safety clutch. A clutch which will slip under loads which might damage the machine. *Nichols, 2.*

safety department. Gr. Brit. A department which aims at winning and working coal with a minimum possible sacrifice of life and limb. The head of the department is a qualified mining engineer often with experience as a colliery manager. The National Coal Board has a safety department in each area. *See also* safety officer. *Nelson.*

safety detaching hook. A device which releases automatically the hoisting rope from the cage in the event of an overwind. *See also* detaching hook; Ormerod detaching hook; King detaching hook. *Nelson.*

safety door; emergency door. A spare or extra door fixed ready for use in a roadway in the event of damage to the existing ventilation door. The safety door is also positioned so that it can be employed in any emergency, for example, explosions or fires. The door may be of steel construction. *Nelson.*

safety engineer. An employee who devotes himself to inspecting all possible danger spots in the mine and plant; to cooperating with safety committees in various parts of the organization; to keeping informed upon safety literature and to carrying on a perpetual educational campaign among workers; to cooperating with agencies such as the Safety Division of the United States Bureau of Mines, the National Safety Council, and state bureaus and inspectors; to heading all rescue work, first-aid instruction courses, and safety-first meetings; and to drawing up and enforcing a written code of minimum safety requirements for all work at the mine and plant. *Hoov, p. 499.*

safety explosive. Explosive which requires a powerful initial impulse and therefore may be handled safely under ordinary conditions. *Bennett 2d, 1962.*

safety factor. a. The ratio between breakage resistance and load. *Nichols.* b. *See* factor of safety. *Nelson.* c. Ratio of breaking stress to working stress. *BuMines Bull. 587, 1960, p. 2.*

safety first. A term often applied to accident-prevention methods, and first-aid and rescue work. As a slogan, was first used nationally by Dr. Joseph A. Holmes, the first director of the U.S. Bureau of Mines, at the national mine safety meeting in Pittsburgh, Pa., in 1911. A Middle West steel company claims to have originated the expression, but it did not come into national use until taken up by the Bureau of Mines. The Bureau, unconscious of its use in any other place, made up the slogan from a program of the H. C. Frick Coal & Coke Co., for a safety meet which stated "safety ahead of output," "safety ahead of dividends," "safety the first consideration." The Bureau of Mines shortened these expressions into "safety first." *Fay.*

safety flange. A type of flange with tapered sides designed to hold together parts of a wheel in the event of accidental breakage. *See also* flange, d. *ACSG, 1963.*

safety fuse; blasting fuse. A train of powder enclosed in cotton, jute yarn, and waterproofing compounds; used for firing a cap containing the detonating compound which in turn sets off the explosive charge. The fuse burns at the rate of 2 feet per minute. Used mainly for small-scale blasting in quarries and metal mines. *See also* capped fuse; premature blast. *Nelson.*

safety fuse capping. The fuse is measured to the desired length, cut off squarely by a sharp knife to avoid mashing the end and is inserted into the cap. It is then crimped near the open end of the cap with a mechanical crimper which makes a groove of proper depth around the cap but does not bring too great a pressure on the powder train and choke the fuse. A waterproofing compound may be used on each cap connection. *Lewis, p. 119.*

safety gate. An automatically-operated gate placed at the top of a mine shaft, or at landings, to guard the entrance, to prevent anyone from falling into the shaft. *Fay.*

safety glass. Most commonly a sandwich of plastic between two sheets of glass, that is, laminated safety glass. Also called tempered safety glass; wire safety glass. *VV.*

safety ground. *See* grounding conductor. *ASA M2.1-1963.*

safety hat. a. A cap or hat with a hard crown worn by miners and which will resist blows against it. *B.C.I.* b. A hat or cap made of rigid material, designed for the protection of the heads of workmen. If worn in a mine equipped with electricity, the material should be electrically nonconducting. Also called safety cap. *Grove.* c. *See* tin hat. *Long.*

safety hook. a. A hoisting hook with a spring-loaded latch that prevents the load from accidentally slipping off the hook. *Long.* b. A self-acting detachable hook on a mine cage, which acts in the event of an overwind. *Pryor, 3.* c. *See* safety detaching hook. *Fay.* d. A hook, shut by a spring or other device, to prevent an article from being accidentally or forcibly detached from a chain. *Standard, 1964.* e. A safety catch in a mine hoist. *Standard, 1964.* f. A round hook with a hinged piece across the opening, that allows a line to enter it readily, but requires special manipulation to remove it. Also called lock on hook. *Nichols.*

safety inspector. *See* coal mine inspector; metal mine inspector. *D.O.T. 1.*

safety joint. A coarse-threaded joint in the head of a double-tube core barrel. If the core barrel becomes lodged in the borehole, the safety joint, inner tube, and core can be removed by backing off at the safety joint, thereby facilitating the subsequent fishing job. *Long.*

safety lamp. In coal mining, a lamp of an approved type, and which is relatively safe to use in atmospheres which may contain flammable gas. Latterly, the term tends to be restricted to oil-burning safety lamps, which are issued to deputies and used for firedamp tests. *See also* cap lamp; flame safety lamp; gauze; electric cap lamp. *Nelson.*

safety-lamp keeper. *See* lampman, c. *D.O.T. 1.*

safety-lamp mine. In Great Britain, a coal mine in no part of which below ground is the use of lamps or lights other than pemitted lights lawful. *Nelson.*

safety latch. A latch provided on a hook or elevator to prevent it from becoming detached prematurely. *Compare* safety hook. *Long.*

safety lock. An offset swivel coupling that supports the weight of the rods when whipstocking. *Long.*

safety man. *See* safety engineer; mine patrolman. *D.O.T. 1.*

safety officer. A certificated colliery official who works directly under the colliery manager and also in close consultation with other mine officials. He investigates and reports on every serious accident. He keeps the manager informed on all safety problems and makes recommendations. *Nelson.*

safety ohmmeter. A circuit tester which consists of a hand-driven generator and a direct-reading ohmmeter mounted together in a strong case. This instrument is perfectly safe, since the testing current developed by the low-voltage generator cannot exceed 12 milliamperes even at excessive handle speeds. *McAdam II, pp. 64-65.*

safety platform. a. A platform built in a derrick as a safe working place for men who must be up the derrick to handle elevators, casing, drill rods, etc. *See also* safety board, a. *Long.* b. A platform with a hinged-door opening, over a shaft while being sunk, especially where blasted materials are hoisted with a muck bucket. After the bucket is hoisted, the hinged door is closed to prevent any material from falling back onto workmen in the shaft. *Bureau of Mines Staff.*

safety plug. Fusible plug in high-pressure devices such as boilers, which melts at a determined temperature. *Pryor, 3.*

safety post; safety prop. A timber placed near the face of working places to afford protection for the workmen at the face. It must be set like a line timber and with equal care. At least two safety posts should be set at the face of each working place, not more than 3 feet back from the face. *Kentucky, pp. 136-137.*

safety poster. A pictorial form of appeal to workmen to exercise care and observe recognized or stipulated safety precautions. The poster is usually displayed at the pithead, canteen, or office. *Nelson.*

safety powder. A term used for short-flame explosives before the introduction of permissible explosives. *Fay.*

safety prop. Eng. *See* temporary prop; safety post.

safety ring. A metallic ring embedded in organic bonded products to contain pieces should breakage occur on the grinder. *ACSG, 1963.*

safety rod. A standby control rod to shut down a nuclear reactor rapidly in emergencies. *L&L.*

safety rope winch. A cable-winding device anchored at the upper grade of an inclined face and having its cable attached to the head of the coal cutter or cutter loader to assist overcoming frictional resistance of the cutter or loader while in operation against the grade. *Bureau of Mines Staff.*

safety shoe. A well-built shoe of leather or rubber provided with a sheet-steel or other strong, stiff toe. *Grove.*

safety stop. a. An appliance to stop or control cars near the shaft at the pit bottom or at the top of incline haulages. *See also* retarder. *Nelson.* b. On a hoisting apparatus, a check by which a cage or lift may be prevented from falling. *Standard, 1964.* c. An automatic device on a hoisting engine designed to prevent overwinding. *Fay.*

safety tools. a. Consist of catching hooks, grappling tongs, fish heads, bell screws, and the like, for recovering broken boring tools, picking up material, etc., at the bottom of boreholes. *Fay.* b. Tools made of beryllium copper for use in explosive atmospheres because they are nonsparking. *Hess.*

safety valve. Synonym for pressure-relief valve. *Long.*

safe yield. The rate at which water can be withdrawn from an aquifier without depleting the supply to such an extent that withdrawal at this rate is harmful to the aquifer itself, or to the quality of the water, or is no longer economically feasible. *A.G.I.*

safflorite. a. Essentially, a diarsenide of cobalt but usually with a considerable amount of iron, and rarely, a small amount of nickel. It crystallizes in the orthorhombic system. *See also* smaltite. *C.M.D.* b. It should be redefined as a cobaltiferous loellingite or as a cobaltian loellingite; has doubtful merit as an independent species. *American Mineralogist, v. 28, No. 1, January 1943, p. 63.*

safreiro. Port. Mucker. *Hess.*

sag. a. A depression in a mine floor or roof. *B.C.I.* b. A depression in a coal seam. *Fay.* c. To cause to curve downward in the middle usually as a result of improper loading or supporting. *Webster 3d.* d. The difference between the sagging path a conveyor belt actually takes due to the imposed load of material and its own weight, and the theoretical plane tangent to the top of the supporting idler rolls. This sag is limited by proper correlation of idler spacing and belt tensioning. *ASA MH4.1-1958.* e. *See* closure. *Spalding, p. 159.* f. *See* rod sag. *Long.* g. A broad, gentle, shallow basin, for example, the Michigan and Illinois Basins. *A.G.I.* h. Downwarping of beds near a fault that is opposite to that of frictional drag. *A.G.I.* i. A decrease in the section thickness of a casting caused by insufficient strength of the mold sand of the cope or of the core. *ASM Gloss.*

sag and swell. The undulating topography characteristic of sheets of till. The till usually is thick enough to completely obliterate all traces of former topography, and the postglacial drainage is then controlled by the surface configuration of the till. *Stokes and Varnes, 1955.*

sag belt tension. The minimum tension in any portion of the carrying run of belt necessary to prevent excessive sag of the belt between belt idlers. *ASA MH4.1-1958.*

sag bolt. Bolts installed at intersections to measure roof sag. A sag bolt is a 12-foot unit put in without a bearing plate. It is securely anchored in the 12-foot horizon with the aid of a heavy nut, and extends about 2 inches from the hole. Three ½-inch strips of colored pressure-sensitive tape are wrapped around the extending section of the bolt, beginning with green at the roof line, then yellow and red. The color bands provide a simple, economical means of detecting roof sag at a glance. *Coal Age, v. 71, No. 8, August 1966, pp. 86-87.*

sag correction. A tape correction applied to the apparent length of a level base line to counteract the sag in measuring tape. *Ham.*

sagenite. A quartz crystal which contains acicular crystals of rutile. *A.G.I.*

sagenitic. Occurring as needles or plates intersecting in a gridlike or grill-like manner. *A.G.I. Supp.*

sagenitic quartz. Quartz containing included acicular crystals of rutile or sometimes similar crystals of black tourmaline, goethite, stibnite, asbestos, actinolite, hornblende, and epidote. *Standard, 1964.*

saggar. A fireclay box, usually oval (23 X 17 inches) in which pottery ware can be set in a kiln. The object is to protect the ware from contamination by the kiln gases and the name is generally thought to be a corruption of the word safeguard. Since the bottle oven has become obsolete as a kiln for the firing of pottery and since clean fuels and electricity have become increasingly used in the industry, the use of saggars has been largely displaced by the setting of ware on lighter pieces of kiln furniture. *See also* kiln furniture. *Dodd.*

saggar-makers' bottom-knocker. The man whose job it was to beat out, by means of a heavy wooden tool, a wad of grogged fireclay to form a bottom for a saggar; the job is now virtually extinct. *See also* saggar. *Dodd.*

sagged. Sheet glass shaped into three-dimensional form by firing on, within or over clay or metal forms. *Kinney.*

sagger; saggar. a. A local term for fireclay, often forming the floor (or thrill) of coal seams. *Fay.* b. A box in which cast-iron articles are placed in contact with hematite or smithy scales, to be rendered malleable by decarbonizing in the annealing furnace. *Webster 3d.* c. In ceramics, a box made of fireclay in which delicate pieces are placed while being baked. Also spelled saggard; segar; sagre. *Fay.* d. The clay of which saggers are made. *Fay.*

sagger clay. Clays used in the making of saggers where high-grade pottery is burned. These clays may be of two types: open-burning and semi-open or tight burning. Saggers are containers in which whiteware and pottery are burned to prevent fire damage. Found in Tennessee, Kentucky, New Jersey, Pennsylvania, Missouri, California. *CCD 6d, 1961.*

sagger filler. *See* kiln placer. *D.O.T. 1.*

sagger maker. One who makes saggers that are used to protect delicate tiles and other clay products during burning and general handling. Shapes clay by pounding with maul to form new saggers. May prepare clay for sagger making by grinding, soaking, and mixing by machine (sagger preparer). *D.O.T. 1.*

saggerman. One who forms the saggers on a rotating horizontal disk (potter's wheel). *D.O.T. 1.*

sagger washer. One who sprays or brushes saggers with glaze slip. *D.O.T. 1.*

sagging. a. The permanent distortion, by downward bending, of vitreous enamelware that is inadequately supported during firing. *Dodd.* b. The flow of enamel on vertical surfaces of vitreous enamelware while it is being fired; the fault is visible as roughly horizontal lines or waves. *Dodd.* c. A method of shaping glassware by heating the glass above a mold and allowing it to sag into the contours of the mold. *Dodd.*

sagging moment. A bending moment which produces concave bending at midspan of a simply supported beam, generally termed a positive bending moment. It is the opposite of a negative or hogging moment which would occur at the supports. *Ham.*

sag length. *See* buckling length. *Long.*

sag meter. *See* closure meter. *Spalding, p. 76.*

sag pipe. A very appropriate term proposed as a substitute for inverted siphon. *Seelye, 1.*

sagponds. Ponds occupying depressions along active faults in California. Depressions due to uneven settling of the ground. *Billings, 1954, p. 161.*

sagre; seggar. *See* sagger. *Fay.*

sag structure. A general term for load-casts and related structures. *Pettijohn.*

sag tower. A pair of floating lightweight sheaves which give support, at a suitable point, to the ropes leading away from the winding drums. The sheaves are located at a point about one-third of the length of rope between the drum and winding pulleys, measured from the drum. A sag tower suppresses the rope oscillation and dampens out the rhythmic swing of the rope. *Nelson.*

sagvandite. A granulose metamorphic rock composed essentially of pyroxene and calcite. *Holmes, 1920.* A curious rock from near Lake Sagvand, Norway, that is mainly bronzite and magnesite. A little colorless mica and pyrite are also present. The name was given by Peterson. *Fay.*

sahamalite. A very rare, weakly radioactive, monoclinic, colorless mineral, $(Mg,Fe)(Ce,La,Nd,Pr)_2(CO_3)_4$, found in barite-dolmite rock with bastnaesite, parasite, dolomite, quartz, and hematite. *Crosby, pp. 108-109.*

sahlinite. A sulfur-yellow basic chloroarsenate of lead, $12PbO.As_2O_5.2PbCl_2$. Aggregates of thin scales. Monoclinic. From Langban, Sweden. *English.*

sahlite. Variant spelling of salite. *Hey 2d, 1955.*

Saint Anne marble. A deep blue-black, white-veined marble from Biesme, Belgium. *Fay.*

Saint Baume marble. A yellow stone veined with brown or red; from the province of Var, France. *Fay.*

Saint Peter's sandstone. An early Ordovician formation in the Midwestern United States. The Saint Peter's sandstone in Illinois is commercially significant since the material mined near Ottawa, Illinois, is the standard for the Industry. *Bureau of Mines Staff.*

Saint Stephen's stone. A white or grayish chalcedony with tiny red spots so close together that the appearance at a distance is a uniform rose-red. *Hess.*

sakalavite. A glassy andesite containing phenocrysts of intermediate plagioclase, augite, and xenocrysts of quartz. *A.G.I.*

Sakmarian. Lower lower Permian. *A.G.I. Supp.*

salable coal. Total coal-mine output less tonnage rejected or consumed during preparation for market. *Pryor, 3.*

salable output. The total tonnage of clean coal produced at a mine as distinct from pithed output. It is the tonnage of coal as weighed after being cleaned and classified in the preparation plant. *Nelson.*

salamander. A solid mass of iron, frequently weighing many tons, that is deposited and substantially replaces the firebrick hearth in the bottom of a blast furnace after long periods of operation. *Henderson.* Also called bear.

salamanders' hair. Asbestos. *Standard, 1964.*

salamander's skin; salamander's wool. First asbestos textiles were supposed to consist of these, based on the fable that these animals were able to live in fire. *Sinclair, W. E., p. 484.*

sal ammoniac. Ammonium chloride, NH_4Cl, crystallizing in the cubic system. It is found as a white encrustation around volcanoes such as Etna and Vesuvius. It is used in chemical analysis, medicine, dry batteries, as a soldering flux, and in textile printing. *C.T.D.*

salamstone. A variety of sapphire, usually in small, transparent, hexagonal prisms of pale red or blue, found chiefly in Ceylon. *Standard, 1964.*

salare. A desert area covered by deposit of rock salt. *A.G.I. Supp.*

salband. A term current among miners for the parts of a vein or dike next to the country rock. *Fay.*

salbanda. Mex. Slickensides. *Fay.*

saleeite. A lemon-yellow hydrous phosphate of magnesium and uranium, $MgO.UO_3.P_2O_5.8H_2O$; orthorhombic; square plates. The magnesium analogue of autunite. From Katanga, Republic of the Congo. *English.*

Salem or Spergen limestone. A member of the Middle Mississippian series of the Mississippi Valley, consisting partly of oölites, partly of cross-bedded lime sand (dune limestone). *C.T.D.*

saler. A saltcellar or salt dish. *Kaufmann.*

salesite. Copper iodate, $CuIO_3(OH)$, as bluish-green orthorhombic crystals from Chile. *Spencer 15, M.M., 1940.*

salic. A mnemonic term derived from (s) for silica and (al) for alumina, and applied to the group of standard normative minerals in which one or both of these elements are present in large amount, including quartz, the feldspars, and the feldspathoids. The corresponding term for the silicic and aluminous minerals actually present in a rock is felsic. Opposite of femic. *A.G.I.*

salient point. A point of land projecting sharply from the shore. *Hy.*

saliferous. Containing a considerable proportion of salt in beds, or as brine; said of strata. *Standard, 1964.*

Saliferous system. The Triassic; so called because of its rich salt deposits in Europe. *Standard, 1964.*

salimeter; salinometer. a. A hydrometer specially graduated to indicate directly the percentage of a salt (as common salt) in a brine or other salt solution. *Webster 3d.* b. A hydrometer graduated to show the percentage of salt in a solution. One type is used to indicate the proportion of salt in a marine boiler. *Standard, 1964.*

salina. a. A pool, pond, or marsh containing salt water diked in from the sea. *Standard, 1964.* b. A saltworks. *Webster 2d.* c. The name given in South America to those superficial deposits which often occupy extensive plains on the Pacific or rainless side of the Andes, and which are usually covered with a white saline efflorescence or crystalline incrustation. They occur at all elevations, from a few feet to several thousand feet above sea level, and are evidently the remains of old sea reaches and lagoons that have been dissected by the upheaval of the land. *A.G.I.*

Salinan. Lower Upper Silurian. *A.G.I. Supp.*

saline. a. A salt spring or well; a saltworks. *Fay.* b. Applied to minerals having the taste of common salt. *Fay.* c. In some playas the amount of mineral substances (common salts and others) left by evaporating water is so great as to encrust the entire area, sometimes to a depth of several inches. Such an area is then called a saline. *A.G.I.* d. In Louisiana, a body of water lying behind a barrier. *A.G.I. Supp.*

saline deposits. This group covers a variety of chemically formed rocks characteristic of certain well-defined environments, for example, lagoons, inland lakes, relic (landlocked) seas, etc. It includes chlorides, sulfates, borates, nitrates, etc., occurring as products of precipitation, usually in regular beds or layers, but lacking stratification in the accepted sense. Apart from such developments per se, certain of the compounds considered here also occur as replacements of preexisting rocks, more particularly those of the calcareous group; the sulfates are implied in this connection. *Stokes and Varnes, 1955.*

saline dome. An upswelling of the earth's surface on the coastal flats of Louisiana and Texas, one-fourth to 1 mile in diameter, often showing a marshy depression at the summit with escaping oil or gas, or both, around the periphery of the dome.

The center is barren of vegetation, consisting of a nucleus of salt. *See also* salt dome; dome, c. *A.G.I.*

saline lakes. *See* salt lakes. *C.T.D.*

salinellen. *See* mud volcano. *A.G.I.*

saline residue. One of a class of deposits formed by evaporation of surface bodies of water and consequent precipitation of the salts dissolved in them. Common salt and gypsum are examples. *Stokes and Varnes, 1955.*

salinero. a. A dealer in salt; an owner of a salt mine or works. *Fay.* b. Sp. Applied to ores requiring much salt in amalgamation. *Fay.*

salines. a. A general term for salt mines of rock salt, mineral springs, salt springs, salt beds, and salt rock. *Ricketts, I.* b. As used by Congress, includes not only salt springs but all salt lands of every character. *Fay.*

saline soil. A soil containing excessive quantities of the neutral or nonalkaline soluble salts. *Stokes and Varnes, 1955.*

Salinian formation. A series of nonmarine strata which succeed the Niagara stage in the Silurian system of North America. Red shale and lime mud deposits containing rock salt and gypsum are included; these form the basis of the salt industry in New York (Syracuse), Michigan, and Pennsylvania. Also called Salina formation. *C.T.D.*

saliniferous. Yielding salt, as a salt bed. *Standard, 1964.*

salinity. The total amount of solid material in grams contained in one kilogram of seawater when all the carbonate has been converted to oxide, the bromine and iodine replaced by chlorine, and all organic matter completely oxidized. Expressed as grams per kilogram of seawater or parts per thousand. *Hy.*

salinity bridge. An instrument for determining salinity of water (a salinometer) by measuring electrical conductivity of the water sample with a wheatstone bridge. *H&G.*

Salinity log. *See* chlorine log. *Wyllie, p. 164.*

salinometer. An instrument which measures conductivity of a water sample. This conductivity when compared with that of a sample of known salinity can be converted to an expression of salinity for the unknown. *Hy.*

salite; sahlite. A variety of monoclinic pyroxene, grayish green, deep green to black in color; obtained from Sala, Sweden. *Dana, 6th ed., p. 352; Webster 3d.*

saliter. Soda niter. *Standard, 1964.*

salites. Used by Wadsworth to include all salts and saline materials. *Fay.*

salitral. A swampy place where certain salts, as saltpeter, become incrusted in the dry season. *Standard, 1964.*

salitrite. An igneous rock consisting of predominant aegirite-bearing diopside, in part with aegirite-rich mantles, and of abundant titanite with the accessories apatite, microcline, and sometimes anorthoclase and baddeleyite. *Johannsen, v. 3, 1937, p. 40.*

salivation. A mild form of mercury poisoning suffered by workmen in amalgamation plants. By efficient ventilation, the wearing of gloves, and perhaps respirators, the hazard is not great. *See also* mining diseases. *Nelson.*

saller. Corn. a. A chamber in a mine. *Fay.* b. A stage to work on. *Fay.* c. A boarded channel for water to run in along the bottom of an adit. *Fay.* d. The floor or stage on which the ladders rest in a shaft. *Fay.* Also spelled solar, sellar, sollar, and soller, sollar being preferable.

salmanazar. A 12-quart wine bottle. *Dodd.*

sal marin. Marine salt, sea salt; a name used as early as the 17th century by the alchemist van Helmont. *Kaufmann.*

salmiac; sal ammoniac. A colorless water soluble mineral with imperfect cleavage, NH_4C1. *Larsen, p. 53; Dana 6d, p. 157.*

Salmian. Synonym for Tremadocian. *A.G.I. Supp.*

salmon. An underfired building brick (in allusion to its color). *Dodd.*

salmon brick. A class of underfired brick embracing those not hard enough for outside walls, and including soft, salmon, backing-up, pale, light, chimney, filling-in, inside wall, and foundry brick. *Standard, 1964.* Sometimes referred to as chuff or place brick.

salmonsite. A buff hydrous phosphate of manganese and iron, $Fe_2O_3.9MnO.4P_2O_5.14H_2O$. Orthorhombic. Cleavable fibrous masses. An alteration product of hureaulite. From Pala, San Diego County, Calif. *English.*

salnatron. Crude soda ash. *Standard, 1964.*

salometer; salimeter; salinometer. A type of hydrometer with scale reading 0° S in water and 100° S in fully saturated brine, the scale indicating the percent of saturation. *Kaufmann.*

Salopian. Middle and Upper Silurian (restricted). *A.G.I. Supp.*

sal rupium. Rock salt. *Kaufmann.*

salse. Eruptions of hot acidulated mud from small orifices, generally in volcanic districts, and often accompanied by steam and at high temperature. *Fay.*

sal soda. Washing soda. Used in glass manufacture. *Crispin.*

salt. a. To accidentally or purposely introduce extra amounts of a valuable or waste mineral into a sample, such as a sludge sample, to be assayed. *Long.* b. To add an accelerator or retardant to cement. *Long.* c. To enrich, as a mine, artificially, usually with fraudulent intent by secretly placing valuable mineral in some of the working places. *Webster 3d.* d. The generic term salt, applied to any one of a class of similar compounds formed when the acid hydrogen of an acid is partly or wholly replaced by a metal or a metallic radical. *Kaufmann.* e. The specific chemical, sodium chloride, NaCl. *Kaufmann.* f. A slang term for money. *Kaufmann.* g. An alchemical name for the earth, or the principle of solidity or fixity. *Kaufmann.* h. A saltcellar, salt dredge, saltshaker, or salt dish. *Kaufmann.*

salt acid; hydrochloric acid; muriatic acid. HCl. *Kaufmann.*

salt-and-pepper sand. Sand consisting of a mixture of light- and dark-colored grains. *A.G.I. Supp.*

salt anticline. An anticline in which the core is composed of rock salt. It is elongate whereas a salt dome is essentially circular in plan. *A.G.I.*

saltation. a. The variable or leaping movements arising largely in combinations of friction with inertia as discussed long ago by Hopkins and more recently by Le Conte, Gilbert, and others. *A.G.I.* b. The reputed direct transformation of one form into another in the course of evaluation; discontinuous variation. *Webster 3d.* c. The process by which a particle, picked up by the stream current, is flung upward after which being too heavy to remain in suspension, drops to the stream floor again at a spot downstream. *A.G.I.*

saltation marks. Marks and the casts thereof, made by an object proceeding along a saltatory path. Related to roll-mark and includes ring-mark. *Pettijohn.*

saltation transport. A mode of transport whereby particles bounce along the stream bed in a series of short, interrupted leaps. *Schieferdecker.*

salt bath. Mixture of salts (for example, sodium nitrate and chloride) used to heat, harden or temper metals. *Pryor, 3.*

salt block. a. Eng. A salt factory where the evaporating process is used; saltern. *Standard, 1964.* b. An installation of vacuum pans or grainers for producing salt by evaporation. *Kaufmann.*

salt blocks. Evaporated salt or fine rock salt mechanically compressed into dense blocks, usually 50 pounds in weight, for stock feeding. A specially compressed block for strengthening refrigerating brines is marketed under the name Kooler Kubes. *Kaufmann.*

salt boot. The lower portion of a vacuum pan into which the finished salt settles; also, the pit or tank into which the barometric leg of a vacuum pan drops salt. *Kaufmann.*

salt bottom. A flat piece of relatively low-lying alkali ground. *Webster 2d.*

saltbox. a. A small reservoir or tank, usually cylindrical, and with a false bottom for drainage and a cleanout door, placed under an evaporator for removal of salt. *Kaufmann.* b. A wooden receptacle used in colonial kitchens for holding culinary salt. *Kaufmann.*

salt brick. Compressed salt of approximately brick shape and size, for animal nutrition. *Kaufmann.*

salt bridge. Usually an inverted glass U-shaped tube filled with a sodium-chloride solution, the two legs of which dip into the connecting two vessels of electrolyte, forming an electrochemical cell. *Kaufmann.*

salt bush. Plants of the genus Atriplex growing in arid saline soils, particularly in Australia. A plant of this genus is found in California under the name Australian salt bush, or Greasewood. *Kaufmann.*

salt cake. Impure sodium sulfate (90 to 99 percent Na_2SO_4) obtained, usually as a byproduct: (1) from production of hydrochloric acid; (2) by crystallization from natural brines, such as the Searles Lake (Calif.) brine; (3) from the coagulating bath for viscose rayon; and (4) by the Hargreaves process. Impurities vary according to the source. Used in ceramic glazes. *CCD 6d, 1961.*

salt catcher. A long cylindrical tube attached to the bottom section of a vacuum pan, into which the full-size crystals settle. *Kaufmann.*

salt cote. A salt pit, or salt house. *Kaufmann.*

salt-crust process. A method of binding mine roadway dust by spraying the area with salt and water. The salt is subjected to wetting and drying cycles. The deposited dust is bound at first by surface tension and then in the recrystallization of the dissolved salt. *See also* roadway consolidation. *Nelson.*

salt deficiency. A condition sometimes suffered by miners in hot and deep mines and workers in steelworks, due to excessive perspiration, causing heat prostration. The salt balance may be restored by taking sodium chloride tablets or drinking water containing 1 ounce of salt per 6 gallons of water. *Nelson*.

salt dome. A structure resulting from the upward movement of a salt mass, and with which oil and gas fields are frequently associated. In the Gulf Coast area of the United States, the salt is in the form of a roughly circular plug of relatively narrow diameter, but often several thousand feet in depth. *A.G.I.*

salt effect. The solubility of a precipitate in a solution of an electrolyte which has no ion in common with the precipitate is higher than it is in pure water. This is not the salting-out effect. *Kaufmann.*

saltern. A building where salt is made; a saltworks. Also, a pond where solar salt is made; a salt garden. *Kaufmann.*

salt field. An area beneath which salt occurs, with the implication that the salt is workable. *Challinor.*

salt flat. The salt-incrusted bottom of an evaporated lake; a playa. *Kaufmann.*

salt fog test. An accelerated corrosion test in which specimens are exposed to a fine mist of a solution usually containing sodium chloride but sometimes modified with other chemicals. For testing details see ASTM B117 and B287. *ASM Gloss.*

salt furnace. A simple form of furance for heating evaporating pans in a salt plant. *Kaufmann.*

salt gage. A salometer, or salinometer. *Kaufmann.*

salt garden. A saltern where seawater is evaporated in large shallow basins by solar heat. *Kaufmann.*

salt glaze. A glaze produced by the reaction, at elevated temperature, between the ceramic body surface and salt fumes produced in the kiln atmosphere. *ASTM C242-60T.*

salt-glazed tile. Facing tile whose surface faces have a lustrous glazed finish from the thermochemical reaction of the silicates of the clay body with vapors of salt or chemicals. *ACSG, 1963.*

salt glazing. Forming a fusible sodium silicate, on surface of ceramics which are being fired, by throwing salt into the furnace. *Bennett 2d, 1962.*

salt horse. A quarryman's term for aplite. *See also* salt vein. *Fay.*

salthouse. A term used by Pliny; a building in which salt is made or stored. *Kaufmann.*

saltilog. *See* chlorine log. *Wyllie, p. 164.*

salting. a. The fraudulent adulteration of a sample, for example, adding a small amount of gold to a sample to make it appear that the gold content of the rock is much higher than it actually is. Salting may be accidental, caused by the fortuitous segregation of rich mineral during sampling. Sampling methods are conducted to reduce chance segregation to a minimum. *See also* moocher. *Nelson.* b. Eng. Sprinkling salt upon the floors of underground ways in very dry mines, in order to lay the dust. *Fay.* c. Consists in serreptitiously placing valuable mineral from a foreign source in such form and place within the claim as the characteristics of the latter may require, or, in like manner, tampering with the samples of ore or mineral taken therefrom or with the assays thereof, or the amalgam or other matter in the mill or other reduction works, with the intent and for the purpose to thereby give increased apparent but misleading and inflated value to the property, which is the subject of the option or contract of sale thereof and so induce its sale at a price greater than its mineral value warrants. *Ricketts, I.*

salting a mine. Sprinkling gold or rich ore upon or digging it into the ground, or placing it in samples for assay. In uranium, drill holes are sometimes salted before logging with radiation counters. *Ballard.*

salting evaporator. An evaporator which produced crystals or other solids, in distinction to one which only concentrates liquids. *Kaufmann.*

salting in. *See* salting out. *Kaufmann.*

salting out. a. The addition of sodium chloride or some other electrolyte to a solution of a monelectrolyte to reduce the solubility of the latter. The rarer converse effect is termed salting in. *Kaufmann.* b. Addition of salt to hasten or to improve the separation of soap from glycerol and weak lye during manufacture. Also, to hasten or to improve the separation of sulfated oil from the residual solution after sulfating. *Kaufmann.*

salt lakes. Lakes which contain a predominating amount of sodium chloride in solution and usually magnesium chloride as well as magnesium and calcium sulfate. *A.G.I.*

salt leg. A long pipe extending downward from an evaporator bottom a sufficient distance to exceed the barometric height of the solution therein. *Kaufmann.*

salt lick. a. place on the surface of the ground where salt deposits, or the discharge of a salt spring, can be licked up by wild animals. *Kaufmann.* b. Pan scale; calcium sulfate with small, varying amounts of salt and various mineral impurities. It settles out or coats immersed surfaces during brine evaporation, and is occasionally sold as a cattle feed supplement, or as a fertilizer. *Kaufmann.*

salt marsh; high marsh; salting. The area above mean high tide level, which is covered by sea water only during the highest tides; usually covered with a thick mat of halophyte vegetation. *Schieferdecker.*

salt mill. A salt grinder. *Kaufmann.*

salt mine. A mine in which rock-salt deposits are worked. *Standard, 1964.*

salt of phosphorus. Sodium-ammonium phosphate. *CCD 6d, 1961.*

salt of tartar. Potassium carbonate, K_2CO_3. H_2O. *Crispin.*

salt of tin; tin salt; stannous chloride. A mordant made by dissolving tin in hydrochloric acid. *Standard, 1964.*

salt of vitriol. *See* white vitriol. *Fay.*

saltometer. A salinometer or salometer. *Kaufmann.*

saltpan. a. A shallow lake of brackish water. *Fay.* b. An undrained natural depression in which water gathers and leaves a deposit of salt on evaporation. *Webster 3d.* c. A large pan for making salt by evaporation. *Webster 3d.*

saltpeter; niter. Potassium nitrate. One of the principal ingredients of black blasting powder. *Fay.*

saltpeter cave. A cave in which the earth fill contains appreciable quantities of nitrates, formerly mined commercially. *A.G.I.*

saltpeter earth. A cave fill from which nitrates may be obtained. *A.G.I.*

saltpit. a. A pit where salt is obtained; a saltpan. *Fay.* b. Reservoir along a salt lake or a seacoast for making solar salt. *Kaufmann.*

salt plug. *See* salt dome. *A.G.I.*

salt prairie. Same as soda prairie. *Standard, 1964.*

salt range. A mountain range in the Punjab, India, containing steep cliffs of solid rock salt, which are extensively quarried or mined. *Kaufmann.*

salts. Reaction products of acids (HX) with bases (M.OH). $M.OH + HX = Mx + H_2O$ being the simplest form. *Pryor, 3.*

salt soil stabilization. A method of stabilizing roads composed of clay, sand and gravel by adding salt. The resultant stabilized road remains dustless in dry weather and mudless in wet weather. *Kaufmann.*

saltspar. Coarsely crystallized and cleavable halite. *Spencer 17, M.M., 1946.*

salt spray test. Porcelain enamel and other finishes are tested for resistance to salt water in a special spray test apparatus. *Enam. Dict.*

salt spring. A spring of water containing a large quantity of common salt. *Fay.*

salt stock. *See* salt dome. *A.G.I.*

salt stone. Rock salt. *Kaufmann.*

salt table. The flat solution surface between the anhydrite cap rock and the top of a salt stock (salt dome). *Kaufmann.*

salt tablets. Thermoplegia tablets; heat tablets. *Kaufmann.*

salt upon salt. Refined salt made by redissolving crude or impure salt and evaporating the brine. *Kaufmann.*

salt vat. Also corruptly, saltfoot, saltfat. A saltcellar, or dredge. *Kaufmann.*

salt vein. A term applied by quarrymen to a coarse granite vein from 2 inches to 2 or more feet thick, intersecting granite or any other crystalline rock. *See also* salt horse. *Fay.*

salt water. Molten sulfates floating on the surface in a glass-melting unit. *See also* gall, c. *ASTM C162-66.*

salt well. A bored or driven well from which brine is obtained. *Standard, 1964.*

saltworks. A building or group of buildings used for salt production. *Kaufmann.*

salvage. a. A layer or parting of clay or pug occurring on the wall of a vein. *C.T.D.* b. To chemically or electroylytically remove diamonds from used diamond bits. *Long.* c. To recover lost bits or drill pipe from a borehole. *Long.*

salvage count. Number of resettable diamonds salvaged by cutting out of worn or used diamond bit. *Long.*

salvage officer. An official appointed to organize and supervise the recovery of timber, rails, steel arches, pipes, etc., from abandoned workings, and to prevent wastage in the use of materials underground. *Nelson.*

salvage value. The net worth of diamonds recovered from a used or worn diamond bit or other diamond-inset tool. *Long.*

Salzgitter ore. An important iron ore deposit in Germany. It consists of conglomerated oolitic limonite and contains about 30 percent iron. *Osborne.*

samarium. A pale gray or silvery, lustrous, metallic element of the rare earth group that occurs associated especially with cerium, yttrium, and neodymium in rare earth minerals. It is bivalent and trivalent in red-brown and pale yellow compounds, respectively. Symbol, Sm; atomic number, 62; and atomic weight, 150.35.

Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-133. Two allotropic forms: (1) alpha samarium; hexagonal; specific gravity, 7.536; and stable up to 917° C; and (2) beta samarium; specific gravity, 7.40; and stable from 917° C to the melting point; ignites in air at 150° C; melting point, 1,072° C; boiling point, 1,900° C; insoluble in water; and soluble in acids. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-133, B-215.*

samarium oxide. Sm_2O_3 has a melting point of 2,350° C. This material has a high thermal neutron cross section, making it usable as a nuclear control rod material. It is also used as a phosphor activator. *Lee.*

samarskite. A moderately to strongly radioactive, orthorhombic mineral, $(Y,Er,Ce,U,Ca,Fe,Pb,Th)(Cb,Ta,Ti,Sn)_2O_6$; velvet black, sometimes with a brownish tint; surface is often brown or yellowish-brown due to alteration; found in granite pegmatites, commonly associated with columbite; other associates are monazite, magnetite, zircon, beryl, biotite, uraninite, muscovite, eschynite, albite, topaz, and garnet; also found as a detrital mineral in placer deposits. *Crosby, pp. 39-40.*

Samian ware. *See* terra sigillata. *Dodd.*

samite. Artificially produced silicon carbide or carborundum. *Bureau of Mines Staff.*

sample. a. Representative fraction of body of material, removed by approved methods, guarded against accidental or fraudulent adulteration, and tested or analyzed in order to determine the nature, composition, percentage of specified constituents, etc., and possibly their reactivity. Bulk samples are large (several tons), so taken as to represent the ore for the purpose of developing a suitable treatment. Channel samples, cores, chips, grab, pannings, stope samples, etc., are small ones, made primarily to establish the value of the ore reserve. *Pryor, 3.* b. A section of core or a specific quantity of drill cuttings that represents the whole from which it was removed. *Long.* c. To select or take at random a sample or specimen, as of ore, coal, etc. *Fay.* d. To try or test. *Fay.*

sample bucker. In ore dressing, a laborer who pulverizes samples of ore to required fineness so that they may be analyzed to determine their composition. Also called bucker. *D.O.T. 1.*

sample crusher. *See* sample grinder. *D.O.T. 1.*

sample cutter. Scot. A steel tube with teeth at the end for cutting cores of mineral in boring. *Fay.*

sample cutters. In mine valuation and process control, devices which cut a representative fraction from a pile of ore or from a passing stream. For dry ore, pipe samplers are thrust into static rock piles. Augers can be similarly used. Riffling shovels lift half the load. Devices which deflect part of a moving stream include the whistle pipe (a vertical metal pipe with notched deflection plates each of which in series deflects half the volume); riffles which split the stream in two; and may be assembled in a riffle bank for series reduction; Vezin samples in which two hollow cones are joined at their outside diameter, mounted vertically and rotated, when the stream of falling ore is cut through each time an aperture in the upper cone registers; arc-path samplers with oscillating deflectors such as the Brunton; tipping pans, for example, the Snyder; and various hopper systems mounted on chains which traverse the stream of ore leaving a belt conveyor. For wet material, and finely crushed dry ore, such hoppers are driven by small electric motors which are controlled by automatic timing and reversing gear mounted on chains, for example, Geco, or screws (Geary-Jannings). *Pryor, 3.*

sampled grade. The tenor of the ore in place as determined by underground, surface, or drill-hole sampling. *McKinstry, p. 463.*

sample division. The process whereby part of the sample is retained and the remainder rejected. The passage through the sample divider of all the sample remaining at a given stage is a pass. The passage of only part of the material, as may be required if the quantity of the sample remaining is too large, is a step. *B.S. 1017, 1960, Pt. 1.*

sample extruder. A mechanical device for removing a soil sample from a sampling tube; usually consists of a piston driven by a jackscrew or a hydraulic mechanism. *Long.*

sample grabber. *See* core grabber. *Long.*

sample grinder. In metal mining, one who grinds samples of ore to required fineness (depending on character of ore) to prepare them for analysis by assayer. Also called sample crusher. *D.O.T. 1.*

sampleite. Hydrous phosphate and chloride of copper, calcium, and sodium, $NaCaCu_5(PO_4)_4Cl.5H_2O$, as blue crusts of minute orthorhombic crystals. *Spencer 16, M.M., 1943.*

sample log. Strip of graph paper showing units of depth on which the geologist, using cores and samples, describes the rock formations penetrated by drilling. *Wheeler.*

sample pan. *See* pan, a. *Long.*

sample preparation. In coal and coke sampling, the process whereby an analysis sample is obtained from a sample by particle size reduction, mixing and sample dividing in successive stages. A stage of sample preparation refers to the sequence of operation leading up to a sample division. *B.S. 1017, 1960, Pt. 1.*

sampler. a. A mechanical device for selecting a certain fractional part of ore to be used as an assay sample; as, for example, split shovel, riffle sampler, Brunton's mechanical sampler, and Vezin's sampler. *Fay.* b. One whose duty it is to select the samples for an assay, or to prepare the mineral to be assayed, by grinding and sampling. *Fay.* c. A laborer who collects samples of materials and products, such as coal, coke, tar, sulfate, benzol, and sewer water, from various parts of coke plant and prepares them for laboratory analysis by grinding, screening, mixing, weighing, and identifying them. May be designated according to location, as sampleman, ovens. *D.O.T. Supp.* d. In metallurgy, one who prepares samples of scrap metal for laboratory analysis by crushing, weighing, melting, grinding, and drilling. *D.O.T. Supp.* e. In ore dressing, smelting, and refining, (1) one who tends mechanical device that cuts out sample of entire shipment of ore by diverting a small portion of the ore from the full stream flowing into bins after being crushed, or (2) one who prepares samples of ore for assaying by the following method: Removes samples of ore, using automatic sampling machine; pours wet sample through splitter to obtain proportionate sample of reduced size and filters it to remove liquids; scrapes residue into pan and dries it in oven; pulverizes dried sample and reduces it in splitter; screens specific amount of dried sample through series of screens of varying mesh size mounted in mechanical shaker and computes proportions of ore left on each screen; and records results of screen tests and places small amount of sifted ore in labeled envelope for assaying. *See also* mill sampler. *D.O.T. Supp.; D.O.T. 1.* f. In mining one who selects small amounts of coal or ore from different sections of a mine, groups of cars, a conveyor, chute, or other sources to obtain representative samples. He bags and marks sample with record of location, and forwards bag to laboratory for analysis. Also called mine sample; sample taker. *D.O.T. 1.* g. A specific device for recovering samples of overburden. *See also* sampler barrel. *Long.* h. An instrument designed to take samples of the flame or other explosion gases at predetermined intervals during an explosion. *Rice, George S.*

sampler barrel; sampling barrel. As used in soil-testing work, one of several tubelike devices used to cut and recover a core sample of soil or soft rock. It can either be a plain tube designed to be driven or pressed into the formation being sampled, or be equipped with cutter heads and helical flutes for taking the sample by rotary methods. *Long.*

sample reduction. To reduce a soil, coal, or other sample to manageable size while still obtaining a representative sample. The methods may be divided into manual, for example, quartering and mechanical; riffle box. *Nelson.*

sampler head. An adapter or sub for attaching a sampler to a drill-rod string. *Long.*

sampler liner; sampling liner. A thin-wall tube fitted inside the barrel of a sampler. The liner serves as a retainer for the sample and when sealed at either end is used as a container in which the sample can be transported safely. *Long.*

sampler tube; sampling tube. Synonym for sampler barrel; sampler liner. *Long.*

sample splitter. A mechanical device for proportionally reducing the physical size of a sample. *See also* Jones splitter. *Long.*

sample taker. *See* sampler, f. *D.O.T. 1.*

sampling. a. Cutting a representative part of an ore (or coal) deposit, which should truly represent its average value. Most usually a trenchlike cut four inches wide and two inches deep is cut into the clean face of ore (or coal) and across its course. Honest sampling requires good judgment and practical experience. *Weed, 1922.* b. Selecting a certain fractional part of ore or coal from cars, stock piles, etc., for analysis. *Fay.* c. Separation of a representative fraction of ore, pulp, or any product for testing or checking purposes. *Pryor 2.*

sampling accuracy. The measure of the closeness with which a single sample represents the unit of coal or coke from which it is taken. *B.S. 1017, 1960, Pt. 1.*

sampling action. In a feedback control system, the operation or action by which the difference between the set point and the value of the variable being measured, is established intermittently, the correction being made intermittently also. *NCB.*

sampling area ratio. The volume of the displaced soil in proportion to the volume of the sample. The cross section of the tube metal is made as small as possible since a quantity of soil equivalent to the volume of the tool must be displaced when the sampler is forced into the ground. A well-designed tool has an area ratio of about 20 percent. *Nelson.*

sampling errors. a. Biased; arise from consistent error or peculiarity in gathering, reducing, and evaluation. They are consistently wrong in the same way. *Pryor, 3.* b. Random, as liable to show too much as too little of the quality being scrutinized. They tend to cancel out. *Pryor, 3.*

sampling instrument; tester; sampler. A device to determine the methane or dust concentration in mine air to assess safety and health. Instruments are designed to sample instantaneously, or over short periods or operate continuously. For methane, warning is required whenever the percentage approaches a danger figure. Dust dangers are not momentary peak concentrations but the bulk quantity of dust breathed over a period. *See also* air sampling; dust sampling; methanometer. The term may also be applied to soil-, coal-, or mineral-sampling devices of an instrumental nature. *Nelson.*

sampling pipe. A small pipe built into and through a stopping or seal to enable samples being taken of the air within the sealed area. The analysis of such samples will give an indication of the state of the fire or heating. In the case of a waste heating a sampling pipe may be pushed into the waste, on the return side, to give an indication of the conditions. *See also* pipe sampling for soils. *Nelson.*

sampling spoon. A cylinder with a spoonlike cutting edge for taking soil samples. *Long.*

sampling tip. The head of a soil auger or soil-sampling barrel. *Long.*

sampling works. A plant and its equipment for sampling and determining the value of ores that are bought, sold, or treated metallurgically. *Fay.*

samsonite. A steel-black, red in transmitted light, sulfantimonite of silver and manganese, $2Ag_2S.MnS.Sb_2S_3$. Monoclinic. Prismatic. Resembles miargyrite in appearance and pyrargyrite in composition, with part of the silver replaced by manganese. From Samson mine, St. Andreasberg, Harz, Germany. *English.*

Samson loader. A loader of the well-known Joy type. The gathering head of the loader has arms which pull the stone or coal on to ramps and push it to a scraper chain conveyor which conveys it to and delivers it at the end of the jib. The jib can be swivelled horizontally and raised or lowered to suit the tub, car, or conveyor to which it is delivering. The whole machine is self-hauling (automobile) on power-driven tractor crawlers with mechanical steering. It is not applicable in steep inclinations. *Mason, V. 1, pp. 85-86.*

Samson post. A vertical beam which supports and serves as a fulcrum for the walking beam used in a cable-tool drilling rig, or in an oil-well pumping unit. *Shell Oil Co.*

Samson stripper. A longwall cutter loader of the plough type, with two cutting blades, one at each end, operated by a hydraulic cylinder which can give a powerful thrust (about 42 tons) to the blades and cause them to bite into the coal. While this trust is being exerted, the machine is anchored by means of a vertical jack which engages the roof and floor. The jack is built on sliding bars and the machine is moved by sliding the jack along the bars to the next position for anchoring the machine. It travels alongside the conveyor but is not connected to it. A loading ramp guides the cut coal on to the conveyor. The machine is employed in seams from 4 to 5 feet thick with a strong roof and floor. *Nelson.*

sanakite. Weinschenk's name for a glassy phase of andesite that contains bronzite, augite, magnetite, and a few large plagioclases and garnets. The rock is related to the andesites, as are the limburgites to the basalts. *Hess.*

sanbornite. A white, barium metadisilicate, $BaSi_2O_5$, triclinic. Crude tabular crystals. From Mariposa County, Calif. *English.*

sand. a. Separate grains or particles of detrital rock material, easily distinguishable by the unaided eye, but not large enough to be called pebbles; also, a loose mass of such grains, forming an incoherent arenaceous sediment. Building sand, any hard, granular rock material finer than gravel and coarser than dust. The term indicates material comminuted by natural means. Quartz grains generally predominate in natural deposits, although such deposits commonly contain many other minerals. Glass sand, a sand of medium grain consisting of 98 to 100 percent silica, SiO_2, used in glassmaking. Iron oxides should form less than 1 percent of the mass. Molding sand, a sand used in making molds for casting metal. *Fay.* b. In geology, any loose or moderately consolidated bed consisting chiefly of sand; often used in the plural, even in the name of a single deposit. *Standard, 1964.* c. Specifically, sandstone: a technical usage in petroleum-producing regions. *Standard, 1964.* d. Detrital material of size range 2-1/16 millimeters in diameter. Very coarse, 1 to 2 millimeters; coarse, ½ to 1 millimeter; medium, ¼ to ½ millimeter; fine, ¼ to ⅛ millimeter; very fine, ⅛ to 1/16 millimeter. *A.G.I.* e. Continuously graded unconsolidated material that appears in the earth's surface as a result of the natural disintegration of rocks, and in a wide variety of types, sizes, and ranges of size classification. The American Society for Testing Materials (ASTM Designation C58-55T) defines sand as: Granular material passing the ⅜-inch sieve and almost entirely passing the No. 4 (4,760-micron) sieve and predominately retained on the No. 200 (74-micron) sieve, and resulting from natural disintegration and abrasion of rock or processing of completely friable sandstone. *AIME, p. 733.* f. Granular material, composed mainly of quartz, that will settle readily in water. In the mechanical analysis of soil, sand—according to international classification—has a size between 0.02 and 2.0 millimeters. It has no cohesion when dry or saturated but has apparent cohesion when damp. *Nelson.* g. The residue after amalgamation on plates. *Nelson.* h. In gold-ore treatment, the coarser and heavier portions of the crushed ore in a mill or battery. *Nelson.* i. Sometimes used by drillers as a name for porous, friable sandstone or for an oil-, water-, or gas-bearing formation. *Long.* j. A trade term for rough diamond particles having an average weight of 120 to the carat. This term is very loosely applied. *I.C. 8200, 1964, p. 149.* k. Rock chips and other waste produced by drilling action. *Nichols.*

sand acid. *See* fluosilicic acid. *CCD 6d, 1961.*

sandbag. a. A term sometimes applied to pocketlike deposits of glacial sand and gravel extending down into a coal seam with branches extending in all directions. They are a result of glacial erosion and deposition subsequent to the accumulation of the coal. *Stutzer and Noe, 1940, p. 402.* b. A bag filled with sand or small debris and used for the building of pack walls, chocks, or for filling cavities behind timber, steel, or concrete roadway linings. The bags are made of cheap hessian material and usually measure 33 by 14 inches when empty. Also called debris bag. *Nelson.*

sandbag stoppings. In many mines a rapid and efficient means of erecting stoppings and walls for the control of ventilation near the face. The walls of doors and air crossings in the workings are often entirely of interlocked sandbags. This method minimizes the use of brattice and gives more permanent results in the workings. *Mason, v. 1, pp. 211-212.*

sand ballers. *See* ballers. *Arkell.*

sandbar. A bar of silt formed by currents in rivers and at their mouths, or of sand formed along beaches by tidal action. *Standard, 1964.*

sand bath. a. A bath of sand in which laboratory vessels to be heated are partly immersed. *Webster 3d.* b. A shallow or deep pan usually of iron for holding the sand. *Webster 3d.*

sand bats. Eng. Layers of calcareous sandstone in the Bridgport sand. *Arkell.*

sand bearings. The supports of a core in the sand of a mold. *Standard, 1964.*

sand bed. a. The bed into which molten metal from a blast furnace is run. *Standard, 1964.* b. A floor of a foundry in which large iron castings are made. *Standard, 1964.*

sandblast. a. Abrasive cleaning by the impingement upon the work of sand entrained in a high velocity air or stream. *Henderson.* b. The apparatus used to apply it. *Webster 3d.* c. A mudcap in which sand is used instead of mud. *Fay.* d. In mica, shady or silvery discolored areas that appear in straight or curved lines or in small silvery dotted areas, possibly sandpits. *Skow.*

sandblasting. A method of cleaning metal and stone surfaces with sand sprayed over them through a nozzle at high velocity. Sandblasting is also used to form a key on the intrinsically smooth surfaces of materials, such as glass, requiring a particular finish. *Ham.*

sand boil. The ejection of sand and water resulting from piping. *ASCE P1826.*

sand bottle. A sand-pouring cylinder used for determining the dry density of soil. *Nelson.*

sand bottom furnace. Furnace, usually of the reheating type, lined with silica sand as a refractory. *Bennett 2d, 1962.*

sand-burned. Said a metal casting, having a hard skin due to the silica of the sand combining with the surface of the metal when the latter is poured into the molds at high temperature. *Webster 3d.*

sandburrs. Concretions of sandstone. *See also* burr, a. *Arkell.*

sand calcite. Calcite crystals containing a large percentage of sand. Also called siliceous calcite; Fontainebleau limestone. *English.*

sand catcher. A hydrographic instrument through which water flows and deposits sand, the quantity of which can then be measured. *Ham.*

sand cay; sand key. A comparatively small and low island of sand. *Schieferdecker.*

sand content. Usually expressed as the percentage bulk volume of sand in a drilling fluid. *Brantly, 1.*

sand control. Control of the properties of foundry sand mixtures through the adjustment of physical and chemical composition, including moisture. *ASM Gloss.*

sand creased. A texture produced on the surface of clay facing bricks. In the handmade process the clot of clay is first sprinkled with, or rolled in, sand; where the sand keeps the clay away from the mold, a crease is produced. An imitation of this texture can be achieved in machine-made bricks by impressing the surface of the green bricks with a tooled steel plate. *Dodd.*

sand crusher. A machine comprising a stationary cylinder into which the sand is charged. Inside this cylinder is fitted a main shaft onto which are bolted retaining discs whose main function is to prevent the loose ball in between each disc from traveling laterally. As the discs rotate on the shaft the lumpy sand is removed into contact with the balls which crush the sand to grain size. *Osborne.*

sand crystal. A large, euhedral or subhedral, poikiloblastic crystal containing up to 60 percent sand, developed by the growth of calcite or barite crystals in a sand deposit. May also form during or as a result of cementation. *A.G.I.*

sand diamonds. Name in the trade for diamonds occurring in the gravels and old marine deposits on the Gold Coast of Africa. *Griffith, S. V., p. 132.*

sand dike. Scot. A wall of sand or gravel. *Fay.*

sand drier. a. A laborer who shovels sand onto a drying stove and removes it when thoroughly dry (the sand is used on haulage tracks to increase friction between wheels and rails). Also called sandman. *D.O.T. 1.* b. One who dries sand for use in brickmaking by shoveling it into hopper of drying oven and removing it after it is dry. Also called sand-drier operator. *D.O.T. 1.*

sand drift. Eng. A general term for all windblown sands, whether occurring in inland deserts or along the seashores. *Fay.*

sand dune. A mound, ridge, or hill of loose sand heaped up by the wind. *Fay.*

sanded in. Drill-string equipment, casing, or drivepipe so firmly fastened in a borehole by reason of caving walls or impaction of sand, mud, or drill cuttings that the article cannot be pulled from the borehole. *Long.*

sand equivalent. A measure of the amount of clay contamination in fine aggregate. *Taylor.*

sander. *See* ware dresser. *D.O.T. 1.*

sanderite. A mineral, $MgSO_4.2H_2O$, from the hydration of kieserite. *Spencer 19, M.M., 1952.*

Sander's process. A flotation process which uses, instead of an acid bath in deep pans, a dilute solution of aluminum sulfate in shallow pans. *Liddell 2d, p. 408.*

sander-up. *See* bedder. *D.O.T. 1.*

sand faced. A clay building brick that has been blasted with sand while in the green state; alternatively, with extruded bricks, the sand facing can be applied by gravity to the column of clay. A wide range of surface textures can be obtained by sand facing. *Dodd.*

sand fill. Hydraulic filling, stowing. Use of sand or plant tailings, conveyed underground by water to support cavities left by extraction of ore. *Pryor, 3.*

sand filter. A filter for purifying domestic water, consisting of specially graded layers of aggregate and sand, through which the water flows slowly downwards. A similar type of filter is used for treating sewage effluent, but has coarser sand. *Ham.*

sand finish. Units whose surface faces are covered with sand, applied either to the clay column in the stiff mud process or as the lubricant to the molds in the soft mud process. *ASTM C43-65T.*

sand flag. Fine-grained sandstone, cleavable into flagstones. *Standard, 1964.*

sand flat. A sandy tidal flat. *Schieferdecker.*

sand flaw. In brickmaking, a flaw caused by imperfect mixture of the clay with sand: sand crack. *Standard, 1964.*

sand flood. A vast body of sand moving or borne along a desert, as in Arabia. *Fay.*

sand floor; casting floor. A sand bed in the floor near the blast furnace into which the molten pig is run to be cast into convenient sizes for handling. *Mersereau, 4th, p. 399.*

sand flotation. The use of well-graded sand, mixed with water, as the medium for washing coal as in the Chance washer. *See also* dense medium washer. *Nelson.*

sandfrac. Injection of jelled oil and graded sand into formation under high pressure to increase permeability. *Wheeler.*

Sandfrac. Trade name for hydraulic-fracturing sand. *AIME, p. 771.*

sand gall. a. A solution pipe in the Chalk, variant of sand gull. *See also* gull. *Arkell, p. 47.* b. *See* sandpipe. *Fay.*

sandgate beds. A division of the lower Greensand of the Weald in southern England, comprising variable clayey sands, sandy loams (often glauconitic), fuller's earth (at Nutfield, in Surrey), and rock bands, the chief of which occur in the Bargate beds. *C.T.D.*

sand gritting. The process of roughening those parts of the glaze of an electrical porcelain insulator where cement will be applied in the final assembly. The sand (a specially prepared mixture of coarse-graded porcelain together with powdered glaze) is applied to areas of the glazed insulator before it is fired. *Dodd.*

sandhog. a. A man who works in compressed air. *Nichols.* b. Synonym for sand pump. *See also* sand pump, b. *Long.*

sand holder. A cavity in a pump barrel to catch sand and keep it out of the way of the plunger or buckets. *Standard, 1964.*

sandhole. a. Eng. A small cavity in stone. Bath stone worked to a fair face, free from vents, sand holes, or other defects. *Compare* clay hole. *Arkell.* b. Small fractures in the surface of glass, produced by the rough-grinding operation, which have not been removed by subsequent fine grinding. *ASTM C162-66.*

sanding. a. The sprinkling of sand or finely crushed brick between courses of bricks as they are being set in a kiln; the object is to make even any irregularity in level and to prevent sticking. *Dodd.* b. The treatment, during manufacture, of the surface of a facing brick to give it a pleasing texture and color. *Dodd.* c. The bedding of earthenware in sand. *Dodd.* d. In ceramics, the testing of gilding with fine sand and water after firing. *Webster 2d.*

sanding-machine worker. One who charges mixing mill and removes mixture of sand and refractory clay to be used in packing around ware in bisque firing. *D.O.T. 1.*

sanding up. The filling in with sand. *Schieferdecker.*

sandiver. A neutral salt skimmed off the surface of melted crown glass. Also called gall of glass. *Fay.*

sandix; sandyx. Any of various red pigments, especially orange mineral. *Webster 3d.*

sand jack. A device consisting essentially of a sandbox and a series of plungers for gradually lowering into position a heavy weight, supported by the plungers, by running out the sand below. *Webster 3d.*

sand key. *See* sand cay. *Schieferdecker.*

sand leaching. Sand leaching or percolation may be practiced wherever the ore is coarse enough to permit free passage of the solvent through the voids. The ore is loaded into large vats or tanks which are then filled with leaching solution. After the solution has been in contact with the ore for a certain time, it is withdrawn, and fresh solution is added. Liquid may be added from the top (downward percolation) or from the bottom (upward percolation). *Newton, p. 419.*

sand-lime brick. A product made from silica sand and lime under the influence of high-pressure steam. *ACSG, 1963.*

sandline. A wire line used to raise and lower a bailer or sand pump to remove cuttings from a borehole. *See also* wire line. *Long.*

sandline drum. The hoist drum upon which a sandline is wound. *Long.*

sandline sheave. The sheave in the crown block over which the sandline runs. *Long.*

sandman. a. In metal mining, a laborer who switches flow of sand (waste minerals and water resulting from treatment of ore for removal of valuable minerals) in pipe or flumes from one stope (underground openings from which ore has been mined) to another, so that they will be properly filled with sand (after water has drained off) to support the walls and roof and prevent caving of the ground surrounding the worked out area. *D.O.T. 1.* b. *See* sand drier. *D.O.T. 1.*

sand mold. A body of sand surrounding a cavity for the reception of molten metal in the production of castings. The cavity must have dimensional accuracy and the sand surrounding it must be of sufficient stability to allow the metal to solidify in the exact shape of the impression. The production of the sand mold involves making a pattern of the part to be cast, packing molding sand round the pattern, which when withdrawn leaves the cavity into which the metal is poured, cores being inserted to leave cavities where desired in the casting. *Osborne.*

sand muller. A machine for mixing sand by a kneading and squeezing action. *Osborne.*

sandpile. A filling of sand that is rammed hard in a deep round hole, is made by driving and withdrawing a wooden pile, and is sometimes used as a means of preparing foundations in soft soil. *Webster 3d.*

sandpipe. A tubular cavity from a few inches to many feet in depth formed by solution in calcareous rocks and often filled with gravel and sand. *Webster 3d.* Also called sand gall. *Fay.*

sand plain. A general term for the sand delta formed at the mouth of a glacial stream as it issued from the ice margin into standing waters of a glacial lake or into the sea. *A.G.I.*

sand pump. a. A piston-type bailer. Also called American pump. *Long.* b. A pump, usually a centrifugal-type, capable of handling sand- and gravel-laden liquids without clogging or wearing unduly. Also called sludge pump. *Long.* c. A cylinder with a valve at the bottom, lowered into a drill hole from time to time to take out the accumulated slime resulting from the action of the drill on the rock. Also called shell pump; sludger. *Fay.* d. A pump for lifting tailings at ore-dressing plants. *Fay.* e. *See* sludger. *Nelson.*

sand-pump dredger. A long pipe reaching down from a vessel into the sand, the latter being raised under the suction of a centrifugal pump and discharged into the vessel itself or an attendant barge. Also called a suction dredger. *C.T.D.*

sand-pump sampler. A sand sampler made and used in the same manner as an American pump or sand pump, a. *Long.*

sand reel. a. The reel on which the bailer rope is wound. *B.S. 3618, 1963, sec. 3.* b. In a churn drill, the high speed winch that lifts the bailing cylinder. *Nichols.* c. A windlass for working a sand pump in well boring. *Standard, 1964.* d. Synonym for sandline drum. *Long.*

sand-replacement method. The normal method of measuring soil density. In its simplest form the measurement requires only a container full of dry sand of known density, a balance and apparatus for determination of soil moisture content. *Nelson.*

sandrock. Same as sandstone. *Fay.*

sand roll. A metal roll cast in a mold of sand; distinguished from a chilled roll, which is cast in an iron mold or chill. *Standard, 1964.*

sands. a. The coarser and heavier portions of the crushed ore in a mill. *Fay.* b. Tailings from the stamp mills of Lake Superior copper mines. *Fay.* c. Particles of crushed ore of such a size that they settle readily in water and may be leached by allowing the solution to percolate. *See also* slimes. *C.T.D.*

sands-and-slimes process. Any cyanidation process for gold ores which involves separation of two portions in a classifier, and separate treatment of sands by percolation and slimes by agitation. *Nelson.*

sand scratches. Scratches or furrows worn in a rock surface by windblown sand. Such appearances are apt to be mistaken for glacial marks and require careful observation. *Compare* glacial striae. *Fay.*

sand seal. A device for preventing hot gases from reaching the undercarriage of the cars in a tunnel kiln. It consists of two troughs running parallel to the internal walls of the kiln and filled with sand; into this sand, dip vertical metal plates (aprons) which are fixed to the sides of each kiln car. *Dodd.*

sand seam. A quarry term for a more or less minute vein or dike of muscovite (white mica) with some quartz, in cases also with feldspar. *Fay.*

sand shadow. A lee-side accumulation of sand behind a fixed object. *Pettijohn.*

sandshale. Sedimentary deposit consisting of thin alternating beds of sandstone and shale. *A.G.I. Supp.*

sand sheet. The region of mass accumulation of sand. *A.G.I.*

sand stalagmite. A structure consisting of calcite-cemented sand produced by water dripping from the roof of a cave and seeping into sand on the cave floor. *A.G.I. Supp.*

sandstone. A cemented or otherwise compacted detrital sediment composed predominantly of quartz grains, the grades of the latter being those of sand. Mineralogical varieties such as feldspathic and glauconitic sandstones are recognized, and also argillaceous, siliceous, calcareous, ferruginous, and other varieties according to the nature of the binding or cementing material. *A.G.I.*

sandstone balls. *See* pillow-structure. *Pettijohn.*

sandstone dike a. A tabular-shaped body composed of sandstone ranging in thickness from a fraction of an inch to several inches, and in length up to several miles, which cuts across structure and bedding of the enclosing rocks. May be formed by fissure filling or by injection of sand into a fissure from below. *A.G.I.* b. A vein of sandstone or mudstone penetrating coal seams from either the floor or roof, both as irregular bulbous masses and vertically or steeply dipping sheets. It frequently extends from roof to floor. *See also* clastic dike. *A.G.I.* c. A body of sandstone contained in a crosscutting fissure; related to sandstone sills, a product of quicksand intrusion. *Pettijohn.*

sandstone grit. a. In geology, a coarse, angular-grained sandstone. *Fay.* b. In commerce, a sandstone well adapted for abrasive purposes and not necessarily having a coarse grain. *Fay.*

sandstone opal. A contraction of sandstone boulder opal. A variety of boulder opal in which thin layers of opal occur in boulders between layers of sandstone and soft clay. This variety occurred in the form of pipes from the thickness of a needle to 1 inch or more, running through a free sandstone; it was thick enough to cut into well-shaped cabochons. *Shipley.*

sandstone pipes. *See* cylindrical structures. *Pettijohn.*

sand storm. *See* dust storm. *Hess.*

sand streak. Linear, parallel, low ridges with symmetrical cross-section that form at interface of sand and air or water and are parallel to direction of flow. *Pettijohn.*

sand-struck brick. *See* soft-mud brick. *ACSG, 1963.*

sand thickness. In ordinary usage the distance between the top and bottom of the oil and gas producing zone of a rock stratum. Thus one speaks of having 50 feet of sand, meaning a paying horizon 50 feet thick. The term is often used although the stratum is not technically sandstone. *Williams.*

sand trap. a. A device for separating sand and other heavy or coarse particles from a cuttings-laden drill-circulation fluid overflowing the collar of a borehole. *Compare* shaker. *Long.* b. A device, often a simple enlargement, in a conduit for arresting the sand, silt, etc., carried by the water, and generally including means of ejecting them from the conduit. *Seelye, 1.* c. An inclined trough across which bars are set at intervals. During the passage of the pulp to strainers, any heavy particles, such as sand, sink to the bottom and are retained by the bars. *C.T.D.*

sand volcanoes. Miniature volcano-like accumulations of sand generally situated on top of slump sheets. *Pettijohn.*

sand wall. A temporary independent wall separated from a slag pocket wall by a thickness of sand for the purpose of easy slag removal and the protection of the permanent wall. *A.I.S.I., No. 24.*

sand washer. An apparatus for separating sand from earthy substances. *Fay.*

sand waves. a. Crossbedding may be considered in connection with ripple mark, because it probably represents in many instances one phase of a phenomenon called sand waves, which are nothing more than current-made ripple marks of mammoth proportions. Sand waves appear to be formed instead of ripple marks when the current is overloaded with sediment. The crests are often 15 to 35 feet apart and rise from 2 to 3 feet above the troughs. *A.G.I.* b. A large ripplelike structure formed by water currents of high velocity. Sand waves may be symmetrical, asymmetrical, or irregular in shape. In currents of high velocity, the sand waves move down current and at slightly lower velocity, they move upstream. *A.G.I.* c. Ridges on the bed of a stream formed by the movement of the bed material, which is usually approximately normal to the direction of flow, and has a shape somewhat resembling a wave. Sand waves are usually periodic and are also common in other fluid systems such as those in aeolian and marine environments. *Pettijohn.*

sand wheel. A wheel about 16 feet in diameter fitted with mild steel buckets around the circumference for elevating sand or sludge out of a sump to stack it at a higher level. Sand wheels are sometimes used to raise the tailings from the stern of a dredge. The trend is away from wheels and towards bucket elevators. *Nelson.*

sandwich kiln. A tunnel kiln designed for rapid firing; the height of the setting is small compared with the width and the firing is from above and below the setting. *Dodd.*

sandwich rolling. Rolling two or more strips of metal together to form a metallurgically bonded composite sheet. *ASM Gloss.*

sandy clay. *See* mild clay. *Bennett 2d, 1962.*

sandy gravel. Gravel containing 50 to 75 percent sand. *A.G.I. Supp.*

sandy sard. Sard dotted with darker spots. *Shipley.*

sandy soil. A soil in which sand is the basic constituent. The sand contributes to strength by mechanical interlock, that is, internal friction between particles. *Nelson.*

Sangamon. Post-Illinoisan interglacial. *A.G.I. Supp.*

sand de boeuf. A distinctive red glaze originally produced in China during the Sung dynasty; the color is due to metallic copper formed in a glaze containing copper and fired under reducing conditions. *Dodd.*

sanguinaria. Sp. a. Bloodstone, of a dark green color, variegated by red spots. *Fay.* b. Hematite. *Fay.*

sanidine. A glassy variety of orthoclase. A form of potash feldspar identical in chemical composition with orthoclase, but physically different, formed under different conditions and occurring in different rock types. Occurs in lavas and dike rocks. *C.T.D.*

sanidinite. An igneous rock consisting mainly of sanidine or other forms of alkali feldspar. *A.G.I. Supp.*

Sanilime. Hydrated lime used in agriculture. *Bennett 2d, 1962.*

sanitary earthenware. A type of sanitary ware made from white firing clays but often covered with a colored glaze; the body itself has a water absorption of 6 to 8 percent. The body is made from a batch containing 22 to 24 percent ball clay, 24 to 26 percent china clay, 15 to 18 percent china stone and 33 to 35 percent flint. *Compare* vitreous-china sanitary ware. *Dodd.*

sanitary engineer. One who supervises the planning and construction of water supply, sewage systems, etc. *Crispin.*

sanitary fire clay. A type of sanitary ware made from a grogged fire clay body, which is covered with a white engobe, which in turn is covered with a glaze. A typical body composition is 60 to 80 percent fireclay, 20 to 40 percent grog. The engobe contains 5 to 15 percent ball clay, 3 to 50 percent china clay, 15 to 30 percent flint, 20 to 35 percent china stone, 0 to 10 percent feldspar; the proportions of china stone and feldspar vary inversely as one another. *Dodd.*

sanitary nipper. *See* latrine cleaner. *D.O.T. 1.*

sanitary presser. Builds large articles, such as bathtubs and sinks, by hand in very large molds. *D.O.T.1.*

sanitary sewer. Underground pipe or tunnel for carrying off domestic sanitary wastes. *Crispin.*

sanitary ware. The various types include: sanitary earthenware; vitreous china sanitary ware; sanitary fire clay; vitreous enamel sanitary ware, for example, baths. *Dodd.*

sanitation. The neutralization or removal of conditions injurious to health. Sanitary engineering; purification of water supply; disposal of sewage, etc. *Crispin.*

Sankey diagram. A heat flow diagram for a heating process in which the quantities of heat in the various items of a heat balance are represented by the width of a band. *Francis, 1965, v. 2, p. 701.*

sanmartinite. Zinc tungstate, near $ZnWO_4$ with small amounts of Fe, Mn, Ca, as minute monoclinic crystals very similar to wolframite; from San Martin, Province of San Luis, Argentina. *Spencer 18, M.M., 1949.*

sannaite. A lamprophyric porphyritic igneous rock with phenocrysts of barkevikite, colorless diopside with rims of aegirine or aegirine-augite, and biotite in a groundmass of alkali feldspar, aegirine, chlorite, calcite, mica pseudomorphs after nepheline, and accessory minerals. Differs from other related rocks in having pyroxene for its ferromagnesian mineral. *Johannsen, v. 4, 1938, p. 159.*

santafeite. A hydrous vanadate, $Na_2O.3MnO_2.6(Mn,Ca,Sr)0.3(V, As)_2O_5.8H_2O$, orthorhombic, black needles, on limestone from New Mexico. Named after the Santa Fe Railroad Company. *Spencer 21, M.M., 1958.*

Santonian. Lower middle Senonian. *A.G.I. Supp.*

Santorin earth. A pozzolana from the Grecian island, Santorin. A quoted composition is 64 percent SiO_2, 13 percent Al_2O_3, 5.5 percent Fe_2O_3, 1 percent TiO_2, 3.5 percent CaO, 2 percent MgO, 6.5 percent alkalies, and 4 percent loss on ignition. *Dodd.*

santorinite. a. A leucocratic volcanic rock with normative quartz and about 65 percent silica content composed mainly of plagioclase varying from labradorite to anorthite. *A.G.I. Supp.* b. Hypersthene andesite containing sodic andesine or oligoclase. *A.G.I. Supp.*

sanukite. A volcanic rock of andesitic composition, containing crystals of hypersthene garnet, and a little andesine in a glassy groundmass. Garnetiferous boninite. *Hess.*

sap. a. The part of the rock in a quarry which is next to the surface or to joints and crevices and has been somewhat stained and softened by weathering. *Fay.* b. A deep, narrow ditch dug from an advanced parallel in the direction of a fortification, as for the advancement of siegeworks. *Standard, 1964.*

sapanthracite. Sapropelic coal of anthracite rank. *Tomkeieff, 1954.*

sapanthracon. Sapropelic coal of Carboniferous age. *Tomkeieff, 1954.*

saphir d'eau. French water sapphire. An intense-blue variety of the mineral cordierite, occurring in waterworn masses in the river gravels of Ceylon; used as a gem stone. *C.M.D.*

saponification. a. The hydrolysis of esters into acids and alcohols by the action of alkalies or acids, by boiling with water, or by the action of superheated steam. It is the reverse process to esterification. *C.T.D.* b. Conversion into soap; the process in which fatty substances form soap, by combination with an alkali. A term used in the flotation process. *Fay.*

saponifier. Any compound, as a caustic alkali, used in soapmaking to convert the fatty acids into soap. A term used in the flotation process. *Standard, 1964.*

saponify. To hydrolyze an ester or form a soap. *Enam. Dict.*

saponin. Complex polyhydroxy carboxylic flotation reagent used as depressant. It destroys bubble adhesion to collector-coated minerals. *Pryor, 3.*

saponite. A hydrous magnesium aluminum silicate, $(Mg,Al)_6(Si,Al)_8(Si,Al)_8O_{20}(OH)_4$. It is soft and massive, with a white, yellowish, grayish-green, bluish, or reddish color; occurs in cavaties in basalt, diabase, etc. A member of the montmorillonite group. *Fay; Dana 17; A.G.I.*

sapper; sappare. Synonym for sapphire and (by error) for kyanite. *Hey 2d, 1955.*

sapphire. a. Blue transparent corundum (Al_2O_3), color being due to traces of cobalt, chromium, titanium; Mohs' hardness, 8 to 9; specific gravity, 4. *Pryor, 3.* b. Single crystal alumina; sapphire boules can be made by the Verneuil process and find use as bearings and thread guides. *See also* Verneuil process. *Dodd.*

sapphire cat's eye. A term often applied to girasol sapphire with a chatoyant effect. Although a true cat's eye is theoretically possible in sapphire, a well-defined single streak of light occurs rarely. *See also* ruby cat's eye. *Shipley.*

sapphire glass. Sapphire-blue glass. One variety of unknown composition has exceptional hardness up to six and three-fourths. *Shipley.*

sapphire quartz. A very rare indigo-blue variety of silicified crocidolite occurring at Salzburg, Austria; used as a semiprecious gem stone. Also known as azure quartz; siderite. *C.M.D.*

sapphire spar. Cyanite with opalescence or girasol effect. *Shipley.*

sapphire spinel. Sapphire-colored spinel, with derivation similar to that of ruby spinel. *Shipley.*

sapphirine. A rare aluminosilicate of magnesium occurring as disseminated blue grains and occasional monoclinic crystals. *C.M.D.* Synonym for haüyne; blue chalcedony.

sapping. The breaking away of blocks of rock by the alternate freezing and thawing of water at the head of a glacier; also, the undermining and overthrowing of rock masses by the wearing back of underlying softer layers. *Stokes and Varnes, 1955.*

saprocol. Indurated sapropel. *Tomkeieff, 1954.*

saprodil. Sapropelic coal of Tertiary age. *Tomkeieff, 1954.* Variety of dysodile.

saprodite. Sapropelic coal of brown coal rank. *Tomkeieff, 1954.*

saprohumolith series. The series of organic and coaly materials intermediate between those of the sapropelite and humolith series. *Tomkeieff, 1954.*

saprolite. Disintegrated somewhat decomposed rock that lies in its original place. *Webster 3d.*

saprolith. Synonym for sathrolith; regolith. *A.G.I.*

sapromyxite. Another name for tomite. *Tomkeieff, 1954.*

sapropel. a. An aquatic ooze or sludge rich in organic (carbonaceous or bituminous) matter. *A.G.I.* b. A fluid organic slime originating in swamps as a product of putrification. In its chemical composition, it contains more hydrocarbon than peat. When dry, it is a lusterless, dull, dark, and extremely tough mass which is hard to breakup. *Stutzer and Noe, 1940, pp. 92-93.*

sapropel-calc. Sedimentary deposit made of remains of calcareous algae (dominant) and sapropel. *Tomkeieff, 1954.*

sapropel-clay. Sedimentary deposit made of clay (dominant) and sapropel. *Tomkeieff, 1954.*

sapropelic coal. a. This term was introduced by H. Potonie in 1906 to designate coal of which the original plant material was more or less transformed by putrefaction. Complete seams of sapropelic coals are rare, but layers or bands of varying thickness within seams are more frequent. This type coal is not abundant and proves troublesome in cleaning processes with jig and dense medium washers because of its lower density relative to humic coals of the same rank and the same ash content. *IHCP, 1963, part I.* b. A group of coals, including the cannel and torbanite types, which are largely composed of the indurated jellylike slime derived from macerated organic debris, and known as sapropel, and also of remains of spores and algae. They are typically massive, unbanded coals, which break with a conchoidal fracture and do not show, as a rule, jointing. *Tomkeieff, 1954. c.* See cannel coal, a. *Nelson.*

sapropelite. a. Coals derived from algal materials. *Rice.* b. Another name for sapropelic coal. *Tomkeieff, 1954.*

sapropelite series. The series of organic and coaly materials in order of increasing rank—sapropel, saprocol, saprodil, saprodite, sapanthracone, and sapanthracite. *Tomkeieff, 1954.*

sapropel-peat. Same as peat-sapropel. *Tomkeieff, 1954.*

saprophyte. An organism living on dead or decaying organic material. *I.C. 8075, 1962, p. 64.*

sapropsammite. Sapropel rich in sand. *Tomkeieff, 1954.*

saprovitrinite. Vitrain of sapropelic coal. *Tomkeieff, 1954.*

saracen stone. Synonym for graywether. *A.G.I.*

Saratogan. Upper Cambrian. *A.G.I. Supp.*

sarcophagus. A kind of limestone, used by the Greeks for coffins. *Standard, 1964.*

sard. A variety of quartz; brownish red. similar to but darker than carnelian, classed by some as carnelian. A gem stone. *CCD 6d, 1961.*

sardachate. A variety of agate with reddish bands of carnelian; carnelian agate. *Standard, 1964.*

sard agate. Banded agate simliar to sardonyx in coloring except bands are not straight and parallel. *Shipley.*

sardinianite. A variety of anglesite, $PbSo_4$, that crystallizes in the monoclinic system. *Standard, 1964.*

Sardinian orogeny. Post-Cambrian diatrophism. *A.G.I. Supp.*

sardium. A name for sard which has been artificially colored brown. *Shipley.*

sardonyx. A variety of chalcedonic quartz. *See also* sard. *Fay.*

Sargassum. A marine alga which grows attached to the bottom in tropical and subtropical waters and becomes detached to form extensive drifts, sometimes called gulfweed. *Hy.*

sargent tube. Synonym for acid bottle. *Long.*

Sarmatian. Upper Miocene. *A.G.I. Supp.*

sarmientite. A hydrous arsenate and sulfate of ferric iron, $FeAsO_4.Fe(OH)SO_45H_2O$, as minute, lemon-yellow, monoclinic crystals, isomorphous with destinezite; in sulfate deposits from Argentina. *Spencer 16, M.M., 1943.*

sarrancolin marble. One of the most beautiful of foreign marbles. The prevailing colors are red, white, brown, green, and orange in veins and blotches; from the Valley of Aure, in the French Pyrenees. *Fay.*

sarsen. Eng. A large loose residual mass of stone left after the erosion of a once continuous bed or layer; specifically, one of the large sandstone blocks scattered over the English chalk downs. Also called druid stone. *Webster 3d.* Also spelled saracen; sarcen. *See also* graywether. *Fay.*

sarsen stone. Synonym for graywether. *A.G.I.*

sartorite. A monoclinic mineral, $PbAs_2S_4$, found in the sugary dolomite of the Binnental at Lengenbach, Valais, Switzerland; dark lead-gray; conchoidal fracture; metallic luster. *Dana 7, v. 1, pp. 478-480.*

saryarkite. A silicate and phosphate of aluminum, rare earths, thorium, and calcium, $(Ca,Y,Th)_2Al_4(SiO_4,PO_4)_4(OH).9H_2O$; tetragonal. *Hey, M.M., 1964; Fleischer.*

sassolite. A mineral, native boric acid, $B(OH)_3$, usually occurring as tabular triclinic crystals deposited in the neighborhood of fumaroles. Also spelled sassolin; sassoline. *C.T.D.; Fay.*

sastruga. An alternating ridge or hollow made in packed snow by the wind. *Hess.*

satelite. A trade name for a serpentine cat's eye from Tulare County, Calif. It resembles chrysotile. *English.*

satellite. A dike accompanying a larger plutonic mass. *Stokes and Varnes, 1955.*

satellites. Certain minerals usually associated with diamond, such as ilmenite, garnet, zircon, rutile, corundum, spinel, olivine, and gorceixite. *I.C. 8200, 1964, p. 149.*

satellite station. In surveying, one used as reference but not occupied. *Pryor, 3.*

sathrolith. Synonym for saprolith; regolith. *A.G.I.*

satin finish; Butler finish; scratch-brush finish. A finish that involves scratch-brushing highly polished metal surfaces to produce a soft sheen instead of a high degree of gloss. *Henderson.*

satin glaze; satin-vellum glaze; vellum glaze. A semimatt glaze, particularly for wall tiles, with a characteristic satin appearance. Such glazes are generally of the tin-zinc-titanium type. *Dodd.*

satin rouge. Lampblack used for polishing celluloid and bone. *AIME, p. 20.*

satin spar. A fibrous silk variety of aragonite or gypsum. *Fay.*

satin stone. Same as satin spar. *Standard, 1964.*

satin-vellum glaze. *See* satin glaze. *Dodd.*

satpaevite; satpajewit. A yellow aluminum vanadyl vanadate, near $6Al_2O_3.V_2O_4.3V_2O_5.30H_2O$, in minute weakly pleochroic flakes in the argillaceous anthraxolitic vanadiferous deposits of Kurumsak and Balasanskandyk, Karatau, Kazakhstan, U.S.S.R. The color is unexpected for a mineral containing both V^{4+} and V^{5+}. *Hey, M.M., 1961.*

saturable reactor. *See* flux-gate magnetometer. *H&G.*

saturated. a. A rock or soil is saturated with respect to water if all its interstices are filled with water. *A.G.I.* b. In petrology, applied to minerals capable of crystallizing from rock magmas in the presence of an excess of silica. Such minerals are said to be saturated with regard to silica and include the feldspars, pyroxenes, amphiboles, micas, tourmaline, fayalite, spessartite, almandine, and accessory minerals, such as sphene, zircon, topaz, apatite, magnetite, and ilmenite. Also applied to igneous rocks composed wholly of saturated minerals. *A.G.I.* c. In fatty acids and other organic compounds, a structure in which each carbon valence is combined either with a distinct atom or by polylinkages. *Pryor, 3.* d. A term describing a membrane which is filled as completely as practicable with bituminous material. *ASTM D1079-54.*

saturated aggregate, surface-dry. Aggregate which has been immersed for 24 hours in water, and has subsequently had the surface moisture removed. *Taylor.*

saturated air. Air which contains the maximum possible amount of water vapor at that temperature. The amount of water vapor which will saturate a given volume of air increases with the temperature. Therefore, if saturated air is cooled, the excess water vapor condenses in the form of mist. *See also* absolute humidity. *Nelson.*

saturated calomel electrode. This is a reference electrode which consists of mercury in contact with a solution saturated with respect to both potassium chloride and mercurous chloride. It has a potential on the standard hydrogen electrode scale of 0.244 to 0.00076(T-25° C). *BuMines Bull. 619, 1964, p. 206.*

saturated minerals. Those minerals capable of crystallizing from rock magma even in the presence of excess silica; they do not necessarily contain silica. *A.G.I.*

saturated rocks. Those rocks that contain neither excess silica nor unsaturated minerals. *A.G.I.*

saturated solution. A saturated solution of a solute at a particular temperature is one which contains as much of the solute as it can dissolve at that temperature, in the presence of solid particles of the solute. *Cooper.*

saturated steam. Steam at the boiling temperature corresponding to the pressure at which it exists. Dry saturated steam contains no water particles in suspension. Wet saturated steam does. *Strock, 10.*

saturated surface. The water table. *Nelson.*

saturated unit weight. The wet unit weight of a soil mass when saturated. *ASCE P1826.*

saturated volume. The volume of unit mass of dry air plus the volume of water vapor required for saturation. *Francis, 1965, v. 2, p. 780.*

saturation. a. The extent or degree to which the voids in rock contain oil, gas, or water. Usually expressed in percent related to total void or pore space. *A.G.I.* b. In petrology, a principle developed by Shand for the classification of igneous rocks, based on the presence or absence of saturated or unsaturated minerals. *A.G.I.* c. The extent to which gas is dissolved in oil found in an underground formation. *Williams.*

saturation coefficient. *See* C/B ratio. *ACSG.*

saturation curve. *See* zero air voids curve. *ASCE P1826.*

saturation factor. The decimel fraction of the pore space of reservoir rock occupied by oil. *Williams.*

saturation line. a. The line, on a variation diagram of an igneous rock series, representing saturation with respect to silica; rocks to the right of it are oversaturated, those to the left are undersaturated. *A.G.I.* b. The water table in a given stratum. *Ham.*

saturation point. Another name for dew point. *Spalding, p. 240.*

saturation pressure. That pressure for a given temperature at which the vapor and the liquid can exist in stable equilibrium. *Strock, 10.*

saturnine. Of or pertaining to lead. *Bennett 2d, 1962.*

saturnine amaurosis. Impairment of vision from lead poisoning. *Standard, 1964.*

saturnine breath. The peculiar odor in the breath of one affected with lead poisoning. *Standard, 1964.*

saturnine colic. Lead colic. *Standard, 1964.*

saturnine palsy. Lead palsy. *Standard, 1964.*

saturnism. Lead poisoning. *Standard, 1964.*

saucer wheel. An abrasive wheel shaped like a saucer. *Dodd.*

Saucesian. Middle lower Miocene. *A.G.I. Supp.*

sauconite. Artificial $Zn(OH)_2$ as various polymorphs, the original sauconite being a montmorillonoid phase. *Spencer 21, M.M., 1958.*

saucyite. A rhyolitelike igneous rock originally rich in glass, with large phenocrysts of sanidine in a gray groundmass consisting of a matrix of orthoclase microlites with a little augite and a few minute phenocrysts of biotite, augite, titanite, zircon, and magnetite. *Hess.*

saussurite. A tough, compact, white, greenish, or grayish mineral aggregate, resulting from the alteration of feldspars, and consisting of albite, prehnite, zoisite, epidote, and other calcium-aluminum silicates and calcite. *Fay; C.T.D.*

saussuritization. The replacement, particularly of plagioclase in basalts and gabbros, by a fine-grained aggregate of zoisite, epidote, albite, calcite, sericite, and zeolites. It is frequently accompanied by chloritization of the ferromagnesian minerals. *A.G.I.*

Savelsberg process. *See* blast roasting. *Fay.*

Savian orogeny. Post-Oligocene diastrophism. *A.G.I. Supp.*

Savox apparatus. A self-contained, oxygen-breathing escape apparatus that weighs 13½ pounds, and is carried on the wearer's chest by means of shoulder straps and a body belt. It will give complete respiratory protection in any atmosphere for a period of 45 minutes. *McAdam, p. 48.*

saw. Eng. A tool for removing irregularities from the sides of boreholes. *Fay.*

sawback. Something that has a serrate dorsal outline; specifically, a mountain range or crest that has sharp peaks of about equal height. *Webster 3d.*

saw bit. A bit having a cutting edge formed by teeth shaped like those in handsaw. Generally it is used to drill through wooden plugs in a borehole. *Long.*

sawed timber. A log which has been squared by sawing lengthwise. *Jones, 2, p. 56.*

saw gang. A frame provided with a number of parallel iron bars which are employed to saw stone. *See also* stone saw. *Fay.*

saw gummer. A grinding wheel used for gumming or sharpening saws; it may be either straight or saucer-shaped. *ACSG, 1963.*

saw gumming. In saw manufacture, the grinding away of the punch or milling marks in the gullets (spaces between the teeth), and in some cases, the simultaneous sharpening of the teeth; in reconditioning worn saws, the restoration of the original gullet size and shape. *ASM Gloss.*

sawing. a. The cutting of blocks of stone using a continuous one- or three-strand steel wire cable running over pulleys as a bolt, which when fed by a slurry of sand and water and held against the rock by tension cuts a narrow uniform channel by abrasion. *Bureau of Mines Staff.* b. Cutting a workpiece with a band, blade, or circular disk having teeth. *ASM Gloss.*

sawmaker. *See* sawsetter. *D.O.T. 1.*

sawman. In metallurgy, one who cuts metal rods to specified lengths as they emerge from a continuous casting machine, using an automatic saw that moves parallel with the rods. *D.O.T. Supp.*

sawney. Mid. To lower full trams down a road with a rope or chain passing round a prop, etc. *Fay.*

saw operator. One who cuts fire clay blocks to specified dimensions, using a circular saw. *D.O.T. 1.*

sawsetter. In stonework industry, one who maintains stone cutting saws in operating condition, replacing broken and bent saw blades from gang saws. Also called sawmaker. *D.O.T. 1.*

sawtooth back stoping. *See* overhand stoping, b. *Fay.*

sawtooth barrel; saw-toothed barrel. *See* basket, a. *Long.*

sawtooth bit; saw-toothed bit. A tube-shaped or annular bit with the cutting edge serrated in the form of saw-like teeth. The teeth may be hard-faced with stellite or boron-tube material. *Long.*

sawtooth blasting. The blasting of oblique, horizontal holes along a face and so cutting a series of slabs which, in plan, resemble saw teeth. *Nelson.*

sawtooth floor channeling. A method of channeling inclined beds of marble by removing right-angle blocks in succession from the various beds, thus giving the floor a zigzag or sawtooth appearance. *Fay.*

sawtooth stoping. In the United States, a form of overhand stoping in which the general line of advance is up the dip. The benches are advanced in a line parallel with the drift. The method permits a large number of machines to be used but requires the miners to work under a comparatively dangerous back. *Nelson. See also* rill stoping.

sawyer. In stonework industry, a general term applied to workers engaged in cutting stone with power driven saws. The techniques required and types of machines very considerably. *D.O.T. 1.*

Sawyear-Kjellgren process. A process for converting beryl to beryllium oxide. This process is based on the discovery that if melted beryl is quenched in cold water the resultant frit reacts with sulfuric acid. The beryl, containing 10 to 12 percent beryllia, is crushed, dried, and melted in an electric arc furnace. The melted beryl is poured into water to obtain frit, which is dry-ground in a ball mill to a fine powder. Batches of the powder are mixed with concentrated sulfuric acid, steamed, and agitated. Water and more steam are then added to the slurry. The liquid, containing soluble beryllium and aluminum sulfates, is filtered from the sediment and pumped to a tank where ammonium hydroxide is added. The filtrate from this operation is further treated with a chelating agent to prevent impurities from precipitating upon subsequent addition of caustic soda. Hydrolysis follows, and the precipitate, beryllium hydroxide, is filtered off. This precipitate is ignited in an electric furnace to form beryllium oxide. *BuMines Bull. 630, 1965, p. 104.*

sawyer, mine timber. *See* timber cutter. *D.O.T. 1.*

sax. A slate-cutter's knifelike chopping tool for trimming roof slates, having a pointed pick at the back to make nail holes. Also called slate ax. *Standard, 1964.*

saxatile. Saxicolous. *Webster 3d.*

saxicolous. Inhabiting or growing among rocks. *Webster 3d.*

Saxon chrysolite. Pale greenish-yellow topaz. *Shipley.*

Saxonian. Middle Permian. *A.G.I. Supp.*

Saxonian chrysolite. A pale wine-yellow topaz. *Fay.*

saxonite. A variety of periodotite containing essential olivine and orthorhombic pyroxene, with or without biotite, hornblende, chromite, and picotite. Synonym for harzburgite, but saxonite has priority. *Fay.*

Saxon slabs. A less common name for norman slabs. *See also* Norman slabs. *Dodd.*

Saxon topaz. a. Genuine yellow topaz from Saxony, Germany. *Shipley.* b. An incorrect term for citrine. *Shipley.*

Saybolt colorimeter. An apparatus that has been universally adopted in the United States for determining the color of light oils. *API Glossary.*

Saybolt seconds. Units of viscosity. Time in which a specific volume of liquid at given temperature flows through the orifice of a Saybolt viscometer. *Pryor, 3.*

Sb Chemical symbol for antimony. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

sborgite. Hydrous sodium borate, $Na_2O.5B_2O_3.10H_2O$, triclinic. A deposit in steam pipes at the hot springs of Larderello, Tuscany. *Spencer 21, M.M., 1958.*

Sc Chemical symbol for scandium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

scab. a. To trim (rough blocks of stone) with a pick or broad chisel; used by quarrymen. *Standard, 1964. See also* scabble, a. *Fay.* b. A man who works at a mine contrary to union orders or during a strike. *Zern.* c. A defect consisting of a flat volume of metal joined to a casting through a small area. It is usually set in a depression, a flat side being separated from the metal of the casting proper by a thin layer of sand. *ASM Gloss.* d. A fault in the base metal for vitreous enameling; the scab is a partially detached piece of metal (which may subsequently have been rolled into the metal surface) and is liable to cause faults in the applied enamel coating. *Dodd.* e. A fault in glass caused by an undissolved inclusion of sodium sulfate; also known as sulfate scab; whitewash. *Dodd.*

scabbing. Damage sustained by the surface dressing of a road. *See also* raveling, b. *Ham.*

scabbit parting. Scot. A rough parting. *Fay.*

scabble. a. To work or shape roughly (as stone before leaving the quarry). *Webster 3d.* b. To dress (as stone) in any way short of fine tooling or rubbing. *Webster 3d. Compare* scab, a. *Fay.*

scabbler. a. In granite works, a workman who scabbles. *Fay.* b. In quarry industry, one who roughs stone slabs in blocks with a scabbling pick to produce a uniform rectangular shape and to reduce shipping weight. *See also* lumper; stone dresser, c. *D.O.T. 1.*

scabbling. a. A quarrying term used to describe the process of trimming blocks of stone. It may be done by hand with a scabbling pick, with circular saws, wire saws, heavy iron disks provided with cutting tools, diamond-toothed dragsaws, or scabbling planers. *AIME, p. 329.* b. Rough trimming of dimension stone before smoothing it into rectangular shape. *Bennett 2d, 1962 Add.* c. The process of removing all surface irregularities from blocks of stone and thus reducing them to proper form. *See also* scab, b. *Fay.* d. A fragment or chip of stone. *Webster 3d.*

scabbling hammer. A hammer with two pointed ends for picking the stone after the spalling hammer. *Fay.*

scabbling planer. A planer consisting of massive blades, which scrape the surfaces being scabbled. Such blades will remove

¼ to ½ inch of stone at each cut. Limestone blocks for export trade or for shipment to distant mills are scabbled very carefully. *AIME, p. 329.*

scabblings. Stone chips produced in dressing stone or ore. *Arkell.*

scabby. In founding, blistered or marred with scabs; said of a casting. *Standard, 1964.*

scabland. The terms scabland and scabrock are used in the Pacific Northwest to describe areas where denudation has removed or prevented the accumulation of a mantle of soil, and the underlying rock is exposed or covered largely with its own coarse, angular debris. *A.G.I.*

scacchite. a. A deliquescent cubic mineral, $MnCl_2$.*Larsen, p. 51.* b. Synonym for monticellite. *Hey 2d, 1955.* c. A selenide of lead. Very doubtful. *Hey 2d, 1955.* d. A brick-red powder on Vesuvian lava at first supposed to contain Fe,Ti_3Pb, and Se, but later described as a fluoride of Ce, La, and Di. *Hey 2d, 1955.*

scad. A name occasionally applied to a nugget, as of gold. *Fay.*

scaf. Prov. The tapered edge of metal where two pieces are welded together. *Standard, 1964.*

scafflings. Derb. Refuse from ore dressing; chippings. *Fay.*

scaffold. a. The framework in the drill tripod on which the helper stands to couple and uncouple drill rods or casing. Also called safety board; safety platform. *Long.* b. An obstruction in a blast furnace above the tuyeres, caused by an accumulation or shelf of pasty, unreduced materials adhering to the lining. *Fay.*

scaffolding. Incrustations on the inside of a blast furnace. *See also* scaffold. *Fay.*

scaglia. An Italian calcareous somewhat fissile and fossiliferous Cretaceous rock, corresponding to the Chalk of England. *Standard, 1964.*

scagliola. An imitation of colored marble obtained in plastering, used for floors, columns, and other ornamental interior work. *Crispin.*

Scaife process. A modified Ugine-Sejournet process for hot extrusion of steel and other metals. The basic difference between the original Sejournet extrusion process and the Scaife modification is one of direction. In the Sejournet, the billet is forced forward through the die with the mandrel projecting through the die to maintain internal shape. In the modified process, the billet is forced into the closed die and the ram pressure squeezes it back over the mandrel. Both are based on the use of molten glass as a lubricant. *Osborne.*

scal. Corn. *See* scall. *Fay.*

scalar. A quantity fully described by a number, such as a speed. *See also* vector. *Hy.*

scalding. A term that has been used to describe the fault in the glost firing of pottery when glaze falls off the ware before it has fused; a cause is too great a difference between dimensional changes of body and applied glaze. *Dodd.*

scale. a. Newc. A small portion of air abstracted from the main current. Also called scale of air, and sometimes spelled skail. *Fay.* b. The rate of wages to be paid which varies under certain contingencies. *Fay.* c. Loose, thin fragments of rock, threatening to break or fall from either roof or wall. *Fay.* d. To regulate the air current in a roadway. *B.S. 3618, 1963, sec. 2.* e. Used among English miners for carbonaceous shale interbedded with thin layers of coal. *Tomkeieff, 1954.* f. The flakes and rubble that fall in after the ore has been removed. *Gordon.* g. Hurdle. *Mason.* h. A weighing apparatus. *B.C.I.* i. Ratio of any length on a map to the length of the corresponding line on the ground. In common usage the scale of a map is usually stated in terms of the equivalent scale; as 1 inch (on map) equals 40 feet (on ground). *Seelye, 2.* j. Crude paraffin wax, obtained by filtering the cooled heavy distillation from petroleum or shale. *Standard, 1964.* k. The crust of metallic oxide formed by cooling of hot metals in air. *Fay.* l. The incrustation caused by steam boilers by the evaporation of water containing mineral salts. *Fay.* m. To get rid of the film of oxide formed on the surface of a metal as to clean the surface. *Fay.* n. A fault, in glass or vitreous enamelware, in the form of an embedded particle of metal oxide or carbon. *Dodd.*

scale cleaner. In bituminous coal mining, one who scales off loose pieces of slate from the roof and walls of haulageways, using a pick or a bar. Also called slate handler. *D.O.T. 1.*

scale copper. Copper in very thin flakes. *Weed, 1922.*

scale door; regulator door. A door which has an air regulator. *B.S. 3618, 1963, sec. 2.*

scalenohedron. An important form in the rhombohedral system; a solid bounded by twelve scalene triangles and still showing a threefold arrangement about the vertical axis. *C.M.D.*

Scalent. In the Pennsylvania (Roger's) system of stratigraphy, a group considered equivalent to the Lower Helderberg of the New York survey. *Fay.*

scale of air. Newc. *See* scale, a. *Fay.*

scale of hardness. *See* hardness scale. *C.M.D.*

scaler. a. An electronic instrument for counting radiation-induced pulses from Geiger counters and other radiation detectors. *L&L.* b. A laborer who knocks the roasted lead ore off grates with a bar as it is dumped from conveyors into cars below, prior to melting, to separate and recover the lead. Lead ore is loaded on grates attached to a conveyor and carried through a furnace in which the sulfur is driven off by roasting. *D.O.T. 1.*

scales. For weighing ore in transit, these include the track scale (carload lots) in which the load is checked by manual operation of weights; platform scales; automatic dump hoppers; conveying weighers which continuously record or register the weight of a portion of passing conveyor belt. *Merrick, Dennison, etc. Pryor, 3.*

scales lay. A rope construction in which the line of contact between each ring of wires is in the interstices between the wires, thus eliminating a concentration of pressure where the wires cross as in other types of rope. This rope construction is often used where shocks and crushing of the strands occur as in scraper loader layouts. *See also* winding rope. *Nelson.*

scale-up. In plant design, calculations of required capacities, machine sizes, etc., from data obtained in batch and pilot testing. *Pryor, 3.*

scaling. a. The plucking down of loose stones or coal adhering to the solid face after a shot or a round of shots has been fired. This work is dangerous and a long scaling bar is often used. *Nelson.* b. Removal of loose rocks from the roof or walls. *Fraenkel.* Also called ramming. *Stoces, v. 1, p. 113.* c. Forming a thick layer of oxidation products on metals at high temperatures. *ASM Gloss.* d. Depositing water-insoluble constituents on a metal surface, as in cooling tubes and water boilers. *ASM Gloss.* e. The process of forming scale with or without acid fumes; sometimes refers to spontaneous detachment of scale. *ASTM C286-65.* f. Cleaning operation consisting of heating the enameling iron to a dull red heat in the presence of acid or sulfur fumes. *A.C.S.B., 3.*

scaling bar. A barlike implement for removing incrustations as from the inside surfaces of boilers. *Fay.*

scaling circuit. A device that produces an output pulse whenever a prescribed number of input pulses have been received; for example, (1) binary scaling circuit where the prescribed number is 2, and (2) decade scaling circuit where the prescribed number is 10. *NCB.*

scaling furnace. A furnace or oven in which plates of iron are heated for the purpose of scaling them, as in the preparation of plates for tinning. *Fay.*

scaling of the face. In quarrying, consists of the removal of loose overhanging rock. *Streefkerk, p. 16.*

scall. a. Eng. Loose ground; foliated ground is frequently called scally ground by miners. Also spelled scal. Probably a variation of scale. *Fay.* b. Rock easily broken up because of its scaly structure. *Fay.*

scallop. a. Eng. To cut or break off the sides of a heading without holing or using powder. *Fay.* b. Eng. To get or hew coal off the face. *S.M.R.B., Paper No. 61.* c. The rims and edges of pottery ware sometimes trimmed to give a scalloped effect, that is, small segments are symmetrically removed from the edges before the ware is fired. Until 1955, when a scalloping machine was introduced, the process had always been carried out by hand. *Dodd.*

scalloped upland. The region near or at the divide of an upland into which glacial cirques have cut from opposite sides. *Stokes and Varnes, 1955.*

scalloping. A name given to a structure of unknown origin found only in slates and superficially resembling ripple marks. *Pettijohn.*

scalp. a. The process of removing oversize lumps on a continuous basis from a stream of bulk material. *A.S.A. MH4.1-1958.* b. Removing large pieces of mine waste from run-of-mine coal, usually when passing over a screen, on way to the preparation plant. *Bureau of Mines Staff.*

scalped anticline. An anticline whose upper part was eroded before the deposition of overlying unconformable strata. *A.G.I. Supp.*

scalped intrusion ingot. A cast, solid, or hollow extrusion ingot which has been machined on the outside surface. *ASM Gloss.*

scalper. Heavy screen shielding fine screen for separating differently sized particles. *Bennett 2d, 1962.*

scalping. a. The removal, by screen or grizzly, of undesirable fine material from broken ore, stone, or gravel. *Nelson.* b. Removing surface layers from ingots, billets, or slabs. *See also* die scalping. *ASM Gloss.* c. A milling term for the removing of a mineral during closed-circuit grinding of the ore. *Pryor, 2.* d. Jigs, hydraulic traps, unit flotation cells, strakes are used. Use of a coarse screen to protect a fine one. Also, removal of superficial oxidized layer from wirebar copper which is to be used in drawing of fine wire. *Pryor, 3.*

scalping screen. A coarse primary screen or grizzly; usually a vibrating grizzly. *Nichols.*

scaly. a. Refers to a mineral when the plates are small, for example, tridymite. *Nelson.* b. In mineralogy, consisting of scales or tabular crystals. *Shipley.*

scammed. N. of Eng. Sooty. *Fay.*

scamy. Eng. Applied to freestone in thin layers, mixed with mica. *Fay.*

scamy post. N. of Eng. Soft, short, jointy freestone, thinly-laminated and much mixed with mica. *Fay.*

scandia. *See* scandium oxide. *CCD 6d, 1961.*

scandium. a. A silvery-white, trivalent metallic element sparsely but widely distributed in combined form in association with the rare earth metals with which it is sometimes included. Found especially in various Scandinavian minerals (such as thortveitite). Symbol, Sc; atomic number, 21; atomic weight, 44.956; specific gravity, 2.992; melting point, 1,539° C; and boiling point, 2,727° C. *Webster 3d; Handbook of Chemistry and Physics; 45th ed., 1964, p. B-133.* b. Soft; very light metal; isometric or hexagonal; and decomposes water liberating hydrogen. Mendeleev predicted the existence of scandium and called it ekaboron. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-133, B-215.*

scandium oxide; scandia. White; molecular weight, 137.91; isometric; Sc_2O_3; resembles magnesia; insoluble in water; soluble in hot acids; less soluble in cold acids; specific gravity, 3.864; and specific heat, 0.153 (at 0° to 100° C). Used in ceramics. *C.C.D. 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-215.*

scanning. The sequential measurement of some quantity at a number of positions on an area or in a volume either (1) continuously, by mechanically moving a detector, or (2) discontinuously, by means of systematic electrical or mechanical switching. *N.C.B.*

scanning electroprobe X-ray microanalyzer. A new instrument for metallurgical research developed in Great Britain. It can create visual images of the minutest particles in metals and alloys by use of electronic X-ray beams. Magnification goes up to 3,000 times and particles smaller than a millionth of an inch can be examined in detail. *Nelson.*

scanning line. The focus of points on ocean surface at which the detecting instrument is directed. *Hy.*

scanning sonar. Echo-ranging system in which the out-going ping is transmitted simultaneously throughout the entire angle to be searched and a rapidly rotating narrow beam scans for the returning echoes. *Hy.*

scantite. A gage by which slates are assorted in sizes. *Fay.*

scantling. a. The dimensions of a stone in length, breadth, and thickness. *Standard, 1964.* b. Stones more than 6 feet long. *C.T.D.* c. A piece of timber of thickness from 2 to 4 inches and of width from 2 to 4½ inches. *C.T.D.* d. Small timber as 2 by 3, 2 by 4, etc., used for studding. *Crispin.*

scapolite. A group of minerals forming an isomorphous series, varying from silicate of aluminum and calcium with calcium carbonate, to silicate of aluminum and sodium with sodium chloride. The group formula is $(Na,Ca)_4Al_3(Al,Si)_3Si_6O_{24}(Cl,CO_3,SO_4)$. Very weakly radioactive; white, gray, bluish, greenish, or reddish. Fluorescent varieties contain small quantities of uranium. Common scapolite is intermediate in composition between these two minerals. It crystallizes in the tetragonal system and is found associated with altered lime-rich igneous and metamorphic rocks. Also known as wernerite. *C.M.D.; Crosby, p. 134.*

scapolite gabbro. A massive hornblende scapolite rock formed by the alteration of gabbro. *Standard, 1964.* Also called spotted gabbro. *Fay.*

scapolite rocks. A general term for rocks containing scapolite, irrespective of its origin, as a major constituent. *Holmes, 1928.*

scapolitization. a. The processes by which the aluminosilicate minerals of igneous rocks, such as gabbro, are replaced by scapolite. Plagioclase is the mineral commonly so altered, associated augite being changed concomitantly to hornblende. *Holmes, 1928.* b. The introduction of or replacement by scapolite. This may involve the introduction of chlorine. *A.G.I.*

scar. a. Eng. In roasting pyrite for sulfuric acid manufacture, a lump formed by fritting; a hard cinder; furnace slag. *Webster 2d.* b. In founding, an imperfect spot in a casting. *Standard, 1964.*

scarbroite; scarbroeite. A white, compact, fine-grained aluminum oxide hydrate, $Al_2(CO_3)_3.12Al(OH)_3$, from vertical fissures in sandstone at South Bay, Scarborough, and from sandstone at Yorkshire, England. *American Mineralogist, v. 43, No. 3-4, March-April 1958, pp. 384-385.*

scarcement. a. A projecting ledge of rock, left in a shaft as footing for a ladder, or to support pitwork, etc. *Fay.* b. An offset or retreat in the thickness of a wall or band of earth. *Webster 3d.*

scares. a. Lenticular pockets of clean coal in sandstone, usually found in the region of a washout. Also called coal scares. *Tomkeieff, 1954.* b. N. of Eng. Thin laminae of pyrite in coal. *Fay.*

scarf. a. A lapped joint made by beveling, notching, or otherwise cutting away the sides of two timbers at the ends, and bolting or strapping them together so as to form one continuous piece, usually without increased thickness. Also called scarf joint. *Standard, 1964.* b. A piece of metal shaped or beveled for a scarf weld. *Standard, 1964.*

scarfed joint. In welding, or joining by rivets, a diagonal joint, giving a larger area of contact than with butt welding or joining. *Pryor, 3.*

scarfer. In the iron & steel industry, one who tends rolls through which skelp (steel strips for making pipe or tube) or steel sheet is run to bevel edges prior to its being formed into tube. *D.O.T. 1.*

scarfing. a. Splicing timbers, so cut that when joined the resulting piece is not thicker at the joint than elsewhere. *Fay.* b. Tapering the ends of two pieces to be joined to avoid an enlarged joint. *Crispin.* c. Cutting surface areas of metal objects, ordinarily by using a gas torch. The operation permits surface defects to be cut from ingots, billets, or the edges of plate that is to be beveled for butt welding. *See also* chipping, d and e. *ASM Gloss.*

scarf joint. a. A butt joint in which the plane of the joint is inclined with respect to the main axis of the members. *ASM Gloss.* b. *See* scarf, a. *Fay.*

scarf weld. A weld joint between two metal pieces that are notched or beveled. *Standard, 1964.*

scarifer. A machine with downward projecting teeth for breaking hard soil at quarries and opencast pits. It may be self-propelled or attached to another vehicle. *See also* rooter. *Nelson.*

scarify. To roughen up, as a road, for repairs. *Crispin.*

scar limestone. The mountain limestone of the English Lower Carboniferous: so called because it frequently forms scars or cliffs. Also called scaur limestone. *Standard, 1964.*

scarp. a. An escarpment, cliff, or steep slope along the margin of a plateau, mesa, terrace, or bench. The term implies a certain amount of linearity and should not be used for a cliff or slope of highly irregular outline. *Fay.* b. To cut so as to form a scarp; to cut vertically or to a steep slope. *Webster 3d.* c. *Northumb.* Boulder clay. *Arkell.*

scarred. A mark in the enamel surface produced by firing enamel which has been scarred after drying. May be applied to the defect as it appears in the dry state. Also called scuffed. *Bryant.*

scarring. a. A mark left by abrasion, or such marks collectively: said specifically of geological processes, as, the scarrings of the glacier. *Standard, 1964.* b. The formation of scars or scaurs in roasting pyrite for sulfuric acid manufacture. *See also* scar, a. *Fay.*

scars; skares. Eng. Thin seams of coal; white skares in Coal Measures, Northumberland and Durham. *Arkell.*

scatter. a. York. A rumbling or falling noise in a mine shaft. *Fay.* b. Deviation of portions of a radiation beam by scattering centers in the medium through which the beam passes. In ultrasonics, it occurs by reflection, refraction, or diffraction at any acoustical discontinuity comparable in size with, or larger than, the wave length used; in radiography, scatter occurs by the Compton, photoelectric, and pair-production processes. *ASM Gloss.*

scatter coefficient. *See* coefficient of scatter. *Dodd.*

scattering. a. A process that changes the trajectory of a particle. Scattering is caused by collisions with atoms, nuclei, and other particles, or by interactions with fields of magnetic force. If the energy of the scattered particle is not changed by the collision, it is elastic scattering; if a change in energy occurs, it is inelastic scattering. *L&L.* b. A phenomenon which occurs when a sound wave travels outward from a source into the sea; the energy producing a primary directional wave and also secondary wavelets which travel in other directions. *Hy.*

scattering loss. That part of the transmission loss which is due to scattering within the medium or due to roughness of any reflecting surfaces. *Hy.*

scatter pile. In underground mining, ore left adjacent to a longwall face to stop flying ore from being lost when blasting. A secondary use is to confine ventilation. *Pryor, 3.*

scavenge. a. To clean out thoroughly. *Nichols.* b. To pick up surplus fluid and return it to a circulating system. *Nichols.*

scavenger. a. Any chemical which is added to a system or a mixture in order to consume, or to convert to an inactive form, small quantities of impurities or undesired materials. *C.C.D. 6d, 1961.* b. In metallurgical operations, an active metal added to combine with oxygen and/or nitrogen in the molten metal and so cause removal into the slag. *C.C.D. 6d, 1961.* c. Oxygen, iodine, or more complex materials which when added to a mixture combine with free radicals in the mixture and permit the measurement of these radicals. *C.C.D. 6d, 1961.* d. In flotation, a rougher cell in which the tailings, before being rejected as waste, are subjected to a scavenging flotation treatment. Concentrating tables are also used as scavenger machines. *Hess.*

scavenger cells. Secondary cells for the retreatment of tailings. *B.S. 3552, 1962.*

scavenger mining. The taking out of coal so close to the surface as to undermine the topsoil, resulting in devastation above ground. Usually engaged in by an independent operator working an old mine on a lease from a major corporation. *Korson.*

scavenging. In mineral processing, final stage in flotation of mineralized froth before discard of tailing. The cells are so worked as to remove for retreatment as much lowgrade rising mineral as possible under the given working conditions. *Pryor, 3.*

scawtite. A carbonated calcium silicate hydrate, $Ca_6Si_6O_{18}2H_2O:CaCO_3.Z=2$. Monoclinic; colorless; found in bundles of thin tabular crystals. From Scawt Hill, County Antrim, Ire.; Ballycraigy, Larne, North Ire.; Crestmore, Calif. *American Mineralogist, v. 40, No. 5-6, May-June 1955, pp. 505-514.*

scenographical geology. An account of rocks as they exhibit themselves to the eye in their general outlines; in other words, an account of natural scenery. *A.G.I.*

scepter quartz. Quartz forming in a crystal resembling a scepter in shape. *Shipley.*

scf Abbreviation for standard cubic foot. *BuMin Style Guide, p. 62.*

schafarzikite. A tetragonal mineral, probably $FeSb_2O_4$; isomorphous with synthetic $ZnSb_2O_4$. *American Mineralogist, v. 37, No. 1-2, January-February 1952, p. 136.*

Schafer method. A method proven to be the least effective of all the methods of artificial respiration. The operator kneels astride the patient who is laid face downward, places his hands on the small of the patient's back, parallel with the vertebral column, and then gradually swings forward, bringing the weight of his body onto the lower part of the patient's thorax to cause exhalation. This pressure is maintained for 2 seconds. Inhalation is induced by the operator swinging sharply back to his upright position, and removing all pressure from the patient's thorax, allowing the lungs to recoil naturally and fill with air. *McAdam, pp. 85-86.*

Schafer-Nielsen-Drinker method. A combination of the Schafer and Nielsen methods of artificial respiration. Two operators are required, in which one performs the Schafer movements to cause exhalation, while the other performs the arms-uplift operation of the Nielsen method to induce inhalation. This method is the least fatiguing of all the manual methods of artificial respiration. *McAdam, pp. 89-90.*

schairerite. A colorless sodium sufate, fluoride, and chloride, $Na_2SO_4.Na(F,Cl)$. Rhombohedral. Minute Crystals. From Searles Lake, Calif. *English.*

schallerite. A light to reddish-brown hydrochlorosilicate and arsenite of manganese, $Mn_5(Si,As)_6O_{15}(OH,Cl)_{10}$. Probably hexagonal. Massive. From Franklin, N. J. *English.*

schalstein. A term used for basaltic and spilitic rocks showing incipient cleavage, and usually partial replacement by calcite. *See also* desmosite; spilosite. *A.G.I.*

schapbachite. A lead-bismuth mineral, $PbS.Ag_2S.Bi_2S_3$, occurring in acicular crystals, granular and massive; lead-gray color. Also called bismuth silver. *Fay.*

Schaumberg diamond. Rock crystal from Schaumberg, Germany. *Shipley.*

schaum earth. Same as aphrite. *Fay.*

scheduled maintenance. Involves (1) the periodic inspection of mine plant and equipment to disclose conditions leading to production breakdowns or to harmful depreciation, and (2) the upkeep of plant to eliminate such conditions or to adjust or repair such conditions while they are still in a minor stage. *See also* preventive maintenance. *Nelson.*

scheelite. Calcium tungstate, $CaWO_4$; tetragonal. Color, yellowish white to brown; Mohs' hardness 4.5 to 5; specific gravity 5.9 to 6.1. WO_2 less than 86 percent. Fluoresces to show blue color, a property useful in prospecting and process check. *Pryor, 3.*

scheererite. A whitish, gray; yellow, green, or pale reddish; brittle; tasteless; inodorous hydrocarbon; melts at 44° C; soluble in alcohol and ether; may be distilled without decomposition, boiling at 92° C. *Fay.*

schefferite. A brown monoclinic mineral of the pyroxene group with perfect intersecting cleavages, $(Mg,Mn)O.CaO.2SiO_2$; hardness 6±. *Larsen, p. 127.*

scheibeite. Fossil resin found in brown coal. *Tomkeieff, 1954.*

Scheidhauer and Giessing process. *See* S.u.G. process. *Dodd.*

Schellbach tubing. A type of enamel-back tubing with a central blue line. *See also* enamel-back tubing. *Dodd.*

schematic. Showing principles of construction or operation, without accurate mechanical representation. *Nichols.*

Schenck porosimeter. Apparatus for the determination of pore size distribution by the mercury penetration method; it has been applied to the study of refractories. *See also* pore size distribution. *Dodd.*

scheteligite. A very rare, weakly radioactive, possibly orthorhombic, black mineral, $(Ca,Y,Sb,Mn)_2(Ti,Ta,Cb)_2(O,OH)_7$, found at Torvelona, Norway, in pegmatite with plagioclase, tourmaline, bismuth, euxenite, thortveitite, monazite, alvite, beryl, garnet, and magnetite. Small amounts of uranium may be present. *Crosby, pp. 109-110.*

Schicht mixed-flow fan. In this fan, the blades are mounted on the curved portion of a dish-shaped rotor and are designed to impart dynamic energy but no pressure or static energy to the air, the dynamic energy being converted to pressure in the diffuser. The fan is suitable for water gages up to 20 inches and there is an absence of noise. It is useful where the resistance of the mine is known and not liable to alter materially. *Sinclair, I, p. 109.*

schieferkohle. .Ger. Name for banded coal formerly called slate coal. *Tomkeieff, 1954.*

schiefer spar. A variety of calcite occurring in very thin plates or scales. *Fay.*

schiller. A phenomenon related to sheen. An almost metallic iridescent shimmer seen just below the surface in certain directions in certain minerals as in bastite, bronzite, hypersthene, etc. Differs markedly in appearance from any other optical phenomenon except adularescence and aventurescence. *Shipley.*

schiller-fels. Enstatite, or bronzite peridotite with poikilitic pyroxenes. Orthorhombic pyroxenes possess the poikilitic texture to a peculiar degree, and especially when more or less altered to bastite, the term schiller is especially applied to them. *Fay.*

schillerization. The development of poikilitic texture by the formation of inclusions and cavities along particular crystal planes, largely by solution somewhat as are etch figures. *Fay.*

schiller obsidian. Obsidian with schiller effect. *Shipley.*

schiller quartz. Quartz cat's eye. *Shipley.*

schiller spar. An altered enstatite or bronzite, having approximately the composition of serpentine. Also called bastite. *Fay.*

schist. a. A crystalline rock that can be readily split or cleaved because of having a foliated or parallel structure, generally secondary and developed by shearing and recrystallization under pressure. *Fay.* b. A rock which occurs in thin layers—called slate by some drillers. *Legrand.*

schistose. Characteristic of, resembling, pertaining to, or having the nature of schist. *Fay.*

schistose cleavage. Rock cleavage in which grains and flakes are clearly visible and cleavage surfaces are rougher than in slaty or phyllitic cleavage. *Leet.*

schistose structure. A banded structure in rocks caused by long-continued stress and recrystallization which accompany regional metamorphism and rock flowage. Various minerals in the rock are oriented with their longer axes parallel. This produces planes of weakness when the rocks are subjected to fracture stresses that differ from those which caused the cleavage. *Lewis, p. 604.*

schistosity. The variety of foliation that occurs in the coarser grained metamorphic rocks. Generally, the result of the parallel arrangement of platy and ellipsoidal mineral grains. *Billings, 1954, p. 336.*

schizolite. A light red, changing to brown, basic silicate of sodium, calcium, and manganese. Triclinic. Columnar prismatic crystals. A manganiferous variety of pectolite. From Julianehaab, Greenland; Kola Peninsula, Russian Lapland. *English.*

schizomorphic. *See* deuteromorphic. Obsolete. *A.G.I.*

Schlenkermann's stone. A German firestone; it contains about 90 percent SiO_2. *Dodd.*

schlicker. Ger. The skimmings from molten, unrefined lead, containing chiefly copper, iron, and zinc, with a little antimony and arsenic. *Fay.*

schliere; schlieren. Tabular bodies generally a few inches to tens of feet long that occur in plutonic rocks; they have the same general mineralogy at the plutonic rocks, but because of some differences in the ratios of the minerals, they are darker or lighter; the boundaries with the plutonic rock tend to be transitional. Some schlieren are modified inclusions, others may be segregations of minerals. *A.G.I.*

schlieren. a. Regions of different density in fluid, especially as shown by special apparatus. *H&G.* b. A method or apparatus for visualizing or photographing regions of varying density in a field of flow. *H&G.*

Schlumberger dip meter. This dip meter measures both the amount and direction of dip by readings taken in the borehole, and can be operated by using either self-potential or resistivity measurements. The instrument has a long cylindrical body in two parts, the lower part moving telescopically into the upper. Three long springy metal strips, arranged symmetrically round the body, have their upper and lower ends attached to the upper and lower parts of the body respectively. These springs press outwards and make contact with the walls of the hole. *Sinclair, III, p. 107.*

Schlumberger logging. *See* electric logging. *Institute of Petroleum, 1961.*

Schlumberger logs. Records obtained from instruments developed by the Schlumberger brothers for use in borehole logging. Such records are the gamma-ray log, laterolog, microlog, and neutron log. *B.S. 3618, 1963, sec. 3.*

Schlumberger method. *See* electric logs.

Schlumberger photoclinometer. This instrument measures simultaneously the amount and direction of the deviation of a borehole. The sonde is fitted with a small camera on the axis of a graduated glass bowl in which a steel ball rolls freely and a compass mounted in gimbals. The sonde is designed to lie exactly parallel to the axis of the borehole. When a reading is required at a particular depth, the camera is electrically operated from the surface and takes a photograph of the bowl. The steel ball has rolled to the lowest point and so marks the amount of deviation. Its position in relation to the image of the compass needle gives the direction of deviation. *Sinclair, III, p. 107.*

Schlumberger sidewall sampler. Consists of long cylindrical body or gun from which small, hollow cylinders or bullets are fired laterally into the strata forming the walls of the hole by means of an electrically ignited powder charge. Each bullet is closed at one end except for small holes for the escape of the drilling fluid as the sample is forced into the open end and each remains attached by a pair of wires to the gun, to be retrieved when it is withdrawn. *Sinclair, III, p. 109.*

schmeiderite. A selenate of lead and copper, $(Pb,Cu)_2SeO_4(OH)_2$; from La Rioja, Argentina. *Hey, M.M., 1964; Fleischer.*

schmelze. Any one of various kinds of decorative glass, especially the variety that is colored red with a metallic salt, as copper or gold, and used to flash white glass. *Standard, 1964.*

Schmidt apparatus. Apparatus used to determine the position of rest of a freely swinging shaft plumbline. *B.S. 3618, 1963, sec. 1.*

Schmidt hammer. A device for the nondestructive testing of set concrete; it is based on the principle that the rebound of a steel hammer, after impact against the concrete, is proportional to the compressive strength of the concrete. *Dodd.*

Schmidt-type magnetic field balance. This has been the most commonly used magnetic instrument for prospecting on land. It consists of a magnet pivoted near but not at its center of mass, so that the magnetic field of the earth creates a torque around the pivot that is opposed by the torque of the gravitational pull upon the center. The angle at which equilibrium is reached depends on the strength of the field. Readings are taken through an eyepiece by comparing a scale reflected from a mirror on the magnetic element with a fixed scale. The balance may be either the horizontal or vertical type. *Dobrin, p. 279.*

schmierkohle. Impure, earthy variety of brown coal. *Tomkeieff, 1954.*

Schnecken topaz. Genuine topaz. Same as Saxon topaz. *Shipley.*

Schneider furnace. A distillation furnace for the reduction of zinc ores containing lead, with a recovery of the latter metal as well as the zinc. *Fay.*

Schnitzler's gold purple. A tin gold color, produced by a wet method; it has been used for the decoration of porcelain. *Dodd.*

schoderite. Orange microcrystalline coatings on sandstone from Eureka, Nev., have the composition $2Al_2O_3.V_2O_5.P_2O_5.12H_2O$. *Hey, M.M., 1961.*

schoenite. Natural salt, $MgSO_4.K_2SO_4.6H_2O$, obtained from Stassfurt, Germany, salt deposits, and an important source of potassium compounds. *C.C.D., 6d, 1961.*

schoepite. A very rare, strongly radioactive, sulfur-yellow to citron-yellow, orthorhombic mineral, possibly $4UO_3.9H_2O$; has a perfect cleavage and occurs as an alteration product of uraninite or ianthinite, associated with cobaltian wad, becquerlite, curite, and other secondary uranium minerals. *Crosby, pp. 40-41.*

schoepite-I; schoepite-II; schoepite-III. Synonyms respectively of schoepite; metaschoepite; paraschoepite. *Hey, M.M., 1961.*

Scholl's method. A method for determining the uranium in any of its ores in which the uranium is extracted with dilute nitric acid. This extract is then diluted, filtered, and treated with ferric chloride and sodium carbonate causing the vanadium iron and aluminum to precipitate. The uranium is then precipitated from the filtrate by boiling with caustic soda and purified by solution in nitric acid. Following precipitating with ammonia, the ammonium uranate is ignited to the oxide, U_3O_8, and weighed. When this weight is multiplied by the factor 0.847, it gives the weight of uranium. *Bureau of Mines Staff.*

scholzite. a. A mineral, $Ca_3Zn(OH)_2(PO_4)_2.H_2O$, as colorless monoclinic crystals with blende and triplite in pegmatite from Hagendorf, Bavaria, Germany. *Spencer 19, M.M., 1952.* b. An orthorhombic mineral, $CaZn_2(PO_4)_2.2H_2O$, with some substitution by Mn, Mg, and Fe; colorless to white. *American Mineralogist, v. 46, No. 11-12, November-December 1961, p. 1519.*

Schone's apparatus. An elutriator consisting of a tall glass vessel tapering towards the bottom, where water enters at a constant rate. Shone's formula is: $V = 104.7(S—1)^{1.57}D^{1.57}$ where V is the velocity of water (millimeter/s) required to carry away particles of diameter D and specific gravity, S. *Dodd.*

schönfelsite. Ger. A variety of picrite porphyry containing phenocrysts of olivine and augite in an aphanitic groundmass composed of apatite, titaniferous magnetite, bronzite, and bytownite, in an interstitial base of brown glass and chloritic minerals. *Holmes, 1920.*

Schoop metallizing. A zinc-coating process by which volatilized zinc is sprayed upon a metallic surface at high pressure to produce a layer of any desired thickness. *Hess.*

schorenbergite. A noselite-tinguiaite porphyritic igneous dike rock with phenocrysts of noselite, sometimes of leucite, in a gray groundmass of leucite, nepheline, and aegirite. *Johannsen, v. 4, 1938, p. 380.*

schorl. An old name for tourmaline, sometimes used in names of rocks. Mainly restricted to black tourmaline. *Fay.*

schorlaceous. Containing black tourmaline, as granite. *Standard, 1964.*

schorlite. A black variety of tourmaline. *Dana 17.*

schorlomite. A massive, black silicate of titanium, iron, and calcium. *Fay.*

schorl rock. A rock composed essentially of aggregates of black tourmaline (schorl) and quartz. A Cornish term for the end-product of tourmalinization. *See also* luxulianite. *C.M.D.*

Schottky defect. An atomic vacancy. *VV.*

Schramhobel cutter plough. *See* cutter plough. *Nelson.*

schrammen. Ger. Striae; grooves; furrows. *Hess.*

schraufite. A resin, $C_{11}H_{10}O_2$, that occurs in Carpathian sandstone near Wamma, Bukovina, Romania. It has a specific gravity of 1.0 to 1.12 and fuses at 326° C. *Fay.*

schreibersite. a. A phosphide of iron and nickel, $(Fe,Ni)_3P$, with small amounts of cobalt and traces of copper; tetragonal, strongly magnetic; highly metallic luster; silver white to tin white, tarnishing to brass yellow or brown; found in all iron meteorites, as oriented inclusions in kamacite, and in troilite (pyrrhotite), and graphite. Also called rhabdite; in tables or plates (schreibersite); in rods or needles (rhabdite). *Dana 7, v. 1, pp. 124-125.* b. Name for a supposed meteoritic occurrence of Cr_2S_3; true nature of the material unknown. *Hey 2d, 1955.*

schriesheimite. A varitey of hornblende picrite. *Holmes, 1928.*

schroeckingerite. A natural hydrated fluocarbonate-sulfate of sodium, calcium, and uranium, $NaCa_3(UO_2)(CO_3)_3(SO_4)F.10H_2O$; greenish-yellow; luster, vitreous; Mohs' hardness, 2.5; specific gravity, 2.51; fluorescent in ultraviolet light; radioactive. Found in Wyoming, Utah, Arizona; Europe. An ore of uranium. *CCD 6d, 1961.*

schrotterite. *See* allophane. *A.G.I.*

Schuermann series. A list of metals so arranged that the sulfide of any one will be precipitated at the expense of the sulfide of any metal lower in the series. *USGS Bull. 625, 1917, p. 117.*

schuetteite. A basic mercuric sulfate, $HgSO_4.2HgO$, yellow, hexagonal; from Nevada, California, Oregon, and Idaho. *Hey, M.M., 1961.*

schuilingite. A mineral, $Pb_3Cu_2Ca_6(CO_3)_8(OH)_6.6H_2O$, occurring in crusts of crystals; apparently monoclinic; turquoise to azure-blue, powder pale blue. *American Mineralogist, v. 43, No. 7-8, July-August 1958, p. 796.*

Schuller process. *See* updraw process. *Dodd.*

schultenite. A colorless basic orthoarsenate of lead, $HPbAsO_4$, monoclinic. Thin crystalline plates, resembling selenite. From Tsumeb, Southwest Africa. *English.*

Schulze elutriator. The original type of water elutriator; it has since been improved. *Dodd.*

Schulze-Hardy rule. This states that the ion which causes a soluble to coagulate is opposite in sign to the electric charge of the colloidal particle; further, the coagulating power increases with the valency of the ion. *Pryor, 3.*

Schulz's theory. A mine subsidence theory of A. Schulz, a German engineer, in which he distinguished between the manner of fracture of shale and sandstone, holding that the former rock breaks along vertical lines irrespective of the angle of dip, and that the latter has a vertical fracture over a rise face and a fracture at right angles to the bed over a dip face. The theory predicts vertical lines of break in either rock for a level seam, and is, indeed, a compromise between the vertical theory and that of the normal. *Briggs, p. 44.*

Schumann plot. Integral plot in graphic representation of sizing analysis. *Pryor, 3.*

schungite. *See* shungite. *Tomkeieff, 1954.*

Schurecht's ratio. A term that has been used for saturation coefficient; named from H. G. Schurecht who introduced this coefficient in his research on frost-resistance of terra cotta carried out at the National Bureau of Standards in 1926 but never published; the term Schurecht ratio was first applied by T. W. McBurney. *Dodd.*

schwarzkohle. Ger. Name for bituminous coal as distinct from brown coal. *Tomkeieff, 1954.*

schwatzite. A mercury-bearing variety of tetrahedrite. *CCD 6d, 1961.*

Schweinfurth green. *See* copper acetoarsenite.

schwelkohle. Ger. Name for tar coal. *Tomkeieff, 1954.*

Schwimmtiefgreifer. A German floating deep grab dredge with a grab capacity up to 8 cubic yards and capable of dredging to a depth of 130 feet. *Institution of Mining and Metallurgy. Symposium on Opencast Mining, Quarrying, and Alluvial Mining. London, 16-19 November, 1964. Paper 2, p. 1.*

scientific alexandrite. An artificial corundum colored with vanadium oxide and resembling true alexandrite in some of its optical characters. *C.T.D.*

scientific emerald. It resembles true emerald in color, but is a beryl glass colored with chromic oxide. *C.T.D.*

scientific ruby. Red glass. *Shipley.*

scientific sapphire. Blue glass. *Shipley.*

scientific stones. A term correctly used for reconstructed or synthetic stones, but often used misleadingly for various imitations. *Shipley.*

scientific topaz. a. A name for the first synthetic sapphires which were pale pink. *Shipley.* b. Topaz-colored glass. *Shipley.*

scintillascope. *See* scintillation counter.

scintillation. a. Burning with brilliant sparks; for example, white-hot iron when exposed to a current of air. *Fay.* b. A very small light flash excited in certain natural or synthetic crystals by radioactive rays or particles; the basic phenomenon of the scintillation counter in which the photoelectric effect of the scintillation flashes is amplified and measured to give a measure of intensity of radioactivity. *A.G.I.*

scintillation counter. A sensitive instrument for the location of radioactive ore, such as uranium, radium, and thorium. It uses a transparent crystal which gives off a minute flash of light when struck by a gamma ray, and a photomultiplier tube which produces an electrical impulse when the light from the crystal strikes it. The scintillation counter has advantages over the Geiger counter as it is more sensitive, more compact and can distinguish between types of radiation. The instrument responds to gamma rays emitted from the minerals mentioned and charts their intensity. It is used in aerial geophysical prospecting and the resulting maps are used as a guide for a more detailed ground investigation. It is also being developed, inter alia, for steering cutter loaders and coal cutters. *See also* coal-sensing probe. *Nelson.*

scintillation probe. An electronic logging device consisting of a scintillation-type gamma-ray detecting unit built into a container small enough to be lowered into a borehole. *Long.*

scintillator. Brand name of a scintillation counting device. *Long.*

scintillometer. An instrument for measuring radioactivity, based on emission of light by certain crystals under impact of gamma rays. *A.G.I.*

scintle. A variant of skintle. *Webster 3d.*

scintling. a. A scintled brick, or one ready to be scintled. *Standard, 1964.* b. Placing half-dry raw bricks diagonally and a little distance apart, so as to admit air between them. *C.T.D.*

scirpus peat. Peat composed of deergrass. *Tomkeieff, 1954.*

scissors crossover. A junction between two parallel railway tracks in the shape of a pair of scissors, enabling trains to cross in either direction from one track to the other. Also called double crossover. *Ham.*

scissors fault. a. A fault of dislocation, in which two beds are thrown so as to cross each other. *Zern.* b. *See* rotational fault. *Nelson.*

sclaffery. Scot. Liable to break off in thin fragments, as the roof of a mine working. *Fay.*

scleretinite. A black, brilliant, oxygenated hydrocarbon from the coal measure of Wigan, England; it has a specific gravity of 1.136, and is insoluble in alcohol, ether, alkalies, and dilute acids. *Fay.*

sclerometer. An instrument for determining the degree of hardness of a mineral by ascertaining the pressure on a moving diamond point necessary to effect a scratch. *Standard, 1964.*

scleroscope. An instrument for determining the relative hardness of materials by a drop or rebound method. *See also* Brinell hardness tester. *A.C.S.G., 1963.*

scleroscope hardness test. A test to determine the hardness of metals by measuring the rebound from them of a standard diamond-tipped hammer dropped from a given height. *See also* Shore hardness scale. *Nelson.*

sclerotinite. A maceral of the inertite group occurring as rounded bodies related to spore coats, etc., 20 to 300 microns in diameter, and irregular fungal filaments. *A.G.I. Supp.*

sclit. a. Scot. Coaly blaes, or slaty coal. Also called sclutt. *Fay.* b. Scot. Coaly shale or mudstone. *Nelson.*

scobbed. Scot. Said of a car only partly filled with coal. A hutch of mineral is scobbed when large pieces are laid over the corners to give the appearance of the hutch being full, when there is in reality little material in it. *Fay.*

scobs. The dross of metals. *Standard, 1964.*

scolecite. A hydrous calcium aluminum silicate; one of the zeolites; typically forms crystalline masses of radiate structure exhibiting silky luster. *Sinkankas.*

scomfish. N. of Eng.; Scot. To suffocate, as with foul gas or smoke; smother; stifle. *Fay.*

sconce. A protecting cover or screen; protection; shelter. *Webster 3d.* A metal cover and holder combined for holding a miner's candle, especially for hanging on wooden timbers. *Fay.*

scone. High-grade tin requiring little or no dressing. *Nelson.*

scones. Firebricks of a certain standard size. *Osborne.*

scoop. a. A large-sized shovel with a scoop-shaped blade. *Zern.* b. Coal miner's shovel; also sometimes used to refer to scraper. *B.C.I.* c. *York.* A barrel or box used in a gin pit. *Fay.* d. *See* scraper bucket. *Nelson.* e. A device which gathers ore at feed end of ball mill and delivers it into the feed trunnion. *Pryor, 3.*

scoopman. In bituminous coal mining, a laborer who places cable-drawn scoop of scraper loader in position for it to scrape up coal (blasted from working face) as it is dragged by the hoisting engine to a point where the coal is dumped into mine cars. *D.O.T. 1.*

scoop stone. A name for amber dredged from the Baltic Sea. *Shipley.*

scopulite. A variety of crystallite consisting of rods or stems terminated by divergent brushes or plumes, characteristic examples of which are found in the Corriegills pitchstone of Arran, Scotland. *Holmes, 1928.*

score. a. N. of Eng. A standard number of tubs of coal upon which hewers' and putters' prices for working are paid. *Fay.* b. A bill runup by a collier in bad times for the necessaries of life. *Fay.* c. Another name for task. *BuMines Bull. 390, 1936, p. 53.* d. To burst or split from unequal cooling; said of casting. *Standard, 1964.* e. To mark with scratches or furrows, as rocks in certain localities by glacial drift. *Standard, 1964.* f. To mark with grooves, usually with a cutter or tool designed for the purpose. *Kinney.*

scored finish tile. Tile whose face surfaces are grooved as they come from the die. *A.S.T.M. C43-65T.*

scoria. a. An irregular, rough, clinkerlike, more or less vesicular fragment of lava, thrown out in an explosive eruption or formed by the breaking up of the first-cooled crust of a lava flow. Plural, scoriae. *Fay.* b. Refuse of fused metals; dross; slag. *Standard, 1964.*

scoriaceous. Characteristic of, pertaining to, consisting of, or resembling scoriae; having a rough, irregular, clinkerlike, somewhat vesicular surface; said of some lava. *Fay.*

scoriae. Light cellular masses of volcanic rock resembling clinkers. *Holmes, 1928.*

scorification. The separation of gold or silver by heating it to a high temperature with a large amount of granulated lead and a little borax, in a scorifier. The gold or silver dissolves in the molten lead, which sinks to the bottom of the vessel, while the impurities form a slag with the lead oxide which is produced. *Nelson.*

scorifier. A bone ash or fireclay crucible somewhat larger than a cupel; used in assaying and in the metallurgical treatment of precious metals. *Nelson.*

scoring. a. Marring or scratching of any formed part by metal pickup on the punch or die. *ASM Gloss.* b. Reducing the thickness of a material along a line to weaken it purposely along that line. *ASM Gloss.* c. The act of that which scores; sometimes, the result effected; specifically, a deep groove or such grooves collectively, as those made by glacial action. *Standard, 1964.* d. Grooves formed in the exterior faces of the shells of structural clay tile to increase the adhesion of mortar, plaster, or stucco. *Bureau of Mines Staff.*

scorodite. Natural ferric arsenate, $Fe_2O_3.As_2O_5.4H_2O$; pale leek-green or liver-brown. Found in Utah; Washington. A lesser ore of arsenic. *CCD 6d, 1961.*

scorpion stone. Coral or jet. *Shipley.*

scorps. War. Top of seam of boney coal. *Tomkeieff, 1954.*

Scortecci process. A process for direct reduction of iron pyrites which depends on the dissociation of pyrites in the absence of air, and in the presence of carbon, with the formation of iron and carbon disulfide. It is claimed that iron yields of more than 95 percent have been obtained. *Osborne.*

scorza. Epidote sand. *Hess.*

scorzalite. A hydrous phosphate, $Al_2O_3.(Fe,Mg)O.P_2O_5.H_2O$, blue, monoclinic, differing from lazulite in having FeO in excess of MgO. From Divino, Brazil; Custer, S. Dak. *Spencer 18, M.M., 1949.*

scotch. a. A wooden stop-block or iron catch placed across or between the rails of underground roadways, to keep the cars from running loose, or to hold them when standing upon an inclined plane. *Fay.* b. Leic. The lower lift of coal which is wedged up in driving a heading. *Fay.* c. A chock placed under a wheel or other curved object to prevent slipping or rolling. *Webster 3d.* d. To dress, as stone, with a pick or picking tool. *Standard, 1964.* e. A slotted bar used to hold up well-boring rods during adjustment. *Standard, 1964.*

scotch block. a. A wedge or block temporarily fitted to a running rail in order to scotch the wheel of a railway vehicle. *Ham.* b. One form of gas port in an open-hearth steel furnace; the distinguishing feature is that it is monolithic, being made by ramming suitably graded refractory material around a metal template. *Dodd.*

Scotch coal. Cannel coal found in Scotland. *Tomkeieff, 1954.*

Scotch gauze lamp. Scot. A safety lamp used in Scotland, the top of the lamp being wholly of wire gauze. *Fay.*

Scotch hearth. A furnace for smelting high-grade lead ores without previous roasting. Air is blown through a shallow layer of sulfide concentrates mixed with coke. The sulfide is oxidized first to oxide by the air, and this in turn is reduced to lead by the coke. Furthermore, lead oxide and sulfide react to form lead and sulfur dioxide. The process requires much poking and shoveling, hence the Newmann and Federal hearths. *C.T.D.*

scotching. A method of dressing stones either with a pick or with pick-shaped chisels. *Fay.*

Scotchlite. A trade name for a brand of reflective sheeting, comprising a thin, flexible, waterproof sheet embodying a large number of spherical glass lenses. The sheeting reflects light back to its source with 40 times the intensity of a white surface. It may be used for pin-pointing oncoming mine cars, danger or directional notices, on haulage roads, etc. *Nelson.*

Scotch kiln. *See* scove, c. *Dodd.*

Scotch pebble. One of several varieties of quartz, chiefly cairngorm, used in Scotland as a semiprecious stone. *Standard, 1964.*

Scotch pig. A very pure grade of pig iron. *Standard, 1964.*

Scotch stone. Cairngorm. *Shipley.*

Scotch topaz. Applied in the gem stone trade to yellow transparent quartzes, resembling Brazilian topaz in color, used for ornamental purposes. *See also* citrine; cairngorm. *C.M.D.*

Scott furnace. A shaft furnace for the recovery of mercury from its ores. *Bennett 2d, 1962.*

scour. a. Mid. To excavate or brush a roadway through a goaf. *Fay.* b. The erosion of the bed or bank of a river or of a seacoast by the action of flowing water and waves. *See also* scour protection. *Ham.*

scour and fill. a. A stream at flood may be deepening (degrading) its channel, where its velocity is great, at the same time that it is building up (aggrading) its flood plain where the velocity is slight. After the flood has subsided, the channel thus deepened may be entirely filled with sediment. This process is called scour and fill. *A.G.I.* b. The process of cutting and refilling channels in sediments, by which nuggets and other placer particles are redistributed. *A.G.I.* c. Small-scale bottom scour or channels that subsequently filled. Also called cut and fill; channel; washout. *Pettijohn.*

scour cast. *See* flute cast. *Pettijohn.*

scour channel. *See* channel. *Pettijohn.*

scour finger. *See* flute cast. *Pettijohn.*

scouring. a. A wet cleaning or drycleaning process involving mechanical operations. *ASM Gloss.* b. A wet or dry mechanical finishing operation using fine abrasive and low pressure by hand or with a cloth or wire wheel to produce satin or butler-type finishes. *ASM Gloss.* c. Having the quality of eroding the furnace hearth, as some kinds of slag or cinder. *See also* scouring cinder. *Fay.* d. The cleaning and smoothing of biscuit-fired ceramic ware by placing the ware in a revolving drum together with coarse abrasive material, for example, pitchers. In the United States, this process is used in the making of bone china and of some other types of vitreous tableware. In the United Kingdom, when applied in the manufacture of electrical porcelain, the process is known as rumbling. *See also* pitchers. *Dodd.* e. *See* gob heading. *Nelson.*

scouring bit. Eng. A piece of iron at the end of the boring rod for extracting drill cuttings. *Fay.*

scouring block. An abrasive block of ceramically bonded SiC or Al_2O_3 used in the grinding of steel rolls. Such a block is 5 to 6 inches long and 2 to 3 inches square (the actual section may be trapezoidal, roughly semicircular, or of other special shape. *Dodd.*

scouring cinder. A basic slag which attacks the lining of a shaft furnace. *Fay.*

scouring sluice. An opening constructed in the lower part of a dam to enable sand, gravel, or other material to be expelled when it accumulates. *See also* washout valve. *Ham.*

scour lineation. Smooth ridges, 2 to 5 centimeters wide of very low relief, characterized by symmetrical ends. Gives line of current movement but not direction. Believed to be due to scour. *Pettijohn.*

scour marks. Sole marks, generally preserved as casts, of depressions produced by current erosion or scour. *Pettijohn.*

scour protection. The protection of soil or other submerged material against scour, by the use of steel sheet pilings, revetment, riprap, or brushwood, or by combining any such methods as most suited to the site. *See also* Dutch mattress; lining. *Ham.*

scourstone. Eng. A bed of massive sandstone worked for hearthstone, for rubbing hearths and sills, Coal Measures, Bonnder House quarry, Durham. *Arkell.*

scourway. A drainage furrow caused by a strong current, as by a glacial river flowing over a gravel plain. *Standard, 1964.*

scout. a. One who gathers information about the drilling rig of a rival company for the benefit of his employer. Also called snooper. *Long.* b. An engineer who makes a preliminary examination of promising oil and mining claims and prospects. *Long.* c. One who goes into a potential area, especially for oil or gas, to lease or option the land. *Long.*

scout boring. Trial bores made to test formations of area being prospected. *Pryor, 3.*

scouter. In stoneworking, a quarryman whose function is to split off large portions of rock by means of a jump drill and wedges. *Standard, 1964.*

scout hole. A borehole penetrating only the uppermost part of an ore body with the intention of delineating its surface configuration. Also, a shallow hole drilled to scout for an indication of ore or to explore an area in a preliminary manner. *Long.*

scout prospecting. Prospecting undertaken in new country in which the first step is to scout prospect rivers, streams, and creeks by washing gravel obtained from their beds. *Griffith, S. V., p. 1.*

scovan. Corn. A tin-bearing lode. *Fay.*

scovan lode. A lode devoid of gossan, especially at the outcrop. *Standard, 1964.*

scovany. Like a tin lode; hard to work, because lacking selvage or other soft material. *Standard, 1964.*

scove. a. Corn. Rich, clean tin ore. *Webster 2d.* b. To case up (bricks) in a kiln. *Standard, 1964.* c. An early type of updraft intermittent kiln for the firing of bricks, etc. It was rectangular and consisted of sidewalls and end walls only, with fire holes in each sidewall and wicketts in each end wall. The top of the setting was covered with a platting consisting of a layer of fired bricks, with ashes or earth above. Also called Scotch kiln. *Dodd.*

scove kiln. An updraft kiln usually having no permanent parts. It is built of unfired brick and is fired with wood, coal, gas, or oil. *ACSG, 1963.*

scovens. S. Staff. Forks for loading coal into tubs, or cars. *Fay.*

scovillite. Synonym for rhabdophane. *Crosby, p. 108.*

scoving. The outer layer, usually wet clay, of a scove kiln applied to make the kiln gastight. *ACSG, 1963.*

scow. A device used to a limited extent to load out solid blocks of coal. The scow proper is a flat steel plate which is moved underneath the undercut and blocks the coal by means of a hoist and tail rope. The coal is then wedged down on the scow, and the solid block is hauled by means of the hoist and a headrope to a delivery point where it is transferred to cars. *Jones.*

scowl a brow. Forest of Dean. To drive a heading or level by guesswork. *Fay.*

scowles; scowl holes. Forest of Dean. Ancient ironstone quarries and mine workings. *Arkell.*

scp Abbreviation for spherical candlepower. *BuMin Style Guide, p. 62.*

scrablag. Hardpan, Isle of Man. *Arkell.*

S-crack. Lamination, in the form of a letter S, in a clay column from a pug having a poorly designed mouthpiece. The crack develops from the central hole in the clay column formed at the end of the shaft in the pug, the hole being deformed to an S in the rectangular mouthpiece. *Dodd.*

scrag. The batir of a post. *Stauffer.*

scram. a. To search for and extract ore in a mine that is apparently worked out. *Weed, 1922.* b. An Alabama term for a small soft-coal mine complete in itself. *Fay.* c. The sudden shutdown of a nuclear reactor, usually by rapid insertion of the safety rods. Emergencies or deviations from normal reactor operation cause the reactor operator or automatic control equipment to scram the reactor. *L&L.*

scram drive. Underground drive above the tramming level, along which ore is moved by scrapers (slushers) to a discharge chute. *Pryor, 3.*

scrammer. One who scrams. *Standard, 1964. See also* scram, a. *Fay.*

scram pile. Prov. The product of the scrammers' labors, gathered for shipment. *See also* scram, a. *Fay.*

scrap. a. Defective product not suitable for sale. *ASM Gloss.* b. Discarded metallic material from whatever source that may be reclaimed through melting and refining. *ASM Gloss.* c. Som. Stone only fit for rough walling. *Arkell.* d. *See* diamond scrap. *Long.*

scrapalurgy. A term coined by Brearley for the efficient use of scrap. *Osborne.*

scrap baler. In the iron and steel industry, one who presses, in a baling press, steel scrap into compact blocks, for remelting in the open-hearth furnace. Also called scrap builder; scrap pressman. *D.O.T. 1.*

scrap bar. The uneven ends of the muck bars. *Mersereau, 4th, p. 444.*

scrap-carbon process. Indian scrap-carbon process using 100 percent steel scrap in which petroleum coke replaces carbon and acid slag replaces silicon. The hearth is protected from erosion by spreading an easily fusible silica sand over the banks before charging and manganese ore is used instead of iron ore for oxidizing the carbon. The quality of the steel made by this process is claimed to be as high as that obtained by the pig-and-scrap process and yields are said to be higher. *Osborne.*

scrap diamond. *See* diamond scrap. *Long.*

scraper. a. A rod for cleaning out shotholes prior to charging with explosives. A ⅜-inch copper rod with the ends flattened and turned at right angles to the line of the rod is usually used. No iron or steel scraper is allowed in a mine. *See also* stemmer. *Nelson.* b. A steel tractor-driven surface vehicle, 6 to 12 cubic yard capacity, mounted on large rubber-tired wheels. The bottom is fitted with a cutting blade which, when lowered, is dragged through the soil. When full, the scraper is transported to the dumping point where the material is discharged through the bottom of the vehicle in an even layer; used for stripping and releveling topsoil and soft material at opencast pits. *See also* scarifier. *Nelson.* c. A scraper loader or scraper chain conveyor. *Nelson.* d. A tool for cleaning the dust out of the borehole. *Fay.* e. A mechanical contrivance used at collieries to scrape the culm or slack along a trough to the place of deposit. *Fay.* f. One who separates the ores from the waste rock. *Fay.* g. An apparatus drawn by horses or oxen for scraping up earth in making roads or canals, and for removing overburden from shallow coalbeds and mineral deposits. *Fay.* h. An apparatus used to take up coal from the floor of a mine after it has been shot, and deposit it either in cars or in a conveyor. It is pulled back and forth by two ropes attached to separate drums of a hoist; a rubber-tired device used to move earth in surface mining; local name for a cutting machine operator's helper. *B.C.I.* i. A machine used in mines for loading cars and transporting ore or waste for short distances. There are two basic types of scraper: (1) the hoe or open type, which is particularly suitable for moving coarse, lumpy ore, and (2) the box or closed type, which is particularly suited for handling fine material, especially on a loading slide. *Lewis, p. 198.* j. A blade or blades caused to bear against the moving conveyor belt for the purpose of removing material sticking to the conveyor belt. *ASA MH4.1-1958.* k. A digging, hauling, and grading machine having a cutting edge, a carrying bowl, a movable front wall (apron), and a dumping or ejecting mechanism. Also called carrying scraper; pan. *Nichols.* l. *See* machine scraper. *D.O.T. 1.* m. The name applied to a bowl scraper or a multibucket excavator; also known as scraper excavator. *Ham.* n. *See* carryall. *Bureau of Mines Staff.* o. *See* poker man. *D.O.T. Supp.*

scraper and break detector. In Great Britain, every shot firer is provided with a scraper for cleaning out shotholes, and in safety lamp mines a break detector must also be provided. The two tools are combined in the scraper and break detector. It can clean out the shothole and detect breaks in the walls of one-eighth inch or more in width. The firing of a shot in a hole traversed by a crack exceeding one-eighth of an inch in width is forbidden. *Nelson.*

scraper boxes. N. of Eng. In this system a thin web of coal is removed by the vertical cutting edges of a series of boxes which move to and fro across the face. The coal so peeled is scraped into the boxes, and transferred from one to another until it reaches the gate conveyor. *Trist.*

scraper box plough; Haarmann plough; Kema plough; Gusto scraper box. A layout of rope-drawn scraper boxes with knives on the face side. They are drawn to and fro, and pushed against the face by guides controlled by rams. A haulage of 250 horsepower must be installed in a semipermanent engineroom; has a rope diameter of 1¼ inches and a speed of 3 feet per second. No conveyor is required as the coal is scraped by boxes to the loading point. The maximum workable seam thickness is 20 inches on gradients of 0° to 30°; maximum length of face, 220 to 275 yards; and advance per shift, 6½ to 8 feet. *Nelson.*

scraper bucket. a. One of the excavating bowls or buckets which form part of a scraper. *Ham.* b. In coal mines, the scraper bucket is a bottomless, three-sided box, with a hinged back. The hinge operates in a forward direction so that on the return journey on the coal face, the back opens allowing the box to remain empty. On the loading journey, the coal closes the hinge and the material is drawn or scraped forward to the point of discharge. Also called scoop. *See also* scraper loader. *Nelson.*

scraper chain conveyor. *See* chain conveyor. *Nelson.*

scraper chaser. One of a number of men whose business is to follow the scraper (go-devil) in the petroleum pipes, and give instant notice if a clog occurs. *Standard, 1964.* He follows the pipeline on the surface and detects the location of the go-devil by sound, especially where pipes are shallow. *See also* go-devil, a. *Fay.*

scraper conveyor. a. A mechanical device for conveying coal, rock, ashes, culm, etc., in a metal trough by means of scrapers attached to a rope or chain. *Fay.* b. A conveyor consisting of chain-drawn scrapers or flights running in a trough through which they push the material to be transported. Also called drag-link conveyor; flight conveyor; chain conveyor. *B.S. 3552, 1962.*

scraper, hand. *See* stope scraper. *D.O.T. 1.*

scraper hoist. A power-driven hoist that operates a scraper to move material (generally ore or coal) to a loading point. *ASA C42.85: 1956.*

scraper loader. a. A machine used for loading coal or rock by pulling an open-bottomed scoop back and forth between the face and the loading point by means of ropes, sheaves, and a multiple drum hoist. The filled scoop is pulled on the bottom to an apron or ramp where the load is discharged onto a car or conveyor. *Jones.* b. A combined scraper and transporting machine. Originally towed by a tractor, but now diesel-electric with direct current motor in each wheel. *Pryor, 3.* c. A double-drum winch with two steel ropes. The tail rope passes around a pulley or tail sheave at one end of the face or road, brought back and attached to the scraper bucket; the pull rope is coupled directly to the front end of the bucket. The bucket is hauled forward and digs into the loose coal or stone until full and then rides to the discharge point. When empty, the bucket is drawn back by the tail rope. The haulage motors are from 5 horsepower upwards and rope speed about 150 feet per minute. The loading capacity of a scraper loader ranges from 30 to 80 tons per hour depending on conditions. The loader is used for transporting and loading coal on longwall faces; for removing and loading stone in tunnels, and for stowing dirt on longwall faces. Also called slusher. *Nelson.*

scraper-out man. In the coke products industry, a laborer who follows coke-drawing machine, removing the coke remaining in ovens, using a long iron rod (scraper). Also called coke-drawing machine helper. *D.O.T. 1.*

scraper packer. N. of Eng. A machine-operated dragline and scoop, for removing stone from the gateway and packing it in the goaf. Also called slusher. *Trist.*

scraper plough; porte et gardin plough. One scraper box with picks, rope-drawn and unguided along the face. A 30-horsepower haulage advances with the face, which is made convex to eliminate the need for guides. Speed, 3 to 4 feet per second. Suitable seam conditions; thickness, 12 to 24 inches at gradients of 0° to 35° (preferably 15° to 25°); and maximum length of face, 65 yards. *Nelson.*

scraper ripper. A new piece of strip-mine equipment that handles the jobs of breaking coal, loading, and hauling. Features of the scraper ripper include ripping teeth on the lip for breaking the coal and a flight conveyor for carrying the broken coal away from the lip. As the ripper teeth bite into and loosen the coal, the conveyor sweeps the loose coal upward and prevents buildup ahead of the lip. *Coal Age, v. 71, No. 8, August 1966, p. 232.*

scrap forgings. Forgings formed from wrought-iron scrap. *Standard, 1964.*

scrap hoist operator. In the iron and steel industry, one who operates a skip hoist to carry scrap material to the furnaces. *D.O.T. 1.*

scrapings, enamel. Enamel recovered from spray booths having been deposited there during a period of spraying. *See also* reclaim. *ACSB-3.*

scrapman. *See* clay carrier; dust-box tender. *D.O.T. 1.*

scrap mica. Mica that because of size, color, or quality is below specifications for sheet mica. Includes flake mica and the mica, except sheet, obtained from pegmatite mining as a sole product or as a byproduct, from the preparation of sheet mica, and from waste in fabricating sheet mica. *Skow.*

scrapper. a. One who removes scrap from bin, casthouse, or chute to skip pit, and charges the material removed into a skip at regular intervals. *Fay.* b. A local name given to men who pick up the ore left on dumps. *Fay.*

scrap picker. A man employed on the slag dump to pick out pieces of iron carried to the dump in slag ladles. *Fay.*

scrapping. a. The breaking up of metal castings, plate, etc., with explosives, generally by mudcapping. *Fay.* b. The removal of excess body from a shaped piece of pottery ware while the latter is still in or on the mold. *Compare* fettling, d. *Dodd.*

scrapping bottom coal. Lifting coal that has been left by an undercutting machine. *Zern.*

scraps. Excess body removed during the shaping of pottery ware, together with any broken, unfired pieces. Scraps are usually returned to the blunger for reuse. *Dodd.*

scrap sorter. In metallurgy, a laborer who sorts scrap metal and removes foreign matter preparatory to use in recasting. *D.O.T. Supp.*

scratch. A calcareous, earthy, or strong substance which separates from seawater in boiling it for salt. *Fay.*

scratch-brush finish. *See* Butler finish.

scratched. In ceramics, ornamented with rough scratches in the paste. *Standard, 1964.*

scratched blue. Incised ornament on unbaked clay, sprinkled with cobalt glass, then fused in the kiln. *C.T.D.*

scratcher. Eng. A boring tool for loosening (or scratching) the cuttings at the bottom of a borehole, to be removed afterwards by a mizer. *Fay.*

scratch hardness. The hardness of a metal determined by the width of a scratch made by a cutting point drawn across the surface under a given pressure. *ASM Gloss.*

scratch pan. A pan in saltworks to receive the scratch. *Fay.*

scratch test. a. A test used to determine the relative resistance of enamel surfaces to scratch or gouging action. *Enam. Dict.* b. *See* scratch hardness.

SCR brick. A brick whose nominal dimensions are 2-2/3 by 6 by 12 inches, laying up three courses to 8 inches; this brick, with norman brick face dimensions builds a nominal 6-inch thick wall. *ACSG.*

screaming joint. A joint from which air leaks and makes a screaming noise. Compressed air escaping at a "screaming joint" or hole in an air hose can be the cause of a mine fire. *Sinclair, I, p. 242.*

scree. a. Long trails of loose rock collected on the slopes beneath steep mountain sides. *See also* scree iron ore. *Nelson.* b. A sieve, screen, or strainer; a coal screen. *Fay.* c. A heap of rock waste at the base of a cliff or a sheet of coarse debris mantling a mountain slope. By most writers, scree is considered to be a synonym for talus but it is a more inclusive term. Whereas talus is an accumulation of material at the base of a cliff, scree also includes loose material lying on slopes without cliffs. *Stokes and Varnes, 1955.*

scree bars. Scot. Bars of which a scree is constructed. *See also* scree, b. *Fay.*

screed; screed board. A wooden or metal template for tamping and finishing a concrete surface to set levels. It may be fitted with a mechanical vibrator. *Ham.*

screed board. *See* screed. *Ham.*

screen iron ore. Accumulation of surface debris on the lower slopes of iron-bearing hills. The scree material may contain sufficient iron ore to make its mining an economic proposition as at Middleback Ranges of South Australia. *Nelson.*

screen. a. A large sieve for grading or sizing coal, ore, rock, or aggregate. It consists of a suitably mounted surface of woven wire or of punched plate. It may be flat or cylindrical, horizontal or inclined, stationary, shaking, or vibratory, and either wet or dry operation. *See also* shaking screen; stationary bar screen; vibratory screen. *Nelson.* b. A sieve of wire cloth, grate bars, or perforated sheet iron used to sort ore and coal according to size. Stamp mortars have screens on one or both sides, to determine the fineness of the escaping pulp. *Fay.* c. A cloth brattice or curtain hung across a road in a mine to direct the ventilation. *Fay.* d. A term used in Joplin, Mo., for a grizzly near the top of a headframe. *Fay.* e. A device for carrying out the operation of screening. *B.S. 3552, 1962.* f. A perforated sheet placed in the gating system of a mold to separate dirt from the molten metal. *ASM Gloss.* g. A more or less tabular body of older rock lying between two intrusions, such as a band of schist between two ring dikes. *A.G.I.*

screen analysis. a. The mechanical analysis of a soil by screens without the aid of wet analysis. This test gives information on particles of clay type. *Ham.* b. The size distribution of noncohering particles as determined by screening through a series of standard screens. *HW.* c. *See* sieve analysis. *ASTM B243-65.* d. The percentage of a sample retained on each size of a series of standard laboratory screens. *Nelson.*

screen ape. a. One who attends the grizzly, or screen. He breaks the large pieces of ore, and picks out such waste rock as he can as it passes over the screen. *Fay.* b. *See* grizzly worker; screenman, a. *D.O.T. 1.*

screen attendant. In the quarry industry, one who tends operation of screening equipment by which crushed rock is separated into various sizes at a rock quarry. *D.O.T. 1.*

screen box. a. A container in which diamond screens are inserted and in which the material that passes through a sieve or screen collects and is retained. *Long.* b. Incorrectly used as a synonym for shaker; also, for shale shaker. *Long.*

screen chute. A discharge chute equipped with a screen section, either stationary or vibrating, to remove the finer portions of the material being handled from the major line of flow. *ASA MH4.1-1958.*

screen cleaner. A laborer who cleans the screen that filters magnesium dust from natural gas. *D.O.T. Supp.*

screen cloth. a. A woven tissue suitable for use in a screen deck. *B.S. 3552, 1962.* b. *Scot.* Tarred canvas; brattice cloth. *Fay.*

screen deck. A surface provided with apertures of specified size for carrying out the operation of screening. *B.S. 3552, 1962.*

screened coal. a. Coal that has passed over any kind of a screen and therefore consists of the marketable sizes. *Fay.* b. Specifically, coal that is weighed and credited to the miner after passing over a standard screen. *Fay.*

screened lump lime. Lump lime after forking or screening to remove the finer portion. *Hess.*

screened material. Material which has been separated by being passed through screens of various sizes. *Ham.*

screened sand. Sand freed of finer material by the winnowing action of waves and currents. *A.G.I. Supp.*

screened trailing cable. A flexible cable provided with a protective screen or screens of tinned copper wire, or other conducting material, applied (1) to enclose each power core separately (individual screening), or (2) to enclose all the cores of the cable (collective screening). *B.S. 3618, 1965, Sec. 7.*

screener. a. Newc. A man who shovels the coal from the screens into the wagons. *Fay.* b. *See* screenman. *D.O.T. 1.*

screen feeder. *See* chute puller. *D.O.T. 1.*

screen film. Any film intended primarily for use under conditions such that the action of X-rays or gamma rays on fluorescent screens in contact with the film is largely responsible for the density produced. *ASM Gloss.*

screen foreman. The man responsible for the routine daily operation of a coal-preparation plant which may include the washery. *Nelson.*

screening. a. The separation of solid materials of different sizes by causing one component to remain on a surface provided with apertures through which the other component passes. *B.S. 3552, 1962.* b. Use of one or more screens (sieves) to separate particles of ore into defined sizes. Also called sizing. *Pryor, 2.* c. The recommended practice of running liquid enamel through a sieve or screen, as it flows from the mill. In this way, any particles of unusually hard unground frit, broken pebbles, and pieces of mill lining, when present, may be removed. The use of 20- or 30-mesh screen for the initial screening should be satisfactory, but the enamel must be screened again through a finer sieve of 50- or 60-mesh before it is ready sieve of 50- or 60-mesh before it is ready to use. *Enam. Dict.* d. *See* sieving. *Pryor, 3.*

screening analysis. Grading rock into sizes, by use of screens. Screen analysis is a laboratory procedure widely used in ore testing and plant control, in which a sample of 100 grams or so is screened for a prescribed period on a series of sieves, ranging in size from (perhaps) 48 mesh to 200 mesh or even smaller. The dried product retained by each screen is weighed and yields data on grinding efficiency, floatability, specific surface, etc. The main laboratory systems are the Tyler in which each successive screen size is #2 larger (or smaller) in area. 200 mesh (#) being a weave in which the side of each square measures 74 u. The British Standard (B.S.) system approximates the Tyler, 200. # being 76 u. In the Institution of Mining and Metallurgy (I.M.M.) system each wire has the same diameter as the succeeding gap, 200 # being 63 u. Mesh refers to the number of wires per linear inch measured along either warp or woof. Other systems include the American Society for Testing Materials (A.S.T.M.) and the German Deutsche Industrie Norm (D.I.N.). Also called sizing. *Pryor, 3.*

screening ink. *See* ceramic ink.

screening machine. An apparatus having a shaking, oscillatory, or rotary motion, used for screening or sifting coal, stamped ores, and the like. *Fay.*

screening paste. An oil suspension of enamel for use with a silkscreen. *Bryant.*

screenings. a. Fine coal that passes through a screen when screening for lump coal. *Fay.* b. Coal which will pass through the smallest mesh screen normally loaded for commercial sale for industrial use. *B.C.I.* c. Material rejected (either oversize or undersize) as a result of screening. *Pryor, 3.* d. The residue from a screening operation. *Nelson.*

screenings crushing. A stage in bituminous-coal crushing in which units for crushing screenings reduce secondary products to final small, commercial sizes, such as 1- to ⅜-inch stoker coal or screenings. *Mitchell, p. 194.*

screen loading chute. A type of chute with a bar screen or grizzly bottom which permits fines to fall onto the conveyor belt first, providing a cushion for the larger material which passes over the screen. *ASA MH4.1-1958.*

screenman. a. In anthracite and bituminous coal mining, a laborer who tends shaking screens or tables over which coal is run to size it. He breaks large lumps of coal that will not pass through openings, and picks out such waste material (slate, rock, and dirt) as he can as coal passes over screens. Also called bankhead screenman; screen ape; screener; shaker attendant; shaker tender; tableman; table runner; table tender. *D.O.T. 1.* b. *See* screen operator. *D.O.T. Supp.* c. One who tends shale-and-clay-sifting screens, keeping the wire mesh unclogged. Also called screener; screen tender. *D.O.T. 1.*

screen operator. One who sifts crushed ore to separate particles within predetermined size ranges. Also called screenman and screenman helper. *D.O.T. Supp.*

screen pipe. A perforated pipe lined with a fine mesh screen, set in portions of a borehole where the walls must be supported and the ingress of water or oil cannot be restricted. Also called well point. *Long.*

screen plate. a. A metal plate with specific-sized openings used to control the fineness of grinding in dry pans and hammer mills. *ACSG, 1963.* b. A plate provided with apertures of specified size for use as a screen deck. *B.S. 3552, 1962.*

screen-printing. *See* silk-screen process. *Dodd.*

screen room. That part of a breaker where boys picked slate and bony. *Korson.*

screens. Wire meshes with specific-sized openings for grading particles of various sizes. *See also* vibrating screens. *ACSG, 1963.*

screen scratcher. A laborer who removes wood chips from ore screens to prevent clogging, using a long-handled hoe. *D.O.T. Supp.*

screen size. A standard for determining the size of diamond particles. The diamonds are passed through screens with openings of specified size. The size of the diamonds is determined by the size of the opening through which the diamonds will not pass. *Long.*

screen sizing. Separating various sized grains into portions, by a screen or sieve. Also called screening; sizing. *Bureau of Mines Staff.*

screen tender. *See* screenman. *D.O.T. 1.*

screen test. A standard test for enamel fineness. A 50 cubic centimeter sample of the liquid enamel is washed through a 200-mesh wire screen, the residue being dried and agitated for a specific length of time before weighing. *Enam. Dict.*

screen-test man. In ore dressing, one who tests crushed ore samples to determine the grinding efficiency of a ball mill. *D.O.T. Supp.*

screen, types of. Commercial screens include the fixed grid, the grizzly or grizzley, which may be so mounted that arriving ore causes it to vibrate (cantilever mounting). Moving grizzlys include the moving bar; the chain; the disc or roller; Ross roll; spool or live-roll; and vibrating grizzly. Fixed screens are of light construction in punched plate, bars, or wire weave. The drag screen is a flight conveyor in a trough with perforated base. The revolving screen is the trommel, simple or compound, conical, hexagonal or prismatic and round. The shaking screen has mechanical or electric vibratory transport from feed to discharge, probably plus throwing action. Screening surfaces include woven wire, slotted plates, stretched piano wire, bars, and for fine dry work, bolting cloth or silk. Washing screens have spraying arrangements for aiding the undersize to become detached from the oversize and then wash through the meshes. *Pryor, 3.*

scree plate. Scot. An iron plate at the foot of a screen on which screened coal is discharged. *Fay.*

scree slips. A slip or loose material on scree slopes, which may bring down rocks, especially during wet weather, or excavations along a new mining site at base. A thick retaining wall is often effective in checking incipient movement. *Nelson.*

screw. a. The feed screw in the swivel head of a gear-feed diamond drill. *Long.* b. Synonym for check screw. *Long.* c. To couple threaded parts. d. Synonym for an auger stem having helical webs. *Long.*

screw bell. a. A device to withdraw broken rods from a borehole, when the fracture occurs below a joint. The screw bell is lowered to cut a thread on the end of the broken rod and thus secure a grip sufficient to withdraw it safely. *See also* crow's-foot; fishing tool; spiral worm. *Nelson.* b. A fishing tool shaped like a bell, bell tap, or bell screw. *Long.*

screw casing. A threaded lap-welded well casing. *Fay.*

screw conveyor. a. A conveyor screw revolving in a suitably shaped stationary trough, or casing fitted with hangers, trough ends and other auxiliary accessories. *ASA MH4.1-1958.* b. One in which a spiral blade presses material forward as it rotates in a suitable housing. *Pryor, 3.*

screw-down mechanism. That mechanism on a mill for lowering and raising the rolls to accommodate the distance between them to the requirements of the article being rolled. *Mersereau, 4th, p. 427.*

screwed flanged joint. These flanges have plain faces; the joint is made by fitting a washer of insertion rubber which is compressed by tightening evenly with the bolts disposed around the flanges. *Mason, V. 2, p. 627.*

screw elevators. Vertical screw elevators are used for handling pulverulent materials. A typical installation for delivering bulk cement into a plant consists of a screw feeder, which takes the cement from the bulk-cement car and feeds it to the screw elevator. Both these units are airtight and all joints are fitted with rubber gaskets which prevent the loss of cement and render the operation dustproof. *Pit and Quarry, 53rd, Sec. C, p. 38.*

screw fan. *See* axial-flow fan, a. *B.S. 3618, 1963, sec. 2.*

screwfeed. A system of gears, ratchets, and friction devices, or some combination of these parts, in the swivel head of a diamond drill, which controls the rate at which a bit is made to penetrate the rock formation being drilled. When controlled by a feed gear, the bit maintains the same penetration rate per revolution regardless of drill-stem revolutions per minute. Also called gear feed, mechanical feed. *Long.*

screw feeder. An auger-type screw to transfer material from one piece of equipment to another. *ACSG, 1963.*

screwfeed head. Synonym for screwfeed swivel head. *Long.*

screwfeed machine. A general term applied to a diamond drill on which the bit-feeding mechanism is actuated through a system of gears. *Compare* hydraulic machine. *Long.*

screwfeed swivel head. A diamond-drill swivel head, equipped with a device consisting of a system of gears, ratchets, friction devices, or some combination of these members, that controls the rate at which the drill stem and bit are fed into the rock. Also called feed head; gear-feed head; mechanical-feed swivel head; screwfeed head. *Long.*

screwjack. Synonym for jackscrew, a. *Long.*

screw mixer. *See* screw-type mixing conveyor. *ASA MH4.1-1958.*

screw pile. A wide helical blade fixed on a shaft and screwed into the ground by means of a winch or capstan. *Ham.*

screwplug. Synonym for hoisting plug. *Long.*

screw press. a. A press whose slide is operated by a screw rather than by a crank or other means. *ASM Gloss.* b. *See* friction press. *Dodd.*

screw shackle. A long cylindrical nut, threaded internally with a right-hand thread at one end and a left-hand thread at the other, used to connect and tighten together the ends of two rods forming a brace or tie. *Ham.*

screwstock. Free machining bar, rod, or wire. *ASM Gloss.*

screw thread. Helical ridge of uniform section, formed on inner or outer surface of cylinder (straight thread); concial spiral on inner or outer surface of cone (taper thread). Right-hand thread winds in clockwise receding direction when viewed end-on. Rolled threads are cold-pressed and cut-threads chased. Tolerance is total permissible variation of size. Pitch is distance between adjacent points measured parallel to axis. Lead is distance advanced in one complete turn. Threads per inch are reciprocal of pitch in inches. Included angle (angle of thread) is that between flanks, measured in axial plane. *Pryor, 3.*

screw-to-rod adapter. A rigid coupling or sub. When coupled to the drive rod of a screwfeed swivel head of a diamond drill (in place of a chuck), it acts as a device by means of which drill rods can be coupled directly to the screwfeed drive rod. Also called rod adapter. *Long.*

screw-type mixing conveyor. A type of screw conveyor consisting of one or more conveyor screws, ribbon flight or cut flight conveyor screws with or without auxiliary paddles. *See also* screw conveyor, a. *ASA MH4.1-1958.*

scribe. An instrument used by surveyors for marking posts, trees, etc. *Fay.*

scribing. Scoring the dry enamel coat with a sharp tool. Generally combined with a brushing operation. *Bryant.*

scrin. a. Derb. Ironstone in irregular-shaped nodules. *Fay.* b. *Derb.* A small subordinate vein. *Fay.* Also spelled skrin. *Fay.*

scrip. a. Credit slips or tickets issued by a mining company to its employees before payday in lieu of cash. The scrip drawn is charged against the pay of the employee, and is exchangeable for commodities at the company store at its face value. *Fay.* b. A document created by legislative enactment, whereby the holder thereof is entitled to acquire public nonmineral land, in the certain quantity therein named upon its surrender to the officers of the land office for the district of lands subjected to sale and wherein the selected lands may lie, or as otherwise provided by the law authorizing its creation. Sometimes called indemnity certificates or land warrants. *Ricketts, I.*

scroddle. To variegate, as pottery ware, in different colors by the use of various colored clays. *Standard, 1964.*

scroll. a. A helical projection on a drill rod or stem to remove the cuttings from the hole. *B.S. 3618, 1964, sec. 6.* b. A power-driven rotary head consisting of iron rings or segments. When supplied with steel shot, this head is used to smooth the surface of granite in a process known as ironing. *AIME, p. 328.*

scroll drum. Eng. A conical winding drum. *Fay.*

scronge. S. Wales. Overlying strata loosened or broken by workings underneath. Probably a variation of scrunge, to squeeze. *Fay.*

scrowl. Corn. A thin, sometimes calcareous or siliceous rock attached to the wall of a lode. *Fay.* b. *Corn.* Loose ore at the point where a lode is disturbed by a cross vein. *Fay.*

scrubber. Device in which coarse and sticky ore, clay, etc., is washed free of adherent material, or mildly disintegrated. The main forms are the wash-screen, wash trommel, log washer and hydraulic jet or monitor. Scrubbers or scrubbing towers are also used to separate soluble gases with extracting liquids, or to remove dust from air by washing. *Pryor, 3.*

scrubbers. Special apparatus for cleaning the waste gases (with water) before they are used for the engines. *Mersereau, 4th, p. 399.*

scrub marks. A surface blemish on glass bottles. *See also* brush marks. *Dodd.*

scrubstone. Eng. A provincial term for a variety of calciferous sandstone. *Fay.*

scrub water. Ark. Water supplied to mining camps for bathing and laundry purposes. *Fay.*

scrud; crud. Mixture of foreign matter (scale, rust, dirt, water, oil, etc.) in pipelines. *Bennett 2d, 1962 Add.*

scruff. a. A mixture of tin oxide and iron-tin alloy formed as dross on a tin-coating bath. *ASM Gloss.* b. *See* scum, a. *Pryor, 3.*

scrumboard. A board dipping below the surface of a fluid to prevent scum flowing away. *Ham.*

scuba. Self-contained underwater breathing apparatus. The diving equipment used by skin divers. *Hy.*

scud. a. Used among British miners for very soft coal with numerous fusain bands. *Tomkeieff, 1954.* b. *Leic.* Very thin layers of soft matter, such as clay, sooty coal, etc. *Fay.* c. *Mid.* Pyrite embedded in coal seams. *Fay.*

scuffed. *See* scarred. *Bryant.*

scuffing. The dull mark that sometimes results from abrasion of a glazed ceramic surface or of glassware. *Dodd.*

scuffing grind. Tumbling of sands with sufficient violence to remove loosely adherent surface coatings without otherwise breaking down the particles to any great extent. *Pryor, 3.*

scuffler. N. of Eng. Man working with a cutting team responsible for cleaning out the kirvings from the undercut coal and placing nogs or sprags to support the coal. Known also as gummer or duffer. *Trist.*

scull. *See* skull. *Dodd.*

sculls. Incrustations of slag, dross and metal on the contacting surfaces of vessels which treat or hold molten metals. *Pryor, 3.*

sculp. To break slate into slabs suitable for splitting. *Webster 3d. See also* hard way, a. *AIME, p. 796.*

sculping. Fracturing the slate along the grain, that is, across the cleavage. *Zern.*

scum. a. Impure or extraneous matter that rises or collects at the surface of liquids, as vegetation on stagnant water, or dross on a bath of molten metal. Sometimes incorrectly used for the word froth in flotation. *Fay.* b. A surface deposit sometimes formed on clay building bricks. The deposit may be of soluble salts present in the clay and carried to the surface of the bricks by the water as it escapes during drying; it is then known as dryer scum. The deposit may also be formed during kiln firing, either from soluble salts in the clay or by reaction between the sulfur gases in the kiln atmosphere and minerals in the clay bricks; it is then known as kiln scum. *Compare* efflorescence. *Dodd.* c. Undissolved batch constituents floating as a layer above the molten glass in a pot or tank furnace. *Dodd.* d. Areas of poor gloss on a vitreous enamel; the fault may be due to action of furnace gases, to a nonuniform firing temperature, or a film clay arising from faulty enamel suspension. *Dodd.* e. The "clouds" appearing around decalcomania formed by varnish residue. *ACSG, 1963.* f. A surface defect appearing as dull patches on otherwise bright surfaces of glazes, glass, or porcelain enamel. *ACSG, 1963.* g. Eng. A thin seam of clay, termed by the quarrymen scum, spread over the whole of the top of the Portland series, at the base of the Purbeck beds, Upwey, Dorsetshire. *Arkell.*

scumming. a. Water-soluble salts which appear on the surface of ceramic ware after drying or firing. *Bureau of Mines Staff.* b. A defect characterized by areas of poor gloss on the surface of porcelain enamel. *ASTM C286-61T.* c. The formation of a scum on the surface of a cyaniding bath. It consists of decomposition products of the bath. *Osborne.*

scun. Dev. A small vein. *Fay.*

scupper nails. Nails with broad heads, for nailing down canvas, etc. *Fay.*

scurf. A hard deposit, mainly of crystalline carbon, formed by the thermal cracking of crude coal gas on the refractory walls of gas retorts and coke ovens. When the scurf is periodically removed, by burning off, there is a danger that the refractory brickwork of the retort or oven may be damaged by overheating. *Dodd.*

scutch. A tool resembling a pick on a small scale, with flat cutting edges, for trimming bricks for particular uses. *Crispin.*

scuttling. Dry concentration of crushed rock by the natives of southwest Africa, a mandate of the Republic of South Africa, using a wood platter that is 24 by 12 by 2 inches. Stratification and force of desert wind winnow the tossed sands. *Pryor, 3.*

scyelite. A mica-hornblende peridotite, named from Loch Scye in Sutherlandshire, Scotland. It is a coarse-grained, ultramafic igneous rock, consisting of green hornblende and other mafic minerals. These include serpentine pseudomorphs after olivine set poikilitically in large amphibole crystals associated with large bronze mica crystals. *C.T.D.*

scythestone. A whetstone suitable for sharpening scythes. *Fay.*

Se Chemical symbol for selenium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

sea. a. An ocean, or alternatively a large body of (usually) salt water less than an ocean. *A.G.I.* b. Waves caused by wind at the place and time of observation. *A.G.I.* c. State of the ocean or lake surface in regard to waves. *A.G.I.*

sea amber. Amber which has been scooped from the ocean or found on the beaches. Its surface is devoid of the incrustations natural to mined amber unless they have been artificially removed to imitate sea amber. *See also* scoop stone. *Shipley.*

sea arch. The roof of a cave cut by the sea through a headland. *Leet.*

sea balls. Ball-like masses of somewhat fibrous material of organic origin mechanically collected by wave movement in shallow waters. *See also* lake balls. *Pettijohn.*

seabeach placers. Alaska. Placers adjacent to the seashore to which the waves have access. *Fay.*

sea bloom. *See* plankton bloom. *Hy.*

sea cave. A cleft in a sea cliff excavated in easily weathered rocks by waves and currents. *A.G.I.*

sea cavern. *See* sea cave.

sea cliff. Wave erosion, acting within a definite zone, may be rudely compared to the operation of a horizontal saw; but the upper wall of the saw cut, being without support, is broken away by its own weight and falls in fragments, leaving a cliff at the shoreward margin of the cut. This wave-wrought cliff is termed a sea cliff. *See also* wave-cut terrace. *A.G.I.*

sea coal. a. Old name for bituminous coal, either because it was exported by sea from collieries in coastal districts, or because it was at first applied to coal washed ashore from deposits below sea level. *Arkell.* b. Coal dug from the earth; so called formerly to distinguish it from charcoal, because it was brought to London by sea. Known formerly as pit coal; earth coal. *Standard, 1964.* c. U.S. Rare. Soft coal as distinguished from anthracite. *Standard, 1964.* d. Archaic: Mineral coal. *Webster 3d.* e. Pulverized bituminous coal used as a foundry facing. *Webster 3d.*

sea current. The currents that constitute part of the general oceanic circulation. Synonym for ocean current. *Schieferdecker.*

sea foam. An early synonym for meerschaum. *Fay.*

sea grass. Seed-bearing marine plants, more highly organized than algae, found in shallow waters, both brackish and marine. Attain lengths up to 8 feet. *See also* eelgrass. *Hy.*

sea-green slate. *See* colored slates. AIME, p. *793.*

seahigh. Elevation of the deep-sea floor of more than 3,000 feet, the morphology of which is insufficiently known to be covered by a more precise definition. *Schieferdecker.*

sea ice. a. Within polar regions, the surface of the sea freezes during the long winter season, the product being known as sea ice or field ice. *A.G.I.* b. Ice formed in the sea (in contrast to icebergs which and formed on land). *Schieferdecker.*

Seailles process. For the simultaneous production of alumina and Portland cement from siliceous bauxite, or from an aluminous slag or clay. An appropriately proportioned batch is fired in a rotary kiln to give $5CaO.3Al_2O_3$ and $2CaO.SiO_2$; leaching of this product yields alumina and reburning of the residue with more lime yields a cement clinker. Alternative name Seailles-Dyckerhoff process. *Dodd.*

sea incense. Old Russian name for amber found on the seashore. *Tomkeieff, 1954.*

seaknoll. Submarine hill or elevation of the deep-sea floor less prominent than seamount. This term should only be used if the feature has been adequately surveyed, and the terms seamount, tablemount or guyot, and seapeak should be used if the elevation exceeds 3,000 feet above the surrounding floor. *Schieferdecker.*

seal. a. Corn. A portion of earth or rock which separates and falls from the main body. *Fay.* b. To secure a borehole or excavation against cave-ins and flowing or escaping gas or liquids by the use of cement or other sealants. *Long.* c. To secure a mine opening against flowing or escaping gas, air, or liquids by injecting grout, by coating rock surfaces with gunite, or by erecting rock, concrete, wood, or cloth barriers. *Long.* d. A short length of roadway which has been tightly filled with concrete, brickwork, sand, sandbags, or other material to close off an area against fire, gas, or water. In the case of a fire, the seal cuts off the air supply and also prevents noxious fumes given off from reaching other parts of the mine. A common method of sealing is to erect a barrier of sandbags, and to plug crevices with sand or clay. The sandbag barrier is usually the first line of defense and when a more permanent and effective seal is needed a brick or concrete wall is erected. Also called stopping. *Nelson.* e. The airtight joint made between the cover and frame of a soil drain manhole cover. The name also applies to the seal formed by the water contained within the trap of a gulley. *See also* double-seal manhole cover. *Ham.* f. The water contained in a trap, which prevents the flow of air or gases from one side to the other. *C.T.D.* g. *See* ceramic-to-metal seal; glass-to-metal seal; metallizing; sealing glass. *Dodd.*

seal coat. An asphaltic treatment of new or existing surfaces to make them waterproof. *Shell Oil Co.*

seal-discharge washer operator. *See* coal washer, a. *D.O.T. Supp.*

Seale construction. Strand construction having one size of wires for the outer layer with the same number of smaller wires in the underlayer. Both layers have the same length and direction of lay, 6 x 19 (9/9/1) equal laid. *Ham.*

sealed area. In mining, portion of underground workings sealed off, usually because of fire (in which case no air is allowed to enter). *Pryor, 3.*

sealed area, reopening. There are four methods used in reopening sealed-off areas in a mine: (1) the direct method in which the stoppings are breached and air is circulated around the district without previous inspection by a rescue team; (2) the prior inspection method in which prior inspection of the whole district by a rescue team is followed by circulation of air around the district; (3) the stage method in which the ventilation is restored and the enclosed gases are removed in successive stages; and (4) the partial reopening method which is adopted when it is required to recover part of a district but leave the remainder sealed off. *Sinclair, I, pp. 302-305.*

sealed off. *See* seal off. *Long.*

sealed-off area. A part of a mine which has been sealed off from the rest of the mine. The object of sealing off a fire area is to: (1) contain the trouble, and to prevent an explosion which may occur inby from extending to other parts of the mine; (2) build up an extinctive atmosphere inside the sealed-off area; and (3) prevent the access of air to the inby side of the seal. *Nelson.*

sealed porosity. *See* porosity. *Dodd.*

sealed source. Any radiactive source of ionizing radiations that is firmly bonded within metals or sealed in a capsule or similar container. *NCB.*

sealer. a. A container in which unconsolidated core or soil samples are placed to prevent drying or damage in transit. *See also* sampler liner. *Long.* b. *See* capper. *D.O.T. 1.*

Seale rope. A wire rope that has six or eight strands each, having a large center wire covered by nine small wires that are covered in turn by nine large wires. *Lewis, p. 249.*

Seale's lay. *A* wire rope with the inner and outer layers consisting of the same number of wires, the outer being larger and lying in the grooves or valleys between the inner wires. Both layers are stranded or laid in one operation. Extra support is given to the outer wires by this method and the wires are in line contact throughout and there is no internal crosscutting of wires. *Sinclair, V, p. 6.*

sea level. *See* mean sea level. *Seelye, 2.*

sea level correction. The deduction made from a measured length of a base line to establish its true length at sea level. *See also* tape correction. *Ham.*

sea level datum. A determination of mean sea level which has been adopted as a standard datum for heights although it may differ from a later determination over a longer period of time. *Hy.*

sealing. a. Shutting off all air from a mine or portion of a mine, a practice used in an emergency in order to check fire by eliminating oxygen. Also, as a routine shutting-off method for worked-out areas in some mines. *B.C.I.* b. Sealing is used to overcome mine fires when other methods have failed. It involves the erection of temporary or permanent seals for the purpose of cutting off the oxygen supply to the area on fire. Sealing causes the fire to extinguish itself by consuming the oxygen in the sealed off area. *Kentucky, p. 277.* c. Cutting off the air supply to effect extinction of underground fires by erecting sandbag stoppings at convenient places. The combustion process uses up the available oxygen within the sealed area, the process is arrested and the hot ground cools down gradually as the heat is conducted away by the surrounding cooler strata. *Mason, v. 1, p. 286.* d. Closing pores in anodic coatings to render them less absorbent. *ASM Gloss.* e. Plugging leaks in a casting by introducing thermosetting plastics into porous areas and subsequently setting the plastic with heat. *ASM Gloss.*

sealing coat. Bitumen or road tar either pure or as an emulsion, applied to form a thin film over a road surface. *Ham.*

sealing glass. A glass that is suitable for use in sealing a glass envelope of an electronic valve, for example, to metal. The usual basis for the selection of such a glass is matching its thermal expansion and contraction with that of the metal over the range of temperature from that at which the seal is made to room temperature; however, a glass that is sufficiently soft (for example, a lead glass) can accommodate considerable stress at a glass-metal seal by slowly yielding. *See also* glass-to-metal seal. *Dodd.*

sealing surface. The portion of the finish which makes contact with the sealing gasket or liner. *See also* finish, d. *ASTM C-162-66.*

sealing-wax flow. *See* convolute bedding. *Pettijohn.*

sealing-wax wood. Pieces of wood full of resin found in brown coal. When ignited they burn, melting and giving off soot and an aromatic odor like sealing wax. *A.G.I.*

seal off. The use of a cement or other sealant in a borehole. Seal off is not synonymous with blank off and case off, where securing the walls of a borehole is accomplished by setting pipe or casing. *Compare* seal, b. *Long.*

seal sapphire. A seal-brown silky variety of sapphire, usually a girasol; sometimes epiasteriated. Same as adamantine spar. *Shipley.*

seam. a. A stratum or bed of coal or other mineral; generally applied to large deposits of coal. *Fay; B.C.I.* b. In geology a thin layer or stratum of rock; also applied to coal. Vein of coal, coalbed, and coal seam are equivalent terms. *Ricketts, I.* c. Corn. A horseload. *Fay.* d. A joint, cleft, or fissure. *Fay.* e. A plane in a coalbed at which the different layers of coal are easily separated. *Fay.* f. As used by churn drillers, a synonym for crevice. *Long.* g. A horseload of tin. *Gordon.* h. A very narrow vein. *Nelson.* i. on the surface of metal, an unwelded fold or lap which appears as a crack, usually resulting from a defect obtained in casting or in working. *ASM Gloss.* j. Mechanical or welded joints. *ASM Gloss.* k. Mark on ceramic ware or glass surface resulting from joint of matching mold parts. *ASTM C162-66.* l. To slightly grind the sharp edges of a piece of glass. *ASTM C162-66.* m. *See* joint line. *Dodd.*

seamanite. A transparent, pale yellow to wine-yellow mineral, $Mn_3(PO_4)(BO_3).3H_2O$; orthorhombic; found in the Chicagon mine near Iron River, Mich. *Dana 7, v. 2, p. 388.*

seam blast. A blast made by placing powder or other explosives along and in a seam or crack between the solid wall and the stone or coal intended to be removed. *Fay.*

seam contour. A line drawn on a plan joining points on the floor or roof of a seam which have the same height above a prescribed datum. *B.S. 3618, 1963, sec. 1.*

seaming. Joining sheet metal parts by interlocking bends. *ASM Gloss.*

seamless-ring rolling. Hot rolling of a circular blank, with a hole in the center, to form a weldless, circular ring by continuous compressive forces exerted by a main roll on the outer diameter against a pin on the inner diameter. Shaped cross sections may be obtained by appropriate contouring of the pin and roll. The height of the ring is controlled by auxiliary rolls. *ASM Gloss.*

seamless tube. Tube other than that made by bending over and welding the edges of flat strip. May be made by extrusion (nonferrous metals), or by piercing a hole through a billet and then rolling down over a mandrel to form a tube of the required dimensions. *C.T.D.*

seamount. a. A submarine mountain rising more than 500 fathoms above the ocean floor. *A.G.I.* Generally a volcanic cone. *A.G.I. Supp.* b. An isolated mountain structure rising from the sea floor to within a short distance of the surface. *Hy.* c. Any hill found on the ocean floor with a relief of more than one kilometer. *Mero, p. 103.*

seam-out. A shot that merely blows out a soft stratum in the coal or escapes through a seam without loosening the main mass of coal. In Arkansas, called squeal-out. *Fay.*

seam structure. The physical characteristics of a coal seam. It refers to the seam thickness, and to the slips, joints, partings, and bands of dirt or inferior coal. The seam structure will influence the method of working, the choice of face machines, machine cutting, and shotfiring. The degradation and dirt produced will depend on the seam structure. *See also* cleat. *Nelson.*

sea mud. A rich saline deposit from salt marshes and seashores. *Fay.*

seam welding. a. Arc or resistance welding in which a series of overlapping spot welds is produced with rotating electrodes, rotating work, or both. *ASM Gloss.* b. Making a longitudinal weld in sheet metal or tubing. *ASM Gloss.*

seamy. Full of seams, so as to be difficult to blast. *Fay.*

sea ore. Eng. Seaweed. *Webster 2d.*

seapeak. A seamount, roughly circular or elliptical in plan, with a pointed top. *Schieferdecker.*

sea peat. Peat derived from seaweeds. It is very rare. *Tomkeieff, 1954.*

seaquake. Earthquake of which the origin lies below the sea bottom. Often unnoticed on land but observed at sea as shocks felt on board ship. Synonym for submarine earthquake. *Schieferdecker.*

search coil. a. Sensitive device, using the mine-detector principle, for locating ferromagnetic material which is to be removed before ore treatment. It typically monitors a stream of ore passing along a conveyor belt, which it stops when iron is detected. *Pryor, 3.* b. Coil that is used in electromagnetic methods for measuring the magnetic field that is associated with the electric current. *Schieferdecker.*

search syndicate. Search syndicates, like prospecting clubs, deal mainly with mines in the early stages of discovery and development, but they have a stronger type of organization and a firmer financial backing. Such a syndicate should have capital sufficient to carry on a campaign over several years. *Hoov, p. 251.*

searlesite. A white, hydrous borosilicate of sodium, $NaB(SiO_3)_2.H_2O$; monoclinic. Minute spherulites composed of radiating fibers. From Searles Lake, Calif. *English.*

Searles Lake brine. A source of trona, $Na_2CO_3.HNaCO_3.2H_2O$. Occurs in Searles Lake, San Bernardino County, Calif. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-221.*

seasale. Newc. Coal delivered by or to ships, as for export. *Fay.*

sea salt. Salt made by the evaporation of seawater. *Standard, 1964.*

sea sand. Sand containing alkaline salts that attract and retain moisture and cause efflorescence in brick masonry. *Zern, p. 145.*

seascarp. Elevated and comparatively steep slope of the sea floor. *Schieferdecker.*

sea slick. An area of sea surface, variable in size and markedly different in appearance, with color and/or oiliness; usually caused by plankton blooms. *Hy.*

season cracking. Cracking resulting from the combined effects of corrosion and internal stress. A term usually applied to stress-corrosion cracking of brass. *ASM Gloss.*

seasoned. Applied to quarrystone after the moisture has dried out. *Fay.*

seasoning; weathering. A mode of treatment of iron castings which are allowed to remain in storage, or to stand out in the open, for a more or less extended period, for example, 6 months, in order to effect a reduction in the residual stresses and consequently in the degree of distortion during subsequent machining. A very similar result can often be obtained by a comparatively short period, for example, 30 minutes of tumbling. Since stress relieving by heat treatment is a more certain process, and seasoning involves much delay and the use of considerable space for storage, stress relieving is more usually employed. *Osborne.*

seasoning timber. The drying of the sap and moisture in the woody fibers and thus reducing the timber by shrinkage. It becomes more durable and weighs less. Timber may be air-dried, that is, dried naturally in air, or kiln-dried, which means dried in kilns under the action of artificial heat. The former is more general. *See also* timber preservation. *Nelson.*

sea state. Numerical or written description of ocean surface roughness. *Hy.*

seastone. Amber. *Shipley.*

seat. a. The underclay or fireclay on which a coal seam rests. Also called seating. *Arkell.* b. *Derb.* The floor of a mine. *Fay.* c. The foundation or framework on which a structure rests, for example, engine seat, cage seat. *Fay.* d. A synonym for socket. *See also* socket, d. *Long.* e. The surface against which the closure part of a valve is pressed to close the valve. *Long.* f. A place prepared on the siege of a glass pot furnace for the support of a pot. *See also* siege. *Dodd.*

seat clay. a. Fireclay. *Fay.* b. *See* seat earth. *B.S. 3618, 1964, sec. 5.*

seat earth. a. A bed representing old soil, usually containing abundant rootlets, underlying a coal seam. *See also* fire clay. *B.S. 3618, 1964, sec. 5.* b. The soil on which the coal forests flourished. *Nelson.* c. Stratum underlying the valuable seam. Floor of a coal seam. *See also* underclay; clunch; seat rock. *Pryor, 3.*

seated. a. Placed in position. *See also* socket, d. *Long.* b. Closed by pressing the closure part of a valve against its seat. *See also* seat, e. *Long.*

seating. The surface of the point of support for a heavy load. *Ham.*

seating block. A block of fire clay refractory shaped to support a boiler. *Dodd.*

seating curve. The curve at the bottom of the tooth gap on a roller chain sprocket. *J&M.*

seat of settlement. The deposit of soil under a loaded foundation within which the major settlement occurs. *See also* excavation deformation. *Nelson.*

seat rock. The nearest bed of clunch, grit, or sandstone, under a coal seam. Also called seat stone; hard seat; seat earth; underclay. *Fay.*

seat stone. *See* seat rock. *Fay.*

sea vacuum cleaners. The notion that a pump system may be the best means for collection of minerals from the bottom of the sea. *Hy.* Vacuum cleaners are presently being used to recover gold-bearing fines from shallow depths in some California rivers (possibly in other localities). *Bureau of Mines Staff.*

seaward rise. The elevated seaward margin of reef islands, generally formed of boulders, or finer gravel, and commonly capped by dune sand. Where appropriate, this rise may be more specifically designated as gravel ridge. *See also* gravel ridge. *Schieferdecker.*

seawater. Water from a sea and having a high content of dissolved salts, 3.5 to 3.6 percent, which is made up as follows: 2.72 percent sodium chloride, 0.38 percent magnesium chloride, 0.17 percent magnesium sulfate, 0.01 percent magnesium bromide, 0.13 percent calcium sulfate, 0.01 percent calcium carbonate, and 0.08 percent potassium sulfate. *Cooper, p. 360.*

seawater batteries. Silver-zinc batteries activated by flow of seawater through them. These can provide six times the power of ordinary batteries. *Hy.*

seawater magnesia. Seawater contains approximately 0.14 percent magnesia. It can be extracted by treatment with slaked lime or with lightly calcined dolomite: $MgCl_2+Ca(OH)_2Mg(OH)_2+CaCl_2$ $MgSO_4 + Ca(OH)_2 Mg(OH)_2 + CaSO_4$. When calcined dolomite is used as precipitant, the yield is almost doubled because the MgO in the calcined dolomite is also largely recovered. The precipitated $Mg(OH)_2$ is settled in tanks, filtered, and then calcined or dead-burned to produce MgO. The first small scale plant was put into operation in California in 1935. The first large scale production was at West Hartlepool, England, in 1938; most of magnesia needed for the production of basic refractories in Great Britain has since been derived from the sea. *Dodd.*

sea water magnesite. A dead-burned material composed essentially of magnesia obtained from sea water or other saline solutions by chemical processes. *Bureau of Mines Staff. See also* synthetic magnesite.

sea wax. a. A kind of ozocerite or mineral wax; maltha. *Webster 3d.* b. Bituminous matter thrown up along seacoasts and probably derived from seaweeds. This material is sometimes mistaken for an indication of the presence of petroleum. *Tomkeieff, 1954.*

seaweed agate. A descriptive term for certain specimens of mocha stone or moss agate. *Shipley.*

seaweed bed. An area of attachment and growth of much algae or eelgrass. *Hy.*

sea weld. Any weld used primarily to obtain tightness and prevent leakage. *ASM Gloss.*

sebastianite. A phanerocrystalline rock composed of anorthite and biotite, with smaller amounts of augite and apatite. The type differs from puglianite, of which it is a heteromorphic form, in containing biotite instead of leucite. *Holmes, 1928.*

sebka. N. Africa. A dry area or bed of a lake incrusted with salt; a salt marsh. *Standard, 1964.*

sebkainite. Crude potassium chloride obtained by solar evaporation of brine from a lake south of Gabes, Tunisia. *Hess.*

sec Abbreviation for second, secant. *BuMin Style Guide, p. 61.*

secant. The secant of an arc is a line drawn from the center of the circle through one extremity of the arc, and limited by a tangent at the other extremity. *Zern, p. 54.*

secant modulus of elasticity. Materials such as concrete or prestressing wire have a variable Young's modulus (E) so that the particular value of E adopted must be either the slope of the tangent to the stress-strain curve or that of the secant. The latter is the line which joins the origin of the curve to, for instance, the 0.1 percent proof stress, expressed on the curve. For a material within its elastic range, the secant will coincide with the tangent. *Ham. See also* modulus of elasticity, a.

Secar. Trade name; a pure calcium aluminate cement, suitable for use in making special refractory castables or shapes. It is available in two grades, the purer (Secar 205) contains 70 to 72 percent Al_2O_3, 26 to 29 percent CaO, less than 1 percent SiO_2, and less than 1 percent Fe_2O_3. *Dodd.*

secchi disk. A white disk which, when submerged to varying depths, aids in determining the color and depth of light penetration in the sea. *Hy.*

sec ft Abbreviation for second-foot. *BuMin Style Guide, p. 61.*

second. a. A unit for measuring angles or time, the 60th part of a minute. *Zern, p. 54.* b. Sometimes used to designate a medium-quality drill diamond. *Long.*

secondarily enriched deposits. Deposits formed by the dissolving or leaching of the metal from the upper part of the deposit close to the surface, the metal content of the solutions collecting on the metallic minerals below, thus forming an enriched zone. Some silver and zinc deposits have been enriched in this way, but certain copper deposits form the most important products of secondary enrichment. *Lewis, p. 276.*

Secondary. Geological period generally called Mesozoic, which embraces all the rocks between the Tertiary and Primary. *Gordon.*

secondary. a. A general term applied to rocks and minerals formed as a consequence of the alteration of preexisting minerals. Secondary minerals may thus be formed in situ as pseudomorphs or paramorphs, or they may be deposited from solution in the interstices of a rock through which the solution is percolating. *Holmes, 1928.* b. Formed of material derived from the erosion or disintegration of other rocks; derivative; said of clastic sedimentary rocks. *Fay.* c. Of rock minerals: minerals introduced into the rock or formed by metamorphism or alteration. Of ore: enriched by supergene processes. *Ballard.*

secondary air. In a combustion chamber, air that meets with primary air to consume the fuel completely and complete combustion. *Newton, p. 259.*

secondary allochthonous coal. Coal from deposits representing the resedimentation of peat or coal masses previously deposited elsewhere. *Stutzer and Noe, 1940, p. 156.*

secondary anomaly. *See* geochemical anomaly. *Lewis, p. 296.*

secondary ash. Ash in coal derived from mineral matter precipitated in cleat cavities, etc. *Tomkeieff, 1954.*

secondary beam. A beam supported off, and transferring loads to, main beams which are themselves carried directly by the walls or columns. *Ham.*

secondary blasting. Irrespective of the method of primary blasting employed, it is usually necessary to reblast a proportion of the rock on the quarry floor so as to reduce it to a size suitable for handling by the excavators and crushers available. Two methods of secondary blasting of rock are available. The first is to fire a charge of explosive placed on the rock and covered with clay, the shock of the detonating explosive breaking the block. This is usually called the plaster or mudcap method. The second technique, known as pop-shooting, is to drill a hole into the block and fire a small charge in this hole, which is usually stemmed with quarry fines. *McAdam II, p. 158.* Also called blistering; bulldozing. *Fay. See also* plaster shooting; popping; snakeholing; pop shot. *Nelson.*

secondary bonds. Van der Waals bonds. These have energies of less than 10 kcal/mole. *V.V.*

secondary calcium phosphate. See calcium phosphate, dibasic. *CCD 6d, 1961.*

secondary cell. a. A cell which receives its electrical energy from a charging operation, then stores this energy until it is required. Hence the name storage battery or accumulator which is often given to secondary cells. Used in motorcars, miners' electric safety lamps, and battery locomotives. *Morris and Cooper, p. 233.* There are two main types in general use: the lead acid and the nickel iron or alkaline, and each has its own particular application. *Mason, v. 2, pp. 399-400.* b. A group of flotation cells in which a product from the primary cells is retreated. *B.S. 3552, 1962.* c. *See* accumulator. *Nelson.*

secondary clay; sedimentary clay. A clay which has been geologically transported from its place of formation. *ASTM C242-60. See also* transported clay.

secondary consolidation. a. The reduction in volume of a soil mass caused by the application of a sustained load to the mass and due principally to the adjustment of the internal structure of the soil mass after most of the load has been transferred from the soil water to the soil solids. Also called secondary compression; secondary time effect. *ACSE P1826.* b. Compaction of sediment occurring at essentially constant pressure resulting from internal processes such as recrystallization. *A.G.I. Supp.*

secondary copper. Copper scrap. Mersereau, *4th, p. 506.*

secondary creep. *See* creep. *ASM Gloss.*

secondary crusher. Crushing and pulverizing machines next in line after the primary crushing to further reduce the particle size of shale or other rock. *See also* primary crusher, *ACSG, 1963.* This group of machines includes the finer types of jaw crusher and gyratory crusher, and also crushing rolls, hammer mills, and edge runner mills. *Dodd.*

secondary crushing. In ore dressing, the second stage of grinding in which the discharge from the primary crusher is broken down to a size suitable for feed to fine grinding machines. *Newton, p. 58.*

secondary deposit. a. Made when the sediments already deposited are eroded and redeposited. *Schieferdecker.* b. A deposit formed by denudation and concentration of the minerals at the surface of the earth. *Hoov, p. 94.*

secondary dispersion. Geochemical dispersion of elements by processes originating at the surface of the earth; opposite of primary dispersion. *Hawkes.* Secondary patterns are those formed at the earth's surface by weathering, erosion, or surface transportation. Secondary patterns have been classified more in detail as halos, fans, and trains, depending on the characteristic shape of the pattern and its geometric relationship to the ore deposit or other source. *Lewis, p. 297.*

secondary drilling. The process of drilling the so-called "popholes" for the purpose of breaking the larger masses of rock thrown down by the primary blast. *Fay.*

secondary enlargement. The desposition around a nucleus, in optical continuity with it, of material of the same composition as the nucleus. Under proper conditions, good crystal faces may be developed in this way. *A.G.I.*

secondary enrichment. An enrichment of a vein or an ore body by material of later origin, often derived from the oxidation of decomposed, overlying ore masses. Nature's process of making high-grade ores out of low-grade ores. *Weed, 1922.*

secondary environment. *See* geochemical environment. *Hawkes, 2, p. 10.*

secondary expansion. The property exhibited by some fire clay and high-alumina refractories of developing permanent expansion at temperatures within their useful range; not the same as overfiring. *HW.*

secondary fan. Any fan installed underground to ventilate tunnels or workings where the air current is sluggish. *See also* auxiliary fan; booster fan. *Nelson.*

secondary fertilizer components. Fertilizer components, other than primary, essential to proper plant growth, for example, calcium, magnesium, sulfur, manganese, copper, zinc, and boron. *Bennett 2d, 1962.*

secondary foliation. Foliation that develops after the rock has consolidated. *Stokes and Varnes, 1955.*

secondary geochemical cycle. This cycle is comprised of the processes of weathering, soil formation, erosion, transportation, and sedimentation. *Hawkes, 2, p. 75.*

secondary gneissic banding. A prominent mineral banding exhibited by coarse-grained crystalline rocks that have been subjected to intense regional metamorphism, involving rock flowage. *Compare* primary gneissic banding. *C.T.D.*

secondary grinding. Further comminution of material already reduced to sand sizes in rod or ball mills. *Pryor, 3.*

secondary hardening. Tempering certain alloy steels at certain temperatures so that the resulting hardness is greater than that obtained by tempering the same steel at some lower temperature for the same time. *ASM Gloss.*

secondary hardness. Further increase in hardness produced on tempering high-speed steel after quenching. *C.T.D.*

secondary haulage. That portion of the haulage system which collects the coal from the various gathering-haulage delivery points and delivers it to the main haulage system. *Wheeler, H.R. p. 2.*

secondary hydrothermal deposit. A metalliferous deposit formed by metal displacements from already existing deposits of an earlier phase of plutonism, for example, the formation of an Alpine ore deposit through the rearrangement of Hercynian ore material. *Schieferdecker.*

secondary interstices. Those developed by processes that affected the rocks after they had been formed. *A.G.I.*

secondary lead. Lead derived from salvage of wornout end-product items, such as battery plates, cable covering, pipe and sheet, which are collected, remelted, and refined in secondary smelters to produce refined lead or various lead-base alloys. *BuMines Bull., 630, 1965, p. 491.*

secondary metal. Metal recovered from scrap by remelting and refining. *ASM Gloss.*

secondary mineral. a. A mineral resulting from the alteration of a primary mineral. Thus, original sulfides by oxidation change to sulfates, carbonates, and oxides, and these by hydration become hydrous forms of the same. *Fay.* b. A mineral that was formed later than the rock in which it is found. *See also* primary mineral. *Nelson.*

secondary mineral deposits. Primary mineral deposits are eventually subjected to alterations through weathering, both chemical and mechanical, and give rise to secondary deposits, which are divided into three groups: sedimentary rocks, secondarily enriched ore deposits, and residual or detrital ore deposits. *Lewis, p. 273.*

secondary mineral matter. In a coal seam, the material brought in solution by percolating waters and deposited in cracks and joints, subsequent to the formation of the coal. *Nelson.*

secondary openings. Voids produced in rocks subsequent to their formation through agencies, such as solution, weathering, or movement. *A.G.I.*

secondary ore. The alteration or secondary concentration products of primary ore. *Schieferdecker.*

secondary porosity. Porosity developed after the formation of a deposit and resulting from subsequent fracturing, replacement, solution, or weathering. *A.G.I.*

secondary products. *See* middlings.

secondary radiation. Radiation, other than the primary radiation emitted by any irradiated matter or scattered in any other direction than that of the primary beam. *NCB.*

secondary recovery. The recovery obtained by any method whereby oil or gas is produced by augmenting the natural reservoir energy, as by fluid injection. It usually implies substantial depletion of the reservoir before the injection of fluids, followed by a secondary development period. *A.G.I.*

secondary recrystallization. *See* grain growth. *ASM Gloss.*

secondary reject elevator. A refuse elevator which extracts the second or lighter reject; usually situated at the discharge end of the washbox. *B.S. 3552, 1962.*

secondary rocks. Rocks composed of derived or secondhand materials. They include residual, sedimentary, chemical, and organic types that are formed of clastic or precipitated materials or of materials accumulated by organisms. The term was also used in the past as one of the series—primary, secondary, Tertiary, and Quaternary, to designate one of a series of successively formed groups of rocks. In this sense, it is no longer employed but the term Tertiary and Quaternary have been retained as period names in the time scale. *Stokes and Varnes, 1955.*

secondary settling. The period following the primary settling in surface subsidence in which the surface subsides gradually. This period may continue for many years or even decades. *Compare* primary settling. *Stoces, v. 1, p. 497.*

secondary shaft. The shaft which extends a mine downwards from the bottom of the primary shaft but not in line with the primary shaft. *Spalding.*

secondary shooting. In quarrying, the reduction in size or dimension of blasted rock by additional or secondary blasting. *Streefkerk, p. 17.*

secondary slimes. *See* slimes. *Pryor, 4, p. 817.*

secondary source. If an operation agitates or disperses dust, it is a secondary source. *Hartman, p. 59.*

secondary splits. The main air splits occur at the shaft bottom. In most cases, these splits are again separated at some point inbye and these are called secondary splits. *See also* ventilation splitting. *Nelson.*

secondary station. A tide station operated only over a short period of time or one at which limited data are collected. *See also* subordinate station. *Hy.*

secondary stratication. Stratification developed when sediments already deposited are thrown into suspension and redeposited. *A.G.I.*

secondary structure. Structure in a sedimentary rock which developed penecontemporaneously with sedimentation or shortly thereafter. Refers to an accretionary structure of chemical origin. *A.G.I.*

secondary sulfide zone. In many metalliferous deposits, particularly those of copper, there is found below the zone of oxidation, a second zone containing sulfide minerals that have reprecipitated from downtrickling solutions containing metals leached from the oxidized zone. This secondary sulfide zone generally marks the change from oxidizing to reducing conditions, such as the level of ground water, at the time of secondary deposition. The zone is often greatly enriched and may constitute economically recoverable ore, whereas the original primary deposit may not. *Stokes and Varnes, 1955.*

secondary twinning. Twinning produced subsequently to the original formation of a crystal, or crystalline mass, due to pressure, causing the inversion of the atomic pattern of the crystal structure in certain lamellae. The cause of parting. *Shipley.*

secondary vein. A mineral vein which was discovered after the original or discovery vein on which the claim was based. Also called incidental vein. *Nelson.* The extralateral rights of secondary veins in a claim depend on the dip of the original vein on which the claim was located; that is, extralateral rights are allowed on the secondary veins if they dip in the same general direction as the original vein, but they are not allowed if the secondary veins dip in the opposite direction. *Lewis, pp. 33-34.*

secondary water. Water entering the mine from other workings, as opposed to water inherent in the area worked by the mine. *B.S. 3618, 1963, sec. 4.*

secondary wave. Synonym for distortional wave; equivolumnar wave; shear wave; S-wave; transverse wave. *A.G.I.*

second bye. Fifth grade of rough diamonds. *Hess.*

second cape. Third grade of South African rough diamonds. *Hess.*

second-class lever. A lever whose force is exerted between the fulcrum and the point where it is applied. *Nichols.*

second-class ore; mill ore. An ore that must be given some preliminary treatment, such as concentration, picking, etc., before a marketable grade or a grade suitable for further treatment can be obtained. *See also* first-class ore. *Nelson.*

second derivative. The magnetic field intensity or of one of its components with respect to the vertical coordinate. *Schieferdecker.*

second-foot. A cubic foot per second. *Seelye, 1.* Usually abbreviated to cusec. *Ham.*

second-foot-day. The volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is 86,400 cubic feet, or nearly 2 acre-feet (actually 1.9835); a convenient unit in storage computations. *Seelye, 1.*

second mining. a. The recovery of pillar coal after first-mining in chambers has been completed. *Hudson.* b. The recovery of pillars after development of block pillars by the multiple entry system has completed a panel. *Bureau of Mines Staff.*

second moment of area. The correct term for the moment of inertia (I) of the plane area of a section. *Ham.*

second or back explosion. Aust. Supposed to be due to the ignition of gases developed from highly heated coal dust, and gases sucked out of the faces of coal by the partial vacuum resulting from the primary explosion, or liberated by fall of roof. *Compare* retonation wave. *Fay.*

second-order reaction. Chemical treatment in which rate of reaction is determined by two concentration terms. When two molecules react ($A + B \rightarrow \ldots$) the rate expression at constant volume is

$$-\frac{d[A]}{dt} = -\frac{d[B]}{dt} = k_2[A].[B]$$

k being the velocity constant. *Pryor, 3.*

second outlet. An emergency exit from the mines to the surface. Also called second opening; escapeway. *Hudson.*

second quality fire clay brick. A trade term, usually indicating fire clay brick of the intermediate duty class. *Bureau of Mines Staff.*

second rippings. The first back rippings on a roadway. *Nelson.*

seconds. a. N.S.W. The second-class ore that requires dressing. *New South Wales.* b. Pottery ware with small, not readily noticeable, blemishes. *Compare* firsts, b; lump, b. *Dodd.*

seconds A.P.I. A unit of viscosity as measured with a Marsh funnel according to American Petroleum Institute procedure. *Brantly, 1.*

second side. The final side of a plate glass to be ground and polished. *ASTM C162-66.*

second way. Grain, quartering way, bate, hem, sheeting plane. *Arkell.*

second weight. In mine subsidence, the powerful thrust or pressure, generally 20 to 40 feet from the face, that causes the distance from the roof to the floor to diminish rapidly and for packwalls to become compressed or pushed down into a soft bottom. Timber legs or metal supports (if any) in the gates are generally broken or twisted. *Briggs, p. 162*

second worker. In anthracite coal mining, one who is required to serve a specified number of years before being termed a first-class miner. *D.O.T.1.*

second working. a. The operation of getting or working out the coal pillars formed by the first working. *Fay.* b. In coal mining, unless the pillars of coal are left permanently to support the surface, they are removed. This phase of mining is called the second working or pillar working. Where the pillars are removed the greater portion of the coal is produced in the second working. *Compare* first working. Also called pillar working. *Kentucky, pp. 334-335.*

seconite. A finely ground plastic clay which in proportions not lower than 6 percent gives satisfactory green strength when used as a bond with molding sand. *Osborne.*

secretion. a. The process by which animals and plants transform mineral material from solution into skeletal forms. *Holmes, 1920.* b. Material which has been deposited from solution by infiltration into the cavity of a rock. *Compare* concretion. *Holmes, 1920.* c. Opposite of concretion in which growth is outward from a nucleus. *A.G.I.*

sectile. Capable of being cut with a knife, without breaking off in pieces. *A.G.I.*

sectile mineral. A mineral that yields a smooth surface when cut with a knife (gypsum, talc, kaolin, fuller's earth, or attapulgite). *Stokes and Varnes, 1955, p. 149.*

sectility. A mineral is said to be sectile when it may be cut with a knife, but is not malleable, for example, graphite. *Nelson.*

section. a. A portion of the working area of a mine. *B.C.I.* b. Representation of features such as mine workings or geological features on a vertical (or inclined) plane. A longitudinal section is parallel to the strike of a vein or geologic plane. A cross section is perpendicular to the strike. *McKinstry.* c. A subdivision of the mine workings under the supervision of a sectional foreman. *Hudson.* d. Detailed measurement, taken vertically, of a coal vein or of strata embracing several veins. *Hudson.* e. A drawing or diagram of the strata sunk through in a shaft or inclined plane, or proved by boring. *Fay.* f. Eng. *See* flat, j. *SMRB, Paper No. 61.* g. A part of a work area or strip. *Nichols.* h. A very thin slice of anything, especially for microscopic examination. *Standard, 1964.* i. The representation to scale of the variations in level of the ground surface along any particular line. *C.T.D.* j. In geology, either a natural or an artificial rock cut, or the representation of such on paper. *Fay.* k. Usually applied to a vertical exposure of strata. *Fay.* l. A piece of land that is 1 square mile or 640 acres in area forming one of the 36 subdivisions of a township in a U.S. public-land survey. *Webster 3d.* m. The local series of beds constituting a group or formation; as, the Cambrian section of Wales. *Standard, 1964.* n. A surface of metals or opaque minerals cut or prepared for examination. *Hess.*

sectional core barrel. A core barrel, the length of which can be increased by coupling unit sections together. *See also* extension core barrel. *Long.*

sectionalizing circuit breaker. *See* circuit breaker, a. *Kentucky, p. 255.*

sectionalizing switch. A sectionalizing switch is used for connecting and disconnecting (or both) adjacent electric circuits. *ASA M2.1-1963.*

sectional mining belt conveyor. A belt conveyor so arranged that it can be lengthened or shortened by the addition or the removal of interchangeable increments or parts. *NEMA MB1-1961.*

sectional tank. A water tank built up of standardized pressed steel units having external flanges which are bolted together in an assembly for varying sizes of tank. *Ham.*

sectional-type conveyor. A conveyor that is lengthened or shortened by adding or removing intermediate sections. *NEMA MB1-1956.*

section boss. A more or less loosely used term applied to the assistant mine foreman in charge of an area, although used in law in some states in lieu of assistant foreman and certified as such. *B.C.I.*

section factor. *See* section modulus. *Ro.*

section foreman. In anthracite and bituminous coal mining, a foreman who has complete charge of a section of a mine. Also called section man. *D.O.T. 1. See also* assistant.

section man. *See* section foreman. *D.O.T. 1.*

section modulus; section factor. The term pertains to the cross section of a beam. The section modulus with respect to either principal central axis is the moment of inertia with respect to that axis divided by the distance from that axis to the most remote point of the section. The section modulus largely determines the flexural strength of a beam of given material. *Ro.*

section of rectifier unit. A part of a rectifier unit with its auxiliaries which may be operated independently. *Coal Age. 1.*

sector gate. A roller gate in which the roller is in the form of a sector of a circle instead of being cylindrical. *Ham.*

secular. Continuing or taking place progressively throughout an age or ages, without observed recurrence in a cycle; having a vastly extended indefinite period; brought about in the course of ages; as, secular decay of rocks, secular depression, or elevation of land. *Standard, 1964.*

secular change. Increase or decrease of intensity and/or change of direction of the total magnetic field over a period of many years; usually given as average gammas per year for intensity values and minutes per year for directional values. *Hy.*

secular variation. A relatively large, slow change in part of the earth's magnetic field caused by the internal state of the planet and having a form roughly to be expected from a simple but not quite uniformly polarized sphere. *A.G.I.*

secundine dike. A dike that is injected into a hot country rock; contact generally irregular, close-welded, the grain generally equal throughout, either finer or coarser at or near the margin. This is a characteristic mode of occurrence for pegmatites and aplites. *J. Geol., v. 30, No. 2, Feb.-Mar., 1922, p. 165.*

securite explosives. The securites are a type of plastic explosives with a balanced oxygen content which satisfy very high requirements for safety. They are built up on a non-explosive, hydrophilic gel also containing oxygen-emitting salts and solid high explosive. They also contain water. In spite of the high degree of safety against involuntary initiation they detonate easily with a blasting cap of normal strength. They have about the same density as the plastic nitroglycerin explosives. *Fraenkel, v. 3, Art. 16:01, pp. 35, 37.*

security risk. Operation in which there is an unusual possibility of theft of valuable product, or danger to personnel or plant, or of leakage of classified or secret information of technical importance. *Pryor, 3.*

sedentary. Formed in place, without transportation, by the disintegration of the underlying rock or by the accumulation of organic material; said of some soils, etc. *Fay.*

sediment. a. Solid material settled from suspension in a liquid. *A.G.I. Supp.* b. Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, or ice and has come to rest on the earth's surface either above or below sea level. *A.G.I. Supp.*

sedimentary. A descriptive term for rock formed of sediment, especially (1) clastic rocks, as conglomerate, sandstone, and shales, formed of fragments of other rock transported from their sources and deposited in water, or (2) rocks formed by precipitation from solution, as rock salt and gypsum, or from secretions of organisms, as most limestone. *Webster 3d.*

sedimentary ash. a. Mineral matter introduced into the coal substance during its accumulation. *See also* extraneous ash. *Nelson.* b. Ash in coal derived from the mud mixed up with plant debris during the formation of coal. *Tomkeieff, 1954.*

sedimentary clay; secondary clay. A clay that has been geologically transported from the site of its formation and redeposited elsewhere. The English ball clays, for example, are secondary kaolins. *Compare* primary clay. *Dodd.*

sedimentary environment. The geographical, physical, chemical, and biological conditions under which a sediment accumulates. *Challinor.*

sedimentary ore. Ore formed by the chemical reaction of iron in solution with other materials with which it comes into contact, especially lime. *Mersereau, 4th, p. 383.*

sedimentary peat. Peat formed underwater, principally in lakes, and largely made of algae and other aquatic plants. *Tomkeieff, 1954.*

sedimentary petrography. The science of laboratory investigations of sediments, their description, and classification. Also called sedimentography. *Schieferdecker.*

sedimentary petrology. The study of sediments in regard to their composition and characteristics as a rock. *Schieferdecker.*

sedimentary rocks. Rocks formed by the accumulation of sediment in water (aqueous deposits) or from air (eolian deposits). The sediment may consist of rock fragments or particles of various sizes (conglomerate sandstone, shale); of the remains or products of animals or plants (certain limestones and coal); of the product of chemical action or of evaporation (salt, gypsum, etc.); or of mixtures of these materials. Some sedimentary deposits (tuffs) are composed of fragments blown from volcanoes and deposited on land or in water. A characteristic feature of sedimentary deposits is a layered structure known as bedding or stratification. Each layer is a bed or stratum. Sedimentary beds as deposited lie flat or nearly flat. *Fay.*

sedimentary tuff. A tuff containing a subordinate amount of sedimentary detritus introduced either during or after deposition, for example, the finer deposits of some mud flows, or rocks produced by the erosion and redeposition of pyroclastic ejecta admixed with nonvolcanic materials. *A.G.I.*

sedimentation. a. The settling of solid particles of soil, coal, or mineral from liquid, as a result of either gravity or centrifuging. The larger particles sink at a faster rate than smaller particles of the same shape. The principle is applied to a number of coal and mineral washers, cyclones, and classifiers. *Nelson.* b. In powder metallurgy, classification of powder particles by settling in a gas or liquid. *ASM Gloss.* c. Method of classification by exploitation of free-falling rates of minute (subsieve) particles. *Pryor, 4.* d. Includes that portion of the metamorphic cycle from the separation of the particles from the parent rock, no matter what its origin or constitution, to and including their consolidation into another rock. Sedimentation, thus includes a consideration of the sources from which the sediments are derived; the methods of transportation from the places of origin to those of deposition; the methods, agents, and environments of deposition; the chemical and other changes taking place in the sediments from the times of their production to their ultimate consolidation; the climatic and other environmental conditions prevailing at the place of origin, over the regions through which transportation takes place, and in the places of deposition; the structure developed in connection with deposition and consolidation; and the horizontal and vertical variations of sediments. *A.G.I.*

sedimentation balance. Apparatus used to measure settling rate of small particles dispersed in liquid. One scale-pan is immersed in the mixture, and the balance is adjusted by increasing the counterweight at suitable time intervals. Alternatively, a float is suspended, and the compensating external weight is reduced as the density of the suspension surrounding the float is reduced by settlement of its solids. *Pryor, 3.*

sedimentation test; clay soils. A test used when selecting materials for stabilized road construction and concrete. Soil, after pretreatment, is shaken up in water and allowed to settle out. The change in specific gravity of the suspended matter with time is measured, and the equivalent diameter is calculated from Stokes' law. *See also* organic test. *Ham.*

sedimentation trend. The direction in which the sediments were laid down. Uranium mineralization often follows such trends, due to increased porosity, carbon precipitants, etc. *Ballard.*

sedimentation unit. A layer or deposit formed under conditions of essentially constant flow and sediment discharge; distinguished from like units by changes in grain size and/or fabric indicating changes in velocity and/or direction of flow. *Pettijohn.*

sedimentation volume. The volume occupied by solid particles after they have settled from suspension in a liquid. With most clays, the sedimentation volume depends on the degree of flocculation or deflocculation. Determination of the sedimentation volume of brick clays has been found to provide some indication of the fineness of the clay, its working moisture content, and drying shrinkage. *Dodd.*

sediment discharge. A time rate of movement of sediment passing a cross section; also called sediment transport rate or sediment load. *USGS Prof. Paper 462-F.*

sedimentography. Same as sedimentary petrography. *Schieferdecker.*

sedimentology. The study of sedimentary rocks and the processes by which they were formed. *A.G.I.*

sediment-petrological province. Comprises a complex of sediments which forms a unit as to source, age, and regional distribution. *Schieferdecker.*

sediment tube. A long open tube fixed above the core barrel in the shot-drill method of exploratory boring. The enlarged space above the sediment tube reduces the upward velocity of the flushing water and the coarse chippings are deposited in the tube where they are retained until drawn up to the surface. *Nelson.* Also called calyx; sludge barrel.

sediment vein. A fissure filled from above by sedimentary matter. A rare occurrence in nature. *Fay.*

Seebeck effect. The phenomenon involved in the operation of a thermocouple. Named for Thomas Seebeck, the German scientist, who first observed the phenomenon in 1822. *See also* thermocouple. *L&L.*

seebenite. A feldspar-cordierite hornfels. *See also* aviolite; cornubianite; edolite; hornfels; leptynolite. *A.G.I.*

Seeboard process. A wet scrubbing process for removing hydrogen sulfide from fuel gases in which the gas is scrubbed by a solution of sodium carbonate. The hydrogen sulfide is dissolved and subsequently removed, unchanged, by blowing air through the solution. *Francis, 1965, v. 2, p. 428.*

seed. A fault, in the form of small bubbles, in glass. When near the surface of plate glass, they sometimes become exposed, as minute depressions, during the polishing process; they are then known as broken seed. *Dodd.*

seed bag. A borehole packer made by filling a fabric bag with flaxseed, which swells when wetted. *Long.*

seed charge. A small charge of material added to a supersaturated solution to initiate precipitation. *ASM Gloss.*

seed core; seed and blanket core. A reactor core which includes a relatively small volume of highly enriched uranium (seed) surrounded by a much larger volume of natural uranium or thorium (blanket). As a result of fissions in the seed, neutrons are supplied to the blanket. In this way the seed causes the blanket to furnish a substantial part of the core power. *L&L.*

seed gypsum. Gypsum beds of loose small crystals. *New South Wales, p. 54.*

seeding. In chemical treatment, addition of tiny crystals of material to a supersaturated solution to induce nuclear precipitation. *Pryor, 3.*

seep. A spot where a fluid (as water, oil, or gas) contained in the ground oozes slowly to the surface and often forms a pool; a small spring. *Webster 3d.*

seepage. a. A quantity of a fluid that has seeped through porous material (as soil). *Webster 3d.* b. (percolation) The slow movement of gravitational water through the soil. *ASCE P1826.* c. Naturally occurring escape of crude oil, gas, or bitumen to the earth's surface. *Institute of Petroleum, 1961.* d. Movement of water through soil without formation of definite channels. *Nichols.* e. Seepage into a body is referred to as influent seepage; that away from a body, as effluent seepage. *Seelye, 1.*

seepage force. The force transmitted to the soil grains by seepage. *ASCE P1826.*

seepage line. *See* line of seepage. *ASCE P1826.*

seepage velocity. The rate of discharge of seepage water through a porous medium per unit area of void space perpendicular to the direction of flow. *ASCE P1826.*

S.E.G. Abbreviation for the Society of Exploration Geophysicists, a professional organization of geophysicists primarily engaged in exploration for oil and gas and other minerals. *Williams.*

Seger cone. A small cone made of a clay and salt mixture which softens at a definite, known temperature. Seger cones are used for the approximate determination of temperatures in furnaces (for example, smelting furnaces) and in volcanology, to determine the approximate temperature of molten lavas. *A.G.I.*

Seger formula. A procedure commonly used for the representation of the composition of a ceramic glaze. The chemical composition is recalculated to molecular fractions and the constituent oxides are then arranged in three groups: the bases, which are made equal to unity: R_2O_3, RO_2; for example, (O.3Na_2O.O.2 CaO.O.5 PbO). O.2 Al_2O_3.(3.OSiO_2.O.7SnO_2). *Dodd.*

Seger's porcelain. A German porcelain compounded of 30 percent feldspar, 35 to 40 percent quartz, 30 to 35 percent kaolin. It is covered with a glaze prepared from 83.5 parts feldspar, 26 parts kaolin, 35 parts whiting, 54 parts flint. It is biscuit fired at a low temperature and glost fired at cone 9. *Dodd.*

Seger's rules. A series of empirical rules for the prevention of crazing and peeling. To prevent a crazing, the body should be adjusted as follows: decrease the clay, increase the free silica (for example, flint), replace some of the plastic clay by kaolin, decrease the feldspar, grind the flint more finely, biscuit fire at higher temperature. Alternatively, the glaze can be adjusted: increase silica and/or decrease fluxes, replace some SiO_2 by B_2O_3; replace fluxes of high equivalent weight by fluxes of lower equivalent weight. To prevent peeling, the body or glaze should be adjusted in the reverse direction. *Dodd.*

seggar. a. Eng. In Yorkshire, Durham, and the Northumberland coalfield, a clay stratum which underlies a coal seam. When sandy it may be called sandy seggar. *See also* underclay. *Nelson.* b. Eng. Fireclay often forming the floor of a seam. *SMRB, Paper No. 61.* c. Clay box used to hold ceramics during firing. *Pryor, 3.* d. *See* seat earth, a. *B.S. 3618, 1964, sec. 5.*

segger. *See* sagger. *Fay.*

segment. A separated part; an individual piece. *Kinney.*

segmental arch. A sprung arch having the contour of a segment of a circle. *Dodd.*

segmented sluice gate. *See* radial gate. *Ham.*

segmental wheel. An abrasive wheel that has been built up from specially made segments of bonded abrasive; wheels up to 5 feet in diameter can be made in this way. *Dodd.*

segment die. A die made of parts that can be separated for the ready removal of the workpiece. Synonymous with split die. *ASM Gloss.*

segmented belt. A coated abrasive belt made of sections spliced together. Segmentation is necessary to obtain belts wider than 50 inches, the widest coating width. *ACSG, 1963.*

segments. Bonded abrasive sections of various shapes to be assembled to form a continuous or intermittent circular grinding surface. *ACSG, 1963.*

segregate. a. Pac. To separate the undivided joint ownership of a mining claim into smaller individual segregated claims. *Fay.* b. In geology, to separate from the general mass, and collect together or become concentrated at a particular place or in a certain region, as in the process of crystallization or solidification. *Webster 2d. See also* segregated vein. *Fay.*

segregated vein. A vein in which the filling is believed to have been derived from the adjacent country rock by percolating water carrying the dissolved mineral matter into the fissure. *Fay.*

segregation. a. A term which refers to the tendency of particles of one and the same mineral to gather together. In the crystallization of molten rock certain minerals sometimes grow in groups, or segregations, in the magma. *Nelson.* b. Nonuniform distribution of impurities, inclusions, and alloying constituents in metals. Arises from the process of freezing, and usually persists throughout subsequent heating and working operations. *C.T.D.* c. The involuntary separation of particles of different physical characteristics. *B.S. 3552, 1962.* d. Partial reseparation of a previously mixed batch of material into its constituents; this can occur either as a result of differences in particle size or in density. Segregation is liable to occur in storage bins, on conveyors, and in feeders during the dry or semidry processing of ceramic materials. *Dodd.* e. The differential concentration of the components of mixed concrete, resulting in nonuniform proportions (for example, coarse and fine aggregate) throughout the mass. *Taylor.*

segregation banding. A compositional banding in gneisses that is not primary in origin, but rather the result of segregation of material from an originally homogeneous rock. *See also* cleavage banding. *A.G.I.*

segregation in magmas. Synonym for magmatic segregation; magmatic differentiation. *A.G.I.*

segregation, magmatic. In geology, concentration of ore mineral in one part of a cooling igneous mass of rock. Pegmatites, being more fluid, form veins which are intruded into sedimentaries near the boundaries of such magmas. *Pryor, 3. See also* magmatic differentiation. *A.G.I.*

segregations. Applied to authigenous mineral aggregates, in masses or streaks, occurring in igneous rocks, and representing early products of crystallization from the same respective magmas. *Holmes, 1928.*

segregation survey. The survey of a mining claim located on lands classified as agricultural. *Fay.*

segregation vein. Same as segregated vein. *Fay.*

sehta. Synonym for cobaltite. *Bureau of Mines Staff.*

seiche. a. Stationary inertia oscillation of the water of a lake, bay, or marginal sea. Synonym for standing wave. *Schieferdecker.* b. In oceanography, an apparent tide in a lake (originally observed on Lake Geneva) due to the pendulous motion of the water when excited by wind. *C.T.D.*

seidozerite. Fanlike clusters of brownish-red needles embedded in microcline in an alkali pegmatite from near Lake Seidozero, Lovozero tundra, Kola Peninsula, near $Na_8Zr_3Ti_3Mn_2Si_8O_{32}F_4$. Named from locality. A member of the wöhlerite family, and in need of full examination. *Hey, M.M., 1961.*

seif dune. A long, sharp-crested dune extending in the direction of the wind that constructed it. *Mather.*

Seignette electric. Seignette salt is the alternative name for Rochelle salt (sodium-potassium tartrate). Crystals of this composition are markedly peizoelectric and were used, for this property, before titanite ceramics were introduced. The term Seignette electric is still used in Western Europe and in the U.S.S.R. to signify ferroelectric. *Dodd.*

S.E.I. photometer. In this instrument the internal comparison lamp is set to a standard brightness as indicated by a photoelectric cell and not by reference to a voltmeter or ammeter. *Roberts, II, p. 52.*

seism. An earthquake. *Mather.*

Seismex. Trademark for an ammonia dynamite for seismic prospecting. *CCD 6d, 1961.*

seismic. a. Pertaining to, characteristic of, or produced by earthquakes or earth vibration; as, seismic disturbances; seismic records. *Standard, 1964.* b. Pertaining to sound waves generated by earthquakes or, artificially by explosives, to map subsurface structure. *Wheeler.*

seismic activity. *See* seismicity.

seismic analysis. A quick, easy, and inexpensive method of determining the consolidation of overburden. The process is based on the principle that sound or shock waves travel through different subsurface materials at varying speeds and along different paths. By this method the operator can determine whether overburden can be ripped or whether it will need to be drilled and blasted. *Coal Age, v. 71, No. 8, August 1966, p. 219.*

seismic area. The area affected by any particular earthquake. *Standard, 1964.*

seismic belt. One of the broad, more or less well-defined, elongate tracts in which most earthquakes originate. *Stokes and Varnes, 1955.*

seismic drill. Synonym for seismograph drill. *Long.*

seismic explosives. Special forms of blasting gelatin, gelatin, and ammonia gelatin dynamites used in geophysical prospecting by the seismic method; developed to shoot consistently at their characteristic rate of detonation under unusually heavy water pressure. *Lewis, p. 109.*

seismic focus. The place of origin, within the earth's crust, of an earthquake; usually some more or less restricted area of a fault surface. If the focus is to be some particular point, it is the central point of the area over which fault movement occurred and caused the earthquake. *Challinor.*

seismicity. a. Measure of frequency of earthquakes, for example, the average number of earthquakes per year and per 100 square kilometers. *Schieferdecker.* b. The phenomenon of earth movements. *Hy.*

seismic method. A geophysical prospecting method based on the fact that the speeds of transmission of shock waves through the earth vary with the elastic constants and the densities of the rocks through which the waves pass. A shock wave is initiated by firing an explosive charge at a known point (the shot point) and records are made of the travel times taken for selected shock waves to arrive at sensitive recorders (geophones). There are two main subdivisions of seismic operations, that is, the reflection method and the refraction method. The seismic method has not been applied to any great extent to elucidate mining problems, partly due to the high cost. It has been used to investigate the base of drift deposits, and drift-filled channels have been successfully outlined. *Nelson.*

seismic prospecting. A method of geophysical prospecting in which vibrations are set up by firing small explosive charges in the ground. Precise measurements of the resulting waves are taken, from which the nature and extent of underlying strata are revealed. *Ham.*

seismic reflection method. In this geophysical prospecting technique, the structure of subsurface formations is mapped by making use of the times required for a seismic wave (or pulse), generated in the earth by a near-surface explosion of dynamite, to return to the surface after reflection from the formations themselves. The reflections are recorded by detecting instruments responsive to ground motion, which are laid along the ground near the shothole. Variations in the reflection times from place to place on the surface usually indicate structural features in the rock below. *Dobrin, p. 4.*

seismic refraction method. In refraction shooting, the detecting instruments are laid down at a distance from the shothole that is large compared to the depth of the horizon to be mapped. The explosion waves travel large horizontal distances through the earth and the time required for travel gives information on the velocity and depth of certain subsurface formations. *Dobrin, p. 5.*

seismic region. Area in which earthquakes are frequent. *Schieferdecker.*

seismic seawave. An exceptionally long wave caused by water displacement following a submarine earthquake. Synonym for tsunami; tidal wave. *Schieferdecker.*

seismic shooting. The initiation of shock waves in the rocks by the firing of an explosive charge at a known point. The disturbance must be capable of accurate timing and must be such that, after traveling considerable distances through varying strata, it produces a sharply defined effect on the seismograph. These requirements may be supplied by the shock produced by detonating a charge of high explosive. The intensity of the shock and its effective range can be controlled by varying the quantity of explosive charge. *See also* reflection shooting; refraction shooting. *Nelson.*

seismic shothole. A hole drilled for a seismic shot. Usually a slim hole, although has also been termed core hole. *See also* slim hole; stratigraphic test hole; structure test hole. *Williams.*

seismic survey. An exploration technique utilizing the variation in the rate of propagation of shock waves in layered media. It is used primarily to delineate subsurface geologic structures of possible economic importance. Seismic surveying is employed most frequently by the petroleum industry. *Long.*

seismic waves. The disturbance or earth tremors produced by a mechanical disturbance on the surface or underground, and are utilized in the seismic method of geophysical exploration. Three types of waves are produced: (1) longitudinal or P waves; (2) traverse or S waves; and (3) surface or Raleigh or L waves. The speed of propagation is characteristic for each type of rock, depending largely on its compactness. In sandy clay, the speed of the P wave is about 4,000 feet per second; in sandstone, 10,000 feet per second and in igneous rock up to 22,000 feet per second. *Nelson.*

seismism. The processes or phenomena involved in earth movements. *Standard, 1964.*

Seismitron. An instrument designed to check ground stability. It amplifies sound 2,500,000 times, and can detect a rock movement as small as .000001 inches. Receiving phones are placed in holes in the area being tested. Either earphones or automatic recording apparatus may be used for listening. A rate of 3 or more microseisms a second indicates probable collapse, and any rate over 25 or 30 a minute is considered dangerous. This instrument is also finding use above ground in checking highway cut slopes. *Nichols, p. 9-90.*

Seismogel. Trademark for a straight gelatin dynamite for seismic prospecting. *CCD 6d, 1961.*

seismogram. The record made by a seismograph. *A.G.I.*

seismogram synthesis. This process produces an artificial reflection record from a continuous velocity log or an electric log. With this system the log is converted from a depth scale to a time scale and is run through a scanning device that transforms the fluctuations on the log into electrical impulses which vary with time so as to simulate reflections. These impulses are passed through appropriate filters and are then recorded on an oscillograph in the same way as signals from a geophone. *Dobrin, p. 151.*

seismograph. a. The instrument used to record the reception of the waves in the seismic method. It works on the general principle that its frame is shaken by the arrival of the waves, while a pendulum of high inertia, mounted in it, remains stationary. The relative movement of the frame and the pendulum is magnified by optical means in the seismograph and by electrical amplifiers in the geophone. The record is on a film. The instrument can also detect and record earthquakes. Also called geophone. *See also* vibrograph. *Nelson.* b. Also used in geophysical prospecting to register passage of waves caused by detonation of dynamite. *Hess.*

seismograph drill. A rotary drill, pump, and hinged mast mounted as an integral drilling unit on a truck body and used primarily to drill vertical shallow holes in which explosives are placed and detonated to produce shock waves from the rock strata, which then are measured by seismic recording instruments. Also called jackknife rig; rotary shot drill; seismic drill; shothole drill. *Long.*

seismograph rod. A collared, tapered, V-thread-coupling drill rod used on seismograph drills. *Long.*

seismologist. One who applies the principles of seismology to his work, for example, oil exploration, earthquake detection, and analysis. *A.G.I.*

seismology. a. The science of earthquakes and attendant phenomena. *Schieferdecker.* b. A geophysical science which is concerned with the study of earthquakes and measurement of the elastic properties of the earth. *A.G.I.* c. The science that studies and measures the velocities of seismic waves in different rock deposits and interprets the results in terms of geological structures at depth. *See also* geophysical prospecting. *Nelson.*

seismometer. a. An instrument buried in the ground which transforms the mechanical effects of earth shocks into electrical energy. This is transmitted by a circuit to a seismograph placed above ground, which records the impulses. *Ham.* b. Detecting device which receives seismic impulses. Synonym for geophone; detector; pickup; jug. *A.G.I.*

seismometer spacing. Distance between successive seismometer stations. *Schieferdecker.*

seismometer spread. Number of seismometers, placed along a straight line, that record the same shot. *Schieferdecker.*

seismoscope. An instrument which indicates that an earthquake has occurred. Considered by some as equivalent to seismometer. *A.G.I.*

seize. a. To bind wire rope with soft wire, to prevent it from raveling when cut. *Nichols.* b. Synonym for bind; freeze. *Long.* c. To cohere or stick to an inadequately lubricated moving part, such as a bearing, piston, or sliding part, through excessive friction, pressure, or temperature. *Long.* d. To protect rope ends by binding with yarn, marline, or fine wire. *Long.*

seizing. a. stopping of a moving part by a mating surface as a result of excessive friction caused by galling. *ASM Gloss.* b. Wire bound securely around the end of a wire rope to prevent unlaying—or securing by wire two parallel portions of rope. *Ham.*

seizure. Welding together of metal parts designed to move smoothly, owing to breakdown of interfilm of lubricant. *Pryor, 3.*

Sejournet process. *See* Ugine-Sejournet process. *ASM Gloss.*

selagite. Hauy's name for a rock consisting of mica disseminated through an intimate mixture of amphibole and feldspar, but it has been since applied to so many different rocks as to be valueless. *Fay.*

select. Sometimes used as a synonym for select round. *Long.*

selected fill. Dumped fills made up of selected materials. These fills are used when it is desired to utilize a particular property of a soil or rock and this property can be secured solely by selective excavation. *Carson, p. 362.*

Selected Natural Diamond. The name applied to a recently developed method of selecting particularly abrasive natural diamond grain. This method, developed by the Diamond Research Laboratory of Johannesburg, Republic of South Africa, can be utilized for different industrial preparations. *I.C. 8200, 1964, p. 115.*

selective crushing. Crushing in such a manner as to cause one ingredient of the feed to be crushed preferentially to others. *B.S. 3552, 1962.*

selective digging. Separating two or more types of soil while digging them. *Nichols.*

selective filling. Hand filling, during which the miner rejects stone or dirt and loads only clean coal. Similar methods are adopted in metal mining. *Nelson.*

selective flotation. a. Generally refers to the surface or froth selecting of the valuable minerals rather than the gangue. Sometimes used to mean differential flotation. *See also* preferential flotation. *Fay.* b. A process for the preferential recovery of a particular ingredient of the coal, for example, a petrological constituent, by froth flotation. *B.S. 3552, 1962.*

selective freezing. A process involved in the solidification of alloys, as a result of which the crystals formed differ in composition from the melt. Thus, in alloys in a eutectic system (except the eutectic alloy), crystals of one metal are formed from a melt containing two, and this continues until the melt reaches the eutectic point. *C.T.D.*

selective grinding. Grinding in such a manner as to cause one ingredient of the feed to be ground preferentially to others. *B.S. 3552, 1962.*

selective heating. Heating only certain portions of an object so that they have the desired properties after cooling. *ASM Gloss.*

selective iridescent filming. A method of forming a thin pellicle of transparent character on polished metallic mineral surfaces which presents diagnostic data for identification. Films may be formed by contact with a hydrochloric acid, chromic oxide, water solution at a definite temperature, between 22° and 22.5° C, for a definite period; for example, 10 or 23 seconds. Introduced by A. M. Gaudin. *Hess.*

selective mining. a A method of mining whereby ore of unwarranted high value is mined in such manner as to make the low-grade ore left in the mine incapable of future profitable extraction. In other words, the best ore is selected in order to make good mill returns, leaving the low-grade ore in the mine. Frequently called robbing a mine. *Fay. Compare* bulk mining. b. The object of selective mining is to obtain a relatively high-grade mine product; this usually entails the use of a much more expensive stoping system and high exploration and development costs in searching for and developing the separate bunches, stringers, lenses, and bands of ore. In general, selective methods are applicable where the valuable sections of the deposit are rather large, comparatively few in number, and separated by relatively large volumes of waste. Selective methods of stoping are square-set stoping, open stoping in low-dipping beds, and cut-and-fill stoping. *BuMines Bull. 390, 1936, p. 32.* c. In coal mining, selective methods may be dictated by market demands and prices. It may be desirable to work the different quality coal seams in such proportions as to obtain a uniform and salable blend over a period of years. In metal mining, the stopes may be restricted in both length and width and thus produce a much higher grade of ore. It is not always practicable to resort to selective mining as the mineralization may be so distributed as to necessitate taking the whole ore body in mining operations. *Nelson.*

selective quenching. Quenching only certain portions of an object. *ASM Gloss.*

selective reflection. The reflection by a substance, such as an opaque gem, of light rays of only certain wavelengths, the others being absorbed. This cause of color in gems is a sort of selective absorption. *Shipley.*

selective replacement; preferential replacement. Replacement of one mineral in preference to or more rapidly than another. *A.G.I.*

selective screwfeed. A drill screwfeed swivel head fitted with three or more sets of feed gears and a shifting mechanism, whereby the driller can easily select and engage the pair giving the desired rate of feed. *Long.*

selective wetting. In mineral processing, development of selective attraction to the water phase of an ore pulp, as a prelude to flotation of an air-attracted fraction of the contained minerals. *Pryor, 3.*

selectivity index. Criterion of trend in a continuous operation such as mineral processing. Abbreviation, S.I. *Pryor, 3.*

selector. In copper smelting, a kind of converter with horizontal tuyeres, to produce bottoms and a purified copper in one operation. *Webster 3d.*

select round. Sometimes used to designate the best quality of industrials normally used as drill diamonds. *Long.*

selenite. Finely crystallized gypsum. *Cooper, p. 287.*

selenite plate. In mineralogy, a plate of selenite that gives a purplish-red interference color of the first order with crossed nicols. *Fay.*

Selenitza. Trade name for a fairly hard asphalt mined in Albania. It contains between 10 and 20 percent mineral matter and approximately 6 percent water. This asphalt has been used locally after softening with softer petroleum bitumens for paving, for mastic and bituminous coating, and in the manufacture of paints. *AIME, p. 632.*

selenium. A nonmetallic element in the sixth group of the periodic system. Selenium is widely distributed in small quantities, usually as selenides of heavy metals. Obtained from sulfide ores and copper refining. Used as a decolorizer for glass, in red glasses and enamels, and in photoelectric cells and rectifiers. Resembles sulfur and tellurium chemically. Symbol, Se; atomic weight, 78.96. *C.T.D.*

selenium cell. Photoelectric cell which emits electricity in ratio to the light falling on it. *Pryor, 3.*

selenium rectifier. A rectifier of the dry-contact type. It is built up of a number of units each consisting of a disk or plate of nickel-plated steel or aluminum, one surface of which is sprayed with a thin coating of metallic selenium. The rectifier consists of a number of these plates forming a stack when clamped over an insulating sleeve; the stacks are connected in series or in parallel to give the necessary current and voltage. The a.c. supply is generally connected through a transformer to give the required d.c. voltage with the load in series with the rectifier, current then passing through the nickel-steel to the selenium but not in the reverse direction. The transformers and rectifiers may be oil-immersed, and contained in a tank mounted on wheels to run on the pit rail gage. The efficiency of this type rectifier is over 80 percent. *Sinclair, V, pp. 243-244.*

selenolite. a. Wadsworth's name for rocks composed of gypsum or anhydrite. *Fay.* b. A mineral, SeO_2, reported as white needles with cerussite and molybdomenite at Cacheuta, Argentina. *Dana 7, v. 1, p. 595.*

selentellurium. *See* hondurasite. *Spencer 19, M.M., 1952.*

self-act. Gravity haulage. *Mason.*

self-acting door. A ventilation door consisting of two halves, so constructed that they are forced apart centrally by the trams as they come in contact with the converging beams which operate them. The door halves move on small pulleys which run on inclined rails so that after the passage of the trams the door closes by gravity. *Nelson.*

self-acting incline. a. In transport by mine car, a brake incline. *See also* brake incline. *Pryor, 3.* b. *See* gravity haulage. *Nelson.*

self-acting plane. An inclined plane upon which the weight or force of gravity acting on the full cars is sufficient to overcome the resistance of the empties; in other words, the full car, running down, pulls the other car (empty) up. *Fay.*

self-acting rope haulage; gravity plane rope haulage. A system of rope haulage used for transporting material on the surface and to transfer loaded cars from one elevation to a lower one in mines. Slope must be sufficiently steep so the loaded cars will pull the empty cars up the grade. *Lewis, p. 225.*

self-advancing supports; power-operated supports. An assembly of hydraulically operated steel hydraulic supports, on a longwall face, which are moved forward as an integral unit by means of a hydraulic ram coupled to the heavy steel face conveyor. *Nelson.* Also called walking props.

self-aligning carrying idler. A belt idler which controls and limits the side runout of the carrying belt within practical limits by means of a swivel mechanism. *NEMA MB1-1961.*

self-aligning return idler. A belt idler which controls and limits the side runout of the return belt within practical limits by means of a swivel mechanism. *NEMA MB1-1961.*

self-annealing. A term applied to metals such as lead, tin, and zinc, which recrystallize at air temperature and in which little strain hardening is produced by cold working. *C.T.D.*

self-centering chuck. A drill chuck that, when closed, automatically positions the drill rod in the center of the drive rod of a diamond-drill swivel head. *Long.*

self-cleansing gradient. The gradient at which flow in a pipe of a particular diameter will carry away any solids in it. This gradient must not be too steep nor too gradual, and is usually laid down under bylaws affecting drains and sewers. *Ham.*

self-contained breathing apparatus. A self-sufficient breathing unit which permits freedom of movement, unencumbered by air hoses. It offers the wearer respiratory protection in atmospheres either oxygen-deficient or too highly toxic to permit the use of gask masks or respirators. The oxygen or air is supplied in compressed form or by chemical generation and the wearer's exhalations are either purified for re-use or released to the surrounding atmosphere. The equipment is devised to afford protection for special lengths of time, in accordance with the standards set by the U.S. Bureau of Mines. The two hour apparatus is used for mine rescue and recovery operations, and shorter period apparatus for industrial uses and auxiliary equipment. *Bests, p. 100.*

self-contained cooling unit. A combination of apparatus for room cooling complete in one package; usually consists of compressor, evaporator, condenser, fan motor, and air filter. Requires connection to electric line. *Strock, 10.*

self-contained portable electric lamps. Electric lamps that are operated by an electric battery that is designed to be carried about by the user of the lamp. *Fay.*

self-detaching hook. One used to attach hoisting rope to cage, which sets the latter free in the event of overwinding. *Pryor, 3.*

self-diffusion. The spontaneous movement of an atom to a new site in a crystal of its own species, as, for example, a copper atom within a crystal of copper. *ASM Gloss.*

self-docking dock. A floating dock built in sections, each of which can be unbolted and lifted up on the others for repair as required. *Ham.*

self-dumping cages. Cages in which the cars are generally fitted with end doors and the cage deck is pivoted and a roller engages with a tipping guide at the surface. As the cage is lifted, towards the end of the wind the deck tilts and the end door is lifted and the coal discharged. *Sinclair, V, p. 60.*

self-dumping car. A mine car which can be side-tipped while in motion on the rail track. A ramp structure is fitted alongside the track opposite to the spot where tipping is required. The car is fitted with a spherically-contoured wheel which engages the ramp and gradually tilts the car while in motion. A chain attachment to the underframe opens the side of the car when tilted for tipping. The ramp can be retracted when not required. *Nelson.*

self-energizing brake. A brake that is applied partly by friction between its lining and the drum. *Nichols.*

self-feeder. An automatic appliance for feeding ore to stamps or crushers without the employment of hand labor. *Fay.*

self-feeding portable conveyor. Any type of power-propelled conveyor designed to advance into a pile of bulk material, thereby automatically feeding itself. *ASA MH 4.1-1958.*

self-fluxing ores. Ores that contain both acid and basic gangue minerals in the proper ratio to form a suitable slag. *Newton, p. 303.*

self-glazed. Having a glaze of but one tint; said of oriental porcelain. *Standard, 1964.*

self-hardening steel. *See* air-hardening steel.

self-help system. *See* self-issue system. *Roberts, II, p. 271.*

self-inductance. The property of a circuit whereby self-induction occurs. It is measured by the rate of change of linkages in a circuit accompanying a rate of change of current in that circuit of one unit per second. *C.T.D.*

self-issue system; self-help system. A system of storage in lamp room operation charging and issue, for alkaline-type car lamps, which allows a user access only to the storage racks for the purpose of lamp collection or return. Charging is controlled by a lamp room attendant. *B.S. 3618, 1965, Sec. 7.*

self-loading dumper. A dumper provided with a bucket, hinged by arms to the chassis, which scoops up the material and discharges it backwards into the hopper. Hydraulic rams operate the lift arms, bucket movement, and dumping operation. *Nelson.*

self-mulching soil. A soil that breaks up into fine, dry dust by cultivation, forming a mulch. *Seelye, 1.*

self-open. Derb. A natural fissure in rock. Also called shack. *Fay.*

self-opening reamer. An underreamer having cutters that expand when they come in contact with, and are pressed against, a surface. *Compare* expansion bit; underreamer. *Long.*

self-potential. *See* spontaneous, b. *Wyllie, p. 1.*

self-potential log. Strip recording of natural potentials of complex origin, arising in the immediate neighborhood of liquid-filled boreholes. Abbreviation, SP log. *See also* electric logging. *Institute of Petroleum, 1961.*

self-potential method. Electrical potential caused by dissimilar conductors in an electrolyte, similar to the action of an electric battery. *See also* spontaneous potential method. *A.G.I.*

self-potential prospecting. A method of electrical prospecting based on the measurement of natural earth potentials caused by the self-potential effects from ore bodies, commonly metallic sulfides. *A.G.I.*

self-powered scraper. A scraper built into a single unit with a tractor. *Nichols.*

self-priming centrifugal pumps. A pump of the centrifugal type which combines in a single hydraulic stage and with a single hydraulic impeller and casing the dual ability to pump, under vacuum, either liquids or gases. These pumps are advantageously used for sump, bilge, mine water gathering, tankcar unloading, vacuum evaporator applications, chemical processing and other uses where the liquid is below the pump center line, or under high vacuum. The suction lift is usually guaranteed at 20 feet for cold water at sea level. *Pit and Quarry, 53rd, Sec. E, p. 87.*

self-propelled hopper dredge. *See* hopper dredge, self-propelled. *Carson, p. 354.*

self-reading staff. A leveling staff, marked with graduations so that the observer looking through the telescope of a level, can read the elevation at which his line of sight intersects the staff. *Ham.*

self-rescuer. A small filtering device carried by a miner underground, either on his belt or in his pocket, to provide him with immediate protection against carbon monoxide and smoke in case of a mine fire or explosion. The device is used for escape purposes only because it does not sustain life in atmospheres containing deficient oxygen. The length of time a self-rescuer can be used is governed mainly by the humidity in the mine air; for example, in moist air it will last for a minimum period of 30 minutes, and in moderately dry atmospheres, for a period of 1 hour or more. *See also* Draeger self-rescuer; M.S.A. self-rescuer; Siebe-Gorman self-rescuer. *McAdam, pp. 65-67.*

self-service system. A system of storage and issue for lead-acid battery operated lamps, whereby the user has direct access to the charging racks for the purpose of connecting or disconnecting his lamp from the charging circuit. *B.S. 3618, 1965, Sec. 7.*

self-shooter. *See* booming; flop gate. *Fay.*

self-slip. In archeology, a term sometimes used to describe the fine layer resulting from the wet-surface smoothing of clay vessels. Also called mechanical slip. *ACSG, 1963.*

self stones. Derb. Fragments of rocks still possessing the original shape and angles. *Arkell.*

self-stowing gate. Applied to an advance gate which carries forward a waste or skip, from 6 to 10 yards wide, to take all the broken rock produced by the gate rippings. A short face conveyor is usually used to move the coal and dirt as required. The width of the waste is just sufficient for stowing the dirt produced. *Nelson.*

self-tightening jar block. Synonym for C-S jar collar. *Long.*

self-tightening jar collar. Synonym for C-S jar collar. *Long.*

self-timing anemometer. An anemometer which has a timing device incorporated in it. Twenty seconds after being started, the device automatically engages the pointer with the rotating vanes and after an interval of one minute disengages it. A German instrument. *Nelson.*

seligmannite. A lead-gray sulfarsenite of lead and copper, $2PbS.Cu_2S.As_2S_3$; orthorhombic. Small, complex crystals. From Binnenthal, Switzerland; Emery, Mont.; Bingham, Utah. Resembles bournonite. *English.*

sellaite. A mineral substance consisting of magnesium fluoride, MgF_2, which occurs in colorless tetragonal crystals. Mohs' hardness, 5; specific gravity, 2.972 to 3.170. *Bennett 2d, 1962.*

Selma chalk. An argillaceous sandy limestone some 900 feet thick, of Upper Senonian age, rich in foraminifera and lamellibranchs (Exogyra, as well as the aberrant form Rudistes), occurring in the coastal region of the Southern United States. *C.T.D.*

selvage. a. The material found along the fault zone. *See also* breccia; flucan; gouge. *Nelson.* b. A layer of clay or decomposed rock along a vein wall. Also called self-edge. *Fay.* c. The chilled glassy border of a dike or lava flow. *Stokes and Varnes, 1955.* d. A marginal zone, as in a dike or vein, having some distinctive feature of fabric or composition. *Stokes and Varnes, 1955.*

selvedge. a. Eng. Joint or parting in a stone quarry, Northamptonshire. *Arkell.* b. A thin layer of clayey or earthy matter surrounding a metalliferous vein. *Arkell.* c. The formed edge of a ribbon of rolled glass. *Dodd.*

Selvulize system. A cold vulcanizing method for use underground. It is simpler and quicker than hot vulcanizing and there is no fire or explosion risk involved. *Sinclair, V, p. 302.*

semianthracite. a. Coal intermediate between anthracite and semibituminous coal. *Tomkeieff, 1954.* b. Nonagglomerating anthracitic coal having 86 percent or more and less than 92 percent of fixed carbon (dry, mineral-matter-free), and 14 percent or less and more than 8 percent of volatile matter (dry, mineral-matter-free). *ASTM D 388-38.* c. Coal intermediate between true anthracite (fuel ratio of fixed carbon to volatiles of 12:1) and bitumen coals. *Pryor, 3.*

semiarid. A term applied to a country or climate neither entirely arid nor strictly humid, but intermediate, with a shading to the arid side. A dry-farming country in which many crops grow without irrigation, but in which far better yields result from irrigation. The term semihumid has a similar significance, with a shading toward the humid side. *Seelye, 1.*

semiautomatic control. A system to control the speed of a winder consisting of a cam-operated rheostat in parallel with the manually operated winder controller, the instantaneous cam position being directly related to the position of the cage in the shaft. Assuming that the driver left his manual control in the full-speed position, the cam control and associated closed-loop control would take charge and automatically decelerate the winder to creep speed as the cage approaches the surface. Should the driver still defer the operation of his lever, the winder would stop on the operation of the overwind limit switch. By the introduction of a small switch to initiate the wind and another to terminate the wind, fully automatic operation is possible. *See also* automatic cyclic winding. *Nelson.*

semibastard amber. Partly cloudy bastard amber. *Shipley.*

semibituminous. Of coal, intermediate between bituminous coal and anthracite, and averaging from 10 to 20 percent of volatile matter. *Webster 3d.*

semibituminous coal. It is harder and more brittle than ordinary bituminous coal. The term superbituminous was suggested instead of semibituminous as a more appropriate one. *Tomkeieff, 1954.*

semibright coal. A variety of banded coal containing from 61 to 80 percent of pure, bright ingredients (vitrain, clarain, and fusain), the remainder consisting of clarodurain. *Compare* bright coal, d.; intermediate coal; semidull coal; dull coal. *A.G.I.*

semicannel coal. Lean cannel coal; otherwise a cannel coal relatively poor in hydrogen. *Tomkeieff, 1954.*

semicarnelian. An old and undesirable name for yellow carnelian. *Shipley.*

semicircumferentor. A surveyor's instrument used for setting out land or buildings to any angle and in preliminary survey work generally and made up of a horizontal graduated semicircle that surrounds a compass and is attached to a base with fixed vertical sights at each end and of a movable arm with vertical sights at each end that pivots on the center of the base. *Webster 3d.*

semicoke. *See* Coalite. *C.T.D.*

semiconducting glaze. Porcelain insulators that are covered with a normal glaze are liable, particularly if the surface gets dirty, to surface discharges which cause radio interference and may lead to complete flashover and interruption of the power supply. This can be largely prevented if the glaze is semiconducting as a result of the incorporation of metals oxides, such as Fe_2O_3, Fe_3O_4, MnO_2, Cr_2O_3, Co_3O_4, CuO, or TiO_2; SiC and carbon have also been used as semiconducting constituents. *Dodd.*

semiconductor. Crystal system in which, though the electrons are ionically bound, a slight rise of temperature frees the valence atoms so the system becomes a conductor. An example is germanium. Conduction of electricity proceeds in one direction only. *Pryor, 3.*

semicontinuous casting. *See* dc (direct chill) casting.

semicontinuous kiln. A transverse arch kiln having only a single line of chambers, so that when the firing zone reaches one end of the kiln the process of fire travel must be restarted at the other end. Kilns of this type are uncommon. *Dodd.*

semicontinuous mill. One that incorporates some stands in tandem, either for roughing or finishing, an example being a semicontinuous wire rod mill with a continuous roughing train and a looping finishing train. *Osborne, p. 358.*

semicoring bit. A noncoring bit that produces a small-diameter core. *Compare* pencil-core bit. *Long.*

semicrystalline. Somewhat crystalline; said of rocks that are partly crystalline or partly amorphous. *Fay.* Synonym for hypocrystalline; hemicrystalline; merocrystalline. Hypocrystalline is preferred. *A.G.I.*

semidiurnal. Having a period or cycle of approximately one-half lunar day (12.42 solar hours). The tides and tidal currents are said to be semidiurnal when 2 flood periods and 2 ebb periods occur each lunar day. *Hy.*

semidry mining. a. Underground work in which humidity of ventilating air is kept low, though moisture is used in drilling to allay dust. *Pryor, 3.* b. In semidry mining every effort is made to prevent the ventilating air from picking up moisture in the downcast shafts and in the main ways leading to the workings. In the workings themselves moisture is added freely in order to reduce dust, and the air rapidly becomes saturated. *Spalding.*

semidry pressing. *See* dry-pressing. *Dodd.*

semidry-press process. In brickmaking, practically the same as dry press, but clay may be slightly moister. *Fay.*

semidull coal. A variety of banded coal containing from 21 to 40 percent of pure, bright ingredients (vitrain, clarain, and fusain), the remainder consisting of clarodurain and durain. *Compare* bright coal, d; semibright coal; intermediate coal; dull coal. *A.G.I.*

semiduplex process. The process consists essentially of pouring molten metal from a primary open-hearth furnace on a heated solid charge of heavy and light alloy scrap (20 to 40 percent of total). The charge is melted and finished under reducing conditions. There is no boil. *Osborne.*

semifaience. Pottery with a glaze very thin or transparent. *Fay.*

semifinishing. Preliminary operations performed prior to finishing. *ASM Gloss.*

semiflint clay. A term that is used in some states to include fire clays which are intermediate in hardness between flint clay and plastic fire clay. *ACSB, 1.*

semifriable alumina. An abrasive similar to regular alumina except that the alumina content is in the range of 96 to 98 percent. *See also* regular alumina. *ACSG, 1963.*

semifusain. A coal constituent transitional between vitrain and fusain. It displays gradual disappearance of cell structure, hardness, and yellowish color when observed in thin sections. Same as vitrifusain. *Stutzer and Noe, 1940, p. 71.*

semifusinite. A constituent intermediate between vitrinite and fusinite showing a well-defined structure of wood and sclerenchyma. The cell cavities, either round, oval, or elongated in cross section, vary in size but are generally smaller and sometimes less well defined than those of fusinite. Occurs as lenses and bands of variable thickness, and as small fragments; associated with fusinite, or included in vitrite, clarite, duroclarite, clarodurite, and durite. It often lies as a transition material between vitrinite and fusinite, and the properties lie between those of fusinite and vitrinite; behaves as a semi-inert diluent in carbonization. *IHCP, 1963, part I.*

semifusite. Same as semifusain; vitrifusain. *Tomkeieff, 1954.*

semigelatins. Dynamites containing ammonium nitrate as the chief explosive ingredient, also a certain percent of blasting gelatin to make them plastic enough to remain in holes directed upward. They are more resistant to water than ammonia dynamites, but less resistant than gelatin dynamites. *Lewis, p. 110.*

semigrouser. A crawler track shoe with one or more low cleats. *Nichols.*

semihorizon mining. Broadly, this is the method adopted in British coal mines for many years. It consists in driving cross measure drifts and developing in the seams. The roads in the seam are equipped with conveyors for transporting coal, and locomotives may be used in the cross measure drifts when these are horizontal or nearly so. The present trend is to concentrate all the production at one central loading point. Semihorizon mining may include the longwall retreating method. *Nelson.*

semihydraulic lime. Lime which is intermediate in composition and character between high-calcium lime and hydraulic lime. *Taylor.*

semikilled steel. Steel that is incompletely deoxodized and contains sufficient dissolved oxygen to react with the carbon to form carbon monoxide to offset solidification shrinkage. *ASM Gloss.*

semiloose. In an excavation, term used to include rock which is only partially detached from the solid and which rings as solid when struck, and rock being still attached to the solid, but parting from it by incipient shear cracks. *Spalding, p. 22.*

semimat finish. An enameled or glazed surface that is not altogether rough to the touch, and having a slight glossy appearance. *Enam. Dict.*

semimat glaze. A colorless or colored glaze having a moderate gloss. *ASTM C242-60.*

semimetallic pellets. *See* prereduced iron-ore pellets.

semimuffle furnace. A furnace with a partial muffle, in which the products of a combustion come in contact with the ware. *ASTM C286-65.*

semiopal. Common opal distinguished from precious and fire opal. *Fay.*

semiopaque enamel. *See* semitransparent, b.

semipelitic rock. A rock intermediate between pelite and psammite. *A.G.I. Supp.*

semipermanent mold. A permanent mold in which sand cores are used. *ASM Gloss.*

semipermeable membrane. In osmosis, a membrane which separates two components of a solution by allowing only one to pass. *Pryor, 3.*

semiplastic explosives. In these types the quantities of liquid products are insufficient to render the mixture compressible. When packing cartridges, however, the same high density is obtained as with plastic explosives. The proportions of the various constituents are actually so arranged that the spaces between the grains are filled out. The proportions in question are determined entirely according to the constituents selected. *Fraenkel, v. 3, Art. 16:02, p. 9.*

semipolar bond; dative bond. Type of covalent bond in which one atom supplies both bonding electrons. *Pryor, 3.*

semiporcelain. a. A trade term designating semivitreous dinnerware. *ASTM C242-60T.* b. A well-fired china not sufficiently translucent or nonporous to qualify as porcelain. Also called Paris granite. *Webster 3d.*

semiportable electric equipment. Semiportable electric equipment is moved infrequently; for instance, room hoists, room conveyors, and gathering pumps. *ASA M2.1-1963.*

semiportable electric lamps. Semiportable electric lamps are connected to a fixed source of power by a flexible cord whose length limits the movable range of the lamp. *ASA M2.1-1963.*

semiprecious. Of less commercial value than those called precious; applied especially to such stones as amethyst, garnet, jade, and tourmaline. *Webster 3d.*

semiround nose. A bit-crown design, in which the radius of the arc forming the rounded portion of the bit face is equal to or greater than the thickness of the bit wall. *Long.*

semisilica fire clay brick. a. A fire clay brick containing not less than 72 percent silica. *HW.* b. *See* siliceous fire clay brick. *A.R.I.*

semisilica refractory; semisiliceous refractory. A refractory containing not less than 72 percent SiO_2. Western European Refractories Federation (PRE) defines a semisiliceous refractory as one containing less than 93 percent SiO_2 and less than 10 percent ($Al_2O_3+TiO_2$); it is noted that the pyrometric cone equivalent shall be considered as a further basis of classification. *See also* siliceous refractory. *Dodd.*

semisiliceous refractory. *See* semisilica refractory. *Dodd.*

semiskilled man. A workman with experience rather less than that of a skilled man. A repairer's assistant or a fitter's mate could be classed as semiskilled and will in time become a skilled man. *Nelson.*

semisolid bituminous materials. Those having a penetration at 25° C (77° F), under a load of 100 grams applied for 5 seconds of more than 10, and a penetration at 25° C (77° F), under a load of 50 grams applied for 1 second of not more than 350. *Urquhart, Sec. 2, p. 81.*

semisplint coal. a. Coal intermediate between durain coal and clarain coal (duroclarain). *Tomkeieff, 1954.* b. A coal in which the proportions of anthraxylon and attritus are more or less equal, but the attritus of which is essentially composed of brown and granular opaque matter in varying proportions. Translucent humic matter, spores, pollens, and finely divided fusain are always present in small proportions. Also known as block coal. *Compare* bright coal, c.; splint coal. *BuMines I.C. No. 7397, 1947, p. 47.* c. A banded coal containing 20 to 30 percent of opaque attritus and more than 5 percent anthraxylon. *A.G.I.*

semisteel. A term once commonly applied to castings made by mixing pig iron and steel scrap; now rarely used. Admixture with steel scrap is now regarded as one of the methods of obtaining high-duty irons. *C.T.D.*

semitrailer. A towed vehicle whose front rests on the towing unit. *Nichols.*

semitranslucent. A degree of diaphaneity between translucent and opaque. Passes light through edges of cabochons but very little through thicker parts. *Shipley.*

semitransparent. a. Used to describe minerals when objects may be seen through them but without distinct outlines. *Fay.* b. An enamel glaze which is partly opaque and not totally transparent. May also be known as semiopaque enamel. *Enam. Dict.*

semiturbulent. Flow in a large airway with fairly smooth sides in which the eddies caused by the slight roughness of the sides are correspondingly small, and may not extend over the full area of the airway. When the roughnesses are large and the airway is comparatively small it becomes filled with eddies and the airflow is then described as turbulent. *Spalding, pp. 296-297.*

semiturquoise. A term which has been used for soft pale-blue turquoise or a turquoiselike mineral. *Shipley.*

semivitreous; semivitrified. That degree of vitrification evidenced by a moderate or intermediate water absorption. *ASTM C242-60. See also* impervious; nonvitreous; vitreous.

semivitreous china. A white or ivory body with 4 to 10 percent absorption and fair strength, with a fairly hard glaze (the common tableware made in the United States). *ACSG, 1961.*

semivitrified. *See* semivitreous. *Dodd.*

semiwater gas. A mixture of carbon monoxide, carbon dioxide, hydrogen, and nitrogen obtained by passing a mixture of air and steam continuously through incandescent coke. Its calorific value is low, about 125 British thermal units per cubic foot. *Osborne.*

semiwet method. A method of mixing the raw materials for portland cement. The materials at first are dry; at some stage water is added, all subsequent steps being similar to those employed in the wet method. Also termed semidry method. *Fay.*

sempatic. A descriptive term applied to porphyritic igneous rocks to indicate that the total volumes of phenocrysts and groundmass are nearly equal. *Fay.*

semseyite. A monoclinic mineral, $Pb_9Sb_8S_4$; color, gray to black; Mohs' hardness, 2.5; metallic; and specific gravity, 5.8. An uncommon mineral rarely identified except in polished section. *McKinstry.*

senaite. A black titanate of iron, manganese, and lead, (Fe,Mn,Pb)O.TiO_2. Isomorphous with geikielite and ilmenite. Rhombohedral. Complex, trirhombohedral crystals. From Diamantina, Minas Geraes, Brazil. *English.*

senarmontite; antimony trioxide. A white or gray mineral, Sb_2O_3, with white streak and resinous, almost adamantine luster. Yellow on melting. Insoluble in water; slightly soluble in sulfuric or nitric acids; soluble in hydrochloric acid, alkali hydroxides, or sulfides. Specific gravity, 5.2 to 5.3; Mohs' hardness, 2 to 5. Found in Europe; northern Africa. Used as a paint pigment and in flameproofing. *See also* valentinite. *CCD 6d, 1961.*

Sendzimir mill. A mill having two work rolls of 1 to 2½ inches diameter each, backed up by two rolls twice that diameter and each of these backed up by bearings on a shaft mounted eccentrically so that rotating it increases the pressure between bearings and backup rolls. *ASM Gloss.*

Senecan. Lower Upper Devonian. *A.G.I. Supp.*

Seneca oil. A crude petroleum formerly in medicinal use. *Webster 3d.*

senesland. Subdued landforms that have lost the full measure of relief that characterizes maturity. Such lands are neither mature nor old, but senescent. Perhaps they may be called seneslands. Synonym for oldland; matureland. *A.G.I.*

sengierite. A very rare, strongly radioactive, green, orthorhombic mineral, $2CuO.\text{-}2UO_3.V_2O_5.10H_2O$, occurring in fissures in chlorite-talc schist adjoining a fault containing uranium, vanadium, and copper minerals. It is related to carnotite and tyuyamunite. *Crosby, pp. 42-43.* A vanadium ore. *Osborne.*

senile. Approaching the end of a geological cycle of erosion; as, a senile topography. *Webster 3d. See also* old. *Fay.*

senile river. A river in maturity, rarely fully reached, characterized by a sluggish current meandering through a peneplane scarcely above baselevel; a dead river. *Standard, 1964.*

senile stream. A stream whose current has become enfeebled by reason of an approximation of its valley to baselevel. *Standard, 1964. Compare* senile river. *Fay.*

senile topography. The physical aspect or conformation of land which approximates to a baselevel plain. *Standard, 1964.*

Senonian series. A division of the Upper Cretaceous of France and Belgium, used also somewhat in England; equivalent to the Upper Chalk of England. *Fay.*

sensible cooling effect. The difference between the total cooling effect and the dehumidifying effect. *Strock, 10.*

sensible heat. a. Thermal energy, the transfer of which to or from a substance results in a change of temperature. *Compare* latent heat. *Webster 3d.* b. The heat added to a body when its temperature is changed. *Bureau of Mines Staff.* c. The sensible heat of a body is the heat given off when it cools to ordinary temperature. *Newton, p. 134.*

sensible horizon. The visible horizon. *Ham.*

sensitive earth fault protection. A system of earth fault protection in which the fault current is limited by design to a low value which generally requires amplification in order to operate an earth fault relay. In the case of 3-phase alternating-current systems, the limitation of the leakage current may be effected by either (1) inserting a current limiting device between the neutral point of the system and earth (single-point earthing), or (2) connecting, in each circuit to be protected, all phases, in star, through current limiting devices, each star point being connected to earth through an earth leakage protective device (multipoint earthing). *B.S. 3618, 1965, sec. 7.*

sensitive explosive. *See* explosive sensitiveness. *Nelson.*

sensitiveness. The property in a high explosive that permits it to be exploded by a shock. The more insensitive an explosive is, the stronger detonator it requires to develop the full strength. *Fay.*

sensitivity. The effect of remolding on the consistency of a clay, regardless of the physical nature of the causes of the change. The degree of sensitivity is different for different clays, and it may also be different for the same clay at different water contents. The change in consistency produced by the disturbance of a sensitive clay is always associated with a change of the permeability. The degree of sensitivity, S_t, of a clay is expressed by the ratio between the unconfined compressive strength of an undisturbed specimen and the strength of the same specimen at the same water content but in a remolded state. The values of S_t for most clays range between two and four. For sensitive clays, they range from four to eight. However, extrasensitive clays are known with the values of S_t greater than eight. They are encountered chiefly among soft glacial clays that were deposited in brackish or sea water and soft clays derived from the decomposition of volcanic ash. *Stokes and Varnes, 1955.* b. In explosives, a measure of the ease with which a substance can be caused to explode and its capacity to maintain explosion through the length of the borehole. *Nichols, 3, p. 9-4.* c. The smallest quantitative increment detectable in using a measuring instrument. *ASM Gloss.*

sensitivity ratio. A measurement of the sensitivity of a clay to the action of remolding. *Ham.*

sensitivity to propagation. Sensitivity to propagation of an explosive can be ascertained by a method called the Ardeer double cartridge, or A.D.C., test. The A.D.C. test consists of firing an explosive cartridge with a standard detonator and determining the maximum length of the gap across which the detonation wave will travel and detonate a second, or receptor, cartridge. Both the primer and the receptor cartridges should be of the same composition, diameter, and weight. *McAdam II, pp. 19-20.*

sensitization. A very small amount of hydrophilic sol (such as gelatine) is able to protect a hydrophobic colloid (such as gold or arsenic sulfide) from the coagulating influence of electrolytes; a still smaller amount either coagulates the hydrophobic sol or makes it more sensitive to the action of electrolytes. This phenomenon is known as sensitization and is thought to be due, in many cases, to the action of the hydrophilic colloid as a colloidal electrolyte. *Miall.*

sensitizer (luminescence). Ions added to a luminescent material to increase the efficiency of electron activation. *VV.*

sensitizing compounds. Metal salts in aqueous or organic solutions which form an invisible film on glass and other ceramic surfaces. Supersensitizing refers to a second step involving the use of noble metal compounds which further enhances the reduction properties of the metals about to be formed on the ceramic surface. Sensitizing compounds include aluminum compounds, barium salts, cadmium compounds, tin chloride, and others. Supersensitizing compounds include gold chloride, iridium salts, palladium chloride, and some silver compounds. *Lee.*

sensitometry. The science of measuring the sensitivity of photographic materials. In practice, it includes the quantitative measurement of the relation between the image produced on a photographic material and the treatment to which it has been subjected, including exposure and development. *ASM Gloss.*

sensor. The component of an instrument that converts an input signal into a quantity which is measured by another part of the instrument. Also called sensing element. *H&G.*

sentinel pyrometers. Small cylinders (used principally in controlling the heat treatment of metals) made from blended chemical compounds (nonceramic) and so proportioned that they melt at stated temperatures within the range 220° to 1,050° C. *Dodd.*

Sentinel pyroscopes. Consist of alloys whose melting point under favorable conditions is known. They are useful for temperatures between 200° and 1,000° C. Small pieces of these alloys are placed on porcelain saucers in various parts of the furnace. Those that melt indicate that a temperature exceeding their melting points has been reached. In this way the maximum temperature may be known within a range of about 20° C. *Francis, 1965, v. 2, p. 745.*

sentries. Men posted at approach points to a place where a shot is about to be fired. They are positioned at a safe and sheltered place and are authorized to stop all persons from passing towards the firing area. In some mines, sentries are issued with discs as a sign of authority. *Nelson.*

sentur. A Wales term for iron pan. *Compare* foxbench; sinter, e. *Arkell.*

separable tin. Eng. An incorrect spelling of sparable. *See also* sparable tin. *Fay.*

separan 2610. Proprietary nonionic flocculating agent. *Pryor, 3.*

separate system. The drainage system in which sewerage and surface water are carried in separate sewers. *See also* combined system. *Ham.*

separate tandem electric mine locomotive. *See* electric mine locomotive.

separate ventilation. A term used at an earlier period for auxiliary ventilation. *Nelson.*

separating bath. a. A vessel containing dense medium in which the feed material is separated on a commercial scale into different fractions according to specific gravity. *B.S. 3552, 1962.* b. The liquid in a separating bath. *B.S. 3552, 1962.*

separating medium. Dense medium of the density required to achieve a given separation. *B.S. 3552, 1962.*

separation. a. Indicates the distance between any two parts of an index plane (bed, vein, etc.) disrupted by a fault. Horizontal separation is separation measured in any indicated horizontal direction; vertical separation is measured along a vertical line; stratigraphic separation is measured perpendicular to the bedding planes. *Billings, 1954, p. 136.* b. Treatment of ore to separate values (concentrates) from nonvalues (gangue, barrens, tails). Also called segregation. *Pryor, 3.*

separation coal. Eng. Coal that has been prepared by screening or washing. *Fay.*

separation density. The effective density at which a separation has taken place, calculated from a specific-gravity analysis of the products; commonly expressed as either partition density or equal errors cut point (density). *B.S. 3552, 1962.*

separation door. a. A door to separate the air in an intake airway from that in a return airway and prevent leakage. It is normally constructed with tongued and grooved boards secured by battens, and built into brick or concrete walls to form an airtight closure of the airway. Separation doors are usually arranged in two's or three's several yards apart, to reduce leakage when men or cars are passing along the roadway. *See also* automatic closing door; steel separation door. *Nelson.* b. *See* air door. *B.S. 3618, 1963, sec. 2.*

separation size. A general term indicating the effective size at which separation has taken place, calculated from a size analysis of the product; commonly expressed as either partition size or equal errors size. *B.S. 3552, 1962.*

separation valve. Eng. A massive cast-iron plate suspended from the roof of a return airway, through which all the return air of a separate district flows, allowing the air to always flow past or underneath it; but in the event of an explosion of gas the force of the blast closes it against its frame or seating, and prevents a communication with other districts. The blast being over the weight of the valve causes it to return to its normal position, allowing the ventilation to continue. *Fay.*

separator. a. A machine for separating, with the aid of water or air, materials of different specific gravity. Strictly, a separator parts two or more ingredients, both valuable, while a concentrator saves but one and rejects the rest; but the terms are often used interchangeably. *Fay.* b. Any machine for separating materials, as the magnetic separator for separating magnetite from its gangue. *Fay.* c. A screen, especially a revolving screen for separating things like stones or coal into sizes. *Standard, 1964.*

sepiolite. *See* meerschaum. *Fay*

septaria. Balls of stone, the interior cellularly constructed. *Arkell.*

septarian. A structure developed in certain concretions known as septarian nodules, consisting of an irregular polygonal system of internal cracks, which are almost always occupied by calcite or other minerals. *Holmes, 1920.*

septarian boulder. *See* septarium.

septarian nodule. Under primary concretions may be included the flint and chalcedonic nodules found in chalk and the older limestones, the material of which was in part derived from the siliceous remains of radiolaria and sponges. Such sometimes occur in the form of lenticular nodules with or without an appreciable concentric structure, lying in parallel layers or beds, continuous for long distances. Clay ironstone, an impure carbonate of iron, occurs characteristically in this form. These latter often crack on drying and consequent shrinkage, the cracks extending from within outward. In these cracks, calcite is subsequently deposited, whereby the nodule is divided into septa of a white or yellowish color. On being cut and polished, these often form beautiful and unique objects. To such the name septarian nodule is commonly given. *A.G.I.*

septarian texture. A concretionary nodule intersected within by cracks often filled with a later mineral. *Schieferdecker.*

septarium. A roughly spheroidal concretion, generally of limestone or clay ironstone, cut into polyhedral blocks by radiating and intersecting cracks that have been filled (and the blocks cemented together) by veins of some material, generally calcite. Plural, septaria. Also called septarian boulder; septarian nodule; turtle stone. *Fay.*

septavalent; heptavalent. Having a valency of 7, as with chlorine and manganese in perchlorates and permanganates. *Pryor, 3.*

septeamesite. Synonym for amesite. *See also* septechlorite. *Hey, M.M., 1961.*

septechlorite. A group name for the amesite-cronstedtite-berthierine family, dimorphous with the chlorites; the name refers to the 7A. c-spacing characteristic of this family. *Hey, M.M., 1961.*

septic tank. A tank in which bacterial action is encouraged to break down sewage to harmless constituents. *Ham.*

septum. Membrane separating two phases, for example, pulp and filtrate. *Pryor, 3.*

sequence. The order in which events are connected or related in time; simple succession. Especially, the connection of antecedent and consequent in a temporal series apart from any causal necessity; as, the reactions of chemical agents may be conceived as merely invariable sequences. *Webster 3d.*

sequence control. a. A method of control whereby, once action has been initiated, a number of electrical circuits will automatically function in a prescribed order. *B.S. 3618, 1965, sec. 7.* b. The electrical arrangement whereby in a system of conveyor belts the conveyor nearest to the main discharge point starts first and the auxiliary conveyors are automatically started at 5 to 10 second intervals, the furthest away starting up last. With sequence control (1) attendants are not required at each of the terminal drives of individual conveyors, and (2) the staggered starting brings on the electrical load gradually. *See also* actuated roller switch. *Nelson.* c. Sequence control in which centrifugal devices are driven by the conveyor belt, by a sprocket and chain from a conveyor roller, or by a flexible drive from a special pulley from the conveyor belt. Their speed, therefore, is proportional to that of the belt; contacts or microcontacts are opened or closed at definite predetermined speeds. Belt speeds vary according to conditions and loading between 150 and 450 feet per minute, but should be as low as possible; belt wear is then less, although a wider belt is required to deliver the same output. *Sinclair, V, p. 306.*

sequence interlock. An interlock provided between a number of manually controlled electrical circuits, which are required to function in a prescribed order, and which prevents a circuit from being operated unless the preceding circuit has completed its part in the sequence. *B.S. 3618, 1965, sec. 7.*

sequence starting. An arrangement whereby the starting of one belt conveyor starts all of its feeder conveyors in a predetermined manner. The purpose of sequence starting is to prevent spilling at transfer points and to reduce the power demand in starting the system. *NEMA MB1-1961. See also* power sequence; pilot sequence; sequence control. *Sinclair, V, p. 306.*

sequence timer. In resistance welding, a device used for controlling the sequence and duration of any or all of the elements of a complete welding cycle except weld time or heat time. *ASM Gloss.*

sequence weld timer. The same as sequence timer except either weld time or heat time, or both, are also controlled. *ASM Gloss.*

sequester; sequestration; sequestering agent. A sequestering agent forms soluble complex ions with a simple ion, thereby inhibiting the activity of that ion. In water treatment, the effects of hardness can be suppressed by adding agents to sequester calcium and magnesium. *Lowenheim.*

sequestering agent. Any chelating compound that forms a water-soluble metallic complex and prevents the usual reactions of the metallic ion in question; for example, sodium metaphosphate and ethylenediaminetetraacetic acid (EDTA). *Bennett 2d, 1962 Add.; CCD 6d, 1961.*

seracs. When two or more sets of crevasses intersect, the surface of the glacier is torn into a broken mass of jagged ice pinnacles known as seracs. *Stokes and Varnes, 1955.*

serandite. A peachblossom red acid metasilicate of manganese, calcium, sodium, and potassium, $15(Mn,Ca)0.3(Na,K)_2 0.20SiO_2.2H_2O$. Monoclinic. Elongated crystals. From Los Islands, Guinea. *English.*

serendibite. An indigo-blue to grayish blue-green borosilicate of aluminum, calcium, and magnesium, $3Al_2O_3.4MgO.2CaO.B_2O_3.4SiO_2$. Triclinic. Grains. From Kandy, Ceylon; Johnsburg, Warren County, N.Y. *English.*

serial samples. Samples collected according to some predetermined plan, such as along the intersections of gridlines, or at stated distances or times. The method is used to ensure random sampling. *A.G.I.*

serial sections. A series of parallel sections illustrating the development of a certain stratigraphic or tectonic event. *Schieferdecker.*

seriate. A rock fabric in which the sizes of the crystals vary gradually or in a continuous series. *Fay.*

seriate fabric. The fabric of inequigranular rocks in which the sizes of the crystals vary gradually from one extreme to the other. Seriate fabrics are intermediate in character between hiatal and equigranular. *Schieferdecker.*

seriate texture. An exsolution texture in which exsoluted large and small bodies show an ordered or seriate arrangement. *Schieferdecker.*

sericite. A white, potash mica very similar to, if not identical with, muscovite mica. It occurs in small flakes and scales in metamorphic rocks, such as, sericite schists and sericite gneisses, and in the wall rocks, fault gouge, and vein fillings of many ore deposits. *Stokes & Varnes, 1955; C.T.D.*

sericite gneiss. Gneiss containing sericite in the place of the ordinary more coarsely crystalline muscovite. *Fay.*

sericite schist. Mica schist whose mica is sericite. Sericite is also used as a prefix to many names of metamorphic rocks containing the mineral. *Fay.*

sericitization. a. A type of hydrothermal alteration which results in a complete loss of soda and a large gain in silica, potash, perhaps pyrite and other substances. The typical product of complete sericitization is a finely granular aggregate of sericite, quartz, pyrite, and calcite, which usually forms a very incompetent rock. Sericitized rocks are often white to light yellow in color and are usually soft. *Lewis, p. 605.* b. The development of sericite in schists and other rocks due to metamorphism. *Fay.*

series. a. An arrangement of electric blasting caps in which all the firing current passes through each of them in a single circuit. *Nichols.* b. Formerly applied to core barrels, casings, rods, etc., and used in the same manner as the currently accepted term design. *Long.* c. As used by persons associated with the diamond industry, parcels of different types of diamonds sold in one lot. *See also* sight. *Long.* d. In geology, the stratigraphic subdivision of the third rank, in the classifications in general use; a division of a system. The chronologic term of equivalent rank is epoch. *Fay.* e. A time-stratigraphic unit ranked next below a system. *A.G.I.* f. Loosely used in petrology for related igneous rocks. *A.G.I. Supp.*

series circuit firing. A method of connecting together a number of detonators which are to be fired electrically in one blast. Each detonator is connected to the adjacent detonator to form a continuous circuit having two free ends which are then connected to the firing cable. In British coal mines, all rounds of shots must be connected electrically in series. This results in large rounds having a high electrical resistance, requiring high voltage at the exploder which in turn increases the chance of misfires due to current leakage. *See also* parallel circuit firing. *Nelson.*

series connection. When the various parts of a circuit are connected in sequence so that the same current passes through each in turn, they are connected in series and the total electromotive force is found by adding together the electromotive forces of the individual parts. *Mason, V. 2, p. 388.*

series copper-refining process. *See* Hayden process; Smith process; Randolph process. *Liddell 2d, p. 495.*

series firing. The firing of detonators in a round of shots by passing the total supply current through each of the detonators. *Compare* parallel firing. *B.S. 3618, 1964, sec. 6.*

series motor. Electric motor with field windings in series with armature. *Pryor, 3.*

series of igneous rocks. *See* igneous rock series. *A.G.I.*

series parallel circuit. A method of connecting together a number of detonators which are to be fired electrically in one blast. The detonators are connected in parallel in a number of groups and these parallel groups in turn connected in series. *See also* parallel series circuit. *Nelson.*

series parallel firing. The firing of detonators in a round of shots by dividing the total supply current into branches, each containing a certain number of detonators wired in series. *B.S. 3618, 1964, sec. 6.*

series refining. *See* Hayden process.

series shots. A number of loaded holes connected and fired one after the other. In contradistinction to simultaneous firing, where the charges are connected electrically, and are all exploded at one time. *Stauffer.*

series ventilation. A system of ventilating a number of faces consecutively by the same air current. *B.S. 3618, 1963, sec. 2.*

series welding. Making two or more resistance spot, seam, or projection welds simultaneously by a single welding transformer with three or more electrodes forming a series circuit. *ASM Gloss.*

serpentine. a. A hydrous magnesium silicate, $Mg_6(Si_4O_{10})(OH)_8$; monoclinic, but only as pseudomorphs. It is always of secondary origin. The translucent varieties are used for ornamental purposes; those with a fibrous habit (chrysotile) are called asbestos. Commonly green, greenish-yellow, or greenish-gray. The name includes at least two distinct minerals, antigorite and chrysotile, very difficult to distinguish. Most asbestos is chrysotile. *Fay; A.G.I.; Dana 17.* b. In petrology, a metamorphic rock serpentinite composed chiefly or wholly of the mineral serpentine. *Fay.*

serpentine asbestos. *See* chrysotile. *C.M.D.*

serpentine cat's-eye. Same as satelite. *Shipley.*

serpentine jade. A variety of the mineral serpentine, resembling bowenite, occurring in China; used as an ornamental stone. *C.M.D.*

serpentine marble. *See* verde antique. *Fay.*

serpentine rock. A rock generally having a dull green color and often spotted or mottled, resembling the spots of a serpent's skin. *Mersereau, 4th, p. 302.*

serpentine spit. Occasionally it happens that variable or periodically shifting currents extend a spit first in one direction, then in another, giving it a more or less serpentine pattern. To this comparatively rare form, the name serpentine spit may be applied. *A.G.I.*

serpentine talc; serpentintalk. A mineral between serpentine and talc in composition, $Mg_6Si_6O_{15}(OH)_8$, and physical characters. From silicification of dolomite in anhydrite bed of the Werra salt deposits, Thuringia, Germany. *Spencer 21, M.M., 1958.*

serpentine ware. a. A hard, green-spotted or green-veined pottery suggestive of serpentine. *Webster 3d.* b. A variety of Wedgwood ware. *See also* pebble ware. *Fay.*

serpentinite. A rock consisting almost wholly of serpentine minerals derived from the alteration of previously existing olivine and pyroxene. *A.G.I.*

serpentinization; serpentization. The conversion of ferromagnesian minerals or rocks into aggregates of the serpentine minerals. *A.G.I.*

serpierite. A bluish-green mineral occurring in minute crystals, $(Cu,Zn,Ca)O.SO_3$-H_2O. Tabular and in tufts with 1 very perfect cleavage. *Larsen, p. 175.*

Serpulite grit. A minor subdivision of the Eriboll quartzite of Cambrian age in the Northwest Highlands of Scotland, characterized by the occurrence of the organism serpulites, by some geologists regarded as a very primitive nautiloid cephalopod, by others as merely a segmented worm. *C.T.D.*

serrate. Notched or toothed on the edge; saw-toothed. *Webster 3d.* Frequently applied to mountain ranges. *Fay.*

serrated. (An edge) cut into a line of teeth. *Nichols.*

serrated saddle. A refractory support for pottery ware during kiln firing; this particular item is a rod of triangular section, its upper edge being serrated to facilitate the rearing of the ware. *Dodd.*

serrate texture. A term denoting saw-toothed contacts between minerals. *A.G.I.*

serumite. A bonding clay for foundry sands. *Osborne.*

Serval. Asphalt-impregnated asbestos fiber felt. *Bennett 2d, 1962.*

servant. One who represents and carries out the will of the master or of a mine operator in the prosecution of the work not only as to the result to be accomplished but also as to the means to be employed, is a servant and not an independent contractor. *Ricketts, I.*

serve. To furnish; supply; as, the gas wells serve the town with light and heat. *Webster 2d.* Gas is said to "serve" when it issues more or less regularly from a fault-slip, a break, etc. *Fay.*

service agreement. Contract between employer or company and member of staff. *Pryor, 3.*

service compartment. The section of a mine shaft in which are located the water pipes, the pipeline for compressed air, the cables and telephone wires, and signaling and similar arrangements. *Stoces, v. 1, p. 508.*

service ell. A pipe elbow having an outside thread on one end. Also known as street ell. *Strock, 3.*

service factor. A factor by which the specified horsepower is multiplied to compensate for drive conditions. *J&M.*

service pipe. A pipe connecting mains with a dwelling. *Strock, 3.*

service rails. Scot. Rails used for a temporary purpose. *Fay.*

service reservoir. A reservoir which is filled from an impounding reservoir through a gravity main, and which distributes a water supply to consumers. *Ham.*

service road. a. A short road parallel to a main road, for the use of local stopping traffic. *Ham.* b. Scot. A temporary road. *Fay.*

service shaft. A shaft employed solely for the hoisting of men and materials to and from underground. *Nelson.*

service tee. A pipe tee having inside thread on one end and on branch, but outside thread on other end of run. Also known as street tee. *Strock, 3.*

serving. a. Fiber cord wrapping around the surface of a wire rope. *Ham.* b. Corn. A supply of tin ready for smelting. *Fay.*

servomechanism. An apparatus for exercising accurate and more or less remote control. *Osborne.*

servomotor. A motor supplying power to move a servomechanism. *NCB.*

sesquisilicate. A slag with a silicate degree of 1.5. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 399.*

sessile. a. Permanently fixed, sedentary, not free moving. *H&G.* b. Organisms which are firmly attached to a substratum. *Hy.*

set. a. A timber frame for supporting the sides of an excavation, shaft, or tunnel. Also called sett. *Webster 3d. See also* one-piece set; two-piece set; timber set; sett. *Lewis, p. 40.* b. Another name for bench of timbers. *Kentucky, p. 140.* c. A group of pumps that are used for lifting water from one level to another; a lift. *Webster 3d.* d. Corn. A group of mines under one lease. *Webster 2d.* e. A flat steel bar; a kind of crowbar. *Webster 2d.* f. A piece placed temporarily upon the head of a pile that cannot be reached directly by the weight or hammer. *Webster 3d.* g. A train of mine cars; a trip. *Fay.* h. To fix a prop or sprag in place. *Fay.* i. S. Staff. To mine the sides off and trim up a heading. *Fay.* j. N. of Eng. To load a tub unfairly by placing the greater part of the coal on the top of it and leaving the bottom part mostly empty. *Fay.* k. N. of Eng. The natural giving way of the roof for want of support. *Fay.* l. To make an agreement with miners to do certain work; for example, to set a stall. *Fay.* m. Mid. A measure of length along the face of a stall, usually from 6 to 10 feet, by which holers and drivers work and are paid. *Fay.* n. A section of a leased mining area in Cornwall, England. *Nelson.* o. The distance between roll faces of a crusher. *Nelson.* p. N. of Eng. A number of tubs (usually of 10 hundredweight capacity) coupled together. Up to about 60 to 70 form a set. *Trist.* q. A facework team or group. *Trist.* r. To place a diamond in the crown of a bit. *Long.* s. To place casing in a borehole. *Long.* t. The hardening or firmness displayed by some materials when left undisturbed, such as cement when hardened or gelatin when cooled. *Long.* u. The distance a pile penetrates with one blow from the driving hammer. *Nichols.* v. The failure of a rock subjected to intense pressure below the point of rupture to recover its original form when the pressure is relieved. *Fay.* w. A group of essentially parallel planar features, especially joints, dikes, faults, veins, etc. *A.G.I.* x. The discharge opening of a crushing machine. It regulates the size of the largest escaping particle. *Pryor, 2.* y. The shape of the solidifying surface of a metal, especially copper, with respect to concavity or convexity. *ASM Gloss.* z. Strain remaining after removal of stress. Also called permanent set; permanent deformation; plastic strain; plastic deformation. *Ro.* aa. The direction in which a current is flowing; for example, when a current sets southward, the movement of water is toward the south. *Hy.* bb. The property which enables an enamel slip to leave a layer of definite thickness on a nonporous surface immersed in the slip and allowed to drain. *ACSB, 3.* cc. To adjust the flow properties of the enamel so as to leave a layer of definite thickness on a nonporous surface, either by dipping or spraying. *ACSB, 3.* dd. To place ware on a kiln. *ACSG, 1963.* ee. To harden, as with gypsum plaster. *ACSG.* ff. A flow property of porcelain enamel slip affecting the rate of draining, residual thickness, and uniformity of coating. *ASTM C286-65.* gg. The hardening or solidifying of a plastic or liquid substance, by chemical action (as of mortar, concrete, or cement), or by cooling and drying (as of glue). *Webster 3d.*

set bit. A bit insert with diamonds or other cutting media. *Long.*

set casing. The cementing of casing in the hole. The cement is introduced between the casing and the wall of the hole and then allowed to harden, thus sealing off intermediate formations and preventing fluids from then entering the hole. It is customary to set casing in the completion of a producing well. *Williams.*

set casing shoe. DCDMA name for a casing shoe set with diamonds. Often used for a one-shot attempt to drill casing down through overburden to bedrock. Also called casing-shoe bit. *Compare* casing bit; casing shoe. *Long.*

set coal. a. Used among British miners for weathered coal. *Tomkeieff, 1954.* b. Leic. Coal occurring near hollows and having a hard dead nature. *Fay.*

set copper. An intermediate copper product containing about 3.5 percent cuprous oxide, obtained at the end of the oxidizing portion of the fire-refining cycle. *ASM Gloss.*

set diameter. The inside and/or outside diameter of a bit measured from the exposed tips of diamonds or other cutting media inset in the wall portions of the bit crown. *Long.*

set hammer. The flat-faced hammer held on hot iron by a blacksmith when shaping or smoothing a surface by aid of his striker's sledge. *Fay.*

set i.d. Synonym for set inside diameter. *Long.*

set inside diameter. The minimum inside diameter of a set core bit. Usually written set i.d. in drilling industry literature. Also called bore; center bore; inside gage; set i.d. *Long.*

set o.d. Synonym for set outside diameter. *Long.*

set-off. Eng. The part of a connecting rod to which the bucket rod is attached. *Fay.*

setoff man. One who removes green brick, tile, or pipe from cars or conveyor belts and stacks products in drying room, spacing products so that hot air will circulate between them. Also called belt boy; floorman. *D.O.T. 1.*

set of timber. The timbers which compose any framing, whether used in a shaft, slope, level, or gangway. Thus, the four pieces forming a single course in the curbing of a shaft, or the three or four pieces forming the legs and collar, and sometimes the sill of an entry framing are together called a set, or timber set. *Zern.*

setout. a. *See* offtake, b. *B.S. 3618, 1963, sec. 3.* b. N. of Eng. *See* layout, c. *Fay.*

set outside diameter. The maximum outside diameter of a set bit. Usually written set o.d. in drilling industry literature. Also called outside gage; set o.d. *Long.*

set reaming shell. A reaming shell a portion of the outside surface of which has embedded diamonds, diamond-inset inserts, or other cutting media, having a set diameter slightly greater than the standard set size of the bit to which the shell is coupled. *Long.*

set rider. a. Aust. The man who accompanies a set of skips hauled by the main-and-tail-rope system, so that he can attend to any points on the track, unfasten the rope, and signal to the engine driver as required. The corresponding American term is trip rider. *Fay.* b. *See* brakeman; c; trip rider. *D.O.T. 1.*

setscrew. a. Synonym for chuck screw. *Long.* b. A machine screw, sometimes cupped or pointed at one end and screwed through one part tightly upon or slightly into another part to prevent relative movement between the two parts. *Long.*

sett. a. A quarryman's term for a square faced steel tool which is held in position and struck with a sledge to cause a fracture in a rock mass. *Fay.* b. Corn. A lease; the boundaries and terms of the mining ground taken by the adventurers. *See also* set, d. *Fay.* c. A timber frame used in underground support. Also spelled set. *Pryor, 3.* d. A small rectangular dressed stone of granite, quartzite, or whinstone, used as road paving in localized areas subject to especially heavy traffic. *Ham.*

setter. a. A man who sets bricks or tiles in a kiln (the man who sets pottary ware is known as a placer). *Dodd.* b. An item of kiln furniture; it is a piece of fired refractory material shaped so that its upper surface conforms to the lower surface of the piece of ware that it is designed to support during kiln firing. *Dodd.* c. An individual trained and skilled in the art of setting diamonds in a bit mold, a bit die, or in the face of a blank bit by handsetting methods. Also called diamond setter. *Long.*

setters. N. of Eng. Large lumps of coal placed round the sides of coal dealers' carts for the purpose of piling up a good load in the center. *Fay.*

setting. a. Those runners, sheeting, or poling boards which are held in place by one pair of timber frames supporting the sides of an excavation. *See also* timbering; top frame. *Ham.* b. The timber frames used at intervals in shaft sinking and close-poled behind. *Stauffer.* c. *See* heading, i. *Fay.* d. *See* square timbering. *Fay.* e. S. Staff. *See* double timber. *Fay.* f. A group of retorts for gas manufacture. *Webster 3d.* g. The day and place of contracting with the men of a mine. *Standard, 1964.* h. The act of contracting with miners for work to be done. *Standard, 1964.* i. The arrangement of ware in a kiln. With pottery ware, the setting generally consists of the individual pieces together with the kiln furniture that supports them; a setting of building bricks or refractories consists merely of the bricks themselves. *Dodd.* j. A group of gas retorts or chambers within a bench, the group being heated independently of other groups of retorts in the same bench. Also known as a bed. *Dodd.* k. The process of hardening of a cement or of plaster. *See also* final set; initial set. *Dodd.*

setting block. A tool to which a blank bit can be coupled and held in a selected position in a vise while handsetting diamonds in a blank bit. *Long.*

setting charge. The amount charged by bit manufacturers for setting a diamond bit. *Long.*

setting chisels. The chisels and punches used by a handsetter to peen or calk a diamond in place in the face of a blank bit. *Long.*

setting gage. Plug or ring gages used by bit setters to measure the inside or outside diameter of a diamond bit. *Long.*

setting out; laying out. Marking out on the ground by means of pegs and lines the proposed positions and dimensions of earthworks, masonry, etc. *Pryor, 3.* Also called staking out.

setting pattern. The geometric arrangement of the inset diamonds in a bit crown. *Long.*

setting plug. A cylindrical object, having a diameter equal to the inside set diameter of a specific-size bit, used to measure the inside set diameter of a core bit. *Long.*

setting rate. A comparative term referring to the time required for the glass surface to cool between the limits of the working range. A short time implies a fast setting rate, and a long time implies a slow setting rate. *ASTM C162-66.*

setting ring. A ringlike sleeve the inside diameter of which is the same as a specific set outside diameter of a diamond bit or reaming shell; it is used to check the set diameter of a bit or reaming shell. Also called bit gage; bit ring; gage ring; gaging ring; ring gage; setting gage. *Long.*

setting rod. A special diamond-drill rod used to set a deflecting wedge in a borehole. *Long.*

setting shack. A temporary shelter, located near one or more drills, used as a shop by a diamond-bit handsetter. *Long.*

setting time; set. The time required by a freshly mixed paste of cement and water to acquire an arbitrary degree of stiffness as determined by specific tests for initial and final set. *Taylor.*

setting tools. The chisels, punches, and other equipment used in handsetting a diamond bit. *Long.*

setting up. a. The act or process of setting a diamond bit. *Long.* b. *See* rigging, a. *Long.* c. In mining, to gather the necessary tools and complete all work preparatory to drilling *Long.* d. The hardening of substances such as cement, plastic, molten gelatin, etc., by cooling or as the result of a chemical action. *Long.* e. The act or process of tightly coupling two threaded parts together. *Long.* f. Hardening of air-setting or hydraulic-setting mortars. *Bureau of Mines Staff.*

setting-up agent; setup agent. An electrolyte used to increase the measured pickup of a slip. *ASTM C286-65.*

setting vise. Used to hold a setting block. *Cumming.*

settle. a. A term used to indicate the amount of vertical fire shrinkage that takes place in a kiln full of bricks. *Fay.* b. To clear of dregs and impurities by causing them to sink. *Webster 3d.* c. To cause to sink; to depress; to render close or compact. *Webster 2d.* d. To sink or drop as sediment, especially of ooze or dust. *Schieferdecker.*

settle blow. The stage in the blow-and-blow glassmaking process when glass is forced into a finish or ring mold by air pressure. *Dodd.*

settle boards. a. N. of Eng. Iron plates or sheets forming the floor of a heapstead, to admit of the tubs being pushed and turned about with facility. Turnsheets. *Fay.* b. N. of Eng. *See* cage shuts. Also spelled settle bords. *Fay.*

settled ground. Ground that has ceased to subside over the waste area of a mine and has reached a state of full subsidence. *Nelson.*

settled production. The production of an oil well which, apart from the normal progressive annual dimunition, will last a number of years. *Fay.*

settle mark. a. mark on a steel bar used to measure the vertical firing shrinkage in a kiln full of ware to indicate that the firing process is complete. *Bureau of Mines Staff.* b. Any slight variation in the wall thickness of a glass container; sometimes called a settle wave. *Dodd.*

settlement. a. The downward movement of a structure, due to compression of the soil below the foundations. Uniform settlement of a reasonable amount is not harmful to normal structures. Damage is liable to occur when different parts settle by different amounts—known as differential settlement. *Nelson.* b. The gradual lowering of the superincumbent strata in mines as the coal or stratified mineral is extracted. *See also* subsidence; differential settlement; seat of settlement. *Nelson.*

settlement clerk. One who calculates payment due shipper for ores, concentrates, scrap metal, and other metal products forwarded to plant for processing, based on weight figures on freight bills, and laboratory report of moisture content and ore analysis. *D.O.T. Supp.*

settlement crator. Uniformly loaded soils settle in such a way that a surface which has been level will assume a basin shape over the loaded area. Such form of crater is largely responsible for the differential settlement of foundations often accompanied by heavy structural damage. *Ham.*

settlement of the roof. *See* closure; convergence, f.

settler. A separator; a tub, pan, vat, or tank in which a separation can be effected by settling. A tub or vat in which pulp from the amalgamating pan or battery pulp is allowed to settle; the pulp is stirred in water to remove the lighter portions. *Fay. See also* settling tank.

settling. a. Falling out of a solid within a liquid because of gravity. *ASM Gloss.* b. A process for removing iron from liquid magnesium alloys by holding the melt at a low temperature after manganese has been added to it. *ASM Gloss.* c. The sag in outcrops of laminated sedimentary rocks caused by rock creep. *A.G.I.* d. The compaction of coastal sediments. *Schieferdecker.*

settling basin. An enlargement in a conduit to permit the settlement of debris carried in suspension, usually provided with means of ejecting the material so collected; one form of sand trap. *Seelye, 1.*

settling box. A box or container in which drill cuttings or sludges are accumulated and coarse materials permitted to settle. *Long.*

settling cone. A conical tank used to settle coarse solids from the circulating water. *B.S. 3552, 1962.*

settlingite. *See* settling stones resin. *Fay.*

settling pit. An excavation through which mine water is conducted in order to reduce its velocity, thus allowing sediment to settle and to be cleaned out from time to time. Also called dredge sump; settling sump (undesirable usage). *B.S. 3618, 1963, sec. 4.*

settling pond. A pond, natural or artificial, for recovering the solids from washery effluent. *B.S. 3552, 1962.*

settling sand. Drillers' term for friable sandstone that caves into wells and settles around the bit. *A.G.I. Supp.*

settling stones resin. A resinoid, hard, brittle substance possessing a pale yellow to deep red color, a specific gravity of 1.16 to 1.54, and burning in a candle flame. It was found in an old lead mine in Northumberland, England. *Fay.*

settling tank. a. A reservoir or tank into which the return water from a borehole collects and the entrained drill cuttings settle. *Long.* b. A tank in which pulp is held while solids settle from suspension. Also called thickener; settler. *Pryor, 3.*

settling-tank operator. A laborer who drains excess liquid from concentrates and discharges from precipitation drum, using settling tanks. *D.O.T. Supp.*

settling vat. A vat in which particles of ore are allowed to settle. *Fay.*

settling velocity. A function of the size of the particles and their relative densities. It is also influenced by shape of the particles, inasmuch as flat particles tend to settle more slowly than rounded grains of equivalent size. *Hawkes, 2, p. 135.*

setts-off. Eng. *See* distance blocks. *Fay.*

setup. a. Working arrangement of a process, for example, a pilot-plant run. *Pryor 3.* b. In surveying, location of theodolite above a station point. *Pryor 3.* c. In drilling, location of machine. *Pryor 3.* d. In transit or leveling, the instrument placed in position and leveled, ready for taking measurements; or a point where an instrument is to be or has been placed. *Seelye, 2.* e. In base-line measurement, distance by which the reference mark on a measuring plate is set ahead so that the end mark of the tape will fall on the next plate. *Seelye, 2.* f. *See* setting up. Synonym for rig; rig-up. *Long.* g. In iron and steel manufacture, a machine for upsetting a bloom that has been lengthened by a squeezer. *Webster 2d.* h. An iron bolt or rod upset at one end. *Webster 2d.* i. That characteristic of an enamel which allows it to drain and seize on the surface of a piece of ware so as to produce a uniform smooth surface on a desired thickness. *Enam. Dict.*

setup time. a. The time required for a cement or gelatin to harden. *Long.* b. Synonym for rig-up time. *Long.*

setup wheel. An abrasive wheel made of a series of sheets of abrasive-coated fabrics compressed into wheel form. *ACSG, 1963.*

set weight. The quantity of diamonds set in a bit, expressed in carats. *Long.*

seventy-two-hour coke. Owing to the suspension of labor on Sunday, an oven charged on Friday must necessarily go over to Monday, so that all charges made on Friday and drawn on Monday must be in the ovens 72 hours, and the coke resulting is called 72-hour coke. The 72-hour coke has higher ash, less volatile matter, less sulfur, and is preferred for foundry purposes. *Fay.*

severance. a. Separation of a mineral or royalty interest from other interests in the land by grant or reservation. A mineral or royalty deed or a grant of the land reserving a mineral or royalty interest, by the landowner before leasing, accomplishes a severance as does his execution of an oil and gas lease. *Williams.* b. *See* liberation.

Sevilla ores. Spanish brown and red hematite, with a very low phosphorus content and containing about 60 percent iron. *Osborne.*

Sèvres. Fr. A fine, often elaborately decorated French porcelain made at the national factory at Sèvres, France. *Webster 3d.*

Sèvres blue. a. Fr. The lighter blue of the Sèvres porcelain, especially of pieces antedating the Revolution (1789) distinctively called bleu celeste. *Webster 3d.* b. Fr. The darker blue of Sèvres porcelain, distinctively called bleu-du-roi. *Webster 3d.*

sewage. The discharge from all types of sanitary appliances, including medical and industrial as well as domestic, collected into drains which are connected usually to a public sewer, or occasionally to a private septic tank for disposal. *See also* sewage disposal. *Ham.*

sewage disposal. The treatment of sewage by bacterial action, chemical precipitation, filtration or by any other method including that of use on a sewage farm. *Ham.*

sewage farm. A farm on which sewage, usually in the form of sludge, taken from settlement tanks, is plowed into the land as manure and the effluent is drawn off for use in irrigation. *Ham.*

sewage gas. A gas which generates in, and can be collected from, sealed tanks where sewage sludge undergoes digestion, by anaerobic bacteria. It may also arise in badly ventilated sewers, where it becomes dangerous. It consists of two-thirds methane, and one-third carbon dioxide. *See also* Imhoff tank. *Ham.*

sewer. A large-diameter pipe or an open channel laid to gradients underground, which carries sewage or surface water to a point for disposal. *See also* self-cleansing gradient; separate system; outfall, c. *Ham.*

sewerage. A planned system of sewers in a particular Authority's district, through which sewage is collected and removed to a disposal works. *See also* collecting system. *Ham.*

sewer brick. A low-absorption, abrasive resistance brick intended for use in drainage structures. *ASTM C43-65T.*

sewer pipe. An impervious clay pipe (usually glazed) for sewerage and trade-effluent disposal. *Dodd.*

sewer pipe clay. A clay that is similar in characteristics to those used for paving brick. It must contain enough silica and stand sufficient heat to combine with the salt fumes to produce the required glaze. A high percentage of iron is also necessary since it aids in the formation of the salt glaze. A high percentage of soluble salts is desirable. *CCD 6d, 1961.*

sewer tile. Impervious tile of circular cross section designed to conduct sewage. *ACSG, 1963.*

sextant. A surveying instrument, held in the hand, which measures angles between distant objects up to 120° in any plane. A fixed horizon glass, reflects images from a second mirror, the index glass attached to a moving arm by which the degree readings are accurately observed on a graduated scale. It is used at sea to measure the altitude of the sun or a star, the reflected image of which is brought to coincide with the visible horizon, enabling the longitude to be determined. *Ham.*

seybertite. A reddish-brown to copper-red mineral of the brittle mica group with perfect micaceous cleavage, $10(Mg,Ca)O.5Al_2O_3.4SiO_2.3H_2O$. *Larsen, p. 178.*

Seyler's classification. A classification of coals based primarily upon the carbon and hydrogen content calculated to a pure coal basis, according to the Parr formula. *See also* carbon-hydrogen ratio. *Nelson.*

Seymourite. A copper-base alloy containing approximately 18 percent nickel and 18 percent zinc; highly corrosion-resistant. *Bennett 2d, 1962.*

sgraffito. A mode of decoration sometimes used by the studio potter; a colored engobe is applied to the dried ware and a pattern is then formed by scratching through the engobe to expose the differently colored body. (Derived from Italian graffito, to scratch.) *Dodd.*

shack. Derb. An irregular ore deposit. *See also* self-open. *Fay.*

shackanite. A variety of analcite trachyte with phenocrysts of rhombic feldspar. *A.G.I.*

shackle. a. A connecting link or device for fastening parts together; usually in such a manner as to permit some motion. *Crispin.* b. A connecting device for lines and drawbars which consist of a U-shaped section pierced for cross bolt or a pin. *Nichols.* c. A short wrought iron or manganese steel chain for connecting mine cars to form a journey or train, for transport by rope haulage or locomotive to and from the workings. Also called coupling; clipl jig; coupler. *See also* automatic clip. *Nelson.*

shackle bolt. A bolt passing through a shackle and some other part fastening the two together. *Crispin.*

shackler; coupler. A person employed to attach and detach the shackles between mine cars either at a junction near the face or at the pit bottom. He attaches the cars at the junction to form trains for the locomotive or rope haulage. Another shackler detaches them at the pit bottom for loading into the cage. *Nelson.*

shadd. a. Corn. Smooth, round stones on the surface, containing tin ore, and indicating a vein. *Fay.* b. Same as shoad. *Arkell.*

shade. a. A color that has been darkened by the addition of black. *Hansen.* b. A term descriptive of that difference between colors which results from a difference in luminosity only, the other color constants being essentially equal. A darker shade of a color is one that has a lower luminosity. *Hess.*

shade classifier. *See* boardman II. *D.O.T.1.*

shading. a. A common method of showing relief on maps. The map is shaded so that the landscape appears as if illuminated with parallel rays of light from a given angle and viewed from a point vertically above. The topographic forms are thus shown by the shadows they cast. *Stokes and Varnes, 1955.* b. A pleasing effect produced in enamel by applying, usually by spraying, an area of dark enamel to a lighter background, the thickness being tapered off in one or more directions. *Enam. Dict.*

shadoof. A counterpoised sweep used in Egypt and nearby countries for raising water, ore, etc. A hand whip. *Fay.*

shadowing. *Same* as shielding. *ASM Gloss.*

shadow photometer. *See* Rumford's photometer. *C.T.D.*

shadow wall. A refractory wall in a glass-tank furnace erected on the bridge cover; it may be solid or may have openings, its purpose being to screen the working end from excessive heat radiation. It is also sometimes known as a baffle wall or curtain wall but the latter term is by some authorities reserved for a suspended wall serving the same purpose. *Dodd.*

shadow zone. Region in which refraction effects cause exclusion of echo-ranging sound signals. *Hy.*

shadrach. *See* salamander. *Fay.*

shaft. a. An excavation of limited area compared with its depth, made for finding or mining ore or coal, raising water, ore, rock, or coal, hoisting and lowering men and material, or ventilating underground workings. The term is often specifically applied to approximately vertical shafts, as distinguished from an incline or inclined shaft. *Fay.* A shaft is provided with a hoisting engine at the top for handling men, rock, and supplies, or it may be used only in connection with pumping or ventilating operations. *Compare* incline. *Lewis, p. 21.* b. A wooden handle of a pick, etc. *Fay.* c. The term shaft came into use towards the end of the sixteenth century. It means a vertical or steeply inclined excavation or opening from the surface (usually) down through the strata to the coal or mineral to be developed. A mine is provided with an upcast and a downcast shaft. A shaft in metal mining may be sunk upon a vein, even if the inclination is but slight. *See also* circular shaft; rectangular shaft; service shaft; staple shaft. *Nelson.* d. S. Afr. Subshafts are those sunk underground as a continuation of shafts from the surface, and there are often several stages. Vertical shafts have been sunk to beyond 5,000 feet in one stage. *Beerman.* e. A vertical or steeply inclined tunnel. *Nichols.* f. S. Wales. To pull or draw at a tub. *Fay.* g. A round bar that rotates or provides an axis of revolution. *Nichols.* h. The interior of a shaft furnace above the boshes. *Fay.* i. A brick or stone stack or chimney. *Standard, 1964.* j. The upper zone of the blast furnace. *Mersereau, 4th, p. 399.*

shaft allowance. The difference between the excavation diameter and the finished diameter in the clear; the extra space allowed to accommodate the permanent shaft lining. *Nelson.*

shaft bottom. *See* loop-type pit bottom; pit bottom, a; single approach pit bottom. *Nelson.*

shaft cable. a. A specially armored cable of great mechanical strength running down the shaft of a mine. *C.T.D.* b. *See* borehole cable.

shaft cable cleat. A clamp fixed to a shaft wall or to a bunton to support vertical cables in a shaft. *B.S. 3618, 1965, sec. 7.*

shaft capacity. The output of ore or coal that can be expected to be raised regularly and in normal circumstances, per day or week. *Nelson.*

shaft casing; air lock. The structure enclosing the top of a shaft designed to prevent short circuiting of air into or out of the shaft. *B.S. 3618, 1963, sec. 2.*

shaft cave. A cave formed primarily of a shaft or shafts. *A.G.I.*

shaft collar. *See* collar set; collar structure. *Nelson.*

shaft column. A length of pipes installed in a mine shaft for pumping, compressed air, or hydraulic stowing. *Nelson.*

shaft crusher. Hard-rock crusher in upcast shaft, set to reduce larger lumps of ore to convenient size for delivery to skip by way of loading pocket. *Pryor, 3.*

shaft deformation bar. A useful contrivance for measuring the deformation in the cross section of a shaft. It consists of a length of 1½-inch pipe fitted at one end with a micrometer and at the other end with a hard steel cone. The micrometer should have a range of 3 to 4 inches and should fit into a bushing in the pipe in some manner. It may thus be removed from the bar for safe keeping or during transport. *Isaacson, p. 207.*

shaft driller. *See* shaft sinker. *D.O.T. 1.*

shaft drilling. The drilling of small shafts up to about 5 feet diameter with the shot drill. In Virginia, shafts up to 6 feet diameter have been sunk by core drilling. A ring 4 inches wide is formed by roller bits similar to oilfield rotary drilling. Six tricone cutters are used and a large core is formed. A central hole is drilled in the core and a small explosive charge fired to break it for removal. In some cases, it is removed bodily by a core catcher. *Nelson.*

shaft driver. *See* hoistman. *D.O.T. 1.*

shaft engineer. *See* hoistman. *D.O.T. 1.*

shaft feeder cable. A cable mounted in a shaft to transmit electrical power to the shaft bottom and/or to an intermediate level. *B.S. 3618, 1965, sec. 7.*

shaft foot. Scot. The bottom of a shaft. *Fay.*

shaft furnace. A high furnace, charged at the top and tapped at the bottom. *Fay.* The iron blast furnace is the most important example of a shaft furnace. *Newton, p. 279.*

shaft guides. *See* cage guides; fixed guides; rope guides. *Nelson.*

shaft headman. *See* cager, a. *D.O.T. 1.*

shaft-hoist engineer. *See* hoistman. *D.O.T. 1.*

shaft hoistman. *See* hoistman. *D.O.T. 1.*

shaft horsepower. a. Actual horsepower produced by the engine after deducting the drag of accessories. Also called flywheel horsepower; belt horsepower. *Nichols.* b. The shaft horsepower of a winding engine is the average load of coal or ore in pounds raised per wind multiplied by the average number of winds per minute (which may be a fraction) multiplied by the depth of the shaft in feet and the product divided by 33,000. *Sinclair, V, p. 150.*

shaft house. A building at the mouth of a shaft, where ore or rock is received from the mine. *Weed, 1922.*

shaft inset. The point where a horizontal tunnel intersects a shaft. *See also* inset. *Nelson.*

shaft kiln. A vertical kiln charged at the top and discharged at the bottom. If solid fuel is used it is fed in with the charge, but shaft kilns can also be fired with gas or oil by burners placed nearer to the bottom of the shaft. Such kilns are used for the calcination of flint, dolomite, fire clay, etc. *Dodd.*

shaft kip. Eng. *See* kip, a. *Fay.*

shaft lamp. Eng. *See* comet. *Fay.*

shaft lighting. The lighting of shafts at landing stations is often found to be far from ideal. Work in the cages, during loading and unloading, and examination of shaft gear, is facilitated by the provision of fittings to provide a directional flux distribution in such a way that light is thrown forwards from the pit bottom or inset roadway into the shaft area. There must also be adequate illumination on a vertical plane at the shaft inset. *Roberts, II, p. 122.*

shaft lining. The timber, steel, brick, or concrete structure fixed around a shaft to support the walls. In modern shafts, a concrete lining is generally favored as a permanent shaft support. *Nelson.*

shaftman. a. In mining, one who inspects shaft timbering, guides, guards, and parts from top of slowly moving cage or by climbing down manway, replacing and repairing damaged or defective shaft timbers, cage guides and guards, and other parts; and tightening joints of compressed air, steam, and water pipes. Also called shaft mechanic; shaft repairman; shaft tender; sheaveman. *D.O.T. 1.* b. *See* shaft sinker. *D.O.T. 1.*

shaft mechanic. *See* shaftman. *D.O.T. 1.*

shaft mine. a. One where the coal seam is reached by a vertical shaft which may vary in depth from less than 100 feet to several thousand feet. *Kentucky, p. 329.* b. A mine in which the main entry or access is by means of a shaft. *Compare* drift mining. *Nelson.*

shaft miner. *See* shaft sinker. *D.O.T. 1.*

shaft mixer. *See* mixer, b. *Dodd.*

shaft pillar. a. A large area of a coal seam which is left unworked around the shaft bottom to protect the shaft and in the surface buildings from damage by subsidence. All roadways in the shaft pillar are narrow and coal faces are not opened out until the limit line of the shaft pillar is reached. The area of shaft pillar is considerably greater than the surface area requiring protection. *Nelson.* Also called high pillar. *Fay.* b. A solid block of ore left around the shaft where it crosses the lode, for protection against earth movement. *Pryor, 3.*

shaft plumbing. a. The operation of transferring one or more points at the surface of a vertical shaft to plumb line positions at the bottom of the shaft; a method to ensure that a shaft is sunk in the true vertical line. *See also* centering of shaft. *Nelson.* b. Survey operation in which the orientation of two plumb bobs is measured both at surface and at depth in order to transfer the bearing underground. *See also* Weisbach triangle, a. *Pryor, 3.*

shaft plumbing wire. Piano wire used for shaft plumbing. *Staley, p. 136.*

shaft pocket. a. Ore storage, excavated at depth, which receives trammed ore pending removal by skip. *Pryor, 3.* b. Loading pockets of one or more compartments for different classes of ore and for waste built at the shaft stations. They are cut into the walls on one or both sides of a vertical shaft or in the hanging wall of an inclined shaft. *Lewis, p. 257.* c. *See* measuring chute. *Nelson.*

shaft raising. *See* raising.

shaft rent. Eng. a. Rent paid for the use of a shaft for raising the minerals from another property. *Fay.* b. Interest on capital invested in sinking a shaft. *Fay.*

shaft repairman. *See* shaftman. *D.O.T.1.*

shaft section. A drawing or log giving details of the structure and the nature of strata intersected by a shaft. *B.S. 3618, 1963, sec. 1.*

shaft set. a. Supporting frame of timber, masonry, or steel which supports sides of shaft and the gear. Composed of two wallplates, two end plates, and dividers which form shaft into compartments. *Pryor, 3.* b. A system of mine timbering similar to square sets. The shaft sets are placed from the surface downward, each new set supported from the set above until it is blocked in place. New wallplates are suspended from those of the set above by hanging bolts. Blocking, wedging, and lagging complete the work of timbering. At stations the shaft posts are made much longer than usual to give ample head room for unloading timber and other supplies. *Lewis, pp. 45-47.*

shaft siding. The station or landing-place arranged for the full and empty tubs at the bottom of the winding shaft. *Peel.*

shaft signal. Code of electric ringing, or for shallow depths knocking, between the onsetter or hitcher at bottom, the banksman at top, and the engineman who operates the winder. Signals inform the latter as to type of load, etc. A telephone is also installed. *Pryor, 3.*

shaft signal indicator. A device, usually mounted in the winding engine house, which gives visual indication of the signals received from the banksman and the onsetter to regulate the movement of conveyances in a shaft, and which retains the indication until cancelled. *See also* cancelling device. *B.S. 3618, 1965, Sec. 7.*

shaft signaling. The transmission of visible and audible signals between the onsetter at the pit bottom and the banksman at the pit top, and also the winding engineman. A definite and clear code of signals is used to avoid misunderstandings. Bell signaling is widely used. Units are now available so that the operators who control the loading and unloading of the cages, instead of signaling by coded ringing, merely push a signal button for the action they wish to occur, that is, raise, lower, man riding, etc. *Nelson.*

shaft signal recorder. A device which records, on paper or otherwise, the signals given by the banksman and the onsetter and the movements of the winder drum. *B.S. 3618, 1965, sec. 7.*

shaft sinker. In mining, one who sinks shafts (passageways) from the surface or an intermediate level to lower levels. Also called shaft driller; shaftman; shaft miner; sinker; sinkman. *D.O.T. 1.*

shaft sinking. a. Excavating a shaft downwards, usually from the surface, to the workable coal or ore. High sinking rates are possible by (1) mechanical mucking; (2) increased winding capacity; (3) improved concrete supply and placing; (4) improved surface layout; and (5) improved methods of blasting. *Nelson.* b. Excavating a shaft with a shaft sinking drill. *Bureau of Mines Staff. Compare* raise.

shaft sinking drill. A large-diameter drill with multiple rotary cones or cutting bits used for shaft sinking. An adaptation from oil well drills. *Engineering and Mining J., v. 167, No. 6, June 1966, p. 378.*

shaft sinking power supply. A supply of compressed air at a working pressure of about 100 pounds per square inch. The quantity required for a modern high-speed sinking may be 2,000-2,500 cubic feet per minute. At a new mine where two shafts are being sunk, the power installation may comprise eight slow-speed water-cooled compressors with a total output of almost 5,000 cubic feet per minute at 100 pounds per square inch. *Nelson.*

shaft sinking pump. *See* sinking pump. *Nelson.*

shaft sinking ventilation. The ventilation of a sinking shaft is by means of auxiliary fans, normally with 24 inch steel ducting. Axial flow fans are commonly used powered by flameproof motors. The ventilation equipment for a shaft sinking 24 feet diameter and between 2,000 and 3,000 feet deep is often designed for an output of from 20,000 to 30,000 cubic feet per minute. *Nelson.*

shaft space. An opening created with the object of relieving pressure on the shaft. *Higham, p. 109.*

shaft spragger. In anthracite and bituminous coal mining, a laborer who controls the movement of mine cars as they are run to the top or to the bottom of the shaft by poking sprags (short metal or wooden rods) between the spokes of the wheels. *D.O.T. 1.*

shaft station. a. An enlargement of a level near a shaft from which ore, coal, or rock may be hoisted and supplies unloaded. *Fay.* b. Enlarged space made to accommodate pump, crusher, ore pockets, shunting, truck tripples, etc. *Pryor, 3.*

shaft survey. A survey to determine the alinement of a shaft. *Bureau of Mines Staff.*

shaft tackle. A poppet head. *Standard, 1964.* A headframe. *See also* poppet, a. *Fay.*

shaft tender. *See* shaftman. *D.O.T.1.*

shaft tunnel. N. Staff. Headings driven across the measures from shafts to intersect inclined seams. *Fay.*

shaft wall. a. The brick or concrete lining in a shaft to support the surrounding ground The construction of the permanent shaft wall is normally in concrete with reinforcement at insets and in bad ground. The wall thickness is between 12 and 36 inches depending on the shaft size and water pressure within the strata. Also applied to the rock masses surrounding the shaft. *See also* permanent shaft support. *Nelson.* b. The side of a shaft. *Fay.* c. Newc. A pillar of coal left near the bottom of a shaft. *Fay.*

shag boss. In the stonework industry, a foreman who supervises the removal of waste stone, loading and unloading of finished and semifinished stone, and the moving and piling of stone slabs and blocks at a stoneworking mill. *D.O.T. 1.*

shaggy metal. a. Ches. Porous clay in the sides of the salt mine shafts. *Arkell.* b. Ches. Horse beans. *Arkell.*

shake. a. In a coal mine, a vertical crack in the seam and roof. *C.T.D.* b. Fissures in rock. *Arkell.* c. Minute calcite veins traversing limestone or other rocks containing carbonates. These veinlets, unlike vents, have no harmful effect on the building stone. *Arkell.* d. A cavern, usually in limestone. *Fay.* e. A close-joint structure in rock, due to natural causes, as pressure, weathering, etc. Used in the plural. *Fay.* f. A crack or fissure. *Gordon.* g. A separation of wood between the growth rings. *Lewis, pp. 38-39.*

shake-out. Removing castings from a sand mold. *ASM Gloss.*

shaker. a. In anthracite and bituminous coal mining, one who operates a shaker (vibrating screen) on which lump coal is sized. Also called shaker engineer; shaker operator; shaker runner; shaker tender. *D.O.T. 1.* b. A workman who turns the drill steel while it is hammered into rock. *Sandstrom.* c. A mechanically vibrated screen through which a returning drill fluid is passed to screen out larger chips, fragments, and drill cuttings before the drill fluid flows into the sump. Also called shale screen; shale shaker. *Long.* d. Incorrectly used as a synonym for agitator. *Long.*

shaker attendant. *See* screenman. *D.O.T.1.*

shaker chutes. Metal troughs, operated mechanically, for the loading of coal into mine cars underground. *Hudson.*

shaker conveyor. a. A conveyor consisting of a length of metal troughs, with suitable supports, to which a reciprocating motion is imparted by drives. In the case of a downhill conveyor, a simple to-and-fro motion is sufficient to cause the coal to slide. With a level or a slight uphill gradient, a differential motion is necessary, that is, a quick backward and slower forward strokes. The quick backward stroke causes the trough to slide under the coal, while the slower forward stroke moves the coal along to a new position. *See also* conveyor. Also called jigger. *Nelson.* b. A type of oscillating conveyor. *ASA MH4.1-1958.*

shaker-conveyor engine. A reciprocating engine operated by compressed air which is used to impart the reciprocating motion to a shaker conveyor panline. *Jones.*

shaker engineer. *See* shaker, a. *D.O.T.1.*

shaker operator. *See* shaker, a. *D.O.T.1.*

shaker runner. *See* shaker, a. *D.O.T.1.*

shaker screen. A screening medium mounted in a rectangular frame, supported in a horizontal or slightly inclined position, and reciprocated longitudinally by a crank or eccentric and connecting rod. The unique feature that differentiates the shaker from all other screens is that the load is made to travel over the screening medium by the shaking motion of the screen. *Mitchell, p. 134.*

shaker-shovel loader. A machine for loading coal, ore, or rock usually in headings or tunnels. It consists of a wide flat shovel which is forced into the loose material along the floor by the forward motion of the conveyor. The shaking motion of the conveyor brings the material backwards and is loaded into cars or a conveyor. It works at its maximum efficiency to the rise or in flat tunnels. The American version of the shaker-shovel is called the duckbill loader. *See also* loader. *Nelson.*

shaker tender. *See* shaker, a; screenman. *D.O.T. 1.*

shake wave. A wave that advances by causing particles in its path to move from side to side or up and down at right angles to the direction of the wave's advance, a shake motion. Also called shear wave; secondary wave. *Leet.*

shaking. a. Same as springing. *See also* shaking a hole. *Fay.* b. Corn. Washing ore; ore dressing. *Fay.*

shaking a hole. The enlargement of a blasthole, by exploding a stick of dynamite, so it will contain a larger amount of explosives for a big blast. Also called a shake blast. *See also* springing, c. *Fay.*

shaking conveyor. An apparatus which slides under the broken coal and by reciprocating motion moves the coal along to a discharge point. *B.C.I.*

shaking-conveyor loader. The broad tapering shovellike end of a shaking conveyor that is thrust suddenly under the coal and slowly withdrawn so as to carry the coal which has been lifted toward the dumping point. *Zern.*

shaking down. The stirring of an open-hearth bath with a rod to assist in oxidizing and removal of carbon. *Henderson.*

shaking screen. a. A screen for sizing coal or other material. It consists of a screening surface of punched plate or wire mesh mounted in a rectangular frame, supported in a horizontal or slightly inclined position and reciprocated longitudinally by a crank or eccentric and connecting rod. The slightly inclined shaking screen is favored. Also called jiggling screen. *See also* wet screening. *Nelson.* b. A suspended screen which is moved with a back-and-forth or rotary motion with a throw of several inches or more. *Nichols.*

shaking table. a. A slightly inclined table to which a lateral shaking motion is given by means of a small crank or an eccentric. One form is covered with copper plates coated with mercury for the purpose of amalgamating gold or silver; other forms are provided with riffles and used in separating alluvial gold. *Fay.* b. In ore dressing, flattish tables oscillated horizontally during separation of minerals fed on to them. *Pryor, 2.* c. In concentration of finely crushed ores by gravity, a rectangular deck with longitudinal riffles. It is shaken rapidly in a compounded to-and-fro motion by a vibrator, in such a way as to move the sands along, while they are exposed to the sweeping action of a stream of water flowing across the deck, which is tilted about its long axis. In dry or pneumatic tabling the feed is dry, and air is blown upward through a porous deck. *Pryor, 3.*

shaking test. A test used to indicate the presence of significant amounts of rock flour, silt, or very fine sand in a fine-grained soil. It consists of shaking a pat of wet soil, having a consistency of thick paste, in the palm of the hand; observing the surface for a glossy or livery appearance; then squeezing the pat; and observing if a rapid apparent drying and subsequent cracking of the soil occurs. *ASCE P1826.*

shale. a. A laminated sediment, in which the constituent particles are predominantly of the clay grade. *Holmes, 1928.* b. Shale includes the indurated, laminated, or fissile claystones and siltstones. The cleavage is that of bedding and such other secondary cleavage or fissility that is approximately parallel to bedding. The secondary cleavage has been produced by the pressure of overlying sediments and plastic flow. *A.G.I.* c. One of the impurities associated with coal seams; this term should not be used as a general term for washery rejects. *B.S. 3552, 1962.*

shale-and-clay feeder. One who keeps conveyor belt that feeds dry mill constantly loaded with shale and clay. Also called clay-and-shale feeder; clay feeder; conveyor loader; shale-and-clay-conveyor man; shale feeder. *D.O.T. 1.*

shale assay ton. In the assay of oil shale, the oil distilled is usually measured in cubic centimeters. To obviate the need of conversion to gallons per ton the shale is weighed in units of 239.66 grams, or shale assay ton. Each cubic centimeter of oil derived from the unit is equivalent to 1 gallon per short ton. The weight is, of course, only an approximation, as the specific gravity of the oil varies. *Hess.*

shale break. Thin layer or parting of shale between harder strata, primarily a driller's term. *A.G.I. Supp.*

shale crescents. Crescents formed by shale filling the troughs of ripple mark. *Pettijohn.*

shale cutter; shale planer. A mechanical excavator sometimes used for getting clay from deposits that are both hard and friable, and that will maintain a steep clay face. The main feature of the machine is an endless chain that carries a series of cutters which bear downwards on the clay, removing a layer about ¾ inch thick. The machine makes semicircular sweeps into the clay face before being moved forward or sideways. *Dodd.*

shale dust. The dust obtained by drying and grinding shale. *Rice, George S.*

shale feeder. *See* shale-and-clay feeder. *D.O.T. 1.*

shale naphtha. Naphtha obtained from shale oil. *Fay.*

shalene. A term proposed in place of gasoline for that product distilled from oil shale. *von Bernewitz.*

shale oil. A crude oil obtained from bituminous shales, especially in Scotland, by submitting them to destructive distillation in special retorts. *Fay.*

shale-oil shale. Scot. Shale yielding oil on distillation. This term was formerly used as signifying argillaceous rock. *Fay.*

shale pipe. A hollow cylinder made from red burning hard clay with a distinct fissile structure. Vitrification, from 1,050° to 1,250° C, and salt glazing is successful only at highest temperature. *Hess.*

shale pit. A dumping place for coarse material screened out of rotary drill mud. *Nichols.*

shale planer. *See* shale cutter. *Dodd.*

shale screen. *See* shaker, c. *Long.*

shale shaker. a. A screen in the mud circulating system of a rotary drill. *Nichols.* b. A cylindrical seive or vibrating table that removes the drill cuttings from the circulating mud stream. *Wheeler.* c. *See* shaker, c. *Long.*

shale spirit. The lower boiling fractions obtained in the refining of crude shale oil. *Fay.*

shaley blaes. In Scotland, bituminous shale. *Nelson.*

shaliness. Shaliness is the property of lutaceous rocks, rich in clay, to split with concave or shelly surfaces in a general way parallel to the bedding planes. *A.G.I.*

shallow. Having the bottom not far below the surface or top; not deep. *Standard, 1964.*

shallow cave. A cave close to the ground surface. *A.G.I.*

shallow ground. Aust. Land having gold near its surface. *Standard, 1964.*

shallow investigation laterolog. The main use of this log is to provide data on the resistivity of a porous zone (immediately behind a mud filter cake) which is fully flushed by mud filtrate to correct induction log readings. It may also be used in conjunction with a proximity log and other focused devices to give a suite of logs which, in theory, can be unequivocally interpreted. This is the so-called "grand slam" technique. This log is also called the laterolog 8, or more often LLS. *Wyllie, pp. 92-93.*

shallow vein zone deposits. These deposits are formed at depths probably not greater than 2,000 feet below the surface and within a temperature range of from 50° to 200° C. They are found as tabular veins, irregular veins with ore chambers, and as ledges and irregular replacement deposits; they constitute a very important class of deposits, being the source of the world's silver, all of its mercury and important quantities of gold, copper, lead, zinc, and antimony. *Lewis, p. 275.*

shallow water. Water of a depth less than one-half the length of the waves concerned. *Schieferdecker.*

shallow-water blackout. A carbon dioxide accumulation or excess in a breathing system which causes the diver to lose consciousness without the usual warning of dyspnea or other symptoms such as headache, nausea, dizziness or weakness. *H&G.*

shallow well. A shaft sunk to pump surface water only. *See also* well. *Ham.*

shaly. a. Characteristic of, pertaining to, composed of, or resembling shale; having the characteristic structure and fissility of shale, as a shaly sandstone or limestone. *Fay.* b. Brittle ground. *Fay.*

shaly blaes. Term used among Scottish miners for oil shale. *Tomkeieff, 1954.*

shaly sandstone. Arquillaceous sandstone with a fissile structure. *Bureau of Mines Staff.*

shambles. Shelves or benches, from one to the other of which ore is thrown successively in raising it to the level above, or to the surface. *See also* shammel. *Fay.*

sham door. Eng. A check or regulator door. *Fay.*

shammel. a. A stage for shoveling ore upon, or for raising water. *See also* shambles. *Fay.* b. To work a mine by throwing the material excavated onto a stage or bench in the "cast after cast" method, which was the usual way before the art of regular mining by means of shafts had been introduced. *Fay.*

shandite. A mineral, $Ni_3Pb_2S_2$, rhombohedral, with X-ray pattern distinct from parkerite and from the artificial beta-phase in the system $Ni_3Bi_2S_2Ni_3Pb_2S_2$. From Trial Harbor, Tasmania. *Spencer 19, M.M., 1952.*

Shand's classification. A classification of igneous rocks based on crystallinity, degree of saturation with silica, degree of saturation with alumina, and color index. *A.G.I.*

shandy-gaff. Aust. Shovel-filled coal. Coal that is loaded by a shovel without screening, hence containing an excess of fines; run-of-mine coal. *Fay.*

shangie. Scot. A ring of straw or hemp put round a jumper in boring to prevent the water in the borehole from splashing out. *Fay.*

shank. a. Scot. A shallow shaft underground; a winze. *Fay.* b. The steel-threaded portion of a diamond bit to which the crown is attached. Also called bit blank; blank; blank bit. *Long.* c. The body portion of any bit above its cutting edge. *Long.* d. That part of the drill steel which is inserted in the chuck of the drill. *Fraenkel.* e. A bar or standard which connects a rooter tooth with the frame. *Nichols, 2.* f. The end of the drill steel that is struck by the hammer. *Lewis, p. 89.* g. The handle for carrying a small ladle or crucible. *ASM Gloss.* h. The portion of a die, tool, or forging by which it is held. *ASM Gloss.* i. The main body of a lathe tool. If the tool is an inserted type, the shank is the portion which supports the insert. *ASM Gloss.* j. A ladle for molten metal, with long handles for use by two or more men. *Webster 3d.*

shanker. Scot. A pit or shaft. *Fay.*

Shanklin sand. Eng. A marine deposit of siliceous sands and sandstone of various shades of green and yellow gray. Also called Lower Greensand. *Fay.*

shank-type cutters. Cutters having a straight or tapered shank to fit into the machine tool spindle or adapter. *ASM Gloss.*

shaped charge. An explosive contained in a case so shaped as to concentrate the power of the explosion in one small area. Shaped charges are used in armor-penetrating weapons, such as the bazooka, for tapping open-hearth furnaces, for cutting deep well linings, and for breaking boulders. *Nichols, 3, p. 9-30.*

shaped stone. An artificially blunted or shaped carbon or diamond cut to form a point conforming to a specific profile. *Long.*

shape factor. Property of a particle which determines the relation between its mass and surface area, and hence its response to frictional restraint. *Pryor, 4.*

shape-firebrick molder. One who makes shaped firebricks in steel molds. *D.O.T. 1.*

shaper. *See* finisher, c. *D.O.T.1.*

shapes. A general term aplied to rolled structural metal, as I beams, channels, Z bars, angles, etc. *Crispin.*

shape-silica-brick molder. One who makes shaped silica bricks in steel molds. *D.O.T. 1.*

shaping. Producing flat surfaces using single-point tools. The work is held in a vise or fixture, or clamped directly to the table. The ram supporting the tool is reciprocated in a linear motion past the work. *ASM Gloss.*

shaping block. A piece of wood for the preliminary shaping of glass on the blowing iron before it is blown in a mold. *Dodd.*

shapometer. An instrument designed for measuring the shape of pebbles. *A.G.I.*

Shap rhyolite group. A division of the great Borrowdale volcanic series of the Lake District of England, occurring high up in the series and consisting essentially of rhyolitic flows. *C.T.D.*

shard. A curved, spiculelike fragment of volcanic glass. *A.G.I.*

shards. Bits of broken pottery. *ACSG.*

share. A share of stock is a piece of paper certifying that the owner possesses one of a number of equal parts of the business. *Hoov, p. 246.*

Sharon quartzite. A quartzite occurring in Ohio and used in the manufacture of silica refractories. A quoted analysis is: 98.7 percent SiO_2, 0.3 percent Al_2O_3, 0.3 percent Fe_2O_3, and 0.3 percent alkalies. *Dodd.*

sharp bit. a. A bit in which the exposed acute edges and points of the diamonds have not been worn off, dulled, or blunted by abrasion. *Long.* b. A newly set and unused diamond bit. *Long.*

sharpening stone. a. Any natural or artificial stone with grit used for putting an edge on steel tools. *Mersereau, 4th, p. 285.* b. Hand-used stones that include scythestones, whetstones, oil stones, water stones, razor hones, holystones, and rubbing stones. *AIME, pp. 13-14.*

sharp finish. *See* finish. *Dodd.*

sharp fire. Combustion with excess air and short flame. *ASTM C162-66.*

sharp gas. Eng. Firedamp that explodes suddenly within a safety lamp without showing any preceptible cap. Gas is sharp when at its most explosive point. *Fay.*

sharp gravel. Angular flint gravel. *Arkell.*

sharpite. A very rare, strongly radioactive, greenish-yellow, orthorhombic mineral, possibly $(UO_2)_6(CO_3)_5(OH)_2.6H_2O$, found associated with uranophane, curite, and becquerelite. *Crosby, p. 43.*

sharp lime. Derb. A very hard limestone, sometimes black, containing small loughs filled with bitumen. *Arkell.*

sharp pitch. *See* pitch, 1. *Dodd.*

sharps. Thin, knife-edge pieces of diamond. *Hess.*

sharp sand. Sand composed of angular quartz grains, used in making mortar. *Arkell.*

sharp stone. a. Drill diamonds or carbon having sharp edges and corners that have not been artificially blunted or rounded through use. *Long.* b. New condition, unused carbon or drill diamonds. *Long.* c. York. A fine-grained sandstone, free from mud and breaking into angular fragments. *Nelson.* d. Proposed by Shrock for a sedimentary rock made up of angular particles more than 2 millimeters in greatest dimension. *A.G.I.*

shastaite. A general term suggested by Iddings for andesine dacites, that is, for normal dacites. *Holmes, 1928.*

shastalite. Wadsworth's name for unaltered, glassy forms of andesite. *Fay.* Obsolete.

Shasta series. The Lower Cretaceous of the Pacific Coast, entirely marine, the Knoxville beds below, and the Horsetown above. Obsolete. *Fay.*

shatter. To splinter with or as if with a blow; reduce to fragments: fracture; smash. *Webster 3d.*

shatter belt. A belt of shattered, but not intensely crushed, rock. It may usually be considered as taking the place of a clean-cut fault. *Challinor.*

shatter cut. *See* burn cut. *Nelson.*

shattered zone. Applied to a belt of country in which the rock is cracked in all directions, resulting in a network of small veins. *Fay.*

shatter index. The percentage of a specially prepared sample of coke remaining on a sieve of stated aperture after the sample has been subjected to a standardized dropping procedure. *B.S. 1016, 1961, Pt. 16.*

shatterproof glass. Layers of glass cemented to clear plastic sheets to prevent shattering. *Mersereau, 4th, p. 329.*

shatter test. An empirical test for coke or briquettes which gives an indication of the resistance of the sample to breakage. A 50-pound sample of test material over 2 inches in size are dropped four times from a height of 6 feet onto an iron plate. It is then screened and each fraction recorded as a percentage of the original sample. *Miall.*

shattery. S. Staff. Burnt clay in the vicinity of burnt coal. *Arkell.*

shattuckite. A green to blue, monoclinic mineral, $2CuO.2SiO_2.H_2O$; fibrous. *Larsen, p. 137.* Possibly identical to plancheite, the formula being $6CuO.5SiO_2.1.5\text{-}2H_2O$. *American Mineralogist, v. 47, No. 5-6, May-June 1962, p. 811.*

shaver. In the stonework industry, one who trims the outline edges of granite blocks, using an abrasive saw. *D.O.T. 1.*

shaving. a. As a finishing operation, the accurate removal of a thin layer by drawing a cutter in a straight-line motion across the work surface. *ASM Gloss.* b. Trimming parts like stampings, forgings, and tubes to remove uneven sheared edges or to improve accuracy. *ASM Gloss.*

Shaw kiln. A gas-fired chamber kiln; one feature is that a proportion of the hot gases pass beneath the kiln floor to diminish the temperature difference from top to bottom of the setting. *Dodd.*

Shaw process. A process for the precision casting of small metal components; its main feature is the use of silicon ester as the bond for the refractory powder, for example, sillimanite, from which the mold is made. *Dodd.*

shcherbakovite. A silicate and titanoniobate $Na(K,Ba)_2(Ti,Nb)_2(Si_2O_7)_2$, monoclinic. *Spencer 20, M.M., 1955.*

shear. a. To make vertical cuts in a coal seam that has been undercut. *Standard, 1964.* b. *See* shearing, a. *Fay.* c. Mode of failure of a body or mass whereby the portion of the mass on one side of a plane or surface slides past the portion on the opposite side; important property in soil stability problems and earth slopes. *See also* shear tests. *Nelson.* d. That type of force which causes or tends to cause two contiguous parts of the same body to slide relative to each other in a direction parallel to their plane of contact. *ASM*

Gloss. e. A type of cutting tool with which a material in the form of wire, sheet, plate, or rod is cut between two opposing blades. *ASM Gloss.* f. The type of cutting action produced by rake so that the direction of chip flow is other than at right angles to the cutting edge. *ASM Gloss.* g. To make into shear steel by condensing blister steel and making it homogeneous. *Standard, 1964.* h. Application to material of external force (stress) parallel to the cross section concerned. Shear strength (f) is

$$f = \frac{BM}{Z}$$

where BM is the bending moment and Z the section modulus. *Pryor, 3.*

shear angle. In metal cutting, the angle that the shear plane makes with the work surface. *ASM Gloss.*

shear box test. A standard method of measuring the shear strength of soil in a box, split in half, to which vertical pressure is applied combined with shearing force horizontally; the box can be either 6 centimeters or 12 inches square. Although this is a very simple shear test, the distribution of stress on the shear plane is difficult to assess, and it is often superseded by the triaxial compression test. *Ham.*

shear boy. One who swabs with oil the inside of the funnel through which blobs of molten glass pass from the cutting shears into the molds of a bottle-making machine, to facilitate passage of the glass. Observes the flow of molten glass from tank opening where automatic shears cut it into regulated amounts, and swabs transfer chute intervals between drops. *D.O.T. 1.*

shear bursts. In deep mining fields, shear bursts are the most common type. By the occurrance of a single shear crack parallel to the face in one of the walls, the wall rock behind the shear plane is able to expand freely into the stope, heavily compressing those supports which up till then have not taken stress, throwing still more stress on those which have and causing the wall rock between the nearest supports and the face to disrupt and fill the place with debris. Shear bursts frequently occur at the working face of a pillar, remnant, or promontary. In such cases they should not be mistaken for true pillar bursts. *Spalding, p. 68.*

shear-cake. A counterweighted refractory slab used as a gate or door to a small furnace or oven. *ASTM C162-66.*

shear center. *See* flexural center. *Ro.*

shear cleavage. Synonym for slip cleavage; strainslip cleavage. *A.G.I.*

shear cut. A vertical cut made by a special type of coal cutter or arc-shearing machine. *See also* turret jib.*Nelson.*

shearer. In bituminous coal mining, one who operates a type of coal-cutting machine which shears (cuts) out a channel down the sides of the working face of coal (as distinguished from undercutting) prior to blasting the coal down. Also called shearing-machine operator. *D.O.T. 1.*

shearer loader. Machine which shears coal or other easily broken mineral from the face of a seam or other suitable formation and delivers the broken material continuously to a conveying system. The Anderton is a vertical drum armed with steel picks and mounted on a flexible armoured conveyor, which can be pressed forward section by section as the coal face advances. *Pryor, 3.*

Shearer plastometer. *See* R & S Plastometer. *Dodd.*

shear failure; failure by rupture. Failure in which movement caused by shearing stresses in a soil mass is of sufficient magnitude to destroy or seriously endanger a structure. *See also* general shear failure; local shear failure. *ASCE P1826.*

shear fold. A fold formed as a result of the minute displacement of beds along closely spaced fractures of cleavage planes. Synonym for slip fold. *Billings, 1954, p. 91.*

shear fracture. a. A fracture that results from stresses which tend to shear one part of a specimen past the adjacent part. Contrast with tension fractures. *Billings, 1954, p. 93.* b. A fracture in which a crystal (or a polycrystalline mass) has separated by sliding or tearing under the action of shear stresses. *ASM Gloss.*

shearing. a. The vertical side cutting which, together with holing or horizontal undercutting, constitutes the attack upon a face of coal. *Fay.* b. Making a vertical cut or groove in a coal face, breast, or block, as opposed to a kerf, which is a horizontal cut. *B.C.I.* Called in Arkansas a cut or cutting. *Fay.* c. The term given to vertical cuts. These are applied in coal headings only to provide an additional free face, since in heading work it is usual to employ deeper cuts than on longwall faces, and the shots in headings are much tighter. *McAdam II, p. 96.* d. The deformation of rocks by cumulative small lateral movements along innumerable parallel planes, generally resulting from pressure, and producing schistosity, cleavage, minute plication, and other metamorphic structures. *Fay.*

shearing force; sliding force. a. A straining action wherein tangentially applied forces tend to produce a skewing type of deformation. Shear forces are usually accompanied by normal forces produced by tension, thrust or bending. *McGraw Hill Encylcopedia of Science and Technology, v. 12, 1960, p. 243.* b. A force such as the force on rivets securing two plates together, for example, boilers and bridges. *Morris and Cooper, p. 141.*

shearing jib. A jib of a coal cutter or cutter loader which makes a vertical or shear cut in the coal, ore, or rock. *Nelson.*

shearing machine. An electrically driven machine for making vertical cuts in coal. *ASA C42.85: 1956.*

shearing-machine operator. *See* shearer. *D.O.T. 1.*

shearing of rocks. Shear zones, which are common in metamorphic rocks, are indicated by bands of crushed rock (cataclasite, etc.) and by the development of such minerals as chlorite. *See also* strainslip cleavage. *C.T.D.*

shearing strain (shear strain). *See* strain. *ASM Gloss.*

shear joints. Joints that formed as shear fractures. *See also* shear fractures. *A.G.I.*

shear lag. On account of shear strain, the longitudinal tensile or compressive bending stress in wide beam flanges diminishes with the distance from the web or webs; this stress diminution is called shear lag. *Ro.*

shear legs. a. A high wooden frame placed over an engine or pumping shaft fitted with small pulleys and rope for lifting heavy weights. *Zern. See also* shears, a. *Fay.* b. A tripod on which miners sometimes stand in drilling. *Standard, 1964.* c. Three long poles fixed together at the top, standing over a shaft, to which a pulley is suspended for hauling. *Gordon.*

shear lip. A narrow, slanting (hence shear) ridge along the edge of a fracture surface. The term sometimes also denotes a narrow, often crescent-shaped, fibrous region at the edge of an otherwise cleavage fracture, even though this fibrous region is in the same plane as the rest of the fracture surface. *ASM Gloss.*

shear mark. A scar appearing in glassware, caused by the cooling action of the cutting shear. *ASTM C162-66.*

shearmeter. An instrument used to measure the gel strength of drilling mud. *B.S. 3618, 1963, sec. 3.*

shear modulus. Also known as the modulus of rigidity, it equals the shear stress divided by the shear strain. *Ham. See also* modulus of elasticity, a.

shear of ore. Ore shoot or ore body. *von Bernewitz.*

shearpin. A small soft metal pin, connecting or pinning together two parts of a tool that will break by shearing if an excessive load is placed on the pinned components. The shearing of the pin prevents damage to the overloaded components; thus it is a safety device. *Compare* shear rivet. *Long.*

shear plane. a. A fracture that produces a positive draw. It differs from a weight break in that the character of the fracture is less ragged and hading takes place over the unwrought coal instead of the waste. *Briggs, p. 172.* b. A confined zone along which shear takes place in metal cutting. It extends from the cutting edge to the work surface. *ASM Gloss.*

shear rate. Rate of strain in shear in a Newtonian fluid system. Velocity gradient across direction of flow of fluid. The concept does not apply to non-Newtonian fluids such as the typical ore pulp where flow commences once the yield point is passed or where there is some thixotropy. *Pryor, 3.*

shear reinforcement. Reinforcement, usually in the form of stirrups and bent-up rods, designed to resist shear. *Taylor.*

shear rivet. Soft copper rivets used in the Hall-Rowe wedge to connect the drive and pilot wedges; they can be sheared off to leave the drive wedge as a permanent reference in the borehole at the point the hole is to be deflected. *Compare* shearpin. *Long.*

shears. a. Corn. Two high timbers, standing over a shaft and united at the top to carry a pulley for lifting or lowering timbers, pipes, etc. of greater length than the ordinary hoisting gear can accommodate. *Fay.* b. *Scot.* A haulage clip. Also called sheers. *Fay.*

shear slide. A landslide or rock slip in which a mass of rock and soil shears and slides downhill. Slippage may occur along a bedding or cleavage plane. *See also* slip surface of failure. *Nelson.*

shear steel. A steel produced by heating blister steel (sheared to short lengths) to a high heat, welding by hammering or rolling, or both, and finally finishing under the hammer at the same or slightly greater heat. *Webster 3d.*

shear strain. Angular displacement of a structural member due to a force acting across it, measured in radius. *See also* shear modulus. *Ham.*

shear strength. a. The stress or load at which a material fails in shear. *Nelson.* b. The internal resistance offered to shear stress. It is measured by the maximum shear stress, based on original area of cross section, that can be sustained without failure. *Stokes and Varnes, 1955.* c. Rocks subject to load are seldom free from shear stresses, and if weak in shear, stress caused by a compressive load may cause them to fail because of induced stresses along shear planes, the angle of failure depending on confinement. There are no generally accepted tests to determine shear strength of rocks. *Lewis, p. 572.* d. A measure of the shear value of a fluid. Also a measure of the gelling properties of a fluid. *Brantly, 1.*

shear stress. a. The shear force operating in a material, measured per unit of cross-sectional area. *See also* shear modulus; punching shear. *Ham.* b. The stress component tangential to a given plane. Also called shearing stress; tangential stress. *ASCE P1826.*

shear structure. A local geologic structure resulting from the relief of earth stresses by the formation of a multitude of minute closely spaced fractures with slight slipping or faulting along each. *Webster 3d.*

shear tests. Tests to determine the shear strength of soil samples. The box shear test or the triaxial compression test may be performed in the laboratory, but the vane test may be made of the in situ soils in a borehole. *Nelson.*

shear thrust; stretch thrust. Proposed by Willis for a thrust fault that follows the sheared and stretched underlimb of an overturned fold. *Stokes and Varnes, 1955.*

shear wave. a. The same as transverse wave. *ASM Gloss.* b. A wave, usually in a solid, which causes an element of the solid to change its shape without at the same time undergoing a change in volume. Also called rotational wave. *Hy.*

shear zone. a. In geology, a zone in which shearing has occurred on a large scale, so that the rock is crushed and brecciated. *Fay.* b. A zone of rock fracturing consisting of many closely spaced, roughly parallel discontinuous cracks. *Bateman.* c. A narrow portion of a rock mass traversed by closely spaced surfaces along which shearing has occurred. The weakness resulting from the stressing of the rock along the shear zone allows ready access of ore-bearing solutions giving rise to an ore body. Many of the ore bodies in Western Australia occur in shear zones. Also called sheeted ground. *Nelson.* d. Hogback. *Zern.*

shear-zone deposit. An ore deposit formed in a system of interlacing openings parallel to the shearing and mostly of infinitesimal size. After mineralization by replacement, a wide, tabular, massive lode or a lens-like mass of irregular shape is produced. *Schieferdecker.*

sheath. To enclose or encase with a covering. *Carson, p. 244.*

shedline. The summit line of elevated ground; the line of a watershed. *Fay.*

sheathed explosive. A permitted explosive surrounded by a sheath containing a noncombustible powder. The powder acts as a cooling agent and reduces the temperature of the resultant gases of the explosion, and therefore reduces the risk of these hot gases causing a firedamp ignition. Sheathed explosives were first introduced into British coal mining in 1934. *See also* Eq.S explosive; explosive. *Nelson.*

sheathing deals. Scot. Deals (plank) nailed to cribs all round a shaft to preserve the cribs from injury and make the sides of the shaft smooth. *Fay.*

sheathing driver. Essentially a paving breaker, an impact hammer driven by air, designed and adapted for driving wood sheathing. *Carson, p. 254.*

sheaths. Newc. The upright framing of a coal wagon or car. *Fay.*

sheave. a. A wheel, grooved around its circumference, that guides and supports a cable or rope between the load and the hoisting engine. *Long.* b. Grooved pulley wheel much used in underground rope haulage. *Pryor, 3. See also* Koepe sheave; return sheave; tail sheave; winding sheave. *Nelson.* c. Any grooved wheel or pulley. *Webster 3d.*

sheave block. A pulley, and a case provided with means to anchor it. *Nichols.*

sheaveman. *See* shaftman; rollerman. *D.O.T. 1.*

sheave wheel. *See* sheave. *Long.*

shed. a. Penn. A kind of long car or trolley. *Fay.* b. *Eng.* A thin, smooth parting in rocks, having both sides polished. *Fay.* c. *Eng.* A very thin layer of coal. *Fay.*

sheen. a. An optical effect due to reflection of light from a position within the stone, in contradistinction to luster. *Shipley.* b. An optical effect that modifies the luster of a mineral and hence a variety of luster, as the mineralogical definitions of both pearly and silky luster indicate. *Shipley.*

sheepback rocks. Synonym for roches moutonnées. *A.G.I.*

sheepbacks. *See* roches moutonnées. *Fay.*

sheep's-foot. A tamping roller with feet expanded at their outer tips. *Nichols.*

sheep silver. Scot. Mica. *Standard, 1964.*

sheer legs. *See* shear legs. *Fay.*

sheers. *See* shears, b. *Fay.*

sheet. a. In geology, an extensive bed of an eruptive rock intruded between or overlying other strata. *Fay.* b. *Aust.* A solid body of pure ore filling a crevice. *Fay.* c. In the Upper Mississippi lead region, galena in thin and continuous masses. The ore itself is called sheet mineral. *Fay.* d. A tabular mass of igneous rock, either a flow, sill, or dike. *A.G.I.* e. A flat-rolled metal product of some maximum thickness and minimum width arbitrarily dependent on the type of metal. It is thinner than plate. *ASM Gloss.*

sheet-asphalt pavement. A pavement having a wearing course composed of asphalt, cement, and sand of predetermined grading, with or without the addition of fine material. *Fay.*

sheet deposit. A mineral deposit (as a lode or bed) that is extended in length and breadth, has relatively small thickness, and is typically approximately horizontal. *Webster 3d.*

sheet drying conveyor. A disk type of live roller conveyor equipped with air outlets from a blower to remove dampness from processed sheet metal while being conveyed. *ASA MH4.1-1958.*

sheeted ground. a. When a fault is distributed along several parallel faults close to each other the wall rocks are broken into thin sheets and are, therefore, termed as being sheeted. *Ham.* b. *See* shear zone. *Nelson.*

sheeted vein. A group of closely spaced, distinct parallel fractures filled with mineral matter and separated by layers of barren rock. *Bateman, 1950, p. 112.*

sheeted vein deposit. An ore deposit occupying a group of closely spaced, distinctly parallel fractures or fissures, separated by narrow plates of country rock. After metallization, a composite vein or a replacement lode results characterized by a banded structure. *Schieferdecker.*

sheeted zone. A zone of closely spaced fractures whether mineralized or not. *A.G.I.*

sheet erosion. a. In the first case, the water flowing off over the surface (the runoff) will descend equally in all directions. It will constitute a continuous sheet of surface water, and both its volume and its velocity will be the same at all points equally distant from the summit. Erosion accomplished by sheets of running water, as distinct from streams, is sheet (or sheetflood) erosion. *A.G.I.* b. Lowering of land by nearly uniform removal of particles from its entire surface by flowing water. *Nichols.*

sheeters. Light steel poling boards driven down to protect trench sides from collapse. *Ham.*

sheetflood. Under certain conditions, sand-laden water flowing over an erodible plain tends at first to divide into parallel streams like those of pure water on an indestructible surface, yet, since the streams formed in this way at once begin to scour and overload themselves and thus check their own flow, this tendency is soon counteracted and the water is districuted again, so that the ultimate tendency is toward movement in a more or less uniform film or sheet and the term sheetflood has come into use in notes and conversation. *A.G.I.*

sheet flow. *See* laminar flow. *H&G.*

sheet glass. a. Flat glass made by continuous drawing. *ASTM C162-66.* b. Glass used for common glazing purposes; produced by drawing a continuous thin film of glass from a molten bath and, after a suitable time interval for cooling, cutting up the product into sheets. It is not of such good quality, nor so flat, as plate glass, which is ground and polished. *C.T.D.*

sheet ground. A term used in the Joplin district, Mo., and applied to horizontal, low-grade, disseminated zinc-lead deposits, covering an extensive area. *See also* sheet deposit. *Fay.*

sheet ice. a. Ice formed in a relatively thin, smooth layer over a water surface; not to be confused with ice sheet. *A.G.I.* b. In Newfoundland, large floes varying in size from several acres to square miles. *A.G.I.*

sheeting. a. The development, in rock formations, of small, closely spaced, parallel fractures. *Fay.* b. In a restricted sense, the gently dipping joints that are essentially parallel to the ground surface; they are more closely spaced near the surface and become progressively further apart with depth. Especially well-developed in granitic rocks. *A.G.I.* c. Seven-eighths-inch tongue-and-groove board. *Nichols.* d. Planks used in shoring and bracing. *Nichols.*

sheeting caps. A row of caps placed on blocks about 14 inches high placed on top of the drift sets when constructing the permanent floor in the stope. Round poles are then laid lengthwise of the stope on the sheeting caps and are covered with lagging. *Lewis, p. 486.*

sheeting driver. An air hammer attachment that fits on plank ends so that they can be driven without splintering. *Nichols.*

sheeting jacks. Push-type turnbuckles, used to set ditch bracing. *Nichols.*

sheet iron. *See* sheet. *Fay.*

sheet-iron gang. Anti-Molly Maguire vigilantes. *Korson.*

sheet-iron pitch. The inclination of a coal seam at which loose coal will not move on the natural bottom, but at which it will slide or can be easily pushed along on iron slides placed on the bottom in the chambers or rooms. *Fay.*

sheet metal. *See* sheet. *Fay.*

sheet-metal gage. A gage used for measuring the thickness of sheet metal. *Crispin.*

sheet mica. Mica that is relatively flat and sufficiently free from structural defects to enable it to be punched or stamped into specified shapes for use by the electronic and electrical industries. Sheet mica is classified further as block, film, and splittings. *Skow.*

sheet minerals. Those minerals belonging to the phyllosilicates having sheets of linked SiO_4 tetrahedra. Includes the mica, chlorite, and most of the clay group of minerals. *See also* sheet, c. *A.G.I.*

sheet pavement. Continuous road surfacing, such as asphalt, tarmacadam, or concrete. *Ham.*

sheet pile. A pile with a generally flat cross section to be driven into the ground or seabed and meshed or interlocked with like members to form a diaphragm, wall, or bulkhead. *H&G.*

sheet piles. Closely spaced piles of timber, reinforced concrete, prestressed concrete, or steel driven vertically into the ground to support earth pressure, to keep water out of an excavation, and often to form an integral part of a permanent structure. *See also* guide pile. *Ham.*

sheet-pile wall. A wall formed of sheet piles which may be of cantilever design, or anchored back at one or two levels. *See also* retaining wall. *Ham.*

sheet piling. a. A diaphragm made up of meshing or interlocking members of wood, steel, concrete, etc., driven individually to form an obstruction to percolation, to prevent movement of material, for cofferdams, stabilization of foundations, etc. *Seelye, 1.* b. Steel strips shaped to interlock with each other when driven into the ground. *Nichols.*

sheet quarry. Often used in granite quarrying to designate a quarry having strong horizontal joints and a few vertical ones. *Fay.*

Sheetrock. Wallboard composed of gypsum core in tough paper. *Bennett 2d, 1962 Add.*

sheets. a. Eng. Coarse, cloth curtains or screens for directing the ventilation underground. b. *Eng. See* brattice cloth, b; brattice sheeting.

sheet sand. A sandstone of great areal extent, presumably deposited by a transgressing sea advancing over a wide front and for a considerable distance. *See also* blanket sand. *A.G.I.*

sheet separation. In spot, seam, or projection welding, the gap which exists between faying surfaces surrounding the weld, after the joint has been welded. *ASM Gloss.*

sheet stalactite. A stalactite that is thin in one horizontal direction and broad in the other, thus forming a pendent triangle. *Schieferdecker.*

sheet structure. a. Sheetlike tracts of crushed rock parallel and adjacent to a fault. *A.G.I.* b. *See* phyllosilicates; sheeting, b. *A.G.I.* c. Used in quarrying to describe granite in which there is only one set of joints, approximately parallel to the rock surface. *Streefkerk, p. 30.*

sheet tin. Thin sheets of iron or steel, coated with tin which serves to prevent corrosion. *Crispin.*

Sheffield process. A basic open-hearth proccess using charges so low in sulfur and phosphorous that they could be used in the acid process; the pig iron charged is hematite iron. The charge contains all the elements required to give the required analysis, plus the usual margin of carbon. The charge contains about 0.5 percent of silicon and a maximum amount of manganese, in order to insure correct conditions in the bath. Nickel-chromium-molybdenum steels can be made by this process, and high yields of the valuable alloying elements are obtainable from scrap charges. No melting and slag difficulties are experienced if the chromium bearing materials are charged first and covered with carbon steel turnings, the limestone and iron being added last of all. *Osborne.*

Shelby tube. A thin-walled soil-sampling tube, 12 to 30 inches long, attached to a special rod adapter or sub by means of machine screws. The device is designed to take soil samples by pressing or pushing the tube down into the formation sampled. Also called Shelby-tube sampler; thin-wall drive sampler. *Long.*

Shelby-tube sampler. Synonym for Shelby tube. *Long.*

shelf. Corn. a. The solid rock or bedrock, especially under alluvial tin deposits. *Fay.* b. A charging bed in a furnace at a higher level than the working bed. *Standard, 1964.* c. A rock, ledge of rock, reef, or sandbank in the sea. *Fay.* d. A projecting layer or ledge of rock on land. *Fay.* e. The submerged border of a continent or of an island extending from the shoreline to the depth at which the sea floor begins to descend steeply toward the bottom of the ocean basin. *See also* continental shelf. *Webster 3d.* f. A ledge of bedrock upon which drift rests. *Statistical Research Bureau.*

shelf angle. A mild steel angle section, riveted or welded to the web of a comparatively deep I-beam supporting the formwork for hollow tiles or forming the seating for precast concrete floor or roof units. *Ham.*

shelf atoll. *See* pseudoatoll. *Schieferdecker.*

shelf edge. The point at which there is a marked increase of slope at the outer margin of the continental shelf. Commonly occurs between 50 and 80 fathoms. *A.G.I.*

shelf ice. Land ice extending outward from the shore over the continental shelf. *Schieferdecker.*

shelf quarry. An open-pit quarry where the ledge of stone forms a hill and the floor of the quarry worked on a hillside may be a little, if any, lower than the surrounding country. In such openings, both transportation and drainage are favorable. *AIME, pp. 324-325.*

shelf retaining wall. A retaining wall of reinforced concrete having a relieving platform built onto its upper part. *Ham.*

shelf seas. The seas overlying the continental shelf, corresponding to the belt of variables. *Challinor.*

shell. a. A steel tube from which air or other gas at high pressure is discharged with explosive force in a shothole; as used with Cardox, Hydrox, and air blasting. *B.S. 3618, 1964, sec. 6.* b. Incorrectly used by some drillers as a synonym for reaming shell; also incorrectly used as a synonym for the inner or outer tube of a core barrel. *Long.* c. Any thin wall tubular device. *Long.* d. A torpedo used in oil wells. *Fay.* e. A metal or paper case which holds a charge of powder. *Fay.* f. A thin, hard band or layer of rock encountered in well boring. *Fay.* g. A hollow structure or vessel. *ASM Gloss.* h. An article formed by deep drawing. *ASM Gloss.* i. The metal sleeve remaining when a billet is extruded with a dummy block of somewhat smaller diameter. *ASM Gloss.* j. In shell molding, a hard layer of sand and thermosetting plastic or resin formed over a pattern and used as the mold wall. *ASM Gloss.* k. A tabular casting used in making seamless drawn tube. *ASM Gloss.* l. A pierced forging. *ASM Gloss.* m. In grinding mill, external cylinder and ends. *Pryor, 3.* n. The falling away of a 1- to 2-inch internal layer of refractory from the roof of an all-basic open-hearth steel furnace; the probable cause is the combined effect of flux migration, temperature gradient, and stress. This form of wear is also known as slabbing. *Dodd.* o. A flake of glass chipped from the edge of glassware, or the hollow left by such a flake. *Dodd.* p. The shell of a hollow clay building block refers to the outer walls of the block. *Dodd.* q. A group of electrons in an atom, all of which have the same principal quantum number. *C.T.D.* r. A curved form of plate construction applicable to roofs. *Ham.*

shellac bond. A bonding material whose chief constituent is shellac. *ACSG, 1963.*

shellac wheel. A grinding wheel bonded with shellac. *ASM Gloss.*

shell agate. Agate containing silicified mollusk shells. *Shipley.*

shell-and-auger boring. Method of making exploratory shallow bores in soft ground using the auger for clay and the shell, or sandpump, for sands. *Pryor, 3.*

shell band. *See* mussel band. *Fay.*

shell bed. A bed containing abundant fossil shells. *B.S. 3618, 1964, sec. 5.*

shell cameo. A cameo carved from shell with raised figure cut from white layers and the background cut way to the darker layers. *Shipley.*

shell clearance. The difference between the outside diameter of a bit or core barrel and the outside set or gage diameter of a reaming shell. *Long.*

shell core. A shell-molded sand core. *ASM Gloss.*

shell door. Eng. A temporary door. *Fay.*

shelling. *See* shell. *Dodd.*

shell lime. Lump lime which when flaked has a characteristic shell-like appearance. It is used mainly in Scotland. *Osborne.*

shell limestone. A sedimentary rock composed chiefly of fragments of fossil shells. *Fay.*

shell marble. An ornamental marble containing fossil shells. *Fay.*

shell marl. A light-colored calcareous deposit in the bottoms of small lakes, composed largely of freshwater shells, but apparently also to some extent of precipitated carbonate of calcium and the hard parts of minute organisms. *Fay.*

shell molding. Forming a mold from thermosetting resin-bonded sand mixtures brought in contact with preheated (300° to 500° F) metal patterns, resulting in a firm shell with a cavity corresponding to the outline of the pattern. Also called Corning process. *ASM Gloss.*

shell-natron. A commercial compound used as a carbon dioxide absorbent in diving. *H&G.*

shell-perm process. A method of reducing the flow of water through a permeable soil into an excavation, by injecting the soil with bituminous emulsion containing a coagulator, which will solidify in the ground. *See also* permeability. *Ham.*

Shell phosphate process. A wet scrubbing process for removing hydrogen sulfide from fuel gases in which a solution of tripotassium phosphate removes H_2S from gases, particularly underpressure, and without appreciable effect upon carbon dioxide. The hydrogen sulfide is regenerated by boiling, and sulfur may be recovered in a Claus kiln. The plant consists of a packed tower, or a bubble-cap tower, for absorption, preferably underpressure, and a bubble-cap tower for regenerating with steam heat. The reagent is stable, noncorrosive to mild steel, and the solution loss is negligible. *Francis, 1965, v. 2, pp. 428-429.*

shell pump. A simple form of sand pump or sludger consisting of a hollow cylinder with a ball or clack valve at the bottom, used with a flush of water to remove detritus. *Webster 3d. See also* sand pump; sludger.

shells. The outer walls of tile. *ASTM C43-65T.*

shell sand. Sand chiefly or largely composed of fragments of mollusk shells. *Standard, 1964.*

shells of the earth. Concentric shells composing the interior of the earth. *Schieferdecker.*

shellstone. Eng. A china stone from Cornwall containing too much iron (as brown mica) for use as a flux in pottery glazes but of potential value in sewer pipe glazes. *See also* china stone. *Dodd.*

shell wall; ring wall. The wall of fireclay refractories that protects the outer steel casing of a hot-blast stove. *See also* hot-blast stove. *Dodd.*

shelly. a. A name applied to coal that has been so crushed and fractured that it breaks up easily into small pieces. Broken ground. *Fay.* b. A laminated roof that sounds hollow and breaks into thin layers of slate or shale. *Zern.*

shelly formation. A thin and generally hard stratum encountered in drilling. *See also* shell. *A.G.I.*

shelly stone; shelly metal. Eng. Laminated stone liable to flake; fissile stone; marl containing flakes of limestone, Northumberland. Cheshire, Northamptonshire. *Arkell.*

shelter cave. a. A cave formed from without, for example, by the wind or by waves. *Schieferdecker.* b. A cave formed within the rock, mostly by solution. *Schieferdecker.* c. A cave only partially underground, which is formed by a protecting roof of overlying rock; generally open on one or more sides. Sometimes called a rock cave. *A.G.I.*

shelter hole. In coal mining, a niche in the rib along a haulage road into which one may step to avoid passing trains. *Grove.*

Shelton loader. An adapted coal-cutting machine in which the picks of the cutter chain are replaced by loading flights. The machine hauls itself along the face, the jib leading, by means of an anchored rope. The flights push the prepared coal up a ramp on to the face conveyor, and on their return path to the back of the prepared coal, fold back and then open up for coal loading as they emerge at the end of the jib. It requires well prepared coal for successful operation, and will load only in one direction, consequently it has to be flitted back along the coal face. The jib can be swung into line with the body for flitting. *Mason, v. 1, p. 126.*

shelves. The most stable areas of the craton that are periodically flooded by marine waters. *A.G.I.*

shelving. The effect produced in the refractory lining of a glass tank furnace by severe erosion of the horizontal joints between the tank blocks. *Dodd.*

shelving stone; shelyngstone; shilling stone. *Corn.; Dev.; Som.* Slate; a roofing slate or tile. *Arkell.*

shepherd. Aust. A miner who preserves legal rights to a claim without working on it. *Standard, 1964.*

shepherding. Preserving the rights in a mining claim while doing the minimum possible amount of developing. *Nelson.*

sherardize. Named after the 20th century English inventor, Sherard O. Cowper-Coles. To coat (an article of iron or steel) with zinc by covering with commercial zinc dust in a tightly closed drum and heating for several hours at 300° to 420° C so that a zinc-iron alloy is formed at the surface through the action of zinc vapor. *Webster 3d.*

sherardizing. A galvanizing process in which the metal to be coated is heated, with or without tumbling, in contact with zinc dust. Blue powder or manufactured dust may be used for the source of the zinc. *Liddell 2d, p. 495.*

sherd. A fragment of pottery. In petrography applied particularly to the characteristic crescentic or cuspate particles into which volcanic glass is sometimes blown, while still hot, by the expansive force of included gases. The glass particles of tuff often show such cuspate outlines. *Fay.*

shergottite. An achondrite (stony meteorite) that is chiefly augite with maskelynite. *Hess.*

sheridanite. A pale greenish to nearly colorless talclike chlorite, near to leuchtenbergite, containing much aluminum and very little iron, $H_6Mg_3Al_2Si_2O_{13}$. From Sheridan, Wyo. *English.*

Sherman settler. A series of cylindrical tanks with conical bottoms having central feed and a peripheral overflow. The tanks continually decrease in depth and increase in diameter. *Liddell 2d, p. 392.*

sherry topaz. a. Topaz the color of sherry wine. *Shipley.* b. An incorrect name for citrine of the same color. *Shipley.*

Sherwen shaker. An electromagnetic vibrator used in shaking table mechanisms, concrete consolidation, ore feeders and screens. *Pryor, 3.*

sherwoodite. A mineral, $Ca_3V_8O_{22}.15H_2O$, blue-black tetragonal prisms from numerous vanadium mines on the Colorado Plateau. *Hey, M.M., 1961.*

she's fired! Eng. An expression used when an explosion of firedamp has taken place in the pit. *See also* squat lads! *Fay.*

shet. S. Staff. The broken-down roof of a coal mine. *Fay.*

sheth. a. Eng. An old term denoting a district of about eight or nine adjacent bords. Thus a "sheth of bords," or a "sheth of pillars." *Fay.* b. *N. of Eng.* To course the air in the workings. *See also* coursing. *Fay.* c. *N. of Eng.* The rib of a chaldron wagon. *See also* sheaths. *Fay.*

sheth door. N. of Eng. A temporary door placed in a working heading. *Fay.*

shething the air. N. of Eng. Ventilating the goaves in a systematic way. *Fay.*

sheth of bords. Eng. *See* sheth, a. *Fay.*

sheugh. a. Scot. To make ditches or drains in; to dig, as peat, by making ditches. *Webster 2d.* Also called sheuch. *Fay.* b. *Scot.* A shaft or coalpit. *Fay.*

slicer. Aust. An unproductive mine. *Webster 3d.* A mining claim without gold. *Fay.*

shides. Brist.; Scot. Pumps for draining mines. *Fay.*

shield. a. In mining or tunneling, a framework or screen of wood or iron protecting the workers, pushed forward as the work advances. *Standard, 1964.* b. A metal diaphragm used in tunneling under rivers, or in water-bearing or loose material under cities. The shield may be cylindrical and include the entire tunnel section, or it may be a roof shield and support the roof only. *Stauffer.* c. The Precambrian nuclear mass of a continent around which and to some extent upon which the younger sedimentary rocks have been deposited. *Webster 3d.* d. A layer or mass of material used to reduce the passage of ionizing radiation. *See also* biological shield; thermal shield. *L&L.*

shield basalts. Basaltic accumulations of smaller size than the plateau or flood basalts, arising from the confluence of lava flows from a large number of small, closely spaced volcanoes. The flows coalesce into masses hundreds to thousands of square miles in size. Synonym for multiple vent basalts. *A.G.I.*

shielded arc welding. Arc welding in which the arc and the weld metal are protected either by a gaseous atmosphere, the products of decomposition of the electrode covering, or a blanket of fusible flux. *ASM Gloss.*

shielded carbon-arc welding. An arc-welding process wherein coalescence is produced by heating with an electric arc between a carbon electrode and the work. Shielding is obtained from the combustion of a solid material fed into the arc or from a blanket of flux on the work or both. Pressure may or may not be used and filler metal may or may not be used. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.*

shielded metal-arc welding. An arc-welding process where coalescence is produced by heating with an electric arc between a covered metal electrode and the work. Shielding is obtained from decomposition of the electrode covering. Pressure is not used and filler metal is obtained from the electrode. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.*

shielded monoelectrode. *See* guard electrode log. *A.G.I.*

shielded stud welding. An arc-welding process wherein coalescence is produced by heating with an electric arc drawn between a metal stud or similar part, and the other work part, until the surfaces to be joined are properly heated, when they are brought together under pressure. Shielding is obtained from an inert gas such as helium or argon. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.*

shielding. Placing an object in an electrolytic bath so as to alter the current distribution on the cathode. A nonconductor is called a shield; a conductor, a robber, thief, or guard. *ASM Gloss.*

shielding glass. A protective glass for use in nuclear engineering; although it is transparent to visible light, it absorbs high energy electromagnetic radiation. Such glasses contain a maximum proportion of oxides of heavy elements, for example, PbO, Ta_2O_5, Nb_2O_5,WO_3. *Dodd.*

shields. Large areas of ancient rocks that have remained relatively stable through most geologic time. *Bateman.*

shield volcano. A broad, gently sloping volcanic cone of flat, domical shape usually several tens or hundreds of square miles in extent, built chiefly of overlapping and interfingering basaltic lava flows. Typical examples are the volcanoes, Mauna Loa and Kilauea, on the Island of Hawaii, and the great basaltic volcanoes of Iceland. The slops of shield volcanoes generally range from about 4° to 10°. The Schildvulcan of German writers. *A.G.I.*

shift. a. The number of hours or the part of any day worked. Also called tour. *Long.* b. The gang of men working for the period; as, the day shift or the night shift. *Fay.* c. One of the main divisions of the day (day, afternoon, and night), or of the operation cycle. *Mason.* d. Move-up; extension. *Mason.* In Great Britain the coal miner works 7½ hours estimated from the time of departure and return to the surface. The actual working period at the face is from 6 to 6½ hours because of traveling time. *Nelson.* e. *See* fault shift. *Nelson.* f. Miner's term for a small fault or slip. *Arkell.* g. To change the ratio of the driving to the driven gears to obtain the desired rotational speed or to avoid overloading and stalling an engine or motor. *Long.* h. A fault of dislocation. *Fay.* i. The maximum relative displacement of points on opposite sides of the fault and far enough from it to be outside the dislocated zone. Also called net shift. *See also* dip shift; normal shift; strike shift; vertical shift. *Fay.* j. A casting defect caused by mismatch of cope and drag or of cores and mold. *ASM Gloss.*

shift boss. a. The foreman in charge of men on a shift. *Ballard.* b. The foreman or official in charge of operations at a quarry or metal mine during a specific shift. *Nelson.* c. A master workman who directs the work of the set of men engaged upon a particular shift; that is, the set of workmen who work in turns with other sets. *Ricketts, I.* d. In metal mining, a foreman who is in direct charge of men in a specific portion of the mine. At small mines, performs a considerable amount of production work. In coal mining, synonymous with pit boss. Also called inside foreman; shifter; shiftman; underground foreman. *D.O.T. 1.*

shifter. a. *See* bottomer. *Fay.* b. N. of Eng. One who repairs roadways in a mine. *Fay.* c. *Newc.* A man who prepares the working places in a coal mine at night. *Fay.* d. In bituminous coal mining, a general term for workers who assist brattice men, repairmen, timbermen, and other workers not engaged in the actual mining of coal. *D.O.T. 1.* e. *See* shift boss. *D.O.T. 1.* f. *See* track shifter

shift gear. A gear on a gear-feed swivel head of a diamond drill by means of which the feed-shifter rod may be moved to engage the shifter-rod pin into the selected feed gear. *Long.*

shifting clothes. Street clothes into which the miner changes on emerging from the mine. *Korson.*

shift joint. In masonry, a break joint. *Fay.*

shift lever. A short rod or shaft attached to the shift-gear shaft by means of which the ratio of the driving to the driven gears may be changed in a gear-feed swivel head of a diamond drill or other transmission-gear mechanism. *Long.*

shiftman. *See* shift boss. *D.O.T. 1.*

shiftmen. Aust. Men engaged on a time-wage basis working at various jobs. Also called company men. *Fay.*

shift work. a. Work performed at a mine and paid for by day wage as opposed to payment by results, namely by tonnage, yardage, or by pricelist. *Nelson.* b. Eng. Work performed underground for which wages are paid on a time basis; for example, timbering, road cleaning, etc. *Fay.* c. N. of Eng. Work, not included in a particular agreement, which is done and paid for at a fixed rate. *Trist.*

shillet. Term for the Devonian slates used for brickmaking in the Plymouth and Torquay areas of England; the word is a dialect form of shale. *Dodd.*

shim. a. A thin piece of material used between two surfaces to obtain a proper fit, adjustment, or alignment. *ASM Gloss.* b. Laminar packing piece used to regulate the gap or set between a pair of spring-loaded crushing rolls, or other device held together by springs or pressure. *Pryor, 3.*

shimmer aggregate. Fine-grained alteration products of sillimanite, kyanite, and staurolite, largely white mica cemented by quartz, which give a shimmer of high polarization tints under crossed nicols. *A.G.I.*

shimmy die. *See* flat edge trimmer. *ASM Gloss.*

shim rod. A nuclear-reactor control rod used in making infrequent coarse adjustments in reactivity, as in startup or in shutdown. *See also* regulating rod. *L&L.*

shin. An edge of a moldboard which is replaceable. *Ham.*

shinbone protectors. A form of leggings which protect the shinbone. They are designed in both metal and tough plastic and are secured by leather straps around the legs. *See also* protective clothing. *Nelson.*

shindle. A roofing slate. *Standard, 1964.*

shindle stone. Stone from which shindles or roofing slates are made. Local variant of shingle. *Arkell.*

shiners. Minute fish scales that sparkle in reflected light; they are liable to occur in vitreous enamelware if the ground coat is overfired. *Dodd.*

shingle. a. Loosely and commonly, any beach gravel which is coarser than ordinary gravel, especially if consisting of flat or flattish pebbles. *Fay.* b. Strictly and properly, beach gravel composed of smooth, well-rounded pebbles of roughly the same size, the interstices between which are not filled with finer material as in ordinary gravel, and which gives out a musical note when trod upon. *Fay.* c. In iron manufacture, to drive out scorias and other impurities from puddled iron by heavy blows or pressure. *Standard, 1964.*

shingle block structure. A series of thrust sheets lying against one another like the shingles of a roof. Also called imbricate structure. *Billings, 1954, p. 184.*

shingler. A machine for squeezing puddled iron. *Webster 3d.*

shingle rampart. *See* gravel ridge. *Schieferdecker.*

shingle structure. Arrangement of veins en echelon in the manner of shingles on a roof. *A.G.I. See also* imbricate structure.

shingle tile. A flat form of roofing tile. *Fay.*

shingley coal. Newc. Small coal free from dust. *Fay.*

shingling. In wrought iron manufacture, the operation by which sinter and other impurities are removed from a bloom and the metal solidly welded together by hammering and squeezing. Also called nobbing. *Henderson.*

shingly. Composed of, or abounding in, shingle. *Webster 3d. See also* shingle, a. *Fay.*

shining. As applied to the degree of luster of minerals, means those which produce an image by reflection, but not one well-defined, as celestite. *Fay.*

shin plaster. *See* suspension, a.

ship and galley tile. A special quarry tile having an indented pattern on the face of the tile to produce an antislip effect. *ASTM C242-60T.*

ship auger. An auger having a simple spiral (helical) body and a single cutting edge, with or without a screw on the end but without a spur at the outer end of the cutting edge, used to obtain soil samples in sticky material. *Long.*

ship caisson. A floating steel box fitted to close the entrance to a lock, dry dock, or wet dock. *See also* gate chamber. *Ham.*

shiplap liners. Longtiudinal lining plates for ball mill of wedgelike shape. The thin edge of each wedge underlies the thick edge of the preceding plate in direction of revolution. *Pryor, 3.*

Shipley polariscope. A gemmological polariscope suitable for use in the hand without use of microscope or other magnifier. Can be used in determinative gemmology to detect glass imitations and to differentiate between singly and doubly refractive gemstones. A mounted or unmounted stone is held, in an enclosed compartment, by a device which permits its being observed in various positions, affording rapid determination. *Shipley.*

ship observations. Meteorological and oceanographic data taken for a specific location, observed from a ship underway or at anchor. *Hy.*

shipper. a. An official who inspects the coal in the railroad cars before they are shipped to market. *Korson.* b. Aust. An instrument used for placing an endless rope on its rollers in cases where it gets off them. *Fay.* c. *See* snowbird mine. *Fay.*

shipper shaft. In a dipper shovel, the hinge on which the stick pivots when the bucket is hoisted. *Nichols, 2.*

shipping measure. For measuring entire internal capacity of a vessel: One register ton equals 100 cubic feet; for measuring cargo: One U.S. shipping ton equals 40 cubic feet or 32.143 U.S. bushels. *Crispin.*

shipping ore. a. Any ore of greater value when broken than the cost of freight and treatment. *Fay.* b. *See* first-class ore. *Nelson.*

ship-po. In ceramics, Japanese cloisonne enamelware. *Standard, 1964.*

shirt. The inner lining of a blast furnace. *Standard, 1964.*

shist. *See* schist. *Fay.*

shiver. a. Shale; a hard argillaceous bed. *See also* sheave. *Fay.* b. A variety of blue slate. *Standard, 1964.* c. Shale or slaty debris. *Arkell.* d. Eng. Shaly strata between the beds of stone, Purbeck beds, Swanage. *Arkell.*

shivering. a. A term used in connection with dry process enamels indicating chipping. Usually the result of a too low coefficient of expansion of the enamel. *Enam. Dict.* b. The splintering which occurs in fired glazes or other ceramic coatings due to critical compressive stresses. Also called peeling. *ASTM C242-60T.*

shiver spar. A calcite with a slaty structure. *Webster 3d.*

shivery post. Eng. *See* scamy. *Fay.*

Shlikh method. A geochemical prospecting method widely practiced in the U.S.S.R., which consists of systematically mapping the heavy minerals in stream sediments. *Hawkes, 2, p. 5.*

shoad; shode. a. Waterworn fragments of vein minerals found on the surface, such as beds of streams, away from the outcrop. *Arkell.* b. Float ore, which has broken from outcrop and gravitated to a distance. *Pryor,* 3. d. To shoad, to trace a lode by following up shoad. *Pryor, 3.* d. Corn. Stream tin, or any surface rubble or talus containing fragments of tin, copper, or lead ore, and signifying proximity of a lode. *Arkell.*

shoading. The process of tracing upstream the parent seam or vein by following fragments along the bed. *Nelson.*

shoal. a. Part of the sea bottom over which the water is relatively shallow. *Schieferdecker.* b. A detached elevation of the sea bottom comprised of any material except rock or coral, and which may endanger surface navigation. *A.G.I.* c. A shallow part in a channel above or below low tide level. Also called bank. *Schieferdecker.*

shock pressure loss. There is a constant ratio between shock pressure loss and the velocity pressure corresponding to the mean velocity of flow. Shock pressure losses can be calculated from the following formula: Ps=XPv, where Ps equals the total shock pressure loss in inches of water, Pv equals the velocity pressure, in inches of water corresponding to the mean velocity of flow (equals approximately $(V/4{,}000)^2$ at standard air density of 0.075 pound per cubic foot), and X equals an empirical factor or shock factor found by experiment. Ps and Pv are expressed in the same units and are equally affected by density. X is therefore independent of both the density and the units used and is the number of velocity pressures equivalent to the shock pressure loss. *Roberts, I, p. 273.*

shoaling effect. Alteration of a wave proceeding from deep water into shallow water. The wavelength decreases and the wave height increases. *Hy.*

shoal reef. *See* patch reef. *Schieferdecker.*

shock. A sudden depression of the nervous system due to accident. *Grove.*

shock bump. a. A rock bump caused by the sudden collapse of a thick sandstone or other strong deposit. *See also* rock burst. *Nelson.* b. A thump experienced in a mine when the breakage of overlying rocks produces the effect of a hammer blow. *Ham.* c. *See* bumps. *Kentucky, p. 327.*

shock loading. In winding, shock loads produced by picking up the cage from the pit bottom with slack chains or by lifting heavy pithead gates or covers. This often causes dry fatigue in the winding ropes. *Sinclair, V, pp. 12-13.*

shock losses. Losses resulting from changes in direction of flow or area of duct. They also occur at the inlet or discharge of a system, at splits or junctions of two or more currents of air, and at obstructions in airways. *Hartman, p. 78.*

shock-proof. As applied to the current-carrying parts of an electric system (excepting trolley wires) is taken to mean that contact with such parts is prevented by the use of grounded metallic coverings or sheaths. *Fay.*

shock-resistant steels. A rather general name for steels used for tools that are required to withstand much pounding. There are two general types. One type contains chromium, vanadium, and a small amount of molybdenum, with usually fairly high manganese; the other type contains up to 2 percent of silicon, with usually some molybdenum. The silicon steels are used for pneumatic tools and for such purposes as coining dies. *Brady, 4th ed., 1940, p. 426.*

shock wave. a. The wave of air and dust which, in some cases, travels ahead of the flame of a coal dust explosion. It may occur when an ignition takes place near the closed end of a mine roadway, and the reaction products behind the flame cannot escape freely. *Nelson.* b. The wave sent out through the air by the discharge of the shot initiating an explosion. This wave travels with the velocity of sound and produces to the human ear the noise like the boom of a cannon. *Rice, George S.*

shock-wave compression. Nonisentropic adiabatic compression in a wave traveling at greater than local sound velocity. *I.C. 8137, 1963, p. 76.*

shode. a. Corn. A loose fragment of veinstone. Ore washed or detached from the vein naturally. *See also* float ore. *Fay.* b. Eng. To search for ore by tracing the shode. *Fay.* Also spelled shoad. *Fay.*

shode pit. An excavation made in tracing shodes. *Standard, 1964.*

shoder. The package of goldbeater's skin in which the thin metal sheets are hammered in the second stage of making gold leaf. *Standard, 1964.*

shode stone. *See* shode, a. *Fay.*

shoding; shoading. Corn. The tracking of boulders toward the vein or rock from which they have come. *Fay.*

shoe. a. Pieces of steel fastened to a mine cage and formed to fit over the guides to guide the cage when it is in motion. *Long.* b. The bottom wedge-shaped piece attached to tubbing when sinking through quicksand. *Fay.* c. A trough to convey ore to a crusher. *Fay.* d. A coupling of rolled, cast, or forged steel to protect the lower end of the casting or drivepipe in overburden, or the bottom end of a sampler when pressed into a formation being sampled. *Long.* e. That part of a braking mechanism made of wood, steel, or asbestos that contacts the brake flange on a wheel or hoist drum. Long. f. A part of a crosshead of a compressor or engine. *Long.* g. A wearing piece in various types of machines used to break rock, such as a column of drill pipes; bottom of crushing stamp; muller of amalgamating pan. *Pryor, 3.* h. The lower replaceable part of a gravity stamp which falls on the mineral ore or rock. *Nelson.* i. A ground plate forming a link of a track, or bolted to a track link. *Nichols.* j. A support for a bulldozer blade or other digging edge to prevent cutting down. *Nichols.* k. A cleanup device following the buckets of a ditching machine. *Nichols.* l. A boat-shaped ingot of sycee silver weighing about 66½ ounces. *Standard, 1964.* m. A metal block used in a variety of bending operations to form or support the part being processed. *ASM Gloss.* n. In glassmaking, a crucible with open end, placed in a furnace, in which the blower heats the rods and punties. *Webster 2d.* o. A hollow refractory shape that is placed in the mouth of a glass pot and used for heating the blowing irons. *Dodd.*

shoe-nose shell. A cylindrical tool, cut obliquely at the bottom, for boring through hard clay. *Fay.*

shoe shell. Eng. A tool used in deep boring for cleaning out the drill cuttings. It has a valve at the bottom, opening upward. A sand pump or bucket. *Fay.*

shoe silver. Ingots of precious metal popularly thought to resemble a shoe. *Webster 2d.*

shoestring claim. A mining claim in the form of a long narrow strip. *Fay.*

shoestring location. A location of a long and narrow strip of mineral land. *Ricketts, I.*

shoestring sands. a. A narrow and relatively long body of sandstone. Examples have been described from the Pennsylvanian system of east-central Kansas. They originated as channel fillings, bars, beaches, etc. *A.G.I.* b. A type of lenticular formation in which a porous, permeable sandstone lens or streak is surrounded by impervious rock, frequently shale. Such stratigraphic traps are difficult to locate because of the absence of significant structural relief. *Williams.*

shonkinite. A melanocratic syenite often containing a small amount of nepheline; the principal minerals are augite and orthoclase. Other minerals that may often be present in varying small amounts are olivine, plagioclase, sodalite, and analcite, with accessory apatite and opaque oxides. *A.G.I.*

shoo-fly. a. Miner's work train. *Korsan.* b. Any crosscut between a haulageway and airway through which cars are run. *See also* slant, a. *Fay.*

shoot. a. To break coal loose from the seam by the use of explosives; loosely used, also as applied to other coal breaking devices. *B.C.I.* b. To break down by airblasting. *B.S. 3618, 1964, sec. 6.* c. To explode a charge in blasting operations. *Hudson.* d. To detonate an explosive in a borehole. *Long.* e. Incorrect spelling of chute. *Long.* f. A body of ore, usually of elongated form, extending downward or upward in a vein. Also called ore shoot. *Long.* g. The payable section of a lode; an enriched portion of a continuous ore body.

Nelson. h. Any considerable and somewhat regular mass of ore in a vein, frequently a rich ore streak in a vein; a chimney; also, a vein branching at a small angle from and reentering the main vein. *Standard, 1964.* i. The valuable minerals are commonly concentrated in certain portions of a vein that have one dimension much longer than the others. This shoot or chimney of ore is usually highly inclined to the horizontal. *Lewis, p. 20.* j. S. Afr. Enrichment of reef extending in long stretches like the shoots of a plant. *Beerman.* k. The portion of the lode, of greater or less length, which carries the ore, and which generally dips as an inclined plane at an angle along the line of lode; a larger form of pipe. *Gordon.* l. *See* ore shoot. *Pryor, 3.* m. *See* chute, a. *Fay.* n. *See* blast. A shot is a single operation of blasting. *Fay.* o. *See* chute, b. *Fay.* p. To torpedo an oil or gas well. *Fay.* q. In seismic exploration, the firing of the explosive by an electrical impulse; also, the process of carrying out a seismic survey, to shoot an area or prospect. *A.G.I.*

shooter. a. Aust. The man who fires a charged hole after satisfying himself that the place is free from firedamp. A shot firer. *Fay.* b. In the petroleum industry, one who shoots oil wells with nitroglycerin to loosen or shatter the oil-bearing formation. *Fay.* c. Tamping the shots. *A.G.I. Supp.* d. *See* blaster. *D.O.T. 1.* e. The shooter is that person on a seismograph crew who has some or all of the following duties: (1) loading the shotholes; (2) damping the shots; (3) firing the shot; and/or (4) care of explosives and shooting equipment. *A.G.I.*

shooting. a. Eng. Blasting in a mine. *Fay.* b. The use of explosives in rock breaking. Shooting an oil well uses a charge of high explosive to disturb the bearing strata and increase the flow of oil. Shooting fast is the breaking of a solid coal face. Shooting-on-the-free is shot firing after an easing face has been formed. *Nelson.*

shooting a well. Exploding nitroglycerine or other high explosive in a hole, to shatter the rock and increase the flow of oil or gas. *Williams.*

shooting boat. In marine seismic exploration, a boat equipped to carry explosives, and from which the placing and firing of shots are performed. *A.G.I.*

shooting by seismograph. The making of a seismographic survey. The term shooting derives from the setting off of explosions in the ground. The shock waves from these explosions are recorded by a seismograph, and from these records a contour map can be made. *Williams.*

shooting fast. Lanc. Blasting without previously holing or shearing the coal. *See also* shooting off-the-solid. *Fay.*

shooting flow. *See* jet flow. *Leet.*

shooting flow cast. Strong parallel ridges, up to 30 centimeters wide, 10 centimeters deep, and up to 2 meters long. *Pettijohn.*

shooting lease. An instrument granting permission to conduct a geophysical survey; it may or may not give the right to take an oil and gas lease on all or part of the lands. *Williams.*

shooting needle. A blasting needle; a metallic rod used in the stemming of a drill hole for the purpose of leaving a cavity through which the charge may be fired. *Fay.*

shooting off-the-solid. Mining the coal by heavy blasting without undermining or shearing it. In England, called shooting fast. *Fay.*

shooting on-the-free. The use of a small charge of powder to blow down the face of the coal after it has been undercut as distinguished from "shooting off-the-solid". *Fay.*

shooting rights. The right to enter upon land and make a geophysical survey. *Williams.*

shooting the gob. N. Staff. Working the coal in the pillars of inclined coalbeds by blasting. *Fay.*

shooting truck. In seismic operations, a truck equipped to carry explosives, materials, and equipment for preparing, loading, tamping, and firing explosive charges. *A.G.I.*

shooting valve. The control valve provided for the purpose of admitting compressed air to an airblasting shell and of venting residual air, in the shell and hose, to atmosphere. *B.S. 3618, 1964, sec. 6.*

shoot of ore. A body of ore with relatively small horizontal dimensions and steep inclination in a lode; in contradistinction to a course of ore, which is flatter. *See also* chute, e. *Fay.*

shop. a. Trades union reference to its membership. Closed shop is one in which only unionmen may work for specified firm. *Pryor.* b. A unit group of workmen producing glassware. *ASTM C162-66.* c. Also, its location at the furnace. *ASTM C162-66.*

shop rivet. A rivet driven in a workshop as distinct from a field or site rivet. *Ham.*

shop scrap. Same as bench scrap. *Skow.*

shop weld. A weld made in a workshop, which is often better and cheaper than one made on a site. *Ham.*

shoran. A high-frequency radio wave location system using microwave pulses used for offshore and airborne prospecting operations. Two stations are located at fixed points, the third is on the mobile station whose location is desired. The fixed stations broadcast pulses, the mobile station rebroadcasts them, and the round trip time is measured by means of cathode-ray screens to an accuracy of ±25 feet. *A.G.I.*

shore. a. Eng. A studdle or thrusting stay. *Zern.* b. Mine timber used to prop, brace, or stay working places. *Pryor, 3.* c. To support as by a stout timber, usually as a prop. *Crispin.* d. Meeting of land and water; shoreline. *A.G.I. Supp.* e. Land immediately beside water. *A.G.I. Supp.* f. Zone between high and low watermarks. *A.G.I. Supp.*

shore cliff. *See* sea cliff. *Schieferdecker.*

shore drift. The coarse material which covers the bottom where the agitation of the water at the bottom is effective, constitutes shore drift. *See also* littoral drift. *A.G.I.*

shore face. The zone seaward from the low-tide shoreline, permanently covered with water, over which the sands and gravels actively oscillate with changing wave conditions. *Schieferdecker.*

Shore hardness test. A scale of hardness of rocks as determined by the Shore scleroscope test. The test utilizes the drop and rebound method of a diamond-tipped hammer. This scale avoids the limitations of Mohs' scale of hardness and gives a better assessment of rock hardness. Welsh quartzitic sandstones have an average hardness of 85 Shore; the quartz and ironstone bands between 90 and 102 Shore and shales between 35 and 55 Shore. *Nelson.*

Shore hardness tester; scleroscope. A procedure for the determination of the hardness of a surface by dropping a ball from a fixed height above the surface and noting the height of rebound. This technique was first proposed by A. F. Shore in 1906. Although primarily for the testing of the hardness of metals, it has also been applied to a limited extent in the testing of ceramics. *Dodd.*

shoreline. a. The line of intersection of the sea with the land. The region immediately to the landward of the shoreline is called the coast, and seaward from this line, the shore. Thus, cliffs and deltas are coastal features while waves advance and retreat along the shore. *A.G.I.* b. A more or less concentric, wavy line which appears in the surface of the fired enamel, similar in appearance to the shore of a lake which has receded and deposited silt in waves. This condition, most frequently found in sheet-steel, acid-resisting enamels, may be caused by too rapid drying of the wet enamel coating or insufficient enamel setup. A shoreline is commonly thought to be the direct result of a too high concentration of sulfate salts in the enamel milling. *Enam. Dict.*

shoreline cycle; cycle of marine erosion; marine cycle. The sequence of coastal forms, developing, according to the Davisian school, under the influence of marine erosion and other coastal processes. *Schieferdecker.*

shoreline of advance. *See* shoreline of progradation. *Schieferdecker.*

shoreline of emergence; emerged coast. A coast havin gundergone a relative raise. *Schieferdecker.*

shoreline of progradation; shoreline of advance; prograded coast; accretion coast. Shoreline showing a regular seaward movement in consequence of sedimentation. *Schieferdecker.*

shoreline of retrogradation; abrasion shoreline. Shoreline produced by the cutting back of the shore in a line of cliffs. *Schieferdecker.*

shoreline of submergence; submerged coast; drowned coast. A coast having undergone a relative lowering. *Schieferdecker.*

shoreman, dredge. In metal mining, one who buries anchor logs (deadmen) in the earth, attaches wire cables, and performs shore duties to keep dredges in the digging positions. *D.O.T.1.*

shore platform. On a rocky shore, the tendency is to produce a horizontal or gently sloping platform, the outer edge of which corresponds to the line of nonerosion, so that its surface is bare at low water. This platform often is called a scar, and its inner side is bounded by cliffs more or less lofty, according to the height of the land which is eaten into. *See also* plain of marine abrasion; wave-cut terrace. *A.G.I.*

shore profile. Profile of the sea bottom immediately in front of and perpendicular to the shoreline. *Schieferdecker.*

shore protection. The prevention of scour by means of constructing breakwaters, graded filters, groins, and revetments. *Ham.*

shore scleroscope. An instrument comprising a small diamond-shaped hammer which falls freely down a graduated tube of glass from a constant height. The hardness of the surface under test is measured by the height of the rebound. In one type of this instrument the rebound of the hammer actuates the pointer of a scale so that the height of rebound is recorded. *See also* scleroscope hardness test. *Ham.*

shore terrace. a. A coastal terrace that is cut in rock or built up of gravel or sand. *Webster 3d.* b. *See* marine terrace. *Schieferdecker.*

shore up To stay, prop up, or support by braces. *Fay.*

shoring. Timbers braced against a wall as a temporary support. Also, the timbering used to prevent a sliding of earth adjoining an excavation. *Crispin.*

shorn. Eng. Cut with a pick, as in undercutting coal. *Fay.*

short. a. Said of roof shale that tends to break up or crush under pressure into small fragments and which will not hold in any span over a few inches. Also called tender. *Raistrick & Marshall, pp. 36-37.* b. Britle; friable; breaking or crumbling readily; inclined to flake off; said of coal. *Fay.* c. Used to denote a roof that has very little structural strength. *TIME.* d. Term applied to a clay body that has little workability, or to a glass that quickly sets. *Dodd.*

short and rough. Unmellowed, as by weathering; said of brick clay, as distinguished from mild and tough. *Standard, 1964.*

short awn. A direction of more than 45° to the main natural line of cleat or cleavage in the coal. Also spelled horn. *TIME. Compare* long awn.

short circuit. A short circuit is an abnormal connection of relatively low resistance, whether made accidentally or intentionally, between two points of different potential in a circuit. *ASA M2.1-1963.*

short clod. Forest of Dean. Clod with pronounced cross fracture or cleat. *Arkell.*

short coal. *See* short, b. *C.T.D.*

short column. A column so short in relation to its cross section that, if overloaded, will fail by crushing rather than by buckling. *See also* long column. *Ham.*

short-delay blasting. a. A method of blasting where the explosive charges are detonated with a very short delay interval between them. It enables shots to assist one another as in simultaneous firing and also each shot or group of shots establishes a free or semifree face for the following group of shots. *Nelson.* b. Method of blasting by which charges are caused to explode in a given sequence with time intervals of 0.001 to 0.1 second. *Fraenkel.*

short-delay detonator. a. A detonator in which the interval of time delay is incremental in milliseconds. *B.S. 3618, 1964, sec. 6.* b. The original 1-second delay detonators are no longer used and the choice now lies between the ½-second type and those known as short-delay detonators. The new type gives better fragmentation of rock and consequently better loading rates. *Nelson.*

short finish. An imperfection in plate glass, resulting from incomplete polishing. *ASTM C162-66.*

short-fire. *See* underfire, a. *Fay.*

short flame. A strongly aerated flame, such as the blowpipe. Air and gas are well mixed and delivered at high speeds with turbulent flow. *Francis, 1965, v. 2, p. 436.*

short-flame coal. a. Coal with a medium volatile matter, approximately 20 to 25 percent dry-mineral-matter-free-basis. *B.S. 3323, 1960.* b. Dry or lean coal, otherwise coal poor in volatiles. *Tomkeieff, 1954.*

short-flame explosive. *See* permissible explosive. *Fay.*

short fuse. a. Any fuse that is cut too short. *Fay.* b. The practice of firing a blast, the fuse on the primer of which is not sufficiently long to reach from the top of the charge to the collar of the borehole. The primer, with fuse attached, is dropped into the charge while burning, and tamping may, or may not, be attempted. It is an exceedingly dangerous practice. *Fay.*

short glazed. *See* starved glaze. *Dodd.*

short hole. a. Taphole in a furnace that is not properly stopped and that is likely to release the molten charge prematurely. *Henderson.* b. *See* blasthole; grout hole. *Long.*

short-hole drill. A blasthole or grout-hole drill. *Long.*

short-hole work. Diamond drilling where the length of borehole generally does not exceed 100 feet. *Long.*

shortite. A double carbonate of sodium and calcium, $Na_2CO_3.2CaCO_3$, as hemimorphic orthorhombic crystals from Wyoming. *Spencer 15, M.M., 1940.*

short leg. One of the wires on an electric blasting cap, which has been shortened so that when placed in the borehole, the two splices or connections will not come opposite each other and make a short circuit. *Fay.*

short length. Refers to lumber less than 8 feet in length. *Crispin.*

shortness. A form of brittleness in metal. It is designed as cold, hot, and red, to indicate the temperature range in which the brittleness occurs. *ASM Gloss.*

short nipple. One whose length is a little greater than that of two threaded lengths or somewhat longer than a close nipple. It always has some unthreaded portion between the two threads. *Strock, 3.*

short outcrops. Outcrops that do not extend for the full length of the claim have extralateral rights allowed, but only between planes through the ends of the outcrop and parallel with the boundaries of the claim. Sidelines may become the endlines in these cases. *Lewis, p. 33.*

short-period delay; millisecond delay. An electric blasting cap that explodes one-fiftieth to one-half second after passage of an electric current. *Nichols.*

short periods. The time required to drill a few holes for trolley hangers or a few short block holes, or one or two holes for bringing down a piece of loose roof. *BuMines. Coal Mine Inspectors' Manual, June 1966, pt. 3-21f, p. 81.*

short-range order. Identical first-neighbor coordination of atoms. Typical of glassy structures. *V.V.*

short run. To be forced by adverse conditions or core blockage to pull the drill string before the core barrel being used is filled to capacity with core. *Compare* long run. *Long.*

shorts. a. The contents of a wagon of coal containing very much dirt. *C.T.D.* b. The shortage in production under a royalty lease. *C.T.D.* c. Eng. The contents of cars filled with coal, or coal and dirt mixed, otherwise than in accordance with the colliery regulations. *Fay.* d. Eng. Deficiency of mineral worked under a lease during any year or other period agreed upon. *Fay.* e. As applied to asbestos, consist of the very shortest of classified grades, and the fibers may vary from microscopical thin filaments to crudey bundles of fibers of appreciable thickness. Included may be particles of nonfibrous serpentine ranging from a palpable powder to granules of visible size. *Sinclair, W. E., p. 288.* f. The product that is retained on a specified screen in the screening of a crushed or ground material. *ASM Gloss.* g. In gold cyanidation, the oversize after the gold-rich zinc from the precipitation boxes has been rubbed through. *Pryor, 3.*

short section. A section of land according to the United States Governmental Survey which contains less than 640 acres. *Williams.*

short shot. Colloquialism for weathering (or low-velocity layer) shot in seismic prospecting. *A.G.I.*

short stall. Mid. A single-road stall. *Fay.*

short-term engagement. In a short-term engagement, men are taken on by the day, week, or month; there is little encouragement given them to become permanent employees, and discharges are frequent. *Spalding, p. 370.*

short-time rating. The maximum electrical load which can be carried for a specified short time without exceeding the specified temperature rise limitations under prescribed conditions of test and within the limitations of established standards. *Coal Age, 1.*

short ton. A unit of weight that equals 20 short hundredweights or 2,000 avoirdupois pounds. Used chiefly in the United States, in Canada, and in the Republic of South Africa. *Webster 3d.*

shortwall. a. The reverse of longwall, frequently used to mean the face of a room. *Zern.* b. A method of mining in which comparatively small areas are worked separately, as opposed to longwall; for example, room and pillar. *B.C.I.* c. A length of coal face intermediate between a stall and a normal longwall face. A shortwall face may be any length between about 5 and 30 yards and is generally employed in pillar methods of working. Rooms and stables may also be classified as shortwall faces. *See also* shortwall development. *Nelson.*

shortwall coal cutter. a. A machine for undercutting coal which has the cutter bar fixed in relation to the main body of the machine. It sumps and cuts across a face in a more or less continuous motion, except when it becomes necessary to stop to change the position of the ropes used to move the machine through the action of rope drums, or when difficulties in cutting are experienced. *Jones.* b. This coal cutter has a long, rigid chain jib in line with the body of the machine and cuts across a heading from right to left, being drawn across by means of a steel wire rope. This machine cannot be readily flitted from one heading to another unless a power-propelled flitting truck is available, otherwise each heading requires its own shortwall cutter. A shortwall cutter will make a 6-foot cut across a 15-foot heading in 20 minutes, including sumping in and out of the cut. *Mason, v. 1, p. 106.*

shortwall development. A system of coal working sometimes employed in seams 4 feet or under in thickness, with the aid of machines. Short faces, each 15 to 30 yards wide, are driven at 50 to 70 yards centers, with crosscuts to assist coal transport and ventilation. The rippings are used to form roadside packs. The shortwalls are driven to the boundary and the coal pillars worked by longwall retreating. *Nelson.*

shortwall working. N. of Eng. An enlarged version of rib-and-stall working with faces of up to 50 yards in length. Gateways are made at both ends of the face. *Trist.*

short workings. Eng. *See* shorts, d. *Fay.*

shoshonite. A variety of alkalic basalt consisting of about equal amounts of labradorite and sanidine with lesser amounts of augite and olivine. Leucite is sometimes present in small amounts. Shoshonite is intermediate in a series with absarokite and banakite. It is transitional into absarokite with increasing amounts of olivine and transitional into banakite with increasing amounts of sanidine. *A.G.I.*

shot. a. A charge of some kind of explosive, in regular mining placed in a hole drilled in the coal, the purpose being to break down the coal. *Rice, George S.* b. Coal which has been broken by blasting or other devices. *B.C.I.* c. A single explosive charge fired in coal, stone, or ore. *Nelson.* d. A shot as used in seismic shooting. *Nelson.* e. A charge or blast. Balanced shot, a shot so placed that the hole containing the powder is parallel to one face of the coal to be broken. Blown-out shot, a shot which merely throws out the stemming without loosening much coal. Cutting shot, a shot arranged to loosen the coal prepared by the cutting and to scatter the coal in advance to facilitate the making of another cutting. Gouging shot (Ark.), a gripping shot or opening shot in a straight face, as to start a breakthrough. Gripping shot, a shot which is farther from the face of the coal at the point than at the heel; also called wedging shot. Opening shot, the first gripping shot fired, in a straight face of coal. Slitting shot, a shot put into a large mass of coal detached by a previous blast. Windy shot, a shot which causes a concussion in the air, usually by an excessive amount of powder behind an easily loosened mass of coal. *Fay.* f. The firing of a blast. *Fay.* g. Injured by a blast. *Fay.* h. Small spherical particles of brittle hard steel used as the cutting agent in drilling a borehole with a shot drill. Also called adamantine shot; buckshot; chilled shot; corundum, steel shot. *See also* shot drill. *Long.* i. Of no further use. *Long.*

shot bit. A short length of heavy-wall steel tubing, ranging from less than 3 inches to more than 6 feet in diameter, with diagonal slots cut in the flat-faced bottom edge. The replaceable flat-faced shoe on a shot-drill core barrel. *See also* shot drill. *Long.*

shot blasting. A method similar to sandblasting for cleansing the surface of metals, using broken shot or steel grit instead of sand. It is less effective than sandblasting because the peening effect of the shot tends to drive unwanted deposits such as oxides into the surface. *See also* descaling. *Ham.*

shot boring. The act or process of producing a borehole with a shot drill. *See also* shot drill. *Long.*

shot-boring drill. Synonym for shot drill. *Long.*

shot bort. a. Incorrectly used to designate a small spherical-shaped drill diamond. *See* drill diamond. *Long.* b. Synonym of ballas. *Long.* c. Variety of bort with little impurity, in milky-white to steel-gray spherical stones with radiating structure and great toughness. *Tomkeiff, 1954.* d. Spheres of translucent diamond with more cohesion than ordinary bort. *See also* bort, c. *Hess.*

shot break. In seismic exploration, the electrical impulse which records the instant of explosion. *A.G.I.*

shot charger. In bituminous coal mining, one who charges explosives in drill holes to prepare them for blasting. *D.O.T.1.*

shot copper. Small, rounded particles of native copper, somewhat resembling small shot in size and shape. *Fay.*

shot-core drill operator. See diamond driller. *D.O.T.1.*

shot-core-drill-operator helper. *See* diamond-driller helper. *D.O.T.1.*

shotcrete. *See* guniting. *Nelson.*

shot datum. Seismic calculations are usually reduced to a convenient reference surface or plane. These calculations simulate a condition where the charge is shot on the reference surface and the energy is also recorded on this same reference surface. At this reference surface, the time-depth charts have their origin. *A.G.I.*

shot depth. The distance from the surface to the charge. In the case of small charges, the shot depth is measured to the center of the charge or to the bottom of the hole. In the case of large charges, the distances to the top and to the bottom of the column of explosives are frequently given, and may be reduced to effective shot depth to give the equivalent of a concentrated charge. *A.G.I.*

shot drill. A core drill generally employed in rotary-drilling boreholes of less than 3 inches to more than 6 feet in diameter in hard rock or concrete, using chilled-steel shot as a cutting medium. The bit is an annular-shaped, flat-face, steel cylinder with one or more diagonal slots cut in the bottom edge. As the bit and attached core barrel are rotated, small quantities of chilled-steel shot are fed, at intervals, into the drill stem with water. The shot works its way under the flat face of the bit and wears away the rock as the bit rotates. At intervals, the core is removed from the borehole in somewhat the same manner as in diamond core-drilling operations. Also called adamantine drill; calyx drill; chilled shot drill. *Long.* *See also* shaft drilling.

shot-drilled shaft. Shafts of up to 5 feet in diameter drilled through rock to a maximum depth of 1,200 feet by means of a shot drill. The latter makes use of shot for cutting a circular groove in the rock being penetrated, from which solid cores are extracted. *Ham.*

shot-drill hole. Borehole produced by a shot drill. *Long.*

shot drilling. The act or process of drilling a borehole with a shot drill. *See also* shot drill. *Long.*

shot-drill sample. In addition to the core sample produced, the heavier sludge particles are caught in a sediment tube which is continuous with the core barrel and open at the top. The combined length of core barrel and sediment tube is about 10 feet. *Nelson.*

shot elevation. Elevation of the dynamite charge in the shothole. *A.G.I.*

shot examiner. a. In Iowa, a shot firer. *Hess.* b. *See* shot inspector. *D.O.T.1.*

shot fast. Coal mined by blasting; shot off the solid. *Fay.*

shot feed. A device to introduce chilled-steel shot, at a uniform rate and in the proper quantities, into the circulating fluid flowing downward through the rods or pipe connected to the core barrel and bit of a shot drill. *Long.*

shot firer. a. A man whose special duty is to fire shots or blasts, especially in coal mines. A shot lighter. In Australia, called a shooter. *Fay.* b. In a colliery, a qualified miner who tests for gas before firing explosive shots. *Pryor, 3.* c. In Great Britain, the shot firer has charge of operations which are a potential source of grave danger in mines, and it is therefore imperative that he be thoroughly competent for his job. He must be appointed in writing by the manager, who is entirely responsible for seeing that the shot firer is in every way qualified for his duties. *Mason, v. 2, p. 673.* Also called shotman. d. N. of Eng. An official whose sole responsibility is to charge, stem, and fire down undercut coal in preparation for filling. *Trist.* e. *See* blaster. *D.O.T.1.*

Shot Firer. A multiple shot permissible blasting unit introduced in 1948, known as Capacitor Type Permissible Shot Firer. Weighing approximately one pound and about the size of an ordinary flashlight, the nonmetallic unit is equipped with a belt hook which permits its being carried under supervision of the shot firer. If desired, shots can be fired without removing the unit from the belt. It is capacitor operated, eliminating dependence on speed of operation for energy output. Capacitors supply high voltage, for a few milliseconds, more than ample to fire from one to ten electric blasting caps. *Kentucky, pp. 175-176.*

shot-firer runner. *See* fire runner. *D.O.T. 1.*

shot-firer's magnetoexploder. In principle, a simple electric generator depending for its action on electromagnetic induction. *Morris and Cooper, p. 224.*

shot firing. a. The action of detonating or igniting a charge of explosive, usually in a drilled hole. *B.S. 3618, 1964, sec. 6.* b. The firing of an explosive charge in a drilled hole to break the material to a suitable size for loading. *Nelson.*

shot-firing blasting cord. A two-conductor cable used for completing the circuit between the electric blasting cap (or caps) and the blasting unit or other source of electric energy. *ASA C42.85: 1956.*

shot-firing cable. A pair of insulated copper conductors which lead from the exploder to the detonator wires. It may be either twin-core (both conductors contained in the one cable) or single-core (each conductor contained in a separate cable). Twin-core cables having cores of 4 strands, each 0.018 of an inch in diameter (4/0.018) with a resistance of approximately 5 ohms per 100 yards, are commonly used. Actual choice of cable must depend upon conditions of use and the relevant regulations. *Nelson.*

shot-firing cable tests. The methods of testing twin-core and single-core cables are identical. Two tests are applied, one for insulation and one for continuity, and where large and important charges are being fired, as in tunnel, wellhole, and quarry blasts, tests are made before every blast. For the cable insulation test, an approved circuit tester or ohmeter is connected to one end of the cable, the two conductors at the other end being separated. No current should flow and the resistance should be infinite. For the continuity test, the two far ends of the cable should be joined. The tester should show that the current is complete, or if an ohmeter is used, this should show the correct resistance of the shot-firing cable. *Nelson.*

shot-firing circuit. Extends from the exploder along the shot-firing cable, detonator wires, and finally the detonator. The shot-firing circuit is the path taken by the electric current from the exploder when a shot is detonated. *Nelson.*

shot-firing curtain. A steel chain mat suspended from the roof about 9 to 12 feet from the face of an advancing tunnel to limit damage to equipment and danger from flying debris when shot firing at the face. It consists of a steel frame with chains suspended about 6 inches apart. *See also* blasting curtain. *Nelson.*

shot firing in rounds. The firing of a number of shots in a tunnel, or shaft sinking at one operation with instantaneous or delay detonators. This practice requires only one complete inspection for firedamp and the taking of shelter on one occasion only. It also saves the time of the shot firer and the workmen. Formerly, the shot firer had to return to the face, containing dust and fume, after each shot to connect the cable for the next shot. In Great Britain, the practice of firing in rounds is increasing and nearly 30 percent of coal shots and 40 percent of ripping shots are now fired in this way. *Nelson.*

shot-firing unit. *See* blasting unit.

shothole. a. A hole drilled for the purpose of shot firing. *B.S. 3618, 1964, sec. 6.* b. A hole drilled in coal, ore, or rock, usually from 3 to 9 feet in length (underground) for breaking down the material by means of explosives *.See also* blasting. *Nelson.* c. The borehole in which an explosive is placed for blasting. *Fay. See also* blasthole. d. A borehole drilled with a shot drill. *Long.* e. *See* shot point.

shothole bridge. When an obstruction in the shothole makes it difficult or impossible to get the charge down deeper, the hole is said to be bridged. A narrow diameter in the hole due to a resistant bed often makes it difficult to get the charge down the hole. A mechanical device is on the market that purposely bridges the hole at a shallow depth in order that the hole may be filled. *A.G.I.*

shothole casing. Lightweight pipe, usually about 4 inches in diameter. A typical joint of casing is 10 feet long and has threaded connections on both ends. The primary use of casing is to prevent the shothole from caving and bridging. The lightweight casing may be considered as expendable item. *A.G.I.*

shothole drill. Drills for shotholes are two general types: (1) the rotary drill and (2) the churn drill. The churn drill is similar to the larger cable-tool type. It is seldom used except in areas where underground cavities hamper the return flow of the circulating fluid used in rotary methods. The rotary methods can be subdivided into (1) mechanical feed and (2) hydraulic feed. Both types provide a means for rotating the pipe, and both make provisions for circulating fluid down through the pipe, thus washing the cuttings away from the bit and conveying them up to the surface in the annular space between the wall of the hole and the string of drill pipe. Portable drills, water jets, and airblast equipment and augers are also used in certain areas. *A.G.I.*

shothole elevation. The elevation of the ground at the top of the shothole. *A.G.I.*

shothole fatigue. Phenomenon causing observed traveltimes to another point to increase with successive shots in the same hole. *A.G.I.*

shothole log. The drillers' record of the depths, thicknesses, and lithologic characteristics of the formations encountered in the seismic shothole. *A.G.I.*

shothole plug. A plug, usually of wood, used by seismic field parties to plug the hole upon completion of shooting. This prevents caving, protects the public from injury and protects the exploration company from damage claims that might result from open holes. *A.G.I.*

shot hopper. A boxlike metal container that, when filled with chilled-steel shot, acts as a reservoir for the shot-feeding device on a shot drill. *Long.*

shot house. A detonator magazine. *Hess.*

shot inspector. In bituminous coal mining, one who inspects shots (holes drilled and charged with explosives by miners) to see that they are properly tamped and are not likely to cause a fire when they are set off. He prohibits the firing of any shot he considers unsafe. Also called shot examiner. *D.O.T.1.*

shot instant. The instant of detonation of the dynamite charge in seismic exploration. *A.G.I.*

shot lighter. *See* shot firer. *Fay. See also* blaster, b.

shot metal. a. Metal in the form of small, spherical, or nearly spherical, pellets. It is usually made by causing molten metal to fall, dropwise, from a suitable height into a quenching medium. Also called shot. *Henderson.* b. An alloy of 98 percent lead and 2 percent arsenic for making small shot. *Webster 3d.*

shot moment. *See* shot instant. *A.G.I.*

shot-moment line. An electric line which is wrapped around the dynamite charge and connected to a telephone or radio circuit. The explosion breaks the circuit to record the shot instant or moment. Use is largely obsolete. *A.G.I.*

shot off the solid. A method of breaking coal from the solid seam by the use of explosives, when the seam has not previously been cut or sheared to prepare the coal for blasting. Also called shot fast. *B.C.I.*

shot-peen. Method of surface treating steel to increase its resistance to surface fatigue by bombarding the surface with high velocity steel shots. *Sandstrom.*

shot peening. Cold working the surface of a metal by metal-shot-impingement. *ASM Gloss.*

shot point. That point at which a charge of dynamite is exploded for the generation of seismic energy. In field practice, the shot point includes the hole and its immediately surrounding area. *A.G.I.*

shot point distance. The distance from the shot point to the seismometer spread. *Schieferdecker.*

shot rock. Blasted rock. *Nichols.*

shot runner. *See* fire runner. *D.O.T. 1.*

shot samples. Samples taken for assay from molten metal by pouring a portion into water to granulate it. *Webster 3d.*

shot-sawed surface; ripple surface. Term used to describe the surface finish of building limestone that is deeply scored by using steel-shot abrasive with gang-saws. *AIME, p. 330.*

shot soil. Soil in which small pellets of iron oxide occur or are forming. *A.G.I. Supp.*

shot tamper. *See* tamper, a. *D.O.T. 1.*

shotter. Bedded pebbles and sand; glacial outwash gravels. *Arkell.*

shotter wick. Eng. Chert in the Upper Greensand, Isle of Wight. *Arkell.*

shotting. The production of shot by pouring molten metal in finely divided streams. Solidified spherical particles are formed during the descent and cooled in a tank of water. *ASM Gloss.*

shotty gold. Small granular pieces of gold resembling shot. *Fay.*

shoulder. a. The graded part of a road on each side of the pavement. *Nichols.* b. The side of a horizontal pipe, at the level of the center line. *Nichols.* c. A line formed by the intersection of the face or leading surface of a bit crown and the straight-wall side surface of the crown. *Long.* d. A ledge formed by an abrupt change in the course of a borehole. *Long.* e. A ledge or projection on drill rods, couplings, pipe, or bits formed at points where an increase or decrease in diameter occurs. *Long.* f. The butt of a threaded part. *Long.*

shoulder angle. A special shape of ceramic wall tile. *Dodd.*

shoulder cutting. S. Staff. Cutting the sides of the upper lift of a working place in a thick coal colliery next the rib, preparatory to breaking the coal. *Fay.*

shouldering. The splay at the top right-hand and bottom left-hand corners of a single-lap roofing tile. *Dodd.*

shoulder nipple. A nipple of any length, which has a portion of pipe between two pipe threads. As generally used, however, it is a nipple about halfway between the length of a close nipple and a short nipple. *Strock, 3.*

shoulder stone. The diamonds set in a bit at or along the line formed by the intersection of the face or leading surface of a bit crown and the straight-walled side surfaces of the bit crown or shank. *Compare* kerf stone. *Long.*

shoved moraine. *See* push moraine.

shovel. a. Any bucket-equipped machine used for digging and loading earthy or fragmented rock materials. *Bureau of Mines Staff.* b. There are two types of shovels, the square-point and the round-point. These are available with either long or short handles. The round-point shovel is used for general digging since its forward edge, curved to a point, most readily penetrates moist clays and sands. The square-point shovel is used for shoveling against hard surfaces or for trimming. *Carson, p. 134,* c. *See* power shovel.

shovel craneman. In bituminous coal mining, a maintenance mechanic who inspects, oils, greases, adjusts, and repairs machinery of a power shovel used to dig and load coal (after blasting) into cars in a strip mine. May be designated according to type of power, as electric-shovel craneman; steam-shovel craneman. Also called stripping-shovel craneman. *D.O.T. 1.*

shovel dozer; dozer shovel. A tractor equipped with a front-mounted bucket that can be used for pushing, digging, and truckloading. *Nichols.*

shoveler. a. In anthracite and bituminous coal mining, one who shovels coal, rock, slate, or refuse into mine cars or containers at working places, along haulageways and passageways, or at other places underground and at the surface of the mine. May be designated according to material shoveled, such as coal shoveler. *D.O.T.1.* b. A man below ground who shovels ore into cans. *Hess.* c. *See* mucker. *D.O.T.1.*

shovel-filled. Aust. Run-of-mine coal as broken at the face. *Fay.*

shovel front. In power-shovel nomenclature, the shovel front is composed of a main boom and a secondary boom known as the dipper stick, at the outer end of which is the dipper or shovel bucket. *Carson, p. 38.*

shovel loader. A loading machine mounted on driven wheels by which it is forced into the loose rock at the tunnel face. A bucket hinged to the chassis, scoops up the material which is elevated over and discharged behind the machine. There are two types: (1) the bucket is discharged directly into a mine car behind the machine, and (2) a short conveyor, built into the loader, receives the dirt from the bucket and conveys it back into a car or conveyor. *See also* mechanical mucking. *Nelson.*

shovel sample. A small flat sample of porcelain enamel obtained at the smelter by allowing the molten enamel to run onto a steel shovel during the discharging of the smelter to the quench tank. The shovel sample is air quenched and examined for smoothness, uniformity, and color. *Enam. Dict.*

shovel trough. In a duckbill, the shovel part of the loading mechanism which is advanced into the coal pile or retracted according to the adjustment of the operating carrier. *Jones.*

show. a. The pale-blue, lambent flame on the top of a common candle flame, indicating the presence of firedamp. *Fay.* b. When the flame of a safety lamp becomes elongated or unsteady, owing to the presence of firedamp in the air, it is said to show. *Zern.* c. A concentration of flammable gas just sufficient to form a perceptible cap above the flame of a flame safety lamp. *B.S. 3618, 1963, sec. 2.* d. The detectable presence of mineral, oil, or gas in a borehole, as determined by examination of the core or cuttings. *Long.* e. A noncommercial quantity of oil or gas, encountered in drilling. *A.G.I.*

shower roasting. Rapid oxidation-roast of finely ground sulfide ores which are caused to fall through rising heated air. *Pryor, 3.*

showing. a. The first appearance of float, indicating the approach to an outcropping vein or seam. *See* also blossom. *Zern.* b. *Can.* Surface occurrence of mineral. *Hoffman.*

shp Abbreviation for shaft horsepower. *BuMin Style Guide, p. 61.*

shraff. N. Staff. Term for the waste (for example, broken fired ware, broken saggars, old plaster molds) from a pottery. *Dodd.*

shredded texture. A texture showing irregular particles of a mineral enclosed in another. *Schieferdecker.*

shredder. *See* clay shredder. *Dodd.*

shredding action. Tearing apart of fibers due to friction in some crushing machines. *Sinclair, W. E., p. 484.*

shrend. The process of making cullet by running molten glass into a water stream. *ASTM C162-66.*

shrinkage. a. The decrease in volume of a soil or fill material through the reduction of voids by mechanical compaction, superimposed loads, or natural consolidation. *Nelson.* b. The settling or reduction in volume of earthen fills, cement slurries, or concrete on setting. *Long.* c. Synonym for outage. *Long.* d. In bitmaking by the powder-metal processes, the difference between the dimensions of the finished bit crown and those of the bit mold. *Long.* e. The reduction in dimensions of a ceramic shape caused by drying or firing. *Bureau of Mines Staff.*

shrinkage cavity. A void left in cast metals as a result of solidification shrinkage. *ASM Gloss.*

shrinkage crack. a. One of a series of cracks, or of filled-up cracks, often seen on rock surfaces; supposed to have resulted from the drying and shrinking of the layer while it was plastic mud. Synonym for sun crack. *Standard, 1964.* b. Hot tears associated with shrinkage cavities. *ASM Gloss.* c. Cracks due to restrained shrinkage. *Taylor.* d. *See* desiccation cracks; syneresis cracks. *Pettijohn.*

shrinkage index. The numerical difference between the plastic and shrinkage limits. *ASCE P1726.*

shrinkage limit. The shrinkage limit of a soil is that moisture content, expressed as a percentage of the weight of the oven-dried soil, at which a reduction in moisture content will not cause a decrease in the volume of the soil mass, but at which an increase in moisture content will cause an increase in the volume of the soil mass. *Stokes and Varnes, 1955.*

shrinkage ratio. The ratio of a given volume change, expressed as a percentage of the dry volume to the corresponding change in water content above the shrinkage limit, expressed as a percentage of the weight of the oven-dried soil. *ASCE P1826.*

shrinkage rule. A measuring ruler with graduations expended to compensate for the change in the dimensions of the solidified casting as it cools in the mold. *ASM Gloss.*

shrinkage spalling. The shearing off of the face of a refractory as the result of stresses set up within the refractory by the shrinkage of the exposed face. *AISI, No. 24.*

shrinkage stope. One in which only part of severed ore is removed during stoping, balance being temporarily available as support of workings. Used in steeply dipping lodes with strong walls. *Pryor, 3.*

shrinkage stoping. a. In this method of stoping the ore is mined out in successive flat or inclined slices, working upward from the level. After each slice is blasted down enough broken ore is drawn off from below to provide a working space between the top of the pile of broken ore and the back of the stope. Usually about 40 percent of the broken ore will have been drawn off when the stope has been mined to the top. Shrinkage stopes often are excavated by taking slices along the vein (especially in narrow veins) from one end of an ore shoot to the other, without leaving any pillars for supporting the walls. Sometimes (especially in wide veins) the ore is mined in a series of transverse stopes of limited size, each stope being separated from the next by a pillar of solid ore to reduce the length of the unsupported span. In some instances, casual pillars may be left to support local areas where the walls are weak; in other instances, pillars of lean ore or waste within the ore body are left. The latter are left primarily because it does not pay to mine them, but at the same time they reduce the length of the unsupported span and assist in supporting the walls and back. *BuMines Bull. 390, 1936, pp. 6, 8, 10.* b. A modification of overhand stoping and its characteristics is the use of a part of the ore for the purpose of support and as a working platform. As applied to small ore bodies, two modifications are used: stoping without ore passes (chutes) and stoping with ore passes (surplus ore is removed by means of the ore passes). As applied to large ore bodies, the stopes are separated by pillars or ribs and the name used is shrinkage stoping with alternate pillar and stope. Also known as back stoping; shrinkage with waste fill; overhand stoping with shrinkage and delayed filling; overhand stoping with shrinkage and no filling. *Fay.*

shrinkage test. A quantitative approximation is obtained as follows: (1) all course particles and fibrous matter are removed from the sample and water added and mixed until the soil is plastic; (2) the plastic soil is filled into wooden or metal trays of similar shape and size, and the length of the sample measured; and (3) the sample is allowed to dry out slowly and completely and the length again measured. The linear shrinkage is then expressed as a percentage:

$$\frac{(\text{Original length}-\text{length after test}) \times 100}{\text{Original length}}$$

Also, the clay content = 5 × linear shrinkage (percent). *Nelson.*

shrinkage water. That part of the water of plasticity which contributes to drying shrinkage. *ACSG, 1963.*

shrinkage with waste fill. See shrinkage stoping, b. *Fay.*

shrink fit. A fit which allows the outside member, when heated to a practical temperature, to assemble easily with the inside member. *ASM Gloss.*

shrink forming. Forming metal wherein the inner fibers of a cross section undergo a reduction in a localized area by the application of heat, cold upset, or mechanically induced pressures. *ASM Gloss.*

shrinkhead. A very large riser intended to feed the castings as well as collect impurities. It is subsequently machined off the casting. *Freeman.*

shrinking on. Method of securing a tight fit either by casting molten metal on to a relatively cool shank or by driving an ice-cold shank into a heated bushing. *Pryor, 3.*

Shropshire method. *See* longwall method, b. *Fay.*

shroud. A housing or jacket; especially, a housing around gearwheels. *Fay.*

shroud laid rope; four-strand rope. A rope of four strands laid around a core. *Zern.*

shuff. A clamp-fired stock brick that is of too poor a quality for use. *See also* stock brick. *Dodd.*

shungite; schungite. Coallike hard bitumen containing over 98 percent carbon and found interbedded among the precambrian schists. Conchoidal fracture; Mohs' hardness, 4; specific gravity, 2.0; incombustible at low temperatures; and insoluble in organic solvents. *Tomkeieff, 1954.*

shunt. a. To shove or put aside or out of the way: sidetrack. *Webster 3d.* b. To turn off to one side; to turn off, as a car or train, from one track to another. *Webster 3d.* c. A connection between two wires of a blasting cap which prevents building up of opposed electric potential in them. *Nichols.* d. Pass by. *Mason.*

shunt back. a. A track arrangement for bringing a wagon or mine car to another track without the need for a curve, turntable, or traverser. The car runs down a gentle incline and is arrested by a buffer stop or a short sharp upgrade at the end of it. The car runs back by gravity over spring-operated points to another track at an acute angle to the first. At the buffer stop, the car may receive a push by springs (or hydraulically), the intensity of which can be adjusted to ensure smooth running. *Nelson.* Also called back shunt; switchback. b. This system is used to economize the area required for surface tub circulation and in manpower. A rising shunt back operates at either end of the car circuit to reverse the direction of mine-car movement after tipping. *Sinclair, V. p. 73.*

shunt excitation. The most common method of working a dynamo. The field coils are wound with many turns of fine wire, being of such a resistance that they can be connected in parallel with the armature, that is, in shunt. *Mason, V.2, p. 416.*

shunt-wound motor. A direct current motor in which the field circuit and armature circuit are connected in parallel. *Lowenheim.*

shut; shutt. a. S. Staff. The crushed and broken-down roof of a seam of coal. *Fay.* b. S. Staff. Old workings. *See also* goaf, a. *Fay.*

shutdown. A term denoting that work has been temporarily stopped, as on an oil well. *See also* standing, a. *Fay. Compare* lost time.

shutdown time. One of the rate provisions in drilling contracts, specifying the compensation to the independent drilling contractor when drilling operations have been suspended at the request of the operator. *Williams.*

shute. *See* chute. *Fay.*

shut height. For a press, the distance from the top of the bed to the bottom of the slide with the stroke down and adjustment up. In general, it is the maximum die height that can be accommodated for normal operation, taking the bolster plate into consideration. *ASM Gloss.*

shut-in. In geology, a narrow gorge cut by a superposed stream across a ridge of hard rock between broad valleys of softer rock on each side of the ridge. *Standard, 1964.*

shutoff valve. A device by means of which the flow of gas or fluid can be made to cease—usually not with the intention of metering or regulating the flow. *Long.*

shuts. Scot. Movable or hinged supports for the cage at a shaft landing. Also called keps; keeps; chairs; dogs; seats. *Fay.*

shutter. a. A movable sliding door, fitted within the outer casing of a Guibal or other closed fan for regulating the size of the opening from the fan, to suit the ventilation and secure economical working of the machine. *Fay.* b. A slide covering the opening in a door or brattice, and forming a regulatory for the proportionate division of the air current between two or more districts of a mine. *Fay.*

shuttering. a. The casing to contain concrete during the period of setting and hardening. For the concrete lining of a circular shaft, the shuttering for 5-foot lifts usually consist of two 2½ feet high rings of ¼-inch steel plate with releasing segments. *Nelson.* b. A common name for formwork and which may also include permanent shuttering. *Ham.*

shuttle. A back-and-forth motion of a machine which continues to face in one direction. *Nichols, 2.*

shuttle car. A vehicle on rubber tires or caterpillar treads and usually propelled by electric motors, electrical energy which is supplied by a diesel-driven generator, by storage batteries, or by a power distribution system through a portable cable. Its chief function is the transfer of raw materials, such as coal and ore, from loading machines in trackless areas of a mine to the main transportation system. *ASA C42.85 1956.* The introduction of shuttle cars in the United States originated the term trackless mining. *See also* rubber-tired haulage; trackless tunneling. *Nelson.*

shuttle car, explosion-tested. A shuttle car equipped with explosion-tested equipment. *ASA C42.85: 1956.*

shuttle-car operator. In bituminous coal mining, one who drives an electrically powered truck (shuttle car) in a coal mine to transport coal from the excavation point to the conveyor belt. *D.O.T. 1.*

shuttle conveyor. a. A conveyor that is moved forward or backward in normal operation to vary the loading or discharge points, or both. It may be designed to move only in a straight path, or in either a straight or a curved path. *NEMA MB1-1956.* b. Any conveyor, such as belt, chain, pan, apron, screw, etc., in a self-contained structure movable in a defined path parallel to the flow of the material. *ASA MH4.1-1958.*

shuttle kiln. An intermittent bogie kiln consisting of a boxlike structure with doors at each end and accommodating kiln cars (usually two in number). Pottery ware is set on the refractory decks of the cars which are then pushed along rails into the kiln, displacing two other cars of fired ware from the kiln. The fired ware is taken from the displaced cars which are then reset with more ware to be fired. The shuttle movement of the kiln cars is then repeated. *Compare* bogie kilns. *Dodd.*

shuttle man. In metal mining one who hauls mine cars containing timber and other mine supplies to and from the shaft entrance. May be designated according to working area, as lumberyard motorman. *D.O.T. Supp.*

shuttles. Eng. Natural cracks running at right angles to the dip of the strata, from the Lancashire coalfield. *Fay.*

shut up. a. To weld together, as pieces of metal. *Standard, 1964.* b. To condense, as porous metal, by hammering or pressure. *Standard, 1964.*

Si. Chemical symbol for silicon. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

sial. A layer of rocks underlying all continents, that ranges from granitic at the top to gabbroic at the base. The thickness is variously placed at 30 to 35 kilometers. The name derives from the principal ingredients, silica and alumina. Specific gravity, about 2.7. *A.G.I.*

siallites. Clays or other ceramic materials consisting of silica and alumina. *Bureau of Mines Staff.*

sialma. A mnemonic term derived from (si) for silica, (al) for alumina, and (ma) for magnesia, and applied as a compositional term to a layer within the earth which occupies a position intermediate between sial and sima. *A.G.I.*

Siam aquamarine. An incorrect but rarely used term for blue zircon or for greenish spinel. *Shipley.*

Siam ruby. A name sometimes erroneously applied to the dark ruby spinel found with the rubies of Siam. *Fay.*

Siberian amethyst. A long-established trade term for the desirable deep or reddish-violet or purple amethysts although amethysts now found in the Ural Mountains, U.S.S.R., are characterized by the less desirable light violet color. *Shipley.*

Siberian aquamarine. A blue-green beryl found in Siberia, U.S.S.R. *Fay.*

Siberian chrysolite. Demantoid garnet. *Shipley.*

Siberian garnet. Almandine garnet. *Shipley.*

Siberian jade. Nephrite from Siberia, fine almost emerald-green qualities being found in the Lake Baikal region. *Shipley.*

Siberian ruby. Rubellite; a red variety of tourmaline found in Siberia, U.S.S.R. *Fay.*

Siberian tourmaline. Light violetish-red (rubellite) to violet tourmaline from the Ural Mountains, U.S.S.R. *Shipley.*

siberite. A violet-red variety of rubellite. *See also* Siberian ruby. *Fay.*

sibirskite. A mineral, $CaHBO_3$, in minute crystals, probably orthorhombic. *Hey, M.M., 1964.*

siccative. A medium which promotes the drying of oils used in underglaze or overglaze colors. *ASCG.*

Sicilian amber. Simetite. *Shipley.*

sickening. a. A scum that forms on the surface of mercury that retards amalgamating, caused by grease, sulfides, arsenides, etc. *Gordon.* b. The flouring of mercury. *See also* floured. *Fay.*

sicker. *See* zighyr. *Fay.*

sickle-dressed mica. Crude mica cobbed, rifted, and dressed with a sickle to eliminate major flaws. It has irregular outlines and beveled edges. *Skow.*

sicklerite. A dark brown hydrous phosphate of iron and manganese with lithia, $Fe_2O_3.6MnO.4P_2O_5.3(Li,H)_2O$. Orthorhombic (?). In cleavable masses. From Pala, San Diego County, Calif. *English.*

sick mercury. Mercury which has become contaminated so that it has neither a clean bright surface nor a spheroidal shape when in globules. Effect produced by sulfur, oil, talc, graphite, sulfides of antimony, arsenic or bismuth, calcium earths. In this state it cannot be used to amalgamate gold. *Pryor, 3.*

sick tin. Tin which has been affected by the tin pest. *Bennett 2d, 1962.*

siddle. The inclination of a seam of coal. *Fay.*

side. a. The more or less vertical face or wall of coal or goaf forming one side of an underground working place. *Fay*. b. Lanc. A district. *Fay*. c. The wall of a vein. *Fay*. d. Part of a rock mass bordering on a fault plane. *Schieferdecker*.

side adits. A side passage sometimes made when the main adit is choked with waste rock. *Fay*.

side arch. A brick with the two largest faces symmetrically inclined towards each other. *Dodd*.

side arch pups. Firebricks of a certain standard size. *Osborne*.

sidearm. A short bar connected to, and extending outward at a right angle from, a drill column and on which a small diamond or other-type drill can be mounted. *Compare* crossarm. b. *Long*.

sidebars. *See* bars. *Hess*.

side basse. A transverse direction of the line of dip in strata. *Fay*.

side blowing converter. A Bessemer converter in which the airblast is admitted through the sidewall near the bottom of the converter. *Bennett 2d, 1962*.

sideboard. a. A board which is used in timbering the sides of a heading. *See also* side trees, a. *Ham*. b. Board applied to the sides of conveyors, usually of the chain type, to increase the height when coal is being loaded at the face by hand onto the conveyor. Also applied to a baffle plate used with belt conveyors. *Jones*.

side-boom dredge. Similar to the hopper dredge except that the discharge, instead of going into hoppers or directly back into the sea, is carried in a discharge pipe hung from a boom, a distance of from 200 to 500 feet directly to port or starboard of the vessel, and there discharged into the atmosphere, dropping vertically from a height of about 50 feet onto the surface of the sea. The drag heads of the dredge provide a channel, and the excavated soil is spread over a wide shoal area on either side, without the necessity of hauling it to the sea. *Carson, 2, p. 63*.

sidecasting. Piling spoil alongside the excavation from which it is taken. *Nichols, 2*.

side chain. A chain hooked onto the sides of cars running on an incline or along a gangway, to keep the cars together in case the coupling breaks. *Fay*.

side-construction tile. a. Tile designed to receive its compressive stress at right angles to the axes of the cells. *ASTM C43-65T*. b. Tile designed for use in interior constructions. *ACSG*.

side-discharge shovel. A shovel loader, driven by compressed air or by electricity, for loading loose coal or rock. A 21-cubic-foot-capacity bucket, hinged to the chassis, digs, lifts, and discharges the material sideways onto a scraper or belt conveyor; suitable for stable holes, pillar methods of working, and general repair work. *Nelson*.

side-discharge tippler. *See* tippler. *Nelson*.

side dumper. An ore, rock, or coal car that can be tilted sidewise and thus emptied. *Fay*.

side-entrance manhole. A deep manhole in which the access shaft is built to one side of the inspection chamber. *Ham*.

side feather. *See* feather brick. *Dodd*.

side-fired furnace. A furnace with fuel supplied from the side. *ASTM C162-66*.

side forms. Side shuttering between which concrete is laid to form a road surface. *Ham*.

side grinding. The practice of grinding on the side of a wheel mounted between flanges. *ACSG, 1963*.

side guide. *See* guard, a. *Fay*.

sidehill. A slope that crosses the line of work. *Nichols*.

sidehill cut. A long excavation in a slope that has a bank on one side, and is near original grade on the other. *Nichols*.

side-hitching. An act in which the mule is hooked by its harness to the side instead of the front of a loaded car to give it enough momentum to slide onto a cage. *Korson*.

side-laning. S. Staff. The widening of an abandoned gate road, and making it part of the new side of work. *Fay*.

side lap. The distance by which the side of a roofing tile overlaps the joint in the course of tiles next below. *Dodd*.

side lengths. *See* lengths. *Fay*.

sideline. a. The line connecting the dredger with anchorage on either side and winch on board used to steady the hull in required digging position. *Pryor, 3*. b. A surface line of the claim along the vein. It bounds the side of the claim. *Fay*.

sideline agreement. In a mineral claim where the apex law applies (United States) neighboring mine owners may come to a sideline agreement to adjust or limit the law as it affects their respective properties. *Nelson*.

sidelong reef. An overhanging wall of rock in alluvial formation extending parallel with the course of the gutter; generally only on one side of it. *Fay*.

side milling. Milling with cutters having peripheral and side teeth. They are usually profile sharpened but may be form relieved. *ASM Gloss*.

side of work. S. Staff. The series of breasts and pillars connected with a gate road in a colliery. *Fay*.

side-over. N. of Eng. To cut or drive in a line with the cleat through a pillar of coal when robbing pillars. *Fay*.

side piles. Another term for the side poling boards in driving a heading. *Stauffer*.

side plate. In timbering, where both a cap and a sill are used, and the posts act as spreaders, the cap and the sill are spoken of as the sideplates. *See also* end plate; wallplate. *Fay*.

side pocket. Alternative name for slag pocket as applied to glass-tank furnaces. *See also* slag pocket. *Dodd*.

side-port furnace. A furnace with ports on the sides. *ASTM C162-66*.

side rake. In a single-point turning tool, the angle between the tool face and a reference plane, corresponding to radial rake in milling. It lies in a plane perpendicular to the tool base and parallel to the rotational axis of the work. *ASM Gloss*.

side rasp. A curved rodlike fishing tool with a serrated surface to help grip or hold an object lost in a borehole. *Long*.

sidereal. In a day, one complete revolution of our globe on its axis, as determined by transit of a fixed star (23 hours, 56 minutes, 4.0906 seconds of local mean time). In a year, one revolution around the sun (365.2564 solar days). *Pryor, 3*.

siderite. a. A spathic iron ore. An iron carbonate, $FeCO_3$, containing 48.2 percent iron. *Sanford*. Siderite is frequently found as clay ironstone, impure by admixture with clay materials in concretions with concentric layers. *Dana 17, p. 341*. Also called chalybite; sparry iron ore; spathic iron. *Fay*. b. A indigo-blue variety of quartz. *Standard, 1964*. c. An iron meteorite. *Standard, 1964*. *d*. A sapphire quartz. *Webster 3d*.

siderodot. A calciferous variety of siderite. *Fay*.

sideroferrite. Native iron found in petrified wood. *Fay*.

siderogel. A mineral, colloidal, FeO (OH), in bog iron ore. *Spencer 19, M.M., 1952*.

sideronatrite. An orange to straw-yellow fibrous mineral with 1 perfect cleavage, $2Na_2O.Fe_2O_3.4SO_3.7H_2O$; Mohs' hardness, 2 to 2.5; specific gravity, 2.15 to 2.36. *Larsen, p. 101*.

siderography. The art of engraving steel; especially, a process of multiplying facsimiles of an engraved steel plate by rolling over it, when hardened, a soft steel cylinder and then rolling the cylinder, when hardened, over a soft steel plate. *Webster 3d*.

siderolite. A type of meteorite consisting of approximately equal parts of metal and silicate phases. Also called pallasites, stoney irons, or syssiderites. *A.G.I.*

sideromagnetic. Synonym for paramagnetic. *Fay*.

sideromelane. A basaltic glass from the palagonite tuffs of Sicily, Italy. *Fay*.

sideronitic texture. Texture of rocks suggesting a silicate meshwork later shattered and pressed to force out solutions and other volatiles. *A.G.I.*

siderophile. Having so little affinity for oxygen and sulfur that in a molten mass the greatest concentration (as of an element) would be found in the metallic phase (as in the iron of a blast furnace). *Webster 3d*.

siderophile elements. Elements with a relatively weak affinity for oxygen and sulfur, characterized by ready solubility in molten iron, hence concentrated in iron meteorites and probably in the earth's core. *A.G.I.*

siderophyllite. A black variety of biotite in which the magnesium is partly replaced by ferrous iron. *Standard, 1964*.

siderosa. Sp. Spathic iron ore or siderite. *Fay*.

sideroscope. An instrument for detecting small quantities of iron by the magnetic needle. *Webster 2d*.

siderosis. Pneumoconiosis occurring in iron workers from inhalation of particles of iron. *Webster 3d*.

siderotil. A hydrous sulfate of iron, $FeSO_4.5H_2O$. Groups of divergent needles. From Idra, Gorizia, Italy. *English*.

sides. A local New York and Pennsylvania term applied by bluestone quarrymen to open joints that extend east and west. *Fay*.

side shear. *See* grip, c. *Fay*.

side shearing. In salt mining, a vertical cut at each end of the room that permits the explosive to expand with the least resistance, thus promoting efficiency and power economy. *Kaufmann, p. 116*.

side-shearing machine operator. In salt production one who cuts slots along the side of the working face of salt-mine deposits to reduce the amount of blasting powder required to loosen the deposits and to eliminate excess amounts of fine salt particles after blasting. *D.O.T.1*.

side shelves. The shelves fastened along the sides of the entry throughout the explosion zone on which dust is placed in explosion testing. *Rice, George S.*

side shot. A reading or measurement from a survey station to locate a point which is not intended to be used as a base for the extension of the survey. A side shot is usually made for the purpose of determining the position of some object which is to be shown on the map. *A.G.I.*

side skew. A brick modified so that one side is inclined at an angle other than 90° to the largest faces. *A.R.I.*

side slicing. See top slicing combined with ore caving. *Fay.*

side spit. The emission of sparks through the sides of a burning fuse. *Fay.*

side stake. a. On a road job, a stake on the line of the outer edge of the proposed pavement. *Nichols.* b. Any stake not on the centerline. *Nichols.*

side stoping. *See* overhand stoping, b. *Fay.*

sidesway. A slight lateral movement of a structural frame in its own plane due to the action of a horizontal force such as wind pressure or to unsymmetrical loading. *Ham.*

side thrust. a. The lateral force against the borehole walls resulting from the buckling or sag in the drill rods at one or more points above the bit. *Long. b.* The lateral force developed when the area covered by the bit is not uniformly hard. *Long.*

side track. Passing or storage track in a rail system. *Bureau of Mines Staff.*

sidetrack. When tools have been lost in the hole and fishing for their recovery is without success, the lost equipment is sometimes drilled by. The lost tools are forced to one side, the hole is continued past them, and the lost equipment is said to have been sidetracked. *A.G.I.*

sidetracked. a. A term applied when tools or downhole drilling equipment is not recovered from a borehole because of the drilling-by or bypassing techniques used. *Long.* b. A term applied when a borehole has been deflected, so as to bypass an obstruction. *Long.*

sidetracked hole. Drill purposely directed away from a normal, straight course. *A.G.I. Supp.*

sidetracking. The act or process of deflecting and drilling a borehole to the side of and beyond a piece of drill-string equipment permanently lodged in the hole. *Long.*

side trees. a. Posts ranging from 3 to 6 inches in thickness which support both the head trees and sideboards in a heading. *See also* foot blocks. *Ham.* b. The two posts of a heading set. *Stauffer.*

side wafer; side waver. a. N. of Eng. Overhanging stones or roof in underground roads liable to drop. *Fay.* b. N. of Eng. A fall of fire clay. *Fay.*

sidewall core. A core or rock sample extracted from the wall of a drill hole, either by shooting a retractable hollow projectile, or by mechanically removing a sample. *A.G.I.*

sidewall coring tool. An eccentric sampling device that gouges a small sample, sometimes in the form of a core, from the sidewall of a borehole. Also called sidewall sampler. *Long.*

sidewalls. a. Walls, usually masonry, at each end of a culvert. *Nichols.* b. Same as endwalls. *Spalding, p. 160.*

sidewall sampler. a. *See* sidewall coring tool. *Long.* b. *See* Schlumberger sidewall sampler. *Sinclair, III, p. 109.*

sidewall sampling. The process of securing samples of formations from the sides of the borehole anywhere in the hole that has not been cased. *A.G.I.*

siding. a. A short piece of track laid parallel to the main track, to serve as a passing place. *Jones.* b. Eng. *See* flat. *SMRB, Paper No. 61.*

siding over. a. A short road driven in a pillar in a headwise direction. *Zern.* b. Eng. *See* skirting, b. *SMRB, Paper No. 61.*

sidings. The surface wagon tracks to provide a regular flow of wagons to and from the main railway system to the coal-preparation plant. The railway authorities cannot supply and remove coal wagons as required and therefore sufficient siding space is provided—usually for 1½ or 2 days operation. The term siding may also be applied to stock tracks for mine cars near the pit bottom. *Nelson.*

siding tile. Any roofing tile employed for upright work. *Fay.*

Siebe-Gorman self-rescuer. A British-made self-rescuer consisting of a hermetically sealed, quick-release canister with inhalation and exhalation valves fitted to the top, a head strap, a rubber mouthpiece, a chin rest, and a nose clip. It is carried on the miner's belt and weighs only 22 ounces. The air enters at the perforated diaphragm in the bottom of the canister, and passes through layers of filters before it reaches the mouthpiece. The complete respirator is held in position by the head strap. *McAdam, pp. 67-68.*

siegburgite. A fossil resin from the brown coal near Bonn, Germany; it varies in color from golden yellow to brownish-red, and is partly soluble in alcohol and ether. *Fay.*

siege. The floor of a pot furnace, often called bench. *ASTM C162-66.*

Siegenian. Middle Lower Devonian. *A.G.I. Supp.*

siegenite. A member of the linnaeite series with the formula, $(Co,Ni)_3S_4$. *Dana 7, v. 1, p. 262.*

Siemens. The man who connected the open-hearth process of making steel with the regenerative system. *Mersereau, 4th, p. 414.*

Siemens and Halske process. A metallurgical process for the recovery of copper. Copper sulfides are dissolved by solutions of ferric sulfate containing free sulfuric acid, and the solution is then electrolyzed in a tank having a diaphragm. Copper is deposited and ferric sulfate regenerated. *Liddell 2d, p. 495.*

Siemens direct process. A process for making wrought iron directly from iron ore, without the previous production of pig iron. *Standard, 1964.*

Siemens furnace. A reverberatory furnace, heated by gas, with the aid of regenerators. *Fay.*

siemensite. A highly refractory material, produced by the fusion of chromite, bauxite, and magnesite, in the open electric arc furnace. *Osborne.*

Siemens-Martin process. The production of steel in a reverberatory furnace by oxidation of the impurities by oxides added (either the rust on scrap, mill scale, or pure ores). It may be conducted either on acid or basic lining. *See also* open-hearth process. *Liddell 2d, p. 496; Fay.*

Siemens-Martin steel. Steel in which pig iron is decarburized by the Siemens-Martin process. *Fay.*

Siemens producer. A furnace used for the manufacture of producer gas. *Fay.*

Siemens-Silesian furnace. A silesian zinc-distillation furnace employing the Siemens system of heat recuperation. *Fay.*

sienna. a. A brownish orange-yellow clay colored by iron and manganese oxides; used as a pigment. *Fay.* b. Mineral paint. *A.G.I.*

sienna marble. One of the most highly esteemed of marbles for interior decoration. The prevailing color is yellow, but often variegated with white and violet or purple. From Monte Arenti, in Montagnola, Tuscany, Italy. *Fay.*

sierra. Sp. A saw; a chain of hills or mountains; used as part of the name of many mountain chains, as Sierra Nevada. Local in the Southwest and the Pacific States. *Fay.*

Sierra Leone. A diamond from the Sierra Leone District in Africa. *Long.*

Sieurin process. A process for manufacturing sponge iron, in which layers of high-purity ore, coal, and lime are heated in closed crucibles. After cooling, the porous cake of powdered metal is removed from the crucible and crushed for further processing. *Bennett 2d, 1962.*

sieve. a. Any screen that is used to separate particles according to size. *Enam. Dict.* b. The screen or grating fixed in a stamp box. *Fay.* c. Vessel, the bottom of which is porous, with apertures of defined size and shape, allowing contents to be retained as oversize or sieved through as undersize. The chief sieve systems used in laboratory work are rings 8 inches in diameter with woven wire cloths so specified. *Pryor, 3.* d. This term is generally reserved for testing equipment; the corresponding industrial equipment is generally called a screen. There are several standard series of test sieves; those most frequently met with in the ceramic industry are: British standard sieves (conforming with B.S. 410), United States standard sieves (conforming with National Bureau of Standards LC-584 or ASTM-E11), French standard sieves (AFNOR NF 11-501), German standard sieves (DIN 4188). Tylor sieves, in which the ratio between the mesh sizes of successive sieves in the series is $\sqrt{2}$; thus the areas of the openings of each sieve are double those of the next finer sieve. *Dodd.*

sieve analysis. a. The determination of the percentage of particles which will pass through screens of various sizes. *Brantly, 1. See also* screen analysis. b. In powder metallurgy, particle size distribution; usually expressed as the weight percentage retained upon each of a series of standard sieves of decreasing size and the percentage passed by the sieve of finest size. Synonymous with sieve classification. *ASM Gloss.* c. A test to determine particle-size distribution in a soil. A set of sieves may contain the following sizes: 1½ inch, ¾ inch, ⅜ inch, 3/16 inch (size of aperture), no. 7, 14, 25, 36, 52, 100, 200 (number of apertures to the linear inch). A set is complete with lid and receiving pan, and can be 9, 12, or 18 inch diameter sieves. *See also* screen analysis. *Nelson.*

sieve classification. The separation of powder into particle size ranges by the use of a series of graded sieves. *ASTM B243-65.* Same as sieve analysis. *ASM Gloss.*

sieve fraction. In powder metallurgy, that portion of a powder sample which passes through a standard sieve of specified number and is retained by some finer sieve of specified number. *ASM Gloss.*

sieve mesh. a. Standard opening in sieve or screen, defined by four boundary wires (warp and woof). The laboratory mesh is square and is defined by the shortest distance between two parallel wires as regards aperture (quoted microns or millimeters), and by the number of parallel wires per linear inch as regards mesh. Sixty (60) mesh equals sixty (60) wires per inch. *Pryor, 3.* b. The length of the side of a hole in a sieve. *See also* mesh, f. *Fay.*

sieve mesh. The length of the side of a hole in a sieve. *See also* mesh, f. *Fay.*

sieve raggings. Eng. Pieces of ore deposited at the bottom of a sieve. *Fay.*

sieve scale. Term applied to the list of screen apertures, taken in order from the coarsest to the finest. *Pit and Quarry, 53rd, Sec. B, p. 115.*

sieve shakers. Mechanized devices on which a nest of laboratory sieves can be shaken or electrically vibrated during the size analysis of sands. *Pryor, 3.*

sieve sizes. Sieves are standardized in British Standard 410, and sieve size diamond powders in British Standard 1987. *Osborne.*

sieve texture. a. A texture of metamorphic rocks and of some igneous rocks produced by inclusions of a mineral or glass in larger spongy crystals of another species. Synonym for diablastic. *Holmes, 1920.* b. A mineral formed by replacement that contains inclusion of the old. *A.G.I.*

sieving. a. Grading in accordance with particle size and shape by means of sieves or screens. *Pryor, 3.* b. The operation of shaking loose materials in a sieve so that the finer particles pass through the mesh bottom. By using a number of sieves with different meshes the particles can be graded according to size. Also called sifting. *C.T.D.*

sieze. *See* freeze, a. *Long.*

sifting. *See* sieving, b.

sigger. *See* zighyr. *Fay.*

sight. a. A bob or weighted string hung from an established point in the roof of a room or entry, to give direction to the men driving the entry or room. *Fay.* b. A quantity of diamonds of different types and sizes sold as a single group or lot. *Long.* c. A bearing or angle taken with a compass or transit when making a survey. *Fay.* d. Any established point of a survey. *Fay.*

sight distance. The distance from which an object at eye level remains visible to an observer. *Ham.*

sighting hub. A stake or mark used by a driller as a means of setting and orienting a drill so that the borehole can be drilled to follow a predetermined directional course. *See also* hub, b. *Long.*

sight line. Established compass or transit course for alignment of working places, usually marked on the roof. *B.C.I.*

sight rail. A horizontal board fixed at a particular height above a required level, and used in conjunction with boning rods for checking the levels in drain trench excavations. *Ham.*

sight rule. *See* alidade, c. *Ham.*

sights. Bobs or weighted strings hung from two or more established points to give direction to men driving a chamber or gangway. *Hudson.*

Sigillaria. A large and important group of Coal Measures trees. Some species had tall, straight trunks over 100 feet high. Others had short, squat trunks 6 feet diameter at the base and less than 20 feet high. *Nelson.*

sigillated ware. Pottery decorated with stamped patterns; stamped ware. *Standard, 1964.*

sigillation. Decoration of pottery with stamped patterns. *Standard, 1964.*

sigloite. A mineral, $(Fe^{+3},Fe^{+2})\ Al_2(PO_4)_2(O,OH).8H_2O$; anorthic; from Llallagua, Bolivia. *Hey, M.M., 1964; Fleischer.*

Sigma cement. Trade name for a hydraulic cement made by mixing portland cement consisting only of particles less than 30 microns with 16 to 50 percent of an inert extender, for example, limestone, basalt, or flint, the particle size of which is 30 to 200 microns. *Dodd.*

sigma function. a. The enthalpy of an airstream mixture less the heat of the liquid. *Strock, 10.* b. Another name for sigma heat. *Spalding, p. 242.*

sigma heat. See total heat, a. *Spalding, p. 242.*

sigma phase. A hard, brittle, nonmagnetic intermediate phase with a tetragonal crystal structure, containing 30 atoms per unit cell, space group $P4_2/mnm$, occurring in many binary and ternary alloys of the transition elements. The composition of this phase in the various systems is not the same and the phase usually exhibits a wide range in homogeneity. Alloying with a third transition element usually enlarges the field of homogeneity and extends it deep into the ternary section. *ASM Gloss.*

sigma recording methanometer. *See* butane flame methanometer. *Nelson.*

signal bell; signal hammer. Scot. A bell or other appliance for signaling in mine shafts or on haulage roads. *Fay.*

signal code, hoist. *See hoist signal code.*

signal glass. Colored glass for light signals on railways, roads, airfields, and at sea; the glass must conform to a close specification. *Dodd.*

signaling system. The arrangement in use for transmitting signals to stop or start conveyors, rope haulages, locomotives, winders, etc. *See also* face signaling; loudspeaker face telephone; shaft signaling. *Nelson.*

signal system, hoist. *See* hoist signal system.

signal system, mine fan. *See* mine fan signal system.

signal wave. Any sound wave upon which an observation of any kind is required; more often known as a signal. *Hy.*

signal wire. Scot. Thin wire strand used for operating signal hammers and bells. *Fay.*

sign enamel. A brilliant high-gloss enamel particularly adaptable for sign work. *ACSB, 3.*

significant anomaly. An anomaly that is related to ore and that can be used as a guide in exploration. *Hawkes, 2, p. 26.*

sikussak. Ice, many years old, which does not drift away (as in the fiords on the north coast of Greenland) and which is largely formed by snow. *Schieferdecker.*

silcrete. a. A superficial quartzite formed by the cementation of rock fragments (as soil, sand, or gravel) by silica. *Webster 3d.* b. Pocket word for siliceous concreted gravel. *Compare* calcrete; ferricrete, c. A synonym for puddingstone, but useful for finer grained varieties. *Arkell.*

silent chain. A roller-type chain in which the sprockets are engaged by projections on the link side bars. *Nichols.*

Silesian furnace. A rectangular combustion chamber, containing about 20 muffles for the distillation of zinc. The furnaces are commonly built in pairs with chambers between each for the calcination of the ore. *Fay.*

Silesian method. A metallurgical process characterized by a large charge of lead ore, slow roasting, and a low temperature. It is not aimed to extract all the lead in the reverberatory, as this is supplemented by the blast furnace. The hearth is inclined toward the flue, beneath which, the lead is collected and tapped at intervals into an outside kettle. *Fay.*

silex. A name sometimes applied to chert, particularly to the trimmed blocks of this material, from Belgium, used in the lining of ball mills. For the milling of vitreous-enamel frits, silex blocks are used more in mills for ground coats than for cover coats. *Dodd.*

Silex. A trade name for a type of heat-resistant glass. *A.G.I.*

silexite. a. Proposed for any body of pure or nearly pure silica (quartz) of igneous or aqueoigneous origin, which occurs as a dike, segregation mass, or cognate inclusion. *Holmes, 1920.* b. Proposed by Cayeux for chert that occurs in calcareous beds. *A.G.I.*

Silfrax. Trademark for bonded refractories containing from 40 to 78 percent silicon carbide. High refractoriness; great strength; high thermal conductivity; freedom from spalling; resistance to clinker adhesion; and resistance to mechanical and flame abrasion. Used in bricks for boiler and furnace installations; kiln furniture in ceramic kilns; shapes for boiler furnaces, air-cooled furnace linings, glass lehrs, pit furnaces, and enameling furnace ware supports. *CCD 6d, 1961.*

silica. a. Dioxide of silicon, SiO_2, which occurs in the crystalline forms as quartz, cristobalite, tridymite; as cryptocrystalline chalcedony; as amorphous opal; and as an essential constituent of the silicate groups of minerals. Used in the manufacture of glass and refractory materials. Refractory materials containing a high proportion of silica (over 90 percent) are known as acid refractories (for example, ganister), and are used in open-hearth and other metallurgical furnaces to resist high temperatures and attack by acid slags. *C.T.D.* b. Very fine white disintegrated chert, used in pottery manufacture. *Fay.*

silica black. A pigment and a gas absorbent made by grinding coal extremely fine, intimately mixing it with silica, such as diatomaceous earth, then heating to 316° C or higher without access of air. *Hess.*

silica brick. Refractory bricks used to line roofs of furnaces, where there is no contact with basic molten material. Silica cemented with a binding agent, for example, slurried lime. *Pryor, 3.*

silica cement. A refractory mortar, often silica and fire clay, or a highly siliceous preparation which may not contain clay. *A.R.I.*

silica-firebrick molder. One who forms silica brick for use in lining furnaces and ovens of various kind. *D.O.T. 1.*

silica fire clay. A refractory mortar consisting of a finely ground mixture of quartzite, silica brick, and fire clay of various proportions; often called silica cement. *HW.*

silica flour. A sand additive, containing about 99.5 percent silica, commonly produced by pulverizing quartz sand in large ball mills to a mesh size of 80 to 325. *ASM Gloss.*

silica gel. Porous material consisting of pure silicon dioxide. Used as a dehumidifying and a dehydrating agent. *Bennett 2d, 1962.*

silica glass. a. Vitreous silicon dioxide, (SiO_2); quartz glass; pure silicon dioxide, (SiO_2); glass. *ASTM C162-66.* b. Fused quartz, occurring in shapeless masses on the surface of the Libyan Desert, in Moravia, Czechoslovakia, and in parts of Australia; believed to be of meteoric origin. *See also* tektites. *C.M.D.*

silicalite. Wadsworth's name for rocks composed of silica, such as diatomaceous earth, tripoli, quartz, lydite, jasper, etc. *Fay.*

silica modulus. The ratio of SiO_2: (Al_2O_3 + Fe_2O_3) in a hydraulic cement. In Portland cement this modulus usually lies between 2 and 3. A cement with a low silica modulus can be expected to have high early strength, but if this modulus is high, the final strength will be the greater. *Dodd.*

silica ramming mix. Usually a sized mixture of ganister, often with sand, silica flour, fire clay, bentonite, or combinations of them. *Bureau of Mines Staff.*

silica refractories. Refractories made from quartzite, bonded by lime, and consisting essentially of silica, usually with about 2 percent of lime, and small quantities of iron oxide, alumina, and alkalies. *Henderson, p. 265.*

silica rock. a. A rock containing a high proportion of silica or quartz, for example, Dinas rock, which may contain 90 percent silica. *Nelson.* b. N.S.W. Usually refers to a clean hard quartzite suitable for making silica firebricks. *New South Wales, p. 60.*

silica sand. Sand very high in SiO_2, hence a source of silicon; also, it has industrial uses. *A.G.I.* A sand used extensively for sandblasting, for the initial grinding or surfacing of plate glass, and as a cutting medium for gang saws on stone. *AIME, p. 15.*

silica sol. Colloidal silica in the form of a dispersion in water. The modern method of manufacture involves the passage of sodium silicate solution through an ion-exchanger. As made, the sols contain about 3 percent SiO_2 but the concentration can be increased to 20 percent by evaporation; to give stability, a concentrated sol must have a larger particle size or a stabilizer, for example, NaOH, must be added. In the ceramic industry, silica sol has been used to a small extent as a bond. *Dodd.*

silicastone. Suggested by Shrock for sedimentary rocks composed of siliceous minerals. They may be fragmental, concretionary, or precipitated of organic or inorganic origin. *J. Geol., v. 56, No. 2, Mar. 1948, pp. 118, 125.*

silicate. a. A salt or ester of any of the silicic acids, real or hypothetical; a compound whose crystal lattice contains SiO_4 tetrahedra, either isolated or joined through one or more of the oxygen atoms to form groups, chains, sheets, or three-dimensional structures. *A.G.I.* The micas, amphiboles, pyroxenes, feldspars, and garnets are examples of groups of rock-forming silicates. *C.T.D.* b. A term used in the Joplin district, Mo., for zinc carbonate. *Fay.*

silicate bond. A type of bond matured by baking at a temperature of about 500°F; silicate of soda is the principal constituent. *ACSG, 1963.*

silicate brick. Usually refers to Forsterite brick. Strictly, most brick are silicate brick of one kind or other. *Bureau of Mines Staff.*

silicate cement. As used in chemical engineering, this term denotes an acid-proof cement, consisting of an inert powder and sodium silicate solution, for jointing chemical stoneware or acid resisting bricks. *Dodd.*

silicate cotton. Slag wool; mineral wool. *Fay.*

silicate degree. In the metallurgical nomenclature of slags, the ratio of the weight of oxygen in the acid to the weight of oxygen in the base. *Newton, p. 397.*

silicated marble. A marble that contains silicates, such as pyroxenes, amphiboles, mica, or chlorite. *Fay.*

silicate injection. Joosten process in which calcium chloride and sodium silicate are separately injected into soil, where they react and form a watertight gel. *Pryor, 3.*

silicate minerals. Minerals with crystal structure containing SiO_4 tetrahedron arranged as (1) isolated units, (2) single or double chains, (3) sheets, or (4) 3-dimensional networks. *Leet.*

silicates, classification. Silicates were formerly classified as salts of hypothetical silicic acids, as orthosilicates—salts of H_4SiO_4, and metasilicates—salts of H_2SiO_3. This classification has now been abandoned in favor of one based on types of linkages of SiO_4 tetrahedra, in which silicon may be partly replaced by aluminum. Nesosilicates (Greek neso, meaning island) have independent SiO_4 groups; for example, Mg_2SiO_4. Sorosilicates (Greek soro, meaning group) have two tetrahedra linked to form $Si_2O_7^{-6}$ groups; for example, $Ca_2MgSi_2O_7$. Cyclosilicates (Greek cyclo, meaning ring) have three tetrahedra linked to form rings such as $Si_3O_9^{-6}$ or $Si_6O_{18}^{-12}$ groups; for example, beryl, $Be_3Al_2Si_6O_{18}$. Inosilicates (Greek ino, meaning thread) have three tetrahedra linked to form continuous chains of $Si_2O_6^{-4}$ or $Si_4O_{11}(OH)^{-7}$ groups; for example, enstatite, $MgSiO_3$, and tremolite, $Ca_2Mg_5Si_8O_{22}(OH)_2$. Phyllosilicates (Greek phyllo, meaning sheet) have four tetrahedra linked to form continuous sheets of $Si_4O_{10}^{-4}$ groups; for example, kaolinite, $Al_2Si_2O_5(OH)_2$, and muscovite, $KAl_2(AlSi_3)O_{10}(OH)_2$. Tectosilicates (Greek tecto, meaning framework) have continuous three-dimensional frameworks of compositions, $(Si,Al)O_2$; for example, quartz, SiO_2, orthoclase, $K(AlSi_3)O_8$, and nepheline, $Na(AlSi)O_4$. *A.G.I.*

silicate wheel. A grinding wheel bonded with sodium silicate (water glass). *ASM Gloss.*

silication. a. The process of changing into a silicate, as the silication of a limestone. *A.G.I.* b. Metamorphic process whereby silicates, such as garnet, amphiboles, and pyroxenes, are developed in carbonate rocks. *A.G.I.*

silicatization. Synonym for silication. *Standard, 1964.*

silicatization process. A special method of sealing off water, for example, reducing its inflow into shafts, by the injection of calcium silicate under pressure. It is sometimes used to reduce the leakage of water through defective lengths of tubing in a shaft; the calcium silicate on solidification, behind the leaking tubing, is highly impervious. *Nelson.*

silicatosis. A disease of the lungs thought to be caused by silicates. *BuMines Bull. 400, 1937, p. 265.*

silica-wet-pan charger. *See* wet-pan charger. *D.O.T. 1.*

siliceous. Of, relating to, or derived from silica; containing or resembling silica or a silicate; silicic. Also spelled silicious. *Webster 3d.*

siliceous bricks. *See* silica brick.

siliceous calcite. *See* sand calcite.

siliceous clay. A clay containing appreciable free silica in particles which may or may not be visible to the naked eye. When visible particles of silica are present in large amount, the term sandy is often used. *ACSB, 1.*

siliceous deposits. A group of natural earth materials including chert and flint and the deep-sea oozes which are formed of the skeletons of such organisms as radiolarians, diatoms, and sponges. *Stokes and Varnes, 1955.*

siliceous dust. Dust arising from the crushing or other dry working of sand, sandstone, trap, granite, and other igneous rocks are included in this class. Siliceous dusts are not soluble in the body fluids, and when introduced into the respiratory tract in the form of particles of the proper sizes and in sufficiently high concentration produce nodular growths that often result in a form of pneumonoconiosis that has been known as silicosis or "stone cutters" consumption. *Pit and Quarry, 53rd, sec. B, p. 252.*

siliceous earth. A general term including both diatomaceous earth (diatomite) and radiolarian earth (radiolarite). *A.G.I.*

siliceous fire clay. A fire clay composed mainly of fine white clay mixed with clean, sharp sand, found in pockets. *Nelson.*

siliceous fire clay brick. Fire clay brick containing appreciable quantities of uncombined silica and usually low in fluxing constituents. *A.R.I.*

siliceous malachite. Green chrysocolla. *Shipley.*

siliceous materials. Materials that consist mainly of SiO_2 and must be low in metallic oxides and alkalies. *Newton, p. 261.*

siliceous oozes. These are pelagic deposits which contain a large percentage of siliceous skeletal materials produced by planktonic plants and animals. The siliceous oozes are subdivided into two types on the basis of the predominance of the forms represented, namely: (1) diatom ooze, containing large amounts of diatom frustules, therefore, produced by plankton plants, and (2) radiolarian ooze, containing large porportions of radiolarian skeletons formed by these plankton animals. *H&G.*

siliceous ores. Another name for gold-quartz ores. *Newton, p. 19.*

siliceous refractory. A refractory material that in the fired state, contains not less than 78 percent but less than 92 percent SiO_2, the remainder being essentially Al_2O_3. Semisilica and semisiliceous refractories are also comprised within this definition. *Dodd.*

siliceous rocks. Rocks which are chiefly formed by sponges and small marine animals called Radiolaria and small plants called Diatoms. *Mason, V. 1, p. 13.*

siliceous shale. A hard, fine-grained rock of shaly structure generally believed to be shale altered by silicification. *A.G.I. Supp.*

siliceous sinter. *See* fiorite. *Fay.*

silicic. a. In petrology, containing silica in dominant amount. *Fay.* b. In chemistry, containing silicon as the acid-forming element. *Fay.*

silicic acid; hydrated silica. Applied to the jellylike precipitate obtained when a sodium silicate solution is acidified. The formla H_2SiO_3 is often used for convenience but no such compound has been isolated, and $SiO_2.nH_2O$ is the proper formula. The proportion of water varies with the conditions of preparation and decreases gradually during drying and ignition, until relatively pure silica, SiO_2, remains. During drying, the jelly is converted into white amorphous powder or lumps. In this form, the material has great surface area and absorbing power. Used for decolorizing (bleaching) oils, fats, and waxes; as a catalyst, a carrier or base for other catalysts and for chromatographic adsorption; and recovery of gases and vapors including moisture from air or gas streams. The adsorbent properties may be regenerated by heating to 150° C. *See also* silica gel. The term silicic acid is also sometimes applied to various hypothetical acids of silica, such as H_4SiO_4 (orthosilicic acid. *See* orthosilcic acid), $H_2Si_2O_5$, etc. *CCD 6d, 1961.* Two types of silicic acid are metasilicic acid and disilicic acid. Metasilicic acid; H_2SiO_3; molecular weight, 78.10; colorless; amorphous; decomposes at room temperature; insoluble in water; and soluble in ammonia, in hydrofluoric acid, and in hot alkalies. Disilicic acid; H_2SiO_5; molecular weight, 138.18; colorless; crystalline; decomposes at 150° C on heating; insoluble in water; and soluble in ammonia and in hydrofluoric acid. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-217.*

silicic magmas. Magmas rich in silica. *Bateman.*

silicide. A binary compound of silicon with a metal. *Osborne.*

silicides. A group of special ceramic materials. *Dodd*

silicification. The entire or partial replacement of rocks and fossils with silica, either as quartz, chalcedony, or opal. *Fay.*

silicified. Made into silica. Organic remains, both plant and animal, are often thus converted. *Fay.*

silicified wood. A material formed by replacement of wood by silica in such manner that the original form and structure of the wood is preserved. The silica is generally in the form of opal or chalcedony. *A.G.I.*

silicinate. Cemented with silica. *A.G.I. Supp.*

silicious. *See* siliceous. *Fay.*

silicofluoric acid. *See* fluosilicic acid. *CCD 6d, 1961.*

silicomanganese. A high-silicon, low-carbon ferromanganese. Also called manganese silicide. *BuMines Bull. 585, 1960, p. 294.*

silicomanganese steel. *See* manganese alloys. *C.T.D.*

silicon. A tetravalent nonmetallic element that occurs in combined form as the most abundant element next to oxygen in the earth's crust. It can be obtained as brittle, hard, lustrous, steel-gray crystals with the lattice structure of diamond, as a glistening black graphitic form, or as a dark brown powder. Usually prepared by reducing silica with carbon in an electric furnace. Used chiefly in the form of alloys (as ferrosilicon), in combination with ceramic materials in cermets, and as a semiconductor (as in transistors) and element in photovoltaic cells. Symbol, Si; valence, 4; isometric; atomic number, 14; atomic weight, 28.086; specific gravity, 2.32 to 2.34 and 2.33 (at 25° C); melting point, 1,410°C; boiling point, 2,355° C; insoluble in water and in hydrofluoric acid; and soluble in hydrofluoric acid and nitric acid mixed. *Webster 3d; Handbooks of Chemistry and Physics, 45th ed., 1964, pp. B-134, B-217.* Silicon constitutes 25.7 percent of the earth's crust by weight. Never found uncombined in nature but occurs abundantly as the oxide and as silicates. This relatively inert element is not affected by most acids, except hydrofluoric acid, but it is attacked by halogens and dilute alkalies. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-135.*

silicon alloys. Silicon bronze is a noncorroding alloy with copper and tin. Silicon copper (70 to 80 percent and 20 to 30 percent silicon) is an alloy added to molten copper or brass to remove oxygen. Silicon iron is a grain-improved iron, corrosion resistant. *See also* ferrosilicon. *Pryor, 3.*

silicon and selenium rectifiers. Silicon and selenium power conversion units are an economical means of obtaining direct current power from the excitation of synchronous motors, magnets, magnetic chucks, arc lights, etc. The basic unit consists of a three phase, insulated transformer and silicon rectifier diodes or selenium rectifier stacks, enclosed in a ventilated steel cabinet. To this can be added the proper accessories, alternating current and direct current switchgear, voltage regulator, regenerative protective panels, off-and-on pushbuttons, meters, etc. Both convection cooled and forced draft cooled units are available. In most large indoor industrial applications, it has been found economical to use forced draft cooled units. Rectifier equipment using silicon diodes requires less floor space, is credited with higher efficiency, and permits better voltage regulation. *Pit and Quarry, 53rd, Sec. D, p. 35.*

silicon borides. Two compounds have been reported: SiB_4, oxidation resistant to 1,370° C; SiB_6 melting point 1,950° C. A special refractory has been made by reacting silicon and boron in air, the product containing SiB_4 and Si in a borosilicate matrix; it is stable in air to at least 1,550° C and has good thermal shock resistance. *Dodd.*

silicon bronze. An alloy of copper and usually 1.5 to 3.0 percent silicon with small amounts of various third elements (as zinc, tin, or manganese). *Webster 3d.*

silicon carbide. A compound of carbon and silicon, SiC. It is made in the electric furnace by heating a mixture of anthracite or coke with sand, a little sawdust, and salt, and forms hexagonal black crystals, many of which have an irridescent coating. It is used as an abrasive in the form of powder, grains, hones, grinding wheels, etc. Known under a number of trade names, such as Carborundum, Carbosilite, Carbowalt, Crystolon, Moissanite, and Silundum. *Hess.*

silicon carbide refractories. Refractory products consisting predominantly of silicon carbide. *HW.*

silicon copper. A rich copper alloy added to molten copper in order to secure clean, solid castings free from blowholes, swellings, etc. When used in the proper amount (about 1½ to 2 pounds per hundred) not a trace of silicon remains in the metal. *Crispin.*

silicon dioxide. *See* silica. *ACSG, 1963.*

silicone. Group name for semi-inorganic polymers made up of a skeleton structure of alternate silicon and oxygen atoms with various organic groups atached to the silicon. Silicones range from low-molecular-weight volatile materials to cyclic, linear, and cross-linked high-molecular-weight polymers. Produced to the basic forms of fluids, resins, and elastomers, they are also further compounded to yield greases, rubbers, protective coatings, and foamable powders. Silicones are heat stable; serviceable over a wide temperature span; water-repellant; and resistant to oxidation and weathering. Used in surface treatments for glass ad ceramic. *CCD 6d, 1961.*

silicon ester. The first chemical compound manufactured in which silicon replaces carbon in a molecule in the realm of organic chemistry. One carbon atom in an alcohol molecule is replaced by silicon. One of the latest developments in the manufacture of highly refractory materials is the mixing of refractory powders with silicon ester. This operation produces a workable body which will not shrink during drying and firing. *Rosenthal.*

silicon iron. A cast iron containing 0.75 to 14 percent silicon. Has low magnetic hysteresis, used for sheets for transformer cores and those containing the higher percentages of silicon are used as cathodic protection anodes. *Bureau of Mines Staff.*

siliconize. To unite or cause to unite with silicon, as in the combination of iron with silicon in certain metallurgical processes. *Standard, 1964.*

siliconizing. Diffusing silicon into solid metal, usually steel, at an elevated temperature. *ASM Gloss.*

silicon nitride. A grayish powder, Si_3N_4 (can be prepared as crystals) ; sublimes at 1,900° C; Mohs' hardness, 9+; resistant to oxidation, various corrosive media, molten aluminum, zinc lead, and tin. Used in abrasives and in rocket nozzles. An important refractory. *CCD 6d, 1961.*

silicon-oxygen tetrahedron. A complex ion composed of a silicon ion surrounded by 4 oxygen ions. It has a negative charge of 4 units, is represented by the symbol $(SiO_4)^{4-}$, is the diagnostic unit of silicate minerals, and is the central building unit of neary 90 percent of the materials of the earth's crust. *Leet.*

silicon spiegel; silicospiegel. a. A spiegeleisen containing 15 to 20 percent managanese and 8 to 15 percent silicon used in making certain special steels. *Webster 3d.* b. A form of pig iron. *Henderson.*

silicon steel. A variety of steel containing ½ to 5 percent silicon. It is very hard, but brittle, and difficult to work. Used in the form of sheets for the making of cores for electromagnets, transformers and motors and generator armatures. *Bureau of Mines Staff.*

silicon ware. A slightly glazed stoneware made at Lambeth, England. *Standard, 1964.*

silicosis. a. Lung disease caused chiefly by inhaling rock dust from air drills. *Nichols.* b. A condition of massive fibrosis of the lungs marked by shortness of breath and resulting from prolonged inhalation of silica dusts by those, as stonecutters, asbestos workers, miners, regularly exposed to such dusts. *Webster 3d. See also* pneumoconiosis; simple silicosis. *Nelson.*

silicotuberculosis. Complication of tuberculosis by silica. *Hartman, p. 45.*

Silimite. Trademark for a high magnesium dolomitic lime used for silica reduction in hot process water softening equipment. *CCD 6d, 1961.*

Silit. Trademark for heating element consisting principally of SiC; to maintain a constant resistance for a long period, silicon is included in the batch and the shaped rods are fired in a controlled atmosphere to cause some nitridation and/or carbonation. *Dodd.*

silk. Microscopically small inclusions in ruby or sapphire; subsurface reflections which produce a whitish sheen resembling the sheen of silk fabric. Inclusions now generally conceded to be tiny needles of rutile, although some authorities still mention canals or negative crystals. *Shipley.*

silklay. A finely ground-plastic clay of high refractoriness used as a bond for molding sands. *Osborne.*

silk-screen process. A decorating method that can be applied to pottery, glassware, or vitreous enamelware. The simplest silk-screen equipment consists of a frame over which is stretched silk bolting cloth, or fine wire gauze of 125 to 150 meshes per inch. A stencil is then placed on the frame and varnish is applied to fill in those parts of the screen not covered by the design. Color, dispersed in a suitable oil, is pressed through the open parts of the screen by means of a roller and the pattern of the stencil is thus reproduced on the ware. The stencil can be made photographically. A further development was the screen printed collodion-film transfer, which has itself been improved to give screen printed cover coat transfers. *Dodd.*

silky. Having the luster of silk, like fibrous calcite or fibrous gypsum. *Fay.*

silky fracture. A metal fracture in which the broken metal surface has a fine texture usually dull in appearance. Characteristic of tough and strong metals. *ASM Gloss.*

silky luster. The luster of silk, and is peculiar to minerals having a fibrous structure. The fibrous form of gypsum and satin spar are good examples of silky luster. *Nelson.*

sill. a. Applied in mining to flat-bedded strata of sandstone or similar hard rocks. *A.G.I.* b. A sheet of igneous rock lying nearly horizontal. A sill may become a dike or vice versa. *Nelson.* c. A footpiece or footblock. A flattish piece of wood or steel placed beneath timber or steel props, or under the uprights of timber sets to prevent or reduce floor penetration. *Nelson.* d. A piece of wood laid across a drift or on the surface which timber or other structures are built. *Ballard.* e. A piece of wood laid across a drift to constitute a frame with which the posts and to carry the track of the tramway. *Fay.* f. Cumb.; York. Same as clunch, spavin, and warrant. *Fay.* g. The floor of a gallery or passage in a mine. *Standard, 1964.* h. Fire clay, used for making slate or sill pencils, Coal Measures. *Arkell.* i. *See* floor sill. *Long.* j. A submarine ridge or rise separating partially closed basins from one another or from the adjacent ocean. *Schieferdecker.* k. Horizontal structural member forming the bottom of a door or opening in a furnace wall. *AISI No. 24.*

sill course. *See* belt course.

sill depth. Greatest depth at which there is free, horizontal communication between two ocean basins. *Hy.*

sillenite. Body-centered cubic modification of Bi_2O_3 as greenish, waxy masses from Durango, Mex. *Spencer 17, M.M., 1946.*

sill floor. *See* square-set stopes. *Nelson.*

sillimanite. a. A silicate of aluminum with the same formula as andalusite and cyanite, Al_2OSiO_5; orthorhombic; white, gray, brown, or greenish; vitreous luster; Mohs' hardness, 6 to 7; specific gravity, 3.23; usually found as fine fibrous masses. Found in Massachusetts, Connecticut, New Hampshire, Pennsylvania, South Carolina, Georgia; India, Brazil, Australia. Used in refractories. Fibrolite is a variety. *See also* mullite. *CCD 6d, 1961; Dana 17.* b. A high heat-resisting material containing a maximum amount of mullite, developed from the alteration of andalusite during firing. This necessitates firing above 1,550° C, for the development of a suitable crystalline structure. Used for special porcelain shapes, furnace patch and refractories. *CCD 6d, 1961.*

sillimanite refractory. A refractory material made from any of the sillimanite group of minerals. Such refractories generally contain about 60 percent Al_2O_3; they have a high RuL and good spalling resistance. Sillimanite refrectories are much used in glass-tank furnaces and in kiln furniture for use in the firing of pottery ware. *Dodd.*

sillimanite schist. A schist containing an appreciable amount of sillimanite (fibrolite). *Sinkankas.*

sillite. Gumbel's name for a rock from the Bavarian Alps, variously referred to by others as gabbro, diabase, mica syenite, and mica diorite. *Fay.*

sills. Strong timbers laid horizontally to support posts or other tunnel timbers. *Stauffer.*

silo. A tall tower, usually cylindrical and of reninforced concrete construction, in which grain, cement, or similar bulk material is stored. *Ham.*

sil-o-cel. A natural material known as diatomaceous earth, used for insulation purposes. *Enam. Dict.*

siloxane. A silicone with alternating silicons and oxygens. *VV.*

Siloxicon. Silicon carbide refractory. *Bennett 2d, 1962.*

silt. a. A name aplied to the fine materials such as culm, ashes, etc., that are flushed into a mine in hydraulic mine-filling. *Fay.* b. In anthracite terminology, the accumulation of waste fine coal, bone, and slate settled out of breaker water. It is made up of particles ranging in size from 3/32-inch round-opening to the finest slime. The material is also called sludge, fines, slush, and mud, and it is the partly dewatered solids content of what has been defined as slurry. *Mitchell, p. 610.* c. In bituminous coal preparation terminology, silt corresponds to coal sludge. It is also called slush, mud, and duff. *Mitchell, p. 610.* d. Breaker waste composed of water, coal, slate, pyrite, and clay. *Korson.* e. Fine-grained sediments, mainly sand and mud, the particles of which have the limiting diameters of 0.1 and 0.01 millimeter, namely, coarse silt (0.1 to 0.05 millimeter) and fine silt (0.05 to 0.01 millimeter). Silt is closely linked with alluvium or marsh land. *Nelson.* f. A general name for the muddy deposit of fine sediment in bays or harbors, and one much employed in conection with engineering enterprises. *Fay.* g. In the mechanical analysis of soil, silt, according to international classification, has a grain size between 0.002 and 0.02 millimeter. *C.T.D. Supp.* h. Soil consisting of 80 percent or more silt (0.05 to 0.002 millimeter) and less than 12 percent clay. *A.G.I. Supp.* i. Material passing the No. 200 U. S. standard sieve that is nonplastic or very slightly plastic and that exhibits little or no strength when air-dried. *ASCE P1826.* j. A fine-grained sediment having a particle size intermediate between that of fine sand and clay. *B.S. 3618, 1964, sec. 5.* k. Soil particles between 0.05 and 0.005 millimeters in size as classified by the American Society for Testing and Materials. *Carson, 2, p. 94.*

silt box. A loose iron box fitted in the bottom of a gulley for collecting deposited silt. It can be removed periodically for emptying and flushing. *Ham.*

silt displacement. A system of using a shield for driving a tunnel in silts which are nearly fluid. *Ham.*

silt ejector. *See* hydraulic ejector. *Ham.*

silt grade. a. Fine-grained sediments, the individual particles of which have the limiting diameters of 0.1 and 0.01 millimeter, namely coarse silt (0.1 to 0.05 millimeter) and fine silt (0.05 to 0.01 millimeter). *C.T.D.* b. Sediments of silt-size particles. *Ham.*

silting. a. Sedimentation in water that results in the deposition of somewhat fine material, which is suspended in the entire body of water or in some considerable portion of it. *A.G.I.* b. Filling with soil or mud deposited by water. *Nichols.* c. *See* hydraulic mine-filling. *Fay.*

silting up. a. The filling in with silt or other fine sediment. *Schieferdecker.* b. *See* filling up. *Schieferdecker.*

siltite. Synonym for siltstone. *A.G.I. Supp.*

silt loam. A type of soil having half of the particles of the size called silt. The amount of material of sand or clay size is relatively small. *Stokes and Varnes, 1955.*

silt size. That portion of the soil finer than 0.02 millimeter and coarser than 0.002 milimeter (0.05 and 0.005 millimeter in some cases). *ASCE P1726.*

siltstone. a. A rock type intermediate in character between shale and sandstone. Essentially a compacted silt, conforming in grain sizes to the silt grade, that is, between 0.1 and 0.01 millimeter. Also called flakes; linsey; slaty stone; stone bind; rock bind; stone clunches. *Nelson.* b. A consolidated silt. *B.S. 3618, 1964, sec. 5.* c. A very fine-grained, consolidated clastic rock composed predominantly of particles of silt grade. *A.G.I.*

silt trap. A settling hole or basin that prevents water-borne soil from entering a pond or drainage system. *Nichols.*

silty soil. A soil in which silt is the basic constituent. The silt contributes to instability especially when subjected to vibration or when saturated with water. *Nelson.*

Silumin. *See* alpax. *C.T.D.*

silundum. A trade name for a form of silicon carbide; produced in an electric furnace, and possessing great hardness, high electrical resistance, and not subject to oxidation below 2,912° C. *Fay.*

Silurian. The third in order of age of the geologic periods comprised in the Paleozoic era, in the nomenclature in general use. Also, the system of strata deposited during that period. (The above usage, in which the term is restricted to the period following the Ordovician and preceding the Devonian, is the one now prevalent. Formerly, Silurian included what is now called Ordovician, and it has been used by some geologists to include the Cambrian also. *Fay.*

silver. A white metallic element in Group I of the periodic system; sonorous, ductile, very malleable, and capable of a high degree of polish. It is not oxidized in air, and has the highest thermal and electrical conductivity of any substance. Occurs massive, or assumes aborescent or filiform shapes. Native silver often has variable admixture of other metals: gold, copper, or sometimes platinum. Used for coin, jewelry, etc. Symbol, Ag; atomic weight 107.88; specific gravity 10.5 at 20° C. *C.T.D.*

silver acetylide. *See* silver carbide. *Bennett 2d, 1962.*

silver amalgam. A solid solution of mercury and silver crystallizing in the cubic system. The percentage of silver is usually about 26 percent, but in the variety arquerite it reaches 86 percent. It is of rare occurrence, and is found scattered either in mercury or silver deposits. *C.M.D.*

silver bed. Eng. A compact oolite, the best local building stone in the neighborhood of Lincoln. So called because it has a true ring like silver. *Compare* guinea bed. *Arkell.*

silver bloc. A group in Congress composed of the senators from the silver-producing states of Idaho, Utah, Montana, Nevada, Colorado, and Arizona. *Mathews, v. 2, p. 1545.*

silver bonanza. A rich silver mine. *Mathews, v. 2, p. 1544.*

silver brazing. Brazing with silver-base alloys as the filler metal. *ASM Gloss.*

silver-brazing alloy. Filler metal used in silver brazing. *ASM Gloss.*

silver brick. A bricklike mass of silver. *Mathews, v. 2, p. 1544.*

silver camp. The temporary quarters of silver miners. *Mathews, v. 2, p. 1545.*

silver capes. Diamonds having a very slight tint of yellow. *Hess.*

silver carbide; silver acetylide. Ag_2C_2; molecular weight, 239.76; white; explodes; insoluble in water; soluble in acid; and slightly soluble in ethyl alcohol. An explosive used in detonators. *Bennett 2d, 1962.*

silver carbonate. Yellow; Ag_2CO_3; molecular weight, 275.75; specific gravity, 6.077; decomposes at 218° C on heating; very slightly soluble in water; soluble in ammonium hydroxide, in nitric acid, and in sodium thiosulfate (sodium hyposulfite); and insoluble in alcohol. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-218; CCD 6d, 1961.* Used to produce iridescent stains or sheens on glazes. This is done at relatively low temperatures (300° to 700° C). Also used as a component of some glass stains. *Lee.*

silver chloride; cerargyrite; horn silver. White; AgCl; molecular weight, 143.32; isometric; specific gravity, 5.552 or 5.56; Mohs' hardness, 1 to 1.5; melting point, 455° C; boiling point, 1,550° C; very slightly soluble in water; and soluble in ammonium hydroxide, in sodium thiosulfate (sodium hyposulfite) solution, and in potassium cyanide solution. Occurs as the mineral cerargyrite (horn silver) which ranges from white to grayish, yellowish, or greenish and turns violet, brown, or black in light. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-218, B-242.* Used in the preparation of yellow glazes, purple of Cassius, and silver lusters. A yellowish-silver luster is obtained by mixing silver chloride with 3 times its weight of clay and ocher and with enough water to form a paste. *Lee.*

silver claim. A claim to an area selected for silver-mining purposes. *Mathews, v. 2, p. 1544.*

silver freighter. A wagoner who hauls silver ore. *Mathews, v. 2, p. 1545.*

silver fulminate. $Ag_2C_2N_2O_2$; molecular weight, 299.77; small needles; soluble in hot water; and it explodes easily. Used as a detonator. Insoluble in nitric acid and soluble in ammonium hydroxide. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-218.*

silver glance. The native silver sulfide, argentite. *Fay.*

silver halides. Silver bromide, AgBr; silver iodide, AgI; silver chloride, AgCl; and silver fluoride, AgF. The bromide and chloride are sensitive to light and are of basic importance in photography. *C.M.D.*

silver hunter. One who prospects for silver. *Mathews, v. 2, p. 1545.*

silvering. a. A plating or covering of silver or an imitation of it, as applied to any surface; as, the silvering on the back of a mirror. *Standard, 1964.* b. The art or process of coating surfaces with, or as with, silver. *Standard, 1964.*

silver jamesonite. Same as owyheeite. *English.*

silver king. A man of importance in the silver industry. *Mathews, v. 2, p. 1545.*

Silver Land. A nickname for Nevada. *Mathews, v. 2, p. 1544.*

silver lead. Lead containing silver. *Standard, 1964.*

silver lead ore. The name given to galena containing silver. When 1 percent or more of silver is present, it becomes a valuable ore of silver. Also called argentiferous galena. *C.M.D.*

silver luster. Because silver tends to tarnish, silver luster is, in fact, made from platinum, with or without the addition of gold. *Dodd.*

silver marking of glazes. Silver cutlery, or other relatively soft metal, will leave a very thin smear of metal on pottery ware if the glaze is minutely pitted. A glaze may have this defective surface as it leaves the glost kiln, or it may subsequently develop such a surface as a result of inadequate chemical durability. The fault is also known as cutlery-marking. *Dodd.*

silver mill. The mill or metallurgical plant used in treating silver ores by either the wet or dry process. *Fay.*

silver minerals. Occurs native, alloyed with gold as electrum, as sulfide argentite (Ag_2S), proustite, pyrargyrite, and horn silver AgCl or cerargyrite. Main source is argentiferous ores of lead, zinc, copper where it is extracted as a byproduct. Bulk of production is used for coinage, electrical alloys, photographic chemicals, and the arts. *Pryor, 3.*

silver nitrate. Colorless; transparent; tabular orthorhombic crystals; $AgNO_3$; molecular weight, 169.87; becomes gray or grayish-black on exposure to light in the presence of organic matter; odorless; bitter, caustic, metallic taste; corrosive; soluble in cold water; more soluble in hot water; soluble in glycerol; slightly soluble in ether; very slightly soluble in absolute alcohol; specific gravity, 4.352 (at 19° C); melting point, 212° C; and it decomposes at 444° C. Used as a reagent in chemical laboratories and in glass manufacture. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-218.* $AgNO_3$ provides the most convenient method of introducing silver into glass; a solution of the compound is poured over the batch. A very low concentration of silver produces a colorless glass which, upon reheating, can be struck to a yellow. *Lee.*

silver ore, brittle. *See* stephanite.

silver ores. Sometimes found native. *See also* acanthite; amalgam; argentite; brongnairdite; bromyrite; calaverite; cerargyrite; dyscrasite; electrum; embolite; freibergite; freieslebenite; hessite; iodyrite; krennerite; nagyagite; petzite; polybasite; proustite; stephanite; stetefeldite; stromeyerite; sylvanite; xanthoconite. *Fay.*

silver oxide; argentous oxide. Brown-black; isometric; Ag_2O; molecular weight, 231.74; specific gravity, 7.143 (at 16.6° C); decomposes at 300° C; very slightly soluble in water; and soluble in acids, in potassium cyanide solution, in ammonium hydroxide, and in alcohol. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-219; CCD 6d, 1961.* Usually produces a yellow color in glazes, but in the presence of lime or zinc compounds the color is brownish, and with boric acid the glaze is gray. In ceramics, other silver compounds are usually preferable to the oxide. It is sometimes used in glass stains. *Lee.*

Silver Peak jade. Local Nevada term for malachite. *Shipley.*

silver plate. Ware plated with silver. *Standard, 1964.*

silver plating. The deposition of a coating of metallic silver, commonly by electrolysis. *Nelson.*

silver powder. A powder used in japanning, composed largely of bismuth, tin, and mercury; also, finely precipitated silver for electroplating. *Standard, 1964.*

silver sand. a. A sharp, fine sand of a silvery appearance used for grinding lithographic stones, etc. *Fay.* b. Specially pure silica. *Pryor, 3.*

silver solder. *See* silver brazing alloy. *ASM Gloss.*

silver stain. a. Yellow color used in stained-glass painting. *Haggar.* b. *See* air stain. *Skow.*

silver state. A state producing silver or advocating the free coinage of silver. *Mathews, v. 2, p. 1544.*

Silver State. Nevada, a nickname; also, rarely, Colorado. *Mathews, v. 2, p. 1544.*

silver steel. Bright-drawn carbon steel low in sulfur and phosphorus, with up to 0.3 percent silica, 0.45 percent manganese, 0.5 percent chromium, and 1.25 percent carbon. *Pryor, 3.*

silver stone. Moonstone. *Shipley.*

silver strike. The discovery of a rich silver-mining area. *Mathews, v. 2, p. 1544.*

silver-zinc battery. This type of battery has many outstanding features. In each cell the electrodes of silver and zinc are enclosed in an absorbent material which also hold the electrolyte, very little free liquid being present. The plates contain no paste. No separators are required and the cells are claimed to be unaffected by prolonged charge or discharge. The most noticeable characteristics of the silver-zinc cell are those of comparative size and weight, when compared with other types in general use. They are less than half the size and less than one-third the weight of conventional type batteries of the same capacity. *Roberts, II, p. 248.*

Silvester method. The oldest manual method of artificial respiration on record, dating back to 1858. The cycle of operations is as follows: Lay the patient flat on his back and place a roll of clothing under his shoulders to ensure that the head is thrown well back and the respiratory tract is clear. Pull the patient's tongue forward and fix it in that position. Kneel at the patient's head and grasp his arms immediately below the elbows. Swing forward and press his arms steadily and firmly downwards and inwards against the lower ribs and the upper part of the abdomen. Maintain a steady pressure for 2 seconds to force air out of the lungs and simulate the movement of exhalation. Thereafter bring the patient's arms steadily backwards until they are in line with the body and the elbows are almost touching the ground. Hold the arms in the extended position for 3 seconds. In this position the chest cavity is extended, air enters the lungs, and the movement stimulates the natural inhalation movement of breathing. *McAdam, p. 84.*

sima. The basic outer shell of the earth; under the continents it underlies the sial, but under the Pacific Ocean it directly underlies the oceanic water. Originally, the sima was considered basaltic in composition with a specific gravity of about 3.0. In recent years, it has been suggested that the sima is peridotitic in composition with a specific gravity of about 3.3. First used in its present form and spelling by Suess. *A.G.I.*

simax. A glass, of very high thermal endurance and good chemical resistance, made by the Kavalier Glassworks, Sazara, Czechoslovakia. *Dodd.*

Simbal breathing apparatus. An improved liquid oxygen breathing apparatus, weighing 33 pounds and approved for use in British mines. Air is fed to the wearer at a temperature of 50° rising to 70° in just over half an hour and is still only 80° after 2½ hours. *Nelson.*

simetite. A resin near succinite from near Mount Etna, Sicily, Italy. It is remarkable for its deep red color, contains but 0.4 percent of succinic acid, and has a specific gravity of 1.052 to 1.068. *Fay.*

similar folding. That type of folding in which each successively lower bed shows the same geometrical form as the bed above. Thus, if the shape of one bed is that of a sine curve, all the beds show the same shape. Similar folding implies thinning on the limbs of the folds and thickening at the axes. Contrasts with parallel folding; supratenuous folding. *Billings, 1954, p. 56.*

simili. A name for lead glass imitations of colorless gemstones. *Shipley.*

similitude. If a given charge will break a crater of given dimensions and it is desired to break a crater of double the linear dimensions, then the charge dimension must be doubled or its volume (weight) cubed. If, however, linear dimensions in each case are divided by $\sqrt[3]{W}$, then this should yield the same scaled values. The cube root of the weight of explosive is usually denoted by r and is given for convenience the dimensions of feet. Linear distances are scaled by dividing by r, areas by r^2 and volumes of weights by r^3. *Lewis, pp. 149-150.*

similor. A golden-colored variety of brass. Also called Mannheim gold; Prince Rupert's metal. *Fay.*

Simmons jar block. Synonym for C-S jar collar. *Long.*

Simmons jar collar. Synonym for C-S jar collar. *Long.*

Simonacco filter. A trade name for a rotary vacuum disk filter used in the final stages of coal preparation. It is continuously operated and designed for the filtration of froth concentrate from flotation plants and for the treatment of flocculated slurries. *Nelson.*

Simon's theory. A theory of drilling to include the effects of drilling by percussion and by vibration with a rotary (oil well) bit, cable tool, and pneumatic hammer. The formula developed is for rate of penetration of a chisel-shape bit into brittle rock. The rate of drilling may be defined by the following equation:

$$R = \frac{N\,Af_v}{\pi D}$$

where R equals rate of advance of bit, N equals number of wings of bit, f_v equals number of impacts per unit time, D equals diameter of the bit, A equals cross-sectional area of crater at periphery of drill hole. *Lewis, p. 98.*

simonyite. Synonym for bloedite. *Dana 6d, p. 946.*

simple alloy steel. An alloy steel containing one alloying element, as for example, simple nickel steel. *See also* ternary steel. *Fay.*

simple beam. A simply supported beam. *Ham.*

simple bending. The bending of a beam which is freely supported, having no fixed end. *Ham.*

simple cross-stratication. Lower bounding surface of cross-stratified unit is a nonerosional surface. *Pettijohn.*

simple curve. A curve having but one radius. *Zern, p. 455.*

simple dike. A dike resulting from a single intrusion of magma. Opposite of multiple dike; composite dike. *Billings, 1954, p. 307*

simple engine. A reciprocating engine from which steam or compressed air is exhausted to atmosphere after expansion in one cylinder only. *Ham.*

simple explosives. These explosives consist of one simple chemical compound. The explosive heat is liberated with the breaking down of the molecules and the atoms recombining to form water, carbon dioxide, nitrogen, and other gases and possibly solid substances such as carbon. To this group belong explosives in the proper sense of the word, such as nitroglycerin, nitroglycol, nitrocellulose, trotyl, and cyclonite (RDX). *Fraenkel, v. 3, Art. 16:01, p. 29.*

simple framework. *See* perfect frame. *Ham.*

simple interest. Interest arising solely from the principal, and even though unpaid, does not itself bear interest. *Hoov, p. 156.*

simple mineral. A mineral found in nature, as distinguished from rocks, which, in the scientific sense, are mixtures of minerals. *Standard, 1964.* Calcite and hematite are simple minerals, while granite is a mixture of three simple minerals—quartz, feldspar, and mica. *Fay.*

simple ore. Ore that yields a single metal. *Schieferdecker.*

simple pegmatite. A pegmatite of simple mineral composition and corresponding to the last products formed during the main stage of magmatic crystallization, without replacement by pneumatolytic-hydrothermal agencies introducing rare elements. *Schieferdecker.*

simple pneumoconiosis. Pneumoconiosis of the lungs that can be related to the amount (and possibly the nature) of the dust breathed by miners over the years. *See also* complicated pneumoconiosis. *Nelson.*

simple silicosis. Silicosis which is not complicated by tuberculosis; a condition which may remain almost stationary for many years. *Nelson.*

simple sill. A sill resulting from a single intrusion of magma. Opposite of multiple sill; composite sill. *Billings, 1954, p. 295.*

simple sound source. A source that radiates sound uniformly in all directions under free-field conditions. *Hy.*

simple split seam. A coal seam which has separated into two layers of coal some distance apart vertically. *See also* multiple splitting. *Nelson.*

simple steel. A steel consisting chiefly of iron and carbon. Other elements are always present, but are not essential to the formation of the steel. The content of carbon may be very small. Often called carbon steel. *Fay.*

simple vein. A vein composed of homogeneous, not banded, material. *Standard, 1964. A* vein composed of one mineral, as pyrite, fluorite, hematite, etc. *Fay.*

simplex kiln. A type of annular kiln in which two barrel-arch galleries are each divided by transverse walls into eight or nine chambers, each of which has grates at the corners for the hand firing of solid fuel. This kiln can be used for the firing of facing bricks, roofing tiles, firebricks, or (because the flue system permits each chamber to be isolated) blue engineering bricks. *Dodd.*

Simplex pump. A reciprocating single- or double-action piston pump having one water cylinder. *Long.*

simplotite. Hydrous tetravanadite of calcium, $CaV_4O_9.5H_2O$; monoclinic, as dark-green plates and warty aggregates with U-V cores in crevices in sandstone from Peanut mine, Montrose County, Colo., and other localities in Colorado and Utah. *Spencer 21, M.M. 1958.*

simpsonite. Hydrous tantalate of aluminum and calcium, $CaO.5Al_2O_3.4Ta_2O_5.2H_2O$; hexagonal; from Western Australia. The name simpsonite has also been applied to an alkalic amphibole, which was afterwards renamed magnophorite. *Spencer 15, M.M., 1940.*

Simpson's rule. A rule for estimating the area of an irregular figure after dividing it into an even number of parallel strips of equal width. *See also* trapezoidal rule. *Ham.*

simulated insert bit. A core bit in the face of which are deeply cut, closely spaced waterways to produce the superficial appearance of an insert-type bit. Also called Thedford crown bit. *Long.*

simultaneous decking. The operation of changing mine cars in a multideck cage at the same time. *Nelson.*

simultaneous filling. Filling in which the mined-out area or room is filled immediately after mining out only a small part of the deposit. *Stoces, v. 1, p. 275.*

simultaneous shot firing. The concurrent firing of a round of shots using instantaneous detonators. *B.S. 3618, 1964, sec. 6.*

sin Abbreviation for sine in equations and tables. *BuMin Style Guide, p. 61.*

sinaite. An alliterative substitute for syenite proposed by Rozieres because on Mount Sinai, true quartzless syenites occur, whereas at Syene, the rock is a hornblende granite. *Fay.*

sincosite. A leek-green hydrous vanadyl calcium phosphate, $CaO.V_2O_4.P_2O_5.5H_2O$. Tetragonal. Small, tabular crystals. From Sincos, Peru. *English.* A vanadium ore. *Osborne.*

sindlag brick. *See* dolomite brick.

sine. The sine of an arc is the perpendicular let fall from one extremity of the arc on the diameter that passes through the other extremity. *Zern, p. 54.*

Sinemurian. Lower Lower Jurassic, above Hettangian. *A.G.I. Supp.*

sing. A hissing noise often made by gas and water when a seam of coal is cut into. *Fay.*

Singapore tin. Pig tin of approximately 99.9 percent purity; obtained from the Singapore area. *Bennett 2d, 1962.*

Singer's test. A rough test for glaze fit proposed by F. Singer; the glaze is placed in a dish of the biscuit ware and fired to its normal maturing temperature; when cold, the glazed dish is examined for faults. *Dodd.*

singing. Resonance phenomenon that is frequently observed on marine seismograms. *Schieferdecker.*

singing coal. Eng. A bed of coal from which gas escapes with a hissing sound, particularly if the surface be wet. *Fay.*

singing lamp. Eng. A form of safety lamp which, when placed in an atmosphere of explosive gas, gives out a peculiar sound or note, the strength of the note varying in proportion to the percentage of firedamp present. *Fay.*

single. A unit length of pipe, casing, or drill rod. *Long.*

single acting. The description given to reciprocating compressed air or steam engines in which pressure is applied to only one side of the piston, as is the case in most internal-combustion engines. *Ham.*

single-acting hammer. A gravity drop hammer. *ASM Gloss.*

single-action press. Any press with a single slide actuated by means of one or more cranks or eccentrics. *ASM Gloss.*

single-action pump. A pump valved so as to discharge liquid at only one end of the water cylinder. *Compare* double-action pump. *Long.*

single-approach pit bottom. A pit bottom layout at a mine where development branches off on one side only. The empty cars are returned from the opposite side by a loop, shunt back, turntable, or traverse. *See also* loop-type pit bottom. *Nelson.*

single-bench quarrying. Quarrying a rock ledge as a single bench the full height of the quarry face. *Fay.*

single bevel cut. A style with beveled sides, flat top and flat base, and used for opaque stones. *Shipley.*

single-bevel groove weld. A groove weld in which the joint edge of one member is beveled from one side. *ASM Gloss.*

single-bladed bit. Synonym for chopping bit. *Long.*

single block. A block with one pulley or sheave. *Long.*

single bucket excavator. There are two principal types of this machine; the mechanical shovel and the drag-line. *Dodd.*

single-burned dolomite. Calcined dolomite. *A.R.I.*

single consignment. A quantity of coal which is to be sampled to a specified accuracy. It is used in contradistinction to the sampling of a coal received regularly at a given point. *See also* isolated consignment. *Nelson.*

single-core shot-firing cable. *See* shot-firing cable. *Nelson.*

single crystal alumina. A product recrystallized from a molten bath. The crystals are of high purity alumina and each grain is essentially a single complete crystal. *ACSG, 1963.*

single-cut sprocket. For double-pitch roller chains, a sprocket having one set of effective teeth. *J&M.*

single-cycle mountain. A mountain that has been folded and then destroyed without re-elevation of any important part. *Stokes and Varnes, 1955.*

single-cycle reactor system. *See* direct-cycle reactor system. *L&L.*

single deck screen. A screen having one screening surface, not necessarily limited to one size or shape of aperture. *B.S. 3552, 1962.*

single entry. A system of opening a mine by driving a single entry only, in place of a pair of entries. The air current returns along the face of the rooms, which must be kept open. *Fay.*

single-entry room-and-piller mining. See room-and-pillar. *Fay.*

single-entry zone test. A test in which coal dust is placed only in a single entry. *Rice, George S.*

single fire. The process of maturing an unfired ceramic body and its glaze in one firing operation. *ACSG, 1963.*

single fired ware. *See* once-fired ware. *Dodd.*

single-grained structure. An arrangement composed of individual soil particles; characteristic structure of coarse-grained soils. *ASCE P1826.*

single hand drilling. Rock drilling by hand, for example, in narrow reefs. A drill steel held in the left hand is struck blows with a 4-pound hammer, the drill being turned between the blows. The drilling is very slow and laborious. *Nelson.*

single-impulse welding. Spot, projection, or upset welding by a single impulse of current. Where alternating current is used, an impulse may be any fraction or number of cycles. *ASM Gloss.*

single-inlet fan. A centrifugal fan in which the air enters the impeller at one side only. *B.S. 3618, 1963, sec. 2.*

single-intake fan. A ventilating fan that takes or receives its air upon one side only. *Fay.*

single jack. a. A lightweight hammer (usually 4 pounds or less). When used in hand drilling holes in rock, the hammer is held in one hand and the drill is held in the other. *Long.* b. Sometimes incorrectly used to designate a sinker drill. *Long.* c. A drill column having a single jackscrew in the bottom end. *See also* drill column. *Long.* d. A method of manual drilling with one man wielding the hammer and turning the steel. *Sandstrom.*

single-J groove weld. A groove weld in which the joint edge of one member is prepared in the form of a J from one side. *ASM Gloss.*

single jigback. An aerial ropeway in which a single carriage runs to-and-fro along a track rope connecting the loading and discharge points. The system is suitable only for short lines of medium capacities. *See also* double jigback; fixed clip monocable. *Nelson.*

single-lap roofing tile. This term includes pantiles, double roman tiles, flat interlocking tiles, and Pooles tiles. *Dodd.*

single-layer bit. Synonym for surface-set bit. *Long.*

single line. A hoist line that is not reeved through a block and tackle and that runs directly from the hoisting point at the collar of a borehole, over the sheave, and to the hoist drum. *Long.*

single opening. Any underground opening which is separated from a free surface by a distance greater than three times the size of the opening in the direction of the free face. *BuMines Bull. 587, 1960, p. 2.*

single outlet. For safety reasons mines with only a single outlet (shaft) are subjected to restrictions in the numbers of mine workers employed at a time. *Beerman.*

single packer. An expandable rubber bushing used to block off a borehole at one point. *Long.*

single packing. The conventional method of strip packing on a longwall face, in which the widest pack is along the roadside. A single packing system varies but may have a 10 yard roadside pack, then 7 yards waste and followed by 4 yard packs and 5 yards waste repeated across the entire face. *See also* double packing. *Nelson.*

single-pass weld. A weld made by depositing filler metal with one pass only. *ASM Gloss.*

single-phase circuit. A two-wire circuit using alternating current. *Kentucky, p. 263.*

single place working. N. of Eng. Systems in which one man works in each place on a shift, doing all coal hewing and stonework tasks as necessary to advance the face. (Includes bord-and-pillar; rib-and-stall; stepwise-and-gateway longwall systems. *Trist.*

single plane idler. A troughing idler in which the shafts of troughing and center rolls are in the same vertical plane. *NEMA MB1-1956.*

single-pulley-drive conveyor. A conveyor in which power is transmitted to the belt by one pulley only. *NEMA MB1-1961.*

single reduction. A gear set that causes one shaft to turn another at reduced speed. *Nichols.*

single refraction. When a ray of light enters a crystal of the isometric system, or an amorphous substance, it is refracted in the normal manner; this is single refraction in contradistinction to double refraction. *Shipley.*

single replacement. Occurs when a single substance replaces another substance in a chemical action. Also called single substitution and single displacement. *Cooper.*

single-road stall. S. Wales. A system of working coal by narrow stalls. *Fay.*

single-roll breaker. A coal crushing machine in which the roll teeth crack downward on the lump and the roll itself compresses the coal against the breaker plates. Teeth of two or more designs are used generally on the same roll, some for the slugging, cracking, or blow action and others for a pulling and splitting force. The breakers are not easy to stall by choking, since they will pass a heavy overload, partly because of the action of a relief mechanism, with which they are all equipped. *Mitchell, p. 196-197.*

single roll crusher. A crushing machine consisting of a rotating cylinder with a corrugated or toothed outer surface which crushes material by pinching it between the teeth and stationary breaking bars. *ACSG, 1963. Compare* double roll crusher.

single-rope friction pulley. *See* Koepe sheave. *Nelson.*

single-rope haulage. A system of underground haulage in which a single rope is used, the empty trip running in by gravity. Engine-plane haulage. *Fay.*

single-round nose. The cross-sectional view of the cutting-face portion of a core bit when the profile is an arc having a radius equal to or greater than the wall thickness. *Compare* double-round nose. *Long.*

single-round-nose bit. *See* single-round nose. *Long.*

single row blasting. The drilling, charging, and firing of a single row of vertical holes along a quarry or opencast face. The holes may be fired simultaneously or by delay detonators to give a peeling action starting at one end of the face. *See also* multiple row blasting. *Nelson.*

single-screened ground refractory material. A refractory material that contains its original gradation of particle sizes resulting from crushing, grinding, or both, and from which particles coarser than a specified size have been removed by screening. *ASTM C71-64.*

single shell tile. Tile with only one outer shell in contrast with double shell tile. *ACSG, 1963.*

single shot. A charge in one drill hole only fired at one time as contrasted with a multiple shot where charges in a number of holes are fired at one time. *Fay.*

single-shot blasting unit. A single-shot blasting unit is a unit designed for firing only one explosive charge at a time. *ASA M2. 1-1963.*

single-shot exploders. Exploders of the magneto type and they are operated by the twist action given by a half-turn of the firing key. A magneto exploder consists essentially of a small armature which can be rotated between the poles of a set of permanent magnets. The armature is rotated by means of toothed gear wheels which are actuated by the movement of the firing key. The electric circuit between the exploder and the detonator is completed by means of an automatic internal switch operating at the end of the stroke, or contact may be made by means of a push button. *McAdam II, p. 63.*

single-shot instrument. A borehole surveying instrument that records only one measurement of the bearing and of the inclination of a hole on a single trip into the borehole. *Long.*

single-shot survey. A borehole survey made with a single-shot instrument. *Long.*

single sling. A sling which has a single hook at one end and an iron or steel ring at the other. *See also* two-leg sling. *Ham.*

single-speed floating control system. In flotation, floating control in which the manipulated variable changes at a fixed rate, increasing or decreasing depending on the sign of the actuating signal. *Fuerstenau, p. 549.*

single spot method. One of three recognized methods of determining the average velocity of airflow along a mine roadway by anemometer. A velocity reading is taken at the center of the airway and the result is multiplied by the center constant to give the average velocity of flow. Alternately, the reading is taken along a midway line at a position some 1/7 to 1/3 of the width of the airway, measured from the side. At this position the mean velocity is obtained, so that no constant is required. *Roberts, I, p. 49. Compare* division method; traversing method.

single-stage compressor. A machine designed to compress air to its full pressure in one cylinder, a type seldom used for pressures exceeding 60 pounds per square inch. *See also* two-stage compression. *Ham.*

single-stage pump. A centrifugal pump with a lift of 100 feet per stage. *Ham.*

single-stall working. *See* room-and-pillar. *Fay.*

single stamp mill. a. A lonely mill, like some to be seen in the deserts of Nevada. *Fay.* b. A mill possessing batteries of one stamp each, like the Nissen, instead of the usual five. c. A mill possessing only one stamp, after the Lake Superior fashion, where one big stamp does the work of 150 ordinary gravity stamps. *Fay.*

single-stand mill. A rolling mill of such design that the product contacts only two rolls at a given moment. Contrast with tandem mill. *ASM Gloss.*

single task machines. N. of Eng. Any machine which mechanizes one task of the cycle. *Trist.*

single-toggle jaw crusher. A jaw crusher with one jaw fixed, the other jaw oscillating through an eccentric mounted near its top. This type of jaw crusher has a relatively high output and the product is of fairly uniform size. *Dodd.*

single tube. *See* single-tube core barrel. *Long.*

single-tube core barrel. A core barrel consisting of a single length of tubing, the upper end of which may be threaded to fit a drill rod or a head, which also contains a drill-rod thread. The lower end can be threaded to fit a reaming shell with its attached coring bit. Circulation fluid is conducted from the drill rod between the core and the inside surface of the core-barrel tube downward past the bit; hence the core inside the core barrel is subject to wash effects of the circulation fluid throughout its length. *Compare* double-tube core barrel. *Long.*

single-U groove weld. A groove weld in which each joint edge is prepared in the form of a J or half-U from one side. *ASM Gloss.*

single unit. N. of Eng. A longwall face with a mothergate and tailgate but no second face across the mother gate. In N.W. Durham 70 to 100 yards, usually 80 yards. *Trist.*

single-unit panel; single-unit face. A longwall conveyor face from about 80 to 200 yards long developed between two gate roads, one serving as an intake airway and usually for coal haulage, while the other acts as a return airway and for bringing in supplies to the face. *See also* double unit conveyor. *Nelson.*

single vein. A single ore deposit of identical origin, age and character throughout. A single small vein is weighed and measured by the same law and entitled to the same consideration as the mother lode, and very often is far more valuable in the eyes of the miner. *Ricketts, pp. 123-24.*

single-V groove weld. A groove weld in which each member is beveled from the same side. *ASM Gloss.*

single-way rectifier circuit. A circuit in which the current between each terminal of the alternating-voltage circuit and the rectifying element conductively connected to it flows in both directions. *Coal Age, 1.*

single welded joint. Any joint welded from one side only. *ASM Gloss.*

singulosilicate. A slag with a silicate degree of 1. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 399.*

sinh Abbreviation for hyperbolic sine. *BuMin Style Guide, p. 59.*

sinhalite. Borate $MgAlBO_4$, orthorhombic. Hitherto mistaken for brown gem olivine. Named from Sinhala, the Sanskrit name for Ceylon. *Spencer 19, M.M., 1952.*

Sinian. System of late Precambrian age in China, referred to the Paleozoic because strata is unmetamorphosed and may be conformable beneath the Cambrian. *A.G.I. Supp.*

sinistral fault. *See* dextral fault. *Challinor.*

sink. a. Corn. A preliminary excavation or pit to be enlarged in working until it is a full-sized shaft; a sump. *Webster 3d.* b. To excavate strata downward in a vertical line for the purpose of winning and working minerals. *Fay.* c. The depression in a shaft made by a center blast. *Standard, 1964.* d. To drive a shaft or slope. *Hudson.* e. A water lodgment. *See also* sump. *Nelson.* f. To put standpipe, or casing down through overburden by rotation or by driving, chopping, or washing operations, employed singly or in combination. *Long.* g. To drill or put down a borehole. *Long.* h. A depression in the land surface; especially, one having a central playa or saline lake with no outlet; a hollow in a limestone region communicating with a cavern or subterranean passage so that waters running into it disappear. Also called sinkhole; swallow hole. *Webster 3d.*

sinker. a. One who sinks mine shafts and puts in supporting timber or concrete. *Webster 3d.* b. A man employed in shaft sinking. He works in a team, on a three-shift basis, and may be paid a daily wage plus a bonus for fast sinking rates. He is skilled in drilling and blasting and in handling sinking equipment. Shaft sinking is usually contract work and therefore a sinker works under a contractor. *Nelson.* b. A rock drill for drilling blasting holes in a sinking shaft. *Nelson.* c. *See* shaft sinker. *D.O.T. 1.* d. Eng. A man who works at the bottom of a shaft when a shaft is being sunk. *Fay.* e. A special movable pump used in shaft sinking. *Fay* f. *See* sinker bar. *Fay.*

sinker bar. a. A heavy rod used to increase the snatching effect of the sliding jars in rope drilling. *B.S. 3618, 1963, sec. 3.* b. A short bar or stem placed above the drill jars to give force to the upward jar in well-drilling with cable tools. *Webster 3d.*

sinker-bar guides. Bars of iron (usually 4) fitted to the drill tools in order to increase their girth and render it impossible for the drill to deviate. *Fay.*

sinker drill. a. A one-man drill, ranging in weight from 25 to 80 pounds, that can be held in the hand but is frequently mounted. This drill has found wide application in sinking shafts and is made in several sizes, each suited for a particular kind of work. Also called plugger drill. *Lewis, p. 87.* b. A rock drill of the jackhammer type commonly used in shaft sinkings. Also called sinker. *Webster 3d.* c. A handheld compressed-air rock drill used in boring down holes as in shaft sinking. *Pryor, 3.*

sinker hoistman. In metal mining, one who operates a small power driven hoist to raise rock and lower supplies in shaft sinking operations. *D.O.T. 1.*

sinkers' hat. Scot. An oilskin or leather hat used for working in falling water, as in wet shafts. *Fay.*

sink-float processes. Processes that separate particles of different sizes or composition on the basis of specific gravity. When ore or coal particles are introduced into a liquid (or into a medium: a solid suspension), those having a specific gravity higher than that of the liquid will sink, while those that are lighter than the liquid will float. *Chemical Engineering, v. 56, No. 1, January 1949, pp. 106-107.*

sink-float separation. *See* dense media separation. *Pryor, 3.*

sinkhead. The same as riser. *ASM Gloss.*

sinkhole. A vertical hole worn by water into limestone rock along a joint or fracture. Such a hole is usually connected with an underground channel. The caving in of the roof may cause more extensive depression and the formation of a pond. The course of a joint is often marked by a row of sinkholes. Synonym for sink. *Standard, 1964.* Also called swallow hole. *Fay.*

sinking. a. The process by which a shaft is driven. *B.C.I.* b. Extending excavations downward at or near the vertical plane. *See also* raising; shaft sinking. *Nelson.*

sinking and walling scaffold. A platform or staging designed for use in shaft sinking to enable the operations of sinking and walling to be performed simultaneously. The late Prof. W. Galloway designed the original scaffold in 1875. The ropes used for supporting the walling scaffold were also used as guides for the kibble which passed through an opening provided in the center of the scaffold. *See also* multideck sinking platform. *Nelson.*

sinking bogie. Scot. A wheeled platform to cover a shaft while the bucket is being emptied. *Fay.*

sinking bucket. A large bucket for hoisting dirt in a shaft sinking. *See also* hoppit. *Nelson.*

sinking crew training. The instruction and intensive training of personnel in rapid shaft sinking methods, in order to achieve the high standard of safety, co-ordination, and timing necessary in modern shafts. Training enables rapid sinking to commence from the first shift. This is a new feature of South African sinking practice. *Nelson.*

sinking fire. A forge in which wrought-iron scrap or refined pig iron is partly melted or welded together by means of a charcoal fire and a blast. *Fay.*

sinking fund. Money reserved for amortization of wasting asset. *Pryor, 3.*

sinking head. The same as deadhead, b. *Fay.*

sinking in rock. Shaft sinking in rock usually comprises the following cycle: Drilling a round of holes, blasting, removing the broken rock, trimming the shaft to form, placing the sets or concrete in position and then preparing to drill the next round. *Lewis, p. 180.*

sinking kibble. A large bucket for raising the stones, etc., from a shaft being sunk. Sometimes called bowk; hoppett. *Peel.*

sinking lamp. An electric lighting fitting designed to be suspended, either singly or in a cluster, in a sinking shaft. *B.S. 3618, 1965, sec. 7.*

sinking lift. A lift (pump) of small size with especially heavy castings to resist the force of blasting: used in shaft sinking. *Standard, 1964.* A sinking pump, which is also sometimes called sinker. *Fay.*

sinking pit. Eng. A shaft in course of being sunk. *Fay.*

sinking plant. In a shaft, consists of the headframe, hoisting equipment, air-compressor for drills, concrete mixing equipment, and suitable pumps. May be either a temporary or permanent plant. *Lewis, pp. 179-180.*

sinking platform. A scaffold or staging designed for use during shaft sinking particularly during lining operations. *See also* sinking and walling scaffold. *Nelson.*

sinking pump. A long, narrow pump designed for keeping a shaft dry during sinking operations. It is usually large enough to deal with 1,000 gallons per minute from the greatest depth at which water will be encountered. A sinking pump must be slung from the surface and be fairly easy to raise and lower when shot firing takes place at the shaft bottom. Most are of the electrically driven centrifugal type and allow for additional stages to be fitted as the shaft depth increases. It may be suspended by a single drum, worm driven, capstan engine with a very slow speed. *Nelson.*

sinking tubing. Drawing tubing through a die or passing it through rolls without the use of an interior tool to control inside diameter, generally resulting in increased wall thickness and length. *ASM Gloss.*

sinkman. a. Scot. Same as sinker, d. *Fay.* b.*See* shaft sinker. *D.O.T. 1.*

sinks. a. Fractions with a defined lower limit of specific gravity and so described, for example, sinks 1.60 specific gravity. *B.S. 3552, 1962.* b. Lanc. Natural cavities found in iron mines. *See also* sink. *Fay.*

sinopis. A variety of red hematite used as a pigment. *CCD 6d, 1961.*

sinople. An aventurescent quartz with inclusions of a red iron mineral. From Hungary. Also spelled sinopal. *Shipley.*

sinter. a. Dross, slag. *Webster 3d.* b. To become or cause to become a coherent imporous mass by heating without melting. *Webster 3d.* c. To heat a mass of fine particles for a prolonged time below the melting point, usually to cause agglomeration. *ASM Gloss.* d. A ceramic material or mixture fired to less than complete fusion, resulting in a coherent mass, or the process involved. *ASTM C242-60T.* e. A chemical sediment deposited by a mineral spring, either hot or cold. Siliceous sinter, consisting of silica, is called geyserite and fiorite; calcareous sinter, consisting of calcium carbonate, is called tufa, travertine, and onyx marble. *Fay.* f. A process commonly used in making diamond bits, whereby powdered metal is compacted in a diamond-set mold or die and the temperature raised to a point just below melting, thus fusing the entire mass together. Also called sintered. *Long.*

sinter bit; sintered bit. A bit the crown of which is formed by applying heat and pressure to a mixture of powdered metals covering diamonds set inside a mold or die-shaped to the form of a bit crown. The bit crown thus formed may be a surface-set, multilayer, or impregnated type. *Long.*

sintered alumina. An abrasive manufactured by sintering (heating without thoroughly melting) mixtures relatively high in alumina but usually containing associated minerals, such as diaspore and various silicates. Commonly coarsely crystalline but sometimes microcrystalline. Also called alumina, manufactured. *ACSG, 1963.*

sintered carbides. Sintering as used in powder metallurgy consists in mixing metal carbide powders having different melting points, and then heating the mixture to a temperature approximating the lowest melting point of any metal included. In sintered carbides, powdered cobalt, having the lowest melting point, acts as the binder holding together the unmelted particles of the hard carbides. *Compare* cemented carbides. *C.T.D. Supp.*

sintered carbide-tipped pick. The pick generally used in coal cutters and cutter loaders, in which the sintered tip is brazed in various ways to the shank of the pick. In the external tip type, which is widely used, the sintered tip is brazed externally to the shank, which is usually a forging. It is self-gaging and as the tip wears down, the cutting edge maintains its shape and clearance. In the slotted type, the tip is brazed into a slot cut in the shank of the pick. In the inserted rod type, the sintered carbide takes the form of a rod inserted into a hollow in the shank of the pink which is a forging. These picks are widely used in the soft coal mines in Germany. *See also* coal cutter picks. *Nelson.*

sintered filter. A filter made from sintered glass, sintered silica or unglazed ceramic. *Compare* ceramic filter. *Dodd.*

sintered glass. Glassware of controlled porosity used for filtration, aeration, etc. It is made by carefully heating powdered glass so that the surfaces of the particles begin to melt and adhere to one another. *Dodd.*

sintered matrix. A bit-crown diamond-embedment metal or alloy produced by a sinter powder-metal process. *See also* sinter; sinter bit. *Long.*

sintered metal. *See* sintered matrix. *Long.*

sintered-metal bit. *See* sinter bit. *Long.*

sintering. a. The agglomerating of small particles to form larger particles, cakes, or masses; in case of ores and concentrates, it is accomplished by fusion of certain constituents. *C.T.D.* b. In powder metallurgy, (1) the bonding of adjacent surfaces of particles in a mass of metal powders or a compact, by heating; (2) a shaped body composed of metal powders and produced by sintering with or without prior compacting. *ASM Gloss.* c. A heat treatment which causes adjacent particles of material to cohere, at a temperature below that of complete melting. *HW*. d. A process in which fine iron ore is mixed with coke and ignited, the coke providing the heat to produce semifused lumps of ore, which can be more efficiently smelted in the blast furnace than the fine ores which would cause operational difficulties. *See also* conditioned sinter. *Nelson*.

sintering furnace. In powder metallurgy, a furnace used to heat metal powders or compacts during the presintering or sintering operations. The heating and subsequent cooling may be carried out in a controlled inert or reducing atmosphere, or in a vacuum. *Rolfe*.

sinterings. A product made by sintering metal powders. Synonymous with powder metallurgy parts, and sintered metal powder parts. *ASTM B243-65*.

sinter-machine operator. In ore dressing, smelting, and refining, one who burns out sulfur and other volatile impurities in iron, lead, or zinc ore prior to smelting. Also called burner man. *D.O.T. Supp*.

sinter magnesia. Dead-burned magnesite. *Bennett 2d, 1962 Add*.

sinter plant. A plant in which sintering is carried out, that is, where the feed to the blast furnace is prepared to secure maximum efficiency. *Nelson*.

sinter set. *See* sinter bit. *Long*.

sinter-set bit. *See* sinter bit. *Long*.

Sintex. Ceramic-tipped tools whose performance is equal to that of carbides. The tips are made of a high-grade alumina pressed and sintered into the desired form. These tips are then attached to steel shanks by platinizing and brazing. *Bureau of Mines Staff*.

sinuous flow. *See* turbulent flow. *Seelye, 1*.

Sioux Falls jasper. A decorative brown jasperlike, fine-grained quartz, from Sioux Falls, S. Dak. Used for tables and interior architectural trim. *Shipley*.

siphon; syphon. a. An arrangement of closed pipes and valves to conduct water from one level to a lower level over an intervening ridge which should not exceed 25 feet (theoretically 34 feet). The difference of level between the inlet and outlet ends of the pipe column must be sufficient to provide a motive head great enough to overcome the frictional resistance of the pipe column. The siphon was often used in the earlier days of mining when pumps were too costly or power was not available. *See* also suction head. *Nelson*. b. A closed conduit, a part of which rises above the hydraulic grade line. It utilizes atmospheric pressure to effect or control the flow of water through it. An inverted siphon has none of the properties of a siphon—the term is a misnomer. *See also* sag pipe. *Seelye, 1*.

siphonage. The action or operation of a siphon. *Fay*.

siphon separator. An apparatus for the sizing of pulverized ores in an upward current of water. *Fay*.

siphon spillway. A spillway built in the form of a siphon passing over the crest of a dam. *Ham*.

siphon tap. *See* Arents tap. *Fay*.

siporex. A building material developed in Sweden composed of sand, lime or cement, and aluminum powder which are mixed and cast into molds. After a number of hours of steaming, the molds are made into roof slabs, door lintels, and wall blocks which give excellent heat and sound insulation. *AIME, pp. 494-495*.

Sirocco fan. A centrifugal fan invented by Samumel Davidson in 1898. It has 64 narrow blades curved forward, mounted at the periphery of a braced, open drum. It is a high-speed, small diameter fan, usually direct driven. It was a popular fan in Great Britain for many years. *See also* Guibal fan; Waddle fan. *Nelson*.

siserskite. Synonym for sysertskite. *Hey 2d, 1955*.

sismondinite. A schist in which magnesium chloritoid (sismondine) is the chief constituent. *See* also schist. *A.G.I*.

sit. Eng. To settle or subside without breaking, as a mass of coal after undercutting and removal of the props. *Standard, 1964*.

site. a. The area investigated or selected for mining works. *See also* site investigation. *Nelson*. b. The location selected where a borehole is to be drilled, engineering work conducted, or a structure erected. Also called location. *Long*. c. In ion exchange, position where ions are attached to resin (uranium hydrometallurgy). *Pryor, 3*.

site exploration. a. The investigation and testing of the surface, subsoil, and any obstruction at a site to obtain the full information necessary for designing a complete structure with its foundations. *Ham*. b. *See* site investigation. *Nelson*.

site investigation; site exploration. The soil and geological examinations at a new mine site to obtain detailed information for the design of foundations, and surface works. At a large and important site, the following investigations may be necessary: (1) a geological survey to determine the nature, thickness, and dips of the superficial deposits; (2) a geophysical survey to obtain data regarding the subsurface geology; and (3) a drilling program and possibly a few trial pits for sampling and fixing bedrock. The amount of investigation will depend on the nature of the terrain and magnitude of surface works. *See also* geophysical site investigation; soil mechanics; soil profile, c; foundation sampling. *Nelson*.

site plan; location plan. A plan, drawn to a suitable scale, showing the location of proposed shafts or opencast operations. It would show the area to be requisitioned, area to be worked (if opencast), grid of 100-foot squares with ground levels, all existing roadways, railways, proposed access road (in red), water and gas mains, powerlines, sewers, and proposed spoil dumps or topsoil dumps. The information shown would vary with nature of land and works contemplated. *Nelson*.

site rivet. A rivet which is driven on a construction site. *See also* shop rivet. *Ham*.

site weld. A weld which is made during construction on a site. *Ham*.

sitter-up. An assistant teaser in a glassworks. *See also* teaser, b. *Dodd*.

six by six (6 x 6). A truck having drive to the front wheels and to tandem rear wheels. *Nichols*.

six-mile-square rule. The rule that the lands in a lease offer for federal lands must be entirely within an area of 6 miles square or within an area not exceeding 6 surveyed sections in length or width. *Williams*.

six wheeler; ten wheeler. A truck with two sets of rear axles. *Nichols*.

size. a. Eng. The extent of the displacement or the throw of a fault. *Fay*. b. To separate minerals according to various screen meshes. *Fay*. c. In brickmaking, plasticity, as of tempered clay. *Standard, 1964*. d. A solution used to treat the surface of pottery ware or of plaster molds. Moldmakers' size is commonly a solution of soft soap. Decorators' size is traditionally based on boiled linseed oil; after its application, and after it has become tacky, the lithograph is applied and brushed down. *Dodd*.

size analysis. The division of a sample into size fractions with defined limits, the proportions of the fractions being expressed as percentages of the total sample, commonly with an indication of the ash percentage (and other characteristics, if required) of each fraction. *B.S. 3552, 1962*.

size assorter. One who inspects and racks finished tile according to color and size marking prior to further classification by boardman II. *D.O.T. 1*.

size consist. Screen analysis of particle size (coal). *Bennett 2d, 1962 Add*.

sized coal; graded coal. Coal screened between specified size limits. *B.S. 3552, 1962*.

sized gypsum. Crushed gypsum of prescribed size of individual particles. *ASTM C11-60*.

size distribution. a. Analysis of crushed or ground materials on the basis of particle size. *Bennett 2d, 1962*. b. In sizing analysis of sands, the percentage of the sample retained on each laboratory sieve in the range examined. *Pryor, 3*.

size-distribution curve. A graphical representation of the size analysis of a mixture of particles of various sizes, using an ordinary, logarithmic, or other scale. *B.S. 3552, 1962*.

sized variation. The variation in dimensions of any ceramic product from the intended dimensions. *Bureau of Mines Staff*.

size effect. Effect of the dimensions of a piece of metal upon its mechanical and other properties and upon manufacturing variables, such as forging reduction and heat treatment. In general, the mechanical properties are lower for a larger size. *ASM Gloss*.

size fraction. Portion of a sample of sand lying between two size limits, the upper being the limiting and the lower the retaining mesh. *Pryor, 3*.

size-frequency analysis. Determination of the statistical distribution of sizes of particles in powder or colloidal systems. *Bennett 2d, 1962*.

size of weld. a. The joint penetration in a groove weld. *ASM Gloss*. b. The lengths of the nominal legs of a fillet weld. *ASM Gloss*.

size range. That between upper (limiting) and lower (retaining) mesh sizes with reference to screened or classified material. *Pryor, 4*.

size ratio. The upper size limit divided by the lower one when these terms are defined as the largest British Standard Test Sieve on which not more than 5 percent of the screen analysis sample will remain and the smallest standard test sieve through which not more than 10 percent will pass. *Nelson*.

size reduction. The breaking of large coal, ore, or stone by primary breaker or of smaller sizes by grinding. *See also* reduction ratio; primary breaker. *Nelson.*

sizer, hand. *See* tile sizer. *D.O.T. 1.*

size selector. A device attached to the intake of a dust-sampling instrument to remove the bulk of the particles above 5 or 10 microns in size and thus the sample is more representative of the health hazard size range of dust, mainly 5 microns and smaller. *Nelson.*

sizing. a. Secondary forming or squeezing operations, required to square up, set down, flatten, or otherwise correct surfaces, to produce specified dimensions and tolerances. *See also* restriking. *ASM Gloss.* b. Some burnishing, broaching, drawing, and shaving operations are also called sizing. *ASM Gloss.* c. A finishing operation for correcting ovality in tubing. *ASM Gloss.* d. In powder metallurgy, final pressing of a sintered compact. *ASM Gloss.* e. *See* screening. *Pryor 2.* f. The process of separating mixed particles into groups of particles all of the same size, or into groups in which all particles range between definite maximum and minimum sizes. *Mitchell, p. 128.* g. Division of a material into products between nominal size limits. *B.S. 3552, 1962.* h. The operation of separating an aggregate of particles into sizes on a series of screens. When performed so as to show percentage of each size in a sample, called sizing analysis or screen analysis. *See also* size, b. *Pryor, 3.* i. *See* painting. *Kentucky, p. 145.*

sizing punch. A punch used for pressing of the sintered compact during the sizing operation. *Osborne.*

sizing screen(s). A screen or set of screens normally used for dividing a product (for example, washed coal) into a range of sizes. Also called grading screen(s) and classifying screen(s) (undesirable usage). *B.S. 3552, 1962.*

sjogrenite. a. A hydrous basic carbonate of magnesium and ferric iron, $Fe_2Mg_6(OH)_{16}CO_3.4H_2O$, as hexagonal scales dimorphous with the rhombohedral pyroaurite. *Spencer 16, M.M., 1943.* b. A synonym for dufrenite. *American Mineralogist, v. 35, No. 3-4, March-April 1950, p. 336.* c. A synonym for chalcosiderite. *American Mineralogist, v. 34, No. 7-8, July-August 1949, pp. 521-523.*

S. J. table. A pneumatic table of American design, for the drycleaning of coal. It is rated at 15 tons per hour for ⅛ to 1/16-inch coal and 160 tons per hour for 2- to 4-inch coal. A sizing ratio of 2:1 is desirably the maximum range of sizes which the table can separate in one operation. *Nelson.*

skail. Scot. A quantity of air allowed to take a short cut to rejoin the main current; air finding its way into the return air course by other than the designed way. *See also* scale, a. *Fay.*

skailing the air. Scot. Brushing out the foul air by means of diverting a current of fresh air into the gaseous workings. *Fay.*

skamy coal. York. Miners' term for impure coal. *Tomkeieff, 1954.*

skares. *See* scares. *Arkell.*

skarn. a. Scandinavian ore, carrying magnetite. Skarn-minerals include iron-garnets, iron-pyroxense, epidote. These ores are pyrometasomatic or contact-metamorphic. *Pryor, 3.* b. The term is generally reserved for rocks composed nearly entirely of lime-bearing silicates and derived from nearly pure limestones and dolomites in which large amounts of silicon, aluminum, iron, and magnesium has been introduced. *See also* calc-flinta; calc-silicate hornfels; limurite; pneumatolytic hornfels; tactite. *A.G.I.*

skate-wheel conveyor. A type of wheel conveyor making use of a series of skate wheels mounted on common shafts or axles or mounted on parallel spaced bars on individual axles. *ASA MH4.1-1958.*

skeating deal. Eng. *See* skeating rail. *SMRB, Paper No. 61.*

skeating rail; skeating deal. a. Eng. A rail or timber fixed as a check to guide tubs around a curve. *SMRB, Paper No. 61.* b. Eng. A rail or deal fixed to roadway props to prevent their displacement by derailed tubs. *SMRB, Paper No. 61.*

skedophyric. Suggested by Cross, Iddings, Pirsson, and Washington for the texture of porphyritic rocks in which the phenocrysts are scattered more or less uniformly through the groundmass. Obsolete. *Johannsen, v. 1, 2d, 1939, p. 233.*

skeel. a. Eng. A layer of soil of any kind; a stratum, Hampshire. *Arkell.* b. Som. A kind of bucket or tub in which coal is lowered down the cuts or staples. *Fay.*

skeif. A lapidary's polishing wheel. *Hess.*

skeins. Eng. Skeins of clay, as the farmer terms the fuller's earth band with which the otherwise brashy land is divided, Cotswolds. *Arkell.*

skeleton. The resulting network of accurate survey lines which have been obtained by triangulation. *Ham.*

skeleton crystals. Hollow or imperfectly developed crystals formed by rapid crystallization. *Fay.*

skeleton sheathing. Consists of a continuous wood frame with sheathing planks placed vertically at intervals, usually of about 4 feet, behind it. Used where the banks consist of compacted, stable soils, primarily to prevent initial yield at the top. *Compare* close sheathing; tight sheathing. *Carson, p. 244.*

skeleton structure. A mineral structure showing crystal outlines with embayments that are not filled with the mineral. *Schieferdecker.*

skeleton texture. The texture of a rock or ore containing skeleton crystals. *A.G.I.*

skeleton tubbing. A temporary method of supporting a circular shaft sinking. It consists essentially of iron curbs or rings. Each ring consists of segments of wrought iron, 3 to 5 inches deep, ⅝ to ⅞ inch thick, and from 6 to 8 feet in length. The segments are bent to the curvature of the shaft and bolted together, each ring being suspended from the ring above. Laggings or backing deals are wedged behind the rings. Every fourth ring or so is supported on steel strata bolts driven into holes drilled in the rock sides. *Nelson.*

skelp. Mild steel strip, often of Bessemer steel, from which tubes are made by drawing it through a welding bell, at welding temperature, to produce butt-welded or lap-welded tubes or pipes. *See also* butt weld; lap weld. *Ham.*

skelp iron. Wrought iron rolled into flat bars suitable for making pipe. *Mersereau, 4th, p. 444.*

skep. a. Corn. An iron box working between guides, in which ore or rock is hoisted. It is distinguished from a kibble, which hangs free in the shaft. A skip. *Fay.* b. Eng. A bucket or tub at a mine out of which a horse drinks. *Fay.*

skerries. War. Greenish-white micaceous sandstone. *Fay.*

skerry. a. Eng. Thin layers of sandstone in the Keuper Marls, Leicestershire, and Derbyshire coalfield. *Arkell.* b. Micaceous sandstones in the Coal Measures of Wales and the Midlands. *Arkell.* c. Eng. A thin band of ferruginous, micaceous rock, crowded with fossils, Middle Lias, Sutton Basset, Rutland. *Arkell.* d. Eng. A hard gritty clay used for making firebricks, Upper Estuarine Series, Stamford. *Arkell.* e. Prov. Eng. A loose, irregular piece of rock; rubble. *Fay.* f. *See* reef. *Schieferdecker.*

skerry coast. Norway, Sweden, Finland. Coast consisting of innumerable small islands and crags, formed by glacial action. *Schieferdecker.*

skerrystone. Mid. Hard, thin bedded sandstone. *Fay.*

sketch liner. One who draws lines on ware to guide decal applier in transferring decalcomania design to ware, judging the proper distance from top or bottom or ends by experience. *D.O.T. 1.*

skew. a. An irregular discontinuous vein striking out from the principal vein in an uncertain direction, lying in a slanting and irregular position. *Fay.* b. The angled support from which an arch is sprung. *A.I.S.I. No. 24.*

skew arch. An arch whose jambs are not at right angles with the face. *Webster 3d.*

skewback. A refractory block having an inclined face, or a course of such blocks forming the top of a wall, from which an arch or furnace roof may be sprung; also known as springer. *Dodd.*

skew brick. A brick with one narrow side inclined so that the two large faces are unequal in size. *VV.*

skew bridge. A bridge spanning a gap at an oblique line and which is, therefore, longer than the width of the gap. *Ham.*

skewed. On a horizontal angle, or in an oblique course or direction. *Nichols.*

skewed roller conveyor. A roller conveyor having a series of rolls skewed to direct objects laterally while being conveyed. *ASA MH4.1-1958.*

skew-facets. Skill-facets. *Hess.*

skewness. In coal sampling, a lack of symmetry in the distribution. It is a tendency of the observed data to extend farther to one side of the average than to the other. *Mitchell, p. 86.*

skew plate. *See* bloomery. *Fay.*

skews. a. Stones cut to form the coping of a gable. *Arkell.* b. Cracks on irregular joints in a mine, sometimes indicating danger from falls. *Arkell.*

skiagite. The ferrousferric garnet molecule, $3FeO.Fe_2O_3.3SiO_2$. From Glen Skiag, Scotland; India. Also called iron andradite. *English.*

skialith. a. Proposed by Goodspeed for shadowy relics of country rock fragments, included in a granitic rock of metasomatic origin, which are not yet entirely replaced by the process of granitization. *Schieferdecker.* b. A term for a process of metamorphism of a very high grade with or without introduction of new material. It may result in the formation of migmatites and even granites. In this process, no magmatic phase appears. Transport of materials during recrystallization takes place by diffusion. *Schieferdecker.*

skid. a. An iron shoe or clog attached to a chain and placed under a wheel to prevent its turning when descending a steep hill; a drag. *Webster 3d.* b. A brake for a power machine, as a crane. *Webster 3d.* c. A timber, bar, rail, pole, or log, used in pairs or sets to form a slideway or rollway, as for an incline from a truck to the ground. *Webster 3d.* d. An arrangement upon which certain coal cutting machines travel along the working faces. *Fay.* e. A metal slide placed under a mine car wheel temporarily to restrict the speed of a trip on a descending grade. *B.C.I.* f. A metal plate placed under a shortwall cutting machine to control it while cutting. *B.C.I.* g. The sledlike platform forming the base on which a machine or structure is set and slid or skidded into position; also, the sled runner, bottommost part of the base of a drill or other machine. *Long.* h. To slide into place on a skid or skids. *Long.* i. A raised wood or metal platform adapted to easy transfer by use of lift trucks, used for storing and moving materials in process of manufacture. *Enam. Dict.*

Skiddavian. Synonym for Arenigian. *A.G.I. Supp.*

skidding the rig. Moving the rig to a new location preparatory to drilling. *Williams.*

skid-mounted. A term applied when a drill or other machine is attached permanently to a skid, a sledlike base, or a base the bottom parts of which are shaped like the runners of a sled. *Long.*

skidoo bell. A term used in Missouri for a bell placed near the bottom of a shaft to warn men of any impending danger, as of falling material, descending cage, fire, etc. *Fay.*

skids. a. Balks of timber, steel rails, pipes, or similar supports placed under a heavy object when it is being moved over bare ground. *Ham.* b. Refractory skids for use in pusher-type reheating furnaces in the steel industry have been made from sintered or fused alumina; they have a long service life and permit more uniform heating of the ingots or billets than do water-cooled metal skids. *Dodd.*

skiffling. The knocking off or knobbing of the corners of building stone in the first dressing. *Standard, 1964.*

ski hoist. A type of conveyor adapted for carrying or assisting skiers to the top of a slope. It is also used for carrying or assisting workmen up or down a slope. *ASA MH4.1-1958.*

ski-lift conveyor. A new method of transporting miners to the coalface in special chairs which move continuously on an endless conveyor. *Nelson.*

skilled man. A man skilled mainly by experience in any specific branch of underground operations, for example, repairer, collier, block layer, hard heading man, stallman, sinker, ripper, etc. Most skilled men in the above categories have been promoted from helpers or assistants. *Nelson.*

skill facets. Small triangular faces or planes of cut gems, divided into upper and under. Upper skill facets are cut on the lower part of the bezel and terminate in the girdle. Under skill facets are cut on the pavilions and terminate in the girdle. *Hess.*

skim gate. A gating arrangement designed to prevent the passage of slag and other undesirable materials into the casting. *ASM Gloss.*

skimmer. a. A single-bucket excavator in which the bucket travels along the boom, which is kept almost horizontal during operation. This machine is sometimes used for removing overburden. *Dodd.* b. An excavator base machine equipped with jib and bucket for digging and loading from a shallow face above track level. *Nelson.* c. A device on the taphole trough next to the furnace by which slag is automatically removed or skimmed from the top of iron at cast, and diverted to ladles or pit. *Fay.* d. An iron bar for holding back the slag in pouring molten metal. *Standard, 1964.* e. A tool for removing scum, slag, and dross from the surface of molten metal. *ASM Gloss.*

skimmer block. A special refractory block that is partly immersed in the molten glass in a tank furnace to prevent impurities from entering the feeder channel. *Dodd.*

skimmer equipment. A digging bucket which is mounted to slide along the boom of an excavator so that the bucket can be used to trim various angles of slope from the horizontal to about 60° elevation. *Ham.*

skimming. a. The removal of the top layer of soil or of irregularities in the ground surface at new mine or opencast sites. *See also* skimping. *Nelson.* b. Removal of surface film from molten metal. *Pryor, 3.* c. Diverting surface water by shallow overflow to avoid diverting sand, silt, or other debris carried as bottom load. *Seelye, 1.*

skimming gate. A channel in a sand mold having over it a bridge that removes the dross from the molten metal as it passes through. *See also* skimmer. *Standard, 1964.*

skimming ladle. Any ladle used in skimming; specifically, a ladle used for pouring molten metal, having its lip covered with a guard to retain the dross. *Standard, 1964.*

skimming pocket. One of the small recesses, on the sides of a tank furnace for the production of flat glass, by means of which impurities on the surface of the molten glass can be removed. The skimming pockets are usually located a short distance before the floaters. *Dodd.*

skimmings. a. Thin films of mica split from blocks to remove imperfections. *Skow.* b. Corn. The poorest part skimmed off the ore in a jig. Also called skimpings. *Fay.*

skimmings operator. *See* crusher man. *D.O.T. Supp.*

skimping. a. The skimmings of the dross from the ore in the vat or tank. *Nelson.* b. The same as jigging. *See also* skimmings. *Fay.*

skin. A thin outside metal layer, not formed by bonding as in cladding or electroplating that differs in composition, structure, or other characteristics from the main mass of metal. *ASM Gloss.*

skin-drying. The drying of the mold surface by direct application of heat. This drying should extend inward at least 1 inch. *Freeman.*

skin effect. Tendency of an alternating current to concentrate at the surface of a conductor. *Schieferdecker.*

skin flotation. a. A concentration process in which adhesion is effected between a free water surface and particles, usually larger than those involved in froth flotation. *Gaudin, p. 334.* b. In skin flotation processes, the separation between minerals and gangue is accomplished at the surface of a body of water, or, in other words, at the air-water interface. Use is made of the surface tension of the water and of the fact that certain minerals such as sulfides and hydrocarbons resist being wetted by water. *Mitchell, p. 571.*

skin friction. a. Friction between a fluid and the surface of a solid moving through it or between a moving fluid and its enclosing surface. *Webster 3d.* b. The frictional resistance developed between soil and a structure. *ASCE P1826.* c. Resistance of ground to the movement of a pile or caisson, generlly proportional to the area in contact. *Ham.* d. *See* wall friction, b. *Long.*

skin lamination. In flat-rolled metals, a surface rupture resulting from the exposure of a subsurface lamination by rolling. *ASM Gloss.*

skin rock. The thin band of rock immediately surrounding an excavation is called the skin rock. *Spalding.*

skintle. To stack molded bricks with places between to allow ventilation for drying. *Webster 3d.*

skintling. The setting of bricks in a kiln so that courses of bricks lie obliquely to the courses above and below. *Dodd.*

skin to skin. As close as practicable. Timbers set up so close as to be touching each other are said to be skin to skin; for example, placing timbers on each other, as laying a wall with rock or brick. *Fay.*

skip. a. A guided steel hoppit usually rectangular with a capacity from 4 to 10 tons and used in vertical or inclined shafts for hoisting coal or mineral. It can also be adapted for man riding. The skip is mounted within a carrying framework, having an aperture at the upper end to permit loading and a hinged or sliding door at the lower end to permit discharge of the load. The cars at the pit bottom deliver their load either direct into two measuring chutes located at the side of the shaft or into a storage bunker from which the material is fed to the measuring chutes. *Nelson.* b. A large hoisting bucket, constructed of boiler plate, which slides between guides in a shaft, the bail usually connecting at or near the bottom of the bucket so that it may be automatically dumped at the surface. *Fay.* c. An open iron vehicle or car on four wheels, running on rails and used specially on inclines or in inclined shafts. Sometimes spelled skep. *Fay.* d. A thin slice taken off a breast, pillar, or rib along its entire length or part of its length. In Arkansas, called slab. *Fay.* e. A truck used in a mine. *Gordon.* f. The small car that conveys the charge to the top of the blast furnace. *Mersereau, 4th, p. 399.*

skip bucket. The tub or bucket used for containing the material conveyed by a skip hoist. *ASA MH4.1-1958.*

skip casts. *See* skip marks. *Pettijohn.*

skip guides. *See* skip track. *Nelson.*

skip guillotine door. A vertically sliding type of door, which, when fully open, does not protrude beyond the projected plan area of the skip. The guillotine door is a safer type than the continental hinged type skip door. It is operated by pneumatic, magnetic, or other equipment. *Nelson.*

skip haulage. A method of underground haulage sometimes adopted in steep workings, where the gradient is 1 in 2 to 1 in 1½. There are two kinds, namely, (1) a skip carriage on which the tub is placed in a horizontal position, and (2) a self-dumping system in which the skip is permanently attached to the rope and discharged automatically at the top of the incline, and then returns for reloading. *Nelson.*

skip hoist. A bucket or car operating up and down a defined path, receiving, elevating, and discharging bulk materials. *ASA MH4.1-1958.*

skip loader I. In metal mining, one who loads ore into skip (large can-shaped container) from skip pockets (underground storage bins) at different shaft stations in mine, operating a mechanical device to open and close the gates of the loading chutes. Also called skipman; skipper. *D.O.T. 1.*

skip loader II. In metal mining, one who dumps ore from mine cars directly into skip in mines not equipped with skip pockets. *D.O.T. 1.*

skipman. *See* skip loader I. *D.O.T. 1.*

skip marks. Regularly spaced marks (or casts) in a straight line produced by regular intermittent impingement on bottom. Essentially a regular series of bounce or brush cast. *See also* bounce cast. *Pettijohn.*

skip miner. In bituminous coal mining, one who drills holes into pillars of coal supporting the roof, charges holes with explosives, and blasts out slabs (skips) of coal to widen haulageway or working place. *D.O.T. 1.*

skip operator. In the iron and steel industry, one who controls the skip hoist by which a skip car containing coke, limestone, or ore is hauled up an inclined runway to the furnace top and dumped into the charging bell of the furnace. *D.O.T. 1.*

skipper. *See* skip loader I. *D.O.T. 1.*

skipper helper. In metal mining, a laborer who keeps ore moving in chutes leading from skip pocket (underground storage bin) to point of loading, using a bar or pick to loosen clogged ore and breaking large boulders with a sledge hammer. *D.O.T. 1.*

skipping; flitching. The working of 2 to 10 yards of coal along the side or sides of a narrow stall or heading to gain coal and make room for ripping stone. *See also* ribside pack. *Nelson.*

skipping the pillar. To take a slice off the pillar before abandoning the workings; to rob. Also widening the gangway or entry. *Fay.*

skip pit. The depression into which the skip descends when at the bottom of the skip incline to bring its top below the discharge chute or the scale car or bin. *Fay.*

skip road; skip way. A track of T-rails, spiked to wooden sleepers, on which a skip runs. *Weed, 1922.*

skips. a. Metal buckets, usually opening at the bottom; sometimes used for removing water from shafts. *Stauffer.* b. Cars operated from the surface by cables attached to a drum which in turn is operated by an engine. The cars or skips are used by the employees of the mine owner to enter and leave the mine and also for the lowering of supplies into and the taking of ore from the mine. *Rickets, I.* c. Wales. Skirtings for widening out a coal road. *See also* skip, c.; skirting. *Fay.*

skip shaft. A (mine) shaft especially prepared for hauling a skip. *Standard, 1964.*

skip system. A system used for moving material from a quarry floor to a plant located at a considerable elevation. This system utilizes two parallel inclined tracks with a skip car operating on each track. The cars are operated by cables controlled by a winding gear at the head of the incline. The quarry trucks or cars deliver their loads to the skips through a chute at the base of the incline. A hopper at the top of the incline receives the loads from the skips and feeds the rock to a crusher. *Pit and Quarry, 53rd, Sec. A, p. 120.*

skip tender. *See* cager, a. *D.O.T. 1.*

skip track; skip guides. The lengths of steel rails in a shaft on which the skips are guided and to prevent them from swinging and colliding with each other while traveling in the shaft. In inclined shafts, the track is similar to a haulage track. In vertical shafts, the rails are secured as with fixed guides. *Nelson.*

skipway. The section or compartment of the shaft in which the hoisting equipment is located. *Stoces, v. 1, p. 229.*

skip winding. A system of winding in vertical or steeply inclined shafts, in which skips replace cages. A skip is often loaded from a measuring chute positioned at the shaft bottom. Skip winding is often adopted where an increased output is required from a small-diameter shaft and which could not be obtained with cages. *Nelson.*

skirt; skirt board. A vertical strip placed at the side of a conveyor belt to prevent spillage or to increase capacity. *Nichols.*

skirting. a. Used in pillar extraction and refers to a stall or roadway working a slice or lift of coal along the side of a pillar. *Nelson.* b. Eng. A place driven alongside a fall of stone or an old fallen place. More especially applied to a jud in the brokens worked headways. Also called siding-over. *SMRB, Paper No. 61.*

skirt plates. Steel sideplates which overlap the conveyor belt slightly and which assist in settling the coal on to the belt at the tail end or at a transfer point. *Nelson.*

skirts. Derb. That which bounds and limits the vein's breadth. *Arkell.*

skirt-type core spring. A core lifter, usually a split-ring type, having a split, thin tubular extension attached above the beveled portion of the core spring, which slides upward and inside the lower end of the inner tube of a core barrel. *Long.*

skit. Cornish term for a pump. *Fay.*

skittering arc. An anomalous low-pressure arc form characterized by multiple cathode spots of small size and in rapid motion. Skittering arcs are further described as "stable" if the cathode spots operate at the tips of cathodic electrodes, and as "displaced" if the cathode spots operate up and down the sides of cathodic electrodes. *BuMines Bull. 625, 1965, p. VII.*

skittle pot. A small pot, resembling a skittle in shape, which can be set in a furnace in some small corner to melt a special glass, for example, a color. Some small firms use a furnace holding only four or six of these, fired by coke. *C.T.D.*

skiving. a. Removal of a material in thin layers or chips with a high degree of shear or clippage, or both, of the cutting tool. *ASM Gloss.* b. A machining operation in which the cut is made with a form tool with its face so angled that the cutting edge progresses from one end of the work to the other as the tool feeds tangentially past the rotating workpiece. *ASM Gloss.* c. To dig in thin layers. *Nichols.*

skleropelite. A rock produced by low-grade metamorphism of an argillaceous sediment without the development of cleavage. *See also* hornfels. *A.G.I.*

sklodowskite. A very rare, strongly radioactive, orthorhombic, citron-yellow mineral, $Mg(UO_2)_2Si_2O_7.7H_2O$; formed from the alteration of uraninite, it is commonly associated with uranophane, soddyite, kasolite, uraninite, curite, and schoepite. *Crosby, pp. 43-44.*

skomerite. A volcanic rock containing phenocrysts of augite and albite oligoclase, with less abundant olivine, in a felted groundmass, consisting predominantly of albite. *Holmes, 1928.*

SK porosity test. A method for the determination of the porosity of aggregates; the principle is to fill the voids in turn with mercury, air, and water. The method, primarily for the testing of iron ores, was proposed by H. L. Saunders and H. J. Tress at South Kensington, thus the name SK. *Dodd.*

skrin; scrin. Derb. Cross fissures in limestone, sometimes containing small quantities of ore. *Fay.*

skull. a. A layer of solidified metal or dross on the walls of a pouring vessel after the metal has been poured. *ASM Gloss.* b. The same term is used for the glass left in a ladle after most of the molten glass has been poured in glassmaking; in the glass industry the usual spelling is scull. *Dodd.* c. Eng. Layers of irregular and impersistent limestone and clay, shale and shaly marl with impersistent mottled limestone, and limestones with very irregular surfaces, and very little shale. *Arkell.*

skull cracker. A heavy iron ball allowed to drop from a height to break up, or crack, hard substances, as aloxite, rock, etc. *Mersereau, 4th, p. 286.*

skull drop; skull cracker. A place where heavy ladle skulls are broken. *Fay.*

skull guard. *See* tin hat; safety hat. *Long.*

skulls. *See* sculls. *Pryor, 3.*

skutterudite. A natural cobalt-nickel arsenide, $(Co,Ni,Fe)As_3$, with cobalt in excess of nickel. Isometric. Tin white to silver gray; luster, metallic; Mohs' hardness, 5.5 to 6; specific gravity, 6.5. Found in Colorado; Canada; Norway. A minor ore of cobalt and nickel. *CCD 6d, 1961; Dana 17.*

skyhook. A system of techniques for rescuing men at sea or from isolated areas by airborne means. *Hy.*

skylight. A very poor quality of plate glass. *ASTM C162-66.*

Skythian. Lower Triassic. *A.G.I. Supp.*

slab. a. Any horizontal section of masonry. *Nichols.* b. A thin piece of stone, marble, concrete, or the like, having a flat surface. *Crispin.* c. The outside pieces cut from a log when sawing it into boards. *Crispin.* d. A split piece of timber from 2 to 3 inches thick, 4 to 6 feet long, and 7 to 14 inches wide, placed behind sets or frames of timber in shafts or levels. *Fay.* e. A skip or slice taken off the rib of an entry or room. *Fay.* f. Cleaved or finely parallel jointed rocks, which split into tabular plates from 1 to 4 inches thick. Slabs are seldom so strong as flags. Also called slabstones. *Fay.* g. A mass of tin run into a stone mold. *Standard, 1964.* h. A piece of metal, intermediate between ingot and plate, with the width at least twice the thickness. *ASM Gloss.*

slabbing. a. The fixing of ceramic tiles to fireplace surrounds, etc., to produce a prefabricated unit. *Dodd.* b. A form of failure of refractories, also known as shelling. *Dodd.* c. Close timbering between sets of timber. *Fay.* d. Lagging placed over bars. Also called slabs. *Fay.* e. Cutting a slice or slab from the side of a pillar. *See also* slab, e. *Fay.*

slabbing cut; swing cut. A drill hole pattern suitable for a wide rectangular tunnel, for example, 8 by 15 feet wide. The entire face is fired in three separate rounds of shots, the first or cut holes providing a free face for the remaining shots. The face is broken in successive lifts or slabs from one side to the other. *Nelson.*

slabbing machine. a. A power-driven mobile cutting machine which is a single-purpose cutter in that it cuts only a horizontal kerf at variable heights. Also called arcwall machine. *ASA C42.85 1956.* b. A coal cutting machine designed to make cuts in the side of a room or entry pillar preparatory to skipping or slabbing the pillar. *Jones.*

slabbing method. A method of mining pillars in which successive slabs are cut from one side or rib of the pillar after a room is finished, until as much of the pillar is removed as can safely be recovered. This system has the disadvantage that the open area is always increasing and the loaders are working away from the solid pillars toward the goaf. *Lewis, p. 543.*

slabbing mill. A primary mill which produces slabs. *ASM Gloss.*

slab entry. An entry which is widened or slabbed to provide a working place for a second miner. *Fay.*

slab glass. A block of optical glass resulting from preliminary shaping of chunk glass. *See also* chunk glass. *Dodd.*

slab milling. *See* peripheral milling. *ASM Gloss.*

slab pile. A pile built up wholly of flat bars of iron, all bars running the full length of the pile. *Hess.*

slabstone. a. A rock that readily splits into flags or slabs; flagstone. *Standard, 1964.* b. Eng. Stones very thin for their large extent, and as hard as pendle, by which name they are also called, Northamptonshire. *Arkell.*

slab zinc. Commercial zinc cast in various shapes and sizes. Slab zinc is produced in six standard grades which range from about 98.3 to more than 99.99 percent zinc. *BuMines Bull. 630, 1965, p. 1086.*

slack. a. Commonly used to describe the smaller sizes of coal passing through screen openings, approximately 1 inch or less in diameter. *Mitchell, p. 2.* b. To disintegrate rapidly when exposed to weathering. *A.G.I.* c. Fine-grained coaly material resulting from weathering, screening, or washing of coal. *A.G.I.* d. The process by which soft coal disintegrates when exposed to the air and weather; also to slake, as lime. *Fay.* e. Small coal, usually less than ⅛ inch. It has a high ash content and is difficult to clean in the washery. High ash slack is being used increasingly in special boilers and power stations. *See also* culm; duff. *Nelson.* f. An old English term for small pit coal. *Tomkeieff, 1954.*

slack adjuster. In air brakes, the connection between the brake chamber and the brake cam. *Nichols.*

slack box. Aust. A bin in which fine coal (slack, a) is stored. *Fay.*

slack-brake switch, hoist. *See* hoist slack-brake switch.

slacken. In metal smelting, the scoria of previous operations, mixed with the ores to retard or prevent fusion of the nonmetallic portions. Also spelled slakin. *Standard, 1964.*

slack hauler. In bituminous coal mining, one who hauls small cars of slack (fine coal) from tipple to boiler room of power plant at mine to maintain fuel supply. *D.O.T. 1.*

slacking. a. Degradation in size (coal). *Bennett 2d, 1962 Add.* b. Coals having a pronounced tendency to disintegrate or slack on exposure to weather, particularly when alternately wetted and dried or subjected to hot sunshine. Coals that slack readily contain relatively large amounts of moisture. When exposed to the weather, such coals lose moisture rapidly. As the coal loses moisture at the surface, the moisture from the interior of the piece gradually drifts outward to the surface. If the loss of moisture at the surface proceeds at a faster rate than that at which it is replaced by moisture from the interior of the piece, then the shrinkage of the coal at the surface is greater than that in the interior; consequently, stresses are generated in the surface coal. These stresses cause the coal to crack and disintegrate. *Mitchell, pp. 47-48.* Also called weathering. *See also* weathering; weathering index.

slacking index *See* weathering index. *A.G.I.*

slackline cableway. a. A cableway having one low and one high tower and a track cable with adjustable tension suspended between them. One end of the track cable is attached to a hoist drum by means of which the tension on the cable can be rapidly changed so as to position, lower, or raise the digging skip. *Bureau of Mines Staff.* b. A cable excavator having a track cable which is loosened to lower the bucket, and tightened to raise it. *Nichols, 2.*

slack quenching. The process of hardening steel by quenching from the autenitizing temperature at a rate slower than the critical cooling rate for the particular steel, resulting in incomplete hardening and the formation of one or more transformation products in addition to or instead of martensite. *ASM Gloss.*

slack water; slack tide. The state of a tidal current when its velocity is near zero, the moment when a current reverses direction. Sometimes considered the intermediate period between ebb and flood currents during which the velocity of the currents is less than 0.1 knot. *Hy.*

slack-water navigation. Navigation in water where the current is negligible. *Ham.*

slade. a. An inclined pathway. *C.T.D.* b. A spade with an L-shaped blade for digging peat. *Standard, 1964.*

slag. a. A substance formed in any one of several ways by chemical action and fusion at furnace operating temperatures: (1) in smelting operations, through the combination of a flux, such as limestone, with the gangue or waste portion of the ore; (2) in the refining of metals, by substances such as lime added for the purpose of effecting or aiding the refining; or (3) by chemical reaction between refractories and fluxing agents such as coal ash, or between two different types of refractories. *HW.* b. Partially fused mixture of spilled batch, overflowed glass, breeze coal, and clay from the siege. *ASTM C162-66.* c. The nonmetallic top layer consisting essentially of silicates and aluminosilicates of lime or other bases, which separates from the metallic products in smelting of ores. *Stokes and Varnes, 1955.* d. The top layer of the multilayer melt formed during some smelting and refining operations. In smelting it contains the gangue minerals and the flux; in most refining operations, the oxidized impurities. *C.T.D.* e. Volcanic scoria. *Standard, 1964.* f. Oxide liquids (exclusive of the commercial glasses) with a high melting temperature. *VV.*

slag blanket. The coating of slag, or scum, that forms on the top of the bath in the open-hearth furnace. *Mersereau, 4th, p. 414.*

slag, blast-furnace. *See* blast-furnace slag. *ACSG, 1963.*

slag brick. Brick made of furnace slag. *Fay.*

slag buggy. Local U.S. A very large pot for holding slag obtained in the smelting or ores. It is mounted on a railway truck or the like, so as to permit easy dumping. *Standard, 1964. See also* slag pot.

slag car. Iron vessel on wheels used to transport molten slag from furnace to dump. Also called slag buggy. *Pryor, 3.*

slag cements. Artificial cements produced by grinding blast furnace slag and mixing it with lime, portland cement, or dehydrated gypsum. *See also* portland blast-furnace cement. *Ham.*

slag dump. A dumping place for the shell or cone that forms in a slag pot. *Standard, 1964.*

slag furnace. A furnace designed for obtaining lead by resembling slags. *Fay.*

slaggable. Capable of becoming or forming into a slag. *Fay.*

slagging. Destructive chemical reaction between refractories and external agents at high temperatures resulting in the formation of a molten liquid. *Henderson.*

slagging of refractories. Destructive chemical reaction between refractories and external agencies at high temperatures, resulting in the formation of a liquid. *Bureau of Mines Staff.*

slag, granulated. *See* granulated slag. *Bennett 2d, 1962 Add.*

slaggy. a. Pertaining to, containing, or of the nature of slag; as, a slaggy substance. *Standard, 1964.* b. Of slaggy structure; said of rocks composed of intermingled roughly cellular and compact portions, like slag from an iron furnace. *Standard, 1964.*

slag hearth. A hearth, on the principle of the Scotch hearth, for the treatment of slags, etc., produced by lead smelting in the reverberatory furnace. The English slag hearth has one tuyere; the Castillian or Spanish, three. *Fay.*

slag inclusion. Slag (dross) entrapped in a metal. *ASM Gloss.*

slag lead. Lead obtained by a resmelting of gray slag. *Fay.*

slag line. The normal level of the slag/metal interface in the working chamber of a metallurgical furnace. The refractory lining of the furnace is liable to be severely eroded at this level owing to the improbability of chemical equilibrium between slag, metal, and refractory. *Dodd.*

slagman. One who breaks up slag refuse into sizes convenient for handling, using a sledgehammer, drop hammer, or drop weight attached to the crane. Also called slag breaker, slag handler, and slag yardman. *D.O.T. Supp.*

slag notch. The hole in the refractory brickwork of the wall of the hearth of a blast furnace permitting molten slag to flow from the furnace as and when necessary. It is also sometimes known as the cinder notch. *Dodd.*

slag pocket. A refractory lined chamber at the bottom of the downtake of an open-hearth steel furnace, or of a glass tank furnace, designed to trap slag and dust from the waste gases before they enter the regenerator. *Dodd.*

slag pot. A vessel for the disposal of slag at furnaces. Small pots are mounted on wheels and handled by hand, while the larger ones are mounted on trucks for mechanical transportation. *See also* slag buggy and slag car. *Fay.*

slag runoff. Tapping off excess slag after the ore boil in the basic open-hearth process of steelmaking. *Bennett 2d, 1962 Add.*

slag shingle. Broken slag used in roadbuilding. *Standard, 1964.*

slag wool. An aggregate of fine filaments of slag produced by blowing a blast of air or steam through a stream of molten blast furnace slag; used for heat insulation, in high-temperature furnaces, etc. Also called mineral wool. *C.T.D.*

slake. a. To crumble in water. *VV.* b. To crumble or disintegrate; said of lime, coal, or the like. *Webster 3d.* c. Small coal. *Webster 2d.* d. To become mixed with water, so that a true chemical combination takes place, as in the slaking of lime. *Fay.*

slaked lime. a. A hydrated form of lime, as a dry powder, putty or aqueous suspension. *Boynton.* b. A hydrated oxide of calcium, sometimes mixed by drillers into a cement slurry to lengthen its setting time. *See also* lime. *Compare* quicklime. *Long.*

slaker. *See* lime slaker. *D.O.T. 1.*

slake trough. A blacksmith's water tank for cooling forgings or tools. *Webster 3d.*

slakin. *See* slacken. *Fay.*

slaking. a. Loosely, the crumbling and disintegration of earth materials when exposed to air or moisture. More specifically, the breaking up of dried clay when saturated with water, due either to compression of entrapped air by inwardly migrating capillary water or to the progressive swelling and sloughing off of the outer layers. Also, the distintegration of tunnel walls in swelling clay due to inward movement and circumferential compression. *Stokes and Varnes, 1955.* b. The addition of water to lime to give slaked lime. *Nelson.*

slam. Eng. Thin slurry and mud, Yorkshire lead mines. *See also* sloam. *Arkell.*

slant. a. Any short inclined crosscut connecting the entry with its air course to facilitate the hauling of coal. Commonly called a dip switch when the coal is not level. Also called shoo-fly. *Fay.* b. A heading driven diagonally between the dip and the strike of a coal seam. Also called a run. *See also* counter, a. *Fay.* c. In West Wales, an inclined tunnel or drift from the surface to intersect coal seams at depth; a drift driven down from the surface in an inclined coal seam. *See also* drift. *Nelson.*

slant chutes. Chutes driven diagonally across to connect a breast manway with a manway chute. *See also* slant, b. *Fay.*

slant drilling. *See* directional drilling. *Williams.*

slants. Eng. A set of joints in slate parallel to the main cleavage, Denbighshire. *Arkell.*

slant vein. York. One vein crossing another at an acute angle. *Arkell.*

slap. a. Som. Slack coal. *Fay.* b. *See* rod slap. *Long.*

slape back. Eng. *See* back. *SMRB, Paper No. 61.*

slash. a. There are many successive ridges of shingle running in varying directions, and often with narrow strips of marsh enclosed between successive ridges. Such bands of marsh have been given the very appropriate name of slashes in New Jersey. *A.G.I.* b. Swampy land, overgrown with dense underbrush. Local in the Northeast. *A.G.I.* c. An open or cutover tract in a forest strewn with debris, as from logging; also such debris. *A.G.I.* d. Eng. A mass of coal crushed and shattered by a movement of the earth's crust. *Fay.* e. Eng. A trough or hollow filled with fractured coal, Pembrokeshire. Also called slatch. *Arkell.*

slasher. a. In brickmaking, a wide swordlike implement for slicing masses of clay in search of stones and roots. *Standard, 1964.* b. The man responsible for mechanical plant and transport on a construction site. *Ham.*

slat. a. A thin piece of slate, as for roofing. *Standard, 1964.* b. A flat piece of stone used in veneering masonry. Also spelled slatt. *Standard, 1964.* c. Prov. Eng. Dark blue ooze, rather hard, left dry by the ebb of the sea. *Standard, 1964.*

slat bucket. a. A digging bucket of basket construction, used in handling sticky, chunky mud. *Nichols.* b. An openwork bucket made of bars instead of plates, used in digging sticky soil. *Nichols.*

slat conveyor. One or more endless chains to which nonoverlapping noninterlocking spaced slats are attached. *ASA MH4.1-1958.*

slate. a. A coal miner's term for any shale or slate accompanying coal; sometimes applied to bony coal. *Fay.* b. Dark shale lying next to the coalbeds. It contains impressions of the plant life of distant ages, proving the vegetable origin of coal. *Korson.* c. A fine-grained metamorphic rock which breaks into thin slabs or sheets. Usually gray to black, sometimes green, yellow, brown, or red. Slates are composed of micas, chlorite, quartz, hematite, clays, and other minerals. Found in Pennsylvania, Vermont, Maine, Virginia, California, Colorado; Europe. Used for roofing; decorative stone; various building applications; in crushed form on shingles; abrasive; pigment. *CCD 6d, 1961. See also* clay slate; phyllite; spotted slate.

slate black. *See* mineral black. *CCD 64, 1961.*

slate cement. A cement made with slate; specifically, (1) kind of hydraulic cement, or (2) a mixture of broken slate and tar, asphalt, or the like, used as a roofing material. *Webster 2d.*

slate chute. a. A chute for the passage of slate and bony coal to the pocket from which it is loaded into dump cars. *Fay.* b. A chute driven through slate. *Fay.*

slate clay. a. Shale. *Standard, 1964.* b. A fireclay occurring among coalbeds. *Standard, 1964.*

slate coal. a. Eng. A hard, dull variety of coal. *Fay.* b. Coal that has pieces of slate of greater or less size attached to it, which can be separated by breaking the coal into smaller pieces and subjecting the coal to a washing process. *Fay.* c. Translation of German schieferkohle. An old name applied to ordinary banded bituminous coal. *Tomkeieff, 1954.*

slate cutter. In the stonework industry, one who operates an upright drilling machine to drill holes into slate so that the slabs may be fastened in place with wires or rods when installed in a building. *D.O.T. 1.*

slate-cutter operator. In the stonework industry, one who cuts slate to appropriate sizes for such uses as the construction of sinks, floors, and stair treads. *D.O.T. 1.*

slate dimensions. The names and sizes of the different grades are as follows: Queen 36 x 24, Princess 24 x 14, Duchess 24 x 12, Small Duchess 22 x 12, Marchioness 22 x 11, Wide Countess 20 x 12, Countess 20 x 10, Viscountess 18 x 9, Wide Lady 16 x 10, Lady 16 x 8, Wide Headers 14 x 12, Headers 14 x 10, Small Ladies 14 x 8 (in inches). *Nelson.*

slate driller. *See* rock driller. *D.O.T. 1.*

slate fault. A local replacement of a coal seam by slate; a simple thickening of a regular slate parting is also often designated by the same term, or is called a "horse". *Fay.*

slate-gate attendant. *See* chute puller. *D.O.T. 1.*

slate ground. a. In Wales, dark fissile shades. *Arkell, p. 53.* b. *See* kind clift. *Nelson.*

slate handler. In bituminous coal mining, a laborer who shovels up falls of slate or rock along haulageways in a mine and loads it into cars. Also called rock handler. *D.O.T. 1. See also* slate picker; slateman.

slate-hoist engineer. *See* dump hoistman. *D.O.T. 1.*

slate-hoistman. *See* dump hoistman. *D.O.T. 1.*

slate larryman. *See* slate motorman. *D.O.T. 1.*

slateman. In anthracite and bituminous coal mining, a general term for a worker handling slate or rock as distinguished from coal. Usually designated according to type of activity, as rock driller; rock loader; slate motorman; slate picker; slate shooter. Also called rockman; slate handler. *D.O.T. 1.*

slateman helper. *See* slate-shooter helper. *D.O.T. 1.*

slate motorman. In anthracite and bituminous coal mining, one who operates a mine locomotive to haul trains of cars loaded with slate or shale, underground and at the surface of a mine. Also called larryman; slate larryman. *D.O.T. 1.*

slate picker. a. In anthracite and bituminous coal mining, a laborer who picks slate, bony coal (coal high in slate), rock, sulfur, and other impurities from coal as it passes by him on a conveyor, picking table, shaking screen, or gravity incline, and throws impurities into pocket, chute, or bin from where it is hauled to a dump. Also called bone picker; breaker boy; breaker hand; breaker picker; breaker worker; dirt picker; picking-table boy; picking-table man; rock picker; slate handler; slater; sulfur picker; tiphouse man; tipple boy; tippler. *D.O.T. 1.* b. A segment of a cylindrical screen provided with narrow slits, through which the flat pieces of slate fall, but through which the coal, not being flat, cannot pass. *Fay.*

slate-picker boss. In coal mining, a foreman who supervises the removal of slate, rock, and other impurities from coal to prepare it for market. Also called picking boss; picking-tableman, head; slate boss. *D.O.T. 1.*

slater. *See* slate picker. *D.O.T. 1.*

slate saw. Same as marble saw. *Standard, 1964.*

slate shooter. In bituminous coal mining, one who drills holes into the slate roof of haulageways, and charges and sets off explosives to blast down slate to increase height or improve safety of roof. *D.O.T. 1.*

slate-shooter helper. In bituminous coal mining, a laborer who assists slate shooter in removing slate and rock from roof, ribs, and face of haulageways. Also called rockman helper; slateman helper. *D.O.T. 1.*

slate spar. A variety of crystallized calcite. *Standard, 1964.* Also called shiver spar. *Fay.*

slate splitter. In stonework industry, one who splits slabs of slate into desired thickness for roofing. *D.O.T. 1.*

slatestone. A slab of slaty rock, the surfaces being determined by the cleavage. *Challinor.*

slat gate. A gate, for controlling water, composed of two upright grooved posts with boards between the boards of slats being removed or added to regulate the height of water. *Fay.*

slatter. Forest of Dean. Miners' term for a hard calcareous shale varying to impure coal and found on top or in a coal seam. *Tomkeieff, 1954.*

slattern. Eng. Hard slatt, slate, or slattern, fissile shivery limestone of the Lower Purbeck beds near the top of the quarries, Portland. *Arkell.*

slaty. Characteristic of, pertaining to, resembling, or consisting of slate; having the characteristic cleavage and texture of slate. *Fay.*

slaty band. In Scotland, ironstone and flaky blaes. *Nelson.*

slaty cannel coal. Laminated cannel coal. *Tomkeieff, 1954.*

slaty cleavage. a. That variety of foliation typical of slates but found in many other kinds of rocks. Generally, the result of parallel arrangement of platy or ellipsoidal minerals. *See also* foliation. *A.G.I.* b. A parallelism of the flakes in slate causing the tendency to split with ease in one direction. This is the outstanding characteristic of slate. *AIME, p. 791.*

slatty coal. a. Coal high in mineral matter and low in combustible matter. *Hess.* b. *See* slate coal. *Tomkeieff, 1954.*

slaty quartzite. A rock intermediate between a slate and a quartzite. *Kemp, 6d, p. 238.*

slaty stone. York. A cross-bedded siltstone. *Nelson.*

slave cylinder. A small cylinder whose piston is moved by a piston rod controlled by a larger cylinder. *Nichols.*

slave mechanism. In automatic process control, a device which responds to signals put out by a monitoring apparatus, thereby varying a specific detail in the work. *Pryor, 3.*

slave piston. A small piston having a fixed connection with a larger one. *Nichols.*

slave's diamond. Colorless topaz. *Shipley.*

slave unit. A machine which is controlled by or through another unit of the same type. *Nichols.*

slavikite. A yellowish-green mineral, $MgFe(SO_4)_4(OH)_3.18H_2O$; hexagonal, rhombohedral crystals. From the Mina "Santa Elena" in Argentina. *American Mineralogist, v. 27, No. 2, February 1942, p. 144.*

slawm. Derb. A rock joint filled with moist clay. Also called slaum; sloam; sloom. *Fay.*

sleck. Eng. a. A kind of reddish sandstone. *Fay.* b. Small pit coal. *Arkell.* c. Newc. Mud deposited by water in a mine. *Fay.* d. *See* slack, f. *Tomkeieff, 1954.*

sled. A drag used to convey coal along the road to where it is loaded into cars, or to the chute. Also called sledge; slype. *Fay.*

sledge. A long-handled heavy hammer used with both hands. *Crispin.*

sledger. a. In bituminous coal mining, one who digs out dirt, rock, or coal with a long-handled pick (sledge) in a strip mine so that it may be loaded into cars by hand or with a power shovel. *D.O.T. 1.* b. In the quarry industry, one who breaks up large stone into small pieces suitable for use in building work. Also called laborer, stone; rock breaker; spawl beater; stone sledger. *D.O.T. 1.*

sledging roll. Crushing roll with projection which breaks the rock, instead of fracturing it by squeezing. Also called slugging roll. *Pryor, 3.*

sleek. a. Smooth or even on the surface; smooth and glossy. *Standard, 1964.* b. Brist. Soft and troublesome, as applied to the condition of the floor in steep seams. *Fay.* c. Fine scratch, with smooth boundaries produced in polishing glass. *Bennett 2d, 1962 Add.*

sleeper. a. The pressure-creosoted wood, steel, or precast-concrete beams laid crosswise under the rails of a rail track and holding them at the correct rail gage. Also called sole plate. *Nelson. See also* track spike. b. A strong piece of wood or other material used as a support: as (1) a horizontal beam placed on or near the ground to support a floor or superstructure, and (2) one of the heavy strips of wood that are set in or on a concrete floor base so that a wooden floor can be nailed down over the concrete base. *Webster 3d.* c. In corduroy roads, a cross log or timber supporting the stringers (longitudinal supports). *Nichols.* d. Can. Old property, abandoned, which later is successfully revived. *Hoffman.*

sleeper block. *See* throat, a, b, c. *Dodd.*

sleepers. An early nickname of Molly Maguires. *Korson.*

sleeper wall. In structural brickwork, a low wall (generally built with openings checkerwise) built to carry floor joists. *Dodd.*

sleeping rent. A fixed rent stated in leases of coal mines, as distinguished from royalty or share of profits. *Standard, 1964.*

sleeping table. Corn. A stationary buddle; for the strict distinction sometimes made between buddle and table. *See also* buddle. *Fay.*

sleeve. a. A pump-cylinder liner. *Long.* b. Sometimes incorrectly used as a synonym for a coupling that joins two lengths of pipe. *Long.* c. Tubular refractory shapes used to protect the metal rod which holds the stopper head in the valve assembly of a bottom-pouring ladle. *A.R.I.* d. *See* rod cover. *Dodd.*

sleeve brick. A tubular-shaped brick used to protect the rod that operates the stopper head in the bottom of a ladle during the teeming of metal. *AISI, No. 24.*

sleeve catcher. A skirt-type core lifter. *Long.*

slender beam. A beam, which if overloaded, will fail by buckling of the compression flange. *Ham.*

slenderness ratio. a. A formula in which the effective height of a column is divided by its radius of gyration. For steel a slenderness ratio of 200 is allowed and for timber this ratio is 150. *See also* long column; reduction factor. *Ham.* b. The ratio of effective length or height of a wall or pier to effective thickness. It is used as a means of assessing the stability of a masonry wall or concrete panel or column against lateral loading. *Taylor.*

slew. To turn around (slue). *Mason.*

slewing. a. The rotation of a crane jib so that the load moves through the arc of a circle on a horizontal line. *Ham.* b. To turn or twist. *Bureau of Mines Staff.*

slice. a. In an ore body of considerable lateral extent and thickness the ore is removed in layers termed slices, which may be 6, 12, 20, or 40 feet thick. *Nelson.* b. A thin broad piece cut off, as a portion of ore cut from a pillar or face. *Fay.* c. To remove ore by successive slices. *Fay.* d. A gem-slitting mill. *Standard, 1964.* e. A large block of rock caught along a thrust. *Billings, 1954, p. 150.*

slice bar. A thin, wide iron tool for cleaning clinkers from the grate bars of a furnace. *Standard, 1964.*

sliced blockwork. A method of breakwater construction using sloping nearly vertical courses of concrete blocks, which can be lowered into position much more easily than in coursed blockwork. *Ham.*

slice drift. In sublevel caving, the crosscuts driven between every other slice from 18 to 36 feet apart. *Lewis, p. 508.*

slicer. A lapidary's slitting mill. *Standard, 1964.*

slicing. In continuous mining, slicing consists of driving up some 4 to 6 places the set or desired distance, which may be 1,000 feet or more, and then pulling the pillars on retreat. After completion of one slice, the unit moves over and mines another along the gob. *Coal Age, v. 71, No. 8, August 1966, p. 185. See also* top slicing. *Nelson.*

slicing-and-filling system. *See* overhand stoping. *Fay.*

slicing machine. An upright pug mill, with radial blades, for slicing clay in the manufacture of pottery. *Standard, 1964.*

slicing method. Removal of a horizontal layer from a massive ore body. In top slicing extraction retreats along the top of the ore body, leaving a horizontal floor which becomes the top of the next slice. A timber mat separates this from the overburden which caves downward as the slices are made. Other methods attack from the bottom (sublevel caving) or side. *Pryor, 3.*

slicing under mats of timber in panels. *See* top slicing and cover caving. *Fay.*

slicing under ore with back caving in rooms. *See* top slicing combined with ore caving. *Fay.*

slick. a. Ore in a state of fine subdivision; synonymous with slimes. Also called slickens. *Fay.* b. A scraper for removing excess material from the top of a mold and for smoothing the surface of the shape in the mold. *A.R.I.*

slickens. Cal. A word sometimes used to designate the debris (tailings) discharged from hydraulic mines or stamp mills. *Fay.*

slickenside. A polished and sometimes striated surface on the walls of a vein, or on interior joints of the vein material or rock masses. Produced by rubbing during faulting, on the sides of fissures, or on bedding planes. Also called slicks. *Fay.*

slickensided clay. A name given to stiff-fissured clay. *Ham.*

slickensides. a. The striations, grooves, and polish on joints and fault surfaces. *See also* fault striae. *Nelson.* b. A variety of galena found in England. *Standard, 1964.*

slicker. A small implement used in a foundry for smoothing the surface of a mold. *Standard, 1964.*

slickers. Term used in western part of the United States for boulders of specular iron ore found in gold placers. *Bureau of Mines Staff.*

slick hole. A hole column loaded with explosive, without springing. *Nichols.*

slicking. a. A narrow vein of ore. *Standard, 1964.* b. The effect on plastic clay of moving over its surface a smooth metal blade; the combined action of pressure and movement tends to bring water, soluble salts, and fine clay particles to the surface. If slicking occurs as a result of movement of the knives or screw in a pug, it causes lamination as the affected clay surfaces do not readily knit together again. *Dodd.*

slick rim. A term used by uranium miners on the Colorado Plateau for the Entrada sandstone. *Ballard.*

slicks. Eng. Smooth parting or mere planes of division in strata. Same as slickenside. *Fay.*

slick sheet. a. Steel sheet laid at rail intersections, on which trucks are skidded around, thus avoiding need for switching points. Worker who handles these trucks is called a flatter. Also called flat sheet. *Pryor, 3, p. 172.* b. Thin steel plate spread on a tunnel floor before a blast, to make hand mucking easier. *Nichols.*

slickstone; sleekstone. A smooth stone used for smoothing and polishing. *Arkell.*

slick top. In coal mining, a term used to describe the roof of the coal vein when it is very smooth. *Kentucky, p. 179.*

slide. a. An upright rail fixed in a shaft with corresponding grooves for steadying the cages. *See also* guide. *Fay.* b. A trough used to guide and to support rods in a tripod when drilling an angle hole. Also called rod slide. *Long.* c. As used by churn drillers, a fault plane or opening encountered in a hole that deflects the bit and/or drill hole. *Long.* d. The bottom of a gold-washing cradle. *Standard, 1964.* e. Corn. A vein of clay intersecting and dislocating a vein vertically; or, the vertical dislocation itself. *Fay.* f. The descent of a mass (as of earth, rock, or snow) down a hill or mountain side. *Webster 3d.* g. The track left by a slide. *Webster 3d.* h. An accumulation of loose gravel and detached boulders washed down from the mountains. *Fay.* i. A small dislocation in a rock mass. *Standard, 1964.* j. Sudden movement of earth and rocks down a steep slope; a landslide. *A.G.I. Supp.* k. Slides are considered by some to have large lateral displacement in contrast to slumps which are local or restricted displacements. *See also* slump, d. *Pettijohn.* l. Main reciprocating member of a mechanical press, guided in a press frame, to which the punch or upper die is fastened. The slide of a hydraulic press is often referred to as the platen. *ASM Gloss.*

slide casts. The casts of marks made by sliding objects, such as a mass of sediment, large soft-bodied animal, plant mats, etc. *Pettijohn.*

slide coupling. A slip joint. *Nichols.*

slide joint. A connection acting in rod boring like the jars in rope boring. *Fay.*

slide mark; slide casts. A parallel system of scratches or grooves left on sediments by subaqueous gliding or slumping. The slide casts are one to several decimeters wide and commonly smoothly curved, less than a meter in length and ascribed to larger clots of mud, sand, or perhaps colonial organisms that slipped or slid. *Pettijohn.*

slide-off transfer. A type of transfer for the decoration of pottery. The pattern is silk-screen printed on litho paper and then covered with a suitable plastic medium. Prior to use, the transfer is soaked in water so that the pattern, still firmly fixed to the plastic, can be slid off the paper and applied to the ware. During the subsequent decorating fire, the plastic coating burns away. *See also* silk-screen. *Dodd.*

slide rail. A mounting of steel or cast iron for a belt driven machine enabling it to be moved along as the belt stretches in order to take up the slack. *Ham.*

slide rock. Rock making up mass of material in a landslide. *Bureau of Mines Staff.*

slide rule. A device for mechanically performing arithmetic processes, such as multiplication, division, extracting the square root, etc. It consists of one rule sliding within another, so that their adjacent similar logarithmic scales permit addition and subtraction, corresponding to the multiplication and division of the numbers engraved on it. *C.T.D.*

sliding. A peculiar manner in which enamel slip sometimes drains from the ware. Instead of draining evenly, patches of the enamel will slide down quickly, thus leaving an uneven coating. An enamel having more than sufficient "setup" will cause this trouble. *Enam. Dict.*

sliding angle. Angle at or above which rock in movement will continue to slide, but less than the angle needed to initiate movement from rest. Some angles on clean steel are:

Material	Starting	Continuing
Coal	16°—25°	14°—22°
Limestone	20°	18°
Sandstone	23°	20°
Hematite	23°	21°

Pryor, 3.

sliding-bat kiln. *See* pushed-bat kiln. *Dodd.*

sliding caisson. *See* ship caisson. *Ham.*

sliding fit. A series of nine classes of running and sliding fits of 21 nominal shaft sizes defined in terms of clearance and tolerance of shaft and hole in ASA B4.1-1955. *ASM Gloss.*

sliding friction. Sliding friction is the resistance offered when one body slides over another body. The amount of friction or resistance is dependent on the laws of friction. *Morris and Cooper, p. 188.*

sliding gate. A crest gate which has a high frictional resistance to opening and is therefore suitable only for small gates. *See also* roller gate. *Ham.*

sliding iron. *See* lowering iron. *Long.*

sliding jars. A sliding joint used in rope drilling to apply a snatch to the bit at each upward stroke. *B.S. 3618, 1963, sec. 3.*

sliding panel weir. A frame weir which has wooden panels sliding between pairs of grooved uprights. *Ham.*

sliding scale. Ark. A method of paying for the coal in proportion to the amount of lump coal it contains. *Fay.*

sliding scale system. A system which regulated colliers' wages by the ascertained selling price of coal. It was in existence in some district agreements from 1870 to about 1910. It had many critics. *Nelson.*

sliding shoe. A metal plate which serves as partial or total support for devices used with shaker conveyors where the device must move or slide on the bottom. The shovel trough of a duckbill and certain types of swivels or angle troughs use this device. *Jones.*

sliding suction. A telescopic suction pipe. *B.S. 3618, 1963, sec. 4.*

sliding the rail. Said of a driver when he places one foot on the rail in front of the car, and the other foot on the bumper, and with his right hand holds on to the car and allows his foot to slide on the rail. *Fay.*

sliding wedge method. The wedge theory by which the passive or active earth pressures acting on a retaining wall may be determined either graphically or by calculation. *Ham.*

sliding windbore. Eng. The bottom pipe or suction piece of pumps used in shaft sinking, having a lining made to slide or telescope within it, to give length without altering the adjustment of the whole column of pumps. Also called sliding suction. *Fay.*

slime; slimes. a. A material of extremely fine particle size encountered in ore treatment. *ASM Gloss.* b. A mixture of metals and some insoluble compounds that forms on the anode in electrolysis. *ASM Gloss.* c. A product of wet grinding containing valuable ore in particles so fine, as to be carried in suspension by water; chiefly used in the plural. *Webster 3d.* d. In metallurgy, ore reduced to a very fine powder and held in suspension in water so as to form a kind of thin ore mud; generally used in the plural. *Fay.* e. A mudlike substance formed of ore in an almost impalpable powder, mixed with water; usually plural. *Standard, 1964.* f. Primary slimes are extremely fine particles derived from ore, associated rock, clay, or altered rock. They are usually found in old dumps and in ore deposits which have been exposed to climatic action; they include clay, alumina, hydrated iron, near colloidal common earths and weathered feldspars. Secondary slimes are very finely ground minerals from the true ore. *Pryor, 2.*

slime box. *See* slime pit. *Fay.*

slime coating. In mineral processing, adherence of an impalpably fine layer of particles of another (for example, calcite on galena), therefore hindering or preventing true surface reaction in leaching or flotation. *Pryor, 3.*

slime deliveryman. In ore dressing, smelting, and refining, a laborer who washes slime from cloth strainers, electrolysis tank debris, and collection barrels into a settling tank, using a water spray preparatory to recovery of precious metals from slime. Becoming obsolete. *D.O.T. 1.*

slime leaching. A leaching method in which the slime and the leach solution are agitated in one or more agitators until the ore minerals have been dissolved. Some agitators have mechanically-driven paddles or elevators inside an agitation tank which serve to keep the pulp in circulation until dissolution is complete. This method may be either continuous or intermittent. *Newton, p. 420.*

slime pit. A tank or large reservoir of any kind into which the slimes are conducted in order that they may have time to settle, or in which they may be reserved for subsequent treatment. *See also* slime. *Fay.*

slimer. A machine that makes slime; for example, a tube mill. *Fay.*

slimes. a. Extremely fine sands, slow to settle in quiet water. Anode slimes are the metals or metal compounds left at, or falling from, the anode during electrolytic refining of metals. In all-sliming, the arbitrary figure of —200 mesh is used to define slimes. *Pryor, 3.* Primary slimes are extremely fine particles derived from ore, associated rock, clay, or altered rock. They are usually found in old dumps, and in ore deposits which have been exposed to climatic action and include clay, alumina, hydrated iron, near-colloidal common earths, and weathered feldspars. Secondary slimes are very finely ground minerals from the true ore. *Pryor, 4.* b. Undesirable extremely fine particles in suspension or present with larger particles. *B.S. 3552, 1962.*

slime sludge. a. The pulp or fine mud from a drill hole. *Fay.* b. *See* slime, c and d. *Fay.*

slime table. a. A table for the treatment of slime; a buddle. *Fay.* b. A shaking table used in gravity concentration of finely ground ore, characterized by special riffles and shallow pools in which stratification is gently produced. *Pryor, 3.*

slime tin. Cassiterite too finely ground to be readily concentrated by the use of gravity treatment. Usually associated with hydrated iron. *Pryor, 3.*

slime washer. A vanner, concentrator, or similar machine, used in the separation of ores. *Standard, 1964.*

slime water. Water defiled in washing ore. *Standard, 1964.*

slim hole. a. Oil driller's term for diamond-drill borehole 5 inches or less in diameter. *Long.* b. Oil-production drill holes begun about 7 inches in diameter at the surface and bottomed in the oil zone with a 4¾-inch-size bit. *Long.* c. Drill hole of the smallest practicable size, often bored as a stratigraphic test. *A.G.I. Supp.* d. A hole drilled with less-than-normal diameter tools. Used primarily for seismic shotholes, and structure tests, and more rarely for strat tests. *See also* seismic shothole; stratigraphic test hole; structure test hole. *Williams.*

slim-hole drilling and casing. Use of the smallest feasible drill hole and casing size. *Williams.*

slim-hole systems. Name applied to lighter-type boring rigs used where holes are not required to reach depths of more than a few thousand feet. The Raky system is of this type. *Sinclair, II, p. 235.*

sliming. Another name for over-grinding in a ball mill. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 237-238.*

sline. a. Mid. Potholes in a mine roof. *Fay.* b. The principal cleat in coal. *Arkell.* c. A natural transverse cleavage of rock; a joint. *Fay.*

sline back. A joint or crevice that bounds a block of rock in the roof, as the upper surface of a pothole or kettle bottom. *Fay.*

sling. a. A rope or chain put around stones or heavy weights for raising them. *Zern.* b. A lifting hold consisting of two or more strands of chain or cable. *Nichols, 2.* c. A ropelike device used to give additional support to lengths of drill rod too long to stand in the drill derrick without sagging unduly. *Long.* d. A short loop or length of cable with small loops at either end. *Long.* e. In ceramics, a piece of wire with a handle at each end for cutting potter's clay. *Webster 3d.* f. To cut clay (for pottery) with a sling. *Webster 3d.*

sling block. A frame in which two sheaves are mounted so as to receive lines from opposite directions. *Nichols.*

sling cart. A cart to transport heavy loads in which the load is suspended by a chain attached to the axletree. *Webster 3d.*

sling chain. Scot. A chain by which pump pipes are suspended. *Fay.*

slinger process. A method used for the molding of insulating refractories; the wet batch is thrown on to pallets by a rotary machine—a slinger—to form a column on a belt conveyor; the column is then cut to shape, dried, and fired. *Dodd.*

sling hygrometer. *See* Storrow whirling hygrometer. *Nelson.*

sling psychrometer. A hygrometer which is held on a short length of cord and whirled around, the observer standing sideways to the air current. The wet bulb is thereby rapidly reduced to its final reading. *Ham.*

slink. Scot. A wide clayey joint; a stage. *Fay.*

slip. a. Ark. A joint in the coal upon which there may have been no preceptible movement. *Fay.* b. Same as horseback, kettleback, or kettlebottom. *Fay.* c. A back. *Arkell.* d. Landslip, or subsiding mass of rock or clay in a quarry or pit. *Arkell.* e. A joint or pronounced cleavage plane, say in the roof. *Mason.* f. Eng. *See* back. *SMRB, Paper No. 61.* g. A minor landslide. *Nelson.* h. A joint or cleat in a coal seam. *Nelson.* i. A small fault. *Nelson.* j. A sudden descent of a hanging or sticking charge in a blast furnace. *Fay.* k. A measure of the slipping of a belt on a pulley, for example, 5 percent slip implies that the driven pulley is rotating 5 percent slower than the driver. *See also* belt slip. *Nelson.* l. The difference between the volume of water which a pump delivers and the volume theoretically calculated—caused by slip at the valves and leakage past pistons or rams. *Nelson.* m. One of a set of serrated-face wedges that fits inside the spider of a drill-rod clamping device. *See also* spider; slips. *Long.* n. The rate expressed in feet per minute, at which a particle of rock will descend or sink in water. *See also* slip velocity. *Long.* o. The percentage of water leaking through valves expressed as a percentage of the volume swept out by the bucket or ram, and is a measure of the volumetric efficiency of a pump. Generally for normal pumping speeds, and with pump valves in good condition, the slip is between 5 and 10 percent but may rise to 20 percent with higher pumping speeds. *Sinclair, IV, p. 52.* p. The relative displacement of formerly adjacent points on opposite sides of the fault, measured in the fault surface. *See also* dip slip; strike slip. *Fay.* q. The downhill movement of a mass of soil under wet or saturated conditions. The movement is only a short distance and the soil mass stays relatively intact. A form of landslide. *A.G.I.* r. Plastic deformation by the irreversible shear displacement (translation) of one part of a crystal relative to another in a definite crystallographic direction and usually on a specific crystallographic plane. Sometimes called glide. *ASM Gloss.* s. A mixture of fine clay and water having the consistency of cream and used in the casting process, for the decoration of ceramic ware, or as a cement for handles and other applied parts. *Webster 3d.* t. Enamel or glaze powdered and suspended in water and ready for application. *Webster 3d.* u. A suspension of ceramic material in liquid. Also called slurry. *ASTM C242-60.*

slip band. a. A group of parallel slip lines so closely spaced, as to appear as a single line when observed under an optical microscope. *See also* slip line. *ASM Gloss.* b. One of the parallel lines on the crystal grains of a material stressed beyond its elastic limit that are visible only under a microscope and are produced by slippages inside the grains. *Webster 3d.*

slip bedding. The contortion of stratification planes caused by gliding. *See also* convolute bedding. *Pettijohn.*

slip block. A separate mass, which has slid away from its original position and come to rest down the slope without being much deformed. *Pettijohn.*

slip bowl. A spider. *See also* spider and slips. *Long.*

slip casting process. One in which clay, or other slip is poured into plaster molds which absorb the water, leaving a body the shape of the mold. *Bureau of Mines Staff.*

slip circle. A clay embankment is designed on the assumption that it is liable to fail along a circular arc. *Ham.*

slip clay. A type of clay containing such a high percentage of fluxing impurities and of such a texture that it melts at a relatively low temperature to a greenish or brown glass, thus forming a natural glaze. It must be fine-grained, free from lumps or concretions, show a low air-shrinkage and mature in burning at as little above 1,300° F., as possible. *CCD 6d, 1961.*

slip cleavage. a. That variety of foliation along which there has been visible displacement, usually shown by bedding that is cut by the cleavage. Such displacements are commonly shown along many adjacent cleavage planes. *Billings, 1954, p. 339.* b. Microscopic folding and fracture accompanied by slippage; quarrymen's false cleavage. *Fay.* c. S. Wales. The cleat of the coal in planes parallel with slips or faults. *Fay.*

slip clutch; safety clutch. A friction clutch that protects a mechanism by slipping under excessive load. *Nichols.*

slip coating. A ceramic material or mixture other than a glaze, applied to a ceramic body and fired to the maturity required to develop specified characteristics. *ASTM C242-60.*

slip crack. A rupture in the pressed compact caused by the mass slippage of a part of the compact. Synonymous with pressing crack. *ASTM B243-65.*

slip decoration. Decoration on ceramic ware made by applying slip or barbotine with a small pipe. *Standard, 1964.*

slip dike. Scot. A whin dike accompanied by a dislocation of the strata; a fault. *Fay.*

slip direction. The crystallographic direction in which the translation of slip takes place. *ASM Gloss.*

slip dock. A dock which has a sloping bottom and a gate to exclude the entry of water. *Ham.*

slip, enamel. The prepared liquid enamel as it comes from the mill after wet grinding operation. *Enam. Dict.*

slipes. S. Staff. Sledge runners, upon which a skip is dragged from the working breast to the tramway. *Fay.*

slip face. The lee surface of a sand wave. The foreset laminations of a cross-bedded layer are slip-face accumulations. Also referred to as slip slope. *Pettijohn.*

slip fiber. One of the three recognized forms in which asbestos fiber is found in rock deposits. In this, the fibers are found lying flat between the encasing rock walls of the cracks. The fiber lies in a direction parallel to the seam and in this way is virtually matted together between the rock walls irrespective of fiber length. Normally, slip-fiber occurrences are found in fractures, cracks and slips in chrysotile or anthophyllite asbestos rock formations, sometimes associated with stockwork cross-fiber mineralization in serpentine mass deposits. *Sinclair, W. E., p. 39.*

slip fiber amphibole. Another name for anthophyllite. *Sinclair, W. E., p. 75.*

slip fit. A loosely defined clearance fit between parts assembled by hand without force but implying slipping contact and probably comparable to one or more of 11 classes of clearance locational fits listed in ASA B4.1-1955. *ASM Gloss.*

slip fold. Synonym for shear fold. *A.G.I.*

slip forming. Forming parts with both stretch flanges and shrink flanges in two operations. *ASM Gloss.*

slip glaze. a. Glaze consisting primarily of a readily fusible clay or silt. *ASTM C242-60.* b. A glaze produced with slip clay. *See also* slip clay. *Fay.*

slip grip. A hold or grip on a drill rod, casing, or pipe by means of serrated-face steel wedges or slips. *Long.*

sliphook. A hook, generally on a hinge, which can be readily disconnected by withdrawing a cotter bolt that holds it in position. *Fay.*

slip house. The department of a pottery factory where the clays and other constituents are dispersed in water and blended to produce the slip. *Dodd.*

slipping. Enlarging an excavation by breaking one or more walls. *Higham, p. 86.*

slipping cut. In blasting underground, a cut used in a wide tunnel face, in which each successive vertical line of shots (round) breaks to the face made by the previous round, so that the relieving cut moves across the end being blasted. Also known as slabbing cut; swing cut. *Pryor, 3.*

slip-interference theory. Theory involving the resistance to deformation offered by a hard phase dispersed in a ductile matirx. *ASM Gloss.*

slip joint. a. A contraction joint between two adjoining sections of wall, or at the horizontal bearing of beams, concrete slabs, and precast units, to allow slight movement in relation to one of the other. *Ham.* b. A splined connection loose enough to allow its two parts to slide on each other to change shaft length. *Nichols.*

slip kiln. A heat-resistant trough placed over a heated flue; water can be evaporated from slip placed on the trough. This method of dewatering has been replaced by filter pressing. *Dodd.*

slip lines; Lüders lines. Lines which appear on the polished surface of a crystal or crystalline body which has been stressed beyond the elastic limit. They represent the intersection of the surface by planes on which shear stress has produced plastic slip or gliding. *Ro.*

slip maker. *See* clay maker. *D.O.T. 1.*

slip mixer. *See* clay maker. *D.O.T. 1.*

slip-off slope. By the time a valley is graded, it is also somewhat winding and its V-shaped cross profile is unsymmetrical, the slopes being steeper in the coves or amphitheaters against which the stream has cut (undercut slopes) than on the tapering and interlocking spurs running down to the convex banks. The slopes of the latter are termed slip-off slopes, because of the way in which they are developed. *A.G.I.*

slippage. *See* slip, n. *Long.*

slipper. Staff. A coal seam. *Arkell.*

slipper coal. Eng. A variety of coal found in Staffordshire. *Tomkeieff, 1954.*

slippery parting. Eng. *See* back. *SMRB, Paper No. 61.*

slip plane. a. Closely spaced surfaces along which differential movement takes place in rock. Analogous to surfaces between playing cards. *Billings, 1954, p. 378.* Synonym for glide plane; gliding plane. *A.G.I.* b. The crystallographic plane in which slip occurs in a crystal. *ASM Gloss.*

slip process. *See* wet process, b. ASTM C242-*60T.*

slip-pump man. One who pumps slip (semi-fluid clay) from mixing machine directly to caster, turning valves to start slip flowing and observing gage to determine if pressure is correct. *D.O.T. 1.*

slippy. Eng. Abounding in cracks or joints; said of rocks in the Midland coal field. *Standard, 1964.*

slippy backs. a. N. of Eng. Vertical planes of cleavage occurring every 4 or 5 inches in the seam of coal. Also called slip things. *Fay.* b. Closely spaced principal cleat in coal. *Arkell, 1953.*

slip-room foreman. *See* glaze maker, a. *D.O.T. 1.*

slips. a. Clearly defined breaks of natural formation in a coal seam, usually having a direction between end and bord line and with an inclination between vertical and 45 degrees from the vertical. Synonymous with nannies. *TIME.* b. Used among British miners for: (1) inferior dirty coal, and (2) joints in shale and other strata. *Tomkeieff, 1954.* c. Small faults. *B.S. 3618, 1964, sec. 5.* d. A tool used at the mouth of a borehole to grip the drill rods or the casing, as these are being inserted or withdrawn. Also called clamp. *B.S. 3618, 1963, sec. 3.* e. Clay made into paint for pottery. *Arkell.*

slip scratch. Markings on a rock surface made by the movement over it of another rock surface, other than the distinctive slickenside effect. Slipping between two bedding surfaces, in adjustment during folding or from some other cause, may produce angular marks. *Challinor.*

slip sealer. One who works as member of team casting tar rings around ends of clay sewer pipe to insure tight fit when they are subsequently joined. *D.O.T. Supp.*

slip serpentine. A fibrous material often noted as a translucent pale green coating along fault planes in Canadian serpentine deposits. *Sinclair, W. E., p. 16.*

slip slope. *See* slip face. *Pettijohn.*

slip spear. A tool for extracting tubing from a borehole. *Fay.*

slip stone. A small wedge-shaped oilstone with rounded edges. It is held in the hand and used for whetting gouges. *Crispin.*

slip stains. *See* pottery body stains. *CCD 6d, 1961.*

slip strainer. A strainer through which potter's slip is passed. *Fay.*

slip surface. The surface along which an earth bank is liable to fail under load. *Ham.*

slip surface of failure. In a bank of homogeneous earth or clay, the slip surface of failure closely follows the arc of a circle which usually intersects the toe of the bank. Stability depends upon fixing the position of the center of rotation of the slip surface along which the greatest shearing resistance would be required for equilibrium. *See also* landslide. *Nelson.*

slip things. S. Staff. The more or less vertical planes of cleavage in coal. *See also* slippy backs. *Fay.*

slip trailer. A device for squeezing out or flowing lines of slip on a clay surface. Sometimes known as bulb trailer. *ACSG, 1963.*

slip trailing. *See* trailing. *Dodd.*

slip trouble. Scot. Difficulties encountered in mining due to slips. *Fay.*

slip-type core lifter. A device used like a core spring, consisting of a series of tapered wedges contained in slotted recesses in a circular ring or sleeve; as the core enters the inner tube, it lifts the wedges along the taper, and when the barrel is lifted the wedges are pulled tight against the core. *Long.*

slip vein. A mineral vein accompanied by faulting or dislocation. *Fay.*

slip velocity. The rate, expressed in feet per minute, at which a given size and shape of rock particle will descend or settle in water. (Example: The slip velocity, in water, of a round, flat particle of rock, half an inch in diameter, is about 54 feet per minute.) *Long.*

slipware. Pottery decorated by the application of slips. *ACSG, 1963.*

slipway. A concrete or masonry slap sloping down to the water's edge, which supports a vessel under construction or repair. *See also* traversing slipway. *Ham.*

slit. a. A communication between two levels. *Fay.* b. A short heading put through to connect two other headings. *Zern.*

slit-side solid sampler. A solid-tube sampler with a slight worm twist on the bottom and an offset slit in the side. When rotated, the lip of the slit scrapes a sample from the side of a borehole. *Long.*

slitter. Eng. A pick. *Fay.*

slitting. A term used for the sawing of colored stones. Usually accomplished with a thin soft metal wheel or disc which revolves vertically. The operation precedes grinding. *Shipley.*

slitting disk. a. Circular saw used in preparing rock specimens. The cutting edge incorporates diamond dust and the thin steel disk revolves at high speed. *Pryor, 3.* b. A gemcutter's slitting mill. *Fay.*

slitting mill. A rotating disk used by gemcutters in slitting; a slicer. *Standard, 1964.*

slitting shot. A shot put into a large mass of coal detached by a previous blast. *Fay, p. 612.*

sliver. a. A defect consisting of a very thin, elongated piece of metal attached by only one end to the parent metal into whose surface it has been rolled. *ASM Gloss.* b.

Bundles of noncontinuous or short-length fibers that have reached that stage of their fabrication into yarn wherein they are parallel and overlapping and have no twist. *ASTM C162-66.* c. Strands from combing machine after the blending of cotton and asbestos before roving. *Sinclair, W. E., p. 484.* d. Eng. A thin wooden strip, inserted into grooves in the adjacent edges of two boards of a brattice, to make it airtight. *Fay.*

sloam. A layer of clay between seams of coal. Also spelled sloom. *Standard, 1964.*

slocking stone. Eng. A piece of rich ore used to tempt persons into a mining enterprise. *Webster 2d. See also* salting a mine. *Fay.*

sloom; slume. A thin layer of clay at the bottom of a coal seam and used for holding or pricking to losen the coal, Midland Counties, England. *Nelson.*

sloot. S. Afr. A ditch; frequently misspelled sluit. *Hess.*

slop. In ceramics, to blend thoroughly, as clay, by kneading, or cutting and piling. *Standard, 1964. See also* wedging, e.

slop brick. A name sometimes applied to soft-mud brick. *Fay.*

slope. a. An inclined passage driven from the dip of a coal vein. *Campare* slant, b. When not open at one end to the surface, it is known as an inside slope. *See also* incline; plane. *Fay.* b. The inclination of a mine roadway or coal seam. *Nelson.* c. S. Wales. An oblique heading driven to the rise off which stalls are turned. *Nelson.* d. Gr. Brit. An inclined tunnel from the surface, usually in stone. *Nelson.* e. The main working gallery or entry of a coal seam which dips at an angle and along which mine cars are hauled. *Nelson.* f. An entrance to a mine driven down through an inclined coal seam; also, a mine having such an entrance. An inside slope is a passage in the mine driven through the seam by which coal is brought up from a lower level. *Korson.* g. In a mining statute or in mining parlance, an inclined way, passage, or opening used for the same purpose as a shaft and is sometimes used as embracing the main haulage passageway, whether inclined or level. *Ricketts, I.* h. Eng. *See* crossheading. *SMRB, Paper No. 61.* i. The degree of inclination to the horizontal. Usually expressed as a ratio, such as 1:25, indicating one unit rise in 25 units of horizontal distance; or in a decimal fraction (0.04); degrees (2°18′); or percent (4%). It is sometimes expressed by such adjectives as steep, moderate, gentle, mild, flat, etc. Also called gradient. *H&G.* j. The inclined surface of a hill, or any part of the surface of the earth; the inclination of a roadway. Also, an inclined tunnel. *Compare* pit slope. *Bureau of Mines Staff.* k. In surface mining, the steepest possible slope of an excavation that is consistent with safety of working. *Institution of Mining and Metallurgy, Symposium on Opencast Mining, Quarrying, and Alluvial Mining, London, 16-19 November, 1964, Paper 17, p. 1.*

slope air course. A passageway parallel to the haulage slope used for the passage of the air current. *Fay, p. 625.*

slope cage; slope carriage. A truck on which the cars are raised at slopes or steep dips. *Fay.*

slope control. Producing electronically a gradual increase or decrease in the welding current between definite limits and within a selected time interval. *ASM Gloss.*

slope conveyor. a. Usually a troughed belt conveyor used for transporting coal or ore through an inclined passage to the surface from an underground mine. *See also* apron conveyor; belt conveyor; flight conveyor. *ASA MH4.1-1958.* b. Generally less than 1,000 feet in length. It is designed to raise or lower material on steep grades and is commonly used to transport material from discharge bins or a main haulage conveyor to the outside. It is often used as a transfer conveyor from a lower to a higher entry or to a gangway in a pitching seam. *NEMA MB1-1961.*

slope correction. A calculation of deduction from a length as measured on a slope to bring it to its true horizontal length. *See also* tape corrections. *Ham.*

slope dook. Scot. An incline driven not direct to the dip, that is, intermediate between the dip and strike. *Compare* slant, b. *Fay.*

slope engineer. In anthracite and bituminous coal mining, one who operates a hoisting engine to haul loaded and empty mine cars along a level or inclined haulage road (slope or plane) in a mine on a level, or from a lower to an upper level, or to the mine surface. Also called drag engineer; dragline engineer; drumman; plane engineer; plane tender; slope tender. *D.O.T. 1.*

slope failure. a. The downward and outward movement of rock or unconsolidated material as a unit or as a series of units. Also called slump. *Leet.* b. Failure of the mass of soil beneath a natural slope or a slope of an embankment by the formation of a slide. *Huntington, p. 346.* c. Slope failure may take place by one or more of three processes: (1) raveling, in which the material will assume an angle of repose approximately equal to the angle of friction of the material, and within limits the stable slope is independent of the weight of the mass, the height of the slope, and the size of the fragments. It is, however, characteristic of each rock material and is dependent on angularity, grading, and mineral content; (2) transitional failure in which failure occurs mostly along existing fault planes or other planes of weakness. Stability is a function of rock cohesion, the angle of internal friction, the angle of dip of the slip plane, the length of the slip surface, and the total weight of the block; and (3) rotational or base failure which is uncommon in open-pit mines or rock cuts because of geologic structure. However, in the case of homogeneous cohesive material—very deep excavation or low rock strength—failure may occur along a cylindrical surface. *Lewis, p. 627.* Four types of slope failure are rockfall, rock flow, plane shear, and rotational shear. *See also* rockfall; rock flow, b; plane shear; rotational shear. *Woodruff, v. 3, pp. 537-539.*

slope gage. A staff gage placed on an incline and graduated to indicate vertical heights. *Seelye, 1.*

slope heading. Scot. A heading driven not direct to the rise. Opposite of slope dook. *Fay.*

slope hoist. A direct rope haulage. *Nelson.*

slope indicator. A device which will record any horizontal movements in the soil. It consists of a tiltmeter housed in a watertight brass cylinder about 2.5 inches outside diameter and about 15 inches long. Within it, the tip of a pendulum contacts a precision-wound resistance coil forming one half of a Wheatstone bridge. The other half of the bridge, together with a pontentiometer, resistors, switches, and batteries is contained in a control box. The tiltmeter, which is lowered into an observation well, is connected by cable to the control box. *Carson, 2, p. 30.*

slope level. A batter level. *Standard, 1964.*

slope man. A worker who grades slopes of excavations with hand tools. *Webster, 3d.*

slope mine. a. A mine opened by a slope or incline. *Fay.* b. A mine with an inclined opening used for the same purpose as a shaft or a drift mine. It resembles a tunnel, a drift, or a shaft, depending on its inclination. *Kentucky, p. 330.*

slope road. Scot. A road driven at an angle less than a right angle with level course. *See also* slope dook. *Fay.*

slope stability. The resistance of any inclined surface, as the wall of an open pit or cut, to failure by sliding or collapsing. *Bureau of Mines Staff.*

slope stake. a. Stake set at the point where the finished side slope of an excavation or embankment cuts the surface of the ground. It is usually placed on a line at right angles to the center line and passing through the station point. *Seelye, 2.* b. A stake marking the line where a cut or fill meets the original grade. *Nichols.*

slope staking. Marking the ground surface by pegs at points where proposed new slopes in cut or fill coincide with the original surface. *Ham.*

slope tender. *See* slope engineer. *D.O.T. 1.*

slope test. A test to determine whether, and to what extent, the course of a well deviates from vertical. *Williams.*

slope wash. Soil and rock material that is being or has been moved down a slope predominantly by the action of gravity assisted by running water that is not concentrated into channels. The term may also designate the process by which such material is moved. *Stokes and Varnes, 1955.*

slop glaze. A suspension of glaze forming materials prepared for application to ceramic ware, usually by dipping or spraying. The materials are kept in suspension by the presence of dispersed clay and by the high concentration of solids. A small amount (about 0.02 percent) of calcium chloride is also added to prevent the glaze from setting in the glaze tub and to act as a thickening agent. *Dodd.*

sloping pump. Scot. A hand pump laid on the slope of the strata to drain dip workings. *Fay.*

slop molding. A method of molding bricks in open-topped boxes or molds previously dipped in water to keep the clay from sticking to them; distinguished from pallet molding. *Standard, 1964.*

slop peck. The volume of slip that contains 20 pounds of dry material. *Dodd.*

slopping. In ceramics, a process of kneading clay to render it homogeneous. *Standard, 1964. See also* wedging, e.

slop weight. The weight (ounce) per pint of a suspension of clay, flint, etc., in water. *Dodd.*

sloshing loss. A loss occurring when there is a fluid in the pores of the rock. This loss arises from the relative movement of the fluid and solid as the elastic waves pass through the rock. *Wyllie, p. 171.*

slot. a. A narrow, vertical opening generally too small to permit traverse by a man. *A.G.I.* b. York. To hole; to undercut or channel. *Fay.*

slot-and-wedge bolt. A special rod designed for use in roof bolting. It consists of a mild steel rod, threaded at one end, the other end being split into halves for a length of about 5 inches. When the bolt is driven into the hole, a wedge opens the slotted end thus forming the anchorage. *See also* wedge-and-sleeve bolt. *Nelson.*

slot dozing. A method of moving large quantities of material with a bulldozer. Each trip is made in the same path and thus the spillage from the sides of the blade builds up along each side and afterwards all material pushed into the slot is retained in front of the blade and bigger loads are handled. *Nelson.*

slotted duct sampler. A new instrument for sampling airborne dust and developed by the National Coal Board, Great Britain. It consists of a wide horizontal duct through which the mine air enters in streamline flow, so that dust particles will be deposited on the duct floor according to their falling speeds derived from Stokes' law. The instrument combines the duties of monitoring and measuring airborne dust concentrations in mine roadways. *See also* thermal precipitator. *Nelson.*

slotted sintered tip pick. *See* sintered carbide tipped picks. *Nelson.*

slotting. a. York. Coal cut away in the process of holing. Often used in the plural. Sometimes called bug dust in the United States. *Fay.* b. Cutting a narrow aperture or groove with a reciprocating tool in a vertical shaper or with a cutter, broach, or grinding wheel. *ASM Gloss.*

slotting wheel. A thin grinding wheel, usually organic bonded, used for cutting slots or grooves in the workpiece. *ACSG, 1963.*

slot weld. Similar to plug weld, the difference being that the hole is elongated and may extend to the edge of a member without closing. *ASM Gloss.*

slough. Fragments of rocky material from the wall of a borehole which either fell into and obstructed the borehole or were washed out of the hole with the returns; fragments of material resulting from the enlargement of a borehole. *Long.*

sloughing. Minor face and rib falls. *Coal Age, v. 71, No. 8, August 1966, p. 200.*

sloughing-off cone. Large cone (for example, Callow) in pulp flow-line designed to remove fine slimes as overflow while delivering a thickened spigot product containing the coarser particles. *Pryor, 3.*

slovan. a. Corn. The outcrop or back of a lode. This generally applies to the appearance of a lode in a marshy place. Cropping out is a Welsh, also East and North of England term; but it is never used in Cornwall. *Fay.* b. A gallery in a mine; day level; especially applied to damp places. *Standard, 1964.*

slow-banking device. An appliance for use in conjunction with the Lilly controller for controlling the landing speed of less than 5 feet per second when men are being wound. On each dial of the Lilly controller, an auxiliary dial is bolted to carry a slow-banking cam engaging near the end of the wind with a roller arm. The action of the appliance depends on the relative rate of movement of this roller and that of the piston in an oil dashpot cylinder. *Sinclair, V, pp. 209-210.*

slow feed. *See* slow gear. *Long.*

slow-feed gear. *See* slow gear. *Long.*

slow gear. a. When applied to a screwfeed-type drill, the pair of feed gears in the feed mechanism that advances the bit the least amount for each revolution of drill drive rod and/or the coupled drill stem; for example, a 400-feed gear is slower than a 100-feed gear. *Compare* feed ratio. *Long.* b. When applied to speed at which the drill motor rotates the drill stem, the transmission gear position giving the lowest number of bit revolutions per minute; thus, slow gear corresponds to low gear in an automobile. *Long.*

slow igniter cord. It consists of a plastic incendiary composition extruded around a central copper wire. An iron wire is added to give greater strength, and the whole is then enclosed in a thin extruded plastic coating. The diameter of slow cord is 0.07 inch. *McAdam II, p. 61.*

slow neutron. *See* thermal neutron. *L&L.*

slow powder. Blackpowder, often called gunpowder. Also, some of the slow-acting dynamites. *Nichols.*

slow-reading thermometer. Consists of a thick-walled glass test tube containing a thermometer, the bulb of which is embedded in cork or paraffin wax. The open end of the tube is corked and the whole protected by rubber rings. When employed in the measurement of strata temperature, this is inserted to the back of a 30-foot borehole and allowed to remain there for 24 hours. The thermometer is read, without removing it from the tube, immediately after withdrawal. *Roberts, I, p. 138.*

slow test *See* consolidated-drained test. *ASCE P1826.*

slow wheel (archeol). The surface perfecting of a handmade vessel by turning it on a rotating base, such as a plate or a block of wood or a sherd. *ACSG, 1963.*

sludge. a. The mud and cuttings made by a diamond or churn drill bit and carried to the surface by the uprising stream of water. *Nelson.* b. The soft mud settling out of water in a pump sump. *Nelson.* c. The machine shop waste containing diamond from grinding operations when obtained from wet grinding. *BuMines Bull. 630, 1965, p. 305.* d. In diamond grinding operations, a wet oily product obtained where liberal quantities of coolant are applied to the work. It is a semifluid mixture and is discharged into a collecting chamber below the grinding machine. Excess liquid may be separated from the solids by decantation or filtration. *I.C. 8200, 1964, p. 75.* e. In diamond drilling, portion of core ground finely by accident or defect in drilling, and therefore reducing reliability of portion of sample in which it happened. Mineral mud, slurry too thick to flow. *Pryor, 3.* f. A soft mud, slush, or mire; for example, the solid product of a filtration process before drying (filter cake). *CCD 6d, 1961.* g. Rock cuttings produced by the drill bit. *B.S. 3618, 1963, sec. 3.* h. *See* cuttings. *Long.* i. A murky colored sediment flowing from the operations of a lead and zinc mining plant. *Ricketts, I.* j. Applied to the tar from the agitators in the chemical treatment of distillates. *Fay.* k. Soft mud; muddy sediment in a steam boiler; slime. *Webster 3d.* l. Refuse from a coal-washing plant. *Standard, 1964.* m. A device for pumping sludge from a borehole; a sand pump or shell pump. *Standard, 1964.* n. Sometimes synonymous with slime. *Fay.* o. Sometimes called slurry. *B.C.I.*

sludge abatement. The control of the discharge into watercourses (or on adjacent land), of mineralized or impure water, or sludge, or mining debris. Provisions to this effect are inserted in the Mining Acts of most countries. *Nelson.*

sludge acid. Waste or spent sulfuric acid, usually from refining petroleum oils or crude benzenes. *CCD 6d, 1961.*

sludge asphalt. Asphaltlike products obtained by separation from the acid sludge produced in the refining of petroleum. *CCD 6d, 1961.*

sludge assay. The chemical assaying of drill cuttings for a specific metal or group of metals. *Long.*

sludge barrel. a. *See* sediment tube. *B.S. 3618, 1963, sec. 3.* b. *See* calyx, a. *Long.*

sludgebound. Any part of the drill-string equipment clogged by impacted cuttings. *Long.*

sludge box. a. A wooden box in which the sludge is allowed to settle from the mud flush and sometimes retained for examination. *Nelson.* b. *See* settling box. *Long.*

sludge bucket. *See* calyx, a. *Long.*

sludge cast. *See* furrow cast. *Pettijohn.*

sludge channel. A tailrace for conveying the tailings away after the gold has been extracted from alluvial beds. *Fay.*

sludge door. An opening through which sediment may be moved. *Fay.*

sludge, general. Any waste product obtained during refining of any material; also, the mud obtained from a drill hole in boring. *Shell Oil Co.*

sludge man. a. One who tends the concentrating tables used in treating fine slime or sludge from a prior separation for the separation of an additional valuable mineral. Also called sludge mill operator. *D.O.T. 1.* b. *See* sludge sampler, a. *Long.*

sludge mill. A machine in which the sludge (slime) from another mill is washed; as, for example, a slime table. *Fay.*

sludge paddocks. Collecting or settling areas for the slurry which results from hydraulicking overburden. *Austin.*

sludge pan. *See* tempering tub. *Dodd.*

sludge pit. Synonym for sump, n. *Long.*

sludge pump. A short iron pipe or tube fitted with a valve at the lower end, with which the sludge is extracted from a borehole. *Fay. See also* mud hog; mud pump; sand pump. *Long.*

sludger. a. A long cylindrical tube, fitted with a valve at the bottom and open at the top, used for raising the mud which accumulates in the bottom of a boring during the sinking process. Also called sand pump; shell pump; sludge pump. *C.T.D.* b. A scraper for clearing mud out of a shothole. *C.T.D.* c. A centrifugal pump designed for dealing with sand and slime. *Nelson.*

sludge sample. a. All or part of the drill cuttings collected, dried, and saved for assaying or chemical analysis. *Long.* b. The mud and chippings made during boring with a diamond or churn drill and sometimes used for sampling purposes. Little reliance can be placed on the assay of the sludge, and it is not regularly saved for assay, except occasionally when drilling in weathered or friable ore zones. Sludge tanks are often used to collect sludge samples. *Nelson.*

sludge sampler. a. An individual responsible for collecting and preparing drill cuttings for the purpose of examining, assaying, chemical analysis, or storage. Also called sampler. *Long.* b. A device used to collect and to split drill cuttings. *See also* riffle. *Long.*

sludge samples. Samples of mud from a rotary drill, or sand from a churn drill, or fine materials from diamond drilling used to obtain information about the formation being drilled. *Nichols.*

sludge sampling. Process of collecting and preparing drill cuttings as samples. *Long.*

sludge-saver. A device for collecting all the drill cuttings from a given interval of borehole. *Long.*

sludging. The act or process of becoming sludgebound. *Compare,* mud up, a. *Long.*

sludge splitter. *See* rifle, a. *Long.*

sludge water. *See* return water. *Long.*

sludging formation. A formation from which it is nearly impossible to recover core, so that sampling is done by collecting the drill cuttings or sludge. *Long.*

sludging up. *See* sludging. *Long.*

slue. To turn, twist, or swing about. To slide and turn or slip out of course. *Webster 3d.* In cutting the coal, the machine moves from right to left, the back part moving faster than the front. It is necessary at intervals to stop the machine and straighten it, or "slue" it, as called by miners. *Fay.*

sluff. a. Mud cake detached from the wall of a borehole. *Long.* b. A variant, incorrect spelling of slough. *Long.* c. The falling of decomposed, soft rocks from the roof or walls of mine openings. *Bureau of Mines Staff.*

slug. a. A piece of alluvial gold up to about one pound weight. *Gordon.* b. A lump of metal or valuable mineral, for example, cassiterite or cerargyrite. *Fay.* c. Eng. A loop formed at the end of a rope through which a miner passes his leg previously to descending an old shaft or working. *Fay.* d. To inject a borehole with cement slurry or various liquids containing shredded materials in an attempt to restore lost circulation by sealing off the openings in the borehole-wall rocks. *Long.* e. Small, shaped pieces of hard metal that can be brazed or handpeened in slots or holes cut in the face of a blank bit. Slugs may or may not contain diamonds. *Compare* insert. *Long.* f. A short piece of metal to be placed in a die for forging or extruding. *ASM Gloss.* g. A small piece of material produced in piercing a hole in sheet material. *ASM Gloss.* h. A mass of half-roasted ore. *Webster 3d.* i. A lump of nuclear fuel, commonly in the form of a short, round bar, or a cylinder, to be inserted into holes or channels in the active lattice of a reactor. Slugs are commonly encased in jackets. The term often refers to the fuel of a natural uranium-graphite reactor. *NRC-ASA N1.1-1957.* j. A rough piece of prepared clay body sufficient for making one piece of ware, for example, by throwing or by jiggering. *Dodd.* k. A fault in a glass-fiber product resulting from the presence of nonfibrous glass; also called shot. *Dodd.*

slug bit. *See* insert bit. *Long.*

slugga. An Irish term for hole in the surface rock of some limestone formations, caused by the falling in of parts of the crust over subterranean streams. *Standard, 1964. Compare* sink, h; sinkhole. *Fay.*

slugged bottom. A fault in a glass container characterized by the bottom being thick on one side and thin on the other; also called a wedged bottom and (in the United States) heel tap. *Dodd.*

slugger. A tooth on a roll-type rock crusher. *Nichols.*

slugging. The unsound practice of adding a separate piece of material in a joint before or during welding, resulting in a welded joint which does not comply with design, drawing, or specification requirements. *ASM Gloss.*

slug iron. Iron strengthening band, keeping grinding pan arms in position. *Noke.*

sluice. a. To mine an alluvial deposit by hydraulicking. *Nelson.* b. A long troughlike box set on a slope of about 1 in 20, through which placer gravel is carried by a stream of water. The sand and gravel are carried away, while most of the gold and other heavy minerals are caught in riffles or a blanket on the floor. *See also* box sluice; ground sluice; placer mining. *Nelson.* c. S. Afr. A sort of trough used in washing alluvial dirt. *Beerman.* d. *See* flume. *B.S. 3618, 1963, sec. 4.* e. To wash with or in a stream of water running through or from a sluice. *Webster 3d.* f. To drench, wash, or scour with gushes or floods, as of water; flush. *Webster 3d.* g. A conduit for carrying water at high velocity. *Seelye, 1.* h. An opening in a structure for passing debris. *Seelye, 1.* i. To cause water to flow at high velocities for wastage, for purposes of excavation, ejecting debris, etc. *Seelye, 1.* j. A steep, narrow waterway. *Nichols.* k. A channel, drain, or small stream for carrying off surplus or overflow water. *Craigie, v. 4, p. 2,151.*

sluiceboxes; sluices. Long, inclined troughs or launders containing riffles in the bottom that provide a lodging place for heavy minerals in ore concentration. The material to be concentrated is carried down through the sluices on a current of water. Sluiceboxes are widely used in placer operations for concentrating such minerals as gold, platinum, and cassiterite from stream gravels. *Newton, pp. 92-93.*

sluice fork. A form of fork having many tines, used to remove obstructions from a sluiceway. *Fay.*

sluice gate. The sliding gate of a sluice. *Webster 3d.*

sluice head. Aust. A supply of 1 cubic foot of water per second, regardless of the head, pressure, or size of orifice. *Compare* miner's inch. *Fay.*

sluice tender. In metal mining, a laborer who tends sluiceboxes (troughs) used in placer mining to separate gold from the sand or gravel in which it occurs; and removes wood and other obstructions to see that the gravel and water run freely through the sluices and that the riffle (cleats) is clear, so that the gold will be caught and held when settling to the bottom. *D.O.T. 1.*

sluice valve. a. A sluice gate. *Webster 3d.* b. A valve consisting of a plate, moved by a screw, between closely fitting channel guides. *B.S. 3618, 1963, sec. 4.*

sluiceway. An artificial channel into which water is let by a sluice. *Webster 3d.*

sluicing. a. Washing auriferous earth through long races or boxes (sluices), provided with riffles and other gold-saving appliances. *Fay.* b. Separation of minerals in a flowing stream of water. *See also* sluiceboxes. *Bureau of Mines Staff.* c. Moving earth, sand, gravel, or other rock or mineral materials by flowing water. *Bureau of Mines Staff. See also* hydraulic mining, b; placer mining.

sluicing table. N.Z. A table, on wheels, used for washing black sand for its gold content. *Fay.*

slum. a. The very finely divided clayey portion of the residue overflowing from a sluice box, particularly applied to deep lead mining. *Nelson.* b. A short roadway to the dip in coal mines used solely to stock spare cars or the spake until required at the end of the shift. *Nelson.* c. N. Staff. A black slippery, indurated clay. *Fay.* d. A soft clayey or shaley bed of coal. *Fay.* Also spelled slumb. e. Used in the plural for the discharge or waste from hydraulic mines. *See also* tailing; slime. *Fay.*

slume. *See* sloom. *Nelson.*

slumgullion. A usually red, muddy deposit in mining sluices. *Webster 3d.*

slump. a. Material that has slid down from high rock slopes; to slip down en masse. *A.G.I.* b. The downward slipping of a mass of rock or unconsolidated material of any size, moving as a unit or as several subsidiary units, usually with backward rotation on a more or less horizontal axis parallel to the cliff or slope from which it descends. *A.G.I.* c. To slide with perceptible motion down a declivity; said of loose earth or rock. *Standard, 1964.* d. The deposit produced by a downslope, en masse movement of material; may be subaqueous or subaerial. *See also* slide, k. *Pettijohn.* e. The vertical distance through which the top of a molded mass of fresh concrete sinks on removal of the mold, under specified conditions of test. *Taylor.*

slump balls. More or less flattened balls, 2 to 3 centimeters to 2 to 3 meters across; commonly laminated, with internal contortions and a smooth external form. Probably the same as pillow-structure. *Pettijohn.*

slump basins. Near the base of many canyon walls and on shale hills and ridges, small, irregular slumps give rise to basins which may be filled with water that runs down the higher land surfaces. Such basins usually are shallow and the lakes that they contain are short-lived. *Stokes and Varnes, 1955.*

slump bedding. a. Deformation in an unconsolidated or plastic sediment due to subaqueous slump or gliding. The disturbance may be restricted to layers only an inch or two thick, and are confined to a single bed or zone between undisturbed beds. Synonym for curly bedding. *A.G.I.* b. Disturbed strata interbedded between undisturbed strata, caused by flow of newly deposited sediment. *B.S. 3618, 1964, sec. 5.* c. Term loosely applied to any disturbed bedding; strictly applicable only to structures produced by lateral movement or slump. *Pettijohn.*

slumping. When the soil and earthy material on a steep slope become charged with water, their weight is greatly increased. At the same time the water makes them more mobile. Under these circumstances the material sometimes slides down the slopes. Such movements are known as slumping or sliding. If the movement is on a large scale, it is a landslide. *A.G.I.*

slump mark. Marks and structures made by dry or wet sand avalanching down the lee side of a sand wave or dune. *Pettijohn.*

slump overfold. Hook-shaped masses of sandstone produced during slump. *Pettijohn.*

slump sheet. A bed of limited thickness and wide extent consisting of slumped materials. *Pettijohn.*

slump test. a. A rough test for the consistency of freshly mixed concrete in terms of the subsidence of a truncated cone of concrete when upturned from a bucket. *Dodd.* b. A worked test for the consistency of vitreous enamel slip. *See also* Irwin slump test. *Dodd.*

slung cartridges. Cartridges of explosive which are lowered into position in drillhole blasting at the end of a length of strong twine (not wire). As detonating cord is normally used for ignition in drill holes, the primed cartridge is lowered first in each charge by using a detaching hook or a length of twine, and it is followed by the remainder of the charge. *Nelson.*

slurry. a. Any finely divided solid which has settled out as from thickeners. *Nelson.* b. The fine carbonaceous discharge from a colliery washery. All washeries produce some slurry which must be treated to separate the solids from the water in order to have a clear effluent for reuse or discharge. Also, in some cases, it is economical to extract the fine coal from the effluent. *Nelson.* c. A mixture of cement and water pumped into a borehole or oil well to support the casing and prevent movement of underground fluids. *See also* mud flush, b. *Nelson.* d. Semiviscous material composed of fine sediments mixed with oily or waxlike substances and water, which accumulates in a borehole. *Long.* e. A mud-laden drill-circulation fluid. *Long.* f. Fine particles concentrated in a portion of the circulating water (usually by settling) and waterborne to treatment plant of any kind. *B.S. 3552, 1962.* g. Cement grout. *Nichols.* h. Pulp not thick enough to consolidate as a sludge but sufficiently dewatered to flow viscously. In metallurgy, a porridge used to repair furnace linings. *Pryor, 3.* i. Eng. A mixture of sulfides and arsenides of copper, lead, silver, etc., resulting from silver smelting. *Standard, 1964.* j. A liquid mixture of cement or other finely divided material and water. *Taylor.* k. A thin watery suspension; for example, the feed to a filter press or other filtration equipment. *CCD 6d, 1961.*

slurry bedding. *See* slump bedding, b. *B.S. 3618, 1964, sec. 5.*

slurry blasting agents. Dense, insensitive, high-velocity explosives of great power and very high water resistance. They are usually mixtures of an explosive such as TNT, which is a reducing agent, an oxidizing agent, such as ammonium nitrate and/or sodium nitrate, and water. A thickening or jelling substance such as guar gum is usually added. Slurries may also be made with nonexplosive reducing agents, including finely divided metals such as magnesium or aluminum, and with organic compounds such as sugar, molasses, or emulsified oil. These slurries are used chiefly in open-pit mines where rock is hard and/or holes are wet. Also called DBA (dense blasting agent). *Nichols, pp. 9-11.*

slurrying. The process of filling in joints with slurry. *Osborne.*

slurry man. *See* furnace sprayer. *D.O.T. Supp.*

slurry man helper. A laborer who makes slurry for use by furnace sprayer, mixing specified amounts of silica, clay, and water in large drums with air-pressure hose. *D.O.T. Supp.*

slurry pond. Any natural or artificial pond or lagoon for settling and draining the solids from washery slurry. *B.S. 3552, 1962.*

slurry screen. A screen to recover a granular product from the circulating water in a washer, usually after a preliminary concentration of the solids and with or without the use of water sprays. *B.S. 3552, 1962.*

slurry slump. A slump in which the moving mass disintegrates into a quasi-liquid slurry. *Pettijohn.*

slush. a. To fill mine workings with sand, culm, etc., by hydraulic methods. *See also* hydraulic mine filling. *Fay.* b. Same as silt. *Korson.* c. To move ore or waste filling with a scraper (slusher) hoist. *Bureau of Mines Staff.* d. Accumulation of ice crystals which remain separate or only slightly frozen together, forming a thin layer and giving the sea surface a grayish or leaden-tinted color. With light winds no ripples appear. *Schieferdecker.* e. Snow or firn saturated with water. *A.G.I.* f. To fill in (as the joints of a wall or of a block pavement) with slush or grout. *Webster 3d.*

slush box. Container about the polishing wheel which collects the mud often used in lapping. *Shipley.*

slush casting. A hollow casting usually made of an alloy with a low but wide melting temperature range. After the desired thickness of metal has solidified in the mold, the remaining liquid is poured out. *ASM Gloss.*

slush casting process. One in which molten metal is poured into a metal mold and immediately poured out, leaving a casting. *Bureau of Mines Staff.*

slusher. a. A scraper loader. Nelson. b. A mechanical dragshovel loader. *Mason.* c. A mobile drag scraper with a metal slide to elevate the bucket to dump point. *Nichols.* d. N. of Eng. *See* scraper packer. *Trist.*

slusher drift. Drift in stope block above haulage level, down which scraper loader conveys broken or to loading chutes which are usually without gates. *Pryor, 3.*

slusher operator. In metal mining, one who operates the hoisting engine of a scraper loader, known as a slusher, to load ore into cars or to scrape it into chutes, or to move sand or rock fill in the stopes. *D.O.T. 1.*

slush-fitted pump. A pump equipped with valves capable of passing a mud-laden fluid. *See also* mud hog; mud pump, a; slush pump. *Long.*

slushing. a. Term sometimes applied to hydraulic stowing and also to scraper loader operations. *Nelson.* b. A method for the application of vitreous enamel slip to ware, particularly to small awkwardly shaped items. The slip is applied by dashing it on the ware to cover all its parts, excess then being removed by shaking the ware. A slip of thicker consistency than normal is required for this process. *Dodd.*

slushing drift. A drift in an ore body, equipped wth a scraper loader, for loading ore directly into cars in the haulage level. The drift is formed at right angles to the haulage level and over it so that the ore drops into the cars. *Nelson.*

slushing oil. Used to coat metals, machine parts, etc., to prevent corrosion. It usually is nondrying oil or grease which coats the metal very well but is easily removed when desired. *Crispin.*

slush pit. An excavation dug near a drill to form a reservoir in which the returns from a borehole are collected and stored. Also called drill sump, mud pit, sludge pit, slush pond, sump. *Long.*

slush pond. A slush pit or sump. *Long.*

slush pump. A pump used to circulate drilling mud in rotary drilling. *Institute of Petroleum, 1961. See also* mud pump; circulating pump.

sly bed. Eng. Soft, black, bituminous shale with a white efflorescence on exposure. A hard calcareous band near the base, Middle Purbeck Beds, Swanage. *Arkell.*

slyne. Same as cleat. *Raistrick and Marshall, p. 43. See also* sline.

slype. Scot. A sled for drawing coal along the wall face, or in steep workings. Also called sawney. *Fay.*

Sm Chemical symbol for samarium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

small. Eng. A term frequently used for slack or fine coal. *Fay.*

small-angle boundaries. Two-dimensional defects consisting of aligned dislocations. *VV.*

small bottom. Ark. A local term used at Jenny Lind for the smaller part of the bottom bench of the coal seam. This is below the top bottom and separated from it by a smooth seam. *Fay.*

small butty. Staff. A contractor who engages to work a certain part of a seam—usually reckoned as a certain width of face—at a tonnage price, the contractor finding and paying the labor necessary to mine and deliver the coal to the haulage road. *Fay.*

small coal. a. Coal broken into small pieces, usually that smaller than stove size; slack. *Standard, 1964.* b. Thin seams of coal; also called low coal. *Fay.* c. Coal with a top size less than 3 inches. *B.S. 1017, 1960, Pt. 1.*

small colliery. In Great Britain, generally a colliery producing less than 1,000 tons per day. *See also* large colliery. *Nelson.*

small diameter blastholes. Multiple row blasting with holes 1½ to 3 inches in diameter in low face quarries. Short-delay blasting is usually adopted using explosive factors similar to those of large diameter holes. With smaller diameter blastholes, the explosive charges can be brought up higher in the holes and so provide better breakage in blocky ground. *Nelson.*

Smalley process. A method for desulfurizing iron and steel with metal hydrides in which a molten slag is floated on a mass of molten ferrous metal and at least one metal hydride is introduced into the mass. The molten ferrous metal is separated from the slag, the metallic hydrides breaking down into metal and nascent hydrogen. Hydrides of the alkali metals have been found very satisfactory and are readily available. *Osborne.*

small floe. Approximately 10 to 200 meters in diameter. *Schieferdecker.*

small mine. A British coal mine employing not more than 30 persons below ground. *Nelson.*

small ore. Eng. Copper, lead, and zinc ore dressed to a small size; also called smalls. *Fay.*

small punch. Same as washer mica. *Skow.*

smalls. a. Small coal; slack. *Standard, 1964.* b. Small particles of mixed ore and gangue. *Standard, 1964.* c. *See* small ore. *Fay.* d. One of the three main size groups by which coal is sold by the National Coal Board of Great Britain. It embraces all coals with no lower size limit and ranges from a top size of 2 to ⅛ inch, and can be either untreated, that is, have received no preparation other than dry screening, or treated, having been washed or dry cleaned. *See also* graded coal; large coal. *Nelson.*

small-stone bit. a. In mineral exploration drilling, a diamond bit set with 100-per-carat size or smaller diamonds. *Long.* b. In petroleum drilling, a diamond bit set with 10-per-carat-size or smaller diamonds. *Long.*

small tin. Eng. Tin recovered from slimes. *Fay.*

smalt. A potash-cobalt glass made by fusing pure sand and potash with cobalt oxide, grinding, and powdering; a blue powder. Used in ceramics as a pigment and for coloring glass. *CCD 6d, 1961.*

smaltine. An arsenide of cobalt, often containing nickel and iron. Also called smaltite; gray cobalt; tin-white cobalt. *Fay.*

smaltite; smaltine. Probably skutterudite; the smaltite formula, $CoAs_2$, was probably based on analyses of impure material, for it has been shown that the diarsenide series does not exist. *Dana 17, p. 276.*

smaragd. A precious stone of light green color; a variety of beryl. *Fay.*

smaragdite. A thin-foliated variety of amphibole, near actinolite in composition but carrying some alumina. It has a light green color resembling much common green diallage. *Fay.*

smaragdmatrix. Emerald. Feldspar and quartz embedded with emerald. *Shipley.*

smaragdolin. Trade name for a glass imitation of emerald which was usually beryl glass and was sold in boules shaped like those of synthetic corundum. Mohs' hardness, 5 to 5.5; specific gravity, 3.3 to 3.45; refractive index, 1.62. *Shipley.*

smart aleck. A limit switch that cuts off power if a machine part is moved beyond its safe range. *Nichols.*

smart fire. N. of Eng. A severe, though small, mine explosion. *Fay.*

smart money. N. of Eng. A weekly allowance of money given by employers to workmen who are injured while at work. Accident compensation. *Fay.*

smashup. A wreck, usually of haulage equipment. *Bureau of Mines Staff.*

smear. a. A volatile flux for glazing ware. *Standard, 1964.* b. To give a luster to (articles of pottery) without glazing, as by putting a volatile flux in the kiln with the ware. *Standard, 1964.* Also spelled smeir. *Fay.* c. In the glass industry, the word has the special meaning of a surface crack in the neck of a glass bottle. *Dodd.*

smectic state. Liquid-crystalline state of some fatty acids and soaps in which bundles of long molecules are oriented into parallel layers. Smectic liquid crystals are composed of series of planes. They glide rather than flow. When less completely oriented (nematic) they are distributed at random and flow. *Pryor, 3.*

smectite. a. A green clay. *Standard, 1964.* b. A greenish variety of halloysite. In certain states of humidity, it appears transparent and almost gelatinous. *Fay.*

smeddum. a. Scot. The smaller particles of ore which pass through the sieve of the hutch. *Fay.* b. Eng. Clay or shale separating coal seams. *Webster 2d.* c. Fine coal slack. *Standard, 1964.* Also spelled smiddam; smiddum; smitham; smithem; smitten; smytham. *Fay.*

smeir. A semiglaze used on pottery; a mixture of common salt and slip glaze. *See also* smear. *Fay.*

Smekal cracks. The canals or pores which, according to Smekal's theory of the structure of crystalline solids, exist between small, structurally perfect lattice blocks in the crystal. *Miall.*

smelt; smelting. a. A process distinct from roasting, sintering, fire refining, and other pyrometallurgical operations. The two most important types are reduction smelting which produces molten metal and molten slag, and matte smelting which produces molten matte and molten slag. Smelting may be conducted in a blast furnace, a reverberatory furnace, or an electric furnace. Reduction smelting is usually performed in blast furnaces and matte smelting in reverberatories, but there are exceptions in both cases. *Newton, p. 298.* b. Any metallurgical operation in which metal is separated by fusion from those impurities with which it may be chemically combined or physically mixed, such as in ores. *Bureau of Mines Staff.* c. A specific batch or lot of frit. *ASTM C286-65.*

smelter. a. One engaged in smelting or works in an establishment where ores are smelted. *Fay.* b. In the United States, smelting works; an establishment where ores are smelted. *Fay.* c. A furnace in which the raw materials of the frit batch are melted. *ASTM C286-65. See also* batch smelter; continuous smelter; rotary smelter.

smelter, batch. See batch smelter.

smelter, continuous. See continuous smelter.

smelter drippings. a. Drippings of molten glassy material formed on the crown of the smelter. *ASTM C286-65.* b. Burnt glass, usually overfired material from roof of smelter, generally seen as amber-colored beads in enamel frit. *Enam. Dict.*

smeltered. A California term applied to animals that have been injured by smelter fumes, either by inhalation or by eating vegetation upon which smelter fumes have settled. *Fay.*

smelter returns. In a contract, returns from the ore, less the smelting charges, without deducting transportation charges. *Ricketts, I.*

smelter, rotary. *See* rotary smelter.

smelters' ton. A long ton plus an allowance for sandage, etc. *Standard, 1964.*

smeltery. A smelting establishment. *Webster 3d.*

smelting. a. The chemical reduction of a metal from its ore by a process usually involving fusion, so that the earthy and other impurities, separating as lighter and more fusible slags, can readily be removed from the reduced metal. An example is the reduction of iron ore (iron oxide) by coke in the blast furnace to produce pig iron. Smelting may also involve preliminary treatment of the ore, as by calcination and further refining processes, before the metal is fit for a particular industrial use. *Rolfe.* b. Thermal processing wherein chemical reactions take place to produce liquid metal from a beneficiated ore. *ASM Gloss.* c. Smelting by its derivation is synonymous with melting. When metallic ores are exposed to heat, and such reagents as develop the metal, it is called smelting in contradistinction from the mere application of heat, causing the ore to become fluid, which is called melting. *Ricketts, I.* d. The process of melting porcelain enamel raw materials in a melting furnace around 2,500° F. The raw materials, which have been first thoroughly mixed, are loaded into the smelter and allowed to remain there until thoroughly and uniformly melted. This melting process requires from one to three hours' time. The molten enamel runs from the furnace in a white hot stream and the contact with the cold water in the quenching tank shatters the enamel into millions of friable pieces which are known to the enameler as either frit or glass. *Enam. Dict.* Also known as melting.

smelting furnace. A blast furnace, reverberatory furnace, or electric furnace in which ore is smelted for the separation of a metal. *Standard, 1964.*

smelting house. a. A structure built over a smelting furnace; a smelting works. *Standard, 1964.* b. A smeltery. *Fay.*

smelting works. a. An establishment in which metals are extracted from ores by furnaces. *Standard, 1964.* b. A smeltery. *Fay.*

smiddam; smitham. Derb. Lead-ore dust. A variation of smeddum, a. *Fay.*

smiddum. Eng. A variation of smeddum. *Fay.*

smiddum tails. Eng.; Scot. Ore sludge; ore slime. A variation of smeddum. *Fay.*

smiddy coal. Scot. Smithy coal. *Fay.*

Smidth agglomerating kiln. A rotary kiln providing an alternative method to sintering for the treatment of fine ores and flue dust. *Osborne.*

smift. a. Eng. A fuse or slow match. *Fay* b. A bit of touch paper, touch wood, etc., attached by a bit of clay or grease to the outside end of the train of gunpowder when blasting. Also called snift. *Zern.*

smith. *See* blacksmith. *Nelson.*

smitham; smithen; smytham. a. Mid. Fine slack. *Fay.* b. Clay or shale between two beds of coal. A variation of smeddum, b and c. *Fay.*

smithery. a. The art of shaping or fashioning, as iron or steel, with a hammer and other tools; smithing. *Standard, 1964.* b. A smith's shop; smithy. *Standard, 1964.*

smith forge. A small, open-hearth furnace utilizing an air blast with coal or coke for fuel. It is commonly used for heating small metal parts previous to manual, hot-working operations. *Henderson.*

smith forging. Hand forging with flat or simple-shaped dies that never completely confine the work. *ASM Gloss.*

smithing. Forging or working iron or steel while hot. *Ham.*

smithing coal. A good smithing coal should have the following characteristics: (1) ash content not to exceed 7.0 percent; (2) calorific value 14,000 British thermal units per pound or higher; (3) low to medium volatile ranging from 19 to 26 percent; (4) quick and positive coking qualities and (5) low sulfur, preferably 1.0 percent or less. *Mitchell, pp. 121-122.*

smithite. A scarlet vermillion, exactly like proustite; on long exposure to sunlight, it changes to orange red. A sulfarsenite of silver. Monoclinic; tabular, flattened pyramid. From Binnenthal, Switzerland. *English.*

Smith-McIntyre mud sampler. With this device the digging and hoisting mechanisms are separated. This fact improves overall performance even under bad working conditions. The sampler consists of a spring-loaded bucket actuated only after the device rests squarely on the bottom. The bucket is carried on a heavy metal bridle which slides on a guide tube, and two heavy springs on the frame bear on the movable bridle. In the set position the springs are held by two catches which fit into a pair of holders and these are triggered when the device strikes bottom. On release, the springs bear on the bridle and push the bucket down into the sediment. At the same time as these are triggered, a release bar moves so that on hoisting the weight goes on the wire and the two halves of the bucket are drawn together taking a sample of the sediment. *H&G.*

Smith process. a. A variation of the series system of copper refining in which the plates are placed horizontally, the top surface of each one acting as cathode, the lower as anode. Linen diaphragms must be placed between the plates to catch the slime. When these diaphragms break and allow the slime to drop on the cathode, it is difficult to remedy any short circuits without dismantling the tank. *Liddell 2d, p. 496.* b. A process for the production of sponge iron, which is carried out in vertical ovens or retorts, similar to coke ovens in design. The crushed ore or iron oxide material is mixed with carbonaceous material and charged into the oven, where it is heated and cooled by means of horizontal flues. It is preheated in the upper part of the oven by the waste gases, which leave the stack at about 200° C. The charge then enters the reduction zone, where temperatures range from about 870° to 1,095° C and is subsequently cooled by the incoming air for combustion in the heating flues, being discharged at less than 120° C. *Osborne.*

Smith refractometer. A very small gemmological refractometer of fair accuracy (±.01) employing a segment of a hemisphere of highly refractive glass in a nonrotating mount. It was designed by G. F. Herbert Smith and is suitable for use in the hand. *See also* Rayner refractometer; Tully refractometer. *Shipley.*

smithsonite. *See* zinc carbonate. *Bennett 2d, 1962.*

smithum. Lead ore dust. *Arkell.*

Smith welding *See* forge welding. *Ham.*

smithy coal. Eng. A grade of small coal habitually used by blacksmiths. *Fay.*

smithy forge. *See* smith forge.

smithy ore. N. of Eng. A soft variety of hematite that is used much for forming bottoms of puddling furnaces. *Fay.*

smitten. Fine gravellike ore, occurring free in mud openings, or derived from the breaking of the ore in blasting. A variation of smeddum, a. *Fay.*

smoke. The exhalation, visible vapor, or material that escapes or is expelled from a burning substance during combustion; applied especially to the volatile matter expelled from wood, coal, peat, etc., together with the solid matter which is carried off in suspension with it. That which is expelled from metallic substances is generally called fume or fumes. *See also* fume and metallurgical smoke. *Fay.*

smoked. a. A term applied to the discoloring of glass in a reducing flame. *ASTM C162-66.* b. Glass covered with smoky film from open-fired lehrs. *ASTM C162-66.*

smoke farmer. The agriculturist whose chief crop is a suit for damages. *Hoov, p. 257.*

smoke helmet. A helmet which encloses the head and to which is attached an air hose through which air is pumped to the wearer by a bellows placed at the fresh air base. This type of apparatus is only suitable for work within a short distance of the fresh air base and this limits the work range in which it can be used. *McAdam, p. 75; Sinclair, I, p. 321.* By the use of compressed air a greater length of hose can be used, and probably a length of 500 feet or more could be attained. A smoke helmet is not normally used by a rescue team, but for building fire seals and for firefighting operations. *See also* breathing apparatus. *Nelson.*

smokeless coal. Finest type of steam coal, otherwise a low volatile bituminous coal. *Tomkeieff, 1954.*

smokeless gunpowder. A powder used as a propellant in guns which makes very little smoke when exploded. *Standard, 1964. See also* smokeless powder. *Fay.*

smokeless powder. Nitrocellulose containing 13.1 percent nitrogen. Produced by blending material of somewhat lower (12.6 percent) and slightly higher (13.2 percent) nitrogen content; converting to a dough with an alcohol-ether mixture; extruding; cutting; and drying to a hard, horny product. Small amounts of stabilizers (amines) and plasticizers are usually present, as well as various modifying agents (nitrotoluene and nitroglycerin salts). *CCD 6d, 1961.*

smokeroom. a. Ark. An entry air course driven room width. *Fay.* b. A room especially constructed in which noxious gases may be generated and confined for the purpose of testing breathing apparatus. *Fay.*

smoke shade. A scale of tints, ranging from 0 to 10, used for comparison of the smoke of different varieties of coal, which are graded according to the amount of unconsumed carbon contained in their smoke, the lightest color indicating the most valuable. *Standard, 1964.*

smoke stick. A means of making a smoke cloud to measure the velocity of air. Fuming sulfuric acid or anhydrous tin tetrachloride are favorite smoke producers. *Zern.*

smokestone. Cairngorm. *Webster 2d.*

smoke technique. A technique used to measure only very low-speed air velocity. The release of smoke enables the fluid motion to be observed with the eye. If the smoke is timed over a measured distance along an airway of constant cross section then the velocity of flow can be determined. Usually a spot reading, that of maximum velocity, is obtained. *Roberts, I, p. 53.*

smoke test. A test for the efficiency of drains carried out with smoke. *Ham.*

smoke tester. One who tests efficiency of Cottrell plant and flue recovery method by determining rate of discharge of gases and solids from smelter smokestack. *D.O.T. Supp.*

smoke tube. To determine the presence of moving air, the direction of flow, and the approximate velocity of flow, the smoke tube method is commonly used, particularly in metal mines. The device consists of an aspirator bulb which discharges air through a glass tube containing a smoke-generating reagent. Usually pumice stone saturated with anhydrous tin or titanium tetrachloride is employed. The dense white cloud of smoke released when the bulb is squeezed travels with the air current; the approximate air velocity in a mine airway is determined by timing how long the cloud takes to travel between two points. *Hartman, p. 108.*

smoke washer. A device in which smoke is forced upward against a downward spray of water in order to remove the solid particles in the smoke. *Webster 3d.*

smoke zone. The area surrounding a smelting plant in which the smoke or fumes damage vegetation, or in which it may be classed as a public menace or nuisance. *Fay.*

smoking. The first stage of biscuit firing during which all water is expelled from the greenware. *ACSG See also* watersmoking.

smoky opal Smoky-brown opal. *Shipley.*

smoky pit. Mid. An upcast shaft with a furnace at the bottom of it. *Fay.*

smoky quartz. A smoky, brown-colored crystalline variety of quartz; from the Cairngorm Mountain in Scotland. *Fay.*

smoky topaz. A smoky quartz used for jewelry. *Webster 3d.*

smooth. a. Wales. The line of face, as of a stall or room. *Fay.* b. Wales. A plane of cleavage more or less vertical. *Fay.* c. The vibration-free rotation of a drill stem. *Long.* d. A dull diamond bit. *Long.* e. Finely ground, as applied to a flat glass surface, prior to polishing. *ASTM C-162-66.*

smooth blasting. Blasting to ensure as even faces as possible without cracks in the rock. *Fraenkel.* Also known as smoothing; perimeter blasting; presplitting. *Langefors, p. 297.*

smooth drilling. a. A rock formation in which a high recovery of core can be attained at a high rate of penetration. *Long.* b. A rock formation in which fast rotation of the drill stem, a fast rate of penetration, and a high recovery of core can be achieved with vibration-free rotation of the drill stem. *Long.*

smoother *See* glazing - machine operator. *D.O.T. 1.*

smoother bar. A drag that breaks up lumps behind a leveling machine. *Nichols.*

smooth-faced drum. Plain-faced drum without grooves. *Ham.*

smooth finish tile. Tile whose surfaces are not altered or marked in manufacture but left as a plane surface as formed by the die. *ASTM C43-65T.*

smooth head. York. A smooth plane of cleavage. *See also* bright head. *Fay.*

smoothing iron. A flat iron tool, heated to the appropriate temperature for smoothing asphalt surfaces and sealing points. *Ham.*

smoothing mill. A lapidary's polishing wheel. *Standard, 1964.*

smoothing trowel. Used by plasterers and cement workers for finishing surfaces. *Crispin.*

smooth rolls. A crusher in which the material passes between a moving set of rolls with smooth surfaces. *ACSG, 1963.*

smooth shoreline. *See* graded shoreline. *Schieferdecker.*

smooth wheel roller. A self-propelled roller for soil compaction. *See also* compaction plant. *Nelson.*

smored. Scot. Obstructed with rubbish, mud, or silt, as the suction pipe of a pump. *Fay.*

smother kiln. A kiln in which the smoke is smothered to blacken the pottery within. *Standard, 1964.*

S.M.R.E. The Safety in Mines Research Establishment of the Ministry of Power, United Kingdom. *Nelson.*

S.M.R.E. bar. Primarily a roadhead support consisting of two special rolled steel joists welded together longitudinally to form one composite bar. The finished weight of the bar is 16½ pounds/feet and after heat treatment, quenching, and tempering, the tensile strength is raised to 47 tons per square inch with the steel remaining ductile. *Nelson.*

S.M.R.E. firedamp recorder. This methane recorder is a combination of the principles used in the Ringrose and McLuckie detectors. Two combustion chambers are used, each of which operates every 6 minutes, the operation being staggered so that 20 determinations are made per hour. Samples are drawn into the instrument by means of an electrically driven pump, the operation of the pump and the combustion filaments being controlled by cams on a shaft driven by the motor. Pressures are measured by an aneroid cell and recorded on a clockwork driven drum. ***Roberts, I, p. 84.***

smudge. See smudge coal, b.*Tomkeieff, 1954.*

smudge coal. a. Coal partly deprived of its bitumen, and converted into a sort of natural coke. *Fay.* b. Used among British miners for coal altered by an igneous intrusion. *Tomkeieff, 1954.* c. Small coal or fine slack. *Arkell.* d. Clay or shale between two coal seams. *Arkell.*

smush. Term used among British miners for a soft inferior coal or fusion dust. *Tomkeieff, 1954.*

smut. a. A thin band of soft, inferior coal. *B.S. 3618, 1964, sec. 5.* b. *S. Staff.* Bad, soft coal, containing much earthy matter. *See also* blossom. *Fay.* c. Coal smuts. *C.T.D.* d. Worthless outcrop material of a coal seam. *C.T.D.* e. York. Friable coal intermixed with dirt. *Nelson.* f. Poor, dull, sooty portions of a coal seam. *Gordon.* g. A reaction product sometimes left on the surface of a metal after a pickling or etching operation. *ASM Gloss.*

smuth; mucks. Eng. Very inferior coal. A variation of smut. *Fay.*

smytham. Lead ore that has been stamped or pounded down to a sand or powder to remove rock and earth from the ore. *Hess.*

Smythe producer. A furnace used for the manufacture of producer gas. *Fay.*

smythite. Iron sulfide, Fe_3S_4, rhombohedral; X-ray pattern similar to, but distinct from, pyrrhotine. *Spencer 21, M.M., 1958.*

Sn Chemical symbol for tin. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

snag boat. A boat equipped with a hoist and grapple for clearing obstacles from the path of a dredge. *Nichols.*

snagging. a. Offhand grinding on castings and forgings to remove surplus metal, such as gate and riser pads, fins and parting lines. *ASM Gloss.* b. Rough grinding with an abrasive wheel to remove large surface defects; wheels with an organic bond are generally used. *Dodd.*

snag grinder. In the iron and steel industry, a laborer who cleans and rough finishes the surface of castings and large metal objects with a large rotary abrasive wheel mounted in a counterbalanced frame. Also called casting finisher, snagger, swing-frame grinder operator, and swing grinder. *D.O.T. 1.*

snake. a. The product formed by the twisting and bending of hot rod prior to its next rolling process. *ASM Gloss.* b. Any crooked surface defect in a plate, resembling a snake. *ASM Gloss.* c. A flexible mandrel used in the inside of a shape to prevent flattening or collapse during a bending operation. *ASM Gloss.* d. Progressive longitudinal cracking in continuous flat glass opertaion. *ASTM C162-66.* e. Variation in width of sheet during the sheet-glass drawing process. Also called snaking. *ASTM C162-66.* f. *See* bulldog, d. *Long.*

snake fashion. A method of boxing core. Beginning in the upper-right-hand corner of the core box the core is run from right to left in the first row, from left to right in the second row, left in the third, etc., until the box is filled. *Long.*

snakehole. a. A borehole driven horizontally or nearly so and approximately on a level with the quarry floor. *Fay.* b. A borehole driven under a boulder for containing a charge of explosives. In quarry work, it is called a lifter. *Fay.* c. Nearly horizontal holes drilled at the bottom of the face of a bench. The holes are not quite horizontal but are inclined slightly downward so the bottoms will be a few feet below grade. *Lewis, p. 159.* d. A hole driven into a toe for blasting, with or without vertical holes. *Nichols.*

snakeholing. a. A method of blasting boulders to break them up, by boring a hole under a boulder and firing a charge in it; this is more efficient but slower than using plaster shots. *See also* plaster shooting. *Ham.* b. Drilling under a rock or face in order to blast it. *Nichols.* c. A horizontal bore on the quarry floor. *Pryor, 3.*

snake line. A line used to skid a drill rig from place to place using a block and tackle or cable, one end of which is attached to a deadman and the other wrapped around the cathead or the hoisting drum. *Long.*

snakesking glaze. A decorative effect obtainable on pottery ware by the application of a glaze of high surface tension. *Dodd.*

snake statement. A monthly statement by a coal company on which a crooked line in red ink was drawn to show a miner's indebtedness. The company checked off rent, supplies, and groceries, which often added up to more than a miner's monthly earnings. *Korson.*

snakestone. A spotted whetstone from Ayr, Scotland. *See also* Ayr stone. *Fay.*

snaking. a. The progressive sliding forward of an armored flexible conveyor, by means of hydraulic rams, as the coal is removed by a cutter loader. *See also* self-advancing supports. *Nelson.* b. Moving a drill rig by the use of its own cathead or hoist unit. *See also* bulldog, d. *Long.* c. Towing a load with a long cable. *Nichols.* d. Inserting a tow or hoist line under an object without moving the object. *Nichols.*

snaking conveyor. *See* armored flexible conveyor. *Nelson.*

snap. a. Miner's morning meal (elevenses), bait, crowst. *Pryor, 3.* b. Mid. Lunch. *See also* bait. *Fay.* c. Mid. A haulage clip. Used in plural form. *Fay.* d. Eng. A small, flat, pointed pick for chipping off brasses, stone, or slate from lump coal. *Fay.* e. A device for gripping a piece of formed glass for fire polishing and finishing. *ASTM C162-66.*

snap flask. A foundry flask hinged on one corner so that it can be opened and removed from the mold for reuse before the metal is poured. *ASM Gloss.*

snap header. *See* half bat. *Dodd.*

snaphead rivet. A rivet having a hemispherical head. *Ham.*

snapper. a. A car coupler; trip rider. *Fay.* b. *See* coupler, a; brakeman, c. *D.O.T. 1.*

snapping time. Mid. A short period of rest during a shift in which a miner takes his lunch. *Fay.*

snatch. Eng. A small chimney used for ventilation. *Fay.*

snatch block. a. A single-rope sheave set in a housing provided with a latch link, which can be opened for admission of a rope or line without the necessity of threading the end of the rope through the block. *Long.* b. A block or sheave with an eye through which lashing can be passed for fastening to a scaffold or pole. *Ham.* c. A pulley in a case which can be easily fastened to lines or objects by means of a hook, ring, or shackle. *Nichols.* d. A sheave in a case having a pull hook or ring. *Nichols.*

snatch plate. A thick steel plate through which a hole about one-sixteenth of an inch larger than the outside diameter of the drill rod on which it is to be used is drilled. When drilling a cover or pilot hole that may penetrate formations containing water under pressure, the plate is slipped over the drill rod between the drill and the collar of the borehole, and one edge is fastened to a securely anchored chain. If a high-pressure water-bearing formation is encountered and rods must be pulled, the eccentric pull of the chain causes the outside of the rods to be gripped and held against the pressure of the water. Tapping the plate causes the plate to release its grip momentarily, and the rod moves a short distance out of the hole and may thus be removed from the borehole a short distance each time the plate is tapped. *Long.*

S-N curve. *See* stress-number curve. *C.T.D.*

S-N diagram. A plot showing the relationship of stress, S, and the number of cycles, N, before failure in fatigue testing. *ASM Gloss.*

sneck. a. Scot. An appliance for diverting wagons, or cars, from the main line into a siding. *Fay.* b. The latch or catch of a door. *Webster 3d.* c. To lay (rubblework) with spalls and fragments to fill the interstices. *Webster 3d.*

snecked rubble. Bonded rubble masonry. *Standard, 1964.*

snecking. In masonry, rubblework. *Standard, 1964.*

snecky. Eng. A wedge-shaped vertical cut at the end of a stall or room. *Fay.*

Snell's law. The concept that the sound ray path undergoes certain specific changes as it passes through different layers of water; the ratio of the sine of the angle of incidence to the sine of the angle of refraction is the same for all angles of incidence and is equal to the index of refraction. *Hy. See also* law of refraction.

snibble. Scot. A sprang or drag for hutches, wagons, or cars. *Fay.*

snore; windbore. A cylinder of cast iron, terminating in an egg-shaped or flat-bottom strainer which is submerged in the sump, and connected at the upper end to a pump. The water drawn up into the pump is thus relatively free from straw, dirt, and debris. *Nelson.*

snorehole. The hole in the lower part of windbore of a mining pump, to admit the water. *Fay.*

snorepiece. a. The suction end of a mine pump fitted with a strainer. *Ham.* b. An intake; a suction pipe. *Fay.* c. A filter fitted to the inlet of a suction pipe. Also called strum; strainer. *See also* on snore; on air. *B.S. 3618, 1963, sec. 4.* d. The lower part of the pipe which admits the water to a mine pump; the nose or wind bore. *C.T.D.*

snorkel. A tube used by skin divers which permits breathing without raising the nose or mouth out of the water when swimming face down on the surface of the water. One end of the tube is held in the mouth of the swimmer while the other end protrudes above the surface. *H&G.*

snort valve. A butterfly valve opening from the cold-blast main of a blast furnace to the atmosphere. It allows casting at the furnace without shutting down the blowing engines; operated by large wheel or lever in cast house. *Fay.*

snowball structure. Same as slump balls. *See* ball-and-pillow structure. *Pettijohn.*

snowbird mine. A mine that produces or ships only small quantities of coal, and operates only when coal is costly by reasons of a scarcity or a shortage of cars for shipment. The coal is loaded from wagons or trucks into cars on sidings. No tipple is used. Also called shipper. *Fay.*

snow course. A course marked on an area drained by a stream, along which snow samples are taken in order to estimate the depth and density of snow subject to melting in spring. *Ham.*

snow density. The water content of snow calculated by the ratio between the depths of snow before and after melting respectively. *Ham.*

snowfield. A stretch of perennial snow existing in an area where winter snowfall exceeds the amount of snow that melts away during the summer. *Leet.*

snowline. The limit of height at which snow is permanent throughout the year. Although in all cases, except in the tropics, the actual height varies from summer to winter, the mean or average height remains very nearly the same. Sometimes called limit of perpetual snow. *A.G.I.*

snow load. The live load which must be included when designing a flat or low-pitched roof in temperate and cold climates; in England it is assumed at 15 pounds per square feet. *Ham.*

snowplow. A machine for moving snow off a road or railway. *See also* rotary snowplow. *Ham.*

snow sample. A core of snow taken on a snow course by a sampling tube from which snow density can be measured and analyzed. *Ham.*

snow sampler. A set of light jointed tubes used for taking snow samples with a spring balance which indicates directly the equivalent depth of water for a given weight of snow. *Ham.*

snowshed. a. A term used in Missouri for a shed or structure of heavy timber for the purpose of protecting the tub hookers and other workmen on the station floor (in a mine) from stone and debris falling from the cans while being hoisted. *Fay.* b. A surface structure of heavy timbers erected to protect railways or other passageways from snowslides. *Bureau of Mines Staff.*

snow surveys. A set of measurements of the depth and density of snow, usually made to determine the water stored on a drainage basin in the form of snow, as a means of forecasting the subsequent runoff. *Seelye, 1.*

snub. a. To increase the height of an undercut by means of explosives or otherwise. *Fay.* b. To check the descent of a car, by a turn of a rope around a post. *Fay.* c. To check descent of any object being lowered by hand. *Bureau of Mines Staff.*

snubber. In bituminous coal mining, a laborer who follows in wake of coal-cutting machine as it undercuts face of coal, and breaks down the front of the working face above the channel with a pick so that the coal will drop freely when it is blasted. *D.O.T. 1.*

snubbing. a. A New York and Pennsylvania term applied by bluestone quarrymen to the process of forcing a cross break in the absence of an open seam. *Fay.* b. Increasing the height of an undercut by picking or blasting down the coal, just above the undercut. *Fay.*

snub-drive conveyor. A conveyor in which a snub pulley is used. *NEMA MB1-1956.*

snub pulley. An idler pulley so mounted as to increase the arc of contact between a belt and a drive pulley. When used in a wrap drive, it has the added function of changing the direction of the return belt travel. *NEMA MB1-1961.*

snuffboxes. Eng. Iron-bearing nodules in the Discites Zone of the Inferior Oolite, Burton Bradstock, Dorsetshire. *Arkell.*

Snyder sampler. A mechanical sampler consisting of a cast-iron plate revolving in a vertical plane on a horizontal axis, and having an inclined sample spout passing through the flange. The ore to be sampled comes to the sampler by way of an inclined chute and impinges upon the flange of the sampling disk. Whenever the sample spout comes in line with the ore stream, the ore passes through the plate and into the sample; at all other times the ore is deflected from the plate and drops into the reject. Generally, the sampler makes from 10 to 30 revolutions per minute, and the size of the cut (generally one-fifth) depends upon the width of the sample spout. *Newton, Joseph. Introduction to Metallurgy, 1938, pp. 466-467.*

soak. a. Aust. A natural receptacle for conserving water drained off rocky mounds. *Fay.* b. To hold the kiln at one temperature for a time. *ACSG, 1963.*

soakaway. A covered pit filled with broken brick or stone into which surface water is drained. *See also* separate system. *Ham.*

soak cleaning. Immersion cleaning without electrolysis. *ASM Gloss.*

soaking. a. A phase of a heating operation during which metal is maintained at the requisite temperature until the temperature is uniform throughout the mass. *C.T.D.* b. Prolonged holding at a selected temperature. *ASM Gloss.* c. As applied to the firing of ceramic ware, this term signifies the maintenance of the maximum temperature for a period to effect a desired degree of vitrification, chemical reaction, and/or recrystallization. *Dodd.*

soaking area. The part of a crossfired glass tank furnace between the gable wall and the first pair of ports; also known as the fritting zone. *See also* gable wall. *Dodd.*

soaking pit. a. In the steel industry, a refractory lined furnace for the reheating of ingots. *Dodd.* b. In the glass industry, a furnace for bringing pots of glass to a uniform temperature. *Dodd.*

soak pit. A pit in which wet clay is allowed to soak preparatory to molding. *Fay.*

soams. N. of Eng. A pair of cords about 3 feet in length, by which boys pull tubs along the roads. A draft rope or chain. *Fay.*

soap. a. A salt of higher fatty acids (stearic, palmitic, oelic mainly) with an alkali or metal. Important property is its labile micellar colloids. In water soaps hydrolyze slightly and become weakly alkaline. $R.C.OO^{-} + H_2O = R.COOH + OH^{-}$. If water is acid, the fatty acid is precipitated, making soap unsuitable for conditions in which sulfonated detergents are used. Ions of calcium and heavy metals precipitate sodium and potassium soaps and limit their use in hard or mineralized water. *Pryor, 3.* b. A brick approximating a standard straight cut longitudinally so that its cross section is approximately square. *AISI No. 24. See also* pup, c.

soap brick. A brick modified so that the width is one-half the usual dimension. *A.R.I.*

soap flotation. A process in which soaps are used as collectors for the flotation of those minerals that do not have a metallic luster and appearance. Oleic acid and sodium oleate are most commonly used. Some metallic minerals that are recovered by soap flotation are oxidized copper minerals, iron oxides, manganese oxides, rhodochrosite, magnesite, and scheelite. *Newton, pp. 103-104.*

soaprock. Synonym for soapstone. *Fay.*

soapstone. a. As used loosely by miners, well drillers, and others, any soft unctuous rock, such as micaceous shale or sericitic schist. *Fay.* b. Lanc. A variety of fire clay, sometimes applied to bind. *Arkell.* c. Talc, massive. Hydrated magnesium silicate, $(3MgO.4SiO_2.H_2O)$. It has a pearly, greasy feel. Mohs' hardness, 1; specific gravity, 2.7 to 2.8. *Pryor, 3.* d. Synonym for steatite; saponite. *Hey 2d, 1955.*

soapy blaes. York. Smooth sandstone or shale. *Arkell.*

soapy feel. Or unctuous, as talc and other magnesium minerals. *Nelson.*

soapy heads. Eng. The joints of stones, which are filled with saponaceous or talc-like mineral. *Fay.*

Sobrisky opal. Opal from the Lead Pipe Spring district in Death Valley, Calif. *Shipley.*

Society of Free Hosts. An old-established society originally founded in 1404 by the fifth statute of Henry IV for the purpose of entertaining merchants and aliens resorting to Newcastle to buy coals and stones (grindstones)—probably the first combination of coal owners formed in Great Britain's history. *Nelson.*

socket. a. A device fastened to the end of a rope by means of which the rope may be attached to its load; the socket may be opened or closed. *Zern.* b. In blasting, the hole left after firing. This may be due to incomplete explosion in which case any attempt to drill into the socket is highly dangerous. Such a socket should be cautiously plugged to show its position, by means of a wooden stick and no drilling should be done in its close vicinity. *Pryor, 3.* c. A hollow tool for grasping and lifting tools that have been dropped in well boring. *Standard, 1964.* d. The point in a borehole, usually in bedrock, at which the bottom end of a string of casing or drivepipe is set. *Long.* e. To lower casing or drivepipe into, and seat it in, a borehole. *Long.* f. An overshot. *Long.* g. A fishing tool designed to encircle and grasp a cylindrical object. *Long.* h. To spring a borehole. *See also* camouflet. *Long.* i. *See* cappel; bootleg. *Nelson.* j. The female portion of a plug-and-socket connection in an electric circuit. *C.T.D.*

socketing. a. A method of fastening rope. The rope is seized or tied near the end, cut off square, another seizing tied just below the end of the socket, and the end seizing then untied and the wires straightened. They are carefully cleaned in gasoline, acid, and washed with hot soda water. The socket is put on the rope, the lower end sealed, and melted zinc poured in to fill the socket. The wires project to a half inch beyond the zinc so that the pulling out of a wire can be quickly detected. *Lewis, pp. 254-255.* b. *See* springing.

soda. a. The normal carbonate of sodium, Na_2CO_3, soda ash; the latter being the common name of the commercial article used in chemical industries. *Fay.* b. A prefix added to the names of igneous rocks to indicate that they contain soda pyroxenes and/or soda amphiboles; for example, soda rhyolite, soda trachyte, soda granite, etc. *Holmes, 1928.* c. A general term applied to various commercial compounds used in the household and in the industries. The sodas of commerce are manufactured from salt. Sodium carbonate is used in the manufacture of glass and as a cleaning agent. *See also* sodium carbonate. *Crispin.*

soda-acid extinguisher. One that contains charges of bicarbonate of soda and sulfuric acid. The sulfuric acid is isolated in a glass bottle within the alkali solution in the sheet steel container. There are two types of soda-acid extinguishers: (1) the turn-over type, in which the acid bottle has a loose lead stopper which falls down when the extinguisher is inverted, thereby allowing the acid to flow into and mix with the bircarbonate of soda solutions; and (2) the plunger type, in which the acid is contained in a hermetically sealed bottle which can only be broken by operating a plunger. Used for fighting general surface and underground mine fires. *McAdam, pp. 112-114.* This extinguisher is going out of favor for underground use due to difficulties associated with the acid charges. *See also* fire extinguisher. *Nelson.*

soda alum. An alum of aluminum and sodium. Occurs in nature as the mineral mendozite. *Standard, 1964.*

soda-and-cleanup man. A laborer who sifts soda ash for use in refining copper. *D.O.T. Supp.*

soda ash. Sodium carbonate used as a flux in assaying. *Statistical Research Bureau.*

sodalite. A silicate of sodium and aluminum with some chlorine, $Na_4(A1SiO_4)_3C1$; usually blue. Isometric. *Dana 17.*

soda augite. Augite containing Na_2O up to 1.7 percent, intermediate between augite and aegirine-augite, as zoned crystals and single crystals. *Spencer 20, M.M., 1955.*

soda ball. Synonym for black ash. *Standard, 1964.*

soda blasting powder. See B Blasting Powder. *Bennett 2d, 1962.*

soda, caustic. A commercial term used to designate caustic alkali, sodium hydrate, or sodium hydroxide. *Shell Oil Co.*

sodaclase. Proposed by Johannsen for the sodic plagioclases from An_0 to An_{10}, commonly called albite. The latter term would be reserved for the pure end-member. Obsolete. *A.G.I.*

soda feldspar. A sodium-aluminum silicate occasionally used as a refractory raw material in the manufacture of porcelain enamels, giving a softer enamel when used to replace potash feldspar in equal weights. *Enam. Dict. See also* albite; barbierite. *C.T.D.*

soda-granite. *See* natron-granite. *Fay.*

soda hornblende. Synonym for arfvedsonite. *Dana 6d, p. 401.*

soda lakes. Salt lakes, the water of which contains a high content of sodium salts (chiefly chloride, sulfate, and acid carbonate). These salts also occur as an efflorescence around the lakes. *C.M.D.*

soda lime. A granular mixture of calcium hydroxide with sodium hydroxide, or with potassium hydroxide, or with both, and sometimes with other substances (as kieselguhr). Used to absorb moisture and acid gases, especially carbon dioxide, as in gas masks. *Webster 3d.*

soda-lime glass. *See* crown glass, a. *C.T.D.*

soda-lime sinter process. Discovered by the Aluminum Company of America for recovering alumina from red mud. The red mud is mixed with soda ash (Na_2CO_3) and ground limestone, and sintered in a rotary kiln at temperatures of 1,800° to 2,000° F. This breaks up the sodium aluminum silicate and forms an insoluble calcium silicate and sodium aluminate. The sinter is leached with water to recover the sodium silicate, which is then treated in the same way as in the Standard Bayer process. *Newton, p. 443.*

sodalitite. A phanerocrystalline rock composed essentially of sodalite, with small amounts of aegirine, eudialyte, and alkali feldspar. *Holmes, 1928.*

soda microcline. A microcline in which sodium replaces potassium. *Dana 17, p. 494.*

soda niter. *See* sodium nitrate. *CCD 6d, 1961.*

soda nitrate; sodium nitrate. ($NaNO_3$), widely used as a fluxing raw material in enamels, usually in conjunction with soda ash. A small percentage is beneficial in oxidizing any organic impurities. *Enam. Dict.* Also called chile nitre; chile saltpeter.

soda orthoclase. Those apparently monosymmetric feldspars with notable amount of soda may be called soda orthoclase. When the soda equals or exceeds the potash, the crystals exhibit triclinic symmetry and are soda microcline. *Spencer 20, M.M., 1955.*

soda prairie. One of the vast level tracts of land covered with an efflorescence of soda, in the southwestern United States and northern Mexico. *Standard, 1964.*

soda richterite. To replace the name astochite. *English.*

soda spar. A feldspar containing more than 10 percent Na_2O. *AIME, p. 341.*

soda syenite. A syenitic igneous rock containing an excess of soda feldspar or feldspathoid. *Compare* potash syenite. *C.M.D.*

soddyite. A very rare, strongly radioactive, orthorhombic, greenish-yellow canary yellow, or amber yellow mineral, possibly $5UO_3.2SiO_2.6H_2O$, occurring in pegmatites associated with malachite; also found as fissure fillings with curite and sklodowskite. *Crosby, pp. 44-45.*

Soderberg electrode. Continuous electrode. *Bennett 2d, 1962.*

sod hog. *See* groundman, b. *D.O.T. 1.*

sodium. A soft, bright, silvery metallic element in group I of the periodic system. One of the alkali metals. Sodium does not occur in the free state in nature, because of its high reactivity, but it is widely distributed as the chloride, nitrate, etc. Symbol, Na (from the Latin natrium); valence, 1; isometric; atomic number, 11; atomic weight, 22.9898; specific gravity, 0.971 (at 20° C); melting point, 97.81° ± 0.03° C; boiling point, 883° C or 892° C; ordinarily does not ignite in air below 115° C; floats on water; may or may not ignite spontaneously on water; decomposes water liberating hydrogen and forming sodium hydroxide; decomposes alcohol; and insoluble in ether and in benzene. It is the sixth most abundant element on earth, and it constitutes 2.6 percent of the earth's crust by weight. It is the most abundant alkali; sodium chloride or salt is the most common natural compound; and sodium is produced commercially by electrolysis of fused anhydrous sodium chloride. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-136, B-219.*

sodium acetate. White powder, $NaC_2H_3O_2$; molecular weight, 82.02; specific gravity, 1.528; melting point, 324° C; soluble in water; soluble in ethyl alcohol. *Bennett 2d, 1962.*

sodium acid fluoride. *See* sodium biflouride. *CCD 6d, 1961.*

sodium aluminate; sodium metaaluminate. White; $NaA1O_2$; molecular weight, 81.97; hygroscopic; soluble in water; insoluble in alcohol; aqueous solution strongly alkaline; and melting point, 1,650° C or 1,800° C. Used in water purification, in the manufacture of milk glass, and in hardening building stones. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-219.* Also used as a setting-up agent for acid-resistant enamel slips. When used in this capacity, it affords easier control of the slip than can be obtained by the use of alum or sulfuric acid, because of its tendency to stabilize the mobility and yield values. Sodium aluminate may also be used as a substitute for sodium silicate and sodium carbonate in whiteware slips. Its use gives increased dry strength, superior drying and finishing characteristics, and increases the stability of the slip condition as to mobility and casting behavior. *Lee.*

sodium-aluminum fluoride *See* cryolite. *C.M.D.*

sodium-aluminum sulfate. *See* aluminum-sodium sulfate. *CCD 6d, 1961.*

sodium antimonate; sodium metaantimonate. White; $NaSbO_3$; molecular weight, 192.74; slightly soluble in hot water and in alcohol; insoluble in dilute alkalies and in mineral acids; and soluble in tartaric acid and in sodium sulfide solution. Used as an opacifier in enamels for glass and as an ingredient of acid-resisting, sheet-steel enamels. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-220.* Melting point, 1,427° C. For use in cast-iron enamels, it is generally recognized as being more desirable than antimony trioxide. When antimony is used, the development of opacity during smelting depends upon oxidation of the antimony trioxide to the pentavalent state. In sodium antimonate, the antimony is already combined as the pentavalent oxide, and consequently the development of uniformly high opacity and the control of enamel color are more certain when sodium antimonate is used. *Lee.*

sodium aurichloride; sodium-gold chloride. *See* gold-sodium chloride. *CCD 6d, 1961.*

sodium autunite. A tetragonal mineral, $Na_2(UO_2)_2(PO_4)_2.8H_2O$, occurring in lemon-yellow and lettuce-yellow plates; sometimes in foliated and radiating masses; found in one of the granodiorite massifs of the U.S.S.R.; a member of the meta-autunite group. *See also* calcium autunite; natroautunite. *American Mineralogist, v. 43, No. 3-4, March-April, 1958, p. 383.*

sodium azide. Colorless; hexagonal; molecular weight, 65.01; NaN_3; decomposes to sodium and nitrogen at about 300° C; specific gravity, 1.846 (at 20° C); soluble in water and in liquid ammonia; slightly soluble in alcohol; and insoluble in ether. Used in the preparation of lead-azide explosives. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-220.*

sodium bentonite. A highly swelling clay from Wyoming. *Spencer 19, M.M., 1952.*

sodium benzoate. An effective inhibitor of the corrosion of mild steel in water and very dilute (for example, 0.03 percent) NaCl solutions. The concentrate of benzoate required for inhibition is greater for machined than for emeried surfaces and for mains water or chloride solutions as compared with distilled water. It is a safe inhibitor, since it does not lead to intense local corrosion when the concentration is just below the minimum required for protection. The following benzoates also possess inhibitive properties; potassium, lithium, zinc, and magnesium. *Osborne.*

sodium bicarbonate; sodium-hydrogen carbonate; sodium acid carbonate. White; monoclinic; $NaHCO_3$; molecular weight, 84.00; cooling, slightly alkaline taste; soluble in water; insoluble or slightly soluble in ethyl alcohol; stable in dry air; slowly decomposes in moist air; specific gravity, 2.159 or 2.20; and loses CO_2 at 270° C *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-221.* Used in ceramics and as baking powder. *Bennett 2d, 1962.* Also used as a deflocculant in special casting slips, in preparing cobalt body stains, as a body wash to increase glaze-body interaction, and in cleaning solutions for enameler's steel. Sodium carbonate (Na_2CO_3) has more general use as a deflocculant for body slips. *Lee.*

sodium bifluoride; sodium-hydrogen fluoride; sodium acid fluoride. Colorless or white; hexagonal rhombohedral; $NaHF_2$; molecular weight, 61.99; specific gravity, 2.08; soluble in water; and decomposes on heating. Used in etching glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-222.*

sodium bisulfate; sodium-hydrogen sulfate. Colorless; triclinic; $NaHSO_4$; molecular weight, 120.06; aqueous solution is strongly acid; specific gravity, 2.435 (at 13° C); decomposes above 315° C; soluble in water; slightly soluble in alcohol; and insoluble in ammonia. Used as a flux for decomposing minerals and in the manufacture of magnesia cements. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-224.*

sodium bisulfate monohydrate; sodium-hydrgen sulafte monohydrate. Colorless; monoclinic; $NaHSO_4.H_2O$; molecular weight, 138.07; deliquescent; specific gravity, 2.103 (at 13.5° C, referred to water at 4° C); melting point, 58.54° ± 0.5° C; and decomposes in water and in alcohol. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-224.*

sodium bisulfite. An etching reagent for ferritic steels. A solution of 60 milliliters $NaHSO_3$ and 40 milliliters H_2O is used at 30° C for selective attack of the ferrite which takes on a uniform maroon color. The solution is particularly useful for the examination of magnetic silicon steels after annealing and 18—4—1 high-speed steels after isothermal quenching. Higher concentration of $NaHSO_3$ decreases contrast in the etched surfaces. *Osborne.*

sodium bromide. A compound used as a nerve sedative in medicinal preparations and for the preparation of silver bromide emulsions used on photographic films, plates, and papers. Also used in process and laboratory reagents. *BuMines Bull. 585, 1960, p. 151.*

sodium carbonate; soda ash. White; Na_2CO_3; molecular weight, 105.99; hygroscopic; specific gravity, 2.532; melting point, 851° C; no boiling point because it decomposes; soluble in water; slightly soluble in absolute alcohol; and insoluble in acetone. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-221.* Soda ash is the crude sodium carbonate of commerce. A grayish-white powder or lumps that contains up to 99 percent Na_2CO_3. Used in glass, in ceramics, in petroleum refining, and in metals processing. *CCD 6d, 1961.* Also used extensively to supply the soda content in glasses, glazes, and enamels. Most soda ash is made by the Solvay process and some is prepared from brines and by electrolytic methods. *Lee.*

sodium chloraurate. *See* gold-sodium chloride. *CCD 6d, 1961.*

sodium chloride; common salt; table salt; rock salt; halite. Colorless; transparent; isometric; molecular weight, 58.44; NaCl; occurs in nature as the mineral halite; somewhat hygroscopic; Mohs' hardness, 2.5; soluble in water and in glycerol; very slightly soluble in alcohol; specific gravity, 2.165 (at 25° C, referred to water at 4° C); melting point, 801° C or 804° C; and boiling point, 1,413° C or 1,490° C. Used in ceramic glazes and in glass. Sodium chloride is slightly soluble in liquid ammonia and insoluble in hydrochloric acid. The mineral halite is colorless, yellowish, and often reddish-blue, gray, or black, and ranges from 2.135 to 2.170 in specific gravity. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-221, B-243.*

sodium cyanide. Colorless or white; deliquescent; isometric; NaCN; molecular weight, 49.01; poisonous; soluble in water and in ammonia; slightly soluble in alcohol, melting point, 563.7° C; boiling point, 1,496° C; and the aqueous solution is strongly alkaline and decomposes rapidly on standing. Used in extracting gold and silver from ores and in electroplating. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-221.* Also used in the process of pickling sheet iron for enameling. The cyanide forms complex iron salts which are removed in the neutralizing bath. *Lee.*

sodium dihydrogen orthophosphate. *See* sodium dihydrogen phosphate. *Cooper, p. 311.*

sodium dihydrogen phosphate; sodium dihydrogen orthophosphate; sodium phosphate, monobasic. NaH_2PO_4; forms white crystals which are highly soluble in water, yielding an acid solution. *Cooper, p. 311; CCD 6d, 1961.*

sodium disilicate. Colorless; orthorhombic; $Na_2Si_2O_5$; molecular weight, 182.15; pearly luster; melting point, 874° C; and soluble in water. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-224.*

sodium diuranate; uranium yellow. a. Yellow-orange; $Na_2U_2O_7.6H_2O$; insoluble in water; and soluble in dilute acids. Used in ceramics to produce colored glazes and in the manufacture of fluorescent uranium glass. *CCD 6d, 1961.* b. Sodium diuranate, or sometimes yellow uranic oxide, UO_3, is used as a pigment to produce yellow or ivory shades in pottery glazes and for imparting an opalescent yellow color to glass, which becomes strongly fluorescent and appears yellowish-green by reflected light. *Merriman.*

sodium ethylxanthate. Pale green; $C_2H_5O.-CS:SNa$; molecular weight, 144.19; and soluble in water and in ethyl alcohol. An ore-flotation agent. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-225.*

sodium fluoaluminate. See cryolite, synthetic. *CCD 6d, 1961.*

sodium fluoride; villiaumite. Colorless or white; isometric or tetragonal; NaF; molecular weight, 41.99; soluble in water and in hydrofluoric acid; slightly soluble in alcohol; specific gravity, 2.558 (at 41° C); melting point, 988° C or 993° C; and boiling point, 1,695° C. Used in glass manufacture and in vitreous enamels and single crystals are used as windows in ultraviolet- and infrared-radiation detecting systems. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-222.*

sodium fluosilicate; sodium silicofluoride. Colorless; odorless; tasteless; hexagonal; molecular weight, 188.06; Na_2SiF_6; specific gravity, 2.679; no melting point because it decomposes at red heat; very slightly soluble in cold water; soluble in hot water; and insoluble in alcohol. Used in opalescent glass and in vitreous enamel frits. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-222.* Also used as a flux in acid-resistant enamels, which contain titania as a partial replacement for silica, and it provides the best means of introducing fluorine when it is desirable to add alumina or lime with the fluorine. *Lee.*

sodium-gold chloride. *See* gold-sodium chloride. *CCD 6d, 1961.*

sodium-graphite reactor. A nuclear reactor that uses liquid sodium as coolant and graphite as moderator. *L&L.*

sodium hexametaphosphate; sodium-phosphate glass; Graham's salt. Colorless; glass; $(NaPO_3)_6$; molecular weight, 611.17; very soluble in water; and insoluble in organic solvents. A sequestering agent, a dispersing agent, and a deflocculating agent. Used to sequester alkaline-earth ions and heavy metal ions, to disperse clays and pigments, to soften water, and to prevent scaling and corrosion of pipes. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-223; CCD 6d, 1961.*

sodium hydride. The compound attained on heating metallic sodium in hydrogen, NaH. It finds application in modern strip mills as a descaling agent for hot rolled strip. *Osborne.*

sodium hydroxide. *See* caustic soda.

sodium hyposulfite. *See* sodium thiosulfate pentahydrate.

sodium illite. Synonym for brammallite. *Spencer 16, M.M., 1943.*

sodium isopropylxanthate. Light-yellow crystals soluble in water. Used as a fortifying agent for certain oils and as a flotation reagent for base metal ores and precious metal ores. *CCD 6d, 1961.*

sodium light. Light emitted by the glowing vapor of sodium, consisting of two sets of light waves of slightly different wavelengths, and commonly considered to be a monochromatic light. Used with the refractometer to produce more well-defined readings than can be obtained with white light. Special monochromators, employing special electric bulbs and special filters, produce similar light consisting of but a few wavelengths, and such light is also popularly known as sodium light. *Shipley.*

sodium-line reversal method. A technique for the measurement of flame temperatures. If a blackbody is viewed, by means of a spectroscope, through a flame that has been colored by sodium, there will be some temperature of the blackbody at which its brightness in the spectral region of the Na_D line will equal the brightness of the light transmitted in this region through the flame, plus the brightness of the Na_D lines from the flame itself. At this temperature the spectrum of the blackbody as seen in the spectroscope is continuous; there is a reversal in contrast above or below this temperature. The method was first described by C. Féry. *Dodd.*

sodium metaantimonate, hydrated; sodium dihydropyroantimonate. a. $2NaSbO_3.7H_2O$; molecular weight, 511.58; colorless or white; tetragonal; loses $2H_2O$ at 200° C; and is soluble in hot water and in ethyl alcohol. Used as an opacifier in glass and enamels. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-220.* b. $Na_2H_2Sb_2O_7.6H_2O$ (?); decomposes at 280° C on heating; insoluble in cold water; and soluble in hot water with decomposition. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-220.*

sodium metasilicate. Colorless; monoclinic; Na_2SiO_3; molecular weight, 122.06; specific gravity, 2.4; melting point, 1,088° C; soluble in water; and insoluble in alcohol, in potassium-salt solutions, and in sodium-salt solutions. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-224.*

sodium metasilicate nonahydrate. Colorless; orthorhombic; $Na_2SiO_3.9H_2O$; molecular weight, 284.20; effloresces; melting point, 40° to 48° C; loses $6H_2O$ at 100° C; very soluble in water; soluble in dilute sodium hydroxide; and insoluble in alcohol and in acids. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-224.*

sodium metasilicate pentahydrate. Colorless; crystalline; $Na_2SiO_3.5H_2O$; specific gravity, 1.75; melting point, 72.2° C; and soluble in water. *CCD 6d, 1961.* Used in most commercial preparations for cleaning drawing compounds from enameling stock. *Lee.*

sodium minerals. Rock-salt (halite) NaCl, niter $NaNO_3$, thenardite Na_2SO_4, mirabilite $Na_2SO_4 1OH_2O$. Various carbonates and borates. Cryolite Na_3AlF_8. *Pryor, 3.*

sodium monosulfide. White; isometric; deliquescent; Na_2S; molecular weight, 78.04; specific gravity, 1.856 (at 14° C); melting point, 1,180° C; soluble in water; slightly soluble in alcohol; insoluble in ether; decomposes in acids; and is largely hydrolyzed to sodium acid sulfide and sodium hydroxide. Used as a solvent for gold in the hydrometallurgy of gold ores, in sulfiding oxidized lead ores and copper ores preparatory to flotation, and in flotation processes for lead ores and copper ores. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-225.*

sodium monosulfide nonahydrate. Colorless; tetragonal; $Na_2S.9H_2O$; molecular weight, 240.18; deliquescent; specific gravity, 1.427 (at 16° C, referred to water at 4° C); decomposes at 920° C; soluble in water; and slightly soluble in alcohol. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-225.* Used as a solvent for gold in the hydrometallurgy of gold ores, in sulfiding oxidized lead ores and copper ores preparatory to flotation, and in flotation processes for lead ores and copper ores. *CCD 6d, 1961.*

sodium niobate. $NaNbO_3$; a compound believed to be ferro-electric and having potential use as a special electroceramic. The Curie temperature is 360° C. *Dodd.*

sodium nitrate; soda niter. Colorless; transparent; odorless; hexagonal; $NaNO_3$; molecular weight, 84.99; slightly bitter taste; specific gravity, 2.267; melting point, 308° C; no boiling point because it decomposes at 380° C; soluble in water, in ethyl alcohol, and in methyl alcohol; very soluble in ammonia; only slightly soluble in acetone; and slightly soluble in glycerol. Used as an oxidizer in solid rocket propellants, a flux, in glass manufacture, in military explosives, and in enamel for pottery. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-223.* Also used in enamel frit batches to prevent reduction of any easily reducible ingredients, such as lead oxide. The function of sodium nitrate, when used in glass batches, is to oxidize organic matter and to prevent reduction of some of the batch constituents. *Lee.*

sodium nitrate gelignites. These explosives are sometimes referred to as straight gelatins. They are really modifications of blasting gelatin in which varing percentages of nitroglycerin are replaced by sodium nitrate and combustible material to give a range of gelatinous explosives of varying strengths. The nitroglycerin content may be from about 30 to 80 percent. Straight gelatins are characterized by their plastic consistency; high densities of 1.5 to 1.6 grams per cubic centimeter; medium velocity of detonation of 2,500 meters per second; good resistance to the effects of water which also gives them good storage properties, and they possess fume characteristics which are suitable for underground workings. All the various requirements for metal mining, tunneling, and quarrying operations are covered by this wide range of gelatinous explosives. Their high resistance to water makes them particularly useful in wet conditions, and their relatively high density is advantageous where a powerful concentration of explosive energy is required. *McAdam II, pp. 29-30.*

sodium nitrite. Colorless to yellow; $NaNO_2$; orthorhombic prisms; molecular weight, 69.00; hygroscopic; specific gravity, 2.168 (at 0° C); melting point, 271° C; decomposes at 320° C; soluble in water, in ethyl alcohol, in methyl alcohol, and in ammonia. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-223.* Used as a mill addition, or as an addition after milling, to enamel ground coats to prevent rust while drying and also as a setting-up agent. *Lee.*

sodium oleate. White or yellow; $Na_2C_{18}H_{32}O_2$; molecular weight, 304.45; slight tallowlike odor; melting point, 232° to 235° C; soluble in water with partial decomposition; soluble in alcohol; and slightly soluble in ether. Used in ore flotation. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-223.*

sodium orthosilicate. a. Colorless; hexagonal; Na_4SiO_4 or $2NA_2O.SiO_2$; molecular weight, 184.04; melting point, 1,018° C; and soluble in water. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-224.* b. A silicate of high alkali content. Used in water as a cleaning compound or it is compounded with other cleaning agents for the same purpose. *Hansen.*

sodium oxide; sodium monoxide. Na_2O; molecular weight, 61.99; gray, deliquescent; specific gravity, 2.27; sublimes at 1,275° C. *Bennett 2d, 1962; CCD 6d, 1961.*

sodium pentaborate. White; crystalline; $Na_2B_{10}O_{16}.10H_2O$; free-flowing; stable under ordinary conditions; soluble in water (15.40 percent at 20° C, increasing with temperature); specific gravity, 1.72; and pH of solution, approximately 7.5. Used in fireproofing compositions and in glass manufacture. *CCD 6d, 1961.*

sodium perchlorate. White; deliquescent; orthorhombic; $NaC1O_4$; molecular weight, 122.44; soluble in water and in alcohol; and decomposes at 482° C. Used in explosives and in jet fuel. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-221.*

sodium perchlorate hydrate; hydrated sodium perchlorate. Colorless; deliquescent; hexagonal rhombohedral; $NaClO_4.H_2O$; molecular weight, 140.46; specific gravity, 2.02; becomes dehydrated at 130° C; decomposes at 482° C; soluble in water and in alcohol. Used in explosives and in jet fuel. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-221.*

sodium peroxide. Yellow powder, Na_2O_2; molecular weight, 77.99; specific gravity, 2.805; soluble in water; used for bleaching fibers, printing and dyeing textiles, as oxidizing agent, germicide. *Bennett 2d, 1962.*

sodium phosphate; disodium hydrogen phosphate; sodium phosphate, dibasic. White crystals; $Na_2HPO_4.12H_2O$; soluble in water; crystals liquefy at 98° F and if the temperature of the inspired air exceeds this the heat is extracted by these crystals; the sodium phosphate recrystallizes on cooling. Used as a cooling agent in the cooler of the Proto self-contained breathing apparatus. *Cooper, p. 311; CCD 6d, 1961.*

sodium pyrophosphate; tetrasodium pyrophosphate. White or colorless; $Na_4P_2O_7$; crystalline; molecular weight, 265.90; specific gravity, 2.534; melting point, 880° C; and soluble in water. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-224.* Used as a deflocculant in glazes and enamels, in the beneficiation of clays, and in high-alumina body slips. It is an efficient water-conditioning agent and may be added when the use of hard water would otherwise produce undesirable results. *Lee.*

sodium regulations. A permit, not including more than 2,560 acres in one state, is granted to prospect for chlorides, sulfates, carbonates, borates, silicates, or nitrates of sodium, and the royalty and rentals are similar to those for potash. Where necessary to secure the most economical mining, a person, association, or corporation may be permitted to hold up to 15,360 acres in one state. *Lewis, p. 35.*

sodium selenite. White; tetragonal; $Na_2SeO_3.5H_2O$; molecular weight, 263.01; soluble in water; and insoluble in alcohol. Used in glass manufacture and in decorating porcelain. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-224.*

sodium sesquicarbonate; natrona; trona; urao. Colorless, gray, or yellowish-white; monoclinic; $Na_2CO_3.NaHCO_3.2H_2O$; molecular weight, 226.03; specific gravity, 2.112, but ranges from 2.11 to 2.147 in the mineral; Mohs' hardness, 2.5 to 3.0; and soluble in water. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-221, B-246.* Extensive deposits of sodum sesquicarbonate, variously known as the mineral natrona, trona, or urao, occur in California and Wyoming in the United States; in Hungary and in Egypt; and in the deserts of Africa, Asia, and South America. *CCD 6d, 1961.*

sodium silicate. Compositions range from $Na_2O.3.75SiO_2$ to $2Na_2O.SiO_2$ and have various proportions of water. Lumps of greenish glass soluble in steam under pressure, white powders of different degrees of solubility, or cloudy or clear liquids; range from high fluidity to extreme viscosity (the viscosity ranges from 0.4 to 600,000 poises); freezing point, slightly below that of water; miscible with some polyhydric alcohols; and partially miscible with primary alcohols and ketones. Used in the manufacture of cements, in concrete hardeners, in cementing stones, in cementing pipe insulations, in ore flotation, in lining Bessemer converters, in ceramic cements, and in drilling mud. *CCD 6d, 1961.* Sodium silicates high in silica are more potent deflocculating agents for a given soda content than are the more alkaline sodium compounds; such as sodium carbonate or sodium hydroxide. Sodium silicate, in combination with soda ash, provides the most commonly used deflocculant for whiteware-body slips. *Lee.*

sodium stannate; sodium hydroxostannate. Colorless, white, and light tan; hexagonal; $Na_2SnO_3.3H_2O$ or $Na_2Sn(OH)_6$; molecular weight, 266.71; soluble in water; insoluble in alcohol and in acetone; loses $3H_2O$ at 140° C; and its aqueous solution is slightly alkaline. Used in ceramics and in glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-224.*

sodium stearate. White powder with fatty odor, $NaOOCC_{17}H_{35}$; soluble in hot water and hot alcohol; slowly soluble in cold water and cold alcohol; insoluble in many organic solvents. Used in medicine; waterproofing and gelling agent; as stabilizer in plastics. *CCD 6d, 1961.*

sodium sulfate; sodium sulfate, anhydrous; thenardite. Usually white and sometimes brownish; orthorhombic, or monoclinic, or hexagonal, depending on temperature; orthorhombic at ordinary temperatures, monoclinic about 160° to 185° C, and hexagonal above 241° C; Na_2SO_4; molecular weight, 142.04; odorless; bitter saline taste; specific gravity, 2.67 to 2.69; Mohs' hardness, 2 to 3; melting point, 884° C or 888° C; soluble in water, in hydroiodic acid, and in glycerol; and insoluble in alcohol. Occurs as the mineral thenardite. Used in glass manufacture and in ceramic glazes. *See also* salt cake. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-224, B-246.* Added to glass batches as a source of soda and to prevent scumming. It is necessary to use a reducing agent with it. *Lee.*

sodium sulfate test. A test claimed to indicate the resistance of a clay building material to frost action. The test piece is soaked in a saturated solution of sodium sulfate and is then drained and dried; the cycle is repeated and the test piece is examined for cracks after each drying. The principle underlying the test is that the stresses caused by the expansion of sodium sulfate as it crystallizes are, to some extent, similar to the stresses caused by water as it freezes. The test has also been used to reveal laminations present in bricks. *Dodd.*

sodium tannate. Sometimes used as a deflocculant for clay slips; the effect is marked, only a small proportion being required. The material used for this purpose is generally prepared from NaOH and tannic acid; the former should be in excess and the pH should be about 8 to 9. *Dodd.*

sodium tantalate. $NaTaO_3$; a ferro-electric compound having the ilmenite structure at room temperature; the Curie temperature is approximately 475° C. Of potential interest as a special electroceramic. *Dodd.*

sodium tetrasilicate; sodium silicate; water glass; waterglass; liquid glass. a. $Na_2Si_4O_9$; molecular weight, 302.23; colorless; amorphous; deliquescent; and soluble in water. Used for waterproofing walls. *Bennett 2d, 1962.* b. Water glass (also waterglass) is also called sodium silicate with the general formula $Na_2O.xSiO_2$ in which $x = 3$ to 5. It is insoluble in alcohol, in potassium-salt solutions, and in sodium-salt solutions. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-224; CCD 6d, 1961; Webster 3d.*

sodium tetrasulfide. Yellow; hygroscopic; isometric; Na_2S_4; molecular weight, 174.24; melting point, 275° C; and soluble in water and in alcohol. Used as an ore-flotation agent. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-225.*

sodium thiosulfate pentahydrate; sodium hyposulfite. Colorless or white; translucent; monoclinic; molecular weight, 248.18; $Na_2S_2O_3.5H_2O$; a cooling taste and a bitter aftertaste; soluble in water, in oil of turpentine, and in ammonia; insoluble in alcohol; deliquescent in moist air; effloresces above 33° C in dry air; specific gravity, 1.729 (at 17° C); melting point, 40° to 45° C; and no boiling point because it decomposes at 48° C; and loses $5H_2O$ at 100° C. Used in extracting silver from its ores. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-225.*

sodium uranate. $Na_2O.2UO_3.6H_2O$; has been used as a source of uranium for uranium red. *See also* uranium red. *Dodd.*

sodium uranospinite. A tetragonal mineral, $Na_2(UO_2)_2(AsO_4)_2.8H_2O$, occurring in fine, tabular to elongated crystals, as radial fibrous aggregates, and as square crystals pseudomorphous after metazeunerite (sometimes with a core of metazeunerite); yellow-green to lemon- and straw-yellow; found in the oxidation zone of a primary hydrothermal deposit; the most abundant secondary U mineral; a member of the meta-autunite group. *American Mineralogist, v. 43, No. 3-4, March-April 1958, pp. 383-384. See also* hydrogen uranospinite. *Spencer 19, M.M., 1952.*

sodium vanadate. $NaVO_3$; a ferro-electric compound having potential use as a special electroceramic. The Curie temperature is approximately 330° C. *Dodd.*

sodium vapor lamp. A light source derived from an electrical discharge through sodium vapor. Valuable as a source of monochromatic yellow (sodium or D-line) illumination, which, when used as illumination in using the usual gemmological refractometer, assists the efficiency of the instrument. *Shipley.*

sodium xanthate; sodium ethylxanthate. Yellowish; amorphous; $NaS.CS.OC_2H_5$ or NaC_2H_5OCSS; molecular weight, 144.19; and soluble in water and in ethyl alcohol. Used as a flotation agent. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-225.*

sods. Leic. Clay beneath coal seams. *Fay.*

soffioni. An emanation, from the earth, of vapors which are principally boric acid; also, the opening from which the vapors issue. *See also* solfatara; fumarole; mofette. *Fay.*

Sofim-Fichter kiln. A gas-fired open flame tunnel kiln; its novel feature, when introduced in about 1935, was the design of the pre-mix burners. The name derives from the initial letters of Société des Fours Industriels et Métallurgiques, the designers of the original kiln, and Fichter (of Sarreguemines) who designed the burners. *Dodd.*

soft. a. Tender, friable, or full of slips and joints. *Fay.* b. Bituminous as opposed to anthracitic; said of coal. *Fay.* c. In mineralogy, usually refers to minerals readily scratched by a needle or knife blade. *Hess.* d. As applied to a glass or glaze, this word means that the softening temperature is low; such a glass or glaze, when cold, is also likely to be relatively soft, that is, of lower than average hardness, in the normal sense. *Dodd.*

soft air. Scot. A stagnant state of the ventilation. *Fay.*

soft asphalt. *See* diasphaltene. *Bennett 2d, 1962.*

soft brass. Brass which has been annealed after drawing and rolling; used where ductility is essential. *Crispin.*

soft-burned lime. A quicklime that is calcined at relatively low temperature. It is characterized by high porosity and chemical reactivity. *Boynton.*

soft clay. A soft clay can be easily molded in the hand and dug with a spade. *Ham.*

soft coal. a. Bituminous coal as opposed to anthracite. *Fay, p. 631.* b. Term in use among British miners for (1) bright bituminous coal which breaks easily and (2) vitrain or clarain. *Tomkeieff, 1954.*

soften. To heat ore so that the minerals are cracked and fissured, permitting easier crushing. *Fay.*

softening. a. Treatment in which metal is heated below critical point and then slowly cooled. *Pryor, 3.* b. Of lead, the removal of antimony and other impurities. *Fay.*

softening point. a. Certain materials do not have a definite melting point but soften over a range of temperatures. In certain refractory substances, the softening point is measured as the pyrometric cone equivalent (P.C.E.) which is the number of that standard pyrometric cone whose tip would touch the supporting plaque simultaneously with a cone of the refractory material being investigated. *See also* deformation point. *Bureau of Mines Staff.* b. The term has a definite meaning when referring to glass, namely the temperature at which the viscosity is $10^{7.6}$ poises; this viscosity corresponds to the temperature at which tubes, for example, can be conveniently bent. Also known as the 7.6 temperature; Littleton softening point. *Dodd.*

softening temperature. The temperature, under specified conditions, at which porcelain enamel or frit begins to flow. *ASTM C286-65.*

soft fire. A flame with a deficiency of air. *ASTM C162-66.*

soft-fired ware. Clay products, fired at low temperature, producing relatively high absorptions and low compressive strengths. *ACSG, 1963.*

soft formation. Synonym for soft ground. *Long.*

soft forms. Organisms which do not possess a hard exterior. Examples include tunicates, algae (other than calcareous algae) and Hydroids. *Hy.*

soft glass. Opposite of hard glass. *See also* hard glass, *ASTM C162-66.*

soft glaze. A glaze softening at low firing temperature; and alternative term would be low temperature glaze. *Rosenthal.*

soft ground. a. That part of a mineral deposit which can be mined without drilling and shooting hard rock; commonly occurs in the upper weathered portion of a vein. *A.G.I. Supp.* b. Heavy ground. Rock about underground openings that does not stand well and requires heavy timbering. *Fay.*

soft-ground boring tools. Drilling tools used in soft ground such as overburden, clay, soft shale, etc. *Long.*

soft inclusion. Applied in the grading of quartz crystals to feathery or fernlike types of foreign inclusions, which look soft (no implication of physical hardness). *AM, 1.*

soft iron. Iron which can be worked with ordinary cutting tools or which can be readily abraded with files. It is gray in color, as distinguished from the harder cast iron which is lighter in color. *Crispin.*

soft mica. Mica which, when slightly flexed or distorted with thumb pressure, generally shows a tendency to delamination. Such mica, in thick pieces, generally gives a dull sound when tapped or dropped on a hard surface. *Skow.*

soft mud brick. Brick produced by a process of forming relatively wet clay (20 to 30 percent water content) in molds. When the inside of the molds are sanded, the product is called sand-struck brick. When molds are wetted with water to prevent sticking of the clay, the bricks are called water struck. *ACSG, 1963.*

soft-mud molder. One who hand-molds varishaped silica green bricks which cannot be made profitably by machinery. Also called soft-silica-mud molder. *D.O.T. 1.*

soft-mud process. A process for the shaping of building bricks from clay at a water content of about 35 percent. The prepared wet clay is fed into sanded molds which are then shaken or jolted until the clay fills the mold; because of its thixotropy, after the jolting ceases the clay stiffens sufficiently for the bricks to maintain their shape. The process can form the basis of handmaking or, more commonly, it can be mechanized as in the Berry machine or in the Aberson machine. *See also* thixotropy. *Dodd.*

softness. a. Tendency to deform easily. It is indicated in tensile test by low ultimate tensile stress and large reduction in area. Usually the elongation is also high. In notched bar test, specimens bend instead of fracturing, and energy absorbed is relatively small. *See also* toughness; brittleness. *C.T.D.* b. The opposite of hardness for either surface or firing temperature. *Bryant.*

soft ore. A soft or incoherent hematite, as opposed to the hard specular variety. From Lake Superior region. *Fay.*

soft paste; fritted porcelain. A type of porcelain made from a body containing a glassy frit and fired at a comparatively low temperature (1,100° C). The most famous soft paste ware was that produced in the 18th century at the Sèvres factory in France, and at Chelsea, Derby, Bow, Worcester, and Longton Hall in England. *Dodd. See also* pâte tendre; paste, f.

soft phosphate. A term used in Florida which is applied arbitrarily to anything phosphatic that is not distinctly hard rock. *Fay.*

soft pitch. Pitch showing a penetration of more than 10. *Fay.*

soft pottery. Pottery, the surface of which is unglazed and easily scratched by a sharp-pointed piece of iron. *Standard, 1964.*

soft radiation. Ionizing radiation of long wavelength and low penetration. *NCB.*

soft rays. Beta particles or gamma rays having little penetration. *Hess.*

soft rock. Rock that can be removed by air-operated hammers, but cannot be handled economically by a pick. *A.G.I.* Loosely used to distinguish sedimentary from igneous and metamorphic rock. *A.G.I. Supp.*

soft-rock geology. Geology of sedimentary rocks. *A.G.I. Supp.*

softs. a. A commercial term for friable bright coal. *B.S. 3323, 1960.* b. Mid. Coal which breaks easily. *Fay.*

soft seat. Eng. Fire clay found under coal seams. *Fay.*

soft shale. Soft and poorly consolidated shale strata and stiff clays commonly encountered in coal-bearing strata. *Woodruff, v. 1, p. 14.*

soft silicas. A common term used in the abrasives trade for the fine-grained, porous materials, tripoli, microcrystalline silica, and rottenstone. *AIME, p. 16.*

soft skin. A soft outer skin developed on burned diamonds. *Long.*

soft solder. Alloys of lead and tin used in soldering. Tin content varies from 63 to 31 percent. The remainder is mainly lead, but some types contain about 2 percent antimony and others contain cadmium. The best-known types are tinman's solder and plumber's solder. *C.T.D.*

soft soldering. *See* soldering. *ASM Gloss.*

soft steel. A general term applied to steels of low carbon content which do not temper. Mild steel. *Crispin.*

soft structure coal. Development of joints and cleats is most pronounced in low volatile bituminous coals. Such coals are very friable, give a high proportion of screenings, and sometimes are termed "soft structure coals." If the fracture system is not so pronounced and the individual fracture planes farther apart, the coal may be characterized as "hard" structure. *Mitchell, p. 34.*

soft vector. A plane or direction in a diamond or other mineral having less resistance to abrasion than that of the hard-vector planes. *See also* hard vector. *Long.*

soft water. Water free from calcium carbonate and calcium sulfate. *Crispin.*

soggendalite. Proposed by Kolderup for a variety of diabase that is especially rich in pyroxene, and intermediate between true diabases and pyroxenites The type rock forms a dike near Soggendal, Norway. *Fay.*

soil. a. Broadly and loosely, the regolith, or blanket of unconsolidated rock material that lies on the bedrock. *Fay.* b. More precisely, the earthy or sandy layer, ranging in thickness from a few inches to several feet, composed of finely divided rock debris, of whatever origin, mixed with decomposing vegetal and animal matter, which nearly everywhere forms the surface of the ground and in which plants grow or may grow. *Fay.* c. In agriculture, loose surface material capable of supporting plant growth, and having properties resulting from the integrated effect of climate and living matter. *Hawkes.* d. In geology, any loose surface material overlying solid rock. *Hawkes.* e. To the pedologist soil is a natural body of mineral and organic constituents, differentiated into horizons, of variable depth, which differs from the material below in morphology, physical makeup, chemical properties and composition, and biological characteristics. *Hawkes, 2, p. 91.* f. In metallurgy, undesirable material on a surface and yet not an integral part of the surface. Oil, grease, and dirt can be soils; a decarburized skin or excess hard chromium are not soils. Loose scale is soil; hard scale may be an integral part of the surface, and hence not soil. *ASM Gloss.*

soil analysis. The method of geochemical prospecting which consists of taking soil samples and analyzing them for the various hydrocarbons and other gases and waxes, minerals, or other rare components which they may contain. *A.G.I.*

soil cap. The earthy material that oftens covers naturally the rock surfaces of the crust. *Standard, 1964.*

soil catena. A related sequence of profile types created by changes from one drainage condition to another. These changes are usually transitional. *Hawkes, 2, p. 101.*

soil cement. The addition of cement to a soil, as a binding agent, and converting it into a weak form of concrete. *See also* cement stabilization. *Nelson.*

soil classification. Soils and the corresponding rock types may be classified according to their dominant grain size or grade, as follows:

Grade	*Dominant grain size*	*Rock type*
scree, shingle, gravel	2 mm and over	conglomerate
very coarse sand	2 mm to 1 mm	very coarse sandstone
coarse sand	1 mm to 0.5 mm	coarse sandstone
medium sand	0.5 mm to 0.25 mm	medium sandstone
fine sand	0.25 mm to 0.1 mm	fine sandstone
silt	0.1 mm to 0.01 mm	siltstone
mud or clay	less than 0.01 mm	mudstone, shale, clay

Nelson.

soil classification tests. The tests are of two main types, namely: (1) mechanical analysis, performed by sieving or sedimentation, to determine the size-distribution of the constituent particles; and (2) index property tests, for soils passing a 36-mesh B.S. sieve, by means of which the type is deduced from the moisture content at standard consistencies. *See also* index properties. *Nelson.*

soil climate. The nature of the air between the soil particles, water content and condition, etc. *Challinor.*

soil core. A cylindrical sample of soil for tests and examination. Undisturbed samples may be obtained by the use of special appliances, which allow soil cores of usually 1½ inch or 4 inch diameter being extracted. The core barrel, forming part of the coring tool, is detachable and is capped and the core hermetically sealed for delivery to the laboratory. The natural moisture content and other properties are preserved for examination. Individual soil cores, up to 3 feet in length, may be obtained and continuous coring if necessary. *See also* soil sample. *Nelson.*

soil creep. A very slow movement of rock fragments down even, gentle slopes. It is this that makes some streams muddy even during periods of dry weather. *A.G.I.*

soil density. Normally expressed as pounds per cubic foot. Although soil density is measured initially on moist soil, the result is always converted in terms of dry density. *Nelson.*

soil discharge. A discharge of ground water through evaporation directly from the soil or rocks. *A.G.I.*

soil evaporation. Evaporation of water from moist soils. *Seelye, 1.*

soil formation. The process whereby fragmental material resulting from rock weathering is transformed into a medium that can support plant growth. *Hawkes.*

soil-forming factors. Factors, such as parent material, climate, vegetation, topography, organisms, and time involved in the transformation of an original geologic deposit into a soil profile. *ASCE P1826.*

soil horizon. A layer of soil, approximately parallel to the surface, which differs from adjacent layers in chemical and physical properties; the principal horizons from the surface downward are (1) the topsoil, A horizon, or leached horizon; (2) the subsoil, B horizon, or horizon of accumulation; and (3) the parent material, C horizon, from which the upper horizons were formed. *Hawkes.*

soil mechanics. a. The subject embracing the detailed investigation of soil composition, its classification, consolidation, and strength; the flow of water through various soils, and the active and passive pressures acting upon them. The father of soil mechanics is Dr. Karl von Terzaghi, and this new branch of science was initiated in 1936 by the First International Conference on Soil Mechanics and Foundation Engineering at Cambridge, Mass. *See also* earth pressure; site exploration. *Ham.* b. The science of the mechanical properties of a mass of loose or unbonded particles, particularly of their composition, shear resistance, and effects of water. Applied in highway and foundation engineering and other problems depending on support by stability of and varieties in loose surface materials. *A.G.I.*

soil mixer. Any machine used to pulverize soil in the process of soil stabilization. *See also* plant mix; travel mixer. *Ham.*

soil moisture. Pellicular water of the soil zone. It is divided by the soil scientist into available and unavailable moisture. Available moisture is water easily abstracted by root action and limited by field capacity and the wilting coefficient. Unavailable moisture is water held so firmly by adhesion or other forces that it cannot usually be absorbed by plants rapidly enough to produce growth. It is commonly limited by the wilting coefficient. *Stokes and Varnes, 1955.*

soil physics. The organized body of knowledge concerned with the physical characteristics of soil and with the methods employed in their determinations. *ASCE P1826.*

soil, preliminary classification. A classification made at the site to recognize the main types, such as gravels, sands, silts, clays, and peat. The clays may be described as soft, stiff, or firm, but the same clay can change into any of these groups by a change in its water content. *See also* soil classification. *Nelson.*

soil profile. a. The vertical section of a soil, showing the nature and sequence of the various layers, as developed by deposition, weathering, or both. *ASCE P1826.* b. Succession of zones or horizons beginning at the surface that have been altered by normal soil-forming processes of which leaching and oxidation have been particularly important. *A.G.I. Supp. See also* soil horizon. *A.G.I.* c. A section, at a spot or along a centerline, indicating the various strata as disclosed by boreholes, trial pits, or geophysical surveys. The section shows all deposits likely to have a bearing on the stability of surface works. Quarries, cuttings, and escarpments often provide a ready-made soil profile. *Nelson.*

soil sample. a. A small sample of the soil, representing the area from which it was removed. *Long.* b. Any sample which is reasonably representative of a soil deposit. Undisturbed soil samples are preferred. Where the ground tends to change laterally, the sampling positions are so spaced as to indicate the change. *See also* soil core. *Nelson.*

soil-sample barrel. A tubular device designed for taking samples of soil. *Long.*

soil sampler. a. A tube driven into the ground so as to obtain an undisturbed soil sample. In sands, such tubes would be fitted with a core catcher. *See also* Raymond standard test. *Ham.* b. One of a number of different mechanical devices used for taking samples of an unconsolidated material. *See also* Shelby tube; solid-barrel sampler; split-tube barrel; split-tube sampler. *Long.*

soil sampling tube; sampling tool. A tool for obtaining an undisturbed sample of the soil. It consists of a cylindrical mild steel tube with a fitting at the top for boring rods and a hardened steel cutting nose. It provides for a sample 4⅛ inch diameter, while a length of 15 inches is usually sufficient. The tube is forced into the ground without rotation until it is full. Then the soil is cut at the bottom either by a wire snare or by rotating the tool to shear the soil at the base. *See also* sampling area ratio. *Nelson.*

soil science. The science which treats of soils. Synonym for pedology. *Schieferdecker.*

soil series. A group of soils having horizons similar as to differentiating characteristics and arrangements in the soil profile and developed from a particular type of parent material. Except for texture, especially of the A-horizon, the morphological features of the soil profile, as exhibited in the physical characteristics and thicknesses of the soil horizons, do not vary significantly with a series. These characteristics include especially structure, color, and texture (except the texture of the A-horizon or surface soil) but not these alone. The content of carbonates and other salts, the reaction (or degree of acidity or alkalinity), and the content of humus are included with the characteristics which determine series. The soil series must not only have definite soil profile features, but also occupy an area on the landscape. *Stokes and Varnes, 1955.*

soil shredder. A machine employed in soil stabilization comprising two nearly touching half drums which rotate in opposite directions, and break up the soil. *Ham.*

soil stabilization. Chemical or mechanical treatment designed to increase or maintain the stability of a mass of soil or otherwise to improve its engineering properties. *ASCE P1826. See also* bituminous stabilization; cement stabilization; pulverization.

soil stabilizer. A chemical which can alter an engineering property of a natural soil to suit an intended use of the soil. Refers to chemicals which convert clayey soils or sandy soils to satisfactory traffic-bearing materials. *CCD 6d, 1961.*

soil structure. The arrangement and state of aggregation of soil particles in a soil mass. *See also* flocculent structure; honeycomb structure; single-grained structure. *ASCE P1826.*

soil survey. a. A detailed investigation of the soils at a site, including boreholes and tests to determine their nature, thickness, strength, and depth to bedrock. *See also* site investigation; soil mechanics. *Nelson.* b. Geochemical prospecting term for the chemical analysis of systematically collected samples of soil and weathered rock. *Hawkes, 2, p. 3.*

soil suspension. A highly diffused mixture of soil and water. *ASCE P1826.*

soil test. a. Synonym for soil sampling. *Long.* b. The laboratory procedure followed in examining and determining the physical characteristics of a soil sample. *Long.*

soil testing. *See* soil sampling, soil test. *Long.*

soil texture. *See* gradation, b. *ASCE P1826.*

soil type. A minor subdivision of a soil series based on texture of the surface layer. *Stokes and Varnes, 1955.*

soil ulmin. An alternative term for humus. *Tomkeieff, 1954.*

Soisson Rodange process. A process for the manufacture of high quality killed basic Bessemer steel in which the steel, after dephosphorization, is poured into another ladle containing the solid components of a basic oxidizing and fluid slag. Blowing for 30 to 40 seconds generates sufficient heat to promote mixing and avoid skull. Phosphorus contents are readily lowered and high quality killed steel is produced with low additional cost. *Osborne.*

sol. Colloidal dispersion of a solid in a liquid. In water, hydrosol. In alcohol, alcosol. Hydrophilic sols (for example, starch, ferric oxide) attract water and form gelatinous glomerules. Hydrophobic sols are solvent repelling. The solid particles are usually of colloidal dimensions (1 m μ less than 100 mμ), below which sizes the solid is considered to be in true solution. *Pryor, 3.*

solar. a. A platform in a Cornish mine shaft and especially between a series of ladders; a longitudinal partition forming an air passage between itself and the roof in a mine. Usually sollar or soller. *Webster 3d.* b. A colloquialism among surveyors to mean an observation on the sun. *Fay.*

solar compass. Synonym for sun compass. *Webster 3d.*

solar furnace. A particular type of image furnace. *See also* image furnace. *Dodd.*

solarization. An effect of strong sunlight (or artificial ultraviolet radiation) on some glasses, causing a change in their transparency. Glasses free from arsenic and of low soda and potash contents are less prone to this defect. *Dodd.*

solar salt. Salt obtained by solar evaporation of seawater or salt lake water in shallow lagoons or ponds. *Kaufmann.*

solar screen tile. Tile manufactured for masonry solar screen construction. *ACSG, 1963.*

solar time. Varying period, marked by successive crossings of the meridian by the sun. Hour angle of sun at observer's point (apparent time) corrected to true time by use of equation of time. Sundials show apparent Solar time. *See also* apparent day. *Pryor, 3.*

solder. To unite the surfaces of metals; an alloy for uniting metals. Brazing solders are alloys of zinc and copper, while soft solders are alloys of tin and lead. *Nelson.*

soldered emerald. A name for any emerald doublet, but correctly for a fused one only. *Shipley.*

solder embrittlement. Reduction in mechanical properties of a metal as a result of local penetration of solder along grain boundaries. *ASM Gloss.*

soldering. Similar to brazing, with the filler metal having a melting temperature range below an arbitrary value, generally 800° F. *ASM Gloss.*

soldering coal. Term used among British miners for caking coal. *Tomkeieff, 1954.*

soldier. An upright timber used in timbering secured in position by horizontal struts. *See also* puncheon, b. *Ham.*

soldier blocks. Refractory blocks set on end. In the glass industry the term is particularly applied to blocks that extend more than the depth of the glass in a furnace. *Dodd.*

soldier course. A course of brick laid in a wall on end with their narrow side parallel to the furnace wall. *A.R.I.* Little used in the case of refractories except in the bottoms of some types of furnaces. *HW.*

soldier frame. Frame set into the inside of a shaft prior to breaking through for a heading. *Stauffer.*

soldier sprag. N.S.W. A long sprag used to support a seam in a coal mine between the top of the holing and the roof. *Webster 3d.*

soldier's stone. Amethyst. *Shipley.*

sole. a. The major fault plane over which other beds ride forward as a group during distributive faulting. *Fay.* b. The lowest thrust plane in an area of overthrusting. Commonly rocks above are imbricated. *A.G.I.* c. The lower surface of a sedimentary stratum. *A.G.I. Supp.* d. The bottom of a level. *Fay.* e. Eng. *See* solepiece. *SMRB, Paper No. 61.* f. The bottom of a reverberatory furnace. *Fay.* g. The refractory brickwork forming the floor of a coke oven; as the charge of coal, which is subsequently transformed into coke, rests on this brickwork, and as the coke is pushed out of the oven by means of a mechanical ram, the sole is subjected to severe abrasion. *Dodd.*

soled boulder. Many of the stones in the (boulder) clay have their corners blunted and have smooth faces ground upon them, which may be scratched by hard, projecting points as they are forced along. Such stones are called soled boulders or striated stones, and are very characteristic of ice action, since no other agency produces such effects. *A.G.I.*

sole-flue port brick. *See* rider bricks. *Dodd.*

sole mark. A term which has come to be generally applied to the various hieroglyphs found on the undersides or soles of sandstone (and in some cases limestone) beds. These marks are largely casts of structures formed on the surface of the underlying mud by currents, organisms, or other agents. After consolidation and exposure, the underlying shale weathers away leaving the cast as a raised positive feature on the sole of the overlying sandstone. *Pettijohn.*

Solenhofen stone. An exceedingly fine and even-bedded limestone, thinly stratified, of Upper Jurassic age, occurring in Solenhofen, Bavaria, West Germany; widely used in lithography. *C.T.D.*

solenoid. a. An electromagnetic helix. A system of equal circular currents flowing in uniform direction about a single straight or curved axis. *Crispin.* b. A series of coils of wire carrying a current of electricity. One can be made by winding wire on a glass or cardboard tube. *Morris and Cooper, p. 210.* c. A cylindrical coil used to produce a magnetic field; sometimes the solenoid includes an iron bar or rod which moves freely along the axis of the coil under the influence of its magnetic field. *NCB.*

solepiece; sole; foot lid. Eng. A piece of wood placed under a prop. *SMRB, Paper No. 61.*

sole plate. a. Formed of several pieces of lagging fastened together, and laid down in the bottom of an invert. It forms a base for the iron ribs used in laying a concrete invert. *Stauffer.* b. Scot. The plate on which a machine rests. *Fay.* c. *See* sleeper. *Nelson.*

solfatara. An expiring or dormant volcanic vent from which steam and vapors are emitted; also, a district or area in which volcanic emanations are given off from fissures and small vents. *Compare* fumarole; mofette; soffioni. *Fay.*

solfataric. Applied to a dormant or decadent stage of volcanic activity characterized by the emission at the surface of gases and vapors of volatile substances. *Holmes, 1928.*

solid. a. Coal that has not been undermined, sheared cut, or otherwise prepared for blasting. Used in the expression, "shooting off the solid." *Fay.* b. That part of the coal which cannot be thrown out by a single shot, or the coal beyond the loose end. Used in expressions describing holes drilled for blasting, such as "3 feet into the solid," or "on the solid." *Fay.* c. Unmined; ungot. *Mason.* d. A rock having few open cracks, crevices, or joints and relatively unaffected by the weakening effects of weathering. *Long.* e. A diamond free of cracks discernible by eye. *Long.* f. The rock near underground openings that stands well without artificial support. *Long.* g. Anything which can be measured in three dimensions. That is, a solid has length, breadth, and thickness. *Jones, 2, p. 116.* h. State of matter in which the constituent atoms, ions, or molecules are sufficiently restricted in their relative movement to result in a definite shape. Between this bound structure and a fully liquid one lies the plastic state exemplified by bitumen. *Pryor, 3.*

solid agate. *See* agate ware, c. *C.T.D.*

solid angle. *See* angle, a. *Webster 3d.*

solid anthraxylon. Anthraxylon units having the appearance of solid bands. *Hess.*

solid-barrel sampler. A straight-walled cylinder with or without a valve on the bottom. Used for taking soil samples. *Compare* Shelby tube, split-tube sampler. *Long.*

solid bearing. A one-piece bushing. *Nichols.*

solid bit. Synonym for noncoring bit. *Long.*

solid bituminous materials. Those having a penetration at 25° C (77° F), under a load of 100 grams applied for 5 seconds of not more than 10. *Urquhart, Sec. 2, p. 81.*

solid car. A mine car equipped with a swivel coupling and generally used with a rotary dump. One or more cars are pulled into the rotary dump, which turns through 180° and the coal is emptied out. These cars have a low first cost, low maintenance, and no spillage. *Kentucky, p. 211. See also* mine cars.

solid casting. Forming ceramic ware by introducing a body slip into a porous mold, which usually consists of two major sections, one section forming the contour of the outside and the other forming the contour of the inside of the ware, and allowing a solid cast to form between the mold faces. *See also* casting. *ACSG, 1963.*

solid couplings. Generally of either the flanged-face or the compression type. They are used to connect two shafts to make a permanent joint and usually are designed to be capable of transmitting the full load capacity of the shaft. This coupling has no flexibility, either torsional, angular or axial, hence it is limited to those installations where rigid connections are suitable, particularly in line shafts and extension shafts. *Pit and Quarry, 53rd, sec. 4, p. 65.*

solid crib timering. Shaft timbering with cribs laid solidly upon one another. *Fay.*

solid-crown bit. Synonym for noncoring bit. *Long.*

solid cutters. Cutters made of a single piece of material rather than a composite of two or more materials. *ASM Gloss.*

solid deposits. Rocks other than drift deposits. *B.S. 3618, 1964, sec. 5.*

solid-drawn. Drawn from hollow ingots, or otherwise, on mandrels of successively decreasing diameters; said of certain seamless metal tubes. *Standard, 1964.*

solid drilling. In diamond drilling, using a bit that grinds the whole face, without preserving a core for sampling. *Nichols.*

solid explosives. These explosives are employed to a certain extent in the form of a powder in cartridges, or as a light-running granulated mass, or as solid sticks. They have the disadvantage that the density of charging will be small, which means that the cost of drilling will be comparatively high. *Fraenkel, v. 3, Art. 16:01, p. 33.*

solid fuels. Any fuel that is a solid; such as wood, peat, lignite, bituminous, and anthracite coals of the natural variety and the prepared varieties as, pulverized coal, briquettes, charcoal, and coke. These are divided into two broad classes: (1) naturally occurring solid fuels, and (2) manufactured solid fuels. *Newton, p. 247.*

solid geology. The geological features of the rocks underlying superficial deposits, specifically excluding these latter. A solid geological map, as opposed to a drift map, shows the whole outcrops as they would appear if all the superficial deposits were removed (though the larger tracts of alluvium are often shown even on solid maps). *Challinor.*

solidification. The process of changing from a liquid or gas to a solid, as, for instance, the solidification of molten alumina to solid in the synthesis of corundum. *Shipley.*

solidification range. Temperature range over which mixtures (alloys, fluxes) melt. In constitutional diagram, area between liquidus and solidus. *Pryor, 3.*

solidification shrinkage. The decrease in volume of a metal during solidification. *ASM Gloss.*

solid loading. Filling a drill hole with all the explosive which can be crammed into it, except for stemming space at top. *Nichols.*

solid map. A British Geological Survey map which shows the solid or stratified hard rocks, the plan view being on the assumption that all superficial deposits are absent or removed. The deposits of alluvium along river courses are, however, shown. *See also* drift map. *Nelson.*

solid masonry unit. A unit whose net cross sectional area in every plane parallel to the bearing surface is 75 percent or more of its gross cross sectional area measured in the same plane. *ASTM C43-65T.*

solid masonry wall. A wall built of solid masonry units, laid contiguously with the joints between units completely filled with mortar. *ACSG.*

solid packing. *See* solid stowing. *Nelson.*

solid-phase welding. Any method of welding in which pressure, or heat and pressure, are used to consummate the weld without fusion. *ASM Gloss.*

solid road. Any roadway driven through the solid coal seam with rib sides. *See also* narrow stall; narrow work, a, b. *Nelson.*

solid rock. Rock which is both consolidated and in situ. *Challinor.*

solids classification. Separation of solids into two or more fractions, on the basis of their velocities of flow through fluids. *Bennett 2d, 1962 Add.*

solids handling pump. Usually a centrifugal pump designed to resist abrasion and used for pumping sand, gravel, fine coal, and ore tailings. Rubber linings are generally used, which last longer than steel or iron. *See also* pulsometer, a. *Nelson.*

solid smokeless fuel. A solid fuel, such as coke, which produces comparatively no smoke when burnt in an open grate. The gas industry produces certain brands of smokeless fuel, such as Coalite, Rexco, Clean-glow, and Phimax. *See also* anthracite; briquette; coke; smokeless coal. *Nelson.*

solid solubility. The extent to which one metal is capable of forming solid solutions with another. This varies widely between different pairs of metals, some of which are mutually soluble in all proportions, while others are practically insoluble in each other. *C.T.D.*

solid solution. a. A single, solid-homogeneous crystalline phase containing two or more chemical species. *ASM Gloss.* b. Substitution of one ion for another ion of a different element in a crystal. Also called isomorphism. *Hurlbut.* c. The term may refer to the solution of small proportions of a material in a seemingly unrelated substance. *HW.*

solids, suspended. *See* suspended solids. *Bennett 2d, 1962 Add.*

solid stowing; solid packing. The complete filling of the waste area behind a longwall face with stone and dirt. The packing operation may be by hand or mechanical methods, for example, pneumatic stowing. *See also* double packing; strip packing. *Nelson.*

solidus. In a constitution or equilibrium diagram, the locus of points representing the temperatures at which various compositions finish freezing on cooling or begin to melt on heating. *ASM Gloss.*

solid water. Scot. Water sufficient to fill the pump barrel at each stroke. *Fay.*

solid web. The web of a steel beam consisting of a rolled section or a plate as distinct from a lattice. *Ham.*

solid workings. Scot. In stoop-and-room workings, the first working or room driven into the solid coal. Distinguished from pillar work or pillar drawing. *Fay.*

solid woven conveyor belt. A construction of conveyor belt consisting of multiple plies of fabrics woven into one piece, which is done on looms designed for this purpose. Stripes are woven into the belt to show the number of plies, which range from two to ten. Impregnating and coating treatments are frequently employed. *ASA MH4.1-1958.*

solid woven fabric belt. A rubber belt in which the plies are interwoven and thus have no dependence on the adhesive properties of the covering material. The belt is claimed to give greater strength for less thickness and weight. *See also* conveyor. *Nelson.*

solifluction. a. The process of slow flowage from higher to lower ground of masses of waste saturated with water. *See also* mud stream. *A.G.I.* b. The movement of soil particles and rock waste chiefly by frost action. *Mather.*

soligenous peat. Peat whose character is determined by soil rather than amount of rainfall. *Tomkeieff, 1954.*

soling. Large stones used in pitched work. *Ham.*

solitary wave. A wave consisting of a single elevation and neither followed nor preceded by another elevation or depression of the water surface. *Schieferdecker.*

sollar; soller. a. Landing stage in a mine shaft. *Pryor, 3.* b. A timber staging, alongside a haulage level, for piling ore ready for loading into mine cars. *Nelson.* c. A staging between ladderway sections in a shaft. *Nelson.* d. A wooden platform fixed in a shaft for the ladders to rest on. *Gordon.* e. The pank flooring of a gallery covering a gutterway beneath. *Fay.* f. A longitudinal partition forming an air passage between itself and the roof in a mine working. *Webster 3d.* g. A platform from which trammers shovel or throw the ore or rock into a car. *Fay.* ***See also*** saller, b. *Fay.*

solonchak soil. A soil occurring most commonly under arid conditions, but may also be found in semiarid and subhumid regions. Usually found in depressions where it has originated by evaporation under shallow ground-water conditions. The typical salts of solonchak are sulfates and chlorides of sodium, calcium and magnesium. These often appear as a white efflorescence at the surface which is liable to be dissolved and temporarily washed downward when it rains. *Hawkes, 2, p. 112.*

solonetz soil. A soil occurring most commonly under arid conditions, but may also be found in semiarid and subhumid regions. Usually found in depressions where it has originated by evaporation under shallow ground-water conditions. Characterized by sodium carbonate as the predominant salt and a dark-colored B horizon which is strongly alkaline in reaction. *Hawkes, 2, p. 112.*

solubility. a. The extent to which a substance will dissolve in a particular solvent. *ASTM STP No. 148-D.* b. The weight of a dissolved substance that will saturate 100 grams of a solvent. *C.T.D.* c. Concentration of substance in a saturated solution, that is, in equilibrium between dissolved and undissolved phase at given temperature. Dissolved product is solute. *Pryor, 3.*

solubility product concentration. In a saturated solution of an electrovalent compound having limited solubility, the product of the ionic concentrations, at the exponential value shown in the stoichiometric equation for its dissociation, is constant at a given temperature. For the substance BA yielding ions B^+ and A^- the equilibrium constant

$$K = \frac{(B^+)(A^-)}{BA}$$

The concentration of a solid substance is constant, in moles per liter. Making $BA = k$ then $(B^+)\ (A^-) = K \times k =$ solubility product. *Pryor, 3.*

solubilization. Spontaneous passage of solute molecules of a substance insoluble in water into aqueous solution of a soap or detergent, to form a thermodynamically stable system. *Pryor, 3.*

soluble. Capable of being dissolved in a fluid. *Crispin.*

soluable anode. An anode which goes into solution during an electrolytic process. *Osborne.*

soluble cutting oil. *See* soluble oil.

soluble glass. Solid sodium silicate or potassium silicate. *C.T.D.*

soluble oil; soluble cutting oil. A blend of mineral oil and emulsifiers which, when mixed with water, forms a dispersion for use as a cutting fluid. *Institute of Petroleum, 1961.*

soluble products of weathering. Consist of those constituents that are released by the decomposition of primary minerals and that are not required in the formation of insoluble secondary minerals. *Hawkes, 2, p. 88.*

soluble salts. Salts, particularly sulfates of calcium, magnesium, and sodium, present in some clays. When the clay is dried these salts migrate to the surface. In the pottery industry this can cause trouble during glazing; in the wet process of body preparation, however, these salts are mostly eliminated during filter pressing. If present in clay building materials, soluble salts can cause efflorescence and scumming. *Dodd.*

solum. The upper part of the soil profile, above the parent material, in which the processes of soil formation are taking place. In mature soils, this includes the A- and B-horizons. *Stokes and Varnes, 1955.*

solute. a. The substance dissolved in a solution, as distinguished from the solvent. *Standard, 1964.* b. A substance dissolved in a liquid. *ASTM STP No. 148-D.*

solution. a. The change of matter from the solid state or the gaseous state into the liquid state by its combination with a liquid. When unaccompanied by chemical change, it is called a physical solution; otherwise, a chemical solution. *Standard, 1964.* b. The result of such change; a liquid combination of liquid and a nonliquid substance. *Standard, 1964.*

solution breccia. Breccias formed, for example, where the lime carbonate of a cherty limestone is removed by solution, the chert fragments gathering together as the mass settles. *Stokes and Varnes, 1955.*

solution cavities. A mode of mineral formation in which percolating solutions have filled cavities in rocks with valuable minerals; cavities formed in certain rocks, such as limestones, where portions have been dissolved by percolating waters. *See also* mineralization. *Nelson.*

solution ceramics. A type of ceramic coating. In the original process, metal salt is sprayed on the hot surface that is to be coated. A subsequent development refers to the application of a coating of vitreous enamel or thermoplastic resin to the surface that has been flame-sprayed with the solution; this is claimed to result in a vitreous enameled surface having improved resistance to thermal shock. *Dodd.*

solution grooves. More or less parallel furrows that sometimes develop on inclined and vertical surfaces of soluble and fairly homogeneous rocks like limestone and marble. They always trend down the slope, for they are made through the slow corrosion by water as it trickles down over the surface. *Stokes and Varnes, 1955.*

solution heat treatment. Heating an alloy to a suitable temperature, holding at that temperature long enough to allow one or more constituents to enter into solid solution, and then cooling rapidly enough to hold the constituents in solution. The alloy is left in a supersaturated, unstable state and may subsequently exhibit quench aging. *ASM Gloss.*

solution injection. Artificial cementing of loose soils or strata to increase their loadbearing capacity. *Ham.*

solution man. One who regulates, by opening and closing pipe valves, the amount of cyanide solution flowing from solution tanks into leaching tanks or vats in which finely ground, gold-bearing ore is treated with cyanide to dissolve the particles of free gold. The resulting gold-bearing solution is later run through boxes containing zinc shavings to precipitate the gold thereon. *C.O.T. 1.* b. *See* leacher. *D.O.T. Supp.*

solution pipe. A tubular or narrowly conical hollow in a soluble formation, filled in by later rock material. *Challinor.*

solution plane. A direction in a crystal of relatively easy solubility (as when the substance is under great pressure). Chemical action along solution planes in minerals in rocks has often resulted in schillerization. *Webster 3d.*

solution potential. Electrode potential where the half-cell reaction involves only the metal electrode and its ion. *ASM Gloss.*

solution pressure. The pressure by which the particles of a dissolved substance are driven into solution and which when equal to the osmotic pressure establishes equilibrium so that the concentration of the solution becomes constant. *Webster 3d.*

solution subsidence. The subsidence of parts of a formation into hollows or pockets of an immediately underlying soluble formation. The solution is caused by water percolating through the upper formation. *Challinor.*

Solvan. Lower Middle Cambrian. *A.G.I. Supp.*

solvate. A chemical compound consisting of a dissolved substance and its solvent, for example, hydrated calcium sulfate. *A.G.I. Supp.*

solvation. a. The chemical union of a dissolved substance and its dissolving liquid. *A.G.I. Supp.* b. Association or combination of molecules of solvent with ions of solute. In the case of micelles, adsorption of dispersion medium by lyophilic sol in such wise as to form sheated groups which do not readily coalesce. *Pryor, 3.*

Solvay process; ammonia-soda process. Manufacture of sodium carbonate (or soda ash, Na_2CO_3) from salt (sodium chloride), ammonia, carbon dioxide, and limestone by an ingenious sequence of reactions involving recovery and reuse of practically all the ammonia and part of the carbon dioxide. Limestone is calcined to quicklime and carbon dioxide. The carbon dioxide is dissolved in water containing the ammonia and salt, with resulting precipitation of sodium bicarbonate. This is separated by filtration, dried, and heated to form normal sodium carbonate. The liquor from the bicarbonate filtration is heated and treated with lime to regenerate the ammonia. Calcium chloride is a major byproduct. *See also* sodium carbonate. *CCD 6d, 1961.*

solvent. a. A substance used to dissolve another substance; for example, the water in a solution of salt in water. *Crispin.* b. That component of a solution which is present in excess, or the physical state of which is the same as that of the solution. *C.T.D.*

solvent extraction. a. A method of separating one or more substances from a mixture, by treating a solution of the mixture with a solvent that will dissolve the required substances, leaving the others. It is used in purifying certain fuels. *Ham.* b. In uranium technology, selective transfer of metal salts from aqueous solutions or pulp, to immiscible organic liquid. *Pryor, 3.* c. *See* liquid-liquid extraction, a. *CCD 6d, 1961.*

solvsbergite. A hypabyssal rock intermediate between grorudite and tinguaite, having a trachytoid texture and consisting of alkali feldspars and aegirite. *A.G.I.; Webster 2d.*

solvus. In a phase or equilibrium diagram, the locus of points representing the temperatures at which the various compositions of the solid phases coexist with other solid phases, that is, the limits of solid solubility. *ASM Gloss.*

somatic effects of radiation. Effects limited to the exposed individual, as distinguished from genetic effects. Large radiation doses can be fatal. Smaller doses may make the individual noticeably ill or may merely produce temporary changes in blood-cell levels detectable only in the laboratory. *L&L.*

sombrerite. Synonym for apatite. *Dana 6d, p. 759.*

sommaite. Monzonitic volcanic ejecta containing bytownite, orthoclase, augite, and olivine; leucite may occur in small amounts. *A.G.I. Supp.*

sonar. The method or equipment for determining, by underwater sound, the presence, location, or nature of objects in the sea. The word sonar is an acronym derived from the expression SOund NAvigation and Ranging. *H&G.*

sonar background noise. The total noise which interferes with the reception of the desired signal. The noise is that presented to the final receiving element, such as a recorder or the ear of a listener. *Hy.*

sonar message. Numerical groups which define sonar conditions for echo ranging in certain areas. *Hy.*

sonar thumper seismic system. A complete continuous seismic profiling system consists of the sonar thumper unit, sonar recorder, transducer fish, receiving hydrophone, preamplifier if necessary and variable filter. Sonar thumper units are available from 1000 watt-second models up to 13,000 watt-second (experimental models). The standard thumper consists of a power supply, capacitor bank and transducer. Thumpers are used for marine geological studies and dredging surveys. The power supply output is fed to the capacitor bank which is discharged into the transducer producing a precisely repeatable pressure pulse in the water. *H&G.*

sondalite. A metamorphic rock composed of cordierite, quartz, garnet, tourmaline, and kyanite. *Holmes, 1928.*

sonde. A circular container in which electrodes are set. The sonde is supported during logging in approximately the center of the borehole. *Wyllie, p. 98.*

sonic. a. Pertains to phenomena involving frequency in the audio range—from about 20 to 15,000 cycles per second. *ASM Gloss.* b. Of, pertaining to, or using sound waves, as in sonic depth finding. *Hy.*

sonic depth finder. An instrument which measures time interval between the origin of a sound signal within the instrument and its reflected return from the bottom. This time interval is then expressed as a function of water depth. *Hy.*

sonic frequencies. Range of underwater sound, generally taken as from 0.02 kilocycle to 15 kilocycles. *Hy.*

sonic gage. *See* acoustic strain gage. *Nelson.*

sonic log. An acoustic log continuously recording travel time of sound from surface to an instrument lowered down a borehole. *A.G.I. Supp.*

sonic marine animals. Species of fishes, marine mammals and Crustaceans which may produce noise of sufficient intensity and frequency to interfere with sound ranging operations and acoustic mines. *Hy.*

sonic method. A method of measuring underground rock pressure by determining the velocity of sound through the rock. Sonic velocity is a function of the elastic modulus of the rock traversed by the wave, and this, in turn, is a function of the pressure. A hammer blow on the rock face is used to initiate the sound waves, which are picked up by a microphone placed at the site of the blow and by a second microphone at the other end of the path through the rock under test. The difference between the times of the signals received from the two microphones will equal the time taken by the sonic pulse to pass through the rock. The signals are converted into visible waveforms on the screen of an oscillograph, and these are photographed to form a permanent record. *Isaacson, pp. 217-219.*

sonic pile driver. A driver based on the principle of delivering vertical vibrations to the head of a pile in alternating up and down cycles at a rate of 100 cycles per second. These vibrations set up high-amplitude waves of tension and compression in the pile, producing alternate expansion and contraction in minute amounts. The elongation of the pile in expansion displaces the soil at the pile tip, and the weight of the pile, hammer, and added loads shoves the pile into the miniscule void. Since this action is occurring at the rate of 100 times a second, the individual movements need not be of great magnitude to produce rapid penetration of the pile. *Carson, 2, p. 184.*

sonigage. An ultrasonic testing instrument used primarily for the measurement of the thickness of materials. *Osborne.*

sonims. Solid, nonmetallic inclusions in metal. *Henderson.*

soniscope. An inspection instrument, which sends, by electronic means, pulses of high frequency through the material to be tested and measures the time of travel from the transmitter on one face to the receiver on the distant face of the material. This method of inspection is known as pulse testing. *Osborne.*

sonograph. Seismograph developed by Frank Rieber for the application of reflection methods to areas of complex geology and steeply dipping beds. The ordinary oscillograph traces are replaced by sound tracks of variable transparency on a moving picture film. The analyzer adds up impulses which are in phase while the random effects tend to cancel one another. *A.G.I.*

sonolite. A mineral, $Mn_9(SiO_4)_4(OH, F)_2$; occurring as monoclinic prisms and anhedral crystals at the Sono, Hanawa, and other manganese mines in Japan. Named from the locality. *Hey, M.M., 1964; Fleischer.*

sonometer. a. An instrument for measuring rock stress. Piano wire is tuned between two bolts cemented into drill holes in the rock, and change of pitch after destressing is observed and used to indicate stress. *Pryor, 3.* b. Consists of a mild steel rack with a micrometer head. A length of piano wire is stretched from one end of the rack to the end of the micrometer screw, so that by rotating the micrometer a continuously varying tension may be induced in the wire. This instrument is used for measuring strain in rock. *Isaacson, p. 203.*

sonoprobe. A type of echosounder that generates sound waves and records their reflections from inequalities beneath a sedimentary surface. *A.G.I. Supp.*

sonorousness. Property of emitting sound on percussion or deformation. This is especially marked in alloys of tin and copper. Aluminum emits a clear sound on percussion, and bar tin gives rise to a peculiar crackling sound, known as tin cry, when it is bent. This phenomenon is considered to be caused by the sliding of the layers of crystals over one another. *Hess.*

Sonstadt solution. *See* Thoulet solution. *Holmes, 1928.*

soot. a. A black substance, consisting essentially of carbon from the smoke of wood or coal, especially that which adheres to the inside of the chimney, containing also volatile products condensed from the combustion of the wood or coal, including certain ammonia salts. *Standard, 1964.* b. Term used among British miners for soft powdery coal, especially fusain. *Tomkeieff, 1954.*

sooty back. Eng. A parting in the coal which runs at right angles or obliquely to the stratification and contains a thin layer of fine coal. *SMRB, Paper No. 61.*

sooty chalcocite. A black, pulverent variety of chalcocite of supergene origin. *A.G.I.*

sooty coal. Eng. Dull, soft coal. *Fay.*

sooty streamers. Fine and often unburnt dust settling out in steamy, warm conditions in stagnant situations. *Sinclair, I, p. 267.*

sop. a. Cumb. A hematite iron-ore body of circular or oval plan and conical section, formed in a swallow hole. *Arkell.* b. Cumb. A nest or pocket of black lead. *Arkell.*

Sophia-Jacoba process. *See* Barvoys process. *Mitchell, p. 495.*

sopwith staff. A telescopic self-reading staff dividing into three sections, set one above the other when the staff is at its full extent of 14 feet. Graduations are marked in feet, tenths and hundredths of a foot, and the thickness of the horizontal lines is 0.01 foot, alternately black and white. *Ham.*

soquetero. Mex. One who wets and kneads clay to be used at the furnace. *Fay.*

sorbite. A fine mixture of ferrite and cementite produced either by regulating the rate of cooling of steel or tempering steel after hardening. The first type is very fine pearlite, difficult to resolve under the microscope; the second type is tempered martensite. (obsolete). *ASM Gloss.*

Sorbo-Cel. Diatomaceous silica; used in filtering. *Bennett 2d, 1962 Add.*

sordavalite. An old name for the glassy salbands of small, diabase dikes formerly regarded as a mineral. It is derived from Sordavala, Finland. *Compare* wichtisite. *Fay.*

Sorel cement. Calcined magnesite or magnesia mixed with a solution of magnesium chloride of a concentration of about 20° B. It sets to a hard mass within a few hours. The basis of artificial flooring cements. *C.T.D. See also* magnesium-oxychloride cement. *CCD 6d, 1961.*

Sorel slag. A Canadian-produced titanium slag containing about 70 percent TiO_2. It is made by electric-furnace smelting or iron-titanium ores. *Newton, p. 25.*

Soret's principle. If differences of temperature are induced in a solution of sodium chloride or some other substance in water, the dissolved material will become relatively more concentrated in those portions in which the temperature is lowest. *Fay.*

sörkedalite. An ultrabasic, feldspathoid-free igneous rock consisting of a titanium-iron potassium-rich facies of essexite or kjelsasit. *Johannsen, v. 4, 1938, p. 54.*

soroche. A mountain sickness that attacks miners who are newcomers in high altitudes. Symptoms are headaches, nausea, vomiting, and nosebleed. If the symptoms do not soon pass off, there is nothing to be done except for the miner to return to a lower altitude. *Hoov, p. 509.*

sorosilicates. Silicate structures in which the SiO_4 units are linked into finite groups, as into pairs of two, rings of three or more, etc. An example is beryl. *A.G.I. See also* silicates, classification.

sorption. Any type of retention of a material at a surface, especially when the mechanism is not specified. Sorption is then restricted to the physical process which leads to the formation of a unimolecular surface layer; chemisorption refers to the corresponding chemical process; and absorption to the entrance of the sorbed material within the solid. *Miall.*

sort. To examine and separate diamonds into quality groupings. *See also* grade. *Long.*

sorted bedding. A type of graded bedding in which only one grain size is present at each horizon within the bed and the size decreases upwards. *Pettijohn.*

sorter. a. In bituminous coal mining, a laborer who picks out and sorts coal according to different qualities as it passes by him on a conveyor belt. *D.O.T. 1.* b. In metal and nonmetal mining, a laborer who sorts ore from waste rock by hand as it is dumped from mine surface. May sort cleaned ore into various grades, judging grades by sight. Also called ore sorter. *D.O.T. 1.*

sorters. The experts at the South African diamond mines who assort the rough diamonds. *Hess.*

sorting. a. In a genetic sense, it may be applied to the dynamic process by which material having some particular characteristic, such as similar size, shape, specific gravity, or hydraulic value, is selected from a larger heterogeneous mass. *A.G.I.* b. In a descriptive sense, it may be used to indicate the degree of similarity, in respect to some particular characteristic, of the component parts in a mass of material. *A.G.I.* c. A measure of the spread of a distribution on either side of an average. *A.G.I.* d. The separation and segregation of rock fragments according to size or specific gravity by natural processes, mainly by the action of running water. *Stokes and Varnes, 1955.* e. The separation of coal or ore as mined into material of economic value and dirt, particularly by hand. *Nelson.* f. Removal by hand (handpicking) of selected pieces of rock. Also applied to classification of finely ground pulps. *Pryor 2.* g. A method of separating mixtures of minerals into two or more products on the basis of the velocity at which the grains will fall through a fluid medium. *Newton, p. 75.* h. The removal, from pottery taken from the glost kiln, of adhering bedding material and/or particles that have become detached from the kiln furniture; sorting is usually done with a small pneumatic tool. *Dodd.*

sorting coefficient. a. A coefficient used in describing the distribution of grain sizes in a sample of unconsolidated material. It is defined as $S_o = \sqrt{Q1/Q3}$ where Q_1 is the diameter which has 75 percent of the cumulative size-frequency (by weight) distribution smaller than itself and 25 percent larger than itself, and Q_3 is that diameter having 25 percent smaller and 75 percent larger than itself. *H&G.* b. Dimensionless measure for degree of sorting. *Schieferdecker.*

sorting hammer. A hammer for breaking up ores in sorting. *Standard, 1964.*

sorting, particle. *See* particle sorting. *Bennett 2d, 1962 Add.*

sorting table. a. Any horizontal conveyor where operators, along its side, sort bulk material, packages or objects from the conveyor. *ASA MH4.1-1958.* b. Tables on which rough diamonds are sorted. *Hess.*

sory. A black earth impregnated with vitriol; also, vitriols. *Webster 3d.*

sos. S. Staff. To sink into the floor under great pressure from overlying strata; said of mine timbers and pillars. *Fay.*

souffle. Spotted or mottled by blowing liquid color upon it, as through lace or network; said of pottery decoration. *Standard, 1964.*

sough. Eng. An adit for draining a mine; a ditch; a drain. *Webster 3d.*

soumaite. An igneous rock similar to leucite monzonite. *Hess.*

sound. a. The act of striking the roof with a metal testing bar to ascertain whether or not it is strong and safe. *Hudson.* b. A dam or barrier in a mine in which the frictional resistance to the passage of water is high. Such a dam permits little water to pass through it and is said to be "sound." *Sinclair, IV, p. 2.* c. Synonym for solid, as applied to diamonds and rocks. *Long.* d. An oscillation in pressure, stress, particle displacement, particle velocity, etc., in a medium having internal forces; that is, elastic viscous, or the superposition of such propagated oscillation. *Hy.*

sound absorption. Sound absorption is the change of sound energy into some other form, usually heat, as it passes through a medium or strikes a surface. *Hy.*

sound channel. Sound waves in the surface layers of the ocean tend to be refracted downward due to decrease of temperature with depth. In deep waters the sound waves are refracted upward by pressure which is more effective in determining the refractive index of these layers than is the decreasing temperature. The result is the formation at middepth of a wave guide which permits compressional waves of acoustic frequencies to travel great distances. *Hy.*

sound-energy density. At any point in a sound field, the sound energy contained in a given infinitesimal part of the medium divided by the volume of that part of the medium. *Hy.*

sound field. A sound field is a region containing sound waves. *H&G.*

soundhead. A cylinder containing the transmitting projector and the receiving hydrophones. Abbreviation, fm. *Hy.*

sounding. a. Knocking on a roof to see whether it is sound or safe to work under. *Fay. See also* roof testing. b. Rapping on a pillar to signal a person on the other side of it, or to enable him to estimate its width. *Fay.* c. *See* sounding the roof. *Nelson.* d. A rough method of judging by sound the direction and distance apart of two roadways driven in coal to meet each other. The sounding is made by giving two slow and three sharp knocks on the solid coal which is answered in similar manner from the opposite roadway. The method is sometimes called chap. *Nelson.* e. Subsurface investigation by observing the penetration resistance of the subsurface material without drilling holes. This can be done by driving a rod into the ground or by using a penetrometer. *Long. See also* penetrometer, soil. f. The measurement of the distance between a given point on the surface of the water and the bottom directly beneath. This may be accomplished by a weight attached to a line or by sonic means. *Hy.*

sounding lead. The hand lead used in sounding. *Ham.*

sounding rod. A closed pipe, 1 inch in diameter, with a flush point and a driving tip, used in sounding. *See also* sounding. *Long.*

sounding the roof. a. Tapping the rock roof with a pick to test its solidity. A sharp ringing sound would suggest film solid strata, whereas a hollow drummy sound would suggest bed separation and instability. Naturally, a roof is supported whatever sound it yields. *Nelson.* b. Same as sounding the top. *See also* roof testing. *BuMines Staff.*

sounding the top. Tapping the roof with a pick or bar to test its soundness; the first thing a miner does when he begins his day's work. *Korson.*

sound intensity. In a specified direction at any point, the average rate of sound energy transmitted in the specified direction through a unit area normal to this direction at the point considered. *Hy.*

soundness. a. The freedom of a solid from cracks, flaws, fissures, or variations from an accepted standard. It is a measure of the freedom of cement from expansion on setting as measured by the LeChatelier test. *Taylor.* b. A hydrated lime is sound when it contains no particles of unslaked lime, water-burnt lime, or any other similar type liable to decompose in subsequent processes, causing either expansion or localized high temperature. *Stowell.* c. As applied to portland cement, refers to its volume stability after it has set. *Compare* unsoundness, c. *Dodd.*

sound pressure. At any point in a medium, the instantaneous pressure at that point in the presence of a sound wave, minus the static pressure at that point. *Hy.*

sound pressure level. The level, in decibels, of a sound is 20 times the logarithm to the base of the ratio of the pressure of this sound to the reference pressure. The reference pressure must be explicitly stated. *Hy.*

sound transmission quality. Water is excellent medium for sound transmission. Sound travels faster with smaller energy losses in water than in air. Acoustic methods thus are best known for transmission of intelligence through the water mass. Sound velocity in seawater is independent of wavelength. *Hy.*

sound velocity. The rate at which the sound wave travels through the medium. Velocity is equal to the square root of the quantity elasticity divided by density. *Hy.*

sound wave. a. Sometimes used interchangeably with shock wave; technically, a wave motion in the air which affects the human ear as sound. Owing to the reflection of waves from the various surfaces, the sound is more or less pronlonged, and as it reaches a given point is really a series of vibrations. *Rice, George S.* b. The wave of compression emanating from any sound source. Since sound travels as a wave of compression it heats the water as it passes through the water mass. Density and compressibility thus influence the velocity of sound; increasing density due to temperature, salinity, and pressure changes increases the velocity. High frequency waves above 10,000 cycles per second have very short range because absorption is high. Low frequencies have greater range. *Hy.* c. Same as longitudinal wave. *Lewis, p. 313.*

sour. a. Having an acid or tart taste; applied to minerals having the taste of sulfuric acid. *Fay.* b. In ceramics, to macerate and render fit for plaster or mortar; said of lime. *Webster 3d.*

source. a. In seismic prospecting either (1) the point of origin or shot from which elastic waves are propagated or (2) the formation, horizon, interface, or boundary at which the seismic wave is refracted and/or reflected and returned to the surface. In earthquake seismology, the point of origin of an earthquake. In neutron logging, the source of neutrons at one end of the logging tool. *A.G.I.* b. A radioactive material packaged to produce radiation for experimental or industrial use. *L&L.*

source area. The area from which the sedimentary material is derived. *Schieferdecker.*

source beds. Rocks in which oil or gas has been generated. *A.G.I.*

source container. The container housing a sealed source in a radiation process, and providing radiation shielding and security devices. *NCB.*

source holder. The holder which provides the immediate mounting and shrouding of a sealed source and is fitted within the source container. *NCB.*

source material. In atomic energy law, any material, except special nuclear material, which contains 0.05 percent or more of uranium, thorium, or any combination of the two. *L&L.*

source-receiver product. In seismic prospecting, the product of the number of detectors per trace and the number of shotholes fired simultaneously. *A.G.I.*

source rock. The geological formation in which oil, gas, and/or other minerals originate. *A.G.I.*

sourdough. a. Old-fashioned and seasoned prospector. *Pryor, 3.* b. A miner who has lived in Alaska more than one season. *von Bernewitz.*

sour gas. Slang for either natural gas or a gasoline contaminated with odor-causing sulfur compounds. In natural gas the contaminant is usually hydrogen sulfide, which can be removed by passing the gas mixture through carbonate solutions containing special metal or organic activators. In gasolines, the sour contaminents are usually mercaptans, which are removed in the doctor treatment or by ethylene oxide with a phenolic catalyst. The improved gas or gasoline is known as sweet gas. *CCD 6d, 1961.*

souring. a. An alternative term for aging. *See also* aging. *Dodd.* b. The storage for a short while of the moistened batch for making basic refractories; some magnesium hydroxide is formed and this acts as a temporary bond after the bricks have been shaped and dried. If souring is allowed to proceed too far, cracking of the bricks is likely during drying and the initial stages of firing. The high pressure exerted by modern brick presses generally gives sufficient dry strength without the bricks being soured, and this process is therefore now generally omitted. *Dodd.*

sour oil; sour gas. Crude oil containing an abnormally large amount of sulfur and sulfur compounds; or natural gas which contains objectionable amounts of hydrogen sulfide and other sulfur compounds. *A.G.I.*

South African. Whole-stone diamonds having outside faces that are smooth as contrasted to the pebbly, encrusted surface of a Congo diamond; also applied to diamonds produced in South African mines as contrasted to those found in the Sierra Leone, Congo, Brazil, etc. *Long.*

South African jade. Same as garnet jade. *English.*

Southerndown beds. A local series of massive and in part conglomeratic limestones found in South Wales and forming part of the Lower Lias; deposited as coastal deposits near islands of Carboniferous limestone rising through the Liassic seas. *C.T.D.*

southern pine. Long-leaf, yellow pine used principally in heavy construction work. Is often spoken of as southern pine although there are a number of varieties native to the southern states. *Crispin.*

southing. A distance measured southwards from an east-west reference line. *Ham.*

south-seeking pole. *See* north-seeking pole. *Morris and Cooper, p. 197.*

South Staffordshire method; thick-seam method. *See* room-and-pillar method. *Fay.*

southwestern cell. Pneumatic flotation machine consisting of long tank with V-shaped base into which pipes connected with a low-pressure source deliver compressed air. Internal baffles provide an air lift and the cell discharges a mineralized froth along one or both sides, the tailing leaving at the far end. The Britannia cell is a modified form. *Pryor, 3.*

souzalite. A hydrous phosphate, $(Al,Fe)_2O_3.3(Mg,Fe)O.2P_2O_5.5H_2O$, green, fibrous, monoclinic (?); an alteration product of scorzalite from Divino, Brazil. *Spencer, 18, M.M., 1949.*

sovereign gold. Standard 22 carat gold, containing 91.7 percent gold and 8.3 percent copper. *Osborne.*

sövite. An igneous rock composed of pyrogenic calcite. *A.G.I. Supp.*

sow. a. Mold of larger size than a pig. *Webster 3d.* b. A channel or runner which conducts the molten metal to the rows of molds in the pig bed. *Webster 3d.* c. A mass of metal solidified in such a channel or mold. *Webster 3d.* d. An accretion that frequently forms in the hearth or crucible of a furnace; it consists mainly of iron. Also called salamander, bear, or shadrach. *Fay.*

sowback. The same as hogback or horseback; a kame or drumlin. *Fay.*

sow block. In forging, a removable block set into the hammer anvil to lessen the wear of the anvil. *ASM Gloss.*

Soxhlet thimble. A dust-sampling instrument. In this apparatus, a paper thimble, after being dried at 105° C and weighed, is fastened to the tapered end of a ground-glass tube which, in turn, is fitted into a copper holder and placed with its open end facing the airstream. A hand pump and air meter are attached to the copper holder to draw a measured volume of air at a standard rate through the filter, and a sample of dust is retained. A true sample of the airborne dust can be collected by this apparatus only when air is drawn through the filter tube at the same velocity as that of the body of air outside. The apparatus gives a gravimetric mass sample, with no information on the size distribution of the dust collected. Is useful where a sample is needed for determining mass concentration and for collecting dust for chemical, petrological, and X-ray analysis. *See also* Hexhlet sampler; tyndallometer. *Roberts, I, pp. 117-118.*

soykerdraad. A local name in the Repubilc of South Africa for a hard, crocidolite asbestos of needlelike structure. *Hess.*

spaad. A fibrous talc. From the German spath. *Fay.*

space. In a screen, the actual dimension of the clear opening between adjacent parallel wires or bars. *Nichols.*

space coordinates. In photographic mapping, the three coordinates of a point defining its horizontal position and elevation with reference to some system of ground coordinates. *Seelye, 2.*

spaced loading. a. Loading so that cartridges or groups of cartridges are separated by open spacers which do not prevent the concussion from one charge from reaching the next. *Nichols.* b. *See* deck loading. *Nelson.*

space frame. A three-dimensional frame which is stable against wind pressures without being braced against any other structure. *Ham.*

space group. a. Applied to the whole array of symmetry elements in a crystal framework or lattice. There are 230 space groups. The atoms in any crystal must be arranged so that they fit into one of these groups. The framework composing a space group is called a space lattice. *Miall.* b. A grouping together of identical space lattices either by interpenetration or by rotation about a definite axis. *C.T.D.*

space lattice. a. A three-dimensional pattern of points so arranged as to determine, by indefinite repetition, sets of equally spaced parallel planes in various directions forming polyhedral cells (as in a honeycomb). Specifically, a set of such points occupied by the atoms of a crystal. *Webster 3d.* b. The pattern formed by the spatial distribution of atoms or radicals in a crystal. *Hackh's Chem. Dict. See also* crystal pattern; lattice.

space nipple. A nipple with a portion of pipe or shoulder between the two threads. It may be of any length long enough to allow a shoulder. *Strock, 3.*

space of discission. According to Posepny, a space or opening in or between rocks, formed by deformation of the rocks. Opposite of space of dissolution. *Fay, p. 221.*

space of dissolution. According to Posepny, a space or cavity in or between rocks, formed by the dissolving away of rock material. Opposite of space of discission. *Fay, p. 222.*

spacer. a. A piece of metal wire twisted at each end so as to form at one end a guard to keep the explosive in a shothole in place and at the other end another guard to hold the tamping in its place, thus providing an open space between explosive and tamping. When this is provided, the charge constitutes a cushion shot. *Zern.* b. Piece of wood doweling which is interposed between charges to extend the column of explosive. *Nelson.* c. A marker block. Also called spacer block. *Long.* d. A device for holding two members at a given distance from each other. Also called spacer block. *Long.* e. The tapered section of a pug joining the barrel to the die; in this section beyond the shaft carrying the screw or blades, the clay is compressed before it issues through the die. *Dodd.*

spacer strip. A metal strip or bar inserted in the root of a joint, prepared for a groove weld, to serve as a backing and to maintain root opening throughout the course of the welding operation. *ASM Gloss.*

spacing. a. The distance between adjacent shotholes in a direction parallel to the quarry or other face. *Nelson.* b. *See* spacing of holes. *Fraenkel.*

spacing of holes; spacing. The distance between two adjacent holes in a cut or a bench. *Fraenkel.*

Spackman System. *See* coal constituent classification. *IHCP, 1963, part I.*

spad. a. A means of marking an underground survey station that consists of a flat spike in which is drilled a hole for the threading of a plumbline. *B.S. 3618, 1963, sec. 1.* b. *See* spud, a. *Fay.*

spade. A cameo cutter's tool, used with diamond powder. *Webster 2d.*

spade drill. *See* flat drill. *ASM Gloss.*

spade-end wedge. A type of deflecting wedge. *See also* deflecting wedge. *Long.*

spadiard. Corn. A worker in the tin mines. *Standard, 1964.* Also called spalliard. *Fay.*

spake. A term used in South Wales for a train of man-riding carriages, for use on the main slants at the beginning and end of each shift. The seats are so arranged that they are horizontal when the carriage is on the inclined slant. *See also* man-riding car; man-riding conductor. *Nelson.*

spale. a. Corn. In mining, to fine for disobedience of orders. *Fay.* b. A variation of spall, c. *Fay.*

spall. a. A relatively thin, commonly curved and sharp-edged piece of rock produced by exfoliation. *A.G.I. Supp.* b. To break off in layers parallel to a surface. *A.G.I. Supp.* c. To break ore. Ragging and cobbing are, respectively, coarser and finer breaking than spalling, but the terms are often used interchangeably. Pieces of ore thus broken are called spalls. Also spelled spawl. *Fay.* d. In masonry, to reduce irregular blocks of stone, approximately to size by chipping with the hammer. Also spelled spawl. *Webster 3d.*

spalliard; spallier. Eng. A pickman; a working miner. A laborer in tinworks. *Fay.*

spalling. a. To break off small flat pieces of rock, formerly by means of fire setting. Rock under excessive tension may also spall, that is, throw off thin surface slabs. *Sandstrom.* b. Flaking off of rock, mineral, or metal from its surface. Hand breaking of ore values away from gangue. Chipping to shape of masonry. *Pryor, 3.* c. The cracking of a refractory product or, in severe cases, the breaking away of corners or faces. The principal causes are: thermal shock, crystalline inversion, a steep temperature gradient, slag absorption at the working face with a consequent change in properties, or pinching due to inadequate expansion allowance. *See also* hotplate spalling test; panel spalling test. *Dodd.* d. The chipping of vitreous enamelware in consequence of internal stress. *Dodd.*

spalling floor. A place for breaking ore with a 4- to 5-pound sledge hammer. *Bureau of Mines Staff.*

spalling of refractories. The cracking or rupturing of a refractory unit, which usually results in the detachment of a portion of the unit. *ASTM C71-64. See also* structural spalling; thermal spalling.

spalmandite. A contraction of spessartite and almandite, for garnets of intermediate composition. *English.*

spalt. A scaly, whitish mineral, used as a flux for metals. *Standard, 1964.*

span. a. The horizontal distance between the side supports or solid abutments along sides of a roadway. *See also* abutment; pressure arch. *Nelson.* b. The horizontal distance between the supports of a bridge, arch, beam, or similar structural member. *See also* clear span; effective span. *Ham.*

span beam. Eng. A long wooden beam supporting the head pivot of the drum axle of a gin, and resting at the extremities upon inclined legs. *Fay.*

spandite. A contraction of spessartite andradite, applied to garnets intermediate in chemical composition between spessartite and andradite. *See also* garnet. *English.*

spangle gold. Aust. Smooth, flat scales of gold. *Fay.*

spangolite. Chemical formula probably $(AlCl)SO_4.6Cu(OH)_2+3H_2O$. A basic copper and aluminum chlorosulfate, carrying about 47.7 percent copper. Crystallization, rhombohedral; fracture, conchoidal. Color, dark green; luster, vitreous. Hardness 2 to 3. Specific gravity, 3.14. Occurrence: Cochise County, Ariz. *Weed, 1918.*

Spanish amethyst. A term formerly used for fine purple amethysts of unknown origin, marketed through Spain. *Shipley.*

Spanish chalk. A variety of talc or soapstone from Aragon, Spain. *Fay.*

Spanish citrine. Citrine from Spain, especially that called Hinjosa topaz. *Shipley.*

Spanish emerald. Emerald of the finest quality (presumably from South America). *Schaller.*

Spanish furnace. Reverberatory furnace used in the smelting of lead. *Bennett 2d, 1962.*

Spanish lazulite. Iolite. *Shipley.*

Spanish ocher. A variety of red ocher. *Standard, 1964.*

Spanish tile. A fired clay roofing tile that, in section, is a segment of a circle; the tile tapers along its length so that the lower end of one tile will fit over the upper end of the tile below. *Compare* Italian tiles. *Dodd.*

Spanish topaz. A trade name for orange-brown quartz, the color resembling that of the honey-brown Brazilian topaz. It is often amethyst which has been heat-treated. *C.T.D.* Also called false topaz.

spanner man. The man who repairs and maintains rock drills and who is generally the leading miner on tunneling or shaft-sinking work. *Ham.*

spar. a. As used loosely, almost any transparent or translucent, readily cleavable, crystalline mineral having a vitreous luster, as calcspar, fluorspar, feldspar, heavy spar, etc. *Fay.* b. A Cornish name for quartz. *Fay.* c. Applied locally by miners to small clay veins found in coal seams. *A.G.I.*

sparable ore. A nonmetallic tin ore occurring in small granules. *Osborne.*

sparable tin. Corn. Tin ore in grains like sparables, or small nails. *Webster 3d.*

sparagmite. A collective term for the late Precambrian or Jotnian Scandinavian rocks, which, like those of the Torridonian of Scotland, comprise polygenetic conglomerates, feldspathic grits, arkose, and graywacke. *Holmes, 1928.*

spar coal. Cumb. Miners' term for coal which breaks into long elastic spars or rods. *Tomkeieff, 1954.*

spare. N. of Eng. A wedge from 6 to 8 inches long, for driving behind plates when adjusting them to the circle of the shaft. Also called spear wedge. *Fay.*

spare face. A standby face. *Nelson.*

spar, Iceland. *See* Iceland spar. *C.M.D.*

spark absorber. *See* absorber, b. *C.T.D.*

spark chamber. An instrument for detecting and measuring nuclear radiation; analogous to the cloud chamber. It consists of numerous electrically charged metal plates mounted in a parallel array, the spaces between the plates being occupied by inert gas. Ionizing radiation causes sparks to jump between the plates along its path through the chamber. *See also* bubble chamber; cloud chamber. *L&L.*

sparker. A geological research device which employs an electrical spark discharge to form the outgoing signal and produces a trace in the recorder showing the subbottom strata. *Hy.*

sparking out. The practice of allowing the work piece and wheel to traverse in relation to each other without additional infeed until all contact between the two ceases. *ACSG, 1963.*

sparkle metal. A matte containing about 74 percent copper. *Webster 3d.*

spark plug. U.S.; **sparking plug.** U.K. The older type of ceramic core for sparking plugs was made of electrical porcelain; the modern type is sintered alumina. The cores are shaped by pressing, rotary tamping or injection molding; they are fired at 1,600° to 1,650° C. The standard size is 14 millimeter. *Dodd.*

spark test. a. Identification of type of iron alloy by appearance of sparks emitted when rubbed on grindstone. *Pryor, 3.* b. A method for the detection of pinholes in a vitreous enamel surface by the discharge of an electric spark. *Dodd.*

spark testing. A method of determining the approximate composition of steel by holding a sample on a grinding wheel and producing sparks. An experienced operator can detect differences in carbon content of steels of 0.05 percent in the range up to 0.35 percent and 0.10 percent in the range from 0.35 to 0.60 percent. *Ham.*

Sparnacian. Upper upper Paleocene. *A.G.I. Supp.*

sparrow-pecked. *See* stippled. *Dodd.*

sparry. Resembling, consisting of, or abounding with spar; spathic. *Webster 3d.*

sparry coal. Scot. Coal, the backs or joints of which are filled with calcite. *Fay.*

sparry iron. Siderite or chalybite. *Webster 3d.*

sparry iron ore. Siderite. *Hess.*

sparry lode. A lode filled with spar, for example, fluorspar, calcspar, or heavy spar. *Fay.*

sparse vitrain. A field term to denote, in accordance with an arbitrary scale established for use in describing banded coal, a frequency of occurrence of vitrain bands comprising less than 15 percent of the total coal layer. *Compare* abundant vitrain; dominant vitrain; modern vitrain. *A.G.I.*

sparstone. Gypsum. *Arkell.*

spar sulfur. A miner's term for deposits of pyrite found in vertical or inclined veins in fissures in the coalbed where sometimes they are as much as 4 inches thick. *Mitchell, p. 67.*

spartaite. A variety of calcite containing some manganese. *Fay.*

spartalite. An old name for zincite. *C.M.D.*

spastolith. Applied to notably deformed ooliths. *Pettijohn, 2d, 1957, p. 97.*

spathic. Of, pertaining to, or resembling spar; especially, having cleavage. *Standard, 1964.*

spathic iron. A native ferrous carbonite, also called siderite, containing 48 percent iron and usually traces of manganese. It is the best native ore for making steel tools by the direct method formerly used. *Sandstrom. See also* siderite.

spathization. a. The widely distributed crystallization of calcite or dolomite, forming either open or closed fabrics. *A.G.I.* b. The development of relatively coarse sparry crystals. *A.G.I. Supp.*

spathose. Same as spathic. *Fay.*

spathose iron. Carbonate of iron, $FeCO_3$. *See also* siderite. *Nelson.*

spatter. a. Agglutinated clots of primary magmatic ejecta larger than lapilli and erupted in a fluid or plastic condition, commonly accumulating around isolated vents as cones or mounds, or along fissures as ramparts. Spatter is produced mainly by the frothing of erupting magma in lava fountains. Essentially synonymous with driblet. *A.G.I.* b. The metal particles expelled during arc or gas welding. They do not form part of the weld. *ASM Gloss.*

spatter cone. A secondary or parasitic lava cone. *Fay.*

spatterdash. A rich mix of portland cement and coarse sand, such as 1 to 2 by volume, which is thrown onto a background by a trowel, scoop or other appliance, so as to form a thin, coarse-textured, continuous coating. As a preliminary treatment before rendering, it assists bond of the undercoat to the background, improves resistance to rain penetration, and evens out the suction of variable backgrounds. *Taylor.*

spatter loss. The metal lost due to spatter. *ASM Gloss.*

spatter rampart. A low wall of coagulated spatter or agglutinate, built by a lava fountain along the sides of an eruptive fissure. The structures range in height from a few inches to 15 or 20 feet and in thickness from 1 to 10 feet. They merge into spatter cones. *A.G.I.*

spattle. a. To sprinkle, as earthenware, with glaze or colored slip; to make party-colored ware. *Standard, 1964.* b. A tool for mottling a molded article. *Standard, 1964.*

S.P. curve. *See* spontaneous, b. *Wyllie, p. 1.*

spattling machine. A machine for spattling earthenware. *Standard, 1964.*

spatula. A long, narrow instrument of metal, horn, or other material, usually flat, but sometimes spoon-shaped or trowel-shaped. Used by enamelers, fresco painters, sculptors, druggists, and dentists to spread enamel, plaster, etc., as on a plate or a mold. *Standard, 1964.*

spavin. York.; Leic. Fire clay or other hard unstratified clay and sand in the Coal Measures. The more siliceous varieties are called ganister and calliard. *Arkell.*

spawl. *See* spall. *Fay.*

spawl beater. *See* sledger, b. *D.O.T. 1.*

speak. Aust. To give signs of weight by cracking; said of mine props. *Fay.*

speaking flame lamp. Eng. An early type of safety lamp. *See also* singing lamp. *Fay.*

spear. a. One of several types of fishing tools designed to be driven and wedged inside of bits, rods, etc., lost in a borehole. *Compare* fishing tap. *Long.* b. A rodlike fishing tool having a barbed-hook end, used to recover rope, wire line, and other materials from a borehole. *Long.* c. Eng. A wooden pump rod cut into lengths of about 40 feet, and, for heavy work, often measuring 16 inches square. Wrought iron spears are also used. *Fay.*

spearhead. a. The point of convergence of two cross faces set off in the form of the letter V. *T.I.M.E.* b. A conical head on a wire-line core barrel, engaged by the dogs on the overshot assembly for the purpose of removing the inner tube of the core barrel from a borehole. *Long.*

spear plates. Eng. Wrought-iron plates bolted to the sides of spears where joined together. *Fay.*

spear pyrite. A marcasite in twin crystals resembling the head of a spear. *Webster 3d.*

spear wedge. Aust. A long wooden wedge used for centering iron tubbing and which helps to pack up the space between the tubbing and the rock. Also called spare. *Fay.*

special. *See* special rounds. *Long.*

special cokes. *See* coke tinplate. *Bennett 2d, 1962.*

special dynamite. Brand name applied to a series of ammonia-type dynamites. They are more economical, less flammable, and relatively safer than nitroglycerin dynamites. Used in open-pit mining, in quarrying, in construction projects, and in general blasting. *CCD 6d, 1961.*

special flexible rope. A wire rope composed of 6 strands of 37 wires each. *Lewis, p. 248.*

special gelatin. Brand name applied to a series of an ammonia-gelatin-type dynamites. Used in open-pit mining, in underground metal mining, in quarrying, and in construction projects. *CCD 6d, 1961.*

special hydrated lime. *See* Type S hydrated lime.

special improved patent. Wire with a tensile strength of 90 to 100 tons per square inch (140 to 160 kilograms per square millimeter. *Ham.*

special improved plow. Wire with a tensile strength of 110 to 120 tons per square inch (175 to 190 kilograms per square millimeter). *Ham.*

specialist. A broker who confines his operations to a single group of securities. *Hoov, p. 281.*

special nuclear material. In atomic energy, it includes plutonium, uranium 233, uranium containing more than the natural proportion of uranium 235 (or more than 0.72 percent of uranium 235), or any material artificially enriched by any of these substances. *L&L; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-143.*

special oxides. *See* oxide ceramics. *Dodd.*

special place. Aust. A place where coal cannot be won so easily as in ordinary working places; for example, development work, headings, etc. *Fay.*

special purpose sampling. The American Society for Testing and Materials divides coal sampling into "commercial sampling" and "special purpose sampling." Special purpose sampling procedures apply when special accuracy is required, and four to nine times the number of increments required in the commercial procedures reduce the expected limits of error of the gross sample by one-half to one-third. *Compare* commercial sampling. *Mitchell, p. 81.*

special purpose tile. A tile, either glazed or unglazed, made to meet or to have specific physical design or appearance characteristics, such as size, thickness, shape, color, or decoration; keys or lugs on backs or sides; special resistance to staining, frost, alkalies, acids, thermal shock, physical impact, high coefficient of friction, or electrical properties. *ASTM C242-60T.*

special rounds. Sometimes used to designate a very high quality or grade of drill diamonds. *Long.*

special shapes. Refractories molded into shapes, the size and contour of which differ from the series of standard shapes. *A.R.I.*

special-shapes man. *See* cut-work man. *D.O.T. 1.*

special steel. A steel containing alloys which provide special properties such as resistance to corrosion or to heavy load. Also called alloy steel. *Ham.*

species. All organisms, of either animal or vegetable kingdoms, which possess in common, a set of constant characteristics and the whole of which form a distinct and well-defined type would constitute a species. *See also* genus. *Nelson.*

specific. Word used with a special meaning in mineral dressing, where minerals of the same species often exhibit differences in their reactions. "Specific to" warns the observer that the process in hand is empirical in some ways, designed to apply to one specific ore body. *Pryor, 3.*

specific adhesion. The chemical bond between glued or cemented surfaces as distinct from any form of mechanical bond. *Ham.*

specific adsorption. Selective adsorbing action. *Pryor, 3, p. 7.*

specification. A detailed statement of particulars. *Crispin.*

specific damping capacity. A measure of the vibrational energy absorbed by the rock and may be considered to be a measure of the internal friction. It is determined by the sharpness of resonance that is evident when a specimen is vibrated through a range of frequencies centered on the fundamental longitudinal resonant frequency. Damping of the dry type (coulomb damping) is commonly assumed to be independent of the velocity, and thus independent of the frequency, and is somewhat sensitive to moisture content. *Lewis, pp. 569-570.*

specific energy. In cutting or grinding, the energy expended or work done in removing a unit volume of work material, usually expressed as inch-pound per cubic inch or horsepower per minute per cubic inch. *ASM Gloss.*

specific extraction of rock broken. Quantity of broken rock (ore) in volume or weight per foot drilled or fired per pound of explosive (cubic yard per pound, ton per pound; or, cubic yard per foot drilled, ton per foot drilled. *Fraenkel.*

specific gravity. a. The weight of a substance compared with the weight of an equal volume of pure water at 4° C. *Anderson.* b. The ratio between the weight of a unit volume of a substance and that of some other standard substance, under standard conditions of temperature and pressure. For solids and liquids, the specific gravity is based upon water as the standard. The true specific gravity of a body is based on the volume of solid material, excluding all pores. The bulk or volume specific gravity is based upon the volume as a whole, that is, the solid material with all included pores. The apparent specific gravity is based upon the volume of the solid material plus the volume of the sealed pores. *HW. See also* specific gravity of solids; apparent specific gravity; bulk specific gravity (specific mass gravity). c. Ratio of densities of a gas and air. Based on dry air = 1. *Hartman, p. 8.* d. In oceanography, the specific gravity is considered numerically equal to the density. *Hy.*

specific-gravity hydrometer. A hydometer indicating the specific gravity or relation of the weight of a given liquid per unit volume to the weight of a given unit volume of water. *Compare* hydrometer; Marsh funnel; Twaddell hydrometer. *Long.*

specific gravity of soil grains. This is measured in a calibrated glass bottle with special precautions against the inclusion of air. Such test is applied in many soil problem computations. *See also* pycnometer. *Ham.*

specific gravity of solids. The ratio of the weight in air of a given volume of soil solids at a stated temperature to the weight in air of an equal volume of distilled water at a stated temperature. *ASCE P1826.*

specific heat. a. Heat required to raise the temperature of a unit weight of air 1° F. Usually, the specific heat at constant pressure is used in air conditioning. Measured in British thermal units per pound per degrees F. *Hartman, p. 8.* For ordinary concrete and steel it is 0.22 and 0.12 British thermal unit per pound per degree F, respectively. *Taylor.* b. The ratio of the amount of heat required to raise a unit weight of a material 1 degree to the amount of heat required to raise the same unit weight of water 1 degree. *Brantly, 2.* c. The heat in calories required to raise the temperature of 1 gram of a substance 1° C. *Webster 3d.*

specific humidity. a. The mass of moisture per unit mass of dry air. *Roberts, I, p. 127.* b. Absolute humidity, or weight of water vapor contained per unit weight of dry air. Measured in grams, or pound per pound. *Hartman, p. 8.*

specific permeability. The permeability measured when the rock contains only one fluid. *Institute of Petroleum, 1961, p. 20.*

specific population. Number of particles in unit volume of pulp. *Pryor, 4.*

specific power. a. The power generated in a nuclear reactor per unit mass of fuel. Expressed in kilowatts of heat per kilogram of fuel. *L&L.* b. The same as unit power. *ASM Gloss.*

specific resistance. Same as resistivity. *Wyllie, p. 2.*

specific retention. As applied to a rock or soil, the ratio of the volume of water which, after being saturated, it will retain against the pull of gravity to its own volume. It is stated as a percentage. *A.G.I.*

specific speed. a. A factor by which the performance of any particular design of impeller for a centrifugal pump or water turbine can be computed. It is the speed in revolutions per minute at which a geometrically similar impeller of suitable diameter will rotate to deliver one gallon per minute at one foot head in the case of a pump. In a water turbine, the specific speed is that at which a geometrically similar runner of suitable diameter will turn to develop one horsepower under a head of one foot. *Ham.* b. The speed in revolutions per minute at which a geometrically similar pump would deliver one gallon of water per minute against a head of one foot of water. *Sinclair, IV, p. 67.* c. The particular speed at which a fan achieves its maximum efficiency. *Roberts, I, p. 190.*

specific surface. a. The surface area per unit of volume of soil particles. *ASCE P1826.* b. The ratio of the total surface of a substance (as an adsorbent) to its volume; surface area (as of a finely divided powder) per unit mass. *Webster 3d.*

specific surface area. The ratio between the total surface area of a number of particles and their total weight, usually expressed in square centimeters per gram. *Taylor.*

specific volume. a. Volume of one gram at specified temperature. *Pryor, 3.* b. Volume per unit weight of dry air. Not equal to the reciprocal of density, which is based on unit volume of mixture. Measured in cubic feet per pound. *Hartman, p. 9.* c. The volume occupied by a unit of air. Usually given in cubic feet per pound. *Strock, 10.*

specific-volume anomaly. The difference in specific volumes of the sample under the conditions which prevailed in situ and the conditions if at salinity 35°/00 and temperature 0° C. *Hy.*

specific weight of sediment. The dry weight per unit volume of the sediment in place. *See also* dry density. *Nelson.*

specific yield. As applied to a rock or soil, the ratio of the volume of water which, after being saturated, will yield by gravity to its own volume. This ratio is stated as a percentage. *A.G.I.*

specified dimensions. The dimensions to which masonry units or constructions are required to conform. Actual (measured) dimensions may differ from the specified dimensions by permissible variations. *ASTM C43-65T.*

specimen. a. A small mass of coal, rock, ore, mineral, or soil, which gives, roughly, an idea of the kind and quality of the deposit from which it was derived. In the case of ore in particular, the specimen should admit of the identification of the various minerals present. A specimen cannot be viewed as a sample. *Nelson.* b. Properly speaking, a sample of anything; but among miners it is often restricted to selected or handsome minerals, as fine pieces of ore, crystals, or pieces of quartz containing visible gold. *Fay.* c. A lump of gold intermixed with quartz or very rich in gold. *Gordon.*

specimen boss. An employee whose duty is to watch carefully, in all parts of the mine, for the appearance of high-grade mineral, and when it is likely that such spots will be opened up he should be the first man at the face after the blast. His job is to prevent high grading (the theft of valuable samples). *Hoov, pp. 494-495.*

specimen hunting. Another name for high grading. *Hoov, p. 490.*

specimens. In mineral dressing, unusually rich pieces of ore or characteristic constituents thereof in coarsely crystalline form—not representative samples. *Pryor, 4.*

speck. A small piece of alluvial gold weighing up to 1 or 2 ounces. *Gordon.*

specking. a. Walking over the ground on the chance of picking up a lump of gold on the surface. *Gordon.* b. The discoloration of an enamel surface due to foreign particles of dirt or scale imbedding themselves in the enamel. This trouble may often be avoided by the use of burning equipment in good condition and proper care in the burning operation. *Enam. Dict.*

speckled ware. A decorative finish with particles of one color appearing in a uniform background of another color or shade. *ASTM C286-65.*

specks, black. In the enameled surface, may be caused by the accidental introduction of foreign particles or by minute bubbling formations in the sheet-iron ground coat during the early stages of firing the first cover coat. *Hansen.*

speckstone. Adapted from speckstein, "bacon stone"; an early name for talc, because it feels greasy. *Fay.*

spectacle. A two-handled frame for carrying well-boring tools. *Standard, 1964.*

spectacle furnace. A form of smelting shaft furnace, used in Germany, with two tapholes, having an inclined bottom from which the melted metal flows into an outside receptacle. *Standard, 1964.*

spectacle stone. An early popular name for selenite, alluding to its transparency. *Fay.*

spectral gamma-ray log. Record of the radiation spectrum and relative intensities of gamma rays emitted by strata penetrated in drilling. Because of their different energies the relative amounts of radioactivity contributed by different elements can be determined. *A.G.I. Supp.*

spectral shift reactor. A nuclear reactor concept in which heavy water moderator is added to, or subtracted from, the light water in the coolant–moderator stream to change the average speed of the neutrons that cause fission. Since the probability of neutron capture varies with neutron velocity, a measure of reactor control is thus obtained. *L&L.*

spectrograph. An apparatus for determining the presence and concentration of metallic constituents in a material and for producing a photographic record by indicating the existence and intensity of characteristic wavelengths of radiation when the material is excited either electrically or thermally. *Henderson.*

spectrographic analysis. Analysis by obtaining the spectrum of a substance and matching lines in the spectrum with known wavelengths of lines in the spectra of the elements. The analysis can be made quantitative by comparing intensities of the spectral lines. *A.G.I.*

spectrography. a. Qualitative or quantitative analysis by visual or photographic assessment of a spectrum of the substance. In emission spectrography, the material is made incandescent in an electric arc; in X-ray work it is bombarded by X-rays and the interference is recorded by a camera, or Geiger-Muller tube and scaler; in sorption spectrography the substance is dissolved and the effect on a beam of visible or ultraviolet light is measured by use of a photoelectric cell. *Pryor, 3.* b. The art or technique of using the spectrograph. *Webster 3d.*

spectrometer. An optical instrument similar to, but more versatile than, the simple spectroscope. Scales are provided for reading angles. A wavelength spectrometer is one designed or equipped in a manner to measure the wavelengths at which absorption bands occur in an absorption spectrum. *Shipley.*

spectrometry. The art or process of using the spectrometer or of measuring wavelengths of rays of a spectrum. *Webster 3d.*

spectrophotometer. An instrument to detect very slight differences in color of solutions of different chemicals and thus measure the quantity of the chemical present. It consists of a light source, an optical prism for providing monochromatic light, that is, light of a single wavelength only, and a device for measuring the intensity of the light beam after it has passed through the solution. Traces of aluminum in steel may be determined in this way. *See also* X-ray spectrograph. *Nelson.* Also called spekker.

spectroscope. Instrument in which collimated light is directed through a narrow slit onto either an optical prism or a diffraction grating, exhibiting its spectrum. The elements from which light emanates have characteristic patterns which aid in their identification. *Pryor, 3.*

spectrum. A band of light showing in orderly succession the rainbow colors or isolated bands or colors corresponding to different wavelengths, as seen through a spectroscope or photographed in a spectrograph. The visible spectrum is only a small region in the vast spectrum of electromagnetic waves, which extend from the longest radio waves to the minutely short waves (gamma rays) emitted by radioactive elements. *See also* emission spectrum; continuous spectrum; absorpton spectrum. *Anderson.*

spectrum analysis. Identification and rough quantification by measurement of characteristic radiations (emission spectrography) or sorptions of light (sorption spectrography). *Pryor, 3, p. 20.*

spectrum colors. The hues into which white light is separated upon passing through a prism. Six of these hues are easily distinguished by the eye: red, orange, yellow, green, blue, and violet. *See also* visible spectrum. *Shipley.*

spectrum density. The spectrum density of an oscillation is the mean-square amplitude of the output of an ideal filter with unity gain responding to the oscillation, per unit bandwidth; that is, the limit for vanishingly small bandwidth of the quotient of the mean-square amplitude divided by the bandwidth. *Hy.*

spectrum intervals. Sometimes used to designate frequency bands represented by intervals on either a linear or a logarithmic frequency scale. *Hy.*

spectrum level. With a specified signal at a particular frequency, the level of that part of the signal contained with a band one cycle per second wide, centered at the particular frequency. Ordinarily this has significance only for a signal having a continuous distribution of components within the frequency range under consideration. The phrase spectrum level cannot be used, but must appear in combination with a modifier, as, for example, pressure, velocity, voltage, etc. *Hy.*

spectrum pattern. A graph showing the relative response of a sonar transducer as a function of frequency for some specified bearing. *Hy.*

specular. Mirrorlike, as specular iron ore, which is a hard variety of hematite. *See also* specularite. *Fay.*

specular coal. Same as pitch coal. *Fay.*

specular gloss (45°). An operational definition of this property, relevant in the surface evaluation of glazed or enameled surfaces, is as follows: the ratio of reflected to incident light, times 1,000, for specified apertures of illumination and reception when the axis of reception coincides with the mirror image of the axis of illumination. *Dodd.*

specular iron. Variety of hematite, (Fe_2O_3), black, lustrous, metallic gleam. Mohs' hardness 5.5 to 6.5. May be micaceous in form. Contains 70 percent iron. Specific gravity 4.9 to 5.3. *Pryor, 3. See also* specularite; hematite.

specular iron ore. A variety of hematite with brilliant black color and metallic luster. *CCD 6d, 1961.*

specularite; specular hematite; specular iron; gray hematite. An iron oxide, Fe_2O_3, occurring in tabular or disklike crystals of gray color and splendent metallic luster. Contains 70 percent iron. Also called micaceous hematite if occurring in foliated or micaceous masses. *See also* hematite. *Sanford.*

specular reflection. Reflection of light from the surface only, as distinguished from reflection of light from positions below the surface. *Shipley.*

specular schist. *See* itabirite. *Fay.*

specular slate ore. A laminated ore with smooth face and brilliant reflection. *Standard, 1964. Compare* itabirite. *Fay.*

specular stone. Mica. *Standard, 1964.*

speculation. The outlay of money in an enterprise offering the hope of high reward in return for the incurring of high risk. *Hoov, p. 322.*

speculum alloy. Copper and tin alloyed in a 2:1 proportion, forming a hard, silvery metal capable of being highly polished; used in manufacture of mirrors, optical instruments, etc. *C.T.D. Supp.*

speculum metal. A hard brittle alloy of two parts copper and one part tin. It takes and retains a high polish and is therefore much used for reflectors. *Crispin.*

Spedding's flint mill. A means of illumination invented about 1750 in which a steel wheel 5 inches in diameter and driven through a gearwheel and pinion pressed on a flint and generated an abundance of sparks and emitted considerable light. The mill was carried and operated by a boy accompanying each miner. *Mason, v. 1, p. 231.*

speed. a. Corn. A quick, but wasteful way of dressing, or rather coarse cleaning of copper ore, by an iron grate in a swift current of water. *Fay.* b. The length of belt, chain, cable, or other linkage which passes a fixed point within a given time. It is usually expressed in terms of feet per minute. In the case of the rolling chain conveyor, the load is moved at a rate double the chain speed. In screw conveyors, the speed is expressed in terms of revolutions per minute and the speed at which the material is conveyed is dependent upon speed, pitch of the screw, type of flight, angle of inclination, nature of material, etc. *ASA MH4.1-1958.*

speed of travel. In welding, the speed with which a weld is made along its longitudinal axis; is usually measured in inches per minute or spots per minute. *ASM Gloss.*

speed reducer. A train of gears, totally enclosed for minework, placed between a motor and the machinery which it will drive, to reduce the speed with which power is transmitted. Belt and chain conveyors are typical examples of machinery employing speed reducers. *Jones.*

speedy moisture tester. A calcium carbide method for the quick determination of moisture. A pressure gage is calibrated to give direct values of moisture content percent of soil samples. *Nelson.*

speiss. Metallic arsenides and antimonides smelted from cobalt and lead ores. *Pryor, 3.*

speiss-cobalt. *See* smaltite.

spekker. *See* spectrophotometer.

speleogen. An individual, specific modification of the surface of a cave's bedrock or a speleothem, other than a secondary mineral deposit. *A.G.I.*

speleologist. One who scientifically investigates caverns. *Schieferdecker.*

speleology. The scientific study or exploration of caverns and related features. *A.G.I.*

speleothem. A secondary mineral deposit formed in caves. *A.G.I.*

spell. a. A rest period for crews at furnace, stock house, etc., or a period of work in drilling the taphole; a change or turn. *Fay.* b. N.S.W. Used in leaching extraction methods to describe the time during which operations are sometimes suspended for several months at a time to spell the mine. *New South Wales, p. 161.*

spellerizing. Subjecting the heated bloom to the action of rolls having regularly shaped projections on their working surface, then subjecting the bloom while still hot to the action of smooth-faced rolls. The surface working is said to give a dense texture to pipe made from the bloom, adapting it to resist corrosion. *Liddell 2d, p. 496.*

spelter. Commercial zinc of under 99.6 percent purity which is used in galvanizing. *Ham.*

spelter solder. A brazing filler metal of approximately equal parts of copper and zinc. *ASM Gloss.*

Spence automatic desulfurizer. An improved Maletra furnace provided with automatic rakes. *Fay.*

Spence furnace. A furnace of the muffle or reverberatory type, the ore being supported on shelves and stirred mechanically. *Fay.*

spencerite. a. A white basic hydrous phosphate of zinc, $Zn_3(PO_4)_2.Zn(OH)_2.3H_2O$. Radiating masses of crystals; lamellar; monoclinic. From Salmo, British Columbia, Canada. *English.* b. Carbide and silicide of Fe and Mn, $(Fe,Mn)_3(C,Si)$. Artificial. *Hey 2d, 1955.*

Spence shale. A subdivision of the Middle Cambrian at Mount Stephen in the Canadian Rockies, famous for its remarkable fossils. *C.T.D.*

spencite. A dark brown metamict borosilicate of Ca and Y, near $(Ca,Fe)_2Y_3B_3(Si,Al)_5(O,OH)_{20}$, from Cardiff Township, Haliburton County, Ontario. *Hey, M.M., 1961.*

spend. a. To break ground; to continue working. *Fay.* b. To exhaust by mining; to dig out; used in the phrase, to spend ground. *Standard, 1964.*

Spengler press. Trade name; a cam-operated, rotary table, dry-press brickmaking machine. *Dodd.*

spent fuel; depleted fuel. Nuclear-reactor fuel that has been irradiated to the extent that it can no longer effectively sustain a chain reaction. Fuel becomes spent when its fissionable isotopes have been partially consumed and fission-product poisons have accumulated in it. *L&L.*

spent shot. A blasthole that has been fired, but has not done its work. *Fay.*

spergenite. A calcarenite containing less than 10 percent of quartz and composed primarily of oölites and fossil detritus. *A.G.I.*

Spergen limestone. *See* Salem limestone. *C.T.D.*

sperone. A porous variety of leucitite containing small crystals of melanite. *Holmes, 1928.*

sperrylite. A tin-white mineral, $PtAs_2$, black streak; metallic luster. Of very rare occurrence but of interest as the only native compound of platinum. Contains 52.57 percent platinum; 43.5 percent arsenic, with some replacement of platinum by rhodium and palladium. Specific gravity, 10.60; Mohs' hardness, 6 to 7. Found in Wyoming, North Carolina, Nevada; Canada. *CCD 6d, 1961.*

Sperry process. A process for manufacturing white lead which begins with softened and desilverized lead, preferably containing some bismuth, cast in the form of anodes. These anodes are placed in the Sperry white-lead cells. Direct current is used to dissolve the lead from the anodes, with diaphragms separating the anolyte and the catholyte. Carbon dioxide is passed into the solution, white lead (basic lead carbonate) is produced, and no cathode deposit is formed. The impurities in the anodes remain on the anodes as a slime blanket. If the slime blanket falls off, the impurities will contaminate the white lead; on the other hand, if the slime blanket is allowed to become too thick, the electromagnetic force across the blanket will increase to a value high enough to force solution to metals other than lead from the face of the blanket. The Sperry process slime is washed, dried, and melted to an impure bismuth bullion, which goes to the bismuth refinery. *BuMines Bull. 556, 1956, p. 106.*

spessartine. *See* spessartite.

spessartite. a. Manganese garnet, $Mn_3Al_2(SiO_4)_3$. *C.T.D.; Dana 17.* b. A dioritic or gabbroic lamprophyre. The principal minerals are hornblende or augite or both, with plagioclase (usually andesine) feldspar. Olivine or biotite may be present, but in small amount. Apatite and opaque oxides are normal accessories. A small amount of quartz and orthoclase may occur interstitially. Since the name has already been used for a variety of garnet, it is a very unfortunate term for the lamprophyre. *A.G.I.; Sanford.*

spew. The cauliflowerlike blowout or outcrop of a lode that extends beyond the limits of the defined vein deeper down. *Fay.*

spewing. An exudation of soft material through gravelly or broken stuff bedded on mud, soft wet clay, or the like. *Webster 2d.*

sp gr Abbrevation for specific gravity. *BuMin Style Guide, p. 62.*

sphagnum peat. Peat composed mainly of bog moss. It is characterized by an open texture, is lightweight, has a high absorbing power, good isolating properties, a clean appearance, and freedom from black dust. *Tomkeieff, 1954.*

sphalerite; zinc blende; blende; black jack. Zinc sulfide, ZnS, cubic crystal, black to brown in color, resinous. Mohs' hardness 3.5 to 4.0, streak white to red-brown, specific gravity 3.9 to 4.2. *Pryor, 3.*

sphene; titanite. $CaO.SiO_2.TiO_2$; melting point, 1,386° C. This mineral has been found in the ceramic color known as chrome-tin pink. *See also* chrome-tin pink. *Dodd.*

sphenitite. An igneous rock consisting of a sphene-rich jacupirangite. *Johannsen, v. 4, 1938, p. 464.*

sphenoid. a. In crystallography, an open form in the monoclinic system, consisting of two intersecting similar faces related to one another only by a twofold symmetry axis perpendicular to their line of intersection and bisecting the dihedral angle between them. *Compare* dome. *A.G.I.* b. A disphenoid. *A.G.I.*

sphenolith. A term invented to distinguish the special form and relations of intrusion at Las Parroquias, Mex. A rock mass of the injected class, partly concordant like a thick sill, and partly discordant. The country rocks have been displaced and even overturned. *Fay.*

Sphenopterias. A fernlike tree of the coal forest characterized by round-lobed pinnules which are contracted at the base. *See also* Neuropteris. *Nelson.*

sphere. a. A solid which is bounded by a uniformly curved surface, every point of which is equidistant from a point within the solid, termed the center. *Jones, 2, p. 125.* b. Solid figure swept out by rotation of a semicircle about its diameter. *Pryor, 3.*

sphere ore. Fragments of rock encrusted with metallic minerals. Same as cocarde ore. *Fay.*

spheric. A general term applied to rocks made up of spherules. It includes such textures as oölitic, pisolitic, spherulitic, variolitic, orbicular, etc. *Johannsen, v. 1, 2d, 1939, p. 234.*

spherical coordinates. A system of three-dimensional coordinates defined by a radius and two angles (like latitude and longitude). In seismic prospecting, the radial distance and angular measures which give the orientation of pulses originating at a point source, such as a shot hole. *A.G.I.*

spherical dam. A brick or concrete seal or stopping built into a roadway to close off an area against water. The convex surface is from the water side of the roadway. The construction is built well into the ground and all crevices cemented. *Nelson.*

spherical powder. Globular-shaped particles. *ASTM B 243-65.*

spherical trigonometry. That which deals with geometric relations of figures drawn on surface of sphere. *Pryor, 3.*

spherical wave. A wave in which the wave fronts are concentric spheres. *Hy.*

spherical wave front. Spherical surface which a given phase of a seismic impulse (in an isotropic medium) occupies at any particular time. *A.G.I.*

sphericity. a. The degree in which the shape of a fragment approaches the form of a sphere. *A.G.I.* b. Ratio of surface area of sphere to that of particles of same volume. Parameter for flow through particle columns. *Pryor, 3.*

spherite. a. The preferred spelling for sphaerite. *English.* b. (of Bucher). Spherical grains, including ovulite with concentric structure and spherulite with radial structure. *Spencer 16, M.M., 1943.*

spherocobaltite. Cobalt carbonate in spherical masses and having a peachblossom red color. *Fay.*

spherocrystal. A homogeneous spherulite formed of minute crystals branching outward from the center. *Standard, 1964. See also* spherulite. *Fay.*

spheroid. In general, any figure differing but little from a sphere. In geodesy, a mathematical figure closely approaching the geoid in form and size, and used as a surface of reference for geodetic surveys. *A.G.I.*

spheroidal. a. A descriptive term applied to igneous rocks that break up on cooling into spheroidal masses analogous to basaltic columns; also, used as a synonym for orbicular, as applied to certain granites. *Fay.* b. In crystallography, enclosed by convex surfaces. *Standard, 1964.*

spheroidal graphite cast iron. The same as nodular cast iron. *ASM Gloss.*

spheroidal parting. A structure due to uniform contraction during cooling produced in igneous rocks of fine homogeneous grain and occurring as a series of concentric spheroidal or ellipsoidal cracks about compact nuclei. Each set of cracks is more strongly developed during weathering, the successive shells so produced resembling the layers of an onion, and varying in diameter from an inch or two to several feet. *Stokes and Varnes, 1955.*

spheroidal structure. Synonym for orbicular structure. *A.G.I.*

spheroidal weathering. Boulders produced chiefly by chemical weathering of rock along fractures. Such boulders are called boulders of decomposition. Synonym for concentric weathering. *A.G.I.*

spheroidite. An aggregate of iron or alloy carbides of essentially spherical shape dispersed throughout a matrix of ferrite. *ASM Gloss.*

spheroidizing. Heating and cooling to produce a spheroidal or globular form of carbide in steel. *ASM Gloss.*

spherosiderite. A variety of iron carbonate occurring in globular concretionary forms. *Fay.*

spherulite. A small, radiating and usually concentrically arranged aggregation of one or more minerals, generally of spherical or spheroidal shape, formed by the radial growth of acicular crystals in a rigid glass about a common center or inclusion. Such structures are especially common in the glassy groundmass of silicic lava flows and in obsidians. *A.G.I.*

spherulitic. Relating to the texture of igneous rocks in which spherulites are very abundant. *A.G.I.*

spherulitic jasper. Jasper with inclusions of spherulites which are usually quartz. If they are of different color from the jasper it is usually an orbicular jasper. *Shipley.*

spherulitic ore. A globule of ore having a radiated structure. Sphere ore. *Fay.*

spherulitic structure. A structure in which spherulites are distributed through an igneous rock or groundmass. *Holmes, 1928.*

spherulitic texture. A texture showing groups of fibers radiating from a central point or area, and these units embedded in a groundmass. *Schieferdecker.*

sp ht Abbreviation for specific heat. *BuMin Style Guide, p. 62.*

spicularite. A sediment or rock in which sponge spicules are an important constituent. *A.G.I. Supp.*

spiculite. a. A spindle-shaped crystallite believed to represent the coalescence of a linear series of globulites. Synonym for belonite. *Holmes, 1920.* b. A rock containing abundant sponge or other siliceous spicules. *A.G.I. Supp.*

spider. a. A ring inserted at the joints of the suspension column of a borehole pump. Radial vanes from the ring support a central sleeve, which acts as a steady bearing from the pump shaft. *B.S. 3618, 1963, sec. 4.* b. A light steel hook with candleholder, once used underground to anchor tallow dip to rock crack or timber. *Pryor, 3.* c. The bowl part of a spider and slips. Also called bowl. *See also* spider and slips. *Long.* d. A contrivance consisting of a frame or skeleton having radiating arms or members, as a casting forming the hub and spokes to which the rim of a wheel or pulley is secured. *Webster 3d.* e. *See* drum horns. *Fay.* f. A wheellike casting consisting of a rim and radial spokes on which are mounted felt polishing pads. *ASTM C162-66.* g. Assembly of radiating tie rods on the top of a furnace. *ASTM C162-66.* h. A defect characterized by a star-shaped fracture in the porcelain enamel. *ASTM C286-65.* i. Sometimes used as an alternative to center brick. *See also* center brick. *Dodd.*

spider and slips. A gripping device used to grip and hold rods or casing while coupling or uncoupling them as they are being run into or pulled from a borehole. The device is essentially a heavy cast-steel circular ring called a spider in which the hole is tapered forming a surface against which four quarter-circle-wedge segments fit and slide. The inside faces of the wedge segments (slips) are serrated and shaped to fit snugly the outside of a drill rod or casing. When in use, any downward movement of the rod or casing causes the slips to wedge inside the tapered ring and grip the rod firmly; when the rods are moved upward the slips release. Also called bowl and slips. *Long.*

spider die. The same as porthole die. *ASM Gloss.*

spider gear; carrier pinion. A differential gear which rotates on its shaft in a rotating case. *Nichols.*

spider lines. Crosshairs in eyepiece of surveying telescope. *Pryor, 3.*

spiderweb rock. A local term in Ohio for sandstone beds that show crossbedding on a small scale, which is complicated by intricate interlacing of fine-bedding planes. Frequently seen in sawed stones, especially where the lamination is slightly oblique or irregular. It is very like the grain of wood that shows in a planed board. *Fay.*

spiegeleisen. An alloy containing 10 to 25 percent manganese. Is used in steelmaking as a deoxidizing agent and to raise the manganese content of the steel. Also called spiegel and psiegel iron. *C.T.D.; Henderson; Camp, 6th. ed. 1961, p. 291.*

spigot. a. The end of a pipe, fitting, or valve that is inserted into the bell end. *Fay.* b. The tapered male part of an inserted joint, as in a plumber's wiped joint. *Fay.* c. A cock, tap, or faucet used to draw water, etc. *Fay.*

spigot joint. A pipe joint made by tapering down the end of one piece and inserting it into a correspondingly widened opening in the end of another piece. Sometimes called faucet joint. *Fay.*

spigot product. In ore dressing, the material discharged at the bottom of the hydraulic classifier. *Newton, p. 79.*

spike. A large nail, but thicker in proportion. *Crispin.*

spike amygdule. A cylindrical amygdule whose longer axis is at right angles to the bedding. *Standard, 1964.*

spiked bottom. One form of bottom for a converter; it is of monolithic refractory material, air passages being formed by spikes which pierce the bottom while the refractory material is being rammed into place. *Compare* tuyere block bottom; tube bottom. *See also* converter. *Dodd.*

spiked core. *See* seed core. *L&L.*

spike driver. In bituminous coal mining, one who drives team of two or more draft animals in tandem for hauling wagons or cars of coal. Also called spike-team driver. *D.O.T. 1.*

spike team. a. A team consisting of three draft animals, two of which are at the pole while the third pads. Three mules, two abreast and one in the lead, used in a mine to haul coal cars. *Fay.* b. Ark. A tandem team of mules for hauling coal. *Fay.*

spike-team driver. *See* spike driver. *D.O.T. 1.*

spiking. A term used in the United States for the operation of adding ferromanganese, silicomanganese, or other deoxidizing agent, to an open hearth bath for the immediate stoppage of all oxidizing reactions. *Osborne.*

spiking curb. Eng. A curb to the inside of which plank tubing is spiked. *Fay.*

spilching. Eng. A soft, friable machine-made brick. *Fay.*

spile. a. A large timber driven into the ground, used as a foundation; a pile. *Crispin.* b. A plank driven ahead of a tunnel face for roof support. Also called forepole. *Nichols.* c. A temporary lagging driven ahead on levels in loose ground. *See also* spill. *Fay.* d. A short piece of plank sharpened flatways and used for driving into watery strata as sheet piling to assist in checking the flow. *Fay.*

spiler. An ironstone miner who excavates and sets timber supports in roadways through wastes and disturbed ground. *Nelson.*

Spilhaus-Miller sea sampler. An instrument resembling the bathythermograph and operating in a similar fashion, with the additional ability of obtaining water samples at discrete depths within the limit of operation. Basically, a bathythermograph to which 12 small seawater sampling bottles are attached, it performs the same functions as a cast of Nansen bottles and reversing thermometers to limited depths, but with less accuracy. It is useful for studies of shallow water areas, bays, and estuaries, where rapidity of sampling is of greater importance than the degree of accuracy of temperatures. *H&G.*

spiling. a. Forepoling over timber and steel supports in weak, loose beds. *See also* spilling. *Nelson.* b. Driving timbers ahead of advancing tunnel through treacherous, loose, watery ground. *Pryor, 3.*

spilite. A basaltic rock with albitic feldspar, generally highly vesicular. The pyroxenes or amphiboles are usually altered. These rocks are frequently developed as submarine lava flows and exhibit pillow structures. *C.T.D.; A.G.I.*

spilitic suite. A suite of igneous rocks, comprising extrusions and minor intrusions, characterized throughout by an abundance of soda feldspar, and by the prevalence of albitization; named after spilite, the type member of the suite. *Holmes, 1928.*

spilitization. The process of albitization of basalts to form spilites. *A.G.I.*

spill. a. Any of the thick laths or poles driven ahead of the main timbering to support the roof or sides in advancing a level in loose ground, or to support the sides of a shaft when sinking through a stratum of loose ground. *Fay.* b. Same as spile, c and d. *Fay.* c. *See* forepole. *Nelson.* d. The accidental release of radioactive liquids. *L&L.*

spillage conveyor. A small, short conveyor to lift the coal out of a spillage pit and deliver it into a mine car or on to the main conveyor. It is usually a chain conveyor run either continuously or intermittently. *Nelson.*

spillage pit. An opening below the loading point of a trunk or gate conveyor, to receive the spillage. Where the output is small, the pit may be emptied by hand once or twice in a shift, but where big tonnages are loaded, a spillage conveyor is installed. *Nelson.*

spilling. A method of tunneling through loose, running ground by driving spills (sharp-edged thick boards or steel rods) ahead and around timber or steel frames. *Nelson.*

spilling breaker. A breaker that spreads out and loses force because of a smooth shoreline. *MacCracken.*

spill pit. *See* runoff pit. *Pryor, 3.*

spilla, spillage. Ore, pulp, circulating liquor inadvertently discharged from flow line and requiring appropriate means of recovery or removal. *Pryor, 4.*

spill trough. A trough to retrieve melted brass that may be spilled in pouring from a crucible into a flask. *Standard, 1964.*

spillway. a. A passage, as a paved apron or channel, for surplus water over or around a dam or similar obstruction. *Webster 3d.* b. A bye channel. *C.T.D.* c. Release overflow for water impounded in a dam. *Pryor, 3.*

spilosite. a. A rock arrested at an early stage in adinole formation; also, used as a synonym for spotted slate. *A.G.I.* b. A spotted schistose rock produced by contact metamorphism of clay slate, usually by diabase. *Webster 3d.*

spin. To rotate the bit or drill stem or to couple or uncouple parts of a drill, casing, or drivepipe string. *Long.*

spin coal. Eng. A variety of black shining coal found in Staffordshire. *Tomkeieff, 1954.*

spindle. a. Derb. A small piece of wood set in the ground to mark the boundary of a mine. *Fay.* b. Shaft of a machine tool on which a cutter or grinding wheel may be mounted. *ASM Gloss.* c. Metal shaft to which a mounted wheel is cemented. *ASM Gloss.* d. In founding, a rod or pipe used in forming a core. *Standard, 1964.* e. *See* drive rod, a. *Long.*

spindle breaker. Old name for gyratory crusher. *Pryor, 3.*

spindle conveyor. A chain-on-end conveyor in which the chain pins are extended in a vertical plane, usually of enlarged diameter in that portion above the chain, on which special revolvable fixtures can be rotated, for the purpose of spraying or drying. Outboard rollers or sliding shoes support the chain and product. *A.S.A. MH4.1-1958.*

spindle rod. See drive rod, a. *Long.*

spindle speed. a. Same as bit rotational speed. *Long.* b. The number of times the drive rod of a gear-feed-drill swivel head must turn to advance the attached drill string 1 inch. *Long.*

spine. A mass of igneous rock solidified in the vent of a volcano; a plug. *Fay.*

spinel. a. An isometric mineral, typically magnesium aluminate, $MgAl_2O_4$. The magnesium may be in part replaced by ferrous iron, or manganese, and the aluminum by ferric iron and chromium. Spinel is red, yellow, green, black, and other colors, and is used as a gem. *Fay; Dana 17.* b. A mineral group of general formula, AB_2O_4. They occur typically as products of contact metamorphism of impure dolomitic limestones, and less commonly, as accessory minerals in igneous rocks of basic composition. *A.G.I.*

spinel emery. A mixture of spinel (pleonaste hercynite), corundum, and magnetite, the corundum being present in variable proportions and sometimes entirely lacking. It is usually a heavy, black, fine-grained aggregate with dark gray crystals of corundum appearing in the best varieties. *A.I.M.E., p. 7.*

spinel law. Cubic crystal system twinning, either contact or penetration type, in which the twinning plane is parallel to a face of an octahedron. *Hess.*

spinellids. A name for minerals of the spinel group characterized by isometric crystallization, predominating octahedral form, having composition of double oxides with the general formula $R''O.R'''_2O_3$, with $R'' =$ Mg, Fe, and less frequently Mn, Zn; $R''' =$ Al,Fe,Cr,Mn. All of the species are hard. *English.*

spinellite. A medium- to coarse-grained hypautomorphic granular titaniferous magnetite-rich igneous rock with pleonaste (spinel) from a few to 20 percent. *Johannsen, v. 4, 1938, p. 469.*

spinel, ruby. See ruby spinel. *C.M.D.*

spinel sapphire. Blue spinel. *Shipley.*

spinel, synthetic. This artificial mineral is produced, in a wide variety of fine colors, by the Verneuil process; in chemical and optical characters identical with natural spinel; widely used as a gem stone. *C.T.D.*

spinner. In the asbestos products industry, one who operates a machine that spins thread from asbestos fibers. *D.O.T. 1.*

spinning. An operation by which round hollow-ware is formed by pressing metal sheets or light plates to molds or forms revolving on a special lathe, the latter being called a spinning lathe. *See also* metal-working. *Henderson.*

spinning cable. A flexible wire or plant-fiber cable or rope used as a spinning chain. *See also* spinning chain. *Long.*

spinning chain. Link chain wrapped several times around drill rod, casing, or pipe and used on cathead to spin up or spin out such equipment when it is being pulled or run into a borehole. A rope or flexible wire cable may be used in lieu of a chain. *Long.*

spinning fiber. Asbestos suitable for the spinning of asbestos fabrics. *A.G.I.*

spinning line. a. A chain or rope used as a wrench in attaching and detaching drill pipe sections. *Nichols.* b. A line wrapped around a threaded pipe, so that a pull will rotate the pipe to fasten or unfasten it from another. *Nichols.*

spinning rope. A plant-fiber rope used for the same purpose as a spinning chain. *See also* spinning chain. *Long.*

spin out. To unscrew lengths of drill rod, casing, or pipe by mechanical means, using a spinning chain, rope, or cable in conjunction with power derived from the cathead or other rotating device. *Long.*

S-P interval. In earthquake seismology, the time interval between the first arrivals of longitudinal and transverse waves, which is a measure of the distance from the earthquake source. *A.G.I.*

spinthariscope. Screen coated with zinc sulfide or other fluorescing substance, on which scintillations are observable when bombarded by radioactive rays. *Pryor, 3.*

spin up. To screw lengths of drill rod, casing, or pipe together by mechanical means by using a spinning chain, cable, or rope in conjunction with power derived from the cathead or other rotating device. *Long.*

spinus; spilus. Found in mines, this stone cut in pieces and thrown together in a heap, exposed to the sun, burns; and that the more if it be moistened or sprinkled with water. Perhaps this refers to a pyritous bituminous shale. *Tomkeieff, 1954.*

spiracle. One of the minute cones formed on the surface of a liquid lava stream by steam or gases escaping from the mass. *Standard, 1964.* Also called bocca. *Fay.*

spiral. a. A spiral coal chute that mechanically separates the slate from the coal. The coal being irregular in shape and light falls over the edge of the spiral due to centrifugal force while the flatter and heavier slate adheres somewhat to the chute surface and is carried down to a special pocket. *Fay.* b. The Humphrey's spiral, developed during the past 30 years, is successfully used in recovering chromite from chrome; sands, rutile, ilmenite, and zircon from beach sands (Florida): and tantalum minerals and lepidolite from crushed ores. Also used in concentrating some iron ores. *See also* Humphrey's spiral. *Bureau of Mines Staff.*

spiralarm methanometer. An instrument which depends for its action on the heat output of burning methane. They may be divided into those having a controlled flame burning within them and others in which combustion of methane occurs on electrically heated filaments. A firedamp alarm making use of the flame principle is the Naylor Spiralarm. *Roberts, I, pp. 84-86.*

spiral balls. Sandstone bodies with rolled-up spiral structure due to lateral mass flowage of thin inter-bedded sands and shales. *Pettijohn.*

spiral chute. a. A vertical or near vertical steel plate forming a screw down which coal flows from an upper level or seam to a lower haulage road. Spiral chutes, built into large steel pipes, are used widely in staple shafts in horizon mining. They are kept filled with coal and therefore, breakage is reduced considerably. *See also* telegraph. *Nelson.* b. A continuous curved trough over which bulk material or objects are guided while being lowered by gravity in a substantially helical path. *A.S.A. MH4.1-1958.*

spiral classifier. *See* Akins classifier. *Pryor, 3.*

spiral cleaner. A device for removing dirt from a conveyor belt. *Nichols.*

spiral coal cleaner. A spiral chute in which the plate is inclined towards the center of the spiral. The stone tends to flow down centrally, the coal tends to slide off round the outside of the spiral. They are seldom used as coal cleaners. *Nelson.*

spiral concentrator. A sluice formed in five or six tight spirals, in which centrifugal force aids the separating effect of sluice action. *See also* Humphreys spiral. *Pryor, 3.*

spiral conveyor. *See* roller spiral; screw conveyor, a. *A.S.A. MH4.1-1958.*

spiral core. A piece of core the outside surface of which is rifled. *See also* rifle, a. *Long.*

spiral curve. a. A curve of gradually increasing radius which allows an easy transition between a circular arc and a straight on a road or railway. *Ham.* b. In railroad or highway surveying, a curve of progessively decreasing (or increasing) radius used in joining a tangent with a simple circular curve or in joining two circular curves of different radii. Also called transition curve. *Seelye, 2.*

spiral drum. A kind of conical winding drum. *Fay.*

spiral grooving. *See* rifling, c and d. *Long.*

spiral gummer. A screw device, attached to a longwall coal cutter, for removing the holings and deposit them either in the track of the machine or at the side clear of the face. It is designed in two types, that is, end discharge and side discharge. *See also* gum stower. *Nelson.*

spiral hole. A borehole that follows a corkscrewlike course. *Compare* rifle, a. *Long.*

spiraling. a. Rifling. *Nichols, 2.* b. A drill hole twisting into a spiral around its intended centerline. *Nichols, 2.*

spiral runner. One who operates a battery of spirals (mechanical devices that separate slate from small-size coal by centrifugal force); and regulates spirals so that too much slack (fine coal) does not go in refuse. *D.O.T.1.*

spiral structure. Probably same as snow-ball structure. Term also applied to organic burrows. *See also* snow-ball structure. *Pettijohn.*

spiral system. In open pit mining, a haul road arranged spirally along the perimeter walls of the pit so that gradient of road is more or less uniform from bottom to the top of the pit. *Bureau of Mines Staff.*

spiral track. A track layout for rail or road transport from large opencast pits. The track is arranged spirally along the steep rise from the coal or ore benches so that the gradient is moderate throughout. *Nelson.*

spiral tunnel. A method of gaining grades in a tunnel by driving the tunnel on a constantly ascending and circular line. *Stauffer.*

Spiral Vane Disk Cutter. Trade name for a cutter loader incorporating a new type of shearer head. The Mark II model consists of section plates welded together to form a composite whole spiral. The disk is made in different sizes to give cutting diameters of from 31 to 72 inches with a maximum web depth of 30 inches. A single spiral is used for the softer coals and a double spiral for hard coals. A plough attached to the machine throws the coal onto the conveyor. *Nelson.*

spiral worm. A device to withdraw broken rods from a borehole. It is lowered down the hole and the screw turned round until it grips the broken rod below the joint. *See also* crow's-foot; screw bell. *Nelson.*

spire. a. The tube carrying the train to the charge in a blasthole. Also called reed or rush, because these, as well as spires of grass, are used for the purpose. A kind of fuse. *Fay.* b. Leic. Coal of a hard, dull, slaty nature, and difficult to break. *Fay.*

Spirelmo smoke helmet. A helmet in which the crown and frontpiece are blocked out of rawhide, and the front shield is fitted with two mica windows in hinged aluminum frames. It has a twin-tubed air feed on each side of the helmet and a valve for the escape of excess and vitiated air. Air is supplied through armored hose from a double-acting bellows or blower worked by a second man at the fresh air base. *Sinclair, I, pp. 321-322.* Airtightness is obtained by means of a soft leather apron which is secured in position about the neck and shoulders. Illumination is provided by portable electric lamps and communication with the wearer by an approved type of mine telephone. *Mason, v. 1, p 326.*

spiral level. A section of convex glass tube containing fluid and an air bubble. When level the air bubble centers itself on an etched line, on the tube. *Bureau of Mines Staff.*

spirit of copper. Acetic acid obtained by distilling copper acetate. *Fay.*

spirits of hartshorn. An aqueous solution of ammonia, the name being derived from the old method of obtaining ammonia by heating the hoofs and horns of animals. *Osborne.*

spirits of niter. a. Nitric acid. *Osborne.* b. A solution of ethyl nitrite in alcohol. *Osborne.*

spirits of sulfur. Sulfurous acid. *Osborne.*

spirits of verdigris. Acetic acid. *Osborne.*

spirits of vinegar. Dilute acetic acid. *Osborne.*

spirits of wine. Ethyl alcohol. *Osborne.*

spirits of wood. Methyl alcohol. *Osborne.*

spiroffite. A mineral, (Mn, Zn)$_2$Te$_3$O$_8$; occurring in red to purple cleavable masses, from Sonora, Mex.; monoclinic. *Hey, M.M., 1964; Fleischer.*

Spirogyra. A genus of freshwater green algae (family Zygnemataceae) having spiral chlorophyll bands and forming slimy masses in still waters and slow streams. *Webster 3d.*

spissograph. Automatic machine for determining the setting time of portland cement. *Bennett 2d, 1962 Add.*

spit. a. To light a fuse. *Fay*. b. Prov. Eng. A spade's depth in digging. *Standard, 1964*. c. In brickmaking, a certain amount of brick clay. *Standard, 1964*. d. A small point of land extending into a body of water or a long, narrow shoal extending from the shore. *Webster 3d*.

spitout. a. A glaze defect of the pinhole type developed in the decorating kiln, due to evolution of minute gas bubbles from body or glaze. *A.S.T.M. C242-60T*. b. A defect in the surface of a piece of ceramic ware caused either by the breaking of a blister in the glase or by the breaking out of a part of the surface of the clay. *A.C.S.G.*

spitted fuse; lighted fuse. Slow-burning fuse which has been cut open at the lighting end for ease of ignition. A small quantity of the plastic explosive used in the hole is sometimes inserted in the cut. *Pryor, 3*.

spitting. a. Lighting the fuse for a blast. *Fay*. b. An action of or appearance on the surface of slowly cooled, large masses of melted silver or platinum, in which the crust is forcibly perforated by jets of oxygen, often carrying with them drops of molten metal. *Standard, 1964*. Also called sprouting. *Fay*.

spitting rock. A rock mass under stress that breaks and ejects small fragments with considerable velocity. *BuMines Bull. 587, 1960, p. 2*.

spitzkasten. A series of hopper-shaped or pointed boxes for separating mineral-bearing slimes according to fineness, in which the width of each box is double that of its predecessor, while the lengths increase by arithmetical progression. As used in flotation, it is the froth-separating compartment of mechanical-agitation-type flotation machines. Also called spitz. *See also* funnel box. *Fay; Hess*.

spitzlutten. Hydraulic classifiers shaped like the spitzkasten, but having provision for pressure water to flow upward from near the apex, thus improving efficiency of separation. *Pryor, 3*.

s-plane. An unwarped s-surface. *A.G.I. Supp*.

splash cup. A cup at the top of some stalagmites formed by the falling drips. *Schieferdecker*.

splasher. a. A plate lined with firebrick and placed over the iron trough next to the taphole to keep down flame that blows from the taphole during a cast. *Fay*. b. A water spray system for the protection of the metal structure immediately above the tapping hole during the tapping of a blast furnace. *Henderson*.

splash man. A laborer who shovels charcoal over the surface of molten copper being poured from a reverberatory furnace into a tilting ladle to prevent excess oxidation of metal. *D.O.T.1*.

splash stalagmite. A stalagmite having whorls of upstanding petaline proturberances in many stories. *Schieferdecker*.

splash zone. The area which undergoes the splashing effect of the breakers. *Schieferdecker*.

splay. a. Spread; said of arches whose straight limbs instead of being vertical are spread (splayed) outwards. *Mason*. b. Eng. *See* hang, c. *S.M.R.B., Paper No. 61*.

splay faulting. Minor faulting which diverges from a longer dislocation at an acute angle. *Schieferdecker*.

splays. Divergent small faults at the extremities of large, normal faults, especially rifts. *A.G.I.*

splendent. Applied to the degree of luster of a mineral, reflecting with brilliancy and giving well-defined images, as hematite or cassiterite. *Fay*.

splent. A hard variety of bituminous coal that ignites with difficulty owing to its slaty structure, but makes a clear, hot fire. *A.G.I.*

splice. a. A joint made in a broken haulage rope. It is a skilled job and the rope ends are unlaid for a length on each side of the break and reformed to a definite pattern. In British coal mines, a splice is not allowed on a winding rope. *Nelson*. b. Generally used to designate an insulated reconnection of wires of an electric cable after it has been cut. *B.C.I.* c. To unite two ropes by interweaving the strands. *Bureau of Mines Staff*. d. A joint made by splicing. *Bureau of Mines Staff*.

splice bar. *See* fishplate. *Ham*.

splice box. An enclosed connector permitting short sections of cable to be connected together to obtain a portable cable of the required length. *A.S.A. C42.85:1956*.

spliced. Applied to veins when they pinch out and are overlapped at that point by another parallel one. *Fay*.

spline. A groove or rib on a shaft or inside a wheel or pulley which allows axial sliding but not rotation. *Mason*.

splint coal. A miner's term long used in Eastern United States and Scotland for certain hard dull coals with a distinctive type of fracture. Splint coals are irregular and blocky, with an uneven rough fracture, grayish black in color and of granular texture. Splint coals are banded coals. Coals containing more than 5 percent of anthraxylon and more than 30 percent of opaque attritus determined by microscopic examination are classed as splint coal. The content of anthraxylon and opaque matter is determined perpendicular to the bedding across the entire thin section (2 to 3 centimeters in width). The opaque attrital portion of the splint coal may be intercalated with fine, hairlike streaks of anthraxylon. It occurs mainly as bands and benches in otherwise bright-banded coal and is wide-spread in bituminous coal seams. Corresponds either to duroclarite or, more frequently, to clarodurite according to the ration of vitrinite and inertinite. May also correspond to vitrinertite. *I.H.C.P., 1963, part I*.

splintery fracture. Breakage which produces elongated splinterlike fragments. *Shipley*.

split. a. A divider for an air current. *C.T.D.* b. To divide the air current into separate circuits to ventilate more than one section of the mine. *B.S. 3618, 1963, sec. 2*. c. Any division or branch of the ventilating current. *Fay*. d. The workings ventilated by that branch. *Fay*. e. A current of air which has been separated from the main intake to ventilate a district in a mine. The proportion of air allowed in a split varies directly with the size of the district and the number of men working in it. *Nelson*. f. A bench separated by a considerable interval from the other benches of a coal bed. *Fay*. g. To divide a pillar or post by driving through it one or more roads. *Fay*. h. A layer of coal which has separated from its parent seam. Seam splitting is often detrimental as it may separate a coal seam of workable thickness into two or more layers which are too thin for economic mining. *See also* split seam; ventilation, splitting. *Nelson*. i. The upper or lower portion of a divided coal seam. *C.T.D.* j. The division of a bed of coal into two or more horizontal sections by intervening rock strata. *Hudson. k.* The process of dividing a core lengthwise, dividing a granular material into several representative parts so that samples can be sent to several interested parties, or reducing core storage space or the quantity of material retained as a sample. *Long*. l. A brick of the shape of a standard square split down its length; commonly a 9 by 4½ inch brick with a thickness of either 1¼, 1½, or 2 inches. Also known as a scone. *See also* standard square. *Dodd*. m. A glass bottle containing 6½ fluid ounces (for mineral water). *Dodd*. n. A crack that penetrates glassware, as distinct from a check or vent. *Dodd*.

split barrel. A core barrel that is split lengthwise so that it can be taken apart and the sample removed. *Long*.

split-barrel sampler. A drive-type soil sampler with a split barrel; also a swivel-type double-tube core barrel, the inner tube of which is split. *Long*.

split block. Mica not exceeding 15 mils in thickness that has been split and selected within tolerances of 3 to 4 mils but which has not been cut or stamped to dimensions, shape, or form. *Skow*.

split brilliant. A brilliant split apart at the base of its pyramidal forms, so as to make two gems. *Standard, 1964*.

split bushing. A bushing made in two pieces, for ease of insertion and removal. *Nichols*.

split check. A system of leasing practiced at Cripple Creek, Colo., whereby the men and company divide the profits. *von Bernewitz*.

split coal. Coalbed separated by clay, shale, or sandstone parting which thickens so that both benches cannot be mined together. *A.G.I. Supp*.

split core. A core that has been split lengthwise into halves or quarters. *Long*.

split core barrel. A type of core barrel which can be opened longitudinally to remove the core. *B.S. 3618, 1963, sec. 3*.

split die. A die part made in two pieces, usually vertically sectioned to facilitate the forming of a cavity; in powder metallurgy, a segment die. *See also* segment die. *Henderson*.

split inner-tube core barrel. A double-tube core barrel with the inner tube split lengthwise. *Long*.

split lagging. Drum lagging made in two pieces to allow changing it without dismantling the drum. *Nichols*.

split-ring core lifter. A hardened steel ring having an open slit, an outside taper, and an inside or outside serrated surface. In its expanded state it allows the core to pass through it freely, but when the drill string is lifted the outside taper surface slides downward into the bevel of the bit or reaming shell, causing the ring to contract and grip tightly the core which it surrounds. Also called core catcher; core gripper; core lifter; ring lifter; split-ring lifter; spring lifter. *Long*.

split-ring lifter. Synonym for split-ring core lifter. *Long*.

split rock. A rock possessing tabular structure, or which cleaves easily in the lines of lamination, and consequently suitable for flagging and curbstones. *Fay*.

splits. a. In mine ventilation, the branches of a circuit. *Hartman, p. 127*. b. Eng. Small pieces of wood set on a prop in place of a headtree. *S.M.R.B., Paper No. 61.*

split seam. A coal seam that has separated into two or more layers which may, or may not, rejoin some distance away. *See also* multiple splitting. *Nelson.*

split shovel. A device for sampling fine ore, consisting of a fork in which the prongs are separate scoops, each scoop being the same width as the open spaces between. *Fay.*

split spread. In seismic prospecting, a line of detectors symmetrically disposed on two sides of the shot point. *A.G.I.*

split sprocket. A two-piece sprocket that can be assembled on a shaft without removing the shaft bearings. *Nichols.*

split switches. Any form of mine switch using switch points or latches. *Kiser, 2, p. 36.*

split system. Historically, a combination of warm air heating and radiator heating. Also used for other combinations, such as hot water steam, steam warm air, etc. *Strock, 10.*

splitter. One employed in the mica industry whose duty it is to separate mica into thin sheets. *Fay.*

split the air. Same as split, b.

split timber. Logs split to form two pieces. *Jones, 2, p. 56.*

splitting. a. Parting of a coalbed into two or more benches separated by other rocks. *A.G.I.* b. In mine ventilation, the practice of connecting airways in parallel by dividing the total air flow among them. *Hartman, p. 127.*

splitting knife. A knife used for splitting leather or for diamond cleaving. *Standard, 1964.*

splitting limits. Of a parcel of mineral or metal being sold, agreed limits of difference between assay values between which buyer and seller will adjust and deal without further external arbitration. *Pryor, 3.*

splitting method. A method of mining pillars seldom followed at present. A room is first driven through the pillars, splitting them into smaller blocks. The pockets are turned at right angles and are driven into the blocks. This method is really gouging the pillars and is wasteful. *Lewis, p. 543.*

splitting of air. *See* ventilation, splitting. *Nelson.*

splitting of samples. To reduce a bulk sample to a representative sample by quartering or by riffle box. *Nelson.*

splittings. a. Laminae of mica with a maximum thickness of 0.0012 inch split from blocks and thins. *Skow.* b. Lanc. Two horizontal level headings driven through a pillar, in pillar workings, in order to mine the pillar coal. *Fay.*

splitting shot. Ark. A shot put into a large mass of coal detached by a previous blast. *See also* block hole. *Fay.*

split-tube barrel. Synonym for split-barrel sampler. *Long.*

split-tube sampler. Synonym for split-barrel sampler. *Long.*

split wall; half-pillar wall. Eng. A place driven headways through the middle of a pillar. *SMRB, Paper No. 61.*

spm Abbreviation for strokes per minute. *Pit and Quarry, 53rd, sec. E, p. 82.*

spodumene. White, pale green, emerald green, pink, or purple mineral, $LiAl(Si_2O_6)$; white streak; vitreous luster. Contains 8.4 percent lithium oxide with some replacement by sodium; insoluble in acids. Hiddenite and kunzite are gem varieties. Specific gravity, 3.13 to 3.20; Mohs' hardness, 6.5 to 7; monoclinic. Found in North Carolina, California, Massachusetts, South Dakota; Brazil, Malagasy Republic. A source of lithium, and used in ceramics and glass as a source of lithia and alumina. Also called triphane. *Sanford; Dana 17; CCD 6d, 1961.*

spoil. a. The overburden or nonore material removed in gaining access to the ore or mineral material in surface mining. Also called waste. *Bureau of Mines Staff.* b. Debris or waste material from a coal mine. *Zern.* c. Eng. A stratum of coal and dirt mixed. *Fay.* d. Dirt or rock which has been removed from its original location. *Nichols.*

spoil bank. a. A term common in surface mining to designate the accumulation of overburden; also, underground refuse piled outside; that part of the mine from which the coal has been worked away and the space more or less filled up with waste. *B.C.I.* b. To leave coal and other minerals that are not marketable in the mine. *B.C.I.* c. Eng. The place on the surface where spoil is deposited. Also called spoil heap. *Fay.*

spoil dam. An earthen dike forming a depression in which returns from a borehole can be collected and retained. *Long.*

spoil heap; dump; tip. The pile of dirt produced by mining operations and stacked at the surface of a mine either in conical heaps or in layered deposits. *Nelson.*

spoil-heap fire. The heating and burning of small coal, carbonaceous shale and perhaps iron pyrites in spoil heaps. *Nelson.*

spoil pile. *See* waste dump. *Bureau of Mines Staff.*

spoil pool. The reservoir formed by a spoil dam in which the returns from a borehole collect and are retained. *Compare* sludge pit; sump. *Long.*

spoils. a. *See* cuttings. *Long.* b. The debris or waste material from a mine. *Long.*

sponge. a. A form of metal characterized by a porous condition, which is the result of the decomposition or reduction of a compound without fusion. The term is applied to forms of iron, the platinum-group metals, titanium, and zirconium. *ASM Gloss.* b. Hafnium produced by the Kroll process. *Thomas.* c. The smoothing out, with a moistened sponge, of slight surface blemishes on pottery ware before it is dried. Also called sponging. *Dodd.*

sponge, ceramic. *See* ceramic sponge. *Bennett 2d, 1962 Add.*

sponge gold. *See* cake of gold. *Bennett 2d, 1962.*

sponge iron. Either porous or powdered iron produced directly without fusion, as by heating iron ore or an oxide with charcoal, or with a reducing gas. *ASM Gloss.*

sponge iron powder. Ground and sized sponge iron, which may have been purified or annealed or both. *ASTM B243-65.*

sponger. One who removes scratches and imperfections from inside of hollow green tile. Also called tile finisher. *See also* finisher. *D.O.T. 1.*

sponges. Numerous sponges of all types are used in the enameling industry. A large quantity are used for ordinary cleaning work, but others are used for enamel decoration. The fine small type of sponges are used for the beading operation in kitchenware plants. *Hansen.*

sponging. Smoothing the surface of clay ware with a sponge before firing. *Rosenthal.*

spongolite. A sediment or rock in which the remains of sponges are an important constitutent. *A.G.I. Supp.*

spongy. a. In powder metallurgy, a porous condition in metal powder particles, usually existent in reduced oxides. *Henderson.* b. Applied to a vesicular rock structure with thin partitions between the visicles, and thus resembling a sponge. *Schieferdecker.*

spongy enamel. Vitreous enamelware that is faulty because of local high concentrations of bubbles. *Dodd.*

spongy iron. *See* reduced iron. *Fay.*

spontaneous. a. Self-starting. *Mason.* b. Used to describe the driving potential which causes electric currents to circulate in boreholes. These currents are not in any way deliberately induced by the well-logging equipment. Also called self-potential; S.P. curve. *Wyllie, p. 1.*

spontaneous chipping. *See* spalling.

spontaneous combustion. a. The heating and slow combustion of coal and coaly material initiated by the absorption of oxygen. The two main factors involved are: (1) a coal of a suitable chemical and physical nature; and (2) sufficient broken coal and air leaking through it to supply the oxygen needed. The heat generated is retained with consequent rise in temperature. *See also* gob fire; gob stink; hydrogen sulfide; open fires. *Nelson.* b. The outbreak of fire in combustible material (such as oily rags or damp hay) that occurs without the direct application of a flame or a spark. It is usually caused by slow oxidation processes (such as atmospheric oxidation or bacterial fermentation) under conditions that do not permit the dissipation of heat. *Webster 3d.*

spontaneous fission. Fission that occurs without an external stimulus. Several heavy isotopes decay in this manner; for example, curium 242. *L&L.*

spontaneous liquifaction. *See* liquefaction. *ASCE P1826.*

spontaneous pneumothorax. This disease or accident refers to the forceful entry of air into the chest cavity. It results from an overexpansion of the lungs. *H&G.*

spontaneous polarization. a. Electrochemical reactions of certain ore bodies causing spontaneous electrical potentials. *Schieferdecker.* b. Synonym for self-potential method; spontaneous potential method. *A.G.I.*

spontaneous potential method. An electrical method in which a potential field caused by spontaneous electrochemical phenomena is measured. Synonym for self-potential method; spontaneous polarization. *A.G.I.*

spontaneous spalling. *See* spalling. *ACSG, 1963.*

spool. a. Cast iron distance piece placed between timbers. *Ham.* b. To wind rope or cable on a hoist drum. *Long.* c. Synonym for cathead. *Long.* d. The drum of a hoist. *Long.* e. The movable part of a slide-type hydraulic valve. *Nichols.* f. To wind in a winch cable. *Nichols.*

spool-type roller conveyor. A type of roller conveyor in which the rolls are of conical or tapered shape with a diameter at the ends of roll larger than at the center. *ASA MH4.1-1958.*

spoon. a. A tool for cleaning dust or sludge from quarry blasting holes. Also called scraper. *See also* pneumatic blowpipe. *Nelson.* b. An instrument made of an ox or buffalo horn, in which earth or pulp may be delicately tested by washing to detect gold, amalgam, etc. *Fay.* c. *See* spoon end. *Fay.* d. A slender rod with a cup-shaped projection at right angles to the rod, used for scraping drillings out of a borehole. *Fay.* e. A scraper, or similar instrument, for cleaning the sludge out of shallow drill holes. This spoon is usually made of a ¼- to ½-inch iron rod, with a spoon-shaped end. *Stauffer.*

spoon end. The edge of a coal basin when the coal seam spoons, that is, rises to the surface after growing thinner as it approaches its termination. Also called spoon. *Fay.*

spooner. In bituminous coal mining, a laborer who scoops drillings out of boreholes in which explosives are to be charged for blasting down coal, using a slender iron rod with a cup-shaped projection bent at right angles to the handle. *D.O.T. 1.*

spooning. Many mineral raw materials, such as petroleum, cementation water (water containing dissolved copper or iron sulfates or other metal compounds), or brine are extracted by pumping through boreholes. In spooning, a long spoon (a hollow cylinder with a bottom equipped with a clap valve, or ball valve, and open above) is attached to a cable which is let down into the boreholes where the cylinder fills with the liquid; this is emptied out after the cylinder is raised. *Stoces, v. 1, p. 478.*

spoon out. To thin out; said of a coal seam. *Korson.*

spoonproof. Test ladle specimen taken during various stages of melting and fining. *ASTM C162-66.*

spoon sampler. A rotating soil sampler, fitted with an auger-type cutting shoe. *Long.*

sporadosiderite. Meteoric stones in which iron is more or less disseminated through the mass. *Dana 6d, p. 32.*

sporangiophore. A structure which bears sporangia, or spore cases. *A.G.I.*

sporangium. A spore case. *A.G.I.*

spore. An asexual reproductive structure, commonly unicellular and usually produced in sporangia. *A.G.I.*

spore coal. a. Coal formed out of the spores of lycopods. *Fay.* b. Coal in which the attritus may contain a large amount of spore matter together with a certain amount of transparent attrius. *See also* cannel coal. *A.G.I.*

spores. Parts of reproduction organs of many Coal Measures' plants. There are two kinds, namely, megaspores (female) and microspores (male). They are found in most coal seams, particularly the dull layers. The megaspores vary from 1 to 5 millimeters in size, and the microspores (or pollen grains) from about 0.01 to 0.1 millimeter. *Nelson.*

spores zones. Some Coal Measures plants and their spores possess restricted time ranges, and these make possible the recognition of a series of spore zones as narrow subdivisions of geological time. Correlation of individual seams is frequently possible by comparison of the frequencies of occurrence of spores making up the seam assemblages. *See also* palynology. *Nelson.*

sporinite. A maceral of the exinite group consisting of spore exines generally much flattened parallel to stratification. *Compare* cutinite. *A.G.I. Supp.*

sporinite coal. This type coal consists of more than 50 percent of spores (microspores and megaspores). The spores occur embedded in gelitocollinite, fusinito-collinite or collinite of fusinitic nature. Other structured components uniformly distributed through the coal are cuticles, resin bodies, gelified and fusinized tissues. Hand specimens of low rank sporinite coal are brownish, with matt or granular surfaces. The coal may have high or low ash and occurs in seams of different geological age but is particularly common as bands of limited thickness in seams of the Lower Carboniferous. Sporinite coal naturally admixed with medium rank gelitocollinite coals is used for coking. *IHCP, 1963, part I.*

sporite. a. A deposit formed through the accumulation of fern spores in the caves of the Island of Reunion. *Tomkeieff, 1954.* b. Same as spore coal. *Tomkeieff, 1954.* c. *See* liptite. *IHCP, 1963, part I.*

sporogelite. A colloidal form of aluminum hydroxide, $Al_2O_3.H_2O$, occurring as one of the constituents of bauxite. Also called diasporogelite; cliachite; alumogel. *English.*

spot. a. To mark the site at which a borehole is to be drilled, a piece of equipment placed, or a structure built. *Long.* b. To set a drill or piece of machinery at a preselected site. *Long.* c. An inclusion in a diamond. *Long.* d. To direct to the exact loading or dumping place. *Nichols.*

spot-bolting. When one or just a few roof bolts are used at spot locations. *Bureau of Mines. Instructions for Disaster, Fatal-Accident, and Miscellaneous Health and Safety Reports, April 1966, Chapter 11.5, p. 63.*

spot coolers. Low capacity, semiportable refrigeration units of 150,000 to 500,000 British thermal units per hour cooling capacity that are used in cooling sites of limited extent, such as an underground enginehouse or the face of a development end. The refrigerant used is nontoxic, and an electric or compressed-air drive is applied to a reciprocating compressor. *Roberts, I, p. 155.*

spot drilling. Making an initial indentation in a work surface, with a drill, to serve as a centering guide in a subsequent machining operation. *ASM Gloss.*

spot facing. Machining a flat seat for a bolt head, nut, or other similar element at the end of and at right angles to the axis of a previously made hole. *ASM Gloss.*

spot level. The reduced level of any survey point. *Ham.*

spot log. A log or marker placed to show a truck driver the spot where he should stop to be loaded. *Nichols.*

spots, sweat. Beads of perspiration, if allowed to drop on bisque ware, can cause a defect in a fired enamel surface. *Enam. Dict.*

spotted. An irregularity of the ore content of any vein; pockety. *Fay.*

spotted schist. *See* spotted slate. *A.G.I.*

spotted slate. An argillaceous rock in which low-grade metamorphism has caused the growth of incipient porphyroblasts. *See also* desmoisite; desmosite; fleckschiefer; fructschiefer; garbenschiefer; hornfels; knotenschiefer; knotted slate; maculose; porphyroid; slate; spilosite; spotted schist. *A.G.I.*

spotter. a. In truck usage, the man who directs the driver into loading or dumping position. *Nichols.* b. In a pile driver, the horizontal connection between the machinery deck and the lead (pile guide). *Nichols.* c. *See* car pincher. *D.O.T. 1.*

spot tests. Simple and speedy qualitative tests used to identify element of minerals species when prospecting, valuing a deposit, or testing mill products. *Pryor, 3.*

spotting. a. The bringing of mine cars or surface wagons to a specific spot for loading, discharging, or any other purpose. *See also* wagon spotter. *Nelson.* b. Placing trucks for loading or dumping. *Nichols, 2.* c. Laying bags of stabilizer at regular intervals on the ground preparatory to soil stabilization. *Ham.* d. Fitting one part of a die to another by applying an oil color to the surface of the finished part and bringing this against the surface of the intended mating part, the high spots being marked by the transferred color. *ASM Gloss.*

spotting hoist. A small haulage engine used for bringing mine cars into the correct position under a loading chute, feeder or other point. *See also* pickrose hoist. *Nelson.*

spotting out. Delayed, uneven staining of metal by entrapment of chemicals during the finishing operation. *ASM Gloss.*

spotty ore. Ore in which the valuable material is concentrated irregularly as small particles; for example, coarse gold in low-grade rocks. *Nelson.*

spot welding. Welding of lapped parts in which fusion is confined to a relatively small, circular area. It is generally resistance welding, but may also be gas-shielded tungsten arc, gas-shielded metal arc, or submerged arc welding. *ASM Gloss.*

spout. a. S. Staff. A short underground passage connecting a main road with an air-heading. *Fay.* b. Newc. A box or trough down which coal is run from the wagons or cars into ships. *Fay.* c. *See* stenton, c. *B.S. 3618, 1963, sec. 2.* d. The part of a feeder which carries the orifice, revolving tube, needle, etc. *ASTM C162-66.* e. A refractory block shaped to carry molten glass, usually to a forming machine. *See also* feeder spout; pot spout. *Dodd.*

spout delivery pump. A pump similar to a diaphragm pump which is not capable of delivering water above its own height. *See also* force pump. *Ham.*

spouter. An oil or gas well, the flow of which has not been controlled by the engineers. *Webster 3d.*

spout hole. S. Wales. A short siding upon which trams are loaded in the mine. *Fay.*

spoutman. One who directs the pouring of slag from ladle through spout into a reverberatory furnace used for smelting. *D.O.T. Supp.*

spout mouth. Scot. A place on a level road where the material from a spout (or chute) is filled into the cars. *Fay.*

spout road. Scot. A chute so steep that the mineral slides down to the haulage level. *Fay.*

sp pd Abbreviation for specific productivity. *BuMin Style Guide, p. 62.*

sprag. a. A short wooden prop set in a slanting position for keeping up the coal during the operation of holding. *Fay.* b. Ark. Heavy slanting props wedged against the coal to prevent it from flying when blasted. *Fay.* c. A short, round piece of hard wood, sharpened at both ends, inserted between spokes of mine car wheels to retard motion. *Hudson.* d. A nog. *Mason.* e. To strut or nog; to set a prop. *Mason.* f. To chock or stop, as a vehicle or wheel, by a sprag; prop. *Standard, 1964.* g. The horizontal member of a square set of timbers running parallel to the axis of a heading. *Stauffer.* h. Eng. A short prop, set inclined, as a strut to support the overhanging side. Also called stay; spur. *SMRB, Paper No. 61.* i. Synonym for rod spear. *Long.*

spragger. In anthracite and bituminous coal mining, a laborer who rides trains of cars and controls their free movement down gently sloping inclines by throwing switches and by poking sprags (short, stout, metal or wooden rods) between the wheel spokes to stop them. *D.O.T. 1.*

spragging. The act of checking a mine car with a sprag. *Korson.*

sprag road. A mine road having such a sharp grade that sprags are needed to control the descent of the car; hence, two-, three-, or four-sprag road. *See also* sprag, b. *Fay.*

sprague and henwood core barrel. A core barrel which is mounted on ball bearings inside a diamond drilling bit and is capable of taking rock cores down to 1 inch diameter. *Ham.*

spray. a. In a hydrocyclone, the discharge from the apex in spray form, showing that the cyclone is not overloaded. *Pryor, 3.* b. In high-tension separation, the spray discharge is the high-voltage corona sprayed from the discharge wire, in an area through which the ore falls. *Pryor, 3.*

spray bar. A pipe with jets spraying binder on to a road from a tank in which the binder is kept under pressure by a pump. *Ham.*

spray-booth. A spray-booth is generally a galvanized iron chamber with an exhaust system, a means for collecting the waste enamel, and the front open for spraying. In some cases spray-booths are of sufficient size so that two operators may work at the same time. *Hansen.*

spray drying. The process of dewatering a suspension, for example, clay slip, by spraying the suspension into the top of a heated chamber, the dried powder being removed from the bottom. *Dodd.*

sprayer. a. A spraying machine. *Nelson.* b. A surface vehicle with a container for distributing fluid material in a thin layer while in slow transit, whether by gravity or pressure. *Nelson.* c. *See* tank sprayer. *Ham.*

spray gun. The primary requirements for an enamel spray gun are light weight, simplicity, good atomization, a constant flow of enamel and resistance to wear. The operation of a spray gun depends upon a flow of enamel slip through a control orifice, called the fluid tip and the air cap through which the air at a pressure of 60 to 100 pounds escapes. Rapid progress has been made in the developments of superior types of spray guns during the last few years. *Hansen.*

spraying. The application of enamel slip or glaze to a surface by means of a spray gun. *ACSB, 3.*

spraying machine. A machine which applies a spray under pressure on mine timber supports to preserve and fireproof them. It may also be used for limewashing and water spraying of dust. The machine is mounted on wheels and operated by compressed air. *Nelson.*

spraying screen. A screen used for the removal by spraying of fine solids present among or adhering to larger particles. *B.S. 3552, 1962.*

spray lance. The pipe from a hand sprayer carrying the jets through which a road binder is spread. *See also* spray bar. *Ham.*

spray lime. A specially milled dry hydrated lime of very fine particle size of at least 98 percent passing a No. 325 mesh screen. *Boynton.*

spray quenching. Quenching in a spray of liquid. *ASM Gloss.*

sprays. Appliances to damp deposits of dust in tunnels and workings before shotfiring and loading operations. Water sprays are also used along dusty roadways. Various types of mist projectors and atomizers are used and effect considerable improvement, but the dust trapped consists chiefly of the coarser particles. In many dusty mines, a water pipe system extends throughout the workings and sprays employed at all loading and other dusty points. Sprays are also used to suppress dust at coal and ore processing plants. *See also* whale-type jib. *Nelson.*

spray sagging. The appearance of wavy lines on the vertical surface of vitreous enamelware after it has been sprayed and before the slip coating is dried. The fault is caused by incorrect adjustment of the fluidity and thixotropy of the slip. *Dodd.*

spray transfer. The term describes the transfer of metal as a spray of droplets during consumable-electrode arc welding. Spray transfer is further described as "axial" when the stream of droplets is along the arc axis, and as "rotating" if it rotates at an oblique angle to the arc axis thus generating a conical surface. Also known as small-drop transfer. *BuMines Bull. 625, 1965, p. VII.*

spray welding. A process for the localized repair of cracks in the refractory brickwork of a gas retort or coke oven; a refractory powder is carried by a stream of oxygen into an oxy/coal-gas flame so that the powder fuses on the brickwork to seal the selected damaged area on which it is projected. *Compare* airborne sealing. *Dodd.*

spray zone. The area affected by the spray of the breakers. *Schieferdecker.*

spread. a. The area covered at a given thickness by a given quantity of such materials as chippings or road binder. *Ham.* b. The surface in proportion to the depth of a stone. *Hess.*

spreader. a. A horizontal timber below the cap of a set, to stiffen the legs, and to support the brattice when there are two air courses in the same gangway. *Fay.* b. A piece of timber stretched across a shaft as a temporary support of the walls. *Fay.* c. A tool used in sharpening machine drill bits. *Fay.* d. One that spreads, holds, or keeps apart; as, any of a series of crossbearers that supports a line of rails (as in an adit or heading). *Webster 3d.* e. A strut in tunnel or heading timber sets. *Nelson.* f. A surface machine which spreads dumped material with its blades. *Nelson.* g. A machine traveling on railway track and equipped with 15-foot-wide blades for spreading dumped material. *Ham.*

spreader beam. A stiff beam suspended from a crane hook and fitted with a number of ropes hanging from different points along its length. It is employed for such purposes as lifting long reinforced concrete piles or large sheets of glass. *Ham.*

spreader block. *See* deflecting block. *Dodd.*

spreader chains. Chains joining the end of the tail chain to ends of the spreader. *Zern.*

spreader operator. *See* tripper man. *D.O.T. Supp.*

spread footing. A particularly wide footing, generally of reinforced concrete. *Ham.*

spreading. The diminution of sound pressure level with distance according to various laws or behavior, such as spherical spreading, cyclindrical spreading, or dipolar spreading. *Hy.*

spreading anomaly. That part of the propagation anomaly which may be identified with the geometry of the ray paths. *Hy.*

spreading box. An appliance having a container into which road material is loaded, and from which it is spread in a uniform layer without being compacted. *Ham.*

spreading the load. Foundation arrangements to spread the structural load over sufficient area of hard soil to prevent penetration and excessive yield. The methods include wide footings, concrete in trenches or rafts, inverted arches, grillages and piles. In soft soils, trenches or rafts of concrete are used, and in sand sheet piles may be used as binders. The concrete extends from 8 to 12 inches beyond the footings to spread the load. *Nelson.*

spread length. Length of a seismometer spread. *Schieferdecker.*

spread of ash. The maximum tolerance allowable for performance between determined bed quality of the coal and the average run-of-mine analysis in the railroad car. Some authorities have accepted a 15-percent increase in ash content as the maximum tolerance allowable. For example, a coal that averages 4.50 percent ash in the bed should not exceed 5.18 percent in run-of-mine shipments. *Mitchell, p. 220.*

spread recorder. An instrument used in bridge testing to measure any outward spread of an abutment under load. *See also* rotation recorder. *Ham.*

sprig. In foundry work, stiffening length of iron inserted in sand mold. *Pryor, 3.*

sprigged ware. Pottery that is decorated by the application of low-relief clay ornamentation, sometimes formed in molds. *ACSG, 1963.*

sprigging. The decoration of pottery vases, etc., by affixing clay figures, usually classical, to form a bas relief; the figures are pressed separately from the vase and are made to adhere to the ware by means of clay slip. *Dodd.*

sprills. In powder metallurgy, metal powder particles of cylindrical form, little longer than their diameters. *Henderson.*

spring. a. To enlarge the bottom of a drill hole by small charges of a high explosive in order to make room for the full charge; to chamber a drill hole. *Fay. Compare* camouflet. b. Synonym for core lifter. *Long.* c. To chamber. *See also* chamber, k. *Long.* d. Synonym for finger, as applied to the fingers of a basket core lifter. *Long.* e. A general name for any discharge of deep-seated, hot or cold, pure or mineralized water. *Fay.* f. A place where, without the agency of man, water flows from a rock or soil upon the land or into a body of surface water. *A.G.I.*

spring auxiliary cylinder. A heavy tension spring, enclosed in a cylinder, which is connected to the panline of certain types of shaker conveyors to keep the conveyor in tension. It is attached to the conveyor by a driving chain and to a prop by a fixing chain. Keeping the conveyor in tension, it is claimed, will save the conveyor connections and increase the output. *Jones.*

springback. a. The elastic recovery of metal after stressing. *ASM Gloss.* b. The degree to which metal tends to return to its original shape or contour after undergoing a forming operation. *ASM Gloss.* c. In flash, upset, or pressure welding, the deflection in the welding machine caused by the upset pressure. *ASM Gloss.*

spring balance. Records weight by measuring spring distortion produced by weight of load. *Pryor, 3, p. 35.*

spring beams. Eng. Two short parallel timbers built into a Cornish pumping engine house, nearly on a level with the engine beam, for catching the beam, etc., and preventing a smash in case of a breakdown. *Zern.*

spring constant. Force for unit elongation of the spring used in geophysical instruments. *A.G.I.*

spring core lifter. Synonym for core spring. *Compare* split-ring core lifter. *Long.*

spring dart. a. A tool used to retrieve lost boring gear. *Pryor, 3.* b. A device to withdraw the steel casing from a borehole when finished. The casing is cut into convenient lengths and then the spring dart is lowered to bring up each length separately. The dart springs open immediately when it meets a cut or recess in the casing, which length it then grips and lifts to the surface. *See also* Kind's plug. *Nelson.*

spring deposits. Minor deposits formed by springs of magmatic origin that are of little economic importance but of considerable scientific interest. Silica and the sulfides of arsenic, antimony, lead, copper, and mercury are being deposited by these springs, as are also gold, silver, fluorite, and barite. *Lewis, p. 275.*

spring dog. Scot. Same as spring hook. *Fay.*

springer. *See* skewback. *Dodd.*

Springeran. Lower lower Pennsylvanian. *A.G.I. Supp.*

spring hook. Eng. An iron hook attached to the end of a winding, capstan, or crab rope, fitted with a spring for closing the opening, and thus preventing the kibble or tub from falling off. *Fay.*

springing. a. A quarry blasting method in which a succession of charges is fired in a borehole to open up a chamber. *B.S. 3618, 1964, sec. 6.* b. Enlarging the bottom of a drill hole by exploding a small charge in it. *Nichols.* c. In blasting, a method of enlarging the bottom of holes by firing a number of charges, of increasing size, until the required quantity of explosive can be placed in the hole. Springing is best done with a powerful, quick-acting explosive, such as 40 percent straight dynamite, 40 percent gelatin dynamite, 50 percent low-freezing dynamite, or 60 percent ammonia dynamite. Overspringing the hole results in the disadvantage of causing cushioned blasting, and the full force of the explosive is not realized. *Lewis, p. 161.* Also called bullying; chambering; shaking a hole. *See also* spring, a. *Fay.* d. In certain types of rock large quantities of stone can be blasted down by the method known as springing the shothole. The technique requires that the rock contains well defined bedding or jointing planes, such as are found in most sedimentary and some igneous rocks, particularly granite. The principle of springing is to drill a borehole with a heavy burden and then explode a succession of gradually increasing charges of black powder so that the bedding planes or joints are opened up to permit the placing of a large final charge. *McAdam II, pp. 148-149.*

springing a hole. *See* springing.

springing drill holes. The operation of enlarging the bottom part of a drill hole by exploding small successive charges. The purpose is to form a chamber so that more explosive can be concentrated in the bottom of the hole. *Fraenkel.*

springing line. a. The horizontal line drawn at the point of origin of an arch; or at the point where the intrados of the arch meets the interior face of the sidewalls or abutments. *Stauffer.* b. The line joining the springings on both sides of an arch. *C.T.D.*

springing points. The points at which the undercurve of an arch commences. *A.R.I.*

spring latch. The latch or tongue of an automatic switch, operated by a spring at the side of the mine track. *Fay.*

spring lifter. Synonym for core lifter. *Compare* split-ring core lifter. *Long.*

spring-lifter case. Synonym for core-lifter case. *Long.*

spring line. The meeting of the roof arch and the sides of a tunnel. *Nichols.*

spring-loaded. Held in contact or engagement by springs. *Nichols.*

spring-mounted roller conveyor. a. A type of roller conveyor where the ends of each roll is supported on a spring. *ASA MH4.1-1958.* b. A section of roller conveyor supported on springs. *ASA MH4.1-1958.* b. A section of roller conveyor supported on springs. *ASA MH4.1-1958.*

spring pits. Small craterlets found on sand beaches produced by ascending waters. They range in diameter from 30 to 60 centimeters with a depth of about 15 centimeters. *Pettijohn.*

spring points. Railway points other than trailing which are held closed by springs. *Ham.*

spring pole; rocking lever. A horizontal beam to give the reciprocal motion to the rods in hand boring. The pole is from 25 to 30 feet in length and is made of pliant larch. The arrangement is slow and only used for shallow holes and where mechanical power is not available. *Nelson.*

spring range. The average semidiurnal range of tide at time of syzygy. *Hy.*

spring rise. The mean height of high water above chart datum during syzygy. *Hy.*

spring roll crusher. A crushing machine similar to the double roll crusher with the difference that springs are fixed to the bearings of one roll. *Nelson.*

spring rolls. Crushing rolls used in ore breaking. Two parallel cylinders, mounted horizontally, are held apart by shims, and pressed together by powerful springs. Crushable rocks falling between them are drawn down as the cylinders revolve, but unbreakable material causes the springs to yield and let it pass without damage. *Pryor, 3.*

spring steel. a. A steel that is processed (as by cold drawings, cold rolling or heat treating) to give it the elastic properties and yield strength useful in springs. *Webster 3d.* b. Carbon steel, or low-alloy steel suitable for making springs. *Pryor, 3.*

spring switches. Switches sometimes used where it is desired to permit flanges of trailing wheels to pass along the other track from that for which the points are set for facing movements. To accomplish this a spring device is incorporated in the operating mechanism so that the points automatically return to their normal position after the trailing wheels have passed through the switch. *Urquhart, Sec. 2, p. 42.*

spring temper. *See* temper. *ASM Gloss.*

spring tidal currents. Tidal currents of increased velocity produced during syzygy. *Hy.*

spring tide. The increased range of tide generated by tractive effect of the moon and the sun occurring in phase. *Hy.*

spring washer. A washer consisting of a steel ring cut through and bent into helical form, which prevents a nut from unscrewing. *Ham.*

spring water. Often contains a considerable amount of dissolved solid substances which render the water hard, but having filtered through finely porous rocks it is usually free from bacteria. *Cooper, p. 360.*

springy fiber. Fiber strands lacking the usual soft texture but possessing a high degree of elasticity. *Sinclair, W.E., p. 484.*

sprinkler. a. In bituminous coal mining, a laborer who sprays or sprinkles water on dry coal or dust in a mine to reduce explosion hazards, using a sprinkler or a sprayer. *D.O.T. 1.* b. *See* timber sprinkler. *D.O.T. 1.* c. The device with which sprinkling is done. *Bureau of Mines Staff.*

sprinkling. An act of spraying water into the atmosphere and on coal surfaces to allay coal dust. *B.C.I.*

sprocket. A gear that meshes with a chain or crawler track. *Nichols.*

sprocket gear. A gear that meshes with a roller or silent chain. *Nichols.*

sprocket wheel. Eng. Rag wheel. A wheel with teeth or pins which engage the links of a chain. *Zern.*

spruce ocher. Brown or yellow ocher. *Fay.*

sprue. a. A piece of metal attached to a casting, occupying the gate or passage, through which the metal was poured. *Fay.* b. A molder's rod for making sprue holes. *Standard, 1964.* c. The channel that connects the pouring basin with the runner. *ASM Gloss.* d. Sometimes used to mean all gates, risers, runners, and similar scrap. *ASM Gloss.* e. The waste enamel frit which accumulates at the taphole of a smelter. Spruce is air-cooled and, therefore, cannot ground as easily as water-quenched frit, producing gallstones in milling. *Enam. Dict.*

sprue hole. A pouring hole in a mold; a gate. *Standard, 1964.*

sprung arch; sprung roof. An arch, or furnace roof, the brickwork of which is supported solely by skewbacks. *Compare* suspended arch. *See also* skewback. *Dodd.*

spud. a. A nail, resembling a horseshoe nail, with a hole in the head, driven into mine timbering, or into a wooden plug inserted in the rock, to mark a surveying station. Also called spad. *Fay.* b. To bore, as the first 50 feet of an oil well, by the use of the bull wheel. *Standard, 1964.* c. To commence drilling operations by making a hole. *Wheeler.* d. To begin the drilling of a borehole with a spud or diamond-point bit. *Long.* e. An offset type of fishing tool used to clear a space around tools stuck in a borehole. *Long.* f. A cable-tool drill bit. *Long.* g. An anchorage during dredging provided by a steel post underneath a dredger which can be lowered by a toothed rack or by ropes until it is secured in the seabed, riverbed, or dredge pond. *Ham.*

spud bit. a. A mud or diamond-point bit used to drill through overburden or soil down to bedrock. *Long.* b. A broad, dull, chisel-face drilling tool for working in earth down to rock with a churn or cable-tool drill. *Long.*

spudded-in. A term applied to a borehole that has been started and the hole has reached bedrock and/or the standpipe has been set. *Long.*

spudder. a. A drill used for seismic shot holes in hard rock or gravel. The bit is raised and dropped and the resulting cuttings are removed with a bail or pipe with a flap valve in the bottom. *A.G.I.* b. A churn drill, churn-drill operator, or the special bit used to begin a borehole by rotary, diamond, or churn drills. *Long.* c. A colloquialism for a small drilling rig. *Williams.*

spudder drill. Synonym for churn drill. *Long.*

spudding. a. The operation, in rope drilling, of boring through the subsoil at the start of a hole. *B.S. 3618, 1963, sec. 3.* b. In diamond and/or rotary drilling, a general term applied to drilling through overburden with a fishtail bit, drag bit, or diamond-point bit. *Long.* c. Sinking a conductor, standpipe, or casing with a churn- or cable-type drill rig. *Long.*

spudding bit. a. A broad dull drilling tool for working in earth down to the rock. *Standard, 1964.* b. A heavy chisel bit used in percussive drilling to drill through subsoil. *B.S. 3618, 1963, sec. 3.* c. *See* spud bit. *Long.* d. The bit used to start the hole. When the hole is deep enough, regular drilling tools are substituted. *Williams.*

spudding boreholes. The working of a cable drill up and down on a short length of rope, when passing through the superficial deposits down to bedrock. This section of hole is cased. *Nelson.*

spudding drill; churn drill. A drill that makes a hole by lifting and dropping a chisel bit. *Nichols.*

spudding driller. In petroleum production industry, one who uses a lightweight, portable drilling rig (spudder) for the drilling of shallow wells, or a regular cable drilling rig to drill the first few feet of a well. Also called spudder or spud driller. *D.O.T. 1.*

spudding drum. In a churn drill, the winch that controls the drilling line. *Nichols.*

spudding in. a. As employed and understood by oil operators, denotes the first abrasion of the soil by the drill or that of first entrance of drill into the ground. *Ricketts, II.* b. *See* spud, d. *Long.*

spudding tools. Tools used to begin a borehole in earthy materials with a diamond or rotary drill; also, the drilling tools used by a cable tool or churn drill. *Long.*

spud drill. Synonym for churn drill. *Long.*

spud driller. *See* spudding driller. *D.O.T. 1.*

spud-in. *See* spud, d. *Long.*

spuds. On a dredge, steel tubes pointed at the bottom and provided with lifting tackle at the top which are used to hold and to move the dredge. *Nichols, 2.*

spud setter. a. A mine surveyor. *See also* spud, a. *Fay.* b. *See* surveyor, mine. *D.O.T. 1.*

spud well. On a dredge, a pair of guide collars for a spud. *Nichols.*

spun concrete. Concrete compacted by centrifugal action. *Taylor.*

spun glass. *See* fiber. *ASTM C162-66.*

spunney. Lanc. A self-acting plane or incline. *Fay.*

spur. a. Scot. A portion of the coal left unholed to support the coal seam until the rest of the holing is completed. Also called spurring; spurn. *Fay.* b. Eng. To support or brace with a spur; prop. *Webster 3d.* c. S. Afr. A small vein leaving the main body of ore. *Beerman.* d. A stempel. *Standard, 1964.* e. A rock ridge projecting from a sidewall after inadequate blasting. *Nichols.* f. Eng. *See* sprag, h. *SMRB, Paper No. 61.* g. A ridge or lesser elevation that projects from a mountain, a range of mountains, or a higher land surface to some distance at right angles or in a lateral direction. *Webster 3d.* h. A prolongation of a mountain range on or across the continental or insular shelf. *Schieferdecker.* i. A solution remnant of rock projecting from the wall of a cave. *A.G.I.* j. An item of kiln furniture in the form of a tetrahedron with concave faces and sharp points on which the ware is set. *Dodd.*

spurious count. Count caused by any agency other than the passage into or through a counter of photons or particles to which it is sensitive. *NCB.*

spurious frequencies. The response of a crystal at frequencies other than the nominal one, commonly due to interfering coupled modes of oscillation. In predimensioning, this is reduced by edge dimensioning. *AM, 1.*

spur marks. Dry spots, not covered by glaze, sometimes seen on the base of ware which has been supported in saggars on spurs. *C.T.D.*

spurns. S. Staff. Small connecting masses of coal, left for safety during the operation of cutting, between the hanging coal and the main body. *See also* spur, a. *Fay.*

spurrite. A pale gray silicate and carbonate of calcium, $2Ca_2SiO_4.CaCO_3$. Granular masses resembling crystalline limestone. Probably monoclinic. From Velardena, Durango, Mex.; Scawt Hill, Ire.; Luna County, New Mex.; Crestmore, Calif. *English.*

spur road. Scot. A branch road leading from a main haulage road. *Fay.*

spurs. a. Relatively short and small veins of quartz that cut across the bedding, in contrast to saddle reefs which more or less follow the bedding. *Nelson.* b. Triangular refractory supports that are placed under glazed ware during firing to prevent sticking to the kiln shelves. *ACSG, 1963.*

spurt. Forest of Dean. A distintegrated stone. *Fay.*

spur track. In railroading, a short sidetrack connecting with the main track at one end only. *Standard, 1964.*

spur valley. A short branch valley. *Nichols.*

sp vol Abbreviation for specific volume. *BuMin Style Guide, p. 62.*

spy. The small hole, kept plugged, through which tests and cones are observed. *Crispin.*

spyker-draad. Nail wire (or wire nails), an Afrikaans term describing springy fiber. *Sinclair, W. E., p. 484.*

sq cm Abbreviation for square centimeter. *BuMin Style Guide, p. 62.*

sq dkm Abbreviation for square dekameter. *BuMin Style Guide, p. 62.*

sq ft Abbreviation for square foot. *BuMin Style Guide, p. 62.*

sq hm Abbreviation for square hectometer. *BuMin Style Guide, p. 62.*

sq in Abbreviation for square inch. *BuMin Style Guide, p. 62.*

sq km Abbreviation for square kilometer. *BuMin Style Guide, p. 62.*

sq m Abbreviation for square meter. *BuMin Style Guide, p. 62.*

sq µ Abbreviation for square micron. Also abbreviated μ^2. *BuMin Style Guide, p. 62.*

sq mi Abbreviation for square mile. *BuMin Style Guide, p. 62.*

sq mm Abbreviation for square millimeter. *BuMin Style Guide, p. 62.*

squad. a. Prov. Eng. Mire; slime; mud *Standard, 1964.* b. Prov. Eng. A small bunch of loose tin ore mixed with earth. *Standard, 1964.* Also called squat. *Fay.*

squamiform cast. *See* squamiform load cast. *Pettijohn.*

squamiform load cast; squamiform cast. A type of load casting that covers some soles with crowded lobate casts overlapping down-current; resembles sagged flute casts that have an opposite orientation with respect to current direction. *Pettijohn.*

squander. York. To extinguish an underground fire. *Fay.*

square. a. A term used in the slate industry with reference to roofing slate. A square is a sufficient number of any size to lay 100 square feet of roof, allowing the standard 3-inch lap. The estimated weight of a square of ¼-inch slate is 1,000 pounds. *BuMines Bull. 630, 1965, p. 882.* b. *See* standard square. *Dodd.*

square-cut glass. Optical glass cut in small squares, separated and designated by weight. *ASTM C162-66.*

squared. Eng. A round prop or balk is said to be squared off when one or more faces have been hewed on it with an axe by slightly flattening it lengthwise. *SMRB, Paper No. 61.*

square- drill collar. A long stabilizer of rectangular shape which when used properly gives a super-packed-hole effect. Square drill collars are made primarily from 30-foot steel bar stock with a diagonal measurement greater than the hole diameter in which the collar will eventually be used. This collar has proved successful in controlling rapid directional and deviational changes in wells drilled in a disturbed-belt-type area. *American Petroleum Institute. Drilling and Production Practice, 1963, pp. 75-79.*

square drilling. Making square holes by means of a specially constructed drill, made to rotate and oscillate so as to follow accurately the periphery of a square guide bushing or template. *ASM Gloss.*

square foot of radiator. The amount of heating surface in the form of radiators, convectors, unit heaters, or other devices which will emit 240 British thermal units per hour. This amount of surface has no exact relationship to the actual area of the surface. *Strock, 10.*

square groove weld. A groove weld in which the abutting surfaces are square. *ASM Gloss.*

squareman. Eng. A stone cutter or stone dresser. *Standard, 1964.*

square measure. Includes the following: 144 square inches (sq in) equal 1 square foot (sq ft); 9 square feet equal 1 square yard (sq yd); 30¼ square yards equal 1 square rod (sq rd); 160 square rods equal 1 acre (A); 640 acres equal 1 square mile (sq mi); and 36 square miles equal 1 township (twp). *Crispin.*

square-mile-foot. A unit of measure representing the volume of water one foot deep over an area of one square mile. *See also* acre-foot. *Ham.*

squareness ratio. Ratio of magnetization at (—H/2) to the magnetization at (H), where H is the field strength of the completed hysteresis loop. *VV.*

square-nose bit. A flat-face bit. *Long.*

square-point shovel. *See* shovel, b. *Carson, p. 134.*

square set. A set of timbers composed of a cap, girt, and post. These members meet so as to form a solid 90° angle. They are so framed at the intersection as to form a compression joint, and join with three other similar sets. The posts are 6 or 7 feet high while the caps and girts are 4 to 6 feet long. *Fay.* This system of timbering can be adapted to large or irregular ore bodies. Sills are laid in trenches cut in the floor of the stope if the stope is to be caught up from the level below. If no stoping is to be done immediately below, and if the ground is hard, sills may be omitted and the posts set directly in hitches in the floor or on footboards. Caps and girts are placed on top of the posts, a line of caps being at right angles to a line of girts. Square sets vary in dimensions at different mines, but in general should give a clear opening of at least 5 feet each way between posts to afford sufficient working space in the stope, and a clear height of 6½ feet is about the minimum height desirable. *Lewis, pp. 42-44.*

square-set and fill. *See* square-set stoping. *Fay.*

square-set block caving. A method of block caving in which the caved ore is extracted through drifts supported by square sets. A retreating system is adopted. *Nelson.*

square-set slicing. *See* top slicing and cover caving. *Fay.*

square-set stopes. A method where square-set timbering is used to support the ground as the ore is extracted. It is often used for mining wide ore bodies particularly where the conditions are irregular and where walls and ore masses are weak. The first tier of timber sets is termed the sill floor and the uppermost the mining floor. *Nelson.*

square-set stoping. A method of stoping in which the walls and back of the excavation are supported by regular framed timbers forming a skeleton enclosing a series of connected, hollow, rectangular prisms in the space formerly occupied by the excavated ore and providing continuous lines of support in three directions at right angles to each other. The ore is excavated in small, rectangular blocks just large enough to provide room for standing a set of timber. The essential timbers comprising a standard square set are respectively termed posts, caps, and girts. The posts are the upright members, and the caps and girts are the horizontal members. The ends of the members are framed to give each a bearing against the other two at the corners of the sets where they join together. The stopes usually are mined out in floors or horizontal panels, and the sets of each successive floor are framed into the sets of the preceding floor. Sometimes, however, the sets are mined out in a series of vertical or inclined panels. *BuMines Bull. 390, 1936, pp. 10, 12.* This method is most applicable in mining deposits in which the ore is structurally weak; also, the surrounding rock may be fractured, faulted, and altered to such an extent that it also is very weak. The primary function of the square sets is to furnish only temporary support for loose fragments of rock and to offer a passageway to the working face. Permanent support for the stope walls is supplied by filling the sets with broken waste rock. This is placed as soon as possible after a tier of sets is worked out, especially if the ground is heavy. *Lewis, p. 484.* The modifications are open stope, partly filled stope, filled stope, vertical slice (underhand), vertical slice (overhand), an alternate pillar and stope. Also known as Nevada system; square-set underhand; pillar-and-stope; back-filling method; square-set and fill. *Fay.*

square-set system. A method of mine timbering in which heavy timbers are framed together in rectangular sets, 6 or 7 feet high, and 4 to 6 feet square, so as to fill in as the ore body is removed by overhand stoping. *Webster 3d.*

square-set underhand. *See* square-set stoping. *Fay.*

square thread. a. A screw thread the cross section of which is square. *Long.* b. A robust type of screw thread which can transmit thrust in both directions. *Ham.*

square timbering. Eng. The formation of a shaft through an excavation. It consists of square settings or frames at intervals, close-poled behind. *Fay.*

square work. a. S. Staff. An old system of working the thick coal by mining the upper beds first and then the lower ones. *Fay.* b. A system of working a seam of coal by cutting it up into square blocks or pillars. *See also* stoop-and-room. *Fay.*

square work and caving. *See* sublevel stoping. *Fay.*

square work, pillar robbing, and hand filling. *See* sublevel stoping.

squaring shear. A machine tool, used for cutting sheet metal or plate, consisting essentially of a fixed cutting knife, usually mounted on the rear of the bed, and another cutting knife mounted on the front of the reciprocally moving crosshead, which is guided vertically in the side housings. Corner angles are usually 90°. *ASM Gloss.*

squat. a. Corn. Tin ore mixed with spar. Also called squad. *Fay.* b. Corn. A small ore body in a vein. *Standard, 1964.*

squat lads! Fall flat down on the floor! In the early days of coal mining, igniting the gas was a very common thing; so, whenever an explosion took place, the colliers shouted to one another, "Squat, lads!" *See also* she's fired! *Fay.*

squat of ore. Eng. A bunch of ore. *Fay.*

squealer. A shot that breaks the coal only enough to allow the gases of detonation to escape with a whistling or squealing sound; also called a whistler. *Zern.*

squeal-out. Ark. *See* seam-out; squealer. *Fay.*

squealy coal. Ark. Seamy coal from which the powder gases escape with a squealing sound. *Fay.*

squeegee oil. a. A special mixture of oils used to suspend enamel color in paste form for silk screen work, etc. This oil will burn off during the firing process. *Enam. Dict.* b. A liquid mixture of organic materials used as the vehicle in squeegee paste. *ACSG, 1963.*

squeegee paste. A mixture of squeegee oil and finely divided inorganic materials such as color oxides and fluxes. *ASTM C286-65.*

squeegee process. The term squeegee oil is used, particularly in the United States industry, for the mixture of oils used to suspend a ceramic or enamel color for silk-screen printing. Similarly, the term squeegee paste is used for the mixture of oils, colors, and flux in this process of decoration. *See also* silk-screen process. *Dodd.*

squeeze. a. A crushing of coal with the roof moving nearer to the floor. *Lewis, p. 543.* b. The settling, without breaking, of the roof over a considerable area of working. Also called creep; crush; pinch; nip. *Fay.* c. The gradual upheaval of the floor of a mine, due to the weight of the overlying strata. *Fay.* d. The effect of the closure of stope walls on supports placed between them. *Spalding.* e. A passageway in a cave that is very narrow and can be passed by a man only with great difficulty. *A.G.I.* f. Applied to sections in coal seams where they have become constricted by the squeezing in of the overlying or underlying rock as a result of pressure during folding or other movements. *A.G.I.* g. A pinch of the vien in passing through hard bands of rock. *Gordon.* h. To inject a grout into a borehole under high pressure. *Long.* i. The plastic movement of a soft rock in the walls of a borehole or mine working that reduced the diameter of the opening. *Long.* j. Pumping cement back of casing under high pressure to block off or recement channeled areas. *Wheeler.* k. Squeeze in diving is due to the effect of increasing external pressure upon the ears and sinuses, the face plate or the swim suit uncompensated by an equal increase in pressure from within. The incidence of squeeze is low. It is recognized by beginning pain in the ears and sinus areas, or by a feeling of tightness within the face covering, usually within the first few feet of descent. This pressure differential decreases with increased depth. Face squeeze can easily be prevented by exhaling into the face plate. *H&G.*

squeeze job. The high-pressure grouting of a borehole. *Long.*

squeezer. a. A machine for reducing the puddle ball to a compact mass, ready for the hammer or rolls. Also called alligator. *Fay.* b. The mechanical device for squeezing a part of the slag from the wrought-iron ball and thoroughly mixing the remainder among the fibers. *Mersereau, 4th, p. 444.*

squeeze riveter. A single stroke compressed air cylinder for closing rivets through the medium of a toggle mechanism. *See also* hydropneumatic riveter. *Ham.*

squeezers. A mine tub controller which acts by squeezing the tub or the wheels. *Mason.*

squeeze time. In resistance welding, the time between the initial applications of pressure and current. *ASM Gloss.*

squeezeup. A small excrescence of lava on the surface of flow (usually a basaltic flow) produced by the extrusion of viscous lava through an opening in the solidified crust. It may be bulbous, linear, or irregular in shape. Linear squeezeups result from the rise of viscous lava into fissures and ordinarily, they project a few inches to a foot or two above the flow surface. *A.G.I.*

squeezing. The slow increase in weight on pillars or solid coal eventually resulting in such things as crushing of the coal, heaving of the bottom and the driving of pillars into soft floor or top. The cause normally is leaving pillars or other support which, after considerable area is opened up, prove to be inadequate, permitting the top to settle gradually with transfer of the weight to active places and solid coal. *Coal Age, v. 71, No. 8, August 1966, p. 200.*

squeezing-box. A metal cylinder having at its bottom an orifice through which a mass of plastic clay is forced in the shape of a long roll, from which handles may be cut, as for jugs. *Standard, 1964.*

squib. a. A thin tube filled with black powder, forming a slow-burning fuse to explode a stemmed charge of black powder. *B.S. 3618, 1964, sec. 6.* b. A firing device that will burn with a flash which will ignite black powder. *Nichols.* c. A small charge of powder exploded in the bottom of a drill hole, to spring the rock, after which a heavy shot is fired. A springing shot. *Fay.* d. In well boring, a vessel, containing the explosive and fitted with a time fuse, that is lowered into a well to detonate the nitroglycerin charge. *Fay.*

squib, electric. *See* electric squib.

squib shot. A blast with a small quantity of high explosives fired at some point in the borehole for the purpose of dislodging some foreign material which has fallen into it. *Fay.*

squint. A building brick with one end chamfered on both edges so that the brick can be used at an oblique quoin. *Dodd.*

squinted vein. Derb. A mineral vein cut by a dike and thereby thrown out of alinement on the two sides of the dike. *Arkell.*

squirrel cage fan. A centrifugal blower with forward-curved blades. *Strock, 10.*

squirrel-cage motor. An alternating current electric motor with many applications. The rotor is made of strong parallel copper or aluminum bars on the perimeter, joined to end rings of the same metal. *Ham.*

squirting. Forcing lead by hydraulic pressure into the form of rods or pipes. *Fay.*

squotting. A stage in the heating of clay when so much of the material has fused that the mass begins to lose its shape and becomes viscous. *See also* fusion of clay. *Nelson.*

Sr Chemical symbol for strontium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

SR fusion-cast refractory. A French fusion-cast refractory, for example, glass tank block, made by a process that largely eliminates the cavites that occur as a result of shrinkage while the block cools from the molten state. The block is made by a so-called high filling process (SR=sur-remplis) and is then heat treated. *Dodd.*

srp Abbreviation for static reservoir pressure. Also abbreviated SRP. *BuMin Style Guide, p. 62.*

SSF Abbreviation for Saybolt seconds furol. *Pit and Quarry, 53rd, sec. E, p. 82.*

s-surface. One of numerous parallel surfaces of bedding or foliation which indicate directional properties in rocks; it may be warped. *A.G.I. Supp.*

stab. a. To guide a pipe, casing, or drill rod so that the threads will engage properly. *Long.* b. To recover a drill tool lost in a borehole by using a spear-shaped or pointed fishing tool. *Long.* c. In adding to a drill string, the action of lining up and catching the threads of the loose piece. *Nichols.*

stabber. In the work of tubing oil and gas wells, the person whose duty is to guide the joints suspended by a rope from the derrick to connect with other joints, placed in the well. *Ricketts, I.*

stag hole. Usually a short hole drilled, charged, and fired to shatter the rock near the collars of the cut holes. *Nelson.*

stabile metabitumens. Stabilized bitumen derived from labile protobitumens by metamorphism, occurs in coal and kerogen shale. Stabile metabitumens are subdivided into two groups, polymerbitumens and kerobitumens. *Tomkeieff, 1954.*

stabile protobitumen. Organic material that resists decay, for example, waxes, resins, spores, leaf cuticle, that is likely to be preserved as amber or in torbanite and cannel coal. *Tomkeieff, 1954.*

stability. a. The resistance of a structure, spoil heap, or a clay bank to sliding, overturning, or collapsing. A structure is only as stable as its foundations and those in turn upon the soil or rock on which they are constructed. Soil stability, such as mountain slopes, spoil heaps, and embankments, depends on the shearing strength of the material and that is a function of internal strength and cohesion. *See also* angle of repose; differential settlement. *Nelson.* b. Resistance to devitrification. *ASTM C162-66.* c. Chemical durability, resistance to weathering. *ASTM C162-66.* d. In thermodynamics, a phase is said to have stability if a slight perturbation in the variables defining the system, temperature, pressure, or composition does not result in the appearance of a new phase. *A.G.I.*

stability field (critical level). The temperature and pressure within which a mineral is stable. *A.G.I.*

stability series; order of persistence. The order of resistance of minerals to alteration or destruction by weathering of the parent rock, abrasion during transportation, and post-depositional solution. *A.G.I.*

stablization. *See* soil stabilization.

stabilize. To make soil firm and to prevent it from moving. *Nichols.*

stabilized coupling. A rod coupling built up to reaming-shell size by welding on an abrasion-resistant metal, applied in ridges parallel to the long axis of the drill rod. *Long.*

stabilized soil base. A base of soil stabilized mechanically, with cement or with a bituminous binder. *See also* soil stabilization. *Nelson.*

stabilized tray conveyor. *See* over-and-under conveyor. *ASA MH4.1-1958.*

stabilizer. a. A hardened, splined bushing, sometimes freely rotating, slightly larger than the outer diameter of a core barrel and mounted directly above the core barrel back head. Also called ferrule; fluted coupling. *Long.* b. A misnomer for guide rod. *Long.* c. Any powdered or liquid additive used as an agent in soil stabilization. *See also* processing; spotting; soil stabilization. *Ham.*

stabilizing treatment. Any treatment intended to stabilize the structure of an alloy or the dimensions of a part. *ASM Gloss.*

stable. a. Not readily decomposed or deformed. *Nelson.* b. A short drivage, room, or space excavated at the end of a longwall face to accommodate a coal cutter or cutter loader. The stable provides room for turning the machine where this is necessary, and also exposes a buttock for the machine to start its cut across the face. *Nelson.* c. An elongated recess in a mine roadway, near the pit bottom, and divided into compartments to accommodate horses or pit ponies. *Nelson.* d. Chemically, in a balanced state which is not easily upset. Structurally, resistant to overturning. Of emulsion, resistant to breakdown into its component phases. *Pryor, 3.*

stable boss. a. A man placed in charge of the stables and of the animals employed at a mine. *Fay.* b. The same as barn boss. *Korson.*

stable coast; stationary coast. A coast showing no signs of a relative raise or subsidence. *Schieferdecker.*

stable equilibrium. Bodies are said to be in stable equilibrium when they tend to return to their original position of equilibrium after being slightly displaced. *Morris and Cooper, p. 167.*

stable gravimeter. A gravimeter having a simple weight on a spring such that the sensitivity is proportional to the square of the period; for example, the Gulf (Hoyt) gravimeter. *A.G.I.*

stable hole conveyor. A short belt or other conveyor for use in stables in advance of the longwall face. The conveyor is usually about 18 inches wide and driven at the tail end by a combined electric motor and drive pulley. The unit can be transported by sliding on steel skids, and is useful where coal or stone has to be moved short distances in confined spaces. *See also* shortwall. *Nelson.*

stable isotope. A nuclide that does not undergo radioactive decay. *L&L.*

stable lead; nonradioactive lead. Any of the nonradioactive isotopes of lead: Lead 206, 23.6 percent of natural lead, and the stable end-product of the uranium disintegration series; lead 207, 22.6 percent of natural lead, and the stable end-product of the actinium disintegration series; and lead 208, 52.3 percent of natural lead, and the stable end-product of the thorium disintegration series. *Glasstone, 2, pp. 133, 134, 135; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-77.*

stable protobitumens. This term includes spore and pollen exines, cuticle, cork tissue, primary resins, waxes, and cell walls of algae. Also included are products derived from nonbituminous matter and unstable protobitumens, among others, as a result of changes brought about by saprophytic agents. Such products are termed secondary bitumen or stable metabitumen, and are usually structureless. Stable protobitumens only show marked changes in coals with less than 30 percent volatile matter. *I.H.C.P., 1963, part I.*

stable relict. A relict that was not only stable under the conditions prevailing while it was formed but also under the newly imposed conditions. *Schieferdecker.*

stable-type gravimeter. A gravity meter which uses a high order of optical and/or mechanical magnification so that a change in position of a weight or associated property is measured directly. *See also* gravimeter. *A.G.I.*

staccato injection. The intrusion of igneous material in distinct, separate steps interrupted by pauses. *Stokes and Varnes, 1955.*

stack. a. Chock; a chock built of old timber. *Mason.* b. To stand and rack drill rods in a drill tripod or derrick. *Long.* c. In a blast furnace, the cone-shaped section rising from bosh to throat. Also called shaft; inwall. *Pryor, 3.* d. A chimney. *Fay.* e. A shaft furnace. *Fay.* f. To build up coal, ironstone, etc., into heaps on the surface for winter or other use. *Fay.* g. In gas works, a row of benches containing retorts. *Fay.* h. In the old method of making white lead, one of the piles of sheet lead in stoneware pots, or of horse dung or spent tanner's bark. *Standard, 1964.* i. Eng. A measure of fuel consisting of 108 cubic feet. *Standard, 1964.* j. Any structure or part thereof that contains a flue or flues for the discharge of gases. *ACSG, 1963.* k. A lofty columnar rock on the shore or shore face. Also called pillar; needle; chimney rock. *Schieferdecker.*

stack cutting. Oxygen cutting of stacked metal plates arranged so that all are severed by a single cut. *ASM Gloss.*

stack effect. The impulse of a heated gas to rise in a vertical passage, as in a chimney, a small enclosure, or building. *Strock, 10.*

stacker. a. One who stacks coal, etc. *Fay.* b. Leic. A miner who looked after the unloading of the coal on the bank, on behalf of the miners, in the earlier days of mining. *Fay.* c. A conveyor, mounted on a long steel boom, for carrying tailings beyond the stern of a gold or tin dredge to avoid silting it up. *Nelson.* d. A machine for blending ore that beds the ore before reclaiming for processing. *Bureau of Mines Staff.* e. One who controls conveyor belt moving molds containing molten lead through water spray to stamping and discharge tables. *D.O.T. Supp.* f. A conveyor adapted to piling or stacking bulk materials, packages, or objects. *See also* apron conveyor; belt conveyor; flight conveyor; portable conveyor; slat conveyor. *ASA MH4.1-1958.* g. A fixed or pivotally mounted boom conveyor. *ASA MH4.1-1958.* h. With a blending system the stacker operates over the stocking conveyor in a manner similar to a wing tripper to build layered piles or beds of material parallel to the stocking conveyor. *See also* boom conveyor; portable conveyor; wing belt tripper. *ASA MH4.1-1958.*

stacker conveyor. *See* stacker. *ASA MH4.1-1958.*

stack glass. Over smelted glass which accumulates in the stack of enamel smelters. *Enam. Dict.*

stack height. The height of a convector enclosure measured from the bottom of the enclosure to the top of the outlet. *Strock, 10.*

stacking fault. A missing plane in a stacking sequence. *VV.*

stack out. Mid. To dam off or shut up the entrance to a goaf by building a wall of stone, coal, and clay in front of it. *Fay.*

stack welding. Resistance spot welding of stacked plates, all being joined simultaneously. *ASM Gloss.*

staddle. Mid. The foundation of a pack in ironstone workings. *Fay.*

stadia. a. A temporary surveying station. *Standard, 1964.* b. Same as stadia rod. *Standard, 1964.* c. An instrument for measuring distances, consisting of a telescope with special horizontal parallel lines or wires, used in connection with a vertical graduated rod; also, the rod alone or the method of using it. *Standard, 1964.* d. A method of surveying in which distances from an instrument to a rod are determined by observing the space on the rod scale intercepted by two lines in the reticule of the telescope. *Seelye, 2.*

stadia hairs. Two horizontal lines in the reticule of a theodolite arranged symetrically above and below the line of sight. They are set at such a distance apart that they subtend a particular known angle at the eye of the observer, generally about 0.01 radian. An intercept of L feet on a vertical staff means that the staff is at a distance of 100 L feet plus or minus an additive constant from the instrument. The figure 100 is known as the multiplying constant. *See also* compensating diaphragm; tacheometer. *Ham.*

stadia rod. A graduated rod used with an instrument having stadia hairs to measure the distance from the observation point to the place where the rod is positioned by observation of the length of rod subtended by the distance between the stadia hairs when these are fixed or of the space between the stadia hairs when they are adjusted to cover a certain definite interval on the rod. *Webster 3d.*

stadia surveying. The process of measuring distances and elevations by observing through a telescope the distance intercepted on a rod between two horizontal crosshairs. These hairs are carried on the same ring as the regular horizontal crosshair, and are equidistant from it. *Zern,* p. 482.

stadia tables. Mathematical tables from which may be found, without computation, the horizontal and vertical components of a reading made with a transit and stadia rod. *Fay.*

stadia wires. In tacheometry (survey), horizontal wires in the eyepiece of the telescope which span an intercept on a leveling or stadia staff and thus show distance from the telescope of the tacheometer. Also called stadia hairs. *Pryor, 3.*

stadia work. Tacheometric survey, in which points sighted from a survey station are oriented as with a theodolite, and their distance is read by means of a vertically held leveling staff on stadia wires. *Pryor, 3.*

staff. a. A body of assistants serving to carry into effect the plans of a superintendent or manager. *Webster 2d.* b. A surveyor's leveling rod. *Standard, 1964.* c. An iron puddler's rabble or rabbler. *Fay.*

staff gage. Graduated scale marked on a rod or a metal plate, or on the masonry of a bridge pier or similar structure, from which the depth of water in a canal, dock, or river can be read. *Ham.*

staff hole. A small hole in a puddling furnace through which the puddler heats his staff. *See also* staff. *Fay.*

staff man. The man who carries a leveling staff for a surveyor. *See also* target rod; telemeter rod. *Ham.*

Staffordian. A subdivision of the Coal Measures based mainly on plant remains. It represents the Pennant sandstone series of South Wales and the southern coalfields, with few coal seams, together with part of the Lower Coal series. *See also* Coal Measures; Westphalian; Yorkian. *Nelson.*

Staffordian series. The so-called Transition group of the British Coal Measures, between the Middle and Upper Coal Measures in the Carboniferous system. They include the Newcastle-under-Lyme group and the Etruria marl, and the Blackband group in north Staffordshire, England. *C.T.D.*

Staffordshire cones. Pyrometric cones. *See also* pyrometric cone. *Dodd.*

Staffordshire kiln. A particular design of transverse-arch kiln; it is fired from the top into combustion spaces in the setting. Such kilns are used for firing building bricks. *Dodd.*

staflux. A material made by sintering together lumps of limestone and certain kinds of iron oxide, such as iron ore or mill scale, at a temperature of 1,450° C in a rotary furnace. Though fusion does not occur, the iron oxide penetrates the limestone completely and rapidly, and forms dicalcium ferrite. *Osborne.*

stage. a. A landing, as in a shaft mine. *B.C.I.* b. The pit bank. *Fay.* c. A certain length of underground roadway worked by one horse. *Fay.* d. Scot. A narrow whin dike, especially one where the material of which the dike is composed is soft. *Fay.* e. A platform on which mine cars stand. *Zern.* f. A process of size reduction followed by one of sample division, with possibly one of mixing interposed. *B.S. 1017, 1960, Pt. II.* g. Stage grinding is successive comminution. Stage concentration is stage grinding repeated on the concentrate produced by treatment between grinding stages. Stage addition in flotation refers to deliberate use of insufficient reagent in the early part of the treatment, in order to increase selectivity of conditioning, followed by further addition at a later point in the process. *Pryor, 4.* h. A time-stratigraphic unit next in rank below a series and corresponding to an age; generally consists of several biostratigraphic zones. It is the most important unit for long-range correlation. *A.G.I. Supp.* i. A Pleistocene stage was formerly recognized as a time unit. *A.G.I. Supp.*

stage addition. *See* stage, g.

stage compression. *See* compound compression. *Lewis, p. 667.*

stage concentration. See stage, g.

stage crushing. A method of ore or stone crushing in which there is a series of crusher, each one crushing finer than the one preceding. *Fay.*

stage grinding. *See* stage, g.

stage loader. *See* feeder conveyor, a. *Nelson.*

stage micrometer. In microscopy, a grid or line ruled on glass and accurately divided into, say, millimeters. Placed on stage, and then used to calibrate micrometer set in ocular or eyepiece of microscope. *Pryor, 3.*

stage plumbing. A precise method of orienting underground workings in which plumblines are transferred down a deep shaft in stages of 400 to 600 feet (120 to 185 meters). While shaft sinking is in progress, the lines can also be employed to orient the shaft itself and to keep it plumb. *B.S. 3618, 1963, sec. 1.*

stage pumping. Draining a mine by means of two or more pumps placed at different levels, each of which raises the water to the next pump above or to the surface. *Fay.*

stage treatment. In mineral processing, development of the desired condition of the particles by defined states, such as comminution to successively fine sizes (possibly coupled with staged concentration or gangue elimination) between such stages of communition. *Pryor, 3.*

stage winding. Winding, usually in compound shafts, where the wind is divided into two or more stages, and underground winding engines are installed to deal with the lower stages. *Sinclair, V, p. 2.*

stage working. A system of working minerals by removing the strata above the beds, after which the various beds are removed in steps or stages. *Fay.*

staggered blastholes. When shot firing in thick coal seams two rows of holes may be necessary and these are usually staggered to a triangular pattern to distribute the burden. A similar pattern is often adopted in quarry wellhole blasting. *Nelson.*

staggered holes. To arrange boreholes in a row, in such a manner that those in one row are placed opposite the spaces between the boreholes in the next row. *Long.*

staggered idlers. An arrangement where the idler rollers of a belt conveyor is such that the central or horizontal idler is placed behind the two inclined or wing idlers. This greatly assists in training the belt. *See also* vertical guide idlers. *Nelson.*

staggered-intermittent fillet welding. Making a line of intermittent fillet welds on each side of a joint so that the increments on one side are not opposite those on the other. Contrast with chain-intermittent fillet welding. *ASM Gloss.*

staggered-tooth cutters. Milling cutters with alternate flutes of oppositely directed helixes. *ASM Gloss.*

staging. a. A temporary flooring or scaffold, or platform. *Zern.* b. One or more working platforms, fixed at defined levels in deep trenches or similar excavations, on to which excavated earth is thrown by shovel. *Ham.*

stagmalite. A general term, to include both stalactite and stalagmite, for formations produced by dropping water. *Hess.*

stagnant ice. Glacier ice that has ceased to move and receives no accretion from the center of accumulation; it wastes away in place. *Stokes and Varnes, 1955.*

stahlstein (steelstone). The German name for some pure crystalline carbonate of iron, because a kind of steel is readily made from such ores without passing through the process of cementation. *Fay.*

stahlton system. Prefabricated building elements made from hollow clay blocks, a row of which is united by prestressed wires and cement filling; each reinforcing wire is prestressed individually and anchored singly. The elements are used in floors and ceilings. The name derives from the German words stahl (steel) and ton (clay). *Dodd.*

stain. a. An imperfection; chemical corrosion on surface of glass. *ASTM C162-66.* b. Color applied to glass by absorption at an elevated temperature. *ASTM C162-66.* c. Ceramic color, usually one of the transition metals in combination with other elements. *ACSG, 1963.*

stained agate. *See* stained stone. *Shipley.*

stained stone. A stone, the color of which has been altered (1) by dyeing with analine dyes, which fade or (2) by impregnation with a substance, like sugar, followed by either a chemical or heat treatment, which usually produce a permanent color. Cryptocrystalline quartz is especially adapted to staining, including agate, in which the bands become more pronounced. *Shipley.*

stainierite. a. A black hydrous sesquioxide of cobalt, with some iron and aluminum, $Co_2O_3.H_2O$. The crystalline form of heterogenite. Granular and crystalline, not colloidal. Orthorhombic (?). From Mindingi, Katanga, Republic of the Congo; Goodsprings, Nev. English. b. Synonym for heterogenite. *American Mineralogist, v. 43, No. 11-12, November-December 1958, pp. 1223-1224.*

stainless; stainproof. An enameled surface is considered stainproof if it is not stained, discolored, or otherwise affected by acids (except hydrofluoric), chemicals, dyes, or fruit juices, under atomspheric conditions. *ACSB, 3.*

stainless steels. Iron-base alloys containing enough chromium to confer a superior corrosion resistance. The American Iron and Steel Institute has chosen 4 percent chromium as the dividing line between alloy and stainless steels. Broadly speaking, the stainless steels fall into three categories: ferritic stainless, martensitic stainless, and autenitic stainless. They are heat and corrosion resistant, and are used for such things as cutlery, furnace parts, valves, turbine blades, ballbearings, etc. *ASM Handbook, 8d, v. 1, p. 408; Newton, p. 492; C.T.D.; Camp, 6d, 1951, p. 1313.*

stainproof. *See* stainless.

stains. The broad term indicating inclusions and intergrowths in mica. Stains arise from foreign materials, resulting in a partial or total loss of transparency. They may be in the form of specks or patches of appreciable area. In a narrower sense the term indicates inclusions having no regular form. *Skow.*

stair pit. Scot. A shallow shaft or staple in a mine fitted with a ladder or steps. *Fay.*

staithe. N. of Eng. A depot in which coal is placed when it comes from collieries by wagons, to be ready to be loaded into keels (boats). *Fay.*

staithman. Eng. A man employed at a staith in weighing and shipping coal. *Standard, 1964.*

stake. a. Leic. To fasten back or prop open with a piece of chain or otherwise the valves or clacks of a water barrel, in order that the water may run back into the sump when necessary. *Fay.* b. Short for grubstake. *Webster 3d.* c. A permanent interest, as in an enterprise or community. *Webster 3d.* d. A pointed piece of wood driven into the ground to mark a boundary, survey station, elevation, etc. *Fay.* e. A stake is not a post. The latter signifies more permanence, and to stick it in the ground requires more effort and outlay than to drive down a stake. It suggests larger proportions, is more readily seen than a stake. *Ricketts, I.* f. Can. A fortune, or a claim post. *Hoffman.* g. To cut lines in bush by blazing trees, marking posts in prescribed rectangles to designate mining claims. *Hoffman.* h. Sprag *Mason.* i. An iron peg used as a power electrode to transfer current into the ground in electrical prospecting. This term is also used to include all power and search electrodes, such as iron pegs, copper coils, and copper screens; also, a station marker used by field parties. *A.G.I.*

staking. Fastening two parts together permanently by recessing one part within the other and then causing plastic flow at the joint. *ASM Gloss.*

staking out. a. The driving of stakes into the earth to indicate the foundation location of the structure to be built. The stakes are often connected by a cord in order to secure a clean edge in the excavation. *Crispin.* b. The physical act of locating a lode or placer mining claim. *Bureau of Mines Staff.*

stalactite. Depending, columnar deposits, generally of calcite, formed on the roof of a cavern by the drip of mineral solutions. *Compare* stalagmite. *Fay.*

stalactitic marble; stalagmitic marble. Marble obtained from the calcareous deposits on the roofs and floors of caves. Such are often beautifully banded and are known commercially as onyx marbles. *Fay. See also* travertine.

stalacto-stalagmite. Column formed by the union of a stalactite and a stalagmite. Synonym for column. *A.G.I.*

stalagmite. A column or ridge of calcium carbonate rising from the floor of a limestone cave formed by the evaporation of water dripping from above. *Compare* stalacite. *A.G.I. Supp.*

stalagmite barrier. A dam of stalagmite stretching right across a passage. *Schieferdecker.*

stalagmometer. An apparatus for determining surface tension. The mass of a drop of a liquid is measured by weighing a known number of drops or by counting the number of drops obtained from a given volume of the liquid. *Lowenheim.*

stalch. Eng. A mass of ore left in a mine. *Fay.*

stalk. The vertical part rising from the horizontal base of a reinforced concrete retaining wall. *Ham.*

stall. a. A working place in a coal seam for one miner or one miner and his helper in the longwall stalls method of working. The empty tub or tram is brought into the face and loaded tub removed by hand or by horses. The narrow coal drivages in pillar-and-stall are also termed stalls. *See also* narrow stall; stallman. *Nelson.* b. S. Staff. A working place in a mine, varying in length from a few feet to 80 yards or more, according to the thickness of the seam and system of working adopted. A room. *Fay.* c. A working place at the coal face; a term associated with narrow workings. *Mason.* d. A small compartment in a furnace or kiln where ore is roasted. *See also* stall roasting. *Fay.*

stall-and-breast. *See* room-and-pillar. *Fay.*

stall-and-room working. A pillar method of working a relatively thick coal seam by a system of compartments; a modification of pillar-and-stall. *Nelson.*

stall gate; stall road. Eng. A road along which the mineral worked in a stall is conveyed to the main road. *Fay.*

stallin. Eng. Working in a stall, in the capacity of a butty or contractor. *Fay.*

stalling angle; critical angle. The blades of axial-flow fans are of aerofoil section, which when inclined at a small angle (known as the angle of attack) to the air stream produces a large lift or raising force for a small drag or retarding force. The lift force is the useful one which gives the thrust to the air in an axial-flow fan. The lift increases with increase in the angle of attack until a point is reached when the lift begins to fall. This angle is the "critical" or "stalling angle." *Sinclair, I, pp. 101-102.*

stallman. A collier who works at the face of a narrow stall or a longwall stall. He is paid according to a pricelist of so much per ton of coal loaded out and for other work, such as timbering. A stallman usually has a mate or boy working with him. *Nelson.*

stalloy. A steel containing 3.5 percent silicon and often used in electrical parts subject to alternating magnetic fields because of its low energy losses due to hysteresis. *See also* permalloy. *Nelson.*

stall roasting. The roasting of ore in small enclosures of earth or masonry walls. The enclosures are called stalls and may be open or closed. *Fay.*

stamp. a. Scot. A hole or mark in the roof of a mine working from which measurements may be taken. *Fay.* b. Eng. A hole made in coal, with the pick, in which the wedge is fixed before driving. *Fay.* c. In brickmaking, to remove from an undried brick with a stamper the rough edge caused by a mold vent. *Standard, 1964.* d. Eng. *See* let into. *SMRB, Paper No. 61.* e. Eng. A section of a bloom nicked, partially cut through, or broken off to show the grain. *Webster 3d.* f. To break up the ore and gangue by machinery, for washing out the heavier metallic particles. *Fay.* g. A heavy pestle raised by water or steam power for crushing ore. Those stamps in which the blow of the pestle is caused by its mere weight are called gravity stamps. *See also* stamp head; steam stamp. *Webster 3d; Fay.*

stamp battery; gravity stamp. A machine for crushing very strong ores or rocks, such as the South African quartzites, and used particularly in gold milling. It consists essentially of a crushing member (composed of a stem, head, and shoe) which is dropped on a die, the ore being cruhed in water between shoe and die. The crushing space is surrounded by a mortar box which is equipped with a screen to regulate the size of discharge. The number of stamps is referred to as so many head—they are usually made up of sets of 5, for example, a 5 head battery means 5 stamps enclosed in a mortar box. An important crushing machine but now becoming obsolescent. *See also* breaker; grinding mill. *Nelson.*

stamp copper. Copper produced from copper-bearing rock by stamping and washing before smelting. *Fay.*

stamp duty. The amount of ore (tons) that one stamp will crush in 24 hours. *Fay.*

stampede. Any sudden, confused, impulsive movement on the part of a crowd or large company. *Standard, 1964,* as a stampede to a new gold field. *Fay.*

stampeder. One who rushes into a new district when a discovery of gold or other precious metal is reported. *See also* rusher. *Fay.*

stamper. One who stamps colored designs on finished pottery and porcelain ware. *D.O.T. 1.* b. A mill for powdering calcined flints for use in making porcelain. *Standard, 1964.*

stamper box. A stamp-mill mortar box. *Fay.*

stamp hammer. A power hammer that moves vertically. *Webster 3d.*

stamp head. A heavy and nearly cylindrical cast-iron head fixed on the lower end of the stamp rod, shank, or lifter to give weight in stamping the ore. The lower surface of the stamp head is generally protected by a cheese-shaped shoe of harder iron or steel which may be removed when worn-out. These shoes work upon dies of the same form laid in the bottom of the mortar or stamper box. *See also* stamp, g. *Fay.*

stamping. a. Reducing to the desired fineness in a stamp mill. The grain is usually not so fine as that produced by grinding in pans. *Fay.* b. A general term covering almost all press operations. It includes blanking, shearing, hot or cold forming, drawing, bending, and coining. *ASM Gloss.* c. A process for the application, by hand or by machine, of decoration to pottery ware; a rubber stamp with a sponge backing is used. Stamping is particularly suitable for the application of backstamps and for some forms of gold decoration. *See also* backstamp. *Dodd.*

stamping ink. *See* ceramic ink. *ACSG.*

stampman. One who tends stamp mills in which ore is finely crushed preparatory to grinding or extraction of the valuable mineral. Also called batteryman and stamper. *D.O.T. 1.*

stamping maundrill. Leic. A heavy pick. *Fay.*

stamp mill. An apparatus (also the building containing the apparatus) in which rock is crushed by descending pestles (stamps), operated by waterpower or steam power. Amalgamation is usually combined with crushing when gold or silver is the metal sought, but copper, tin ores, etc., are stamped to prepare them for dressing. *Fay.*

stamp rock. A term used in Michigan for rock containing fine copper that must be crushed and jigged to recover the metal. *Weed, 1922.*

stamps captain. Corn. The superintendent or foreman of a stamp mill. *Fay.*

stamps. a. S. Afr. Heavy pestles for pulverizing broken ore. *Beerman.* b. S. Wales. The pieces into which the rough bars shingled from the finery ball are broken, to be piled for subsequent rolling into sheet iron. *Fay.*

stamp shoe. The heavy, chilled iron casting attached to the lower end of a stamp piston, that does the actual crushing of rock in a stamp mill. It drops on a round, steel block called a die. *Weed, 1922.*

stampsman. One who attends or operates a stamp or stamp battery. *Fay.*

stampwork. A term used in the Lake Superior region for rock containing disseminated native copper. Stamp rock. *Fay.*

stanch air. Som. Choke damp. *Fay.*

stanchion. a. A vertical prop or strut. *Zern.* b. A support or post of iron or wood. *Crispin.*

stand. a. Two or more lengths of drill rod or casing coupled together and handled as a unit length as they are taken from a borehole and set upright in a drill tripod or derrick. *See also* double; forble; treble. *Long.* b. A drill floor. *Long.* c. To allow a cement slurry to remain undisturbed in a borehole until it hardens or sets. *Long.* d. To set a string of casing in a borehole. *Long.* e. Gt. Brit. A somewhat variable unit of measurement for coal tar varying from 2½ to 3 hundredweights (280 to 336 pounds). *Hess.*

standage. a. Reservoir or storage capacity, said of water and of mine cars. *Mason.* b. A sump. *Mason.* c. Eng. A large sump, or more than one, acting as a reservoir. *Fay.* d. A lodge. *B.S. 3618, 1963, sec. 4.* e. The capacity of a sump or lodge. *B.S. 3618, 1963, sec. 4.*

standage room. A length of roadway provided near the shaft-bottom to stock loaded mine cars and/or empty cars, (1) during peak hours when the coal reaches the pit bottom at a faster rate than the shaft can wind, and (2) during emergency periods, such as plant breakdown at the surface, therefore, permitting coal production to continue. In general, the standage room accommodates 45 minutes to 1 hour's winding capacity. *See also* bunker conveyor; bunkering capacity. *Nelson.*

standard. a. Something that is set up and established as a rule for the measure of quantity, weight, extent, value, or quality; especially, an original specimen measure or weight (as the international prototype meter and kilogram of the International Bureau of Weights and Measures) or an official copy of such a specimen used as the standard of comparison in testing other weights and measures. *Webster 3d.* b. The fineness of the metal used in coins and the legally fixed weight each coin should have when first minted. *Webster 3d.* c. A metal casting in the shape of a U, which is fixed to the upper plate of a theodolite and carries the trunnions for the telescope. *Ham.*

standard air. Atmospheric air having a specific weight of 0.075 pound per cubic foot. Note: the specific weight of 0.075 pound per cubic foot corresponds to atmospheric air at a temperature of 68°F, a barometric pressure of 30 inches of mercury and a relative humidity of 62 percent. *B.S. 3618, 1963, sec. 2.*

standard air course. N. of Eng. The quantity or supply of fresh air allowed to pass through each district or split. *Fay.*

standard air density. In mine ventilation, the standard density of air for mine ventilation work is considered to be 0.075 pound per cubic foot. This is based upon the weight of 1 cubic foot of dry air at 70° F at a sea-level pressure of 29.9 inches mercury. *BuMines Bull. 589, 1960, p. 4.*

standard bit. a. Commonly, although incorrectly, used as a synonym for bevel-wall bit. *Long.* b. A bit the size and design of which are as specified in standards accepted by the drilling industry. *Long.*

standard black. A ceramic color; a quoted composition is 30 parts Co_2O_3, 56 parts Fe_2O_3, 48 parts Cr_2O_3, 8 parts NiO, and 31 parts Al_2O_3. *Dodd.*

standard compaction. *See* compaction test. *ASCE P1826.*

standard conditions. In refrigeration, an evaporation temperature of 5° F, condensing temperature of 86° F, liquid temperature before the expansion valve of 77° F, and suction temperature 14° F. *Strock, 10.*

standard copper. Practically any brand of 96 percent, or higher, fineness. *Fay.*

standard core bit. a. See standard bit, b. *Long.* b. Commonly, although incorrectly, used as a synonym for bevel-wall bit. *Long.*

standard costing. A system which attempts to relate performances and actual results to standards in the field of productivity and labor costs. One defect disclosed was that the presentation of statistics was too late to effect speedy and effective control. *See also* method study. *Nelson.*

standard deviation. A measure of accuracy or precision, calculated as the square root of the variance. *B.S. 1017, 1960, Pt. 1.*

standard dolomite brick. *See* dolomite brick.

standard electrode potential. The reversible electrode potential where all reactants and products are at unit activity. *ASM Gloss.*

standard error. The standard deviation of many samples of the mean. This reveals the amount of inconsistency between the sample and an average sample. *Ham.*

standard gage. A width of 4 feet 8½ inches between the inner edges of the rails. It is the recognized gage for main line railways in Great Britain, Europe, Australia, and the United States. *Nelson.*

standard gold. A legally adopted alloy for coinage of gold. In the United States, the alloy contains 10 percent copper. *ASM Gloss.*

standard height. Aust. A given height of seam, say 5 feet, below which the miner is paid so much extra for every inch short of the standard height. *Fay.*

standard ignition test. A method developed for testing coal dust to obtain the limits of explosibility. *Rice, George S.*

standard impinger. For many years, the Greenburg-Smith impinger was the routine dust sampling instrument in this country. It is still relied upon as a standard, but because of its size and weight, is little used underground today. *Hartman, p. 53.*

standardization. An agreement between engineers or authorities on certain tests, dimensions, qualities, and tolerances of a certain machine, product, or practice and to adopt same in engineering or mining practice. Standardization offers many advantages in the mining industry such as interchangeability of machine parts and a reduction in stocks of spares. *Nelson.*

standardization correction. A tape correction applied to a tape which is not of the correct length when filled at the correct tension under a standard temperature. *Ham.*

standard lay. Synonym for regular lay. *Long.*

standard mineral. A hypothetical mineral composition, as used in the calculation of the norm. Synomym for normative mineral. *A.G.I.*

standard mix. Concrete mixed in the proportions of 1 cement, 2 sand, and 4 of coarse material. *See also* aggregate; cement. *Nelson.*

standard of ventilation. An adequate amount of ventilation to dilute and render harmless all noxious and flammable gases to such an extent that all roads and workings in a mine shall be kept in a fit state for working or passing therein. *Mason, v. 1, p. 183.*

standard parallel. In public land survey, a parallel of latitude, other than the base line, passing through a selected township corner on a principal meridian, and established for the purpose of limiting the convergence of range lines that intersect it from the south. *Seelye, 2.*

standard penetration resistance. *See* penetration resistance. *ASCE P1826.*

standard penetration test. a. A soil-sampling procedure to determine the number of blows by a drive hammer, freely falling a distance of 30 inches per blow, needed to drive a standard sampling spoon 1 foot. The first 6 to 7 inches of penetration is disregarded, but the blows required to drive the sample the ensuing foot are counted. *Long.* b. *See* penetration test. *Nelson.*

standard pile. *See* guide pile. *Ham.*

standard pipe. a. A coupled pipe conforming to specifications accepted as standard by the API. *Long.* b. As used by plumbers, etc., pipe conforming to specifications adopted as standard by the wrought pipe makers in 1886. *Long.*

standard plough. The original coal plough; a heavy double-ended machine with fixed blades. Its length is 6½ feet and height varies from 14 to 31 inches. The depth of cut can be varied from 2 to 6 inches. From this relatively slow-moving machine has been evolved the rapid plough. *Nelson.*

standard potential. The reversible electrode potential for an electrode when all products and reactants are in the standard states or at unit activity, expressed on a scale in which the potential for the standard hydrogen electrode is zero. This is the potential used in preparing the electromotive force series. *BuMines Bull. 619, 1964, p. 206.*

standard practice. In progressive plant, system worked out and adopted for doing given job; arrived at by cooperation between research, planning and workers. *Pryor, 3.*

standard pressure. A term applied to valves and fittings suitable for a working steam pressure of 125 pounds per square inch. *Strock, 3.*

standard propagation test. A method developed for testing coal dust to obtain the limits of explosibility. *Rice, George S.*

standard rig. a. A well-drilling machine that operates with a heavy steel bit and stem that is raised and dropped, thus cutting away the rock by percussion. *See also* cable tools. *A.G.I. Supp.* b. A common misnomer for cable-tool rig, churn-drill rig. *Long.*

standards. Agreed specific values, as defined by the organization concerned with such definition. These groups include: U.S.A. Standards Institute, United States of America Standards Institute, formerly the American Standards Association; B.S.I., British Standards Institution; D.V.M., German Association for Testing Materials; A.FN.O.R., French Association for Standardizing Materials; I.S.A., International Standards Association. *Basle. Pryor, 3.*

standard section. a. Applied to belt conveyor equipment to distinguish standard intermediate sections from special types of intermediate sections. *Jones.* b. A rolled steel section. *Ham.* c. A profile showing as complete as possible a sequence of all the strata in a certain area, in their correct order, and thus affording a standard for correlation. *Schieferdecker.*

standard selling price. Aust. An assumed price, not necessarily the actual selling price, adopted so as to afford a basis for a uniform mining rate. *Fay.*

standard shapes. A series of refractory units in various sizes and shapes which, because of their extensive or essential use, are stocked by the manufacturer or can be made from stock molds. *A.R.I.*

standard silver. An alloy containing 92.5 percent silver and 7.5 percent copper. *Bureau of Mines Staff.*

standard solution. One which contains a known weight of a substance in a given volume of solution. *Cooper.*

standard surface factor. *See* surface factor. *Dodd.*

Standard Temperature and Pressure. Atmospheric pressure of 760 millimeter mercury, at 0° C. *Pryor, 3.*

standard time. Mean local time of one meridian, as used throughout a defined country or zone. For Great Britain this is Greenwich mean time. *Pryor, 3.*

standard tin. Tin of 99.75 percent or greater purity. *Bennett 2d, 1962.*

standard wire gage. Gage number defining the diameter of wire. Abbreviation, SWG. *Pryor, 3.*

standard zinc dust. A mixture of metallic zinc powder and zinc-oxide powder. Used in protective paints for metals. *Bennett 2d, 1962.*

standard zinc-lead white. A mixture of lead sulfate and zinc oxide. Used as a pigment. *Bennett 2d, 1962.*

standby. A piece of equipment held in readiness to replace a piece that may become inoperative. *Long.*

standby face. A spare conveyor face, of normal length, which could be worked should another face cease production due to faults, washouts, roof collapse, water, gas, or any other unforeseen impediment. *Nelson.*

standdown. In Great Britain, the sending of miners home because they cannot be usefully employed due to any reason outside the control of the management. In some cases, coal mining awards confine this right to certain occurrences, for example, breakdown of plant or machines. *Nelson.*

stander. Eng. A coal-pillar support. *Webster 2d.*

standing. a. Used by well drillers to denote that work has been stopped for a considerable time. Also applicable to mines and other industrial plants. *Fay. Compare* shutdown; standby. *Long.* b. Drill rods or casing stacked vertically in the drill tripod or derrick. *Long.* e. An iron floor covering the sunken part of a rolling mill. *Standard, 1964.*

standing bobby. N. of Eng. An exploded shot that does not blow the stemming out, but expends itself in crevices or cleavage planes, without doing its work. *Fay.*

standing column. The column of drilling liquid left in the hole when the drill tools have been removed. *Long.*

standing fire. A fire in a mine continuing to smoulder for a long time; often many years. *Fay.*

standing gas. A body of firedamp known to exist in a mine, but not in circulation; sometimes fenced off. *Fay.*

standing ground. Eng. Ground that will stand firm without timbering. *Fay.*

standing pier. A bridge pier, free standing between two spans, as distinct from an abutement pier. *Ham.*

standing rope. Another term applied to galvanized guy rope which consists of 6 strands, 7 wires, and a hemp core. *H&G, p. 130.*

standing set. Eng. A fixed lift of pumps in a sinking shaft. *Fay.*

standing shot. The result of a small or undercharged shot wherein the coal is slightly loosened so that it is easily mined by pick. The term is a misnomer, as it applies to the result and not the "shot" or "charge." *Fay.*

standing time. In Great Britain, the period when face workers are idle due to lack of empty cars, etc. Payments are made to miners on piecework for time lost. *See also* lying money. *Nelson.*

standing water level. The level at which water stands in a well or pit. The ground below this level is saturated, and any pore water above the level is retained by capillary attraction. The standing water level at mine locations often fluctuates on account of pumping operations. *See also* water table, a; held water; water-bearing ground. *Nelson.*

standing wave. a. A type of wave in which there are nodes, or points of no vertical motion and maximum horizontal motion, between which the water oscillates vertically. The points of maximum vertical motion and least horizontal motion are called antinodes or loops. It is caused by the meeting of two similar wave groups traveling in opposing directions. Sometimes called stationary wave. *A.G.I.* b. A wave in which the energy flux is zero at all points. Such waves in elastic bodies result from the interaction of similar trains of waves running in the opposite direction, and are usually caused by reflected waves meeting those which are advancing. *ASM Gloss.*

stand of drill rods. *See* stand, a. *Long.*

standoff. a. A short length of core attached to and left standing upright in the bottom of the borehole when the core barrel is pulled. *Long.* b. On taper-tool or drill-pipe joints, the space between the pin- and box-thread shoulders before wrenching up. *Long.*

standoff distance. The distance from the charge to the material to be penetrated. *Higham, p. 90.*

standpipe. a. A relatively short length of pipe driven into the upper soillike portion of the overburden as the first step of collaring or spudding-in a borehole. Also called conductor; conductor pipe. *Long.* b. A short piece of pipe wedged or cemented into a borehole after completion to act as a marker and keep collar free of cave. *Long.* c. The first length of casing inserted in a borehole. Also called conductor casing; surface casing (undesirable usage). *B.S. 3618, 1963, sec. 3.* d. A pipe or tank connected to a closed conduit and extending to or above the hydraulic gradeline. *Seelye, 1.* e. A large vertical pipe or water tower which serves as a reservoir, and is used to secure a uniform pressure in a supply system. *Crispin.*

standpiping. Driving pipe deep enough through overburden to deep soil, sand, etc., out of a borehole. *See also* standpipe. *Long.*

stands. Connected joints of drill pipe racked in the derrick while changing the bite. *Wheeler.*

stanekite. A resinlike hydrocarbon derivative, $C_{20}H_{22}O_8$, found chiefly in coal deposits in Bohemia, Czechoslovakia. *Standard, 1964.*

stanford joint. A joint, for sewer pipes, consisting of tar, sulfur, and ground brick or sand; the proportions vary according to the nature of the tar, which should contain sufficient pitch to ensure that the joint will set. *Dodd.*

stangenkohle. Ger. Name for columnar coal. *Tomkeieff, 1954.*

stank. a. To make watertight; to seal off; an airtight and watertight wall against old mine workings. *See also* seal; sealed-off area. *Nelson.* b. A small cofferdam constructed of timber and made watertight with clay. *Ham.* c. Mid. A watertight stopping; generally a brick wall. *Fay.* d. *See* stanking. *B.S. 3618, 1963, sec. 4.*

stanking; stank. a. A watertight stopping or bulkhead. *B.S. 3618, 1963, sec. 4.* b. The application of a waterproofing material to a stopping or bulkhead. *B.S. 3618, 1963, sec. 4.*

Stanley compensating diaphragm. A specially designed theodolite used as a direct reading tacheometer. *See also* Beaman stadia arc. *Ham.*

stanley header. *See* header, a. *Fay.*

stannary. a. A tin mine or tin works. *Webster 2d.* b. One of the regions in England containing tinworks and formerly placed under jurisdiction of special courts. Usually used in plural. *Webster 3d.*

stannary courts. Eng. Courts in Cornwall and Devonshire for the purpose of regulating the affairs of tin mines and tin miners. *Fay.*

stannate. A salt of stannic acid, especially metastannic acid (H_2SnO_3). Metal stannates are commonly used in plating baths. *Henderson.*

stannatores. An early name applied to Cornish tin miners. *Fay.*

stanners. Scot. The small stones found near or in a body of water. *Webster 3d.*

stannic. Of, pertaining to, or containing tin in the tetravalent state; for example, stannic dioxide (SnO_2). *Webster 3d; CCD 6d, 1961.*

stannic bromide; stannic tetrabromide; tin bromide; tin tetrabromide. Colorless or white; orthorhombic; $SnBr_4$ molecular weight, 438.33; deliquescent; fumes when exposed to air; specific gravity of liquid, 3.34 (at 35° C); melting point, 31° C; boiling point, 202° C (at 734 mm); soluble in water with decomposition; soluble in alcohol, in acetone, in carbon tetrachloride, in phosphorus trichloride, and in arsenic tribromide. Used in mineral separations. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-232.*

stannic chloride; tin chloride. Colorless; fuming; caustic liquid; isometric when solid; $SnCl_4$; molecular weight, 260.50; water converts it into the crystalline pentahydrate, $SnCl_4.5H_2O$; specific gravity, 2.226 or 2.2788; melting point, —33° C; boiling point, 114° C; soluble in cold water, in alcohol, in ether, in carbon disulfide, and in oil of turpentine; and it is decomposed by hot water. Used in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-232.*

stannic chromate; tin chromate. Brownish-yellow; crystalline; $Sn(CrO_4)_2$; molecular weight, 350.68; decomposes on heating; and soluble in water. Used in decorating porcelain and china in rose and violet colors. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-232; Bennett 2d, 1962.*

stannic dioxide; tin dioxide; cassiterite. a. White; tetragonal; SnO_2; molecular weight, 150.69; specific gravity, 6.95, and ranges from 6.8 to 7.1; Mohs' hardness, 6 to 7; melting point, 1,127° C; sublimes at 1,800° to 1,900° C; insoluble in water; decomposes in potassium hydroxide and in sodium hydroxide; and insoluble in aqua regia. The mineral cassiterite is brown or black, and sometimes red, gray, white, or yellow. Used in ceramics (glazes), in the production of ceramic colors, as polishing powder for steel, glass, etc., and in the manufacture of milk glass, alabaster glass, enamel, and opaque glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-233, B-242.* b. This oxide is used as an opacifier in glazes. It is an important constituent of ceramic stains for enamels, glazes, and bodies. Pink and maroon colors are obtained with tin oxide, chromates, and lime. Yellow stains are made from tin oxide and vanadium compounds, and these have replaced uranium compounds. *Lee.*

stannic dioxide hydrate; tin dioxide hydrate; stannic acid. White; amorphous or gelatinous; $SnO_2.xH_2O$; insoluble in water; and soluble in alkalies and in potassium carbonate. Alpha stannic acid (ordinary stannic acid) is soluble in acids, and beta stannic acid (metastannic acid) is insoluble in acids. Used in ceramics. *See also* stannic dioxide. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-233; CCD 6d, 1961.*

stannic sulfide; tin-bronze; mosaic gold. Gold-yellow to brown; hexagonal; SnS_2; molecular weight, 182.82; soluble in concentrated hydrochloric acid, in alkali sulfides, in aqua regia, in alkali hydroxides, in phosphorus pentachloride, and in stannous chloride; insoluble in some acids; and nearly insoluble in water; specific gravity, 4.42 to 4.60; and no melting point because it decomposes at 600° C. Used as an imitation gilding and a pigment. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-233.*

stanniferous. Yielding or containing tin; as, stanniferous ores. *Standard, 1964.*

stanniferous ware. Pottery with a tin glaze. *Standard, 1964.*

stannite. a. A mineral, Cu_2FeSnS_4, a sulfostannate of copper, iron, and sometimes zinc, which crystallizes in the tetragonal system. It usually occurs in tin-bearing veins, having been deposited from hot ascending solutions. Also called tin pyrites; bell-metal ore. *Dana 17; Fay; A.G.I.* b. Impure cassiterite. *Hey 2d, 1955.*

stannometric surveying. Geochemical prospecting term for soil surveys based upon semiquantitative spectrographic analyses of soil and stream sediment for tin. *Hawkes, 2, p. 3.*

stannopalladinite. A cubic alloy of tin and palladium, Pd_3Sn_2, with some Pt and Cu.

Spencer 18, M.M., 1949.

stannous. Of, pertaining to, or containing tin in the bivalent state; for example, stannous oxide (SnO). *Webster 3d; CCD 6d, 1961.*

stannous chromate; tin chromate. Brown; $SnCrO_4$; and almost insoluble in water. Used in decorating porcelain. *CCD 6d, 1961.*

stannous oxide; tin monoxide; tin protoxide. Black to brownish-black; tetragonal; SnO; molecular weight, 134.69; unstable in air; slightly soluble in ammonium chloride; soluble in acids and in strong alkalies; insoluble in water; specific gravity, 6.446 (at 0° C); and no melting point because it decomposes with combustion or at 1,080° C (at 600 mm). Used as an intermediate in the preparation of stannous salts used in the plating and the glass industries and as a reducing agent. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-233.*

stannum. *See* tin. *Fay.*

stantienite. Black amber found on the Prussian coast together with the normal yellow amber. *Tomkeieff, 1954.*

Stanton diagram. Historically the plot of the airflow friction coefficient against the Reynolds number is referred to as a Stanton diagram. Originally Stanton and Pannel carried out flow experiments with water and air in the same pipes at different velocities and temperatures. The friction coefficients were evaluated and plotted against the respective Reynolds number for the flow system on log-log ordinate paper. The curve obtained from these experiments provides the best proof of Reynolds' law of similarity, as the points obtained fall on the one curve thereby establishing that identical flow conditions exist for such apparently different fluids as gas and liquid provided the two flow systems are dynamically similar. *Roberts, I, p. 14.*

staple. a. A shaft that is smaller and shorter than the principal one and joins different levels. *Webster 3d.* b. Eng. A small pit. *Webster 2d.* Used in coal mining. The American equivalent in metal mines is winze. *Fay.* c. N. of Eng. A spiral chute down which coal passes from one seam to the haulage system of a lower seam. Can act as a storage bunker in case of haulage breakdown. *Trist.* d. An internal shaft connecting two coal seams. Also called staple pit. *Compare* winze. *C.T.D.* e. In founding, a piece of nail iron pointed at one end and having a disk of sheet iron riveted to the other; used to steady a core and gage the thickness of the metal. *Standard, 1964.*

staple fiber. *See* fiber. *ASTM C162-66.*

staple shaft. a. An underground shaft, which does not penetrate to the surface. *Fraenkel.* b. A relatively small vertical pit connecting a lower seam to an upper seam. It corresponds to a rise or winze in metal mining. A staple shaft is an important drivage in horizon mining and may be used for dropping coal or stowing dirt to a lower level. It is often equipped with a spiral chute or an auxiliary winder system with a single cage and counterweight. *Nelson.*

stapping. Scot. A method of wedging down coal across the working face. *Fay.*

star agate. Agate exhibiting star-shaped figures. *Shipley.*

star almandine sapphire. Purplish star sapphire which is usually misnamed star ruby. *Shipley.*

star amethystine sapphire. Violet star sapphire which is usually misnamed star ruby. *Shipley.*

star antimony. Refined metallic antimony characterized by crystalline patterns resembling stars or fern leaves on its surface. Also called star metal. *Webster 3d.*

star beryl. Asteriated beryl. *Shipley.*

star bit. Synonym for cross bit. *Long.*

starboard. Right side of a boat. *Nichols.*

starch. Used as depressant in flotation process. Alkaline starch (starch dissolved in dilute sodium hydroxide) is a flocculating agent used in purifying the water in coal-cleaning plants. Also known as amylum. *Pryor, 3.*

starch nitrate. *See* nitrostarch. *Bennett 2d, 1962.*

star chrysoberyl. Applied to chrysoberyl specimens which have shown an indistinct unsymmetrical six-rayed star with two of the three streaks which made up the star closer to one another than either is to the third streak. *Shipley.*

star connection. A method of connecting the windings of a three-phase machine, in which one end of each of the phases is connected to the same point and the other three ends are connected each to its own slip ring. The line voltage in star is 1.732 times that in delta, and the line current in delta is 1.732 times that in star. *Mason, V. 2, p. 421.*

star-delta starter. A starting switch for an induction motor which, in the one position, connects the stator windings in star for starting and, in the other position, reconnects the windings in delta when the motor has gained speed. *C.T.D.*

star doublet. Assembled stones which imitate star sapphire or ruby, consisting usually of (1) a cabochon top of some asteriated stone, usually decolorized rose quartz; (2) a thin mirror of sapphire or ruby color, sometimes indented with intersecting lines; and (3) (usually) an unpolished domed back of some transparent to translucent substance which imitates the back of the genuine stone. Star sapphire has also been imitated by coating the back of decolorized rose quartz with a brillant coloring substance. *See also* lacquer back; starolite. *Shipley.*

star dresser. A tool for the dressing of abrasive wheels; it consists of a series of star-shaped metal cutters separated by washers, freely mounted on the spindle of a holder. Also sometimes known as a Huntington dresser. *Dodd.*

star drill. A tool with a star-shaped point used for drilling in stone or masonry. *Crispin.*

star facets. a. Small triangular faces or planes of gems cut on the upper part of the bezel, terminating in the table. *Hess.* b. The light triangular facets that bound the table of a round, brilliant-cut gem between the main bezel facets. *Bureau of Mines Staff.*

star feeder. A rotating feeder consisting of a horizontal shaft fitted with radial blades running within a close-fitting cylindrical chamber provided with an inlet and an outlet. Also called star gate; star valve (undesirable usage). *B.S. 3552, 1962.*

star garnet. Variant of almandine. *Hey 2d, 1955.*

starkeyite. First described from the X-ray pattern as $FeSO_4.4H_2O$, and later shown to be $MgSO_4.4H_2O$. Named from the locality, Starkey mine, Madison County, Missouri. *Spencer 21, M.M., 1958.*

starling. a. projecting pointed or rounded structure of piles driven close together around a pier of a bridge and often filled with gravel or stone to protect the pier by breaking water, ice, or drift. *Webster, 3d.* Also called sterling. A sort of cofferdam. *Fay.* b. One of the piles of such an enclosure. *Standard, 1964.*

Starlite. Trade name given by Kunz to the artifically-colored blue zircon from Siam. *English.*

star malachite. Chalcedony with inclusions of malachite arranged in the form of a star. A variety of prase malachite. *Shipley.*

star mark. A defect (star shaped fracture) liable to occur in vitreous enamel cover coats if the ware is roughly handled as it is being placed on the pointed supports used in the firing process; the marks result from fracture of the enamel coating. *Dodd. See also* burning tool mark.

star metal. Synonymous with star antimony. *Fay.*

star observation. In surveying, location or orientation of a station by means of star sights with theodolite. *Pryor, 3.*

Starolite. A jewelers' trade name for asteriated quartz showing a six-rayed star by reflected light. *English.*

Star Peak group. A group which comprises three great limestones with three intervening quartzites, totalling more than 10,000 feet in the Triassic rocks of Nevada; succeeds the Koipato group. *C.T.D.*

star pinner. Sets small cylinders bearing four potter's pins in center of saggers to support four columns of small ware. *D.O.T. 1.*

star quartz. *See* asteriated quartz. *Fay.*

star reamer. A star-shaped tool for regulating the diameter of, or straightening a borehole. *Fay.*

star rectifier circuit. A circuit which employs six or more rectifying elements with a conducting period of 60 electrical degrees plus the commutating angle. *Coal Age, 1.*

starred glaze. Term sometimes applied to a glaze that has partially devitrified, star-shaped crystals appearing on the surface; the cause may be sulfuring. *See also* sulfuring. *Dodd.*

starring. A defect of glazes characterized by starlike figures. *C.T.D.*

star ruby. An asteriated variety of ruby. *Webster 3d.*

star ruby sapphire. Pink, purple, or violet star sapphires. *Shipley.*

stars. A defect similar to star marks, and showing in the burned ware in a series of small hairlines radiating from a common center, due to the use of cold burning points, or slight impact upon the unburned ware. *Enam. Dict.*

star sapphire. An asteriated sapphire. *Standard, 1964.*

starstone. a. A variety of ruby exhibiting a bright opalescent star of six rays in the direction of the principal axis. *Fay.* b. An asteriated sapphire. *Standard, 1964.* c. A cross section of a petrified tree fern when cut and polished. *Standard, 1964.* d. Corn. A variety of hornfels containing starlike bunches of radiating crystals of amphibole. *Arkell.* e. Fossil corals. *Arkell.*

start. N. of Eng. A lever for working a gin to which the horse is attached. *Fay.*

starter. a. A drill used for making the upper part of a hole, the remainder of the hole being made with a drill of smaller gage known as a follower. *Fay.* b. Penn. The miner who ascends to the battery to start the coal to run. *Fay.* c. *See* battery starter. *D.O.T. 1.* d. Protective equipment to ensure that an electric motor does not receive too high a current when starting. *Ham.*

starter bar. A steel reinforcing bar embedded in the concrete and projecting through a construction joint to bind adjoining masses of concrete together. *Ham.*

starter rods; stub rods. Rods left projecting from concrete, in order to locate and provide continuity with other reinforcement. *Taylor.*

starting anode. An electrode which is used in establishing the initial arc. *Coal Age, 1.*

starting barrel. A short (12 to 24 inches) core barrel used to begin coring operations when the distance between the drill chuck and the bottom of the hole or to the rock surface in which a borehole is to be collared is too short to permit use of a full 5- and 10-foot-long core barrel. *Long.*

starting casing barrel. A short piece of casing to which a casing bit and shell are attached and used under the same conditions as a starting barrel. *See also* starting barrel. *Long.*

starting sheet. A thin sheet of metal used as the cathode in electrolytic refining. *ASM Gloss.*

starting submergence. In an air lift, the distance below the static head at which the air picks up water. *Lewis, p. 687.*

star topaz. Yellow star sapphire. *Shipley.*

starvation. a. As used in flotation, the deliberate inadequate addition of a reagent in order to restrict its effect. In comminution, avoidance of crowding in the machine by restricting rate of feed. *Pryor, 4.* b. In conditioning for flotation, use of threshold quantity of collector agent to aid in selective adsorption by the desired species of mineral. In precipitation of pregnant cyanide, use of threshold quantity of powdered zinc so as to attract gold salts rather than copper ones in first stage of precipitation. *Pryor, 3.*

starved. Eng. When a pump is chocked at the brass holes. *Zern.*

starved glaze. The poor quality of the glazed surface of ceramic ware if insufficient glaze has been applied; also sometimes called short glazed. *Dodd.*

starved ripples. Only isolated crests of ripple marks are present. *See also* incomplete ripples. *Pettijohn.*

star zircon. *See* asteriated zircon. *Shipley.*

Stassano furnace. Indirect arc furnace, with electrodes entering the furnace through the sides. *Bennett 2d, 1962.*

Stassfurt deposits. A series of saline minerals found in the Triassic rocks at Stassfur, Saxony, Germany, which include halite, anhydrite, kieserite, gypsum, and boracite. *C.T.D.*

stassfurtite. A massive variety of boracite found in East Germany. It resembles a fine-grained white marble; sometimes has a subcolumnar structure. *Fay; C.T.D.*

Stassfürt salt. *See* abraum salts. *Kaufmann.*

stat. A suffix meaning apparatus to render stationary; for example, thermostat, a device to maintain a constant temperature, etc. *Strock, 10.*

statement of performance. A statement describing the scope and duty of a plant in terms, for example, of the tonnage of coal treated per hour, the processes used, the separations effected and sizes produced; sometimes also used to express the results of plant operation. *B.S. 3552, 1962.*

state mine inspector. *See* inspector; mine inspector.

state of ground. The physical condition of the surface of the ground resulting from effects of climate and weather; usually expressed in terms such as dry, moist, wet, or frozen, and ice-, slush-, or snow-covered. *A.G.I.*

state of strain (strain state). A complete description of the deformation within a homogeneously deformed volume or at a point. The description requires, in general, the knowledge of six independent components of strain. *ASM Gloss.*

state of stress (stress state). A complete description of the stresses within a homogeneously stressed volume or at a point. The description requires, in general, the knowledge of six independent components of stress. *ASM Gloss.*

state point. The determination of the psychrometric properties of air at given conditions. *Hartman, p. 306.*

stathmograph. An apparatus which records automatically, in the form of a graph, the loss of weight during the whole reduction of iron ores. *Osborne.*

sattically determinate frame. A structural frame the bending moments and reactions in which can be determined by the laws of statics alone. *Ham.*

statically indeterminate frame. A redundant frame in which the bending moments and reactions cannot be calculated from statical equations alone. *See also* perfect frame. *Ham.*

static balance. A condition of rest created by inertia (dead weight) sufficient to oppose outside forces. *Nichols.*

static efficiency. Is calculated in the same way as fan efficiency, but using a reading of static pressure at some point instead of total pressure. Was formerly widely quoted, and is still used to some extent, in relation to mine fans. *See also* fan efficiency. *Roberts, I, p. 186.*

static E. P. The electrode potential measured when no current is flowing between the electrode and the electrolyte. *Lowenheim.*

static friction Static friction is that which prevents the sliding of a stationary body. A greater force is required to overcome static friction than to maintain motion against sliding friction. *Morris and Cooper, p. 188.*

static grizzly. A grizzly in the form of a stationary bar screen, often improvised from bars or rails set longitudinally, without cross bars. If used as a chute it has a slope of 35° to 45°. It may allow suitable pieces of rock or ore to pass over and the unwanted small sizes drop through, or it rejects oversize pieces while allowing suitable material to drop through. *See also* power grizzlies. *Nelson.*

static head. a. The height of a standing column of water as measured from the bottom of a borehole upward. Generally expressed in feet but sometimes expressed in pounds of pressure as measured at the bottom of the borehole. *Long.* b. The total head without deduction for velocity head or losses; for example, the difference in elevation of headwater and tail water of a power plant. *Seelye, 1.* c. In an air lift, the distance from the surface or top of well casing to the normal surface of the water when not pumping. *Lewis, p. 687.* d. The sum of the suction and discharge heads. *Carson, p. 211.*

static level. a. The position of the water table when not influenced by pumping. *Legrand.* b. Synonymous with hydrostatic level.

static load. a. The basal pressure exerted by the weight of a mass at rest, such as the load imposed on a drill bit by the weight of the drill-stem equipment or the pressure exerted on the rocks around an underground opening by the weight of the superimposed rocks. Also called dead load. *Long.* b. A load that is at rest and exerts downward pressure only. *Nichols.*

static magnification. The ratio between the pulse of the indicator and the respective pulse of the gravity center of the stationary mass. *Schieferdecker.*

static metamorphism. In geology, metamorphism produced by the internal heat of the earth and the weight of the superincumbent rocks and not accompanied by appreciable deformation. Used in contradistinction to dynamic metamorphism which involves stresses principally due to thrust. *Fay.*

static method. *See* Young's modulus of elasticity. *Lewis, p. 565.*

static moment. The static moment of a section about an axis, YY, is also termed the first moment of the area about the axis. It is the sum of the products obtained by multiplying each component of an area, A, by its distance, X, from YY. *See also* moment of inertia. *Ham.*

static penetration test. A penetration test in which the testing device is pushed into soil with a measurable force, as distinct from a dynamic penetration test in which the testing device is driven into the ground by blows from a standard hammer. *See also* penetrometer; penetrometer, soil. *Ham.*

static pressure. a. The difference, in consisttent units, between the absolute pressure at a point, and the absolute pressure of the ambient atmosphere, being positive when the pressure at the point is above the ambient pressure, and negative when below. *B.S. 3618, 1963, sec. 2.* b. The basal pressure exerted by the weight of a mass on a unit area, such as pounds per square inch or tons per square foot. *Long.* c. The force per unit area acting on the surface of a solid boundary parallel to the flow. The static pressure is constant in all directions and is the component normal to the direction of the flow. *Roberts, I, p. 2.* d. The pressure exerted by a fluid in all directions; the pressure which would tend to burst the container; the pressure exerted by the fluid if stationary. *Strock, 10.* e. The static pressure at a point is the pressure that would exist at that point in the absence of sound waves. *H&G.* f. In mine ventilation, the pressure, either negative or positive, exerted in all directions. May be compared to atmospheric pressure. *BuMines Bull. 589, 1960, p. 3.*

statics. That branch of mechanics dealing with the relations of forces that produce equilibrium among material bodies. *Webster 3d.*

static switch. A device giving contactless control of a circuit, for example, a transistor, thyratron, saturable reactor, etc. *NCB.*

static tube. Has a shaped, solid nose, on the downstream side of which a number of small holes are positioned around the circumference. The holes are so placed that the pressure in the tube is that of the undisturbed airstream. Unlike the Pitot tube, the measured pressure is affected considerably by the position of the stem of the tube in relation to the pressure holes, also by the distance between the holes and the nose tip. The static tube is considerably more sensitive to yaw than is the Pitot tube. *See also* Pitot tube; Pitot-static tube. *Roberts, I, p. 40.*

static zone. Suggested for the zone which extends below the level of the lowest point of discharge, and in which the water is stagnant or moves with infinitesimal velocity. *Fay.*

station. a. The excavation adjoining the shaft at each of the different levels, where men and material are removed or delivered. *Higham, p. 35.* b. An enlargement of a shaft or gallery on any level, thus affording room for landing at any desired place, and at the same time provides space for receiving loaded mine cars that are to be sent to the surface. Empty cars and material to be used in the mine are taken from the cage at this place. Also, a similar enlargement of shaft or level to receive a balance-bob (bob-station), pump (pump-station), or tank (tank-station). *Fay.* c. Any fixed point underground beyond which naked lights may not be carried. *Fay.* d. Any fixed point in a mine where deputies or foremen meet to report upon the condition of their respective districts. *Fay.* e. An opening into a level heading out of the side of an inclined plane. *Fay.* f. *See* underground station. *ASA M2.1-1963.* g. In surveying, the point at which an instrument is planted or observations are made. *Webster 3d.* h. Reference point in surveying, marked by a readily seen indentation in metal plate set permanently in concrete, or by suspending plug drilled into roof of underground working. *Pryor, 3.* i. Any one of a series of stakes or points indicating distance from a point of beginning or reference. *Nichols.* j. A setup point, that is, a marked point on the ground, over which an instrument is to be placed. *Seelye, 2.* k. A length of 100 feet, measured along a given line, which may be straight, broken, or curved. *Seelye, 2.* l. Any point on a straight, broken, or curved line, whose position is indicated by its total distance from a starting point, or zero point. For example, station 4+47.2 identifies a point 447.2 feet from the starting point, the distance being measured along a given line. *Seelye, 2.* m. The location on a conveyor or conveyor system where bulk material or objects are received or loaded onto the conveyor or are discharged from the conveyor. *ASA MH4.1-1958.*

stationary bar screen. A large-capacity screening or sorting appliance for coal or ore. It consists of a series of heavy metal bars arranged side by side and spaced at a definite distance apart. The bars are set at an angle so that material delivered at the upper end will just slide, and chutes are arranged to receive oversize at the lower end and undersize passing between the bars. Today, the stationary bar screen has been discarded in most modern cleaning plants but is still used at many small mines. *See also* Bradford breaker; resonance screen; screen. *Nelson.*

stationary block. Relatively undeformed rocks beneath the plane of an overthrust. *A.G.I.*

stationary coast. *See* stable coast. *Schieferdecker.*

stationary dredge. A fixed vessel with equipment for digging, washing, and concentrating alluvial deposits. *See also* dredge. *Nelson.*

stationary dredger. A bucket ladder dredger which is not self-propelled, the dredged material from which is discharged into either a hopper barge or a pipeline. *Ham.*

stationary engine. An engine located on a fixed foundation, as distinguished from a portable engine. *Crispin.*

stationary grizzly. The simplest of all separating devices and the cheapest to install and maintain. It consists of a series of fixed bars or rails spaced the required distance apart in order that the "undersize" may drop through. The use of a stationary grizzly is limited to coarse screening of dry material (aperture 2-inches and larger), although it is sometimes used with openings as small as ¾ inch, the efficiency dropping off in proportion. It is not satisfactory for moist or sticky material. *Pit and Quarry, 53rd, Sec. B, p. 118.*

stationary inner-tube core barrel. Synonym for rigid-type double-tube core barrel. *Long.*

stationary jaw. The fixed jaw of a safety clamp or wrench. *Compare* anvil; anvil jaw. *Long.*

stationary mass. Main element of every seismograph. A heavy weight in one way or another suspended or supported and which by its own inertia remains at first quiescent during the earthquake. *Schieferdecker.*

stationary motors. Motors installed in a permanent manner. *Fay.*

stationary-piston drive sampler. A piston-type sampler in which the position of the piston relative to the sample remains constant during the sampling operation. *Long.*

stationary slip. Synonym for stationary jaw. *Long.*

stationary wave. A wave of essentially stable form that does not move with respect to a selected reference point; a fixed swelling. Sometimes called standing wave. *A.G.I.*

station equipment. Stationary equipment is installed in a given location and is not moved from that location in performing its function. This includes equipment such as substations, pumps, and storage-battery charging stations. *ASA M2.1-1963.*

station error. *See* deflection of plumbline. *Seelye, 2.*

station foreman. In metal mining, a laborer who supervises the haulage and handling of ore, timber, and mining supplies at a shaft station. *D.O.T. 1.*

stationman. *See* bottomer, a. *D.O.T. 1.*

station pump. A mine pump permanently placed, as distinguished from a movable sinking pump. *Weed, 1922.*

stations. Points on the center line of a tunnel, permanently marked. These stations may be outside of the tunnel and used for projecting the center line into the tunnel, or they may mark the center line inside the tunnel. *Stauffer.*

station tender. a. A cage tender. *Fay.* b. *See* bottomer, a. *D.O.T. 1.*

station yards haul. Equals the number of cubic yards multiplied by the number of 100 feet stations through which it is moved. *Nichols.*

statistical method. Classification, judging, and evaluation of numerical data derived from observations made under suitable control. *Pryor, 3.*

statistical uniformity. A term describing that variation in quality of materials of manufactured goods which is stable and determinate, so that statistical analysis and prediction can be applied to it. *See also* representative sample; level of control. *Ham.*

statistics. The collection, tabulation, and study of numerical facts and data. In industry, statistics will indicate trends which would be almost impossible to establish by other means. The statistical method is useful in: (1) estimating the real value of work done, goods, or machines in terms of useful service and maintenance costs; and (2) estimating and forecasting profits and markets. *Nelson.*

stator. In a torque converter, a set of fixed vanes that change the direction of flow of fluid entering the pump or the next stage turbine. *Nichols.*

statuary marble. A fine-grained saccharoidal marble used for sculpture. The best qualities are pure white and free from markings. *Fay.*

staubosphere. The dust-bearing portion of the atmosphere. *Hess.*

staunching piece. The vertical gap left between successive bays of concrete in a concrete dam. *Ham.*

staunching rod. A strong rubber rod which is in contact with the crest gate of a dam and is compressed between gate and structure to form a watertight joint. *Ham.*

staurolite. a. A silicate of aluminum and iron with chemically combined water, $Fe_2Al_9O_7$-$(SiO_4)_4(OH)$, commonly occuring as brown cruciform twins, and crystallizing in the orthorhombic system. It is usually found in metamorphic rocks. Occasionally a transparent stone is cut as a gem stone. Also called granatite; grenatite; staurotide; xantholite. *Fay; Dana 17.* b. Synonym for harmotome. *Hey 2d, 1955.*

stauroscope. A modified polariscope used to find the position of planes of light vibration in sections of crystals. *Webster 3d.*

staurotile. A variety of mica schist characterized by porphyroblastic crystals of saturolite, often accompanied by garnet. *Holmes, 1928.*

staurotypous. In mineralogy, having crosslike markings. *Standard, 1964.*

stave. a. A ladder step. *Zern.* b. A wedge-shaped section placed around the die of a stamp to take up the side wear. *Fay.* c. Individual longitudinal elements, a number of which makes up a sonar transducer. *Hy.*

stavrite. A coarse-grained rock possibly of metamorphic origin essentially amphibole (grammatite) and biotite with the accessories of a little quartz, ilmenite, and apatite. *Johannsen, v. 4, 1938, p. 445.*

stay. a. Eng. A prop, strut, or tie for keeping anything in its place. *Zern.* b. A diagonal brace or tie bar to stiffen or prevent movement of a structural component. *Ham.* c. Eng. *See* stretcher sprag. *SMRB, Paper No. 61.*

stay-bolt tap. A type of combination reamer and tap used extensively in locomotive-boiler work. *Crispin.*

stay pile. A pile driven or cast in the ground to anchor a land tie. *Ham.*

stay prop. Eng. A long sprag. *SMRB, Paper No. 61.*

stb Abbreviation for stock tank barrel. Also abbreviated STB. *BuMin Style Guide, p. 62.*

stb d^{-1} Abbreviation for stock tank barrels per day. *BuMin Style Guide, p. 62.*

stb per day Abbreviation for stock tank barrels per day. *BuMin Style Guide, p. 62.*

std cu ft Abbreviation for standard cubic foot. *BuMin Style Guide, p. 62.*

std ft^3 Abbreviation for standard cubic foot. *BuMin Style Guide, p. 62.*

stead. S. Wales. Very thin bands of ironstone. *Nelson.*

steadite. a. A eutectic consisting of iron phosphide and iron, as a constituent of gray cast iron. *English.* b. A basic calcium silicophosphate, $[3(3CaO.P_2O_5).2CaO.-(2CaO.SiO_2)]$, occuring as yellow, hexagonal needles in basic slag. *English.*

Stead's brittleness. A condition of brittleness that causes transcrystalline fracture in the coarse grain structure that results from prolonged annealing of thin sheets of low-carbon steel previously rolled at a temperature below 1,300° F. The fracture usually occurs at about 45° to the direction of rolling. *ASM Gloss.*

Stead's reagent. An etching reagent, used in metallographic examination of steels, containing 100 milliliters methyl alcohol, 18 milliliters water, 2 milliliters concentrated hydrochloric acid, 1 gram copper chloride, $CuCl_2.2H_2O$, 4 grams magnesium chloride, $MgCl_2.6H_2O$. *Osborne.*

steady. A support for blocking up a stone that is to be worked. *Standard, 1964.*

steady flow. a. A constant flow, that is, the same volume in equal units of time. Also called permanent flow. *Nelson.* b. A steady flow exists when the velocity, pressure, density, and temperature of the fluid at a point fixed in space do not change in time. If these quantities do vary with time at a point in the system, then unsteady flow results. *Roberts, I, p. 2.*

steady-flow process. One in which the fluid is continually in motion in a linear direction through a conduit. *Hartman, p. 73.*

steady head tank. In connection with use of moderate pressure hydraulic water (for example, in classification of ore pulps), a reservoir set above the draw-off points of the system, which maintains a full supply of water at a set height and therefore constant pressure. *Pryor, 3.*

steady point; peg point. A pointed steel bar which can be locked in a clamp, and is used to brace a drill frame against the ground. *Nichols.*

steady rest. In cutting or grinding, a stationary support for a long workpiece. *ASM Gloss.*

steal down. Can. Paying for continuing shaft sinking by finding ore in progress. *Hoffman.*

stealite. Chiastolite. *Shipley.*

steam. Water in the form of vapor; aqueous vapor; the gas into which water is changed by boiling. It is colorless and transparent until it begins to condense. *Standard, 1964.*

steam accumulator. A vessel to smooth out violent steam loads on a boiler. While the steam demand is relatively low the accumulator is charged and acts as a buffer when sudden steam demands occur. A similar effect is obtained by a recently developed type of shell boiler of the thermal storage type. *Nelson.*

steamboat coal. In anthracite only, coal small enough to pass through bars set 6 to 8 inches apart, but too large to pass through bars from 3½ to 5 inches. Steamboat coal prepared at different colleries varies considerably in size. Comparatively few colleries prepare steamboat coal except to fill special contracts or orders. *Fay.*

steamboat rolls. Those rolls in an anthracite breaker which are set farthest apart to break the coal into steamboat coal. *Standard, 1964.*

steam boiler. A vessel or plant for generating steam. There are two basic types of boiler in use, the fire-tube shell type (Lancashire boiler) and the water-tube boiler (Babcock and Wilcox boiler). The most common and simplest boiler is the Lancashire which was developed in 1844 by Fairbairn, who put in the second flue, from the original Cornish boiler of Trevethick. The Lancashire boiler is now gradually giving away to the Economic boiler. *Nelson.*

steam coal. a. Coal suitable for use under steam boilers. *Webster 3d.* b. Coal which is intermediate in rank between bituminous coal and anthracite. The Welsh steam coal contains from 8 to 22 percent of volatile matter, and from 91 to 93 percent of carbon. Typical steam coals have a carbon/hydrogen ratio of about 20 and as the ratio becomes less they pass into the bituminous coals, and as it becomes greater, they pass into anthracite. Some kinds of steam coal are used for smelting and coke making, while others are specially suitable for steam generation. *See also* rank of coal. *Nelson.*

steam condenser. A device primarily used to condense exhaust steam from an engine or turbine into water. A condenser is used to: (1) reduce the exhaust steam pressure by condensation and thus reducing back pressure on the engine; and (2) return the feed water to the boiler at as high a temperature as possible. The condenser may be of the surface or jet type. *Nelson.*

steam curing. The rapid curing of precast concrete units; this can be done at high pressure in an autoclave or at atmospheric pressure in chambers or tunnels. *Dodd.*

steam dredger. A dredging machine operated by steam. *Fay.*

steam drill. A drilling machine operated by a steam-powered engine. *Long.*

steam engine. A reciprocating engine, worked by the force of the steam on the piston; the steam expands from the initial pressure to the exhaust pressure in a single stage. The early steam engines of Savory, in 1698, and of Newcomen, in 1705, were designed to pump water from mines. *Nelson.*

steamer. A laborer who cleans dirt and corrosion from contacts of anodes, starting sheets, and electrical conductors to prevent these accumulations from breaking electrical contacts during electrolytic refining of copper, using high-pressure steam hose. *D.O.T. 1.*

steam gas. Highly superheated steam. *Webster 2d.*

steam hammer. A heavy hammer, moving between vertical guides, actuated by steam pressure. *Crispin.*

steam-haulage engineer. In bituminous coal mining, one who operates a steam locomotive to haul railroad cars in and about a strip mine. *D.O.T. 1.*

steam-hoist man. *See* hoistman. *D.O.T. 1.*

steam infusion. The injection of steam into the coal seam by infusion tubes, connected to a small boiler through high-pressure hose pipes, to suppress the dust in situ. The technique and equipment are somewhat similar to water infusion. Due to technical, safety, and other problems, water infusion is preferred. *Nelson.*

steam jet. a. A blast of steam issuing from a nozzle. *Fay.* b. A system of ventilating a mine by means of a number of jets of steam at high pressure kept constantly blowing off from a series of pipes in the botton of the upcast shaft. *Fay.* c. A jet of steam to moisten the intake air current and thus keep the coal dust in the mine wet. *Zern.*

steam jet refrigeration. A method of cooling involving the use of steam nozzles to reduce the pressure in a water chamber so that the water boils at a low temperature; since heat is drawn from the water, it is thus cooled. *Strock, 10.*

steam main. A horizontal pipe for carrying live steam from a boiler to radiators, a steam engine, or other steam consuming device. *Crispin.*

steam metal. Any copper alloy specially designed to endure exposure to steam. *Webster 3d.*

steam navvy. a. A mechanic excavator having a single large bucket, ½ to 8 cubic yards, at the end of a long beam carried in a revolving jib. Also called steam shovel. *C.T.D.* b. *See* excavator. *Pryor, 3.*

steam point. *See* point, d. *Fay.*

steam press. A press actuated by steam pressure for truing the shape of green fire clay brick *A.R.I.*

steam pressed brick. *See* repressed brick. *A.R.I.*

steam pressed de-aired brick. Repressed brick made from a column of clay from an auger machine equipped to evacuate the air from the extruding chamber. *A.I.S.I. No. 24.*

steam rack drier. A room equipped with pipes containing steam erected so as to allow the stacking of pallets of green, wet ware for drying. *ACSG, 1963.*

steam-reduced asphalt. Asphalt produced as a residue in distilling petroleum. *Bennett 2d, 1962 Add.*

steam rig. Synonym for steam drill. *Long.*

steam shovel. An excavating machine in which a large dipper is operated by steam power. *Standard, 1964.* Used for stripping purposes and in open-pit mining, especially for iron and coal. A similar shovel is now operated by electricity, gasoline, and diesel engines. *Fay.*

steam shovel mine. An opencut mine in which steam shovels or other power shovels are used for loading cars. *Hess.*

steam sizes. A coal product which passes through a ¾-inch-diameter hole. *Compare* beans, b. *Nelson.*

steam stamp. A crushing machine consisting of a vertical stamp shaft which is forced down to strike its blow, and lifted up preparatory to striking the next, by a steam piston. *Fay.*

steam tempering. The treatment of clay (particularly brick clay) with steam to develop its plasticity for the shaping process and, as an additional advantage, to reduce the time required to dry the shaped bricks. The clay generally reaches a temperature of 70° to 80° C. Also known as hot preparation. *Dodd.*

steam thawing. A method of dredging permanently frozen ground in Alaska and the Yukon territory in which steam is forced through pipes which are fitted with steel points on one end and a driving head on the other end so that the pipes can be hammered into the frozen gravel. Thawing by steam is a slow and costly process. *See also* thawing. *Lewis, pp. 394-395.*

steam trap. An apparatus for allowing water or air to pass but preventing passage of steam. *Strock, 10.*

steam turbine. A machine in which high-pressure steam is made to do work by acting on, and rotating, blades in a cylinder. It is used for large stationary engines in power stations. Its comparative efficieny is high. *Nelson.*

steam winders. The most common type of steam winder at work today is the two-cylinder double-acting horizontal engine driving direct on the drum shaft. These engines, which are made with cylinders up to 42-inch diameter and 84-inch stroke, possess the merit of simplicity and ease of control. The two cylinders act on cranks set at 90° to each other and are large enough for either to start the engine from rest against full load, since one may happen to stop at dead center (that is, with the piston at the end of its stroke, in which position it can exert no turning moment on the crank). *Mason, v. 2, p. 450.*

stearates. Stearates of aluminum, calcium, magnesium, and zinc are used chiefly as die lubricants for dry-pressing certain ceramic products. *Lee.*

stearic acid; octadecanoic acid. Colorless; waxlike; monoclinic; $CH_3(CH_2)_{16}CO_2H$; molecular weight, 284.49; slight odor and taste suggesting tallow; specific gravity, 0.9408 (at 20° C, referred to water at 4° C); melting point, 69.6° C or 70.1° C; boiling point, 361.1° C (at 760 mm), or 358° to 383° C; insoluble in water; slightly soluble in alcohol, in acetone, and in benzene; very soluble in ether; and soluble in chloroform, in carbon tetrachloride, and in carbon disulfide. Used in metal polishes. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-435.* Sometimes used as a lubricant in extruding structural clay products. *Lee.*

Steart fan. A propeller or axial flow fan developed by Steart in Australia. *See also* fan. *Nelson.*

steatic talc. High-grade variety of talc suitable for use in electronic insulators. *A.G.I. Supp.*

Steatite. Massive form of the mineral talc, $Mg_3Si_4O_{10}(OH)_2$. The chief sources are in the United States, France, Italy, India, Norway, and Austria. The natural rock can be machined and the shaped parts fired for use as electroceramics. A far greater proportion is ground and shaped in the usual way with a clay bond to produce low-loss electroceramics. Steatite is also used as a raw material for cordierite electroceramics and refractories. *Dodd.*

steatite ceramic. Any ceramic whiteware in which magnesium metasilicate, ($MgO.SiO_2$), is the essential crystalline phase. *ACSB-4.*

steatite porcelain. A vitreous ceramic whiteware for technical application in which magnesium metasilicate, ($MgO.SiO_2$), is the essential crystalline phase. *ASTM C242-60.*

steatite talc. A high-grade variety of talc suitable for use in electronic insulators. *A.G.I. Supp.*

steatite ware. Ware made from a body containing steatite; used where great accuracy of size and resistance are needed. *C.T.D.*

steatite whiteware. Any ceramic whiteware in which magnesium metasilicate, ($MgO.SiO_2$), is the essential crystalline phase. *ASTM C242-60.*

steatitic. Of or pertaining to steatite or soapstone; made of steatite. *Fay.*

steatitization. The introduction of or replacement by steatite (talc). Usually used in reference to ultrabasic rocks as that process of hydrothermal alteration of an ultrabasic which in its final stages results in the formation of a talcose rock. *A.G.I.*

Stebinger drum. A type of gradienter used particularly on alidades, such as gale, explorer, or miniature types. *A.G.I.*

Steckel mill. A cold reducing mill having two working rolls and two backup rolls, none of which is driven. The strip is drawn through the mill by a power reel in one direction as far as the strip will allow and then reversed by a second power reel, etc., until the desired thickness is attained. *ASM Gloss.*

s-tectonite. In structural petrology, a deformed rock characterized by an s-surface, such as schistosity, shear planes, bedding, etc. *Billings, 1954, p. 378.*

steel. a. The borer, consisting of shank, shaft, and bit or cutting edge; used for rock-drilling with drifters or jackhammers. *C.T.D.* b. In air hammers, the hollow or solid steel bar which connects the hammer with the cutting tool. *Nichols, 2.* c. Can. The railroad. Also, drill steel used in various mining and rock-cutting tools. *Hoffman.* d. In iron-base alloy, malleable in some temperature range as initially cast, containing manganese, usually carbon, and often other alloying elements. In carbon steel and low-alloy steel, the maximum carbon is about 2.0 percent; in high-alloy steel, about 2.5 percent. The dividing line between low-alloy and high-alloy steels is generally regarded as being at about 5 percent metallic alloying elements. Steel is to be differentiated from two general classes of irons: the cast irons, on the high-carbon side and the relatively pure irons, such as ingot iron, carbonyl iron, and electrolytic iron, on the low-carbon side. In some steels containing extremely low carbon, the manganese content is the principal differentiating factor, steel usually containing at least 0.25 precent; ingot iron contains considerably less. *ASM Gloss. See also* chromium steel; manganese steel; nickel steel.

steel arches; steel rings. Curved lengths of steel, usually of H-section, used for supporting mine roadways. Two-, three-, or four-segment arches are available, with straight leg, splayed leg, horseshoe, or circular design; in double radius or with welded baseplate. *See also* camber girder; steel support. *Nelson.*

steel band. Ill. A thin band or layer of pyrite in a coal seam. Also called sulphur; brasses. *Fay.*

steel band belt. A belt of relatively thin carbon or stainless strip steel alloyed and heat treated to withstand continued flexing over pulleys. *ASA MH4.1-1958.*

steel belt. Thin, flat, steel belts varying from 0.008 to 0.035 inch in thickness and from 7/8 to 8 inches in width have been successfully used. The pulleys should be faced with a thin layer of cork. Steel belts can be run at speeds as high as 10,000 feet per minute. It has been claimed that a 4-inch steel belt will transmit as much power as a 19-inch leather belt. *Crispin.*

steel bit. The cutting tool at the end of the drill steel. Various bit shapes are used, the three commonest being the single chisel bit (used only for hand drills); the double chisel bit (used for fairly soft rock), and the cross bit (used for hard rock and for general purposes). *See also* tungsten carbide bits. *Nelson.*

steel boy. A boy who carries drills to the miners, and collects dull drills and sees that they are returned to the blacksmith shop. *Fay.*

steel bronze. The same as bronze steel. *Standard, 1964.*

steel cable. A flexible rope, the strands of which are steel wires instead of plant fibers. *See also* cable, e. *Long.*

steel-cable conveyor belt. A rubber conveyor belt in which the carcass is composed of a single plane of steel cables which acts as a longitudinal tension-carrying member and includes two or more plies of fabric to provide transverse strength and hold the cables together. *ASA MH4.1-1958.*

steel casing. A pipe to support the walls of a borehole in loose ground. The casing is secured in position by a concrete block or by the cross beams of the platform. It is driven down from the surface and follows the drilling operation closely or sometimes even precedes the borehole in sand or very loose ground. *See also* borehole casing. *Nelson.*

steel centralizer. On a wagon drill, a guide to hold the starting steel in proper alignment. *Nichols, 2.*

steel changes. The difference in length between successive steels used in drilling one hole. *Nichols.*

steel chock. *See* hydraulic chock. *Nelson.*

steel converter. The retort, lined with refractory material, in which cast iron is converted into steel, as by the Bessemer process. *Crispin.*

steel conveyor band. A conveyor consisting of a band of cold-rolled, hardened, and tempered charcoal steel. Steel bands are extremely flat and straight and are supplied in widths up to 32 inches, thickness up to 0.064 inch, and in lengths up to 500 feet. For normal conveyors, the ends are usually joined together by a small lap-riveted joint, but for long runs the overlap joint is vulcanized. *See also* rubber-covered steel conveyor. *Nelson.*

Steele; Steele dry table. *See* Sutton. *Fay.*

steel equivalent. a. The radiographic equivalence factor of a material, in terms of steel, i. e., the relative thickness of steel which has the same radiographic absorption as a unit thickness of the material in question. *ASM Gloss.* b. The thickness of steel which has the same radiographic absorption (which will require the same radiographic exposure) as a particular specimen, or part of a specimen, of another material. *ASM Gloss.*

steel erector. A skilled member of a team specially trained to erect steel framed buildings, bridges and other steel structures. *Ham.*

steel grit. Steel grit is a product manufactured by crushing and grading steel shot. It is angular, presenting many sharp corners and is very hard and strong, these features being important towards its use as a sandblasting abrasive. Steel grit is produced in sizes from about 14 to 100 mesh, the finer being used for soft iron where a finely ground surface is desired. In some operations the sizes of steel grit may be blended to give the desired surface and in other cases silica sand should be mixed with the steel grit. *Hansen.*

steel guides. Steel rails, rods, or bars fixed in a vertical shaft to guide the cage and prevent it swinging. *See also* fixed guides. *Nelson.*

steel iron. A mixture of iron and steel; imperfectly made steel. *Standard, 1964.*

steel jack. a. This support is in effect a screw jack and it is especially suitable in mechanical mining. Under headers at the face, or near the face, steel posts or jacks are used for legs or upright timbers, then usually replaced with wood as the equipment advances. As a safety post this type of support is very good if a wooden block is used on the top end to avoid slipping on the roof rock. Also called steel post. *Kentucky, p. 142.* b. Same as sphalerite. *Fay.*

steel lines. Lines visible in the enamel surface which follow the rolling direction of the steel. May also result from scratches in the metal surface. *Bryant.*

steelmaking. The process of making steel from solid or molten pig iron, with or without admixture with steel scrap. The processes used are the Bessemer, open-hearth, crucible, electric arc, high-frequency induction, and duplex. *C.T.D.*

steel mill. a. Eng. An early-type apparatus for obtaining light in a fiery mine. It consisted of a revolving steel wheel, to which a piece of flint was held, to produce sparks. *See also* flint mill, a. *Fay.* b. A mill where steel is manufactured. Also called steelworks. *Webster 3d.*

steel money. N. of Eng. Payment made to faceworkers who have to handle steel straps instead of timber planks. *Trist.*

steel needle. An instrument used in preparing blastingholes, before the safety fuse was invented. *Fay.*

steel nipper. *See* nipper, a. *Fay.*

steel ore. A name given to various iron ores and especially to siderite, because it was supposed to be especially adapted for making steel by the earlier and direct process. *See also* stahlstein. *Fay.*

steelplate. A steel product obtained by the reduction in thickness of steel slabs. The slabs are reheated to rolling temperature, about 2,250°F and the thickness reduced in a hot roughing mill. Steelplates may be up to 75 inches and between 3/16 and 4½ inches thick. *Nelson.*

steel plate conveyor. *See* plate conveyor. *Nelson.*

steel press. A machine for compressing molten steel in casting, to improve the the quality of the product. *Standard, 1964.*

steel prop. A steel upright or post to support the nether roof at a longwall or other face. It usually incorporates a yielding device. *See also* hydraulic prop; mechanical yielding prop; self-advancing supports. *Nelson.*

steel puller. A hinged clamp on the bottom of a hand drill. *Nichols.*

steel rectangular shaft supports. A shaft support consisting of H-beams, I-beams, angles, and sheeting. The design is somewhat similar to that used for timber. Bolts, rivets, and fastening angles are used to connect and secure the steel members. The fastening angles are riveted to the beams. The addition of galvanized-iron corrugated wall sheets (or laggings) form a secure and fireproof shaft. *See also* permanent shaft support; barring, a; bunton, a; wall plate; lagging, a. *Nelson.*

steel ring. Ring or horseshoe shaped support for underground traveling way. Also called arch ring. *Pryor, 3. See also* steel arches.

steel scrap. Miscellaneous pieces of steel, old and new, used in the bath for steel making, especially in the open-hearth furnace. *Mersereau, 4th, p. 414.*

steel separation door; safety door; emergency door. A steel door specially erected for the purpose of being closed only in an emergency, such as a fire or explosion. Steel is necessary to secure strength and avoid destruction by fire. Steel doors may also be used as separation doors in the vicinity of the pit bottom or fan drift. *Nelson.*

steel sets. Used in main entries of coal mines and in shafts of metal mines in the United States. The sections are I-beams for caps and H-beams for posts or wall plates, the H-section giving equal stiffness in two directions at right angles to each other. Steel sets of various shapes are coming into wide use in deep European coal mines where pressures are so great that timber would not be satisfactory. *Lewis, p. 51. See also* steel tunnel support.

steel sheet piling. Piling composed of interlocking rolled steel sections driven vertically into the ground with guide walings in place before excavation starts. *Ham.*

steel shot. a. Chilled cast iron drops; used as abrasive. *Bennett 2d, 1962 Add.* b. Synonym for chilled shot. *Long.*

steel slab. Steel which has been rolled in a slabbing or primary mill. The slabs, which may weigh up to 11 tons, are deseamed, that is, the surface flaws are removed by the use of oxyacetylene torches to provide a smooth surface. *See also* steelplate. *Nelson.*

steel support. A straight or curved length of steel, usually of H- or channel section, used for support purposes in mine roadways, faces, or shafts. A steel support (1) possesses a high degree of permanency or long service; (2) ensures a minimum area of excavation for given dimensions in the clear; and (3) it is fireproof. In return airways and shafts, a chrome-nickel-copper steel is sometimes used to counteract the corrosive air. For high-strength roof bars best results are obtained by the use of heat-treated low-alloy steels of the carbon manganese type. *See also* S.M.R.E. bar; steel arches. *Nelson.*

steel tapes. Thin bands of varying lengths wound into round leather cases and graduated in feet and inches on one side and links on the reverse. They require careful handling as they are easily snapped by twisting and kinking. *Mason, v. 2, p. 713.*

steel tunnel support. Tunnel-support systems made of steel are roughly of five types: (1) continuous rib—this type is usually made in two pieces for maximum speed of erection, lowest first cost, and lowest erection cost. Sometimes used in three or four pieces to meet special conditions and the following methods of attack: full face, side drift, and multiple drift; (2) rib and post—this type is employed with the following methods of attack: full face in tunnels whose roof arch makes an angle with the sidewall; multiple drift and side drift in tunnels of such large size that two-piece continuous ribs cannot be shipped and/or handled; and heading and bench and top heading for support in the drift (with truss panels) for early support to roof; (3) rib and wallplate—in this type the rib is also usually made in two pieces for maximum speed of erection, lowest first cost, and lowest erection cost. It is sometimes used in three or more pieces to meet special conditions and with the following methods of attack: heading and bench, top heading, and full face. This type is especially applicable to circular and high-sided tunnel sections where only a light roof support is needed; (4) rib, wallplate, and post—this method of support is used with the following methods of attack: heading and bench and top heading—for quick support to roof; side drift—in large tunnels with bad rock conditions required quick support; and full face—for favorable rock where support is not needed tight to the face, for tunnels whose roof makes an angle with the sidewall, and where post and rib spacing differ; and (5) full circle rib—this method is used with the following attack: full face—in tunnels in squeezing, swelling and crushed rock, or any rock that imposes considerable side pressure, also where bottom conditions make it impossible to carry roof lodes on foot blocks, and in earth tunnel conditions sometimes encountered in rock tunnels; and heading and bench—under earth tunnel conditions with joints at spring line. The invert strut is used where mild side pressures are encountered and also to prevent the bottom from heaving. A full circle with ribs closely spaced is heavily lagged for heavy loads associated with squeezing conditions. *Lewis, pp. 54–56.*

steel wire reinforced belt. A rubber belt in which the cords are replaced by high carbon steel wide strands. The wires are copper plated and rubber coated to provide maximum adhesion to the rubber covers. *Nelson.*

steel wire rope. *See* wire rope. *Nelson.*

steel wool. Fine threads of steel matted together into a mass; used principally for polishing or cleaning surfaces of wood or metal. *Crispin.*

steelworks. *See* steel mill.

steelyard. Weighing machine in which rigid steel bar is pivoted about a fulcrum placed close to one end, from which the scalepan and object are suspended. Weights are moved over the long portion, which is graduated appropriately. *Pryor, 3.*

steening; steining. The brick, or stone lining of a shaft. *Fay.*

steenstrupine. A silicate and phosphate, with fluoride (?), of rare earths, Na,Ca,Mn,Fe, and Th; one analysis also shows Be. None of the analyses show F, but it has been suggested that it may be present. The formula $(La,Ga,Na)_2(Al,Fe,Mn)_3(Si,P)_3(O.\text{-}OH,F)_{12}$ has been suggested. *Hey 2d, 1955.*

steep. *See* brasque. *Fay.*

steep (dipping) fault. Fault dipping at an angle of 45° or more. Synonym for high-angle fault. *Schieferdecker.*

steep gradient. In general, in coal mining, an inclination (of a roadway, working, or coal seam) steeper than 1 in 4. *Nelson.*

steeply inclined. Said of deposits and coal seams with a dip of from 40° to 60°. *Stoces, v. 1, p. 56.*

steep seams. *See* edge coal; rearers. *Fay.*

steer. Leic. Steep; highly inclned; dips fast. *Fay.*

steering brake. A brake which slows or stops one side of a tractor. *Nichols.*

steering clutch. A clutch which can disconnect power from one side of a tractor. *Nichols.*

Stefan-Boltzmann Law. The energy radiated in unit time by a black body is given as $E=K(T^4-T_0^4)$, where T is the absolute temperature of the body, T_0 the absolute temperature of the surroundings, and K is a constant. *Osborne.*

Steger's crazing test. A method for the assessment of the fit between a ceramic body and a glaze by measuring any deformation, on cooling, of a thin bar glazed on one side only. *Dodd.*

steg the cleek. Scot. To retard or stop the winding; to stop the work. *Fay.*

steigerite. A very rare, weakly radioactive, amorphous, canary yellow mineral, $Al_2(VO_4)_2.6\frac{1}{2}H_2O$, found as coatings on highly weathered sandstone of the Colorado-Utah carnotite region; found associated with the sodium analogue of hewettite. *Crosby, p. 135.*

stein. Stonework used to secure the sides of a shaft. *Gordon.*

steinheilite. Synonym for corderite. *Dana 6d, p. 419.*

steining. The brick or stone lining of a shaft to prevent the loose strata of the sides from falling. *Fay.*

steinkohle. Ger. Coal. *Holmes, 1928.*

steinmannite. A variety of galena with part of the lead replaced with antimony and arsenic. *Standard, 1964.*

stele. In coal, primarily the vascular tissues of the axis of a vascular plant. It consists of two parts: the xylem which carries water from the roots, and the phloem which carries the food. *Hess.*

stell. Sprag. *Mason.*

stellar coal. *See* stellarite. *Fay.*

stellarite. A variety of asphaltum, called also stellar coal, because stars of fire drop from it when burning. *Fay.*

stellate. Resembling a star (as in shape); pointed, formed, or radiated like a star. *Webster 3d.* Frequently applied to minerals. *Fay.*

stellite. a. A series of alloys containing cobalt, chromium, tungsten, and molybdenum in various proportions; very hard. The range is 10 to 40 percent chromium, 35 to 80 percent cobalt, 0 to 25 percent tungsten, and 0 to 10 percent molybdenum. It is used for cutting tools and for protecting surfaces subjected to heavy wear. *C.T.D.* b. Synonym for pectolite (or of wollastonite?). *Hey, 2d, 1955.*

stell prop; anchor prop. A steel or timber prop fixed firmly between roof and floor at the end of a longwall face and from which a coal cutter is hauled by rope when cutting. A stell prop may also be used as part of a belt-tensioning arrangement, or a return sheave. *Nelson.*

stem. a. To insert and pack stemming in a shothole. *B.S. 3618, 1964, sec. 6.* b. A bar to the forged end of which is brazed a hard metal tip for drilling. *B.S. 3618, 1964, sec. 6.* c. The assemblage of drill rods in a borehole connecting a drill bit and core barrel to the drill machine. *Long.* d. The heavy iron rod acting as the connecting link between the bit and the balance of the string of tools on a churn rods in a borehole connecting a drill bit drill. *Long.* e. The vertical rod or shaft of wrought iron which carries the stamp at its lower end. Also called shank. *Fay.* f. The handle of the hammer. *Fay.* g. The heavy iron rod to which the bit is attached in deep drilling by the rope method. *Fay.* h. Frequently used as a synonym for tamp. *See* stemming. *Fay.* i. Corn. A day's work. Also called stemmyn. *Fay.* j. *See* ram. *Mason.*

stem bags. Fire-resisting paper bags, about 8 inches long, filled with dry sand for stemming shotholes in coal or hard headings. *See also* water-ampul stemming. *Nelson.*

stemmer. a. Eng. A blasting needle. *Standard, 1964.* b. A wooden rod used by shot firers for inserting the explosive cartridges and stemming material in shotholes. The stemmer must be long enough to reach the back of the shothole, and the diameter 1/8 inch larger than the cartridges. Metal is not permitted in any part of a stemmer used in British coal mines. Also called tamping rod; beater. *See also* scraper; break detector. *Nelson.*

stemming. a. The material (limestone chippings or sand and clay) used to fill a shothole after the explosive blowing out along the hole. In tunnels and hard headings, the stemming may be blown in by a hurricane air stemmer. *Nelson.* b. The act of pushing and tamping the material in the hole. *See also* water ampul stemming. *Nelson.* c. Inert material packed between the explosive charge and the outer end of the shothole, or between adjacent charges in deck charging. *B.S. 3618, 1964, sec. 6.* d. *See* tamping. *Fay.*

stemming rod. A nonmetallic rod used to push explosive cartridges into position in a shothole and to ram tight the stemming. *B.S. 3618, 1964, sec. 6.*

stemming stick. *See* stemming rod. *B.S. 3618, 1964, sec. 6.*

stemmyn. Corn. *See* stem, i. *Fay.*

stempel; stemple. a. Derb. One of the crossbars of wood placed in a mine shaft to serve as steps. *Fay.* b. A stullpiece. *Fay.* c. A cap, both sides of which are hitched instead of being supported upon legs. *See also* stull, e. Also spelled stimple. *Fay.*

stemware. A general term for wine glasses, etc., having stems. The stem may be pulled or drawn from the bowl (pulled stem or drawn stem), or it may be made separately (stuck shank). *Dodd.*

stence. Eng. Timber for supporting a roof. *Fay.*

stench. A substance with a distinctive, disagreeable odor put in the air current to warn underground workers of fire or other emergency; ethyl mercaptan is commonly used. *Hess.*

stench capsule. A fire warning device designed to be bolted to a flat surface which may rise to a dangerous temperature. It consists of a cavity filled with 20 cubic centimeters of ethyl or butyl mercaptan alone or with other stench agents and is sealed with a fusible plug in a brass container with a hexagonal head, arranged to liberate the stench agent at any temperature chosen. Tests in pits have shown that a strong smell could be detected 1.7 miles from the discharge point 25 to 30 minutes after the device operated. *Sinclair, I, pp. 277-278.*

stencil. A substance laid on parts of the surface of pottery to be decorated by the transfer process to prevent adherence of oil; hence, the pattern made by such called a templet. *Enam. Dict.*

stencil brush. *See* brushes. *Hansen.*

stencil carver. *See* stencil cutter. *D.O.T. 1.*

stencil cutter. In stonework industry, one who designs, lays out, and cuts inscriptions and designs in stencil compound applied to the face of monumental stones preparatory to sandblasting. Also called engraver; engraver, hand; modeler; stencil carver. *D.O.T. 1.*

stencil knife. A sharp pointed instrument used for cutting stencils. Surgical knives and also knives fashioned from tempered hacksaw blades are frequently used for this work. *Hansen.*

stencil metal. Metal from which stencils for the enamel shop are cut is usually sheet lead or sheet zinc. *Enam. Dict.*

stenonite. A mineral, $(Sr,Ba,Na)_2Al(CO_3)F_5$, in monoclinic grains from Ivigtut, South Greenland. *Hey, M.M., 1964; Fleischer.*

stent. a. The amount of work expected from a coal miner in a day or week. *See also* stint. *Nelson.* b. Corn. Tourmaline and quartz veins in kaolinized granite. *Arkell.* c. Eng. Rubble; waste. *Fay.* d. Eng. Extent or limit, as of a pitch or bargain. *Standard, 1964.* e. *See* pitch, h. *Fay.*

stenting. N. of Eng. *See* stenton, b. *Fay.*

stenton. a. Eng. A narrow road driven to connect two winning places. *SMRB, Paper No. 61.* b. Newc. A passage between two winning headways. A stenton wall is the pillar of coal between them. Also called stenting. *Fay.* c. A connecting roadway between two adjacent roadways which may be used for ventilation purposes. Also called air slit; breakthrough; crosscut; cross hole; thirling; througher; spout. *B.S. 3618, 1963, sec. 2.* d. *See* pillar-and-stall. *Nelson.*

stenton wall. Newc. The pillar of coal between two working headings. *Fay.*

step. a. Eng. The cavity in a piece for receiving the pivot of an upright shaft or the end of an upright piece. *Zern.* b. Eng. The shearing in a coal face. *Zern.* c. Scot. A hitch or dislocation of the strata. *Fay.* d. Eng. The portion of a longwall face at right angles to the line of the face formed when a place is worked in front of or behind an adjoining place. *SMRB, Paper No. 61.* e. Eng. Any right angle bend on a face. *SMRB, Paper No. 61.* f. Fault; a small fault; a small fault in a stepped series of faults. *Mason.* g. A small offset on a piece of core or in a drill hole resulting from a sudden sidewise deviation of the bit as it enters a hard, tilted stratum or rock underlying a softer rock. *Compare* kick. *Long.* h. One of several terracelike or stairstep concentric configurations on the crown of a diamond bit. *See also* step-face bit. *Long.* i. A treatment of one part of the sample in a sample divider (thus a pass consists of one or more steps. *B.S. 1017, 1960, Pt. II.* j. The action of setting a lock gate into a vertical position. *Ham.*

step banks. S. Wales. Working places at regular distances along the face of the longwall system. *Fay.*

step core bit. Synonym for step face bit. *Long.*

step cut. a. A mode of cutting gems in steplike facets. *Standard, 1964.* b. A form of cutting employed for stones not deeply colored when they are not cut as brilliants; a simple typical form is that of a stepped pyramid with the apex sliced off. Also called trap cut. *Hess.*

step-face bit. A thin-nosed bit with diamonds set in several concentric terracelike rows, which form the outside wall. *Long.*

step fault. A series of parallel faults which, all inclined in the same direction, gives rise to a gigantic staircase; hence these are called step faults. Each step is a fault block and its top may be horizontal or tilted. *A.G.I.*

step grate. A grate made in steps or stairs, to promote completeness of the combustion of the coal burned upon it. *Fay.*

Stephanian. Upper Upper Carboniferous. *A.G.I. Supp.*

stephanite; brittle silver ore. A sulfide of silver and antimony, Ag_5SbS_4, which crystallizes in the orthorhombic system. It is usually associated with other silver-bearing minerals, and is deposited from ascending solutions. *Dana 17; Sanford.*

Stephenson lamp. An early type of coal miners' lamp. It had a glass chimney surrounded by a wire gauze about 2 inches in diameter. The glass chimney was covered by a perforated copper cap, and the air was fed to the flame from below through small holes and wire gauze in a lateral extension of the oil vessel. The lamp was unsafe, that is, it passed flame when the velocity of the air current exceeded about 8 feet per second. *See also* safety lamp. *Nelson.*

step irons. Galvanized malleable cast iron staples built into a wall of a brick or concrete manhole approximately 12 inches apart vertically to allow men to get into and out of a deep sewer. *Ham.*

step-out correction. The correction, determined from the geometry of the detector spread, which eliminates the effect on the reflection time of the horizontal distance between seismometers and shot point. *See also* step-out time. *A.G.I.*

step-out time. In seismic prospecting, the time differential in arrivals of a given peak or trough of a reflected or refracted event for successive detector positions on the earth's surface. This difference gives information on the dip of the reflecting or refracting horizon in the earth. *A.G.I.*

steppe. A vast tract in southeastern Europe and in west central Asia, generally level and without forests. *MacCracken.*

stepped foundation. *See* benched foundation. *Ham.*

stepped longwall; hitch-and-step. A system of longwall stalls in which the faces are carried forward in a steplike formation, one stall about 5 yards in advance of the next stall. It is claimed to have advantages when the roof is friable. *See also* top holes. *Nelson.*

stepped stope. Similar to advance stope. The term implies that mining at one face is stepped aside from that below so as not to hinder the work at it. *Stoces, v. 1, p. 249.*

stepping. N. of Eng. The system of working a face of coal in advance of the one next to it. *Fay.*

stepping ahead. Term used in dredging operations when the digging spud is dropped, the other spud is raised, and the dredge is ready to begin a new cut. *Lewis, pp. 392–393.*

step reef. *See* step vein. *Fay.*

step socket. A special form of socket for use on locked-wire rope. *Zern.*

steptoe. An island of bedrock in a lava flow. *Fay.*

step up. To increase the voltage of (a current) by means of a transformer. *Webster 3d.*

step vein. A vein alternately cutting through the strata of country rock and running parallel with them. In Australia, it is called step reef. *Fay.*

stepwise longwall. N. of Eng. A variant of gateway longwall in which faces 12 to 40 yards in length are stepped, each face being 4 to 6 yards in advance of the adjacent one. *Trist.*

stercorite. Microcosmic salt, $NH_4NaHPO_4.H_2O$. Native salt of phosphorous. *Dana 7, v. 2, p. 698; Hey 2d, 1955.*

stereochemistry. Branch of chemistry which deals with the graphic bonding of atoms in a molecule, and their spatial or steric arrangement. *Pryor, 3.*

stereocomparator. In photographic mapping, an instrument for accurately measuring the three space coordinates of a point by stereoscopic observation of two images of the same point contained in two overlapping photographs taken from two different exposure stations. *Seelye, 2.*

stereogram. a. A stereographic projection of a crystal. *Fay.* b. Diagram in graphic form with three axes, used to give three-dimensional representation on a plane surface. *Pryor, 3.*

stereographic projection. In mineralogy, a projection made on a plane through the center of a sphere by projectors from the South Pole. *Fay.*

stereometer. An apparatus for determining the specific gravity of powders or porous materials. *Osborne.*

stereometric map. In photographic mapping, a relief map made by the application of the stereoscopic principle to aerial or terrestrial photographs. Also called stereotopographic map. *Seelye, 2.*

stereophotogrammetry. The art of surveying by stereoscopic measurements of photographs. *Seelye, 2.*

stereoradiography. A technique for producing paired radiographs which may be viewed with a stereoscope to exhibit a shadowgraph in three dimensions with various sections in perspective and spatial relation. *ASM Gloss.*

stereoscopic principle. In photographic mapping, the formation of a single, three-dimensional image by binocular vision of two photographic images of the same terrain taken from different exposure stations. With proper equipment all measurements needed in map construction can be made from this visual model. *Seelye, 2.*

stereoscopic vision. The normal vision of human beings in which depth and distance can be seen and estimated accordingly. A special plotting instrument enables vertical photographs taken during an air survey to be viewed stereoscopically. *Ham.*

stereosphere. a. Suggested by Willis for a highly elastic shell, 1,900 kilometers thick, which is the inner of three composing the mantle of the earth. *A.G.I.* b. That part of the earth's crust which lies above the level of compensation, or the top of the asthenosphere. *See also* asthenosphere. *A.G.I.* c. The relatively strong outer shell of the earth. *A.G.I.*

stereotopographic map. *See* stereometric map. *Seelye, 2.*

stereotype metal. An alloy resembling type metal, but containing more lead, suitable for stereotype plates. *Standard, 1964.*

sterile coal. Eng. Black shale or clay on top of a coal seam. *Fay.*

sterilized coal. That part of a coal seam which, for various reasons, is not mined. *B.S. 3618, 1963, sec. 1.*

sterlie. Scot. A drum or wheel on a self-acting incline. *Fay.*

sterling. Having a standard of value or fineness established by the British government; said of British money of account and of gold and silver; as, pounds sterling; sterling plate. *Standard, 1964.*

sterling silver. A silver alloy containing at least 92.5 percent silver, the remainder being unspecified by usually copper. *ASM Gloss.*

sternbergite. A silver-iron sulfide, $Ag_2S.Fe_4S_5$. It contains 30.4 percent sulfur, 34.2 percent silver, and 35.4 percent iron. *Fay.*

sterny. Scot. Rough; coarse-grained or crystalline, for example, sterny limestone. *Fay.*

sterrettite. Supposedly $Al_6(PO_4)_4(OH)_6.5H_2O$, is probably $ScPO_4.2H_2O$; its structure is of the metavariscite type; eggonite and sterrettite are identical. *American Mineralogist, v. 45, No. 1–2, January–February 1960, p. 257; Fleischer.*

sterro metal. An alloy of three parts copper, two parts zinc, and a small proportion of iron and tin; stronger and cheaper than gunmetal. *Standard, 1964.*

stetefeldite. A somewhat uncertain compound containing silver, copper, iron, antimony, sulfur, and water. *Fay.*

Stetefeldt furnace. A furnace for the chloridizing and roasting of silver ores, and also for roasting fine copper ores low in sulfur. Provision is made for an auxiliary fireplace. *Fay.*

stevensite. A hydrous magnesum silicate, $[Mg_{2.88}Mn_{.02}Fe_{.02}]\ [Si_4]\ O_{10}\ [OH]_2\times_{.15}$, typically pseudomorphous after pectolite in basalt; a member of the montmorillonite group of clay minerals. From Hoboken, N.J. *American Mineralogist, v. 38, November–December 1953, p. 973.*

Stevenson's formula. A formula by which the height of waves can be calculated. *See also* fetch. *Ham.*

steward. York. An underground foreman. *Fay.*

stewartite. a. A colorless to yellow hydrous manganese phosphate, $3MnO.P_2O_5.4H_2O$. Triclinic. Fibers or minute crystals. From Stewart mine, Pala, Calif. *English.* b. A steel-gray fibrous variety of bort containing iron and, therefore, magnetic. From Kimberely, Republic of South Africa. *English.*

Stewartite bort. *See* bort, c. *Hess.*

stey. Scot. Steep; highly inclined. *Fay.*

stibianite. Stibiconite. *Fleischer.*

stibiconite. $(Sb^{3+}, Ca)_ySb_{2-0}\ (O,OH,H_2O)_{6-7}$ with the value of y ranging from 2 to less than 1; usually chalky white to pale yellow, but orange, brown, gray, and black are not uncommon; isometric; pyrochlore structure; typically occurs as an alteration product of stibnite. *American Mineralogist, v. 37, No. 11-12, November-December 1952, pp. 982-999.*

stibiocolumbite. Name proposed for the stibiotantalite from Mesa Grande, Calif., because the amount of niobium is greatly in excess of the tantalum (in one analysis). *English.*

stibiopalladinite. A silver-white to steel-gray antimonide of palladium Pd_3Sb. Isometric. Grains and small crystals. From the platiniferous morite of the Bushveld in the Transvaal, Republic of South Africa. *English.*

stibiotantalite. A brown, yellow, reddish-yellow tantaloniobate of antimony, $(SbO)_2(Ta,Nb)_2O_8$. Orthorhombic, hemimorphic. *English.*

stibium. The ancient name for antimony and stibnite and now used in pharmacy for the metal. *Dana 6d, p. 36.*

stiblite. Synonym for stibiconite. *Dana 6d, p. 203.*

stibnite; gray antimony. An orthorhombic, lead-gray mineral, Sb_2S_3; inclining to steel-gray; subject to blackish tarnish; metallic luster; sometimes containing silver or gold. Differs from galenite and other sulfides by ease of fusion. Contains 71.8 percent antimony, 28.2 percent sulfur. Soluble in concentrated boiling hydrochloric acid with evolution of H_2S. Specific gravity, 4.52 to 4.62; Mohs' hardness, 2. Found in Arkansas, Alaska, California, Nevada; Germany; Hungary; France; Japan; China; Mexico; Chile. The most important ore of antimony. Formerly called antimony glance. Also known as antimonite and antimony red. *Dana 17; Sanford; CCD 6d, 1961.*

stichtite. A lilac basic hydrous carbonate of magnesium, chromium, and iron, $MgCO_3.5Mg(OH)_2.2[(Cr,Fe)(OH)]_3.4H_2O$. Hexagonal (?). Masses of fibers or scales in serpentine. A chrome-brugnatellite. From Dundas, Tasmania; near Dinvel's Kantoor, Barberton district, Transvaal, Republic of South Africa; Cunningsburgh, Shetland Islands; Quebec, Canada. *English.*

stick. a. To become fixed or lodged in a borehole due to the constriction created by swelling ground or to the compaction of cave materials and/or drill cuttings. *Long.* b. A cartridge of explosive. *B.C.I.* c. A stick of mine timber, due to the cellular nature of the wood, may be considered as a bundle of parallel tubes. It resists pressure against the ends much better than pressure brought against the sides. *Lewis, p. 38.* d. Eng. To cease work in order to obtain an increase, or prevent a reduction of wages; to strike. *Fay.* e. In a dipper shovel or pull shovel, a rigid bar hinged to the boom and fastened to the bucket. Also called handle. *Nichols.* f. A bonded abrasive product of sticklike dimensions, used for such operations as hand sharpening of tools, precision honing, and dressing of wheels. *ASM Gloss.*

sticker. *See* stone repairer. *D.O.T. 1.*

sticking. a. Derb. A small vein (a scrin) not wide enough for shoulder room. *Arkell.* b. The selvage of mineralized country rock at the side of a vein. *Arkell.* c. Derb. A rib of ore in a vein, or a small rake vein crossing the main vein. *Arkell.* d. Eng. A thin vein of ore, or thin seam of clay in an ore vein. *Fay.*

sticking scrins. Eng. Small veins that do not afford shoulder room. *Fay.*

sticking up. The process of joining together, by means of slip, the various parts of items of pottery ware that cannot readily be made in one piece, for example, putting the knob on a tureen cover, or spouts on teapots. *See also* slip. *Dodd.*

stick loading. A technique used in trench blasting, etc., in which a lower concentration of charge is obtained by placing wooden pegs between every cartridge in the hole thus halving the concentration. *Langefors, p. 89.*

stickup. *See* standoff, a. *Long.*

sticky. A term applied when drilling rock or a formation so soft that the drill bit tends to penetrate too rapidly and the circulation fluid is unable to clear the cuttings away fast enough to prevent their adhering to and compacting on the surfaces of the bit and other downhole drilling equipment and/or the borehole sidewalls. *Compare* balling formation, gummy. *Long.*

sticky coal. a. Ark. Coal strongly adhering to a hard stratum of rock above or below it; also called frozen coal. *Fay.* b. A coal seam which does not separate cleanly from the roof and fragments of the roof adhere to the top coal as it is worked. A sticky coal results in a high proportion of shale in the run-of-mine coal. Also called ditched top. *Nelson.*

sticky limit. The lowest water content at which a soil will stick to a metal blade drawn across the surface of the soil mass. *ASCE P1826.*

stiff clay. Clay of low plasticity. *A.G.I. Supp.*

stiffener. a. S. Wales. A door for regulating the ventilation. *Fay.* b. A steel angle or bar riveted or welded across the web of a built-up girder to stiffen it. *C.T.D.*

stiff-fissured clay. a. A clay which is firm when dry at depth but is intersected by cracks through which water will seep easily. Clay deposits of this type are liable to slips on hillside slopes. *Nelson.* b. *See* slickensided clay. *Ham.*

stiff frame. *See* redundant frame. *Ham.*

stiff mud. A plastic mix of clay of very stiff consistency, as extruded from an auger machine. *Bureau of Mines Staff.*

stiff mud brick. a. Brick formed by repressing blanks cut from a column of clay extruded by an auger machine. *A.R.I.* b. Brick produced by extruding through a die a plastic clay with a water content of from 12 to 15 percent. *ACSG.*

stiff mud machine. A brick machine for making bricks out of very stiff clay. *Mersereau, 4th, p. 261.*

stiff-mud process. A plastic method of molding bricks by forcing the clay through a die. *Fay. See also* wire-cut process.

stiffness. The ability of a metal or shape to resist elastic deflection. For identical shapes, the stiffness is proportional to the modulus of elasticity. *ASM Gloss.*

stiff plastic process. A process of brickmaking by mechanical presses; the clay is prepared to a moisture content of about 12 percent and the shaped bricks can be set direct in the kiln without preliminary drying. This is particularly common in brickworks sited on the clays and shales of the Coal Measures. *Dodd.*

stifle. a. A suffocating atmosphere. *Webster 3d.* b. To blanket or envelop to the point of suffocation. *Webster 3d.* c. To cut off (as the voice or breath). *Webster 3d.* d. Scot. Noxious gas resulting from an underground fire. *Fay.* e. To suffer difficulty in breathing, or to be oppressed, as by reason of air charged with smoke or other impurities. *Webster 2d.*

Stigmaria. The below-surface portions of Sigillaria, Lepidodendron, and probably other Coal Measures trees. They usually occur in the underclays as casts and vary in size from less than 1 inch to 2 feet and more. The Stigmaria gave support and anchorage for the growth of the tall treeforms of the coal forest. *Nelson.*

stilbite; desmine. A zeolite; silicate of sodium, calcium, and aluminum with chemically combined water; $Ca(Al_2Si_7O_{18}).7H_2O$; crystallizing in the monoclinic system, the crystals frequently being grouped in sheaflike aggregates. Found in igneous rock cavities and metamorphic rocks. *Dana 17; Fay.*

still. a. An apparatus in which a substance is changed by heat into vapor, with or without chemical decomposition. The vapor is then liquefied in a condenser and collected in another part of the apparatus. Used generally for separating the more volatile parts of liquids and obtaining them in pure form. *Standard, 1964.* b. Slang for a steam-generating boiler. *Long.* c. *See* amalgam retort. *Nelson.*

stillage. A small platform on which shaped clayware may be placed to facilitate its handling within the factory, for example, to and from a dryer. *Compare* pallet, a. *Dodd.*

still coke. The residue left in the still on distilling crude shale oil to dryness. *Fay.*

stillen. Corn. *See* astyllen. *Fay.*

stilliards. Ware racks for pottery. *ACSG.*

stilling pond. Enlargement and deepening of a river at the foot of a dam spillway. *Ham.*

stillings. a. N. of Eng. The walling of a shaft within the tubbing above the first hard stratum underlying quicksand. *Fay.* b. A stand, as for holding vats or casks, or for unburned pottery while it is drying. *Standard, 1964.*

stilling well. A chamber connected to a main body of water by a small inlet; such an arrangement is suitable for a recording gage. *Ham.*

still leaching. Sands or coarser materials are leached by still or percolation methods, i.e., by merely allowing the solution to contact the solids by filling the voids in the mass of crushed material, and to remain in contact for some time. *Ency. of Chem. Tech., v. 8, p. 938.*

stillman helper. *See* benzol stillman helper. *D.O.T. Supp.*

Stillson wrench. The pipe wrench of common use, named for its inventor. *Crispin.*

still wax. *See* wax tailings. *Bennett 2d, 1962.*

stillwellite. Borosilicate of lanthanons, $(Ln,Ca)BSiO_5$, rhombohedral, in radioactive ore from Queensland, Australia. *Spencer 21, M.M., 1958.*

stilpnochorane. A yellow to bronze-red hydrous silicate of ferric iron, aluminum, calcium, and magnesium. Possibly $H_{34}(Al,Fe)_{10}(Ca,Mg)Si_9O_{46}$. A chloritic mineral. In scales. Structurally identical with nontronite. From Gobitschau, Moravia, Czechoslovakia. *English.*

stilpnomelane. a. A mineral, near $K(Fe'', Fe''', Al)_{10}Si_{12}O_{30}(O,OH)_{12}$, with Al nearly 2 and Fe''' more than Fe''; K may be nearly absent; Mg or Mn may be present in appreciable amounts. Also formulated, $(K,Ca)(Fe,Al)_{7-8}Si_8O_{23-24}(OH)_4.2\text{-}4H_2O$. *Hey 2d, 1955.* b. Synonym for ferrostilpnomelane. Dana uses stilpnomelane for the ferrous member of the series, and chalcodite for the ferric, but Hutton has shown that stilpnomelane from the original locality is a ferric mineral, chemically identical with typical chalcodite. The name stilpnomelane has a priority over chalcodite. The ferrous mineral does exist; for it, the varietal name ferrostilpnomelane is appropriate. *Hey 2d, 1955.*

stilpnosiderite. Limonite. *Standard, 1964.*

stilt. a. A device to allow roadway steel arches a measure of yield under roof pressure to prevent buckling. The stilt may take the form of wooden extensions strapped to the legs of the arch, wire bags filled with dirt, and mechanical frictional appliances and even hydraulic stilts. *See also* yielding support. *Nelson.* b. Any of the piles forming the back of the sheet piling for a bridge starling. *Webster 3d.* c. In ceramics, a piece of hard, fired clay, usually three-armed with points on each side used to keep articles apart in a pottery kiln. *Webster 3d.* d. A support of nonfusible material for ware placed in saggars. *C.T.D.* e. A tripodlike setter for glostware. *ACSG, 1963.* Also called spur.

stilt marks. Three marks left in the bottom of a glazed piece from the stilt. *ACSG, 1963.*

stimples. S. Wales. Small timbers. *See also* lacing; stempel. *Fay.*

stinger. a. A steel cylinder projecting beyond the face of a cutting bit that serves as a pilot or guide. *See also* pilot. *Long.* b. The pneumatically actuated piston attached to a pointed rod that acts as a feed mechanism on a stoper drill. *Long.*

stinger ream. To ream a borehole using a reaming bit equipped with a pilot or stinger. *Long.*

sting-out. Hot air and flame exhausted through openings in furnaces or tanks due to positive internal pressure. *ASTM C162-66.*

stink. *See* gob stink, b. *B.S. 3618, 1963, sec. 2.*

stink coal. a. A hydrocarbon mineral found in lignite. *See also* dysodile. *Fay.* b. Brown coal which on burning emits odor of petroleum. *Tomkeieff, 1954.*

stinkdamp. A mining term for hydrogen sulfide. The gas has an unpleasant smell, resembling that of rotten eggs, hence the name. The presence of this gas may indicate a gob fire in its early stages. *Nelson.* Produced by the distintegration of iron pyrites. Seldom found in anthracite mines in sufficient quantity to cause explosion or to be otherwise dangerous. *Hudson.*

stinker. a. Used among British miners for inferior coal which stinks when burned. *Tomkeieff, 1954.* b. N. Wales. A bed of dolomite. *Arkell.*

stinkquartz. A variety of quartz, which emits a fetid odor when struck. *Fay.*

stinkstone. a. Boulders of phosphate rock, from Tennessee. *Fay.* b. A stone that emits a fetid smell on being struck or rubbed owing to the decomposition of organic matter. *Webster 3d.* Also called swinestone. *See also* bituminous limestone. *Fay.*

stint. a. Mid. A measure of length by which colliers mine coal. *Fay.* b. Glouc. A certain number of trams filled per man per day. *Fay.* c. S. Staff. A collier's day or shift. *Fay.* d. Brist. To fix upon, or agree to, a certain number of trams being filled per stall per day. *Fay.* e. A fixed work target on the coalface which every collier is expected to do in one shift or in one week. In longwall conveyor work, it is the length, area, or volume of face which he regularly clears or loads out. Also called stent; cut; darg. *Nelson.*

stip. *See* hitch, a.

stipite. Variety of lean coal rich in pyrite found in the Lias formation in France. *Tomkeieff, 1954.*

stipple. A spatter of a different colored enamel over the surface of a porcelain enamel finish. *Bryant.*

stippled. a. A surface texture on a clay facing brick produced by the rapid impingement on the green brick of a head, carried on a reciprocating arm, fitted with steel spikes; this texture is also called sparrow-pecked. *Dodd.* b. A mottled decoration on pottery ware or on vitreous enamelware, produced by applying color with a sponge or brush. *Dodd.*

stippled finish. A pebbly textured porcelain enamel, often multicolored. *ASTM C286-65.*

stippling. The application of fine drops of enamel to a background of enamel of a different color. *Enam. Dict.*

stirian. An early name for nickel-bearing marcasite. *Fay.*

stirrup. a. An adjustable bale of a socket. *Zern.* b. A piece of steel like that part of a horse's harness of the same name but having a long bar in place of the strap by which it is suspended. This stirrup is hung at dumps from a gallows frame. When the car is tilted over, the endgate hooks are engaged each by a stirrup and the endgate is lifted, thus causing the material in the car to pitch forward onto the chute or over the bank. *Zern.* c. A long screw placed between the initial short rod and the bracehead, to enable the boring to proceed a greater depth before a change of rods becomes necessary. *Nelson.* d. Eng. A screw joint suspended from the brakestaff or spring pole, by which the boring rods are adjusted to the depth of the borehole. Also called temper screw. *Fay.* e. A binder holding together the main reinforcing bars in reinforced concrete. *Ham.*

stishovite. A mineral consisting essentially of SiO_2; occurs in aggregates of submicron size; from coesite-bearing Coconino sandstone from Meteor Crater, Ariz. *American Mineralogist, v. 47, No. 5-6, May-June 1962, p. 807.*

stitch. To fasten a timber by toenailing. *Fay.*

stitched canvas belt. A belt made of plies of cotton fabric, in which the plies are stitched in a machine and afterwards waterproofed. The duck is generally more closely woven than is usual with rubber belting; not very suitable to mining conditions especially in the presence of water. *See also* solid woven fabric belt. *Nelson.*

stitched canvas conveyor belt. A construction of conveyor belt made up of plies of cotton fabric stitched together. Stitched canvas belts may be untreated, inpregnated, or coated. *ASA MH4.1-1958.*

stitch welding. Spot welding in which successive welds overlap. *Ham.*

stithe. Eng. Choke damp; afterdamp; blackdamp. Also spelled stythe. *Fay.*

St. Louis limestone. A marine limestone containing abundant corals and echinoids, resting upon continental beds of Middle Mississippian age in the Mississippi Valley. *C.T.D.*

stob. Eng. A long steel wedge used in bringing down coal after it has been holed. *Fay.*

stob-and-feather. Eng. *See* fox wedge. *Fay.*

stochastic. Containing a random variable; word used to describe a system (for example, sampling method) which has in it an element of randomness. *Pryor, 3.*

stock. a. An ore body similar to a chimney but of greater irregularity of outline. *Nelson.* b. Eng. Coal, or ore, stored at the surface during slack trade, or in reserve for an extra demand at any time. *Fay.* c. The average tonnage sent out of a working place in one day. *Fay.* d. In quarrying, the useful rock as distinguished from the waste. *Fay.* e. An irregular, metalliferous mass in a rock formation; as a stock of lead ore in limestone. *Fay.* f. A body of igneous rock that is smaller than a batholith and intruded upward into older formations and that in ground plan is roughly circular or elliptical but in cross section may increase downward. *Webster 3d.* g. A core of small wet coal, with a hole through for the air blast, made between the tuyere and the front of a forge. *Webster 2d.* h. A holder for a threaded die. *Webster 3d.* i. The proprietorship element in a corporation divided into shares and represented by transferable certificates and giving to the owners a pro rata interest in the assets, the earnings, and except where withheld in the charter the voting power of the business. *Webster 3d.* j. The mixture of ore, coke, and limestone charged into the furnace, or stored in bins at the stock house. *Fay.* k. A sharply domed body of intrusive igneous rock that presumably has no floor. *Bateman.* l. A body of plutonic rock that covers less than 40 square miles, has steep contacts (generally dipping outward), and, although generally discordant, may be concordant. *A.G.I.* m. In forging, the portion of metal cut from the bar that has been alloted to a given number of forgings. *Henderson.*

stock brick; kiln-run brick. A class of bricks embracing all hard enough for the outside of buildings, divided into hard brick, common building brick, paving brick, hard building brick, outside brick, hard red brick, strictly hard brick, select hard brick, rough hard brick, hard washed brick, kiln-run hard brick, and common hard brick. *Standard, 1964.*

stock craneman. One who lifts and moves stock, such as limestone, scrap iron, or pig iron, for the open-hearth furnaces. *D.O.T. 1.*

stock dumper. *See* trestleman. *Fay.*

stocker. A laborer who performs various duties, such as unloading scrap material from cars, sorting and assembling the different grades of scrap in piles, and loading materials for open-hearth melting (limestone, scrap, and pig iron) into charging boxes. Also called billet handler; laborer, scrapyard; laborer; stock; laborer, stockhouse; and stock unloader. *D.O.T. 1.*

stockhouse larryman. One who drives an electric car to haul ore and limestone from the stockpiles to the blast furnace. *D.O.T. 1.*

stockhouse man. A general term for anyone working in stockhouse. *See also* stock, j. *Fay.*

stocking conveyor. A belt conveyor in a blending system which receives bulk materials for delivery to the stacker conveyor. *ASA MH4.1-1958.*

stocking end. a. Lanc. The inner end of a heading at a short distance from which there is a depression in the seam, which has become more or less filled with water, causing the ventilation to be cut off. *Fay.*

b. Leic. A geordie. *Fay.*

stockpile. a. The ore accumulated at the surface when shipping is suspended. *Standard, 1964.* b. An accumulation of ore or mineral built up when demand slackens or when the treatment plant or beneficiation equipment is incomplete or temporarily unequal to handling the mine output; any heap of material formed to create a reserve for loading or other purposes. *Nelson.* c. Material dug and piled for future use. *Nichols, 2.*

stock rail. A fixed outer rail against which the point is held at a turnout. *See also* points. *Ham.*

stock salt. Rock or evaporated salt, with or without added trace minerals, used for feeding stock. *Kaufmann.*

stock unloader. A laborer who unloads ore, coke, or stone from cars on trestle. *Fay.*

stockwork. An ore deposit of such a form that it is worked in floors or stories. It may be a solid mass of ore, or a rock mass so interpenetrated by small veins of ore that the whole must be mined together. Stockworks are distinguished from tabular or sheet deposit (veins, beds), which have a small thickness in comparison with their extension in the main plane of the deposit (that is, in strike and dip). Taken from German term stockwerk. *See also* stock, e and f. *Fay.*

stockyard. A space reserved on the surface near the materials shaft for the temporary storage of steel, timber, and other bulky items of supplies for mine use. The yard is surfaced and a mine car is used throughout. *Nelson.*

stoichiometric. A chemical compound, or a batch for synthesis, is said to be stoichiometric when the ratio of its constituents is exactly that demanded by the chemical formula. Of more interest in the field of special ceramics are non-stoichiometric compounds. *See also* non-stoichiometric. *Dodd.*

stoichiometric chemistry. Quantitative chemical relations during reaction. *Pryor, 3, p. 80.*

stoichiometry. That branch of chemistry that deals with the numerical relationships between elements or compounds (atomic weights); the determination of the proportions in which the elements combine (formulas); and the weight relations in reactions (equations). *Hackh's Chem. Dict.*

stoke. Unit of kinematic viscosity. The cgs unit of kinematic viscosity being that of a fluid which has a viscosity of one poise and a density of one gram per cc. *Webster 3d.*

stokehole. A hole, as in a reverberatory furnace, for introducing a rabble or other tool for stirring. *Standard, 1964.*

stoker. A mechanical appliance for feeding coal, coke, or other fuel into a boiler or furnace. In hand stoking, the man who shovels the fuel into the furnace is known as the stoker. *See also* underfeed stoker; vibrating grate. *Nelson.*

stoker coal. a. A screen size of coal specifically for use in automatic firing equipment. *B.C.I.* b. This coal can be of any rank and the stoker is usually designed to fit the coal available. Factors of importance in the selection of coal for stoker use are: size limits, size consist, uniformity of shipments, coking properties, ash-fusion characteristics, ash, sulfur and volatile-matter percentages. *Mitchell, p. 123.*

Stokes diameter. Equivalent free-falling. *Pryor, 3.*

stokesite. A colorless basic silicate of tin and calcium, $H_4CaSnSi_3O_{11}$. Orthorhombic. Acute pyramidal. A single specimen known. From Roscommon Cliff, St. Just, Cornwall, Eng. *English.*

Stokes' law. a. A formula expressing the rates of settling of spherical particles in a fluid. *A.G.I.* b. Gives the rate of fall of a small sphere in a viscous fluid. When a small sphere falls under the action of gravity through a viscous medium it ultimately acquires a constant velocity, V:

$$V = \frac{2ga^2(d_1-d_2)}{9\eta}$$

where g is gravitational acceleration, a is the radius of the sphere, d_1 and d_2 are the densities of the sphere and of the medium respectively, and η is the coefficient of viscosity. V will be in centimeters per second if g is in centimeters per second per second; a will be in centimeters; d_1 and d_2 will be in grams per cubic centimeter; and η will be in dyne-seconds per square centimeter, or poises. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-58.* c. The wavelength of light emitted by a fluorescent material is longer than that of the radiation used to excite the fluorescence. In modern language, the emitted photons carry off less energy than is brought in by the exciting photons; the details accord with the energy conservation principle. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-58. See also* elutriator; sedimentation test.

Stokes stretcher. The simplest type of stretcher used for underground first aid. This basket-type stretcher acts as a splint for the whole body, and is constructed of tubular steel and strong wire mesh. Used for lifting or lowering injured persons in difficult places. *McAdam, p. 104.* This type of stretcher is used in metal mines or in coal mines where the coalbed has a steep pitch. *Kentucky, p. 393.*

stoking. In powder metallurgy, presintering or sintering in such a way, that the compacts are advanced through the furnace at a fixed rate by manual or mechanical means; also called continuous sintering. *ASM Gloss.*

stolzite. A mineral, $PbWO_4$, consisting of a native lead tungstate isomorphous with wulfenite and probably with scheelite and powellite. *Webster 3d.* Tetragonal. *Dana 17.*

stomp. a. Mid. To set a prop or sprag with one end in a slight hole cut out of a floor or roof to receive it. *Fay.* b. A short wooden plug fixed in the roof, to which lines are hung, or to serve as a bench mark for surveys. *Fay.*

stone. a. Consolidated rock either in mass or in a fragment of pebble or larger size. *A.G.I. Supp.* b. A gem. *A.G.I. Supp.* c. A stony meteorite. *A.G.I. Supp.* d. Crushed or naturally angular particles of rock that will pass a 3-inch sieve and be retained on a No. 4 U.S. standard sieve. *ASCE P1826.* e. Stone is more properly applied (than rock) to individual blocks, masses, or fragments that have been taken from their original formations for commercial use. *BuMines Bull. 585, 1960, p. 794.* f. Aust. (The Englishman uses the term "millstuff" and the Colorado-Cornishman "mill dirt.") In southwest Missouri lead and zinc mines the term "dirt" is used, while in Michigan copper mines "rock" is the common expression. *Fay.* g. Commonly, although incorrectly, used as a synonym for diamond. *Long.*

stone amiante. Ancient term for fiber-bearing rock or ore. *Sinclair, W. E., p. 484.*

stone ax. A stonecutter's ax. *Standard, 1964.*

stone bind. A variety of sandstone. *Fay.*

stone-block paving. Paving consisting of stone setts accurately cut to a rectangular shape in order to obtain a minimum joint thickness. *Ham.*

stoneboat. a. A flat runnerless sledge or drag for transportating stone or other heavy material. *Webster 3d.* b. A runnerless plank sled on which to transport heavy stones, or a platform, used for the same purpose, swung under the axles of a wagon. *Standard, 1964.* c. A flat steel sled with an up-curbed front. *Nichols.* d. A species of wooden sled, used for hauling large stones a comparatively short distance. *Stauffer.* e. Can. Jumper. *Hoffman.*

stonebrash. Land abounding in stones, especially a subsoil of small stones or finely broken rock. *Webster 3d.*

stone breaker. A stone crusher. *Fay.*

stone brick. A hard brick or firebrick made in Wales. *Webster 3d.*

stone butter. a. A variety of halotrichite. *Standard, 1964.* Also called rock butter. *Fay.* b. A sort of alum. *Fay.* c. A kind of clay said to have been used instead of butter. *Fay.*

stone carver. In stonework industry, one who carves out figures or designs in full or bas relief on blocks or slabs of marble, sandstone, or granite, to be used for building or monumental purposes. May be designated according to type of work, as monument carver, or according to the kind of stone worked on, as granite carver or marble carver. Also called cutter, hand; decorator. *D.O.T. 1.*

stone china. *See* ironstone ware. *ACSG, 1963.*

stone chips. In road building, small angular fragments of stone containing no dust. *Hess.*

stone clunch. Eng. Hard, sandy underclay, Midlands. *Arkell.*

stone coal. a. Wales. Anthracite, in lumps; also certain other very hard varieties of coal. *Fay.* b. Mineral coal, as distinguished from charcoal; especially, in England, hard or anthracite coal. *Standard, 1964.* c. Sometimes applied to anthracite on account of its hardness. *Nelson.* d. Early term for anthracite. *Korson.*

stone concentration. Synonym for diamond concentration. *Long.*

stone content. Synonym for diamond content. *Long.*

stone copper. A somewhat misleading translation of granada de cobre which may be interpreted as gravel copper or granular copper, meaning small scrap such as turnings or filings. *Hess.*

stone count. Synonym for diamond count. *Long.*

stone crane operator. a. In the quarry industry, one who lifts blocks of stone and boxes of broken stone with a guy derrick in a quarry. Also called stone hoist operator. *D.O.T. 1.* b. In the stonework industry, one who lifts and moves blocks of stone with an electric bridge crane in a stone mill. *D.O.T. 1.*

stone crusher. a. A machine for breaking stones, as for road building. When used for breaking ore, called ore crusher. *Standard, 1964*. b. *See* crusher man. *D.O.T. 1.*

stone-crusher operator. *See* crusher operator. *D.O.T. 1.*

stonecutter. a. One whose occupation is cutting stone, as for building. *Standard, 1964*. b. A gem cutter. *Standard, 1964*. c. A machine for facing stone. *Standard, 1964*. d. *See* jadder. *Pryor, 3*.

stonecutter, hand. In stonework industry, one who cuts and shapes building and monumental stone by hand from rough blocks or slabs of granite, marble, and stone. May be designated according to type of work or kind of stone, as building stonecutter, granite worker, marble cutter, marble worker, or stonecutter, monument. Also called chisel worker; stoneworker. *D.O.T. 1.*

stonecutter, machine. In stonework industry, one who trims and surfaces rough blocks and slabs of building or monumental granite to specified size and finish with a pneumatic surfacing machine. Also called surfacer operator; surfacing machine operator. *D.O.T. 1.*

stone cutters consumption. *See* siliceous dust.

stone dike. A clean-cut washout in coal which penetrates to the base of the seam and takes out all the coal. *Arkell.*

stone drain. *See* rubble drain. *Ham.*

stone dresser. a. One who smoothes and shapes stone. *Standard, 1964*. b. A machine for trimming and shaping, dressing and finishing building stones, etc. *Standard, 1964*. c. In the stonework industry, one who points down (dresses or chips) the surfaces of rough granite blocks or slabs to approximate dimensions preparatory to the tone being worked on a planer, surfacing machine, or stone lathe. Also called scabbler. *D.O.T. 1.*

stone drift. a. A drift excavated in rock, as from the surface down to a coal seam. *See also* hard heading; rock drivage; slant, c. *Nelson*. b. Aust. A passage driven in rock instead of coal. *Fay. See also* drift.

stone driller. a. In the stonework industry, one who drills holes in large finished slabs and blocks of building stone for insertion of wires or rods in mounting and fastening them in place. *D.O.T. 1*. b. See driller, machine. *D.O.T. 1.*

stone dropout. *See* rollout. *Long.*

stone dust. a. In coal mines any inert dust spread on roadways as a defense against the danger of coal dust explosions. The stone dust used is of a type that does not cake in mine air. Ground limestone is satisfactory in most conditions. About 5 percent less limestone is required than shale, and gypsum has about two to three times the efficiency of shale. The gypsum appears to owe its high efficiency to its hydrate water. Inert dusts are effective because they absorb heat that the coal dust would otherwise receive from the flame. *See also* dust consolidation. *Nelson*. b. Really shale dust and loosely applied to any incombustile dust used to render coal dust incombustible. *Mason.*

stone-dust barrier. A device erected at strategic points in mine roadways for the purpose of arresting explosions. Consists essentially of trays or Vee trough loaded with stone dust, which are upset or overturned by the pressure wave in front of an explosion ahead of the flame, producing a dense curtain or cloud of inert dust to blanket the flame and stop further propagation of the explosion. *Sinclair, I, p. 257. See also* flame inhibitor.

stone duster. The man in charge of stone dusting in coal mines. *See also* dust suppression man. *Nelson.*

stone dusting. The systematic distribution of stone dust along mine roadways to cover the coal dust and reduce its flammability. Although stone dusting may not always stop an explosion, it is less violent with stone dusting than without. *Nelson*. Safety regulations in many countries require that stone dust be applied either mixed with the coal dust along mine roadways, or as stone dust barriers, to reduce the liability of coal-dust explosions. *Roberts, I, p. 108.*

stone exposure. Synonym for diamond exposure. *Long.*

stone eye. *See* stone intrusion.

stone feeder. *See* crusher man. *D.O.T. 1.*

stone fields. *See* felsenmeer. *A.G.I.*

stone finisher. *See* marble polisher, d; stone mechanic; stone rubber. *D.O.T. 1.*

stone flax. An early name for asbestos. *Fay.*

stone fork. A hand tool with tines designed for loading broken rock, on which material from about 2 to 4 inches will stand. *Nelson.*

stonegall. A clay concretion found in certain sandstones. *Standard, 1964.*

stone gobber. In bituminous coal mining, one who removes stone and other refuse from coal mine floors and dumps refuse into mine cars for disposal. *D.O.T. 1.*

stone-gotten. *See* gotten. *Stowell.*

stone grader. a. In the quarry industry, one who inspects and measures newly quarried stone, and classifies it as to quality according to a standard classification schedule. In some quarries, the stone grader may act only as a measurer. Also called measurer. *D.O.T. 1*. b. In the stonework industry, one who selects marble stock from yard according to order specifications, making choice through the knowledge of color and quality of standard grading samples used by plant. *D.O.T. 1.*

stone green. A mixture of ground green earth and a white clay used as an ingredient of waterproofing paints. *CCD 3d, 1942.*

stone grinder. *See* granite polisher.

stone hammer. A hammer for breaking or for dressing stone. *Standard, 1964.*

stonehead. a. Eng. A heading driven in stone or bind. A stone drift. *Fay*. b. The solid rock first met with in sinking a shaft. *C.T.D*. c. Scot. Rockhead *Arkell*. d. *See* bedrock. *Nelson*. e. N. of Eng. The first hard stratum underlying quicksand. *Fay.*

stone hoist operator. *See* stone crane operator. *D.O.T. 1.*

stone intrusion. Irregular masses of sandstone occurring within a coal seam or penetrating the seam from top to bottom, sometimes much distorted, but always connected with a similar sandstone in the roof or higher strata. Also called stone eye. *Raistrick and Marshall, pp. 92-93.*

stone land. Land chiefly valuable for stone, as sandstone, limestone, granite, etc. *Fay.*

stone lathe operator. In stonework industry, one who cuts or turns blocks of limestone, marble, granite, or sandstone to columns, pillars, balusters, and other cylindrical building or monumental work on a stonecutting lathe. Also called lathe man; lathe operator; turner. *D.O.T. 1.*

stone lathe polisher. In stonework, one who polishes the rough surface of granite or marble columns, pillars, balusters, and other cylindrical work to a smooth, lustrous finish on a polishing lathe *D.O.T. 1.*

stone maker. In concrete products industry, one who specializes in making concrete blocks designed to resemble stone. *D.O.T. 1.*

stoneman. a. A miner employed on stonework. *See also* repairer; ripper. *Nelson*. b. A man who drills shotholes in rock in readiness for firing by the shotfirer. *Ham*. c. N. of Eng. Face (gateway) stonemen make the mothergate and tailgate to the face, shovel the shot stone from the caunches into the goaf, build packs, and erect gateway supports. *Trist*. d. N. of Eng. One who is employed in driving a stonehead, or who rips, timbers, and repairs roads. *See also* brusher. Fay. e. Aust. A man who works in rock, in contradistinction to one who works in coal. *Fay.*

stonemason. One who builds foundations, walls, etc., of stone. *Crispin.*

stone mechanic. In stonework industry, a general term applied to one who is skilled in layout work and the use of hand tools and machines for cutting, polishing, and sandblasting building and monumental stone. Also called stone finisher. *D.O.T. 1.*

stone mill. a. A stone crusher. *Standard, 1964*. b. A machine for dressing and finishing marble, slate, etc.; a stone dresser. *Standard, 1964.*

stone mine. a. Scot. An ironstone mine or working. *Fay*. b. Scot. A mine driven in barren strata. *Fay.*

stone molder. In concrete products and stonework industry, one who sets up, maintains, and operates a machine with specially shaped abrasive wheels for cutting moldings, grooves, shaped fluted columns, panels, and other decorative designs in building or monumental limestone, granite, sandstone, marble, artificial marble or stone, and other concrete products. Also called carboman; molder; molding machine operator. *D.O.T. 1.*

stone ocher. Ocher found in hard globular masses. *Webster 3d.*

stone of ore. A piece of ore. *Fay.*

stone oil. Petroleum. *Webster 3d.*

stone peat. Compact dark variety of peat forming the lower layer of a peat bog. *Tomkeieff, 1954.*

stone pit. A quarry where stones are dug. *Webster 2d.*

stone pitch. Pitch that is hard, like stone. *Webster 2d.*

stone polisher. In the stonework industry, one who polishes to a high luster by hand methods those curbed, irregular, and straight surfaces of blocks and slabs of marble and granite that cannot be polished by machine. May be designated according to kind of a stone, as granite polisher; marble polisher. Also called stone finisher. *D.O.T. 1.*

stone polygon. A polygon of stones formed in some stony-soil regions by frost action. Also called stone ring; stone net. *Challinor.*

stone pressure. Synonym for diamond pressure. *Long.*

stone quarry. A place where stone is quarried. *Standard, 1964.*

stoner. A workman in a glassworks whose job is to smooth the rims of the ware; also called a flatter. *Dodd.*

stone repairer. In stonework industry, one who mends broken marble slabs to restore them to a usable condition. Also called sticker. *D.O.T. 1.*

stone rubber. In stonework industry, who rubs down the surface of finished blocks and slabs of building limestone or sandstone with abrasive to remove defects and marks left by machine and hand tools. Also called rubber; stone finisher. *D.O.T. 1.*

stones. a. Detached particles of rock usually smaller than 10 inches (256 millimeters) in diameter. Stones are classed as gravel on bottom sediment charts. *H&G.* b. In mica, small embedded crystals or holes resulting from them. Also called stone holes. *Skow.* c. A crystalline inclusion present as a fault in glass; stones may result from incomplete reaction of particles of batch or from the pickup of small fragments of the refractory lining of the pot or furnace in which the glass is melted. The most common constituents of stones are carnegieite, corundum, cristobalite, mullite, nephelite, triydmite, and zirconia. *See also* china stone, c. *Dodd.*

stone saw. A stone-cutting apparatus having no teeth, being a simple iron band fed with sand and water, cutting by attrition. *Standard, 1964.*

stone sawyer. *See* circular sawyer, stone; gang sawyer. *D.O.T. 1.*

stone sill. Comb. Sandy fireclay. *Compare* sill, h. *Arkell.*

stone sledger. *See* sledger. *D.O.T. 1.*

stone spavin. York. Usually a stone bind or sandstone with rootlets. *Arkell.*

stone per carat. a. Synonym for diamonds per carat. *Long.* b. The number of near-equal-size diamonds the weight of which is 1 carat, hence a relative measure of the size of diamonds. *Long.*

stone squarer. A workman who squares or shapes stones, as for building. *Standard, 1964.*

stone trimmer. a. In stonework industry, one who trims rough roofing slate to largest size which slabs will make on a trimming machine fitted with rotary cutting knives or a single blade on a spring pole. Also called slate trimmer. *D.O.T. 1.* b. *See* coper, machine. *D.O.T. 1.*

stone tubbing. Watertight stone walling of a shaft cemented at the back. *Fay.*

stone turf. Same as black turf. *Tomkeieff, 1954.*

stone wall. Applied by Newberry to the feature now called hogback. *A.G.I.*

stoneware. a. Ceramic ware fired to a hard, dense condition and with an absorption of less than 5 percent; not translucent; it may be underglazed, salt glazed, or glazed with hard feldspathic glazes. *ACSG.* b. A vitreous or semivitreous ceramic ware of fine texture, made primarily from nonrefractory fire clay. *ACSG.*

stoneware clay. a. A clay suitable for the manufacture of stoneware; it possesses good plasticity, vitrifies between cones 4 and 10, and has a long firing range. The fired color is buff to gray. *ACSB-1.* b. Clay which ranges from inferior material through semirefractory to firebrick clay. It should have a tensile strength of 125 pounds or more pounds per square inch; low fire shrinkage; enough plasticity and toughness for shaping; no lime or Fe-bearing concretions; and very little coarse sand. *CCD 3d, 1942, pp. 195-196.*

stone weight. Synonym for diamond content. *Long.*

stone wire. Wire smaller than No. 14 put up in 12 pound coils, which are about 8 inches inside diameter. *Zern.*

stonework. a. All underground work involving the excavation, loading, or handling of rock or dirt, such as ripping, dinting, tunneling, packing, etc. In thin coal seams, stonework is a major cost item. *See also* deadwork. *Nelson.* b. The process of working in stone; the shaping, preparation, or setting of stone. *Webster 3d.* c. Scot. Driving of drifts or galleries in stone or rock. *See also* stonehead, a. *Fay.*

stoneworker. *See* stonecutter, hand. *D.O.T. 1.*

stoneworks. a. An establishment for cutting stone, as marble. *Standard, 1964.* b. A pottery for making stoneware. *Standard, 1964.*

stoneyard. A yard in which stones are cut, shaped, broken or the like. *Webster 2d.*

stone yellow. Yellow ocher. *Webster 3d.*

stoning. a. Broken stone laid along a riverbed to prevent scour. *Ham.* b. The removal, by means of a rubbing stone, of excrescences from enamelware during the stages of manufacture. The need for stoning may arise as a result of splashes of enamel slip from the spray gun, or of nonuniform draining of the slip. *See also* rubbing stone, b. *Dodd.*

stony. Containing or composed of stones, used especially in describing agricultural land. Synonym for lithoidal. *Stokes and Varnes, 1955.*

stony clunch. Eng. Compressed clays with sandstone layers interspersed, Midlands. *Arkell.*

stony coal. Northumb. Miners' term for coal with stone ribs, coal of good hard quality. *Tomkeieff, 1954.*

stony meteorite. A meteorite consisting mainly of rock-forming silicate minerals, such as pyroxene, olivine, and feldspar. *Compare* achondrite; chondrite. *A.G.I. Supp.*

Stoodite. Trade name for cast tungsten carbide. *Hess.*

stook. a. The last stump or corner block of coal left when extracting pillars by means of lifts, in pillar methods of working. *Nelson.* b. Eng. A small pillar of coal left to support the roof (bord-and-pillar). *SMRB, Paper No. 61.*

stook-and-feather. Eng. A wedge for breaking down coal, worked by hydraulic power, the pressure being applied at the extreme inner end of the drilled hole. *Fay.*

stool. a. The point where a miner stops his digging downward to work outward. *Hess.* b. The assembly carrying the return rollers and brackets for connecting standard sections together in belt conveyors. *Nelson.*

stooled. Eng. Applied to a vein cut vertically for some distance. *Fay.*

stool end. A supporting pillar of rock in a mine. *Webster 3d.*

stool pigeon. A recording device attached to a drill machine, showing on paper the time required to complete certain drilling operations and also how the drill machine was operated during a unit of time. *Long.*

stool pipe; stool piece. Scot. The pipe on which a column of pipes rests. *Fay.*

stool stalagmite. A calcite formation shaped like a plate and grown around a stalagmite at the point where it had touched the surface of a pool of saturated water. *Schieferdecker.*

stoop. a. Eng. A hogback of limestone or iron ore, Whitehaven district. *Arkell.* b. Eng. A post or pillar; specifically, a large pillar (as of coal) left to support the roof of a mine. *Webster 3d.* c. Scot. A chief supporter; prop; mainstay. *Webster 3d.*

stoop-and-room. a. Scot. A method of working moderately thick seams, and similar in principle to the pillar-and-stall. The rooms were the narrow roadways or stalls in the coal and the stoops were the pillars of coal. *Nelson.* b. Scot. A system of working by which mineral is extracted from its bed in a series of galleries or rooms leaving pillars or stoops to support the roof. Also called pillar-and-stall; post-and-stall. *Fay.* c. *See* bord-and-pillar. *Pryor, 3.*

stoop-and-thirl. Scot. An old name for stoop-and-room. *Fay.*

stooped. Scot. Said of a mine when the pillars or stoops have been extracted. *Fay.*

stooped waste. Scot. Stoop-and-room workings where the pillars have been worked out. *Fay.*

stooper. A miner in pillar methods of working employed in pillar robbing; a practice now obsolete. *Nelson.*

stooping. Scot. The process of extracting stoops or pillars. *Fay.*

stoop road. Scot. A road driven in the solid coal in connection with the stoop-and-room system of mining. *Fay.*

stoopway. A passageway, the height of which requires a man to stoop or crouch in traversing it. *A.G.I.*

stop. a. Any cleat or beam to check the descent of a cage, car, pump, pump rods, etc. *Fay.* b. In mining, a variation of stope. *Fay.*

stopblocks; nubber. A simple arrangement of two stout timbers, sliding on pivots, one of which can be placed across the track rail and held in position by the other block. They are often used on haulage landings to prevent trams running down the incline uncontrolled. *Nelson.*

stope. a. An excavation from which ore has been excavated in a series of steps. A variation of step. *Standard, 1964.* Usually applied to highly inclined or vertical veins. Frequently used incorrectly as a synonym for room, which is a wide working place in a flat mine. *Fay.* b. To excavate ore in a vein by driving horizontally upon it a series of workings, one immediately over the other, or vice versa. Each horizontal working is called a stope because when a number of them are in progress, each working face under attack assumes the shape of a flight of stairs. When the first stope is begun at a lower corner of the body of ore to be removed, and, after it has advanced a convenient distance, the next is commenced above it. This is called overhand stoping. When the first stope begins at an upper corner, and the succeeding ones are below it, it is called underhand stoping. The term stoping is loosely applied to any subterranean extraction of ore except that which is incidentally performed in sinking shafts, driving levels, etc., for the purpose of opening the mine. *Fay.* c. Commonly applied to the extraction of ore, but does not include the ore removed in sinking shafts and in driving levels, drifts and other development openings. *Lewis, p. 21.* d. The working above and below a level where the mass of the ore body is broken. A stope is the very antithesis of a shaft, tunnel, drift, winze, or other similar excavation in a mine. *Ricketts, I.* e. Any excavation in a mine, other than development workings, made for the purpose of extracting ore. The outlines of the ore body determine the outlines of the stope. The term is also applied to breaking ground by drilling and blasting or other methods. *See also* caving. *Nelson.* f. The opening created when ore is mined. As a rule stoping is started on each side of a raise-winze connection. *Highman, p. 35.* g. A body of mineral left by running drifts about it. *Standard, 1964.* h. S. Afr. Workings in a mine, or the activity by which ore is broken from blocks in ore reserves and other areas. *Beerman.* i. A cavern, chamber, or room from which ore has been extracted. *BuMines Bull. 587, 1960, p. 2.*

stope assay plans. Plan showing assay value of exposures of ore in a stope, together with any other data desired. *Pryor, 4.*

stope board. A timber staging on the floor of a stope for setting a rock drill. The stage is tilted to enable the bottom holes being drilled in the same inclined direction. *Nelson.*

stope development. The driving of subsidiary openings designed to prepare blocks of ore for actual extraction by stoping. *BuMines Bull. 419, 1939, p. 3.*

stope driller. In metal mining, one who operates compressed air, percussion-type rock drill in a stope (an underground opening from which ore is extracted in a series of steps). Also called stoper. *D.O.T. 1.*

stope fillings. Broken mullock or rock or the broken low-grade portion of a lode or vein used to fill stopes on abandonment. *Nelson.*

Stopehamer. A trademark name applied to air-feed hammer drills. *Hess.*

stope hoist. A small portable compressed-air hoist for operating a scraper-loader or for pulling heavy timbers into position, often used in narrow stopes. *Nelson.*

stope miner. *See* miner, i. *D.O.T. Supp.*

stop end. The shuttering erected at the end of a length of concrete construction shaped to provide a suitable joint for the next length. *Ham.*

stope pillar. A column of ore left to support the stope. *Pryor, 3.*

stoper. a. A stoping drill. *Fay.* b. A light percussive drill incorporating a pneumatic cylinder to provide support and thrust while drilling steeply upward. *B.S. 3618, 1964, sec. 6.* c. A hammer drill usually used for drilling upwards. *See also* autostoper. *Nelson.* d. A hand-size air drill mounted on a column or other support. *Nichols.* e. *See* stope driller. *D.O.T. 1.*

stoperman. *See* roof bolter. *D.O.T. Supp.*

stope sampling. The sampling of exposures in the stopes, or of material coming from the stopes. This type of sampling permits a closer control of the grade of ore being won and is conducted largely at the working place or stope. *Truscott, pp. 9, 27.*

stope scraper. In metal mining, one who shovels or rakes ore into mine cars in a stope (an underground opening in a vein from which ore is extracted in a series of steps). Also called scraper, hand. *D.O.T. 1.*

stope washings. In gold mines, auriferous slimes washed down from the floor (footwall) of the stope and sent to the mill. *Pryor, 3.*

stop-gate valve. Synonym for gate valve. *Long.*

stoping. a. The act of excavating ore, either above or below a level, in a series of steps. In its broadest sense stoping means the act of excavating ore by means of a series of horizontal, vertical, or inclined workings in veins or large, irregular bodies of ore, or by rooms in flat deposits. It covers the breaking and removal of the ore from underground openings, except those driven for exploration and development. The removal of ore from drifts, crosscuts, shafts, winzes, and raises, which are excavated to explore and develop an ore deposit, is incidental to the main purpose for which stopes are driven and is not a stoping operation. Exploratory and development openings are driven to prepare a mine for extraction of the ore by stoping. *BuMines Bull. 390, 1936, p. 3.* b. In civil engineering, an enlargement. *Fraenkel.* c. The loosening and removal of ore in a mine either by working upward (overhead or overhand) or downward (underhand). *A.G.I. Supp.* d. A method of intrusion of light acidic magma into heavier basic rocks at Ascutney Mountain, Vt. Blocks of the older rock are wedged loose overhead, settle in the magma, and are assimilated at depth. Thus, the magma works its way upward. *A.G.I.* e. A process whereby plutonic rocks are emplaced. Magma engulfs blocks of the overlying country rock, these blocks sink into the magma, and are presumably assimilated at depth. The magma in this way can eat its way upward. *A.G.I.* f. *See* stope, b. *Fay.*

stoping-and-filling. *See* overhand stoping, b. *Fay.*

stoping drill. A small air or electric drill, usually mounted on an extensible column, for working stopes, raises, and narrow workings. *Fay.*

stoping ground. Part of an ore body opened by drifts and raises, and ready for breaking down. *Fay.*

stoping in horizontal layers. *See* overhand stoping, b. *Fay.*

stoping methods. The classification of stoping methods adopted by the U.S. Bureau of Mines, devised largely on the basis of rock stability, is as follows: (1) stopes naturally supported—this includes open stoping with open stopes in small ore bodies, and sublevel stoping; and open stopes with pillar supports which includes casual pillars and room (or stope) and pillar (regular arrangement); (2) stopes artifically supported—this includes shrinkage stoping, with pillars, without pillars, and with subsequent waste filling; cut-and-fill stoping; stulled stopes in narrow veins; and square-set stoping; (3) caved stopes—this includes caving (ore broken by induced caving), block caving, including caving to main levels and caving to chutes or branched raises; sublevel caving; and top slicing (mining under a mat which, together with caved capping, follows the mining downward in successive stages); and (4) combinations of supported and caved stopes (as shrinkage stoping with pillar caving, cut-and-fill stoping with top slicing of pillars, etc.) *BuMines Bull. 390, 1936, p. 4.*

stoping underhand. Mining a stope downward in such a series that presents the appearance of a flight of steps. *Fay.*

stoping width. a. Width of lode broken during mining, including any barren rock. *Pryor, 3.* b. Used in underground sampling and is estimated from direct measurement behind the stope face and reduced to allow for any waste stowed. With wide tabular deposits, there is little difference between the stoping width and the clean width. *Nelson.*

stop log. A log, plank, cut timber, or steel or concrete slab or beam fitting into end guides between walls or piers to close an opening to the passage of water. *Seelye, 1.*

stopoff. a. To close off a part of a mine by means of a brattice, wall, stopping, etc. *Fay.* d. In founding, to fill part of a mold with sand or earth to prevent access of molten metal to that part. *Fay.*

stoppages. Eng. Deductions from miners' wages, such as rent, candles, blacksmith's work, field club, etc. *Fay.*

stopper. a. The round-ended refractory (fireclay or graphite) shape that terminates the stopper-rod assembly in a steel-casting ladle and controls the rate of flow of metal through the nozzle. *Dodd.* b. A movable refractory shape for the control of the flow of glass in the channel leading from a glass tank furnace to a revolving pot of a suction machine. *Dodd.* c. A refractory closure for the mouth of a covered glass pot or for the working hole outside an open pot. *Dodd.*

stopper grinder. One who grinds bottle necks and stoppers on a grinding lathe to produce a perfect fit between the two. *D.O.T. 1.*

stopper head. A refractory shape, usually made of clay and graphite, which is a movable valve head seating in the nozzle brick, the assembly forming a valve for the metal in bottom-pouring ladles. *A.R.I.*

stopper hole. In a puddling furnace, the hole through which the rabble is introduced. *Webster 2d.*

stopper maker. One who forms and finishes fire clay stoppers for open hearth ladles, using a stopper press and a finishing machine. *D.O.T. 1.*

stopping. a. A brattice, or more commonly, a masonry or brick wall built across old headings, chutes, airways, etc., to confine the ventilating current to certain passages, and also to lock up the gas in old workings, and in some cases to smother a mine fire. *Fay.* b. A permanent wall built to close off the unused or no longer needed crosscuts to prevent the air from short circuiting. *Lewis, p. 544.* c. A dam or seal to isolate old workings containing water or injurious gases. *See also* inrush of water. *Nelson.* d. The filling up of any cracks in biscuit pottery ware prior to the glost firing. *Dodd.*

stopping builder. In bituminous coal mining, one who builds walls of concrete, stone, or brick and mortar, to close off old passageways or haulageways underground, to maintain ventilation in new workings. *D.O.T. 1.*

stopping distance. *See* braking distance.

stopping off. a. Depositing a metal like copper in localized areas to prevent carburization, decarburization, or nitriding in those areas during heat treatment. *ASM Gloss.* b. Filling in a portion of a mold cavity to keep out molten metal. *ASM Gloss.*

stop valve. a. A valve used for controlling the flow of a liquid or gas by turning it on or completely shutting it off. *Ham.* b. In a steam boiler, a valve which serves to isolate the boiler from the common steam range when it is laid off for cleaning or repair. *Mason, v. 2, p. 359.*

storage; memory device. The element of a computer in which information is retained for reference. *N.C.B.*

storage battery. a. A combination of secondary cells or accumulators which when once charged may be used for a considerable time after as a source of electric current. There are a number of types and makes. Large ones find use in operating mine-haulage motors, while a portable type is used in the electric safety lamp. *Fay.* b. *See* secondary cell, a. *Morris and Cooper, p. 233.* c. *See* accumulator. *Nelson.*

storage battery locomotive. a. An underground locomotive powered by storage batteries which is cheaper than one driven by compressed air, or by electric power supplied from an overhead wire. *Ham.* b. *See* battery locomotive. *Nelson.*

storage-battery-type electric mine locomotive. *See* electric mine locomotive.

storage tanks. Large circular steel tanks for storing oil, located near the well or near the refineries. *Mersereau, 4th, p. 199.*

Stora-Kaldo process. *See* Kaldo steel process.

store. A mine surface building where spare tools, equipment, machine, and plant replacements, protective clothing, fuel, etc., are stored and issued for use when required. *Nelson.*

stored-energy welding. Welding with electrical energy accumulated electrostatically, electromagnetically, or electrochemically at a relatively low rate and made available at the higher rate required in welding. *ASM Gloss.*

storekeeper. A man appointed at a mine to supervise the issue of stores and to insure that materials are readily available when required. Guided by the manager, he aims to avoid the accumulation of excessive quantities of slow moving articles. *Nelson.*

storm beach. A pebble beach built up by storm waves at exceptionally high tides, immediately above the level reached by normal spring tides. *Challinor.*

storm delta; washover. A deltalike deposit formed by the breaching of a barrier or barrier-spit during a storm. *Schieferdecker.*

stormer viscometer. A rotating cylinder viscometer of a type that has found considerable use for the determination of the viscosity and thixotropy of clay slips. *Dodd.*

storm pavement. A gently inclined paved bank to a breakwater. *Ham.*

storm-roller. *See* pillow-structure. *Pettijohn.*

storm sewer. A sewer which is normally empty but which is designed to carry the overflow of storm water. *Ham.*

storm surge. A rise or piling up of water against shore, produced by wind stress and atmospheric pressure differences in a storm. *Schieferdecker.*

storm-surge lamination. A lamination in marsh deposits caused by storm surges. *Schieferdecker.*

storm water. The water which runs off a catchment area after a heavy rainfall. *Ham.*

storm-water tanks. Tanks which receive excessive storm water and allow grit or other solid material to settle before the water is discharged into a stream or river. *Ham.*

storm wave. A rise of the sea over low coasts not ordinarily subject to overflow; it is caused primarily by wind, and has no relation to the tide brought about by gravitational forces except that the two may combine. More than three-fourths of all the loss of human lives in tropical cyclones has been caused by these inundations and not by the winds directly. *A.G.I.*

Storrow whirling hygrometer. A hygrometer in which the two thermometers are mounted side by side on a brass frame and fitted with a loose handle so that it can be whirled in the atmosphere to be tested. The instrument is whirled at some 200 revolutions per minute for about one minute and the readings on the wet- and dry-bulb thermometers recorded; used in conjunction with Glaisher's or Marvin's hygrometrical tables. It gives more consistent and accurate results than the ordinary instrument. *Nelson.*

stoss side. That side facing the direction from which a glacier moves, as a rock or hill in its track; as, the stoss side of a crag; opposite of lee side. *Standard, 1964.*

stottite. Ferrous germanate, $Fe''Ge(OH)_6$, tetragonal, occurring with tennantite and renierite at Tsumeb, Southwest Africa. *Hey, M.M., 1961.* Brown; greasy luster; contains by far the highest germanium content of any known mineral. *American Mineralogist, v. 43, No. 9-10, September-October 1958, p. 1006.*

stove. a. A large steel furnace or oven connected with the blast furnace to preheat the blast before it is introduced into the furnace proper. *Mersereau, 4th, p. 400.* b. A kiln, as for firing pottery or drying minerals. *Webster, 2d.* c. *See* hot-blast stove. *Dodd.*

stove coal. a. In anthracite only; two sizes of stove coal are made, large and small. Large stove, known as No. 3, passes through a 2¼ to 2 inch mesh and over a 1-7/8 to 1½ inch mesh; small stove, known as No. 4, passes through a 1-7/8 to 1⅜ inch mesh and over a 1⅛ to 1 inch mesh. Only one size of stove coal is now usually made. It passes through a 2 inch square mesh and over 1-⅜ inch square mesh. *Zern.* b. *See* anthracite coal sizes.

stoved salt. Stoved open-pan salt. *Kaufmann.*

stove fillings. The special fireclay refractory shapes used as checker bricks in a hot-blast stove. Normally, these stoves operate at a maximum temperature (at the top of the stove) of about 1,200° C; the top 15 feet or so of fillings are therefore built with 40-42 percent Al_2O_3 refractories, with 35-37 percent Al_2O_3 refractories below. Recently, interest has been shown in the possibility of still higher hot-blast temperatures and trials have been made with 50-65 percent Al_2O_3 stove fillings for the upper courses. *See also* hot-blast stove. *Dodd.*

stove glass. Mica for use in stoves. *Standard, 1964.*

stove nuts. A cleaned and screened anthracite product 2 by 1⅝ inches. *Nelson.*

stovepipe. Riveted-seam or spiral-welded-seam, thin-wall pipe used as a conductor, standpipe, or casing in a borehole. *Long.*

stovepipe casing. *See* stovepipe. *Long.*

stovesse. A cleaned and screened anthracite product 1⅝ inches by 7/8 inch. *See also* beans, b. *Nelson.*

stove up; stoved. Upset. When a rod of iron heated at one end is hammered endwise the diameter of that end is enlarged, and it is said to be upset or stove up. *Zern.*

stoving finish; heat-hardening finish. Finish produced by hardening a paint or varnish coating by means of heat, for example, with infra-red lamps. Also called baking finish. *Bennett 2d, 1962.*

stow. a. To pack away rubbish into goaves or old workings. *Fay.* b. To gob; to fill the waste; to put debris into the waste. *Mason.* c. Eng. To fill a place with stone or debris. *SMRB, Paper No. 61.*

stowage. Scot. In longwall mining the space from which the mineral has been extracted and which has been filled with waste. *Fay.*

stowbord. Newc. A place into which rubbish is put. Also spelled stowboard. *Fay.*

stowce. a. A windlass. *Fay.* b. Derb. A wooden landmark, placed to indicate possession of mining ground. Also spelled stowse. *Fay.*

stower. Aust. One who stows away waste in old workings. *Fay.*

stowing. a. A method of mining in which all the material of the vein is removed and the waste is packed into the space left by the working. *Fay.* b. The debris of a vein thrown back of a miner and which supports the roof or hanging wall of the excavation. *Zern.* c. *See* solid packing. *Nelson.*

stowing forms; stowing molds. The temporary boards or sheets to hold the material stowed by pneumatic or hydraulic machines in the waste area. The forms sometimes used are corrugated iron sheets, which are moved forward as the stowing of each track is completed. *Nelson.*

stowing methods. Methods of working coal or ore deposits in which systematic stowing of the worked out areas is part of the system. *See also* coal mining methods; filled stopes; solid stowing; strip packing. *Nelson.*

stowing molds. *See* stowing forms. *Nelson.*

stow road. Scot. An abandoned road in which waste is stowed. *Fay.*

stows. Seven pieces of wood set on the surface of mining property which were fastened together with pins of wood; two stows are called soul trees; two, stowblades; two, hank benches; and one, a spindle. Gave the miner the right to a meer, or meers, of ground. Every meer had a pair of stows. *Hess.*

stowse. N. of Eng. A windlass. Also spelled stowce. *Fay.*

stp Abbreviation for standard temperature and pressure. Also abbreviated STP. *Bu Min Style Guide, p. 62.*

st. P. Abbreviation for strain point. *See also* strain point. *Dodd.*

straddle. A vertical mine timber, especially one supporting a set in a shaft. *Fay.*

straddle milling. Face milling a workpiece on both sides at once by using two cutters spaced as required. *ASM Gloss.*

straddle pipe. In gas manufacture, a bridge pipe connecting the retort with hydraulic main. *Fay.*

straddle shot. Shot with the shotpoint in the center of the seismometer spread. *Schieferdecker.*

strahlite. Synonym for actionalite. *Standard, 1964.*

straight. Common term for straight brick, as a 9 inch straight. *Bureau of Mines Staff.*

straight arch. *See* jack arch. *A.I.S.I. No. 24.*

straightaway. In stripping, a pit that follows a straight line when projected on a horizontal plane. *Woodruff, v. 3, p. 414.*

straight bit. Eng. A flat or ordinary chisel for boring. *Fay.*

straight brick. A rectangular shape, 13½ inches or less in length, in which the thickness is less than the width, the latter being substantially less than the length. *A.R.I.*

straight chopping bit. Synonym for chopping bit. *Long.*

straight coal. S. Staff. An excavation made in thick coal, having the solid coal left on three sides of it. Also called straight stall. *Fay.*

straight-cut gang frame. In quarrying, a saw gang which slides back and forth on a bed, as contrasted with the ordinary saw gang which swings back and forth when suspended from above. *Fay.*

straight dynamites. Dynamites composed of nitroglycerin, a combustible such as wood meal, sodium nitrate, and an antacid, such as calcium or magnesium carbonate, and are made in 15 percent to 60 percent strength, the percentage representing the proportion of nitroglycerin in the dynamites. They are powerful, quick acting, and fairly water resistant, but on detonation produce poisonous gases, especially in the higher grades. *Lewis, p. 108.* Their relatively high cost, sensitivity to shock and friction, and high flammability, together with the dangerous fumes developed, make them less suitable for general use than more recently developed modifications. *Carson, p. 308.*

straightedge leveling. A system of leveling using a straightedge and a spirit level. *B.S. 3618, 1963, sec. 1.*

straight-ends-and-walls. N. Wales. A system of working coal somewhat similar to bord-and-pillar. *Fay.*

straightening press. A power press to straighten iron and steel bars, such as rails, shafting, etc. *Fay.*

straight girder support. An H-section girder used as a roadway or face beam support. The girder for spanning roadways is commonly 6 inches deep and 5 inches in width of flange. It is supported by wood or steel props or by brick or concrete sidewalls, the roof being made secure by timber or sheet lagging. Channel section girders are also used in special cases. *See also* steel support. *Nelson.*

straight-hole tool. Annular diamond bit inside of which is mounted a roller bit, used to straighten a crooked borehole in petroleum drilling. *Long.*

straight line. One that does not change its direction throughout its entire length. It is the shortest distance between two points. *Jones, 2, p. 80.*

straight-line compressor. A compressor with either a simple air cylinder or a tandem compound air cylinder in line with a simple steam cylinder. *Lewis, p. 671.*

straight nitroglycerin dynamites. These grades, which contain nitroglycerin as the only explosive ingredient, are highly flammable and quite sensitive to shock and friction. They should be used only above ground, for such work as mudcapping in secondary blasting. *Pit and Quarry, 53rd, Sec. A, p. 79.*

straight point. Aust. That straight portion of the inner main rail between the rails of a turnout. *Fay.*

straight polarity. Arc welding circuit arrangement in which the electrode is connected to the negative terminal. *ASM Gloss.*

straight-run bitumen. A residual bitumen obtained as a result of distilling a selected petroleum. *Ham.*

straight-run pitch. A pitch run to the consistency desired in the initial process of distillation and without subsequent fluxing. *Urquhart, Sec. 2, p. 81.*

straight shoreline. *See* graded shoreline. *Schieferdecker.*

straight-side core bit; straight-sided core bit. Synonym for straight-wall bit. *Long.*

straight stall. A lateral excavation into a thick seam of coal. *Standard, 1964.* Also called straight coal. *Fay.*

straight throat. A throat the same level as bottom of melter. *ASTM C162-66. See also* throat.

straight-type wedge. A plain deflecting wedge, not equipped with a rose or stabilizing ring. *Long.*

straight-wall bit. An annular-shaped (core) bit the inner walls of which are parallel with the outer walls and not tapered to receive a core lifter. *Long.*

straight-wall core shell. a. A reaming shell the outside walls of which are straight and not set with diamonds or hard-metal reaming points. *Long.* b. Sometimes used as a synonym for blank reaming shell. *Long.*

straightway valve. Synonym for gate valve. *Long.*

straight wheel. A grinding wheel that has straight sides or a straight face and which is not recessed, grooved, dovetailed, beveled, or otherwise changed from a cylindrical shape. *ASM Gloss.*

straight work. a. Eng. Roads driven in the solid to open out a district or seam. *SMRB, Paper No. 61.* b. Narrow headings in coal. *C.T.D.* c. A method of working coal by driving parallel headings and then removing the coal between them. *C.T.D.*

strain. a. Deformation resulting from applied force; within elastic limits strain is proportional to stress. *A.G.I. Supp.* b. The change in length per unit of length in a given direction. *ASCE P1826.* c. A measure of the change in the size or shape of a body, referred to its original size or shape. Linear strain is the change per unit length of a linear dimension. True strain (natural strain) is the natural logarithm of the ratio of the length at the moment of observation to the original gage length. Conventional strain is the linear strain referred to the original gage length. Shearing strain (shear strain) is the change in angle (expressed in radians) between two lines originally at right angles. When the term strain is used alone, it usually refers to the linear strain in the direction of the applied stress. *ASM Gloss.* d. There are, generally speaking, two kinds of strains. Normal strains are those that may result in the relative displacement of two particles along the line joining those particles, or they may be shear strains, in which case the particles are displaced at right angles to the line joining them. All possible deformations may be represented as a combination of these two types of strain. *Isaacson, p. 9.*

strain aging. Aging induced by cold working. *See also* aging. *ASM Gloss.*

strain bar. An instrument well suited for measuring the strain on a rock face. It consists essentially of an invar steel bar with a fixed point at one end and a movable point attached to a rider at the other end. The rider may be moved along the bar between two stops, and the extent of movement is indicated by a dial gage attached to the bar. *Isaacson, p. 202.*

strain breaks. Fractures occurring in rock quarries where the rock is under compressive stress. This stress is relieved locally in the process of quarrying, resulting in the rending or fracturing of the rock mass. *Fay.*

strain bursts. Rock bursts in which there is spitting, flaking, and sudden fracturing at the face, indicating increased pressure there. *Higham, p. 208.*

strain cleavage. Synonym for strainslip cleavage. *A.G.I.*

strain disk. A glass disk internally stressed to give a calibrated amount of birefringence; the disk is used as a comparative measure of the degree of annealing of glassware. *Dodd.*

strain ellipsoid. In elastic theory, a sphere under homogeneous strain is transformed into an ellipsoid with this property; the ratio of the length of a line, which has a given direction in the strained state, to the length of the corresponding line in the unstrained state, is proportional to the central radius vector of the surface drawn in the given direction. The ellipsoid whose half axes are the principal strains. *A.G.I.*

strain energy. a. The work done in deforming a body. *ASM Gloss.* b. The work done in deforming a body within the elastic limit of the material. It is more properly elastic strain energy and can be recovered as work rather than heat. *ASM Gloss.*

strainer. a. A screening device on the suction line of the primary pump or in the head of a core barrel to keep out debris that might clog the pump valves or core barrel. *Long.* b. *See* snorepiece. *B.S. 3618, 1963, sec. 4.*

strainer corer. A porous refractory shape for use in foundries to control the flow of metal and to keep slag and sand inclusions out of the casting. High thermal-shock resistance is required. *Dodd.*

strain gage. a. An electrical, mechanical, or optical device for measuring movement of rock, cumulative loading of support props, opening cracks, etc. *Pryor, 3.* b. An electromechanical device which transforms small displacements to changes in resistance which are proportional to the displacement. Strain gages are used in ocean bottom pressure measuring equipment. *H&G.*

strain gage, electric resistance. The basic principle of this was enunciated by Lord Kelvin in 1854 when he applied tension to the fine wires and observed that their resistance increased with tension. This was first used for measuring strain in 1930 by Carlson, who investigated strains in concrete structures, using fine steel wires. A further advance was the bonding of wire to a metal structure so that the wire automatically adopted local strain in the metal. This was applied by Andrews and Crockett for research on the vibration of forging hammers. During the Second World War this type of gage was used with outstanding success by the Royal Aircraft Establishment, Farnborough, in England, for laboratory and flight testing of complex aircraft structures. The foil strain gage is bonded to the surface under test by an adhesive, reliable operation being possible between 300° and 350° C.

See also electric resistance strain gage. *Ham.*

strain gage, vibrating wire. This consists of a thin steel wire stretched between knife edges, one being free to move longitudinally. The wire is maintained vibrating at its natural frequency by an electrical method. The knife edges are held firmly against the girder under test, a change of strain in the girder varying tension in the wire and hence its natural frequency. This gage is used in conjunction with a reference instrument of fixed frequency; electrical impulses from both instruments are superimposed to produce beats having a frequency equal to the difference between the frequencies of the two instruments. Changes in the frequency of the test gage caused by variations in strain result in identical changes in the beat frequency. The joint output from these two instruments is applied to the plates of a cathode-ray tube, leading to an oscillation of the electron beam with a frequency equal to that of the higher of the two applied frequencies, with an amplitude which increases and decreases with the same frequency as that of the beats. *Ham.*

strain hardening. An increase in hardness and strength caused by plastic deformation at temperatures lower than the recrystallization range. *ASM Gloss.*

strain line. Alternative term for the vitreous enamel fault more generally known as hair-line. *Dodd.*

strain point. The temperature corresponding to the lower end of the annealing range and defined in ASTM-C336 as the temperature at which the viscosity of a glass is $10^{14.5}$ poises. Abbreviated to St. P. *Dodd.*

strain rate. The time rate of straining for the usual tensile test. Strain as measured directly on the specimen gage length is used for determining strain rate. Since strain is dimensionless, the units of strain rate are reciprocal time. *ASM Gloss.*

strain relief method. A technique for the determination of absolute (total) strain and stress within rock in situ. In this method, a smooth hole is bored in the rock and a gage capable of measuring diametral deformation is inserted. The hole is then overcored with a large coring bit so that the cylinder of rock containing the deformation measuring gage is free to expand. The change in the diameter of the hole when the rock cylinder is free to expand is a function of the original stress in the rock and its elastic modulus. *Woodruff, v. 1, p. 95.*

strain restoration method. A technique for the determination of absolute (total) strain and stress within rock in situ. This method involves (1) installation of strain gages on the rock surface, (2) cutting of a slot in the rock between the strain gages so that the surface rock is free to expand, (3) installation of a "flat-jack" (hydraulic pressure cell) in the slot, and (4) application of hydraulic pressure to the flat jack until the rock is restored to its original state of strain. The original stress in the rock is presumed to be equal to the final pressure in the flat jack. *Woodruff, v. 1, pp. 95-96.*

strain rods. Rods sometimes used on gap framepresses to lessen the frame deflection. *ASM Gloss.*

strain rosette. At any point on the surface of a stressed body, strains measured on each of three properly chosen intersecting gage lines make possible the calculation of the principal stresses at that point. Such gage lines, and the corresponding strains, are called a strain rosette. *Ro.*

strain shadows. A general term for the undulatory extinction seen in homogeneous minerals, such as quartz, indicating a modification of the normal optical properties due to strain. The phenomenon is commonly seen in cataclastic rocks, and must not be confused with the partial extinction of zoned crystals. *Holmes, 1928.*

strain sheet. a. A skeleton drawing of a structure, as a roof of truss or a bridge, showing the stress to which each member will be subjected. *Fay.* b. A quarryman's term for granite sheets produced by compressive strain. *Fay.*

strainslip cleavage. a. A variety of cleavage occurring in certain low-grade metamorphic rocks, due to differential movement or slip along each of a nearly parallel series of closely packed shear planes. Between each pair of shear planes, the rocks are puckered into sigmoidal microscopic folds, the outer limbs of which merge tangentially into the shear planes. *Holmes, 1928.* b. In slates and schists, a structure similar to fracture cleavage but with marked flexing of the earlier cleavage or foliation along the shear planes. Synonym for close-joints cleavage; false cleavage; slip cleavage; strain cleavage. *A.G.I.*

strait. a. Scot. Narrow; in the solid. *See also* straight work. *Fay.* b. A narrow passage of water connecting two large bodies of water, for example, Straights of Florida. *MacCracken.*

Straits tin. One of the purest commercial forms of tin (99.89 percent purity) produced from alluvial ores in Malaysia. *Bureau of Mines Staff.*

strait work. a. Narrow headings in coal. *C.T.D.* b. A method of working coal by driving parallel headings and then removing the coal between them. *C.T.D.* c. A roadway driven in the solid coal. *T.I.M.E.*

strake. a. A relatively wide launder or sluice set at a slope and covered with a blanket or corduroy for catching comparatively coarse gold and valuable mineral. *See also* blanket strake; tye, a. *Nelson.* b. A trough in which ore, gravel, etc. are washed; a launder. *Standard, 1964.* c. The place where ore is assorted on the floor of a mine; a dressing floor. *Standard, 1964.*

strand. a. A number of steel wires grouped together by twisting. A round steel wire rope (except a locked coil rope) for winding or haulage purposes, consists of a number of strands laid around a fiber core to a definite pattern. *See also* winding rope. *Nelson.* b. A multiplicity of continuous glass filaments combined in a single compact unit, without twist. *Phillips.*

strand count. The thickness of a strand of glass fibers expressed as the number of 100 yard lengths per pound weight. *Dodd.*

stranded. Term for wire rope with one or more broken strands. *Pryor, 3.*

stranded caisson. *See* box caisson. *Ham.*

stranded rope. *See* preformed rope; multistrand rope; flattened strand rope. *Sinclair, V. pp. 5-6.*

strange particles. A class of elementary particles for which the details of production and decay cannot be fully explained by existing theories. Hyperons and nesons are in this class. *L&L.*

stranskiite. A mineral, $Zn_2Cu(AsO_4)_2$, anorthic, blue crystals, from Tsumeb, Southwest Africa. Also synthetic. *Hey, M.M., 1961.*

strap. a. A bar; a beam; a coal face bar. *Mason.* b. Scot. A plank supported at each end to make the roof strata secure. *Fay.* c. Mid. An old iron rail put up between the coal face and the front row of props, in longwall stalls, for supporting a weak roof. *Fay.* d. Eng. See plank. *SMRB, Paper No. 61.* e. A thin bar or metal plate, similar to a fishplate, used to secure together butt-jointed timber or steel members. *Ham.*

strap belt. A length of belting, of the same width as the conveyor belt, passing around the driving drum inside the main belt and returning around the leading-in roller. A strap belt increases the driving capacity of the drive head and reduces belt slip. *Nelson.*

strap brake. A brake generally used on small winding engines. *Sinclair, V, p. 197.*

strap fishplates. Flattened bars of iron with holes punched through them for bolts. The holes are made somewhat larger than the bolt to permit rail expansion and contraction. *Kiser, 2, p. 14.*

strapping plate. Corn. One of the wrought-iron plates by which the spears of a pump rod are bolted together; a spear plate. *Fay.*

strap-rope haulage. A system of haulage (usually endless rope) in which the engine is installed on the surface, and the power is transmitted to the haulage drums at the pit bottom by means of a rope, known as a strap rope, or driving rope. This rope merely transmits power, and is distinct from the haulage rope. *Nelson.*

straps. N. of Eng. Corrugated steel bars about 4 inches wide and 6 feet, 9 feet, or 12 feet in length, held against the roof by props. Are replacing timber planks. Usually placed at right angles to the face and 3 to 4 feet apart. *Trist.*

strass. a. Flint glass with high content of lead which results in relatively great specific gravity, refractive index, and dispersion. It is the most common glass imitation of diamond. Also used to imitate other colored gemstones. *See also* paste. *Shipley.* b. A term widely but incorrectly used as a synonym for paste to mean any glass imitations of gems. *Shipley.*

strata. a. Sedimentary rock layers. *Wheeler.* b. Plural of stratum. Layers either artificial or natural. *Crispin.*

strata bolts. Bolts or rods, from 2 to 5 feet or more in length, set in drill holes in the strata for the support of curbs, skeleton tubbing, helical steel supports, etc., in shafts and staple shafts. In general, the weaker the ground, the longer the bolts. *Compare* roof bolting. *Nelson.*

strata control. a. N. of Eng. The system of props, straps, chocks, and packs used to maintain control of the roof and floor strata. *Trist.* b. *See* roof control. *Nelson.*

strata gases. These occur in the mineral deposit itself or in adjacent or nearby formations. Their origin may be in a particular formation in which they were laid down or formed subsequently by chemical action, or they may occasionally migrate into other formations, frequently because of release of pressure with mining. Water flow and rock porosity and fissures also allow gas migration. The principal strata gases are methane, carbon dioxide, nitrogen, sulfur dioxide, hydrogen sulfide, and radon. *Hartman, pp. 22-23.*

strata temperature. The strata temperature is determined by the surface temperature, the diffusivity of the strata and the emissivity of the surface. With rocks of high thermal conductivity, and thus, high diffusivity, as in metal mines, the increase in temperature with depth is small, that is, the geothermic gradient is low. Where rocks have low thermal conductivity, as in coal measure strata, the geothermic gradient is steep. *See also* geothermic gradient. *Roberts, I. p. 138.*

strategic mica. Ruby and nonruby block mica. Good-stained or better qualities, grade No. 6 or larger; ruby-stained A/B quality, grade No. 6 or larger; ruby and nonruby film, first and second qualities, grade No. 4 and smaller; muscovite and phlogopite splittings; and phlogopite block of high heat quality. *Skow.*

strategic minerals. Minerals essential to the national defense for the supply of which, during war, we are wholly or in part dependent upon sources outside the continental limits of the United States, and for which strict measures controlling conservation and distribution are necessary. In 1941, strategic minerals of the United States included aluminum, antimony, chromium, manganese (ferrograde), mica, nickel, quartz crystal, mercury, tin, and tungsten. *Hess.*

strategic planning. The long-term planning of major reconstruction work and possibly new sinkings, involving a large increase in production capacity or a transfer of productive capacity and the closure of uneconomic mines. *See also* tactical planning. *Nelson.*

strath. a. A broad valley, as distinguished from a glen or gorge; it may not be the valley of a single stream. *Fay.* b. A broad valley with a planated floor which is a local or incipient peneplain. *Fay.*

strath stage. That stage in the peneplanation of a region when the main streams have carved broad valleys with planated floors graded to the same regional baselevel. *Fay.*

stratic. Of, pertaining to, or designating the order or sequence of strata; stratigraphic. *Webster. 2d.* Obsolete.

straticulate. a. Having numerous thin layers, either of sedimentary deposition, as by oscillation or wave motion, often somewhat oblique to the main layers of stratification, or of deposition from solution, the layers being often those of color or structure, and not of fissility, as in banded agate. *Standard, 1964.* b. Applied to polygonal columnar structure in limestone. *See also* columnar structure. *Pettijohn.*

stratification. A structure produced by deposition of sediments in beds or layers (strata), laminae, lenses, wedges, and other essentially tabular units. *A.G.I.*

stratification foliation. The segregation of certain minerals in thin, irregular, discontinuous laminae, in planes parallel to the bedding or stratification. *Standard, 1964.*

stratification of methane. In relatively unventilated cavities in coal mines, such as wastes, it is frequently found that the methane percentage or concentration is higher at roof level, lower at midheight, and least at floor level. This is termed stratification of methane. *See also* firedamp layer. *Nelson.*

stratification planes. Continuous divisional planes of great extent, marking changes in the character of material or the mode of deposition, and the presence of fossiles generally arranged in planes parallel to the plane of deposition and with their broader surfaces lying in the same planes. *Standard, 1964.*

stratified. Formed or lying in beds, layers, or strata. *Fay.*

stratified cone. *See* composite cone. *A.G.I.*

stratified rocks. a. Derivative or stratified rocks may be fragmental or crystalline; those which have been mechanically formed are all fragmental; those which have been chemically precipitated are generally crystalline; and those composed of organic remains are sometimes partially crystalline. Synonym for sedimentary rocks. *A.G.I.* b. Rocks arranged in layers. *Shell Oil Co.*

stratiform. Bedded or layered. *Bateman.*

stratigrapher. A geologist who specializes in stratigraphy. *Webster 3d.*

stratigraphic. Pertaining ot the composition, sequence, and correlation of stratified rocks. *BuMines Bull. 587, 1960, p. 2.*

stratigraphic bores. Exploratory boreholes drilled primarily to determine geological sequence and type of rock formations in a given region. *See also* structure drilling. *Nelson.*

stratigraphic classification. Classification of stratified rocks and geologic time into rock, time-rock, time, and biostratigraphic units. *A.G.I. Supp.*

stratigraphic control. The apparent localization of mineral deposition by stratigraphic features. *A.G.I.*

stratigraphic geology. *See* geology. *Fay.*

stratigraphic heave. a. For normal faults, the width of the gap between two parts of a disrupted bed, measured in the direction of the faulted bedding plane. *Schieferdecker.* b. For reserve faults, the width of the overlap between two parts of a disrupted bed, measured in the direction of the faulted bedding plane. *Schieferdecker.*

stratigraphic hole. A borehole drilled specifically to obtain a detailed record of the character and composition of the rock formation penetrated and not for the purpose of locating a mineral deposit. *Long. See also* record hole.

stratigraphic separation. *See* stratigraphic throw. *A.G.I.*

stratigraphic sequence. Any stratum (not complicated by overthrusting or overfolding) is younger than the strata below it and older than the strata above it. This original succession from older below to younger above is referred to as stratigraphic sequence. *Nelson.*

stratigraphic test hole. A hole drilled for stratigraphic information, including lithology, porosity and permeability. It is drilled to penetrate a potentially productive zone, and thus may result in production. *See also* seismic shothole; slim hole; structure test hole. *Williams.*

stratigraphic throw. The stratigraphic thickness that separates two beds brought into contact at a fault. Synonym for stratigraphic separation. *A.G.I.*

stratigraphic time. *See* time, stratigraphic. *A.G.I.*

stratigraphic trap. A type of trap that results from variation in lithology of the reservoir rock, a termination of the reservoir (usually on the up-dip extension), or other interruption of continuity. *A.G.I.*

stratigraphy. a. That branch of geology which treats of the formation, composition, sequence, and correlation of the stratified rocks as parts of the earth's crust. *Fay.* b. That part of the descriptive geology of an area or district which pertains to the discrimination, character, thickness, sequence, age, and correlation of the rocks of the district. *Fay.*

stratometric survey. A system whereby the in situ orientation of a core sample can be reproduced on the surface. A line is inscribed on the smoothed bottom of a borehole, and its azimuth relationship with a compass direction photographically recorded. When cored and removed from the borehole, the inscribed line can be used as a guide in orienting the core on the surface. *Long.*

stratoscope. An apparatus inserted in the drill hole which permits engineers to make a visual inspection of the strata. *Coal Age, v. 71, No. 8, August 1966, p. 86.*

stratovolcano. A volcanic cone, generally of large dimension, built of alternating layers of lava and pyroclastic materials. Essentially, synonymous with composite cone; stratified cone. *A.G.I.*

strat test. A hole drilled to determine stratigraphic sequence and thickness, or lithologic character of formations penetrated, but not necessarily aimed at securing structural information. *A.G.I. See also* structure test hole. *Williams.*

stratum. a. A bed or layer of rock; strata, more than one layer. *Fay.* b. Also defined as a layer greater than 1 centimeter in thickness. *Pettijohn.*

stratum contours. *See* structure contours. *B.S. 3618, 1964, sec. 5.*

stratum plain. A plain that has been reduced approximately to the surface of a level or nearly level resistant stratum which has served as a local baselevel. *Fay.*

straw. Eng. A straw or reed filled with gunpowder, and used as a fuse. *Fay.*

straw boss. A generic term which sometimes includes all supervisory officials in a mine; a supervisor of a small group of men usually working under a certified foreman. *B.C.I.*

straw stalactite. In the United States, a hollow, thin-walled stalactite, uniform in diameter throughout its length. *Schieferdecker.*

straw stem. The slender hollow stem of a wine glass. *Dodd.*

straw tin. Metallic tin cast into molds shaped by pressing stalks of straw into wet clay. *Pryor, 3.*

stray current. a. The use of direct current electric power in most coal mines presents a problem of corrosion caused by an electrolytic action on the pipe. Where the track is employed as a conducted of electricity in this type of power system, the system, the voltage drop thereon produces a difference in potential between the track and earth or other structures that may serve as a conductor, such as pipelines. This condition may cause an electric current to flow in pipelines that form a parallel path with the track system. Such current is called stray current. *BuMines Bull. 570, 1957, p. 17.* b. Electric current that is introduced in the earth by leakage of industrial currents. *Schieferdecker.*

stray sand. A rock formation, usually sandstone, separated by a short interval from a more persistent member by a break or other change in lithology. *A.G.I.*

streak. a. The color of the powder of a mineral as obtained by scratching the surface of the mineral with a knife, file, or, if not too hard, by rubbing it on an unpolished porcelain surface. *Fay.* b. The characteristic white or colored streak a mineral makes when rubbed against or along a streak plate. *Bureau of Mines Staff.*

streaked. Having some of the mineral constituents so arranged as to give the rock a striped or streaked appearance. In the eruptive rock, this structure is often produced by the flowing of the mass in a partially cooled condition. It is best seen in obsidian, rhyolite, and quartz porphyries. *Fay.*

streaked-out ripples. *See* flame structure. *Pettijohn.*

streaking. Synonym for streaming. *See also* mineral streaking. *A.G.I.*

streak plate. A piece of unglazed porcelain for testing the streak of minerals. *Fay.*

streaks. Irregular, generally platy lentils of ore. *Schieferdecker.*

streaky structure. A term denoting the presence in rhyolitic and allied rocks of numerous dark films or lenticular veinlets, arranged parallel, or nearly so, to the flow surfaces, and containing minerals, such as quartz, pyrite, chlorite, sericite, carbonates, epidote, and sometimes garnet. Typically developed in the Lake District, the streaks are considered to be due to deposition in and around contraction cracks from infiltrating solutions under high pressure during the solfataric stage of the Borrowdale vulcanism. *Holmes, 1928.*

stream. a. Corn. To separate or clean ore by washing. *Fay.* b. A body of flowing water, whether in an open or closed conduit; a jet of water as from a nozzle; the term is incorrectly used to designate the conduit in which the stream flows. *Seelye, 1.* c. A steady current in water or air. The Gulf Stream is an example. *MacCracken.*

stream capture. *See* stream piracy. *Leet.*

stream clays. Clays deposited in protected areas on flood plains during periods of overflow. Consequently, the deposits are pockety and grade laterally into sandy material. The pockets, however, yield a fine plastic clay, but different pockets vary greatly in composition. *Stokes and Varnes, 1955.*

stream-down sluice. A sluice box placed to receive the material rejected from the tables of a dredge. *Fay.*

streamer. a. Corn. A searcher for stream tin. *Fay.* b. One who washes out stream tin. *Webster 2d.*

streamflow coupling. Synonym for counterbored coupling. *Long.*

streamflow rod coupling. Synonym for counterbored coupling. *Long.*

stream gold. Gold in placer deposits of alluvial origin. *Stokes and Varnes, 1955.*

streaming. a. Separating ore from gravel by the aid of running water. *Fay.* b. The working of alluvial deposits for the tin found in them; the washing of tin ore from the detrital materials; also, the reduction of stream tin. *Standard, 1964.* c. A property which firedamp possesses as a result of its low density. If, in a sloping roadway having a smooth roof, firedamp is released from a break at the lower end, the gas will cling to the roof and stream upwards forming a pool at the upper end. Pure steaming and diffusion can occur where the air currents are sluggish or nonexistent, such as in wastes which have not collapsed, and roadways of large cross-sectional area in which the ventilation air speed is low. *Roberts, I. pp. 74-75.*

streaming potential. Potential difference between a permeable diaphragm and the liquid passing through it. *Pryor, 3.*

streamline. A hypothetical line which shows the velocity direction of the fluid stream at each point along the line. Streamlines do not therefore cross each other. A set of streamlines charts the flow pattern. If the flow is steady then the streamline pattern does not change with time. If, however, the streamlines are continually changing shape the flow is unsteady. *Roberts, I. p. 2.*

streamlined waterway. A bit waterway the configuration of which is such that the flow of coolant (water or mud-laden liquid) and cuttings is not impeded in any way. *Compare* expanding waterway. *Long.*

streamline flow; steady flow; laminar flow. Fluid flow in which the movement is steady, continuous and more or less parallel at all points. *See also* critical velocity; turbulent flow. *Nelson.*

streamlining. This involves the placing of fairing round or over obstructions to airflow, in such a way as to change that flow from turbulent to laminar. *Spalding.*

stream priracy; stream capture. The process whereby a stream rapidly eroding headware cuts into the divide separating it from another drainage basin, and provides an outlet for a section of a stream in the adjoining valley. The lower portion of the partially diverted stream is called a beheaded stream. *Leet.*

stream terrace, Shoshoni type. A stream-cut rock terrace with thick cover of slope wash. *A.G.I.*

stream tin. Alluvial tin, as opposed to that contained in reefs and lodes. The tin is waterworn and has resulted from the wearing away of tin veins or rocks containing the ore. It occurs in the beds of streams and in the alluvial deposits which border them. A fair proportion of commercial tin is derived from this source. *See also* cassiterite; black tin. *Nelson.*

stream traction. That process by which rock material is forced downstream by pushing, rolling, and saltation. *Stokes and Varnes, 1955.*

stream tube. A tube of fluid the enveloping surface of which consists of streamlines. *Roberts, I. p. 2.*

stream valley. By the removal of weathered material and the abrasion of bottom and sides of its bed, a stream gradually excavates a trench in the solid rock or regolith which is called the stream valley. *Stokes and Varnes, 1955.*

stream wheel. A wheel used to measure the velocity of flowing water in which it dips. *Webster 2d.*

streamworks. a. Corn. A name given by miners to alluvial tin deposits usually worked in the open air. *Fay.* b. A place where ore, generally tin ore, is washed from alluvial deposits. *Standard, 1964.*

strebbau. Ger. The longwall system of coal mining. *Fay.*

streck. Eng. A signal word for the whim or tackle to be lowered. *Fay.*

street ell. A pipe elbow with male threads on one end, female on the other. *Nichols.*

strek. Corn. A trough for washing tin ore. A variation of strake. *Fay.*

strengite. A mineral, $FePO_4.2H_2O$, consisting of a hydrous iron phosphate, occurring mostly in pale red botryoidal masses, and being isomorphous with variscite; specific gravity, 2.87. *Webster 3d.*

strength. a. In explosives as measured by the ballistic mortar, it is the strength per unit weight or, more simply, the weight strength. To assess the blasting capabilities of different explosives, however, it is also necessary to take into account its bulk strength, that is, the strength per unit volume. *McAdam II, pp. 16-17.* b. The energy content in relation to its weight. *Nichols.* c. The force developed by the explosive. *Kentucky, p. 167.* d. The stress at which rock ruptures or fails. *BuMines Bull. 587, 1960, p. 2.* e. The limiting stress that a solid can withstand without failing by rupture or continuous plastic flow. Rupture strength or breaking strength refers to the stress at the time of rupture. If a body deforms plastically continuously after a certain stress has been reached without any increase in stress, this is also called strength. *See also* fundamental strength; ultimate strength. *A.G.I.* f. A term to indicate relative thickness in sheet glass. *ASTM C162-66.*

strength of current. The number of amperes flowing through a circuit. Analogous to the flow of gallons per minute in a water pipe. *Crispin.*

strength of materials. The science that deals with the effects of forces in causing changes in the size and shape of bodies. *Crispin.*

stress. a. Force per unit area, often thought of as force acting through a small area within a plane. It can be divided into components, normal and parallel to the plane, called normal stress and shear stress, respectively. True stress denotes the stress where force and area are measured at the same time. Conventional stress, as applied to tension and compression tests, is force divided by the original area. Nominal stress is the stress computed by simple elasticity formulas, ignoring stress raisers and disregarding plastic flow; in a notch bend test, for example, it is bending moment divided by minimum section modulus. *ASM Gloss.* b. The intensity at a point in a body of the internal forces or components of force which act on a given plane through the point. As used in product specifications, stress is calculated on the basis of the original dimensions of the cross section of the specimen. *A.G.I.* c. The force that results in strain. *A.G.I. Supp.* d. Resistance of a body to compressional, tensional, or tortional force. *A.G.I. Supp.* e. Any condition of tension or compression existing within the glass, particularly due to incomplete annealing, temperature gradient, or inhomogeneity. *ASTM C162-66.*

stress amplitude. One-half the elgebraic difference between the maximum and minimum stress in one cycle. *ASM Gloss.*

stress analysis. Determination of the stresses in the component parts of a structure when subjected to load. *See also* photoelasticity. *Ham.*

stress circle. A Mohrs' circle which reveals the distribution of stress. *Ham.*

stress concentration. a. Sudden changes of cross sectional area in a structural member will cause concentrations of stress, revealed by photoelastic analysis. *See also* notch effect. *Ham.* b. *See* factor of stress concentration. *Ro.* c. Ratio of the stress at any point to the applied stress. *BuMines Bull. 587, 1960, p. 2.*

stress concentration factor, K_t. The ratio of the greatest stress, in the region of a notch or other stress raiser as determined by advanced theory, photoelasticity, or direct measurement of elastic strain, to the corresponding nominal stress. *ASM Gloss.*

stress corrosion. a. Chemical corrosion, as of reactor pressure vessels, that is accelerated by stress concentrations, either built in, or resulting from a load. *L&L.* b. The acceleration of the corrosion of a metal by static stress. *BuMines Bull. 619, 1964, p. 206.*

stress-corrosion cracking. Failure by cracking under combined action of corrosion and stress, either external (applied) or internal (residual). Cracking may be either intergranular or transgranular, depending on metal and corrosive medium. *ASM Gloss.*

stress diagram. *See* stress-strain diagram. *Ro.*

stress difference. The algebraic difference between the maximum and minimum principal stresses. *A.G.I.*

stressed-skin construction. A term borrowed from the aircraft industry, applicable in structural engineering to plywood, cladding, shell concrete, and lamella roofs, with the particular connotation of sandwich construction. *Ham.*

stress envelope. The zone of extra stress around a cylindrical hole being actually cylindrical inform. The term ring stress is synonymous. *Spalding, p. 17.*

stress field. By the use of force lines the distribution of one component of stress can be illustrated. This is the stress field. *Spalding.*

stress field, hydrostatic. Where the medium is subjected to equal stresses in three mutually perpendicular directions. *BuMines Bull. 587, 1960, p. 2.*

stress field, two directional. Where the medium is subjected to compressional or tensional stresses in two directions. *BuMines Bull. 587, 1960, p. 2.*

stress field, unidirectional. Where the medium is subjected to compressional or tensional stresses in one direction. *BuMines Bull. 587, 1960, p. 2.*

stress meter. An instrument designed to measure pressure changes within rock as a result of mining operations. The instrument consists of a tongue of steel containing a groove filled with glycerin. When pressure is exerted upon the external surface of the tongue, the glycerin is partially squeezed from the groove and exerts pressure on a diaphram, which accordingly bulges outwards. A strain gage is cemented on the outer wall of the diaphragm, and as the curvature increases and the gage is strained, so does its resistance vary. *Isaacson, p. 214.*

stress minerals. Suggested for minerals, such as chlorite, chloritoid, talc, albite, epidote, amphiboles, kyanite, etc., whose formation in metamorphosed rocks is favored by shearing stress; opposite of antistress minerals. *A.G.I.*

stress-number (S-N) curve. A curve obtained in fatigue tests by subjecting a series of specimens of a given material to different ranges of stress and plotting the range of stress against the number of cycles required to produce failure. In steel and many other metals, there is a limiting range of stress below which failure will not be produced even by an indefinite number of cycles. *C.T.D.*

stress raisers. a. Changes in contour or discontinuities in structure that cause local increases in stress. *ASM Gloss.* b. *See* factor of stress concentration. *Ro.*

stress range. The algebraic difference between the maximum and minimum stress in one cycle of a fatigue test. *ASM Gloss.*

stress ratio. In fatigue testing, the ratio of the minimum stress to the maximum stress in one cycle, considering tensile stresses as positive, compressive stresses as negative. *ASM Gloss.*

stress-relief heat treatment. *See* stress relieving. *ASM Gloss.*

stress relieving. Heating to a suitable temperature, holding long enough to reduce residual stresses and then cooling slowly enough to minimize the development of new residual stresses. *ASM Gloss.*

stress ring. Stress rings are force lines drawn on the cross section of an excavation to indicate the distribution of the additional stress in the rock caused by that excavation. *Spalding.*

stress-rupture test. A tension test performed at constant load and constant temperature, the load being held at such a level as to cause rupture. Also known as creep-rupture test. *ASM Gloss.*

stress solid. The solid figure formed by surfaces bounding vectors drawn at all points of the cross section of a member and representing the unit normal stress at each such point. The stress solid gives a picture of the stress distribution on a section. *Ro.*

stress-strain curve. A curve similar to a load extension curve, except that the load is divided by the original cross-sectional area of the test piece and expressed as tons or pounds per square inch, while the extension is divided by the length over which it is measured and expressed in inches per inch. *C.T.D.*

stress-strain diagram. a. A graph on which is plotted stress vs. strain. Such a graph may be constructed in any test during which frequent or continuous measurements of both stress and strain are made. It is commonly constructed for the compression, tension and torsion tests. It is usually necessary for the determination of deformation energy, elastic limit, modulus of elasticity, modulus of rigidity, proportional limit and yield strength. It is often useful in determination of elongation, modulus of rupture, ultimate strength and other related properties. *H&G.* b. The curve obtained by plotting unit stresses as ordinates against corresponding unit strains as abscissas. Also called stress diagram. *Ro.*

stress: strength ratio. The ratio of the actual stress in a rock to its ultimate failing stress is called the stress; strength ratio. Its reciprocal gives the factor of safety. *Spalding.*

stress trajectory; isostatic. A line (in a stressed body) tangent to the direction of one of the principal stresses at every point through which it passes. *Ro.*

stress zone. This is the zone of additional stress in the rock surrounding and caused by a stoped area. *Spalding.*

stret. a. Mid. Solid, close, compact; as gobbed stret, packed stret, etc. *Fay.* b. The system of mining coal by headings or narrow work. *See also* bord-and-pillar. Also spelled strett. *Fay.*

stretch. A particular direction or course; as, the stretch of a coal seam. *Standard, 1964.*

stretched-membrane theory. *See* membrane theory of plasticity. *Dodd.*

stretcher. a. A bar used for roof support on roadways either wedged against or pocketed into the sides of the roadway and not supported by legs or struts. *T.I.M.E.* b. Eng. In Cumberland it is called a stay. *SMRB, Paper No. 61.* c. A bar fixed across a narrow working place or tunnel to support a rock drill. *C.T.D.* d. A main backing deal or longitudinal bar in contact with three or more support bars or girders. *Mason.* e. A brick or stone laid lengthways along a wall. *Mason.* f. A litter usually made of canvas stretched on a frame for carrying injured, disabled, or dead persons. *Webster 3d. See also* Stokes stretcher; Neil-Robertson stretcher; Briggs stretcher carriage; Croxdale stretcher tram. *McAdam, pp. 104-107.*

stretcher bar. a. A single screw column, capable of holding one machine drill; used in small drifts. *Fay.* b. A telescopic bar used to support a theodolite when the inclination of the roadway (and sometimes its width) does not permit the use of a tripod. *B.S. 3618, 1963, sec. 1.*

stretcher bond. A form of bond in which the bricks or aslar are laid lengthwise in successive courses, so that the joints of one course are at the middle of those of the adjacent courses. *Standard, 1964.*

stretcher carriers. *See* Briggs stretcher carriage; Croxdale stretcher tram. *McAdam, pp. 105-107.*

stretcher course. A course of brick laid in a wall with their largest faces horizontal and their longest dimension parallel to the face of the wall. *A.R.I.*

stretcher leveling. Leveling where a piece of metal is gripped at each end and subjected to a stress higher than its yield strength to remove warp and distortion. Sometimes called patent leveling. *A.S.M. Gloss.*

stretchers. In shaft-sinking, the crosspieces holding the waling apart. *Stauffer.*

stretcher straightening. A process for straightening rod, tubing, and shapes by application of tension at the ends of the stock. The products are elongated a definite amount to remove warpage. *ASM Gloss.*

stretcher strains. Elongated marikngs that appear on the surface of some materials when deformed just past the yield point. These markings lie approximately parallel to the direction of maximum shear stress and are the result of localized yielding. The same as Lüders lines. *ASM Gloss.*

stretch former. a. A machine used to perform stretch-forming operations. *ASM Gloss.* b. A device adaptable to a conventional press for accomplishing stretch forming. *ASM Gloss.*

stretch forming. Shaping of a sheet or part, usually of uniform cross section, by first applying suitable tension or stretch and then wrapping it around a die of the desired shape. *ASM Gloss.*

stretching bond. The laying of brick in a wall as stretchers with broken vertical joints. *A.R.I.*

stretch point. The greatest stress at which a material exhibits a specified elongation under load. *Hess.*

stretch thrust. Thrust that forms when the inverted limb of an overturned or recumbent fold becomes so stretched that it ruptures. *A.G.I.*

stretch wipe forming. The same as wiper forming. *ASM Gloss.*

stria. a. A minute groove or channel; a threadlike line or narrow band (as of color) especially when one of a series of parallel grooves or lines. *Webster 3d. See also* glacial striae. *Fay.* b. A cord of low intensity generally of interest only in optical glass. *See also* cord, b. *ASTM C162-66.*

striae. A line or furrow generally seen on the walls of a lode or fault. *Gordon.*

striated. Streaked, or with lines or grooves running more or less parallel to each other. *Gordon.*

striated crystal. One with striae on the surface of a face or faces. *Shipley.*

striation. a. A very fine parallel line marking the surface or cleavage face of a mineral. *Fay.* b. A channel or scratch made in rock scoring. *Standard, 1964.* c. A scratch or small channel gouged by glacial action. Bedrock, pebbles, and boulders may show striations produced when rocks trapped by the ice were ground against bedrock or other rocks. Striations along a bedrock surface are oriented in the direction of ice flow across that surface. *Leet.*

striation cast; microgroove cast. Casts of striations or very small grooves. *Pettijohn.*

strick. Corn. To let a man down a shaft by a windlass. *Compare* streck. *Fay.*

striding level. In surveying, a sensitive level tube fitted at each end with a leg at right angles to the tube, so that the striding level may be placed astride a theodolite by resting the V-shaped ends of the legs on the trunnion axis, enabling the latter to be accurately leveled. *C.T.D.*

strike. a. The course or bearing of the outcrop of an inclined bed or structure on a level surface; the direction or bearing of a horizontal line in the plane of an inclined stratum, joint, fault, cleavage plane, or other structural plane: it is perpendicular to the direction of the dip. *Compare* trend. *Fay.* b. To find a vein of ore; a valuable discovery. *Webster 3d.* c. *See* level course. *Nelson.* d. *See* fault strike. *Nelson.* e. S. Afr. Intersecting a reef in a borehole or in shaft sinking, etc. *Beerman.* f. To withdraw supports. *Mason.* g. A combined effort among workmen to compel the employer to the concession of a certain demand by preventing the conduct of his business until compliance with the demand. A strike is lawful. It only becomes unlawful when the means employed to carry it out are unlawful, or when it maliciously is originated to attain an unlawful end. *Ricketts, I. Compare* lockout. h. A straight-edged implement for leveling something as clay in a brick-maker's or potter's mold, or sand in a founder's mold, by scraping off the superfluous portion on top; a strickle. *Standard, 1964.* i. In masonry, to wipe off the projecting fresh mortar from (a joint). *Standard, 1964.* j. In ironworking, a puddler's rabble. *Webster 3d.* k. In a foundry, a hoisting hook for metal. *Standard, 1964.* l. A thin, electrodeposited film of metal to be followed by other plate coatings. *ASM Gloss.* m. A plating solution of high covering power and low efficiency designed to electroplate a thin adherent film of metal. *ASM Gloss.*

strike a lead. To come upon or discover a lead, lode, or vein, as of ore. *Standard, 1964. See also* strike, b. *Fay.*

strike board; strike tree. Scot. A board at the top of a shaft from which the bucket is tipped; used in shaft sinking. Formerly the beam or plank at the shaft top on which the baskets were landed. *Fay.*

strikebreaker. The same as blackleg or scab. *Korson.*

strike cut. In separating blocks of stone in a quarry, the cut that is parallel to the strike of the rock strata. *Fay.*

strike fault. A fault whose strike is parallel to the strike of the strata. *A.G.I.*

strike joints. Joints which lie parallel to the strike of bedding, schistosity, etc. *Lewis, p. 593.*

strike line. A structure contour which is sufficiently regular to keep a more or less constant direction and thus define a similarly constant strike of the structural surface (usually a bedding surface). Where the surface is plane, strike lines are straight, parallel, and equally spaced for equal vertical intervals. *Challinor.*

strike pan. Vacuum pan. *Bennett 2d, 1962.*

striker. a. Derb. The man who lands the kibble, corf, or bucket at the top of a shaft. *See also* strike board. *Fay.* b. A blacksmith's assistant who handles the hammer. *See also* forging. *Nelson.* c. A workman who dresses off the clay bricks with a strickle in molding. *Webster 3d.*

striker-off. One who levels off clay projecting above tops of brick and tile molds by drawing a straightedge across the molds flush with their top edges so that brick and tile will be of uniform size. *D.O.T.1.*

strike shift. The horizontal component of the shift parallel to the fault strike. *Fay.*

strike slip. The horizontal component of the slip parallel with the fault strike. *Schieferdecker.*

strike-slip fault. A fault in which the net slip is practically in the direction of the fault strike. Synonym for transcurrent fault. *A.G.I.*

strike tree. *See* strike board. *Fay.*

strike valley. A valley parallel to the strike of the underlying rocks of a region. Also called longitudinal valley. *Webster 3d.*

strike working; opencast working. Where the dip of the coal seam is about 1 in 10 or less, the opencast method of working usually employed is to excavate along lines parallel to the outcrop. This is termed the strike or opencast method. *See also* box-cut method. *Nelson.*

striking. a. The development of opacity or color in glassware by a heat treatment process, for example, by the formation of a colloidal dispersion, within the glass, of a small amount of copper, silver, or gold (Cu, Ag, or Au). *Dodd.* b. The smoothing of the wet clay surface in a mold by means of a wooden or metal rod, as in the hand-molding of special clay building bricks. *Dodd.* c. A fault sometimes encountered with enamel colors on pottery ware, the color becoming detached from the ware during firing; a common cause is lack of control during hardening-on. *See also* hardening-on. *Dodd.* d. Setting out the first mold and the profile tool for the shaping of ware on a jigger. *Dodd.* e. Electrodepositing, under special conditions, a very thin film of metal which will facilitate further plating with another metal or with the same metal under different conditions. *ASM Gloss.* f. Lowering the arch centers, after the masonry is completed and the mortar set. *Stauffer.*

striking deal. Eng. Planks fixed in a sloping direction just within the mouth of a shaft, to guide the bucket to the surface. *Fay.*

striking hammer. A quarryman's hammer for striking a rock drill. *Standard, 1964.*

striking house. Derb. A sheltered place at the top of a shaft for the striker, or cager. *See also* striker, a. *Fay.*

striking plates. Two horizontal timbers separated by striking wedges and supporting an arch center. The latter is lowered by slacking the wedges. *Stauffer.*

striking solution. A dilute solution of silver cyanide, containing potassium cyanide, in which articles to be silver-plated are dipped before being immersed in the silver bath proper. *Standard, 1964.*

string. a. Pieces of pipe, casing, or other downhole drilling equipment coupled together and lowered into a borehole. *Compare* string of tools. *Long.* b. A driller's term for the drilling bit, jars, drill stem, rope socket, and other tools connected to the lower end of a drilling cable in standard or percussion drilling. Also used for the rig and complete drilling equipment. *A.G.I.* c. A measurement of depth of a drill hole obtained by stringing over the length of cable from the drilling floor to the crown pulley on top of the derrick or mast. *A.G.I.* d. A very small vein, either independent or occurring as a branch of a larger vein; a stringer. *Fay.* e. An imperfection; a straight or curled line, usually resulting from slow solution of a large grain of sand or foreign material. *ASTM C162-66.*

string (stringer) bead. A continuous weld bead made without appreciable transverse oscillation. Contrast with weave bead. *ADM Gloss.*

string course. A distinctive, usually projecting, course in a brick wall; its purpose is aesthetic. *Dodd.*

string dryer. A tunnel-type dryer, particularly for building bricks, that is operated intermittently; in the early stages of drying, the exits and exhaust ducts are closed so that a high humidity is built up. *Dodd.*

stringer. a. A small vein, usually one of a number making the lode. *Ballard.* b. A thin layer of coal at the top of a bed, separating in places from the main coal by material similar to that comprising the roof. *A.G.I.* c. A narrow vein or irregular filament of mineral traversing a rock mass of different material. *Webster 3d.* d. A heavy timber or plank, usually horizontal, but sometimes inclined, supporting other members of a structure, and usually running in the direction of the greatest length of the collection of supported members. *Standard, 1964.* e. A veinlet or seam. *Nelson.* f. The horizontal crosspiece in square set timbering. *Nelson.* g. Eng. A balk set between the heads of the props and the balks or girders of several adjacent settings along a road. Also called running bar; running head. *SMRB, Paper No. 61.* h. *See* roof stringer. *Kentucky, p. 141.* i. A long horizontal member which frames together the heads of trestles in timber trestle bridges or which runs under each rail of a steel railway bridge. *Ham.* j. In American railway building, a longitudinal construction member in a bridge or tunnel. *Sand-*

strom. k. In wrought materials, an elongated configuration of microconstituents or foreign material alined in the direction of working. Commonly, the term is associated with elongated oxide or sulfide inclusions in steel. *ASM Gloss.*

stringer lead. A small ore body—generally, a vein leading to a more valuable one. *A.G.I.*

stringer lode. A shattered zone containing a network of small nonpersistent veins. Also called stringer zone. *Fay.*

stringer sets. Mine timbering in which the caps reach across two or more sets in a drift or stope. *Hess.*

stringing deals. Eng. Thin planks, nailed to the inside of the curbs in a shaft, so as to suspend each curb from those above it. *Fay.*

string level. A spirit level equipped with prongs so that it can be hung from a string. *Nichols.*

string loading. Filling a drill hole with cartridges smaller in diameter than the hole, without sliting or tamping them. *Nichols.*

string of tools. a. The bit, jars, drill stem, rope socket, etc., attached to cable of percussion drill rig. Also called drill assembly. *Pryor, 3.* b. In a churn drill, the tools suspended on the drilling cable. *Nichols.* c. The entire downhole drilling assembly. *Long.*

string pump. A system of pumping whereby the motion of the engine is transmitted to the pump by timbers or stringers bolted together. *Zern.*

string rods. A line of surface rods connected rigidly for the transmission of power; used for operating small pumps in adjoining shafts from a central station. *Zern.*

string survey. a. A rough method of transferring points from upper to lower levels in very narrow steep workings by suspending strings from point to point and measuring offsets. The excavation dimensions may be similarly obtained. *See also* plumbing. *Nelson.* b. The use of stretched strings in awkward underground workings to provide survey lines and basis for offsets. In the lost thread method of survey, string or thread is paid out over a measuring device as a traverse line is walked. *Pryor, 3.*

strip. a. In coal mining, to remove the earth, rock, and other material from a seam of coal, generally by power shovels. Generally practiced only where the coal seam lies close to the earth's surface. *B.C.I.* b. To remove from a quarry, or other open working, the overlying earth and disintegrated or barren surface rock. *Fay.* c. To mine coal, alongside a fault, or barrier. *Fay.* d. To fill prepared coal from a coal face. *Mason.* e. To complete the filling of prepared coal from the face. *Mason.* f. Can. To remove soil and vegetation covering mineral deposit. *Hoffman.* g. To remove overburden or thin layers of pay material. *Nichols, 2.* h. A shallow cast ingot of brass for rolling into sheets. *Webster 3d.* i. To bare an ingot of steel by removing the mold. *Webster 3d.* j. One of a set of troughs, or their equivalent, along which ore particles, as they come from the stamps, are deposited in the order of their specific gravity. *Standard, 1964.* k. A sheet of metal in which the length is many times the breadth. *ASM Gloss.*

Stripa process. a. A dense medium washer developed in Sweden for concentrating poor quality ores. It often utilizes part of the ore under treatment as medium solids. The trough is a shallow, reciprocating, rectangular box supported on flexible rods. The sink and float fractions are discharged separately at the end of the trough. A bed of sand-sized particles lubricated by water is used as the separating medium. The process can be used for upgrading ore prior to froth flotation. In central Sweden, a number of Stripa plants have been installed for iron-ore treatment. *Nelson.* b. A method of gravity treatment of coarse sands, in which feed is shaken along horizontal launder and at the same time kept in teeter by hydraulic water. Constituent minerals stratify into separable layers. *Pryor, 3.*

strip-borer drill. A skid- or caterpillar-mounted drill operated by electric motor or diesel engine. It is used at quarry or opencast sites for drilling 3 to 6 inches in diameter, horizontal blast holes up to 100 feet in length, without the use of flush water. It cannot penetrate strong strata. *Nelson.*

stripe. The series of bands of variation in color or texture in a rock mass, or the course of the planes of such bands, as indicative of the course of the bedding plane when that is otherwise obscure. *Standard, 1964.*

striper. A pen-shaped article having a small wheel at the point, onto which the special printing ink flows, used for placing borders, etc., on enameled surfaces. *Enam. Dict.*

striper, hand. One who paints stripes and decorative edges on glass, enamel, or ceramic ware using small hand brushes. *Bureau of Mines Staff.*

strip foundation. A continuous foundation for a wall or for several piers or columns too closely spaced to permit individual or pad foundations. *Ham.*

Stripkolex. Trademark for a dynamite for coal stripping operations. *CCD 6d, 1961.*

strip mine. a. A stripping; an opencut mine in which the overburden is removed from a coalbed before the coal is taken out. *Hess.* b. *See* open-pit mine. *Bureau of Mines Staff.*

strip mining. The mining of coal by surface mining methods as distinguished from the mining of metalliferous ores by surface mining methods which is commonly designated as open-pit mining. *Woodruff, v. 3, p. 469. See also* opencast mining; open-pit mining; surface mining.

strip packing. An arrangement of alternate packs and wastes built in a direction parallel to the gate roads in longwall conveyor mining. A common practice is to allow 5 yard wastes between 4 yard packs or both are made 5 yards wide. The dimensions vary with local conditions. *See also* double packing; single packing. *Nelson.*

stripped atom. One from which one or more electrons has been removed, rendering it ionically charged. *Pryor, 3.*

stripped illite. Synonym for degraded illite. *A.G.I. Supp.*

stripped plain. A plain composed of flat-lying or gently tilted sedimentary rocks from which sediments have been removed down to some resistant bed which seems to have controlled the depth of erosion. *Compare* dip slope.

stripper. a. A nearly depleted well whose income barely exceeds operating cost of production. *Wheeler.* b. In the quarry industry, a laborer who cleans up dirt left by the power shovel in stripping overlying ground from rock, using a shovel and wheelbarrow. *D.O.T.1.* c. A person employed in the pottery industry to remove the dried ware from the plaster molds. *Dodd.*

stripper punch. In powder metallurgy, a punch that serves as top or bottom of the die cavity and later moves farther into the die to eject the compact. *ASM Gloss.*

stripping. a. An excavation with power shovels in which the coal seams are laid bare by the stripping of the surface soil and rock strata. Operators are resorting more and more to this form of mining as it greatly reduces cost of production, especially the item of labor. It is estimated that for every ton of anthracite that is stripped instead of mined, ten men are deprived of work. Stripping also eliminates the cost of timbering, hauling, pumping, ventilating, and complicated safety provisions. *Korson.* b. The operation of removing the overburden prior to working the mineral in a quarry or open pit mine. *Barger.* c. The loading or clearing away of coal from a longwall face after shotfiring. *Nelson.* d. Opencast mining. *Nelson.* e. *See* stripping the quarry. *Nelson.* f. An open pit working. *Fay.* g. *See* strip, b. *Fay.* h. The earth, rock, or soil so removed. *Fay.* i. York. A web or portion of coal worked off all along the face of a stall. *See also* strip, c. *Fay.* j. Removal of a surface layer or deposit, usually for the purpose of excavating other material under it. *Nichols.* k. In chemical extraction of minerals, treatment of pregnant solution to remove dissolved values. *Pryor, 3.* l. The removal of earth or nonore rock materials as required to gain access to the ore or mineral materials wanted; the process of removing overburden or waste material in a surface mining operation. *Bureau of Mines Staff.* m. Removing a coating from a metal surface. *A.S.M. Gloss.* n. Removal of an electrodeposit by any means, that is, by chemical agent or by reversed electrodeposition. *C.T.D.* o. The removal of molds from ingots. *Mersereau, 4th, p. 408.*

stripping a gutter. Removing the headings from off the wash dirt, which is left undisturbed. *Fay.*

stripping a jig. Aust. The forming of a jig, by enlarging a cut-through on an incline. *See also* jig, g. *Fay.*

stripping a mine. a. *See* strip, b. *Fay.* b. Robbing a mine of its best ore. *Fay.*

stripping area. In stripping operations, an area encompassing the pay material, its bottom depth, the thickness of the layer of waste, the slope of the natural ground surface, and the steepness of the safe slope of cuts. *Nichols, pp. 10-11.*

stripping a shaft. a. Taking out the timber from an abandoned shaft. *Fay.* b. Trimming or squaring the sides of a shaft. *Fay.*

stripping job. The operation of dismantling the sucker rod in the course of bringing a pump to the surface for repair. *Williams.*

stripping-pit limits. The strip area that includes area of pay material plus enough area beyond the limits of the ore pit to provide for a bench. The total volume of stripping will be that vertically above the limits of the ore pit plus that outside of the ore pit necessary to maintain safe strip-pit slopes and benches and provide working approaches to the pit. *BuMines Bull. 419, 1939, pp. 356, 363.*

stripping ratio. The unit amount of spoil or waste that must be removed to gain access to a similar unit amount of ore or mineral material. *Bureau of Mines Staff.*

strippings. A strip mine. *Hess.*

stripping salt. *See* abraum salts. *Kaufmann.*

stripping shovel. A shovel with an especially long boom and stick which enables it to reach further and pile higher. *Nichols, 2.*

stripping-shovel craneman. *See* shovel craneman. *D.O.T.1.*

stripping-shovel operator. In bituminous coal mining, one who operates a power shovel in a strip mine to strip back overlying ground and to load coal into cars. Also called boom cat; coal-loading-shovel engineer; loading-shovel engineer. *D.O.T.1.*

stripping solution. In solvent extraction, the aqueous solution used to re-extract the uranium from the pregnant solution. *Newton, p. 440.*

stripping system. The removal of the overburden and mining of the ore in one or more benches, the ore face being broken by blasting and the broken ore loaded by hand, shoveling machine, or steam shovel. The name "terrace or bench open-pit working" has been suggested. *Fay.*

stripping the quarry. The removal of all dirt and disintegrated material from the quarry face. *Nelson.*

stripping yard. The place where glass plates are removed from tables after grinding and polishing. *ASTM C162-66.*

strip pit. A coal or other mine worked by stripping. An open-pit mine. *Fay.*

strip sample. A sample, in the form of a notch or groove, cut from roof to floor of a coal seam, or hanging wall to footwall of a vein. *See also* groove sample. *Nelson.*

strip steel. Flat rolled steel from the finishing rolls in a hot strip mill. Strip steel may be up to 60 inches wide and ranges in thickness from 0.049 to 0.25 inch. The strip is wound into coils by downcoilers, and may be cut to size and coated with a thin protective layer of tin (tinplate). *Nelson.*

strip thrust. *See* decollement. *A.G.I.*

stroboscope. Variable-speed flashing light source used to observe the behavior of machinery in rapid closed-circuit motion. Also known as a rotoscope. *Pryor, 3.*

stroboscopic effect. The illusion that a fast-moving part is stationary. *Mason, V. 1, p. 258.*

strockle. A shovel with a turned-up edge used by glassworkers. *Webster 3d.*

stroge. a. The distance traveled by a piston in a pump or a piston in a hydraulic-feed mechanism on a drill. *Long.* b. The maximum distance a piston moves within a cylinder before the direction of its travel is reversed. *See also* run, x; travel. *Long.* c. The distance a churn-drill stem and bit are raised for dropping while drilling. *Long.* d. To give a finely fluted surface to (a stone). *Webster 3d.*

stroke of crusher. The difference in inches between the open and closed positions measured at the throat of the crusher. For small crushers it is about ⅜ inch to ¾ inch, and for large crushers from 1 to 2 inches. Also known as throw of crusher. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 216.*

stromatite. A type of mixed rock or chorismite in which the units of the fabric (granitic material and metamorphic or sedimentary rock) form a system of layers, strata, or bands so intricately united that the whole rather than the individual layers constitutes the geological field unit. *A.G.I.*

stromatolite. This term has been generally applied to laminated structures attributed to the work of blue-green algae. Commonly called algal structures. Characteristically laminated with varied gross forms, from near-horizontal, to markedly convex, columnar and sub-spherical. *Pettijohn.*

stromatolith. a. Certain curious layered, banded structures in the buntersandstein associated with oöliths, and supposed to be organic. *A.G.I.* b. Applied to a large mass of mixed rock which consists of alternating layers of igneous and schistose rocks in sill relationship. A large mass of stromatite. *A.G.I.*

stromatolithic. A term, meaning stone layer, applied to the banded structure of composite gneisses that consist of alternating layers of igneous and schistose rocks in sill relationship. *Holmes, 1928.*

Stromboli type. In volcanology, activity characterized by eruption of slag bombs and gas. *Hess.*

stromeyerite. A somewhat, variable sulfide of silver and copper, $(Ag,Cu)_2S$, containing 50.2 to 52.7 percent silver and 30.5 to 33.7 percent copper. Orthorhombic. *Sanford; Dana 17.*

stronalite. A cataclastic biotite gneiss associated with diorite gneiss and kinzigite. *See also* cataclasite; flaser gneiss; kinzigite. *Holmes, 1920.*

strong. a. Hard and thick; said of dikes. *Standard, 1964.* b. Important or rich; said of veins. *Standard, 1964.* c. Referring to the character of bind, meaning that the argillaceous is largely mixed with the arenaceous or siliceous material. *Fay.* d. Scot. Hard, not easily broken, for example, strong coal, strong blaes. *Fay.*

strongback. A heavy timber or metal beam or bar for taking a strain. *Webster 3d.*

strong lode. A large, persistent lode. At Alston moor, England, applied to lodes lying in a fault plane in which the difference of level between similar strata is considerable. *Fay.*

strontianiferous. Containing or yielding strontium or its salts. *Standard, 1964.*

strontianite. Natural strontium carbonate, $SrCO_3$; white, gray, yellow, green; luster, vitreous; Mohs' hardness, 3.5 to 4; specific gravity, 3.7; orthorhombic. Found in California, New York, Washington; Germany; Mexico. Associated with limestones and less frequently with eruptive rocks. A source of strontium chemicals. *Dana 17; CCD 6d, 1961.*

strontioginorite. A strontian variety of ginorite, $(Sr,Ca)_2B_{14}O_{23}.8H_2O$, from the "Old Halite" bed of the Königshall-Hindenburg mine, Reyershausen, Germany. The unit cell and refractive indices are near those of volkovite. *Compare* strontium ginorite. *Hey, M.M., 1961.*

strontium. A bivalent metallic element in group II of the periodic system. One of the alkaline-earth metals. When pure and untarnished, it is silvery-white. It is always combined in nature, chiefly in the minerals celestite ($SrSO_4$) and strontianite ($SrCO_3$). It also occurs in mineral springs. Symbol, Sr; atomic number, 38; and atomic weight, 87.62. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-136.* Softer than calcium metal; oxidizes quickly in air and becomes pale yellow; should be kept under kerosine to prevent oxidation; specific gravity, 2.6 (at 20° C); when finely divided, it ignites spontaneously in air; melting point, 769° C or 774° C; boiling point, 1,366° C or 1,384° C; decomposes water more violently than does calcium metal; and is soluble in acids, in alkalies, and in liquid ammonia. Three allotropic forms include at least one isometric form: (1) alpha strontium, stable below 235° C; (2) beta strontium, stable from 235° to 540° C; and (3) gamma strontium, stable from 540° C to the melting point. Strontium 90 is the most important of the 16 known isotopes (strontium 80 to strontium 95). Strontium 90 has a half-life of 28 years; is one of the best long-lived, high-energy beta particle emitters known; is a product of nuclear fallout; and as such constitutes a serious health problem. *See also* strontium 90. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-25, B-136, B-226.*

strontium apatite. A vitreous lustered mineral, nearly $(Sr,Ba)_6(Ca,RE,Mg,Na)_4$-$(PO_4)_6(F,OH)_2$; pale green to yellowish-green, colorless and transparent in small crystals; greasy fracture; found in sugary albite filling interstices between crystals of aegirine and eckermannite in veins in alkalic pegmatites from Inagil massif, southern Yakutia. It is suggested that the name strontium apatite be used for all members of the apatite group with more than 50 percent (atomically) of Sr. *American Mineralogist, v. 47, No. 5-6, May-June 1962, p. 808.* Synonym for fermorite; saamite.

strontium boride. SrB_6; melting point, 2,235° C; specific gravity, 3.42. *Dodd.*

strontium carbonate; strontianite. Colorless or white; orthorhombic becoming hexagonal at 926° C; $SrCO_3$; molecular weight, 147.63; specific gravity, 3.62 or 3.70; Mohs' hardness, 3.5 to 4.0; melting point, 1,497° C (at 69 atm); ordinarily no melting point because it decomposes losing CO_2 at about 1,100° C or at 1,340° C; very slightly soluble in water; soluble in carbonated water, in acids, and in solutions of ammonium salts. The mineral strontianite is colorless, white, gray, yellow, or green, and it ranges in specific gravity from 3.680 to 3.714. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-226, B-245.* Used in the manufacture of iridescent glass. *CCD 6d, 1961.* Has limited use in introducing strontia into glasses, glazes, and enamels. It is principally used in making low-temperature leadless glazes. *Lee.*

strontium ginorite. The strontium analogue of ginorite, $Sr_2B_{14}O_{23}.8H_2O$, as distinct from strontioginorite. *See also* strontioginorite. *Hey, M.M., 1961.*

strontium minerals. Used in the chemical and rayon industries, and occasionally for metallurgical purposes; also for railroad and military flares. Known chiefly as celestite. Domestic production has been unimportant. *Barger.*

strontium 90. Radioactive strontium of mass number 90; half-life, 28 years; radiation, beta; and radiotoxicity, very hazardous. In fallout, this isotope, a member of the mass 90 fission product chain which is produced in high yield from fission, is the longest lived member of that chain and consequently is itself produced in high yield. Because of its half-life, which is comparable to times of importance in meteorological and biological processes, this isotope is one of the principal radioactive species in terms of activity and in fission products that are a few months to a few years old. The element is classed as a bone seeker; is metabolized in much the same manner as calcium; is generally considered the most hazardous component of fallout; is the cause of much of the concern for the fallout problem; and it is the radioisotope generally isolated and measured when fallout measurements are made. Used in electronics for studying strontium oxide in vacuum tubes, for measuring silt density, and in atomic batteries. *See also* strontium. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-26.*

strontium oxide; strontia. Grayish-white; isometric; SrO; specific gravity, 4.7; melting point, 2,430° C; and it is converted to strontium hydroxide by water. Molecular weight, 103.62; boiling point, about 3,000° C; soluble in hot water and in fused potassium hydroxide; slightly soluble in alcohol; and insoluble in ether and in acetone. Used in pigments. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-227.* Obtained by heating strontium nitrate or carbonate to a high temperature. *Standard, 1964.*

strontium stannate. $SrSnO_3$; sometimes used as an additive to titanate bodies, one result being a decrease in the Curie temperature. *Dodd.*

strontium sulfate; celestite; celestine. Colorless or white; orthorhombic; $SrSO_4$; molecular weight, 183.68; specific gravity, 3.96; Mohs' hardness, 3.0 to 3.5; melting point, 1,605° C; very slightly soluble in water; slightly soluble in acids; and insoluble in alcohol and in dilute sulfuric acid. Occurs naturally as the mineral celestite (celestine) which is colorless, white, or yellow, and sometimes bluish, reddish, or greenish and its specific gravity ranges from 3.84 to 3.97. Used in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-227, B-242.*

strontium titanate. $SrTiO_3$; isometric; and melting point, 1,670° C. Used in ceramic dielectric bodies, either alone or in combination with barium titanate or other titanates. *Lee; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-137.*

strontium zirconate. $SrZrO_3$; melting point, 2,700° C; specific gravity, 5.48. Sometimes used in small amounts (3-5 percent) in ceramic dielectric bodies, one effect being to lower the Curie temperature. *Dodd.*

stroup. Scot. A spout. *Fay.*

struck capacity. a. The capacity of a mine car, tram, hoppit, or wagon to the flat surface at the edges, that is, the volume of water it would hold if of watertight construction. *Nelson.* b. In scraper loading, the maximum volume of liquid that the bowl can hold. *Compare* heaped capacity. *Carson, p. 78.*

struck out. Corn. The termination of a vein or lode by a fault. *Fay.*

structon. A unit of atomic structure in an amorphous solid, such as glass and further defined as a single atom (or ion, or molecule) surrounded in a specified manner by others; examples for a sodium silicate glass would be Si(40), O(2Si,Na), etc. The concept aimed to reconcile the randomness of the long-range structure of a glass with the relative regularity in the short-range structure. The term has not achieved popularity. *See also* vitron. *Dodd.*

structural facing unit. A structural or building unit designed for use where one or more faces will be exposed in the finished wall and for which specifications include requirements on color, finish and other properties affecting appearance. This classification includes facing brick, structural clay facing tile, ceramic glazed structural facing tile, architectural terra cotta and ceramic veneer. *ASTM C43-65T.*

structural. Pertaining to, part of, or consequent upon the geologic structure; as, a structural valley. *Fay.*

structural analysis. The initial stage of structural design, in which all the forces carried by the various parts of a structure are determined. *Ham.*

structural basin. a. The force within the earth bends it (the crust) down between the mountain ridges, giving rise to depressions. These are called structural basins or valleys. *A.G.I.* b. An elliptical or roughly circular structure in which the rock strata are inclined toward a central point. *A.G.I.*

structural bottoming. *See* bottoming, a. *Lewis, p. 295.*

structural chemistry. The branch of chemistry dealing with atomic linkages. *Pryor, 3, p. 80.*

structural clay facing tile. Tile designed for use in interior and exterior unplastered walls, partitions, or columns. *ASTM C43-65T.*

structural clay tile. Hollow burned clay masonry building units with parallel cells or cores or both. *ASTM C43-65T.*

structural control. The apparent localization of mineral deposition by structural features. *A.G.I.*

structural drill. A highly mobile diamond- or rotary-drill rig complete with hydraulically controlled derrick mounted on a truck, designed primarily for rapidly drilling holes to determine structure in subsurface strata or for use as a shallow, slim-hole producer or seismograph drill. Capacity is generally about 1,500 feet of 3⅞-inch-diameter or NX-size borehole. *See also* seismograph drill, structural drilling. *Long.*

structural drilling. Drilling done specifically to obtain detailed information delineating the location of folds, domes, faults, and other subsurface structural features undiscernible by studying strata exposed at the surface. *Compare* structure drilling. *Long.*

structural fabric. *See* fabric. *A.G.I.*

structural geology. The study of the structural (as opposed to the compositional) features of rocks, of the geographic distribution of the features and their causes. *A.G.I.*

structural glass. a. Flat glass, usually colored or opaque, and frequently ground and polished, used for structural purposes. *ASTM C162-66.* b. Glass block, usually hollow, used for structural purposes. *ASTM C162-66.*

structural high. *See* high, structural. *A.G.I.*

structural load. The load due to the structure itself as distinguished from the imposed load. *Crispin.*

structural log. A record of the breaks, fractures, faults, and physical properties of rocks within a formation. *BuMines Bull. 587, 1960, p. 2.*

structural low. *See* low, structural. *A.G.I.*

structural petrology. a. That phase of petrofabric analysis that deals with deformed rocks and their tectonic history. Synonym for petrotechtonics. *A.G.I.* b. The study of structure within rocks, particularly minute structure revealed by petrofabric investigation. *A.G.I. Supp.*

structural plain. A gently sloping stratum plain. *Fay.*

structural products. As applied to structural clay products, building material units which, when assembled in a structure, may be load-bearing (designed to support loads in addition to their own weight) or non-load-bearing (designed to resist no loads other than their own weight). *ASTM C43-65T.*

structural relief. The difference between the highest and lowest elevations of a bed or stratigraphic horizon within a given region; more commonly, the difference in elevation between stratigraphically equivalent points at the crest of an anticline and in the trough of the adjacent syncline. *Stokes and Varnes, 1955.*

structural shape. A piece of metal of any of several designs accepted as standard by the structural branch of the iron and steel industries. *ASM Gloss.*

structural slate. Relates to products used chiefly for interior construction such as mantels, floor tiles, steps, risers, baseboards, window sills, lavatory slabs, and many others. *AIME, p. 798.*

structural spalling. a. The breaking off of pieces of a refractory as the result of repeated unequal heating at high temperatures. *A.I.S.I. No. 24.* b. The spalling of a refractory unit caused by stresses resulting from differential changes in the structure of the unit. *ASTM C71-64.*

structural steelwork. Rolled steel sections or other fabricated members assembled to form structural frames by riveting, welding, bolting, or a combination of all three. *Ham.*

structural terrace. Shelflike flattening of the dip in more steeply inclined strata. *A.G.I. Supp.*

structural trap. A reservoir, capable of holding oil or gas, formed from crustal movements in the earth that fold or fracture rock strata in such manner that oil or gas accumulating in the strata are sealed off and cannot escape. The most common structural traps are fault traps, anticlines, and salt domes. *Williams.*

structural uplift. The vertical distance between the trough of a syncline and the crest of an anticline; also the upthrow of a fault or series of faults. *Challinor.*

structural valley. A valley that owes its origin or form to its geologic structure. It may be a synclinal, anticlinal, or fault valley. *A.G.I.*

structural vitrain. Same as phyllovitrite. *Tomkeieff, 1954.*

structure. a. The parts or members of any building that carry the loads and transmit them to the foundations. Structures in mining areas may suffer some subsidence and are designed accordingly. *Nelson.* b. Geologically, the disposition of the rock formations, that is, the broad dips, folds, faults and unconformities at depth. *Nelson.* c. In petrology, one of the larger features of a rock mass, like bedding, flow banding, jointing, cleavage, and brecciation; also, the sum total of such features. *Compare* texture. *Fay*. d. *See* soil structure. *ASCE P1826*. e. A general term referring to the proportion and arrangement or spacing of abrasive in a wheel. A number in the specification, generally from 0 to 15, designates this spacing in arbitrary fashion and is termed "structure number." *ACSG, 1963*.

structure bit. a. A hollow, cylindrical chopping bit used in the Lake Superior iron districts to sample soft or highly fractured iron formations by wash boring. *Long*. b. An obsolete term, colloquially used in the Midwestern United States as a synonym of core bit. *Long*.

structure contour. a. A contour line drawn through points of equal elevation on a stratum, key bed, or horizon, in order to depict the attitude of the rocks. *A.G.I.* b. Contours of a selected bed, which indicate the physical form of that bed. *B.S. 3618, 1964, sec. 5*.

structure-controlled shoots. Ore shoots that are localized by various structures. Places of change in strike and dip of fissures are favorable sites for ore shoots. *Stokes and Varnes, 1955*.

structure drilling. a. Exploratory drilling to determine the geological structure particularly with reference to the coals or minerals sought. Rotary or diamond drilling is usually employed to yield cores at key horizons. *See also* stratigraphic bores. *Nelson*. b. A form of drilling practiced in the Lake Superior iron district to sample soft iron formations by counter-circulation-wash boring methods. *Long*.

structure number. A number, generally from 0 to 15, designating in arbitrary fashion the spacing of the abrasive grains in a grinding wheel relative to their grit size. The higher the number the greater is the spacing, but the actual relationship depends on the wheel manufacturer. *ASM Gloss*.

structure sections. Diagrams to show the observed geological structure on vertical faces or, more commonly, to show the inferred geological structure as it would appear on the sides of a vertical trench cut into the earth. *Billings, 1954, p. 422*.

structure test hole. A hole drilled for geologic structure alone, although other types of information may be acquired during the drilling. This type of hole is drilled to a structural datum which is normally short of known or expected producing zones. *See also* seismic shothole; slim hole; stratigraphic test hole. *Williams*.

strum. a. N. of Eng. A kind of iron sieve placed around the suction pipe of a pump, to prevent stones or other rubbish passing into the pump. *Fay*. b. Scot. A safety fuse. *Fay*. c. *See* snorepiece. *B.S. 3618, 1963, sec. 4*.

Strunian. Uppermost Devonian, transitional into Carboniferous. *A.G.I. Supp*.

strunzite. A monoclinic polymorph of laueite and pseudolaueite, $MnFe'''_2(PO_4)_2(OH)_2.8H_2O$, as straw-yellow radiating fibers from alteration of triphyline, at Hagendorf, Bavaria, Germany, and 12 United States localities. *Spencer 21, M.M., 1958*.

strut. a. A piece of wood or steel inserted between each pair of steel or timber supports on roadways to resist buckling and to maintain the proper spacing between the sets. Steel struts are often used and Hammerlock is one type. *Nelson*. b. A mine prop to sustain compression, whether vertical, or inclined. *Zern*. c. A prop; any structural member or support under compression. *Mason*. d. A diagonal brace between two legs of a drill tripod or derrick; also, a vertical-compression member in a structure or in an underground timber set. *Long*. e. Eng. Timber placed between two adjacent girders. *SMRB, Paper No. 61*. f. An inside brace. *Nichols*.

strut tenon. A tenon, such as is used on a diagonal piece or strut, usually on heavy timbers. *Crispin*.

Struve ventilator. A pneumatic ventilating apparatus consisting of two vessellike gas holders, which are moved up and down in a tank of water. By this means, the air is sucked out of the mine as required. *Zern*.

struvite. a. A colorless to yellow orthorhombic mineral with 1 perfect and 1 good cleavage, $(NH_4)_2O.2MgO . P_2O_5 . 12 H_2O$; Mohs' hardness, 2; specific gravity, 1.72. *Larsen, p. 99*. b. An isomorphous mixture of rutile and tapiolite or a solid solution of tapiolite in rutile. *Hess*.

stub. a. York. Drub. *Arkell*. b. York. Miners' term for impure cannel coal. The same as trub. *Tomkeieff, 1954*. c. An abrasive wheel that has been used until its diameter has been so much reduced by wear that it is no longer serviceable. *Dodd*.

stubachite. An altered diallage peridotite containing tremolite, talc, serpentine, magnetite, pyrite, and breunnerite in variable amounts. By increase of serpentine, the type passes into stubachite serpentine. *Holmes, 1928*.

stub entry. A short, narrow entry turned from another entry and driven into the solid coal, but not connected with other mine workings; a dead end. *Fay*.

stub pipe. A fitting to which the lower end of the casing must be joined in borehole lining. The stub pipe serves as a connection with the discharge pipe from the pump. It must be recessed at the top to receive the casing and be flanged at the bottom for discharge-pipe connections. It may be made of cast iron—plain, wood, or cement-lined—or of bronze, depending on the nature of the water. *BuMines Bull. 570, 1957, p. 6*.

stub rods. *See* starter rods.

Stub's gage. A gage for measuring the size of wire. Also known as Birmingham gage. *Crispin*.

stub switches. Switches used to some extent on narrow gage industrial tramways, consist of a pair of short switch rails, held only at or near one end and free to move at other end to meet rails of straight or diverging track. *Urquhart, Sec. 2, p. 42*.

stucco. a. A material used in a plastic state, which can be troweled to form, when set, a hard covering for the exterior walls or other exterior surfaces of any building or structure. *ASTM C11-60*. b. A fine plaster made of gypsum and glue-water, or of powdered white marble and fine sand, gypsum, and water, for walls or their relief ornaments. *Standard, 1964*. c. Plaster of Paris. *Standard, 1964*.

stucco dash. Consists of various types of stones, usually white or brilliantly colored, crushed to ⅛- to ⅜-inch size range. *BuMines Bull. 630, 1965, p. 886*.

stuck. *See* sanded in. *Compare* freeze, a. *Long*.

stuck shank. *See* stemware. *Dodd*.

stuck ware. Pottery ware that has stuck to the kiln furniture during the glost firing and is therefore waste. The fault may be caused by careless placing, by the presence on the ware of too much glaze, or by firing at a temperature that is too high for the glaze being used, which therefore becomes too fluid. *Dodd*.

stud. a. A bolt having one end firmly anchored. *Nichols*. b. A threaded rod or a bolt without a head. *See also* welding. *Ham*. c. An upright beam or scantling as in the framework of a dwelling. *Crispin*.

studdle. a. A strong crossbeam in a shaft collar set. *Nelson*. b. Corn. A prop to support the middle of a stull. *Fay*. c. A distance piece between successive frames of timbering. *Fay*. d. The vertical members of shaft-timber sets placed at each corner and at the intersection of the dividers and the wallplates. *Fay*. e. An upright prop supporting a platform in a mine, usually one of a set of four. *Standard, 1964*.

stud type chain. A roller chain in which the inner (block) links are connected solidly by nonrotating bushings. *Nichols*.

stud welding. An arc-welding process wherein coalescence is produced by heating with an electric arc drawn between a metal stud, or similar part, and the other work part until the surfaces to be joined are properly heated, when they are brought together under pressure and no shielding is used. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92*.

stufa. A jet of steam issuing from a fissure in volcanic regions. *Fay*.

stuff. a. Ore associated with the gangue of a lode. *Fay*. b. The produce of a mine, as coal and slack. *Fay*.

stuffed mineral. A mineral having large interstices in its structure may accommodate various foreign ions in these holes; such a mineral is then said to be stuffed. The stuffing may have considerable consequences on the stability of the mineral. *A.G.I.*

stuffing box. a. A cylindrical recess, filled with packing and compressed by a gland, to make a pressure tight joint. It prevents leakage of water from a pump or steam from an engine. *Nelson*. b. A chamber designed to contain packing and to maintain a fluid tight joint about a piston rod where it enters a cylinder or around a drill rod where it enters the casing at the collar of a borehole. *Long*. c. A space around a shaft filled with soft packing to prevent fluids or gases from leaking along it. *Nichols*.

stugg. Scot. To take down coal with the pick only. *Fay*.

stull. a. A timber prop set between the walls of a stope. *Nelson*. b. A timber platform on which valueless rock or mineral is deposited. *Nelson*. c. The top piece of a set of mine timbers. *Weed, 1922*. d. A timber prop supporting the roof of a mine opening. *Weed, 1922*. e. Corn. A platform (stull-covering) laid on timbers (stullpieces), braced across a working from side to side, to support workmen or to carry ore or waste. *Fay*. f. A timber extending from footwall to hanging wall. *Ballard*. g. Can. Timber used to brace the walls of mine openings. *Hoffman*. h. A round timber used to support the sides or back working of a mine. *Mersereau, 4th, p. 506*.

stull covering. a. A platform resting on stulls in a stope as a stage for miners or for holding rock or mineral. *Nelson*. b. A platform in a stope, to carry men or mineral. *C.T.D.*

stull dirt; stull rock. Material supported upon the stulls. *Fay.*

stulled stopes. Stopes in which the roof is supported by stulls, square-set timbering, or concrete columns. *Stoces, v. 1, p. 394.*

stull piece. A piece of timber placed slanting over the back of a level to prevent rock falling into the level from the stopes above. *Standard, 1964.*

stull stoping. The walls of narrow veins frequently are supported by stull timbers placed between the foot and hanging walls, which constitute the only artificial support provided during the excavation of the stopes. Stulls may be placed at irregular intervals to support local patches of insecure ground, in which case the stopes are virtually open stopes. Sometimes the stulls are placed at regular intervals both along the stope and vertically, in which case stull stoping should be considered a distinctive method. *BuMines Bull. 390, 1936, p. 10.*

stull timbering. The support of walls in shrinkage stoping by setting stulls. *Nelson.*

stulm. An approximately horizontal passageway into a mine; an adit. Taken from the German term stollen. *Webster 3d.*

stump. a. Entry pillars; small portion of room pillars left for pick mining. *B.C.I.* b. A small pillar of coal left between the gangway or airway and the breasts to protect these passages; any small pillar. *Fay.* c. A narrow pillar of coal. *Lewis, p. 543.*

stumper. A narrow heavy dozer attachment used in pushing out stumps. *Nichols.*

stumping. Lanc. A kind of pillar-and-stall plan of mining coal. *Fay.*

stump prop. Short posts set under the crown bars of a tunnel. *Stauffer.*

stump pulling. Pillar robbing. *Fay.*

stun. a. In stonecutting, to loosen the surface of, as stone in dressing, by blows with the edge or point of a hammer, delivered at right angles to the face. *Standard, 1964.* b. A white or discolored place in marble or other stone, caused by a blow from a blunt-edged or blunt-pointed hammer. *Standard, 1964.* c. A groove or scar on the sawed face of a piece of stone, caused by sand or grit between the side of the sawblade and the stone. *Standard, 1964.*

stunning. A quarryman's term for the formation of fractures caused by the cutting bars of a channeling machine striking the rock excessively heavy blows. *Fay.*

stunt. *See* dunt.

stup. A pulverized mixture of clay and coke or coal. *Fay.*

stupalith. *See* lithium ceramcs. *Osborne.*

stupid. An extrusion machine in which the clay is forced through the die by means of a piston; such machines are now rare. *Dodd.*

stupp. Deposit, obtained in the distillation of mercury ores, consisting of mercury metal, mercuric oxide, soot and dust and ore particles. *Bennett 2d, 1962.*

sturt. Corn. A tribute bargain which turns out profitably for the miner. *Fay.*

Sturtevant balanced rolls. Rolls in which all four boxes are moveable and held in position by springs. The idea is to divide the thrust whenever the springs yield and thus reduce internal stresses. *Liddell 2d, p. 357.*

Sturtevant grinder. A disk grinder in which one disk is stationary and the other rotates. The stationary disk is moved out of center from time to time, so that any groove which forms can be ground out. *Liddell 2d, p. 357.*

Sturtevant ring roll crusher. A crusher similar to the Kent roller mill. *Liddell 2d, p. 358.*

Sturtevant roll jaw crusher. A crusher in which the motion of the upper part of the jaws is like that of the Dodge crusher, while the lower parts of the jaws, of cylindrical surfaces of varying radii, grind the ore between them. *Liddell 2d, p. 358.*

Sturzelberger iron reduction process. A process evolved for dealing with pyrite roasting residues rich in zinc (8 to 10 percent). The direct reduction takes place in a short rotary drum which has a rammed tar-dolomite lining. Lime is added to produce a highly basic slag, the pyrite cinders, precalcined, are mixed with coke breeze and fired with pulverized coal burners. The zinc is recovered from the waste gases. The drum works discontinuously in 7-hour heats and the capacity of such plant is limited in comparison with a blast furnace. The product is a liquid pig iron, which is claimed to be of high grade. *Osborne.*

Stygian deposits. A general term for ore deposits formed underground by waters of atmospheric origin. *Fay.*

stylolite. Suture planes in marble or limestone. *See also* suture joint; crowfoot. *Bureau of Mines Staff.*

stylotypite. A mixture, mainly tetrahedrite. *American Mineralogist, v. 37, No. 3-4, March-April 1952, p. 362.*

styphnic acid; 2,4-dihydroxy-1,3,5-trimethylbenzene; 2,4,6-trinitroresorcinol. Yellow; hexagonal; $C_6H(OH)_2(NO_2)_3$; molecular weight, 245.11; astringent taste; melting point, 179° to 180° C; explodes on rapid heating; no boiling point because it sublimes; soluble in ethyl alcohol and in ether; and slightly soluble in water. Used as a constituent of priming agents in the explosive industry. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-161.*

Styrian jade. Same as pseudophite. *Shipley.*

Styrian orogeny. Early Miocene diastrophism. *A.G.I. Supp.*

styrine. A transparent plastic with comparatively high refractive index and dispersion; refractive index, 1.59. *Shipley.*

stythe; stithe. a. Used among British miners for carbonic acid gas, often found in old workings and given off in most shallow mines. *Tomkeieff, 1954.* b. Scot. A miner's term for firedamp, or rather for stifling, suffocating odor of chokedamp that follows an explosion of the former. *Fay.* c. Blackdamp. *Mason.*

sub. a. Mid. Subsistence; money or wages paid on account. *Fay.* b. Short for sublevel in caving systems of mining. *Fay.* c. A coupling with different types and sizes of box or pin threads at either end. Used to connect unlike threaded members of drill string, casing, or drive pipe equipment together. Also called adapter; substitute. *Long.* d. A short section of hollow shafting used to connect parts of a drilling shaft which, because of difference in thread design, size, or for some other reason, cannot be screwed together. Subs should always be made of properly heat-treated tool-joint steel. Also called substitute. *Brantly, 2.*

sub-. A prefix denoting under, below, or less than. Containing only a relatively small proportion or less than the normal amount of (such) an element or radical; not used systematically. *Webster 3d.*

suba Abbreviation for subbituminous A. *BuMin Style Guide, p. 62.*

subadamantine. Luster not as highly reflective as adamantine, but more so than vitreous. *Shipley.*

subaeration cells. *See* sub-A flotation cells.

subaeration method. In flotation, a method employing an impeller, of which the principal function is to keep the pulp in suspension, and a port for admission of air below the surface of the pulp, this port of entry being in the vicinity of the impeller. *Gaudin 2, p. 416.*

subaerial. Formed, existing, or taking place on the land surface; contrasted with subaqueous. *Fay.*

subaerial deposit. Deposit laid down on a land surface. *Schieferdecker.*

subaerial erosion. The erosion of land masses not permanently covered by water. This is contrasted with the negligible erosive forces under the sea. *Hy.*

Sub-A flotation cells; subaeration cells. Those in which air is supplied direct to a rotary agitator, mechanically driven, situated at depth in the flotation cell so that air is churned with ore pulp. Two types are: (1) that in which air is drawn down by impeller; and (2) that in which low-pressure air is blown in. *Pryor, 3.*

subalkalic. a. Refers to igneous rocks lacking alkali minerals other than feldspars. *A.G.I. Supp.* b. Formerly used to describe the Pacific series of igneous rocks. *A.G.I. Supp.*

subalpine peat. Peat deposit formed at moderate elevation under the influence of a cold-temperature climate. *Tomkeieff, 1954.*

subaluminous. In the Shand classification of igneous rocks, a division embracing those rocks in which the molecular proportion of alumina is equal to, or slightly greater than, that of soda and potash combined, that is, there is little or no excess of alumina over that required to form feldspar and feldspathoids. *A.G.I.*

subangular. Somewhat angular; having rounded edges and corners. A typical glacial boulder is subangular. *Challinor.*

subanthracite. Coal intermediate between anthracite and superbituminous coal. *Tomkeieff, 1954.*

subaqueous. Formed, existing, or taking place beneath a body of water; contrasted with subaerial. *Fay.*

subaqueous deposit. Deposit made beneath a body of water. *Schieferdecker.*

subaqueous mining. Surface mining in which the material mined is removed from the bed of a natural body of water. *American Institute of Mining and Metallurgical Engineers. Technical Publication No. 604, 1935, p. 6.*

subarkose. Sandstone containing 10 to 25 percent feldspar. *Compare* feldspathic sandstone; arkosic sandstone. *A.G.I. Supp.*

subatomic particle. Any of the constituent particles of an atom; such as, an electron, a beta particle, a neutron, a proton, etc. *L&L.*

subaudible noise. Noise the intensity of which is so low that it can only be detected by means of a microphone and suitable amplifying equipment. How these subaudible noises, or microseisms, originate has not definitely been established, but it is believed that they are produced by incipient cracking or intermovement between fragments of crystalline aggregates in the rock and it has been found that almost invariably a period of increased microseismic activity precedes any large-scale ground movement or failure. *Isaacson, pp. 171-172.*

subbase. a. A layer of material laid on the natural ground under a road base for purposes of strengthening. *Ham.* b. The lowest part of a base. *Crispin.*

subbituminous A coal. Both weathering and nonagglomerating subbituminous coal having 11,000 or more, and less than 13,000 British thermal units (moist, mineral-matter-free). *ASTM D388-38.*

subbituminous B coal. Both weathering and nonagglomerating subbituminous coal having 9,500 or more, and less than 11,000 British thermal units (moist, mineral-matter-free). *ASTM D388-38.*

subbituminous C coal. Both weathering and nonagglomerating subbituminous coal having 8,300 or more, and less than 9,500 British thermal units (moist, mineral-matter-free). *ASTM D388-38.*

subb Abbreviation for subbituminous B. *BuMin Style Guide, p. 62.*

subbituminous coal. a. Black lignite or lignitic coal. *Fay.* b. Coal of rank intermediate between lignite and bituminous. In the specifications adopted jointly by the American Society for Testing Materials (D388-38) and the American Standards Association (M20.1-1938), subbituminous coals are those with calorific values in the range 8,300-13,000 Btu, calculated on a moist, mineral-matter-free basis, which are both weathering and nonagglomerating according to criteria tentatively adopted in the classification. *Stokes & Varnes, 1955.* c. Glossy black coal which grades downwards in properties from bituminous to brown coal and includes black lignite. *Tomkeieff, 1954.*

subboundary structure. A network of low-angle boundaries (usually less than one degree) within the main crystals of a metallographic structure. *ASM Gloss.*

subc Abbreviation for subbituminous C. *BuMin Style Guide, p. 62.*

subcannel coal. Cannel coal of brown coal and subbituminous rank. *Tomkeieff, 1954.*

Subcarboniferous. Synonym for Mississippian. Obsolete. *A.G.I. Supp.*

subchord. Any chord of a circular curve whose length is less than that of the chord adopted for laying out the curve. In a railroad curve, for example, a subchord is a chord less than 100 feet in length. *Seelye, 2.*

subcoastal plains. Submerged plains of the continental shelf. *Fay.*

subconchoidal. Partially or indistinctly conchoidal. *Webster 3d.*

subcooling. Cooling of a liquid refrigerant below the condensing temperature at constant pressure. *Strock, 10.*

subcritical area of extraction. An area of goaf too small to cause full subsidence at the surface. *See also* critical area of extraction. *Nelson.*

subcritical assembly. A mass of fissionable material and moderator, the effective multiplication factor of which is less than 1 and hence which cannot sustain a chain reaction. Used primarily for educational purposes. *L&L.*

subcritical flow. Flow at velocities less than one of the recognized critical values; specifically, turbulent flow with a mean velocity less than Belanger's critical velocity; streaming flow. *Seelye, 1.*

subcritical mass. An amount of fissionable material insufficient in quantity or of improper geometry to sustain a fission chain reaction. *L&L.*

subcritical reactor. *See* subcritical assembly. *L&L.*

subcrustal deformation. Deformations of very viscous subcrustal masses. *Schieferdecker.*

subdelta. A smaller delta forming part of a larger, lobate- or bird-foot delta. *Schieferdecker.*

subdeposit level. *See* group level. *Stoces, v. 1, p. 228.*

subdivide. In geology, a divide between the tributaries of a main stream; a subordinate divide. *Standard, 1964.*

subdrift caving. *See* sublevel caving. *Nelson.*

subdrifting and caving. *See* top slicing combined with ore caving. *Fay.*

subdrilling. Refers to the breaking of the base in which boreholes are drilled one foot or several feet below the level of the quarry floor. *Streefkerk, p. 16.*

suberain. A subvariety of provitrain in which the corky origin of the cellular structure is microscopically visible. *Compare* periblain; xylain, a. *A.G.I.*

suberinite. a. A variety of provitrinite. The micropetrological constituent, or maceral, of suberain. It consists of corky tissue almost jellified in bulk but still showing indications of cell structure under the microscope. *A.G.I.* b. A distinction of telinite based on botanical origin (corky tissue). *A.G.I.*

suberitoid. Vitrain made of cork tissues. *Tomkeieff, 1954.*

subfeldspathic. Applied to a lithic wacke or lithic arenite containing less than 10 percent matrix. *A.G.I.*

subglacial. Formed or deposited beneath a glacier. *Fay.*

subgrade. a. The natural ground below a road, track, or siding. *Nelson.* b. The surface produced by grading native earth, or cheap imported materials, which serves as a base for a more expensive paving. *Nichols.* c. The soil prepared and compacted to support a structure or a pavement system. *Taylor.*

subgrade surface. The surface of the earth or rock prepared to support a structure or a pavement system. *ASCE P1826.*

subgrain. A portion of a crystal or grain, with an orientation slightly different from the orientation of neighboring portions of the same crystal. Generally, neighboring subgrains are separated by low-angle boundaries. *ASM Gloss.*

subgraphite. a. Coal intermediate between pure graphite and anthracite. *Tomkeieff, 1954.* b. Synonymous with superanthracite. *A.G.I. Supp.*

subgraywacke. Similar to graywacke but has less feldspar and more and better rounded quartz grains. *A.G.I.*

subhedral. Bounded in part by crystal faces proper to the mineral itself and in part, by surfaces formed against preexisting crystals; hypautomorphic and hypidiomorphic; said of some crystals in igneous rocks and intermediate in meaning between euhedral and anhedral. *Fay.*

sub-Hercynian orogeny. Mid-late Cretaceous diastrophism. *A.G.I. Supp.*

subhornblendic. Of or pertaining to material, as rocks that contain hornblende disseminated through their mass. *Fay.*

subhydrous coal. a. Coal of hydrogen content below average for the rank of coal, for example, coals containing a high proportion of fusain. *B.S. 3323, 1960.* b. Coal with a low hydrogen content—below 5 percent on a dry ashless basis. *Tomkeieff, 1954.*

subhydrous macerals. Macerals having a low hydrogen content, such as fusinite. *Tomkeieff, 1954.*

subincline. An inclined shaft along the footwall of a reef on the Rand. It develops and extracts ore from areas below the main haulage level. *See also* staple shaft. *Nelson.*

subindividual. One of the small crystals that often unite in parallel growths to build up larger crystals of the same general habit. *Standard, 1964.*

sub-irrigation. Irrigation effected by raising the standing water level in the proximity of the roots of plants. *Ham.*

subjacent. Situated directly underneath; lying below; in geology, lying below a stratum or another formation. *Standard, 1964.*

subjacent igneous body. An intrusive igneous body that has no visible floor and which enlarges downward to some unknown limit. Examples are batholiths, stocks, and bosses. Contrasted with injected igneous body. *A.G.I.*

subject contrast. The ratio of the X-ray intensities transmitted by selected portions of a specimen. *ASM Gloss.*

subjective brightness. The subjective brightness of a surface is determined by two factors, the light flux radiated from the surface and the sensitivity of the eye under the conditions in which the surface is seen. The sensitivity of the eye is partly controlled by the contrasts presented over the visual field, but is mainly dependent on its adaptation brightness level. *Roberts, II, p. 81.*

subjoint. Minor joints diverging from or parallel to the regular joints. *Fay.*

subjoint protector. A threaded thread protector used with a drill pipe. *Nichols.*

sublabile sandstone. Sandstone containing 10 to 20 percent of nonquartz material not counting matrix or cement. *A.G.I. Supp.*

sublevel. a. A secondary level for working ore in top slicing and sublevel caving; a companion heading. *Nelson.* b. An intermediate level opened a short distance below the main level; or, in the caving system of mining, a few feet (15 to 20) below the top of the ore body, preliminary to caving the ore between it and the level above. *See also* sublevel stoping; caving system of mining. *Fay.*

sublevel backstoping. See sublevel stoping, b. *Fay.*

sublevel caving. a. A stoping method in which relatively thin blocks of ore are caused to cave by successively undermining small panels. The ore deposit is developed by a series of sublevels spaced at vertical intervals of 18 to 25 or 30 feet and occasionally more. This is not all done before stoping operations are begun, but usually only one or two sublevels are developed at a time, beginning at the top of the ore body. The sublevels are developed by connecting the raises with a longitudinal subdrift from which timbered slice drifts are driven right and left opposite the raises to the ore boundaries or to the limits of the block. Usually alternate drifts are driven first, and caving back from them is begun and continued while the intermediate slices are being driven. The caving is begun at the ends of the slices by blasting out cuts and retreating in the same manner toward the raises. The broken and caved ore formerly was shoveled into cars and trammed to the raises, but in recent years it is dragged to the raises by power scrapers. Successively lower sublevels are developed and caved back until the entire block has been mined. This method is intermediate between block caving and top slicing, since part of the ore is mined as in top slicing and part is caved. *BuMines Bull. 390, 1936, p. 15.* b. Similar to top slicing from which it is thought to have been developed. The general plan of operations is to mine every other slice by driving crosscuts (slice drifts) from 18 to 36 feet apart. The ore between the crosscuts as well as that in the slice above is then mined, thus causing the overlying material to cave. The method is applicable to irregular and steeply dipping ore bodies that cannot be worked by top slicing. The present tendency is to sink vertical shafts in the footwall rather than inclined shafts as formerly done. *Lewis, p. 508.* Also called subdrift caving. *Nelson.* c. *See* top slicing combined with ore caving. *Fay.*

sublevel drive. A drive often made in a section, especially in gently inclined deposits, which divides the deposit into narrower panels and zones. They are narrower, and the support and equipment for them is more simple than that required in level drives. *Stoces, v. 1, p. 233.*

sublevel method. *See* sublevel stoping, b. *Fay.*

sublevel slicing. *See* top slicing combined with ore caving; sublevel stoping. *Fay.*

sublevel stoping. a. A method of stoping in which the ore is excavated in open stopes, retreating from one end of the stope toward the other. The ore body is developed first by a series of sublevel drifts above the main haulage level. These sublevels usually are 20 to 25 feet apart vertically but in some instances are 40 to 50 feet apart. They are connected by a starting raise at one end of the stope and by a manway raise for entrance to the sublevels and stope face at the other end. Chute raises connect the haulage level to the lowest sublevel, at which the tops of the chute raises are belled out to form millholes. Beginning at the starting raise the ore is benched down from the sublevels; the broken ore falls into the millholes, where it is drawn off through the chutes. The stope face is kept nearly vertical as it is benched backward toward the manway raise. *BuMines Bull. 390, 1936, p. 6.* b. A mining method involving overhand, underhand, and shrinkage stoping. Its characteristic feature is the use of sublevels. The sublevels are worked simultaneously, the lowest on a given block being farthest advanced and the subs above following one another at short intervals. The uppermost sublevel underneath the cover is partly caved. The caved cover follows down upon the caved ore. The broken ore is in part drawn from the level, and a part remains in the stope in order to give lateral support to the walls and to prevent admixture of cover and ore. The breaking faces are developed by crosscuts, which are extended from wall to wall from the end of the sublevel. The method can also be looked upon as a retreating method, the ore body being worked from the top down and the individual blocks upon a given level being worked from their ends to the center. Modifications of this method are: Chamber-and-pillar system; chambers without filling; combination of subslicing and stoping; drift stoping; filling system; Mitchell slicing system; pillar robbing; pillar robbing and hand filling; room-and-pillar system; square work and caving; square work, pillar robbing, and hand filling; sublevel back stoping; sublevel method; sublevel slicing system; substoping. *Fay.* c. A method of mining best adapted to steeply inclined deposits which have strong ore and strong walls. The ore is usually blocked out by two horizontal drifts separated vertically by 100 to 200 feet and raises between the two horizontal drifts, the latter separated by comparable distances. Vertical pillars may be left between stopes on the same level, and horizontal ones to support the main haulage. After the main blocks of ore have been completely mined, it is common practice to rob the pillars, and the walls of the stope may collapse after the pillars have been robbed. *Lewis, pp. 439-440.* d. Of lodes, open-stope mining in which ore is blasted and drawn through footwall openings to a gathering level in the country rock below. Used with strong containing walls and wide lodes. *Pryor, 3.* e. Of massive deposits, working simultaneously of a series of sublevels echeloned vertically, the lowest leading, and the uppermost being partly caved as the covered rock descends. *Pryor, 3.* f. *See* substoping. *Nelson.*

sublimate. a. A coating or deposit formed in a glass tube or on charcoal as a result of heating certain minerals. *Fay.* b. A solid deposited by a gas or vapor; commonly used in reference to material deposited by volcanic gases. *A.G.I.* c. The product of sublimation. *C.T.D.*

sublimation. The vaporization of a solid (especially when followed by the reverse change) without the intermediate formation of a liquid. *C.T.D.*

sublimation theory. The theory that a vein was filled first with metallic vapors. *Fay.*

sublimation vein. A vein formed in accordance with the sublimation theory. *Standard, 1964.*

sublime. a. To cause to pass from the solid state to the vapor state by the action of heat and again to condense to solid form. *Webster 3d.* b. To produce, to purify, or to release by heating a containing mixture. *Webster 3d.*

sublimed. Purified or prepared by a process of sublimation; for example, zinc dust. *Bennett 2d, 1962.*

Sublittoral Zone. *See* Benthic Division. *Hy.*

submarginal land. Generally means land not very good for farming. Tens of millions of tons of coal are removed each year by stripping the surface of this type land. *Kentucky, p. 330.*

submarine blast. A charge of high explosives fired in boreholes drilled in the rock underwater for dislodging dangerous projections and deepening channels. *Fay.*

submarine blasting. Blasting operations underwater. For isolated blasting under shallow water the gelatinous explosives are in common use. *Nelson.* Blasting underwater often has to be done in wet shafts or to break up rock during dredging. Special detonators and wires are used for this purpose. *Ham.*

submarine canyon. An elongated, steep-walled cleft running across or partially across the continental shelf, the continental borderland and/or slope, the bottom of which grades continually downwards. *A.G.I.*

submarine core drill. Used for investigating strata beneath the sea bed and taking sample and cores from which dredging conditions may be assessed. *Ham.*

submarine drilling. Drilling from the surface of a body of water with a drill mounted on an anchored tower, platform, or barge. *Long.*

submarine earthquake. Earthquake originating at or beneath the sea bottom. *A.G.I.*

submarine geology. The marine science which treats with the topographical features of the sea bottom, the phenomena which have developed them, and the types, processes, and distribution of sedimentation. *Hy.*

submarine mines. Workings that follow the mineral under the sea. *Zern.*

submarine packing. Special heavy paper shells in which dynamite is packed in underwater blasting. *Carson, 2, p. 54.*

submarine throat. A throat with level below the bottom of melter. *ASTM C162-66.* *See also* throat.

submarine valley. a. Like a submarine canyon but having sides with gentle slopes. *A.G.I.* b. A prolongation of a land valley into or across the continental or insular shelf, which generally gives evidence of having been formed by stream erosion. *A.G.I.*

submerged arc welding. An arc-welding process wherein coalescence is produced by heating with an electric arc or arcs between a bare metal electrode or electrodes and the work. The welding is shielded by a blanket of granular, fusible material on the work. Pressure is not used and filler metal is obtained from the electrode and sometimes from a supplementary welding rod. *Coal Age, v. 66, No. 3, Mar. 1961, p. 92.*

submerged bar. *See* offshore bar. *Schieferdecker.*

submerged coast. *See* shoreline of submergence. *Schieferdecker.*

submerged float. *See* subsurface float. *Ham.*

submerged objects. Any objects which are more or less constantly beneath the surface of the water, rarely exposed to the atmosphere and never exposed long enough to become dry. *Hy.*

submerged orifice. An orifice entirely below the level of water in a tail race. *Ham.*

submerged throat. *See* submarine throat. *ASTM C162-66.*

submerged unit weight. The weight of the solids in air minus the weight of water displaced by the solids per unit of volume of soil mass; the saturated unit weight minus the unit weight of water. *ASCE P1826.*

submerged wall. A wall of refractory material below the level of the molten glass in a tank furnace and separating the melting zone from the refining zone. *Dodd.*

submergence. a. In an air lift, the distance below the water level, during pumping, at which the air picks up water. *Lewis, p. 687.* b. A term which implies that part of the land area has become inundated by the sea but does not imply whether the sea rose over the land or the land sank beneath the sea. *A.G.I.*

submersible pump. A centrifugal pump, usually driven by electricity, which can be wholly submerged in water. The motor is totally enclosed and fully protected and its position in a shaft or borehole can be adjusted as the water level varies. Control of the pump can be remote and automatic. It is usually made of corrosion-resistant bronze and stainless steel with sealed motor stator windings. Submersible pumps are often used for dewatering old shafts and workings to safeguard active workings in the area or to prevent the seepage of water into such workings. These pumps are available for heads up to 1,000 feet and capacities up to 100,000 gallons per hour. *Nelson.*

submetallic. Applied to minerals having an imperfect metallic luster, as columbite and wolframite. *Fay.*

submetallic luster. A luster between metallic luster and nonmetallic luster. *Hurlbut.*

submicroscopic twinning. A twinning of certain minerals that is on such a small scale it can only be detected by X-rays and not by a microscope. *Hess.*

subnate. Applied to rocks formed within or below the crust. *Fay.*

suboceanic. a. Situated, taking place, or formed beneath the ocean or the bottom of the ocean. *Webster 3d.* b. Concerned with the sea bottom. *Webster 3d.*

subophitic. Used by some authors for ophitic texture when the feldspars are of approximately the same order of size as the pyroxenes and their enclosure by the latter mineral is only partial. *Schieferdecker.*

subordinate station. A tide or current station at which a short series of observations is obtained to be reduced by comparison with simultaneous observations at another station having well-determined tidal or current constants; also a station listed in Tide Tables or Current Tables for which predictions are obtained by means of differences or factors applied to the full predictions at a reference station. *See also* secondary station. *Hy.*

suboutcrop. a. A blind apex. *Nelson.* b. S. Afr. What would have been the outcrop on the surface, but covered by other formations. *Beerman.* c. Intersection of a vein, or other structural feature, with an unconformity. *McKinstry.* d. Area of intersection of geologic feature with the surface of bedrock beneath the regolith. *Hawkes.*

subporphyritic. Having, in an imperfect degree, the character of porphyry. *Fay.*

subsalt. A basic salt. *Standard, 1964.*

subsample. In coal and coke sampling, part of the sample consisting of a number of increments spaced evenly over the unit. *B.S. 1017, 1960, Pt. 1.*

subsaver. a. A sub which is used to take the wear between frequently broken joints, such as the position between the swivel and the kelly and between the kelly and the drill pipe. *Brantly, 2.* b. A protector for the thread protector on the kelly of a rotary drill. *Nichols.*

subsequent. Tributary to and subsequent in development to a primary consequent stream, but itself consequent upon structure brought out in the degradation of the region; subconsequent: said of some streams and their valleys; as, a subsequent valley. *Fay.*

subsequent deposits. Proposed for ores which were not directly the result of igneous processes. *Fay.*

subsequent dike. A dike that has been injected into a cold country rock, with fine-grained selvages with straight and not close-welded contacts. A characteristic occurrence of many basic or basaltic dikes. *J. Geol. v. 30, No. 2, Feb.-Mar., 1922, p. 165.*

subsequent fault. A fault whose detailed location has been mostly determined by previously existing planes of weakness. *Stokes and Varnes, 1955.*

subsequent ore deposit. See epigenetic deposit.

subsequent stream. Subsequent, which Jukes used in a descriptive sense, has been used similarly in a restricted and technical sense for streams that have grown headward by retrogressive erosion along belts of weak structure, and also for streams which, having been thus developed in one cycle, persist in the same courses in a following cycle. *See also* longitudinal valley. *A.G.I.*

subsequent valley. The valleys on the soft rocks which are opened up after the birth of the streams are called subsequent valleys, and their streams subsequent streams, because their origin is subsequent to that of the consequent streams. Valleys cut by those streams which have grown by headward erosion along belts of weak structure, without relation to the initial trough lines. *A.G.I.*

subshafts. S. Afr. Subshafts are those sunk underground as a continuation of shafts from the surface, and there are often several stages. Vertical shafts have been sunk to beyond 5,000 feet in one stage. *Beerman.*

subsidence. a. A sinking down of a part of the earth's crust. *Fay.* b. The lowering of the strata, including the surface, due to underground excavations. *See also* maximum subsidence. *Nelson.* c. Surface caving or distortion due to effects of collapse of deep workings. *Pryor, 3.*

subsidence area. The area affected by subsidence over areas where minerals or other substances have been removed. The area is larger than the mined-out area below. *A.G.I.*

subsidence basin. The shallow troughlike depression at the surface resulting from subsidence. *Nelson.*

subsidence break. A fracture in the rocks overlying a coal seam or mineral deposit as a result of its removal by mining operations. The subsidence break usually extends from the face upwards and backwards over the unworked area. *Nelson.*

subsidence curve. A curve on a graph representing a subsidence basin. *Nelson.*

subsidence factor. Full subsidence expressed as a fraction of the thickness of coal seam extracted. *See also* maximum subsidence. *Nelson.*

subsidence process. The strata composing the earth's crust are, generally speaking, subject to two main natural forces, namely, vertical and lateral compressive forces. Both of these can, normally, be considered as being in equilibrium (that is, in a state of balance). The general effect of mining is to create a space into which the overlying strata tend to subside and break down. In this way the normal state of equilibrium is disturbed, and there are vertical and lateral movements in the strata, which ultimately transmit themselves to the overlying surface. These movements will continue until the space has been closed and all the forces have been redistributed and equilibrium restored. The general tendency of the strata movement is inwards and downwards towards new centers of gravity in the area of extraction. Thus, the strata over the unworked coal is also affected and is drawn towards the workings. *Mason, v. 1, pp. 151-152.*

subsidiary company. A company in which a majority of the shares of stock are held by another company, giving the control to the latter. *Fay.*

subsidiary fracture; tension fracture. Minor breaks sometimes developed in the rocks along a fault plane. They often indicate the general direction of movement, and were caused by differential tension in the rocks contiguous to the main fault plane. *Nelson.*

subsidiary survey. An underground survey made to determine the position of a face line or goaf line or some other specific feature. *B.S. 3618, 1963, sec. 1.*

subsidiary transport. The conveying or haulage of coal or mineral along the working faces and outwards to a junction or loading point. *See also* main transport; underground haulage. *Nelson.*

subsieve analysis. In powder metallurgy, size distribution of particles all of which will pass through a 44-micron (No. 325) standard sieve, as determined by specified methods. *ASM Gloss.*

subsieve fraction. In powder metallurgy, currently, particles all of which will pass through a 44-micron (No. 325) standard sieve. *ASM Gloss.*

subsieve material. In ore dressing, material finer than 400 mesh which must be sized by elutriation in rising currents of water or air, by microscopic counts or other methods. *Newton, p. 72.*

subsieve sizes. Particle sizes too small for efficient grading on screens; usually —200 mesh material. They are examined by elutriation (beaker decantation, sedimentation, infrasizing in air, turbidimetry, permeability). *Pryor, 3.*

subsieve sizing. Size analysis of particles too small for efficient grading by use of screens, usually minus 200 mesh. *Pryor, 4.*

subsilicate. A basic silicate. *Standard, 1964.*

subsilicic. Used in place of the term basic to connote rocks having a silica content of less than 52 percent. *A.G.I.*

subslicing. *See* top slicing combined with ore caving. *Fay.*

subsoil. a. Broadly and loosely, the part of the regolith (earth mantle) which lies beneath the true soil and which contains almost no organic matter. *Fay.* b. More precisely, a layer of the regolith, grading into the soil above and into unmodified rock waste below, that is less oxidized and hydrated than the soil proper and contains almost no organic matter, but is somewhat charged with and indurated by iron oxides and clay that has been leached down from the overlying soil. *Fay.* c. Soil below a subgrade or fill; that part of a soil profile occurring below the A-horizon. *ASCE P1826. See also* soil profile.

subsoil drain. An agricultural drain laid just below the surface in wet ground and covered with broken stones. *See also* half-socket pipe. *Ham.*

subsoil drainage. The removal of subsoil water by open intercepting ditches and drain pipes. The distance between subsoil drains is a maximum in sandy soils and a minimum in clay. *See also* catchwater drain. *Nelson.*

subsoiling. The firing of small charges of dynamite 2 or 3 feet below the surface for breaking up impervious strata of soil, clay, etc., for aerating, draining, and moistening the soil. *Fay.*

subsoil plow. A one-tooth ripper designed for agricultural work. Also called pan breaker. *Nichols.*

subsolifluction. Subaqueous solifluction. *Pettijohn.*

substage. The time-stratigraphic unit next in rank below a stage. *Schieferdecker.*

substalagmite. A compact, noncrystalline deposit of calcium carbonate. *Webster 3d.*

substance. In the glass industry, this word means the thickness of glass sheets in ounces per square feet. *Dodd.*

substation. a. An electrical installation containing generating or power-conversion equipment and associated electric equipment and parts, such as switchboards, switches, wiring, fuses, circuit breakers, compensators, and transformers. *U.S. Bu-Mines Federal Mine Safety Code—Bituminous Coal and Lignite Mines, Pt. I Underground Mines, October 8, 1953.* b. A mining-type substation is an assemblage of equipment, such as motor generators, rotary converters, transformers, and rectifiers, through which electric energy in bulk is passed to change or to modify its characteristics. *ASA M2.1-1963.* c. The place where power is converted to the type, usually direct current, and voltage necessary for the mining equipment before it is fed into the mine power system. *Jones.* d. An assemblage of plant and equipment at one place, including the necessary housing, for the conversion, transformation, or control of electric energy. *See also* power station. *Nelson.* e. Subsidiary station in triangulation survey. *Pryor, 3.*

substitute. a. In gemmology, any substance represented to be, or used to imitate, a more valuable or better known substance, such as a genuine gem stone. *Shipley.* b. Synonym for sub. Long.

substitutional solid solution. A solid alloy in which the solute atoms are located at some of the lattice points of the solvent, the distribution being random. *ASM Gloss.*

substitution product. Chemical replacement of an element or group by another; redox reaction. *Pryor, 3.*

substitution vein. A metalliferous vein formed by the partial or complete substitution of the vein material for the original rock or mineral. *Webster 3d.* Also called replacement vein; replacement deposit. *Fay.*

substoping. a. An open stope method of mining employed in wide ore bodies with strong walls. *Nelson.* b. *See* sublevel stoping. *Fay.*

substratal lineation. Defined to include groove casts and load-cast lineation but commonly extended to include all substratal lineations. *Pettijohn.*

substrate. a. A layer of metal underlying a coating, regardless of whether the layer is basis metal. *ASM Gloss.* b. The true lattice of a crystal, as distinct from its discontinuity lattice, or surface. *Pryor 2.*

substratum. a. An underlayer or understratum; a stratum, as of earth or rock, lying immediately under another. *Standard, 1964.* b. As used more specifically by Daly (1946) and others, the hypothetical vitreous basaltic substratum lying beneath the lithosphere or outer granitic shell of the earth. *A.G.I.*

substructure. a. That part of any structure which is below ground, more particularly the foundations. The latter may take many forms, according to the nature and bearing strength of the ground. *Ham.* b. The lower portion of a structure upon which something else is built up. *Crispin.*

subsurface. a. Underground; the zone below the surface whose geologic features, principally stratigraphic and structural, are interpreted on the basis of drill records and various kinds of geophysical evidence. *A.G.I. Supp.* b. An underground workplace. *Long.* c. The underside of a glass blank or sheet of glass. *Kinney.*

subsurface air. The gases in the interstices of the zone of aeration that open directly or indirectly to the surface and hence communicate with the atmosphere. *A.G.I.*

subsurface contours. Same as structure contours and so called to distinguish them from topographic contours representing the surface of the ground. *Stokes and Varnes, 1955.*

subsurface correlation. Correlation of rock units and structures that do not appear at the surface, by means of well logs, mine maps, and geophysical data. *Stokes and Varnes, 1955.*

subsurface corrosion. Formation of isolated particles of corrosion products beneath the metal surface. This results from the preferential reaction of certain alloy constituents by inward diffusion of oxygen, nitrogen, and sulfur. *ASM Gloss.*

subsurface currents. Currents flowing below the surface. These currents normally flow at a speed different from that of the surface currents and may have a different set. *Hy.*

subsurface drainage. The removal of the surplus water from the interior of the soil, by means of natural drainage (for a gravelly subsoil) or by artificial drains placed under the surface. *See also* catchwater drain. *Nelson.*

subsurface erosion. *See* piping, c. *Nelson.*

subsurface float. A submerged float attached by a line to a surface float which reveals its movements. *Ham.*

subsurface geology. a. Geology of rock formations and structures at depth; the study of rock relationships and structures by the use of data obtained in mines or from exploratory drilling. *Compare* surface geology. *Nelson.* b. The study of structure, thickness, facies, correlation, etc., of rock formations beneath land or sea floor surfaces by means of drilling for oil or water, core drilling, and geophysical prospecting. *A.G.I.*

subsurface injection. *See* subsurface waste disposal.

subsurface map. A plane surface representation, generally in horizontal projection, of geologic data or features beneath the earth's surface. There are many types of subsurface maps, such as structure contour maps, isopachous maps, and maps showing variations in lithology, or proportions of different types of lithology in rocks not exposed at the surface. *Stokes and Varnes, 1955.*

subsurface waste disposal. Waste disposal in which manufacturing wastes are disposed of in porous underground rock formations. Disposal wells should be at least 200 feet deeper than the deepest water-bearing formation, and they must be sealed with cement from top to bottom. Also called subsurface injection. *Bureau of Mines Staff.*

subsurface water. All the water that exists below the surface of the solid earth. *A.G.I.*

subtense bar. A horizontal bar used in the subtense system of surveying by tacheometry. It is held at a distant point and its distance is calculated from its known length and the angle which it subtends at the observer's eye. *See also* tacheometer. *Ham.*

subterposition. The state of being placed beneath something else; specifically, in geology, the order in which strata are disposed in descending series. *Standard, 1964.*

subterrane. The bedrock beneath a surficial deposit. *Fay.*

subterranean. Being or lying under the surface of the earth. *Webster 3d.*

subterranean stream. A body of flowing water that passes through a very large interstice, such as a cave, cavern, or a group of large communicating interstices. *A.G.I.*

subtranslucent. Same as semitranslucent. *Shipley.*

subtransparent. Imperfectly or partially transparent; semitransparent. *Webster 3d.*

subtropical convergence. A region of convergent currents marked by rapid increase in surface water density with distance toward poles. Water sinking farther from the equator is more dense and will sink to greater depth. *Hy.*

subtuberant. Having a domelike form due to igneous intrusion into the rocks beneath; said of some domes in strata and of the consequent deformation of the surface and the resultant form of the topography. *Fay.*

subvitreous. Not quite vitreous. *Webster 3d.*

subvolcanic deposit. According to European nomenclature, a mineral deposit of magmatic origin formed at moderate or shallow depth, that is under epicrustal conditions, very often in Tertiary or Quaternary lavas; a term sometimes substituted by volcanic deposit. *Schieferdecker.*

subweathering. Below weathering. Pertaining to the consolidated material—bedrock or high-velocity weathered layer or zone. This velocity is distinctly greater than that in the weathered zone. *A.G.I.*

subweather velocity. The velocity of a seismic wave in a bed immediately underlying the low-velocity weathered layer or zone. This velocity is distinctly greater than that in the weathered zone. *A.G.I.*

succinite. a. A yellow or reddish-brown resinous substance commonly known as amber. It occurs in considerable quantities on the coast of the Baltic Sea, and in the bituminous coals of Southern France. *A.G.I. Also called* electrum. *Fay.* b. An amber-colored garnet of the grossularite species. *C.T.D.*

succinite garnet. Light yellow amber-colored andradite. *Shipley.*

suck. The shape of the bottom of a cutting edge or tooth which tends to pull it into the ground as it is moved. *Nichols.*

suck-and-blow process. A method of shaping glassware, the parison is made by sucking molten glass into a mold, the final shape being subsequently produced in a blow-mold. The process is also known as vacuum-and-blow. *See also* parison. *Dodd.*

sucked stone. Corn. A honeycombed or porous stone. *Fay.*

sucker list. A list composed of the names of people who have in the past been attracted by the advertisements of the type of wildcat company offering "one-dollar shares at three cents, the shares to advance to ten cents Friday." *Hoov, p. 262.*

sucker rod. a. The pump rod of an oil or artesian well. *Fay.* b. A rod of steel or wood having screw connections so that it may be joined to other rods and so form a string by which to operate a pump in a well. *Hess.*

sucker rod pump. A deep oil well pump used widely in the United States for extracting oil. The pump is fixed at the foot of the well and consists of a working barrel and hollow plunger operated by a line of rods hung from a walking beam at the surface. *Nelson.*

sucking. Loss of volatile oxides, particularly lead oxide, from a glaze by volatilization during glost firing in unglazed saggars or adjacent to nonvitreous kiln furniture, the vapor being sucked into the porous refractory. The fault is prevented by washing the inside of saggars with glaze or, in saggarless firing, by the use of kiln furniture of low porosity. *Dodd.*

sucking pump. A suction pump. *Standard, 1964.*

suction. a. Atmosphere pressure pushing against a partial vacuum. *Nichols.* b. The pull of a pump. *Nichols.* c. Adhesion of a mass of mud to the underside of an object being lifted out of it. *Nichols.* d. Resistance of objects to being lifted out of mud. Caused by atmospheric pressure. *Nichols, 2.*

suction anemometer. An anemometer that measures wind velocity by the degree of exhaustion caused by the blowing of the wind through or across a tube. *Standard, 1964.*

suction bailer. Synonym for sand pump. *See also* sand pump, a. *Long.*

suction basket. The strainer at the foot of the suction pipe of a pump or of a suction hose. *Standard, 1964.*

suction blast. *See* backlash, a.

suction casting. *See* vacuum casting. *Henderson.*

suction chambers. If the pressure within the sealed-off mine area is less than that outside, it is necessary to reduce the pressure within the chamber. This can be done by using an ejector or fan to draw air through a pipe in the outer wall of the chamber, a second pipe, fitted with a control valve, serving as an intake. Adjustment of the valve gives regulation of the chamber pressure within fine limits. The function of the suction chamber is to provide a trough of low pressure between the sealed area and the intake, so that air which would otherwise be drawn into the sealed area, through fissures and pores surrounding the seal, is drawn instead into the chamber. *Roberts, I, p. 100.*

suction cutter. a. In dredging, use of pump fed by pipe with power-rotated cutting blades to lift spoil. *Pryor.* b. In alluvial dredging, use of power-rotated cutting shoe to detach minerals from deposit, followed by their delivery by suction and elevation through a centrifugal pump. *Pryor, 3.*

suction-cutter dredger. A dredger in which rotary blades dislodge the material to be excavated, which is then removed by suction as in a sand-pump dredger. *C.T.D.*

suction dredge. a. Essentially a centrifugal pump mounted on a barge. *Carson, p. 354.* b. A dredge in which the material is lifted by pumping through a suction pipe. *Fay.*

suction dredger. a. A dredger which digs by means of powerful suction pumps, the semiliquid spoil thus raised being frequently conveyed away in a floating pipeline. *Ham.* b. See sand-pump dredger. *C.T.D.*

suction fan. A fan which sucks or draws the air towards it through airways or air pipes. The term generally used is exhaust fan. *Nelson.*

suction head. The head or height to which water can be raised on the suction side of the pump by an influence of atmospheric pressure. Normal atmospheric pressure will sustain in a vacuum, a column of mercury 30 inches high, or a column of water 30 by 13.6 divided by 12, equals 34 feet in height. Therefore, theoretically, a pump should be able to draw water from a depth of 34 feet. Because of constructional imperfections, mine pumps are not usually placed at a greater height than 20 to 25 feet above the surface of the water in the sump. *Nelson. See also* lift pump.

suction hole. The flexible, reinforced hose that runs from the drill sump to the intake port on a pump. *Long.*

suction lift. In pump nomenclature, exists when the liquid level is below the pump centerline and/or when a gage on the suction would show a vacuum. *Pit and Quarry, 53rd, sec. E, p. 82.*

suction pipe. a. That part of a pump where the water enters. *Fay.* b. *See* snore; strainer. *Nelson.*

suction pressure. Pressure in the suction line or evaporator of a refrigerating system. *Strock, 10.*

suction primer. A pump auxiliary to a steam pump, used to exhaust the air from the main chamber, as a preliminary to the use of steam. *Standard, 1964.*

suction process. Any process where glass is gathered by vacuum into the mold. *ASTM C162-66.*

suction pump. A common pump in which the liquid to be raised is pushed by atmospheric pressure into the partial vacuum under a retreating valved piston on the upstroke and reflux is prevented by a nonreturn valve in the pipe. *Webster 3d.* Theoretically the suction pump will lift water about 34 feet, but practically only a little over 20 feet can be counted on, because of leakage and other losses. *Webster 2d.*

suction pyrometer; high velocity thermocouple. An instrument for the determination of the temperature of moving gases when it differs considerably from that of their surroundings; the hot gases are drawn rapidly past the junction of a fine wire noble metal thermocouple. Such an instrument is used, for example, in the determination of the temperature of hot kiln gases passing through a setting of relatively cool bricks. *Dodd.*

suction rate. See absorption rate.

suction valve. a. A check or nonreturn valve on a suction pipe which allows an upward flow of water only. *Nelson.* b. The inlet valve forming part of a reciprocating pump. *B.S. 3618, 1963, sec. 4.*

suctive dike. A dike which has been forced quickly into a crack otherwise opened, by fault or earthquake relieving strain, aided by gravitative suction, owing to the condensation by cooling of the gases from the magma; contacts generally fairly straight and not close welded. *J. Geol, v. 30, No. 2, Feb.-Mar., 1922, p. 165.*

sudburite. A variety of hypersthene basalt. *A.G.I.*

sudd. The name given to a floating mass of decaying vegetable matter, originating from the impenetrable mass which accumulates on the Upper Nile and where it hinders navigation. It has sometimes formed an obstruction 20 miles long and about 20 feet deep, when it becomes so compact that it will support an elephant. *Ham.*

sudden drawdown. A rapid lowering of water level such as that caused by tidal variations. *See also* drawdown. *Ham.*

suddy partings. Term used among Lancashire miners for isolated lumps or broad lenticular bands of fusain in coal. *Tomkeieff, 1954.*

Sudetian orogeny. Late Early Carboniferous diastrophism. *A.G.I. Supp.*

Suffolk kiln. An early type of updraft intermittent kiln. The fire boxes were below the kiln floor which was perforated for the upward passage of the hot gases. *Dodd.*

sugar. A fault on lead crystal glass resulting from inadequate control during acid polishing and revealed as crystallites on the surface of the glass. *Dodd.*

sugar of lead. Lead acetate. *Fay.*

sugar sand. A variety of sandstone that breaks up into granules resembling sugar. *Arkell.*

sugar spar. Corn. Friable granular quartz. *Fay.*

sugar stone. Eng. An ironstone in Norfolk, so-named from its rich brown color. *Arkell.*

sugar test. A quality test for cement. *See also* Merriman test. *Dodd.*

sugar tube. A device to assess the degree of dustiness of mine air. It was first used on the Rand and consists of a tube containing about 50 grams of crystallized sugar. A known volume of mine air is aspirated through the tube. The sugar is dissolved and the dust is caught on a filter paper which is incinerated to give the weight of dust. The instrument thus measures airborne dustiness on a mass basis. *See also* dust sampling; midget impinger; soxhlet thimble. *Nelson.*

sugar-tube method. A dust sampling technique which measures airborne dustiness on a mass basis. A sugar tube consists of a glass tube 2⅜ inches in diameter and 5½ inches long, one end of which is constricted to 15/16 inch outside diameter, for connection to an air pump by means of suitable rubber tubing. In the glass tube is placed a layer, 1½ inches deep, of sized granulated sugar weighing 100 grams. By means of a suitable pump, air is drawn through the sugar tube at a rate of approximately 1 cubic foot per minute. The dust is retained in the sugar tube, which is then stoppered and sent to the laboratory for analysis. *R.I. 2392, September 1922, p. 1.*

sugary cut. Undue roughness of the edge of flat glass resulting from faulty cutting. *Dodd.*

sugary quartz. A granular and somewhat friable and massive variety of quartz. Same as sugar spar. *Fay.*

S.u.G. Process. A German method for the shaping of highly grogged fire clay refractories; the bond clay is added as a slip and shaping is by a compressed-air rammer. The name derives from the originators: Scheidhauer und Geissing A.C *Dodd.*

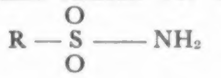
suite. a. A series of objects or things related through origin or composition and classed together for purpose of study. Minerals and rocks are commonly treated in suites. *Stokes and Varnes, 1955.* b. Collection of rock specimens from a single area, generally representing related igneous rocks. *A.G.I. Supp.* c. Collection of rock specimens of a single kind, for example, granites from all over the world. *A.G.I. Supp.* d. Succession of closely associated sedimentary strata, especially a repeated sequence. *A.G.I. Supp.*

suites (of igneous rocks). *See* consanguinity. *A.G.I.*

suldenite. A name given by Stache and von John to gray, acidic, andesitic porphyrites in the eastern Alps. They range from 54 to 62 percent, SiO_2, and have, in the prevailing gray groundmass, phenocrysts of hornblende, plagioclase, a little orthoclase, and accessory augite, biotite, and quartz. *Compare* ortlerite. *Fay.*

sulfamic acid; amidosulfuric acid; aminosulfonic acid. Colorless or white; orthorhombic; HSO_3NH_2; molecular weight, 97.09; nonvolatile; specific gravity, 2.126 (at 25° C); melting point, 200° C or 205° C (with decomposition); moderately soluble in water; slightly soluble in alcohol, in ether, and in acetone; insoluble in carbon disulfide and in carbon tetrachloride; and odorless. Aqueous solutions are highly ionized giving pH values lower than solutions of formic, citric, tartaric, phosphoric, and oxalic acids. All of the common salts (including calcium, barium, and lead salts) are extremely soluble in water. Used in metal and ceramic cleaning and in the electroplating and refining of metals. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-227.*

sulfamine. Compound with the structure R being an organic radical. For example:



$$R - \overset{O}{\underset{O}{S}} - NH_2$$

Pryor, 3.

sulfate. a. A salt or an ester of sulfuric acid, of which most of the salts except those of barium, lead, strontium, and calcium are fairly soluble in water. *Webster 3d.* b. As a verb, to treat or to combine with sulfuric acid, a sulfate, or a related agent. To convert into a sulfate, especially to convert (an organic compound) into a sulfuric monoester containing the acid group—OSO_2OH. *Webster 3d.* c. As a verb, to form a deposit of a whitish scale of lead sulfate on (as on the plates of a storage battery). *Webster 3d.*

sulfate-bearing soils. On silts where the ground water contains more than 0.1 percent of SO_3, or where a clay soil has more than 0.5 percent of this substance, the use of lime-free cement in all concrete work is essential to prevent the resulting chemical attack. High-alumina cement gives complete protection, but a sulfate-resisting cement to British Standard 12 may be used where conditions are less severe. *Ham.*

sulfate of alumina. A chemical reagent added to water for the removal of organic substances, such as cylinder oil. Used in water softening plants. *Cooper, pp. 372-373.*

sulfate of iron. *See* melanterite.

sulfate of lead. *See* anglesite.

sulfate of lime. *See* gypsum.

sulfate of strontium. *See* celestite.

sulfate sulfur. The inorganic sulfur in coal other than the pyritic sulfur. *B.S. 1016, 1961, Pt. 16.*

sulfate test. Sulfate in soil can be precipitated as barium sulfate and measured so as to indicate whether water or soil will have a harmful effect on concrete. *Ham.*

sulfating roast. One in which conditions in furnace allow sulfur in feed to recombine with calcined products to form sulfates. *Pryor, 3.*

sulfation. The formation of insoluble white lead sulfate ($PbSO_4$) on the plates of a lead storage battery. *Bennett 2d, 1962.*

sulfatite. A liquid compound found in certain volcanic regions, consisting of native dilute sulfuric acid, H_2SO_4. *Standard, 1964.*

sulfatize. To convert into sulfate, as by roasting sulfide ores. *Webster 3d.*

sulfatizing. The chemical reaction that takes place in many roasting operations in which metallic sulfates form instead of oxides. *Newton, p. 287.*

sulfatizing roast. *See* sulfating roast.

sulfhydryl-collector method. In flotation, a method for treatment of various oxygen ores where sulfhydryl collectors are used to float the base-metal minerals from associated minerals. *Gaudin 2, pp. 462 & 465.*

sulfide. A compound of sulfur with more than one element. A salt or an ester of hydrogen sulfide. Except for the sulfides of the alkali metals, the metallic sulfides are usually insoluble in water and occur in many cases as minerals. *Webster 3d.*

sulfide enrichment. The enrichment of a deposit by replacement of one sulfide by another of higher valuable metal content, as pyrite by chalcocite. *A.G.I.*

sulfide of iron. An iron ore with sulfur as its main impurity. *Mersereau, 4th, p. 383.*

sulfide ore. Ore in which the sulfide minerals predominate. *Ballard.*

sulfide zone. That part of a lode or vein not yet oxidized by the air or surface water and containing sulfide minerals. *Fay.*

sulfidization. In conditioning a flotation pulp, addition of soluble alkaline sulfides in aqueous solution to produce a sulfide-metal layer on an oxidized ore surface. *Pryor, 3.*

sulfidizing method. In flotation, a method for treatment of various oxygen ores in which the desired base-metal minerals are sulfidized, then the ore is floated as if it were a sulfide ore. It is useful in treating lead carbonate ores, less useful if other lead minerals are present, and of limited utility in connection with copper and zinc ores. *Gaudin 2, pp. 462-463.*

sulfite. A salt or ester of sulfurous acid; a compound containing the radical, SO_3^-. *A.G.I.*

sulfite lye. A byproduct of the paper industry used as a cheap temporary bond, for example, for silica refractories; it has also been used as a plasticizer in making building bricks. It generally contains 50 to 70 percent of the ligno-sulfonate of Na, Ca or NH_4, together with 15 to 30 percent of a mixture of sugars; the ash content of the NH_4 type is very low but that of the Ca or Na types may amount to 30 percent. *Dodd.*

sulfo-aluminate cement. A hydraulic cement made by grinding a mixture of high alumina cement and gypsum (or anhydrite). *Dodd.*

sulfo-antimonite. A mineral in which sulfur and antimony are united chemically with a metal. *Weed, 1922.*

sulfoarsenite. An ore mineral of any metal or metals with which sulfur and arsenic are united chemically. *Weed, 1922.*

sulfonates. *See* sulfonic acid.

sulfonation. Reaction which introduces one or more sulfonic acid groups either by direct use of H_2SO_4 or by means of a mercaptan (—SH), followed by oxidation. *Pryor, 3.*

sulfonic acid; sulfonates. A hydrophilic group known as HSO_3. In the sulfate ester O. SO_3H an oxygen link is provided, forming the acid group of many commercial surface-active agents in which a little sulfonic acid and much long-chain sulfate ester are linked to fatty acids and oils. Examples of reagents used in mineral processing include Lissapol LS (sodium salt of oleic acid chloride and p-anisidine sulfonic acid); Aerosol (sulfosuccinic acid diester). *Pryor, 3.*

sulfonite. Light green to yellow vaselinous variety of sulfur-containing bitumen. *Tomkeieff, 1954.*

sulfophile. Elements that occur preferentially in minerals free of oxygen (or fluorine or chlorine), that is, mostly as sulfides, selenides, tellurides, arsenides, antimonides, intermetallic compounds, native elements, etc. This group includes some of the chalcophile and some of the siderophile elements as classified by Goldschmidt. *A.G.I.*

sulfur. a. This brittle, odorless, nonmetallic element in group VI of the periodic system exists in two stable crystalline forms (alpha sulfur and beta sulfur) and in at least two amorphous forms and two liquid forms. In every physical state, whether solid, liquid, or gaseous, elemental sulfur occurs in more than one allotropic form, the relationships of which are not yet well understood. Alpha sulfur converts to beta sulfur at 94.5° C or 95.5° C on heating. This transformation is reversible, and beta sulfur slowly changes to alpha sulfur when cooled below 94.5° C or 95.5° C. Alpha sulfur is yellow; orthorhombic; specific gravity, 2.07 (at 20° C); Mohs' hardness, 1.5 to 2.5; melting point (on rapid heating), 112.8° C; boiling point, 444.6° C; insoluble in water; slightly soluble in alcohol, in toluene, in benzene, in ether, and in liquid ammonia; and soluble in carbon disulfide and in carbon tetrachloride. Beta sulfur is pale yellow; monoclinic; specific gravity, 1.957 (at 20° C); melting point, 118.75° to 119.3° C; boiling point, 444.6° C; insoluble in water; slightly soluble in alcohol and in ether; and soluble in carbon disulfide, in carbon tetrachloride, and in benzene. Gamma sulfur (amorphous sulfur or plastic sulfur) is pale yellow; amorphous; specific gravity, 1.92; melting point, about 120° C; boiling point, 444.6° C; and insoluble in water and in carbon disulfide. Amorphous sulfur is obtained by rapid cooling of crystalline sulfur. Symbol, S; valences, 2, 4, and 6; atomic number, 16; and atomic weight, 32.064. The formula of alpha sulfur, beta sulfur, and gamma sulfur is S_8 and the molecular weight of each of these allotropic forms of elemental sulfur is 256.512 (8 times the atomic weight). X-ray investigations suggest that crystalline sulfur is composed of rings of eight sulfur atoms, each ring joined with the other rings to give the normal sulfur X-ray patterns, and that amorphous sulfur may have a helical structure with eight sulfur atoms per spiral. The nine isotopes (sulfur 30 to sulfur 38) include four nonradioactive isotopes that occur as natural sulfur in the following abundance: (1) sulfur 32, 95.0 percent; (2) sulfur 33, 0.76 percent; (3) sulfur 34, 4.22 percent; and (4) sulfur 36, 0.014 percent. Native sulfur occurs in Texas and Louisiana associated with salt domes and in volcanic deposits in Sicily, Italy. Sulfur is also obtained from some natural gas and some crude petroleum. Used mainly in the manufacture of sulfuric acid, which is the largest tonnage chemical produced in the United States; used in the vulcanization of natural rubber, in blackpowder, and as an electrical insulator. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-10, B-137, B-227, B-246.* b. Iron pyrite occurring in coal seams. Also iron sulfide (pyrite) occurring with Wisconsin and Missouri zinc ore. In the Southern States, synonymous with pyrite. *Fay.* c. Sulfureted hydrogen, H_2S; stinkdamp. *Fay.* d. S. Staff. An old, but improper, term for firedamp. *Fay.* e. One of the elements present in varying quantities in most bituminous coal as part of the ash and deleterious to coke for steelmaking. *B.C.I.*

sulfur ball. a. An accumulation of sulfur in the form of iron pyrites sometimes found in coal seams, often hard enough to break the bits on cutting machines. *B.C.I.* b. A concretionary form of the sulfide of iron occurring as both pyrite and marcasite. This material seems to crystallize or grow within the coal as a result of the action of waters bearing sulfuric acid acting upon compounds of iron. This iron is then taken into solution as iron sulfates and subsequently converted to sulfides which form into the sulfur ball. *Kentucky, p. 25.*

sulfur band. *See* band, a. *Fay, p. 61.*

sulfur burner. A furnace in which sulfur is burned in the manufacture of sulfuric acid. *Standard, 1964.*

sulfur-concrete. A mixture of sulfur with pulverized stoneware and glass, melted and run into molds. *Fay.*

sulfur, crude. *See* crude sulfur.

sulfur diamond. Pyrite. *Shipley.*

sulfur dioxide. Colorless gas or liquid; SO_2; molecular weight, 64.06; suffocating odor; density of gas, 2,927 grams per liter; specific gravity of liquid, 1.4337 (at 0° C); soluble in water (especially in cold water), in alcohol, in ether, in acetic acid, and in sulfuric acid; forms sulfurous acid, H_2SO_3; melting point, −72.7° C or −76.1° C; boiling point, −10° C; and vapor pressure, 3.2 atmospheres at 20° C. Used in extracting bituminous matters from lignite and in the annealing of glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-227.*

sulfur dome. An inverted container, holding a high concentration of sulfur dioxide gas, used in die casting to cover a pot of molten magnesium to prevent burning. *ASM Gloss.*

sulfuret. Pac. In miners' phrase, the undecomposed metallic ores, usually sulfides. Chiefly applied to auriferous pyrites. Concentrate and sulfide are preferable. An old synonym for sulfide. Obsolete. *Fay.*

sulfureted hydrogen. *See* hydrogen sulfide.

sulfur group. The group VI elements sulfur, selenium, tellurium, and oxygen. *Standard, 1964.*

sulfur hydrides. Combinations of sulfur and hydrogen; H_2S; H_2S_2; H_2S_3; H_2S_5. *Pryor, 3.*

sulfuric acid; oil of vitriol. Colorless to dark brown depending on purity; highly corrosive; dense; oily liquid; H_2SO_4; molecular weight, 98.08; specific gravity of 96 to 98 percent acid, 1.84; melting point of 100 percent acid, 10.4° C; boiling point, ranges from 315° to 338° C due to loss of sulfur trioxide during heating to 300° C and higher, and boiling point of 98.3 percent acid, 338° C; soluble in water in all proportions accompanied by the evolution of heat; and it decomposes alcohol. Used in petroleum refining, in the production of iron and steel, in industrial explosives, and in nonferrous metallurgy. Generally considered, from the annual tonnage produced in the United States, to be the most important industrial chemical. *See also* pyrosulfuric acid. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-228.*

sulfur impregnated product. A bonded abrasive product in which all connected pores have been filled with sulfur. *ACSG, 1963.*

sulfuring. A surface bloom or dulling of glazed ceramic ware resulting from attack by SO_3 in the kiln, and more particularly by sulfuric acid condensed on the ware in cooler parts of the kiln in the early stages of firing. The sulfur compounds may originate in the fuel or in traces of sulfur compounds (for example, pyrite) present in the ware itself. The fault is most common in glazes containing calcium or barium; glazes containing lead are usually more fluid and, although they may absorb more sulfur as sulfate, this may not result in a visible fault. *Dodd.*

sulfurite. A mineralogical name for native sulfur. *English.*

sulfur minerals. The element occurs naturally in association with volcanoes and hot springs, and in cap rocks in salt domes. Extensively produced from pyrites and pyritic minerals, either direct or as a byproduct, also as byproduct in gas stripping. Main uses are as sulfuric acid, sulfur dioxide (paper making), and in vulcanizing compounds, fungicides and insecticides. *Pryor, 3.*

sulfur mining. Thick sulfur-bearing deposits may be worked by a network of tunnels and general caving. The bed is extracted in a series of thick slices, horizontal if the dip is great, or parallel to the dip if it is moderate. *See also* Frasch process. *Nelson.*

sulfur monochloride. Amber to yellowish-red; oily; fuming liquid; S_2Cl_2; molecular weight, 135.03; penetrating odor; reacts violently with water when contained in a closed vessel; soluble in alcohol, in ether, in benzene, in carbon disulfide, and in amyl acetate; decomposes on contact with water; specific gravity, 1.690 (at 15.5° C); melting point, −80° C; boiling point, 135.6° C or 138° C; and flash point, 130° C. Used in extracting gold from its ores. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-227.*

sulfur ore. Pyrite, often roasted for its sulfur. *Webster, 2d.*

sulfurous acid. A solution of sulfur dioxide in water. H_2SO_3; the acid occurs in solution only and is known only through its salts. Suffocating sulfur odor; specific gravity, about 1.03; unstable; and soluble in water, in alcohol, in ether, and in acetic acid. Used in metallurgy and in ore flotation. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-228.*

sulfur oxides. Combinations of sulfur with oxygen; SO; SO_2; SO_3; S_2O_7; and SO_4. *Pryor, 3.*

sulfur picker. *See* slate picker, a. *D.O.T. 1.*

sulfur print. Exhibition of sulfur content and location in a polished specimen of steel or iron, by pressing against it filter paper moistened with acid and a lead salt. H_2S is generated and blackens the paper at the point of contact. *Pryor, 3.*

sulfur, refined. Sulfur of purity not less than 99.8 percent, distilled from crude product. *Bennett 2d, 1962 Add.*

sulfur scum. A particular type of scumming resulting in an area of poor gloss on an enameled surface, caused by a film of some sulfate burning into the enamel. A leaky muffle in a gas, oil, or coal-fired furnace will sometimes result in this trouble. Also called sulphur scum. *Enam. Dict. See also* scumming.

sulfur stone. Pyrite. *Shipley.*

sulfur 35. Radioactive sulfur of mass number 35; half-life, 86.7 days; radiation, beta; and radiotoxicity, moderately hazardous. Used as a research tool in studying the role of sulfur in the coking process, in steel, and in sulfur deposition in diesel engines. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-10.*

sulfur trioxide. Colorless trimetric crystal or liquid, SO_3; molecular weight, 80.06; specific gravity, 2.75, liquid 1.925^{13}; melting point, 16.83° C; boiling point, 44.8° C. *Bennett 2d, 1962.*

sulfydril. Mercapto thiol. —SH, the monovalent radical. *Pryor, 3.*

sullage piece. The same as deadhead, b. *Standard, 1964.*

sullage. a. Mud and silt deposited from flowing water. *Ham.* b. Scoria on molten metal in the ladle. *Webster 3d.*

Sullivan angle compressor. A two-stage compressor in which the low-pressure cylinder is horizontal and the high-pressure cylinder is vertical. It is a compact compressor and is driven by a belt, or it can be directly connected to an electric motor or diesel engine. *Lewis, pp. 671-672.*

Sullivan process. A process for the treatment of sheet steel prior to vitreous enameling; it is based on the spraying of a suspension of NiO on the metal to give a deposit of about 0.1—1.0 grams per square foot. *Dodd.*

Sulman and Picard processes. Pioneer flotation methods which marked advances in the technology of the modern process. The patented use of very small quantities of surface-active reagents and method of introducing air bubbles were upheld as innovations in protracted litigation. *Pryor, 3.*

sulvanite. A gray, bronze-yellow sulfovanadate of copper, Cu_3VS_4, cubes, also massive. Isometric. Found in Burra Burra, South Australia; Mercur, Utah. *English.*

Suma Carb. Gr. Brit. Trade name for activated charcoal. *Hess.*

sumacoite. A dark gray, moderately porphyritic igneous rock with phenocrysts of plagioclase and augite. It consists of 33 percent potassium feldspar, 40 percent acid plagioclase, 6 percent nepheline and haüynite, 15 percent augite, and 6 percent iron ores. *Johannsen, v. 4, 1938, p. 188.*

summary of reinforcement. A cutting list with details of reinforcing bars. *Ham.*

summer black oil. A black lubricating oil of 540° F fire test, used as a heavy tempering oil and for waterproofing cement. *Fay.*

summer degree-hour. The product of 1 hour in time and the amount the outside dry-bulb temperature at that hour is above a base temperature. Some correlation has been found between the number of degree-hours over 85° F and summer cooling load in residences. *Strock, 10.*

summer oil. A heavy, railway car and engine oil that has a flashpoint above 140° C and solidifies below −5° C. *Fay.*

summit canal. A canal cutting across a summit and which, therefore, must have water pumped into it. *Ham.*

summit concordance. The equal or almost equal elevation of ridge tops or mountain summits that is thought to indicate the existance of ancient erosion surfaces of which only scattered patches are preserved. *Stokes and Varnes, 1955.*

sump. a. That portion of the shaft below the normal winding level which is used for the collection of water for pumping. *B.S. 3618, 1963, sec. 4.* b. Any excavation in a mine for collecting or storing water. *B.S. 3618, 1963, sec. 4.* c. An excavation made underground to collect water, from which water is pumped to the surface or to another sump nearer the surface. Sumps are placed at the bottom of a shaft, near the shaft on a level or at some interior point. *Lewis, p. 21.* d. The prolongation of a shaft or pit, to provide for the collection of water in a mine. *C.T.D.* e. A water lodge or catch basin that receives the gravity drainage and supplies the pump inlets. It also serves as a settling basin to remove sludge and sand from the water before it enters the pumps. Screens may be interposed between drainage ditches and sumps to extract wood and trash from the water. A sump should provide a sufficient settling capacity with baffles to still the water. *Nelson.* f. N. Wales. A staple shaft sunk in the lode from one level to the other. *Nelson.* g. Newc. That part of a judd of coal which is extracted first. *Fay.* h. An excavation smaller than and ahead of the regular work in driving a mine tunnel or sinking a mine shaft. *Webster 3d.* i. To undercut coal preliminary to placing a shortwall machine in position for cutting along the working face. Sometimes called a sumping cut. *Fay.* j. To test the load in depth. *Gordon.* k. *See* cut. *B.S. 3618, 1964, sec. 6.* l. To drill diagonally. *Mason.* m. *See* jib in. *Mason.* n. A pit or basin in which the returns from a borehole are collected and stored and in which the cuttings settle before recirculating the cuttings-free drilling fluid. *Long.* o. A cellar under a drill floor. *Long.* p. A pit or basin in which waste oil products are collected and stored. *Long.* q. A storage tank for solutions, usually at a level below other vats. *Fay.* r. A round, clay-lined pit of stone used in metallurgy for collecting fused metal. *Webster 3d.*

sump cleaner. In bituminous coal mining, one who shovels up accumulations of coal, rock, dirt, and refuse at the bottom of a shaft and loads it into buckets which are hoisted to the surface or an upper level for dumping. *D.O.T. 1.*

sumper. a. A shothole drilled diagonally. *Mason.* b. Eng. A shot placed in or very near to the center of the bottom of a shaft. *Fay.* c. Scot. A shot for breaking up the bottom or floor. *Fay.* d. In bituminous coal mining, one who oils and greases coal-cutting machines. Also called machine sumper. *D.O.T. 1.*

sump fuse. A waterproof fuse for use in a sump. *Standard, 1964.*

sump in. Eng. To work the coal on one side of a wall. *SMRB, Paper No. 61.*

sumping. a. Scot. Cutting down into the floor; or, in sinking, cutting down at the lowest part of the shaft. b. Forcing the cutter bar of a coal cutter into or under the coal. Also called sumping cut. *Fay.* c. A small square shaft, generally made in the airheadings when crossing faults, etc., or made to prove the thickness of coal, etc. *Fay.*

sumping bar. An angle iron about 8 feet long with flanges about 4 inches high, weighing about 75 pounds. Its function is to guide the cutter bar on an electric coal-cutting machine. *Fay.*

sumping cut. *See* sump, i. *Fay.*

sumping hole. Aust. The first or opening cut made by a coal cutter. A sumping cut. *Fay.*

sumping-in. *See* jibbing-in. *Nelson.*

sumping shot. Newc. *See* sumper, b and c. *Fay.*

sumpman. a. Corn. A man employed in shaft sinking to assist the miner with the pumping machinery, timbers, etc. *Fay.* b. In metal mining, one who installs sets of timbers to support the walls of a shaft, working with the shaft sinking crew and installing the timbers as the work advances. *D.O.T. 1.*

sump planks. S. Staff. Strong timbers bolted together, forming a temporary bottom, or scaffolding, for the shaft. *Fay.*

sump pump. A pump employed to raise water from a mine sump. *Standard, 1964.*

sumps. Holes sunk in drifts to a depth of 2 or 3 yards. *Hess.*

sump shaft. That shaft in a mine at the bottom of which is the sump. *Standard, 1964.*

sump shot. A blast made in a shaft that is being sunk, to make a collecting place for water. *Standard, 1964.*

sump throat. *See* submarine throat. *ASTM C162-66.*

sump winze. A winze sunk in the bottom of the lowest level, in order to explore the lode below and ascertain whether the sinking of the main shaft is advisable. *Standard, 1964.*

sunbaked. Hardened and desiccated by the sun's heat as mud, clay, or unburnt bricks. *Fay.*

sun bed. Som. A widespread and persistent bed of fine-grained sublithographic limestone or mudstone, with a conchoidal fracture, pale brown on the outside, blue in the center, at the top of the White Lias. The upper surface often bears polygonal cracks which geologists have likened to sun cracks and have thus explained the name. It is more likely, however, that the name means sound bed, because it rings (if dry) when broken by the hammer. *Compare* guinea bed; ringstone, b. *Arkell.*

sunburner. A faulty piece of hand blown glassware characterized by excessive local thickness. *Dodd.*

sun cheek. The south side of a vein. *Arkell.*

Suncole. Low-temperature coke used in making producer gas. *Bennett 2d, 1962.*

sun compass. A navigational compass that uses the sun and its calculated bearing to establish direction especially in high latitudes. *Webster 3d.*

sun crack. *See* shrinkage crack; mud crack.

Sundance series. Marine Jurassic clays and sands exposed in the Front Range District, Colo. Similar, though thicker, strata with some limestones occur also in the Big Horn Mountains, where the series is 300 feet thick. *C.T.D.*

Sunday salt. An English term for very coarse grainer-type salt produced by weekend cooling down and quiet surface evaporation from open evaporating pans. *Kaufmann.*

Sunday stone. A calcareous deposit formed inside pipes carrying waste water from collieries. It is composed of alternating dark and light bands corresponding to the day and night shifts and a broader light band corresponding to Sunday. *Arkell.*

Sundberg method. In electrical prospecting an inductive method in which the current flows through an insulated copper cable connected to a source of alternating current and run along the surface in a rectangle 1 by ½ mile in dimensions. A series of transverse profiles are laid out perpendicular to and crossing the cable, and the magnetic part of the electromagnetic field is measured at discrete points along the profiles by special search coils consisting of several hundred turns of wire. The magnitude and direction of the induced field observed by the coils can be related to the inductive effect of the subsurface material directly below. *Dobrin, p. 367.*

Sunderland splatter. A characteristic effect found on some of the old luster pottery made in Sunderland, England; after the luster had been applied it was splattered with a second medium which caused the formation of irregular patches on the base luster. *Dodd.*

sundiusite. The hypothetical amphibole end-member, $Na_2CaMg_3Al_2(Si_6Al_2)O_{22}(OH)_2$. *Hey, MM, 1964; Fleischer.*

sun-dried brick. *See* adobe brick. *ACSG, 1963.*

sun effect. The quantity of heat from the sun tending to heat an enclosed space. *Strock, 10.*

Sunflower apparatus. *See* Craven Sunflower method. *Roberts, I, p. 59.*

sun gear. The central gear in a planetary set. *Nichols.*

sun gears. A planetary gear set consisting of a central gear, an internal-tooth ring gear, and two or more planet gears meshed with both of them. *Nichols.*

sunk. a. Drilled downward. *Long.* b. As used by miners, excavated downward. *Long.*

sunken pit. *See* dig-down pit. *Nichols.*

sunk shaft. A shaft which is driven from the top downwards (vertical or inclined). *Fraenkel.*

sun observations. In surveying, fixation of longitude and/or latitude of a station, or orientation of a survey line, by use of theodolite to relate Sun's position, sidereal time and theodolite's location. *Pryor, 3.*

sun opal. The same as fire opal. *Standard, 1964.*

sunshine. A name of a soft grade of paraffin wax with a low melting point. It can be burned in an ordinary miners' lamp with a nail (usually copper) in the wick and gives little smoke. Also called miners' sunshine. *Fay.*

sunstone. A Russian metaphorical name for fossil coal. It is also an old name for aventurine feldspar similar to moonstone. *Tomkeieff, 1954.*

sunstroke. A sudden attack of illness from prolonged exposure to the direct rays of the sun or to other high temperatures, particularly of those engaged in hard labor in confined quarters. It may occur without being exposed to direct rays of the sun. *Kentucky, p. 380.*

sun vein. N. of Eng. Ore veins discovered on the south side of a hill. Sun is synonymous with south, so sun veins are south veins. *Fay.*

spuer airflow cleaner. In this cleaner, the coal is fed from a raw coal hopper by an oscillating plunger feeder insuring uniform feed throughout the entire width of the machine deck. A rotating shutter in the inlet duct provides a pulsating air current which is much more effective as a separating current than a uniform airstream. The coal and refuse stratify as they move toward the discharge end of the deck with the refuse falling to the bottom against the deck. The perforated deck has four refuse draws; normally the products of the first two draws are discharged as refuse and the third and fourth draws are middlings. The product of the third draw may be refuse or middlings depending on the ash content of the feed. Generally, this cleaner is an effective machine for cleaning coal from ¾ inch or ¼ inch x 28 mesh coal if it contains less than 5 percent of surface moisture. It will not clean effectively below 20 mesh. *Kentucky, pp. 312-313.*

superalloy. An alloy developed for very high temperature service where relatively high stresses (tensile, vibratory, and shock) are encountered and where oxidation resistance is frequently required. *ASM Gloss.*

superanthracite. a. Same as meta anthracite. *Tomkeieff, 1954.* b. Coal intermediate between anthracite and graphite. *A.G.I. Supp.*

superbituminous coal. Same as semibituminous coal. *Tomkeieff, 1954.*

superbronze. Corrosion-resistant, high-tensile-strength brasses, containing both aluminum and manganese. *Crispin.*

supercapacity bucket elevator. A type of continuous bucket elevator employing supercapacity elevator buckets. *See also* supercapacity elevator bucket. *ASA MH4.1-1958.*

super capacity elevator bucket. A type of continuous elevator bucket used with a pair of chains in which the back of the bucket at the bottom extends backwards into space between the up and down runs to provide additional capacity without increase in length or projection. *ASA MH4.1-1958.*

supercharger. A blower that increases the intake pressure of an engine. *Nichols.*

superconductivity. The abrupt and large increase in electrical conductivity exhibited by some metals as the temperature approaches absolute zero. *ASM Gloss.*

supercooled liquid. A liquid which is cooled so rapidly below its freezing point that it has not had time to crystallize. *Cooper, p. 279.*

supercooling. Cooling below the temperature at which an equilibrium phase transformation can take place without actually obtaining the transformation. *ASM Gloss.*

supercritical area of extraction. An area of goaf of sufficient extent to cause full subsidence at more than one point on the surface. *Nelson.*

supercritical flow. Flow at velocities greater than one of the recognized critical values; specifically turbulent flow with a mean velocity equal to or greater than Belanger's critical; shooting flow; sinuous flow. *Seelye, 1.*

supercritical mass. A mass of fuel, the effective multiplication factor of which is higher than 1. *See also* critical mass. *L&L.*

supercritical reactor. A nuclear reactor in which the effective multiplication constant is higher than 1. Consequently a reactor that is increasing its power level. If uncontrolled, a supercritical reactor will undergo an excursion. *L&L.*

supercrustal rock. A general term for rocks that originated at the surface of the earth, namely sediments and volcanic rocks. Intercalated eruptives are also included in this term. *Schieferdecker.*

superdip. An instrument of limited sensitivity for measuring changes in the total intensity of the magnetic field. *Schieferdecker.*

superdusting. The presence of a very large excess of coal dust in the air over that required for consumption of the oxygen. *Rice, George S.*

superduty fire clay brick. Fire clay brick which have a pyrometric cone equivalent not lower than cone 33, and which meet certain other requirements as outlined in ASTM Designation: C27-58T. *HW.*

superduty fire clay plastic refractories. Similar to fire clay plastic refractories, but having higher P.C.E., lower shrinkage, and lower spalling loss. *Bureau of Mines Staff.*

superduty silica brick. *See* low alumina silica brick. *Bureau of Mines Staff.*

superduty silica refractory. In the United Kingdom, the National Silica Brickmakers' Association has defined this type of refractory as a silica refractory containing not more than 0.5 percent Al_2O_3 and with a total of Al_2O_3 plus alkalies not exceeding 0.7 percent. *Dodd.*

superelevation; cant; banking. A tilt given to a haulage track at a curve to counteract the effect of centrifugal force. For locomotive-hauled cars, the outer rail is superelevated above the inner rail of the track. For rope-hauled cars, the cant is reversed, the inner rail being higher. A useful rule for determining the superelevation (E) of the outer rail of a curve is $E\ (\text{inches}) = \frac{GV^2}{1.25R}$, where G equals gage in feet; V equals maximum speed in miles per hour; and R equals radius of curve in feet. *Nelson.*

superficial. Pertaining to the surface, for example, superficial deposit. *Nelson.*

superficial compaction. Compaction of soil in layers generally not greater than 6 inches deep, by various methods including the use of the frog rammer, vibration, sheepsfoot roller, pneumatic tired rollers, or similar machines. Ham. *See also* compaction plant.

superficial deposits. The most recent of geological formations; unconsolidated detrital material lying on or near the surface, generally unstratified. *Fay.*

superficial Rockwell hardness test. A form of Rockwell hardness test using relatively light loads which produce minimum penetration. Is used for determining surface hardness, hardness of thin sections or small parts, or where large hardness impression might be harmful. *ASM Gloss.*

superficial structure. A structure, particularly a deformation structure in sedimentary rocks or in superficial deposits, which has originated and formed under recent superficial conditions and forces, such as glacial push and drag, relief of load by erosion, freezing and thawing of ground ice, surface creep, etc. *Challinor.*

superfines. In powder metallurgy, the portion of a powder that is composed of particles smaller than a specified size, currently less than 10 microns. *ASM Gloss.*

superfinishing. A form of honing in which the abrasive stones are spring supported. *ASM Gloss.*

superfluent. Applied by Dana to those igneous magmas which discharge at the summit on a volcano. *See also* effluent; interfluent. *Fay.*

supergene. Applied to ores or ore minerals that have been formed by generally descending water. Ores or minerals formed by downward enrichment. *Compare* hypogene, c. *Fay.*

supergene enrichment. Solution of metal by surface waters from the upper part of an ore deposit and its redeposition below, causing enrichment of the underlying ore. *Bateman.*

supergene sulfide enrichment. A process of enrichment near the ground water table in a sulfide deposit, where the primary ore acquires increasing metal values as a result of the chemical reaction between descending metal-bearing solutions with the primary (or hypogene) sulfides, whereby secondary sulfur compounds are formed. Also called secondary sulfide enrichment. *Schieferdecker.*

supergene sulfide zone. The zone in which supergene sulfide enrichment occurs. *Schieferdecker.*

superheat. a. To heat a vapor not in contact with its own liquid so that it remains free from suspended liquid droplets. *Webster 3d.* b. Heat added to a substance after melting is complete. *Leet.* c. Sensible heat in a gas above the amount needed to keep it a gas. *H&G.*

superheated steam. Steam above a temperature of 100° C; produced by heating water under a pressure greater than atmosphere. *Nelson.*

superheater. a. One that superheats especially steam or other gases; especially, a coil or other device through which steam from a boiler passes to be superheated. *Webster 3d.* b. A refractory lined chamber in a water-gas plant; it is filled with checkers and insures completion of the decomposition of the oil vapors begun in the carburetor. *See also* carburetor, b. *Dodd.*

superheating. a. Heating a phase above a temperature at which an equilibrium can exist between it and another phase having more internal energy, without obtaining the high-energy phase. *ASM Gloss.* b. Heating molten metal above the normal casting temperature so as to obtain more complete refining or greater fluidity. *ASM Gloss.* c. The heating of a vapor, particularly saturated (wet) steam, to a temperature much higher than the boiling point. This is done in power plants to improve efficiency and to reduce condensation in the turbines. *L&L.*

superimpose. a. In geology, to establish (a structural system) over, independently of, and eventually upon, underlying structures; said of terranes, rivers, drainage systems, valleys, etc.; as, a superimposed valley. *Standard, 1964.* b. To place one thing upon another. *Kinney.*

superimposed ac. A form of current in which an ac component is superimposed on the dc plating current. *Lowenheim.*

superimposed drainage. A natural drainage system that has been established on underlying rocks independently of their structure. Of such a system, three kinds are recognized: (1) by sedimentation, where the drainage system of newer strata is formed over and independently of that of closely underlying older strata; (2) by alluviation, where an extensive alluvial deposit has established a new and independent drainage system over that of the preceding surface; and (3) by planation, where, after extensive planation of a rock surface, a drainage system is established independent of the underlying rock structure. *Standard, 1964.*

superimposed halo. A dispersion pattern formed in the regolith by the movement of material in subsurface waters. *Hawkes.*

superimposed load. In foundation work, it implies all loads other than dead load. *See also* live load. *Nelson.*

superimposed stream. There can be no doubt that the present courses of the streams were determined by conditions not found in rocks through which the channels are now carved, but that the beds in which the streams had their origin when the district last appeared above the sea, have been swept away. While Powell applied the term first to the valley only, later writers have applied it also to the streams which occupy such valleys. Synonym for superposed stream. *A.G.I.*

superincumbent strata. Strata above the nether strata. *See also* nether strata. *Mason.*

superintendent. a. The mining engineer or manager of a coal or metal mine. He is in immediate charge of all operations concerned with the development and mining of the coal or ore. *See also* mine superintendent. *Nelson.* b. The person who shall have, on behalf of the operator, immediate supervision of one or more mines. *Jones.* c. One who superintends; a director; an overseer. *Ricketts, I.*

superintendent, colliery. In anthracite and bituminous coal mining, one who supervises and is responsible for all activities of mining and preparing coal for market at a mine. Also called colliery boss. *D.O.T. 1.*

superintendent-of-tanks. One who supervises the feeding and maintenance of glass-melting furnaces (tanks), and the operation of reheating ovens (lehrs) for fire-glazing glass articles. Directs unloading and storage of raw materials and crushing and washing of waste glass (cullet) used as ingredients in the manufacture of new glass. *D.O.T. 1.*

superior official; higher official. An official between the owner and the manager of a coal mine. It includes both officials in the direct line of command and functional or specialist officials. *See also* agent. *Nelson.*

superjacent pattern. A dispersion pattern developed more or less directly over the bedrock source. *Hawkes, 2, p. 153.*

superjacent roadway system. *See* methane drainage. *Roberts, I, p. 80.*

superlattice. An ordered arrangement of atoms in a solid solution to form a lattice superimposed on the normal solid-solution lattice. *ASM Gloss.*

Super Norite. Trade name for activated charcoal. *Hess.*

superopaque. A classification applied to highly opaque enamels. *Enam. Dict.*

superpanner. A mechanism, invented by Professor H. T. Haultain, which simulates rocking, bumping, and sluicing action used in panning and gives precise information as to possibility of gravity treatment of sands. Is used in rapid assays and as a research aid. *Pryor 2.*

superphosphate. Any of various commercial phosphate fertilizers obtained as white to gray granules or powders by acidulating ground insoluble phosphate rock; as (1) a product made by acidulating with sulfuric acid, consisting essentially of soluble primary calcium phosphate, calcium sulfate, and smaller quantities of secondary calcium phosphate, and containing usually about 20 percent of available phosphoric acid, or (2) a product made by acidulating with phosphoric acid, consisting essentialy of primary calcium phosphate and containing usually 40 to 50 percent of available phosphoric acid. *Webster 3d.*

superposed. Not in adjustment to the structure of the rocks upon which it now flows, having acquired its course on a previously overlying terrane which has since been removed or cut through; said of some streams; the same as superimposed, which it is replacing. *Fay.*

superposed stream. A stream with a present course which was established on young rocks burying an old surface. With uplift, this course was maintained as the stream cut down through the young rocks to and into the old surface. *A.G.I.*

superposition. a. A principle stating that if a body be subjected to several stresses acting simultaneously, then each stress produces its own strain or strains, and these strains may be superimposed to give the complete state of strain of the solid. Similarly, two separate stress distributions in a body, due to the application of two separate stresses, may be superimposed to give the stress distribution due to the simultaneous application of those two stresses. *Isaacson, pp. 16-17.* b. The order in which rocks are placed above one another. *Fay.* c. A principle which simplifies structural calculations and which can be used for solving the forces acting in a redundant frame. *Ham.*

Super Prime. Brand name for a specially constructed explosive primer for detonating noncap, sensitive blasting agents and ammonium nitrate-fuel oil mixtures. *CCD 6d, 1961.*

superpushing. Using extra large pushers, or two or even three standard units in tandem, in order to increase the speed and size of loading. *Nichols, p. 8-30.*

super-refractory. Refractory capable of withstanding unusually high temperatures and/or other severe conditions of operation. *Bennett 2d, 1962.*

supersaturated solution. A solution is said to be supersaturated when it contains in solution more of the solute than it can hold at that temperature in the presence of the crystals of the solute. *Cooper.*

supersaturation. Higher concentration of a solute in a solvent than would normally correspond to its solubility at a given temperature; a metastable condition, as the excess solute separates when the solution is seeded by introducing a crystal of the solute. *Bennett 2d, 1962.*

supersonic. Pertains to phenomena in which the speed is higher than that of sound. Not synonymous with ultrasonic; *see also* ultrasonic frequency. *ASM Gloss.*

supersonic testing. *See* ultrasonic inspection. *Osborne.*

super Staffordshire kiln. A Staffordshire kiln modified in design so that the fuel is charged on to a grate instead of within the setting of bricks. Kilns of this type can be used for temperatures up to about 1,200° C. *Dodd.*

superstratum. An overlying stratum or layer, *Webster 3d.*

superstressed. *See* overstressed. *Mason, v. 1, p. 143.*

superstructure. a. The deformed upper part of the crust. *Schieferdecker.* b. Wegmann's term for the upper nonmigmatitic phase of an evolving granitic magma. *A.G.I.* c. Structural features resulting from later deformation that modified older structures. *A.G.I. Supp.* d. Those parts of a tank above the sidewall tank blocks. *ASTM C162-66.* e. Anything built up or founded on something else. *Crispin.*

supersulfated cement. A type of hydraulic cement, also known as metallurgical cement, made by grinding together blast-furnace slag, calcium sulfate, and about one percent of lime or cement. It is particularly resistant to sulfate attack. *Ham.*

Super X. Trademark applied to each of a series of permissible ammonia gelatin type dynamites developed for use in underground coal mining operations. *CCD 6d, 1961.*

supplement. The supplement of an arc is 180° minus the arc. *Zern, p. 54.*

supplementary twinning. Twinning by which a crystal simulates the symmetry of a crystal class with higher grade in the same system. *Fay.*

supplied-air respirator. An atmospheric-supplying device which provides the wearer with respirable air from a source that is outside of the contaminated area. The worker's range of operations is always limited by the length of the air-hose which brings him the uncontaminated air. Only those with manual or motor operated blowers are approved for immediately harmful or oxygen-deficient atmospheres. Ones which have no blower, or which receive air from a central air supply system are recommended for trench work, paint spraying, etc., where gases and dusts are of sufficiently light concentration to permit the wearer's escape in case of accident. With the addition of special mask-hoods or helmets, the air supply-system respirator has been adapted for protection against abrasive blasting. *Bests, p. 100.*

supplies department. A department which aims to ensure that the requirements of the mine, in matters of equipment and stores, are fulfilled; that the various articles are of the necessary quality and, as far as possible, of standard design and price. In addition, the quantity of physical stores held at the mines is controlled, thus avoiding the tying up of capital by unnecessary duplication. A further function is to ensure that spare parts, vital to production, are always available. *See also* store; storekeeper. *Nelson.*

supplies vehicle. A carriage or car for taking in materials alongside gate-load conveyors. A recent development, the carriage is capable of carrying a load of about 1 ton over the normal coal mine roadways up to gradients of 1 in 4. It runs on pneumatic tires and is driven by a diesel engine. The narrow width of the vehicle (3 feet 3 inches) enables it to run in the space normally available alongside a gate conveyor. In addition to the load, the vehicle can tow, on level roadways, a weight of 15 tons. *Nelson.*

supply. The sedimentary material added by the transporting medium. *Schieferdecker.*

supply cager. In anthracite and bituminous coal mining, one who directs and assists the loading of mine supplies on a cage (elevator) at a mine with a separate shaft or shaft compartment for handling supplies. *D.O.T. 1.*

supply-hoist engineer. *See* supply-hoist operator. *D.O.T. 1.*

supply-hoist operator. In anthracite and bituminous coal mining, one who operates the hoisting machinery which serves the shaft or shaft compartment of a mine in which mining supplies are lowered into the mine. Also called supply-hoist engineer. *D.O.T. 1.*

supply motorman. In bituminous coal mining, one who operates a mine locomotive to haul trips (trains) of cars, loaded with timbers, rails, explosives, and other supplies, into a mine. *D.O.T. 1.*

supply pump. *See* bank pump. *Long.*

support. A general term for any timber, steel, concrete, brick, or stone structure erected to counteract the subsidence of the roof strata when undermined. *See also* self-advancing supports; steel arches; steel support. *Nelson.*

support moment. *See* hogging moment. *Ham.*

support pins. Rods or pins of accurate length used to support the overhand of irregularly shaped punches. *ASM Gloss.*

support plate. A plate that supports the draw ring or drawplate; it also serves as a spacer. *ASM Gloss.*

support roller. In a crawler machine, a roller that supports the slack upper part of the track. *Nichols.*

supports. Supports are materials placed in stopes for the purpose of ground control, that is to arrest or regulate the closure of the walls. *Spalding.*

suppressed weir. A measuring weir having its sides flush with the sides of the channel, so that there are no end contractions. *Ham.*

supratenuous fold. a. A fold in which the beds thicken toward the syncline because the basin subsided during sedimentation. *A.G.I.* b. A fold which shows a thinning of the formations upwards above the crest of the fold. *A.G.I.*

surbed. To set, as stone, on edge, or in a position different from that in the quarry. *Standard, 1964.*

surcharge. a. Any load including earth which is supported above the level of the top of a retaining wall. *See also* relieving platform; active earth pressure. *Ham.* b. The algebraic sum of the losses and gains of the cornet of gold during cupellation and solution. *Fay.* c. In ceramics, an enamel painting or an enamel ground of darker hue. *Standard, 1964.*

surcharged wall. A retaining wall which supports a surcharge such as an embankment above its top level. *Ham.*

surf. The swell of the sea which breaks upon the shore; also, the breaking waves. *Schieferdecker.*

surface. a. The top of the ground; the soil, clay, etc., on the top of strata. As used in the conveyance of coal in place, or in a conveyance of land reserving the minerals, includes not merely the surface within the boundary lines, without thickness, but includes whatever earth, soil, or land lies above and superincumbent upon the coal or mineral reserved. *Fay.* b. In mining controversies, that part of the earth or geologic section lying over the minerals in question, unless otherwise defined by the deed or conveyance. It is not merely the top of the glacial drift, soil, or the agricultural surface. The owner of a higher stratum is entitled to the same rights to surface support as the actual surface owner. When the landowner grants the underlying minerals, reserving the surface to himself, his grantee is entitled only to so much of the mineral as he can extract without injury to the superincumbent soil. *Ricketts, II.* c. Above ground—a connotation well known to mining personnel. *ASA M2.1-1963.* d. As used in the Lake Superior Iron District, a synonym for cover, drift, mantle, and overburden. *Long.* e. An area that has length and breadth but no thickness. *Jones, 2, p. 90.* f. Of a mineral particle, a zone of change from the true substrate (usually an ionic repetition of unit cells) with increasing chemical and sorptive change, to a sheared lattice structure at which it forms an interface or interphase with faces or phases with which it is in contact. Face and phase are not necessarily synonymous. *See also* interface; interphase; zeta potential. *Pryor, 3.* g. In geology, usually refers to the boundary surface between one bed or mass of rock and another immediately adjacent, such as a bedding surface, a fault surface, a surface of unconformity, a surface of igneous compact, or to an imaginary surface, such as the axial surface of a fold. It thus usually means a surface within a structure, not an outside surface which is what is usually implied in the ordinary use of the term. The exposed surface of a rock is an obvious rock surface, but not a surface in the structurally significant meaning of the term. *Challinor.* h. The outer face of a solid body; usually the upper level of a sheet of glass. *Kinney.*

surface action. Any kind of action which affects a surface; for example, action of smoke fumes, moisture, etc., on a painted surface. *Crispin.*

surface-active agent. One which modifies physical, electrical or chemical characteristics of surface of solid, also surface tensions of solids or liquids. Used in froth flotation, and in detergency. Characteristically, its heteropolar molecules are attracted to a specific type of surface in a mixture where one group forms polar monolayer attachments while the rest of the molecule points outward and changes the relations between the surface and the ambient phase. These relations may change lyophilic and aerophilic attraction, surface tension, intermiscellar grouping, emulsification, froth foaming. Surface-active agents include cleaners (for example, soaps); water-repellants (for example, greases); dispersants and emulsifiers (for example, glue); additives adsorbed at interfaces between liquids (usually aqueous) and external gas, liquid or solid phases, with resulting change in interfacial tension. Three electro-chemical types are unionized molecule, anion and cation. Important characteristics of surface-active agents are solubility in the medium and effects of specific adsorption at interfaces. Such agents either provide anchorage between phases or form a barrier, according to their flocculating or dispersing effect. *Pryor, 3.*

surface activity. a. The property possessed by certain substances to influence the surface tension of liquids. *Ham.* b. *See* depressant; flotation agent; surface tension. *Nelson.*

surface air leakage. The amount of surface air entering the fan through the casing at the top of the upcast shaft, the air-lock doors and fan-drift walls. The extent of leakage will depend on the fan-drift watergage method of construction, the number and type of entrances and whether the upcast shaft is used for winding. The surface leakage at air locks may vary from about 25,000 cubic feet per minute at 5-inch water gage to about 55,000 cubic feet per minute at 25-inch fan-drift water gage. *See also* volumetric efficiency. *Nelson.*

surface area. Of a particle, area calculated from data obtained by a specified method, such as: (1) adsorption measurement, (2) calculation, (3) permeability measurement, (4) microscopic observation, or (5) close screening and averaging from study of a number of particles. *Pryor, 3.*

surface boss. a. In bituminous coal mining, a foreman in charge of the surface workings of a mine. May also be in charge of the washery, where coal is sized and cleaned for market. Also called surface foreman; top boss. *D.O.T. 1.* b. Any person in charge of surface operations. *Bureau of Mines Staff.*

surface break; surface damage. The disturbance or sinking of the strata reaching to the surface consequent on the extraction of coal or mineral. *Fay.*

surface bunker. *See* bunker, surface. *Nelson.*

surface casing. *See* standpipe, c. *B.S. 3618, 1963, sec. 3.*

surface charges. All expenses incurred on the surface of a mine which have to be charged against the mineral. *Fay.*

surface checking. The same as checks. *ASM Gloss.*

surface circuit. The mine car track layout from the shaft to the preparation plant and back to the shaft. The term includes all the equipment necessary to move and control the movement of cars such as creepers, retarders, back shunts, traversers, and turntables. *Nelson.*

surface clay. An unconsolidated, unstratified clay, occurring on the surface. *ASTM C43-65T.*

surface combustion. Combustion of injected properly proportioned fuel and air, on a surface, or within a definite zone; as when a mixture of air and gas or of air and oil vapor is forced through a porous wall, and ignited on the other side. Since necessary air is mixed with the gas it will burn regardless of atmospheric conditions, and even under water. *Porter.*

surface condenser. A condenser in which exhaust steam is condensed by contact with the surfaces of metal cooled by a flow of cold water on their sides opposite the condensing surfaces. *Fay.*

surface conductance. The heat transmitted from (or to) a surface to (or from) the fluid in contact with the surface in a unit of time per unit of surface area per degree temperature difference between the surface and fluid. *Strock, 10.*

surface conductor. *See* conductor, c; standpipe. *Long.*

surface cooling. Air cooling by passing it over cold surfaces. *Strock, 10.*

surface creep. *See* creep. *Challinor.*

surface damage. a. Any damage done to land surface during exploration or development operations. *Bureau of Mines Staff.* b. Scot. Ground occupied and damaged by colliery operations; the compensation for such. *Fay.*

surface deposits. a. Ore bodies that are exposed and can be mined from the surface. *Zern.* b. *See* superficial deposits. *B.S. 3618, 1964, sec. 5.*

surface dressing. The covering of an existing surface with a coating of bituminous binder covered by a layer of chippings or fine aggregate. *Nelson.*

surface drift. A drift (usually inclined) from the surface to the coal seam or ore body to be developed. *See also* drift mining, b; slant, c. *Nelson.*

surface glaze. In ceramics, a thin and perfectly transparent glaze over both the body and the decoration. *Fay.*

surface drilling. Boreholes collared at the surface of the earth, as opposed to boreholes collared in mine workings or underwater. *Long.*

surface energy. Product of surface tension (dynes per centimeter) and surface area (cm^2), expressed in ergs. Work required to increase surface area by unit area. *Pryor, 3.*

surface factor. A factor used in the ceramic industry to indicate the fineness of a powder. It is calculated from the equation:

$$S = \frac{6}{G}\left(\frac{W_1}{d_1} + \frac{W_2}{d_2} + \frac{W_3}{d_3} + \ldots\right)$$

where G is the specific gravity of the powder; W_1, W_2, etc., are the fractional weights of material whose average diameters are d_1, d_2, etc.; $W_1 + W_2 + \ldots = 1$. *Dodd.*

surface finish. a. The condition of a surface as a result of a final treatment. *ASM Gloss.* b. Measured, surface profile characteristics, the preferred term being roughness. *ASM Gloss.*

surface float. A float on a water surface used to indicate velocity or direction of flow. *Seelye, 1.*

surface foreman. a. An official in charge of the general labor at the surface of a mine, and all handling operations and movement of mine cars, supplies, etc. *See also* foreman. *Nelson.* b. *See* surface boss, a. *D.O.T. 1.*

surface geology. The geology of the superficial deposits and of the surface of the fundamental rocks. *Compare* areal geology. *Fay.*

surface grinding. Producing a plane surface by grinding. *ASM Gloss.*

surface leakage. The amount of air which leaks through the casing at the top of the upcast shaft, the air-lock doors, and the fan-drift walls. It will depend upon the fan-drift water gage, and on the size, method of construction, and condition of the pit-top structures, on the number and type of entrances, and on whether the shaft is used frequently for winding. *Roberts, I, p. 255.*

surface lift. A term used in the freezing method of shaft sinking. The surface around the shaft tends to heave due to the formation of ice and the variation of temperatures. This uplift is sufficient to throw surface structures, such as winding towers, out of alignment. To enable corrections to be made, the tower bases may be mounted on grillages with facilities for jacking in order to keep the towers level. *Nelson.*

surface lines. The boundary lines of a mining claim as indicated by the locator. *Fay.*

surface loss. Losses occurring in the restricted area around the tub and caused by the increased velocity along the walls of the airway, and from the friction and turbulent effects due to the surfaces of the tub. For an empty tub, a portion of the turbulent effect is due to eddying and shock within the tub. *Roberts, I, p. 283.*

surface man. a. A miner, or other workman, employed in an open-air working. A yard or shop employee at a mine. *Fay.* b. *See* topman. *D.O.T. 1.*

surface mining. a. The mining in surface excavations. It includes placer mining, mining in open glory-hole or milling pits, mining and removing ore from opencuts by hand or with mechanical excavating and transportation equipment, and the removal of capping or overburden to uncover the ores. *BuMines Bull, 419, 1939, p. 325.* b. Mining at or near the surface. This type of mining is generally done where the overburden can be removed without too much expense. *Kentucky, p. 330.* c. The obtaining of coal from the outcroppings or by the removal of overburden from a seam of coal, as opposed to underground mining; or any mining at or near the surface. Also called strip mining; placer mining; opencast; opencut mining; open-pit mining. *B.C.I.; Standard, 1964.*

surface moisture. a. The moisture attached to the surface of the coal particles or that is retained in cracks and fissures other than capillary openings in the coal substance. *Mitchell, p. 648.* b. Moisture on the surface of an aggregate, as distinct from the moisture contained in the material itself. *Taylor.*

surface orientation. Alignment of certain types of low-solubility molecules (for example, terpineol) at the air-water interface with one group (nonpolar and aerophilic) turned outward from, and one (polar, hydroxyl) turned inward to the water phase. *Pryor, 3.*

surface plan. A plan of the surface layout of a mine. *B.S. 3618, 1963, sec. 1.*

surface reinstatement. The restoration of the surface after opencast mining operations have been completed. The work may involve leveling the hill-and-dale formation, drainage and relaying of the original topsoil. *Nelson.*

surface resistance. The surface resistance between two electrodes is the ratio of the electromotive force applied to the electrodes, to the current which flows through the surface layers. *Hess.*

surface resistivity. Surface resistivity is four times the resistance between two electrodes covering opposite faces of a cube when the volume resistance is so high that practically all of the current flows through the surface layers. This is equivalent to defining surface resistivity as the resistance between two opposite edges of a square of the surface layers. *Hess.*

surface reverberation. *See* reverberation.

surface rig. A drill rig designed specifically and used only for surface drilling operations. *See also* surface drilling. *Long.*

surface rights. a. The ownership of the surface of land only, where mineral rights are reserved. *Weed, 1922.* b. Those reserved to the owner of the land beneath which ore is being mined. *Pryor, 3.* c. The right of a mineral owner or an oil and gas lessee to use so much of the surface of land as may be reasonably necessary for the conduct of operations under the lease. *Williams.*

surface roughness. *See* roughness, a. *ASM Gloss.*

surface runoff. Runoff that has not passed below the surface of the land during its journey to the outlet of the drainage area considered. *A.G.I.*

surface salinity. Salinity of the surface waters varies in all the oceans in relation to latitude as follows: very low near the equator, increasing to latitude 20° N. and S., then decreasing continuously through higher latitudes. These salinity characteristics affect sound velocities. *Hy.*

surface-set bit. A bit containing a single layer of diamonds set so that the diamonds protrude on the surface of the crown. Also called single-layer bit. *Compare* multilayer bit. *Long.*

surface slope. The inclination of the water surface expressed as change of elevation per unit of slope length; the sine of the angle which the water surface makes with the horizontal. The tangent of that angle is ordinarily used, no appreciable error resulting except for the steeper slopes. *Seelye, 1.*

surface speed. Synonym for peripheral speed, a. *Long.*

surface string. A large diameter drivepipe sunk through the uppermost part of the overburden. *Compare* conductor; standpipe. *Long.*

surface tension. a. In the flotation process, the contractile force at the surface of a liquid whereby resistance is offered to rupture. *Fay.* b. Interfacial tension between two phases, one of which is a gas. *ASM Gloss.* c. A condition that exists at the free surface of a body (as a liquid) by reason of intermolecular forces unsymmetrically disposed about the individual surface molecules and is manifested by properties resembling those of an elastic skin under tension. Specifically, the force per unit length of any straight line on the surface that the surface layers on opposite sides of the line exert upon each other. *Webster 3d.*

surface texture. The surface texture of an exposed rock is an expression of the interaction between weathering and lithology; that of a rock particle, particularly a boulder or pebble, is usually an indication of its manner of attrition, for example, water-smoothed, ice-scratched. *Challinor.*

surface thrust. Synonym for erosion thrust. *A.G.I.*

surface water. a. Water running into underground workings from the surface of the ground. *Fay.* b. Water that rests on the surface of the lithosphere. *A.G.I.*

surface-water drain. Any pipe laid in the ground for carrying away surface water. *See also* separate system. *Ham.*

surface wave. An elastic wave in which the energy is confined to the surface or a narrow region just below the free surface of an extended solid. These waves readily follow the curvature of the part being inspected and are reflected only from sharp changes of direction at the surface. *ASM Gloss.*

surface working. Same as surface mining. *Standard, 1964.*

surfacing. a. The top layer or crust of a pavement. *Fay.* b. Treating the surface of a finished roadway with a bituminous material. *Fay.* c. The action of bringing the top of a railroad rail to a true grade line. *Webster 3d.* d. The action or process of digging gold on the surface of the ground. *Webster 3d.* e. To wash the surface deposits for gold. *Webster 2d.* f. The auriferous material that lies at the surface. *Fay.* g. The deposition of filler metal on a metal surface by welding, spraying, or braze welding, to obtain certain desired properties or dimensions. *ASM Gloss.*

surfactant. Surface active agent, a substance that affects the properties of the surface of a liquid or solid by concentrating in the surface layer. *Brantly, 1.*

surfeit. Term used among British miners for (1) afterdamp or chokedamp, or (2) pressure exercised by a pent-up gas resulting in its escape with or without rupture of strata. *Tomkeieff, 1954.*

surficial. Characteristic of, pertaining to, formed on, situated at, or occurring on the earth's surface; especially, consisting of unconsolidated residual, alluvial, or glacial deposits lying on the bedrock. *Fay.*

surficial geology. The geology of the young and unconsolidated materials at the earth's surface, such as stream alluvium, glacial deposits, and windblown sand; also, the geology of soils and the untransported products of rock weathering. Surficial geology maps are specially prepared to show these deposits, which are generally of Pleistocene and Recent age, in greater detail than is possible if both they and the underlying bedrock are presented on a single map. *Stokes and Varnes, 1955.*

surf ripples. A general name for ripples formed by wave-generated currents in the surf zone. *Pettijohn.*

surf zone. The area between the outermost breaker and the limit of wave uprush. *Schieferdecker.*

surge. a. To move sideways; to fleet. *Mason.* b. The uneven rate of flow and regular variations in pressure caused by time lags between pressure strokes on a piston-type pump. *Long.*

surge bin. a. In salt mining, a generally large bin above the crusher into which the mine-run salt is dumped prior to being discharged into the primary crusher. A feeder at the bottom of the surge bin facilitates transfer of the mine-run material to the crusher. *Kaufmann, pp. 128-129.* b. A compartment for temporary storage, which will allow converting a variable rate of supply into a steady flow of the same average amount. *Nichols.*

surge bunker. A large-capacity storage hopper, installed near the pit bottom or at the input end of a processing plant to provide uniform feeding of material from bulk deliveries. Surge bunkers are generally required either on the surface or underground to act as a buffer between the shaft and the coal preparation plant and the working faces. *Nelson; Sinclair, V, p. 71. See also* bunker, surface; bunker, underground.

surge hopper; surge bunker. A hopper (bunker) designed to receive a feed at fluctuating rate and to deliver it at some predetermined rate. *B.S. 3552, 1962.*

surge pipe. Open-topped standpipe to release pressure from surge. *Ham.*

surge pulley. The pulley used on a tension carriage in endless-rope haulage. *See also* balanced direct-rope haulage. *Nelson.*

surge tank. a. A standpipe or storage reservoir at the downstream end of a closed aqueduct or feeder pipe, as for a water wheel, to absorb sudden rises of pressure and to furnish water quickly during a drop in pressure. *Webster 3d.* b. An open tank to which the top of a surge pipe is connected so as to avoid loss of water during a pressure surge. *Ham.* c. In pumping of ore pulps, a relatively small tank which maintains a steady loading of the pump. When new pulp is in short supply a float valve causes recirculation of part of the load, therefore avoiding settlement. Alternatively, a float may vary speed of pump, vary rate of delivery to the tank, or divert the flow to a parallel system. *Pryor, 3.*

surge wheel. Fleeting wheel; a wheel or pulley which drives an endless rope by friction grip of laps of rope which surge, slip, or fleet sideways against a rim so as not to lap off the pulley. *Mason. See also* surge pulley.

surging. The flapping of a moving rope. *Zern. See* whipping, a. *Zern.*

surturbrand. An Icelandic term for a peat-like variety of brown coal or lignite occurring in the Pliocene deposits, and sometimes under the volcanic overflows of that island. *Fay.*

survey. a. To determine and delineate the form, extent, and position of (as a tract of land, a coast, or a harbor) by taking linear and angular measurements, and by applying the principles of geometry and trigonometry. *Webster 3d.* b. To view with a scrutinizing eye; to look over or examine with reference to condition, situation, or value. *Webster 3d.* c. The process of surveying an area of land or water; the operation of finding and delineating the contour, dimensions, and position of any part of the earth's surface whether land or water. *Webster 3d.* d. A measured plan and description of a portion of an area or of a road or line through an area obtained by surveying. *Webster 3d.* e. An organization (as a government agency) engaged in surveying. *Webster 3d.* f. *See* borehole survey, a and b. *Long.* g. The information plotted from a borehole survey. *Long.*

survey, cadastral. A survey relating to land boundaries and subdivisions, made to create units suitable for transfer or to define the limitations of title. Derived from cadastre, meaning register of the real property of a political subdivision with details of area, ownership, and value; the term cadastral survey is now used to designate the surveys of the public lands of the United States, including retracement surveys for the identification, and resurveys for the restoration of property lines; the term may also be applied properly to corresponding surveys outside the public lands, although such surveys are usually termed land surveys through preference. *A.G.I.*

survey department. A department under the control of the chief mine surveyor. *Nelson.*

surveying. a. The action or occupation of one that surveys; specifically, a branch of applied mathematics that teaches the art of determining the area of any portion of the earth's surface, the lengths and directions of the bounding lines, and the contour of the surface and of accurately delineating the whole on paper. *Webster 3d.* b. The act or process of making a borehole survey. *See also* borehole survey, a and b. *Long.* c. Specifically, in civil engineering, the science or art of making such measurements as are necessary to determine the relative position of points on or beneath the surface of the earth, or to establish such points. *Seelye, 2.*

survey meter. An instrument sensitive to ionizing radiations used in prospecting for radioactive deposits. *Webster 3d.*

surveyor. a. One who surveys land and other surfaces; one who practices the art of surveying. *Webster, 3d.* b. In geophysical prospecting, one who determines the elevations and positions of seismic or gravity stations. *A.G.I.*

surveyor, assistant. One who assists the mine surveyor in planning development of the mine and in making necessary surveys; and draws map of the mine from data secured by mine surveyor, using drafting instrument. Also called surveyor, deputy. *D.O.T. 1.*

surveyor, deputy. a. In anthracite, bituminous, and metal mining, one who works under a permit of the General Land Office, surveying and marking the boundaries of mining claims prior to the issuing of a patent; drafts and files maps with the district United States Land Office. Also called surveyor, mineral. *D.O.T. 1.* b. *See* surveyor, assistant. *D.O.T. 1.*

surveyor general. a. A principal or superintending surveyor. *Webster 3d.* b. A U.S. government official in charge of the survey of public lands in a particular area (as a state). *Webster 3d.*

surveyor, geophysical prospecting. In petroleum production, one who locates and marks sites selected for conducting geophysical prospecting activities concerned with locating subsurface earth formations likely to contain petroleum deposits. *D.O.T. 1.*

surveyor, mine. One who applies special knowledge and techniques gained through experience or training to make surface and underground surveys at a mine, locating himself on the earth's surface by taking instrument shots on the sun or stars and making necessary calculations, surveying and calculating the volume of material in dumps, carrying survey lines underground by shaft plumbing (cord or wire with attached bob is suspended from the shaft surface) and instrument shots taken on the bob at a shaft station, controlling by underground surveys and calculations the driving and connection of underground passages on and between various levels, computing the volume of coal in portions of the mine from survey notes, and drafting maps of the mine workings. Also called spud setter; surveyor, underground. *D.O.T. 1.*

surveyor, mineral. *See* surveyor, deputy. *D.O.T. 1.*

surveyor's area measure.

625 square links (sq. li.)	=1	square pole or square rod
16 square poles	=1	square chain (sq. ch.)
10 square chains	=1	surveyor's acre (A.)
640 acres	=1	square mile (sq. mi.)
36 square miles	=1	township

Crispin.

surveyor's compass; surveyor's dial. An instrument used in surveying for measuring horizontal angles. *Compare* circumferentor; semicircumferentor. *Webster 3d.*

surveyor's cross. A simple instrument made of two bars forming a right-angled cross with sights at each end and used in setting out right angles in surveying. *Webster 3d*

surveyor's dial. *See* surveyor's compass. *Webster 3d.*

surveyor's level. A level consisting of a telescope and a spirit level mounted on a tripod, revolving on a vertical axis, and having leveling screws provided for adjustment. *Compare* dumpy level; Y level. *Webster 3d.*

surveyor's measure. a. A system of measurement having the surveyor's chain as a unit and used in land surveying. *Webster 3d.* b. 7.92 inches=1 link; 100 links=66 feet=22 yards=4 rods=1 chain; 220 yards=10 chains=1 furlong; 80 chains=8 furlongs=1 mile. *Crispin.*

surveyor, underground. *See* surveyor, mine. *D.O.T. 1.*

Surwell clinograph. Well-surveying device which determines the departure of the borehole from vertical. Uses a gyroscope and spherical level with a photographic record made on 16-millimeter moving-picture film which includes a photograph of a small watch by which the depth is determined from correlation with a synchronized depth-time record made at the surface. *A.G.I.*

SUS. Abbreviation for Saybolt Universal Second. *BuMin Style Guide, p. 61.*

susannite. Variant of leadhillite. *Dana 6d, p. 922.*

susceptibility. Property of a material that defines the extent to which it will be magnetized in a given external field. *Schieferdecker.*

susceptibility, magnetic. *See* magnetic susceptibility. *A.G.I.*

susceptible. When not otherwise qualified, tending to change in consistency with variation in temperature. *ASTM D 1079-54.*

suspended arch; suspended roof; suspended wall. An arch, furnace. roof, or wall, in which some or all of the bricks are suspended by metal hangers from a steel framework. In an arch or roof, the object is to relieve the bricks from the mechanical stress resulting from the thrust of the arch; in a suspended furnace wall, the usual purpose is to permit refractory brickwork to be inclined inwards without danger of it falling into the furnace. *Dodd.*

suspended frame weir. A frame weir in which the frames are raised and hung above water level from a bridge during times of flood. *Ham.*

suspended load. a. In the process by which running water transports detritus, two factors are distinguished. The smaller particles are lifted far from the bottom, sustained for long periods, and distributed through the whole body of the current; they constitute the suspended load. *A.G.I.* b. That part of the total load of a stream which is carried in suspension. Distinguished from traction load. *Stokes and Varnes, 1955.*

suspended matter. Particles from the feed of specific gravity equal or close to that of a separating medium, and which are therefore relatively difficult to remove from the bath. *B.S. 3552, 1962.*

suspended roof. *See* suspended arch. *Dodd.*

suspended solids. Solids that can be separated from a liquid by filtration. *Bennett 2d, 1962 Add.*

suspended span. The middle freely supported length of the central span of a cantilever bridge. *Ham.*

suspended tray conveyor. A vertical conveyor having one or more endless chains with suitable pendant trays, cars, or carriers which receive objects at one elevation(s) and deliver them to another elevation(s). *ASA MH4.1-1958.*

suspended tray elevator. *See* suspended tray conveyor. *ASA MH4.1-1958.*

suspended tray lift. *See* suspended tray conveyor. *ASA MH4.1-1958.*

suspended tubbing. A permanent method of lining a circular shaft, in which the tubbing (German type) is temporarily suspended from the next wedging curb above. Slurry is run in behind the tubbing by means of a funnel passing through the holes provided in the segments. No temporary supports are required. *Nelson.*

suspended wall. *See* suspended arch. *Dodd.*

suspended water. Underground water held in the zone of aeration by molecular attraction exerted on the water by the rock and earth materials and by the attraction exerted by the water particles on one another. *Leet.*

suspender. A vertical rod or hanger in a suspension bridge, by which the road is supported from the cables. *Ham.*

suspending agent. A material, such as clay, used to keep a vitreous enamel or glaze in suspension so that it can be conveniently used for application to the ware by dipping or spraying. *Dodd.*

suspension. a. A method of rock bolting employed to secure fragments or sections of rock which are loose and subject to dropping out of place, such as small slabs or fragments barred down after blasting when they would not constitute an integral part of the rock structure if bolted securely in place, and blocks of rock which are broken by fracture or joint patterns in such a manner that they may subsequently loosen and fall. *Lewis, p. 63.* Also called shin plaster. *Fraenkel, v. 3, Art. 22: 01, p. 45.* b. A cessation of work by the miners consequent on the conclusion of a contract before another contract is made. *Zern.* c. In washing practice, when a large number of minute solid particles are allowed to settle in a fluid, the solid/liquid mixture is known as a suspension. *Nelson.* d. The condition of a mixture of solid particles and water or air in which the solid particles are completely and individually supported, normally by means of an upwardly moving current and sometimes with the assistance of mechanical agitation. *B.S. 3552, 1962.* e. A turbid or cloudy mixture of two or more substances, usually small solid particles in a liquid medium. A suspension will generally settle on standing, the suspended matter forming a layer at the bottom of the container. *Crispin.*

suspension dryer. *See* flash coal dryer. *Nelson.*

suspension roast. *See* flash roast.

suspension transport. Mode of transport whereby particles are swept along, free from the streambed. *Schieferdecker.*

suspensoid; hydrofuge; hydrophobe. A mixture of finely divided, colloidal particles in a liquid. The particles are so small that they do not settle, but are kept in suspension by the motion of molecules of the liquid (Brownian motion). *Enam. Dict.*

suspensoid particles. Small solid particles suspended in a liquid; they exhibit the Brownian movement and do not settle by themselves but can be readily coagulated. *Bennett 2d, 1962.*

suspent. Material in suspension that is to be filtered out. *Bennett 2d, 1962 Add.*

sussexite. a. Special name suggested by Brögger for the eleolite porphyry; originally described by Kemp; from Beemerville, Sussex County, N.J. The name was, however, applied years ago to a hydrated borate of manganese and magnesia, from Franklin Furnace, N.J. *Fay.* b. A porphyritic dike rock containing over 50 percent nepheline. In addition to nepheline, it contains major aegirine-augite, soda sanidine, minor biotite, and titanite, with accessory apatite and opaque oxide. *A.G.I.*

Sutton, Steele, and Steele dry table. A concentrator of the Wilfley type in motion, but instead of using water, stratification is by means of rising currents of air. The heavy grains are pushed forward by the head motion, while the lighter grains roll or flow down the slope toward the tailing side. *Liddell 2d, p. 388.*

sutured texture. A mosaic texture in which the meeting lines between grains are very irregular or toothed, like sutures; applied to igneous rocks. The term has also been applied to sedimentary rocks in which mineral grains, which have grown or enlarged after the sediment was deposited, interfere with their neighbors, producing suturelike contacts. *Stokes and Varnes, 1955.*

suture joint. Same as styolite. *Fay.*

svabite. Essentially a fluoride arsenate of calcium $Ca_5(AsO_4)_3F$; is colorless and transparent; also yellowish-white to gray. *Dana 7, v. 2, p. 899.*

svanbergite. A hexagonal mineral, $SrAl_3(PO_4)(SO_4)(OH)_6$, a member of the alunite-beudantite group; rhombohedral, sometimes pseudocubic; also granular; colorless to yellow, rose, or reddish-brown; vitreous to adamantine luster; from Horrsjoberg, Wermland. Sweden, as euhedral crystals in quartzite; also from Skane, Sweden. *Dana 7, v. 2, pp. 1005-1006; Hey 2d, 1955.*

svedala kiln. A chamber kiln with a dryer built above it; designed in Scandinavia for use in the building brick industry. *Dodd.*

swab. a. A pistonlike device provided with a rubber cap ring that is used to clean out debris inside a borehole or casing. *Long.* b. Synonym for bailer and/or sand pump. *Long.* c. The act of cleaning the inside of a tubular object with a swab. *Long.* d. In petroleum drilling, to pull the drill string so rapidly that the drill mud is sucked up and overflows the collar of the borehole, thus leaving an undesirably empty borehole. *Long.* e. Procedure for applying suction within the casing or tubing to draw fluid from the reservoir. *Wheeler.* f. A rod with flexible rubber suction cups working inside the pipe on a wire line. *Wheeler.* g. A hemp brush used in founding especially for holding water, moistening mold joints, spraying on edges, or spreading blacking on dry-sand molds. *Webster 3d.* h. To clean, as with a swab; to mop. *Webster 3d.*

swabber. In petroleum production, one who uses a special device known as a swab to draw the mud, which clogs the screen at the well bottom, into the well so that it may be bailed out and the flow of oil established. *D.O.T. 1.*

swabbing. The moving of a rubber swab, by means of a rope, up and down in the casing of a well. *Nelson.*

swab stick. A stick frayed at one end, for cleaning the sludge out of holes in process of being bored for blasting. *Fay.*

swab test. An electrical test, carried out with low voltage, for exploration of such defects in vitreous enamelware as pinholes or other discontinuities. *Dodd.*

swad. a. Newc. A thin layer of stone or refuse coal at the bottom of the seam. *Fay.* b. N. of Eng. Impure shaly coal or black shale. *Compare* squad. *Arkell.*

swag. a. A depression in a roadway usually containing water. *Zern.* b. Lanc. Subsidence of weighting of the roof. *Fay.* c. Aust. A pack of personal belongings carried especially by a swagman. *Webster 3d.* c. A digger's roll of blankets, in which he carries his spare clothes, food, etc. *Gordon.*

swage. a. A part of the christmas tree. *Williams.* b. A tool used to repair collapsed or damaged casing. *Williams.* c. A tool used by metal workers to shape material to a desired form; a dolly, jumper, or upset. A tool used in sharpening drill bits. *Webster 3d; Fay.*

swage block. A large rectangular block of cast iron used by a blacksmith. It is pierced through with numerous holes, both round and square in section, for the reception of work which requires shouldering. *Crispin.*

swaged. Reduced in diameter by use of a blacksmith's swages, hence the name. This is a hammering process, but the same result may be attained by press forging or by spinning. *Fay.*

swaging. Forming a taper or a reduction on metal products, such as rod and tubing by forging, squeezing, or hammering. *See also* rotary swager. *ASM Gloss.*

swagman. Aust. A man who travels in search of employment; so called because he carries his swag, or bundle of clothes, blankets, etc. *Fay.*

swale. A local depression in the floor of an entry or room. *Grove.*

swallet. a. Eng. An underground stream; also, an opening through which a stream disappears underground. *Webster 3d.* Also called swallow; swallows. *Fay.* b. An inrush of water in a mine. *Fay.*

swallet hole. Synonym for swallow hole; sink; sinkhole. *A.G.I.*

swallow. Derb. A loose, broken, or porous place in a vein. It derives its name from the ease with which water sinks through the loose material. *See also* swallet, a. *Fay.*

swallow hole. a. A natural cavern formed by the solution of rock, usually limestone, by water passing down a joint or bedding plane. *B.S. 3618, 1963, Sec. 4.* b. A sinkhole. *A.G.I.*

swally; swelly. A trough, or syncline, in a coal seam. *Zern.*

swamp. a. A local depression in a coalbed in which the water collects; applied particularly in bituminous coal mining. *Fay.* b. As applied to a mining claim, to clear a narrow strip along the boundary line, where the location is on timberland. *Fay.* c. Eng. All rocks on the downthrow side of a fault, Shropshire coalfield. *Arkell.* d. In geography, a low, spongy land generally saturated with moisture and unfit either for agricultural or pastoral purposes. The term is commonly used as synonymous with bog and morass; but a swamp may be here and there studded with trees, while bogs and marshes are destitute of trees, though frequently covered with grasses and aquatic vegetation. *A.G.I.*

swamp buggy. Any vehicle with very large, low-pressure tires enabling it to be used in swamps. *Bureau of Mines Staff.*

swamper. a. A rear brakeman in a metal mine. *Fay.* b. A laborer who assists in hauling ore and rock, coupling and uncoupling cars, and throwing switches. *D.O.T. 1.* c. A laborer who assists in loading and unloading wagons, dump wagons, trailers, or other type carriers that may be used to haul materials about a mine yard or the workings of a pit or placer mine. *D.O.T. 1.* d. A digger who walks up to a field behind a wagon upon which he has put his swag. *Gordon.*

swamp marl. A marl found at the outlets of lakes, composed of myriads of tiny shells in different stages of amalgamation. *Standard, 1964.*

swamp muck. Imperfect peat, especially the less compact variety. *Fay.*

swamp ore. Bog iron ore. *Webster 3d.*

swamp peat. Same as fen peat. *Tomkeieff, 1954.*

swamp shooting. *See* peat blasting. *Ham.*

swamp theory. The theory which holds that coalbeds formed in the place where the plants grew. Expressed by von Bergoldingen in 1778. *See also* autochthonous coal; in situ origin theory. *Stutzer and Noe, 1940, p. 134.*

swape. N. of Eng. A large oar by which coalboats are steered. A variation of sweep. *Fay.*

Sward hardness. Hardness measured by the number of oscillations of the Sward hardness rocker on a polished plate glass surface coated with the material to be tested. *Bennett 2d, 1962.*

swarf. a. Scot. A tool for widening boreholes. *Fay.* b. In diamond grinding operations, a relatively dry dust derived either from grinding operations where no coolant, or lubricant is applied to the grinding operation, or where the coolant (kerosine, an aqueous solution, or an emulsion of oil and water) is sprayed on the wheel as a fine mist. *I.C. 8200, 1964, p. 75.* c. Fine metallic particles removed by a cutting or grinding tool; chippings and shavings from soft iron castings, used as a reducing agent in various chemical syntheses. *Webster 3d.* d. An intimate mixture of grinding chips and fine particles of abrasive and bond resulting from a grinding operation. *ASM Gloss.*

swarm. *See* dike swarm.

swartzite. A very rare, strongly radoactive, green, monoclinic mineral, $CaMg(UO_2)(CO_3)_3.12H_2O$, found as an efflorescence with gypsum, schroeckingerite, bayleyite, and andersonite. *Crosby, pp. 45-46.*

swash mark. a. A thin wavy line on a beach marking the upper limit of the swash of a wave. Also called wave line. *Pettijohn.* b. A delicate arcuate ridge of fine-grained beach material, left on the beach at the end of the uprush. *Schieferdecker.*

swaugh. Derb. A soft clay in the vein. *Fay.*

S-wave. A transverse body wave that travels through the interior of an elastic medium. Originally applied to earthquake seismology, where it was the second (hence: S) type of wave to arrive at a recording station. Synonym for distortional wave; equivolumnar wave; secondary wave; shear wave; transverse wave. *A.G.I.*

sway. A sideways movement, such as sidesway, in a structural frame. *Ham.*

swaying of a bank. York. Undergoing disturbance due to weight of the roof. A settling of the mine roof. *Fay.*

sway rod. A diagonal brace designed to resist wind or other horizontal force acting on a structural framework. *Ham.*

sweal. a. Eng. To burn slowly. *Fay.* b. To melt and run down; to waste away without feeding the flame. A candle is said to sweal when the grease runs down, owing to its burning in a strong current of air or being improperly carried or fixed. *Fay.*

sweat. a. To gather surface moisture in beads as a result of condensation. *Webster 3d.* The roof of a mine is said to sweat when drops of water are formed upon it, by condensation of steam formed by the heating of the waste or goaf. *Fay.* b. To exude nitroglycerin; said of dynamite in which nitroglycerin separates from its adsorbent. *Webster 3d.* c. To unite two closely fitting pieces by enlarging the outer one by heat. *Nichols.* d. Exudation of a low-melting phase during solidification. For tin bronzes, it is called tin sweat. *ASM Gloss.*

sweaters. *See* thawing. *Lewis, p. 395.*

sweating. a. The condensation of moisture and distillation products on the surface of a roast heap, forming a damp and sticky crust. *Fay.* b. The illegal removal from coins, of a portion of their metallic content, by shaking them in a bag until some of the metal wears off by abrasion. The dust is retained and the coins are put back into circulation. *Hess.* c. *See* exudation. *ASTM B 243-65.*

sweating out. Bringing small globules of one of the low-melting constituents of an alloy to the surface during heat treatment, as lead out of bronze. *ASM Gloss.*

sweat out. In powder metallurgy, the low-melting constituent of a compact that melts during sintering and subsequently appears on the surface of the compact. *Henderson.*

sweat spot. Imperfection of enamel surface caused by a drop of perspiration falling on the bisque ware. *ACSB-3.*

swedenborgite. A colorless to wine-yellow antimonate of sodium and beryllium, $Na_2O.8BeO.Sb_2O_5$. Prismatic crystals. Hexagonal. A basic salt of H_7SbO_6. From Langban, Sweden. *English.*

swedge; drift. A tool used in oil wells for straightening bulged casing. *Fay.*

Swedish amber. *See* Baltic amber. *Shipley.*

Swedish bit. Synonym for chisel bit. *See also* chisel bit, b. *Long.*

Swedish iron. An iron of highest quality due to the freedom from phosporous and sulfur of the Swedish ore. *Crispin.*

Swedish mining compass. A magnetic instrument in which a magnetic needle is suspended on a jewel and a stirrup so that it can rotate about a horizontal and vertical axis. *A.G.I.*

Swedish process. *See* continental process. *Fay.*

sweep. a. Aust. That part of a branch that reunites with the main vein farther on. *Fay.* b. In founding, a profile pattern, used especially in forming molds for cylindrical or other symmetrical articles. *Standard, 1964.* c. A form or template used for shaping sand molds or cores by hand. *ASM Gloss.* d. A curved metal blade projecting from the central shaft of a pug mill, to force clay through holes at the bottom. *Standard, 1964.*

sweep delay. The action of a control (or an alternate control), found on some instruments using cathode-ray tube displays, that causes the observed time-base sweep to begin at a time other than the normal initial event. *ASM Gloss.*

sweeper. a. One who carries clay into cellar storage for aging; and compresses clay into banks. Also called cellerman. *D.O.T. 1.* b. One who cleans the brick pavement between stockhouse, stoves, and blast furnace. *Fay.* c. In an iron mill, one whose duty it is to remove with a twig broom the scale that forms on plates, etc., during the process of rolling. *Standard, 1964.* d. *See* wasteman. *D.O.T. 1.*

sweep-head pick. Eng. A curved pick. *Fay.*

sweeping. *See* sweeps, a.

sweepings. Dust swept from the workbenches and floors of jewelers and other workers with precious metals, and heated for recovery of the metals contained in the dust. *Bennett 2d, 1962.*

sweeping table. Stationary circular buddle provided with rotating brushes which prevent formation of channels as pulp flows radially across. *Pryor, 3.*

sweep plates. Eng. Curved plates for barrow ways at a turn. A turnsheet. *Fay.*

sweep point. Aust. The curved rail of a turnout that crosses the main rails and is moved against or from the outer main rail, according to the track it is desired the skip or car shall run on. *Fay.*

sweep rail. Aust. The inner curve of a turnout. *Fay.*

sweeps. a. The dust of the workshops of jewelers, goldsmiths, silver-smiths, and assayers and refiners of gold and silver. Also called sweeping. *Fay.* b. Brushwood arms on round buddles which rotate slowly and break down channels as the ore slime runs across the surface. *Pryor, 3.*

sweepwasher. A person who extracts precious metals from the sweepings of refineries of gold and silver. *Fay.*

sweepwashings. Valuable metal washed from sweepings. *Standard, 1964.*

sweet. a. Eng. Free from firedamp or other gases, or from fire stink. *Fay.* b. Applied to potable water and to oil and gas free of hydrogen sulfide. *Bureau of Mines Staff.* c. Applied to easily workable glass. *ASTM C162-66.*

sweet coal. Eng. Term in use among miners in Wyre Forest for a non-sulfurous coal. *Tomkeieff, 1954.*

sweetish astringent. Applied to those minerals that have the taste of alum. *Fay.*

sweet roasting. Complete roasting, or until arsenic and sulfur fumes cease to form. *See also* roasting. *Fay.*

swell. a. The tendency of soils, on being removed from their natural, compacted beds, to increase in volume due to an increase in void ratio; that is to say, the space between soil particles increases. *Carson, p. 46.* b. The volumetric increase, normally expressed as a percentage, which occurs through change from bank (in situ) to loose (excavated) measure. *Austin.* c. A local enlargement or thickening in a vein or ore deposit. *Webster 3d.* d. A space in a seam from which the coal has been eroded and its place filled with clay or sand. *Standard, 1964.* Also called horse; horseback; swine back; want. *Fay.* e. A low dome or quaquaversal anticline of considerable areal extent. *Fay.* f. Waves caused by the wind but no longer being activated. *Schieferdecker.* g. Long and generally symmetrical waves, period approximately 10 seconds, produced by storm and wind remote from the point of observation. These are gravity waves and contribute to the mixing processes in the surface layer and thus to its sound transmission properties. *Hy.* h. In geology, a large-scale submarine topographic feature rising above the surrounding surface and having nearly equal length and width. *Hy.*

swell-and-swale topography. Topography of ground moraine having low relief and gentle slopes. *A.G.I.*

swelled coupling. a. A rod coupling having a considerably larger outside diameter than the drill rods to which it is threaded, such as BW rod outside diameter with AW rod threads. Also called oversize coupling. *Long.* b. Canadian synonym for reaming shell. Its usage in this sense is obsolete except in Canada. *Long.*

swelled ground. a. A soil or rock that expands when wetted. *Long.* b. Soil or rock that flows into mine workings as a result of pressure. *Bureau of Mines Staff.*

swelling. A volume change that takes place during heating of many coals under such conditions that the softened coal can expand freely in a direction perpendicular to the heating surface. *A.G.I.*

swelling number. A numerical expression to indicate the relative swelling properties of a sample when heated under standardized conditions. *Nelson.*

swelling of shale. When a shaft is sunk through a thick, dry deposit of shale, the absorption of water may cause the shale to swell and damage the shaft lining. Again when shale is exposed to weathering, the lamina tend to separate and the material swells. When wet, the disintegrated mass still further swells and eventually becomes a plastic clayey deposit. It follows that the strength and hardness of a shale freshly exposed in place gives no clue as to its probable behavior when wet or after contact with moist air. When excavations are made in a shale deposit during a wet period, the foundations may be constructed on exposed shale which has swollen considerably. Later, the material may shrink unevenly due to the drying of parts protected by the building. *Nelson.*

swelling pressure. a. A force. The pressure that the softened coal mass frequently exerts when it is obstructed from free swelling. *A.G.I.* b. The pressure exerted by a contained clay when absorbing water. This pressure may greatly exceed that of the overlying soil. *Ham.*

swelly; swilly; swally. a. A seam of coal which thickens out over a limited area. *See also* pressure belt. *Nelson.* b. Eng. A local thickening of a coal seam. Also called swell. *Standard, 1964.* c. Eng. *See* swally. *SMRB, Paper No. 61.*

swept valley. A form of roof tiling designed to cover a re-entrant corner of a roof without any sharp valley; careful cutting of the roofing tiles is necessary to ensure a symmetrical finish. *Dodd.*

SWG Customary abbreviation for British Standard wire gage. *Ham.*

swilley. A depression in a mine road from which the road rises both ways. *Mason.*

swilling vat. A vat in which tinplate is washed after pickling. *Standard, 1964.*

swilly. York. A detached portion of coal strata. *Fay. See also* swell, d; swelly.

swimming pool reactor. *See* pool reactor. *L&L.*

swimming stone. Same as floatstone, b. *Standard, 1964.*

Swindell-Dressler kiln. *See* Dressler kiln. *Dodd.*

Swindell producer. A furnace used for the manufacture of producer gas. *Fay.*

swine back. A Wales term for horseback, f and i; swell, d. *Fay.*

Swineburne-Ashcroft process. Treating sulfide ores with chlorine gas in a closed shaft furnace at approximately 1,200° F; the metals of the ore are converted to fused chlorides and the sulfur is volatilized. *Bennett 2d, 1962.*

swinestone. a. A variety of marble that gives off a fetid odor when broken or rubbed. Also called stinkstone. *See also* bituminous limestone. *Fay.* b. Synonym for fetid calcite. *Hey 2d, 1955.*

swing. a. Eng. The arc or curve described by the point of a pick or mandril when being used. Also called the swing of the pick. *Fay.* b. In power-shovel nomenclature, the rotation of the superstructure on the vertical shaft in the mounting. *Carson, p. 38.* c. In revolving shovels, to rotate the shovel on its base. *Nichols.* d. In churn drills, to operate a string of tools. *Nichols.*

swing angle. The distance in degrees which a shovel must swing between digging and dumping points. *Nichols, 2.*

swing cut. A slabbing cut. *Nelson.*

swing day. Synonym for change day. *Long.*

swing-frame grinder. A grinding machine suspended by a chain at the center point so that it may be turned and swung in any direction for the grinding of billets, large castings, or other heavy work. Its principal use is removing surface defects and roughness. *ASM Gloss.*

swing-hammer crusher. a. A rock breaker in which crushing force is generated by hammers loosely mounted on a rapidly revolving shaft. Rock entering the crushing chamber is hit, and rebounds against liner plates of walls or against other rock, until small enough to escape through a grid. *Pryor, 3.* b. A machine in which size reduction is effected by elements loosely pivoted to disks fitted on a rotating horizontal shaft mounted in a surrounding casing. Also called pulverizer; swing-hammer mill; swing hammer. *B.S. 3552, 1962.*

swing-hammer regulator. A simple method of regulating the flow of lump ore in a chute. It consists of several heavy pivoted hammers which allow fine ore to pass through but check the passage of lumps. *Nelson.*

swinging a claim. The adjustment of the boundaries of a mining claim to more nearly conform to the strike of the vein. A reasonable time is allowed the discoverer to explore the vein or lode to find out its strike and thus enable him to lay his claim. *Fay.*

swinging bont; swinging bant. Mid. Before the introduction of cages and guides, the skips or buckets or coal, etc., and also the men, were raised and lowered swinging loose in the shafts. *See also* bant. *Fay.*

swinging-electrode controller. This controller is made up of three fixed electrodes consisting of groups of parallel plates of noncorroding alloy fixed at the bottom of curved troughs of insulating material of uniform width and varying depth. The trough is deep at the end corresponding to full speed and minimum resistance; and shallow at the maximum resistance, starting position. The moving electrodes, of similar construction, are joined to form the star point of the rotor and are moved towards or away from the fixed electrodes, giving a wide range of resistance. *Sinclair, V, pp. 114-115.*

swinging field magnetization. A magnetic field which is the result of two or more magnetizing forces impressed upon the same area of a part in controlled sequence and which permits magnetic-particle inspection after one processing. *ASM Gloss.*

swinging-gate anemometer. An instrument of the steady deflection type, where speed is read off directly from the scale of the instrument. This is most useful for measuring low speeds, since it permits a spot reading. This instrument does not integrate and is used extensively in work connected with the ventilation of building interiors, and to a fair extent underground. *Roberts, I, p. 39.*

swinging plate. An amalgamated copper plate hung in a sluice to catch float gold. *Fay.*

swinging-vane anemometer. This instrument consists essentially of a damped, pivoted vane which is deflected when placed in an airstream. As the weight of the vane is constant, the angle of inclination will be dependent upon the rate of change of momentum of the impinging airstream. The instrument gives a direct reading and can be calibrated for use over a wide range of velocities, from 20 to 2,000 feet per minute. In underground airways it can be used without attachments. Its main field of use is the measurement of air velocity in ducts and the rate of air discharge from ventilating grills. *Roberts, I, p. 45.*

swing jack. A jack used to replace derailed cars on a railway track. *Fay.*

swing-jib crane. A crane with one horizontal boom on which there is a counterweight. It can swing through a full circle. *See also* titan crane; tower crane. *Ham.*

swing loader. A tractor loader that digs in front, and can swing the bucket to dump to the side of the tractor. *Nichols.*

swing loose. Ark. To gradually loosen over a considerable area and sag; said of the rock over a mine working. *Fay.*

swing of a lathe. The largest diameter of work which can be carried between the centers of a lathe. In England, the swing refers to radius. *Crispin.*

swing offset. The perpendicular distance from a point to a transit line found by holding the zero point of a tape at the given point and swinging the (taut) tape in an arc until the minimum (horizontal) distance is obtained. *Seelye, 2.*

swing parting. Ark. A parting some distance from the mouth of an entry. The loaded cars are left by the gathering driver to be taken out by a swing driver. *Fay.*

swing press. A hand-operated screw press sometimes used, for example, in the shaping of a small quantity of special-shaped wall or floor tiles. *Dodd.*

swing roller. In a revolving shovel, one of several tapered wheels that roll on a circular turntable and support the upper works. *Nichols.*

swing shift. a. Workday from 4 p.m. to 12 p.m. *Nichols.* b. Occasionally refers to the 12 p.m. to 8 a.m. shift. *Nichols.* c. Working arrangement in a three-shift continuously run plant which changes working hours at regular intervals. During swing the old morning shift becomes the new afternoon shift. The afternoon shift of the first period must work the morning shift of the next with only an 8-hour break on the first day of change. *Pryor, 3.*

swing table. A movable bed on which plate glass is cemented for polishing; a runner. *Standard, 1964.*

Swiss jade. Stained jasper. *See also* stained stone. *Shipley.*

Swiss lapis. A fraudulent imitation of lapis lazuli obtained by staining pale-colored jasper or ironstone with ferrocyanide. Also known as German lapis. *C.M.D.*

switch. a. A mine switch is a device for enabling a car or a trip of cars to pass from one track to another. The term switch is also frequently used in a loose sense to apply to the whole side track or turnout, and a car standing on a side track is frequently said to be standing on the switch. *Kiser, 2, p. 33.* b. The junction of two tracks. *Fay.* c. Eng. A mechanical device for opening and closing an electric circuit; a mechanism for shifting a moving body in another direction. *C.T.D.*

switchback. a. A zigzag arrangement of a roadway (or rail tracks) for surmounting the grade of a steep hill or the slope wall of a surface or open-pit mine. *Bureau of Mines Staff.* Common in mountainous mining districts. *Fay.* b. A hairpin curve. *Nichols.* c. *See* shunt back, a. *Nelson.*

switchboard. a. This is a type of switchgear assembly consisting of one or more panels and associated framework on which electric devices are mounted. *ASA M2.1-1963.* b. An assembly of switch panels. *C.T.D.*

switch boy. *See* switchman. *D.O.T. 1.*

switcher. *See* switchman. *D.O.T. 1.*

switchgear. This is a general term applying to switching, interrupting, controlling, metering, protective, and regulating devices, as well as assemblies of these devices with associated interconnections, accessories and supporting structures. The term is used primarily in connection with generation, transmission, distribution, and conversion of electric power. *ASA M2.1-1963.*

switchman. a. In anthracite and bituminous coal mining, a laborer who throws switches (points) of mine tracks with a bar or by means of a lever to control the movement of train or cars along the haulage system underground or at the surface of a mine. Also called latchman; point tender; switch boy; switcher; switch thrower. *D.O.T. 1.* b. *See* grinder. *D.O.T. 1.*

switch plate. An iron plate on tramroads in mines, to change the direction of movement. *Standard, 1964.* A turnsheet. *Fay.*

switch point. A movable tongue or rail for diverting a train from one track to another. *Grove.*

switch rope. A short length of rope fitted with a hook on one end and a link on the other, used for the switching of cars. *Zern.*

switch throw. a. The arrangement of levers by means of which a switch is thrown for the straight track or the turnout. *Jones.* b. The handle or lever by which a switch is operated. *Grove.*

switch thrower. *See* switchman. *D.O.T. 1.*

swither. A term used in Wisconsin lead regions to denote a crevice or crack branching from a main lode. *Fay.*

swivel. a. A shortened term for water swivel; also for swivel head. *Long.* b. In oil well drilling, a short piece of casing having one end belled over a heavy ring, and having a large hole through both walls, the other end being threaded. *Fay.*

swivel barrel. A misnomer applied to a swivel-type double-tube core barrel; also, the inner tube of a like-type core barrel. *Long.*

swivel coupling. a. A coupling where one link is made so that it can be rotated independently of other links. When such a coupling is used, one or more cars can be rotated on a revolving dump without uncoupling from the rest of the trip. *Zern.* b. A coupling that gives complete rotary freedom to a deflecting wedge-setting assembly. *Long.*

swivel head. a. The assembly of a spindle, chuck, feed nut, and feed gears on a diamond-drill machine that surrounds, rotates, and advances the drill rods and drilling stem. On a hydraulic-feed drill the feed gears are replaced by a hydraulically actuated piston assembly. Also called boring head; drill head; drilling head; gate. *Long.* b. In a diamond drill, the mechanism that rotates the kelly and drill string. *Nichols.* c. *See* drill head. *B.S. 3618, 1963, sec. 3.*

swivel-head bevel gear. The bevel gear mounted on the outside of the drive quill in the swivel head of hydraulic-feed, and/or some types of gear-feed, diamond drills. The gear meshes with, and is driven by, a matching gear on the drill-motor shaft. *Long.*

swivel hoisting plug. Same as hoisting plug. *Long.*

swivel hook. a. A hoisting hook suspended from a freely rotating (bearing) part in such a manner that the rotation of the drill rods is not transferred to the hoist cable, or vice versa, when the rods are pulled or lowered. *Long.* b. A hook with a swivel connection to its base or eye. *Nichols.*

swivel neck. Synonym for a water or a mud swivel. *Long.* Also called gooseneck.

swivel plug. Synonym for hoisting plug. *Long.*

swivel sockets. Another name for jars. *Stoces, v. 1, p. 77.*

swivel trough. A short, adjustable angle trough which permits turning the conveyor panline any amount up to 30°, either to the right or to the left. The position of the swivel is controlled by a roof jack and a pendulum. *Jones.*

swivel-tube barrel. A misnomer for a swivel-type double-tube core barrel. *Long.*

swivel-tube core barrel. A misnomer for swivel-type double-tube core barrel. *Long.*

swivel vise. A bench vise which may be rotated on its base to bring the work which it holds into better position. *Crispin.*

swom stuff. Eng. An old term for certain alluvial deposits found in coal measures. *Fay.*

sworl. The marks on the bottom of a pot formed by cutting from the wheel. *ACSG, 1963.*

sycee silver. Pure, uncoined, lump silver of various sizes, usually having a banker's or assayer's seal stamped on them; used by Chinese as a medium of exchange and reckoned by weight. The larger, sometimes called shoes, are boat shaped and weigh about one pound troy. *Standard, 1964.*

sycite. A fig-shaped pebble or mass of flint. *Standard, 1964.*

syderolite. A variety of Bohemian earthenware. *Standard, 1964.*

syenite. Any granular igneous rock composed essentially of orthoclase, with or without microcline, albite, hornblende, biotite, augite, or corundum. In mica syenites, hornblende is replaced by biotite and in augite syenites it is replaced by augite. If a small quantity of quartz is present, it is called quartz syenite. In nepheline syenite, the feldspar is partly replaced by nepheline. *Fay.*

syenite porphyry. A rock of porphyritic texture and the same mineral composition as syenite. *Fay.* Of medium grain size, occurring in minor intrusions; it consists of phenocrysts of feldspar and/or colored silicates set in a microcrystalline groundmass. *C.T.D.*

syenodiorite. A term based on the form of granodiorite for rocks like the latter, but free from quartz, that is, for phanerocrystalline igneous rocks intermediate in composition between syenite and diorite rocks of this kind have generally been called monzonite, a term which should, however, be restricted to types intermediate between syenite and gabbro. *Holmes, 1928.*

syenogabbro. An intrusive rock that contains orthoclase in addition to the normal gabbroic minerals. An orthoclase gabbro. The plutonic equivalent of trachybasalt. *A.G.I.*

sylvane. Native tellurium, and original form of sylvanite. *Hey 2d, 1955.*

sylvanite. a. One of the gold telluride group of minerals, $(Au,Ag)Te_2$. Corresponds to the same general formula as calaverite and krennerite. It is usually associated with igneous rocks and, in veins, with native gold. Monoclinic. Steel-gray to silver-white in color. Brilliant metallic luster becoming dull on exposure. Contains 24.2 percent gold, 13.3 percent silver. Specific gravity, 7.9 to 8.3; Mohs' hardness, 1.5 to 2. Found in California, Colorado; Australia. A source of gold. *CCD 6d, 1961.* b. An old name for native tellurium. *Dana 6d, p. 11.*

sylvester. A hand-operated device for withdrawing supports from the waste or old workings. The appliance enables a leverage of about 30 to 1 to be applied. A long chain allows it to be positioned a safe distance from the support to be extracted. It may also be used for applying tension or for moving machines short distances. *See also* monkey winch. *Nelson.*

Sylvester process. A method for the recovery of manganese and iron from open hearth slag and low grade ores. The process consists of three essential steps. First, a slag is corrected to a molecular lime: silica ratio of about 2, as determined by the following formula:

$$2 \simeq \frac{(CaO—3P_2O_5)}{SiO_2}$$

This is accomplished by the addition of limestone or silica, as required. The mixture is then fired until the oxides of iron, manganese, aluminum, and magnesium separate into one crystalline phase and the oxides of silicon, calcium, and phosphorus separate into another crystalline phase. Second, the oxide phase is separated from the silicate and phosphate phase. Third, the oxide phase is either reduced directly to spiegeleisen or, by a two-stage reduction, to iron and ferromanganese. *Osborne.*

sylvine. The name for potassium chloride found native in the salt deposits at Stassfurt, Germany. *Cooper, p. 322. See also* sylvite.

sylvinite. A mining term for the mixtures of sylvite and halite occurring in the Prussian salt deposits; mined as potassium ore. *English; A.G.I.*

sylvite; sylvine. The principal ore of potassium, KCl, occurring as a sublimation product near volcanoes. It is a source of potash compounds used as fertilizers. *A.G.I.; Dana 17.*

symbiosis. Two or more organisms living together to the mutual benefit of both. *I.C. 8075, 1962, p. 64.*

symbol. a. An arbitrary or conventional sign (as a character, a diagram, a letter, or an abbreviation). Used in writing or in printing relating to a particular field (as mathematics, physics, chemistry, or geology) to represent operations, quantities, spatial position, valence, direction, elements, relations, qualities, character, etc.; a sign. *Webster 3d.* b. Geological maps are generally accompanied by special symbols to show the outcrops of formations and the attitude of bedding, foliation, faults, joints, etc. *A.G.I.*

symbols of crystal faces. a. The mathematical expressions for designating the position of crystal faces on coordinate axes. *Fay. See also* Miller indices. b. Any sign or letter used in crystallography to designate a group of smaller faces. *A.G.I.*

symmetrical. Fold in which the axial plane is essentially vertical. *McKinstry, p. 641.*

symmetrical dispersion. In optical mineralogy, the dispersion that produces an interference figure with color distribution symmetrical to the trace of the axial plane and also to a line normal to it. *Fay.*

symmetrical fold. A fold in which the axial plane is essentially vertical, that is, the two limbs dip at similar angles. *Billings, 1954, p. 40.*

symmetrical oscillation ripple mark. *See* wave ripple mark. *A.G.I.*

symmetrical ripple marks. Ripple marks with symmetrical cross-section; straight crests predominate. *Pettijohn.*

symmetry. The symmetrical distribution of nonparallel but equivalent directions (faces, edges, etc.) in a crystal with reference to certain planes and lines called planes of symmetry and axes of symmetry. The grade of symmetry is determined by the number of nonparallel equivalent directions that a given crystal possesses. There are only 32 crystal classes possible having different grades of symmetry. *Standard, 1964.*

symmict clay. One in which the varves are composed of mixtures of fine and coarse material. *A.G.I.*

symon. Shrop. Red shale. *See also* calamanco. *Arkell.*

symond strings; simon strings. Thin veins of carbonate of lime running through the coal. *Arkell.*

symon fault. a. A space in a seam from which the coal has been eroded and its place filled with clay or sand. *A.G.I.* b. The original symon fault of the Coalbrookdale field of England, once thought to be a great fault, has subsequently been shown to be the surface of an extensive denuded slope resulting from erosion and weathering followed by deposition of strata in unconformable relationship, even including a pebble conglomerate. Also called horse; horseback; swine back; want. *A.G.I.*

Symon's cone crusher. A modified gyratory crusher used in secondary ore crushing that consists of a downward-flaring bowl within which is gyrated a conical crushing head. The main shaft is gyrated by means of a long eccentric which is driven by bevel gears. *Newton, pp. 59-60.*

Symon's disk crusher. A mill in which the crushing is done between two cup-shaped plates that revolve on shafts set at a small angle to each other. These disks revolve with the same speed in the same direction and are so set as to be widest apart at the bottom. Feed is from the center, and the material is gradually crushed as it nears the edge, and is then thrown out by centrifugal force. *Liddell 2d, p. 358.*

symplectic. The rock texture produced by the intergrowth of two different minerals. Pegmatitic, granophyric, poikilitic, ophitic, and basiophitic textures are included under this term. *See also* symplektite. *Stokes and Varnes, 1955.*

symplektite. A secondary intergrowth of two minerals which are interwoven or plaited together, one of the minerals usually having a vermicular shape. The texture so produced is described as symplektitic, and is found in certain igneous and metamorphic rocks. Commonly the intergrowth is of quartz and feldspar. *Holmes, 1920.*

symplesite. A pale indigo or green prismatic monoclinic mineral with perfect cleavage, $3FeO.As_2O_5.8H_2O$: Mohs' hardness, 2.5; specific gravity, 2.96. *Larsen, p. 181.*

symptomatic minerals. *See* diagnostic mineral, a. *A.G.I.*

synadelphite. A basic arsenate essentially of divalent manganese. The formula probably is $(Mn,Mg,Ca,Pb)_4(AsO_4)(OH)_5$. Fracture uneven to conchoidal. *Dana 7, v. 2, p. 781.*

synantetic. Proposed by Sederholm and applied to those primary minerals in igneous rocks which are formed by the reaction of two other minerals, as in kelyphite rims, reaction rims, etc. *Johannsen, v. 1, 2d, 1939, p. 198.*

synchisite; synchysite. A rare, weakly radioactive, orthorhombic or monoclinic mineral, $(Ce,La)Ca(CO_3)_2F$, usually found in pegmatites associated with aegirite, microcline, astrophyllite, fluorite, gadolinite, xenotime, cordylite, and catapleiite. May be related to parisite. *Crosby, p. 110.*

synchrocyclotron. A cyclotron in which the frequency of the accelerating voltage is decreased with time so as to match exactly the slower revolutions of the accelerated particles. The decrease in rate of acceleration of the particles results from the increase of mass with energy as predicted by the Special Theory of Relativity. *L&L.*

synchromesh. A silent-shift transmission construction, in which hub speeds are synchronized before engagement by contact of leather cones. *Nichols.*

synchronal. Occurring at the same time. *Fay.*

synchroneity. Synchronism; specifically, supposed coincidence in the time of formation; said of strata. *Standard, 1964.*

synchronism. The state when the phase difference between two or more periodic quantities is zero; they are then said to be in phase. *NCB.*

synchronous. *See* synorogenic. *A.G.I.*

synchronous motors. This type of motor has a stator similar to a squirrel cage motor but the rotor has a direct current field winding with salient poles equal in number to the stator poles. The direct current is supplied to the field winding through slip rings. In addition to the direct current field windings, the rotor normally has a squirrel cage (amortisseur) winding which is used for starting. *Pit and Quarry, 53rd, Sec. D, p. 7.*

synchronous timing. In spot, seam, or projection welding, a method of regulating the welding-transformer primary current so that all the following conditions will prevail: (1) the first half-cycle is initiated at the proper time in relation to the voltage to insure a balanced current wave; (2) each succeeding half-cycle is essentially identical to the first; and (3) the last half-cycle is of opposite polarity to the first. *ASM Gloss.*

synchrotron. An accelerator in which particles are accelerated around a circular path of essentially constant radius by electrostatic fields. *L&L.*

synclase. Used by Daubree for minor divisional planes produced by some intense mechanical or molecular motion; generally by contraction, as in cooling and drying. *Fay.*

synclinal. a. In geology, characteristic of, pertaining to, occurring, situated in, or forming a syncline. Opposite of anticlinal. *Fay.* b. A trough-shaped curve of the strata. *Gordon.*

synclinal axis. In geology, the central line of a syncline, toward which the beds dip from both sides. *Fay.*

synclinal bend. An upwardly concave flexure in which the beds of one limb dip relatively steeply toward the apex (line of greatest flexure) and the beds of the other limb dip gently away from it. *Stokes and Varnes, 1955.*

synclinal closures. Structural basins and canoe folds, so called because when these are represented by structure contours, these contours are closed. *Stokes and Varnes, 1955.*

synclinal mountain. *See* anticlinal mountain. *A.G.I.*

synclinal valley. a. The plication of the earth's crust produces alternating depressions and elevations, unless the folds are pressed together into a close mass. The depressions are synclinal valleys. *A.G.I.* b. Synclinal valleys are those which follow synclinal axes. *A.G.I.*

syncline. A fold in rocks in which the strata dip inward from both sides toward the axis. Opposite of anticline. *Fay.*

synclinore. Same as synclinorium. *Fay.*

synclinorium. a. A compound syncline; a closely folded belt, the broad general structure of which is synclinal. Also called synclinore. *Fay.* b. A major syncline composed of many smaller folds. *Ballard.*

syndets. Abbreviated form for synthetic detergents. *See also* detergents, synthetic. *CCD 6d, 1961.*

syndicate. A group of persons or concerns who combine under a usually temporary agreement to carry out a particular transaction, such as underwriting a bond issue. *Webster 3d.*

syndicate man. In bituminous coal mining, one who works with a party of men who operate machines for undercutting, drilling, and loading coal into cars at the working face, and are paid on a basis of tonnage of coal mined. *D.O.T. 1.*

Syndalog. Rice-size clinkered dolomite used in electric furnace practice. *Bennett 2d, 1962.*

syndromous load cast. A peculiar form of load casting characterized by elongate shallow casts with sharp creases which combine to form a dendritic pattern. Junctures occur without exception in the downcurrent sense. *See also* rill cast; rill mark; furrow flute cast. *Pettijohn.*

syneclise. *See* anticlise. *Challinor.*

syneresis cracks. Cracks developed by shrinkage related to dehydration; usually applied only to cracks formed upon aging of gels. *Pettijohn.*

synergism. a. Action of two agencies, usually two chemicals, to produce an end effect greater than or different from the sum of the effects of the two agencies acting separately. *I.C. 8075, 1962, p. 64.* b. Used in metallurgy with reference to reagent combinations to obtain the maximum possible recovery of ore or metal. *Nelson.*

syngenesis. The process by which mineral deposits were formed simultaneously and in a similar manner to the rock enclosing them. *See also* epigenesis. *A.G.I.*

syngenetic. A term now generally applied to mineral or ore deposits formed contemporaneously with the enclosing rocks, as contrasted with epigenetic deposits, which are of later origin than the enclosing rocks. *Holmes, 1920.*

syngenetic deposits. Deposits formed contemporaneously with the parent rock and enclosed by it. There are two types of syngenetic deposits, the igneous and the sedimentary. Some examples are nickeliferous sulfides, nontitaniferous magnetite, diamond, chromite, and corundum. *Lewis, p. 273.*

syngenetic igneous deposits; magmatic segregations. These deposits are formed by the solidification of basic magmatic material and occur as dikes and irregular masses. *Lewis, p. 273.*

syngenetic ore deposit. Term generally applied to ore (mineral) deposits formed contemporaneously with the enclosing rocks. *Schieferdecker.*

syngenetic pattern. A dispersion pattern formed at the same time as the matrix in which they occur. Syngenetic patterns include those developed (1) in igneous rocks during their crystallization, (2) in residual soil, gossan, or leached rock as a residual product of weathering, and (3) in glacial till, as clastic material mechanically transported and deposited by glacial action. *Hawkes, 2, p. 26.*

syngenetic sedimentary deposits. Include placer deposits and beds like the Clinton hematite ores, which are simple sedimentary rocks containing sufficient valuable minerals to constitute ore. *Lewis, p. 273.*

syngenite. *See* calcium potassium sulfate. *Bennett 2d, 1962.*

synglyph. A hieroglyph formed during the sedimentation process. *Pettijohn.*

synkinematic. *See* synorogenic. *A.G.I.*

synneusis. Applied to a texture of rocks in which the individual crystals of a mineral species are collected together to form groups or aggregates. The texture resembles glomeroporphyritic texture except that the rock is not necessarily a porphyry nor do the aggregated crystals need to form the phenocrysts. *Johannsen, v. 1, 2d, 1939, pp. 234-235.*

synorgenic. Adjective describing some process, usually the emplacement of plutons or the recrystallization of metamorphic rocks, that is, contemporaneous with orogeny. Synonym for synkinematic; syntectonic; synchronous. *A.G.I.*

synorgenic granite. A granite of which the emplacement took place during the process of mountain making. *Schieferdecker.*

synorgenic plutonism. Intrusion of igneous plutons essentially simultaneously with orogenic deformation. *A.G.I.*

syntectic. a. Magmas produced by syntexis, and also used substantively to connote the magmas themselves. *Holmes, 1920.* b. An isothermal reversible reaction in which a solid phase, on absorption of heat, is converted to two conjugate liquid phases. *ASM Gloss.*

syntectites. Rocks produced by the melting of older rocks. *A.G.I. Supp.*

syntectonic. Synonym for principal tectonic; synkinematic; synorogenic. *A.G.I.*

syntexis. a. Synonym for assimilation. *A.G.I.* b. The formation of a magma by direct melting of more than one kind of rock. *A.G.I.*

synthesis. The production of a chemical compound by the union of elements or of simpler compounds or by the degradation of a complex compound especially by laboratory or industrial methods. Broadly, the artificial production of a substance. Opposite of analysis. *Webster 3d.*

synthetic alexandrite. Usually synthetic spinel; sometimes synthetic sapphire. *See also* synthetic stone. *Shipley.*

synthetic aquamarine. Pale blue synthetic sapphire or synthetic spinel. Synthetic aquamarine is not yet made commercially. *Shipley.*

synthetic beryl. a. Made commercially in all tones of green. *See also* synthetic emerald. *Shipley.* b. Misnomer for light green synthetic spinel. *Shipley.*

synthetic corundum. Made by melting alumina in an oxyhydrogen flame. So far has been crystallized only in long slender rods or in boules which differ greatly from shape of natural crystals. Rarely the correct color of the genuine natural stone. Detected most effectively by nature of its inclusions which differ from those of genuine corundum. *See also* synthetic stone. *Shipley.*

synthetic cryolite. Cryolite produced by chemical reaction. *Mersereau, 4th, p. 515.*

synthetic diamond. a. A diamond produced artifically by subjecting a carbonaceous material to extremely high temperature and pressure; currently and commonly called MM and/or manmade diamond. *See also* manmade diamond. *Long.* b. A misnomer for sintered tungsten carbide. *Long.*

synthetic emerald. a. A synthetic beryl crystallizing in the same form as the genuine and sold commercially. Rarely of sufficiently dark green color to be rigidly classed as emerald. Made in Germany and in California, but so far in small quantities. *Shipley.* b. Term widely used for so-called emerald triplets and for glass imitations, especially of beryl glass. *Shipley.*

synthetic faults. Subsidiary faults parallel to the master fault. *A.G.I.*

synthetic gem. One artificially made from chemicals. *Schaller.*

synthetic hematite. Manufacturers' misnomer for various metallic imitations of hematite. *Shipley.*

synthetic magnesite. Magnesite made by a chemical process using seawater or other saline solutions (often called seawater magnesite). *A.R.I.*

synthetic mica. Any of a large number of micas formed from a batch of accurately proportioned raw materials by crystallization during slow cooling of a melt or by solid-state reactions. *Skow.*

synthetic mineral. An artificial substance having all the properties of a mineral. *Hurlbut.*

synthetic oil. Oil produced artificially as in the Bergius process or Fischer-Tropsch process. *Nelson.*

synthetic ore. A term used by the Bureau of

Mines for material that is the equivalent of, or better than, natural ore, which can be put to the same uses, and is produced by means other than ordinary concentration, calcining, sintering, or nodulizing. *BuMines Bull. 630, 1965, p. 555.*

synthetic ruby; synthetic sapphire. In chemical composition and in all their physical characters, including optical properties, these stones are true crystalline ruby or sapphire, but they are produced in quantity in the laboratory by fusing pure precipitated alumina with the predetermined amount of pigmentary material. They can be distinguished from natural stones only by the most careful expert examination. *C.T.D.*

synethetic sapphire. *See* synthetic ruby.

synthetic spinel. *See* spinel, synthetic. *C.T.D.*

synthetic stone. A reproduction of a stone which has the same chemical composition, hardness, specific gravity, refractive power, dichrosim, etc., as has the genuine stone it reproduces. Many gem minerals have been made synthetically as a scientific experiment, but only corundum, spinel, and emerald have been commercially made and cut as stones for the trade. *Shipley.*

synthetic turquoise. A misnomer for various amorphous imitations of turquoise, including Vienna turquoise. *Shipley.*

syntholite. A trade-mark name for a synthetic alexandritelike sapphire, green changing to violetish. *Shipley.*

syphon. A special type of refractory block for the bath of a glass tank furnace. *Dodd.*

syphon brick. A brick for tapping metal from the cupola, the primary object of which is to eliminate the tapping and botting up of the cupola tap hole each time metal is drawn off. With the syphon brick, the orifice from which the metal is drawn is continually open to the atmosphere, and the flow of metal is controlled by shutting the blast on and off. The ease of control permits the use of quite small ladles at the cupola, so that there is no need for redistribution from large to small ladles. *Osborne.*

syphonic inclinometer. An instrument widely used in the United States for surveying oil wells or boreholes. The device is lowered to a given position in the well and allowed to stand a short period, during which a marking fluid records its level upon a cylindrical chart within its recording chamber. The device is withdrawn, the chart is removed, and its reading is reduced to degrees. *See also* photomagnetic borehole surveying. *Nelson.*

Syracuse salt series. The chief-salt-bearing members of the Salinian of southern Michigan and the adjacent areas. *C.T.D.*

Syrian asphalt. A glance pitch found in Syria, containing mineral matter up to 5 percent and having a fusing point (ball and ring) of 275° F. *CCD 6d, 1961.*

Syrian garnet. Trade name for almandine garnet, of gem stone quality. *C.T.D.*

syssiderite. An obsolete term for meteorites that consist of silicates cemented together by metallic iron. Siderolite is the term now used. *A.G.I.*

system. a. A standard, worldwide division; contains rocks formed during a fundamental chronologic unit, a period. An example is the Devonian system. *A.G.I.* b. The fundamental time-rock unit is the system. *A.G.I.* c. In crystallography, the division of first rank, in the classification of crystals according to form. The six sytems ordinarily recognized are the isometric, tetragonal, hexagonal, orthorhombic (or rhombic), monoclinic, and triclinic; some divide the hexagonal system into hexagonal and trigonal. *Fay.* d. Regular method or order; a plan. *Fay.* e. Applied to the sum of the phases that can be formed from one, two (binary system), three (ternary system), or more components under different conditions of temperature, pressure, and composition. *Holmes, 1928.* f. The term is used to denote any member of any assemblage of members such as a composite column, a coupling, a truss, or other structure. *Ro.* g. The term system or general system of work means simply that the work, as it is commenced on the ground is such that, if continued, will lead to a discovery and development of the veins or ore bodies that are supposed to be in the claim, or, if these are known, that the work will facilitate the extraction of the ores and mineral. *Ricketts, I.*

systematic error. a. Cumulative, always on the same side of correct reading, leading to biased interpretation of sampling campaign, calculation of ore reserves, etc. *Pryor, 3.* b. Those errors in surveying which are either always positive or always negative, as distinct from compensating errors. *Ham.* c. *See* biased error. *Pryor, 3, p. 159.*

systematic sampling. The taking of samples at evenly spaced periods (for example, one every 5 minutes) or quantities (for example, one per wagon) from a unit of coal. *See also* intermittent sampling. *Nelson.*

systematic sampling errors. Errors that arise from some basic defect in the sampling or preparation process such that the result obtained is always either higher or lower than the true figure. Systematic errors are additive, that is, if there are two sources of error, the total error is obtained by adding the individual errors. *Nelson.*

systematic support. The setting of timber or steel supports regularly at fixed intervals irrespective of the condition of the roof and sides; a support in accordance with a system specified in rules made by the manager of the mine. *Nelson.*

systematic timbering. Placing mine timbers according to a predetermined plan, regardless of roof conditions. *Zern.*

system sand. U.S. Foundry sand used in making molds and which eventually becomes the bulk of the sand used in the mechanical system or mechanized unit. *Osborne.*

systems of crystals. The seven large divisions into which all crystallizing substances can be placed, namely isometric (or cubic), tetragonal, hexagonal, trigonal, orthorhombic (or rhombic), monoclinic, and triclinic. This classification is based on the degree of symmetry displayed by the crystals. *C.M.D.*

szaibelyite. A white to yellow acicular mineral, (Mn,Mg)(BO$_2$)(OH). Probably orthorhombic. Occurs in nodules; related to camsellite. *Larsen, p. 85; Dana 7, v. 2, p. 375.*

szaskaite. Same as smithsonite. From Szaska, Hungary. *English.*

szomolnokite. A yellow or brown hydrous ferrous sulfate, FeSO$_4$.H$_2$O. Pyramids, prismatic crystals, or botryoidal stalactites. Monoclinic. Ferropallidite has the same composition. From Smolnik, Czechoslovakia (formerly Szomolnok, Hungary). *English.*

T

t a. Abbreviation for temperature, usually ordinary temperature as expressed in degrees centigrade, or in degrees Fahrenheit. *Zimmerman, pp. 106, 184.* b. Symbol for standard temperature of the atmosphere. *Zimmerman, p. 107.* c. Abbreviation for time, times. *Zimmerman, p. 109.* d. Abbreviation for troy in weight. *Zimmerman, p. 112.* e. Abbreviation for ton. *Zimmerman, p. 110.* f. Abbreviation for thickness. *Zimmerman, p. 108.* g. Symbol for depth. *Zimmerman, p. 34.* h. Abbreviation for territory, territorial. *Webster 3d.* i. Abbreviation for tension, technical, technician. *Webster 3d.* j. Abbreviation for transition, transitional. *Zimmerman, p. 111.* l. Abbreviation for temporary. *Webster 3d.* m. Symbol for height. *Zimmerman, p. 174.*

t a. Symbol for temperature in degrees centigrade, degrees Fahrenheit, thermometric temperature, general temperature. *Zimmerman, pp. 146, 186, 368.* b. With subscript *c* as t_c, symbol for critical temperature. *Zimmerman, p. 152.* c. With subscript O as t_o, symbol for ice point, ordinary temperature of ice point. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* d. Symbol for time. When symbols for both time and temperature are required in the same expression and *t* is used for temperature, then *r* is the symbol *used* for time. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* e. With subscript ½ as $t_{1/2}$, symbol for half-life in radioactivity. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-4.* f. Symbol of thickness. *Zimmerman, p. 176.* g. Symbol for length of prism base. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* h. As a subscript, symbol for transition between polymorphic forms. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.*

***t*-** Abbreviated prefix meaning Tertiary. Used especially in the name of organic chemical radicals; for example, *t*-butyl, for Teritary butyl. *Webster 3d.*

T a. Abbreviation for temperature; absolute temperature; standard absolute temperature of the atmosphere. *Zimmerman, pp. 107, 370.* b. Abbreviation for time, Time. *Zimmerman, p. 132.* c. Symbol for Tertiary. *USGS Sugg., p. 86.* d. Abbreviation for town, Town, township, Township. *Webster 3d; Zimmerman, p. 110.* e. Abbreviation for territory, Territory. *Webster 3d.* f. Symbol for tritium which is the radioactive isotope of hydrogen having the mass number 3; also hydrogen 3. *CCD 6d, 1961.* g. Abbreviation for trace. *Webster 3d.* h. Abbreviation for ton. *Zimmerman, p. 492.* i. Symbol for kinetic energy. *Zimmerman, p. 41.* j. Symbol for torque. *Zimmerman, p. 110.* k. Symbol for thunderstorm. *Zimmerman, p. 109.* l. Abbreviation for technical technology. *Webster 3d.* m. Symbol for transformer. *Zimmerman, p. 111.*

T a. Symbol for absolute temperature, temperature on the Kelvin scale or degrees Kelvin, temperature on any of several absolute scales, including the Rankine scale. *Handbook of Chemistry and Phy-*

sics, 45th ed., 1964, p. F-101; Zimmerman, p. 146. b. With subscript *c* as T_c, symbol for critical temperature. *Zimmerman, p. 152.* c. With subscript O, as T_0, symbol for ice point, absolute temperature of ice point. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* d. Symbol for reverberation time. *Zimmerman, p. 164.* e. Symbol for period, oscillation period, period of a periodic motion. *Zimmerman, pp. 161, 183.* f. Symbol for half-life in radioactivity. *Handbook of Chemistry and Physics, 45th ed., 1946, p. F-101.* g. With parentheses as (T), or without parentheses, symbol for kinetic energy. *Zimmerman, pp. 158, 183.* h. Symbol for tension, surface tension. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-59.*

Ta Chemical symbol for tantalum. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

T_a. *See* refractoriness-under-load. *Dodd.*

taaffeite. A mineral, $BeMgAl_2O_8$, hexagonal. Known only as two small faceted gem stones resembling mauve-colored spinel. *Spencer 19, M.M., 1952.*

tab. Token, check, tally. *Mason.*

tabah. In Sumatra a term for crowbar used in gold mining. *Fay.*

tabaschir. *See* tabasheer. *Hess.*

tabasheer; tabaschir. Amorphous opallike silica deposited within the bamboo joints; used in native jewelry of the Orient. *Hess.*

tabby. In Morocco, a mixture of lime with shells, gravel, or stones in equal proportions, with an equal proportion of water, forming a mass which when dry becomes as hard as rock; a substitute for bricks or stone in building. *Fay.*

Tabbyite. Trade name for a solid elastic bitumen from the Uintah basin, Utah. Closely related to wurtzilite. *English.* A mineral hydrocarbon found in Utah. Used as a filler in rubber and roofing materials. *CCD 6d, 1961.*

Taber abraser. A device for assessing the abrasion resistance of a surface; the principle is contact with loaded abrasive wheels which are rotated against the surface to be tested. It has been used for testing vitreous enamel and floor-tile surfaces. *Dodd.*

table. a. Any tablelike surface for cleaning or sorting coal or ore, for example, rotary sorting table. *Nelson.* b. A water table. *Nelson.* c. In placer mining, a wide, shallow sluice box designed to recover gold or other valuable mineral from screened gravel. *See also* undercurrent. *Hess.* d. Synonym for rotary table. *Long.* e. Scot. A platform or plate on which coal is screened and picked. *Fay.* f. A concentrating machine for separating finely crushed particles of ore from gangue. *Weed, 1922.* g. The flat face forming the top of a brilliant-cut stone. A cut stone having two flat faces and a border of triangular or square facets. *Standard, 1964.* h. A large, round sheet of crown glass. *Webster 3d.* i. In iron slab with a raised rim, on which melted glass is spread in making plate glass. *Standard, 1964.* j. That part of a grinding machine which directly or indirectly supports the work being ground. *ACSG, 1963.*

table cut. Having a flat top or table with a beveled or triangular facet border; said of cut diamonds, emeralds, etc. *Standard, 1964.*

table cutter. A lapidary who cuts tables or plane faces on diamonds or other precious stones. *Fay.*

table diamond. A relatively flat diamond of table cut. *Webster 3d.*

table feeder. *See* rotary table feeder. *ASA MH4.1-1958.*

table flotation. Flotation process practiced on a shaking table. Ore is ground, deslimed, conditioned, and fed to table as thick slurry. Flotable particles become glomerules, held together by minute air bubbles and edge adhesion. These roll across and are discharged nearly opposite feed end, process being helped by jets of low-pressure air from piping set across table. Tailings work along deck to discharge end. *Pryor, 3.*

tableland. a. A plateau, or elevated region of flat or undulating country rising to heights of 1,000 feet, and more, above the level of the sea. *See also* plateau. *Fay.* b. In geography, any flat or comparatively level tract of land considerably elevated above the general surface of a country. *A.G.I.* c. A flat or undulating elevated area; a plateau or mesa. *A.G.I.*

tableman. a. In the stonework industry, one who lays out and marks marble slabs to size prior to their being cut, using a rule, straightedge, and crayon or chalk. *D.O.T. 1.* b. *See* screenman. *D.O.T. 1.* c. In ore dressing, smelting, and refining, one who tends concentrating tables used in treating pulp (mixture of finely ground ore and water) to separate valuable minerals from gangue (waste minerals). *D.O.T. 1.*

tablemount. Seamount (roughly circular or elliptical in plan) generally deeper than 100 fathoms, the top of which has a comparatively smooth platform. *Schieferdecker.*

table mountain. A mountain with a flat top. *Standard, 1964.*

table reef. An isolated coral reef or island without lagoon. *Schieferdecker.*

table runner. *See* screenman. *D.O.T. 1.*

table salt. *See* sodium chloride. *CCD 6d, 1961.*

table spar. Tabular spar. *See also* wollastonite. *Fay.*

table stone. The typical form thus described is a style of diamond cutting derived from an octahedron by cutting to opposite corners to an equal amount. *Hess.*

tablet. In mineralogy, a tabular crystal. *Shipley.*

table tender. *See* screenman. *D.O.T. 1.*

table traverse. The reciprocating movement of the table of a grinding machine. *ACSG, 1963.*

tableware. All utensils and decorative articles used on the table for meal service. *ASTM C242-60.*

tabling. Separation of two materials of different densities by passing a dilute suspension over a slightly inclined table having a reciprocal horizontal motion or shake with a slow forward motion and a fast return. *Bennett 2d, 1962 Add.*

Tabriz marble. A beautiful transparent limestone, composed of innumerable laminae, thin as paper, and formed by deposition from a celebrated calcareous spring near Maragheh, Iran. *Fay.*

tabular. a. The form of crystals which are flattened in one plane. Tabular crystals may occur in tables, plates, disks, foliae, and scales. *Schieferdecker.* b. A mineral showing broad, flat surface, for example, wollastonite. *Nelson.* c. *See* tabular deposit *Nelson.*

tabular alumina. Corundum (> 99.5 percent Al_2O_3) supplied by Aluminum Company of America: T-60 grade, for refractories, contains <0.25 percent Na_2O; T-61, for electroceramics, contains <0.05 percent Na_2O. *Dodd.*

tabular cross-bedding. A cross-bedded unit with a flat base and flat top forming a tabular body. *Pettijohn.*

tabular crystal. A crystal flattened parallel to any face. *Standard, 1964.*

tabular deposit. A flat tablelike or stratified bed, for example, a coal seam. *Nelson.*

tabular ore body. An ore body shaped like a tablet, relatively long in two dimensions and short in the third. *Stokes and Varnes, 1955.*

tabular spar. Same as wollastonite. *Standard, 1964.*

tabular structure. A tendency in certain igneous or crystalline rocks to separate into plates or laminae. It differs from stratification in manner of origin. *Standard, 1964.*

Taby cut. This is a modified double-spiral cut. As regards the advance it is inferior to the proper double spiral. The benefits of the Taby cut are, however, that the holes are here located vertically below one another on one and the same line. This facilitates drilling and mechanization of the drilling. *Langefors, pp. 245, 247.*

tacharanite. A mineral $(Ca,Mg,Al)(Si,Al)O_3.H_2O$, with gyrolite, tobermorite, and mesolite in dolerite from Portree, Isle of Skye, Scotland. Readily changes to a mixture of tobermorite and gyrolite. Named from the Gaelic tacharan, a changeling. *Hey, M.M., 1961.*

tacheometer. An instrument, generally a theodolite, embodying a telescope which is used for measuring distances by means either of the stadia hairs in the telescope or of a subtense bar. *See also* direct-reading tacheometer. *Ham.*

tachometer. a. An instrument of the direct-reading type, indicating the speed of a shaft or machine in revolutions per minute. *Long.* b. An instrument for measuring speed. In mining it is used on hoists lifting cages, cars, or skim in shafts or slope. *Zern.*

tachyhydrite. A yellowish, massive, hydrous calcium magnesium chloride, sometimes found in the form of chlorobromide mixed crystals, $2MgCl_2.CaCl_2.12H_2O$. *Webster 3d; E.C.T., v. 2, p. 637.*

tachylyte; tachylite. A black, glassy igneous rock of basaltic composition, that occurs as a chilled margin of dikes and sills. In Hawaii, it forms the bulk of certain lava flows. *C.T.D.*

tachymeter. Form of tacheometer. *Pryor, 3.*

tachymetry. A method of measurement of distances by use of transit or theodolite and a levelling rod. *Zern.*

tack. a. N. of Eng. A small pillar. *See also* spurns. *Fay.* b. Som. A wooden scaffold put into a mine shaft for temporary purposes. *Fay.* c. A small piller of coal. *Fay.* d. Veinstone; gangue, etc. *Fay.* e. Scot. A mining lease. *Fay.*

tack coat. A thin coat of hot road tar or bitumen emulsion applied over a road surface to improve adhesion with the subsequent single or two course bitumen final surfacing. *See also* wearing course. *Ham.*

tackey. Having a rough, catchy surface. *Gordon.*

tacking. Making tack welds. *ASM Gloss.*

tackle. a. An assemblage of ropes or wire cables and pulleys arranged for hoisting or pulling. *Long.* b. Eng. Ropes, chain, detaching hooks, cages, and all other apparatus for raising coal or ore in shafts. *Zern.* c. Corn. The windlass, rope, and kibble. *Fay.*

tackle block. Synonym of block and tackle. *Long.*

tacklers; tucklers. Leic. a. Small chains put around the top of loaded tubs or buckets, to keep the coal from falling off. *Fay.* b. Short chains formerly used for raising and lowering men in a shaft. Three men generally sat in them at one time. *See also* bant; bont, a. *Fay.*

tackler skip. S. Staff. A kind of box in which men used to ride in a shaft; used also for carrying minerals. *See also* paddy pan; bant; bont, a. *Fay.*

tack rivet. A rivet which carries no load but is inserted for convenience of construction. *Ham.*

tacksman. Scot. The lessee of a colliery. *See also* tack, e. *Fay.*

tack welds. Small, scattered welds made to hold parts of a weldment in proper alignment while the final welds are being made. *ASM Gloss.*

Tacoma process. An electrolytic method for the production of iron powder. *Osborne.*

Taconian. Lower Cambrian. *A.G.I. Supp.*

Taconian orogeny. Post-Ordovician diastrophism. *A.G.I. Supp.*

Taconic. That series of rocks containing the primordial fauna, at least that portion which is older than New York Potsdam. It is the Lower Cambrian of English geologists, and the Huronian of the typical Huronian area of the Canadian geologists. Named from the Taconic Mountains of western New England, by Dr. Emmons; it antedates, as a primordial system, both Cambrian and Huronian. It is the principal iron ore-bearing system of the Lake Superior Region. The term was not generally accepted by geologists. *Fay.*

Taconic revolution. A period of intense folding that affected the eastern parts of North America at the end of the Ordovician period. The effects are best seen in the Taconic Mountains, on the borders of New York and Massachusetts. *C.T.D.*

taconite; taconyte. a. The cherty or jaspery rock that encloses the Mesabi iron ores in Minnesota. In a somewhat more general sense, it designates any bedded ferruginous chert of the Lake Superior district. *Stokes and Varnes, 1955.* b. In Minnesota practice, is any grade of extremely hard, lean iron ore that has its iron either in banded or well disseminated form and which may be hematite or magnetite, or a combination of the two within the same or body. *Cumming.*

taconite ore. A type of highly abrasive iron ore now extensively mined in the United States. *Sandstrom.*

taconyte. *See* taconite.

tactical planning. The short-term or day-to-day planning at a mine to maintain the scheduled output. The planning does not cease with the layout of faces—it also includes the necessary services, such as haulage, ventilation, stowing, supplies, etc. *See also* strategic planning; ventilation planning. *Nelson.*

tactite. A general term for rocks of complex mineralogy formed by the contact metamorphism of limestone, dolomite, or other carbonate rocks into which foreign matter from the intruding magma has been introduced by hot solutions. *Stokes and Varnes, 1955.*

tadjerite. A black, semiglassy, crustlike stony meteorite composed of bronzite and olivine. *Hess.*

tadpole nests. An early name used for interference ripple mark. *Pettijohn.*

taeniogranite. In Besborodko's classification, a mixed rock with more than 65 percent granite; one with 35 to 63 percent is a migmatite and with less than 35 percent, an injection gneiss. *A.G.I. Supp.*

taeniolite. A white, colorless, or tinged with blue basic silicate of potassium, lithium, and magnesium, $KLiMg_2Si_4O_{10}F_2$(Ark.). Crystals thin, elongated strips; friable masses. Monoclinic, belonging to the mica group. From Narsarsuk, Greenland; Magnet Cove, Ark. *English.*

taeniopegmatite. Synonym for taeniogranite. *A.G.I. Supp.*

taenite. A nickel-iron phase found in some meteorites; contains about 73 percent iron and a little cobalt. *Hess.*

taffrail log. A log consisting essentially of a rotator towed through the water by a braided logline attached to a distance registering device usually secured at the taffrail, the railing at the stern. Also called patent log. *H&G.*

tag. A numbered piece of tin or wood that a miner attaches to, or places on the cars loaded by him. These tags are removed at the tipple where the car is credited to the miner. *See also* ticket, c. *Compare* wedge rock. *Fay.*

tagged. Said of atoms rendered radioactive (labeled), the movements of which can then be traced by use of Geiger tube. *Pryor, 3.*

tagged atom. *See* tracer. *L&L.*

tagger. Tinplate below the standard size; in the plural, very thin tinplate. *Standard, 1964.*

Tagg's method. A graphical method of determining the resistivity of the ground. *A.G.I.*

Taghanican. Upper Middle Devonian. *A.G.I. Supp.*

tagilite. Pseudomalachite. *American Mineralogist, v. 36, No. 3-4, March-April 1951, p. 383.*

tagline. A line from a crane boom to a clamshell bucket that holds the bucket from spinning out of position. *Nichols.*

tague. Eng. An iron plate fitted on one side with a semicircular projection or rib, and two other short curved pieces, adjusted to the gauge of the tram rails, by which the wheels of the trams are guided from the plate onto the rails. *Fay.*

tahitite. A variety of feldspathoidal trachyandesite containing phenocrysts of haüyne. The rock is a microlitic form of the nepheline monzonite with which it is associated in the type locality. *Holmes, 1928.*

tahona. a. Mex. An arrastre operated by waterpower. *Fay.* b. In the United States, an arrastre operated by horsepower or mule power. *Standard, 1964.*

tail. a. (also plural). The inferior, less valuable, or refuse part of anything; foots, bottoms, dregs; sediment. *See also* tailings. *Fay.* b. The poor grade of ore slime at the lower end of the slime box as it flows from the stamps. *Standard, 1964.* c. The unexposed end of a brick or stone in a wall; a tailing. *Standard, 1964.* d. The rear of a shovel deck. *Nichols.* e. The anchor end of a cable excavator. *Nichols.* f. A bar or barrier formed behind a small isle or a skerry. Also called trailing spit; banner bank. *Schieferdecker.*

tail anchor. The anchor for a track cable, or the turn point for a backhaul line in a cable excavator. *Nichols, 2.*

tail back. Eng. When firedamp ignites and the flame is elongated or creeps backward against the current of air, and possibly causes an explosion of a large body of gas, it is said to tail back into the workings. *Fay.*

tail bay. That part of a canal which is immediately downtream of the tail gates. *Ham.*

tail beam; tail joist. A joist or beam which abuts against the header joist. *Crispin.*

tailblock. a. The boom foot and idler sprocket assembly on a ladder ditcher. *Nichols.* b. The block used to pull a slusher to the face. *Bureau of Mines Staff.*

tailboard. Tailgate. *Nichols.*

tail chain. a. A chain used in mine haulage; also, tail rope. *Korson.* b. Scot. A chain by which a horse hauls hutches or wagons. Putters in former times also used a tail chain. *Fay.*

tail crab. In mining, a crab or winch for operating a tail rope. *Standard, 1964.*

tailend. a. That part of a mining belt conveyor which consists of the tail section and, when required, a belt takeup, a telescopic section, and a loading station. *NEMA MB1-1961.* b. The end of a conveyor remote from the delivery point. *See also* tension end. *Nelson.*

tailend loading station. *See* loading station. *N.E.M.A. MB1-1961.*

tail-end rider. *See* brakeman, c. *D.O.T. 1.*

tailgate. a. A subsidiary gate road to a conveyor face as opposed to a main gate. The tailgate commonly acts as the return airway and supplies road to the face. *Nelson.* b. Eng. A gateway, usually an airway at the opposite end to the delivery gate on a conveyor face. Also called barrier gate. *SMRE, Paper No. 61.* c. The hinged rear wall of a dump truck body. *Nichols.* d. The hinged or sliding rear wall of a scraper bowl. *Nichols.*

tail house; tail mill. The buildings in which tailings are treated. *Fay.*

tail-in. Mid. To run out or terminate a length of holing stints at a buttock or other point along the stall face. *Fay.*

tailing. a. Giving the proper angle, or elevation, in driving the poling boards in a heading. *Stauffer.* b. The part of a projecting brick or stone inserted in a wall. *Crispin.*

tailing machine. Aust. A machine or apparatus for dressing the tailings and for obtaining gold from the detritus from other ore-dressing apparatus. *Fay.*

tailing out. *See* dying out. *Fay.*

tailing pit. *See* catchpit. *Fay.*

tailing pond. Area closed at lower end by constraining wall or dam to which mill effluents are run. Clear water may be returned after settlement in dam, via penstock(s) and piping. *Pryor, 3.*

tailings. a. The parts, or a part, of any incoherent or fluid material separated as refuse, or separately treated as inferior in quality or value; leavings; remainders; dregs. The sand, gravel, and cobbles which pass through the sluices in hydraulic mining were formerly generally designated as tailings, but of late years, especially in state and United States legislative documents, they have been called mining debris or simply debris. *Fay.* b. The gangue and other refuse material resulting from the washing, concentration, or treatment of ground ore. *Webster 3d.* c. Those portions of washed ore that are regarded as too poor to be treated further; used especially of the debris from stamp mills or other ore-dressing machinery, as distinguished from material (concentrates) that is to be smelted. *Standard, 1964.* d. The inferior leavings or residue of any product; foots, bottoms. In mining the residum after most of the valuable ore has been extracted. *Fay.* e. The term tailings has been construed as including slag. *Fay.* f. The term tailings as used in the mineral industry is used in the plural form. *Fay.* g. Also applied to sectional residue, for example, table tailings, which is the residue from shaking screens and tables. This material may be recrushed or retreated. *Nelson.* h. The waste rock after the asbestos fiber has been removed. *Mersereau, 4th, p. 210.* i. The decomposed outcrop of a vein or bed. *Fay.* j. Borehole returns allowed to run to waste; the parts of the drill cuttings (sludge) that are discarded. *Long.* k. The reject from froth flotation cells. *B.S. 3552, 1962.*

tailings dam. One to which slurry is transported, the solids settling while the liquid may be withdrawn. *Pryor, 3, p. 122.*

tailings dam laborer. In ore dressing, smelting, and refining, a laborer who performs duties concerned with flow and distribution of tailings (waste). Also called laborer, tailings dam. *D.O.T. Supp.*

tailings machine. A machine for sifting the tailings and collecting the gold from the detritus after it has passed through the washer. *Nelson.*

tailings man. A general term applied to a worker who tends equipment used to dispose of tailings (worthless material) after valuable minerals have been removed by ore-dressing processes. The equipment used varies with each individual mill; pumps, bucket elevators, desliming cones, thickeners, and launders being commonly used. *D.O.T. 1.*

tailings sampler. *See* mill sampler. *D.O.T. Supp.*

tailings settling tank. A vessel to remove solids from the tailings effluent as in a coal washery. The tank is about 60 feet in diameter and 10 feet deep. The tailings are fed in at the center with a flocculant. As the suspension travels from the center to overflow at the perimeter of the tank, the solids settle out and the clear water overflows, is collected, and returned to the washer for reuse. *Nelson.*

tailings thickener operator. *See* thickener operator. *D.O.T. Supp.*

tailings wheel. A wheel carrying buckets or compartments on the periphery and used in conveying liquid, pulp, or sand from a lower to a higher level. *Fay.*

tail joist. A joist which has one end terminating against a header joist. *Crispin.*

taillight. A light carried at the back end of a car, train, trip, or movable machinery. *Grove.*

tail mill. *See* tail house.

tail of water. The edge of water standing in mine workings. *B.S. 3618, 1963, sec. 4.*

tail pipe. The suction pipe of a pump. *Fay.*

tail pulley. a. The terminal pulley at the end of the conveyor opposite the normal discharge end. It is usually an idler pulley but may be a drive pulley. *NEMA MB1-1961.* b. The pulley or roller in the tail or foot section of a belt conveyor around which the belt runs. Also known as foot-section pulley. *Jones.*

tailrace. a. A trough or channel used for conveying the tailings; a channel for conducting water away from any plant or works. *Nelson.* b. An afterbay. *Seelye, 1.*

tail rope. a. The rope which passes around the return sheave in main-and-tail haulage or a scraper loader layout. *See also* main rope. *Nelson.* b. The rope that is used to draw the empties back into a mine in a tail rope haulage system. *Zern.* c. A counterbalance rope attached beneath the cage when the cages are hoisted in balance. *Zern.* d. A hemp rope used for moving pumps in shafts. *Fay.*

tail-rope boy. *See* tail-rope coupler. *D.O.T. 1.*

tail-rope coupler. In bituminous coal mining, one who works on a tail-rope haulage system, removing haulage-cable hook from the rear of a train of empty cars which has been lowered down an inclined haulageway, and attaching hook to front of train of loaded cars to be hauled to the surface. Also called tail-rope boy. *D.O.T. 1.*

tail-rope engineer. In bituminous coal mining, one who operates a hoisting engine which draws the cable of a tail-rope haulage system used to raise and lower mine cars on tracks between the surface and a level in a mine. *D.O.T. 1.*

tail-rope haulage. a. A single track system of rope haulage now used only in coal mines abroad. A double-drum haulage engine at the unloading terminal winds the main rope on one drum. The train or trip of cars is connected to the other end of the main rope and also to a tail rope which extends to the inner terminal in the mine, around a tail sheave and then back over idler sheaves at one side of the haulagway to the other drum at the haulage engine. *Lewis, p. 225.* b. A system of rope haulage by which the full hutches (cars), with the tail rope attached behind, are drawn by a main rope passing over a drum, and the empty hutches, with the main rope attached, are drawn back again by the tail rope passing over another drum. *Fay.*

tail-rope man. *See* tail-rope rider. *D.O.T. 1.*

tail-rope rider. In bituminous coal mining, one who works on trains of cars hauled by tail-rope haulage system at mine, coupling and uncoupling cars, and hooking and unhooking cable to and from trains. Also called tail-rope man. *D.O.T. 1.*

tail-rope system. A method of haulage in which one rope—the main rope—is attached to the front end of a trip of cars and another rope—the tail rope—is attached to the rear end of the trip. Is operated by a hoisting engine and two separate drums. *Hudson.*

tails. a. Can. Portion of tailings containing some mineral which cannot be economically removed. This is constantly assayed as it leaves the treatment plant so that recovery can be known and controlled at all times. *Hoffman.* b. Corn. Refuse tin ore thrown behind the stamps to be treated again. *See also* tailings. *Fay.* c. *See* depleted uranium. *L&L.*

tails-common. Eng. Washed lead ore. *Fay.*

tail section. That part of a mining belt conveyor which consists of the tail pulley, the framing, belt idlers if included, and means for attaching a belt takeup. *NEMA MB1-1961.*

tail shaft. The shaft in the tail or foot section of a belt or chain conveyor which supports either the tail pulley or the tail sprocket. *Jones.*

tail sheave. a. An arrangement whereby a sheave is placed at the bottom of a shaft, and a rope is fastened to the bottom of one cage and then passed down around the sheave and up to the bottom of the cage in the other compartments, thus practically complete balancing is effected. *Lewis, p. 246.* b. Aust. The return sheave for an endless rope or the tail rope of the main-and-tail-rope system, placed at the far end of a haulageway. *Fay.* c. The pulley around which the tail rope of a scraper loader or main-and-tail haulage passes. *See also* return sheave. *Nelson.*

tail swing. The clearance required by the rear of a revolving shovel. *Nichols.*

tail-track system. The simplest form of track layout for car or trip loading. In this system, the track can merely be extended down the heading, or it can be turned right or left, or turned right or left and then turned back, U-fashion, in an adjacent heading. The major disadvantage is that trips must come out the same way they go in, meaning increased loss of time unless the changing track is very close. *Coal Age, v. 71, No. 8, August 1966, p. 206.*

tail water. a. Water in a tailrace. *Fay.* b. The water immediately downstream from a structure. *Seelye, 1.*

taimyrite. A variety of soda trachyte characterized by the presence of actual or occult quartz, and regarded as the effusive equivalent of nordmarkite. *Holmes, 1928.*

tainiolite. Same as taeniolite. *English.*

tainter gate. *See* radial gate. *Ham.*

Tainton process. Electrolytic recovery of lead; lead sulfate, formed by roasting of the ore at approximately 950° F, is leached with hot saturated brine and then subjected to electrolysis with graphite anodes and rotating sheet-iron cathodes. *Bennett 2d, 1962.*

take. a. A mineral bearing area which a mine is permitted to work. Also called holding; parcel; taking. *B.S. 3618, 1963, sec. 1.* b. The area or extent of coal which a coal mine owner has the right, under a lease, to mine and extract. Also called taking. *See also* concession system; royalty. *Nelson.* c. Eng. The extent or area of a lease of mineral property, often several thousand acres. *Fay.* d. Lanc. To show or reveal gas. *Fay.*

takeoff man. One who removes green bricks from feed-out table of a brick-pressing machine, and stacks the bricks on a hand truck for removal by another worker. Also called brick machine tender. *D.O.T. 1.*

takeout. a. Cumb. An outcrop. As a verb, to crop out. *Fay.* b. A mechanical device for removing a finished article from any glass-forming unit. *ASTM C162-66.*

take over. To assume the ownership, control, or management of, as a mining property. *Fay.*

taker. a. Eng. A contractor; a man who works in a mine on tribute. *Fay.* b. Corn. A leaser; a contract miner. *Fay.*

taker-off. York. Same as puller-off. *Fay.*

take the air. a. To measure the ventilating current. *Fay.* b. Applied to a ventilating fan as working well, or working poorly. *Fay.*

takeup. a. In a belt-conveyor system, a tensioning device such as a carriage-mounted weight free to run downslope; or a take-up pulley with weights hanging vertically below the belt near the feed end. *Pryor, 3.* b. Any device for taking up slack or removing the looseness of parts due to wear or other cause. *Crispin.* c. *See* chain takeup. *J&M.*

take up bottom. Ark. To remove rock from the floor of a roadway to increase the height. Also called bottom brushing. *Fay.*

takeup pulley. An idler pulley so mounted that its position is adjustable to accomodate changes in the length of the belt as may be necessary to maintain proper belt tension. *NEMA MB1-1961.*

takherite. A clay mineral. *Hey 2d, 1955.*

taking. Eng. A mineral-land lease. *See also* take, b; tack. *Fay.*

taking-a-test. Removing a small amount of steel from the furnace to determine its quality. *Mersereau, 4th, p. 414.*

taking-off boy. In brickmaking, a boy who removes newly made bricks from a pallet or brick machine to the barrow. *Standard, 1964.*

taking of props. Lanc. Drawing the timbers from the mined-out workings. *Fay.*

taking timber necessary to support their improvements. The term applied to a miner which means all the timber he might need to make the working of his mine possible. *Rickets, I.*

takong. In Malaysia, local word for riffles. *Institution of Mining and Metallurgy. Symposium on Opencast Mining, Quarrying, and Alluvial Mining. London, 16-19, November, 1964. Paper 6, p. 7.*

takyr. A surface depression containing clay and evaporites in south-central Asia. *A.G.I. Supp.*

Talbot continuous process. This is a pig and ore process, although scrap is occassionally added. It depends upon the rapid oxidation of the impurities contained in pig iron by a liquid, highly ferruginous slag and is carried out in the basic open hearth furnace, generally of the tilting type. The essential feature of the process is to retain a certain amount of metal in the furnace (1) to dilute the impurities contained in the additions of pig iron, and (2) to supply the heat necessary to keep the slag very fluid. A tilting furnace of 200 tons capacity or over is ordinarily employed, and from about one-quarter to one-third of the finished steel is tapped out at one time. This having been done, additions of ore or iron oxide and lime are made, and after they are properly melted and incorporated in the slag, molten pig iron is run in. A violent reaction takes place, and most of the phosphorus and silicon are eliminated in a few minutes, a large part of the slag running out of the furnace. The bath is then adjusted as in ordinary practice, a part tapped, and the cycle of operations repeated. *Osborne.*

Talbot process. A process for protecting the inside of cast iron pipes with a coating of sand and bitumen. *Ham.*

talc; steatite. A natural hydrous magnesium silicate, $Mg_3(Si_4O_{10})(OH)_2$, usually occurring as a natural alteration of magnesium silicate rocks or in metamorphosed dolomites. Compact massive varieties may be called steatite in distinction to the foliated varieties which are called talck. Monoclinic. Color, white, apple green, gray; luster, pearly or greasy; high resistance to acids, alkalies, and heat; Mohs' hardness, 1 to 1.5; specific gravity, 2.7 to 2.8. Found in New York, North Carolina, California, Vermont, Georgia, Maryland, Virginia, Nevada, Montana, Texas, Washington. Used in cermics; in gas burner tips and electrical insulation. French chalk is a variety used for crayones. Also called potstone; soapstone. *Dana 17; Fay; CCD 6d, 1961.*

talcite. a. A massive variety of talc. *Fay.* b. A kind of muscovite. *Fay.*

talcoid. Resembling talc, as talcoid schist. *Fay.*

talcose. Containing talc, as potstone, steatite, and talcose schist. *Fay.*

talcose granite. Same as protogine. *Standard, 1964.*

talc schist. Schistose rocks consisting chiefly of talc and quartz. Talc is also prefixed to several other rock names. *Fay.*

talcum. The same as talc and soapstone. *Fay.*

tale. Som. A day's work or a day's output of coal. *Fay.*

talking. Term applied to a series of small bumps or cracking noises within the walls. Bumping, talking, and spitting are signs that the rock is beginning to yield to the stress and indicate a change in conditions within the rock. *Spalding, p. 76.*

tall oil. The oily mixture of rosin acids, fatty acids, and other materials obtained by acid treatment of the alkaline liquors from the digesting (pulping) of pine wood. Used in drying oils, in cutting oils and in emulsifiers, in flotation agents, in dryers, in oil well drilling muds, in core oils, in lubricants and greases, and in asphalt derivatives. *CCD 6d, 1961.*

tallow drop. A style of cutting precious stones in which the stone is domed on one or both sides. *Fay.*

tallow peat. Ir. A variety of highly flammable peat. *Tomkeieff, 1954.*

tallow top. A precious stone with a very rounding front and a flat back. *Standard, 1964.*

tally. a. A mark or number placed by the miner on every car of coal or ore sent out of his place, usually a tin ticket. By counting these, a tally is made of all the cars he sends out. In Arkansas, called a check. *See also* tag; ticket; motty, b. *Fay.* b. Any numbering, counting, or memorandum, as a tally sheet. *Fay.* c. *See* tab; motty. *Mason.* d. A brass tag attached to a chain at every tenth link, and so marked or shaped as to enable the position of the tally along the chain to be immediately read. *C.T.D.*

tally boy. *See* tally shouter. *D.O.T. 1.*

tallyman. *See* chute checker. *D.O.T. 1.*

tally shouter. A laborer who calls out the number chalked on each loaded mine car, as it is run on scales for weighing, so that weighmaster can identify for pay purposes the miner who loaded the car. Also called tally boy. *D.O.T. 1.*

talmi gold. A variety of brass made to resemble gold, sometimes plated. Also called Abyssinian gold. *Standard, 1964; Fay.*

ta-lou. A glass flux consisting of lead silicate with a little copper, used by the Chinese as an enamel color on porcelain. *Standard, 1964.*

taltalite. Tourmaline. *Dana 6d, p. 551.*

talus. A heap of coarse rock waste at the foot of a cliff, or a sheet of waste covering a slope below a cliff; the same as scree, which is more commonly used in Great Britain, whereas talus is more commonly used in the United States, but is often incorrectly used for the material composing the talus. *Fay.*

talus creep. The slow downslope movement of a talus or scree, or of any of the material of a talus or scree. *A.G.I.*

talus glacier. The loose debris on steep slopes sometimes assumes a sort of flowing motion and descends the slope with some such form and at some such rate as a glacier. Such bodies of debris are sometimes called talus glaciers. *See also* rock glacier. *A.G.I.*

Talwalker-Parmelee plasticity index. This index, based on the results of tests on a clay in shear with a specially designed apparatus, is the ratio of the total deformation at fracture to the average stress beyond the proportional limit. *Dodd.*

tamaraite. A melanocratic dike rock, containing augite and barkevikite as the chief mafic minerals, and nepheline or analcite as the chief felsic constituent; in addition, small amounts of orthoclase or plagioclase may be present. The type is thus a lamprophyric facies of nepheline basalt. *Holmes, 1928.*

tamarugite. A monoclinc, colorless, vitreous lustered mineral, $NaAl(SO_4)_2.6H_2O$, found at Tarapaca, Chile; a secondary mineral formed principally under arid conditions by the oxidation of sulfides in aluminous and alkali-rich environments. *Dana 7, v. 2, pp. 466-467.*

Tamasopo limestone. The chief member of the oil-bearing strata in the Mexican oilfields; of Lower to Middle Cretaceous (Washita or Cenomanian) age; includes the Escamela limestone above and the Maltrata limestone below. *C.T.D.*

Tamax. Trade name for a premium grade mullite refractory made from the best grade of calcined Indian Kyanite to which a mineralizer is added. The mineralizer increases the mullite content of the bond. Al_2O_3, 68 percent. Specific uses are glass melting superstructure and feeder parts, ferrous and nonferrous melting refractories, crowns and linings for all types of furnace and kilns. *CCD 6d, 1961.*

tambikir quali. A Malayan term for black incrustation found on auriferous quartz. *Fay.*

Tamiskamian. Precambrian system of late Archeozoic age, younger than Kewatinian. *A.G.I. Supp.*

tammite. A doubtful mineral, possibly an artificial alloy, essentially Fe and W. Ferrotungstine; crookesite (crookesite also the name of a Cu,Ti selenide). *Dana 6d, p. 1049.*

tam-o-shanter. A very fine-grained, soft, gritty, natural stone found in Scotland. It is used in the United States as an axstone and for sharpening knives. *Fay.*

tamp. a. To tightly pack a drilled hole with moist, loose material after the charge has been placed. *Hudson.* b. To fill a charged shothole with clay or other stemming material to confine the force of the explosion. *See also* stemming. *C.T.D.* c. To ram or pound down ballast on a railway track, or road metal. *See also* punning. *C.T.D.* d. To pound or press soil to compact it. *Nichols.* e. *See* stem. *B.S. 3618, 1964, sec. 6.*

tamper. a. In bituminous coal mining, one who fills drill holes in which explosives have been charged, by machine driller or miner, with clay or some other tamping material, using a tamping bar. Also called shot tamper. *D.O.T. 1.* b. One who tamps. *Standard, 1964.* c. An implement for tamping; a tamping iron or tamping bar. *Standard, 1964.* Sometimes made of wood, copper, or iron with a copper tip. *See also* tamping bar. *Fay.* d. A tool for compacting soil in spots not accessible to rollers. *Nichols.*

tamping. a. The act of inserting and packing explosives and stemming in a shothole. *See also* stemmer. *Nelson.* b. The act of packing a drilled hole around a cartridge with fine dirt from the floor of a mine before blasting, to prevent a misdirection of the force of the blast. *Korson.* c. The material placed over a charge in a borehole, to better confine the force of the explosion to the lower part of the hole. *Stauffer.* d. Ramming down, as of ballast. *Crispin.* e. The operation of compacting freshly placed concrete by repeated blows. *Taylor.* f. The shaping of a semidry powder, for example, of refractory material, in a mold by repeated blows delivered mechanically on the top mold plate. *Compare* jolt molding. *Dodd.*

tamping bag. A paper bag which is filled with good stemming material such as sand for use in horizontal and upward sloping holes. Plastic bags are also available for this purpose. *See also* tamp. *Ham.*

tamping bar. a. A rod made of wood for pushing explosive cartridges into shotholes. Metal rods must never be used for this purpose. *Ham.* b. A piece of wood the size of a broom handle for tamping or forcing the stemming in a drill hole. *von Bernewitz.*

tamping plug. A plug of iron or wood used instead of tamping material to close up a loaded blasthole. *Standard, 1964.*

tamping rod. *See* stemmer, b. *Nelson. See also* stemming rod. *B.S. 3618, 1964, sec. 6.*

tamping roller. One or more steel drums, fitted with projecting feet, and towed by means of a box frame. *Nichols.*

tamping stick. *See* stemming rod. *B.S. 3618, 1964, sec. 6.*

Tamul. Trade name for a refractory made of sintered synthetic mullite grain; Al_2O_3, 68.21 percent. Available in refractory heat setting cements, air setting cements, hydraulic setting cements, and ramming mixes. Used in refractories for glass melting superstructure, ferrous and nonferrous metal melting, construction of high temperature furnaces and kilns using all types of fuel. *CCD 6d, 1961.*

tan Abbreviation for tangent in equations and tables. *BuMin Style Guide, p. 62.*

tandem. a. A double-axle drive unit for a truck or grader. A bogie. *Nichols.* b. A pair in which one part follows the other. *Nichols.*

tandem die. The same as follow die. *ASM Gloss.*

tandem drive. A three-axle vehicle having two driving axles. *Nichols.*

tandem-drive conveyor. A conveyor having a belt drive mechanism in which the conveyor belt is in contact with two drive pulleys, both of which are driven with the same motor. *NEMA MB1-1961.*

tandem hoisting. Hoisting in a deep shaft with two skips running in one shaft. The lower skip is suspended from the tail rope of the upper skip. Both are loaded and discharged simultaneously. The upper one discharges at the surface and is loaded at a pocket halfway down the shaft. The lower skip is loaded at the shaft bottom and discharges at the half-way pocket. Thus, the rope on the winding drum is only equal to half the full depth. *See also* two-stage hoisting. *Nelson.*

tandem hydroseparator. A two-celled hydroseparator with troughs. The raw coal feed is conveyed through a trough by water under pressure where the refuse stratifies to the bottom. The action in the first cell is that of a forceful upward current which results in the removal of the heavy refuse. In the second cell a lighter current permits the settling of lighter and smaller refuse. The refuse settles to a perforated cell deck where it joins the slowly moving slate bed to the discharge. Refuse discharge is controlled by a refuse gate or hinged plate at the end of the cell bed. *Kentucky, p. 308.*

tandem mill. A rolling mill consisting of two or more stands arranged so that the metal being processed travels in a straight line from stand to stand. In continuous rolling, the various stands are synchronized so that the strip may be rolled in all stands simultaneously. Contrast with single-stand mill. *ASM Gloss. See also* continuous mill.

tandem roller. A road roller with two rolls of similar diameter running on the same track. *Ham.*

Tandem support system. A trade name for a longwall steel support system. It consists of two 50 ton chocks in line at right angles to the face and linked together with a double-acting ram. In operation, the front chock is lowered and advanced with the conveyor and reset to the roof, the rear chock is then lowered and brought forward. *Nelson.*

tandem unit panel. A longwall conveyor face with two face conveyors of different capacities, one delivering on to the other—tandem fashion. The layout has the disadvantage that the whole tonnage of coal must be transported along the second conveyor, and any breakdown on the second conveyor will affect the output of the entire face. *Nelson.*

tandem welding. Arc welding in which two or more electrodes are in a plane parallel to the line of travel. *ASM Gloss.*

tanette. A small hill covering a residual surface of laterite frequently ore bearing. *Hess.*

tangeite. Synonym for calciovolborthite. *Crosby, p. 68.* A vanadium ore. *Osborne.*

tangent. a. A straight line which touches a given curve at one and only point, and which does not intersect it. *Seelye, 2.* b. That part of a traverse line, or alinement, included between the point of tangency of one curve and the point of curvature of the next curve. *Seelye, 2.* c. In public land survey, the line of a great circle normal to the meridian at a selected corner on a base line, standard parallel, or latitudinal township boundary. *Seelye, 2.* d. A line that touches a circle and is perpendicular to its radius at the point of contact. *Nichols.*

tangent bending. Wiping metal around a predetermined radius to form a number of identical bends with parallel axes in a single part. *ASM Gloss.*

tangent distance. The distance from the point of curvature to the point of intersection (vertex), or from the point of intersection to the point of tangency. *Seelye, 2.*

tangiential cross-bedding. Foreset beds tangential to underlying surface. *Pettijohn.*

tangential stress. a. Stress parallel to the tangent to the boundary of any opening. *BuMines Bull. 587, 1960, p. 2.* b. *See* shear stress, b. *ASCE P1826.*

tangent modulus. See modulus of elasticity. *ASM Gloss.*

tangent point. The point at which a curve meets a straight line or another curve. *Ham.*

tangent screw. Fine adjustment screw used on theodolite to complete alignment of sight, by gentle rotation of reading circle about its axis. *Pryor, 3.*

tangers. Wales. Timbers fixed in a particular manner for supporting the sides of headings in soft ground. *Fay.*

tangible. Evident; real. *Crispin.*

tangiwai. A variety of serpentine used by the Maoris for ornaments. Similar to bowenite. *Dana 6d, p. 670.*

tangiwaite. A variety of serpentine, identical with bowenite. From New Zealand. *English.*

tangle sheet. Mica with intergrowths of crystals or laminae resulting in books that split well in some places but tear to produce a large proportion of partial films. *Skow.*

tanh Abbreviation for hyperbolic tangent. *BuMin Style Guide, p. 59.*

tank. a. A large vessel or receptacle, made either of wood or of metal, intended to contain a fluid as gas or water; as water tank, gasoline tank. Used as a synonym for vat. *Fay.* b. A subterranean reservoir into which a pump delivers water for another pump to raise. *Fay.* c. A melting unit, in which the container for the molten glass is constructed from refractory blocks. *ASTM C162-66.*

tankage. a. The act or process of storing oil, etc., in a tank. *Fay.* b. The price charged or paid for storage in a tank. *Fay.* c. The capacity of a tank or tanks. *Fay.* d. The waste residue deposited in lixiviating vats or tanks. *Fay.*

tank block. A refractory block used in the lower part of a glass tank furnace. These blocks are normally made of sillimanite, mullite, or corundum; they are frequently made by electrofusion of the refractory, which is then cast in a mold to form a highly crystalline, virtually non-porous, block which is very resistant to attack by the molten glass. *Dodd.*

tank cars. Railroad cars equipped with large steel tanks for transporting crude oil. *Mersereau, 4th, p. 199.*

tanker. A vessel constructed for the special purpose of carrying liquids in bulk form. *Shell Oil Co.*

tank furnace. a. Essentially a large box of refractory material holding from 6 to 200 tons of glass, through the sides of which are cut ports fed with a combustile mixture (producer gas and air, coke oven gas and air, or oil spray and air), so that flame sweeps over the glass surface. With the furnace is associated a regenerative or recuperative system for the purpose of recovering part of the heat from the waste gas. *C.T.D.* b. *See* tank. *ASTM C162-66.*

tank glass. a. Glass melted in a tank as distinct from a pot. *ASTM C162-66.* b.

Glass suitable for tank melting. *ASTM C162-66.*

tank reactor. A nuclear reactor in which the core is suspended in a closed tank, as distinct from an open pool reactor. Commonly used as research and test reactors. *L&L.*

tank sprayer. A pressure tank mounted on wheels for impregnating timber. *Ham.*

tank station. *See* station. *Fay, p. 646.*

tannic acid. ($C_{14}H_{10}O_9$), tannin. A yellow amorphous powder or lustrous crystalline scales, soluble in water, alcohol or glycerol and slightly soluble in ether. It is used as a reagent and in the treatment of burns. *Enam. Dict.*

tannin. A complex organic compound of carbon, hydrogen, and oxygen produced by metabolism in trees and plants. Sodium tannate is used to some extent as a deflocculant for clay slips. *Dodd.*

tantalic ocher. A native brown tantalum oxide found in Finland. *Standard, 1964.*

tantalite. A tantalate of iron and manganese, $(Fe,Mn)Ta_2O_6$, crystallizing in the orthorhombic system. It usually has an admixture of the niobate of iron and manganese and the mineral passes from the pure tantalate (tantalite) to the pure niobate (columbite). In some varieties, (manganotantalite) the iron is replaced by manganese. It commonly occurs in pegmatite veins, and is used for the filaments of electric lamps and as a source of tantalum. *See* also columbite. *C.T.D.*

tantalum. A metallic element in group V of the periodic system; it occurs in various rare minerals and principally in columbite-tantalite. A rather brittle, lustrous, hard, heavy, gray metal. Used for corrosion-resisting laboratory apparatus and in the manufacture of electronic equipment. Symbol, Ta; atomic number, 73; atomic weight, 180.948; specific gravity, 16.6 (at 20° C); ductile; isometric; valences, 2?, 3, 4?, and 5; melting point, 2,996° C or 2,996° ± 50° C; boiling point, 5,425° ± 100° C; practically immune to chemical attack below 150° C, being attacked only by hydrofluoric acid, by acidic solutions containing the fluoride ion, by sulfur trioxide, and only slowly by alkalies; more reactive at higher temperatures; melting point is exceeded only by that of tungsten and that of rhenium; insoluble in water and in most acids; and soluble in hydrofluoric acid and in fused alkalies. Used in many alloys having high melting points, high strength, and good ductility, in electrolytic capacitors, in lightning arrestors, in surge suppressors, in chemical-process equipment, in nuclear reactors, and in aircraft and missile parts, and it has good gettering ability at high temperatures. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-137, B-228.*

tantalum borides. Several borides are known, including the following: TaB_2, melting point, 3,200° C; specific gravity, 12.5; thermal expansion, 5.5×10^{-6}; TaB, melting point, 2,400° C; specific gravity, 14.3; Ta_3B_4, melts incongruently at 2,650° C; specific gravity, 13.6. *Dodd.*

tantalum carbide. TaC; molecular weight, 193.4; melting point, 4,150° C; boiling point, 5,500° C; very hard material extremely resistant to chemical action except at high temperatures; formed by heating tantalum oxide with carbon at high temperatures; used for cemented carbide tools. *Bennett 2d, 1962.*

tantalum nitrides. Two nitrides are known: TaN, melting point, 3,090° ± 50° C; Ta_2N, which loses nitrogen at 1,900° C. *Dodd.*

tantalum pentachloride; tantalum chloride; tantalic chloride. Pale yellow; vitreous luster; crystalline; $TaCl_5$; molecular weight, 358.21; specific gravity, 3.68 (at 27° C); decomposes in moist air; melting point, 216° C or 221° C; boiling point, 242° C; decomposes in water; and soluble in absolute alcohol, in sulfuric acid, and in potassium hydroxide. Used in the production of tantalum metal. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-228.*

tantalum pentoxide; tantalum oxide. Colorless; orthorhombic; Ta_2O_5; molecular weight, 41.89; specific gravity, 7.6 or 8.2; melting point, 1,800° C; insoluble in water and in acids except hydrofluoric acid; and soluble in hydrofluoric acid and in fused potassium-hydrogen sulfate. Used in the production of tantalum metal, in optical glass, in special glass having a high index of refraction for camera lenses, as an intermediate in the preparation of tantalum carbide, and in electronics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-228.*

tantalum-potassium fluoride; postassium-tantalum fluoride. White; silky needles; K_2TaF_7; slightly soluble in cold water; and soluble in hot water. Used as an intermediate in the preparation of tantalum metal. *CCD 6d, 1961.*

tanteuxenite. a. A black or brown, resinous tantalum mineral, $(Y,Er,Ce,U)(Ta,Nb)(Ti)O_6$. Orthorhombic. *E.C.T., v. 13, p. 602.* b. Euxenite with Ta_2O_5 in greater amount than Cb_2O_5. *Crosby, p. 20.*

tap. a. To drive one passageway into another. *Hudson.* b. To cut or bore into old workings or water-bearing strata for the purpose of proving or extracting gas or water. *B.S. 3618, 1963, sec. 4.* c. To win coal in a new district. *Fay.* d. To intersect with a borehole and withdraw or drain the contained liquid as water from a water-bearing formation or from underground workings. *Long.* e. A threaded cone-shaped fishing tool. It may be either an inside or an outside tap, depending on whether the tap fits into or over the outside of a piece being fished. *Long.* f. A tool for cutting screw threads (box threads) inside a tubular part or inside a hole. *Long.* g. A quantity of a liquid, as molten metal from a furnace, run out at one time. *Webster 3d.* h. To drain a furnace. *ASTM C162-66.* i. To remove excess slag from the floor of a pot furnace. *ASTM C162-66.* j. To center a pot upside down on the wheel for trimming or decorating. *ACSG, 1963.* k. A connection to an electric coil making it possible to place only part of the coil in circuit. *Webster 3d.* l. A wire brought from a winding to which connections may be made. *Webster 3d.* m. An intermediate point where an electrical connection may be made. *Webster 3d.*

tap bar. A pointed bar by which a blast-furnace taphole is opened or the metal in a melting pot, etc., is tested. *Standard, 1964.*

tap cinder. The basic iron silicate slag flowing through the tap hole of the puddling furnace. *Bennett 2d, 1962.*

tap density. In powder metallurgy, the apparent density of a powder, obtained when the volume receptacle is tapped or vibrated during loading under specified conditions. *ASM Gloss.*

tape. a. A long, thin, narrow band of mineral or ore. *Standard, 1964.* b. A narrow strip of woven cloth or steel marked with linear dimensions, as feet and inches, used for measuring distances. *Bureau of Mines Staff.*

tape corrections. These are applied as a routine matter to slope, temperature, sag, standardization, gravity and sea level effect when measuring a length accurately with a tape. *See also* precision. *Ham.*

taper. A gradual and uniform decrease in size, as a tapered socket, a tapered shaft, a tapered shank. *Crispin.*

taper bit. A long cone-shaped noncoring bit used in drilling blastholes and in wedging and reaming operations. When the nose of the bit is rounded and the overall shape resembles the silk end of a corncob the bit often is called a corncob bit. *Compare* bull nose bit. *Long.*

tapered acme. An acme thread cut on a tapered surface on either the pin or the box ends of a piece of tubular equipment. *See also* tapered thread. *Long.*

tapered core bit. A core bit having a conical diamond-inset crown surface tapering from a borehole size at the bit face to the next larger borehole size at its upper, shank, or reaming-shell end, as from EX to AX, or BX to NX. *Long.*

tapered end. An end of rope having a reduced diameter to facilitate threading the rope through fittings and over pulleys. *Ham.*

tapered-flange beam. The common form of rolled steel joist in which the inner surfaces of the flanges are tapered, normally at an angle of 98° to the web. *See also* I-beam; web, e. *Ham.*

tapered ledge reamer. A tapered reaming bit or shell the maximum outside set diameter of which corresponds to a standard X-group-size casing, with the smaller end threaded to receive a matching and same-range coring or noncoring bit. *Compare* tapered reamer. *Long.*

tapered prop; pointed prop. Eng. A prop of which one end has been reduced in diameter. *SMRB, Paper No. 61.*

tapered reamer. A reamer having a conical diamond-inset surface tapering from any borehole size at its lower (bit) end to the next larger borehole size at its upper (core barrel) end, such as EX to AX, AX to BX, BX to NX. *Long.*

tapered rope. *See* taper rope.

tapered step-core bit. Synonym of tapered step-face bit. *Long.*

tapered step-face bit. A tapered core bit having the cutting face set in the same manner as a step-face bit. Also called tapered step-core bit. *Long.*

tapered tap. Snyonym for tap. *See also* tap, e. *Long.*

tapered thread. a. A screw thread cut on the surface of a tapered part; it may be either a pin or box thread or a V-, Acme, or square-screw thread. *Long.* b. Used sometimes as a misnomer for a V-type thread. *Long.*

tapered wheel. A tapered grinding wheel, with a flat face, having greater thickness at the hub than at the face. *ASM Gloss.*

taper-lock sprocket. A sprocket with a split tapered bushing for rigid mounting on a shaft. *J&M.*

taper off. Corn. To stop work temporarily. *Weed, 1922.*

taper of thread. Measurement in inches of taper or slope for a 1 foot length of the threaded section. *Brantly, 2.*

taper pin. A straight-sided pin that is smaller at one end than at the other. *Nichols.*

taper reamer. A reamer whose fluted portion is smaller at the front end than at the back, used to produce a hole with a specified taper. *ASM Gloss.*

taper rope. A rope that has a gradually diminishing diameter from the upper to the lower end. The diameter of the rope is decreased by dropping one wire at a time at regular intervals. Both round and flat ropes may be made tapered, and such ropes are intended for deep shaft hoisting with a view to proportioning the diameter of the rope to the load to be sustained at different depths. *Zern.*

taper shank. Part of a tool, conical in shape, which fits a driving member, usually with a tongue on its end. *ASM Gloss.*

taper tap. A tap with a chamfer of seven to nine threads in length. *ASM Gloss.*

taper-type dropper. A device by which a straight-type wedge can be attached to a diamond-drill rod, lowered, and set in a borehole. *Long.*

taper-wall bit. Synonym for bevel-wall bit. *Long.*

taper-wall core shell. Synonym for bevel-wall reaming shell. *Long.*

tapestry brick. a. Brick made by the stiff mud process and having all surfaces roughened by wire cutting. Much used now for exteriors. *Fay.* b. A rough, unscored textured brick. *ACSG, 1963.*

tape-triangulation method. A mine roadway area measurement method in which the tape is stretched diagonally across the roadway. Offsets to the roof, floor, and sides are taken at right angles to the tape and on both sides of it. Alternatively, the floor of the cross section is divided into equal increments and vertical offsets to the roof are made at each division. Horizontal offsets to the sidewalls are made from the nearest adjacent vertical offsets. The measurements so obtained are plotted to scale and the area of the resulting diagram determined from the plot. *Roberts, 1, p. 59.*

taphoglyph. Imprints of dead animal bodies. *Pettijohn.*

taphole. a. The opening through which the molten metal is tapped or drawn from a furnace. *Fay.* b. In steel manufacturing, a hole at or near the bottom of a furnace or ladle through which molten metal, matte, or slag can be tapped. *Webster 3d.* c. In a puddling furnace, a hole for drawing off slag. Also called tapping hole. *Standard, 1964; Fay.*

taphole clay. The plastic refractory material used to plug the taphole of a blast furnace generally consists of a mixture of fire clay and grog together with carbon in the form of coal or coke (pitch is sometimes also used). In Great Britain, the range of chemical composition of a number of taphole clays is 40 to 60 percent SiO_2; 22 to 27 percent Al_2O_3; 8 to 18 percent loss on ignition. The material is adjusted to have a moisture content of 15 to 18 percent and is forced into the taphole by means of a gun. *Dodd.*

taphole gun. A gun shaped device used to force taphole clay into the taphole of a blast furnace after it has been tapped. *See also* taphole; taphole clay. *Dodd.*

tapiolite. A series consisting of niobate and tantalate of iron and manganese. This variable series of minerals may be considered dimorphous with the columbite-tantalite series. The various molecules have been named tapiolite (tantalate of iron), mossite (niobate of iron), and ixiolite (tantalate of manganese). The minerals crystallize in the tetragonal system. *C.M.D.* They are rare, weakly radioactive; black, sometimes brown on surface by alteration; found in granite pegmatites or detrital deposits resulting from their disintegration. *Crosby, pp. 135-136.*

tapish. a. Eng. To break in "at unawares" as gas. A miner who just escapes with his life is said to be "tapished". *Fay.* b. Derb. To let water out of a mine by tapping the place where the water is confined. *Fay.*

tappet. a. A sliding member working in a guide, interposed between a cam and the push rod or valve system which it operates, to eliminate side thrust on the latter. *C.T.D.* b. The collar under which the cam is inserted so as to lift the stamp. Also called disk. *Fay.*

tapping. a. Opening the outlet of a melting furnace to remove molten metal. *ASM Gloss.* b. Removing molten metal from a furnace. *ASM Gloss.*

tapping assembly. A mechanical device consisting of a short piece of casing cemented in the collar of a borehole at the upper end of which is affixed a gate or large plug valve followed by a rod stuffing box. Utilizing this assembly, underground drilling can be accomplished safely in areas of high hydrostatic pressure. *Long.*

tapping bar. *See* tap bar. *Fay.*

tapping clay. A plastic clay used in plugging the tap hole of a smelting furnace. *Standard, 1964.*

tapping old workings. Boring a hole into old workings to release gradually any accumulation of water and gas. The borehole tapping may be followed by driving an advance heading into the area. This is dangerous work. As the heading is extended, borehole are kept in advance of the face to prevent the sudden breakthrough of water. *See also* inrush of water. *Nelson.*

tapping the hollows. Eng. Allowing water or gas, or both, to flow out of old or abandoned workings, often under a great pressure. *See also* tapish. *Fay.*

tappit hen. A 3 quart wine bottle. *Dodd.*

taproot. A big root which grows downward from the base of a tree. *Nichols, 2.*

tar. a. Any of various dark brown or black bituminous usually odorous viscous liquids or semiliquids that are obtained by the destructive distillation of wood, coal, peat, shale, and other organic materials, and yield pitch on distillation. *Webster 3d.* b. Soft pitch or thickened petroleum, found in cavities of some limestones. *Fay.*

tar-acid oil. Black liquid; specific gravity 0.950 to 1.090; used in wood preservation. *Bennett 2d, 1962.*

taramite. A black, with a tinge of blue, soda-iron amphibole. Monoclinic. Incorrectly spelled tamarite. From Wali-tarama, Mariupol, Ukraine, U.S.S.R. *English.*

taramellite. A reddish-brown basic metasilicate of barium and iron, $(Ba,Ca,Na)_4$-$(Fe'',Mg)(Fe_2'''Ti(Si_4O_{12})(OH)_4$, with a little Ti replacing Si; apparently to be classed as a sorosilicate. Radiating, fibrous aggregates; orthorhombic. From Candoglia, Piedmont, Italy. *English; American Mineralogist, v. 44, No. 3-4, March-April 1959, pp. 469-470.*

taranakite. Described as a massive yellowish-white mineral resembling wavellite; hydrous Al phosphate with ferrous iron and potash. *Dana 6d, p. 846.*

tarapacaite. A yellow mineral with fair cleavage; $K_2O.CrO_3$; specific gravity, 2.74. *Larsen, p. 192.*

tarbuttite. A colorless to pale yellow basic phosphate of zinc, $Zn_3P_2O_8.Zn(OH)_2$. Rounded crystals often aggregated into sheaves. Triclinic. From Broken Hill, Northern Rhodesia. *English.*

tar chaser. *See* chaser, tar. *D.O.T. Supp.*

tar coal. Variety of brown coal rich in resins and bituminous matter. *Tomkeieff, 1954.*

tar, dehydrated; tar, refined. Dark brown, thick, viscid liquid. Used in waterproofing compounds and on roads. *CCD 6d, 1961.*

tar distillate. A fraction in petroleum refining containing heavy oils and paraffin. *Webster 3d.*

tare. a. The weight of a mine car when empty. *B.C.I.* b. To weigh mine cars when empty in order to determine the weight of coal in a car when the loaded car is weighed, done at specific intervals in order that miners paid on a tonnage basis may receive proper credit for coal which they have loaded. *B.C.I.* c. Allowance for weight of packing in which goods are moved. The difference between gross and net weight. *Pryor, 3.*

target. a. Sliding weight on leveling rod used in surveying to enable staffman to read line of collimation. In underground leveling, bead on hanging plumbline used for same purpose, distance from this to roof or working then being measured. *Pryor, 3.* b. The point a borehole or exploration work is intended to reach. *Long.*

target length. The distance, measured along the direction of propagation, between the first point and the last point, on a given target, to return detectable echo signals to the source. *Hy.*

target rod. A type of leveling staff provided with a sliding target, which can be moved by the staffman, under direction from the leveler, to a position in which it is in line with the line of sight of the level, the staff reading being recorded by the staffman. *C.T.D.*

target strength. Measure of reflecting power of the target. Ratio, in decibels, of the target echo to the echo from a 6 foot diameter perfectly reflecting sphere at the same range and depth. *Hy.*

tarmacadam. a. Asphalt that is made artificially from grit or crushed stone and bonded with tar. *See also* bituminous macadam; premix. *Nelson.* b. Material used for the base and wearing courses of roads, consisting of graduated broken stone or gravel coated with tar or a tar-bitumen mixture. *See also* tar pavior. *Ham.*

tarman. *See* chaser, tar. *D.O.T. Supp.*

tarn. A small rock-rimmed lake in an ice-gouged basin on the floor of a cirque or in a glaciated valley. *Mather.*

tarnish. a. In mineralogy, the thin film of color, different from that of a fracture, that forms on the exposed surface of a mineral, especially a metallic mineral, as columbite. *Standard, 1964.* b. A change of color resulting from exposure to atmospheric action. *Fay.* c. Surface discoloration of a metal caused by formation of a thin film of corrosion product. *ASM Gloss.* d. A thin film of stain on the surface of glass. *ASTM C162-66.* e. To lose luster; to become dull. *Crispin.*

Tarnowitz process. A metallurgical process in which large charges of lead ore are roasted at low temperatures in furnaces and treated substantially as in the Carinthian process. The residual containing considerable lead is remelted in special furnaces. *See also* Silesian method. *Fay.*

tar oil, wood; pine-tar oil. Almost colorless liquid when freshly distilled; turns dark reddish brown; has a strong, tarry odor and taste; specific gravity, 0.862 to 0.872; and soluble in ether, in chloroform, in alcohol, and in carbon disulfide. Used as quenching oil for steel and iron castings and as a reagent in ore flotation. *CCD 6d, 1961.*

Tarola. Coal-tar product; used as cattle and sheep dip. *Bennett 2d, 1962.*

tarpaulin. A stout waterproof covering of canvas. *Crispin.*

tar pavior. A leading hand who forks coated macadam on to a foundation course and spreads it to a cambered or level space. *Ham.*

tar, pine. Very viscous; dark brown to black; liquid or semisolid; strong characteristic odor; sharp taste; translucent in thin layers; hardens with aging; specific gravity, 1.03 to 1.07; boiling point, ranges from 240° to 400° C; soluble in alcohol, in ether, in chloroform, in acetone, in glacial acetic acid, in fixed and volatile oils, and in sodium hydroxide; and insoluble in water. Chief constituents are complex phenols; also present are turpentine, rosin, toluene, xylene, and other hydrocarbons. Used in ore flotation and in asphaltic compositions. *CCD 6d, 1961.*

tar, refined. *See* tar, dehydrated. *CCD 6d, 1961.*

tarring. a. The coating of piles used for permanent work with prepared acid-free tar before driving. The tar is obtained from the high temperature carbonization of coal in horizontal retorts. *Nelson.* b. The act of coating, (as of a pipe) with tar. *Bureau of Mines Staff.*

tar runner. *See* chaser, tar. *D.O.T. Supp.*

tar sand. a. Barbados name for sand impregnated with petroleum which dries up to viscous or solid bitumen. *Tomkeieff, 1954.* b. These consist of heavy petroleum oils, or bitumen, impregnating sand or clay near the surface of the earth. Vast quantities exist, notably at Athabasca in North Alberta, Canada, and in Iran. *Francis, 1965, v. 1, p. 320.*

tar sprayer. A member of a team of skilled hands responsible for the various operations of spraying tar on a road. *Ham.*

tasco. A fire clay from which melting pots are made. Also spelled tasko. *Standard, 1964.*

Tasil. Trade name for a mullite super refractory made from the best grade of calcined Indian kyanite, selected for low content of impurities including iron, titania, and alkalies. Al_2O_3, 59.0 percent. Available in bonded brick and special shapes; also refractory heat, air setting and hydraulic setting cements, and ramming mixes. Used in refractories for glass melting superstructure and feeder parts, ferrous and nonferrous metal melting and heat treating, linings and crowns for high temperature furnaces and kilns firing all kinds of fuel, kiln furniture. *CCD 6d, 1961.*

task. The number of tons or the amount of ore or material that can or should be loaded either by mechanical loaders or by hand loaders. Also called score. *Bu-Mines Bull. 390, 1936, p. 53.*

Tasmanian alexandrite. Alexandrite of good quality from Tasmania. *Shipley.*

Tasmanian diamond. White topaz. *Shipley.*

Tasmanian topaz. Colorless to light blue topaz from Tasmania. *Shipley.*

Tasmanian zircon. Yellow-brown to dark red zircon from Tasmania, the former becoming colorless by heating. *Shipley.*

tasmanite. A reddish-brown, resinous mineral, dissemniated in scales through a laminated shale (combustible shale); it has a specific gravity of 1.18 and yields oil on distillation. Also called resiniferous shale and yellow coal. *Fay.*

tasmanite shale. Same as tasmanite. *Tomkeieff, 1954.*

tassette. Fr. A small, sharp-pointed infusible earthenware cone, used in threes to support plates, etc., in a kiln or muffle, in place of a stilt. *Standard, 1964.*

Tassie paste. Glass which is lower in lead content than strass, used by James Tassie, a Scottish chemist who studied art and later produced impressions in his paste of most of the then-known famous antique intaglios and cameos, remarkable reproductions representing almost all colored stones. Complete sets were made for collections. The paste was inferior for imitating diamond. It contained about 49 percent silica, 34 percent lead monoxide, and 10 percent potassium oxide. *Shipley.*

tatarskite. A mineral, $Ca_3Mg(SO_4)(CO_3)Cl_2(OH)_2.3\frac{1}{2}H_2O$; massive, in anhydrite. *Hey, M.M., 1964; Fleischer.*

Tatham furnace. A stationary crucible furnace for retorting zinc crusts. *Fay.*

tator butt. Shrop. Fragile sandstone. *Arkell.*

Tauridan topaz. Very light blue, almost colorless, topaz. *Shipley.*

tauriscite. A doubtful mineral possibly epsomite. *Dana 6d, p. 939.*

taurite. A variety of rhyolite, with granophyric or spherulitic texture, rich in soda, and containing aegirite. *Fay.*

taut. Tense, tight; as a rope pulled taut, thus eliminating sag. *Crispin.*

tautline cableways. The tautline cableway differs from the aerial tramway in that its operation is limited to the distance between two towers (not over 3,000 feet apart), it has only one carrier, and the traction cable is reeved at the carrier so that loads can be raised and lowered. Also, the tautline cableway is not restricted to a fixed position; the towers can be mounted on trucks or crawlers and the machine then can be shifted across a wide area. The machine will hoist loads from any point under the span, convey these loads in either direction and lower these loads at any point under the span. By using movable towers, an area of any length can be traversed. Equipped with slings, this machine will pickup and carry unwieldy loads of every kind, then by exchanging the slings for a skip it will handle large chunks of ore, stone, etc., or it can be equipped with a dump bucket to handle any bulk material including semi-fluid mixtures. *Pit and Quarry, 53rd, Sec. A, p. 122.*

tautomeric. Descriptive term for amphoteric substance, able to react in accordance with two oppositely directed structural arrangements of its atoms. *Pryor, 3.*

tavistockite. A white mineral occurring in microscopic acicular orthorhombic crystals with perfect cleavage, $3CaO.Al_2O_3.P_2O_5.2H_2O$. *Larsen, p. 103.*

tavolatite. A volcanic rock consisting primarily of leucite, sanidine, nepheline, haüyne, aegirine-augite, and plagioclase. *A.G.I.*

tavorite. Hydrous lithum ferric phosphate, $LiFe(PO_4)(OH)$, as yellow fine-grained aggregates from Brazil. *Spencer 20, M.M., 1955.*

tawite. A granular igneous rock composed essentially of sodalite and pyroxene. *Fay.*

tawmawite. A dark green chromiferous variety of epidote, Cr_2O_3, 11.16 percent. Massive fragments. From Tawmaw, Upper Burma. *English.*

taxite. Lavas that, on crystallizing, have broken up into contrasted aggregates of minerals so as to present an apparent clastic texture which is either banded, that is, eutaxitic, or brecciated, that is, ataxitic. *Fay.*

taxitic. Having separated, during cooling, into small portions differing in texture, color, or composition, and hence having a false appearance of being clastic; said of some volcanic rocks, especially if banded. *Fay.*

taxoite. Serpentine from Chester County, Pa. *Schaller.*

Taycor. Trade name for a corundum base super-refractory made of sintered high purity alumina. Al_2O_3, 88.0 to 90.0 percent. Available in bonded brick and shapes and also heat, air setting and hydraulic setting cements, patches and ramming mixes. Outstanding resistance to abrasion, load and iron oxide slag attack at high temperatures. Used as rails in billet heating furnaces and other service where iron oxide slag is a problem; lining for ferrous melting in electric furnaces, direct arc, indirect arc and induction types; high temperature furnaces of all types including crowns, linings, kiln furniture, maffles and piers. *CCD 6d, 1961.*

taylorite. a. Obsolete term for bentonite. *Bureau of Mines Staff.* b. A potassium-aluminum sulfate found in guano. *A.G.I.*

Taylor process. A process for making extremely fine wire by inserting common wire into a glass tube and stretching the two together at high temperature. *ASM Gloss.*

Taylor producer. A furnace used for the manufacture of producer gas. *Fay.*

Taylor-White process. A process invented about 1899 for heat treating high-speed steels. *Webster 3d.*

Taylor Zircon. Trade name for a refractory made of selected grades of refined zirconium silicate. Available in bonded bricks and special shapes; also high temperature cements and ramming mixes of all types. Used in refractories for phosphate, sodium silicate and frit melting; kiln furniture for firing of certain porcelain and other ceramic bodies. *CCD 6d, 1961.*

Tb Chemical symbol for terbium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

T-bolt. A bolt with a T-shaped head, made to fit into a T-shaped slot in a drill swivel head; by means of it the swivel head can be turned to any angle of inclination to drill a borehole. Also, a similar bolt made to fit into a T-slot in the bed of a machine, for the purpose of holding a piece of metal to be machined or to fasten a machine to its base. *Long.*

tc Abbreviation for thermocouple. *Zimmerman, p. 108.*

Tc Chemical symbol for technetium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Tcf Abbreviation for trillion cubic feet. *Williams.*

tcheremkhite. An algal sapropelic deposit found in the vicinity of Cheremkhovo, U.S.S.R., and which has been interpreted as an aggregation of peaty matter washed from other deposits. *A.G.I.*

tchesa stick. a. An igniting stick used to light powder fuses when firing a round of shots. Also called a fire stick. *Pryor, 3.* b. A paper shell about ¼ inch in diameter and 8 inches long, filled with a balanced combustible that gives a strong spitting flame of 4 minutes duration. This device requires the individual lighting of each fuse. *Lewis, p. 120.* c. *See* fuse lighter. *B.S. 3618, 1964, sec. 6.*

T-chisel. A boring tool with its cut-edge made in the form of the letter T. *Fay.*

tchornozem. Literally, black mold; the local name for the black earth that covers the whole of the Aralo-Caspian plain, and much of the South of Russia in Europe; interesting from its close resemblance to the regur or so-called cotton soil of India. It is evidently one of the most recent deposits, and of alluvial origin. Synonym for tschernosem; chernozem. *A.G.I.*

tcr Abbreviation for tracer. *Zimmerman, p. 111.*

Te Chemical symbol for tellurium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

T$_e$ a. The temperature at which the electrical resistivity is 1 megohm per cubic centimeter. The Te value of some ceramics is: porcelain, 350° C; cordierite, 780° C; steatite, 840° C; zircon, 870° C; forsterite, 1,040° C; alumina, 1,070° C. *Dodd.* b. A temperature associated with refractoriness under load. *See also* refractoriness under load. *Dodd.*

teaching reactor. *See* research reactor. *L&L.*

tea dust glaze. An opaque stoneware glaze, greenish in color from reduced iron compounds, sometimes used by studio potters. *Dodd.*

Tea-Green marl. The highest portion of the Keuper series, characterized by a green color, and lying immediately beneath the Rhaetic system. *C.T.D.*

Tealby clay. A thin bed of clay found in Lincolnshire, England; believed to be of Neocomian age. It forms part of the Lower Cretaceous rocks. *C.T.D.*

Tealby limestone. A limestone found beneath the Red Chalk of Lincolnshire, England; believed to be of the same age as the Lower Greensand of southern England. It forms part of the Cretaceous system of rocks. *C.T.D.*

tea lead. A term used in Ceylon for lead manufactured into tea-chest lining. *Fay.*

teallite. A blackish-gray sulfostannate of lead, $PbS.SnS_2$. Thin, flexible folia. Orthorhombic (?). From Montserrat, Pasna, Bolivia. *English.*

team captain. N. of Eng. *See* puffler. *Trist.*

team shovel. A scraper or large scoop for moving earth, having guiding handles, and drawn by one or more horses. *Standard, 1964.*

teapot ladle. A ladle, lined with refractory material and used in foundries for the transfer of molten iron or steel; its distinctive feature is the refractory dam below which the metal passes to reach the ladle spout; the refractory dam prevents the outflow of slag. *Dodd.*

tear. An imperfection; a small surface section of glass torn out by sticking to hot metal. *ASTM C162-66.*

tear down. To disassemble the drilling rig preparatory to moving it to another drill site. *Long.*

tear-down time. The time needed to disassemble a drill rig. *Long.*

teardrop set. A surface-set damond-bit crown molded in a die, prepared so that each inset diamond is backed by a raised teardrop-shaped mound of matrix metal. *Long.*

tear fault. a. A horizontal displacement of a series of rocks along a more or less vertical plane, as a result of differential stresses acting upon the bed. *C.T.D.* b. A strike-slip fault that trends tranverse to the strike of the deformed rocks. Synonym for transcurrent fault; transverse fault. *A.G.I.*

tearing. Cracks (usually partially healed) in the cover coat of vitreous enamelware. The cause is high drying shrinkage resulting, most commonly, from to fine grinding, too wet a slip, or too heavy an application of slip. The amount of electrolyte in the slip is important; the presence of sodium nitrite is beneficial. *Dodd.*

tearing down. The dismantling of a rig at completion of oil well drilling, and preparation for moving to another site. *Nelson.*

tears. Torn laminae. *Skow.*

tear war! Newc. A signal that men are ready at the bottom to ascend the shaft. *Fay.*

teary ground. a. Ground easily broken and worked. *Gordon.* b. Corn. A lode or stratum that breaks easily by reason of many joint planes. *Fay.*

teaser. a. Can. Prospect with values but no defined ore shoots. *Hoffman.* b. The worker in direct charge of glass furnace operations who regulates the charging of batch and adjusts fires. *ASTM C162-66.* Also called furnaceman. c. Scot. An iron rod for stirring a boiler furnace. *Fay.*

teasing rods. Light iron rods, about 2 feet long, hinged together to form one continuous length of 40 to 60 feet. They are pushed up inside a drainage borehole casing to clear stoppages of pebbles and gravel away, thus allowing the drainage water to flow freely. *Engineering and Mining Journal, v. 139, No. 4, April, 1938, p. 55.*

teaze hole. The opening of a glass furnace through which fuel is introduced. *Standard, 1964.*

Tecalamit system. Trade name; an impulse system for the oil-firing (from the top or side) of ceramic kilns; the impulses are controlled by a compressed air device. *Dodd.*

technate. A less common name for didymium. *Dodd.*

technetium. A metallic element in group VII of the periodic system. First obtained by the deuteron bombardment of molybdenum in 1937 but since has been found in the fission products of uranium and plutonium. All 14 known isotopes (technetium 92 to technetium 105) are radioactive. Silvery-gray; melting point, 2,200° ± 50° C; specific gravity, 11.50 (calculated); and it is slightly magnetic. The principal chemical interest in technetium derives from the remarkably strong corrosion-inhibiting properties for steel of pertechnate compounds. Symbol, Tc; valences, 3?, 4, 6, and 7; atomic number, 43; and the mass number of the most stable isotope, 97 or 98. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-29, B-138.*

technic. *See* technique.

technical cohesive strength. Fracture stress in a notch tensile test. Often used instead of merely cohesive strength to avoid confusion among the several definitions of cohesive strength. *ASM Gloss.*

technique. The manner of handling details in the execution of an undertaking. *Kinney.*

technologist. A specialist in technology. *Webster 3d.*

technology. a. The science of the application of knowledge to practical purposes; applied science. *Webster 3d.* b. The terminology of a particular subject; technical language. *Webster 3d.*

tectofacies. a. A group of strata of different tectonic aspects from laterally equivalent strata. *A.G.I.* b. Laterally varying tectonic aspects of a stratigraphic unit. *A.G.I.*

tectogene. a. A deeply downbuckled belt of sediments within a eugeosyncline. *A.G.I.* b. A large downfold of the granitic crust (sial) beneath an orogenic belt. *A.G.I.*

tectogenesis. A term sometimes used instead of orogenesis for folding and thrusting, to avoid any implication that actual mountains were necessarily formed. *Challinor.*

tectomorphic. Applied to deuteromorphic constituents of a rock whose shapes have been modified by magmatic corrosion. *Schieferdecker.*

tectonic. Pertaining to rock structures and topographic features resulting from deformation of the earth's crust; also earthquakes not caused by volcanic action, landslides, or collapse of caverns. *Mather.*

tectonic breccia. An aggregation of angular coarse rocks formed as the result of tectonic movement. Included in this category are fault breccias, especially those associated with great overthrust sheets, and fold breccias or riebungsbreccia. *A.G.I.*

tectonic change of sea level. A change in sea level produced by land movement. *Leet.*

tectonic conglomerate. A coarse clastic rock produced by deformation of brittle closely jointed rocks. Rotation of the joint block and granulation and crushing sometimes produce a rock that closely simulates a normal conglomerate. Synonym for crush conglomerate. *A.G.I.*

tectonic earthquakes. Earthquakes caused by faulting within the upper layers of the earth's crust, usually at depths of 5 to 10 miles. *Stokes and Varnes, 1955.*

tectonic geology. Used more or less synonymously with structural geology. On the whole, there is perhaps a little stronger tendency to restrict this term to rock deformation during earth movements than is apparent in the use of the term structural geology, but even its use is not strictly confined to secondary deformation. *Stokes and Varnes, 1955.*

tectonic map. A map showing structure. *Ballard.*

tectonics. The study of the structures resulting from deformation of the earth's crust. *B.S. 3618, 1964, Sec. 5.*

tectonic unmixing. Mechanical segregaton of minerals resulting from recrystallization in sheared zones. *A.G.I. Supp.*

tectonite. A rock whose minute structure has been produced by internal movement of its parts without these parts losing spacial continuity or the rock its individuality. *A.G.I. Supp.*

tectonites. A term used by M. E. Wadsworth to include all mineral construction material for buildings or roads. *Fay.*

tectonized region. An area which has been affected by tectonic movements. *Schieferdecker.*

tectonometer. a. New radar apparatus which is affected by changes in rock structure, particularly faults. At about 5 meter intervals along selected lines, the reading of a microammeter is recorded. The instrument is affected by the surface—whether ploughed or grassland. It has been used in conjunction with resistivity methods to determine the presence and throw of faults and general geological structures. *See also* geophysical prospecting. *Nelson.* b. An apparatus used on the surface to obtain knowledge of the structure of the underlying rocks. *B.S. 3618, 1963, sec. 3.*

tectonophysicist. One who studes elastic deformation of flow and rupture of constituent materials of the earth's crust and makes deductions concerning the forces causing these deformations (changes). *D.O.T. 1.*

tectonosphere. The outer part of the earth above the level of isostatic equilibrium, in which the dynamic processes are thought to occur which cause orogenesis near and at the surface. *Schieferdecker.*

tectosilicates. Silicate structures in which the SiO_4 tetrahedra share all oxygens with adjacent tetrahedra, to build up a three-dimensional network structure. Examples are quartz and feldspar. *A.G.I.*

tedge. In founding, an ingate in a mold. *Standard, 1964.*

tee. a. Eng. A crossvein meeting a main vein without intersecting it. *Fay.* b. A sleeve with a third opening in the side, usually at right angles, to allow a branch line to be connected to the main pipeline. *Kentucky, p. 119.* c. A fitting, either cast or wrought, that has one side outlet at right angles to the run. A single outlet branch pipe. *See also* branch tee; crossover tee; double-sweep tee; drop tee; service tee; union tee. *Strock, 3.*

tee-beam. A rolled steel section in the shape of the letter T, the flat top being the table. *Ham.*

tee-bolt. Synonym for T-bolt. *Long.*

tee joint. A joint in which the members are oriented in the form of a T. *ASM Gloss.*

teem. a. Eng. Sometimes tem. To dump rubbish, etc., down a spoil bank. *Fay.* b. Pouring molten metal from a ladle into ingot molds. The term applies particularly to the specific operation of pouring either iron or steel into ingot molds. Also called teeming. *ASM Gloss.*

teemer. a. A pourer of metal. *Standard, 1964.* b. One who controls the rate of pouring (teeming) stainless steel into molds. *D.O.T. 1.* c. The person who teems or casts the pot of glass. *See also* casting. *ASTM C162-66.*

teeming. a. Shaping glass by pouring it into or on molds, tables, or rolls. *Bureau of Mines Staff.* b. *See* casting. *ASTM C162-66.*

teeming hole. A pit containing the mold in which crucible steel is cast. *Standard, 1964.*

teeming trough. Lanc. A cister (or trough) into which the water is pumped from a mine. *Fay.*

teepleite. a. A hydrous borate and chloride of sodium, $Na_2B_2O_4.Na_2Cl_2.4H_2O$. Tetragonal. *English.* b. Synonym for burkeite; gauslinite. From Borax Lake, Calif. *English.*

tee-slot. Synonym for T-slot. *Long.*

teeter. a. Dancing or boiling movement of small particles in a rising fluid column, when velocity is too high to let them fall and too low to sweep them clear. Characteristic zone in hydraulic classifiers. *Pryor, 3.* b. The condition of a suspension of solids in an upward-moving current of water or air, whereby the support given to the particles reduces the internal friction between them to such an extent that the suspension acquires fluid or partially-fluid properties. *B.S. 3552, 1962.*

teeth. A molded organic bonded abrasive segment for insertion in the periphery of a steel disk. *ACSG, 1963.*

teeth work. Scot. A system of working coal end-on. *Fay.*

teggoglyph. A load structure. *See also* load cast. *Pettijohn.*

tegula. *See* Italian tiles. *Dodd.*

teineite. A hydrous tellurate and sulfate of copper, $Cu(Te,S)O_4.2H_2O$, as blue orthorhombic crystals from Teine mine, Japan. Named from locality. *Spencer 15, M.M., 1940.* Possibly a tellurite instead of a tellurate. *American Mineralogist, v. 46, No. 3-4, March-April 1961. pp. 466-467.*

teja. Sp. A roofing tile. *Fay.*

tekoretin. Fossil hydrocarbon similar to fichtelite. *Tomkeieff, 1954.*

tektites. A group term (of Suess, 1900) covering moldavites, billitonites, australites, and replacing the term obsidianite (of Walcott, 1898). They consist of balls and other spheroidal dumbell forms of green and black glass, approximating to obsidian in composition. *C.M.D.*

tektonite. *See* tectonite. *A.G.I.*

telain. Anglicized from the German telit. Greater fragments of plant tissues, which are completely soaked with vitrain, that is, the cell walls as well as the cell cavities. *A.G.I.*

telecontrolled power station. A hydroelectric power station operated by remote control. *Ham.*

telegraph. A vertical rectangular timber or steel chute for the transfer of coal to a lower level. Strips of wood placed crosswise in the chute retard the downward flow and the chute is kept full for the same purpose. *See also* spiral chute. *Nelson.*

telemagnetic deposit. An ore deposit of magmatic origin but far removed from the original source. *Schieferdecker.*

telemagnetic. Deposits far from the intrusive center. *A.G.I.*

telemeter rod. A leveling staff used in connection with stadia work. *See also* stadia rod. *Ham.*

telemetary. The science involved with measuring a quantity or quantities, transmitting this value to a station, and there interpreting, indicating, or recording the quantities. *H&G.*

telephone coupler. A device, of a type approved by the Minister of Power, designed to enable telephones of approved type below ground to be connected to telephones, of a type not so approved, at the surface, without affecting the intrinsic safety of the approved telephones. *B.S. 3618, 1965, sec. 7.*

telephone system, mine radio. *See* mine radio telephone system.

telephoto lense. Photography: A combination of positive and negative lenses designed to obtain larger magnification of distant objects than is possible with ordinary lenses. *Seelye, 2.*

telescope. a. To slide one piece inside another. *Nichols.* b. To force or jam one segment or part into the part to which it is coupled by applying excessive load; for example, to force or telescope a core-barrel head into the upper end of the outer tube of the core barrel. *Long.* c. Any optical instrument used to aid the eye in observing distant objects. *Bureau of Mines Staff.*

telescoped ore deposits. Ore deposits representing most of the metals of most of the plutonic ore-sequence zones within short horizontal or vertical distances. *A.G.I.*

telescopic derrick. A drill derrick divided into two or more sections, made so that the uppermost sections nest succesively into the lower sections. In use, the sections are extended and locked into place to form a tall derrick and when moved are nested to form a unit length transportable on a single truck. *Compare* telescopic tripod. *Long.*

telescopic dial. *See* improved dial. *B.S. 3618, 1963, sec. 1.*

telescopic drill rig. A two-man-operated, mobile electric hydraulic four drill rig for boring blasting holes in quarries and opencast pits. All drills, percussive and rotary, can be simultaneously or independently raised, lowered, or slewed enabling the rig to serve a working face 32 feet high and 24 feet wide. *Nelson.*

telescopic loading trough. A shaker conveyor trough of two sections, one nested in the other, used near the face for advancing the trough line without the necessity of adding either a standard or a short length of pan after each cut. C-clamps hold the two sections together in any desired length. *Jones.*

telescopic section. That section of a rigid side-framed conveyor which is (1) adjustable in length, (2) immediately adjacent to the tail section, and (3) so designed that it forms a continuous framing and cover for the return belt when the tail section is pulled back to tension the belt. *NEMA MB1-1961.*

telescopic tripod. a. A drill tripod each leg of which is a series of two or more closely fitted nesting tubes, which can be locked rigidly together in an extended position to form a long leg or nested one within the other to shorten the leg while it is being transported from one drill site to another. *Long.* b. A misnomer applied to a drill-hoisting derrick, hinge-mounted on a truck-mounted drill machine, that is raised or lowered by means of hydraulic pistons. *Long.* c. A surveyor's tripod, similarly constructed. *Bureau of Mines Staff.*

telescoping conveyor. A type of conveyor, the length of which may be varied by telescoping frame members. *See also* extendable conveyor. *ASA MH4.1-1958.*

telethermal. Zone or environment of ore deposition characterized by lesser intensity than epithermal and in general by remoteness from an igneous source. *McKinstry.*

telethermal deposits. Ore deposits produced at or near the surface from ascending hydrothermal solutions and representing the terminal phase of its activity. *A.G.I.*

telex. Wired or radio-transmitted communication system. *Pryor, 3.*

telford. Being or related to a road pavement having a surface of small stone rolled hard and smooth and distinguished from macadam road by its firm foundation of large stones with fragments of stone wedged tightly in the interstices. *Webster 3d.*

telfordize. To furnish (a road) with a telford pavement. *Webster 3d.*

telfunken process. *See* metallizing. *Dodd.*

telinite. This term was proposed by W. J. Jongmans (1935) to designate a vitrinite showing cellular structure. The Nomenclature Sub-committee of the International Committee for Coal Petrology decided in 1957 to use the term telinite only for the cell walls seen in vitrinite. Only in this manner can telnite be rightly included among the macerals. Telinite shows more or less clearly defined cell structure (wood, periderm, etc.) sometimes deformed. The cells are generally filled with collinite, but the structure is better shown when the cells are either empty or filled by material such as resinite, fine micrinite, clay minerals, etc. *I.H.C.P., 1963, part I.*

telite. Same as provitrain. *See also* telain. *Tomkeieff, 1954.*

teller. *See* tab. *Mason.*

telltale. a. A simple device, perhaps fabricated on site, for indicating selected conditions of loading, flow, etc., in a plant. Flashing light, hooter, bell, marker moving along scale are among such arrangements showing height of liquid in a tank, loading on conveyor belt, ore level in bin, failure in oil line, stalling of thickener rakes. *Pryor, 3.* b. A device for keeping a check on employees (as factory hands, drivers, check takers), especially a time clock. *Webster 3d.* c. A wind direction indicator in the form of a ribbon or similar piece of material. *Webster 3d.* d. A device serving as a warning on a railroad. *Webster 3d.* e. A small overflow pipe that indicates by dripping when a tank or cistern is full. *Webster 3d.*

telluric bismuth. The same as tetradymite. *Standard, 1964.*

telluric-current prospecting. A geophysical prospecting technique utilizing natural earth currents as a source instead of artificially generated currents injected into the ground. *Dobrin, p. 8.*

telluric currents. Natural electric currents that flow on or near the earth's surface in large sheets. Methods have been developed for using these currents to make resistivity surveys. Synonym for earth currents. *A.G.I.*

telluric silver. Same as hessite. *Standard, 1964.*

telluride. A binary compound of tellurium usually with a more electropositive element or radical. *Webster 3d.* Often rich in gold and silver. *Fay.*

telluric ocher. The mineral tellurite, TeO_2. *Fay.*

tellurides. Ores of the precious metals (chiefly gold) containing tellurium. *Gordon.*

telluriferous. Yielding or containing tellurium. *Standard, 1964.*

tellurie. A mineral, TeO_2, that consists of tellurium dioxide and occurs sparingly in tufts of white or yellowish crystals. *Webster 3d.*

tellurium. An element in group VI of the periodic system. Silvery-white; metallic luster; metallic characteristics; orthorhombic or hexagonal; Mohs' hardness, 2.3; specific gravity, 6.24 (at 20° C); melting point, 449.5° ± 0.3° C; boiling point, 990° C or 989.8° ± 3.8° C; soluble in sulfuric acid, in nitric acid, in potassium hydroxide, and in potassium cyanide solution; and insoluble in water. Occasionally found in native form. Obtained from anode slime produced in the electrolytic refining of copper and lead. Used as a coloring agent in glass and ceramics. Symbol, Te; valences, 2, 4, and 6; atomic number, 52; and atomic weight, 127.60. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-138, B-228.* Two forms of tellurium are listed: Crystalline tellurium and amorphous tellurium. Crystalline tellurium is silvery-white and amorphous tellurium is brownish black. Whereas the specific gravity of crystalline tellurium is 6.25, the specific gravity of the amorphous form is 6.00. All other properties are the same for both forms. It is uncertain whether the amorphous form is truly amorphous or is composed of minute crystals, in which case all tellurium is crystalline. There are two allotropic forms of crystalline tellurium: Alpha tellurium and beta tellurium with the temperature of transition being 348° C. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-41, B-138, B-228; Bureau of Mines Staff.*

tellurium glance. Same as nagyagite. *Webster 2d.*

telurium minerals. These include native tellurium (Te); tellurite, TeO_2; tetradymite $Bi_2(Te,S)_3$; hessite, sylvanite, calaverite, petzite, nagyagite, these last being tellurides of silver and gold. *Pryor, 3.*

tellurnickel. Synonym for melonite. *Dana 6d, p. 76.*

tellurobismutite. A mineral, Bi_2Te_3, as distinct from tetradymite (Bi_2Te_2S). The earlier names tellurwismuth and tellurbismuth covered both. A synonym for tellurobismuthite. *Spencer 20, M.M., 1955.*

tellurometer. Survey instrument which measures distance electronically with high accuracy. A radar pulse is sent to the distant station (up to 40 miles) and the time taken for its echo to arrive is recorded, with an accuracy of 1 to 100,000. Also called trilateration. *Pryor, 3.*

telmatic peat. Same as reed peat. *Tomkeieff, 1954.*

teloclarain. A rock-type coal containing the maceral telinite and other macerals, mainly exinite, and in which the quantity of other macerals exceeds that of telinite. *Compare* clarotelain. *A.G.I.*

teloclarite. A type of coal intermediate between telite and clarite. *Tomkeieff, 1954.*

telodurain. Durain in which a large part of the microconglomerate elements consist of telain. Obsolete. *Compare* durotelain. *A.G.I.*

telofusain. a. A coal constituent transitional between telain and fussain, and showing plant cell structure. The cell walls are soaked with vitrain and the cell cavities are partly filled with vitrain. It is not a transition. Accepted by the Heerlen Congress of 1935 to designate material transitional between telain and fusain with fusain being predominant. *Compare* fusotelain. *A.G.I.* b. Same as fusovitrite. *Tomkeieff, 1954.*

telovitrain. Structureless vitrain with minute inclusions of telain (fragments of plant tissue completely soaked with structureless vitrain, that is, cell walls as well as cell cavities). Obsolete. *Compare* vitrotelain. *A.G.I.*

telpher. An electric hoist which hangs from a power-driven wheeled cab rolling on an overhead rail; it is often referred to as a monorail. *See also* aerial ropeway. *Ham.*

telpherage. Automatic aerial transportation, as by the aid of electricity, especially that system in which the carriages having independent motors are run on a stout wire conducting an electric current. *Standard, 1964.*

Telsmith breaker. A type of gyratory crusher often used for primary crushing. It has a fixed spindle, that is, the spindle is not suspended from above, but is mounted in a long eccentric sleeve. Rotation of the sleeve imparts a gyratory motion to the crushing head, but gives a parallel stroke, that is, the axis of the spindle describes a cylinder rather than a cone as in the suspended spindle gyratory. Adjustment for set in the Telsmith breaker is accomplished by placing shims between the bottom of the breaking head and an adjusting plate—the addition of shims at this point raises the crushing head and decreases the throat opening. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 221.*

Telsmith gyrasphere. A type of secondary crusher that utilizes the gyratory principle; it has a hemispherical crushing head. *Newton, p. 61.*

temblor. An earthquake. *Mather.*

temper. a. In heat treatment, reheating hardened steel or hardened cast iron to some temperature below the eutectoid temperature for the purpose of decreasing the hardness and increasing the toughness. The process also is sometimes applied to normalized steel. *ASM Gloss.* b. In tool steels, temper is sometimes used, but inadvisedly, to denote the carbon content. *ASM Gloss.* c. In nonferrous alloys and in some ferrous alloys (steels that cannot be hardened by heat treatment), the hardness and strength produced by mechanical or thermal treatment, or both, and characterized by a certain structure, mechanical properties, or reduction in area during cold working. *ASM Gloss.* d. An alloy composed of two parts of tin and one of copper, added to pure tin to make the finest pewter. *Standard, 1964.* e. An alloy of arsenic and lead sometimes used for hardening shot. *Standard, 1964.* f. To moisten and mix clay, plaster, or mortar to the proper consistency for use. *ACSG, 1963.* g. To anneal or toughen glass. *Webster 3d.* h. The degree of residual stress in annealed glass measured polarimetrically or by polariscopic comparison with a standard such as one or more strain disks. *See also* strain disk. *ASTM C162-66.* i. Term sometimes employed in referring to tempered glass. *See also* tempered glass. *ASTM C162-66.*

temperature. a. A degree of hotness or of coldness measured on one of several arbitrary scales based on some observable phenomenon, as the expansion of mercury on heating, for example. The degree of a material substance that is a linear function of the kinetic energy of the random motion of its molecules. The degree of a vacuum that depends upon the density of the radiant energy within it. Abbreviations and symbols, temp; T; t; *T; t. Compare* absolute zero. *See also* absolute temperature; Celsius; centigrade; critical temperature; Fahrenheit; Kelvin temperature scale; Rankine scale. *Webster 3d.* b. The heat content of a body as measured on a definite scale. In oceanography both the centigrade and Fahrenheit scales are used. Temperature of seawater usually is determined to an accuracy of ± 0.02° C. *Hy.*

temperature coefficient. a. A numerical value indicating the relation between a change in temperature and a simultaneous change in some other property (for example, solubility). Specifically, the factor *a* in the equation $R_t = RO\ (1 + at)$ in which R_t equals the resistance of a conductor at t° C, and RO equals its resistance at 0° C. *Webster 3d.* b. The change in reactor reactivity occurring when the operating temperature changes. The coefficient is positive when an increase in temperature increases the reactivity and negative when an increase in temperature decreases the reactivity. Negative temperature coefficients are desirable because they help to prevent power excursions. *L&L.*

temperature colors. Colors shown to the eye by incandescent bodies at different temperatures. *Bureau of Mines Staff.*

temperature dew point. Temperature at which condensation of water occurs; a saturation temperature. Measured in degrees F. *Hartman, p. 9.*

temperature, dry bulb. Temperature indicated by a conventional dry thermometer; a measure of the sensible heat content of air. *Hartman, p. 9.*

temperature gradient. a. The rate of change of temperature with distance in a specified direction. Also called lapse rate. *A.G.I.* b. A curve showing the temperature at different distances from the hot face, in refractory wall. *Bureau of Mines Staff.*

temperature gradient furnace. A laboratory electric resistance furnace in which the heating element is wound around the furnace tube in such a manner that there is a steady temperature gradient along the axis of the furnace. Such a furnace is useful in the ceramic laboratory in that it will expose a long test piece placed within the furnace to different temperatures at different points, so that the effect of various firing temperatures can be studied in a single operation. *Dodd.*

temperature logging. The measurement of temperature in boreholes by use of a delicate thermometer that will record temperature anomalies of as much as 7° F for thin coal seams in coal measures according to the thermal conductivity of the rocks concerned. This type logging has proved useful in discriminating between coal and sandstone and also in cased holes in conjunction with gamma-ray logging. *Sinclair, III, p. 105.* Also widely used in oil fields for locating position of cement, casing leaks, etc. *Bureau of Mines Staff.*

temperature profile recorder. A portable unit consisting of a thermistor sensing element, 6-volt power supply, amplifier, and a recorder. The recorder is geared to a drum containing an electrical cable to which the bead is fastened. When the bead is lowered into the water, the paper on the recorder is moved accordingly. Depth is measured by the amount of wire paid out. This device is used in shallow water, particularly in lakes. *H&G.*

temperature reducers. In an explosive copper sulfate ($CuSO_4.5H_2O$), magnesium sulfate ($MgSO_4.7H_2O$), sodium chloride (NaCl), and ammonium chloride (NH_4Cl), all of which act as cooling agents either by giving off water or by volatilizing. They also tend to reduce the sensitivity of the explosive. *Cooper, p. 345.*

temperature-regulating equipment. Any equipment used for heating and cooling the rectifier together with the devices for controlling and indicating its temeprature. *Coal Age, 1.*

temperature-salinity (t-s) diagram. This is the plot of temperature vs. salinity data of a water column. The result is a diagram which makes it possible to identify the water masses within the column, its stability, to read off its σ_t value and to estimate the accuracy of the temperature and salinity measurements. *Hy.*

temperature standards. For normal measurement 0° C (regarding gas properties). For thermodynamics and physical properties either 18° C or 25° C as defined in each stated case. *Pryor, 3.*

temperature steel. Reinforcement which is introduced into a concrete slab or other member in order to minimize any cracks arising from shrinkage or from temperature stresses. *Ham.*

temperature stress. Stress in a structural member due to a rise or fall of temperature. *See also* temperature steel. *Ham.*

temperature survey. A geophysical prospecting method which either measures (1) temperature anomalies in boreholes (*see* temperature logging), or (2) temperature trends and concentrations along the ground surface. For example, a temperature survey across a salt dome may give peak values in the central area, due to the high thermal conductivity of the buried salt mass. *Nelson.*

temperature, wet bulb. Temperature at which water evaporating into air can bring the air to saturation adiabatically at that temperature—a measure of the evaporating capacity of air. Indicated by a thermometer with a wetted wick. Measured in degrees F. *Hartman, p. 9.*

temper brittleness. Brittleness that results when certain steels are held within, or are cooled slowly through, a certain range of temperature below the transformation range. The brittleness is revealed by notched-bar impact tests at or below room temperature. *ASM Gloss.*

tempered. In brickmaking, (1) moistened and worked to the proper consistency, as clay for bricks or molding and, (2) capable of being cut with ease, as bricks made of such clay. *Standard, 1964.*

tempered glass. Glass which has been rapidly cooled from above the annealing point to induce residual compressive stresses in the surface. *VV.*

tempered lead. Lead hardened by addition of alkaline-earth metals and/or lithium; usually made by electrodepositing the alkaline-earth metal into a fused lead cathode. *Bennett 2d, 1962.*

tempered safety glass. A single piece of specially heat-treated glass, with a stress pattern such that the piece when fractured reduces to numerous granular fragments, with no large jagged edges. *See also* safety glass. *ACSG, 1963.*

tempered steel. Steel that has been hardened and subsequently tempered by a second lower heating. *Fay.*

temperer. One who or that which tempers; specifically, a machine for mingling and thoroughly working potter's clay, brick clay, mortar, plaster, or other materials. *Standard, 1964.*

temper hardening. A term applied to alloys that increase in hardness when heated after rapid cooling; also to the operation of producing this. Also called artificial aging; distinguished from aging or age hardening, which occurs at atmospheric temperature. Both processes are covered by the term precipitation hardening. *C.T.D.*

tempering. a. Reheating a quench-hardened or normalized ferrous alloy to a temperature below the transformation range and then cooling at any rate desired. *ASM Gloss.* b. Thorough mixing of clays with water, etc., to form a plastic paste for molding. *C.T.D.*

tempering bar. *See* furgen. *Fay.*

tempering furnace. A furnace for heating articles in the process of tempering. *Standard, 1964.*

tempering machine. A machine for giving large steel plates a uniform and thorough tempering without permitting them to bend or buckle; usually by pressing them between hot masses of iron, or by firmly clamping them between jaws or plates while immersing them in a tempering bath. *Standard, 1964.*

tempering mortar. Softening mortar by adding water and mixing. *A.I.S.I. No. 24.*

tempering oil. An oil that is used for tempering hot metal. *Shell Oil Co.*

tempering oven. An oven for heating lass in the process of annealing; a leer. *Standard, 1964.*

tempering sand. Foundry sand wetted to the proper dampness for molding. *Bennett 2d, 1962.*

tempering tub. A combined pan and vertical pug mill for the preparation of clay for brickmaking. The mixing pan is about 7 feet in diameter, a central vertical shaft carrying the mixing blades; the shaft continues downward as the shaft of the pug mill. In some districts of England, this equipment is known as a sludge pan. *Dodd.*

tempering unit; tempering pan; cooling unit. A vessel intermediate between the pug and the press used to regulate the temperature of the charge. *B.S. 3552, 1962.*

tempering water. The amount of water used to give the desired consistency of workability to a mix. *A.R.I.*

tempering wheel. A wheel mounted on a shaft and revolved in a pit after the manner of an arrastre, for kneading and tempering clay. *Standard, 1964.*

temper screw. a. A screw link by which well-boring tools are hung from the walking beam and connected and lowered as the work progresses. *Standard, 1964.* b. An adjusting screw. *Standard, 1964.*

temper time. In resistance welding, that part of the postweld interval during which the current is suitable for tempering or heat treatment. *ASM Gloss.*

template. a. A form for building tunnel inverts. *Stauffer.* b. A pattern device used as a guide to mark points at which boreholes are to be collared in ring drilling. *Long.* c. A full-sized mold, pattern, or frame, shaped to serve as a guide in forming or testing contour or shape. *Taylor.* d. A pattern or guide of any of various kinds used in manufacturing as usually thin metal pattern for laying out and scribing a workpiece. Also, a gage or pattern for checking dimensions, locations, or contours as on castings. *Webster 3d.* e. A thin plate, cut to the shape or profile required on a finished surface, by which the surface is marked off or gaged during machining or other operation. Also called templet. *C.T.D.*

temporary adjustment. An adjustment, such as leveling or focusing, made to a surveying instrument at each setup. *Ham.*

temporary baselevel. The valley flat (flood plain) is a sort of baselevel, though the first flat developed by a stream is not necessarily the lowest level to which it may bring its valley bottom. It is the lowest level to which the stream can bring its valley under the conditions which exist when the flat is developed. It is, therefore, a temporary baselevel, and serves as the limit below which tributary streams may not cut. *A.G.I.*

temporary hardness. Of water, that which can be removed by boiling out the CO_2, therefore precipitating calcium and magnesium as their carbonates from the more soluble bicarbonate form. *Pryor, 3.*

temporary hardness of water. Water hardness which can be destroyed by boiling. *See also* hard water. *Nelson.*

temporary installation. An installation made for a limited time only, generally in the area between the loading point and the working face, but also in other locations where portable or mobile equipment is installed for a limited time. A temporary installation is limited to a period of six months. *BuMines. Coal-Mine Inspectors' Manual, June 1966, pt. 3-18e, p. 53.*

temporary prop; policeman; safety prop. a. (Eng.) A prop set temporarily in advance of the main timbering. *SMRB, Paper No. 61.* b. Eng. A prop set temporarily under a broken balk. *SMRB, Paper No. 61.*

temporary shaft support. A timber or steel lining inserted for a limited period until the permanent shaft support is put in to replace it. *See also* skeleton tubbing. *Nelson.*

temporary splice. According to the Federal Coal Mine Safety Act, is considered to be one that does not have a rubber or neoprene jacket vulcanized over the splice and bonded to the cable jacket. *I.C. 8149, 1963, p. 16.*

temporary support. In sinking a shaft or driving a tunnel, one that is erected immediately after breaking the ground to give support for a limited time, that is, until it is no longer needed or until it is replaced by a permanent support. *Stoces, v. 1, p. 142.*

ten. N. of Eng. A certain weight of coal agreed upon between lessor and lessee, upon which a royalty is paid. A ten varies between 48 and 50 tons, or 18¼ Newcastle chaldrons of 53 hundredweights. *Fay.*

tenacity. a. The force or strength with which the particles (or molecules) of a mineral or rock hold together or resist separation. The terms commonly used to describe the tenacity of a mineral are friable, brittle, sectile, malleable, flexible, elastic, and tough. *Stokes and Varnes, 1955.* b. The adhesion possessed by a substance, or its toughness. *Gordon.*

tenant helve. Eng. *See* frontal hammer. *Fay.*

tender. a. Said of roof shale that tends to break up or crash under pressure into small fragments, and which will not hold in any span over a few inches. Also called short. *Raistrick and Marshall, pp. 36-37.* b. The formal offer by the tenderer to carry out the work described in the drawings and/or specification for a certain sum of money. *See also* agreement; schedule of rates. *Nelson.*

tenderfoot. A newcomer in a comparatively rough or newly settled region; especially one not hardened to frontier or outdoor life. *Webster 3d.*

tender roof. Aust. A mine roof that requires support. *Fay.*

tending chuck. Pouring water into a drill hole to assist in drilling. *Stauffer.*

tendon. A stretched element used in a concrete member or structure to impart prestress to the concrete. *Taylor.*

teniogranite. Synonym for taeniogranite. *A.G.I. Supp.*

tenmoku. A glaze containing iron compounds sometimes used by studio potters; it is lustrous black except where it is thinner and has oxidized to a red color. *Dodd.*

tennantite. A natural sulfarsenide of copper and iron, $(Cu,Fe)_{12}As_4S_{13}$, found in metallic veins. Isometric. A variety of fahlore. Flint gray to iron black; luster, metallic; streak, black to brown; Mohs' hardness, 3.5 to 4.5; specific gravity, 4.6. Found in Colorado, Idaho, Utah, Montana; Canada; Europe. An important ore of copper and silver. Synonum for gray copper ore; fahlore. *A.G.I.; Fay; CCD 6d, 1961.*

Tennesseean. a. Upper Mississippian, includes Meramecian and Chesterian. *A.G.I. Supp.* b. System between Waverlyan and Pennsylvanian. Obsolete. *A.G.I. Supp.*

tenon. A projecting tongue fitting into a corresponding cavity called a mortise. *Fay.*

tenor. The tenor of an ore refers to the amount of valuable metal in the ore. This is given in percentage of metal or metallic oxide, except in gold, silver, and platinum ores, where the analysis is reported in troy ounces per avoirdupois ton (1 ton=29,167 troy ounces), or in pennyweight (dwt) per ton (1 troy ounce=20 dwt). *Newton, p. 8.*

tenorite; melaconite. A copper mineral, C_uO, occurring as dull black earthy masses, black powder, or shining black scales; streak, black; luster, metallic in scales, dull in masses. Triclinic. Specific gravity, 5.82 to 6.24; Mohs' hardness, 3. Found in Utah, Arizona, Wyoming, Oregon, Tennessee; Italy. Also called black copper. *See also* copper oxide. *Fay; Dana 17; CCD 6d, 1961.*

tensile force. A force such as the force applied when a haulage rope pulls a set of tubs. *Morris and Cooper, p. 141.*

tensile modulus of elasticity. The tangent or secant modulus of elasticity of a material in the tension test. The relationship between tensile stress and tensile strain. Also called modulus of elasticity in tension and often merely modulus of elasticity. *H&G.*

tensile strength. a. The ultimate strength of a material subjected to tensile loading. The maximum tensile stress developed by a material in the tension test. It is calculated by determining the tensile stress corresponding to the maximum load observed in the tension test. For ductile metals, tensile strength of a material is usually greater than its breaking strength, but is well below the maximum true stress developed by the material. Tensile strength is a common index for strength comparison of materials. It may be directly useful in design where some plastic deformation is permitted, but yield strength is the common basis for elastic design. Tensile strength may also be some indication of allowable severity of hot and cold working processes. *H&G.* b. Tenacity of resistance to pulling, measurable in dynes per square centimeter or, for metals and alloys, tons per square inch. Measured in latter case by testing a dimensioned bar to breaking point on tensile testing machine. *Pryor, 3.*

tensile stress. Sometimes called modulus. The nominal stress developed by a material subjected to a specified stretching load, as in the tension test. Above the elastic limit, nominal tensile stress is considerably lower than the true stress because it does not reflect the decrease in cross-section area accompanying continued deformation. *H&G.*

tensile test. a. A test in which specimens are subjected to an increasing tensile pull until they fracture. A stress-strain curve may be plotted and the limit of proportionality, proof stress, yield point, ultimate tensile stress, elongation and reduction in area, determined. *C.T.D.* b. Rock specimens are tested for tensile strength in a standard testing machine with special tension grips which allow rock cores to be easily adjusted to ensure alinement of the load with the axis of the test piece. The rate of loading is 100 pounds per minute. For rocks of nonuniform nature this test yields erratic results, and tensile strengths determined from rupture tests are preferred. *Lewis, p. 570. See also* Brazilian test.

tension. a. In subsidence, the amount of lengthening per unit of measurement. *Nelson.* b. In engineering, a pulling force or stress; metals in tension are strong, while concrete and masonry are weak. *Nelson.* c. A system of forces tending to draw apart the parts of a body, especially of a belt, a line, a cord, or a sheet, combined with an equal and opposite system of resisting forces of cohesion holding the parts of the body together. The stress caused by pulling; opposite of compression and distinguished from torsion. *Standard, 1964.* d. Sometimes used in place of voltage or electromotive force. *C.T.D.*

tension carriage. A bogie or frame carrying a pulley round which the rope of an endless rope haulage passes to be tensioned or tightened. The bogie moves on rails and may be kept taut by balance weights or placed on an inclined roadway (with sufficient weights) to move up or down according to the tension in the endless rope. A tension device is necessary to take up any slack rope created by varying loads on the haulage system. *Nelson.*

tension-control cylinder. A hydraulic piston and cylinder mechanism that can be attached to a rotary-drill feed-off line and adjusted to allow the drill stem to feed downward while maintaining a constant preset tension on the drill string. *See also* tension drilling. *Long.*

tension correction. The correction which must be applied to a tape if it is being used at a tension different from that at which it was standardized. *See also* tape corrections. *Ham.*

tension drilling. Drilling with part of the weight of the drill string supported by the drill swivel head or suspended on a drilling line, as opposed to drilling with the entire weight of the string imposed on the bit. *Long.*

tension end. The tail end or receiving end of a belt conveyor. It consists of a return drum carried in a boxlike structure. A scraper, plough, or brush is attached to remove as much as possible of the spillage on the bottom belt before it passes on to the return drum. The tension end is drawn back by two Sylvesters attached to staking anchor props; this enables adequate, but not excessive, tension to be imparted to the belt. *Sinclair, V, p. 287. See also* drivehead.

tension fault. Geological fault due to tension which separates rock strata; unlike gravity or normal fault, since strata may reappear on other side of gap caused by fall of intervening section to lower level when fissure opened. *Pryor, 3.*

tension flange. The side of a beam which is in tension, being the lower side in the general case of a simple beam supported at both ends. *Ham.*

tension fracture. a. A fracture that is the result of stresses that tend to pull material apart. *Billings, 1954, p. 93.* b. *See* subsidiary fracture. *Nelson.*

tensioning device, belt. A device fitted to a belt conveyor which automatically takes up any slack or stretch in the belting. A gravity takeup device is sometimes fitted immediately behind the driving unit, thus eliminating slack which would otherwise occur. The main disadvantage of gravity takeup is that it gives the belt three entire bends. *Nelson.*

tension jack. A type of jack equipped with a jackscrew for wedging against the roof, which also has a ratchet device for applying tension on a chain to be attached to the tail or foot section of a belt conveyor. The jacks and tension chains pull the tail section back until the belt is at the proper tension. *Jones.*

tension joint. A joint that is a tension fracture. *See also* tension fracture. *A.G.I.*

tension linkage. A chain application in which linear motion is not continuous in direction. *J&M.*

tension pulley. Aust. A pulley around which an endless rope passes mounted on a trolley or other movable bearing so that the slack of the rope can be readily taken up by the pull of the weights. *Fay.*

tension sleeve. See screw shackle. *Ham.*

tension zone. The surface area affected by tensile strain. *See also* compression zone; neutral zone; tension. *Nelson.*

tentale rent. N. of Eng. A rent or royalty, paid by a lessee upon every "ten of coal" that is mined in excess of the minimum or certain rent. *See also* ten. *Fay.*

tenter. Eng. A man who has the control or working of an engine or jig. *Fay* .

ten wheeler. *See* six wheeler.

tepee butte. a. In the Pierre shales of Colorado are limestone masses of peculiar character. Their height is greater than their width and all dimensions are of a size to be measured by feet or yards. Resisting erosion much better than the shales, they stand above the general surface. Their fallen fragments protect sloping pedestals of shale, and their positions are marked in the landscape by conical knolls or buttes. The formal resemblance to these buttes to the conical lodges, or tepees, of the Sioux and other Indians, has led us to call them distinctively tepee buttes. *A.G.I.* b. A conical erosion hill, so named from its resemblance to the Indian wigwam or tepee. *A.G.I.* c. A hill formed by a columnar bioherm found in the Cretaceous Pierre shale of Colorado, containing enormous numbers of the small Pelecypod, lucina. *A.G.I.*

tepetate. Mex. In geology, a secondary volcanic or chemical nonmarine deposit, very commonly calcareous, coating the solid rock or penetrating the earthy portions of a district; so called in Mexico and in the central United States. *Standard, 1964.*

tephra. A collective term for all clastic volcanic materials which, during an eruption, are ejected from a crater or from some other type of vent and transported through the air, including volcanic dust, ash, cinders, lapilli, scoria, pumice, bombs, and blocks. Synonym for volcanic ejecta. *A.G.I.*

tephrite. A volcanic rock composed essentially of calcic plagioclase, titanaugite, and nepheline or leucite. Sodic sanidine is sometimes an accessory. A feldspathoidal basalt. *A.G.I.*

tephritoid. A rock having the chemical composition of a tephrite, but containing a soda-rich, glassy base in place of nepheline. *Compare* basanitoid. *Holmes, 1928.*

tephroite. A manganese orthosilicate, $Mn_2(SiO_4)$, containing 70 percent MnO and commonly, small quantities of magnesium, iron, and zinc. Orthorhombic. One of the olivine group minerals. *Sanford; Dana 17.*

tepla-masse. A coal-tar pitch, for protecting the outside of steel tubes against corrosion and bacteria. *Osborne.*

tepostetes. Boulders of specular iron ore found in gold placers, Sonora, Mex. *Fay.*

teratolite. A clay from the coal measures of Saxony, formerly supposed to have curative properties. Also spelled terratolite. *Standard, 1964.* Also called lithomarge. *Fay.*

terbia. *See* terbium oxide. *Bennett 2d, 1962.*

terbium. A metallic element and a member of the rare earth group. Resembles yttrium and occurs in the same minerals as dysprosium, europium, and gadolinium. *C.T.D.* Silvery-gray; metallic luster; hexagonal; reacts slowly with water; soluble in dilute acids; specific gravity, 8.272 or 8.332; melting point, 1,356° C or 1,360° C; boiling point, 2,800° C; and its salts are colorless. A phosphor activator. Symbol, Tb; valences, 3 and 4; atomic number, 65; and atomic weight, 158.924. *See also* rare earth metals. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-139.* Malleable; ductile; soft enough to be cut with a knife; two crystal modifications; 18 known isotopes (terbium 147 to terbium 164); insoluble in water; and soluble in acids. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-139, B-229.*

terbium oxide; terbia. White; Tb_2O_3; isometric; molecular weight, 365.85; and soluble in dilute acids. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-229.*

terlinguaite. An oxychloride of mercury, Hg_2ClO, or a mercuric-mercurous oxychloride, HgO.HgCl. Monoclinic. Small, elongated, prismatic crystals. From Terlingua, Texas. *English.*

terminal curvature. The sharp change in dip of strata in the vicinity and abutting a fault plane, caused by the movement and drag of the rocks against the fault plane. The curvature may be only local or extend a considerable distance from the fracture. Terminal curvature is reliable evidence in establishing the direction of displacement of coal or mineral deposits. *See also* drag j. *Nelson.*

terminal moraine. The transported debris left by a glacier at or near its lower terminus. *Standard, 1964. See also* moraine. *Fay.*

terminal phase. A solid solution, represented by an area, at either extreme side of a binary diagram. *ASM Gloss.*

terminal velocity. The constant velocity acquired by a particle falling in water or air when the frictional resistance is equal to the gravitational pull. *See also* equal-falling particles; Stokes' law. *Nelson.*

termination. In mineralogy, the end of a crystal and especially the natural crystal faces on that end as distinguished from a broken or polished end. A crystal is said to be singly terminated if natural faces occur on only one end as in attached crystal; doubly terminated if they occur on both ends as in disseminated crystals. *Shipley.*

terminology. The technical or special words or terms used in any science, art, industry, trade, etc. *Shipley.*

terms of reference. Schedule which defines responsibilities and area of activity delegated to and/or accepted by subsection, department or subordinate official in organization working on line-and-staff system of large company where harmonious cooperation might otherwise be endangered. *Pryor, 3.*

ternary. Consisting of three components. *Rolfe.*

ternary alloy. An alloy that contains three principal elements. *ASM Gloss.*

ternary diagrams. Phase diagrams of 3-component systems. *VV.*

ternary steel. An alloy steel that contains one alloying element; the term being synonymous with a simple alloy steel. It contains the one element plus the iron and carbon, hence ternary. *Fay.*

terne. Sheet iron or steel coated with an alloy of about 4 parts lead to 1 part tin. *Webster 3d.*

terneplate. Sheet steel covered with a tin-lead alloy. *BuMines Bull. 585, 1960, p. 876.*

Terni furnace. A modification of the open hearth furnace in which the essential feature is the port design. The airports gradually increase in cross section until they are as large as the hearth itself, thus practically eliminating turbulent flow in the furnace. This is claimed to result in increased output and reduced fuel consumption. *Osborne.*

terosin. Same as fichtelite. *Tomkeieff, 1954.*

terp; mound. An artificial mound or hill of earth. *Schieferdecker.*

terpene. Hydrocarbon of general formula $C_{10}.H_{16}$; present (30 to 60 percent) in pine oil which is widely used as frother in flotation process. Present in many plant growths as essential oil. *Pryor, 3.*

terpineol. The principal frothing agent in pine oil with formula $C_{10}H_{18}O$. *Pryor, 3.*

terra. The earth; earth. *Standard, 1964.*

terra alba. a. Finely pulverized powder, $CaSO_4.2H_2O$, made from gypsum and used in the manufacture of paper, paints, artificial marble, and composition plastics. *CCD 6d, 1961.* b. Any of several white mineral substances as: (1) gypsum ground for a pigment; (2) kaolin used especially as an adulterant of paints; (3) burnt alum; (4) magnesia; and (5) blanc fixe. *Webster, 3d.*

terra cariosa. The same as tripoli. *Standard, 1964.*

terrace. a. A level or nearly level plain, generally narrow in comparison with its length, from which the surface slopes upward on one side and downward on the other side. Terraces and their bounding slopes are formed in a variety of ways, some being aggradational and others degradational. *Fay.* b. A flaw in marble, commonly cored out and filled up. *Webster 2d.* c. A raised portion of an ancient riverbed or a bank on which alluvial deposits may be found. *Nelson.* d. A bench in quarry or opencast mining. *Nelson.* e. A ridge, a ridge and hollow, or a flat bench built along a ground contour. *Nichols.* f. N.S.W. High-level river gravels. New South Wales.

terrace clay. Any clay, usually impure, which underlies a topographic terrace occurring on the slopes of valleys, basins, or on slopes of other types. *ACSB-1.*

terraced flute cast. Flute casts with external sculpturing resembling differentially-weathered bedding laminations. In reality, a cast of differentially eroded laminations in the underlying shale and unrelated to internal structure of the cast. *Pettijohn.*

terraced stalagmite. A stalagmite having more or less horizontal terraces. *Schieferdecker.*

Terrace epoch. In geology, the earlier part of the Recent or Holocene epoch; also called Terracian; a time of general formation of terraces in the drift-filled valleys of the region glaciated during the preceding Pleistocene epoch. *Fay.*

terrace placers. Placer deposits on levels above the present streams. *A.G.I.*

terracettes. Ledges of earth on steep hillsides, varying from a few inches to 4 to 5 feet in height and averaging 2 to 4 feet in width, formed as a result of the development of slippage planes in, and subsequent slumping of, the soil or mantle. Also called terracette slope. *A.G.I.*

Terracian. Synonym for Terrace epoch. *A.G.I.*

terra cotta. A burned-clay product widely used for ornamental work on the exterior of buildings. *Crispin.*

terra-cotta clay. Terra-cotta clays differ quite widely, but semifire clays or a mixture of these with a more impure clay or shale are mostly used. Buff-burning clays are preferred because of the hard body produced on burning. Desirable qualities in the terra-cotta clay: (1) dense burning character and strong bonding; (2) low shrinkage and freedom from warping; and, (3) absence of soluble salts. Found in New Jersey, Pennsylvania, Indiana, Missouri. *CCD 6d, 1961.*

terrain. a. A complex group of strata accumulated within a definite geological epoch. *A.G.I.* b. Area of ground considered as to its extent and natural features in relation to its use for a particular operation. *A.G.I.* c. The tract or region of ground immediately under observation. *A.G.I.* d. Ground surface. *Nichols.* e. A variation of terrane. *Fay.*

terrain coefficient. A terrain coefficient is a number expressing the ratio of actual ground displacement by elastic waves to that which the same waves would produce in rock. The terrain coefficient for rock is thus 1; for unconsolidated materials it ranges upward to as high as 30, depending on the thickness of the material. *Leet 2, p. 75.*

terrain correction. A correction applied to observed values obtained in geophysical surveys in order to remove the effect of variations to the observations due to the topography in the vicinity of the sites of observation. Synonym for topographic correction. *A.G.I.*

terrain slope. Used to describe quarries when located in low slopes. *Compare* hillside. *Streefkerk, p. 14.*

terrane. a. A group of strata, a zone or a series of rocks; used in the description of rocks in a general, provisional, or noncommittal sense. *Fay.* b. A region considered in relation to its fitness for some purpose; an extent of ground or territory. *Standard, 1964.*

terranean. Of or relating to the earth. *Webster 3d.*

terra ponderosa. Literally, heavy earth; another name for heavy spar or barite. *Fay.*

terra rossa. Residual red clay mantling limestone bedrock. *A.G.I.*

terras. In marble working, a defective or disfigured place in a marble block, which is cut out and filled with a composition. *Standard, 1964.* Also spelled terrace. *Fay.*

terra siennas. *See* ochers. *Fay.*

terra sigillata. A porous red clayware characterized by embossed decorations of the same color and a satinlike unglazed surface. Originated on the Isle of Samos. *ACSG, 1963.*

terra silicea. *See* infusorial earth. *Bennett 2d, 1962.*

terrazzo. Small chips or pieces of stone, usually marble or limestone, about one-half to three-fourths of an inch in diameter, made by crushing and screening. Terrazzo chips are used with portland cement in making floors, which are smoothed down and polished after the cement has hardened. *BuMines Bull. 585, 1960, p. 804.*

terrene. a. A land area; the earth; terrain. *Webster 3d.* b. In surveying, the surface of the ground. *Webster 2d.*

terreplein. An embankment of earth with a broad, level top. *Webster 3d.*

terrestrial. Of or relating to land as distinct from air or water. *Webster 3d.*

terrestrial deposits. Deposits laid down on land, specifically those of glacial or eolian origin. Some geologists also include deposits laid down in lakes and rivers, and hence consider the term to be opposed to marine and not to water in general. *Stokes and Varnes, 1955.*

terrestrial magnetician. *See* geomagnetician. *D.O.T. 1.*

terrestrial magnetism. The natural magnetic field within and surrounding the earth and the factors affecting it. *Hy.*

terrestrial peat. Peat formed above water level. *Tomkeieff, 1954.*

terre verte. Glauconite, or the similar mineral celadonite, used as a green pigment by artists. The best preparations are very permanent but of slight intensity, losing character if mixed with other pigments. *Webster 2d.*

terrigenous. Produced from or of the earth; in geology, derived from the land; said of marine deposits formed of material washed from the land, as contrasted with those of organic, chemical, or other origin, formed primarily in the sea. *Standard, 1964.*

terrigenous deposits. Particles of rock that have been washed from the land into the ocean. *MacCracken.*

terrigenous sediments. Sediments derived from the destruction of pre-existing rocks on the earth's surface, as distinguished, for example, from sediments of organic or volcanic origin. *Stokes and Varnes, 1955.*

territe. A plastic explosive which consists of the constituents, blasting gelatin+BNT+sodium nitrate+ammonium perchlorate. The explosive has a relatively low rate of detonation and is very insensitive, on which account care must be taken to ensure that its initiation is extremely powerful. It is preferably employed in loose rock. *Fraenkel, v. 3, Art. 16:02, p. 25.*

terroite. An extra-strong high explosive of the nitroglycerine type. *Standard, 1964.*

Tertiary. The earlier of the two geologic periods comprised in the Cenozoic era, in the classification generally used. Also, the system of strata deposited during that period. *Fay.*

tertiary air. Preheated air introduced into the waste-gas flue of a kiln firing under reducing conditions, for example, a blue-brick kiln; its purpose is to burn the combustible matter in the gases leaving the kiln chamber, thus helping to minimize smoke emission from the stack. *Compare* primary air; secondary air. *Dodd.*

tertiary creep. *See* creep. *ASM Gloss.*

tertiary crushing. The preliminary breaking down of run-of-mine ore and sometimes coal. In metal mines, the tertiary crushing may be performed at a central point underground. *See also* primary breaker. *Nelson.*

tertiary grinding. When a particularly fine grinding of ore is needed, two and even three ball mills may be used in a series to attain the degree of fineness. The successive stages are referred to as primary, secondary, and tertiary grinding. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 237.*

Tertiary igenous rocks. The various types of igneous rocks which were intruded or extruded during early Tertiary times, especially over a region stretching from Great Britain to Iceland; for example, in the Inner Hebrides and northeast Ireland (the Thulean Province). *C.T.D.*

tertiary shaft. The shaft which extends a mine downwards from the bottom of the secondary shaft. *Spalding.*

tertschite. A hydrous calcium borate, $Ca_4B_{10}O_{19}.20\text{-}21H_2O$, finely fibrous, probably monoclinic; from Turkey. *Spencer 20, M.M., 1955.*

tervalent. Having three difference valencies. Not synonymous with trivalent. *Pryor, 3.*

teschenite. a. An alkali-rich variety of analcite dolerite characterized by the presence of idiomorphic purple augite or aegirine-augite, and generally containing soda amphiboles, such as barkevikite. *Holmes, 1928.* b. A name given in 1861 by Hohenegger to a group of intrusive rocks in the Cretaceous strata near Teschen, Austrian Silesia. They have since, however, been shown to embrace such a variety of types that the name has little value, but as analcite occurs quite constantly in most of them, many still use the term for diabasic rocks with this mineral. *Fay.*

tessellated. a. A surface divided in squares, or figures approaching squares, by joints or natural divisions. *Fay.* b. Composed of tesserae or small cubes of stone, marble, glass, or terra cotta variously colored and arranged in artistic design: inlaid; mosaic; as tessellated pavement. *Standard, 1964.*

tessera. A small square stone or tile used in making mosaic pavements, walks, etc. *Crispin.*

tesseral. In crystallography, the same as isometric. *Standard, 1964.*

tesseral system. Isometric or cubic system. *C.M.D.*

tessha. A version of the tenmoku glaze; it is described as more metallic and broken. *Dodd.*

test. a. A cupel, or cupelling hearth, for refining precious metals; also a particular portion of metal refined for the purpose of isolating and weighing its gold and silver. *Webster 2d.* b. To subject to cupellation as gold and silver. *Webster 3d. See also* cupel, b. c. To explore an unproved area by using boreholes to search for a mineral deposit, or to obtain samples of soil or rock from which the physical characteristics of the sampled formations can be determined, as in foundation testing. *Long.* d. To determine the inclination of a borehole by means of an acid-dip survey. *Long.* e. Any procedure for sampling reservoir content. *Wheeler.* f. A procedure or a reaction used to identify or to characterize a substance or a constituent; as, the iodine test for starch. *Webster 3d.* g. An apparatus for proving light hydrocarbon oils by heat to find the temperature at which they evolve explosive vapors; an oil test. *Fay.*

test bore. Drilling to test subsoil and rocks when considering foundations of buildings, dams and heavy plant. *Pryor, 3.*

test borer. *See* diamond driller. *D.O.T. 1.*

test-borer helper. See diamond-driller helper. *D.O.T. 1.*

test boring; test borings. a. As used by foundation engineers, the act or process of sinking holes into the overburden (sometimes to considerable depth into bedrock) with rotary or drive sampling equipment for the purpose of recovering samples from which information on the physical characteristics of the materials penetrated can be obtained; also applied to the sample or samples so obtained. *Long.* b. Synonym for borehole; drill hole; drilling. *Long.*

test cone. A test piece cut or molded from a sample of refractory material that is to be tested for refractoriness or pyrometric cone equivalent. The shape is that of a pyramid on a triangular base; the dimensions vary according to which national specification is being followed. *Dodd.*

test core. Core removed from a concrete structure by diamond core drilling and tested in a laboratory to determine the strength and other physical properties of the concrete. Also, core removed from a borehole drilled in search of oil and used to determine the porosity of the core and whether oil is present. *Long.*

test-correction chart. *See* capillarity-correction chart. *Long.*

test cube. A 6- or 4-inch cube of concrete is used in Great Britain as a specimen to test the strength of concrete. A compressive test is generally taken at either 7 or 28 days age, the methods of casting and testing being described in British Standard 1,881. *See also* slump test. *Ham.*

tester. a. A sampling instrument. *Nelson.* b. A person responsible for carrying out ventilation, dust or other tests. *Nelson.* c. Service company representative who supervises drill stem testing operations. *Wheeler.*

testeras. Mex. Uprights in a mine, whether pillars, arches, or posts. *Fay.*

test hole. a. A drill hole or shallow excavation for testing an ore body; a test pit. *Fay.* b. Generally, any borehole drilled to obtain samples whereby the structural and physical characteristics of the rocks penetrated can be determined; more specifically, a hole produced by rotary or driving soil-testing tools in the course of obtaining samples used in soil- and foundation-testing work. *Long.* c. Usually a small hole drilled ahead and flanking in a working place to ascertain proximity of old workings and to determine water or air content of same. *B.C.I.* d. A tap hole, as in a cementation furnace. *Standard, 1964.*

test-hole driller. *See* diamond driller. *D.O.T. 1.*

test-hole-driller helper. *See* diamond-driller helper. *D.O.T. 1.*

testing. In mineral processing, main categories are amenability tests, made to ascertain response of unknown ore specimen or sample to standard methods of treatment; batch tests on small representative samples, made to obtain reliable details of grade and recovery percentage of values and to compare or originate methods of such recovery; pilot tests to confirm the findings of batch tests and aid in costing and design of a full-scale plant, also to reveal potential difficulties not displayed in miniature batch testing; routine control tests of established process made in order to maintain operating efficiency in a working plant. These tests may include crushing and grinding, jigging, tabling and other gravity-based treatments, chemical attack, flotation, magnetic and electrostatic tests, and thermal treatment. *Pryor, 3.*

testing bedrock. *See* bedrock test. *Long.*

testing flame. The lowered flame of a miner's flame safety lamp, which is used to detect the presence of small percentages of firedamp in mine air. *See also* firedamp tests. *Nelson.*

testing machine. A machine used for applying test loads to standard test pieces or to structural members. Machines are available for carrying out tensile, compressive, impact, and fatigue tests. *Ham.*

test lead. Lead free from any silver, and often finely granulated; used in testing or cupelling, assaying, etc. *Webster 3d.*

test paper. Paper (as litmus paper) cut usually in strips and saturated with an indicator or other reagent that changes color in testing for various substances. *Webster 3d.*

rest piece. A piece of material prepared in a suitable shape so that it can be tested in a testing machine. *Ham.*

test pit. A shallow shaft or excavation made to determine the existence, extent, or grade of a mineral deposit or to determine the fitness of an area for engineering works, such as buildings or bridges. *Stokes and Varnes, 1955. See also* trial pit.

test plate. A white plate or tile on which to try vitrifiable colors by heat. *Standard, 1964.*

test reactor. A nuclear reactor specially designed to test the behavior of materials and components under the neutron and gamma fluxes and temperature conditions of an operating reactor. *L&L.*

test ring. An oval iron frame for holding a test or movable cupelling hearth. *Fay.*

test stone. Basanite. Used for testing streak of precious metals. *Shipley.*

test tube. a. A tube for simple tests; usually a plain tube of thin glass closed at one end, but sometimes having a foot, bulb, graduated scale, or other modification. *Webster 3d.* b. Synonym for acid bottle. Also called testing tube. *Long.*

test well. a. One that determines not only the presence of petroleum oil, but its commercial value, considering its abundance and accessibility. The information resulting should be such as a prudent and experienced investor would desire to know before expending his capital in labor, or improvements for the profitable working of the property. *Ricketts, II.* b. An exploratory well for water. *Bureau of Mines Staff.*

test zone. The section of the mine loaded with coal dust for a given explosion test. It is most frequently used in connection with the zone from E 1300 to E 950 and E 1250 to A 950, used in the standard ignition and propagation tests. *Rice, George S.*

tetartohedral. Of a crystal, having one-fourth the number of planes required by complete symmetry. *Webster 3d.*

tetrabromoethane. Same as acetylene tetrabromide. *Shipley.*

tetrachloride. A chloride (as carbon tetrachloride, CCl_4) containing four atoms of chlorine. *Webster 3d.*

tetradymite; telluric bismuth. A natural telluride of bismuth, Bi_2Te_3, frequently containing sulfur and selenium. Trigonal. Color and streak pale steel gray; luster, metallic; Mohs' hardness, 1.5 to 2; specific gravity, 7.3. Found in California, Colorado, Arizona, Montana, New Mexico, Virginia; Canada; Europe. An ore of bismuth. *Fay; A.G.I.; CCD 6d, 1961.*

tetraethyllead; lead tetraethyl. a. The important constituent of antiknock gasoline; $Pb(C_2H_5)_4$. *Crispin.* b. Colorless; liquid; specific gravity, 1.659 (at 18° C); boiling point, 200° C with decomposition; insoluble in cold water; and soluble in benzene, in petroleum, in alcohol, and in ether. *Handbook of Chemistry and Physics, 42d ed., 1960, p. 706.*

tetraethyl orthosilicate. *See* ethyl orthosilicate. *CCD 6d, 1961.*

tetragonal. a. Designating or belonging to a system of crystallization having all three axes at right angles and the two lateral axes equal. *Fay.* b. The crystal system in which crystals have one fourfold symmetry axis. *Hurlbut.*

tetragonal system. That system of crystals in which the forms are referred to three mutually perpendicular axes, two of which are of equal length and the third either longer or shorter. *Fay.*

tetrahedral. Pertaining to the tetrahedron, a four-sided form of the cubic system. *Shipley.*

tetrahedrite. A mineral, the part with Sb greater than As of the tetrahedrite-tennantite series, $Cu_3(Sb,As)S_3$. Silver, zinc, iron, and mercury may replace part of the copper. Isometric. An important ore of copper and silver. Color, grayish-black to black; luster, metallic; streak, black to brown; Mohs' hardness, 3 to 4; specific gravity, 4.6 to 5.1. Found in Colorado, Montana, Nevada, Arizona, Utah; Mexico; Europe; South America. Synonym for gray copper ore; fahlore. *A.G.I.; Fay; CCD 6d, 1961.*

tetrahedron. A crystal form, in the isometric system, enclosed by four faces having equal intercepts on all three axes. *Fay.*

tetrahedron, SiO_4. A silicon atom surrounded by four oxygen atoms. Each oxygen must either receive an extra electron or be shared by two tetrahedra. *VV.*

tetrahexahedron. A crystal form of the isometric system bounded by twenty-four equal triangular faces, four to each face of the cube. *Fay.*

Tetrakis. A light yellow liquid used in stopping water production in air- or gas-drilled wells. Chemically, Tetrakis may be classified as a titanium ester; the compound is tetra 2-ethylhexyl titanate. *American Petroleum Institute. Drilling and Production Practice, 1963, p. 7-8.*

tetralite. *See* tetryl. *CCD 6d, 1961.*

tetranitroaniline. $C_6H(NO_2)_4NH_2$; a nitration product of aniline; melting point, 170° C; and it explodes at 237° C. A high explosive used in the manufacture of detonators and primers. Abbreviation, TNA. *CCD 6d, 1961.*

tetrapod. An equiangular figure in the form of a tripod, having a fourth leg, engaging from the intersection of the other three. Solid tetrapods weighing 15 tons, made of concrete, were used very successfully to form a breakwater at Casablanca. *Ham.*

tetra sodium pyrophosphate. ($Na_4P_2O_7$) or ($2Na_2O.P_2O_5$), a salt commonly used in small amounts to reduce set in milled enamels. *Enam. Dict.*

tetravalence. An atom, or group, having four valence bonds. *Pryor, 3.*

tetravalent; quadrivalent. a. Having a valence of 4. *Webster 3d.* b. Having four valences; for example, chlorine which has valences of 1, 3, 5, and 7. *Webster 2d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-106.*

tetrazene. An initiating explosive. *CCD 6d, 1961.*

tetryl; N-methyl-N,2,4,6-tetranitroaniline; tetralite. Yellow; prismatic crystals; $C_7H_5N_5O_8$; molecular weight, 287.15; specific gravity, 1.57 (at 19° C); melting point, 129° C; explosion point, 187° C; insoluble in water; and slightly soluble in alcohol, in ether, and in chloroform. Tetryl and tetralite are commercial names. Used as an explosive in detonators and as a priming or intermediate detonating agent for less sensitive high explosives. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-120.*

tewel. a. A hole; bore; a chimney, as for smoke. *Webster 3d.* b. The tuyere of a furnace. *Webster 2d.*

Texas agate. Agate jasper from gem gravels of Pecos River, Tex. *Shipley.*

textile clays. China clays low in grit and silica, and used as fillers for textiles. *CCD 6d, 1961.*

textile glass. Glass in form suitable for spinning, weaving, etc. *Bennett 2d, 1962 Add.*

texture. a. The character, arrangement, and mode of aggregation of the fragments, particles, or crystals that compose a rock; the sum total of those features of a rock which determine its physical structure and appearance as a rock. Texture and structure have been and still are used more or less interchangeably, but there is a growing and commendable tendency to confine structure to the features that characterize the rock mass, as a part of the earth's crust, and texture to those that characterize the particular specimen, as a piece of rock. For example, the structure of a rock may be stratified, slaty, or brecciated, and its texture may be clastic, crystalline, or glassy. *Fay.* b. The grain pattern, relating to sizes, shapes, and mutual relations of component grains or crystals, as equigranular (grains of approximately same sizes), inequigranular (grains of markedly unequal sizes); porphyritic (relatively large grains of one or more mineral components in a groundmass of markedly finer texture); interlocking (in which grains with irregular boundaries interlock by mutual penetration); mosaic or granulitic (closely packed grains with smooth to moderately irregular, noninterlocking mutual boundaries); clastic (naturally cemented fragmental grains but without interlocking or mosaic relations). *ASTM C119-50.*

textured brick. A brick with the surface treated to change its appearance from that created by the die. *ACSG, 1963.*

texture of rock. The size and arrangement of mineral grains. *Bateman.*

Tg point. *See* transformation points. *Dodd.*

th. Abbreviation for total head. *Pit and Quarry, 53rd, sec. E, p. 82.*

Th. Chemical symbol for thorium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

thalassic. Marine; usually implying deep or open water. *Challinor.*

thalassophile element. An element specifically enriched in sea water. *Schieferdecker.*

thalassoxene element. An element specifically concentrated in the continental masses. *Schieferdecker.*

thalenite. A verv rare, weakly radioactive, monoclinic mineral, $Y_4Si_4O_{13}(OH)_2$, occurring in pegmatite with fluocerite; flesh, red, or pink. *Crosby, p. 80.*

thallassic rocks. Strata formed in deep, still water, far from shorelines, generally composed of very fine particles of material; contrasted with littoral rocks. *Standard, 1964.*

thallic. Of, pertaining to, or containing thallium in the trivalent state; for example, thallic oxide (Tl_2O_3). *Webster 3d.*

thallite. Yellowish-green epidote. *Dana 6d, p. 516.*

thallium. A rare metallic element in group III of the periodic system, resembling lead in physical properties. The metal is silvery-white, but turns bluish-gray in air. Used in alloys and in glassmaking. Symbol, Tl; valences, 1 and 3; atomic number, 81; atomic weight, 204.37; specific gravity, 11.85 (at 20° C); melting point, 303.5° C; boiling point, 1,457° ±10° C; insoluble in water; soluble in nitric acid and in sulfuric acid; and slightly soluble in hydrochloric acid. *C.T.D.; Fay; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-139, B-229.* Malleable; metallic luster; soft enough to be cut with a knife; toxic; two allotropic forms: (1) alpha thallium, tetragonal or hexagonal, and stable below 235° C; and (2) beta thallium, isometric, and stable from 235° C to the melting point, 303.5° C; and 20 known isotopes (thallium 191 to thallium 210). Obtained from the roasting of pyrite in the manufacture of sulfuric acid and from the smelting of lead ores and zinc ores. Used in low-melting glasses and in glasses having a high index of refraction. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-74, B-139, B-229; Bureau of Mines Staff.*

thallium acetate; thallous acetate. White; deliquescent; crystalline; $TlOCOCH_3$; poisonous; very soluble in water and in alcohol; melting point, 110° C; and specific gravity, 3.68. Used in high-specific-gravity solutions for separating ore constituents by flotation and settling. Molecular weight, 263.42; specific gravity of liquid, 3.765 (at 137° C); melting point, 131° C; insoluble in acetone; and very soluble in chloroform. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-229.*

thallium glass. A variety of flint glass of great density and refracting power; made by using thallium in place of lead. *Standard, 1964.*

thallium oxide; thallous oxide. Black; Tl_2O; molecular weight, 424.74; deliquescent; specific gravity, 9.52 (at 16° C); melting point, 300° C; no boiling point because it loses oxygen at 1,865° C; soluble in water with decomposition to TlOH; and soluble in acids and in ethyl alcohol. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-230.* Used in low-temperature glasses and in optical glass; it raises the refractive index. It imparts greenish-yellow shades to lead glass. *Lee.*

thallous. Of, pertaining to, or containing thallium in the univalent state; for example, thallous oxide (Tl_2O). *Webster 3d.*

thallous acetate. *See* thallium acetate. *CCD 6d, 1961.*

thalweg. a. In physical geography, a term adopted into English usage signifying the line of greatest slope along the bottom of a valley, that is, a line drawn through the lowest points of a valley in its downward slope. It thus marks the natural direction of a watercourse. *A.G.I.* b. In hydraulics, the line joining the deepest points of a stream channel. *A.G.I.* c. By many geomorphologists, the term is used as a synonym for valley profile. *A.G.I.* d. The center line of the principal navigational channel of a waterway constituting a boundary between political subdivisions. *H&G.*

Thanetian. Lower upper Paleocene. *A.G.I. Supp.*

thanite. a. A mixture of kainite and halite. *English.* b. Carbon oxysulfide, COS, as a natural gas. *Tomkeieff, 1954.*

thaumasite. A white, commonly fibrous mineral with a trace of cleavage, $3CaO.CO_2.$-

$SO_3.SiO_2.15H_2O$; Mohs' hardness, 3.5; specific gravity, 1.87. *Larsen, p. 78.*

thaw house. A small building, designed for thawing dynamite, of such size as to provide enough thawed dynamite for the day's work. Thawing houses should be heated either with hot water or exhaust steam in such a manner that the explosives cannot come in contact with the heated metal or lie directly over the heated metal. *Fay.*

thawing. a. A method of working permanently frozen ground in which water at a temperature of from 50° to 60° F is pumped through pipes down into the frozen gravel. The pipes through which the water is pumped are called sweaters. Thawing with cold water is practicable during only about 3 months of the 6 month's working season in Alaska and the Yukon territory, and a supplementary steam thawing plant is necessary for the early summer and late fall. *See also* steam thawing. *Lewis, pp. 394-395.* b. In dynamiting, warming to reduce risk of premature explosion which might originate from rupture of frozen crystal. Performed in thaw house or thawing kettle using steam or hot water. With modern methods of explosive manufacture, the need has practically disappeared. *Pryor, 3.*

thawing kettle. A double kettle, built somewhat like a farina boiler, having two compartments, an outer compartment, which is filled with hot water and which entirely surrounds the inner compartment that contains the dynamite to be thawed. It is provided with a lid for retaining the heat. *Fay.*

thaw pipe; thawing pipe. A string of pipe lowered into a string of drill rods that is frozen in a borehole drilled into permafrost, through which water is circulated to thaw the ice and free the drill rods. *Long. See also* thawing.

thaw shed operator. In the coke products industry, one who thaws frozen materials in railroad cars by heating sections of shed where cars are spotted. *D.O.T. Supp.*

THDM. *See* translucent humic degradation matter. *IHCP, 1963, part I.*

theats. Scot. A horse's draw chains. Trace chains. *Fay.*

Thedford crown bit. Synonym for simulated insert bit. *Long.*

the hanging. *See* hanging wall. *Pryor, 3.*

The Industrial Revolution. Began during the second half of the eighteenth century. The factors which led to it were the use of coal in the manufacture of iron (developed at Coalbrookdale Foundry in Shropshire, England, in about 1740) and James Watt's great invention—the steam engine. *Nelson.*

thelotite. A carbonaceous constituent of torbanite, occurring in the form of a solidified clear, jellylike substance, something like solidified dopplerite, but probably of unlike chemical composition. *Tomkeieff, 1954.*

thenardite; verde salt. A natural anhydrous sulfate of sodium, Na_2So_4, appearing in saline lakes. Orthorhombic. Color, white to brownish. Found in Arizona, California, Chile, Spain, and Germany. *Dana, 17; Sanford; CCD 6d, 1961.*

Thenard's blue. *See* cobalt aluminate.

theodolite. Survey instrument in which a sighting telescope, equipped with a vertical and a horizontal circular plate graduated in degrees and minutes, together with verniers or other devices giving still finer readings, is mounted so as to rotate about a leveling base, the whole being equipped with spirit levels. Horizontal (ground) angles between observed points can be read, also slopes from instrument to such points. A transit theodolite is mounted between trunnions and can be rotated in the vertical plane, thus facilitating repetition of the observations face-right and face-left, and cancellation of slight errors of axial alignment of the instrument. *See also* face right; face left. *Pryor, 3.*

theoretical depression. The water gage produced by an imaginary fan which is perfect and connected to an evasé chimney of infinite height so as to eliminate kinetic losses at discharge. Its value is a calculated value and depends only on the speed of the blade tips and on the shape of the blades. *See also* manometric efficiency. *Nelson.*

theoretical fan depression. That depression which can be produced by a perfect fan. *B.S. 3618, 1963, sec. 2.*

theoretical time curve. *See* consolidation time curve. *ASCE P1826.*

theoretical tonnage. *See* probable reserves. *Nelson.*

theoretical yield. The maximum yield (as shown by the washability curve) of a product with a specified percentage of ash. *B.S. 3552, 1962.*

theory of lateral secretion. The theory that the contents of a vein or lode are derived from the adjacent country rock by a leaching process, whereby either superficial water or thermal water is involved. *Schieferdecker.*

theory of machines. Comprises the study of the relative motion between the parts of a machine and the study of the forces which act on those parts. *See also* machine design. *Nelson.*

theralite. A granular igneous rock composed essentially of andesine, nepheline, and pyroxene, with or without a little hornblende, biotite, or olivine. *Fay.*

therm. Equals 100,000 British thermal units. *Newton, p. 122.*

thermal. Hot or warm; applied to springs which discharge water heated by natural agencies. *Fay.*

thermal-acceptance ratio. A physiological method of assessing the effect of a given climate upon workmen which is based on the ratio between the heat actually lost by the body via the skin, lungs, etc., and the maximum which can be lost in the prevailing conditions. *Roberts, I, p. 136.*

thermal agitation. All the constituent atoms (or atomic groups of molecules) of a substance at any temperature above absolute zero are in ceaseless motion, and this motion is thermal agitation. This may take the form of motion of translation, in which case the atoms move in straight lines until they collide with other atoms, motion of vibration with the atom vibrating about a fixed point, or motion of rotation which occurs when a molecule having a definite moment of inertia spins about an axis. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 15.*

thermal analysis. A method for determining transformations in a metal by noting the temperatures at which thermal arrests occur. These arrests are manifested by changes in slope of the plotted or mechanically traced heating and cooling curves. When such data are secured under nearly equilibrium conditions of heating and cooling, the method is commonly used for determining certain critical temperatures required for the construction of equilibrium diagrams. *ASM Gloss.*

thermal barrier. The zone where temperature is highest in the melting end of a glass tank furnace. *Dodd.*

thermal boring. Use of high-temperature flame to fuse rock in drilling. Heat comes from ignition of kerosine with oxygen or other fuel system, at bottom of drill hole, and water with compressed air may be used to flush out the products. *Pryor, 3.*

thermal breeder reactor. A breeder reactor in which the fission chain reaction is sustained by thermal neutrons. *See also* breeder reactor. *L&L.*

thermal capacity. a. Heat required to raise the temperature of a body one degree centigrade. *Bennett 2d, 1962.* b. The amount of heat that a clay product will absorb, usually expressed in Btu per °F. *ACSG, 1963.*

thermal column. A channel incorporated in some research reactors to supply thermal neutrons for experimental purposes. It consists of a large body of moderator located adjacent to the core or reflector of the reactor. Neutrons escaping from the reactor enter the thermal column where they are slowed down to thermal energies (about 2,200 meters per second). *L&L.*

thermal conductivity. The quantity of heat which will pass through unit area of a material in unit time, when unit difference of temperature is established between the faces of a unit thickness of it. *Taylor.*

thermal cutout. A device fitted in hydraulic power systems underground so that temperatures cannot rise above about 85° C. It is a safeguard against fire risk due to a rapid rise in temperature if the fluid circuit is interrupted by wrong manipulation of valves, etc. *Nelson.*

thermal diffusivity. a. Thermal conductivity divided by the product of specific heat times unit weight. It is an index of the facility with which concrete undergoes temperature change. *Taylor.* b. *See* coefficient of thermal diffusion.

thermal diffusivity of strata. *See* thermal conductivity.

thermal dissociation. The decomposition of a compound by the action of heat. If the products are allowed to cool they will reform the original substance. *Cooper.*

thermal drying. a. The evaporation of water by thermal means from a mixture of coal and water. *Mitchell, p. 649. See also* McNally-Vissac dryer; multilouvre dryer; Raymond flash dryer; cascade coal dryer; flash coal dryer; fluidized bed dryer. b. The application of heat (generally hot-air currents) to wet coals and other materials and the evaporation of the free moisture and also part of the inherent moisture. *Nelson.*

thermal efficiency. The ratio of the electric power produced by a powerplant to the heat value of the fuel consumed; thus a measure of the efficiency with which the plant converts thermal energy to electric energy. *L&L.* Symbol, η. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-102.*

thermal electromotive force. The electromotive force generated in a circuit containing two dissimilar metals when one junction is at a different temperature from the other. *ASM Gloss.*

thermal emissivity. The thermal emissivity, or heat transfer coefficient, of a rock surface is the rate at which heat will flow from rock to air, per unit area for one degree temperature difference. This varies with color and other surface characteristics. *Roberts, I, p. 141.*

thermal endurance. The relative ability of glassware to withstand thermal shock. *ASTM C162-66.*

thermal exhaustion. The underwater swimmer is extremely sensitive to moderate changes in water temperature in both directions because water is a much better heat conductor than air. At present there is no equipment to protect a man against moderately warm water. Heat prostration may occur during exercise in water around 86° F and at rest in water around 96° F. A much commoner stress is water colder than 65° to 72° F. Many types of clothing have been devised to protect against cold water. Unfortunately most have obvious handicaps such as loss of protection when wet inside, limitation of motion, squeeze and chafing at depths, marked buoyancy changes of depth and lack of mechanism to rid oneself of sweat and excreta. *H&G.*

thermal expansion. The increase in linear dimensions and volume which occurs when materials are heated and which is counterbalanced by contraction of equal amount when the materials are cooled. *HW.*

thermal expansion factors for glass. Factors that have been proposed from time to time for the calculation of the coefficient of linear thermal expansion of a glass on the assumption that this is an additive property. *Dodd.*

thermal fatigue. Fracture resulting from the presence of temperature gradients which vary with time in such a manner as to produce cyclic stresses in a structure. *ASM Gloss.*

thermal glass. A glass in which boron oxide replaces the calcium oxide in ordinary lime soda glass. Has low coefficient of expansion, can be heated and cooled rapidly without breakage. *See also* Pyrex. *CCD 6d, 1961.*

thermal gradient. In the earth, the rate at which temperature increases with depth below the surface. A general average seems to be around 30° C increase per kilometer of depth, or 150° F per mile. *Leet.*

thermal growth. *See* thermal ratcheting. *VV.*

thermal insulating cement. A prepared composition, in dry form, comprising granular, flaky, fibrous, or powdery materials which, when mixed with a suitable proportion of water to develop a plastic consistency, and applied and dried in place, forms a coherent covering that affords substantial resistance to heat transmission. *ACSG, 1963.*

Thermalite ytong. Trade name; a lightweight concrete made from Portland cement, sand, and pulverized fuel ash; these are well mixed with water and a small proportion of aluminum powder is then added. This causes gas bubbles to form. Blocks of the cellulated material are then autoclaved. The material is a development of the Swedish material ytong. *Compare* ytong. *Dodd.*

thermal metamorphism; thermametamorphism. Metamorphism in which heat is the principal agent causing reconstitution. *A.G.I.*

thermal neutron; slow neutron. A neutron in thermal equilibrium with its surrounding medium. Thermal neutrons have been slowed down by a moderator to about 2,200 meters per second from the much higher initial speeds of neutrons released by fissioning. *L&L.*

thermal piercing. *See* fusion piercing; jet piercing.

thermal precipitator. An instrument for obtaining information regarding the number of particles present in unit volume of a dust cloud, together with their size distribution. *Nelson.* This is probably the most efficient instrument used for dust counts since its efficiency is practically 100 percent for all particles from 0.2 to 10 microns in diameter. Its principle of operation is to pass an aspirated sample of the mine air around an electric resistance wire heated by a battery. The hot wire is thus surrounded by a thermal gradient and the dust in the air is deposited on two glass plates, suitably spaced one on either side of the wire. The plates consist of microscope cover glasses and are held in brass plugs so that they can be inserted in the sampling head and stored in carriers, as required. After a sample has been collected underground the cover glass is stored away for transport to the laboratory where the particles of dust are counted under a microscope. *Roberts, I, p. 118. See also* long-running thermal precipitator; P.R.U. hand pump and densitometer. *Nelson.*

thermal probe. A device used for measuring the heat flow out of ocean bottom sediment. *H&G.*

thermal prospecting. A system of geophysical prospecting based on measuring underground temperatures or temperature gradients and relating their irregularities to geological deformation. *A.G.I.*

thermal ratcheting. Irreversible volume expansion accompanying thermal cycling. *VV.*

thermal reactor. A nuclear reactor in which the fission chain reaction is sustained primarily by thermal neutrons. Most reactors are thermal reactors. *L&L.*

thermal recovery. A petroleum recovery process that utilizes heat to thin viscous oil in an underground formation and allows it to flow more readily towards wells through which it can be brought to the surface. Most of the recoverable heavy crude is locked in sandstone formations at depths of less than 3,000 feet. Such relatively shallow reservoirs are most suitable for injection of steam or hot water, fireflooding or in situ combustion, and increasingly popular combinations of thermal with other methods of stimulating recovery. *Bureau of Mines Staff.*

thermal-release water spray. A device which brings water sprays into action when heating occurs on roadway belt conveyors. The local heat fuses an element holding taut wires. On release by fusion, the wires allow spray valves to open and the water cools the affected area. *Nelson.*

thermal resistance. Same as resistance. *Strock, 10.*

thermal resistivity. Same as resistivity. *Strock, 10.*

thermal separation. The separation of minerals and metals by heat. The method is used, for example, to remove impurities from rock salt. The crude salt is first exposed to radiant heat. The impurities absorb the heat and become warm, while the rock salt transmits the radiant heat and remains cool. The warm, impure particles adhere slightly to a belt covered with heat sensitive resin, while the salt remains free. Separation takes place at the end of the belt. The cool salt is thrown into one container, while the adhering impurities drop directly into another. *Nelson.*

thermal shield. A dense shield, located just outside a reactor, between the reflector and the biological shield, to reduce radiation damage and radiation heating in the pressure vessel and biological shield. *L&L.*

thermal shock. The development of a steep temperature gradient and accompanying high stresses within a structure. Thermal shock (repeated heating and cooling) of a refractory may cause it to break apart or spall. This can be prevented by careful operation to avoid sudden temperature changes. *ASM Gloss.; Newton, p. 264.*

thermal shock failure. Fractures or crazing produced by sudden cooling (quenching) of the porcelain enamel surface by application of water or other cold liquids. Spot-cooling of a large hot surface is more severe than quenching of the whole area. *Bryant.*

thermal shock resistance. The ability to withstand sudden heating or cooling, or both without cracking or spalling. *Bureau of Mines Staff.*

thermal sintering. In metallurgy, molding by sintering, without prior compacting. *Gaynor.*

thermal spalling. The chipping or spalling of ceramic ware by repeated heating and cooling. *Bureau of Mines Staff.*

thermal spalling of refractories. The spalling of a refractory unit caused by stresses resulting from nonuniform dimensional changes of the unit produced by a difference in temperature. *ASTM C71-64.*

thermal spring. A spring that brings warm or hot water to the surface. Sometimes called warm spring or hot spring. Temperature usually 15° F or more above mean air temperature. *Leet.*

thermal stresses. Stresses in metal, resulting from nonuniform temperature distribution. *ASM Gloss.*

thermal structure. The temperature variation with depth of sea water. *Hy.*

thermal unit. A unit for the comparison or the calculation of quantities of heat. Abbreviation, tu. *See also* British thermal unit. *Compare* calorie. *Webster 3d.*

thermal value (volatile matter); volatile therms. The calorific value in therms per ton of dry coke, of the gas given off when dry coke, ground to pass a 36 mesh B.S. test sieve, is heated under standard conditions. *B.S. 1016, 1961, Pt. 16.*

thermal water. The mineral-charged water that issues from a hot spring or geyser. *A.G.I.*

thermic boring. a. A method of boring holes in concrete under the high temperature generated by a burning steel tube, known as a lance. This is packed with steel wool, through which a jet of suitable gas flows to ignite the end of the lance and keep it burning. *Ham.* b. Another name for jet piercing. *Streefkerk, p. 153.*

thermic drilling. *See* jet piercing. *Nelson.*

thermionic conversion. The conversion of heat into electricity by boiling electrons from a hot metal surface and condensing them on a cooler surface. No moving parts are required. *L&L.*

thermistor. An electrical resistor made of a material whose resistance varies sharply in a known manner with the temperature. Thermistors are commonly used for shipboard oceanographic temperature measurements because of their percentage response to unit temperature change and their great sensitivity. *H&G.*

thermite. a. Any fossil combustible substance. *Tomkeieff, 1954, p. 91.* b. An intimate mixture of aluminum powder and powdered iron oxide that when caused to react by strong heating evolves a great deal of heat and yields alumina and a white-hot molten mass of metallic iron that is used in welding and in incendiary bombs. *Webster 3d.*

thermites. Used by Wadsworth including mineral fuels or burning materials. *Fay.*

thermit process. The energetic action of finely divided aluminum on a metallic oxide, when heated together, is utilized for the production of metallic iron manganese, chromium, tungsten, molybdenum, uranium, etc. The aluminum combines directly with the oxygen of the oxide, and the heat evolved by the reaction is sufficient to promote the fusion of the reduced metal. *Nelson.* At one time, the process was much used for welding railroad rails in the field. *Bureau of Mines Staff.*

thermit welding. Welding with heat produced by the reaction of aluminum with a metal oxide. Filler metal, if used, is obtained from the reduction of the appropriate oxide. *ASM Gloss.*

thermoaqueous. Produced by or related to the action of heated waters. *Fay.*

thermochemistry. The study of the heat changes accompanying chemical reactions. *C.T.D.*

thermocline. a. A temperature gradient; especially, one marking sharp change. *Webster 3d.* b. A layer of water in a thermally stratified lake or other body of water separating an upper warmer lighter oxygen-rich zone from a lower colder heavier oxygen-poor zone; specifically, a stratum in which temperature declines at least 1° C with each meter increase in depth. *Webster 3d.*

thermocouple. Two conductors of different metals joined together at both ends, producing a loop in which an electric current will flow when there is a difference in temperature between the two junctions. *L&L.* Abbreviation, tc. *Zimmerman, p. 108.*

thermodynamics. Study of transformation of energy into other manifested forms and of their practical application. The three laws are: (1) Conservation of energy; energy may be transformed in an isolated system, but its total is constant. *See also* energy; (2) Heat cannot be changed directly into work at constant temperature by any cyclic process. *See also* entropy; entropy change; and (3) Heat capacity and entropy of every crystalline solid becomes zero at absolute zero (0° K). *Pryor. 3.*

thermodyne test. A test to determine the durability of optical glass in contact with moist air. Freshly broken or optically polished surfaces, sealed off in a flask together with a quantity of water, are subjected to a series of temperature cycles, each of 2 hour duration, from 15° to 60° C in air saturated with water vapor for a period of 12 days. *Dodd.*

thermoelectric conversion. The conversion of heat into electricity by the use of thermocouples. *L&L.*

thermoelectricity. Electricity involved in thermoelectric phenomena. Specifically, electricity accumulated or put in motion by thermoelectric action. *Webster 3d.*

thermoelectric metals. Metals or alloys used in thermocouples for measuring high temperatures. Platinum, nickel, copper, rhodium, etc., are much used. *Crispin.*

thermograph. A self-recording thermometer which gives a continuous trace of air temperature on a rotating drum worked by clockwork. It is mainly used for recording variations in temperature rather than actual temperatures. *Ham.*

thermoluminescence. The property possessed by many minerals of emitting visible light when heated. It results from release of energy stored as electron displacements in the crystal lattice. *A.G.I.*

thermometamorphism; thermal metamorphism. a. Metamorphism in rocks that is produced by heat but is not the result of dynamic action or of volcanic emanations. *Webster 3d.* b. *See* pyrometamorphism.

thermometer. An instrument for determining temperature usually by means of a scale graduated directly in temperature units and consisting typically of (1) a device having a bimetallic element, the expansion or contraction of which indicates a change in temperature or (2) a glass bulb attached to a fine tube of glass with a numbered scale etched on it or fastened to it and containing a liquid (as mercury or cooled alcohol) that is sealed in and rises and falls with changes of temperature and that indicates the temperature by the number at the top of the column of liquid. *Webster 3d.*

thermometer anemometer. An anemometer consisting of two thermometers, one with an electric heating element (battery powered) connected to the bulb. The heated bulb cools in an airstream, and the difference in temperature as registered by the heated and unheated thermometers can be translated into air velocity by a conversion chart. It is nondirectional and can be made safe (6 volts) for use in explosive atmospheres. *Hartman, p. 110.*

thermometer float. This instrument is used for studying the temperature structure in the upper 10 meters of water. The instrument is in two sections; a float which contains a spooling winch from which the sensing unit is lowered, and an indicator case which contains the remote indicating equipment and remote control system. The two sections are connected by an electric cable and flexible shaft, supported by net floats. The indicator case is clear lucite. It contains the indicating meter and electric circuitry for temperature determination. It also contains a Veeder-Root counter which indicates directly in centimeters the depth at which the sensing unit is located. This instrument makes it possible to read temperature to within 0.1° C and to know the depth of the sensing unit to within plus-or-minus 0.5 centimeter. It is intended to be used at sea from a skiff or tender rather than from the research vessel itself. *H&G.*

thermometer scales. Two thermometer scales are in general use, the Fahrenheit which is generally used in engineering, and the centigrade which is almost universally used in scientific work. The Fahrenheit scale has the freezing point at 32° F and the boiling point at 212° F, whereas the centigrade scale has the freezing point at 0° C and the boiling point at 100° C. *Nelson.*

thermometric fan test. A method of assessing the efficiency of a mine fan by comparing the temperature rise in an ideal isentropic fan for a given fan pressure with the measured temperature rise actually occurring in the fan under consideration when producing the same fan pressure. The ratio of isentropic temperature rise to the actual temperature rise across the fan gives the fan efficiency. The method is claimed to give an accuracy of plus or minus 5 percent. *See also* overall ventilation efficiency. *Nelson.*

thermonatrite. A white, water-soluble mineral occurring in flat orthorhombic crystals with a difficult cleavage, $Na_2O.CO_2.H_2O$; hardness 1.5; specific gravity 1.55. *Larsen, p. 153.*

thermonuclear reaction. A reaction in which two light nuclei combine to form a heavier atom, thus releasing a large amount of energy. *Crispin.*

thermo-osmosis. Natural migration of moisture from a relatively warm part of a mass of soil towards a cooler part. *See also* electro-osmosis. *Ham.*

thermophile. An organism growing best at high temperatures, usually 50° C, or above. *I.C. 8075, 1962, p. 64.*

thermopile. An apparatus consisting of a number of thermoelectric couples (as of antimony and bismuth or of copper sulfide and German silver) combined so as to multiply the effect and used to generate electric currents for various purposes and also in a very sensitive form for determining intensities of radiation due especially to its heating effect. *Webster 3d.*

thermoplastic. In plastics, rigid material which temporarily becomes soft when heated and can then be molded into a shape which it will retain on cooling. Antonym for thermosetting, a material which reacts chemically on heating (curing) and is then resistant to deformation. *Pryor, 3.*

thermoplegia salt. Heat tablets. *Kaufmann.*

thermoscope. *See* pyroscope. *Dodd.*

thermoscopic bars. Small ceramic bars of specified composition which soften at certain temperatures. *See also* Holdcroft thermoscope bars. *Osborne.*

thermostat. An automatic device for regulating temperature (as by opening or closing the damper of a heating furnace or by regulating the supply of gas) and commonly utilizing either the differential expansion of solids or the vapor pressure of liquids. *Webster 3d.*

theta. Symbol (θ) for contact angle in flotation testing. *Pryor, 4.*

Thetis hairstone. Crystalline quartz containing inclusions of green fibrous crystals which may be tangled or wound into a ball and are hornblende, or actinolite or asbestos. *See also* moss stone; Venus hairstone; sagenitic quartz. *Shipley.*

thi-; thio-. A combining form meaning containing sulfur (for example, thiamine); especially containing bivalent sulfur, usually in place of oxygen (for example, thiocyanic; thioether). *Webster 3d.*

thia-; thi-. A combining form meaning containing sulfur in place of carbon or regarded as in place of carbon, usually in place of the methylene group—CH_2— (for example, thiacyclohexane; thiadiazole; thiazole). *Webster 3d.*

thick band. A field term that, in accordance with an arbitrary scale established for use in describing banded coal, denotes a vitrain band ranging in thickness from 5 to 50 millimeters (about ½ inch to 2 inches). *Compare* thin band; medium band; very thick band. *A.G.I.*

thick-bedded. In sandstone quarrying, a term used to describe open-bed seams farther apart than 3 feet. *Compare* thin-bedded. *AIME, p. 333.*

thick coal; thick seam. Eng. A coal seam of greater thickness than 8 or 10 feet (sometimes as much as 130 feet), or those which are worked in two or more stages or lifts. *Fay.*

thickener. A vessel or apparatus for reducing the proportion of water in a pulp. *Nelson.*

thickener operator. In ore dressing, smelting, and refining, one who separates waste solids from ore solutions or water, using thickeners, preparatory to recovery of metal or disposal of waste. Also called millman. *D.O.T. Supp.*

thickening. a. The process of concentrating a relatively dilute slime pulp into a thick pulp, that is, one containing a smaller percentage of moisture, by rejecting liquid that is substantially solid free. Settling is another name for the same operation. *Taggert, p. 972.* b. The concentration of the solids in a suspension with a view to recovering one fraction with a high concentration of solids than in the original suspension. *B.S. 3552, 1962.*

thickness. a. The distance at right angles between the hanging wall and the footwall of a lode or lens. *Standard, 1964.* b. As used in mine subsidence, the thickness of a bed or seam of mineral is the distance from its roof to its floor, measured at right angles to the plane of stratification. *Briggs, p. 22.* c. In founding, material, as loam, set in a mold to a certain thickness, to be partially displaced by a templet. *Standard, 1964.* d. That dimension designed to lie at right angles to the face of the wall, floor, or other assembly in which tile is used. *ASTM C43-65T.*

thick seam. In general, a coal seam over 4 feet in thickness. *See also* medium thickness seam. *Nelson.*

thick-wall drive sampler. Synonym for thick-wall sampler. *Long.*

thick-wall sampler. A soil sampler made from a steel tube having a wall thickness greater than 16 gage. *See also* drive sampler. *Compare* Shelby tube. *Long.*

thief. a. A sampling rod used for obtaining representative samples from large lots of materials. *Enam. Dict.* b. The same as robber. *ASM Gloss.*

thierschite. Calcium oxalate occurring as a grayish, warty, and somewhat opaline incrustation on marble. Probably identical with whewellite. *Tomkeieff, 1954.*

Thiess process. A chlorination process for recovering gold from its ore. For each ton of ore in a revolving drum, 130 gallons of water, 30 pounds chloride of lime, and 36 pounds concentrated sulfuric acid are added, and the drum revolved for some time. A solution of chloride of gold is thus obtained. The silver remains as an insoluble chloride, which can be separated by the addition of sodium hyposulfite solution. *Fay.*

thill. a. The floor of a coal seam. *See also* underclay. *Nelson.* b. Eng. Seat earth or pavement of underclay directly underlying a coalbed, Newcastle. *Raistrick and Marshall, p. 37.* c. A thin stratum of fire clay. *Webster 3d.*

thil-whin. Eng. An old name in use in Northumberland and Durham for hard bituminous shale or fireclay found in the Coal Measures. *Tomkeieff, 1954.*

thimble. a. An oval iron ring around which a rope end is bent and fastened to form an eye. *Zern.* b. Aust. The iron ring, placed a few feet below the headframe pulley which supports the safety detaching hook in case of an overwind. *Fay.* c. A metal socket for fixing a lead pipe to stoneware. *Webster 3d.* d. An item of kiln furniture; it is conical, hollow, and with a projection at the base to support the pottery ware being fired; thimbles are inserted into one another so that a bung of ware can be built up. *Dodd.* e. A refractory shape, usually resembling the letter L, used to stir optical glass in a pot. *Dodd.*

thimble-bat. A refractory bat of a type used in the firing of pottery; it is perforated to hold the ends of thimbles. *See also* thimble. *Dodd.*

thimble joint. A sleeve joint packed to allow longitudinal expansion. A slip expansion joint. *Fay.*

thin band. A field term that, in accordance with an arbitrary scale established for use in describing banded coal, denotes a vitrain band ranging in thickness from 0.5 to 2 millimeters (about 1/50 to 1/12 inch) thick. *Compare* medium band; thick band; very thick band. *A.G.I.*

thin-bedded. a. Applied to shale indicating it is easy to split. *A.G.I.* b. Occurring in relatively thin layers or laminae. *A.G.I.* c. In sandstone quarrying, a term used to describe open-bed seams a few inches to 3 feet apart. *Compare* thick-bedded. *AIME, p. 333.*

thin coal. *See* thin seam.

thing. a. N. Staff. A straight facing from floor to roof, often many yards in length. *Fay.* b. Mid. A fault slip. *Fay.*

thinner. A liquid which is used to dilute a solution of a paint or lacquer. *Enam. Dict.*

thinolite. A tufa deposit of calcium carbonate occurring on an enormous scale in northwestern Nevada; also occurs about Mono Lake, Calif. It forms layers of interlaced crystals of a pale yellow or light brown color and often skeleton structure, except when covered by subsequent deposit of calcium carbonate. *Fay.*

thin out. Applied to beds or strata that grow gradually and continually thinner in one direction, until they disappear entirely. *Fay.*

thins. Knife-trimmed mica, 0.002 inch to less than 0.007 inch in thickness. They may be classified as follows: (1) thins, 0.002 to 0.004 inch and (2) thick-thins, 0.004 to 0.007 inch. *Skow.*

thin seam. In general, a coal seam 2 feet and under in thickness. *See also* economic coal reserves. *Nelson.*

thin section. a. A fragment of rock or mineral ground to paper thinness, polished, and mounted between glasses as a microscopical slide. Rocks and most minerals except the oxides and sulfides of the metals are translucent to transparent in thin section and the optical properties of each mineral can be studied with the microscope. *Fay.* b. A coal seam which is below its normal thickness. *Nelson.*

thin stock. Slabs of stone employed for wainscoting, flooring, etc. *Fay.*

thin-wall bit. A coring bit the kerf or wall thickness of which is about one-half or less that of the wall thickness of the same outside-diameter-size standard coring bit. *Long.*

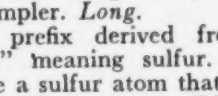
thin-wall drive sampler. Synonym for thin-wall sampler. *Long.*

thin-wall sampler. A soil-sampling barrel made from steel tubing having approximately a 16-gage wall thickness. *Compare* Shelby tube. *Long.*

thin-wall tube sampler. Synonym for thin-wall sampler. *Long.*

thio-. A prefix derived from the Greek "theion" meaning sulfur. It is used to indicate a sulfur atom that has a negative valence of two. *Enam. Dict.*

thio-carbanilid. Derivative from thio-urea:



$$H_5C_6HN{-}\underset{\underset{\displaystyle S}{\|}}{C}{-}NHC_6H_5$$

In flotation process, collector agent of low solubility in water; sometimes used in copper or galena flotation. *Pryor, 3.*

thiocarbonates. These (di- and tri-) have the general formula $X_2N.CS.SM$; X being hydrogen or an alkyl or aryl radical. The dithiocarbonates are powerful collector agents in the flotation process where xanthates fail, but of limited use owing to cost. They are reaction products of carbon disulfide with cold alcoholic ammonia or amines. *Pryor, 3.*

thiokerite. Kerite containing 9 percent sulfur. *Tomkeieff, 1954.*

thiols. Hydrosulfides of formula R.SH. *See also* mercaptans. *Pryor, 3.*

thiophene; thiofuran. A liquid; C_4H_4S; analogous to furan and pyrrole in its heterocyclic structure and resembles benzene both physically and chemically except for its greater reactivity. Found in small amounts (as up to 0.5 percent by weight) in benzene from coal tar unless it has been removed by treatment with sulfuric acid. Usually made commercially from butane and sulfur at high temperature. Used chiefly in organic synthesis (as of antihistaminic drugs). *Webster 3d.* Molecular weight, 84.14; specific gravity, 1.0583 (at 25° C, referred to water at 4° C); melting point, −38.4° C; boiling point, 84.12° C (at 760 mm); insoluble in water; and soluble in all proportions in ordinary organic solvents. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-567.*

thiophile elements. Equivalent to chalcophile. Literally, sulfur-loving. *A.G.I.*

thiophosphates. Sulfydric flotation agents, produced by reacting phosphorus pentasulfide with phenols, alcohols, etc., and marketed as Aerofloats. *Pryor, 3.*

thiourea; 2-thiourea. White; crystalline; $(NH_2)_2CS$. Can be prepared from ammonium thiocyanate by melting the latter (melting point, 147° C) and then maintaining the liquid at 170° C for some time. Used in the glass industry and as the basis of a solution for cleaning silver; for example, silver dip. *Merriman.* Molecular weight, 76.12; orthorhombic; specific gravity, 1.405; melting point, 180° to 182° C; soluble in water and in alcohol; and insoluble in ether. *Handbook of Chemistry and Physics, 45th ed., 1954, p. C-593.*

third-class lever. A lever to which force is applied between the fulcrum and the work point. *Nichols.*

thirdhand assistant. Aust. A boy who helps the machinist and his assistant with a coal-cutting machine. *Fay.*

third quality fire clay brick. A trade term, usually indicating fire clay brick of the low duty class, as classified by ASTM. *A.R.I.*

Third Theory of Communition. The Third Theory states that the specific work input required for size reduction is inversely proportional to the square root of the product size, less the work required to form the feed. *Pit and Quarry, 53rd, Sec. B, p. 43.*

thirl. a. A cross hole or ventilation passage between two headings. *Standard, 1964. See also* thurl; thurling; thirling. *Fay.* b. To cut through from one working into another. *C.T.D.* c. To cut out the lost coal between two workings or headings. *C.T.D.*

thirling. a. The driving of a proposed roadway from two points some distance apart and to meet each other; the connecting of underground roadways or shafts. A careful survey is made to ensure the accurate meeting of the roadways. *Nelson.* b. Slit; crosscut; through cut. *Mason.* c. N. of Eng. In lead mines, a mark at the end of a pitch or set. *Standard, 1964.* d. *See* holing; stenton. *B.S. 3618, 1963, sec. 1.*

13.0 temperature. *See* annealing point. *Dodd.*

thirting. Cutting ball clay into blocks about 9 inch cube. *Dodd.*

this vein. A notice claiming a location upon this vein has only one meaning. It raises an inference that the notice was posted upon or in close proximity to a vein or lode; although, as a fact, no vein or lode then was exposed. *Ricketts, I.*

Thivier earth. A siliceous hydrated iron oxide from Thivier, 19 miles northeast of Perigueux, France. A quoted composition is: 83 percent SiO_2, 10 percent Fe_2O_3, 2 percent Al_2O_3, 1 percent CaO, 1 percent alkalies, 3 percent loss on ignition. It has been used as a red color for pottery decoration. *Dodd.*

thixotropic. a. Behavior whereby there is a decrease in the apparent viscosity of a colloidal structure during mechanical agitation. The transformation from gel to sol by mechanical agitation. *VV.* b. Of, or pertaining to, liquid plastics which contain suspended colloidal solids (such as finely divided silica) that are gellike at rest but become fluid when applied. A thixotropic resin remains more or less fixed on an inclined surface, inhibiting its flow downward. *Crispin.*

thixotropic fluid. Clays termed thixotropic are those which reveal this property by weakening when they are remolded and by increasing in strength when allowed to stand undisturbed. *See also* remolding. *Ham.* An important characteristic of oil-well drilling fluids.

thixotropy. a. The property of a material that enables it to stiffen in a relatively short time on standing, but upon agitation or manipulation to change to a very soft consistency or to a fluid of high velocity, the process being completely reversible. *ASCE P 1826.* b. Property of certain mineral suspensions in water (for example, bentonite) of remaining fluid while agitated, but gelling when quiescent. *Pryor, 2.* c. Important property of muds used in drilling deep oil wells since, if drill stops, rock chips on way to surface are held in suspension instead of settling to bottom where they might jam the drilling bit. *See also* gel and plastic flow. *Pryor, 3.*

tholeiite. Rosenbusch's name for augite porphyrites, which, aside from the usual phenocrysts, have a groundmass with but one generation of crystals and with a little glassy basis between them, affording a texture called intersertal. *Fay.*

tholeiitic magma. A type of basaltic magma containing little or no olivine and yielding oversaturated late differentiates. Characteristically, the primary magma from which the Pacific series of rocks are derived. Also called nonporphyritic central magma type. Opposite of olivine-basalt magma type or Atlantic series. *A.G.I.*

tholoid. A dome of viscous lava squeezed up, exuded, and accumulated over a volcanic orifice. *Challinor.*

thomaite. A variety of siderite that is found massive and in pyramidal crystals. *Standard, 1964.*

Thomas converter. A bottom-blown basic pneumatic converter having a basic bottom and lining, usually dolomite, and employing a basic slag. *ASM Gloss.*

Thomas-Gilchrist process. Conversion of iron to steel in basic-lined Bessemer converter. Phosphorus combines with dolomite in this lining to produce basic slag. *Pryor, 3.*

Thomas slag. The finely powdered basic slag obtained in the Thomas process. It consists of phosphates and is used as a fertilizer. *Hackh's Chem. Dict.*

Thomas steel. Steel made in the Bessemer converter using a basic refractory lining. The process was developed by Thomas and Gilchrist. In Europe such steel is known as Thomas steel; in Great Britain, Thomas-Gilchrist steel; and in the United States, basic Bessemer steel. *Henderson.*

Thompson arc cutter. Synonym for arc cutter. *Long.*

Thompson clinometer. A clinometer having ports through which a cooling flow of water can be circulated past the acid and gelatin containers. *Long.*

Thompson limestone. A marine limestone occurring in the Jurassic succession of the Cordilleran geosyncline in California; equivalent, with the overlying Mormon sandstone, to the Bajocian of the European succession. *C.T.D.*

Thompson pilot shoulder reamer. A reaming or coring bit with an articulated steel pilot protruding about 36 inches beyond the face of the bit. The diameter of the pilot is slightly smaller than the set inside diameter of the bit; its upper end is a piston fitted tightly inside a single-tube barrel with its attached coring bit. When lowered into a borehole in which a deflection wedge has been set, the pilot section forces the coring bit to ream out the first part of the deflected hole at a point about 20 inches above the tip of the wedge. Reaming is continued to about 6 inches below the wedge tip, at which point the pilot shoulder reamer is withdrawn and replaced by a bullnose or deflection bit. *Long.*

Thompson shoulder reamer. Synonym for Thompson pilot shoulder reamer. *Long.*

Thompson wedge. A retrievable type of deflecting wedge. *See also* deflecting wedge. *Long.*

thomsenolite. A mineral, $NaCaA1F_6.H_2O$, consisting of a hydrous fluoride of aluminum, calcium, and sodium and occurring in small white prismatic monoclinic crystals on cryolite. *Webster 3d.*

thomsonite. A mineral, $NaCa_2A1_5(SiO_4)_5.\text{-}6H_2O$; one of the zeolites. White, reddish or green in color; streak uncolored; vitreous luster; specific gravity 2.3 to 2.4; hardness 5 to 5.5. Found in the United States; Europe, Iceland, Nova Scotia. *CCD 6d, 1961.*

Thomson process. A process of electric welding in which heat is developed by a large current passing through the metal. *Webster 3d.*

thonstein. Formerly the fine pelitic varieties of porphyry, more correctly known as porphyry tuff or felsite tuff. *Hess.*

thorax. In the respiratory system, the chest cavity that occupies the upper part of the trunk. *McAdam, p. 82.*

thoreaulite. A brown tantalum mineral, $SnTa_2O_7$, found in pegmatite at Katanga, Republic of the Congo. *Hey 2d, 1955; Dana 7, v. 1, p. 832.*

thoria. A rare refractory oxide, ThO_2. Fusion point 3,050° C (5,522° F). *Bureau of Mines Staff.*

thorian gummite. Gummite derived from uranothorianite containing large amounts of thorium. *Crosby, p. 24.*

thorianite. A mineral consisting largely of thorium oxides with oxides of the cerium metals, uranium, etc.; important as an ore of thorium and uranium. *NRC-ASA N1.1-1957.* Strongly radioactive; isometric thorium. A complete series between UO_2 (uraninite) and thorianite has been artificially prepared; (Ce,La) may substitute for Th up to 8 percent by weight. Thorianite is dark gray to brownish-black and black, sometimes with a bronze tarnish; found principally in alluvial deposits as water-worn crystals, associated with zircon, ilmenite, geikielite, thorite, and other heavy minerals; also occurs in pegmatites, and in one locality, at the contact of limestone with pegmatite. *Crosby, p. 46.*

thorian uraninite. A variety of uraninite containing thorium in partial substitution for uranium. *Crosby, p. 53.*

thorides. a. A name proposed for elements of the last row of the periodic system in oxidation state +4. The compounds of the elements beyond thorium in this state are generally isostructural with the corresponding compounds of thorium. *NRC-ASA N1.1-1957.* b. A name proposed for the series of elements immediately following thorium, atomic number 90, based on the assumption that the filling of the 5*f* electron shell begins with protactinium (protoactinium), atomic number 91. This name has not received as wide acceptance for this series as the name actinides has. *NRC-ASA N1.1-1957.*

thorite. a. A high explosive used as a bursting charge for shells. *Fay.* b. A rare mineral consisting essentially of thorium silicate, $ThSiO_4$, usually hydrated. Tetragonal. Strongly radioactive. The color is highly variable, commonly brown, black, reddish, orange, and sometimes green. A minor accessory mineral of granites, syenites, and pegmatites; found associated with zircon, monazite, xenotime, ellsworthite, allanite, gadolinite, betafite, euxenite, and fergusonite. *Crosby, p. 47; Dana, 17.*

Thorite. Trade name for a nonshrink grouting compound used as a patching mortar to fill holes and blisters in masonry surfaces and to prevent further destruction of steel reinforcing. *CCD 6d, 1961.*

thorium. A radioactive, silvery-white, metallic element in group III of the periodic system. The most stable of its 13 radioactive isotopes (thorium 223 to thorium 235) is thorium 232 which occurs naturally, has a half-life of 1.4 X 10^{10} years, emits alpha particles, and is the parent of the thorium disintegration series. Thorium occurs in the radioactive minerals thorite ($ThSiO_4$) (+He) and thorianite $(Th,U)O_2$ (+He,Ce,La,Pb,Fe), but its chief commercial source is monazite $(Ce,Nd,Pr,La)PO_4$ $(+Th_3(PO_4)_4)$. Symbol, Th; valence, 4; isometric; atomic number, 90; atomic weight, 232.038; specific gravity, 11.7; often pyrophoric; its turnings ignite when heated in air; melting point, uncertain, variously reported about 1,700° C, or 1,845° C, or 1,900° C; boiling point, about 4,000° C or 4,230° C; is fissionable and is a source of nuclear power; insoluble in water or slowly attacked by water; readily soluble in hydrochloric acid; soluble in sulfuric acid and in aqua regia; and slightly soluble in nitric acid. Used in the preparation of gas mantles, as an alloying element in magnesium, to coat tungsten wire for electronic equipment, and can be used as a nuclear fuel, but thorium has not received the attention given uranium because of the demand for plutonium. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-83, B-140, B-231; Glasstone, 2, p. 134.*

thorium A. A name for polonium 216, a member of the thorium disintegration series; symbol, ThA; emits alpha particles; and half-life, 0.16 second. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-80.*

thorium B. A name for lead 212, a member of the thorium disintegration series; symbol, ThB; emits beta particles; and half-life, 10.64 hours. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-77.*

thorium borides. Two borides are known: ThB_4 (gray) and ThB_6 (deep red). The more attention has been paid to the tetraboride, the properties of which are melting point, > 2,200° C (but oxidizes slowly above 1,000° C); thermal expansion, 5.9 X 10^{-6} (20 to 1,000° C); specific gravity, 8.45 grams per milliliter; modulus of rupture (20° C), 20,000 pounds per square inch. Some properties of ThB_6 are: melting point, 2,200° C; specific gravity, 7.1. *Dodd.*

thorium C. A name for bismuth 212, a member of the thorium disintegration series; symbol, ThC; emits alpha and beta particles; and half-life, 60.6 minutes. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-78.*

thorium C′. A name for polonium 212, a member of the thorium disintegration series; symbol, ThC′; emits alpha particles; and half-life, 3 X 10^{-7} seconds. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-80.*

thorium C′′. A name for thallium 208, a member of the thorium disintegration series; symbol, ThC′′; emits beta particles; and half-life, 3.1 minutes. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-75.*

thorium carbides. Two carbides are known: ThC, melting point, 2,625° C; ThC_2, melting point, 2,655° C. These special carbides are of potential interest in nuclear engineering. *Dodd.*

thorium D. A name for lead 208, the stable end-product of the thorium disintegration series; symbol, ThD. Natural lead contains 52.3 percent of lead 208. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-77.*

thorium dioxide; thorium oxide; thoria; thorianite (uranium-free). White; isometric; ThO_2; molecular weight, 264.04; specific gravity, 9.7 or 9.86; Mohs' hardness, 6.5; very refractory; melting point 3,050° C or 3,300° C (the highest melting point of all oxides); boiling point, 4,400° C; insoluble in water, in dilute acids, and in alkalies; and soluble in hot sulfuric acid. Used in mantles for portable gas lights, in high-temperature ceramics, in high-temperature laboratory crucibles, in nonsilica optical glass, as nuclear fuel, to control the grain size of tungsten (thoriated tungsten) for electric lamps, as a catalyst, and in electronics. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-231, B-246; CCD 6d, 1961.* Has limited use in ceramic bodies and cermets. *Lee.*

thorium disintegration series; thorium decay series; thorium series. a. The series of radioactive elements produced as successive intermediate products when the element thorium (thorium 232) undergoes its spontaneous natural radioactive disintegration into stable lead (lead 208). *CCD 6d, 1961.* b. Thorium 232 to radium 228 to actinium 228 to thorium 228 to radium 224 to radon 220 to polonium 216 to lead 212 to bismuth 212 to polonium 212 plus thallium 208 to lead 208, the stable end-product. *Glasstone, 2, p. 134.*

thorium fluoride. White; isometric; ThF_4; molecular weight, 308.03; specific gravity, 6.32 (at 24° C); melting point, above 900° C; decomposes slightly in dilute sulfuric acid and in hydrochloric acid; and insoluble in concentrated sulfuric acid. Used to produce thorium metal and magnesium-thorium alloys and in high-temperature ceramics. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-231; CCD 6d, 1961.*

thorium minerals. These include monazite, a rare earth of cerium with some thorium; the silicate thorite ($Th.SiO_4$); and the oxide thorianite ($ThO_2.U_3O_8$). *Pryor, 3.*

thorium nitride. Three nitrides have been reported: ThN, Th_2N_3, and Th_3N_4. *Dodd.*

thorium oxalate. White, crystalline. $Th(C_2O_4)_2$; molecular weight, 408.08; specific gravity, 4.637 (at 16° C); decomposes to thorium oxide (ThO_2) before melting; nearly insoluble in water; insoluble in nitric acid; and soluble in alkali solutions, such as that of sodium carbonate, and in hot ammonium oxalate solution. Used in ceramics. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-231; CCD 6d, 1961.*

thorium oxide. S. Afr. Occurs in monazite and thorianite, ThO_2. *Beerman.*

thorium sulfides. Three sulfides have been reported: Th_4S_7, Th_2S_3, and ThS. Crucibles made of these sulfides have been used as containers for molten Ce. *Dodd.*

thorium X. A name for radium 224, a member of the thorium disintegration series; symbol, ThX; emits alpha particles; and half-life, 3.64 days. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-82.*

thorofare. In geology, a channel cut across a spit or barrier beach. *Fay.*

thorogummite. a. A hydroxol-containing variant of thorite, $ThSiO_4$, in which there is a serial substitution of $(OH)_4$ for (SiO_4) with the formula, $Th(SiO_4)_{1-x}(OH)_{4x}$. Isostructural with thorite; differs from thorite in being secondary in origin, in being formed by the alteration of primary thorium minerals including thorite itself, in occurring as fine-grained aggregates that are not metamict but crystalline, and in containing essential water. *American Mineralogist, v. 38, No. 11-12, November-December 1953, p. 1007.* b. Altered mackintoshite. *Crosby, p. 48.*

thoron. A name for radon 220, a member of the thorium disintegration series; symbol, Tn; emits alpha particles; and half-life, 5.5 seconds. Also called emanation; thorium emanation. *See also* emanation. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-81.*

thorosteenstrupine. A dark brown metamict mineral, $(Ca,Th,Mn)_3Si_4O_{11}F.6H_2O$. Named from the composition. *Hey, M.M., 1964; Fleischer.*

thorotungstite. A very rare, moderately to strongly radioactive mineral, possibly $3WO_3.ThO_2.4H_2O$, found in eluvial deposits of cassiterite as an alteration product of wolframite or scheelite; possibly orthorhombic. *Crosby, p. 48.*

thorough cut. a. A narrow open longitudinal cut advanced in a deposit. *Hess.* b. Through cut. *Nichols.*

thorough joints; upright joints. Eng. Vertical joints affecting all the strata, as opposed to cricks or looses, Oölite quarries, Northamptonshire. *Arkell.*

Thorpe's ratio. A formula for assessing the probable solubility of a lead frit: the sum of the bases expressed as PbO divided by the sum of the acid oxides expressed as SiO_2 should not exceed 2. *Dodd.*

thortveitite. A silicate mineral belonging to the sorosilicate group and used as a source of scandium, $(Sc,Y)_2O_3.2SiO_2$. It is the only mineral rich in scandium and may contain up to 42 percent Sc_2O_3. It is a very rare, weakly radioactive, monoclinic mineral; grayish-green when fresh, white to reddish-gray by alteration; found in pegmatites associated with monazite and euxenite; also found with beryl, strueverite, monazite, and possibly, fergusonite. *BuMines Bull. 585, 1960, p. 718; Crosby, p. 110-111.*

Thoulet's law. With decreasing geological age, there is an increase in the complexity of the heavy mineral suites. *A.G.I.*

Thoulet solution. A yellowish-green, transparent, aqueous solution of potassium mercuric iodide, having a maximum specific gravity of 3.19. Also known as Sonstadt solution. *Holmes, 1928.* Used in the sink-float process of mineral separation.

thp Abbreviation for theoretical horsepower. *Pit and Quarry, 53rd, sec. E, p. 82.*

thrackscat. Eng. Metal or mineral still in the mine. An obsolete term. *Fay.*

thread. a. An extremely small vein, even thinner than a stringer. *Fay.* b. Mid. A small wooden wedge. *See also* cleat, c. *Fay.* c. A more or less straight line of stall faces, having no cuttings, loose ends, fast ends, or steps. *Fay.* d. To reeve rope or cable through a sheave or block and tackle. *Long.* e. A spiral-shaped groove forming a screw. *Long.* f. To couple screw-threaded parts. *Long.*

thread cutter. a. A tool used to cut screw threads on a pipe or bolt. *Long.* b. A name sometimes applied to a diamond crystal having the shape of an octahedron. *Long.*

thread grinding. The use of bonded abrasive products to form threads on a piece. *ACSG, 1963.*

thread guide. Porcelain thread guides are satisfactory for use with cotton, wool, or silk; manmade fibers, for example, rayon and nylon, are more abrasive and sintered alumina or synthetic sapphire thread guides are used. *Dodd.*

thread-lace scoria. Synonym for reticulite. *A.G.I.*

thread protector. A short-threaded ring to screw onto a pipe or into a coupling to protect the threads while the pipe is being handled or transported. Also called pipe-thread protector. *Long.*

threads per inch. The number of full threads and the fractions of a thread within the limits of 1 inch. *Brantly, 2.*

three-blanket method. An arrangement used for blanketing a stretcher, in which there are as many layers of blanket between the stretcher and the patient as there are on top of the patient. This method is very effective in underground first aid in keeping the patient warm and reducing the rise of shock while waiting to be transported to the surface. *McAdam, pp. 101-102.*

three-cone bit. *See* roller rock bit. *B.S. 3618, 1963, sec. 3.* Also called tricone bit.

three-dimension dip. In seismic prospecting, the true dip of a reflection or refraction horizon found by exploration and calculation. Synonym for true dip. *A.G.I.*

three-high mill. Consists of three rolls arranged horizontally, one above the other, each rotating continuously in one direction only, the piece being rolled between the bottom and middle, and middle and top rolls alternately. *Osborne, p. 357.*

three-high train. A roll train composed of three rolls, the bar being entered on one side between the bottom and the middle roll, and on the other side between the middle and the upper roll. The passes in both directions thus take place without reversing the movement of the rolls, as is done in so-called reversing rolls. *Fay.*

three-hinged arch. An arch hinged at its abutments and at its crown, with the advantage that each half can sink in relation to the other without damaging the arch. Moreover, it is statically determinate. *Ham.*

three-jaw chuck. A drill chuck having three serrated-face movable jaws that can be made to grip and hold fast an inserted drill rod. *See also* chuck, a. *Long.*

three-leg sling. A sling having three chains or ropes with a hook at the end of each. The legs are hung from a ring known as a thimble. *See also* double sling. *Ham.*

threeling. In crystallography, a group of three crystals united by the same twinning law. *Standard, 1964.*

three-part line. A single strand of rope or cable doubled back around two sheaves so that three parts of it pull a load together. *Nichols.*

three-phase circuit. Usually a three-wire circuit using alternating current with three equal voltages. This should not be confused with the three-wire service supplying 110 volts and 220 volts. This latter is merely a two-voltage single-phase circuit arrangement and is used almost universally to provide power and lighting to homes and small business establishments. *Kentucky, p. 263.*

three-phase current. Alternating current (A.C.) in which three separate pulses are present, identical in frequency and voltage, but separated 120°. *Pryor, 3.*

three-phase inclusion. An inclusion in a gemstone consisting of a liquid or negative inclusion which in turn encloses (1) a gas or air bubble or bubbles, and (2) a small mineral crystal or crystals. Distinguishable under a gemmological microscope in some stones, especially some emeralds. *Shipley.*

three-piece set. A set of timber used in ground that requires greater support than a two-piece set or stull will provide. A cap is supported by two posts often spread apart at the bottom to give greater stability. *See also* four-piece set. *Lewis, p. 41.*

three-point bending. Bending where the metal is placed upon two supports and a force applied between them. *See also* V-bend die. *ASM Gloss.*

three-point problem. a. In surveying, a method used to orient underground workings via three plumblines suspended in a vertical shaft. *Pryor, 3.* b. The problem in plane table surveying of locating precisely the point at which the table is set up, using three fixed points are visible from the plane table. *Ham.* c. The problem of determining dip and strike of a plane from elevations determined at three known points not in a straight line. *Bureau of Mines Staff.*

three-product washing. A method in which the cleanest fraction of the coal with an ash content of 1 to 2 percent (for hydrogenation, etc.) is separated; the remainder giving coal with an ash content of 10 to 15 percent (for boiler firing, etc.) and finally incombustible shale. *Nelson.*

three-quarter coal. A mixture of lump and nut coal. *Fay.*

three-shift cyclic mining. A system of cyclic mining on a longwall conveyor face, with coal cutting on one shift, hand filling and conveying on the next, and ripping, packing, and advancement of the face conveyor on the third shift. The system restricts coal production to one shift. *Nelson.*

three-term process controller. Instrument which automatically regulates a process in proportional, integral and derivative terms, thus neutralizing and removing the errors which arise during operation. *Pryor, 3, p. 32.*

three-throw ram pump. This type of pump consists essentially of three single-acting ram pumps side by side, either vertical or horizontal, and driven from a triple crankshaft with cranks set at angles of 120°. The three-throw pump can deal with heads up to 1,000 yards in a single lift. *Sinclair, IV, p. 51.*

three trees. Eng. A kind of ladder used in mines. *Fay.*

three-wire system. A voltage improvement system which consists of the series operation of two generators. One circuit of a mine is fed from one generator, and a second circuit is fed from the other generator. The mine track or return is common to both generators and is connected between the generator. This method provides high voltage for transmission of power, yet the individual circuits provide normal low voltage power. In effect, this is the Edison three-wire system, wherein the rails form the neutral third wire. The third wire (mine track) carries only the unbalance between the loads on the two separate circuits. *Kentucky, pp. 250-251.*

threshold. a. In geochemical prospecting: the limiting anomalous value below which variations represent only normal background effects and above which they have significance in terms of possible mineral deposits. *Hawkes.* b. In analytical chemistry: the limiting sensitivity of an analytical method. *Hawkes.*

thribble. Three sections of drill pipe handled as a unit. *Nichols.*

throat. a. The part of a blast furnace at the top of the stack. *Dodd.* b. The zone of decreased cross section found between the port area and the furnace chamber in some designs of open-hearth steel furnace. *Dodd.* c. The submerged passage connecting the melting end to the working end of a glass tank furnace; the refractory blocks forming the sides of the throat are known as throat cheeks, sleeper blocks, or dice blocks, the refractories for the top are the throat cover. *Dodd.* d. The least thickness of a weld, the calculation of its strength being based on the thickness at the throat. *Ham.*

throat depth. On a resistance welding machine, the distance from the center line of the electrodes or platens to the nearest point of interference for flatwork. *ASM Gloss.*

throat of a fillet weld. Actual—The shortest distance from the root of a fillet weld to its face. Nominal or theoretical—The perpendicular distance from the beginning of the root of the joint to the hypotenuse of the largest right triangle that can be inscribed within the fillet-weld cross section. *ASM Gloss.*

throat of crusher. Point at which the rock is discharged, and its short dimension varies, depending upon whether the swing jaw is in the open or closed position. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 216.*

throstlebrest. Derb. An ore with much gangue adhering, so that it requires a great deal of knocking or breaking to make it marketable. Also spelled throstlebreast. *Fay.*

throttle. a. To obstruct the flow of, as steam to an engine especially by a throttle valve. *Webster 3d.* b. *See* accelerator, c. *Long.*

throttle valve. A valve designed to regulate the supply of a fluid (as steam or gas and air) to an engine. *Webster 3d.*

through; thirling. A passage cut through a pillar to connect two rooms. *Fay.*

through and through. Wales. Mining bituminous coal without regard to the size of the lumps. *See also* through coal. *Fay.*

through coal. a. Coal as it is mined, that is, large and small mixed together; run-of-mine coal. *Nelson.* b. Coal after passage through a screen of stated size. *B.S. 3323, 1960.* c. A commercial term for coal with a specified top size, usually above 2 inches (50 millimeters) and below 6 inches (150 millimeters) and having no lower size limit. *B.S. 3553, 1962.*

through cut. An excavation between parallel banks that begins and ends at original grade. *Nichols.*

througher. a. Scot. A crosscut between two headings. *Fay.* b. *See* stenton. *B.S. 3618, 1963, sec. 2.*

throughput. Quantity of material (ore or selected fraction) passed through the mill or a section thereof in a given time or at a given rate. *Pryor, 3.*

through stone. A stone passing entirely through the thickness of a wall; a bond stone; perpend. *Standard, 1964.*

through ventilation. The normal ventilation produced in a mine as the air flows from the intake to the return, as opposed to ventilation produced locally by auxiliary fans. *Nelson.*

through weld. A weld of appreciable length made by either arc or gas welding through the unbroken surface of one member of a lap or tee joint, joining that member to the other. *ASM Gloss.*

throw. a. Eng. To break out the pillars in (a coal mine), leaving the hanging coal unsupported. *Standard, 1964. See also* spur, a. *Fay.* b. *See* fault throw. *Nelson.* c. The amplitude of shake of a vibratory screen, concentrating table, jigger conveyor, etc. *Nelson.* d. The projection of broken rock during blasting. *See also* flyrock. *Nelson.* e. The longest straight distance moved in the stroke or circle of a reciprocating or rotary part. *Nichols.* f. Scattering of blast fragments. *Nichols.* g. The distance from air supply opening measured in the direction of air flow, from the opening to the point where the air velocity is 50 feet per minute. *Strock, 10.* h. A fault; a dislocation. *Fay.* i. The amount of vertical displacement up (upthrow) or down (downthrow) produced by a fault; sometimes, loosely, a dislocation not vertical, the direction being specified. *Webster 2d. See also* heave; perpendicular throw; stratigraphic throw. *Fay.* j. Synonym for deviation. *Long.* k. Lateral displacement of screen, shaking table, or crushing surface in motion. *Pryor, 4.* l. In ceramics, to form or shape ceramic ware from plastic clay on a potter's wheel. *Bureau of Mines Staff.*

throwaway bit. A bit that is discarded when worn. *Nichols.*

throw crook. A potters' wheel; throwing table. *Standard, 1964.*

thrower. One who forms ware of clay by molding it with hands as it revolves on potter's wheel. In forming large ware, like vases, may mold separate sections and stick them together. Also called clay thrower; pot maker; potter. *D.O.T. 1.*

thrower belt. *See* boxcar loader. *ASA MH4.1-1958.*

throwing. a. S. Staff. The operation of breaking out small pillars, so as to leave the hanging coal unsupported, except by its own cohesion. *See also* throw, a. *Fay.* b. The method of shaping pottery hollowware in which a ball of the prepared body is thrown on a revolving potter's wheel, where it is centered and then worked into shape with the hands. The process is now chiefly used by studio potters, although a small amount of high-class commercial pottery is still made in this way. *Dodd.*

throwing clay. Clay plastic enough to be shaped on a potters' wheel. *Standard, 1964.*

throwing engine. A potter's wheel with its supports, used in throwing. Also called throwing table; throwing mill; throwing wheel. *Webster 2d.*

throwing house. A building in which clay is thrown on potters' wheels. *Standard, 1964.*

throwing marks. The striations or ridges formed on the surface of a pot during the process of throwing. *ACSG, 1963.*

throwing power. The ability of a plating solution to produce an approach to uniform metal distribution on an irregularly shaped cathode. It is measured by the percentage improvement of the metal-distribution ratio over the primary-current ratio. *ASM Gloss.*

throwing table. A potter's wheel. *Standard, 1964.*

throwing wheel. A potter's wheel. *Bureau of Mines Staff.*

thrown. a. Faulted or broken up by a fault. *Fay.* b. Turned, as a piece of ceramic ware on a potter's wheel. *Standard, 1964.*

throw of crusher. *See* stroke of crusher.

throwoff. A switch used in derailing cars. *Standard, 1964.*

throwoff switch. Aust. A switch by means of which an obstruction is thrown across the rails of a track, causing the derailment of the trucks. A derailing switch. *Fay.*

throwout bearing. a. A bearing, sliding on a clutch jackshaft, that carries the engage and disengage mechanism. *Nichols.* b. A bearing that permits a clutch throwout collar to slide along the clutch shaft without rotating with it. *Nichols.*

thru-and-thru. Run-of-mine coal. *Pryor, 3.*

thrust. a. A crushing of coal pillars caused by excess weight of the superincumbent rocks, the floor being harder than the roof. Nearly the same as creep, except that in the latter the workings are disorganized by the upheaval of the floor, which being softer than the roof is the first to yield. *Compare* creep. *Fay.* b. The ruins of the fallen roof, after pillars and stalls have been removed. *Fay.* c. The weight or pressure applied to a bit to make it cut. *Long.*

thrust arm. A cable-controlled bar that can slide by power in two directions. *Nichols.*

thrust bearing. a. One which resists attempt of shaft to move along its axis. *Pryor, 3.* b. Bearing designed to carry axial loads on a shaft. *Shell Oil Co.*

thrust block. The antifriction part of the thrust yoke attached to the drive rod in the swivel head of a diamond-drill machine. Also called cage; friction head; thrust collar. *Long.*

thrust borer. Mechanism for forcing a hole through an embankment for the insertion of pipes or cables. *Ham.*

thrust collar. Synonym for thrust block. *Long.*

thrust fault. a. A reverse fault that is characterized by a low angle of inclination with reference to a horizontal plane. *A.G.I.* b. A reversed fault heading at a high angle. *B.S. 3618, 1964, sec. 5.*

thrust nappes. Reverse faults in which the fault plane is horizontal, or nearly so, are called low-angle thrusts, or if the translation of the thrust blocks is very great, thrust nappes. *Stokes and Varnes, 1955.*

thrust plane. The plane of a thrust or reversed fault. *Fay.*

thrust plate. a. The upper and/or the lower race parts of the thrust bearing in the thrust block or cage on the drive rod in a diamond-drill swivel head. *Long.* b. Incorrectly used as a synonym for thrust yoke. *Long.*

thrust race. *See* thrust plate. *Long.*

thrust washer. A washer that holds a rotating part from sideward movement in its bearings. *Nichols.*

thrust yoke. The part connecting the piston rods of the feed mechanism on a hydraulic-feed diamond-drill swivel head to the thrust block, which forms the connecting link between the yoke and the drive rod, by means of which link the longitudinal movements of the feed mechanism are transmitted to the swivel-head drive rod. Also called back end; cage. *Long.*

thucholite. A brittle, jet-black hydrocarbon, having a variable amount of ash rich in thorium, uranium, and other radioactive elements. Occurs as small nodules associated with uraninite in pegmatite in Canada. *Tomkeieff, 1954.* Weakly radioactive. *Crosby, p. 81.*

thud. Eng. A dull and heavy report made by the rending of the strata far overhead when the coal has been extracted. *Fay.*

thulite. A pink monoclinic mineral of the epidote group, owing its color to the presence of manganese. *Dana 17; Fay. See also* zoisite. *Fay.*

thulite stone. A pink or rose-colored siliceous rock from Norway, composed chiefly of quartz and thulite; used for small ornaments. *Standard, 1964.*

thulium. A silvery-white, metallic element of the rare-earth group. It occurs combined in rare minerals associated with granite or pegmatite veins. Its pale green compounds resemble those of erbium, ytterbium, and lutetium in solubility. Symbol, Tm; valences, 2 and 3; hexagonal; atomic number, 69; atomic weight, 168.934; and specific gravity, 9.35. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-140, B-232.* Reacts slowly with water; soluble in dilute acids; forms green salts; and melting point, 1,550° to 1,600° C. *CCD 6d, 1961.* Can be cut with a knife; malleable; ductile; specific gravity, 9.332; melting point, 1,545° C; boiling point, 1,727° C; and insoluble in water. It is the rarest of the rare-earth elements. It constitutes about 0.007 percent of monazite and is obtained commercially from that mineral. Thulium 169 is the only nonradioactive isotope among the sixteen known isotopes (thulium 161 to thulium 176). *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-60, B-140.*

thulium 170. A radioisotope that has a half-life of 127 days; emits beta particles; and has a characteristic gamma-radiation energy of 0.084 million electron volt. *ASM Gloss.; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-61.*

thulium exolate. A greenish-white precipitate; $Tm_2(C_2O_4)_3.6H_2O$; molecular weight, 710.02; soluble in aqueous alkali oxalate solutions; and insoluble in water and in dilute acids. Used for the analytical separation of thulium and other rare-earth metals from the common metals. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-232.*

thulium oxide; thulia. Greenish-white; Tm_2O_3; molecular weight, 385.87; specific gravity, 8.6; and slightly soluble in mineral acids. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-232; CCD 6d, 1961.*

Thum-Balbach process. A silver refining process using carbon cathodes, dore anodes, and a silver-nitrate nitric-acid electrolyte. The silver is scraped off the bottom as crystals. *Liddell 2d, p. 496.*

Thum furnace. A gas-fired furnace especially for the treatment of zinc ore which is high in lead. *Fay.*

thumb-marked fracture. The minute ripples or thumbmarks characteristic of the fractured surface of amethyst. *C.M.D.*

thumb marks. In gemmology, the rhythmic or rippled markings or fractured surfaces of crystalline quartz which contains twinning laminae. *Shipley.*

thumb-trimmed mica. Rifted mica trimmed by thumb and fingers. *Skow.*

thunderbolt. a. A stone or stony concretion, especially if elongated and tapering, found in the ground and ignorantly supposed to have fallen from the sky. *Standard, 1964.* b. A nodule or mass of iron pyrites found in English chalk formations. *Standard, 1964.*

thunder egg. Agate-filled nodules usually with the form of a 5-pointed star in cross section. *Hess.*

thunderstone. Same as thunderbolt. *Fay.*

Thuringian. In geology, designating the upper division of the European Permian. *Webster 2d.*

thuringite. An olive- to pistachio-green mineral of the chlorite group occurring in monoclinic plates of hexagonal outline and with a micaceous cleavage, $8FeO.4(Al,Fe)_2O_3.6SiO_2.9H_2O$. *Larsen, p. 174.*

thurl. S. Staff. To cut through from one working into another. Also spelled thirl. *Fay.*

thurling. a. A passage cut from room to room, in post-and-stall working. *Fay.* b. *See* thirling. *Nelson.*

thurm. a. In mining, a small displacement of fault of a seam. *Fay.* b. A Nova Scotian term for a ragged, rocky headland swept by the sea. Also called thurm cap. *Fay.*

thwack. To beat (a half-dried pantile) into shape. *Webster 3d.*

thwacker. One that thwacks; specifically, a wooden implement with which the half-dried pantile is beaten to take out any warping. *Webster 3d.*

thwacking. The process by which clay pantiles are given their final curved shape. When partially dry, the tiles are placed on a wooden block of the correct curvature and beaten so that contour by means of a beveled piece of wood; any distortion of the tile caused by unequal shrinkage during the preliminary drying is thus corrected. *Dodd.*

thwacking frame. A table, or horse, with curved top, used in thwacking a pantile. *Standard, 1964.*

thwacking knife. A knife used for trimming unburned pantiles after thwacking. *Standard, 1964.*

thwarting. A short tunnel driven between two or more veins where they are nearly vertical. *Nelson.*

Thylox process. A process for the removal of hydrogen sulphide (H_2S) and the recovery of sulphur from artificial gas in which the gas is scrubbed with a solution of soda ash whose alkalinity is partly neutralized; 98 percent of H_2S is said to be thus removed and the gas is then passed through boxes containing iron hydroxide to remove the other 2 percent H_2S. The foul scrubbing liquid is passed into a thionizer where air is bubbled through it, setting free elemental sulphur which floats and is then separated and dried. *Hess.*

thyratron. A gas-filled valve or tube in which the initiation of current in an ionized gas or vapor is controlled by the voltage applied to a control electrode. *NCB.*

Thyssen gravimeter. An early gravity meter of the unstable equilibrium type. *A.G.I.*

Ti Chemical symbol for titanium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Tibet stone. A mixture of aventurine quartz and quartz porphyry which may be of various colors. It has been cut as ornamental or curio stones. From U.S.S.R. *Shipley.*

tick. Credit. *Korson.*

tick book. An account book. *Korson.*

Tickell roundness number. An index of the shape of a particle in terms of the ratio of the actual area of the projection of the grain to the area of the smallest circumscribing circle. *Dodd.*

ticket. a. Scot. An old measure for coal. The Campbeltown ticket was about 300 pounds. *Fay.* b. A sealed bid for ore to be sold. *Webster 3d.* c. The numbered check which the miner puts on his loaded car to inform the weighmaster to whom the coal belongs. *See also* tag; tally. *Fay.* d. Can. Slang; the cost of a mining property or enterprise. *Hoffman.*

ticket boy. *See* check puller. *D.O.T. 1.*

ticketing. a. In English mining districts, a periodical sale of ore to the highest bidders by ticket. *Standard, 1964.* b. *See* ticket, b. *Fay.*

tick hole. A small cavity in a rock; a vug. *Fay.*

tidal air whistle. A small whistle used for training operators in the various methods of artificial respiration. The air whistle is inserted in the patient's mouth and sounds when the patient is exhaling or inhaling. In this way the movements of artificial respiration are timed by the patient's respiratory reactions, and the operator quickly develops the required slow, steady, and smooth rhythm of operations. *McAdam, pp. 92-93.*

tidal basin. Portion of a tidal-flat area, drained at ebb tides by the channel system of a single tidal inlet. *Schieferdecker.*

tidal bedding. Deposits produced by tides especially where currents of high tides are stronger than those of low tides flowing in the opposite direction. Thus, high tide deposits a layer of coarse sediments that the low tide does not destroy. *Hess.*

tidal bore. As a tide wave approaches the shore it is slowed in proportion to the square root of the depth and becomes steeper. If this occurs in an estuary in which the discharge of a river impedes entry of the tide wave the wave will be restrained until it rises sufficiently to move against the river discharge. When this happens the tide wave sweeps up the river. This is the tidal bore which bears the characteristics of a shock wave. *Hy.*

tidal channel. A major channel followed by the tidal currents. *Schieferdecker.*

tidal (force) correction. Correction for the effect on gravity of the sun and the moon, including the effect of the tides of the solid earth. *Schieferdecker.*

tidal current. The periodic horizontal movement of water accompanying the rise and fall of the tide and due to the tide producing forces. *Schieferdecker.*

tidal current cycle. The complete oscillation of the flood and ebb through all phases of the tide from high water to the next succeeding high water. The duration of a semidiurnal tide approximates 12.42 hours, while that of a diurnal tide approximates 24.84 hours. *Hy.*

tidal difference. Difference in time or height of a high or low water between a subordinate station and a reference station. The difference is applied to the prediction at the reference station to give the corresponding time or height for a subordinate station. *Hy.*

tidal divide. Divide between two adjacent channel systems. *Schieferdecker.*

tidal dock. A dock having no gates to segregate it from outside tides. *Ham.*

tidal flat. A flat, soggy area, which emerges during low tide and is characterized by the simultaneous deposition of clay and sand by tidal waters. *Hy.*

tidal-flat area. A relatively extensive area of unconsolidated sediments, the greater part of which is alternately covered and uncovered by the tides. *Schieferdecker.*

tidal inlet. a. A natural inlet maintained by tidal flow. *A.G.I.* b. Loosely, any inlet in which the tide ebbs and flows. Also called tidal outlet. *A.G.I.*

tidal lag. The delay between high tide or low tide in an estuary and the subsequent level of adjacent ground water. *Ham.*

tidal lamination. A lamination in channel, tidal-flat or marsh deposits caused by the tides. *Schieferdecker.*

tidal marsh. *See* tidal flat. *A.G.I.*

tidal prediction. The prediction of times and heights of high and low waters. Tidal predictions generally are published by the hydrographic departments of various countries for various reference stations throughout the world. In the United States they are published by the U.S. Department of Commerce, Coast and Geodetic Survey. *Hy.*

tidal prism. The volume of water required on the flooding tide to produce the rise of water level in a bay, estuary, fiord, etc. *Hy.*

tidal range. The differences in height between consecutive high and low waters. *Hy.*

tidal river. A river up the course of which the tides are noticeable for a considerable distance. *Schieferdecker.*

tidal wave. a. In astronomical usage, restricted to the periodic variations of sea level produced by the gravitational attractions of the sun and the moon. *A.G.I.* b. Commonly and incorrectly used for a large sea wave caused by a submarine earthquake or volcanic eruption, properly called a tsunami. *A.G.I.* c. Sometimes used for a large sea wave caused by a hurricane wind or a severe gale, properly called a storm wave. *A.G.I.*

tidal wedge. Tidal channel, narrowing or shallowing at downstream end, in which either the ebb or the flood current dominates. *Schieferdecker.*

tide. Rise and fall of the surface of the sea due to the gravitational pull of the moon, generally taking place twice daily. In the open sea, this rise may not exceed 2 feet, whereas in the shallow seas bordering continents it may be more than 20 feet, and in narrow tidal estuaries from 40 to 50 feet. Since the moon travels in its own orbit in the same direction as the earth, a period of about 24 hours, 25 minutes will elapse between successive occasions when the moon is vertically above a given meridian. The interval between successive high tides will therefore be about 12½ hours. *Ham.*

tide crack. Line of junction between an immovable ice foot and fast ice, the latter being subject to rise and fall of the tide. *Schieferdecker.*

tide curve. A graphic representation of the rise and fall of tide in which time is represented by the abscissas and the heights by the ordinates. For a normal tide, the trace approximates a sine or cosine curve. *Hy.*

tide gage. An apparatus used for predicting the tides in a known set of channels. *Ham.*

tidelands. Technically lands overflowed during floodtide, but the term, by reason of the so-called Tidelands cases, has been used to describe that portion of the continental shelf between the shore and the claimed boundaries of the states (3 or 9 miles at sea). *Williams.*

tide level. *See* mean tide level, a. *Seelye, 2.*

tide race. A very rapid tidal current in a narrow channel or passage. *Hy.*

tide rips. A turbulent water body produced by opposition to tidal currents. *Hy.*

tidewater glacier. A glacier that descends to the sea, especially if it breaks off into icebergs. *Stokes and Varnes, 1955.*

tie. a. A beam, post, rod, or angle to hold two pieces together; a tension member in a construction. *Webster 3d.* b. One of the transverse supports to which railroad rails are fastened to keep them to line, gage, and grade. *Webster 3d.* c. Eng. A level; also, a support for the roof in coal mines. *Fay.* e. Linear or angular measurements or a combination of the two made for the purpose of locating other points from points of known position. Ties may be made to connect physical objects with the survey line, or to locate the instrument point with reference to physical objects so that it can be reestablished if lost. To tie in is to close a survey on itself or on another survey, or to locate a point by means of ties. *Seelye, 2.* f. *See* sleeper.

tieback. a. A beam serving the purpose similar to a fend-off beam, but fixed at the opposite side of the shaft or inclined road. *Fay.* b. The wire ropes or stayrods that are sometimes used on the side of the tower opposite the hoisting engine, in place of or to reinforce the engine braces. *Fay.*

tie band. Eng. A piece of rope used in securing long timbers or rails when being sent down in the cage. *Fay.*

tie bar. a. A bar used as a tie rod. *Webster 3d.* b. A rod between two railway switch rails to hold them to gage. *Webster 3d.*

tied retaining wall. A retaining wall tied into the adjoining ground by means of a dead man or other suitable anchorage. *Ham.*

tie line. a. A line drawn to join opposite corners of a four-sided figure, thereby enabling its area to be checked by triangulation. *Ham.* b. *See* conode. *VV.*

tiemannite. A mercuric selenide, $HgSe$, containing 71.7 percent mercury, and 28.3 percent selenium. *Sanford.*

tie plate. A metal plate used under rails where they rest on ties. The rail is spiked to the tie through holes in the plate. *Jones.*

tie point. Point of closure of a survey either on itself or on another survey. *Seelye, 2.*

tie pumping. When track is not adequately drained and water enters the ballast and roadbed, tie pumping occurs. Under the action of the rolling stock, pressure on the tie discharges water to the surface, washing the ballast from beneath and around the tie. *ASA M7.3-1958, p. 3.*

tier. *See* wythe. *ACSG.*

tiering. *See* torching. *Dodd.*

tie rod. a. A tie, taking the form of a steel rod, often provided with a screw thread at each end to engage with a member subjected to thrust. *Ham.* b. A round or square iron rod passing through or over a furnace and connected with buckstays to assist in binding the furnace together. *Fay.* c. For forging or forming presses, the same as strain rods. *ASM Gloss.*

tier of pumps. *See* tyer. *Fay.*

tierra. a. Sp. Earth, land, soil, ground; t. arcillosa, clay ground. *Fay.* b. Sp. Region of the earth; t. adentro, the interior of a country. *Fay.* c. Sp. Any rock or mineral; t. blanca (Mex.), a calcareous tufa; t. de batan, fuller's earth; t. de fluor (Venez.), a bed of reddish clayey earth; t. de porcelana, china clay; t. pesada, heavy spar. *Fay.* d. Mex. A fine-sized ore. *Fay.*

tierra blanca. Sp. White, chalky, limestone beds having special value for hydraulic cement. *Fay.*

tierras. a. Sp. Fine material impregnated with quicksilver ore, which must be made into adobes before roasting. *Fay.* b. Sp. Ore generally in a fine state of division. *Fay.* c. Sp. Gangue or matrix. *Fay.* d. Any low-grade, powdered ore. *Standard, 1964.*

tier saw. A saw for giving bricks curved outlines. *Standard, 1964.*

ties. Sleepers. *Nelson.*

tiff. a. A common name for calcite in Wisconsin and Missouri zinc fields. *Fay.* b. Barite in southeast Missouri. *Fay.*

tiffanyite. A hydrocarbon present in certain diamonds, to which the phosphorescence is due. *English.*

tiger. A device, as a fork, for supporting a continuous series of well-boring rods or tubes while raising or lowering them in the hole. *Standard, 1964. See also* nipping fork. *Fay.*

tigereye; tiger's-eye. a. A usually yellow-brown chatoyant stone that is much used for ornament and is a silicified crocidolite in which the fibers penetrating the quartz are changed to oxide of iron. *Compare* hawk's-eye. *Webster 3d.* b. A ceramic glaze resembling in appearance the tiger-eye. *Webster 3d.*

tigerite. Same as tiger eye. *Shipley.*

tight. a. Soil or rock formations lacking veins of weakness. *Nichols.* b. Blasts or blastholes around which rock cannot break away freely. *Nichols.* c. Inadequate clearance or the barest minimum of clearance between working parts. *Long.* d. Unbroken, crack-free, and solid rock in which a naked hole will stand without caving. *Long.* e. A borehole made impermeable to water by cementation or casing. *Long.* f. An impermeable rock formation. *Long.* g. An underground opening having limited space in which to work. *Long.* h. Lacking in porosity; impervious. *Wheeler.*

tight-bedded. In sandstone quarrying, a term used to describe the rock if it is massive, showing no open-bed seams. *See also* thin-bedded; thick-bedded. *AIME, p. 333.*

tight-burning clay. A clay which is dense or approaches vitrification after firing. *Bureau of Mines Staff.*

tight crawl passage. A passage which can only be mastered by crawling in a prone position. *Schieferdecker.*

tight fit. A loosely defined fit of slight negative allowance requiring a light press or driving force to assemble; probably comparable to certain classes of interference locational fits or force and shrink fits given in ASA B4.1-1955. *ASM Gloss.*

tight formation. *See* tight, d and f; tight rock. *Long.*

tight head. Synonym for circulating head; stuffing box. *Long.*

tight hole. a. A borehole the diameter of which is too small for adequate clearance between the drill-stem equipment and/or inserted casing. *Long.* b. A borehole the wall rocks of which are impermeable to water or have been made tight by cementation or insertion of casing. *Long.* c. A borehole-drilling operation access to which and information about which are not released except to authorized persons. *Long.*

tight lagging. Lagging placed touching each other. *Bureau of Mines Staff.*

tight rock. a. Rock formation in which the joints, cracks, or crevices are sealed and impermeable to water. *Long.* b. Rock composed of tightly cemented grains of very fine, even-sized crystals. *Long.* c. Rock that does not chip easily under the impact of cable tools. *Long.* d. A tough, resilient rock. *Long.* e. Can. Without evidence of shearing or mineralization. *Hoffman.*

tight sand. In petroleum geology, commonly used for a sand with pores so few or so filled with clay or cementing material that oil and water cannot pass through. *Stokes and Varnes, 1955.*

tightset. A quarrymen's term, equivalent to blind seam, or incipient joint. *Fay.*

tight sheathing. The most complete sheathing using wood timbering. Used where water or fine wet soils must be retained. The frame is designed for this use and is generally stronger than that required for other types of sheathing. A specially edged plank, generally tongue-and-grooved, eliminates the crevices existing in close sheathing. *Compare* close sheathing; skeleton sheathing. *Carson, p. 244. See also* tight lagging.

tight shot. An explosive shot which has been set off to loosen coal in the seam that has not been previously cut or sheared. *B.C.I.*

tikhonenkovite. A mineral, $SrAlF_4(OH).H_2O$, in small monoclinic crystals. The strontium analogue of gearksuitite. *Hey, M.M., 1964; Fleischer.*

tilaite. A melanocratic variety of olivine gabbro or olivine eucrite containing pyroxenes and olivine with subordinate feldspar (bytownite to anorthite) and small amounts of hornblende, biotite, apatite, and magnetite. *Holmes, 1928.*

tilasite. A fluoarsenate of calcium and magnesium, $(MgF)CaAsO_4$. From Langban, Sweden; Kajlidongri, Central India. Same as fluoradelite. *English.*

tile. a. A flat or curved piece of fired clay, stone, concrete, or other material used especially for roofs, floors, or walls and often for such work of an ornamental nature. *Webster 3d.* b. A small, flat piece of dried earth or earthenware, used to cover vessels in which metals are fused. *Webster 3d.* c. Rectangular refractory shapes in sizes larger than brick and usually typified by thinness with respect to length and width. *A.R.I.* d. A ceramic surfacing unit, usually relatively thin in relation to facial area, made from clay or a mixture of clay and other ceramic materials, called the body of the tile, having either a glazed or unglazed face and fired above red heat in the course of manufacture to a temperature sufficiently high to produce specific physical properties and characteristics. *See also* structural clay tile. *ASTM C242-60T.*

tile classifier. *See* boardman II. *D.O.T. 1.*

tile copper. Copper obtained by roasting and refining the metal bottoms that collect under the regulus in smelting certain impure ores; usually cast in flat, rectangular plates, hence its name. *See also* bottoms, b. *Standard, 1964; Fay.*

tile-cutting-machine operator. *See* brick-cutting-machine operator. *D.O.T. 1.*

tile decorator. One who traces, transfers, stamps, or stipples decorative designs on glazed and unglazed (bisque) tile with brushes, stamps, sponges, stencils, and decalcomanias. May do freehand decorating. Also called decorator. *D.O.T. 1.*

tile designer. One who designs individual tiles and lays out designs for tile walls and floors. *D.O.T. 1.*

tile earth. A compact clay soil. *Standard, 1964.*

tile edger. *See* fettler. *D.O.T. 1.*

tile field. A field or yard, as at a pottery, devoted to the construction of tiles. *Standard, 1964.*

tile finisher. *See* sponger. *D.O.T. 1.*

tile-fixture caster. One who casts hollow-tile fixtures, such as lavatory equipment, in individual shaped molds by hand. Also called caster. *D.O.T. 1.*

tile hanging. The process of fixing roofing tiles (as distinct from wall tiles) on a vertical outside wall. *Dodd.*

tile kiln. A kiln for vitrifying tiles. *Standard, 1964.*

tile machine. A machine for making tubular or arch-shaped tiles from clay, operating by forcing the raw material through a die, in a continuous stream, which is cut into suitable lengths by wires. *Standard, 1964.*

tile ore. A massive variety of cuprite, of brick-red color. *Fay.*

tile-oven. An oven for burning tiles. *Standard, 1964.*

tile-pickup man. One who separates tile after removal from kiln according to color or hardness. *D.O.T. 1.*

tile placer. One who deposits glaze-dipped and fettled green tile in saggers, places covers over saggers, and passes the saggers to setter for setting in kiln. Also called placer. *D.O.T. 1.*

tiler. a. A kiln or oven for baking tiles. *Standard, 1964.* b. A maker or layer of tiles. *Standard, 1964.*

tilery. A factory in which tiles are made. *Standard, 1964.*

tile segregator. *See* boardman I. *D.O.T. 1.*

tile shoe. A device that permits laying tile directly behind a ditcher. Also called tile box. *Nichols.*

tile sizer. One who measures the thickness of ceramic tile with a thickness gage and sorts it accordingly. Also called sizer, hand. *D.O.T. 1.*

tile sorter. *See* sorter. *D.O.T. 1.*

tile, special purposes. *See* special purpose tile.

tilestone. A tile, particularly of stone; a brick. *Standard, 1964.*

tile turner. One who removes green tile from clay press, performing essentially the same duties as described under pipe turner. *D.O.T. 1.*

tile works. A tilerv or file field. *Standard, 1964.*

tilgate stone. Beds of calcareous sandstone or ironstone, near Hastings, England. *Fay.*

till. a. That part of a glacial drift consisting of material deposited by and underneath the ice, with little or no transportation and sorting by water; it is generally an unstratified, unconsolidated, heterogeneous mixture of clay, sand, gravel, and boulders. *Fay.* Two kinds are recognized: (1) glacier till, deposited directly by glacier ice, not by glacier waters, though it may be locally modified by them. Contrasted with glacier sediment. It may be englacial (carried within the ice mass), superglacial (borne on the ice surface), or subglacial (dragged along beneath the glacier), and in this case called also ground moraine or boulder clay; and (2) berg till or floe till, detrital matter deposited by icebergs. Also called subaqueous till. *Standard, 1964.* b. Nonsorted, nonstratified earth or rock materials carried or deposited by glaciers. Equivalent to moraine of some European geologists and to boulder clay of some British geologists. *Compare* alluvium. *Bureau of Mines Staff.* c. Synonym for boulder clay. *Long.* d. Incorrectly used as a synonym for glacial drift. *Long.*

tiller. a. Eng. An instrument similar to a brace head, but usually made of iron, for turning drill tools. *Fay.* b. *See* brace head, b. *B.S. 3618, 1963, sec. 3.*

tiller rope. A flexible wire rope composed of six small ropes, usually of seven wire strands each laid about a hemp core. *Zern.*

tilleyite. A white silicate and carbonate of calcium, $Ca_6SiO_4.CaCO_3$. Monoclinic (?). Grains in rock. From Crestmore, Calif. *English.*

tillite. A sedimentary rock composed of firmly consolidated till. *Mather.*

till sheet. A sheet, layer, or bed of till. It may or may not be moraine. *A.G.I.*

Ti-Loc process. Trade name; a process for the treatment of steel prior to enameling; it is claimed to improve adherence and to eliminate the need for a ground coat. *Dodd.*

tilt. a. In aerial photography, the angle between the lens axis and a vertical through the exposure station (rear nodal point of lens). *Seeyle, 2.* It is seldom more than 3° and can generally be kept to 1° regarded as satisfactory for vertical photographs. *Ham.* b. To hammer or forge with a tilt hammer; as, to tilt steel to render it more ductile. *Standard, 1964.*

tilt dozer. A bulldozer to which a large degree of tilt can be applied to either side.

tilted steel. Hammered steel. *Standard, 1964.*

tilter. One who forges metal with a tilt hammer. *Standard, 1964.*

tilth. Soil condition in relation to lump or particle size. *Nichols.*

tilt hammer. A hammer for shingling or forging iron, arranged as a lever of the first or third order, and tilted or tripped by means of a cam or cog gearing and allowed to fall upon the billet, bloom, or bar. *Fay.*

tilting. Forging by means of a tilt hammer. *Bennett 2d, 1962.*

tilting disk valve. A form of quick-closing reflux valve used with high-lift pumps in order to minimize water hammer or closing. Usually pivoted on a diameter. *B.S. 3618, 1963, sec. 4.*

tilting dozer. A bulldozer whose blade can be pivoted on a horizontal center pin to cut low on either side. *Nichols.*

tilting furnace. Open-hearth furnace swung about its major axis when pouring out the melted product. *Pryor, 3.*

tilting gate. A crest gate for dam spillways designed so that water pressure acting upon it will do so only at a definite level. It closes automatically when the water level falls to normal. *Ham.*

tilting idlers. An arrangement of idler rollers in which the top set is mounted on vertical arms which pivot on spindles set low down on the frame of the roller stool. This permits the entire carrier frame to lean forward slightly in the direction of belt travel. In the event of the belt not running true, the tilting idlers guide it back to its correct course again. *See also* staggered idlers. *Nelson.*

tilting level. In surveying, an instrument with sighting telescope so mounted that it can be raised or lowered through a limited arc without impairing accuracy of reading, though axis of rotation is not precisely horizontal. *Pryor, 3.* In this instrument the telescope and the vertical axis or limb are not rigidly connected, but the former can be tilted vertically by means of a micrometer or gradienter screw. The bubble therefore has to be brought to the center of its run for each sight as the line of collimation does not traverse horizontally. The bubble tube is usually mounted alongside the telescope and is viewed from the eyepiece and through an optical sighting arrangement, which either brings opposite halves of the bubble image into coincidence or the end of the bubble to a reference line. *Mason, v. 2, pp. 734-735.*

tilting manometer. *See* Chattock-Fry tilting micromanometer. *Roberts, I, p. 31.*

tilting mixer. A concrete mixer with a rotating drum which is tilted to discharge its contents. *Ham.*

tiltmeter. a. In earthquake seismology, a device for observing surface disturbances on a bowl of mercury, employed in an attempt to predict earthquakes. *A.G.I.* b. An instrument used to measure displacement of the ground surface from the horizontal. In volcanology, used to indicate the degree and intensity of tumescence or doming up of a volcano by magmatic pressure. *A.G.I.*

tilt mill. A mill where metal (as steel) is titled. *Webster 3d.*

tilt-mold billet. The same as tilt-mold ingot except the size of the piece of metal permits the use of the term billet. *ASM Gloss.*

tilt-mold ingot. An ingot made by a casting practice employing a book-type mold that has its bottom nearly vertical at the start of the pouring and is gradually tilted back to a normal horizontal position during pouring. The object of such a practice is to reduce the amount of agitation while the metal stream is being poured into the mold, thus reducing the tendency toward formation of oxide film and entrapment. *ASM Gloss.*

timazite. A metamorphosed, basic igneous rock with white feldspar and hornblende, and sometimes quartz. *A.G.I.* A variety of andesite. *Webster 2d.*

timber. a. Applied to rough blocks of natural rock as it comes from the quarry before being shaped into sharpening stones. *Mersereau, 4th, p. 286.* b. Any of the wooden props, posts, bars, collars, lagging, etc., used to support mine workings. *Fay.* c. To set or place timbers in a mine. *Fay.* d. One of the steel joists or beams, which have in some mines replaced wooden timbers. *Fay.* e. Generally considered as that part of a tree which is obtained by sawing the trunk of the tree into sections with varying lengths. *Jones, 2, p. 56.* f. Trees in the forest, trees when cut into logs or when sawed into large squared sizes. Specifically, lumber 5 inches or more in the least dimension. *Crispin.*

timber boss. *See* timberman, head. *D.O.T. 1.*

timber cutter. In mining, one who operates a power saw to cut to designated- and standard-length timbers and props used to support the walls and roofs of underground passageways and workplaces. Also called prop cutter; prop sawyer; sawyer, mine timber. *See also* timber framer. *D.O.T. 1.*

timber drawer. a. An appliance for withdrawing timber supports from wastes, for example, a Sylvester. *Nelson.* b. A miner engaged in timber drawing. *Nelson.* c. *See* timber puller. *Kentucky, p. 152.*

timber drawing. *See* drawing timber. *Kentucky, p. 151.*

timbered stopes. These are stopes in which square-set timbering and its variations are employed. As a rule the ground is broken by overhand methods, the face being advanced by successive small excavations, each one timbered before the next is begun. *Higham, p. 196.*

timberer; timberman. a. One who cuts, frames, and puts in place any of the timbers used in a shaft, slope, mine, or tunnel. Also one who draws props, posts, etc. *Fay.* b. One who puts in place timbers cut and framed by power equipment. *Bureau of Mines Staff.*

timber foreman. *See* timberman, head. *D.O.T. 1.*

timber framer. In mining one who operates a power saw to frame (cut and fit notches in the ends) timbers used in mine to support the roof and walls of underground openings. Also called timber cutter. *D.O.T. 1.*

timbering. a. The operation of setting timber supports in mine workings or shafts. The term support would cover the setting of timber, steel, concrete, or masonry supports. *See also* timber set. *Nelson.* b. Eng. The timber structure employed for supporting the faces of an excavation during the progress of construction. *Fay.* c. Timber work taken collectively, as in a mine. *Standard, 1964.* d. The protecting against falls of roof formation of a mine, by means of horizontal timbers or caps extending across the passageway just under the roof, the ends of such timbers resting upon the vertical timbers or posts. *Ricketts, I.* e. A general term for the placing of timber, to support the roof or the face of a tunnel during excavation and lining. *Stauffer. See also* face timbering; pin timbering. *Kentucky, p. 149.*

timbering machine. An electrically driven machine to raise and hold timbers in place while supporting posts are being set after cut to length by the machine's power-driven saw. *ASA C42.85:1956.*

timbering set. A tunnel support consisting of a roof beam or arch, and two posts. *Nichols.*

timber jack. A jack to raise and hold cross bars against the roof while props are being set. *Hess.*

timber lander. In metal mining, one who loads on a cage timbers, lagging, lumber, track ties, and sand, ordered from underground. *D.O.T. 1.*

timberline. The upper limit of aboreal growth in mountains or in high latitudes. *Webster 3d.*

timberman. a. In mining, one who frames (cuts end and side notches), fits, and installs sets of timbers underground to support the walls and roofs of haulageways, airways, and shafts. In some mines, miners do their own timbering as the work advances. *D.O.T. 1.* b. A miner skilled in notching, erecting, and securing timbers sets in mine workings. The craft of the timberman is gradually becoming extinct with the advent of power tools, and steel as a support. *See also* repairer. *Nelson.* c. *See* timberer. *Fay.* d. *See* roof bolter. *D.O.T. Supp.* e. One who installs precut timbers. *Bureau of Mines Staff.*

timberman, head. In bituminous coal mining, a foreman who supervises timbermen installing timbers in a mine to support the roof and walls of haulageways, passageways, and the shaft. Also called timber boss; timber foreman. *D.O.T. 1.*

timberman helper. In mining, a laborer who assists the timberman in erecting supports for roof of mine, using posts, headers, cap pieces, and wedges. *D.O.T. 1.*

timber mat. Broken timber forming roof of ore deposit being extracted by caving methods such as top slicing. It separates the downward gravitating overburden and rock strata from the ore. *Pryor, 3.*

timber packer. a. A laborer who delivers timber to the working place in a pitching or inclined coal seam. *Fay.* b. *See* pack builder. *D.O.T. 1.*

timber pickling. A method to assist timber preservation, for example, creosoting. *See also* timber preservation. *Nelson.*

timber preservation. Any treatment of mine timber for the purpose of extending the useful life of the timber. Various preservatives are used such as creosote, zinc chloride, sodium fluoride, and other chemicals. *See also* brush treatment; guniting, b; open-tank method; pressure process; Bethell's process; seasoning timber. *Lewis, p. 71.*

timber puller. a. A piece of equipment used in removing the supports or timbers in a mine. The timber puller should be constructed so that the operator will be under safe roof while drawing the timber. A Sylvester is an example of this type appliance. Also called timber drawer. *Kentucky, p. 151.* b. *See* timber robber. *D.O.T. 1.*

timber rights. The right to cut timber on the public domain for use in the mining industry. *Fay.*

timber robber. In anthracite and bituminous coal mining, a laborer who pulls out and recovers timbers and props in working places from which all coal has been mined. Also called prop drawer; timber puller. *D.O.T. 1.*

timber set. A timber frame to support the roof, sides and sometimes the floor of mine roadways, or shafts. For a mine roadway, the simplest timber set consists of a crossbar, cap, or collar supported on two upright posts or arms with round or board lagging. Such a set will resist roof pressure and moderate side pressure, and are erected at intervals of from 2 to 6 feet. The timbers are about 5 to 10 inches in diameter. In South Wales, such a timber set is known as double timber. *Nelson. See also* two-piece set; three-piece set; four-piece set.

timber sprinkler. In metal mining, one who sprays timber in mine with a chemical solution to fireproof and prevent it from rotting, using a spray gun. Also called sprinkler or timber treater. *D.O.T. 1.*

timber treater. *See* timber sprinkler. *D.O.T. 1.*

timber trestle. Name applied to such wooden structures as are used for carrying railroad tracks across a stream or ravine. *Crispin.*

timber trolley. A strong carriage of low height for transporting timber from the surface stockyard to underground workings. It consists of a timber or steel base, mounted on wheels, with U-shaped arms in which the timber is lashed with chains. *See also* bogie. *Nelson.*

timber truck. Any truck or car used for hauling timbers inside of a mine. In conveyor work, it is applied to the small truck mounted on wheels which is designed to run in the panline of a shaker conveyor for the purpose of carrying timber and other materials to the face. *Jones.*

time. a. A statement of the number of days or hours worked by, or of the amount of wages due a workman; usually furnished him upon request in the event of his quitting work before the regular payday. *Fay.* b. To count the strokes of a pump, or revolutions of an engine or fan. *Zern.* c. In surveying, civil mean time or Greenwich mean time (G.m.t.) may require adjustment to apparent time. *Pryor, 3.* d. In geology, a general term indicating a subdivision of geological history; as, Paleozoic time. *Standard, 1964.*

time-and-motion study. The coordination and analysis of the data provided by time study and motion study. *Nelson.*

time at shot point. In seismic exploration, the time required for the seismic impulse to travel from the charge in the shothole to the surface of the earth. Synonym for uphole time. *A.G.I.*

time break. An indication on a seismic record showing the instant of detonation of a shot or charge. *Compare* time signal. Synonym for shot moment; shot instant. *A.G.I.*

time clock. A special alarm clock which can be set to ring at fractions of a minute and widely used as a timing device for burning enamel ware. As the ware must be fired at a recommended temperature for a specific length of time a time or reminder clock is a valuable asset to good work. *Hansen.*

time correlation. Correlation of rocks in one area with those of another area on basis of time equivalence or contemporaneity of origin. *A.G.I.*

time curve. *See* consolidated time curve. *ASCE P1826.*

time-delay relays. Those that do not operate until a predetermined time has elapsed. The time ratings are usually adjustable but there are a few that have the time rating built into them. *Coal Age, v. 71, No. 8, 1966, p. 270.*

time-depth chart. A graphical expression of the functional relation between the velocity function and the times observed in the seismic method of geophysical exploration. It permits the time increments to be converted to the corresponding depths. Synonym for time-depth curve. *A.G.I.*

time-depth curve. *See* time-depth chart. *A.G.I.*

time-distance curve. In refraction seismic computations, a graph, usually with arrival times of seismic events plotted as ordinates and distances along the surface of the earth plotted as abcissas. In earthquake studies, the times of arrival of seismic waves at recording stations may be known but the time of initiation of the waves may be unknown. As data is accumulated from different recording stations, a time-distance graph may be constructed. If it is possible to extrapolate this graph to the origin on the time and distance coordinates, it becomes a travel time curve. *A.G.I.*

time-distance graph. In refraction seismic computations, a plot of the arrival times of refracted events against the shot point to detector distance. The reciprocal slopes of the segments plotted are the refraction velocities for the refracting bed. *A.G.I.*

time gradient. In the reflection seismic methods applied to dipping reflectors, the travel time curves may not be straight lines, that is, the apparent velocity observed varies with the spread from shot point to detectors. The time gradient is the reciprocal of the apparent velocity. In seismic prospecting, also the rate of change of travel time with depth. *A.G.I.*

timekeeper. A clerk who records all details of time, place, nature of work, and rates of payment of surface and underground workmen. *Nelson.*

time lag. In refraction seismic interpretation, where arrival times are plotted against shot-detector distances, if some of the paths from shot point to detector include a low-speed bed, the corresponding arrival times will be abnormally long, and the departure from normal travel time is called a time lag. Also, in seismic prospecting, time delays in arrivals due to phase shifts in filtering, to shot-hole fatigue, etc. *A.G.I.*

time leads. In a method of interpretation of refraction seismic records where the arrival times are plotted against shot-detector distances, if some of the paths from shot point to detector include a high-speed segment, the corresponding travel times will not fall on a smooth curve. The departure in this case from the curve is called a time lead, and it is proportional to the horizontal extent of the high-speed segment. Used in salt-dome exploration. *A.G.I.*

time mark. Synonym for time break. *Schieferdecker.*

time meridian. Any standard meridian to which time is referred, may be Greenwich, standard, or local. *Hy.*

time quenching. Interrupted quenching in which the time in the quenching medium is controlled. *ASM Gloss.*

timer. A special alarm clock which can be set to ring at fractions of a minute, widely used as a timing device for firing enamelware. As the ware must be fired at a recommended temperature for a specific length of time, a timer or reminder clock is a valuable asset to good work. *Enam. Dict.*

timer lines. Lines on the seismogram that mark the time. *Schieferdecker.*

time scale. An arbitrary system of organizing geologic events or subdividing geologic time usually presented in the form of a chart showing the names of the various divisions of time, rock time, or rock as currently understood. *Stokes and Varnes, 1955.*

time signal. A signal sent by telegraph or radio indicating an exact instant of time; in geophysics, such a signal is used to indicate the time of explosion in a shothole. *Compare* time break. A signal sent from the Naval Observatory to regulate timepieces. *A.G.I.*

Timiskaming group. An important member of the Precambrian succession in the Canadian Shield, of post-Laurentian, pre-Huronian age, and consisting essentially of quartzites and arkoses. Equivalent to the Sudbury series (or Sudburian) of Coleman, the Hastings series of southwest Ontario, Canada, and the Pontiac series around Lake Quebec, Canada. *C.T.D.*

time stratigraphic. Applied to rock units with boundaries based on geologic time, that is, with synchronous boundaries. *A.G.I.*

time-stratigraphic unit. The stratigraphic unit of rocks representing some definite interval of geologic time; *see also* paratime rock units. Time-stratigraphic units in descending order of importance are system, series, stage, and substage corresponding to period, epoch, age, and subage. *A.G.I. Supp.*

time study. A detailed investigation underground, in shafts, or on the surface, in which the average time taken to do each operation of a complete cycle is recorded. Time studies will disclose whether face, haulage, or winding operations can be improved by reducing idle times and whether the equipment and power services are adequate at all times to provide full employment for men and machines throughout the shift. *See also* motion study. *Nelson.*

time tie. In seismograph continuous profiling, a coincident travel path for seismic energy initiated at opposite ends of the path. The use of such coincident travel paths on adjacent reflection layouts facilitates correlation from one layout to the next as the shot point or recording position is changed. *A.G.I.*

time value. The geologic time represented by a stratigraphic unit, unconformity, range of a fossil, etc. *A.G.I. Supp.*

timing. The time elapsing between two successive exposures of an aircraft camera when taking vertical photographs. *See also* photogrammetry. *Ham.*

timing lines. Marks or lines placed on seismic records at precisely determined intervals of time (usually at intervals of 0.01 or 0.005 seconds) for the purpose of measuring the time of events recorded. The timing mechanism commonly includes an accurate tuning fork for the determination of small time intervals. *A.G.I.*

tin. a. A soft, faintly bluish-white metallic element in the fourth group of the periodic system. Obtained as a soft crystalline metal, malleable at ordinary temperatures, but brittle when hot. Sometimes occurs native; found in several minerals, but its only ore is cassiterite. Is used principally as a coating to protect iron and copper, as tin foil, and in solder, bronze, and other alloys. Commercially, tin is available in three grades. Grade A tin must assay 99.75 percent tin; grade B must assay 99.7; and grade C, or common tin, must assay 99.0 percent tin. Symbol, Sn; atomic weight, 118.7; specific gravity, 7.3 at 20° C. *BuMines Bull. 630, 1965, pp. 962–963; Webster 3d; Bennett 2d, 1962.* b. To coat with tin, as to tin iron; tinplate. *Standard, 1964.*

tinaja. Mex. A large earthen jar. *Fay.*

tinajitas. Small, shallow flutes developed on flat surfaces of limestone, southwest Texas. *A.G.I.*

tin bath. Molten tin into which sheets of iron are dipped in order to form tinplate. *Standard, 1964.*

tin bound. a. Corn. To mark a limit, as on a tract of waste land, within which one claims or reserves the right to mine unworked tin ore. *Standard, 1964.* b. Land so reserved. *Standard, 1964.*

tin bromide. *See* stannic bromide. *CCD 6d, 1961.*

tin-bronze. *See* stannic sulfide. *CCD 6d, 1961.*

tincal. The name given, since early itmes, to crude borax obtained from salt lakes in Kashmir, India, and Tibet, China. *C.T.D.* Also spelled tinkal. *Fay.*

tincalconite. a. A colorless or white mineral without cleavage, $Na_2O.2B_2O_3.5H_2O$. *Larsen, p. 68.* b. A pulverulent variety of borax, with 32 percent water. Same as octahedral borax; mohavite. *Fay.*

tin-can safety lamp. A Davy lamp placed inside a tin can or cylinder having a glass in front, airholes near the bottom, and open-topped. *Fay.*

tin chloride. *See* stannic chloride. *CCD 6d, 1961.*

tin cry. Crackling sound heard when pure tin is bent; assumed to be due to the sliding of layers of crystals over one another. *Bennett 2d, 1962.*

tin cut. A misleading trade term sometimes applied to glass imitations of rock crystal beads which have been cut, as distinguished from molded or cast beads. *See also* tin polished. *Shipley.*

tinder. Any dry inflammable material such as might be used for kindling a fire. *Crispin.*

tinder ore. An impure variety of jamesonite. *Standard, 1964.*

tin disease. *See* tin pest. *Bennett 2d, 1962.*

tin dish. a. A pan used by prospectors for washing gold-bearing materials and extracting the gold. *Fay.* b. *See* pan, a. *Long.*

tin dredging. The extraction of tin-bearing ore from placers by means of dredges. In large-scale operations, tin or gold dredges may handle up to 15,000 cubic yards of gravel per 24 hours and dig 135 feet below pond level. *Nelson.*

tine. The actual excavating tooth or point of a grab bucket, scraper loader, dragline or excavator bucket. *Ham.*

tin enamel. An opaque glaze containing tin oxide. *ACSG, 1963.*

tin floor. a. Corn. A thin flat mass of tinstone between beds of rock. *Fay.* b. A flat mass of tin ore. *Standard, 1964.*

tinfoil. Tin or a tinlike alloy made into foil. *Standard, 1964.*

tin frame. Corn. A sloping table used in dressing tin-ores slimes. It is discharged by turning it upon an axis till its surface is nearly vertical, and then dashing water over it to remove the enriched deposit. A machine frame or self-frame thus discharges itself automatically at intervals; a hand frame is turned for the purpose by hand. *Fay.*

ting. The same as sycee silver. *Standard, 1964.*

tinge. A color designation. A faint trace of a hue which modifies another hue, as a blue with a tinge of green, that is, blue tinged with green or, stated differently, very slightly greenish-blue. *Shipley.*

tin glass. A name formerly applied to bismuth. *Fay.*

tin glaze. An opaque glaze of stannic oxide, used on pottery. *Standard, 1964.*

tin ground. Corn. Tin-bearing alluvium, stream works. *Arkell, p. 53.*

tinguaite. A dike rock composed of alkalic feldspars, nepheline, alkalic pyroxene, and amphibole. The rock is commonly porphyritic and the mafic constitutents have a characteristic crisscross orientation in the groundmass. A textural variety of phonolite. *A.G.I.*

tinguaitic. Applied to the texture of tinguaites, and consisting of a mosaic of equigranular grains of feldspar and nepheline, between which, and sometimes within which, are numerous needles of sodic pyroxene, more or less parallel to the contacts. *Johannsen, v. 1, 2d, 1939, p. 235.*

tin hat. A head covering made of reinforced sheet aluminum or plastic-impregnated fabric and shaped somewhat like a sun helmet; worn for protection and/or to reduce the severity of head injuries from falling objects. *Long.*

tin house. Building or room for tin plating. *Bennett 2d, 1962.*

tinkal; tincal. Borax. *Dana 6d, p. 886.*

tinker. Derb. Laminated carbonaceous shale. *Fay.*

tin mill. Plant for manufacturing tin and terneplate. *Bennett 2d, 1962.*

tin minerals. Virtually all the industrial supply comes from cassiterite (SnO_2), though a little has been won from the sulfides stannite, cylindrite and franckeite. Bulk of cassiterite comes from alluvial workings. Main market is in tin plating, tin foil, solders, bearing metals, bronze and other alloys, and in such salts as opacifiers and dye mordants. *Pryor, 3.*

tinned rope. Rope made of wires that have been coated with tin to protect them from corrosion. *Zern.*

tinned sheet iron. *See* tinplate. *Fay.*

tinner. a. A tin miner. *Webster 3d.* b. A tinsmith. *Webster 3d.*

tinning. a. The act, operation, or process of covering with or preserving in tin. *Standard, 1964.* b. A protective coating of tin, as on sheet iron. *Standard, 1964.* c. Coating metal with a very thin layer of molten filler metal. *ASM Gloss.*

tinning metal. An alloy of equal parts of tin and lead; used by electrotypers for coating copper shells before backing. *Fay.*

tin ore. *See* cassiterite. *CCD 6d, 1961.*

tin pest; tin disease. Disintegration of tin to a gray powder at low temperatures. *Bennett 2d, 1962.*

tin pickling. In the manufacture of tinplate, the process of immersing thin iron plate in a bath of acid, previous to tinning. *Standard, 1964.*

tin-pickling machine. A machine for hoisting and lowering the plates in the process of pickling and washing. *Standard, 1964.*

tin plate. Sheet iron or steel, cleaned by pickling in acid and then passed through bath of molten tin to produce coating. Three grades are charcoal plate, coke plate and crystallized. Tin is also deposited by electroplating. *Pryor, 3.*

tin polished. A term correctly applied to gems which have been polished on tin laps. Also incorrectly used synonymously with the term tin cut. *Shipley.*

tin pot. a. A vessel for holding molten tin in the tin plating process. *Webster 3d.* b. A bath of molten tin in which sheet iron or sheet steel is dipped in making tinplate. *Standard, 1964.*

tin protoxide. *See* stannous oxide. *CCD 6d, 1961.*

tin pyrites. Same as stannite. *Standard, 1964.*

tin, roofing. Terneplate made with a 25 percent tin alloy. *Bennett 2d, 1962 Add.*

tinsel. a. To give a metallic appearance to (ceramic ware) by washing with a metallic substance. *Standard, 1964.* b. Very thin glass that has been crushed and silvered for use as a decorative material. *Compare* glass frost. *Dodd.*

tin spar. Synonym for cassiterite. *Fay.*

tinstone. Cassiterite; a miner's name. *Standard, 1964.*

tin stuff. Eng. Tin ore mixed with its gangue. *Fay.*

tin sweat. *See* sweat, d. *ASM Gloss.*

tint. A color which has been lightened by the addition of white. *Hansen.*

tin telluride. Gray; isometeric; SnTe; molecular weight, 246.29; specific gravity, 6.48; melting point, 780° C; and insoluble in water. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-233.*

tinter. *See* painter, hand. *D.O.T. 1.*

tinticite. A hydrated basic ferric phosphate, $2FePO_4.Fe(OH)_3.3\frac{1}{2}H_2O$, as a compact creamy-white wall coating in a limestone cave at Tintic, Utah. Named from locality. *Spencer 18. M.M., 1949.*

tintometer; comparator. Instrument in which color of test solution is compared with that of reference cell or tinted glass slide. Also called colorimeter. *Pryor, 3.*

tin-vanadium yellow. *See* vanadium yellow. *Dodd.*

tin-white cobalt. Synonym for smaltite. *Fay.*

tin witts. Corn. The product of the first dressing of tin ores, containing, besides tinstone, other heavy minerals (wolfram and metallic sulfides). It must be roasted before it can be further concentrated. Its first or partial roasting is called rag burning. *Fay.*

tinworks. A place or an establishment where tin is manufactured or mined. *Standard, 1964.*

Tioughniogan. Middle Middle Devonian. *A.G.I. Supp.*

tip. a. The point at which loaded mine cars are dumped on the surface. Also called tipple. *Hudson.* b. Eng. A platform upon which a pair of iron tramrails, fixed upon an axle and attached to a lever, are bolted down, for emptying tubs or cars into wagons, boats, bins, etc. Also called tipple. *Fay.* c. S. Wales. A coal mine spoil heap. *Nelson.* d. A piece of tool material secured to a cutter tooth or blade. *ASM Gloss.*

tinphouse man. *See* slate picker, a. *D.O.T. 1.*

tipped bit. A. drill bit in which the cutting edge is made of specially hard material. *B.S. 3618, 1964, sec. 6.*

tipped solid cutters. Cutters having a body of one material with tips or cutting edges of another material brazed or otherwise bonded in place. *ASM Gloss.*

tipper. a. A vehicle, commonly a truck, with a body which can be raised at one end or sideways in order to discharge its contents. *Nelson.* b. An apparatus for emptying cars of coal or ore, by turning them upside down and then bringing them back to the original position with a minimum of manual labor. Tipple is the common name. *Fay.* c. Aust. The man who runs skips into a tippler. *Fay.*

tipping lorry. A lorry with its body pivoted so as to discharge its load, often to either side as well as endways. *Ham.*

tipping wagon. A small wagon, similar to the jubilee wagon running on a narrow gage track and pivoted for either end or side tipping. *Ham.*

tipple. a. Originally the place where the mine cars were tipped and emptied of their coal, and still used in that sense, although now more generally applied to the surface structures of a mine, including the preparation plant and loading tracks. *B.C.I.* b. The dump; a cradle dump. *Fay.* c. Aust. The tracks, trestles, screens, etc., at the entrance to a colliery where coal is creened and loaded. *See also* tipper, b; tip. *Fay.*

tipple boss. In bituminous coal mining, a foreman in charge of operations at a tipple where the coal output of a mine is dumped, screened, cleaned, and loaded into railroad cars or trucks for market. Also called tipple foreman. *D.O.T. 1.*

tipple boy. *See* slate picker, a. *D.O.T. 1.*

tipple engineer. In bituminous coal mining, one who operates steam engines or motors that drive conveyors, shaking screens, and other machinery in a tipple where coal is prepared for market. Also called tipple operator. *D.O.T. 1.*

tipple foreman. *See* tipple boss. *D.O.T. 1.*

tipple inspector. *See* coal inspector. *D.O.T. 1.*

tippleman. a. In bituminous coal mining, a general term applied to a worker in a tipple. Classifications are made according to type of work, as slate picker, tipple boss, tipple engineer, tipple repairman, etc. *D.O.T. 1.* b. In metal mining, a laborer who uncouples one or more loaded mine cars from train, pushes them on rotary dumper, and actuates dumper which turns cars over and dumps contents into chutes or bins. *D.O.T. 1.*

tipple mechanic. *See* tipple repairman. *D.O.T. 1.*

tipple operator. *See* tipple engineer. *D.O.T. 1.*

tippler. a. A power-operated appliance for discharging the coal or mineral from a mine car. It consists of a steel structure with a rail track to receive a mine car. On rotation, it discharges the material (usually) sideways on to a primary screen or bunker. Also called dumper; unloader. *See also* end-discharge tippler; multiple tippler; rotary vibrating tippler; tip; tipper; tipple. *Nelson.* b. *See* slate picker. *D.O.T. 1.*

tipple repairman. In bituminous coal mining, a maintenance mechanic who inspects, repairs, and overhauls machinery in a tipple. Also called tipple mechanic. *D.O.T. 1.*

TIR Abbreviation for total indicator reading. *ASM Gloss.*

tirar. a. Sp. To hoist or wind. *Fay.* b. Sp. To blast or shoot. *Fay.* c. Mex. T. una labor, prospecting; placer mining. *Fay.*

T-iron. a. An angle iron having T-shaped cross section. *Fay.* b. T-rails used in a mine, as distinguished from wooden rails. *Fay.*

tirr. a. Scot. The covering on rock in a quarry; overburden. Also called tirring. *Fay.* b. Scot. To remove the covering from the rock in a quarry. *Fay.*

tisar. In plate-glass making, a heating furnace for an annealing chamber. *Standard, 1964.*

tit. An imperfection; a small protrusion on a glass article. *ASTM C162–66.*

titan. a. Titanium. *Standard, 1964*. b. Titanite. *Standard, 1964.*

titanate. a. Any of various compounds (as barium titanate) that are multiple oxides or solid solutions of titanium dioxide with other metallic oxides. *Webster 3d*. b. An ester of the general formula, $Ti(OR)_4$, obtainable by the reaction of titanium tetrachloride with an alcohol or a phenol in the presence of a base. *Webster 3d.*

titanate ceramics. A group of electroceramic materials generally based on the compound barium titanate but often with the addition of other titanates, zirconates, stannates, or niobates. These ceramics are notable for their high dielectric constant (up to, and even exceeding 10,000 compared with a value of 5 to 10 for the more common ceramic materials); because of this property they find use in capacitors. Titanate ceramics are also used where piezoelectric properties are needed, that is in transducers. *Dodd.*

titanaugite. A titaniferous variety of augite, $(Ca,Na)(Mg,Fe.Ti)(Si,Al)_2O_6$. *English.*

titan crane. A heavy crane generally of at least 50 tons lifting capacity which consists of a portal frame carrying a swing-jib crane and is used for building breakwaters and for shipbuilding. *See also* Goliath crane. *Ham.*

titanhornblende. A titaniferous variety of hornblende. *English.*

titania. *See* titanium dioxide.

titania brick. Rutile, TiO_2, formed into brick, using lime as a binder. *Bureau of Mines Staff.*

titania ceramic. Any ceramic whiteware in which titania, (TiO_2), is the essential crystalline phase. *ACSB-4.*

titania porcelain. A vitreous ceramic whiteware for technical application in which titania, (TiO_2), is the essential crystalline phase. *ASTM C242–60.*

titania whiteware. Any ceramic whiteware in which titania, (TiO_2), is the essential crystalline phase. *ASTM C242–60.*

titanic. Of, pertaining to, or containing titanium. Used especially for compounds in which titanium is tetravalent. *Webster 3d.*

titanic anhydrite. A white pulverulent titanium oxide, TiO_2, found native as brookite, octahedrite, and rutile, and a common constitutent of iron ores. Also called titanic oxide. *Fay.*

titanic iron ore. Ilmenite, $FeTiO_3$. *Fay.*

titanic schorl. Rutile. *Standard, 1964.*

titaniferous. Carrying titanium, as titaniferous iron ore. *See also* ilmenite. *Fay.*

titaniferous augite. *See* augite. *Hess.*

titaniferous magnetite. Magnetite containing titanium. *Bateman.*

titanite; sphene. A calcium silicotitanite, $CaTiO(SiO_4)$, with iron, manganese, or yttrium in varying amounts. Monoclinic. Wedge-shaped crystals. Weakly radioactive; brown, gray, yellow, green, red, or black; a very widespread mineral commonly occurring in hornblende granites, syenites, and diorites; also common in schists and gneisses; found associated with pyroxene, amphibole, chlorite, scapolite, zircon, and apatite. *Crosby, pp. 111–112; Dana 17.*

titanium. A silvery-gray or iron-gray, metallic element in group IV of the periodic system found in nature only in combined form. The chief ore is ilmenite. Characterized by strength; lightness; and corrosion resistance. Used in steel alloys, as a deoxidizer, and as a carbide in cemented carbides. Symbol, Ti; valences, 2, 3, and 4; atomic number, 22; atomic weight, 47.90; and specific gravity, 4.5 (at 20° C). Titanium burns in air; is the only element that burns in nitrogen; melting point, 1,675° C or 1,725° ± 10° C; boiling point, 3,260° C; insoluble in water; and soluble in dilute acids. It is dimorphic (having two allotropic forms): (1) alpha titanium, hexagonal, stable below 880° C; and (2) beta titanium, isometric, stable from 880° C to the melting point. The metal occurs in rutile, ilmenite, and sphene (titanite) primarily, and it is the ninth most abundant element in the crust of the earth. Used as an alloying agent with aluminum, molybdenum, manganese, iron, and other metals. Alloys of titanium are used in aircraft and missile parts because they have light weight, strength, and the ability to withstand temperature extremes, and in ship parts because they resist salt-water corrosion. *C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-141, B-233.*

titanium boride. *See* titanium diboride. *CCD 6d, 1961.*

titanium carbide. A compound produced by fusing titanium dioxide with carbon or calcium carbide. Has a melting point in the range of 3140 to 3160° C. This very hard, refractory material is used for wear-resistant applications and where good thermal shock resistance is needed, as in bearings, nozzles, and special refractories under either neutral or reducing conditions. *Lee.*

titanium diboride; titanium boride. TiB_2; hexagonal; molecular weight, 69.52; oxidative resistance up to 1,400° C; melting point, 2,480° C or 2,900° C; specific gravity, 4.50; Mohs' hardness, 9+ and low electrical resistance. Used as a metallurgical additive, a refractory, a cermet component, and in nuclear steels. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-233.*

titanium dioxide; titanium oxide; titanic dioxide; titanic oxide; titania; rutile; anatase; octahedrite; brookite. Colorless, white, pale yellow or yellowish red, reddish-brown, brown, blue or bluish, violet, and black; tetragonal and orthorhombic; TiO_2; molecular weight, 79.90; specific gravity, 3.82 to 5.13 depending on crystal system and crystal form; Mohs' hardness, 5.5 to 6.5; melting point, 1,825° to 1,850° C; boiling point, 2,500° to 3,000° C; insoluble in water and in most acids; and soluble in hot concentrated sulfuric acid and in alkalies. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-233, B-242, B-245; CCD 6d, 1961*. Titanium dioxide occurs as the minerals rutile (tetragonal); anatase or octahedrite (tetragonal); and brookite (orthorhombic). Titanium dioxide is a common constitutent of iron ores. *Fay; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-242, B-245.* Titanium dioxide as rutile: Colorless, pale yellow, reddish-brown, red, bluish, violet, and black; tetragonal; adamantine to submetallic luster; refractive indexes, 2.616 and 2.903; specific gravity, 4.26 and ranges from 4.18 to 5.13; Mohs' hardness, 6.0 to 6.5; melting point, 1,830° to 1,850° C; boiling point, 2,500° to 3,000° C; insoluble in water and in most acids; and soluble in hot concentrated sulfuric acid and in alkalies. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-234, B-245.* Titanium dioxide as anatase or octahedrite: Brown, blue, and black; tetragonal; refractive indexes, 2.493 and 2.554; specific gravity, 3.84 and ranges from 3.82 to 3.95 Mohs' hardness, 5.5 to 6.0 insoluble in water in in most acids; and soluble in hot concentrated sulfuric acid and in alkalies. Titanium dioxide as brookite: White, brown, yellowish, reddish, and iron black; orthorhombic; refractive indexes, 2.583, 2.586, and 2.741; specific gravity, 4.17 and ranges from 3.87 to 4.17; Mohs' hardness, 5.5 to 6.0; melting point, 1,825° C; insoluble in water and in most acids; and soluble in hot concentrated sulfuric acid and in alkalies. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-233, B-242.* Titania commonly refers to synthetic white titanium dioxide that is produced mainly from ilmenite which contains 50 to 54 percent TiO_2. Titania is used as a pigment, and it replaces zinc oxide in manufacturing white rubber and as a filler for paper. Titania can be used alone as a refractory and as an electrical insulator. Its crystals show marked piezoelectric effects and have a greater brilliance and a higher refractive index than diamond. *Merriman.* Titanium dioxide possesses the greatest hiding power of all the white pigments. Used in glassware and in ceramics, in enamel frits, in welding rods, and single crystals are used as high-temperature transducers. *CCD 6d, 1961.*

titanium dioxide pigments. Generally there are three grades of titanium dioxide pigments sold domestically. Rutile and anatase grades are more or less pure titanium dioxide, but owing to a difference in crystal structure, they differ slightly in hiding power and chalking quality. Titanium dioxide of pigment quality is manufactured principally by treating finely ground ilmenite or titanium slag with concentrated sulfuric acid. They are used in the production of paints, paper, and many other products requiring a white pigment with a high hiding power and chemical stability. Also used in ceramics, fiberglass, and in making titanium gems. *BuMines Bull. 585, 1960, pp. 883, 885, 887, 890.*

titanium hydride. Gray-black; metallic; TiH_2; molecular weight, 49.92; dissociates above 290° C or at 400° C; specific gravity, 3.8 or 3.9 (at 12° C); and is attacked by strong oxidizing agents. Used in refractories, in powder metallurgy, in the production of foamed metals, in solder for joining metal and glass, as a source of hydrogen gas (approximately 1,800 cu cm of hydrogen at standard temperature and pressure per cu cm of the hydride), as a hydrogenation agent, and for reducing atmospheres for furnaces. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-233.*

titanium metal. One of the newest of the engineering metals used primarily in aircraft and missiles because of its high strength-weight ratio and strength at elevated temperatures. The metal's corrosion resistance make it ideal for use in chemical process equipment such as anodizing racks and reaction vessels for leaving cobalt-nickel-sulfide ores. Symbol Ti; atomic weight 47.9; specific gravity 4.5. *Bureau of Mines Staff.*

titanium minerals. Main commercial ones are rutile (TiO_2) and ilmenite ($FeTiO_3$). Used in paints, pigments, fillers for plastics, steel metallurgy, welding, enamels, smoke-screen chemicals and as titanium metal where strength, lightness and corrosion-resistance justify cost. *Pryor, 3.*

titanium nitride. TiN; a special refractory material (melting point, 2,950° C). It can readily be produced from $TiCl_4$, and NH_3. *Dodd.*

titanium oxide. TiO_2; used as an opacifier, particularly in vitreous enamels, and as a constituent of some ceramic colors. Titania and titanate electroceramics, for use in the radio-frequency field, are based on this oxide and its compounds. Titania occurs in three crystalline forms: anatase, brookite, and rutile. *Dodd.*

titanium peroxide. *See* titanium trioxide. *CCD 6d, 1961.*

titanium silicide. Ti_5Si_3; 2,120° C, specific gravity, 4.2. This special ceramic has good resistance to high temperature oxidation but not to thermal shock. *Dodd.*

titanium sponge. The metal product from reducing titanium tetrachloride with magnesium in the Kroll process. It is called sponge because of its sponge-like appearance. Sodium reduced metal also is referred to as sponge. *BuMines Bull. 630, 1965, p. 974.*

titanium tetrachloride. A volatile colorless liquid which is used in the manufacture of titanium metal and pigments. *BuMines Bull. 630, 1965, p. 974.*

titanium trioxide; titanium peroxide. Yellow; TiO_3; and is soluble in acids. Used in dental porcelain and in dental cements and in yellow tile. *CCD 6d, 1961.*

titanmagnetite. A titaniferous magnetite (titanomagnetite) containing TiO_2 in solid solution, as distinct from ilmenomagnetite with exsolution ilmenite. *See also* mogensenite. *Spencer 21, M.M., 1958.*

titanmelanite. A titaniferous melanite garnet approaching schorlomite in composition. *English.*

titanomagnetite. Magnetite containing titanium. *Bateman.*

titanous. Of, pertaining to, containing, or derived from titanium. Used especially for compounds in which titanium is trivalent. *Webster 3d.*

titan process. A process of concentrating iron ore which comprisses the steps of effecting a dry, thermal partial reduction of the iron in the ore to the metallic state to a degree or reduction of between 50 and 80 percent, subjecting the reduced product to a magnetic separation and recovering the magnetic concentrate. *Osborne.*

titer. The solidifying range of a liquid fatty acid. *Pryor, 4.*

titer (of soaps). The melting point of the fatty acids derived from a fat or oil. *Lowenheim.*

tithe ore. Eng. A portion of ore set aside for the payment of rental or royalty on mineral lands. *Fay.*

Tithonian. Synonym for Portlandian. *A.G.I. Supp.*

title. The right to enter, develop and work a coal or mineral deposit. *See also* claim; lease. *Nelson.*

titration. a. A determination of the reactive capacity, usually of a solution. Especially, the analytical process of successively adding from a burette measured amounts of a reagent (as a standard solution) to a known volume of a sample in a solution, or to a known weight of a sample, until a desired end-point (as a color change or a large change in potential of the solution) is reached. *Webster 3d.* b. The operation forming the basis of volumetric analysis. *See also* volumetric analysis. *Nelson.*

TIV Abbreviation for total indicator variation. *ASM Gloss.*

tizar. Mex. A white, pure silica used in glass-making. *Fay.*

tizon. Mex. A bond in masonry. *See also* diente, b. *Fay.*

TKPP Abbreviation for tetrapotassium pyrophosphate. *See also* potassium pyrophosphate. *CCD 6d, 1961.*

Tl Chemical symbol for thallium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Tm Chemical symbol for thulium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

TM Abbreviation for temperature meter, technical manual. *Zimmerman, p. 106.*

tn Abbreviation for ton. *Zimmerman, p. 110.*

TNA Abbreviation for tetranitroaniline. *CCD 6d, 1961.*

TNT Abbreviation for trinitrotoluene. *CCD 6d, 1961.*

TNT/ammonium nitrate explosive. An explosive containing ammonium nitrate sensitized with trinitrotoluene. A proportion of aluminum powder or calcium silicide may be added to increase power and sensitiveness. It is susceptible to moisture, and under wet conditions, is used only in a watertight container. *See also* A.N./fuel oil explosive. *Nelson.*

toadback marl. Eng. Unlaminated marl with lumpy fracture, in contrast to beechleaf marl, Lancashire. *Arkell.*

toadrock. *See* toadstone. *Fay.*

toad's-eye. Eng. Shelly pink limestone in the Corbula Beds of the Purbeck Beds at Durlston Bay. So called because full of the small gastropods Pachychilus manselli which resemble eyes when seen in transverse section. *Compare* rabbit-eye. *Arkell.*

toad's-eye tin. Massive cassiterite. *Bennett 2d, 1962.*

toadstone. a. Eng. A kind of traprock. *Fay.* b. Eng. An old Derbyshire name for amygdaloidal basalt lava in the Carboniferous Limestone. *Arkell.* c. Applied earlier to various stones or stonelike objects likened in color or shape to toads (batrachites, bufonites, crapodius). *Arkell.*

to-and-fro ropeway. *See* jig-back. *Nelson.*

toas. Corn. To shake or toss tin ore in a kieve or vat with water, to cleanse and dress it. *Fay.*

tobacco rock. Light yellow or gray with brown limonite stains, a favorable host rock in the Salt Wash formation, Colorado plateau. *Ballard.*

tobermorite. A hydrated calcium silicate approximating in composition to $5CaO \cdot 6SiO_2 \cdot 5H_2O$. Tobermorite gel is the principal cementing compound in hardened Portland cement. *Dodd.*

Tobin bronze. A type of alpha-beta brass or Muntz metal containing tin. It contains 59 to 62 percent copper, 0.5 to 1.5 percent tin, and the remainder zinc; used when resistance to seawater is required. Also called naval brass. *C.T.D.*

todorokite. A hydrous oxide of Mn^2, alkaline earths and Mn^4; formula uncertain, possibly $(Mn,Ba,Ca,Mg)Mn_3O_7.H_2O$. Occurs as black spongy banded and reniform aggregates composed of minute, possibly monoclinic, lathlike crystals at Hokkaido, Japan. *Dana 7, v. 1, p. 573.*

toe. a. The base of the coal, ore, or overburden face in a quarry or opencast mine. *Nelson.* b. The projection of the bottom of a face beyond the top. *Nichols, 2.* c. The burden of material between the bottom of the borehole and the free face. *Fay.* d. Sometimes used to designate the bottom of the borehole itself as distinguished from the heel, collar or mouth of the borehole, which is the open end. *Fay.* e. A spurn, or small pillar of coal. *Fay.* f. The front end of a frog, opposite the heel, in a car track. *Fay.* g. The part of the base of a reinforced concrete retaining wall projecting in front of the face of the stalk. *C.T.D.* h. The base of a bank, bench, or slope in a quarry or open-pit mine. *Bureau of Mines Staff.*

toeboard. A raised edging around the perimeter of a work platform to prevent handtools from being accidentally kicked or knocked off the platform. *Long.*

toe crack. A base-metal crack at the toe of weld. *ASM Gloss.*

toe cut. In underground blasting, the cut obtained by the use of single cut holes inclined downward. *Lewis, p. 165.*

toe filter. A graded filter constructed at the lower end of an earth dam on its free side. *Ham.*

toehole. A blasting hole, usually drilled horizontally or at a slight inclination into the base of a bank, bench, or slope of a quarry or open-pit mine. *Bureau of Mines Staff.*

toeing-in. A quarry term for the wedging-in of the end of a granite sheet under an overhanging joint, probably in consequence of the faulting of the sheets along the joint. It is also applied to the overlapping of lenticular sheets. *Fay.*

toellite. A biotite-hornblende porphyrite, with garnets, that forms dikes in mica schist and gneiss near Meran, Tirol, Austria. *Fay.*

toenails. In geology, curved joints intersecting the sheet structure, in most cases striking with the sheets, in some differing from them in strike 45° or more. *Fay.*

toensbergite. A name given by Brögger to certain feldspathic syenitic rocks, from Tönsberg, Norway, that are close relatives of the anorthosites. They differ from the anorthosites in their smaller percentage of lime and higher percentage of alkalies. *Fay.*

toe of a shot. The distance from the inner end of the hole to the adjacent free face measured at right angles to the direction of the hole; or that portion of the hole which is filled with powder; or that part of the seam to be broken lying between the powder and a free face. *Zern, p. 668.*

toe of weld. The junction between the face of a weld and the base metal. *ASM Gloss.*

toeset. The forward, lower part of a tangential foreset bed. Name derived from deposition at the toe of a tangential foreset. *Pettijohn.*

toe-to-toe drilling. The drilling of large diameter blasting holes in quarries and opencast pits. They are put down vertically from top to bottom of the quarry face. Deck loading is often adopted with half to two-thirds of the total charge at the bottom and the remainder in one or more deck charges as required. *Nelson.*

tofo. Mex. China clay. *Fay.*

tofus. Same as tufa. *Standard, 1964.*

to gage. a. Made to gage, or a size as specified, especially as applied to the outside set diameter of bits and reaming shells and the inside diameter of a borehole. *Long.* b. To determine, by measurement or other test, the capacity, quantity, or dimension. *Long.*

toggle action. Application of crushing force so that the distance moved diminishes without change of input strength, between gape and set. Thus greatest speed of movement of the approaching faces is applied with weakest thrust and vice versa. *Pryor, 4.*

toggle joint. A joint having a central hinge like an elbow, and operated by applying the power at the junction of motion, as from horizontal to vertical, and giving enormous mechanical advantage; a mechanism common in many forms of presses, and in stone crushers. *Standard, 1964.*

toggle mechanism. A mechanism utilized to apply heavy pressure from a small applied force, such as in a jaw breaker, and other machinery. *Ham.*

toggle press. A mechanical press in which the slide is actuated by one or more toggle links or mechanisms. *ASM Gloss.*

toise. A unit of length used in early geodetic surveys and equal to about 6.4 English feet. It became the legal standard of length in France, and from it was derived the French meter. *A.G.I.*

token. a. Aust. A metal or leather ticket stamped with a distinctive number, fastened to a skip so as to indicate to the weighman who mined the coal. A ticket; tag; tally. *Fay.* b. Wales. A thin bed of coal, etc., indicating a thicker seam at no great distance. *Fay.*

tol. Corn. The land owner's part of the tin ore; toll or rental. *Fay.*

tolerance. A specified allowance (either plus or minus) of the given dimensions of a finished product to take care of inaccuracies in workmanship of parts to be fitted together. The amount allowed as tolerance is generally small as compared with the standard dimension of the part; for example, the tolerance allowed in the set diameters of a diamond bit is plus or minus five-thousandth (0.005) of an inch. *Long.*

tolerance limits. In control of a measured value in a process, limited drift from optimum or norm (for example, pH 7.6+ or −0.2). *Pryor, 3.*

toll. Ches. Royalty on rock salt, or other mineral. *Fay.*

toll enrichment. A proposed arrangement by which uranium owned privately could be enriched in uranium 235 content in Government facilities upon the payment of a service charge. *L&L.*

toller; tollur. Corn. One who inspects or superintends tin-bearing lands. To review or inspect. *Fay.*

toluene; toluol; methylbenzene; phenylmethane. Colorless; liquid; $C_6H_5.CH_3$; melting point, −94° C; boiling point, 110° C; insoluble in water; and miscible with alcohol, with ether, and with chloroform. It occurs in coal tar and wood tar. Used as a solvent and as an intermediate for its derivatives. *C.T.D.* Molecular weight, 92.13; C_7H_8; melting point, −95° C; boiling point, 110.6° C; specific gravity, 0.8669 (at 20° C); soluble in acetone, in carbon disulfide, and in ligroin; and miscible with benzene. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-571.*

toluol. *See* toluene. *Nelson.*

tom. a. An inclined trough in which gold-bearing earth or gravel is crudely washed; usually called long tom because it is longer than the rocker. *Webster 2d.* b. Eng. A parting of black shale in a coal seam, Cumberland. *Compare* bulgram. *Arkell.*

Tomassi process. An electrolytic process for refining lead in which the electrolyte is a solution of a double acetate of lead and potassium or sodium. The anodes are cast from crude argentiferous lead; the cathodes are in the form of large disks of copper or aluminum bronze and are about half immersed in the electrolyte, in which they slowly revolve, each being placed between two anodes. The lead crystals formed are detached by scrapers; when in sufficient quantity they are collected, drained, washed, dried, and fused with a little charcoal. *Fay.*

tombac. Any one of several copper and zinc alloys, as Prince's metal, Mannheim gold, etc. Also spelled tambac and tombak. *Standard, 1964.*

tombolo. a. Upon the coast of Italy where island-tying in its various stages is beautifully shown, such a bar is called a tombolo. For convenience in distinguishing island-tying bars from those of other kinds, it was proposed to call every bar of this kind a tombolo, giving an English plural tombolos. *A.G.I.* b. Spits or bars may tie islands to the mainland, the bar then being known as a tombolo, and the island as a tied island. *A.G.I.* c. A bar connecting an island with the mainland or with another island. *A.G.I.*

tomite. A variety of algal coal the name of which was later changed to sapropmyxite. *Tomkeieff, 1954.*

tommy. A movable point in rail track where there is only one point whose fulcrum is at the crossing; a swing rail. *Mason.*

tommy bar. A short rod used as a lever or handle for turning a jackscrew or a spanner by being inserted loosely in the hole provided for that purpose. *Long.*

tommy dodd. Aust. A series of small pulleys, with vertical axles placed betwen the rails at a curve, so as to keep an endless rope in place. *Fay.*

tomography. A division of radiography dealing with the photography of a particular plane in an object while leaving out undesired detail in other planes. Although this technique was developed for medical radiography, it is recommended for certain purposes in work with metals where it is essential that the location of faults be exactly known. *Osborne.*

ton. a. Any of various units of weight: (1) a unit that equals 20 long hundredweight or 2,240 pounds, used chiefly in England; also called a long ton; (2) a unit that equals 20 short hundredweight or 2,000 pounds, used chiefly in the United States, Canada, and the Republic of South Africa; also called a short ton; (3) a unit of internal capacity for ships that equals 100 cubic feet; also called a register ton; (4) a unit that approximately equals the volume of a long ton weight of sea water; used in reckoning the displacement of ships and its equals 35 cubic feet; also called a displacement ton; and (5) a unit of volume for cargo freight usually considered to be 40 cubic feet; also called a freight ton; a measurement ton. *Webster 3d.* b. A unit of weight for large quantities. In Great Britain, the short ton is used in metal mining; the long ton in coal mining; and the smelter's ton is heavier than the long ton. *C.T.D.* Usually not abbreviated, but abbreviations are t and tn. *BuMin Style Guide, p. 62; Webster 3d.*

tonalite. A coarse-grained igneous rock, quartz-mica diorite. Two varieties are distinguished: soda tonalite, with albite in excess of anorthite, and lime tonalite, with anorthite in excess of albite. *Compare* adamellite. *C.T.D.*

Tonawandan. Middle Middle Silurian. *A.G.I. Supp.*

Toncan copper-molybdenum iron. *See* pure iron. *Mersereau, 4th, p. 482.*

ton-cap screen. Commercial brand of wire screen cloth with long rectangular meshes. *Pryor, 3.*

tone. That attribute of a color which determines its position in a scale from light to dark. Thus white, and also light gray, are light tones, and dark gray the dark tone of the same color sensation; pink is a light tone of red, and maroon a dark tone. A light tone is usually known as a tint, a dark tone as a shade. *Shipley.*

tonelada. Sp. Term meaning ton. The ton of Castile equals 2,032.2 pounds avoirdupois; the Mexican and Spanish Amercian ton equals 2,028.88 pounds avoirdupois; the metric ton, 1,000 kilogram equals 2,204.6 pounds avoirdupois. *Fay.*

tong die. A hard, replaceable, serrated metal insert in pipe tongs, which comes in contact with and grips the outside of a pipe, casing, or drill rod. Also called tong key. *Long.*

tong hold. The portion of a forging billet, usually on one end, that is gripped by the operator's tongs. It is removed from the part at the end of the forging operation. Common to drop-hammer and press-type forging. *ASM Gloss.*

tong key. Synonym for tong die. *Long.*

tong outcrop clay. A fire clay associated with the better bed coal, Yorkshire, England. The raw clay contains about 65 percent SiO_2, 22 percent Al_2O_3, 1.5 percent Fe_2O_3, and 1.6 percent alkalies. *Dodd.*

Tongrian. Synonym for Lattorfian. *A.G.I. Supp.*

tongs. a. A pair of curved arms pivoted to each other, scissor fashion, so that a pull on a ring or chain connecting the short ends will cause the long ends to close, to grip an object between them. *Nichols. See also* pipe grip; pipe tongs; pipe wrench. *Fay.* b. A two-legged instrument used for picking something up or for holding material while it is being worked. Also called a pair of tongs. *Crispin.* c. One of the various tools or wrench devices that can be made to fit and grasp drill rods, casing, or drivepipe. *Compare* chain tongs. *Long.* d. Any of the various tools consisting to two pivoted or hinged legs designed to clasp hot metal, such as a churn-drill bit, while it is being dressed. They are made in several sizes and forms essential to a toolie or a blacksmith. *Long.* e. In gem cutting, a viselike arrangement by which the dop is firmly held in order to press the stone against the wheel. *Standard, 1964.*

tongue. a. Drawbar of a towed vehicle. *Nichols, 2.* b. A piece of iron or steel projecting from the stem of a stamp head. *Fay.* c. A long narrow strip of land, projecting into a body of water. *Schieferdecker.*

tongue joint. In welding, a split joint formed by inserting a wedge-shaped piece into a corresponding split piece and welding the two together. *Fay.*

tongue plate. An adjustable plate which controls the quantity of feed entrapped by the rolls of a double-roll press. *B.S. 3552, 1962.*

tongue test. A test by which crystals or crystalline gemstones, all of which are genuine or synthetic, can be distinguished from glass which feels warmer in comparison, when held to the tongue. *Shipley.*

tongue tile. In a port, the projection partition between gas and air stream. *ASTM C162–66.*

tong up. To couple lengths of drill rod, pipe, or casing, using tongs to grip and screw the members together. *Long.*

ton hr^{-1} Abbreviation for tons per hour. *Bu-Min Style Guide, p. 62.*

tonite. A blasting explosive consisting of a mixture of guncotton with a nitrate and sometimes a nitro compound. *Webster 3d.*

ton-kilometer. A unit of measurement often used for the work done in transport. The number of ton-kilometers is the weight in tons of material transported multiplied by the number of kilometers driven. *Stoces v. 1, p. 166.*

ton mile. In railroading, a standard measure of traffic, based on the rate of carriage per mile of each passenger or ton of freight. *Standard, 1964.*

Ton MPH. A system recently developed that permits calculating how hard an earthmoving tire should work and how much work it is doing. The Ton MPH for any tire is determined by multiplying the mean load and average speed. The resulting figure provides an index to the work a tire is doing. The system enables the operator to determine which type of tires he should use to get top performance without overheating. *Coal Age, v. 71, No. 8, August 1966, p. 234.*

tonnage. The amount of ore handled per day. The amount of ore in sight. *Fay.*

tonnage factor. Cubic feet or ore per ton in deposit. *Pryor, 3.*

tonnage man. In anthracite coal mining, one who is paid at a certain rate per ton of coal mined. *D.O.T. 1.*

ton of refrigeration. The extraction of 200 British thermal units per hour, 12,000 British thermal units per hour or 288,000 British thermal units per day of 24 hours. The last is also called a ton-day of refrigeration. *Strock, 10.*

Tonolowayan. Middle Upper Silurian. *A.G.I. Supp.*

Tonpilz machine. An apparatus for measuring damping values. *Osborne.*

tönsbergite. A red, laurvikitelike rock, in which the feldspars are orthoclase and andesine. Some varieties are porphyritic. *Holmes, 1928.*

Tonsil. Activated decolorizing earth. *Bennett 2d, 1962.*

tonstein. a. Term introduced by G. Bischof (1863–1866) to designate certain argillaceous bands in the hard coal seams of the Carboniferous. *IHCP, 1963, Pt. I.* b. Uncommon Coal Measures rock, consisting mainly of the clay mineral kaolinite, and which may be used as a marker band for correlation. *B.S. 3618, 1964, sec. 5.*

tool box. The same as powder box. *Korson.*

tool box miner. A lazy miner, specifically one who rests on his tool box while his laborer does his work. *Korson.*

tooldresser. a. The driller's helper on a cable tool rig. Formerly a tooldresser on both cable tool and rotary rig was responsible for sharpening or dressing the bit. *A.G.I.* b. A churn driller's helper. *Compare* dresser. *Long.* c. A toolstone-grade diamond inset in a metal shank and used to trim or form the face of a grinding wheel. *Long.*

tooled surface. Term used to describe the surface finish of building limestone that has fine parallel grooves. *AIME, p. 330.*

tooler. A stonemason's chisel 2 to 4 inches broad. *Standard, 1964.* Also called broad tool; drove. *Fay.*

tool extractor. An implement for grasping and withdrawing drilling tools when broken, detached, or lost in a borehole. A fishing tool. Also called tool grab. *Long.*

tool grab. *See* tool extractor. *Long.*

tool grinder. In stonework industry, one who grinds the cutting tools for stoneworking planers and lathes to a keen edge of the desired shape. *D.O.T. 1.*

tool heat treater. One who hardens and tempers tools, dies, and fixtures. *Bureau of Mines Staff.*

toolie. A man who sharpens churn-drill bits; a dresser; a tooldresser. *Long.*

tooling. Compressing and shaping the face of a mortar joint with a special tool other than a trowel. *ACSG.*

tool joint. The point at which drill-stem equipment is provided with screw threads by means of which various members can be coupled. *Long.*

toolmaker. A workman skilled in the making of jigs, fixtures, gages, etc. *Crispin.*

tool marks. a. Sole marks produced by engraving tools such as shells, sand grains, pebbles, and others swept over firm lutite bottoms by currents, generally preserved as casts on base of overlying bed. *Pettijohn.* b. Any of the imperfections in the enamel surface caused by contact with furnace tools during the firing of the enamel. *Enam. Dict.*

tool nipper. A person whose duty it is to carry powder, drills, and tools to the various levels of the mine and to bring such tools and drills as have been dulled by use to the surface. *See also* nipper, a. *Fay.*

toolpusher. The head driller or drill foreman. *Long.*

tool steel. Steel suitable for use in tools, usually for cutting or shaping wood or metals. The main qualities required are hardness, toughness, ability to retain a cutting edge, etc. Contains 0.6 to 1.6 percent carbon. Many tool steels contain high percentages of alloying metals—tungsten, chromium, molybdenum, etc. Usually quenches and tempered, to obtain the required properties. *C.T.D.*

toolstones. Industrial diamonds used for wire-drawing dies, indentor points, shaped-diamond tools, glaziers, and dressers. Toolstones approach gem diamonds in perfection, although not in color. The finer grades may be identical with diamonds sold as low-grade gems. The lower grade toolstones are also sometimes used as drill diamonds. *Long.*

tooltips. Ceramic tooltips for use in the machining of metals are of two types: carbide, for example, tungsten carbide; oxide, for example, corundum. It is important that the size of the individual corundum crystals in an oxide tooltip shall be small $(<10\mu)$; the presence of a small amount of MgO inhibits crystal growth. Important advantages of oxide tooltips is their retention of strength, hardness and wear resistance at high temperatures; these factors result in long life and clean cutting even at cutting speeds higher than normal. *Dodd.*

to open. To start a hollow or opening in a ball of clay as it spins on the potter's wheel. *ACSG.*

tooth. a. A projection on a tool, such as a saw or file, designed to provide a cutting acion. *ASM Gloss.* b. A projection on the circumference of a wheel, designed to engage corresponding projections on another wheel and thereby transmitting force. *ASM Gloss.* c. Roughness in a clay; coarse grain structure. *ACSG, 1963.*

tooth base. a. The inner part of a two-piece tooth on a digging bucket. *Nichols.* b. Occasionally, the socket in which a tooth fits. *Nichols.*

tooth brake; jaw brake. A brake used to hold a shaft by means of a tooth or teeth engaging with fixed sockets. Not used for slowing or stopping. *Nichols.*

toothed roller bit. Synonym for roller bit. *Long.*

toothed-shoe cutter. A drivepipe or casing shoe with a serrated or toothed cutting edge. *Long.*

toother. A masonry unit projecting from the end of a wall against which another wall is to be built. *ACSG.*

tooth flange thickness. The width in profile of a sprocket tooth. *J&M.*

tooth form. The shape of the working surface of a sprocket tooth. *J&M.*

tooth gap. The space between two sprocket teeth. *J&M.*

toothing. Leaving a section of brickwork toothed so that the brickwork to follow can be bonded into it. It consists of allowing alternate courses to project a sufficient distance to assure a good bond with the portion to be built later. *Crispin.*

tooth point. On a face mill, the chamfered cutting edge of the blade, to which a flat is sometimes added to produce a shaving effect and improve the finish. *ASM Gloss.*

tooth profile. The outline of a sprocket tooth as projected on a plane through the sprocket axis and the center of the tooth. *J&M.*

tooth turquoise. Odontolite. *Shipley.*

too wet. A mine-safety expression used to describe those mines or areas of mines which are too wet to propagate explosions even though they are not rock-dusted. Too wet is when water exudes from a ball of dust when it is squeezed in the hands. *Bureau of Mines Staff.*

top. a. The surface around a mine shaft; the outside. *Jones.* b. A mine roof. Top coal, the upper part of a coalbed separated from the rest by a seam or parting. Top bottom (Ark.), the upper part of the bottom bench of a coalbed. *Fay.* c. A quarryman's term for overburden. *Fay.* d. The apex of a vein. *Hess.* e. To pile coal above the sides and ends of a mine car. *Hess.* f. The part of a cut gem above the girdle; the crown. *Webster 3d.* g. *See* cap, e.; blue cap. *Fay.*

top and apex. The words top and apex as applied to mineral veins were not a part of the miner's terminology prior to the adoption of the federal mining law, but were words used by legislators to convey the intent of the formulators of that law. *Ricketts, I.*

top and bottom process. *See* Orford process.

topaz. A mineral, $Al_2(SiO_4)(F,OH)_2$, orthorhombic, colorless, pale blue, or pale yellow. It occurs usually in granitelike rocks. Used as a gem stone. *Compare* false topaz; Oriental topaz; Scotch topaz. *Dana 17; Fay.*

topaz cat's eye. Yellow girasol sapphire which theroretically can exhibit a more or less well-defined light line, or chatoyancy. *Shipley.*

topazfels. Ger. A brecciated, contact rock, near granite contacts, and formed of topaz, tourmaline, quartz, and some rarer accessory minerals, Also called topaz rock. *Fay.*

topaz glass. Topaz-colored glass. One variety used in imitation gems has a specific gravity of 4.98 and a refractive index of 1.77. *Shipley.*

topazite. Igneous dike rocks composed almost exclusively of quartz and topaz. *Stokes and Varnes, 1955.*

topazolite. A little-known greenish-yellow to yellow-brown variety of andradite garnet. Rarely transparent. *Shipley.*

topazoseme. A rock composed essentially of topaz, quartz, and tourmaline. *Holmes, 1928.*

topaz rock. A rock resulting from contact metamorphism, made up of an aggregate of fragments of quartz and tourmaline, cemented by a mixture of quartz and topaz. Also called topazfels. *Fay.*

top bed. Eng. Often applied to the highest bed in a quarry. In Dorset and Somerset the upper division of the Inferior Oolite. *Arkell.*

top benching. The method by which the bench is removed from above, as with a dragline. *American Institute of Mining and Metallurgical Engineers. Technical Publication No. 604, 1935, p. 7.*

top boss. *See* surface boss, a. *D.O.T. 1.*

top bottom. Ark. *See* top, b. *Fay.*

top brick. Fire clay brick for use in lining the top section of a blast furnace. *A.R.I.*

top cager. A man at the top of a shaft to superintend the operation of lowering and raising of the cage. It is also his duty, at most mines, to remove the loaded cars from the cage, and place the empty cars on the cage. *See also* cager, a. *Fay.*

top canch. That part of a mine roof which has to be taken down to give headroom on roadways. *Fay.*

top coal. Scot. The uppermost of two or more divisions of a seam of coal. *See also* top, b. *Fay.*

top crystals. Standard grade of diamonds. *Hess.*

top cut. a. A machine cut made in the upper limit of the workable section of a coal seam. *See also* overcut. *Nelson.* b. A horizontal cut or groove made in the coal at or near the top of the working face. *Grove.*

topcutter. A cutting machine designed especially for cutting through the seam at a high level above the footwall. *Stoces, v. 1, p. 106.*

top-fired kiln. A kiln fired by feeding coal or oil through apertures in the roof. The typical kiln of this type is the Hoffman annular kiln, but the Monnier kiln provides an example of a top-fired car-tunnel kiln. *Dodd.*

top frame. A frame set at or just below ground level as a preliminary to the main timbering in an excavation. *Ham.*

top gas. Aust. Firedamp. *Fay.*

top gate. A gate road at the upper end of an inclined longwall conveyor face, usually a tailgate. *See also* bottom gate. *Nelson.*

tophat kiln. An intermittent kiln of a type sometimes used in the firing of pottery. The ware is set on a refractory hearth, or plinth, over which a box-shaped cover is then lowered. *Dodd.*

top head. S. Staff. A passage driven in the upper part of a thick coal seam for drawing off the gas. *See also* boss. *Fay.*

top heading (underhand bench). The Belgian method of driving used for adits, tunnels, and drifts. The upper part or top heading is driven to the full length, before the enlargement of the rest of the section is carried out. *Fraenkel.*

Tophet A. Alloy consisting of nickel and chromium; resistant to mine and seawaters. *Bennett 2d, 1962.*

Tophet C. Alloy consisting of iron, nickel, and chromium; resistant to mine and seawaters; used for electrical resistance. *Bennett 2d, 1962.*

top hole. S. Wales. A horizontal shothole in the roof of a stall road for ripping purposes. It is usually about 5 feet in length. *Nelson.*

top holes. An earlier system of working the coal between two levels in an inclined coal seam. The top holes are driven to the full rise and the face-line is usually stepped. Only the coal is worked and no ripping is done in the top holes. The coal gravitates into trams in the lower level. *See also* stepped longwall. *Nelson.*

top hooker. *See* lander. *D.O.T. 1.*

tophus. Any natural calcareous tufa. Also called toph; tophin. *Standard, 1964.*

topit. Eng. A small bracehead, screwed on to the top of boring rods when withdrawing them from the hole. *Fay.*

top kick. *See* top shot. *Fay.*

top lander. *See* lander, d. *D.O.T. 1.*

top lease. A lease granted by a landowner during existence of a recorded mineral lease which is to become effective if and when the existing lease expires or is terminated. *Williams.*

topman. a. In mining, a workman who is employed at surface jobs around the mine plant. *Bureau of Mines Staff.* b. *See* damperman. *D.O.T. Supp.*

topochemical. Referring to localized reactions which take place in the inner or outer fields of force of crystalline material. Topochemistry is the study of localized reactions. *Lowenheim.*

topochemical elements. Elements generally present in low concentrations, in rocks and minerals, which are characteristic of the conditions of formation of the host. *Bennett 2d, 1962 Add.*

topographic adolescence. A geologic stage when lakes have mostly disappeared, and the river drainage is well established, stream channels being comparatively narrow and well marked and falls occuring characteristically. Also called topographic youth. *Standard, 1964.*

topographic agate. Agate with fine markings like lines on a topographic map. *See also* fortification agate. *Shipley.*

topographical surveying. The mapping of a land, as undertaken by the land surveyor. *Ham.*

topographic correction. *See* terrain correction. *A.G.I.*

topographic deserts. Deserts deficient in rainfall either because they are located far from the oceans toward the center of continents, or because they are cut off from rain-bearing winds by high mountains. *Leet.*

topographic high. Frequently used in the oilfields to indicate the higher elevations, regardless of age; opposite of topographic low, which indicates a lower elevation. *Compare* geologic high. *Fay.*

topographic infancy. In geology, a featureless stage characterized by a smooth, nearly level surface of deposit, lakes abounding in slight depressions, shallow streams, and drainage systems not well established. *Standard, 1964.*

topographic low. *See* topographic high. *Fay.*

topographic map. a. A representation on paper that is designed to portray certain selected features of a section of the earth's surface plotted on some form of projection and to a certain scale that primarily depicts the relief of the country mapped but shows also, its drainage and cultural features; and that delineates all features in true latitude and longitude and therefore, all parts in a rigidly correct relative position. *Stokes and Varnes, 1955.* b. A map showing the topographic features of a land surface generally by means of contour lines. *A.G.I. Supp.*

topographic maturity. In geology, a stage of maximum diversity of form when valleys have greatly increased, and the river channels are widely opened. *Standard, 1964.*

topographic old age. A geologic stage in which there is a featureless surface, differing from the earliest stage in having a system of drainage streams, separated by faintly swelling hills. *Standard, 1964.*

topographic quadrangle. Map upon which is shown a small portion of land with elevations indicated by a series of curving lines each passing through a specified altitude; the curvature and crowding together of the contour lines, as they are called, indicate the nature of the terrain. *Sinkankas.*

topographic unconformity. If the invading glaciers disappear before they carry their erosion beyond youth, the area will show two kinds of topography: (1) the mature upland incised by (2) the new glacial valleys, and these two topographic phases will be out of harmony with one another, that is, they will be topographically unconformable. Their relation will be that of topographic unconformity. *A.G.I.*

topography. a. The science of surveying the physical features of a district or region and the art of delineating them on maps. *Fay.* b. The physical features of a district or region, such as are represented on maps, taken collectively; especially, the relief and contour of the land. *Fay.* c. The configuration of a surface including its relief. May be applied to a surface such as the sea bottom or a surface of given characteristics within the water mass. *Hy.*

topped crude petroleum. A residual product remaining after the removal, by distillation or other artificial means, of an appreciable quantity of the more volatile components of crude petroleum. *ASTM D288–57.*

topping. a. The contents of a loaded mine car above water level. *Hudson.* b. S. Wales. The amount of coal or ore loaded into a tram or wagon above its struck capacity. Topping is sometimes adopted with hand filling especially where the number of empty trams for each miner is restricted. *See also* racing. *Nelson.* c. Fine material forming a surface layer or dressing for a road or grade. *Nichols.* d. A finishing layer of fine concrete, usually 2 inches thick, laid over the base concrete of a ground floor or over the structural components of a solid or hollow suspended floor or roof. *See also* hollow tile. *Ham.*

topping curve. The curve of the outer portion of the tooth form. It is shaped to guide the roller smoothly into mesh with the sprocket. *J&M.*

toppings. Eng. The first regular layers of flints in the Brandon flint mines. *Arkell.*

topping-up. a. In a lead-acid cap battery, the filling up with pure distilled water to restore the electrolyte to its proper gravity, the loss of water from the battery being caused by normal evaporation and charging of the battery. *Mason, v, 1, p. 238.* b. In automotive fuel or lubricating oil tanks, the filling of the tank with the proper fuel or lubricant. *Bureau of Mines Staff.*

topple. S. Wales. From tophole. A working place driven to the rise of the main levels. *Fay.*

top ply; top leaf; tops. Scot. The uppermost layer of a bed of coal left for a roof. Also called water leaf. *See also* top, b. *Fay.*

top pouring. *See* direct teeming. *Dodd.*

top-reef deposits. Deposits on the reef flats. *Schieferdecker.*

top ripping. Roof ripping. *Nelson.*

top rod. Scot. The rod connecting the uppermost pump rod to the bellcrank. *Fay.*

tops. a. Eng. Term in use among Lancashire miners for the top section of a coal seam, usually when separated by a parting. *Tomkeieff, 1954.* b. The unrefined distillate obtained in topping a crude petroleum. *ASTM D288–57.*

topsailite. A lamprophyric rock (intermediate in type between camptonite and kersantite), containing phenocrysts of plagioclase (about An_{30}), augite, apatite, and titanoferrite in a groundmass composed of andesine, biotite, barkevikite, augite, and sphene. *Holmes, 1928.*

topset bed. Gently inclined strata deposited on the subaerial plain or the just submerged part of a delta. It is succeeded seawards by the foreset beds and, in the deep water, by the bottomset beds. *C.T.D.*

top shot. An explosion or puff of gas at the furnace top. *Fay.*

topside. a. Above the drill rig in the derrick or tripod. *Long.* b. The inlet end of the hyraulic cylinder of a hyraulic-feed mechanism on a diamond drill. *Long.* c. On the surface as opposed to underground. *Long.*

top slice. A horizontal block of ore extracted by top slicing. The dimensions vary in different mines. *Nelson.*

top slicing. A method of stoping in which the ore is extracted by excavating a series of horizontal (sometimes inclined) timbered slices alongside each other, beginning at the top of the ore body and working progressively downward; the slices are caved by blasting out the timbers, bringing the capping or overburden down upon the bottom of the slices which have been previously covered with a floor or mat of timber to separate the caved material from the solid ore beneath. Succeedingly lower slices are mined in a similar manner up to the overlying mat or gob, which consists of an accumulation of broken timbers and lagging from the upper slices and of caved capping. As the slices are mined out and caved this mat follows the mining downward, filling the space occupied previously by the ore. *BuMines Bull. 390, 1936, p. 15.* Much timber is required for top slicing, and a low-cost, adequate supply of low-priced timber is necessary. Top slicing is also applied to the extraction of pillars between stopes and for cleaning up operations in caved or badly broken ground. *Lewis, pp. 405, 502–503. See also* block caving.

top slicing and caving. *See* top slicing and cover caving. *Fay.*

top slicing and cover caving. A mining method that entails the working of the ore body from the top down in successive horizontal slices that may follow one another sequentially or simultaneously. The whole thickness of the slice is worked. The ore may be broken by overhand or underhand stoping in each unit. The overburden or cover is caved after mining a unit. The method is a retreating method. The longwall method, the pillar robbing in both room-and-pillar, and bord-and-pillar methods of mining coal are essentially the same in principle as top slicing. The principal difference is that a single slice only is worked in these methods. There are two modifications: top slicing by drifts, and top slicing by rooms. A timber mat is used in almost all cases. Other terms used for this system are: caving system; crosscut method (combined with removal of pillars); horizontal slicing (descending); mining ore from top down; panel slicing; prop slicing; removing pillars and allowing roof to cave; slicing under mats of timber in panels; square-set slicing; top slicing and caving; and transverse slicing with caving. *Fay.*

top slicing combined with ore caving. A method in which the ore body is worked from the top down in successive slices. Instead of taking the full height of the slices, only the lower part is taken and the upper part is caved. After removing this portion of the ore, the cover is caved. A timber mat is used in most cases to separate the broken cover from the ore and for safety. Also known as caving system sub-drifting and caving; subslicing; slicing under ore with back cave; sublevel caving; and sublevel slicing. *Fay.*

top slopeman. *See* headman. *D.O.T. 1.*

topsoil. A general term applied to the surface portion of the soil including the average plow depth (surface soil) or the A-horizon, where this is deeper than plow depth. It cannot be precisely defined as to depth or productivity except in reference to a particular soil type. *Stokes and Varnes, 1955.*

top testing. *See* roof testing. *Kentucky, p. 133.*

top wall. Same as haanging wall. *Standard, 1964.*

top water. a. Water which enters an oil or gas well from a sand above the productive sand. *Compare* bottom water; edgewater. *Fay.* b. Water introduced with the raw coal feed to assist the transport of material through the washbox. Also called transport water. *Compare* flush water. *B.S. 3552, 1962.*

tor. Eng. a. A rounded mass of rock left in an elevated position by the decay of surrounding parts. Sometimes called boulder. *Fay.* b. A rocky pinnacle or peak; a high craggy hill. *Webster 3d.*

Torbane Hill mineral. A boghead coal obtained from Torbane Hill, Scotland. *Webster 2d.*

torbanite. a. A variety of algal or boghead coal from Torbane Hill, near Bathgate, Scotland. Is layered, compact, brownish-black to black in color, very tough and difficult to break. The fracture is conchoidal or subconchoidal. Under the microscope, it is seen to be composed of elipsoidal yellow bodies, which consist of colonies of blue-green algae. On distillation, torbanite gives a high yield of oil. *Tomkeieff, 1954.* Also called bathvillite. *See also* boghead cannel; boghead coal; boghead mineral; kerosine shale. b. A dark-brown variety of cannel coal. *Fay.* c. An oil shale mined in South Africa. *Beerman.*

torbernite. A rich green mineral. A hydrous phosphate of uranium and copper, $Cu(UO_2)_2(PO_4)_2.8\text{-}12H_2O$, tetragonal. It is associated with autunite and frequently in parallel growth with it, and also with other uranium minerals. Strongly radioactive; a secondary mineral resulting from the alteration of uraninite. Also called copper (cupro-) uranite. *Dana 17; Fay; Crosby, pp. 49–50.*

Torbite. Lanc. A trademark name of a dried and compressed peat. *Fay.*

torch. a. A gas burner used to braze, cut, or weld. For brazing or welding, it has two gas feed lines—one for fuel, such as acetylene or hydrogen, and the other for oxygen. For cutting, there may be an additional feed line for oxygen. *See also* oxygen cutting. *ASM Gloss.* b. An oil-burning, wick-fed lamp of tin or copper, with a long spout, used by miners. *Fay.*

torch brazing. Brazing with a torch. *ASM Gloss.*

torching. The pointing, with cement or mortar, of the underside of a tiled roof; also sometimes known as tiering. *Dodd.*

torch peat. Peat rich in wax and resins and composed mainly of pollen grains. *Tomkeieff, 1954.*

tordrillite. An obsolete name for a variety of rhyolite. *A.G.I.*

torendrikite. The first member of a distinct group of amphiboles, intermediate between those or richterite, imerinite, and glaucophane, approximately $Na_2O.4MgO.CaO.FeO.Fe_2O_3.10SiO_2$; monoclinic; dark blue color. From Itorendrika, Malagasy Republic; near Tine, Wadai, Africa. *English.*

torf. German and Russian name for peat. *Tomkeieff, 1954.*

Torkret process. A German process for spraying refractory patching material on the walls of steel furnace ladles. *Dodd.*

tormentor. a. A wooden axle, studded with iron spikes, for puddling auriferous clay, by spinning or turning in a trough. *See also* puddler, e. *Nelson.* b. A device somewhat similar to the log washer. *Fay.*

Tornado. The Tornado crusher is based on the principle of central impeller shoes spinning to hurl particles of gravel against breaker plates at tremendous speed. The impact literally "explodes" the rock, causing it to cleave across the grain as well as with the grain, producing the most desirable cubical product. *Pit and Quarry, 53rd, Sec. B, p. 35.*

tornebohmite; toernebohmite. A very rare, weakly radioactive, possibly monoclinic, green to olive mineral, $R_3(F,OH)(SiO_4)_2$, where R=Ce, (La,Nd), Al,Fe,Mn,Mg,Ca. Found in contact zones at Bastnas, Sweden. *Crosby p. 112; Hey 2d, 1955.*

torose load cast. A sole mark formed by elongate ridges which pinch and swell along their trends; unlike flute casts, the down-current terminations are bulbous or tear-drop shaped. *Pettijohn.*

torpedo. a. An encased explosive charge slid, lowered, or dropped into a borehole and exploded to clear the hole of obstructions or to open communications with an oil or water supply. Also called bullet. *Long.* b. A charge of explosive contained in a narrow cylinder, which is lowered into an oil well to the required depth and then fired. The object is to fracture the oil-bearing rock and thus increase the flow of oil. *Nelson.* c. A tough cardboard tube containing explosives, which is lowered by a line into a quarry blasthole which has been chambered. It is used when the ground is too hot to receive explosives without a protective coating. *Nelson.* d. A kind of detonating cartridge placed on a rail, and exploded when crushed under a locomotive wheel; used as a signal. *Webster 3d.*

torpedo bit. A seldom-used synonym for noncoring bit. *Long.*

torpedo crown. A torpedo or noncoring bit. *Long.*

torque. a. An engineering term defined as the product of a force times its lever arm. It is a measure of the ability to produce rotation. *API Glossary.* b. *See* twisting moment. *Ro.*

torque bar. Square or vertically fluted bar run on one type of auger drill to rotate, raise, and lower the auger. *Long.*

torque converter. A hydraulic coupling which utilizes slippage to multiply torque. *Nichols.*

torquemeter. A device for measuring the actual torque transmitted to the drilling head and/or to the drill-rod string. *Long.*

torque rod. a. A bar having the function of resisting or absorbing twisting strains. *Nichols.* b. Synonym for torque bar. *Long.*

torque thickener. Tank thickener in which bottom rakes rise when overloaded with settled material. *Pryor, 3.*

torque winding diagram. A chart showing how the winding load on a winch drum varies and is used to decide the method of balancing needed. A torque diagram is usually made by plotting the turning moment in pounds per foot on the vertical axis against time, or revolutions or depth on the horizontal axis. With a parallel drum, the depth is proportional to the revolutions of the drum and the diagram obtained in each case would be identical. With a conical drum, the depth is not proportional to revolutions of the drum nor to time and in such cases, it is usual to plot torque against revolutions. *Nelson.*

torr. The pressure exerted per square centimeter by a column of mercury 1 millimeter high at a temperature of 0° C where the acceleration of gravity is 980.665 centimeters per second. *Hy.*

torrential crossbedding. Fine, horizontally laminated strata alternating with uniformly crossbedded strata composed of coarser materials. Believed to originate under desert conditions of concentrated rainfall, abundant wind action, and playa lake deposition. *A.G.I.*

torrential cross-lamination. See torrential cross-bedding. *Pettijohn.*

torrents. Beds of quicksand encountered below the chalk marl in the Anzin coalfield, in France. *Fay.*

torreyite. A monoclinic mineral, $(Mn,Mg,Zn)_8(SO_4)(OH)_{14}\cdot 4H_2O$, from Sterling Hill, N.J. *Spencer 19, M.M., 1952.*

torsion. a. A body is under torsion when subjected to force couples acting in parallel planes about the same axis of rotation but in opposite senses. *A.G.I.* b. A strain due to twisting, as of a rod or filament; measured by the angle of rotation of one cross section with respect to another at unit distance from it. *A.G.I.* c. The process of twisting a wire, thereby showing its ductility. *Zern.*

torsional center; center of twist; center of torsion; center of shear. If a twisting couple is applied at a given section of a straight member, that section rotates about some point in its plane. This point, which does not move when the member twists, is the torsional center of that section. It is sometimes defined as though identical with the flexural center, but the two points do not always coincide. *Compare* flexural center; elastic center; elastic axis. *Ro.*

torsional moment. In a body being twisted, the algebraic sum of the couples or the moments of the external forces about the axis of twist, or both. *ASM Gloss.*

torsional shear test. A shear test in which a relatively thin test specimen of solid circular or annular cross section, usually confined between rings, is subjected to an axial load and to shear in torsion. Inplace torsion shear tests may be performed by pressing a dentated solid circular or annular plate against the soil and measuring its resistance to rotation under a given axial load. *ASCE P1826.*

torsion anemometer. See Rees's torsion anemometer.

torsion balance. A geophysical prospecting instrument for locating gravity anomalies, and its use is generally confined to shallow and localized investigations. *See also* gravimeter. *Nelson.*

torsion break. A break in the drill core caused by an accumulation of chips at the bit face. When drilling is stopped to rechuck, these chips grip the core, and the core is twisted and broken. *Compare* torsion fracture. *Long.*

torsion fracture. A spiraled crack in a drill core caused by torque in a blocked bit or core barrel. *Compare* torsion break. *Long.*

torsion seismometer. A seismograph with which the horizontal component of the earthquake can be defined making use of the torsion of a vertical suspension thread at which a stationary mass is fastened sidewise. *Schieferdecker.*

torsion viscometer. An instrument much used for works' control of the viscosity and thixotropy of clay slips. It consists of two concentric cylinders, the slip occupying the space between them; the inner cylinder is suspended from a torsion wire and is released from a position equivalent to a 360° twist in the wire. The overswing gives a measure of viscosity; comparison of this degree of overswing with that after a specified lapse of time provides a measure of the thixotropy of the slip. *Dodd.*

torta. Mex. The flat circular heap of ore spread out on the floor of the patio in a cake about fifty feet in diameter and a few inches in thickness, ready for amalgamation in the patio process. T. rendida, amalgam ready to be washed. *Fay.*

tortoise. A term sometimes applied by miners to such structures as pots, bells, kettles, and other rock masses that tend to fall easily from the roof of a coal mine. *See also* camel back. *A.G.I.*

tortoiseshell. A decorative effect produced on a lead glaze by dusting metal oxides (MnO_2,CoO, or CuO) over the surface and firing. *Dodd.*

Tortonian. Upper middle Miocene. *A.G.I. Supp.*

tortuga. A slang expression for seismic geophone in Spanish-speaking localities. *A.G.I.*

tortuous flow. *See* turbulent flow. *Nelson.*

toryhillite. A light-colored igneous rock that is a nepheline type containing albite. Related to witite. *Hess.*

toscanite. Proposed by Washington for a group of acid, effusive rocks in Tuscany, Italy, that are characterized mineralogically by the presence of basic plagioclase, as well as orthoclase, and by occasional quartz. They range from 62 to 73 percent silica and are intermediate between rhyolites and dacites. *Compare* dellenite. *Fay.*

toss. *See* tossing. *Fay.*

tosser. One who picks up dried or fired brick or tile stacked on drier car in storage yard or in kiln and tosses articles to setter, car loader II, or to another tosser. May be designated according to material handled as brick tosser, tile tosser. Also called handler; pitcher; pitchman. *D.O.T. 1.*

tossing; tozing. a. The operation of raising the grade or purity of a concentrate by violent stirring, followed by packing, in a kieve or open dolly tub. Chimming is a similar process on a smaller scale. *C.T.D.; Fay.* b. An operation in tin refining in which the molten metal is lifted in a ladle and poured back in a fine stream to oxidize impurities. *Webster 3d.* c. Corn. The same as jigging. *Fay.*

tossing, tin. Oxidizing impurities in molten tin by pouring it from one vessel to another in air, forming a dross that is mechanically separable. *ASM Gloss.*

tot. N. of Eng. A measure of gunpowder used in blasting. *Fay.*

total acidity. Acidity to phenolphthalein. Total acidity of mine water indicates the complete capacity of water to produce chemical change by acid reaction. It is the total amount of acid held in solution or the sum of the quantities of both the ionized and the un-ionized portions of actual acid and the potential quantity of acid that can be formed from mineral salts held in solution. Total acidity is customarily reported in equivalent parts per million (ppm) by weight of calcium carbonate. The indicated total acidity of mine water found by currently accepted methods of analysis generally is greater than the actual total acidity. *T.P. 710, 1948, p. 2.*

total analysis of coal. See ultimate analysis, c. *Cooper, p. 396.*

total bit load. A drilling term describing the total amount of any load or pressure, expressed in pounds or tons, that is applied to a bit when it is in use. *Long.*

total bit pressure. *See* total bit load. *Long.*

total cap lag. A blasting term describing the total time between application of current and the detonation. *Streefkerk, p. 44.*

total carbon. The sum of the free and combined carbon (including carbon in solution) in a ferrous alloy. *ASM Gloss.*

total cooling effect. The difference between the total heat content of the air-steam mixture entering a conditioner per hour and the total heat of the mixture leaving per hour. *Strock, 10.*

total cooling load. The sum of the sensible and latent heat components. *Hartman, p. 352.*

total critical load; total critical pressure. a. The total load or pressure that must be applied to a bit for its optimum rate of penetration in a specific rock. *Long.* b. The maximum load that can be applied to a bit without causing damage to the bit. *Compare* critical pressure, a and b. *Long.*

total cyanide. Cyanide content of an electroplating bath including both simple and complex ions. *ASM Gloss.*

total displacement. Used by Spurr and Tolman to designate slip. *A.G.I.*

total dynamic head. The total of the static head (the suction and discharge heads), the friction head, together with any discharge head that must be overcome by a pump is termed the total dynamic head. *Carson, p. 200, 211.*

total energy. The total energy at any section in a moving fluid consists of the sum of the internal static, velocity, and potential energies at that section. *Hartman, p. 74.*

total hardness of water. All waters contain two forms of hardness, that is, temporary (or carbonate) hardness and permanent (non-carbonate) hardness. The combination of the two is referred to as total hardness. *See also* hard water. *Nelson.*

total head. a. Energy lost by friction of water against the walls of the pipe column, and the kinetic energy of the water, are both derived from the pump, which consequently consumes more power than that theoretically necessary for elevation. This extra power is allowed for in calculations by increasing the vertical height. The increased height is called the total head, and is made up of three parts: (1) static head, the vertical distance which the water must be raised, (2) friction head, the head needed to overcome frictional resistance, and (3) velocity head, the head which would be necessary to produce an equal velocity in water which is freely falling. *Higham, p. 238.* b. The pressure attained when the free stream velocity is decreased to zero along a streamline. The pressure measured is the algebraic sum of the static and dynamic pressures. *Roberts, I, p. 2.* c. The static head plus the friction head. *Kentucky, p. 125.*

total heat. a. The total heat of atmospheric air is the heat contained in the same amount of dry air (known as sensible heat) plus the latent heat of the contained water vapor plus the sensible heat of the water vapor above the wet-bulb temperature. This is called the sigma function or sigma heat. True total heat or enthalpy is the sigma heat plus the heat of the water below the wet-bulb temperature. The latter is a very small quantity, and in mining work sigma heat is always used. Sigma heat is usually measured above 0° F, so that it is the heat that would be given up if all moisture were condensed out and removed and the air cooled to 0°. Some engineers use 32° F as the basic temperature so care should be taken to verify the base used. If absolute total heat is specified, it is measured above absolute zero (−459° F). *Spalding, p. 242.* b. The sum of sensible heat and latent heat in a substance or fluid above a base point, usually 32° F or 0° F. *Strock, 10.*

total ice season. a. (maximum) The longest ice season recorded over a period of years in an area. *Hy.* b. (minimum) The shortest ice season recorded over a period of years in an area. *See also* ice period. *Hy.*

total indicator reading. See total indicator variation. *ASM Gloss.*

total indicator variation. The difference between the maximum and minimum indicator readings during a checking cycle. *ASM Gloss.*

total lift. In an air lift, the distance the water is elevated during pumping; it equals drop plus static head plus elevation. Also called lift. *Lewis, p. 687.*

total lung capacity. The total volume of air that the lungs can hold when filled to capacity. It is normally between 5 and 6 liters. (A liter is about the same as a quart.) It is the standard unit of volume in the metric system, which is generally used in physiological measurements. *H&G.*

total magnetic intensity. The vector resultant of the intensity of the horizontal and vertical components of the earth's magnetic field at a specified point. *Hy.*

total moisture. a. Free moisture plus moisture in air-dried coal, both being expressed as percentages of the sample as received. *B.S. 3552, 1962.* b. The moisture in the coal or coke as samples. *B.S. 1016, 1961, Pt. 16.*

total of correctly placed material. The sum of the weights of material correctly included in the products of a sizing or density separation, expressed as a percentage of the weight of the feed to the separator (and equal to 100 minus the total of misplaced material). *B.S. 3552, 1962.*

total of misplaced material. The sum of the weights of the misplaced material in the products of a sizing or density separation, expressed as a percentage of the weight of the feed. When three products are made in a single separator the total of misplaced material will be the sum of the weight of material wrongly placed in each of the three products, expressed as a percentage of the feed to the separator. *B.S. 3552, 1962.*

total porosity. Synonym for porosity. *A.G.I.*

total pressure. a. The total ventilating pressure in a mine, usually measured in the fan drift. *Nelson.* b. The pressure in a soil mass due to overlying material and any superimposed loads. *Nelson.* c. The algebraic sum of the static pressure and velocity pressure at any particular point. *B.S. 3618, 1963, Sec. 2.* d. The gross load applied on a given surface. *Long.* e. The pressure on any horizontal plane in a mass of soil, calculated from the weight of the material above it together with any applied loads. *See also* effective pressure. *Ham.*

total reflection. In gemmology, total reflection occurs when a ray of light, after entering a gemstone, strikes any boundary of that gemstone at an angle greater than its critical angle. Total reflection may continue indefinitely within a stone, as the light striking any boundary is totally reflected until it strikes a boundary at an angle less than the critical angle, in which event it passes out of the stone. *Shipley.*

total reflectometer. An instrument for measuring the critical angle (of total reflection). *Shipley.*

total resistance. The total resistance or friction of a ventilation system (in Atkinsons) is calculated from the total ventilating pressure and the total quantity of air at the fan. Thus:

$$R=\frac{P}{Q^2}$$

See also modified Atkinson formula. *Nelson.*

total sediment load. All the sediment being moved by the stream, that is, suspended load and bedload. *USGS Prof. Paper 462-F.*

total stress. The total force per unit area acting within a mass of soil. It is the sum of the neutral and effective stresses. *ASCE P1826.*

total tonnage. The total tonnage taken from a mine is the tonnage of the ore or product shipped, plus the tonnage of the ore, waste, and tailing on the dumps. *Hoov, p. 84.*

total value. The total value taken from a mine is the value of the ore or product shipped, plus the value of the ore, waste, and tailing on the dumps. *Hoov, p. 84.*

total ventilating power. The sum of the natural ventilating power plus the effective (or air) horsepower of the fans where all fans are in series. When the circuit is divided and there are fans in parallel, the total ventilating power of each split is worked out separately, the natural and fans powers being added together. Finally the total powers of each circut are summed to give the total ventilating horsepower. *Spalding, pp. 302–303.*

total ventilating pressure. The water gage reading in the fan house, which can be converted into pound pressure per square foot by multiplying by 5.2. *Nelson.*

Totanin. Trade name; an ammonium based sulfite lye. *See also* sulfite lye. *Dodd.*

Totco test. A test to determine the deviation of a well from the vertical, employing an instrument known as a Totco. *Williams.*

touch. a. Eng. A fuse for setting off a powder charge. *Fay.* b. *See* touchstone. *Fay.* c. A stone of durable character suitable for preserving inscriptions or for fine monumental work. *Fay.*

touch needle. A needle or small strip of gold alloy, of known composition, for determining the composition of another alloy by comparing marks made by each on the same touchstone. *Standard, 1964.*

touchstone. a. A black siliceous stone, allied to flint, SiO_2. *Fay.* b. A black, hard stone (basalt or jasper), on which the fineness of an alloy of gold and silver can be tested by comparing its streak with that of a piece of alloy (touch needle) of known fineness. Also called Lydian stone; basanite. *Fay.*

touch up. A term used to describe the practice of applying a small amount of liquid enamel to the ware in order to cover up small defects. The ware must, of course, be refired after this operation. *Enam. Dict.*

touchup man. *See* process inspector. *D.O.T. 1.*

touf, pisée (archeol.). Walls built of straw-tempered, sundried clay without forming clay into bricks; this type of construction, used in ancient times in the Near East, is still employed today; it is similar to some forms of adobe construction. *ACSG, 1963.*

tough. a. The exact state or quality of texture and consistency of well-reduced and refined copper. *Fay.* b. Copper of the above quality; also called tough cake. *Fay.* c. Having the quality of being strong or firm in texture, but flexible and not brittle; yielding to force without breaking; capable of resisting great strain without coming apart. *Webster 3d.*

tough alumina. A relatively impure regular alumina (90 to 96 percent alumina) of blocky shape. *ACSG, 1963.*

tough cake. Refined or commercial copper. *See also* tough, a; b. *Fay.*

toughen. To remove the last remaining quantities of foreign metals from copper in refining, as by poling. *Standard, 1964.*

toughened glass. Glass that has been rapidly cooled so that the surface layers are in compression; the thermal and mechanical endurance are increased and, if the glass does break, it will shatter into small, granular, fragments rather than into large and dangerously jagged pieces. *Dodd. See also* tempered glass.

tough mineral. A mineral is tough when it strongly resists a tearing stress (muscovite, the native metals, such as gold and copper). *Stokes and Varnes, 1955, p. 149.*

toughness. a. A property of a material that denotes, nominally, an intermediate value between softness and brittleness. Tensile tests show a tough material to have a fairly high tensile strength accompanied by moderate values of elongation and reduction of area. Generally, a tough material also shows high values in the notched bar impact test. *Henderson.* b. The amount of work required to deform a body to its rupture point. *A.G.I.* c. All diamonds, including carbons, are brittle, and while showing extreme resistance to pressure, are apt to break under vibration or sudden shocks. Toughness can be used to denote relative resistance to shock and is greatest in carbons, ballas, bortz, and congos in No. 1 grades, in that relative descending order. *See also* hardness. *Cumming.*

toughness index. The ratio between the index of plasticity and the flow index of a soil. *Ham.*

toughness of refractories. Resistance to crumbling, abrasion, or to coarse particles being dislodged from the brick structure. *Bureau of Mines Staff.*

tough pitch. a. A term used in electrolytic copper refining to designate copper which has set, from the molten condition, with a level surface. *See also* underpoled; overpoled. *Fay.* b. A term applied to copper in which the oxygen content has been correctly adjusted at 0.03 to 0.06 percent by poling. Distinguished from overpoled and underpoled copper. *C.T.D.*

tough pitch copper. Copper containing from 0.02 to 0.05 percent oxygen, obtained by refining copper in a reverberatory furnace. *ASM Gloss.*

tough tom. Soft tenacious clay floor of coal seams. *Arkell.*

tough way. a. A quarryman's term to denote the direction in rock opposite to the rift and along which the rock is hard to break. *Ham.* b. Hardway; head. *Arkell.*

tour. A work-shift. Sometimes incorrectly spelled tower. *Long.*

tourbe. Fr. Peat. *Tomkeiff, 1954.*

tourmaline. A complex aluminum silicate of hexagonal crystallization containing boron and in some varieties, lithium and other elements, $XY_3Al_6(BO_3)_3(Si_6O_{18})(OH)_4$, of various colors; the clear pink, blue, and green varieties are used as gems. It occurs in long, usually striated, prisms in the ancient crystalline rocks. Rhombohedral. Also called schorl. *Sanford; Dana 17; Fay.*

tourmaline-corundum rocks. Very hard and fine-grained rocks of blue-black color, having the mineral composition indicated by their name. Under the microscope, they show oölitic structure, indicating they are probably due to the intense metamorphism of oölitic cherts by granite. *Holmes, 1928.*

tourmalinization. The processes whereby minerals or rocks are replaced wholly or in part by tourmaline. These processes result from the invasion by mineralizing fluxes and gases. *C.M.D.*

Tournaisian. Lower Lower Carboniferous. *A.G.I. Supp.*

tournasin. Fr. A knife for scraping excess of slip from baked and decorated ceramic ware. *Standard, 1964.*

tournette. Fr. In ceramics, a rotating tablet, resembling a small potter's wheel, used in decorating the finer wares with lines. *Standard, 1964.*

tourniquet. Any instrument or appliance which, by means of a constricting band, a pad to lie over the artery, and a device for tightening it, exerts pressure on an artery so as to control bleeding from it. *C.T.D.*

Toussaint-Heintzmann arch. A channel section steel arch support consisting of three elements or sections. The three elements overlap and yield by sliding one upon the other under the constraint of bolted clamps. They are set closeup to the face of the tunnel. The center or crown element is usually foreset to give temporary protection until the complete arch is erect. The arch is used widely in France and West Germany. *See also* steel arches; steel support. *Nelson.*

Tovex. Trademark for a nonnitroglycerin, water-compatible explosive slurry that gives very high loading density. Used where rock or ore is massive and hard to break. *CCD 6d, 1961.*

tow. a. Leic. Dark, tough, earth clay or shale. *Fay.* b. Scot. The winding rope, which before the introduction of iron or steel ropes was made of hemp or tow. *Fay.*

tow conveyor. An endless chain supported by trolleys from an overhead track or running in a track at (above, flush with, or under) the floor with means for towing trucks, dollies, or cars. *ASA MH4.1–1958.*

towed grader. *See* grader, a. *Nelson.*

tower. a. A peak rising with precipitous slopes from an elevated tableland; a towerlike formation. Local in the Northwest. *A.G.I.* b. Synonym for tour. *A.G.I.* c. A misnomer for derrick and an incorrect spelling of tour. *Long.*

tower crane. A swing-jib or other type of crane mounted on top of a tower, the base of which may sometimes move on rails. These cranes are especially effective on congested sites. *See also* monotower crane. *Ham.*

tower engineer. In anthracite coal mining, one who operates a hoist to raise loaded mine cars from the surface of the mine to the top of the breaker where the coal is dumped, crushed, and prepared for market. *D.O.T. 1.*

tower excavator. A cableway excavator designed specifically for levee work but which is used extensively in the stripping of overburden, spoil, or waste in surface mining. The unit is basically a Sauerman-type excavator with towers either fixed or movable. With the headtower located on the spoil pile and the tail tower on the unexcavated wall, it is possible to dig pits of almost unlimited width. *Bureau of Mines Staff.*

tower loader. A front-end loader whose bucket is lifted along tracks on a more or less vertical tower. *Nichols.*

Towers magnetic stirrer. A device utilizing a rotating field of magnetic force to induce a vigorous rotary movement in a small magnetized bar totally enclosed in a polythene or glass tube, and placed in the liquid to be stirred. *Osborne.*

towing. The smoothing, generally on a powered wheel, of the outer edge of dried pottery flatware before it is fired. Tow is commonly used for the purpose, but sandpaper or a profile scraper are also sometimes used. *Dodd.*

towing hawser. A large flexible wire rope made of galvanized wires. Uusal construction, 6 strands of 37 wires each, or 6 strands of 24 wires each. *H&G, p. 130.*

towing winch; logging winch. A heavy-duty winch mounted on the rear of a crawler tractor. *Nichols.*

towned. Citified. Used derisively by the prospector. *Hoffman.*

tow net. In oceanography, a conical net having the mouth kept open by a frame and at the apex a glass or metal vessel in which the catch accumulates; it is towed behind a boat in order to obtain samples of the fauna of the surface waters. *C.T.D.*

town's gas. Gas manufactured from coal for use in cities for illumination and heating; usually a mixture of coal gas and carbureted water gas. *Bennett 2d, 1962 Add.*

township. A piece of land that is bounded in the east and west by meridians 6 miles apart at its south border, has a north-south length of 6 miles, and forms one of the chief divisions of a U.S. public-land survey. *Webster 3d.*

toxic. Having poisonous effects. *Strock, 10.*

toxic dusts. Dusts poisonous to body organs, tissue, etc. They include ores of beryllium, arsenic, lead, uranium, radium, thorium, chromium, vanadium, mercury, cadmium, antimony, selenium, manganese, tungsten, nickel, and silver (principally the oxides and carbonates). *Hartman, p. 41.*

toxicity symptoms. In geochemical prospecting, a collective term for the abnormal colors and morphological features of a plant caused by a poisonous element in the nutrient solution. *Hawkes, pp. 297–298.*

tozing. *See* tossing. *Fay.*

tph Abbreviation for tons per hour. *BuMin Style Guide, p. 62.*

trace. a. The intersection of a line or plane with a plane or other surface and especially with a plane of projection. *Webster 3d.* b. A very small quantity of a chemical constitutent or component especially when not quantitatively determined because of minuteness. *Webster 3d.* c. To follow the lode on the surface, and to lay it open by long pits. *Fay.* d. Recording on the seismogram of a single seismometer station. *Schieferdecker.*

trace-by-trace plotting. A procedure used in seismic reflection where reflection times from all traces, or sometimes alternate traces, are plotted at the reflecting point positions (midway between shot and detector). When no correction has been made for normal moveout, the plotted times appear to lie along arcs which are convex upward and straddle the shot positions symmetrically. *Compare* center-trace time. *Dobrin, p. 132.*

trace elements. Elements present in minor amount in the earth's crust; all elements except the eight abundant rock-forming elements: oxygen, silicon, aluminum, iron, calcium, sodium, potassium, and magnesium. Synonym for minor elements; accessory elements. *A.G.I.*

trace element salt. Table salt or cattle salt which contains trace elements equivalent to those found in seawater. *Kaufmann.*

trace hole. A small horizontal passage or flue left in a setting of bricks in a kiln to facilitate the movement of hot gases. *Dodd.*

trace mineral salt. Livestock salt with added trace minerals to suppliment mineral deficiencies. *Kaufmann.*

tracer. a. An employee who makes tracings, or copies of plans or machine drawings on transparent paper or cloth. In mining, tracers are employed in the drawing office, and surveying and planning departments. *Nelson.* b. In the stonework industry, one who lays out or traces lettering and designs on the surface of marble and granite to prepare the stone for cutting. Also called decorator. *D.O.T. 1.* c. An element or compound that has been made radioactive so that it can be followed (traced) easily in industrial and biological processes. Radiation emitted by the tracer (radioisotope) pinpoints its location. *L&L.* Abbreviation, tcr. *Zimmerman, p. 111.*

tracer gas. A gas introduced in small quantities into the main body of the air to determine either the air current or the leakage paths in a ventilation system. *B.S. 3618, 1963, sec. 2.*

tracer-gas technique. This method, as applied for the measurement of airflow in headings, can be used for determining velocities below the working range of the vane anemometer. The tracer used is nitrous oxide. The technique consists of releasing a quantity of tracer gas, either instantaneously or over a timed interval. The tracer then diffuses throughout the airstream until a position is reached where it is uniformly dispersed over the cross section of the airway. At such a position samples are taken and these are put through the analyzer to determine the gas concentration. *Roberts, I. p. 57.*

tracer milling. Duplication of a three-dimensional form by means of a cutter controlled by a tracer that is directed by a master form. *ASM Gloss.*

traces. The lines of intersection of a fault plane with the two parts of a dislocated bedding plane. *Schieferdecker.*

trace slip. Component of the net slip parallel to the trace of an index plane (vein, bedding, etc.) on plane of the fault. *A.G.I.*

trace-slip fault. A fault on which the net slip is parallel to the trace of a bed (or some other index plane) on the fault. *A.G.I.*

trachorheite. Proposed by Endlich as a collective designation for the four rocks—propylite, andesite, trachyte, and rhyolite, as used by von Richthofen. *Fay.*

trachyandesite. Effusive rocks, intermediate between trachytes and andesites. Used by Washington for trachytes that also have much acidic plagioclase (andesine to oligoclase). *Fay.*

trachybasalt. An extrusive rock intermediate between trachyte and basalt and consisting primarily of calcic plagioclase, sanidine, augite, and olivine. Analcite or leucite may be minor constituents. *A.G.I.*

trachydolerite. Suggested by Abich for a group of rocks intermediate between the trachytes and basalts. Trachydolerite as used by Washington means a trachyte with considerable basic plagioclase (labradorite to anorthite). *Compare* latite. *Fay.*

trachyte. Any aphanitic, aphanophyric, or glassy igneous rock composed essentially of alkalic feldspar, with or without mica, amphibole, pyroxene, and other accessories, or of rock glass having essentially the same composition. It was formerly used for both rhyolite and trachyte proper, as a field term for light-colored lavas and porphyries. As such, in older reports, it is to be understood. *Compare* acmite trachyte; pantellerite. *Fay.*

trachytic. A textural term applied to the groundmasses of volcanic rocks in which neighboring microlites of feldspar are arranged in parallel or subparallel fashion, bending around phenocrysts, and corresponding to the flow lines of the lava from which they were formed. The texture is common in trachytes. *A.G.I.*

trachytic texture. A special name for those microscopic groundmasses that are made up of rods of feldspar, usually in flow lines, but without basis. *Fay.*

trachytoid. A textural term applied to phaneritic igneous rocks in which the feldspars have a parallel or subparallel disposition, as in many varieties of nepheline syenite. Corresponds to the trachytic texture of some lava flows. *A.G.I.*

trachytoid phonolite. A general term for varities of nepheline phonolite, containing preponderant alkali feldspars, and consequently having a trachytic texture; contrasted with nephelinitoid phonolite in which nepheline is the preponderant felsic mineral. *Holmes, 1928.*

trachytoid texture. A texture in which the prismatic feldspars of a phanerocrystalline rock have a parallel or subparallel disposition, as, for example, in many varieties of alkali syenites and nepheline syenites. *Holmes, 1928.*

tracing float. In rough country, float may be found a long distance from its source. To trace it back to its origin the prospector works up the slope looking for pieces of float until no more are to be seen. At this point if no outcrop is visible, the probabilities are that the soil or loose surface material covers a hidden outcrop, which can be sought by digging pits or trenches. *Lewis, p. 279.*

track. a. Aust. In Bendigo, applied to veins when the walls come together; when followed the veins widen out again. *Fay.* b. The groove cut in a rock by a diamond inset in the crown of a bit. *Long.* c. As applied to a pattern of setting diamonds in a bit crown, an arrangement of diamonds in concentric circular rows in the bit crown, with the diamonds, in a specific row following in the track cut by a preceding diamond. *Long.* d. The slide or rack on which a diamond-drill swivel head can be moved to positions above and/or clear of the collar of a borehole. *Long.* e. Can. Railroad. Word used in the same sense as steel. *Hoffman.* f. A crawler track. *Nichols.* g. A railroad-type track. *Nichols.* h. Applied to rails along which a train or a crane travels or to the single rail for a monorail or telpher. *See also* gage, railway. *Ham.* i. One of a pair of roller chains used to support and propel a machine. It has an upper surface which provides a track to carry the wheels of the machine, and a lower surface providing continuous ground contact. *Nichols, 2.* j. *See* conveyor track; rail track. *Nelson.*

track bolt. A chair bolt or coach screw used in fastening rails. *Ham.*

track braking. Track brakes, similar to those used on surface tramcars, may be installed on heavy downgrades underground to supplement other braking systems; they apply blocks to the rails by mechanical, pneumatic, or electromagnetic power. The normal shoe brake must be designed to work in conjunction with the track brakes so that the wheels are not skidded when the track brakes utilize part of the weight of the locomotive. Electromagnetic track brakes may utilize the braking currents produced in rheostatic braking to excite the electromagnets, which are then pulled down onto the rails and produce a strong retarding pull. *Sinclair, V, p. 229.*

track cable. Steel wire rope, usually a locked-coil rope which supports the wheels of the carriers of a cableway. *Ham.*

track cable scraper. This type of excavator operates in general the same as a slackline cableway except that it uses a bottomless scraper bucket which must convey its load over the ground instead of through the air. Like the slackline cableway, this machine is operated by a two-drum hoist which controls a track cable that spans the working area and a haulage cable that leads to the front of the bucket. Both cables are reeved through sheave blocks attached to a high guyed mast or tower at the head end of the installation. When the bucket comes in with a load and reaches the desired dumping point, a few rotations of the rear drum of the hoist serve to tighten the track cable and lift the bucket off its load; then the brake is released on the front drum which controls the haulage cable, permitting the empty bucket and carrier to glide back down the inclined track cable. *Pit and Quarry, 53rd, Sec. A, p. 100.*

track channeler. In quarrying, a rock channeler designed to operate from a track on which it is mounted; frequently a combined locomotive and channeling machine. *Standard, 1964.*

track cleaner. In mining, a laborer who cleans mine track and switches by shoveling coal, ore, rock, mud, and refuse, and throwing it to one side or loading it into a mine car. Also called road cleaner. *D.O.T. 1.*

track cleaners. Remove gob from railroad tracks, between rails, and to a distance of 48 inches from the track centers. Digger plates remove gob to the top of ties while wings on either side of the machine gather it from the sides of the track, into the track to be moved by conveyors to a car at the machine's rear. One man operates the towing motor and observes the digging, while another controls the digging plate height, adjusts wing plows, and observes loading. *Bests, p. 372.*

track diamonds. Diamonds set in the face or lead portion of the drill-bit crown. *Long.*

track frame. In a crawler mounting, a side frame to which the track roller and idler are attached. Also called truck frame. *Nichols.*

track gage. a. The distance between the inside edges of installed railway rails. *B.C.I.* b. The minimum track gage which should be used on a modern haulage system is 3 feet 6 inches. This gage has been established as a standard by the American Mining Congress as a result of the consensus of opinion of mining engineers and manufacturers in the United States. *Wheeler, H.R., p. 11.* c. *See* rail gage. *Nelson.*

track haulage. Movement or transportation of excavated or mined materials in cars or trucks running on rails. *Bureau of Mines Staff.*

tracking. a. Iron or wooden tramrails. *Fay.* b. Lines of wear on a road surface caused by vehicles following in each other's tracks. *Ham.*

tracking through. N. of Eng. Clearing a path along the whole length of the face through the newly fired-down coal. The first operation of filling. *Trist.*

tracklayer; trackman. A workman engaged in work involved in putting railway tracks in place. *Webster 3d.* Also, one employed at mines to lay or repair tracks. *Fay.*

track laying machine operator. *See* track moving machine operator. *D.O.T. 1.*

tracklaying tractor. A tractor moving on crawler tracks. *Ham. See also* halftrack.

trackless mine. A mine with no rails. In these mines, rubber-tired vehicles operating independently of tracks, are used for haulage and transport. *Stoces, v. 1, p. 185.*

trackless tunneling. Tunneling by means of loaders mounted on caterpillars, with a combined dump truck haulage system of battery or diesel type. *See also* rubber-tired haulage. *Nelson.*

trackless vehicle. *See* supplies vehicle. *Nelson.*

track-mounted. Referring to the operation of equipment on tracks, such as track-mounted cutting machines, track-mounted loaders, etc. *Jones.*

track moving machine operator. In metal mining, one who operates a machine that moves and lays track mechanically in open pit mines, picking up a section of track and moving and laying it in the desired position without having to detach rails from ties. Also called track laying machine operator. *D.O.T. 1.*

track pin. A hinge pin connecting two sections or shoes of a crawler track. *Nichols.*

track resistance. The total rolling friction of the train on straight level track. It is generally taken as 30 pounds per ton weight of the train for cars having plain bearings and 20 pounds per ton for cars with roller bearings. These figures should be increased from 10 to 15 pounds if the track is in poor condition and may be less for track in excellent condition. *Lewis, p. 212.*

track roller. In a crawler machine, the small wheels which are under the track frame and which rest on the track. *Nichols.*

track shifter. A machine or appliance used in shifting a railway track laterally. Also the operator of such a device or machine. *Bureau of Mines Staff.*

track spike. A heavy steel nail of square section which is driven into a wooden sleeper to hold a flanged rail. *See also* rail fastening. *Ham.*

track stones. *See* track diamonds. *Long.*

track wheel. One of a set of small flanged steel wheels resting on a crawler track and supporting a track frame. *Nichols.*

tract book. A book maintained in the District Land Office of the Bureau of Land Management listing all entries affecting described lands. *Williams.*

traction. a. The act of drawing a vehicle over a surface and the force exerted in so doing. Traction is the friction developed between tracks or tires and the surface of the ground on which they are moving. *Carson, p. 68.* b. The total amount of driving push of a vehicle on a given surface. *Nichols.* c. Adhesive or rolling friction as of wheels on a road. *Crispin. See also* frictional force.

traction rope. a. A rope used for transmitting the power in a wire rope tramway and to which the buckets are attached. *Zern.* b. The rope by which a container is hauled along the track cable of a cableway. *Ham.*

traction transport. Mode of transport whereby particles roll, slide, or tumble along the bottom. *Schieferdecker.*

tractive efficiency. A measure of the proportion of the weight resting on tracks or drive wheels which can be converted into vehicle movement. *Nichols.*

tractive effort. a. The necessary drawbar pull plus the resistance of the locomotive itself. *Kentucky, p. 235.* b. The effort exerted by the locomotive at the rim of its driving wheels and is a function of its weight, the nature of its tires, and the condition of the track. It is equal to the weight of the locomotive times the adhesion of the locomotive to the track. For steel wheels on clean dry track the adhesion is 25 percent, and the tractive effort is therefore 500 pounds per ton of weight. For cast-iron wheels the adhesion is 20 percent. *Lewis, p. 213.* c. *See* tractive force. *Nelson.*

tractive force. a. The pull exerted by a haulage rope on the drawbar of a car to overcome the frictional resistance of the car and the force of gravity acting on it. Similarly, it is the force available at the wheels of a locomotive for propulsion of the locomotive and its attached load. Also called tractive effort. *Nelson.* b. The pull which a locomotive is capable of producing at its drawbar. *See also* drawbar pull. *Ham.*

tractive power. The weight of the vehicle multipled by the coefficient of traction; it is the total pounds of pull that can be exerted before slippage occurs. *Carson, p. 68.*

tractive resistance. The resistance to motion due to friction per unit weight hauled. *Ham.*

tractor. a. A self-propelled vehicle which may be mounted on crawler tracks, on wheels with large pneumatic tires, or on a mixture of both. *See also* halftrack; wheeled tractor. *Ham.* b. A piece of mechanical equipment designed to convert engine power into tractive power for the purpose of moving itself and other vehicles. *Carson, p. 68.*

tractor drills. These drills have a crawler mounting that supports the feed guide bar on an extendable arm. Small air motors control the movements of the arm used in tilting and turning the guide bar and provide power for crawler movement. The compressor is a separate unit, which can be towed by the tractor drill. These drills have now largely superceded the wagon drill. *Carson, p. 296.*

tractor loader. A tractor equipped with a bucket which can be used to dig, and to elevate to dump at truck height. Also called tractor shovel; shovel dozer. *Nichols.*

tractor, mine. *See* mine tractor.

tractor pan operator. In ore dressing, smelting, and refining, one who scrapes up bauxite ore from stockpiles, hauls the ore to the crusher, and dumps it into the crusher hopper, using a combination bulldozer carryall. *D.O.T. 1.*

tractor shovel; front-end loader; loader. Some of the names applied to a class of excavating equipment that has a bucket supported from the front end of a tractor. *Carson, p. 62.*

tractor-towed scraper. *See* scraper, b. *Nelson.*

trade. a. Eng. Refuse; debris. *Fay.* b. Demand for coal. *Fay.*

traffic man. *See* motor boss. *D.O.T. 1.*

traffic marks. Abrasions which result from metal to metal contact and vibration during transit. These abrasions are usually dark in appearance because of the presence of a dark powder, which consists of aluminum and aluminum oxide fines produced by the abrasive action of surfaces rubbing together. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17–24.*

tragacanth. Gum dragon. A gum powder, organic in nature. Used in small amounts as a mill addition to improve dry film strength. *Enam. Dict.*

trail. a. A track made by passage (as through a wilderness or wild region). *Webster 3d.* b. *See* trail of the fault. *Fay.* c. Eng. *See* put, e. *SMRB, Paper No. 61.*

trailer. a. Scot. A bar dragging behind a car to prevent it from running downgrade should a coupling break; a jock. *Fay.* b. N. of Eng. One who pushes a coal car in a mine; a putter. *Fay.* c. A towed carrier which rests on its own wheels both front and rear. Also called full trailer. *Nichols.* d. *See* drag. *Mason.* e. *See* brakeman; pusher. *D.O.T. 1.*

trailer cable. Aust. A branch cable for conveying electricity to a coal cutter, one end of which is attached to the main cable. It is capable of being paid out as the machine advances. Also used on gathering motors, as the trolley wire does not extend into the rooms. *Fay.*

trailing. A method of slip decoration sometimes used by the studio potter; a pattern is formed on the ware by means of a viscous slip squeezed through a fine orifice, for example, a quill. *Dodd.*

trailing cable. a. A flexible cable designed to be movable while in use. *B.S. 3618, 1965, Sec. 7.* b. A flexible electric cable for connecting portable face machines and equipment to the source of supply located some distance outby. The cable is heavily insulated and protected with either galvanized steel wire armoring, extra stout braiding hosepipe, or other material. *See also* collectively screened trailing cable; individually screened trailing cable. *Nelson.* c. A cable for carrying electricity from a permanent line or trolley wire to a movable machine such as in mining or quarrying. It is usually paid out from a reel as the machine advances. *Grove.* d. A flexible, rubber-insulated conductor, or set of conductors, which carries electric power to a crane or other moving machine. *Ham.* e. A flexible insulated cable used for transmitting power from the main power source, such as a trolley wire, nipping station, or junction box, to a mobile machine. It includes cables between the nipping station and distribution center. *BuMines Coal-Mine Inspectors' Manual, June 1966, pt. 3–18e, p. 53.*

trailing cable coupler. An assembly of two restrained type sockets for coupling together two trailing cables fitted with restrained plugs. *B.S. 3618, 1965, sec. 7.*

trailing points. Points which are approached by a train from such a direction that it first meets the heel of the points. *Ham.*

trailing spit. *See* tail, f. *Schieferdecker.*

trail jud. In driving a wide heading or jud, the first 3 or 4 yards are driven narrow and then opened to the full width. This practice provides a pillar of coal to protect the roadway off which the jud branches. *Nelson.*

trail of the fault. Crushed material of a bed or vein that indicates the direction of the fault movement; valuable as a guide to the miner in search of the main vein. *Fay.*

trail road. Eng. *See* gate, b. *SMRB, Paper No. 61.*

train. a. A number of empty or loaded mine cars, coupled together, for transport by rope haulage or locomotive. *See also* journey. *Nelson.* b. To trace, or follow an alluvial mineral deposit to its place of origin. *Fay.* c. A roll train. *Fay.* d. A connected line of cars on a railroad, with or without a locomotive. *Fay.* e. A line of gunpowder laid to lead fire to a charge. *Fay.* f. Can. A long sleigh for transportation of merchandise. *Fay.* g. A trip of coal cars. *Fay.* h. A linear dispersion pattern resulting from movement along well-defined drainage channels. *Hawkes.*

train boats. York. A number of boats coupled together in a simple manner, admitting of free articulation, in which coal is carried on canals or rivers from the mines to the shipping ports. *Fay.*

trainboy. A boy that rides on a trip, to attend to rope attachments, signal in case of derailment of cars, etc. A trip rider. *Zern.*

train conductor. *See* brakeman, c. *D.O.T. 1.*

train dispatcher. *See* motor boss. *D.O.T. 1.*

training face. Usually a longwall coal face where new colliery entrants or trainees can gain experience, skills, and confidence in the winning and working of coal. The trainees are under the control of a training officer. *Nelson.*

training film. One used to teach workers the technical details of machines or processes, and to show them how to control and handle them. *Pryor, 3.*

training gallery. A short tunnel or chamber attached to a rescue station, in which rescue workers may receive training in irrespirable atmosphere in the form of dense smoke. It is also used to give rescue men experience in stretcher drill, in the use of reviving apparatus, and practice with tube-breathing apparatus, artificial respiration, etc. *See also* central rescue station. *Nelson.*

training wall. A wall constructed along the banks of a river or estuary to restrain the flow within the confines of a given channel. *Ham.*

training works. Any structure designed for the purpose of altering or remedying the flow, scouring, or silting capacity of a river or estuary. *Ham.*

Trainite. Trade name for a mixture of vashegyite with a colloidal zeolitic mineral near laubanite. Used as a gem stone. Originally described as a banded variscite. Also called Sabalite. From Manhattan, Nev. *English.*

trainman. a. In metal mining, a laborer who loads railroad cars from chutes of ore bins located near the shaft into which ore has been dumped from skip as it is hoisted to surface. *D.O.T. 1.* b. *See* brakeman. *D.O.T. 1.*

train-mile. One mile traversed by one train; used as a unit in railroad accounting. *Webster 3d.*

train of rolls. A series of mills, one after the other, each successive mill approaching more nearly the size of the finished piece. *Mersereau, 4th, p. 427.*

train resistance. The grade resistance plus the track resistance. *Kentucky, p. 235.*

trainroad. A temporary track in a mine, used for light loads. A tramroad. *Fay.*

trajectory. Line that intersects the wave fronts at right angles. *Schieferdecker.*

tram. a. A trip of coal cars. *Jones.* b. Generally, to move a self-propelled piece of equipment other than a locomotive; tramcar. *B.C.I.* c. A small wagon, tub, cocoa pan, corve, corf, or hutch for carrying mineral. *C.T.D.* d. S. Wales. A tub. In general, a tram is larger than a tub with a capacity ranging from about 1 to 1½ tons. *Nelson.* e. A four-wheeled truck to carry a tub, corve, or hutch. *Fay.* f. The rails of a tramroad or railroad. *See also* tramroad. *Fay.* g. A boxlike wagon, now often of steel, running on a tramway or railway in a mine, for conveying coal or ore. *Webster 3d.* h. To haul or push trams or cars about in a mine. *Fay.*

tramcar. Eng. A car used in coal mines; same as tram, g. *Fay.*

tram carriage. Corn. *See* tram, e. *Fay.*

tram driver. In mining, one who drives a draft animal to haul coal, ore, or rock in a tram (car) along tracks underground or at the surface of a mine. *D.O.T. 1.*

tramlines. a. An overfill appearing as two parallel lines on rolled bars. *Osborne.* b. Long, straight marks due to drawn out inclusions on rolled sheet. *Osborne.*

trammel. a. A board with two grooves intersecting at right angles, in which the two ends of a beam compass can slide and describe an ellipse. *Ham.* b. *See* beam compass. *C.T.D.* c. A pivoted rod, used to keep brick in alinement in lining circular kilns. *Bureau of Mines Staff.*

trammel net. In oceanography, a form of gill net consisting of two taunt outer nets of large mesh and a larger slack middle net of finer mesh, all three being attached to each other at the head, foot, and ends. *See also* gill net. *C.T.D.*

trammer. a. One who pushes cars along the track. In Arkansas known as a pusher. Also called haulier; putter. *Fay.* b. A person whose duty it is to load broken rock upon tramcars and deliver it at the shaft. *Fay.* c. Trammers work as assistant miners in all the work a miner does. They load the broken mineral onto shaker or belt conveyors, fill and haul the mine cars, bring in the mine timber and other materials to support and equip the mine workings, serve the mining and transport machines, and work also as auxiliary mine timbermen. *Stoces,* v. 1, p. 648. d. *See* pusher. *D.O.T. 1.* e. One who transports coal, ore concentrate, or flux to roasting furnaces or bins. *D.O.T. Supp.*

tramming. The practice of pushing tubs, mine cars, or trams, by hand. Tramming was an earlier practice in longwall stall mining, but is now largely obsolete. On the surface, tramming means moving material in skips or wagons running on light railway track. *See also* hand putting. *Nelson.*

tramming motor. May refer to an electric locomotive used for hauling loaded trips, or it may refer to the motor in a cutting machine which supplies the power for moving or tramming the machine. *Jones.*

tramp. Synonym for boomer, drifter, or duster, as applied to a drill-crew member who moves often from job to job, usually after payday. *Long.*

tramp iron. a. Stray metal objects, such as coal-cutter picks or bolts, which have become mixed with the run-of-mine coal or ore. To remove this iron before it damages the crushers or other machines, various types of magnets are widely used. *See also* magnetic separator. *Nelson.* b. Any loose piece of metal in a borehole. *Long.*

tram plate. Scot. A cast-iron flanged rail or plate for tramroads. *Compare* tramrail. *Fay.*

tramp oversize. a. Ore which should not have been released from the previous section at the delivery size. *Pryor, 4, p. 818.* b. Ore undergoing treatment which is larger than the maximum particle size that can be handled efficiently by the machine into which it is fed. *Pryor, 3.*

tramrail. Eng. A rail for a tram. *Webster 3d.* A light railroad rail distinguished from tram plate by being rolled while the latter is cast. *Fay.*

tramroad. a. A mine haulage road. *Jones.* b. Eng. A road laid with tramrails or plates. So called after Benjamin Outram, of Little Eton, in Derbyshire, who in 1800 used stones for carrying the ends of the metal plates or edge rails. The name Outram was subsequently contracted into tram, hence tramway, trams, etc. *Fay.*

tram rope. A hauling rope, to which the cars are attached by a clip or chain, either singly or in trips. *Zern.*

tram vibrator. *See* vibrating platform. *Nelson.*

tramway. a. A roadway having plates or rails on which wheeled vehicles may run. A tramroad. *Standard, 1964.* b. A suspended cable system along which material, as ore or rock, is transported in suspended buckets. *See also* aerial tramway. *Fay.* c. A system in which carriers are supported by cable and in which the movement is continuous over one or more spans. *ASA MH4.1-1958.*

tramway operator. *See* inclined railway operator. *D.O.T. 1.*

transcrystalline. The same as intracrystalline. *ASM Gloss.*

transcrystalline failure. The normal type of failure observed in metals. The line of fracture passes through the crystals, and not around the boundaries as in intercrystalline failure. *C.T.D.*

transcurrent fault. a. A fault resulting from movement that is essentially horizontal along the face of the fault, the plane of fracture being vertical or approximately so. *B.S. 3618, 1964, sec. 5.* b. Synonym for strike-slip fault. *A.G.I.* c. *See* tear fault, b. *Nelson.*

transducer. a. A device actuated by one transmission system and supplying related waves to another transmission system; the input and output energies may be of different forms. Ultrasonic accept electrical waves and deliver ultrasonic waves, the reverse also being true. *ASM Gloss.* b. A device which measures quantities in a system, that is, pressure, current, voltage, and converts them into related or proportional units. *NCB.*

transducer loss. The transducer loss of a transducer connecting an energy source and an energy load is the transmission loss measured by the ratio of the source power of the source to the load power of the load. *H&G.*

transductor; magnetic amplifier. A device consisting of one or more ferromagnetic cores with winding by means of which an alternating voltage or current can be varied by an independent voltage or current, utlilizing saturation phenomena in the magnetic circuit or circuits. *NCB.*

transfer. a. A vertical or inclined connection between two or more levels and used as an ore pass. *Nelson.* b. The action of transferring load in prestressing tendons to concrete. *Taylor.* c. A printed decoration which is applied and burned into the enamel surface. Stove names, trademarks, borders, and heat-control wordings are applied in this way, the transfers being made from ceramic inks or overglazes which will fuse at temperatures between 1,200° and 1,500° F. *Hansen.*

transfer admittance. The transfer admittance of a network made up of an energy source and an energy load connected by a transducer is the quotient obtained by dividing the phasor representing the source current of the source by the phasor representing the load voltage of the load. *H&G.*

transfer car. a. A quarry car provided with transverse tracks, on which the gang car may be conveyed to or from the saw gang. *See also* transfer carriage. *Fay.* b. A car equipped with rails, used to transfer a drier or kiln car from one set of tracks to another. *ACSG, 1963.*

transfer car helper. *See* brakeman. *D.O.T. 1.*

transfer-car man. One who operates an electric car on an ore trestle, which transfers ore from the ore bridge to an ore bin. *Fay.*

transfer carriage. A movable platform or truck used to transfer mine cars from one track to another. *Zern.*

transfer case. A transmission or gearset that provides drive to secondary drives, winches, etc. *Bureau of Mines Staff.*

transfer chute. A chute used at a transfer point in a conveyor system. The chute is designed with a curved base or some other feature so that the load can be discharged in a centralized stream and in the same direction as the receiving conveyor. *Nelson.*

transfer conveyor. Generally 50 to 300 feet in length. It is used to transport material only from one conveyor to another. *NEMA MBI-1961.*

transference number. The proportion of the total current carried by the ions of a given kind. Also called transport number. *Lowenheim.*

transfer-gang-car system. A system used in quarries in order to save time in handling stone blocks and slabs. In this system, a transfer car which runs on a depressed track in front of the gangs is provided with a short section of track across the top. A gang car loaded with marble, sandstone, etc., is placed on this track and when moved to proper position is shifted beneath the gangsaw. Similarly, a gang car loaded with sawed slabs may be quickly moved from beneath the saws to the transfer car for transportation to the shops. *AIME, p. 332.*

transfer gear. Self-acting mechanim at shaft head by which skip is emptied and its contents are moved away to the next stage of handling. *Pryor, 3.*

transfer glass. Optical glass cooled in the pot in which it is melted. *ASTM C162-66.*

transfer guilding. In ceramics, a transfer of a pattern in gold, as from paper to unglazed ware, usually done either by direct transfer of the gold in reverse, or by stamping the pattern in oil and dusting with gold powder. *Standard, 1964.*

transfer impedance. The transfer impedance of a network made up of a given source and a given load connected by a given transducer is the quotient obtained by dividing the phasor representing the source voltage of the source by the phasor representing the load current of the load. *H&G.*

transfer ladle. A large ladle lined with refractory material (usually fire clay bricks) for the transport of molten pig iron from a blast furnace to a hot-metal mixer or to a steelmaking furnace. *See also* hot-metal ladle. *Dodd.*

Transfer Order. A statement in which an interest is conveyed through an understanding between the pipe line purchasing company and the participants in production. *Wheeler.*

transfer point. a. The point where coal or mineral is transferred from one conveyor to another. *See also* loading point, a. *Nelson.* b. Turning point. *Nichols.*

transfer printing. An intaglio process of decoration, particularly applicable to pottery ware; a single-colored pattern is transferred directly from a printing plate or roller by means of thin paper. The color used is generally dispersed in linseed oil; soft soap is the traditional size for the transfer paper but various synthetics have also been used. *Dodd.*

tranfser ring. *See* holding ring. *Dodd.*

transfer table. A table connected with rolling mills for transferring work from one mill to the other laterly. *Mersereau, 4th, p. 427.*

transformation. A constitutional change in a solid metal; for example, the change from gamma to alpha iron, or the formation of pearlite from austenite. *C.T.D.*

transformation points. Temperatures at which the coefficient of thermal expansion of a glass changes. For any one glass, there are normally two such points known respectively as the Tg point and the Mg point; the Tg point is the first temperature at which there is a sudden change in expansion when the glass is heated at 4° C per minute; the Mg point is the temperature at which the thermal expansion curve reaches a maximum and is usually equal to the softening temperature. *Dodd.*

transformation ranges (transformation temperature ranges). Those ranges of temperature within which austenite forms during heating and transforms during cooling. The two ranges are distinct, sometimes overlapping but never coinciding. The limiting temperatures of the ranges depend on the composition of the alloy and on the rate of change of temperature, particularly during cooling. *See also* transformation temperature. *ASM Gloss.*

transformation temperature. The temperature at which a change in phase occurs. The term is sometimes used to denote the limiting temperature of a transformation range. The following symbols are used for iron and steels: Ac_{cm}—in hypereutectoid steel, the temperature at which the solution of cementite in austenite is completed during heating; Ac_1—the temperature at which austenite begins to form during heating; Ac_3—the temperature at which transformation of ferrite to austenite is completed during heating; Ac_4—the temperature at which austenite transforms to delta ferrite during heating; Ae_{cm}, Ae_1, Ae_3, Ae_4,—the temperatures of phase changes at equilibrium; Ar_{cm}—in hypereutectoid steel, the temperature at which precipitation of cementite starts during cooling; Ar_1—the temperature at which transformation of austenite to ferrite or to ferrite plus cementite is comleted during cooling; Ar_3—the temperature at which austenite begins to transform to ferrite during cooling; Ar_4—the temperature at which delta ferrite transforms to austenite during cooling; M_s (or Ar″)—the temperature at which transformation of austenite to martensite starts during cooling; and M_f—the temperature at which martensite formation finishes during cooling. NOTE: All these changes except the formation of martensite occur at lower temperatures during cooling than during heating, and depend on the rate of change of temperature. *ASM Gloss.*

transformed flow net. A flow net whose boundaries have been properly modified (transformed) so that a net consisting of curvilinear squares can be constructed to represent flow conditions in an anisotropic porous medium. *ASCE P1826.*

transformer. A device which, through electromagnetic induction but without use of moving parts, transforms alternating or intermittent electric energy in one circuit into energy of similar type in another circuit, commonly with altered values of voltage and current. Transformers are frequently classified as stepdown, stepup, radio-frequency, input, output, pushpull, power, etc. *A.G.I.*

transformer oil. A special type of oil of high dielectric strength, forming the cooling medium of electric power transformers. *C.T.D.*

transformer station. A transformer station is any installation of one or more transformers, either portable or stationary, used for power or lighting service, for increasing or reducing alternating-current potential, or for isolation. *ASA M2.1-1963.*

transformist. One who believes that all granites had a metasomatic or palingenetic origin. *Compare* magmatist. *A.G.I. Supp.*

transfusion. A term proposed for a process in which a highly energized stream of emanations, rich in alkalies, etc., moves into the crustal rocks from below and reacts with them to produce either solid altered rocks or even completely liquid magmas. *A.G.I.*

transgranular. The same as intracrystalline. *ASM Gloss.*

transgression. a. In geology, discrepancy in the boundary lines of continuous parallel strata; unconformability of overlap; used only by European geologists. *Standard, 1964.* b. In the United States, the encroachment of the sea upon the land. *Standard, 1964.*

transgressive overlap. Synonym for onlap. *A.G.I.*

transient vibration. Temporarily sustained vibration of a mechanical system. It may consist of forced or free vibration or both. *H&G.*

transistor. A device for amplifying alternating electric currents by the controlled movement, through a crystal of silicon or germanium, of electrons and holes. *Hurlbut.*

transit. A surveying instrument with the telescope mounted so that it can measure horizontal and vertical angles. Also called a transit theodolite. *Fay.* The principal differences between the ordinary transit and the mining transit are that the latter has, as far as possible, been made water- and dust-proof and is equipped with a full vertical circle, with guard. Some highly refined foreign instruments have special eyepieces and micrometer centering devices for shaft plumbing. *Staley, p. 4.*

Transite. A trade name for a material of asbestos fiber and Portland cement molded under high pressure. Used for fireproof walls, roofing, and in lining ovens, etc. *Crispin.*

transition. a. In the nomenclature of Werner and other early geologists, the older Paleozoic strata, which are now assigned to the Cambrian, Ordovician, and Silurian systems; little used at present. *See also* intermediate. *Fay.* b. A short conduit uniting two others having different hydraulic elements; a conversion. *Seelye, 1.*

transitional environment. The place of meeting of environments, for example, land and sea. *Schieferdecker.*

transitional fit. A fit which may have clearance or interference resulting from specified tolerances on hole and shaft as given by six classes of transition locational fits of 13 nominal shaft sizes in ASA B4.1-1955. *ASM Gloss.*

transition belt. A short belt carrying material from a loading point to a main conveyor belt. *Nichols.*

transition curve. a. A curve designed to effect a gradual change between a straight and a circular curve. *See also* junction point. *Ham.* b. *See* spiral curve b. *Seelye, 2.*

transition elements. a. In periodic system, a group characterized by incompleteness of the second outermost shell of electrons. *Pryor, 3.* b. Elements having atomic numbers 21 to 30; 39 to 48; and 57 to 80. *Hurlbut.*

transition lattice. An intermediate, unstable, crystallographic configuration that forms during solid-state reactions, such as precipitation from solid solution and eutectoid decomposition. *ASM Gloss.*

transition metals. Elements in the middle of the long periods of the periodic table. Usage varies, but most commonly the transition elements are taken to include those from scandium to zinc in the first long period, from yttrium to cadmium in the second, and from lanthanum to mercury (excluding the 14 rare-earth metals from cerium to lutecium) in the third. *A.G.I.*

transition point. A single point at which different phases of matter are capable of existing together in equilibrium. Also, called inversion point. *Webster 3d.*

transition rocks. *See* transition, a. *Fay.*

transition temperature. The temperature at which the change from tough to brittle fracture occurs in a notched bar impact test, or sometimes in other forms of test, for example, notched tensile test. *Osborne.*

transition zone. The water area between two opposing currents manifested by eddies, upwelling, rips and similar turbulent conditions occurring either vertically or horizontally; or a zone between two water masses of differing physical characteristics such as temperature and/or salinity. *Hy.*

transitman. One who operates a surveyor's transit. He need not necessarily be a graduate engineer. *Crispin.*

transit mixer. *See* truck mixer. *Ham.*

translational failure. *See* slope failure, c. *Lewis, p. 627.*

translational fault. A fault with a translational displacement in the fault plane. Synonym for translatory fault. *Schieferdecker.*

translation twinning texture. A texture showing slip movements on adjacent twin planes (false cleavage). *Schieferdecker.*

translatory fault. Synonym for rotary fault. *A.G.I.*

translucency. a. Descriptive of mineral crystals sufficiently transparent to transmit light. Also called subtransparency. *Pryor, 3.* b. The ability to transmit light is an important feature of bone china and of most porcelain. The translucency of these materials agrees reasonably well with Lambert's law; the ratio of the intensity of the emergent light to that of the incident light is an exponential function of the thickness of the ware and of a constant, the latter depending on the nature of the material. Translucency can be measured by an apparatus comprising a standard light source and a photoelectric cell. *Dodd.*

translucent. Admitting and diffusing light so that objects beyond cannot be clearly distinguished; partly transparent. *Webster 3d.*

translucent attritus. This term was first used by R. Thiessen in 1930 referring to the attritus of ordinary humic coal, which is ordinarily composed largely of transparent humic matter, with spores, cuticles, resins, and opaque matter in minor proportions. Translucent attritus consists of the complex residual organic matter, exclusive of anthraxylon, in bituminous lower rank coal that transmits light in thin section. The following macerals of the Stopes-Heerlen nomenclature are included in translucent attritus: vitrinite less than 14 microns thick; sporinite; cutinite; alginite; resinite and those parts of semifusinite; micrinite; and sclerotinite that are weakly reflecting, that is semitranslucent. Translucent attritus is a collective term and not comparable with any of the microlithotypes of the European system of nomenclature. *IHCP, 1963, part I.*

translucent concrete. A combination of glass and concrete blended together in precast or prestressed panels. *Taylor.*

translucent glass. Glass that will admit rays of light to pass but through which objects cannot be seen. *Mersereau, 4th, p. 329.*

translucent humic degradation matter; THDM. This term was introduced by R. Thiessen in 1930 for transparent humic matter consisting of irregular particles varying greatly in shape and size. Although rounded or ovoid particles are not rare, humic matter is mostly flattened in form and usually of frayed or tattered appearance. The particles are of the same deep red color as the anthraxylon strips, becoming lighter in thinner sections. According to the practice at the U. S. Bureau of Mines, translucent humic degradation matter includes all humic matter less than 14 microns in width perpendicular to the bedding. May be fibrous or in fine bands. Color ranges from orange to red to brownish red, depth of color increasing with rank and thickness of thin section. Differences in color are sometimes observable in the same coal. Occurs as the groundmass of translucent attritus in which are embedded the microspic plant entities (phyterals) such as spores, cuticles, resins and waxes. May also be associated with opaque attritus. In bright coal containing little anthraxylon it may be the predominant constituent. In semisplint and splint coals, particularly the latter, it is generally a minor constituent. *IHCP, 1963, part I.*

transmissibility. Term used to describe the ability of a system either to amplify or to suppress an input vibration. It is the ratio of the response amplitude of the system in steady-state forced vibration to the excitation amplitude. The ratio may be between forces, displacements, velocities, or accelerations. *Hy.*

transmissibility coefficent. The rate of flow of water, in gallons a day, at the prevailing water temperature, through each vertical strip of the aquifer 1 foot wide having a height equal to the thickness of the aquifer and under a unit hydraulic gradient. Synonym for coefficient of transmissibility. *A.G.I.*

transmission. a. A mechanism that provides a variety of gear ratios for different load conditions, such as level road or steep hill. *API Glossary.* b. A gear set that permits change in speed-power ratio and/or direction of rotation. *Nichols.*

transmission anomaly. The difference, in decibels, between the total transmission loss in intensity and the reduction in intensity due to an assumed inverse square divergence. *Hy.*

transmission gain. Whenever the transmission factor is a number greater than unity, as it is in the case of an amplifier, the transmission loss would have a negative sign. In such cases the logarithm of the reciprocal of the transmission factor is written with a positive sign and designated as a transmission gain. *Hy.*

transmission level. The transmission level of the energy at any point in an energy transmission system is the rate of flow of that energy as expressed in terms of (1) a specified reference rate of flow and of (2) the transmission loss by which the actual rate of flow must be reduced to equal the reference rate. *Hy.*

transmission loss. Transmission loss is the reduction in the magnitude of some characteristic of a signal, between two stated points in a transmission system. *Hy.*

transmission reversing. A transmission that has only a forward and reverse shift. *Nichols.*

transmission rope. a. A rope used for transmitting power. *Zern.* b. A rope composed of 6 strands, 7 wires each, and a hemp core. *H & G, p. 130.*

transmissometer. A light-path device for measuring in situ turbidity by relative light scattering and absorption of light transmitted. *H&G.*

transmit. The property of any crystal or substance of allowing the rays of light to pass through it. *Gordon.*

transmittance. Rate of heat flow per unit area per unit temperature difference. *Strock, 10.*

transmitted light. Light which has passed through an object as distinguished from reflected light. Gems are usually examined for imperfections by transmitted light. *Shipley.*

transmutation. a. An alternating change. The conversion of metals, one into another; especially, base metals into gold or silver, which was one of the aims of alchemy, but never realized. *Fay.* b. The transformation of one element into another element by a nuclear reaction; for example, the transmutation of uranium 238 into plutonium 239. *L&L.*

transmutation glaze. In ceramics, an iridescent porcelain glaze. *Standard, 1964.*

transmute. a. In alchemy, the transformation of the baser metals into the more precious. *Gordon.* b. In geology, a change from one place to another, or from one thing to another. *Gordon.*

Transote. Refined coal-tar creosote; used as wood preservative. *Bennett 2d, 1962.*

transparency. a. A mineral is transparent when the outlines of objects seen through it appear sharp and distinct. Rock crystal (quartz) and selenite are good examples. A mineral is subtransparent or semitransparent when the objects seen through it appear indistinct. *Nelson.* b. That property of the water mass which permits the passage of radiation through the water. *Hy.* c. The degree to which light is transmitted through a substance. A stone is termed transparent when objects can be clearly seen through it, as through glass; for example, quartz, diamond, etc. Where some light is transmitted but no clear outlines can be discerned the stone is termed translucent; for example, jade. Where no light can pass through, the substance is opaque; for example, pyrites. Also called diaphaneity. *Anderson.*

transparent. a. Permitting the passage of light so that objects may be seen. *Kinney.* b. Things that may be seen through, such as rock crystal, Iceland spar, and selenite. *Fay.*

transparent enamel. Enamel which has the property of transmitting high percentage of incident light striking its surface. *ACSB, 3.*

transparent glass. Glass through which objects can be seen. *Mersereau, 4th, p. 329.*

Transphalt. Unsaturated coal-tar derivatives that can be resinified; used in rubber compounding. *Bennett 2d, 1962.*

transpiration. The process by which water vapor escapes from a living plant and enters the atmosphere. *Leet.*

transponder. An automated receiver/transmitter for transmitting signals when triggered by an interrogating signal. *Hy.*

transport. A mining term used to cover vehicular transport, hydraulic transport, and conveyors. *See also* conveyor; haulage; hydraulic pipe transport. *Nelson.*

transportable equipment. Machines or equipment which can be moved from one part of a mine to another by mechanical means, but not by self-propulsion nor on its own wheels or track. *See also* mobile equipment. *Nelson.*

transportable substation; portable substation. A transformer equipped with switchgear and mounted upon wheels or skids. *B.S. 3618, 1965, sec. 7.*

transportation. a. In geology, the shifting of material from one place to another on the earth's surface by moving water, ice, or air. The carriage of mud and dissolved salts by rivers, the passage of a dust-laden whirlwind across a desert, the inland march of sand dunes from a seashore, and the creeping movement of rocks on a glacier are all examples of transportation. *Fay.* b. The hauling or moving from one place to another material; as, ore, coal, rock, etc. *Fay.*

transport case. These wood, plastic or fabric containers are used to transport safely small quantities of dynamite sticks to and from blasting sites. The moistureproof, nonconductive containers feature a carrying strap or handle, and a locking device. Most models permit the carrying of detonators as well, while some models are intended for detonators alone. *Bests, p. 374* .

transport controller. A man stationed in a central position, at a large opencast pit or quarry, to observe all the excavations. By means of signals, he is informed when and where vehicles or cars are required and can instruct the lorry or locomotive drivers accordingly. *Nelson.*

transported clay. *See* sedimentary clay.

transported gossan. Some transported gossans are simply colluvial accumulations of fragments of normal gossan that have moved down the slope from the site of weathering. Another variety of an entirely different origin is effectively a fossil spring or seepage deposit, where at one time iron-rich ground water has precipitated massive limonite at or near the daylight surface. *Hawkes, 2, p. 164.*

transported limonite. Oxidation limonite that is carried away in solution and deposited outside the parent sulfide. *Bateman.*

transported soil. Soil transported from the place of its origin by wind, water, or ice. *ASCE P1826.*

transporter crane. A long lattice girder supported by two lattice towers which may be fixed or may move along rails laid at right angles to the girder. A crab with a hoist suspeneded from it travels along the girder. *Ham.*

transport number; Hittorf number. In electrolysis, fall in concentration at an electrode proportionally to the number of ions moving from that electrode.

$$n=\frac{\text{Loss of concentration at cathode}}{\text{Loss at cathode and anode}}$$

Phenomenon is due to difference in rate of travel of various species of ion. *Pryor, 3.*

transuranic. a. Of, or pertaining to, radioactive substances produced by bombarding uranium with neutrons. *Bennett 2d, 1962.* b. Having an atomic number higher than that of uranium; having an atomic number higher than 92. *Webster 3d.*

transuranic element. An element above uranium in the periodic table; that is, an element having an atomic number higher than 92. All 11 known transuranic elements (atomic numbers 93 through 103) are radioactive and are produced artificially. They are: (93) neptunium; (94) plutonium; (95) americium; (96) curium; (97) berkelium (98) californium; (99) einsteinium; (100) fermium; (101) mendelevium; (102) element 102 (formerly nobelium); and (103) lawrencium. *L&L; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-2.*

Transvaal emerald. Same as African emerald. *Shipley.*

Transvaal garnet. A green garnet, said by most authorities to be grossularite. Specific gravity, 3.45 to 3.50; refractive index, 1.72 to 1.73. Others class it as demantoid or other variety of andradite. *Shipley.*

Transvaal jade. Applied in the gem stone trade to massive green garnet (grossularite.) *C.M.D.* Same as garnet jade. *English.*

transverse. Literally, across, usually signifying a direction or plane perpendicular to the direction of working. *ASM Gloss.*

transverse-arch kiln. An annular kiln that is divided into a series of chambers by fixed walls (hence the alternative name continuous chamber kiln). The axis of the arched roof of each chamber is transverse to the length of the kiln. This type of kiln finds use in the heavy clay industry. *Dodd.*

transverse basin. Synonym for exogeosyncline. *A.G.I. Supp.*

transverse coast; unconformable coast; Atlantic type of coast. Coast transverse to the strike of the rock formations. *Schieferdecker.*

transverse dune. A dune formed in areas of scanty vegetation and in which sand has moved in a ridge at right angles to the wind. It exhibits the gentle windward slope and the steep leeward slope characteristic of other dunes. *Leet.*

transverse fault. A fault whose strike is transverse to the general structure. *Fay. See also* transcurrent fault.

transverse fissure. A fissure that is parallel with the dip of a deposit. *Stoces, v. 1, p. 266.*

transverse gallery. An auxiliary crosscut made in thick deposits across the orebody in order to divide it into sections along the strike. It serves only a short time and runs across the whole thickness of the deposit only. *Stoces, v. 1, p. 226.*

transverse joint. A joint that is transverse to the strike of the strata or schistosity. *Fay.*

transverse lamination. Lamination of cleavage transverse to stratification. *Standard, 1964. See also* crossbedding. *Fay.*

transverse loading. The loading on a beam. *Ham.*

transverse pitch. The lateral distance between the center lines of each strand of a multiple-strand chain, or between the tooth profiles on a sprocket for a multiple-strand roller chain. *J&M.*

transverse reinforcement. Links or helical reinforcement for columns, or reinforcement at right angles to the main reinforcement. *Taylor.*

transverse riffles. *See* Hungarian riffles. *Lewis, p. 386.*

transverse ripple mark. A ripple mark oriented at approximate right angles to current direction. *A.G.I. Supp.*

transverse scour marks. Scour marks with long axes transverse to main current direction; regular spacing leads to confusion with ordinary transverse ripples; have been called current ripple casts. *Pettijohn.*

transverse slicing with caving. *See* top slicing and cover caving. *Fay.*

transverse strength. a. A measure of the capability of a bar of stone (or beam) supported at its ends, to bear a weight or load at its center. *Fay.* b. The strength of a specimen tested in transverse bending; normally synonymous with modulus of rupture but also used to refer to breaking load. *Taylor.*

transverse ventilation. *See* peripherical ventilation. *Stoces, v. 1, p. 528.*

transverse wave. a. In seismology, a wave motion in which the motion of the particles, or the entity that vibrates, is perpendicular to the direction of progression of the wave train. *A.G.I.* b. In geophysics, a body seismic wave advancing by shearing displacements. *A.G.I.* c. A wave in which the direction of propagation of the wave is normal to the displacements of the medium, for example, a vibrating string. The gravity wave in which fluid parcels move in circular orbits is an example of a mixed transverse-longitudinal wave. The Rossby wave is also mixed, except in the case of zero current speed, when it is a transverse wave. Also called distortional wave. *H&G.*

transverse with filling. *See* overhead stoping, b. *Fay.*

trap. a. A door used for cutting off a ventilating current, which is occasionally opened for haulage or passage; guarded by a trapper. *Fay.* b. Scot. Traveling road for miners in edge coals driven on the slope of the seam. *Fay.* c. Scot. Short ladders in a shaft. *Fay.* d. A device inserted in a pipeline to separate a denser material from one of lesser density, such as entrained water in a stream or a compressed-air line. *Long.* e. A natural subsurface petroleum reservoir. *Long.* f. A body of reservoir rock completely surrounded by impervious rock; a closed reservoir. *See also* traprock. *A.G.I.* g. A useful field name for any dark, finely crystalline igneous rock. *Fay.* h. A fault or dislocation. *Fay.* i. The troughs and catch pits, carrying mercury or not, which are used to arrest escaping amalgam, etc. The word trap should be confined to the deep boxes unprovided with mercury, and the word well to the transverse troughs which do contain it. At Clunes, Australia, the word boxes is used, while, elsewhere in Australia, ripples is a term given to shallow wells as distinguished from the deep ones. Also called well. *Fay.* j. That portion of any mass of porous, permeable rock which is sealed on top and down the sides by relatively nonporous and impermeable rock, and which lies above the intersection of a horizontal plane passing through the lowest point of complete sealing. *Williams.*

trap brilliant. A trap-cut brilliant. *See also* trap cut. *Fay.*

trap cut. A gem with a row or rows of steplike facets around the table and culet (or small lower terminus of the gem, parallel to the table), or around the culet alone. *Fay. See also* step cut.

trap dike. A dike of any of the sorts of rock called trap. The term has no very definite significane, as rocks such as diabase, bostonite, and dacite have been included under it. *Fay.*

trapdoor. a. A door in a mine passage to regulate or direct the ventilating current. Also called weather door. *See also* trap, a. *Fay.* b. Another term for mine door *B.C.I.* c. *See* air door, a. *B.S. 3618, 1963, sec. 2.*

trap down. Brist. A down throw fault. *Fay.*

trapezium. A plane figure contained by four straight lines, no two of which are parallel. *Gordon.*

trapezohedron. a. In the isometric system, the same as tetragonal trisoctahedron. *Fay.* b. In the tetragonal and hexagonal systems, any of several forms having principal and lateral axes of symmetry, but no planes of symmetry, and enclosed by six, eight, or twelve faces, each having unequal intercepts on all the axes. *Fay.*

trapezoid. A quadrilateral that has only two sides parallel. *Jones, 2, p. 99.*

trapezoidal method. In estimate of plotted irregular area, parallel lines are drawn at equal intervals, sufficiently close to allow the average of the enclosing lengths of each strip thus formed, to be representative of the length dimension of that rectangle. *Pryor, 3.*

trapezoidal rule. A rule for estimating the area of an irregular figure, by dividing it into parallel strips of equal width, each strip being a trapezium. *See also* Simpson's rule. *Ham.*

trap man. *See* crusher feeder. *D.O.T. 1.*

trapp. Synonym for traprock.

trappean. Relating to traprocks. *Fay.*

trappean ash. A fragmentary scoriaceous variety of eruptive rock, generally resembling volcanic deposits only in structure, not in origin. Also called ash bed. *Standard, 1964.*

trapper. a. An employee, normally an apprentice, formerly used to open and close mine doors such doors are now sometimes mechanically operated. *B.C.I.* Also called trapper boy; nipper; door tender. *Fay.* b. An employee who assists the dispatcher by throwing switches and attending telephone at an inside station. *B.C.I.* c. Same as door boy. *Korson.* d *See* doorman. *D.O.T. 1.*

trapper boy. *See* doorman. *D.O.T. 1.*

trappoid. Of, pertaining to, or having the nature of traprock. *Standard, 1964.*

trap points. Points placed on a railway line to derail a train which has been incorrectly signaled. *Ham.*

traprock. Applied to dark-colored dike and flow rocks, chiefly basalt and diabase. Also spelled trapp. *A.G.I.*

trap-shotten gneiss. Applied to gneiss impregnated with nearly black indurated material originally supposed to be injections of traprock, but now identified as flinty crush rock. *Compare* pseudotachylyte. *Holmes, 1928.*

trap up. Brist. An upthrow fault. *Fay*

trash line. A line on the beach, defined by debris and surface texture, that marks the farthermost advance of high tide. *Pettijohn.*

trash rack. A screen of parallel bars or mesh placed across a stream or turbine intake to intercept floating debris. *See also* revolving screen. *Ham.*

trash screen. Protective screen for removing detritus from the pulp stream. *Pryor, 4.*

trass. A light-colored volcanic tuff resembling pozzolana in composition and occurring especially on the lower Rhine, where it is ground for use in a hydraulic cement. *Webster 3d.*

Traube's rule. In a homologous series of surface-active molecules, each additional CH_2 group decreases the solubility in water by a multiple of about three. Rule is useful in study of effect of fatty acids on surface tension between air and water, though applicability seems fortuitous. *Pryor, 3.*

traunter. Mid. A long sprag. Also called tront. *Fay.*

Trauzl test. A test to determine the strength of an explosion by exploding a known weight of a substance in the cavity of a standard test block of lead and measuring the increase in volume resulting from the explosion of the charge. *CCD 6d, 1961.*

travel. a. Scot. The length of stroke of a pump. *Fay.* b. The distance traversed by a piston in passing from one extreme position to the other in a cylinder, such as in a diamond-drill hydraulic-feed system or in a piston-type pump. *Compare* stroke. *Long.* c. The linear distance traversed by a component in moving from one extreme position to the other, as does the traveling block in a block-and-tackle system. *Long.* d. In power shovel nomenclature, travel is the movement of the mounting forward or backward. Turning is accomplished by locking one crawler and moving the other. *Carson, p. 38.*

traveled. In geology, removed from the original place; erratic. *Standard, 1964.* Said of stones, boulders, etc. *Fay. See also* transportation.

traveler. a. A truck rolling along a suspended rope for supporting a load to be transported. *Zern.* b. A crab or winch moving on an elevated track, used especially in erecting steel bridges or other large work; also, a traveling crane. *Webster 3d.* c. A boning rod moved along when setting out a slope in order to check levels between the sight rails. *Ham.*

traveler gantry. A stationary gantry supporting a pair of rails along which a carriage-mounted crane crab travels. *Ham.*

traveling angle of draw. The angle of draw advancing with a moving face. *Nelson.*

traveling apron. *See* apron, f. *Fay.*

traveling belt. A conveyor belt, for handling ore, rock, or coal. *Fay.*

traveling block. a. The movable unit, consisting of sheaves, frame, clevis, and/or hook, connected to, and hoisted or lowered with, the load in a block-and-tackle system. Also called floating block; running block. *Long.* b. The pulley block which hangs below the crown block and is used for lifting the drilling column. *B.S. 3618, 1963, sec. 3.* c. A frame for a sheave or a set of sheaves that slides in a track. *Nichols.*

traveling compartment. The section of a mine shaft used for raising and lowering the miners. *Stoces, v. 1, p. 508.*

traveling gantry. A movable gantry built on wheels for traveling on rails and supporting a crab and hoist. *Ham.*

traveling road. A roadway used by miners for walking to and from the face, that is, from the shaft bottom or main entry to the workings. *Nelson.*

traveling screen. a. A screen capable of moving in certain directions in order to extract foreign bodies from flowing water. *Ham.* b. A diaphragm, usually of canvas in a frame moved by water in the direction of flow, for purposes of measuring directly the mean velocity; only useful in regular channels where the frame is shaped to the channel cross section and nearly fills it. *Seelye, 1.* c. A revolving trash screen. *Seelye, 1.*

traveling sheave. a. A sheave block that slides in a track. *Nichols.* b. *See* traveling block. *Long.*

traveling wave. A wave in which energy is transmitted only away from the source. *NCB.*

traveling way. a. A passage for men and mules in or into a mine. *Korson.* b. *See* traveling road. *Fay.*

traveling weight. a. That portion of the overlying strata at the coal face that is supported and controlled by the face supports. This weight advances as the face line moves forward. *Nelson.* b. *Aust. See* underweight, b. *Fay.*

travel mixer. A self-propelled type of soil mixer taking in soil from a windrow at the front end and discharging it after mixing with the requisite quantity of water and stabilizer. *See also* mix-in-place. *Ham.*

travel time. Time required for the wave to travel from the shotpoint to the recording point. *Schieferdecker.*

travel-time curve; T-X graph. Graph of the travel time as a function of the horizontal distance from the shotpoint to the recording point. *Schieferdecker.*

traverse. a. To make or carry out a traverse survey of. *Webster 3d.* b. A line surveyed across a plot of ground. *Webster 3d.* c. A vein, line, or fissure in a rock, etc., which runs obliquely and in a transverse direction. *Standard, 1964.* d. A chain of survey stations so positioned that any one station is visible from the two stations adjacent to it. An endless chain of stations is called a closed traverse; an open chain is called an open traverse. *B.S. 3618, 1963, sec. 1.*

traverser. A platform superimposed upon, or forming part of, the rail track and which is free to roll or slide sideways so that a car can be moved bodily from one track to another parallel to it. The arrangement eliminates the need for a turntable or shunt back. The traverser may range from a simple hand-operated sliding type for tunnel work to heavy power-operated structures for car or wagon transfers on the surface. *See also* inclined traverser. *Nelson.*

traverser system. The basic idea of this system is to confine the mine-car circuit to the smallest possible compass near the mine shaft. This avoids locking up cars on the surface which are better employed underground and reduces manpower requirements. In this system, instead of the use of shunt backs on car circuits, the direction of car travel is changed by running onto a portable platform which then moves the car bodily in a transverse direction. It can be applied, in conjunction with the necessary lifts, to multideck cages. This system may be operated electrically, hydraulically, or pneumatically. *Sinclair, V, pp. 77–78.*

traverse survey. A survey used especially for long narrow strips of country in which a series of lines joined end to end are completely determined as to length and azimuth and are often used as a basis for triangulation. *Webster 3d.* Also used for underground surveys. *Fay.*

traverse tables. Published tables from which the differences of latitude and departure for different angles may be read off. *Ham.*

traversing bridge. A movable bridge designed to roll backwards from an opening such as in a dock to allow passage to vessels. *Ham.*

traversing method. One of three recoginzed methods for determining the average velocity of airflow along a mine roadway by an anemometer. This is the general routine procedure which is applied when measuring air velocities in mine roadways. While the instrument is running it is slowly and steadily moved up and down a series of imagined vertical lines, so as to cover equal areas in equal time. The total period is usually 1 minute for a medium-sized roadway. The integrated reading is then the mean velocity for that section. *Compare* division method; single spot method. *Roberts, I, p. 50.*

traversing slipway. A slipway suitable to accommodate ships up to about 500 tons weight. Such a ship, having been hauled up the slipway, can be traversed to another berth for repairs, leaving the slipway free for another vessel. *Ham.*

travertine. A calcium carbonate, $CaCO_3$, deposited from solution in ground and surface waters. The cellular deposits are known as tufa, calcareous sinter, spring deposit, or cave deposit. When solid, banded, and susceptible of a good polish, it is known as Mexican onyx, or onyx marble. True onyx, however, is banded silica or agate. Travertine forms the stalactites and stalagmites of caves, and the filling of some veins and spring conduits. *Sanford; Dana 17.*

travertine marble. *See* travertine. *ASTM C119–50.*

trawl. In oceanography, a sacklike net, the mouth of which is kept open by some kind of framework; used on smooth ground for obtaining samples of the fauna of the sea bottom. There are many different types, for example, the Agassiz trawl, beam trawl, and otter trawl. *C.T.D.*

trawley. A small truck or car conveying material about a furnace or iron mill; sometimes applies to trucks, in mines, etc. *See also* trolley. *Fay.*

trawn. Corn. In mining, a cross course. *Standard, 1964.*

tray. a. A car, a carrier, or a pallet usually suspended from the moving element of the conveyor. *ASA MH4.1–1958.* b. A section of a gravity conveyor, chain conveyor, or shaker conveyor. *See also* pan; trough. *Nelson.*

tray carrier. *See* tray. *ASA MH4.1-1958.*

tray thickener. One which differs from the ordinary round tank in that it houses several horizontal trays which divide it into compartments. Each has its own set of rakes, and its own underflow for settled material and peripheral overflow. Used where space is limited or in subarctic conditions which call for antifreeze housing. *Pryor, 3* .

tread. a. The ground contact surface on a tire or a track shoe. *Nichols.* b. Occasionally, a high-friction lagging on a belt pulley. *Nichols.* c. The pit in which brickmakers soak their clay before putting it into the pug mill. *Standard, 1964.*

treadle. A foot pedal hinged to the floor at one end. *Nichols.*

treadle bar. The foot pedal of a potter's wheel. *ACSG, 1963.*

tread tractor. A form of locomotive which is serviceable over rough roads, and is an important haulage equipment at many opencast pits, particularly in the United States. A trailer, with capacity up to 16 cubic yards, with bottom discharge or two-way side discharge is used with the tractor. The maximum speed is about 6 miles per hour. *Nelson.*

treamble earth. An altered slate found alongside the Great Perran iron lode, near Perranporth, Cornwall, England; used as a dressing for Bath stone. *Hess.*

treasure box. A pocket of very rich ore. *Fay.*

treated stone. A heated stone, stained stone, coated stone, or a stone which has been treated with X-rays or radium, to improve or otherwise change its color. Also a stone which may have been treated to disquise flaws as are doctored pearls, opals the cracks of which have been filled with oil, etc. *Shipley.*

treatment. In metallurgy, the reduction of ores by any process, whereby the valuable constituent is recovered. *Fay.*

treble. Three standard lengths of drill rod or drill pipe connected together and handled and stacked in a drill tripod or derrick as a unit length of rod on borehole round trips. Also incorrectly spelled thribble; thrible; tribble; trible. *Long.*

treble coursing. In mining, the system of dividing a ventilating current into three coursings. *Standard, 1964.*

trechmannite. A scarlet-vermilion sulfarsenite of silver, $AgAsS_2$. Trirhombohedral; minute crystals. Rhombohedral. From Binnenthal, Switzerland. *English.*

Trécuhon-Kieffer annealing schedule. A procedure for annealing the glass components of electron tubes; it is based on annealing at the transformation temperature for 20 minutes followed by cooling at a rate dependent on the nature of the glass and its thickness. *Dodd.*

tree. a. A thick log used as a prop in heavy ground. A prop, leg, or puncheon. *Fay.* b. Scot. A trestle. *Fay.* c. The fulcrum for the lever used in boring. *Fay.* d. A treelike aggregate of crystals, as a lead tree obtained by suspending a piece of zinc in a solution of lead acetate. *Webster 2d.*

tree agate. A variety of agate containing dendritic markings; sometimes made artificially. *Standard, 1964.*

tree cutter. Horizontal toothed blade fitted in front of the moldboard on a bulldozer, for cutting tree stumps. *Ham.*

treed. Supported by props, as a mine roof. *See also* tree, a. *Fay.*

treenail. a. A hardwood plug drilled so as to allow a track spike to be driven through it into a timber sleeper. *See also* rail fastening. *Ham.* b. A long wooden pin for securing planks or beams together. *Zern.*

tree ore. Buried carbonaceous material (often trees) which has been replaced and/or enriched with uranium-bearing solutions; usually extremely good grade of uranium ore. *Ballard.*

trees. Visible projections of electrodeposited metal formed at sites of high current density. *ASM Gloss.*

tree stone. Same as tree agate. *Shipley.*

tree up. Scot. To set props in the workings. *Fay.*

Trefor boring method. A percussive boring method very similar to the Foraky system. The principal difference is in the arrangement of the boring cable or rope, which is taken in a loop around a central pulley. *Nelson.*

trek. S. Afr. The act of drawing or hauling; traction; also, the state of the roads; as, the trek was heavy. *Standard, 1964.*

trek wagon. A large six-wheeled covered wagon used especially in southern Africa in trekking and designed to provide lodging and storage space as well as seating for trekkers. *Webster 3d.*

trellised drainage. This arrangement of parallel brooks, which swell the volume of a creek, generally flowing at right angles to their courses, resembles a vine from whose central stem branches are trained on a trellis. It is sometimes called the trellis or grapevine system. Synonym for grapevine drainage. *A.G.I.*

treloob. To treat or work loobs or tin slimes; to toss. An obsolete term. *Standard, 1964.*

treloobing. Corn. Stirring the "loobs" (slime tin) in water, so that the lighter mud may run off. *Fay.*

Tremadocian. Lower Lower Ordovician; considered uppermost Cambrian in Great Britain. *A.G.I. Supp.*

tremenheerite. Impure graphite rock from India. *Tomkeieff, 1954.*

tremie. A box or frame of wood or metal used for depositing concrete underwater. Its upper section forms a hopper above water to receive the concrete, and it may be moved laterally or vertically by any suitable device, as a traveling crane. *Standard, 1964.*

tremolite. An amphibole, $Ca_2Mg_5(Si_8O_{22})$-$(OH)_2$, monoclinic. It is usually gray or white, and occurs in bladed crystals or fibrous aggregates associated with metamorphic rocks. *See also* amphibole. *Fay; Dana 17.*

tremolitic. Pertaining to or characterized by the presence of tremolite, as tremolitic marble. *Fay.*

tremor tract. An area of intensely jumbled coal and associated beds. The contortions contain sharp folds, thrusts, and glides. The mode or origin is controversial. A theory which has gained some favor is that the disturbance was initiated by a seismic shock, causing the coal seam and beds to crack and heave. Later, lateral forces appear to have produced the final complicated structures. *See also* lurching coal seam. *Nelson.*

Trempealeauian. Upper Croixan. *A.G.I. Supp.*

trench. a. An elongated but proportionally narrow depression, with steeply sloping longitudinal borders, one of which (the continental) rises higher than the other (the oceanic). Trenches are the ends of unsymmetrical basins and lie beside the continental border or island chains. *A.G.I.* b. A long but narrow depression of the deep-sea floor having relatively steep sides. *A.G.I.* c. A long, narrow, intermontane depression occupied by two or more streams (whether expanded into lakes or not) alternately draining the depression in opposite directions. *A.G.I.* d. A narrow ditch. *A.G.I.* e. In geological exploration, a narrow, shallow ditch cut across a mineral deposit to obtain samples or to observe character. *Bureau of Mines Staff.* f. A long, narrow excavation in the ground, as a trench dug for the laying of pipes. *Crispin.* g. A trench is a temporary scar in which a conduit is placed and then covered over. *Compare* ditch, f. *Carson, p. 146.*

trench excavation. Excavation in which the width of operations and, generally, the depth is limited. Trenching may be performed in any soil, and will sometimes fall into the category of limited-area, vertical excavation. *Carson, p. 28.*

trench excavator. A self-propelled machine generally mounted on crawler tracks designed for digging trenches or ditches. It is equipped with either a bucket ladder or buckets mounted around the periphery of a circular wheel. *Ham.*

trenching. a. Prospecting in which subsurface strata are exposed by trenching across the strike of the lode. *Pryor, 3.* b. The digging of shallow trenches to expose a coal seam or vein for inspection and sampling. *See also* costean; trace. *Nelson.*

trenchman. *See* ripper, b. *Nelson.*

trench sampling. A slight refinement of grab sampling in which the material to be sampled is spread out flat and channeled in one direction with a shovel, and the material for the sample taken at regular intervals along the channel. The procedure is repeated with several other channels in different directions until a sample of the proper size has been secured. Also called channel sampling. *Newton, p. 29.*

trend. a. The direction or bearing of the outcrop of a bed, dike, sill, or the like, or of the intersection of the plane of a bed, dike, joint, fault, or other structural feature with the surface of the ground. *Fay.* b. The direction or bearing of a fold or series of folds in rocks, of the axes of the folds, of subsurface structures, of oriented or elongated structures indicated by geological surveys, or of topographic features that are consequent on the geologic structure. (As used in either sense the trend may or may not coincide with the strike, depending on the structural relations at the place of observation.) *Fay.* c. All mineral deposits have a trend in occurrence of valuable minerals. That is, the ore varies in grade from wall to wall and gradually or abruptly from ore to subore grade. A trend is a nonrandom factor and hence may impair the validity of a statistical analysis. *Lewis, p. 350.*

trent agitator. An agitator with arms of the paddle wheel type, but they are hollow, and the pulp solution or air is discharged from nozzles on these arms, thus causing the stirrer to rotate. *Liddell 2d, pp. 392–393.*

Trenton. a. A subdivision of the American Ordovician sometimes considered as the equivalent of the whole Middle Ordovician and sometimes restricted to a portion of this series. *Webster 3d.* b. Formerly, a division of the lower Silurian. *Bureau of Mines Staff.*

Trenton diamond. Quartz crystal from Herkimer County, N.Y. *Shipley.*

Trentonian. Upper Mohawkian. *A.G.I. Supp.*

Trenton limestone. An important member of the Ordovician succession in the region of the Adirondack Mountains, lying between the Black River limestone below and the Utica shales above. Usually regarded as the highest member of the Champlainian series; it is typically exposed at Trenton Falls, N.Y., and is an important oil-bearing formation in the Central States. *C.T.D.*

Trent process. Agglomeration process sometimes used in coal cleaning and briquetting. Raw coal crushed to -65 mesh is agitated with water and oil. Coal agglomerates and ash-forming fraction is removed in aqueous solution. *Pryor, 3.*

trepan. a. A large boring tool used in the Kind-Chaudron sinking method. *Nelson.* b. Fr. A heavy tool consisting of vertical chisels fixed to a horizontal bar and used in boring mine shafts. *Webster 3d.* c. A boring machine used for shaft sinking through water-bearing strata. *Fay.*

trepanner. A cutter loader for continuous mining in longwall faces. Its main cutting unit is the trepanner wheel with cutting arms, one at each end of the machine to enable it to cut in both directions on the face. Also fitted are a vertical, back-shearing jib, a floor-cutting jib, duplicated to enable cutting in either direction and, if necessary, a roof-cutting disk. The machine is used in conjunction with an armored flexible conveyor on a prop-free front face; suitable for seams between 3 and 4 feet thick, though it can work in thicker seams if the top coal falls freely. *Nelson.*

trepanning. A type of boring where an annular cut is made into a solid material with the coincidental formation of a plug or solid cylinder. *ASM Gloss.*

trepan shearer. A new cutter loader in which the trepanner head is incorporated in the shearer loader as the principal coal-getting medium while the cutting drum is retained to dress the floor and back of the cut. *Nelson.*

trespass. a. Working coal from the property or take of another coal mine owner. *See also* encroachment. *Nelson.* b. An intrusion upon land occupied by another for the purpose of locating a mining claim is but a naked trespass and initiates no right; although the occupant has no other valid title than possession. *Ricketts, I.*

trestle. a. A framework of timbers, carrying tram tracks. *Weed, 1922.* b. A bridge, usually of timber or steel, that has a number of closely spaced supports between the abutments. *Nichols.* c. A bent of timber, reinforced concrete, or steel, supporting a temporary or permanent structure. *Ham.*

trestle bridge. A bridge supported by trestle bents. *Ham.*

trestleman. One who unloads coke, limestone, and ore, and keeps bins poked down. *Fay.*

tret. Allowance to purchaser for waste. *Pryor, 3.*

trevorite. A black, with greenish tint, oxide of nickel and iron, $NiO.Fe_2O_3$, massive. Regarded by Walker as a ferrate of nickel, belonging to the spinel group. From Barberton, Transvaal, Republic of South Africa. *English.*

triad. An atom, a radical, or an element that has a combining power of 3. *Standard, 1964.*

trial. In ceramics, one of the pieces of ware which is used to try the heat of the kiln and the progress of the firing of its contents. *Fay.*

trial face. *See* experimental face. *Nelson.*

trial of the pysc. The test made by special commissioners of the weight and fineness of coins reserved from each delivery of coin. In the mints of the United States and England, the test is made annually; in the United States, it is now known as the Annual Assay Commission. *Hess.*

trial pit. a. A shallow hole, 2 to 3 feet in diameter, put down to test shallow minerals or to establish the nature and thickness of superficial deposits and depth to bedrock. *See also* test pit; pit sampling, b. *Nelson.* b. An exploratory pit or hole excavated for determining the nature of the ground. *Ham.*

trial shots. The experimental shots and rounds fired in a sinking pit, tunnel, opencast, or quarry to determine the best drill-hole pattern to use. This is carried out when hard rocks are exposed. *Nelson.*

triamorph. Minerals having the same chemical composition, but crystallizing in three different forms. *Fay.*

triangle. a. Scot. A three-legged derrick for hoisting rods in boring. *Fay.* b. In ceramics, a triangular stilt. *Webster 2d.* Keeps articles apart in the kiln. *Bureau of Mines Staff.*

triangle bar. One type of metal support for vitreous enamelware during firing. *Dodd.*

triangle cut. The characteristic feature of this cut lies in the fact that the drill holes are arranged in zigzag. In this way a larger openings is obtained as the drill holes can break out between the preceding row of holes. Each vertical row of holes breaks out a layer. If the front holes do not break out to the full depth, the burnt-out holes indicate the direction of break for the following row of holes since the holes are arranged in zigzag. The name, triangle cut, is due to the distribution of the holes at the working face and the form of the initial opening. *Fraenkel, v. 1, Art. 6:02, p. 29.*

triangle of error. The triangle formed during a graphical trial-and-error solution of the three-point problem. *Ham.*

triangle of forces. This theorem states that when the forces acting at a point can be represented in magnitude and direction (but not in position) by the sides of a triangle taken in order, the three coplanar forces will be in equilibrium. *Morris and Cooper, p. 179.*

triangle shooting. A refraction type of seismic shooting used to facilitate the separation of intercept times into constituent delay times. Three profiles can be laid out as sides of a triangle. If intercept times are obtained at each of the vertices of the triangle from shots at the other two vertices, one can solve for the delay times at the three corners. Delay times along the sides of the triangle can be determined by taking differentials in the intercept times with respect to the delay times established at the vertices. *Dobrin, p. 98.*

triangular core. The strand core of a flattened strand rope. *Ham.*

triangular facets. Truncated spur ends with a broad base and apex pointing upward. Usually associated with gravity faults, but may also characterize faultline scarps. Triangular facets may also be formed by other processes, such as wave erosion of a mountain front and truncation of spurs by a valley glacier. *A.G.I.*

triangular method. This method of ore reserve estimation is based on the assumption that a liner relationship exists between the grade difference and the distance between all drill holes. In deposits with erratic mineralization, this relationship is anything but linear. *Krumlauf, p. 80.*

triangular notch. A V-shaped measuring weir which is used for measuring small flows. *Ham.*

triangular texture. A crystallographic exsolution texture in which the exsolved mineral is oriented along octahedral planes forming a diagrammatic triangular arrangement. Also a replacement texture. *Schieferdecker.*

triangulate. To divide into triangles; to survey, map, or determined by triangulation; to give triangular form to. *Webster 3d.*

triangulation. a. In surveying, the series of network of triangles into which any portion of the earth's surface is divided in a trigonometrical survey. *Webster 2d.* b. The operation of measuring the elements necessary to determine the network of triangles into which any part of the earth's surface is divided in surveying and to fix the positions and distances apart of their vertices. *Webster 3d. See also* trigonometrical survey. *Fay.*

Trias. Synonym for Triassic. *A.G.I. Supp.*

Triassic. The earliest of the three geologic periods comprised in the Mesozoic era, in the nomenclature generally used. Also, the system of strata deposited during this period. *Fay.*

triaxial compression test. a. A test made on a soil specimen which is confined within a rubber bag surrounded by water under pressure. A load is applied to the specimen and any deflections are observed and measured. *See also* unconfined compression test; drained shear test. *Ham.* b. A test in which a cylindrical specimen, encased in an impervious membrane if necessary, is subjected to a confining hydrostatic pressure and then loaded axially to failure. *Taylor.*

triaxiality. In a triaxial stress state, the ratio of the smallest to the largest principal stress, all stresses being tension. *ASM Gloss.*

triaxial shear test. A test in which a cylindrical specimen of soil encased in an impervious membrane is subjected to a confining pressure and then loaded axially to failure. Also called triaxial compression test. *ASCE P1826.*

triaxial stress. A state of stress in which none of the three principal stresses is zero. *ASM Gloss.*

triaxial test. A method of testing clay in which the test piece, in a plastic state, is enclosed in a rubber envelope and is then subjected to uniform hydrostatic pressure while it is also being loaded axially. A stress/deformation diagram is plotted. *Dodd.*

tribasic. Of molecule, containing three replaceable H-atoms (hydrogen atoms). *Pryor, 3.*

tribble. Synonym for treble. *Long.*

tribe. a. A subdivision of an igneous rock kindred. *A.G.I. Supp.* b. A taxonomic subdivision intermediate between genus and family. *A.G.I. Supp.*

trible. Synonym for treble. *Long.*

tribocouple. Two chemically dissimilar metals in mutual electrical contact. The friction produced by the mechanical agitation of the two members of the couple results in the flow of an electric current. The power of a tribocouple is the magnitude of the current which it will generate under specified conditions of friction. *Osborne.*

tribolites. Employed by Wadsworth including mineral abrasives or attrition materials. *Fay.* Obsolete.

triboluminescence. The property of some specimens of zinc sulfide of emitting sparks when scratched. Not only the mineral zinc blende but the artificial sulfide exhibits this phenomenon. The sparks do not ignite flammable gases. *Fay.*

tribrach. a. Three leveling screws and footplate used to attach theodolite or surveyor's level to its tripod, level the instrument, and perhaps center it precisely over its mark. *Pryor, 3.* b. The frame below a theodolite on which the three foot screws are mounted. *See also* limb. *Ham.*

tribomomethane. *See* bromoform. *CCD 6d, 1961.*

tributary. a. Applied to any stream which directly or indirectly contributes water to another stream. One stream falling directly into another stream becomes an affluent to that stream, and both may be tributaries to the same larger current. *A.G.I.* b. An affluent flowing into a larger stream; any stream feeding a larger stream or lake. *A.G.I.*

tribute. Corn. A portion of ore given to the miner for his labor. Tributors are miners working under contract, to be paid by a tribute of ore or its equivalent price, the basis of the remuneration being the amoun of clean ore contained in the crude product. *Fay.*

tribute pitches. Eng. The limits assigned to a crew of miners. *Fay.*

tributer. One who works a mine or mineral deposit for a share of the product. *Fay.*

tribute work. In mining, work on shares. *Standard, 1964.*

tributing. a. A system under which a syndicate of miners delivers coal at the pithead at an agreed price. It may also operate where ore deposits are too small and scattered for normal mining activities. The tributors work and deliver their ore to the owner and receive payment calculated upon agreed terms from its ascertained valuable content. *Nelson.* b. Also, working on a sharing basis. *Pryor, 3.*

tributors. S. Afr. Miners who work ground under an agreement to pay a percentage of their production to the owners. *Beerman.*

tricalcium aluminate. $3CaO.Al_2O_3$; white; isometric; specific gravity, 3.038 (at 25° C); and insoluble in water. A refractory, and an important ingredient of cements, especially of aluminous cement. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-160.*

tricalcium disilicate. $3CaO.2SiO_2$. *See also* rankinite. *Dodd.*

tricalcium pentaluminate. A compound, $3CaO.5Al_2O_3$, formerly believed to be present in high-alumina hydraulic cement. It is now known that a melt of this composition consists of a mixture of $CaO.2Al_2O_3$ and $CaO.Al_2O_3$, the latter compound being responsible for the hydraulic properties. *Dodd.*

tricalcium phosphate. *See* calcium phosphate, tribasic. *CCD 6d, 1961.*

tricalcium silicate. $3CaO.SiO_2$; dissociates at approximately 1,900° C to form CaO and $2CaO.SiO_2$. This compound is the principal cementing constitutent of Portland cement, small quantities of MgO and Al_2O_3 usually being present in solid solution. Tricalcium silicate is also present in stabilized dolomite refractories. *Dodd.*

trichalcite. A discredited term. Trichalcite (of Hermann, 1858), previously thought to be $Cu_3(AsO_4)_2.5H_2O$, equals tyrolite; from Turginsk, Ural Mountains, U.S.S.R. Trichalcite (of Shannon, 1922) equals the sulfate langite; from Shoshone County, Utah. *American Mineralogist, v. 42, No. 1–2, January-February 1957, p. 123.*

trichite. A thin filament or hairlike form of crystallite, often occurring in irregular or radiating groups. *Holmes, 1928.*

trichloroethylene; trichloroethene. a. Colorless; stable; low-boiling; heavy; mobile; toxic; liquid; $CHCl:CCl_2$; chloroform odor; will not attack the common metals, even in the presence of moisture; boiling point, 86.7° C; melting point, −73° C; specific gravity, 1.456 to 1.462 (at 25° C, referred to water at 25° C); refractive index, 1.4735 (at 27° C); and flash point, (ASTM open cup), none at boiling point. *CCD 6d, 1961.* b. Molecular weight, 131.39; C_2HCl_3; specific gravity, 1.462 (at 20° C, referred to water at 4° C); melting point, −88° C; boiling point, 87° C (at 760 mm); slightly soluble in water; and soluble in all proportions in alcohol and in ether. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-314.* c. A widely used industrial solvent for fats, resins, bitumens, sulfur, phosphorus, and similar compounds. Used in dry cleaning, in degreasing, and in soap manufacture. Previously considered nonflammable, but found to be flammable under combinations of pressures and temperatures often occurring in normal use. Abbreviation, TCE. *Bureau of Mines Staff.*

trichroism. A property possessed by certain minerals of exhibiting three different colors when viewed in different directions. *Fay.*

trickle drain. A pond overflow pipe set vertically with its open top level with the water surface. *Nichols.*

trickle scale. Scale which has become detached from a pack of sheets in pack rolling, trickling in between the pack and becoming embedded in the surface of the sheets during further rolling. *Osborne.*

triclinic. The crystal system in which crystals have no axes of symmetry or planes of symmetry. *Hurlbut.*

triclinic block. In quarrying, a term applied to a block of stone bounded by 3 pairs of parallel faces, none of the interfacial angles being right angles. *Fay.*

triclinic crystals. Crystals having no symmetry elements, or only inverse centers. The typical crystal has three unequal axes, no two of which are perpendicular. *Henderson.*

triclinic system. That system of crystals in which the forms are referred to three unequal mutually oblique axes. *Fay.*

triclorethylene solvents. Solvents used for the degreasing of steel. They may be applied by immersion of the part, or by vapor or spraying. *Osborne.*

tricobalt tetroxide. See cobaltocobaltic oxide. *CCD 6d, 1961.*

tricone bit. A roller bit having three cone-shaped cutters in the head of the bit. *See also* roller bit, b. *Long.*

tricone roller bit. *See* tricone bit. *Long.*

tridimite. Synonym for tridymite. *Hey 2d, 1955.*

Tridite. Mixture of trinitrophenol and dinitrophenol used as an explosive in bursting charges. *Bennett 2d, 1962.*

tridymite; tridimite. A mineral, like quartz, consisting of silica, SiO_2, but differing in crystallization. In volcanic rocks. Orthorhombic. *Dana 17.*

Trief process. A process for making concrete with Portland blast furnace cement. The slag is wet ground and fed as a slurry to a concrete mixer together with Portland cement and aggregate. *See also* Portland blast furnace cement. *Dodd.*

trig. Eng. A sprag used to block or stop a wheel or any machinery. *Zern.*

Triger process. A method of sinking through water-bearing ground in which a shaft is lined with tubbing and provided with an air lock so that work proceeds under air pressure. *Webster 3d. Compare* Kind-Chaudron process. *Fay.*

trigger circuit; trigger. A circuit having a number of states of electrical condition (which are either stable or quasi-stable) or unstable with at least one stable state and so designed that desired transition can be initiated by the application of suitable trigger excitation. By quasi-stable state is meant a state which persists during the time of interest. *NCB.*

trigger effect. When rock is subjected to increasing stresses there comes a time when it is on the point of failure. In some circumstances it may remain at that point for a considerable time. Any small external influence, such as a seismic wave, may then be sufficient to precipitate the failure. This is known as the trigger effect. *Spalding.*

triggers. Term applied to any number of things which may initiate or trigger rock bursts. Such triggers include blasting, changes of temperature, sudden influxes of water, and even rock bursts themselves which sometimes act as a trigger impulse to initiate a second burst. *Isaacson, pp. 164–166.*

trigonal. a. Having, in the ideal or symmetrically developed form, triangular faces; as, the trigonal trisoctahedron. *Fay.* b. Threefold—occurring three times at equal intervals in one complete rotation; said of one kind of axial symmetry. *Fay.* c. Characteristic of, pertaining to, or belonging in the trigonal division of the hexagonal system. *Fay.*

trigonal system. According to some crystallographers, the trigonal (or rhombohedral) division of the hexagonal system, regarded by some others as a system in itself. *Fay.*

trigonite. A sulfur-yellow acid arsenite of lead and manganese, $HPb_3Mn(AsO_3)_3$. Monoclinic. Small wedge-shaped crystals. From Langban, Sweden. *English.*

trigonometrical leveling. Basically this method consists of determining the vertical heights by measurement of distances and angles of inclination. Angles of inclination are measured either by hand instruments, for example clinometers, of which they Abney level is the best known, or more accurately by theodolite. *Mason, V. 2, p. 737.*

trigonometrical relations. Mathematical relationship between sides and angles of triangles. *Pryor, 3.*

trigonometrical station. A station used in surveying by triangulation on a large scale. *Ham.*

trigonometrical survey. A survey accomplished by the trigonometrical calculation of lines after careful measurement of a base line and of the angles made with this line by the lines toward points of observation; generally preliminary to a topographical survey. *See also* triangulation. *Standard, 1964.*

trigonometry. Measurement of three-angled figures, or measurement by use of three-angled figures. *Jones, 2, p. 128.*

trihydrocalcite. A hydrous calcium carbonate, $CaCO_3.3H_2O$. A moldlike incrustation on chalk marl. From Nova-Alexandria, Poland. *English.*

trikalsilite. A form of kalsilite, $(K,Na)AlSiO_4$, in parallel intergrowth with nepheline, $(Na,K)AlSiO_4$. *Spencer 21, M.M., 1958.*

trilateration. Land survey based on triangulation, in which sides of triangles are measured direct by use of tellurometer, instead of being calculated from a measured baseline. *Pryor, 3.*

trilling. A symmetrical intergrowth of three crystals. The type of twinning, such as the six-rayed twinned crystals, consisting of three individuals, which occur in chrysoberyl. *Shipley.*

trilobite. A primitive, extinct crustacean, occurring throughout the Paleozoic and abundant in the earlier Paleozoic periods, characterized by segmented bodies divided by longitudinal grooves into three lobes. One of the Trilobita. *A.G.I.*

trim. To shave down a leather-hard pot on the wheel. *ACSG, 1963.*

trimaceral. Coal microlithotype consisting of a mixture of three macerals, that is, clarodurite and duroclarite. *A.G.I. Supp.*

trimerite. A rare mineral consisting of the silicates of berylium, manganese, and calcium. *Fay.*

trimetric. A solid figure in which the three axes are all unequal, but intersect one another at right angles; orthorhombic. *Gordon.*

trim holes; relief holes. Unloaded drill holes closely spaced along a line to limit the breakage of a blast. *Nichols.*

trimmer. a. One who distributes loose material, such as coal, rubbish, sand, or other substances in railroad cars or holds of ships and barges during or after loading, using a shovel. May be designated according to material trimmed, as coal trimmer. *D.O.T. 1.* b. A shothole bored slightly outwards to trim the drivage to the shape required. *Mason.* c. Eng. A piece of bent wire by which the size of the flame of a safety lamp is regulated without removing the top of the lamp. *See also* pricker. *Fay.* d. N. of Eng.; S. Wales. One who arranges coal in the hold of a vessel (miner, ship) as the coal is discharged into it from bins. *Fay.* e. Scot. One who cleans miners' lamps. *Fay.* f. An apparatus for trimming a pile of coal into a regular form (as a cone or prism). *Webster 3d.*

trimmer arch. An arch, usually of brickwork and of low rise used for supporting the fireplace hearth. *ACSG.*

trimmer conveyor. A self-contained, lightweight portable conveyor, usually of the belt type, for use in unloading and delivering bulk materials from trucks to domestic storage, and for trimming bulk materials in bins or piles. *ASA MH4.1–1958.*

trimmer holes. These complete the breaking out of the ground. The positioning and number of trimmer shots will be governed by the size of the drift, the hardness of the ground, and the fragmentation required for the loading-out method to be adopted. *McAdam II, p. 125.*

trimmers. a. The shotholes drilled around the periphery of a shaft sinking or tunnel which break or trim the sides of the excavation to the shape and size required. *See also* cut holes. *Nelson.* b. The top row of holes in a tunnel face. *Stauffer.* c. Units of various shapes consisting of such items as bases, caps, corners, moldings, and angles, necessary or desirable to make a complete installation and to achieve sanitary purposes as well as architectural design for all types of tilework. *ASTM C242–60T. See also* fittings, e.

trimming. a. In drawing, shearing the irregular edge of the drawn part. *ASM Gloss.* b. In forging or die casting, removing the parting-line flash and gates from the part by shearing. *ASM Gloss.* c. In casting, the removal of gates, risers, and fins. *ASM Gloss.* d. The finishing work on the surface of an earthwork. *Ham.* e. The process of removing broken and ragged edges, loose scales, and major imperfections from rifted mica. Trimming may be accomplished by fingers, sickle, knife, shear, or guillotine and is then named for the implement; for example, thumb-trimmed mica. Also called dressing. *Skow.*

trimming shed. *See* mica house. *Skow.*

Trimonite. Mixture of trinitrophenol and mononitronaphthalene; explosive used in bursting charges. *Bennett 2d, 1962.*

trimorphous. Having the property of crystallizing in three different forms with the same chemical composition. *A.G.I.*

trinascol. Dense asphaltic petroleum containing 9 percent sulfur. *Tomkeieff, 1954.*

Trinidad asphalt. Natural asphalt removed from the large natural deposit of asphalt in Trinidad. *API Glossary.*

Trinidad pitch. Same as Trinidad asphalt. The deposit of solid or semisolid bitumen constituting the Pitch Lake, southwest Trinidad. *Fay.*

Trinitian. Middle Lower Cretaceous. *A.G.I. Supp.*

trinitronaphthalene. An ammonium nitrate explosive of low power suitable for use on coal and weak rock. Will not freeze but is very liable to absorb moisture. Should be made waterproof and carefully stored. *Cooper, p. 347.*

trinitrotoluene; TNT. A yellow to dark brown crystalline substance, $C_6H_2(CH_3)(NO_2)_3$, which melts at approximately 80.9° C and has a specific gravity of 1.654. Insoluble in water; soluble in ether, toluol, etc.; begins to decompose at 150° C, decomposes rapidly between 305° and 320° C. One of the most powerful explosives, having an explosive wave of 23,500 feet per second in the open. Used in the ammunition of the armed services; sometimes used as a constitutent of permitted explosives in mining. *Cooper, pp. 343–344; CCD 6d, 1961.* Yields a very powerful explosive when mixed with ammonium nitrate. Trinitrotoluene is manufactured by nitrating toluene. *Nelson.*

Trinity series. The lowest of the three divisions into which the Comanchean is divided. These beds are marls, limestones, and marine argillaceous strata in Zarcatecas, Mex.; they cover half of Texas and part of Arizona, where a limestone member (the Glen Rose limestone) rests upon continental Comanchean beds. *C.T.D.*

trinkerite. A resinous substance occurring in large amorphous masses of a hyacinth-red to chestnut-brown color in brown coal near Albona, Istria. Resembles tasmanite in composition. *A.G.I.*

trinol. *See* trinitrotoluene. *Pryor, 3.*

trioctahedral. a. Refers to the structure of layered clay minerals in which all possible octahedral positions of aluminum are occupied by magnesium, iron, chromium, or zinc. *A.G.I. Supp.* b. Atoms filling all of the six-fold interstices. *VV.*

Triolith. A proprietary mixture of 55 percent sodium fluoride, 35 percent sodium dichromate, and 10 percent dinitrophenol. This water soluble preservative is used in timber preservation. *Higham, p. 113.*

trip. a. A small train of mine cars. *Korson.* b. The number of cars moved at one time by a transportation unit. *Hudson.* c. The cars hauled at one time by mules, or by any motor, or run at one time on a slope, plane, or sprag road. *Fay.* d. An automatic arrangement for dumping cars; a tipper, a kickup. *Fay.* e. Synonym for round trip. *Long.* f. A release catch. *Nichols.*

trip change. A term used in mine transportation for the period during which the loads (loaded mine cars) are taken away and a fresh trip of empties is brought back. This period is known as trip change in contrast to car change. In this interval a great deal of potential loading time can be lost. *Kentucky, p. 219.*

trip chock. Eng. A chock with one of the members set a certain distance out of line with those above and below it; in a full trip chock this distance is equal to the width of the members; in a half trip chock it is about half the width of the members. *SMRB, Paper No. 61.*

trip coil. A device for opening protective equipment or a circuit breaker, operated by a solenoid. *Ham.*

tripestone. a. Stalactite resembling intestines. *Arkell.* b. A variety of gypsum formed of crumpled alternating laminae of pure white gypsum and gray argillaceous gypsum. *Arkell.* c. A contorted concretionary variety of anhydrite. *Fay.*

trip hammer. A power hammer operated by a tripping mechanism which causes the hammer to drop. *Crispin.*

triphane. The same as spodumene. *Standard, 1964.*

triphylite; lithiophilite. A mineral, $LiFePO_4$. Orthorhombic. *Dana 17.*

trip lamp. A removable self-contained mine lamp, designed for marking the rear end of a train (trip) of mine cars. *ASA C42.85:1956.*

triple-action press. A mechanical or hydraulic press having three slides with three motions properly synchronized for triple-action drawing, redrawing, and forming. Usually, two slides—the blank-holder slide and the plunger—are located above, and a lower slide is located within the bed of the press. *ASM Gloss.*

triple-beam balance. Three sets of sliding weights appropriately adjusted, for used in pulp density measurement. *Pryor, 3, p. 35.*

triple-cavity mold. A mold possessing three cavities for simultaneous fabrication of three articles of glass. *ASTM C162–66.*

triple-cavity process. Any glass-forming process that uses three charges of glass and forms them simultaneously. *ASTM C162–66.*

triple decking. A method of stacking a load to increase capacity of a given furnace. *Enam. Dict.*

triple entry. a. A system of opening a mine by driving three parallel entries for the main entries. *Fay.* b. *See* main entry, b. *Nelson.*

triple-entry room-and-pillar mining. *See* room-and-pillar. *Fay.*

triple-gob process. *See* triple-cavity process. *ASTM C162–66.*

triple point. A point on a pressure-temperature diagram where three phases of a substance coexist in equilibrium. *ASM Gloss.*

triple round edge. A type of wall tile. *Dodd.*

triplet. a. An assembled stone of two main portions bound together by a layer of cement or other thin substance which can be colored to reproduce the color of the stone which the triplet imitates. If it is of two portions of the species being imitated, plus a binding layer, it is a genuine triplet; if of one portion only, it is a semigenuine triplet; if it contains no portion of the species being imitated it is a false triplet; if no portion is a genuine mineral, it is an imitation triplet. *Shipley.* b. A chemical bond which consists of three electrons shared between two atoms. *C.T.D.* c. N. of Eng. A tipper; a kickup. *See also* trip, d. *Fay.*

tripletine. A name for emerald-colored beryl triplet. *See also* emerald triplet.

triple-tube core barrel. A special core barrel used to take soil samples, as in foundation testing. The inner tube is swivel mounted and nonrotating and extends through, and a short distance beyond, the bit. Hence, the bit only cuts clearance for the outer tube or core-barrel assembly, and the core taken by the inner tube is cut by a spudding action. The triple or core tube is mounted inside the inner tube to receive the core and is split longitudinally to facilitate removal of the core. Also called clay barrel. *Long.*

Triplex glass. A patented form of laminated glass. *See also* safety glass. *C.T.D.*

triplexing. A method of steelmaking which involves the use of three processes, for example, a sequence of melting in a cupola, blowing in a Bessemer converter and finishing in a basic electric furnace, or a combination of the acid Bessemer converter, the basic open-hearth furnace, and the basic electric furnace. *Osborne.*

triplex pump. A positive-displacement piston pump having three water cylinders mounted side by side. It may be either a single- or double-action type. *Compare* duplex pump. *Long.*

triplex steel. Steel produced by superrefining duplex steel in the electric furnace. *Mersereau, 4th, p. 414.*

triplite. A basic phosphate of manganese, iron, magnesium, and calcium, $(Mn,Fe,Mg,Ca)_2(PO_4)(F,OH)$, generally with a fibrous massive structure, monoclinic; dark brown. *Webster 3d.*

triplodite. A yellowish to reddish-brown mineral with a perfect cleavage, $4(Mn,Fe)O.P_2O_5.H_2O$: Mohs' hardness, 5; specific gravity, 3.43. *Larsen, p. 132.*

trip maker. A device to elevate cars on an inclined track as received from a kickback. *Zern.*

tripod. a. A three-legged support for a rock drill used at quarries and opencast pits. *See also* air-leg support. *Nelson.* b. A three-legged wooden frame over the mouth of a pit or shaft. *Weed, 1922.* c. A framework of wood or metal over a drill and platform composed of three principal members (legs) inclined toward, and fastened at, a common joint with a bolt on which a clevis and attached sheave is suspended. It is alined over the centerline of the borehole and the hoisting drum on the drill machine. *Compare* Michigan tripod. *Long.* d. A three-legged stand for supporting a theodolite, magnetometer, compass, camera, or any other instrument. *A.G.I.*

tripod bolt. A large heavy bolt that pins together the upper ends of the three tripod legs. *Long.*

tripod clevis. A heavy clevis, pinned by the tripod bolt in the top of a tripod, from which the hoisting sheave is suspended. *Long.*

tripod drill. A reciprocating rock drill mounted on three legs and driven by steam or compressed air. The drill steel is removed and a longer drill inserted about every 2 feet. *Fay.*

tripod drill operator. *See* driller, machine. *D.O.T. 1.*

tripoli; tripolite. An incoherent, highly siliceous, sedimentary rock composed of the shells of diatoms, radiolaria, or finely disintegrated chert. *Fay.* Used as a polishing powder and for filters. Also called rottenstone; polierschiefer; terra cariosa. *Standard, 1964.*

tripolite. An opal silica composed of the siliceous shells of diatoms. *See also* tripoli. *Fay.*

tripper. a. A device in the run of a conveyor comprising two free drums around which the belt passes S-fashion. *Nelson.* b. A device for discharging material from a belt conveyor. *Nelson.* c. A double pulley that turns a short section of a conveyor belt upside down in order to dump its load into a side chute. *Nichols.* d. One who trips. *Webster 3d.* e. A device or mechanism that trips, as a device for causing the load on a conveyor to be discharged into a hopper or other receptacle. *Webster 3d.* f. An automatic car dump. *Fay.* g. A device for tipping and dumping the skip at the top of the blast furnace. *Mersereau, 4th, p. 400.*

tripper belt. *See* tripper regulator. *Nelson.*

tripper man. One who unloads grain or ore from conveyor belt into bins or processing equipment by operating tripper. *D.O.T. Supp.*

tripper regulator; tripper belt. An arrangement to improve the carrying capacity of a belt conveyor where loading is performed at more than one point along its run. The tripper belt, usually about 20 feet, is driven by a chain drive from the tripper drum shaft. Speed of tripper is about 60 percent of the main conveyor. With a regulator, all material on the conveyor, together with that being received from, say a subsidiary conveyor, is mixed and delivered in one stream in the direction of belt movement. *Nelson.*

tripping. a. The process of pulling and/or lowering drill-string equipment in a borehole. *Long.* b. To open a latch or locking device, thereby allowing a door or gate to open to empty the contents of a skip, bailer, etc. *Long.*

trippkeite. A blue-green mineral, an arsenate of copper with 1 highly perfect and 1 less perfect cleavage permitting crystals to be broken up into flexible asbestoslike pieces. From Atacama, Chile. *Larsen, p. 74.*

trip recorder, hoist. *See* hoist trip recorder.

trip rider. a. One who rides on trips and whose duty it is to throw switches, give signals, make couplings, etc. Also called rope rider. *Fay.* b. A brakeman. *B.C.I.*

trip sender. In bituminous coal mining, a laborer who switches cars to various tracks, couples and uncouples trains, and attaches and detaches cars to and from the haulage cable at a mine where there are several sidetracks on the haulageway. *D.O.T. 1.*

tripuhyite. A dull greenish-yellow iron antimonate, $Fe_2Sb_2O_7$. Microcrystalline aggregates. From the cinnabar-bearing gravels of Tripuhy, Ouro Preto, Minas Geraes, Brazil. *English.*

trisilicate. In metallurgy, a slag with a silicate degree of 3. *Newton, Joseph. Introduction to Metallurgy, 1938, p. 400.*

trislope screen. A screen in which each section of the deck is flatter than the preceding one. The rate of feed is reduced on succeeding sections to maintain proper bed depth for rapid stratification. It is designed for fine dry screening of ¾ by 0, ½ by 0, and ¼ by 0 inch moist coal or other material. *Nelson.*

trisoctahedron. In the isometric system, either of two forms of normal symmetry, enclosed by 24 faces: (1) the trigonal or ordinary trisoctahedron, having triangular faces, each with equal intercepts on two axes and a greater intercept on the third axis; and (2) the tetragonal trisoctahedron (also called trapezohedron and icositetrahedron), having trapezial faces, each with equal intercepts on two axes and a less intercept on the third axis. *Fay.*

trisodium phosphate. (Na_3PO_4), a chemical compound used in some enamel frit compositions. *Enam. Dict.*

tristetrahedron. a. An isometric hemihedron included under 12 trapeziform faces; a tetragonal tristetrahedron. *Standard, 1964.* b. An isometric hemihedron included under 12 isoceles triangular faces; a trigonal tristetrahedron. *Standard, 1964.*

tritium; hydrogen 3. a. The radioactive isotope of hydrogen having two neutrons and one proton in the nucleus. Being hydrogen 3, it is heavier than deuterium (heavy hydrogen) or hydrogen 2. Used in industrial thickness gages, as a label in tracer experiments, and in controlled fusion experiments. *L&L; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-6, B-115.* b. Hydrogen having atomic weight 3 was discovered in 1934. Whereas deuterium or hydrogen 2 occurs naturally as about 1 part in 6,000 parts of hydrogen, or as 0.015 percent of natural hydrogen, tritium occurs in a much smaller proportion. Tritium is produced in nuclear reactors and is used in the production of hydrogen bombs. Tritium emits beta particles and has a half-life of 12.26 years. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-6, B-115.*

tritomite. A very rare, moderately radioactive, possibly rhombohedral, dark brown fluosilicate of thorium, the cerium and yttrium metals and calcium, with boron; found in syenite with leucophanite, analcite, mosandrite, aegirite, catapleiite. Probably related to melanocerite. *Crosby, pp. 81–82.*

Tritonal. A composition of TNT and aluminum powder. A military explosive. *Bennett 2d, 1962.*

triton value. The number of grams of TNT required to produce the same angle of recoil of the ballistic mortar as 10 grams of the explosive under test. *McAdam II, p. 15.*

triturate. a. A powder produced from a solid by grinding, usually with the addition of some liquid. *Gaynor.* b. To grind to a powder, usually with the addition of some liquid. *Gaynor.*

trituration. The act of triturating or reducing to a fine powder by grinding. It is a dry process, and thus distinguished from levigation. *Fay.*

triumph concentrator. A machine resembling a Frue vanner, but the shaking motion is endwise instead of side to side. *Liddell 2d, p. 388.*

triuranium octoxide; uranium-uranyl oxide; uranous-uranic oxide; uranyl uranate. Olive-green to black; crystalline; U_3O_8; molecular weight, 842.09; specific gravity, 8.30 of 8.39; decomposes to uranium dioxide on heating to 1,300° C or to 1,450° C; insoluble in water; and soluble in nitric acid and in sulfuric acid. Contains 84.8 percent uranium. Most chemical analyses for uranium are expressed in terms of U_3O_8; ore and concentrate purchases are made on the basis of U_3O_8 content; and uranium statistics are reported on the basis of U_3O_8 content. This uranium oxide is used in nuclear technology and in the preparation of other uranium compounds. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-235; Bull. 630, 1965, p. 1,013.*

trivalent; tervalent. a. Having a valence of 3. *Webster 3d; Standard, 1964.* b. Having three valences; for example, chromium which has valences of 2, 3, and 6. *Webster 2d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-106.*

trochoidal fault. A type of hinge fault in which the hinge point has also slipped along the fault surface. *Bureau of Mines Staff.*

trocolite. A variety of gabbro consisting essentially of labradorite and olivine with little or no pyroxene. *A.G.I.*

trod. a. Eng. A footpath; a trail. *Webster 3d.* b. Eng. To trace; to track. *Webster 3d.*

troegerite; trogerite. A very rare, strongly radioactive, possibly tetragonal, lemon-yellow mineral, $(UO_2)_3(AsO_4)_2.12H_2O$, found in veins with walpurgite, zeunerite, uranospinite, pitchblende, and other uranium minerals. *Crosby, pp. 50–51.*

Tröger's classification. A system of classification of igneous rocks somewhat similar to Johannsen's classification. *A.G.I.*

trogtalite. Cobalt selenide, $CoSe_2$; cubic (pyrite group). *Spencer 21, M.M., 1958.*

trogue. Eng. A wooden trough, forming a drain. *Fay.*

troil. Corn. A tin miner's feast. Also called duggle. *Fay.*

troilite. A ferrous sulfide, FeS, occurring in nodular masses and in thin veins in many iron meteorites. Some authors regard it identical with pyrrhotite. *Dana 17.*

Trojan coal powder. High explosive used in mines. *Bennett 2d, 1962.*

trolley. a. A low carriage, mounted on wheels, for carrying timber, supplies, and machines underground. *See also* bogie. *Nelson.* b. The grooved wheel, fixed in bearings at the end of a trolley pole, pressed upward in rolling contact with the overhead trolley wire to take off the electric current for operating the locomotive or other piece of motorized equipment. A trolley glider is frequently used in place of the wheel, making a sliding contact with the wire. Also called trolley wheel. *Jones.* c. A small, four- or two-wheeled truck without a body. The two-wheeled trolley is used in a rolling mill to wheel the puddle balls to the squeezer. Also spelled trolly. d. Brist. A basin-shaped depression in strata. Also called lum. *Fay.*

trolley conveyor. A series of trolleys supported from or within an overhead track and connected by an endless propelling medium, such as a chain, a cable, or other linkage, with loads usually suspended from the trolley. Trolley conveyors may be designed for single or multiple plane operation. *ASA MH4.1–1958.*

trolley locomotive. A mine locomotive operated by electricity drawn from overhead conductors. Small grooved wheels are held in contact with the conductors and the current passes down a trolley arm to the motor. It is very efficient where heavy loads are hauled up relatively steep gradients. In British coal mines, their use is restricted to approved intake airways not nearer than 274 meters to a working face. Their high cost and stringent conditions of use have discouraged their more rapid application. *Nelson. See also* electric mine locomotive.

trolley tap, fused. See fused trolley tap.

trolley voltage. Although not actually set by law, the generally accepted maximum direct-current trolley voltage is considered to be 300 volts. The use of alternating current voltages above 220 volts in mines is usually permitted provided the conductors are properly insulated and the cables end in suitable terminal boxes. *Kentucky, pp. 244–245.*

trolley wire. The means by which power is conveyed to an electric trolley locomotive. It is hung from the roof and conducts power to the locomotive by the trolley pole. Power from it is sometimes also used to run other equipment. *B.C.I.*

trolley wire guard. Exposed trolley wires in mines and other locations where transportation power wires are within reaching height are a constant source of danger to all personnel. Coverings, made of rubber or some other insulating material, guard workmen from severe burns or electrocution by direct contact with the wire. *Bests, p. 372.*

trombe; trompe. An apparatus for producing an airblast by means of a falling stream of water, which mechanically carries air down with it, to be subsequently separated and compressed in a reservoir or drum below. *Fay.*

tromel. Sp. A revolving screen; a trommel; t. classificador, a grading trommel; t. de desenlodar, a cleaning or washing trommel. *Fay.*

trommel. a. A revolving cylindrical screen used in grading coarsely crushed ore. The material to be screened is delivered inside the trommel at one end. The fine material drops through the holes; the coarse is delivered at the other end. Also called, according to its various uses, sizing trommel, washing drum, and washing trommel. *ASM Gloss.; Liddell 2d, p. 393; Standard, 1964. See also* rotary breaker; rotary screen; shaking screen. b. To separate coal into various sizes by passing it through a revolving screen. *Fay.*

trommel man. One who washes copper precipitate off scrap iron in the trommel (revolving, drumlike sieve). *D.O.T. Supp.*

trommel screen. a. A screen in which the screening surface is formed into a cylinder or frustum of a cone, mounted upon a rotating shaft or on revolving rollers. Also called revolving screen. *B.S. 3552, 1962.* b. *See* revolving screen. *Mitchell, p. 132.*

tromp curve. Graph used in sink-float separation to relate the percentage of a product which floats in a heavy liquid to the specific gravity of the particles concerned. *See also* ash curve. *Pryor, 3.*

trompe. *See* trombe. *Fay.*

Tromp process. a. The Tromp process was the first to introduce (about 1938) the use of magnetite suspension in dense-medium washing. The magnetite is ground to about −1/250 inch and added to water, and the process makes use of an unstable suspension with horizontal currents of differing densities at intermediate levels. The process operates within the size range 6 to 200 millimeters and in practice is used for raw coal down to ¼ inch. It gives a reasonably accurate three-product separation. *Nelson.* b. A dense-media process which utilizes a rapidly settling suspension of finely powdered magnetite or sintered roasted pyrite. This process may be used on any size of coal from 10 inches to ¼ inch and for any specific gravity from 1.3 to 1.9. The grain size of the magnetite or pyrite is minus 0.1 millimeter. The quick settling of the magnetite particles gives a higher specific gravity in the lower layers of the wash box, which makes it possible to obtain three products: clean coal, middlings, and refuse. *Mitchell, p. 498.*

trona; urao. A natural sodium sesquicarbonate, $Na_2CO_3.NaHCO_3.2H_2O$, and the most important of the natural sodas. White, gray, or yellow with vitreous, glistening luster, contains 41.2 percent Na_2O, 38.9 percent Co_2, 19.9 percent H_2O with some impurities. Extensive deposits are found in Wyoming, California, especially Searles Lake, Owens Lake; Hungary; Egypt; Africa; Venezuela. A source of sodium compounds. *CCD 6d, 1961.*

Trona process. The method used for the separation and the purification of soda ash (anhydrous sodium carbonate), anhydrous sodium sulfate, boric acid, borax, potassium sulfate, bromine, and potassium chloride from the Searles Lake, San Bernardino County, Calif., brine. *CCD 6d, 1961.*

trondhjemite. Alternate spelling of trondjemite. *A.G.I. Supp.*

trondjemite. A plutonic rock consisting essentially of sodic plagioclase, abundant quartz, and minor biotite, hornblende, and/or augite. Small amounts of potassic feldspar may be present. A quartz-rich variety of quartz diorite. *A.G.I.* Also spelled trondhjemite. *A.G.I. Supp.*

tront. Mid. A long sprag fixed diagonally to the face of the coal wall. *Fay.*

troostite. a. A variety of willemite, in large reddish crystals, Zn_2SiO_4, in which the zinc is partly replaced by manganese. *Dana 17.* b. A previously unresolvable, rapidly etching, fine aggregate of carbide and ferrite produced either by tempering martensite at a low temperature or by quenching a steel at a rate slower than the critical cooling rate. Preferred terminology for the first product is tempered martensite; for the latter, fine pearlite. *ASM Gloss.*

troostitic structure. Fine aggregates of ferrite and cementite in steel; emulsified ferrite. *Pryor, 3.*

Tro-Pari survey intrument. Trade name of a single-shot borehole surveying instrument combining a compass and inclinometer, which is locked in place by the action of a preset time clock. *Long.*

tropic pack. A pecial type of packing to protect explosives going to tropical areas and prevent deterioration when subjected to hot, humid atmospheric conditions. The explosives, after being sealed with paraffin wax, are packed in cartons which are then wrapped in a waxed paper wrapper and sealed with paraffin wax. The filled cartons are then placed inside a satchel-type case liner of Hesheen-bitumen laminated paper reinforced with sisal fiber which is completely sealed with a waterproof adhesive. *Nelson.*

tropic tides. Tides occurring approximately every 2 weeks when the effect of the moon's maximum declination north or south of the equator is greatest. *Hy.*

trouble. a. A dislocation or fault; any irregularity in a coalbed. Also called a throw, slide, slip, heave, or check. *Fay.* b. Eng. A place where gypsum becomes spoiled and ends off, probably along a joint not a fault, since there is no displacement. *Arkell.* c. Eng. *See* fault. *SMRB, Paper No. 61.*

troubled. A vein is sometimes called troubled when disturbed or faulted. *Weed, 1922.*

trough. a. A channel much longer than its width, open at the top or fitted with a cover, which contains the material being conveyed. The shape of the cross section depends on the type of conveyor involved. *ASA MH4.1–1958.* b. A U-shaped steel plate about three-sixteenths of an inch thick forming part of the troughing in which the chains and crossbars of a chain conveyor travel. The term is also applied to sections of a gravity conveyor. *See also* pan. *Nelson.* c. That portion of a chain or shaker conveyor in which the coal is transported. The complete assembly of trough sections, joined end-to-end is referred to as the trough line. *Jones.* d. A conduit for conveying water. *Webster 3d.* e. A buddle or other vessel in which slimes are sorted in water. *Webster 3d.* f. In general, any long, narrow channel or depression, as between hills or waves. Used in structural geology to indicate synclines and elongate narrow structural depressions, such as grabens. *Stokes and Varnes, 1955.* g. A hollow or undulation in a mineral field, or in a mineral working. In geology, synonymous with basin; synclinal. *Fay.* h. A long and broad depression of the deep-sea floor with gently sloping sides. *Schieferdecker. Compare* trench. i. A line occupying the lowest part of a fold; the line connecting the lowest parts on the same bed in an infinite number of cross sections. *McKinstry, pp. 640–641.* j. A fire clay box in which iron bars are subjected to the cementation process. *Webster 2d.*

trough banding. An alignment of minerals across the floor of a magma chamber considered to have been produced by currents set up by the magma during cooling. *Hess.*

trough conveyor. A pan conveyor or gravity conveyor. *Nelson.*

trough cross-lamination. *See* trough cross-stratification. *Pettijohn.*

trough cross-stratification. The lower bounding surface of a cross stratified unit is a curved surface of erosion. *See also* festoon cross bedding; festoon cross lamination. *Pettijohn.*

troughed belt. A belt conveyor in which the carrying side is made to form a shallow trough by means of troughing idlers. *Nelson.*

troughed belt conveyor. A belt conveyor with the conveyor belt edges elevated on the carrying run to form a trough by conforming to the shape of the troughed carrying idlers or other supporting surface. *ASA MH4.1–1958.*

troughed roller conveyor. A roller conveyor having two rows of rolls set at an angle to form a trough over which objects are conveyed. *See also* el conveyor. *ASA MH4.1–1958.*

trough fault. In geology, two parallel faults bounding a dropped mass of rock between them that has more or less the form of a wedge. *Bureau of Mines Staff.*

troughing. a. A structural section shaped like a wide U, riveted or welded to form a bridge deck with the U-shaped alternately upwards and downwards. *Ham.* b. Making repeated dozer pushes in one track, so that ridges of spilled material hold dirt in front of the blade. *Nichols.* c. Eng. In Derbyshire, toadstones filling fissures. *Arkell.*

troughing idler. A belt idler having two or more rolls arranged to turn up the edges of the belt so as to form the belt into a trough. *NEMA MB1–1956.*

troughing rolls. The rolls of a troughing idler that are so mounted on an incline as to elevate each edge of the belt to form a trough. *NEMA MB1–1956.*

trough joint. Eng. The fissure or joint that frequently accompanies the abrupt bending of strata passing through the middle of the curvature. *Fay.*

trough line. a. The line occupying the lowest part of the fold, or, more precisely, the line connecting the lowest parts of the same bed in an infinite number of cross sections. *Stokese and Varnes, 1955.* b. *See* trough, c. *Jones.*

trough plane. The plane that joins the troughs of a whole series of beds in a syncline. Generally, but not necessarily, the same as the axial plane of a syncline. *See also* trough. *A.G.I.*

trough vein. Trough-shaped ore deposit formed between sedimentary beds in the troughs of, mostly sharply folded, synclinal structures. *Schieferdecker.*

trough washer. a. A washer applying the principle of alluviation in troughs. *B.S. 3552, 1962.* b. In its simplest form it is a sloping wooden trough, 1½ to 2 feet wide, 8 to 12 feet long, and 1 foot deep, open at the tailend, but closed at the head end. It is used to float adhering clay or fine stuff from the coarser portions of an ore or coal. A log washer. *Fay.*

troutstone. *See* troctolite. *C.M.D.*

trow. A wooden channel for air or water. *Fay.*

trowhole; trowroad. Scot. A steep road, down which mineral slides instead of being loaded in hutches, or cars. *Fay.*

trowelsworthite. A variety of granite that has been so altered by fumarole action that it consists of fluorite, orthoclase, tourmaline, and some quartz, the last named having been largely replaced by the first. The name is derived from an English locality, and was given by Worth. *Fay.*

troy; troy weight. A system of weight measures formerly used for various articles but now only for weighing precious metals and precious stones. According to this system, 24 grains (gr) equal 1 pennyweight (dwt or pwt); 20 pennyweights equal 1 ounce (oz); and 12 ounces equal 1 pound (lb). Abbreviation, t. *Standard, 1964; Zimmerman, p. 112.*

troy ounce. One-twelfth of a pound of 5,760 grains (troy pound), or 480 grains. It equals 20 pennyweights; 1.09714 avoirdupois ounces; or 31.1035 grams. This ounce is used in all assay returns for gold, silver, and platinum-group metals. *Fay.* Abbreviation, oz t. *Zimmerman, p. 77.*

troy pound. A unit of weight that equals 5,760 grains; 12 troy ounces; 240 pennyweights; 13.1657 avoirdupois ounces; 0.82286 avoirdupois pound; or 373.2509 grams. *Fay.* Abbreviation, lb t. *Zimmerman, p. 83.*

troy weight. These are the weights used for precious metals. The equivalents are: 24 grains=1 pennyweight; 20 pennyweights=1 ounce; 12 ounces=1 pound. The troy grain is the same as the avoirdupois grain, but the ounce is larger on the troy scale; 1 ounce troy=31.103 grams; 1 ounce avoirdupois=28.35 grams. *Anderson.*

trub. York. Miners' term for carbonaceous shale, impure cannel coal, or nodule in coal. *Tomkeieff, 1954.*

truck. a. Any wheeled vehicle, usually self-propelled, used to transport heavy articles or materials. In mining, usually applied to dump and/or bottom-dump semitrailers used to transport mined waste and ore materials. *Bureau of Mines Staff.* The number of types of these haulage units varies widely but generally they vary from the small 2-ton standard dump truck to the 80-ton semitrailer unit. For larger stripping operations where the haulage conditions are not too rugged, a diesel tractor pulling a bottom-dump semitrailer of 40 to 60 ton capacity is most common. The newer-type trucks are equipped with power steering, power brakes, torque converters, and automatic transmissions. *Krumlauf, p. 6.* b. Gr. Brit. An open railroad freight car. *Webster 3d.*

truck chamber kiln. *See* bogie kiln. *Dodd.*

truck frame. Track frame. *Nichols.*

truckman. In metal mining, one who pushes, loads, and unloads trucks (cars) used to transport timber, drilling machines, tools, and other supplies to different parts of the underground workings. *D.O.T. 1.*

truck mixer. A concrete mixer, generally mounted on a lorry, or caterpillar tracks. crete during the journey from the batching plant to the construction site. *See also* transit mixer. *Ham.*

truck-mounted drill rig. A drilling rig mounted on a lorry, or catepillar tracks. A modern outfit can drill down to 4,000 feet or more. *Nelson.*

truck roller. a. In a crawler machine, the small wheels which are under the track frame and which rest on the track. *Nichols, 2.* b. A track roller. *Nichols.*

truck system. An earlier system whereby the coal miners' wages, instead of being paid in cash, were paid either in goods purporting to be of the same value, or under conditions which forced the employee to spend them in making purchases from his employer. The truck system operated during the early part of the 19th century. *Nelson.*

truck unloading conveyor. *See* trimmer conveyor. *ASA MH4.1–1958.*

trudellite. An amber-yellow hydrous basic chloride and sulfate of aluminum, $4AlCl_3 \cdot Al_2(SO_4)_3 \cdot 4Al(OH)_3 \cdot 3OH_2O$. Hexagonal, rhombohedral. Compact masses. From Pintados, Tarapaca, Chile. *English.*

true bearing. Azimuth angle of a survey line with respect to true north. *Pryor, 3.*

true crater. In explosion-formed crater nomenclature, the boundary between loose fall-back material and the rupture zone where material is fractured but has undergone little vertical displacement. *Mining and Minerals Engineering, v. 2, No. 2, February, 1966, p. 65.*

true current density. *See* local current density. *ASM Gloss.*

true density. A term used when considering the density of a porous solid, for example, a silica refractory. It is defined as the ratio of the mass of the material to its true volume. Sometimes referred to as powder density. *See also* true volume. *Dodd.*

true depth. The actual depth of a specific point in a borehole measured vertically from the surface in which the borehole was collared. Also called true vertical depth. *Long.*

true dip. a. The angle at which veins, strata, etc., dip, as measured vertically downward from the horizon along a line at right angles to the strike of the veins, strata, etc.; also, the dip of a vein, strata, etc., as determined on oriented core. *See also* core orientation; oriented core. *Compare* apparent dip. *Long.* b. The maximum angle which an inclined bed makes with a horizontal plane. It is the direction in which water would flow if poured on the smooth upper surface of the bed at the outcrop. Also called dip. *See also* apparent dip; full dip; level course. *Nelson.* c. Synonym for three-dimension dip. *A.G.I.*

true emery. A mixture of corundum and magnetite, with or without hematite derived from the magnetite, such as Greek or Turkish emery, and usually has a reddish-black tint. *AIME, p. 7.*

true fissure vein. A fissure vein with promise of extending to great depth, in contradistinction to a gash vein. All mineralized fissures are true fissure veins. *Fay.*

true folding. Same as flexure folding. *A.G.I.*

true jade. *See* jadeite.

true lode. A fissure vein. *Fay.*

true meridian. The geographical north-south plane, as distinct from the magnetic meridian which follows the direction of the magnetic needle. *Ham.*

true middlings; bone coal. Comparatively high-ash material so nearly homogeneous that its quality cannot readily be improved by crushing and cleaning. *B.S. 3552, 1962.*

true north. The direction from any point on the earth's surface toward the geographic North Pole; the northerly direction along any projection of the earth's axis upon the earth's surface, for example, along a longitude line. Except for much of navigational practice (which uses magnetic north), true north is the universal 0° (or 360°) mapping reference. True north differs from magnetic north by the magnetic declination at that geographic point. *H&G.*

true porcelain. *See* hard porcelain. *Rosenthal.*

true porosity. Porosity of open and closed pores. *VV. See also* porosity.

true rake. The angle between a plane containing a tooth face and the axial plane through the tooth point, as measured in direction of chip flow through the tooth point. It is, therefore, the rake resulting from the cutter geometry as well as the actual direction of chip flow. *ASM Gloss.*

true section. A cross section drawn with the same scale vertically and horizontally. *Ham.*

true solution. One which is homogeneous in nature and can be separated by evaporation or distillation. *Cooper.*

true specific gravity. The ratio of the mass of a material to the mass of a quantity of water that, at 4° C, has a volume equal to the true solid volume of the material at the temperature of measurement. *Dodd.*

true strain; natural strain; logarithmic strain. The integral, over the whole of a finite extension, of each infinitesimal elongation divided by the corresponding momentary length. It is equal to $\log_e (1 + \varepsilon)$, where ε is the strain as ordinarily defined. *Ro. See also* strain.

true stress. For an axially loaded bar, the load divided by the corresponding actual cross-section area. It differs from the stress as ordinarily defined because of the change in area due to loading. *Ro. See also* stress.

true topaz. Genuine topaz as distinguished especially from citrine or topaz quartz. *Shipley.*

true-to-scale print. A contact print made with black ink lines, which is of reliable accuracy and quality but requires adequate time for drying. *Ham.*

true vein. An occurence of ore, usually disseminated through a gangue of veinstone, and having more or less regular development in length, width, and depth. *See also* vein; fissure vein. *Fay.*

true vertical depth. *See* true depth. *Long.*

true volume. A term used in relation to the density and volume of a porous solid, for example, a brick. It is defined as the volume of the solid material only, the volume of any pores being neglected. *Dodd.*

true whiting. A finely divided calcium carbonate prepared by wet grinding and levigating natural chalk, a variety of limestone. *BuMines Bull. 630, 1965, p. 886.*

true width. a. The width or thickness of a vein, stratum, etc., as measured perpendicular to or normal to the dip and the strike. The true width is always the least width. *Compare* apparent width. *Long.* b. The true width of a vein in sampling may be found by the mathematical formula where: h=horizontal width; w=the true width; a=the angle of dip; then $h=\frac{w}{\sin a}$ or $w=h \sin a$. In this simple formula the angle a is known from previous observations and the horizontal width sampled can be measured by the use of a level. This leaves only w to determine. It is important in the use of this formula that the horizontal width is measured at right angles to the strike. *Hoov, p. 51.*

truffite. Fibrous nodular lignite which when struck emits an odor like that of truffles. It occurs in large nodular masses inside a normal lignite of Createceous age in France. *Tomkeieff, 1954.*

trug. Dev. Red limestone in the Devonian. *Arkell.*

truing. Removal of an outside layer of abrasive grains on a grinding wheel to restore its face to running true or alter the cutting face for grinding special contours. *ASM Gloss.*

truing-machine operator. One who grinds the surfaces of refractory blocks to reduce them to standard dimensions, using a truing machine. *D.O.T. 1.*

truite. In ceramics, having a delicately crackled surface; said of Japan ware and porcelain. *Standard, 1964.*

truller. Corn. A miner who wheels ore in barrows. *Fay.*

trumpet. A fire clay refractory funnel placed at the top of the assembly of guide tubes to receive molten metal from the nozzle of a ladle in the bottom pouring of steel. *See also* bottom pouring; guide tube, b. *Dodd.*

trumpeting. Eng. A channel or passage partitioned off from a shaft or left behind the lining, usually running along one corner of the latter. *Webster 2d.* Used for ventilation. *Fay.*

trumpet lamp. N. of Eng. A miner's term for a Mueseler or Belgian safety lamp. *Fay.*

trumpet log. *See* microlaterolog. *Wyllie, p. 103.*

truncated landform. A landform cut off, especially by erosion, and forming a steep side or cliff. *H&G.*

truncated spur. The widening of a stream valley by a glacier results in the truncation of the spurs which extend into it from the two sides. *See also* spur, i. *A.G.I.*

truncation. Erosional process that cuts across tilted or folded bedding reducing it to a low regional plane. *Wheeler.*

truncheon. Som. A sleeper (tie) for underground railways. A small railway tie. *Fay.*

trunk. a. Mid. A wooden box or sled in which the debris is conveyed from a small heading. *Fay.* b. Brist. A wooden pipe or box for conveying air in the workings. *Fay.* c. York. *See* kibble. *Fay.* d. A long narrow, inclined box, in which the separation of the fine ore from the earthy impurites is effected. *Fay.* e. A launder for conveying slimes, etc. *Webster 2d.* f. To separate slimes by means of a trunk for further treatment. *Webster 2d.*

trunk conveyor. A high-capacity main road conveyor, usually a belt conveyor. It may extend from the main inby loading point to the shaft bottom or along levels or drifts to the surface. It varies from 42 to 60 inches wide and is powered by a motor of about 200 horsepower. *See also* gathering conveyor, c. *Nelson.*

trunk glacier. The main ice stream in a system of tributary valley glaciers. *A.G.I.*

trunking. Corn. Separating slimes by means of a trunk. *Fay.*

trunk pumping engine. A pump that commands the drainage of underground waters over a considerable area of mine workings, being a substitute for a number of smaller and independent pumps. *Fay.*

trunk roadway. The main developing heading from the pit bottom and is usually driven along the strike of the coal seam. Since it will carry heavy traffic and large volumes of air, the trunk roadway is of large sectional area, and is at least 14 feet wide with possibly two rail tracks. At intervals, crossheadings are turned off for opening out conveyor panels in the coal seam. Trunk roadways for development are usually driven in pairs for ventilation, stowing space and access purposes. *Nelson.*

trunnion. a. Either of two opposite pivots, journals, or gudgeons, usually cylindrical and horizontal, projecting one from each side of a piece of ordnance, the cylinder of an oscillating engine, a molding flask, a converter, etc., and supported by bearings, to provide a means of swiveling or turning. *Webster 2d.* b. A pin or pivot usually mounted on bearings for rotating or tilting something. *Webster 3d.* c. An oscillating bar which allows changes in angle between a unit fastened to its center, and another attached to both ends. *Nichols.* d. A heavy horizontal hinge. *Nichols.* Also called walking beam; walking bar. *Nichols.*

trunnion axis. The horizontal axis about which the telescope of a theodolite can be rotated. *Ham.*

trunnion plate. A metal plate lining the bearings or recesses, in which the trunnions rest. *Webster 2d.*

trunt. N. Staff. A heading drven on a level. *Fay.*

truscottite. a. A white hydrous silicate of calcium and magnesium, $2(Ca,Mg)O.\text{-}3SiO_2.3H_2O$. Spherical aggregates of scales. Related to gyrolite. From Benkulen, Sumatra. *English.* b. A discredited term equal to reyerite. *American Mineralogist, v. 44, No. 3–4, March-April 1959, p. 470.*

truss. a. An assemblage of members, such as beams, bars, rods, typically arranged in a triangle or combination of triangles to form a rigid framework, as for supporting a load over a wide area, that cannot be deformed by the application of exterior force without deformation of one or more of its members. *Webster 3d.* b. A framed structure built up entirely from tension and compression members, arranged in panels so as to be stable under load; used for supporting loads over long spans. *C.T.D.*

trussed. Braced by an assembly of members into a rigid unit. *Nichols.*

trussed beam. A beam of timber or other material which is stiffened so as to reduce deflection. *Ham.*

trying a lamp; lamp testing. The examination of a safety lamp to ensure that it is locked and in safe working order. *B.S. 3618, 1965, Sec. 7.*

trying the lamp. Eng. The examination of the flame of a safety lamp for the purpose of judging the quantity of firedamp mixed with the air. *Fay.*

ts. Abbreviation for tensile strength. *BuMin Style Guide, p. 62.*

tscheffkinite. A rare, weakly to moderately radioactive, velvet black, monoclinic complex silicate of rare earths, Fe, Mn, Mg, Ca, Al, Ti, Th, and U; found with other titanium-bearing minerals principally ilmenite. Also spelled chevkinite; cherfquinite. *Crosby, pp. 82–83.*

tscheremchite. A variant spelling of cheremchite. *Tomkeieff, 1954.*

tschermakite. A hypothetical Tschermak molecule, $Ca_2Mg_3Al_4Si_6O_{22}(OH)_2$ to explain (together with the corresponding iron molecule $Ca_2Fe_3Fe_2'''Al_2Si_6O_{22}(OH)_2$, named ferrotschermakite) the composition of aluminous amphiboles. Not the tschermakite of F. Kobell, 1873, a synonym of albite. *Spencer 17, M.M., 1946.*

tschernosem. A very black soil, rich in humus and carbonates, that forms under cool to temperature, semiarid, climatic conditions. Synonym for tchornozem; chernozem. *A.G.I.*

tsehong. A red pigment consisting of white lead mixed with aluminic, ferric, and silicic oxides; used by the Chinese in decorating porcelain. *Standard, 1964.*

tsing-lien. A red pigment consisting of stannic and plumbic silicates mixed with small quantities of copper oxide or cobalt and gold; used by the Chinese in decorating porcelain. *Standard, 1964.*

tsingtauite. A variety of granite porphyry having phenocrysts of orthoclase in a fine-grained granitic groundmass. *Holmes, 1928.*

T-slot. The slot into which the head of a T-bolt fits. *See also* T-bolt. *Long.*

tsumebite. An emerald-green basic, hydrous phosphate of lead and copper, $5(\mathrm{Pb,Cu})\mathrm{O.P_2O_5.8H_2O}$. Orthorhombic (?). Small, tabular crystals. From Tsumeb, Southwest Africa. *English.*

tsunami. A very long water wave caused by a submarine earthquake or volcanic eruption. Mistakenly used as a synonym for tidal wave. Tsunamis are tidal waves but not all tidal waves are tsunamis. *Bureau of Mines Staff.*

tu. Abbreviation for thermal unit. Also abbreviated. TU. *Webster 3d.*

T.U. Takeup. A mechanism for adjusting belt or chain tension. *Nichols.*

tub. a. A tram, wagon, corf, or corve. *C.T.D.* b. A small rail-track vehicle for carrying coal or mineral, with a capacity ranging from 10 to 25 hundredweights. Tub is the term used in most English mines, tram in South Wales, and hutch in Scotland. *Nelson.* c. A box or bucket in which coal or ore is sent up a shaft. A keeve. *Webster 3d.* d. To line, as in a mine shaft, with tubbing; to keep back water by tubbing. *Webster 3d. See also* tubbing. *Fay.* e. Eng. A complete length of metal or timber tubbing from and including the wedging crib upward. *Fay.* f. The large circular base, providing maximum practical bearing area, on which is mounted the revolving frame or subbase of a walking dragline. *Austin.*

tubbed back (or off). Eng. Springs or feeders of water found in shafts are said to be "tubbed back" (or tubbed off) when tubbing has been put in to keep the water out of the mine. *Fay.*

tubber. In mining, a double-pointed pickax; a beele. *Standard, 1964.*

tubber man. In mining, a man who uses a tubber. *Standard, 1964.*

tubbing. a. The watertight cast-iron lining of a circular shaft built up of segments which are fixed together with internal flanges and bolts (German tubbing) or with the flanges outside, giving a smooth inner face (English tubbing), the segments in the case being wedged and not bolted. The space outside the tubbing is grouted to add strength and improve watertightness. The use of tubbing is on the decline, concrete being preferred. *See also* suspended tubbing. *Nelson.* b. Eng. A lining of timber or metal for a shaft, as in a mine, especially: a watertight shaft lining consisting of a series of cast-iron cylinders bolted together and used to sink through water-bearing strata. *Webster 3d.* c. A shaft lining of casks or cylindrical caissons, of iron or wood. *See also* plank tubbing. *Fay.*

tubbing deals. Scot. Plank put behind tubbing in a shaft. *Fay.*

tubbing plate. Eng. A cast-iron segment of a ring of tubbing. *Fay.*

tubbing wedge. A small wooden wedge hammered between the joints of tubbing plates. *Zern.*

tube. a. A cave passage with a nearly circular or elliptic cross section. *Schieferdecker.* b. A hollow product whose cross section is completely symmetrical, round, square, rectangular, octagonal, or elliptical with sharp or rounded corners and with walls of uniform thickness except as affected by corner radii. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17–24.*

tube and shape bending. A process of bending tubes or shapes so that the metal on the outside of the bend is stretched and the metal on the inside of the bend is compressed. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17–24.*

tube-axial fan. An airfoil (propeller) or disk fan within a cylinder and including driving mechanism supports either for belt drive or direct connection. *Strock, 10.*

tube bloom. A product of an extrusion press which is subsequently reduced by means of tube reducers and/or drawbenches to a wide range of tube sizes. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17–24.*

tube blower. A man who cleans boiler tubes. *Fay.*

tube bottom. One form of bottom for a converter; it is made of monolithic refractory material, the air passages being lined with copper tubes. *See also* conveyor. *Compare* spiked bottom; tuyere block bottom. *Dodd.*

tube clamp. a. A clamp or clip for gripping a tube or pipe; especially, a jawed tool used in hoisting and lowering well tubes. *Standard, 1964.* b. A misnomer for casing clamp. *Long.*

tube furnace. A muffle furnace in which combustion occurs within alloy tubes. *ASTM C286–65.*

tube grinder. *See* grinder, tubes. *D.O.T. Supp.*

tubelining. A process of decoration, particularly for wall tiles requiring 'one-off' designs. Lines of colored slip are added to the tile by squeezing it from a rubber bag through a narrow tube; the tile is then fired and the pattern between the raised lines is filled-in with various colors and refired; alternatively, the colors can be applied to the unfired tile and the once-fired process used. *Dodd.*

tube-machine operator. *See* die presser. *D.O.T. 1.*

tube mill. A revolving cylinder, usually lined with silex, nearly half filled with glacial or water-worn flints, used for fine grinding of certain ores, preliminary to further treatment. The material to be ground, mixed with water, is fed through a trunnion at one end and passes out the opposite trunnion as a slime. This is an exceptionally long mill with a relatively small diameter. *Fay; Newton, p. 65.*

tube packing. A bag of flaxseed, or ring of rubber, made to occupy the space between the tube of an oil well and the bored hole to prevent access of water to the oil-bearing stratum. *Fay.*

tubercle texture. A texture described by Bastin in cobalt-nickel-silver ores, consisting of an often complex arrangement, somewhat similar to atoll and core texture, and due to automorphic replacement of an easily replaceable gangue by crystals showing a strong tendency to automorphism. *Schieferdecker.*

tube reducing. Reducing both the diameter and wall thickness of tubing with a mandrel and a pair of rolls with tapered grooves. The Rockrite process uses a fixed, tapered mandrel, and the rolls reciprocate along the tubing with corresponding reversal in rotation. Roll reliefs at the initial and final diameters permit, respectively, advance and rotation of the tubing. The Pilger process uses a uniform rod (broach) which reciprocates with the tubing. The fixed rolls rotate continuously. During the gap in each revolution, the tubing is advanced and rotated and then, upon roll contact, reduced and partially returned. *ASM Gloss.*

tuberose. A mineral exhibiting very irregular rounded surfaces, often giving rise to gnarled, rootlike shapes *Nelson.*

tube stock. A semifinished tube used in a subsequent reduction process. *ASM Gloss.*

tube worms. Segmented marine worms, some of which secrete calcareous tubes. *Hy.*

tub hooker. The man who hooks or unhooks the hoisting rope to or from the buckets. *Hess.*

tubing. a. Small-diameter removable pipe through which oil and gas are produced from the well. *Wheeler.* b. The tube lining of boreholes; casing. *Fay* c. The act of lining a deep borehole by driving down iron tubes. *See also* casing, c. *Fay.* d. Hollow cast-iron segments placed in a shaft to dam backwater or sink through quicksand. Also spelled tubbing. *Fay.* e. A misnomer for casing. *Long.* f. *See* hose; ventilation tubing. *Nelson.*

tubing catcher. A misnomer for casing catcher. *See also* casing catcher. *Long.*

tubing hanger. A misnomer for casing catcher. *See also* casing catcher. *Long.*

tubing rose. The leading piece of a set of borehole casing for tapping water from a deep lead, usually 6 feet long, and pierced with 40 to 50 holes, and several slots. A driving shoe about 7 inches long, with a hole through the middle is fitted securely into the top end. *Engineering and Mining Journal, v. 139, No. 4, April 1938, p. 55.*

tub rider. a. In India, a trip rider. *Fay.* b. *See* brakeman. *D.O.T. 1.*

tub stop. *See* car stop. *Nelson.*

tubular product. A general term, comprising tube, hollow shape, and semihollow shape. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17–24.*

tubular screw conveyor. *See* screw conveyor, a. *ASA MH4.1–1958.*

tubule. In geology, an irregular, hollow, twiglike calcareous concretion characteristic of the loess. *Standard, 1964.*

tub way. N. of Eng. A tramway for handling tubs of ore, coal, etc. *Fay.*

tucker. a. Aust. Work by which a miner is hardly able to make a living. *Fay.* b. Aust. "Grub," food, or rations. *Fay.*

tucker ground. A name given to poor workings, from which a miner can only make enough to keep him in food. *Gordon.*

tucking frame. A frame in timbering in which the poling boards are supported by walings at their upper and lower ends. *Ham.*

tucking space. The space between the blocks separating the cap in a heading set from the poling driven. This space provides for driving the second set of poling boards. *Stauffer.*

tuck-joint pointing. Pointing in which the mortar projects as a fine ridge between the bricks. *Standard, 1964.*

tuck pointing. Filling in with fresh mortar of cutout or defective mortar joints in old masonry. *ACSG.*

tuckstone. A shaped refractory block fitting above the tank blocks of a glass furnace. The general purpose of the tuckstones is to protect the top of the tank blocks from the furnace gases and, in some types of tank furnace, to act as a seal between the tank blocks and the side- and endwalls. The course of tuckstones is sometimes called the tuck wall. *Dodd.*

tuck wall. *See* tuckstone.

tue iron. a. The same as tuyere. *Standard, 1964.* b. In the plural, blacksmiths' tongs. *Standard, 1964.*

tufa. A chemical sedimentary rock composed of calcium carbonate or of silica, deposited from solution in the water of a spring or lake, or from percolating ground water. Not to be confused with tuff. Also called calcareous tufa; calc-tufa. *See also* travertine; sinter. *Fay.*

tufaceous. Of, relating to, or resembling tufa. *Webster 3d. Compare* tuffaceous. *Fay.*

tuff. A rock formed of compacted volcanic fragments, generally smaller than 4 millimeters in diameter. *A.G.I.*

tuffaceous. Characteristic of, pertaining to, containing, or resembling tuff. Not to be confused with tufaceous. *Fay.*

tuff breccia. A type of volcanic breccia in which the tuffaceous matrix between the blocks is abundant and comprises between 25 and 75 percent by volume. *A.G.I.*

tuff cone. A volcanic cone made up chiefly or wholly of tuff and other fragmentary explosively ejected material. *Fay.*

tuff flow. Synonymous with ash flow. Obsolete. *A.G.I*

tuffisite. An intimate mixture of finely fragmental country rock and finely divided primary magmatic material. *A.G.I. Supp.*

tuffite. Indurated rocks composed of a mixture of pyroclastic and sedimentary detritus, especially ash and fine sediment. *A.G.I.*

tuff lava. Applied to consolidated, lavalike tuffa consisting primarily of lenses of black and gray obsidian lying in a tuffaceous matrix that displays a streaky, varicolored banding or eutaxitic structure. Rocks of this sort are generally considered to be the product of ash flows or nuées ardentes. Essentially synonymous with welded tuff. *A.G.I.*

tuff palagonite. A bedded aggregate of dust and fragments of basaltic lava, among which are conspicuous angular pieces and minute granules of pale yellow, green, red, or brown altered basic glass called palagonite. *A.G.I.*

tufnol. Laminated plastic, light, wear-resistant and a good insulator. Tensile strength 3½ ton per square inch upward. Used in bearings, special pump parts. *Pryor, 3.*

tuft. Eng. A soft sandstone; also, calcareous deposits. Probably a variation of tufa. *Fay.*

tuft stone. a. Eng. Tufa near Newport, Monmouthshire, and Dursley, Gloucestershire. b. Eng. Toadstone, Derbyshire. *Arkell.*

tug. The iron hook of a hoisting tub to which a tackle is fastened to pull the tub up a mine shaft. *Webster 3d.*

tugger. a. Brist. A short chain by which tubs are drawn. *Fay.* b. *See* air hoist, b. *Long.*

tugger boy. Brist. One who draws small tubs or sleds underground by means of a tugger. It is called tugger work. *Fay.*

tugger hoist. A useful little air hoist for small or big mines. *von Bernewitz.*

tugger man. *See* tugger operator. *D.O.T. 1.*

tugger operator. In mining, one who operates a small portable or semiportable hoist (tugger), powered by compressed air or electricity, to raise coal, ore, rock, or supplies in a shaft or stope or along an incline inside a mine. Also called tugger man. *D.O.T. 1.*

tugtupite. An aluminosilicate and chloride of beryllium and sodium, $Na_4BeAlSi_4O_{12}Cl$; from the Ilimaussaq massif, southwest Greenland. *Hey, M.M., 1964; Fleischer.*

tugwith. Derb. A small pole or sapling used as a brake on a windlass or turntree. *Fay.*

tuhalite. Originally described (Marshall, 1932) as a variety of amphibole, but later (1936) Marshall thought it to be a distinct mineral. C. O. Hutton now redefines the mineral as $H_9(Na,K)_{12}Fe_6''$-$Fe_9'''(Si_3O_8)_{15}$; orthorhombic. *American Mineralogist, v. 41, No. 11–12, November-December 1956, p. 959.*

tuiles. The working openings at the discharging end of a glass furnace. *Mersereau, 4th, p. 329.*

tuille. *See* tweel. *ASTM C162-56.*

Tukon hardness test. A method of determining the hardness of microconstitutents by using the Knoop or Vicker's type of diamond indenter. *Henderson. See also* microhardness; Vicker's hardness test.

Tula metal. An alloy of silver, copper, and lead; made in Tula, Russia, and used in making niello. *Webster 2d.*

Tully limestone. A limestone lying between the Genesee shale and the Hamilton shale, and forming the base of the Upper Devonian in central New York. *Fay.*

Tully refractometer. A gemmological refractometer of greater accuracy (±.005) than Rayner refractometer or Smith refractometer. Employs a segment of a hemisphere of glass of high refractive index in a rotating hemisphere which expedites the rotation of a specimen for the purpose of obtaining birefringence, but which because of its design somewhat limits the size of the specimen which can be tested. A laboratory sized instrument, too large for the pocket. *Shipley.*

tumble. To smooth, clean, or polish, as casttings, by friction with each other or with a polishing material in a rotating box or barrel; to rattle. *Standard, 1964.*

tumbled. Cleaved carbon or other diamonds the sharp edges and corners of which have been rounded and blunted by the tumbling action in a barrel-shaped vessel. *Long.*

tumbler. a. A projecting piece on a revolving shaft or rockshaft, for actuating another piece. In dredges, there is an upper and a lower tumbler supporting the bucket line. *Fay.* b. Scot. A tipping apparatus for tubs or wagons. *Fay.* c. N. of Eng. A stop, scotch, or catch, affixed to each deck of a cage for keeping the tubs in place. *Fay.* d. Derb. Any stone that is too large to go into the hoisting bucket. *Fay.* e. Any piece of equipment which polishes gem stones by a tumbling action. *Bureau of Mines Staff.*

tumbler test. Test for determining relative friability of a particular size of sized coal. *Bennett 2d, 1962.*

tumble-up. S. Wales. Space by the side of the haulageway for the empty tram or car to be turned over so that the full car or tram can pass it. *Fay.*

tumbling. An operation where the work, usually castings or forgings, is rotated in a barrel with metal slugs or abrasives to remove sand, scale, or fins. It may be done dry or with aqueous solution. Sometimes called rumbling or rattling. *ASM Gloss.*

tumbling barrel. A revolving barrel, cask, or box in which objects or materials (as small metal parts, castings, plastics, leather, or clothing) undergo a process (as finishing, polishing, coating, softening, or drying) by being whirled about and so brought into vigorous frictional contact. Also called rattler; rumble; scouring barrel. *Webster 3d.*

tumbling box. A tumbling barrel for small objects. *Webster 3d.*

tumbling crank. Scot. A crank on the end of the pump shaft for giving reciprocating motion. *Fay.*

tumbling mill. Any horizontally mounted cylindrical mill which tumbles its contents when rotating. Name used in foundries in connection with cleaning of castings. *Pryor, 3.*

tumbling shaft. The camshaft used in stamp mills. *Fay*

tumbling stones. N. of Eng. Boulders or detached masses of rock. *Arkell.*

tumbling tom. Eng. A car-tipping or dumping apparatus that turns completely over. *Fay.*

tumesence. In volcanology, the swelling or uparching of a volcano during periods of rising magma preceding an eruption. *A.G.I.*

tummals; tummels. Corn. A great quantity, or heap, as of ore. *Fay.*

tumphy. a. Used in Scotland to describe a wide range of materials occurring on top of coal seams and which often fall as the coal is worked. *See also* following stone, a. *Nelson.* b. Scot. A carbonaceous fire clay. A clay containing streaks of coal. *Fay.*

tumpline. Can. Wide leather strap attached to packsacks and fitted to reach over the carrier's head and rest against his forehead. *Hoffman.*

tumuli. Low, small, domelike hills in lava flows. *Lewis, p. 599.*

tumulose. Full of small hills or mounds. *Webster 3d.*

tumulus. A swelling, or low domelike hill, formed in congealed lava flows. *Fay.*

tundish. A rectangular trough lined with fire clay refractories and with one or more refractory nozzles in its base. Tundishes are sometimes used between the ladle and the ingot molds in the teeming of steel. *Dodd.*

tundra. A level or undulating treeless plain that is characteristic of arctic and subarctic regions, marks the limit of arborescent vegetation, consists of black mucky soil with a parmanently frozen subsoil, and supports a dense growth of mosses and lichens (as the reindeer moss) and of dwarf caespitose herbs and shrubs often with showy flowers. *Webster 3d.*

tundra peat. Peat formed under subarctic conditions by slow accumulation of the remains of mosses, heaths, birch, and willow. *Tomkeieff, 1954.*

tundra placers. *See* gravel plain (tundra) placers. *Fay.*

tunelite. A hydrous strontium borate, $SrO.3B_2O_3.4H_2O$, occurring as compact fine-grained nodules and as prismatic and tabular crystals in Kramer, Calif., and in the Furnace Creek area, Death Valley, Calif. A secondary mineral; monoclinic; isostructural with the calcium mineral, nobleite; colorless; subvitreous to pearly luster. *American Mineralogist, v. 47, No. 3-4, March-April 1962, p. 416.*

tune work. Labor paid for by the day or the hour, in opposition to piecework. *Fay.*

tung ash. A trade name for a roasted and ground vermiculite mined 5 miles south of Hecla, Colorado. By calcining the mica as it comes from the mines and then crushing and sizing, a ground product with a rich golden-bronze to silver color and metallic luster is obtained. This is suitable for various decorative purposes. *U.S.G.S. Bull. 740, 1923, p. 50.*

tungstate. A salt or ester of tungstic acid: a compound containing the radical, WO_4^{-}. *A.G.I.*

tungsten; wolfram. A metallic element in the sixth group of the periodic system, and a member of the chromium family. Found combined in certain minerals, as wolframite and scheelite, and isolated as a hard, brittle, white, or gray metal. Used as the filament in electric lamps, a constituent in magnet and high-speed steels, and as carbide in cemented carbides. Symbol, W; atomic weight, 184; specific gravity, 19.3 at 20° C. *C.T.D.; Webster 3d.*

tungsten alloy. An alloy used in drill-bit-crown matrices and in making bit and reaming-shell inserts by powder methods in which the principal constituent is tungsten, generally in the form of carbide. Tungsten-carbide powder usually is mixed with a powdered cobalt or other metal to bind it together in a cohesive mass. *Long.*

tungsten arc welding. Inert-gas shielded arc welding using a tungsten electrode. *ASM Gloss.*

tungsten carbide. Black or gray; hexagonal; WC; molecular weight, 195.86; specific gravity, 15.63 (at 18° C); melting point, 2,780° C or 2,870°±50° C; boiling point, 6,000° C; hardness, approaches that of diamond, or 9+Mohs' scale; insoluble in water; and soluble in nitric acid plus hydrofluoric acid and in aqua regia. Used in cemented carbide tools and in cermets. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-234.*

tungsten-carbide alloy. *See* tungsten alloy. *Long.*

tungsten-carbide bits. Drilling bits tipped with tungsten carbide. A 9 percent cobalt carbide generally gives the best results and comparisons are usually referred to bits of this standard. Tests with tungsten-carbide bits indicate that efficient drilling is possible only up to a hardness of about 55 Shore; beyond this, wear increases rapidly until, at 62 Shore, the cost becomes prohibitive. Several factors affects the cutting life of the bits such as the grade of carbide used, the rake angle of the cutters, the length of cutting edges, support of cutters, etc. *See also* coal-cutter picks; Shore hardness scale; sintered carbide-tipped picks. *Nelson.*

tungsten carbide, cemented. A mixture consisting of 85 to 95 percent of tungsten carbide and 5 to 15 percent of cobalt. Specific gravity, 12 to 16; Mohs' hardness, about 9.0; and it is not affected by severe high industrial temperatures. Used for machine tools and for abrasives for machining and grinding metals, rocks, molded products, porcelain, and glass. *CCD 6d, 1961.*

tungsten-carbide insert. a. A small plate or slug of tungsten-carbide alloy mounted in the crown or shank of a bit or grooves on the outside surface of a reaming shell as wear-resistant or rock-cutting surfaces or edges. The term is sometimes incorrectly applied to diamond-set plates of a tungsten carbide alloy inset as reaming surfaces in reaming shells. *Long.* b. In mining, a slug composed of tungsten-carbide alloy shaped and mounted in the bit face so that the slug acts as the cutting edge of the bit. *Long.* c. The ordinary roller bits wear out quickly in drilling hard rock, so hemispherical-ended cylinders of sintered carbide are inserted in place of the usual teeth and give 10 to 15 times the total footage and 2 to 3 times the cutting rate. However, hard rocks are drilled more economically by diamond boring. *Nelson.*

tungsten direct-from-ore process. An electrowinning method developed by the U.S. Bureau of Mines for producing high-quality tungsten powder directly from ore. A strong electric current separates the metal from the ore which has been placed in solution and deposits it as a pure powder on an electrode. Electrowon tungsten compares favorably with hydrogen-reduced tungsten. *Bureau of Mines Staff.*

tungsten electrode. A nonfiller-metal electrode, used in arc welding, consisting of a tungsten wire. *Coal Age, v. 66, No. 3, Mar. 1961, p. 91.*

tungstenite. a. A dark, lead-gray sulfide of tungsten, probably WS_2. Monoclinic. Earthy or foliated; minute scales. From Emma mine, Utah. *English.* b. An old name for the metal, tungsten. *Hey 2d, 1955.*

tungsten lighting. In the tungsten system, the lamp consists of a glass bulb filled with the inert gas argon at a pressure when cold of some 7 pounds per square inch, in which is inserted a "coiled coil" of fine tungsten wire. In order to overcome glare from the bright coiled coil, a flameproof fitting, in which light passes first through a toughened glass plate and then through a dished cover of opal acrylic plastic, a special Prespex, is used. *Sinclair, I, p. 226.*

tungsten silicide. Blue or gray; WSi_2; tetragonal; molecular weight, 240.02; specific gravity, 9.4; melting point, above 900° C; insoluble in water and in aqua regia; and soluble in nitric acid plus hydrofluoric acid. A ceramic used in oxidation-resistant coatings and in electrical resistance applications. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-235.*

tungsten steel. Steel formerly used for cutting tools and for magnets which has been replaced by high speed or hot work steels which contain tungsten with other alloying elements for cutting and forging tools and by alnico alloy for magnets. *Bureau of Mines Staff.*

tungsten trioxide; tungstic oxide. Canary yellow and orange; orthorhombic; WO_3; molecular weight, 231.85; dark orange when heated and regains its original color on cooling; melting point, 1,473° C; specific gravity, 7.16; insoluble in water; soluble in hot alkalies; slightly soluble in hydrofluoric acid; and insoluble or only soluble with difficulty in acids. Used as a yellow coloring agent in ceramics. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-234.*

tungstic ocher. Same as tungstite, WO_3. *Standard, 1964.*

tungstite. a. A yellow or yellowish-green pulverulent mineral, tungsten trioxide, WO_3. *Fay.* b. Synonym for scheelite. *Hey 2d, 1955.*

tuning-fork test (for glaze-fit). A test piece is made by joining, with clay slip, two bars of the extruded pottery body to a short piece of the same material. The test piece is biscuit fired and the outer faces are then glazed. The test piece is placed in a furnace and fired so that the glaze matures; it is then allowed to cool, while still in the furnace, and any relative movement of the two ends of the 'tuning-fork' is measured by a micrometer telescope. From this measurement the magnitude of any stress in the glaze can be calculated. *Dodd.*

tunna. A Wales term for a hoisting bucket; a bowk; a kibble. *Fay.*

tunnel. a. A long, narrow subterranean passageway. *ASA MH4.1-1958.* b. A horizontal or nearly horizontal underground passage that is open to the atmosphere at both ends. The term is loosely applied in many cases to an adit. *Lewis, p. 21.* An adit, if continued through a hill, would then be a tunnel. Any level or drift in a mine open at one end, or which may serve for an adit. Often used as a synonym for adit; drift; gallery. *See also* adit. *Fay.* c. A horizontal or inclined stone drivage for development or to connect mine workings, seams, or shafts. It may be open to the surface at one end, and used for drainage, ventilation, haulage, or as an egress and man-riding from mine workings. *See also* tunneling. *Nelson.* d. *See* crut. *Mason.* e. Penn. A crosscut through or across barren measures is often called a tunnel, or a rock tunnel; an anthracite term. *Fay.* f. In marble quarrying, applied to a subterranean working level, or incline, having a roof of undisturbed rock. *Fay.* g. To penetrate with or as if with a tunnel; to make a passage through or under; to make or use a tunnel; to undermine. *Webster 3d.* h. A chimney flue; a funnel. *Webster 3d.* i. A leaden tube used in making sulfuric acid to connect adjoining chambers in a series. *Standard, 1964.*

tunnel blast. a. A blast effected by the detonation of great quantities of explosive, loaded in small tunnels driven into the face at the level of the quarry floor or at the level of the terrain at the foot of the slope of the deposit. This blasting method is called tunneling. *Streefkerk, p. 16.* b. *See* heading blast. *B.S. 3618, 1964, sec. 6.*

tunnel blasting. A method of heavy blasting in which a heading is driven into the rock and afterwards filled with explosives in large quantities, similar to a borehole, on a large scale, except that the heading is usually divided in two parts on the same level at right angles to the first heading, forming in plan a T, the ends of which are filled with explosives and the intermediate parts filled with inert material like an ordinary borehole. Similar to gopher hole blasting. *Fay. See also* gopher hole blasting.

tunnel borer. Any boring machine for making a tunnel; often a ram armed with cutting faces operated by compressed air. *Standard, 1964.*

tunnel carriage. A new development in rapid tunneling, consisting of a combined drill carriage and manifold for water and air so that immediately the carriage is at the face, drilling may commence with no lost time for connecting up, waiting for drill steels, etc. The air is supplied at pressures of 95 to 100 pounds per square inch. *Nelson.*

tunnel cave. A simple cave composed of one passageway into which a surface stream enters and farther on emerges at a second opening. *A.G.I.*

tunnel claim. This is not a mining claim; it only is a means of exploration and discovery. When a lode or vein is discovered in the tunnel the tunnel owner is called upon to make a location of the ground containing the vein or lode and thus create a mining claim. *Ricketts, I.*

tunnel column. A heavy bar used for mounting machine drills in large drifts or tunnels, and usually holding two machines. *Fay.*

tunnel disease. a. Caisson disease. *Webster 2d.* b. Ancylostomiasis. *Webster 2d.*

tunnel dryer. A continuous dryer through which shaped clayware can be transported on cars; it is controlled so that the humidity is high at the entrance and low at the exit. *Dodd.*

tunnel excavation. Excavation carried out completely underground and is limited in width, and in depth or height. *Carson, p. 28.*

tunnel face. The working face in an excavation or tunnel or other working place from which driving is carried out. *Fraenkel.*

tunneling. The operation of excavating, driving, and lining tunnels. *Nelson.*

tunnelite C. High explosive used in mines. *Bennett 2d, 1962.*

tunnel kiln. a. A long tunnel-shaped furnace through which ware is generally moved on cars, passing progressively through zones in which the temperature is maintained for preheating, firing, and cooling. *A.R.I.* b. A lime kiln having a tunnel for the consumption of coal, as distinguished from a flame kiln, where wood is burned. *Standard, 1964.*

tunnel-kiln-car setter. One who loads saggers filled with green ware on automatic-conveyor car that carries ware through tunnel kiln for firing. Also called kiln-car setter. *D.O.T. 1.*

tunnel-kiln drawer. One who unloads saggers filled with fired ware from tunnel-kiln cars, and removes them to proper location by hand truck for reuse. *D.O.T. 1.*

tunnel-kiln operator. One who controls the operation of a tunnel kiln in which bricks are fired, and a preheating chamber in which bricks are heated prior to firing and after drying. *D. O. T. 1.*

tunnel lining. a. The timber, brick, concrete, or steel supports erected in a tunnel to maintain dimensions and safe working conditions. Lining is more correctly applied to a continuous and solid casing such as concrete work. *See also* lining, a. *Nelson.* b. *See* ring. *Ham.*

tunnelman. In anthracite coal mining, one who drives a tunnel in rock from one coal seam to another or through a fault (the movement of the earth having separated a once continuous seam into two sections). *D.O.T. 1.*

tunnel miner. A hard-heading man. A miner experienced in the use and handling of rock drills, shovel loaders, and in tunnel-blasting methods. He is wholly employed on tunneling and is usually paid a fixed rate per shift with perhaps a bonus payment for high rates of tunnel advance. *Nelson.*

tunnel right. A grant of a tunnel right through a specific piece of ground is a right to enter upon and occupy the ground for the purpose of prosecuting the work in the tunnel, and to extract therefrom waste rock or earth necessary to complete the running of the tunnel, and making such use thereof, after completion, as may be necessary to work the mining ground or lode owned by the party running the tunnel. By implication the grant of such a right carries with it every incident and appurtenant thereto, including the right to dump the waste rock at the mouth of the tunnel on the land owned by the grantor at the time of the conveyance of the tunnel right; such right or easement being necessary for the full and free enjoyment of the tunnel right. *Ricketts, I.*

tunnel set. Timbers 6 to 8 inches in diameter and of sufficient height to support the roof of the tunnel. They are sometimes set upon sills and usually capped with short crosspieces. *Fay.*

tunnel shaft. A shaft sunk, as in a hill, to meet a horizontal tunnel. Also called tunnel pit. *Standard, 1964.*

tunnel site. a. A tunnel-site location is made to secure an area for a tunnel. The locator of a tunnel site is given the right to all veins cut by the tunnel within 3,000 feet of its portal, and to 1,500 feet on the strike of each blind vein cut, this length may be all on one side of the tunnel or divided as desired. The veins must be blind lodes not previously known to exist. *Lewis, p. 28.* b. There is no distinction between a tunnel claim under which a tunnel is run for the development of veins or lodes already located, and one pursuant to which a tunnel is projected for blind veins or lodes. *Ricketts, I.*

tunnel support. *See* steel tunnel support. *Lewis, p. 54. See also* tunnel lining.

tunnel system. A method of mining in which tunnels or drifts are extended at regular intervals from the floor of the pit into the ore body. The extension of the drift beyond the working face is made great enough to facilitate the handling of several cars at a time. The ore is mined above the drift level, and the cars are loaded by lifting short boards which span an opening, through the lagging on, and above, the centerline of the drift. The method avoids the construction of raises and chutes, and facilitates the filling of the cars. *Fay.*

tup. a. Eng. An early custom of covering with lighted candles the last corf of coal sent to the bank at the beginning of the fortnight's holiday at the end of the year when stock was taken and no coal hoisted. This was called "sending away the tup." *Fay.* b. The ram or monkey, or falling weight, of a piledriver, drophammer, etc.; specifically, the heavy head of a steam hammer in which the upper pallet is secured. *Webster 2d.*

turanite. A very rare, weakly to moderately radioactive, orthorhombic, olive-green mineral, $Cu_5(VO_4)_2(OH)_4$, found with vanadium and uranium minerals in cavities in limestone; from Tyuya Muyun, Fergana, Russian Turkistan; occurs as reinform crusts and spherical concretions with a radial fibrous structure. *Crosby, p. 83.* A vanadium ore. *Osborne.*

turba. Sp. Dung mixed with coal and molded into adobes and used as fuel in brickkilns. *Fay.*

turbage. Ir. Soft shale, Coal Measures, Tyrone. *Arkell.*

turbary. a. The ground where turf or peat may be dug especially for fuel; peat bog. *Webster 3d.* b. An easement under English law to dig turf or peat on a common or on another's land. *Webster 3d.* A right of turbary is confined to such quantity of land as is sufficient for the house into which the common is appendant. *Fay.* c. Peaty. *Gordon.*

turbid. Not clear or translucent; clouded or cloudy. *API Glossary.*

turbidimeter. An instrument for determining the concentration of particles in a suspension in terms of the proportion of light absorbed from a transmitted beam. An instrument of this type designed for particle-size analysis is the Wagner turbidimeter. *See also* Wagner turbidimeter. *Dodd.*

turbidimetry. Determination of concentration of very finely divided and slow-settling particles in a liquid. Made by measurement of interference exerted on ray of light, by means of a photoelectric cell. Turbidimeter also measures average rate of fall (as diminution of concentration and of interference) of these particles. *Pryor, 3.*

turbidite. Turbidity current deposit. *A.G.I. Supp.*

turbidity. The state or condition of having the transparence or translucence disturbed, as when sediment in water is stirred up, or when dust, haze, clouds, etc., appear in the atmosphere because of wind or vertical currents. *H&G.*

turbidity current. A large volume, rapid, down-slope underwater current, usually generated by a seismic disturbance, which causes a slumping of sediment on the slope and starts a flow of sediment and water. With the increased density of the sediment-water mixture the flow increases and picks up additional sediment and velocity. Velocities of 55 kts. have been estimated. *Hy. See also* density current.

turbidity size analysis. Size analysis based upon the amount of turbidity in a suspension, the turbidity decreasing as the grains settle. The turbidity is usually measured by means of a photoelectric cell. *A.G.I.*

turbine. a. A rotary engine actuated by the reaction or impulse or both of a current of fluid (as water, steam, gas, or mercury vapor) subject to pressure and usually made with a series of curved vanes on a central spindle arranged to rotate with the whole being enclosed by a casing provided with redirecting vanes and passageways which permit the inlet and outlet of the fluid in a desired manner. *Compare* axial flow; radial flow. *Webster 3d.* b. In a turbine pump, the rapid rotation of the blades imparts high velocity and a pressure head to water. *See also* steam turbine. *Nelson.*

turbine blades. *See* gas turbine. *Dodd.*

turbine pump. A pump with a shrouded impeller and receiving the water at its center. A diffusion ring containing vanes surrounds the impeller and directs the impeller discharge into a circular casing which delivers into the eye of the next impeller in series. The diffusion ring converts the high-velocity discharge of the impeller into pressure head. The turbine pump is widely used in mines. *See also* diffuser chamber. *Nelson.*

turboaxial fan. An axial flow fan with a turbine rotor-type impeller. *B.S. 3618, 1963, sec. 2.*

turbocompressor. The type of machine commonly installed at a colliery today where a large volume of compressed air is required. A single unit can deliver 10,000 cubic feet free air per minute or more, and the floor space occupied is a minimum for these capacities. It is also ideally suited for direct drive by a steam turbine, and this combination is commonly found at collieries. The compressor consists essentially of a number of impellers keyed to a shaft and running in a fixed casing with specially shaped passages. Each impeller is in the form of a hollow wheel, the two sides being united by curved vanes. *Mason, V.2, p. 376.*

turbodrill. A drill developed in the U.S.S.R. for drilling deep oil wells. One type is designed as a turbine and driven by the drilling fluid which is circulated at high pressure. *Nelson.*

turbodrilling. A system of drilling in which the bit is directly driven by a turbine at the bottom of the hole. *B.S. 3618, 1963, sec. 3.*

turboglyph. *See* flute cast. *Pettijohn.*

turbojet engine. A thermal jet in which the air is compressed by a rotating compressor, is heated either by fuel combustion at compressor pressure, then released through a gas turbine that drives the compressor and finally, ejected at high velocity through the rearward exhaust nozzle. *Shell Oil Co.*

turbulence. a. The state or condition of being violently agitated or disturbed, as a stream which meets an obstacle, or air flowing over an uneven surface. *H&G.* b. May be considered as the superposition of an unsteady fluctuating velocity flow upon a steady mean flow. *Roberts, I, p. 2.*

turbulent diffusion. The process by which gas released in an air current becomes dispersed in that current. *Roberts, I, p. 75.*

turbulent flow. a. Fluid motion in which random motions of parts of the fluid are superimposed upon a simple pattern of flow. All or nearly all fluid flow displays some degree of turbulence. Opposite of streamline flow. *H&G.* b. A fluid flow in which there is an unsteady motion of the particles, the motion at a fixed point being inconstant. Turbulent flow occurs at a speed above the critical velocity of Reynolds. Also called tortuous flow; sinuous flow; eddy flow. *Nelson.* c. When air flows over roughnesses on the sides of the airway or passes obstructions at over a certain velocity, eddies are set up in the air and its flow becomes turbulent. Opposite of laminar flow. *Spalding.* d. When the fluid particles are moving in directions other than in a straight line parallel to the axis of the pipe or duct. *Strock, 10.*

turbulent resistance. Resistance that causes vortices and eddies to form behind a moving particle because of the rapid displacement of the liquid when the body moves through it. *Compare* viscous resistance. *Newton, p. 77.*

turf. a. Same as peat. There are several varieties, as white, brown, black, stone, gas, or candle turf. *Fay.* b. Sod, the upper strata of topsoil filled with the roots of grass and other small plants. *Bureau of Mines Staff.*

turfa de marahu. An early name for marahuite, from Marau, Bahia Province, Brazil. *Tomkeieff, 1954.*

turfary. Eng. A place where turf or peat may be gotten. *Fay.*

turf charcoal. Same as peat charcoal. *Standard, 1964.*

turfing. Covering a bare earth surface with grass turfs cut from another site. Turf of selected grass is very suitable for use as a revetment to a slope. *Ham.*

turfing iron; turfing spade. An implement for cutting and paring off turf. *Fay.*

turf peat. Yellowish-brown to wood-brown peat containing distinct plant remains. *Tomkeieff, 1954.*

turf spade. A long narrow spade for cutting and digging turf, peat, etc. *Standard, 1964.*

turgite; hydrohematite. An iron ore intermediate between hematite and limonite, consisting of hydrous ferric oxide, $2Fe_2O_3H_2O$. It is fibrous and red in the mass, with an orange tint when powdered. *Fay; Dana 17.*

turjaite. A coarse-grained rock consisting primarily of melilite, biotite, and nepheline. *A.G.I.*

Turkey brown; Turkey umber. Natural earth which serves as a permanent pigment. Contains iron oxides, manganese oxides, and some clay. *CCD 6d, 1961.*

turkey fat. In Missouri, a local name for a variety of smithsonite, colored yellow by greenockite; so called from its appearance. *Fay.*

turkey red oil. Sulfonated castor oil. *Pryor, 3.*

Turkey slate. A whetstone or honestone. *See also* Turkey stone. *Fay.*

Turkey stone. A very fine, close-grained stone containing about 75 percent silica and 25 percent calcite. Quarried in the interior of Turkey. Once very popular for sharpening mechanics' tools but now superseded largely by Arkansas and Washita oilstone. Same as novaculite. Also called Turkey slate. *Fay.*

Turkey umber. *See* Turkey brown. *CCD 6d, 1961.*

turkis. A turquoise. *Standard, 1964.*

turk's head. A name for Brazilian tourmaline crystal with a red termination or end. *Shipley.*

Turk's-head rolls. Four, undriven working rolls, arranged in a square or rectangular pattern, through which strip, wire, or tubing is drawn to form square or rectangular sections. *ASM Gloss.*

Turks Island salt. Solar salt from Turks Island, British West Indies. *Kaufmann.*

turmetic paper. Paper impregnated with an extract of turmeric. Used as a test for alkaline substances which turn it from yellow to reddish-brown and for boric acid which turns it red-brown. *Webster 3d.*

turn. a. Locally a curve into a pillar. *B.C.I.* b. The time or period during which coal, etc., is raised from the mine. Called run in Arkansas. A shift. *Fay.* c. To open rooms, headings, or chutes off from an entry or gangway. *Fay.* d. The number of cars allowed each miner. Good turn, many cars for each miner. *Fay.* e. Eng. A pit sunk in some part of a drift. *Webster 3d.* f. To draw or wind coal up a shaft or up an inclined plane to the surface. *Fay.* g. Curved tramrails laid round a corner or turn, often made of cast iron. *Fay.* h. Bend; branch; junction; points and crossings. *Mason.* i. To set (undried bricks) on edge to facilitate drying. *Standard, 1964.*

turnagain. N. Staff. A change in the direction of the dip of the strata. *Fay.*

turn angles. To measure the angle between directions with a surveying instrument. *Nichols.*

turn barrel. Mid. A hand windlass; also called jackroll. *Fay.*

turn bat. A wooden stick used in turning the tongs which hold a bloom under the hammer. *Fay.*

turn beam. Eng. One of the beams which serve as a pivot for a hoisting machine. *Standard, 1964.*

turnbuckle. a. A form of coupling so threaded or swiveled that by turning it the tension of a rope or rod may be regulated. *Zern.* b. *See* screw shackle. *Ham.*

turn bolt. A bolt turned in a lathe to a close tolerance and used in steel-to-steel connections. *Ham.*

turned vertical shaft. A shaft sunk vertically in the hanging wall block until it intersects the reef after which it continues down at an angle in the footwall parallel to the reef. This unusual practice is sometimes adopted on the Rand as it enables the mine to become productive at an earlier stage. *Nelson.*

turner. One who operates lathe to trim pottery and porcelain ware that has been formed by jiggerman; thrower; or other ware formers. *See also* pipe turner; stone lathe operator. *D.O.T. 1.*

turnerite. A yellowish-brown variety of monazite. *Standard, 1964.*

Turner's yellow. *See* basic lead chloride.

turnhouse. a. A point where workings turn from a crosscut to a level along the lode. *Gordon.* b. The first cutting on the lode after it is cut in a crosscut. *Fay.*

turning. a. In ceramics, the process of removing the surface of green pottery to make its shape true before firing. *Standard, 1964.* b. Shaving and paring leather-hard clay from the walls or feet of pots on a lathe or potter's wheel. *ASCG, 1963.* c. Removing stock from a rotating workpiece by means of a tool. *ASM Gloss.* d. Eng. Drilling a shothole by hand. *Fay.*

turning effect. *See* moment of force. *Morris and Cooper, p. 150.*

turning out. S. Staff. Bringing coal to the skips. *See also* turnout, f. *Fay.*

turning over and packing shift. On mechanized longwall faces, the shift during which face conveyors are moved over, and the operations of ripping, packing, and drawing supports from the wastes are performed. *Mason, v. 1, p. 119.*

turning point. a. A point of intersection between survey lines. *See also* traverse. *Ham.* b. A point on which both a minus sight (foresight) and a plus sight (backsight) are taken on a line of direct levels. *Seelye, 2.* c. A point whose elevation is taken from two or more instrument positions to determine their height in relation to each other. Also called transfer point. *Nichols.*

turning vane. Curved strips of short radii placed in a sharp bend or elbow in a rectangular duct to direct the air around the bend in streamlined flow. *Strock, 10.*

turn keeper. *See* motor boss. *D.O.T. 1.*

turnoff. a. Aust. The point where a branch tramline leaves the main line. *Fay.* b. Aust. A siding or passing place for skips on a haulage road. A turnout. *Fay.*

turnout. a. A contrivance for passing from one track to another. The principal parts are the switch, the frog, and two guardrails. *Zern, p. 471.* b. The branching off of one rail track from another. *Nelson.* c. A siding. *Hudson.* d. The movable tapered rails or points by which a train or tram is directed from one set of rails to another. *C.T.D.* e. A siding or bypass upon an underground haulageway. *Fay.* f. Ark. To shovel coal toward the track for more convenient loading. *Fay.* g. A switch on a mine railroad. *Korson.* h. *See* turn, h. *Mason.*

turnout boy. One who removes glassware from molds by overturning (dumping) the molds. Also called mold dumper. *D.O.T. 1.*

turnover. a. In cyclic mining, the moving over of the conveyor in a machine-cut face. This operation takes place every time the coal is loaded out, supports and packs advanced, and space prepared for the conveyor in the new track. *Nelson.* b. The distance the conveyor is advanced during each cycle of operations, that is, approximately the depth of machine cut. *See also* conventional machine mining. *Nelson.* c. A device used to rotate an object through approximately 180° so that its carrying surface is changed to an opposite side. *ASA MH4.1-1958.* d. *See* move-up. *Mason.*

turn pulley. A sheave fixed at the inside end of an endless- or tail-rope hauling plane, around which the rope returns. *See also* tail sheave, b. *Zern.*

turn round. N. of Eng. The time involved in turning or flitting a coal-getting machine. *Trist.*

turns. A term used with any device used to change the direction of a shaker conveyor trough line; for example, curved trough turn, adjustable angle turn, right angle turn, etc. The angle turn corresponds to the bell crank drive in principle of operation. *Jones.*

turnsheet. A flat sheet. *Nelson.*

turn stakes. Eng. A windlass. *Fay.*

turntable. a. A revolving platform on which cars or locomotives are turned around. *Zern.* b. A circular steel platform pivoted at its center, which can be power rotated. On the platform are ingoing and outgoing car tracks. The car on reaching the table from one track is carried around through an arc of 180° at which point it leaves along the outgoing track in the opposite direction. Turntables are used on the surface and underground, and may be single or twin track. *See also* shunt back; traverser. *Nelson.* c. In oil well drilling, a horizontal rotating circular plat with a central rectangular hole which engages top drilling pipe. *Pryor, 3.* d. A base that supports a part and allows it to rotate or swing. *Nichols.* e. In a shovel, the upper part of the travel unit. *Nichols.* f. *See* rotary table, a. *Long.*

turn ree. Derb. A sort of windlass for hoisting ore. *Fay.*

Turonian. Middle Upper Cretaceous. *A.G.I. Supp.*

turpentine substitutes. Petroleum products usually intermediate between gasoline and illuminating oil (49° naphtha). They range in gravity, from 40° to 58° B, and are considered to be more homogeneous than burning oils. Used for paint thinners and for a mixing with turpentine and should evaporate without leaving residues or stains. *Fay.*

turquoise. A blue, bluish-green, or greenish-gray mineral, triclinic, $CuAl_6(PO_4)_4(OH)_8.4H_2O$. Used as a gem. *A.G.I.; Dana 17.*

turquoise matrix. Name for cabochon-cut mixtures of turquoise and its mother rock, which is usually brown, sometimes gray or almost black. *Shipley.*

turrelite. A Texas asphaltic shale. *Fay.*

turret coal cutter. A coal cutter in which the horizontal jib can be adjusted vertically to cut at different levels in the seam, for example, an overcut. The center of gravity of such a machine makes it top heavy and less stable than the ordinary undercutter. *Nelson.*

turret jib. A vertical rotating jib fitted with cutter picks and driven from the end sprocket of the bottom jib of a coal cutter. The turret jib is satisfactory in seams where the coal parts readily from the roof and is not too hard. *See also* curved jib. *Nelson.*

turtle back. A name for chlorastrolite, especially the green variety with patches of color; also, turquoise matrix, or variscite matrix. *Shipley.*

turtlestones. Large, nodular concretions found in certain clays and marls. In form, they have a rough resemblance to turtles, and this appearance is increased by their being divided into angular compartments by cracks filled with spar, reminding one of the plates on the shell of a turtle. They are common in the cretaceous marls of the Northwest Territories of Canada. *See also* septarium. *Fay.*

Tuscan red. A pigment containing iron oxide, *Bennett 2d, 1962.*

Tuscarora quartzite. An important source of raw material for silica refractories. A typical analysis is 97.8 percent SiO_2; 0.9 percent Al_2O_3; 0.7 percent Fe_2O_3; 0.4 percent alkalies. *Dodd.*

tusculite. A variety of melilite leucitite containing only small amounts of pyroxene, ilmenite, and feldspar. *Holmes, 1928.*

tushkar. *See* tuskar. *Fay.*

tusiite. Synonym for calciocopiapite. *American Mineralogist, v. 47, No. 5-6, May-June 1962, pp. 807-808.*

tuskar. Scot. A peat spade. *Webster 2d.* Also called tushkar; twiscar. *Fay.*

tusru. In Japan, a pick used for loosening auriferous gravel preliminary to washing. *Fay.*

tut. Corn. To perform a piece of work at a fixed price. *Fay.*

Tutania. A white alloy consisting chiefly of tin with varying proportions of antimony, copper, bismuth, and sometimes brass or steel; used for making tableware, etc. A trade name for Britannia metal. *Standard, 1964; Fay.*

tutenag. a. A white alloy, resembling German silver, used in making tableware, etc., with varying proportions of copper, zinc, nickel, and sometimes a little lead or iron. *Standard, 1964.* b. Zinc or spelter, especially that from China and the East Indies. *Standard, 1964.*

tut money. Eng. Pay for tutwork, overtime, etc. *Webster 2d.*

Tutogen. A foam-producing agent used in fire extinguishers. *Sinclair, I, p. 295.*

tutwork. a. A term sometimes used for piecework or contract work. *Nelson.* b. Corn. Excavation paid for by measure or by weight, an extra credit being usually allowed for timberwork, and a debit charged for certain sundries, as candles, explosives, tools, etc., supplied by the mine owner. *Webster 2d.*

tuxtlite; tuxlite. A pea-green silicate of sodium, magnesium, calcium, and aluminum, $NaMgCaAlSi_4O_{12}$. Monoclinic; massive. A combination of about equal amounts of diopside and jadeite. From Tuxtla, Mex. Previously called diopside jadeite. *English.*

tuyere. A tube or opening in a metallurgical furnace through which air is blown as part of the extraction or refining process. In a blast furnace, the tuyeres are water-cooled metal tubes which pass through the refractory lining of the bosh (tube). *Dodd.*

tuyere arch. An arch in a blast furnace to admit a tuyere. *See also* tuyere. *Standard, 1964; Fay.*

tuyere block bottom. One form of bottom for a converter. The passages for the air blast are separate preformed tuyeres each having several holes; these tuyere blocks are interspersed with solid refractory blocks, the whole bottom then being finished by ramming refractory material into any spaces. *Dodd.*

tuyere brick. A refractory shape containing one of more holes through which air and other gases are introduced into a furnace. *A.R.I.*

Twaddell degrees; °Tw. A system for denoting the specific gravity of a liquid—

degrees Twaddell=(specific gravity—1)×200

the specific gravity of solutions of sodium silicate, for example, is often quoted in this form. Each Twaddell degree corresponds to a specific gravity interval of 0.005. *Dodd.*

Twaddell hydrometer. A hydrometer used for liquids heavier than water and marked with the Twaddell scale. Twaddell-scale readings multiplied by 0.005 give the specific gravity of the liquid measured. *Compare* Marsh funnel; specific-gravity hydrometer. *Long.*

Twaddlle scale. Scale of specific gravity as measured on the Twaddlle hydrometer: $n = 200\ (\Delta - 1)$, where n is the reading and Δ is the specific gravity of the solution tested. *Pryor, 3.*

tweel. A counterweighted furnace door, opening vertically. Also spelled tuille. *ASTM C162-66.*

tweel block. A type of refractory block used in the glass industry for such purposes as protection of a newly-set pot, the construction of a furnace door or damper, or control of the flow of molten glass. Derived from French tuile, a tile. *Dodd.*

tweer; twere. *See* tuyere. *Fay.*

twenty-mesh dust. Dust at least 95 percent of which will pass through a 20-mesh sieve. *Rice, George S.*

twibil; twibill. a. Eng. A strong pick generally with a rectangular eye used for stonework. *Fay.* b. A tool like a pickax, but having instead of the points, flat terminations, one parallel to the handle, and the other perpendicular to it. *Webster 2d.*

twig. a. A divining rod. *Standard, 1964.* b thin strip of plastic fire clay used in ceramic modeling, especially in imitation basketwork. *Standard, 1964.*

twill cloth. Weave used in screens and filters, in which two or more warp threads interweave one wood thread. *Pryor, 3.*

twin. Two portions of a crystal having a definite crystallographic relationship; one may be regarded as the parent, the other as the twin. The orientation of the twin is either a mirror image of the orientation of the parent about a twinning plane, or an orientation that can be derived by rotating the twin portion about a twinning axis. *ASM Gloss.*

twin-arc welding process. The use of two small diameter electrodes in place of one larger electrode in a single submerged arc welding head. The deposition rate is faster than with the single arc process, time savings of up to 50 percent having been obtained. *Osborne.*

twin band. On a polished and etched surface, the section through a twin and the parent crystal. *ASM Gloss.*

twin boy. In bituminous coal mining, one who pushes cars along a passing branch (double track) or bypass of the underground haulage system. *D.O.T. 1.*

twin-cable ropeway. An aerial ropeway which has parallel track cables with carriers running in opposite directions; both rows of carriers are pulled by the same traction rope. *See also* locked coil rope. *Ham.*

twin-core shot firing cable. *See* shot-firing cable. *Nelson.*

Twin Creek series. Dark calcareous shales and shaly limestones representing a marine intercalation in the continental Jurassic strata of Wyoming. Underlain by eolian sandstones and succeeded by the Beckwith formation. *C.T.D.*

twin crystals. Crystals in which one or more parts, regularly arranged, are in reverse position with reference to the other part or parts. They often appear externally to consist of two or more crystals symmetrically united, and sometimes have the form of a cross or star. They also exhibit the composition in the reversed arrangement of part of the faces, in the striae of the surface, and in re-entering angles; in certain cases, the compound structure can only be surely detected by an examination in polarized light. *Fay.*

twin entry. A pair of parallel entries, one of which is an intake air course and the other the return air course. Rooms can be worked from both entries. Often called double entry. *Fay.*

twin-geared press. A crank press in which the drive gears are attached to both ends of the crankshaft. *ASM Gloss.*

twinning axis. Any direction in a twin that has the same relation to the lattices of both parts of the twin. It is always normal to a twinning plane, and at least one of these is always rational with respect to the lattices. *A.G.I.*

twinning laminae. The laminae or thin plates in repeated twins. *See also* twin. *Shipley.*

twinning law. The special and characteristic method according to which twin crystals of any mineral are formed. *Fay.*

twinning plane. In a twin crystal, a plane normal to the twinning axis. *Fay.*

twinoriasocpe. A type of oriascope used to detect and mark twinning and determine the sense of orientation in etched sections. *AM, 1.*

twinoscope. An instrument employing a directed beam of light used to examine etched wafers for twinning. *AM, 1.*

twin packer. A packer designed so that a borehole can be sealed simultaneously at two separated points. *Long.*

twin-plate process. A process for the simultaneous grinding and polishing of both faces of a continuously produced ribbon of glass; the complete flow line is nearly 1,300 feet long. *Dodd.*

twin pressure packer. Synonym for twin packer. *Long.*

twin seam. Aust. Two seams of coal so close together that they can be worked in conjunction, or one following closely on the other. *Fay.*

twin stone. Staurolite. *Shipley.*

twin-twisted bars. Two bars of the same nominal diameter twisted together. *Taylor.*

twin way. Brist. Two branch roads, one on either side of a main road driven to the working face, through which trams are pushed by twin boys. *Fay.*

twiscar. *See* tuskar. *Fay.*

twist conveyor. An el conveyor in which the carrying surface and guard gradually exchange their functional duties. *ASA MH-4.1-1958.*

twist drill. A drill made by twisting a length of steel of rectangular or oval section into a spiral form, hence, the term twist drill. Many hand operated coal drills are of this type and the rotation of the drill spiral removes the cuttings from the hole. *See also* auger; coal auger. *Nelson.*

twisted-loop splice. Made by holding the bared wires side by side. Half of their length is bent back to form a loop at the end. The loop is then twisted around the main shank of wire. *Carson, p. 326.*

twisted-steel fabric. Factory-made reinforcing fabric made from cold-twisted steel bars. *Taylor.*

twister operator. In the asbestos products industry, one who twists together two or more strands of wire and asbestos yarn for use in weaving asbestos products, such as brake linings. *D.O.T. 1.*

twisting force; turning force. A force, such as the force on the draft of a rotating motor. *Morris and Cooper, p. 141.*

twisting moment; torque. The twisting moment at any section of a member is the moment of all forces that act on the member to the left (or right) of that section, taken about a polar axis through the flexural center of that section. For sections that are symmetrical about each principal central axis, the flexural center coincides with the centroid. *Ro.*

twistoff. The breaking off of a member of the drill string, caused by excessive torsional stress. *Long.*

twitch; twith. N. of Eng. A pinch in a vein. *Fay.*

two. Scot. A cageful of men. A term no doubt originating when cages were small and could accomodate only two men. *Fay.*

two-axle scraper. A full trailer-type carrying scraper. *Nichols.*

two-coat work. Enamelware which has two coats of enamel on the metal, usually one ground coat and one cover coat. Many enamelers refer to two cover coats over a ground coat on sheet iron as two-coat work although the buying public refers to it as triple-coated ware. *Enam. Dict.*

two-cone bit. *See* roller rock bit. *B.S. 3618, 1963, sec. 3.*

two-cycle engine. An engine in which only two strokes of the piston, corresponding to one revolution of the crankshaft, are required to complete the cycle. In this cycle an explosion occurs on each downward stroke of the piston, the fresh charge being admitted and the exhaust gases expelled at or near the end of the stroke. For the same number of revolutions of the crankshaft, there are twice as many explosions in the cylinder of a two-cycle engine as in that of a four-cycle engine. *Zern, p. 332.*

two-fan auxiliary ventilation; overlap auxiliary ventilation. An arrangement, using two auxiliary fans, for ventilating a mine tunnel or hard heading. It consists of an exhausting fan with rigid ducting to within about 100 feet of the face, and a forcing fan using a flexible duct discharging air about 20 feet from the face. The ducts of the two units overlap by at least 30 feet to minimize recirculation of air. The air delivered by the forcing fan does not exceed about one-third that removed by the exhaust fan. *See also* recirculation of air; reversible auxiliary ventilation. *Nelson.*

two-high mill. Contains two horizontal rolls, one above the other. In some two-high mills the direction of rolling can be reversed, and these are known as reversing mills, that is, when a piece has passed through the rolls, the rolls are stopped and then rotated in the opposite direction, thus imposing another pass on the steel, the operation being repeated until the desired reduction is attained. Between passes, adjustment is made to the height of the top roll, and/or the piece is moved sideways by means of manipulators, to be in line with other grooves in the rolls. *Osborne, p. 357.*

two-hinged arch. A rigid frame which is hinged at both supports. It may have an arched or rectangular form. *Ham.*

two intakes; double intakes. The provision of two intake airways, generally side by side, to a ventilating district of a mine. *Nelson.*

two-jaw chuck. A chuck equipped with two movable clamping or holding devices by means of which the motion of the chuck is imparted to the drill rods. *Long.*

two-leg sling. A sling having two chains or ropes which hang from a thimble. *See also* three-leg sling. *Ham.*

two-liquid differential manometer. Consists of two concentric glass tubes, each expanded into a large bulb at the upper end. The lower end of the outer tube is sealed and the inner tube reaches nearly to the bottom of the outer tube. Two liquids are used and the movement of the interface between the two liquids down the central tube is used as an index against which the change in pressure is measured. It is essential that the two liquids do not mix and that neither is soluble in the other. *Roberts, I, pp. 28-29.*

two-mica granite. Granite containing both light and dark micas. Preferred term is binary granite. *Stokes and Varnes, 1955.*

two-minute lighter. *See* cheese stick. *South Australia, p. 40.*

two-part line. A single strand of rope or cable doubled back around a sheave so that two parts of it pull a load together. *Nichols, 2.*

two-piece set. A set of timbers consisting of a cap and a single post. If the ground is loose and must be supported over the side or back, lagging commonly of 2-inch boards is used. These boards extend from the center line of the post or cap to the middle of the next post or cap. If they are placed touching each other, such an arrangement is called tight lagging; if a few inches apart, depending on the nature of the ground to be held back, it is called open lagging. *Lewis, p. 40.*

two-pipe steam system. A heating system in which one pipe is used for supplying steam to the radiator and another pipe is used to return cooled water or condensate to the boiler. *Strock, 10.*

two-plane idler. A troughing idler in which the troughing roll shafts are in a vertical plane separate from but parallel to a vertical plane through the shaft of the center roll or rolls. *NEMA MB1-1956.*

two-point press. A mechanical press in which the slide is actuated by two connections. *ASM Gloss.*

two-process washer. A method of cleaning raw coal in which the material from 8 inches to one-sixteenth inch in size is treated in heavy medium washers, and the fines below one-sixteenth inch are treated by froth flotation. *Nelson.*

two-speed differential. A differential having a high-flow gearshift between the drive shaft and the ring gear. *Nichols.*

two-stage compression. Air compression carried out in two stages as is usual for pressures exceeding 60 pounds per square inch or for outputs greater than 100 horsepower. *See also* intercooler, c. *Ham.*

two-stage hoisting. Deep shaft hoisting with two winders, one at the surface and the other at mid-depth in the shaft. The surface engine winds mineral from the mid-depth pocket and the other from the pit bottom to the mid-depth point. The arrangement is often adopted in turned vertical shafts. *Nelson.*

two-step control system. In flotation, a system in which the manipulated variable alternates between two predetermined values. *Fuerstenau, p. 547.*

two-stroke cycle. A working cycle of a piston in an internal-combustion engine consisting of two strokes in which the piston during the first stroke compresses the fuel mixture on one side while receiving the expansive thrust of previously compressed gases on the other side and during the second draws in a fresh charge on one side while expelling burnt gases on the other. *Webster 3d.*

two throws. Eng. A depth of about 12 feet when the debris from a sinking shaft has to be raised to the surface by two lifts or throws with the shovel (one man working above another). At this point the employment of a hand windlass becomes necessary. *Fay.*

two-way ram; double-acting ram. A hydraulic cylinder in which fluid can be supplied to either end, so the piston can be moved by power in two directions. *Nichols.*

T-X graph. *See* travel-time curve. *Schieferdecker.*

tychite. A white, sulfatocarbonate of magnesium and sodium, $2MgCO_3.2Na_2CO_3.Na_2SO_4$. Isometric. Small octahedrons. Differs from northupite, with which it is found, in containing Na_2SO_4 in place of NaCl. From Borax Lake, San Bernardino County, Calif. *English.*

tye. a. A strake, in which a considerable thickness of low-grade concentrate is collected. *Nelson.* b. Eng. The point where two veins cross each other or where two pipes cross obliquely. *Fay.* c. Corn. An adit or drain. *Fay.* d. Corn. A sluicebox for the extraction of the heavy sands in milltailings. Sometimes spelled tie. *Fay.*

tyer; tier of pumps. Corn. A set of pumps of which the lower pump or piece is called the driggoe, but more frequently the working piece. *Fay.*

tying. Corn. The washing of ore in a strake, tye, or launder. *Fay.*

Tyler. A sieving system. *Pryor, 4.*

Tyler sieve. *See* sieve. *Dodd.*

Tyler standard scale. A grade scale for the determination of size grades of sediment particles which is based on $\sqrt{2}$, and in which the midpoint values of each class turn out to be simple whole numbers or fractions. *A.G.I.*

Tyler Standard series. The series of carefully woven, square-mesh wire screens most commonly used in the United States in screening ores. *Newton, p. 71.*

tymp. a. Eng. A horizontal roof timber in a coal mine; a cap or lid. *Standard, 1964.* b. A hollow iron casting, cooled interiorly by a current of water and placed to protect the tymp arch, or arch over the dam, in a blast furnace having a forehearth. *Fay.*

tymp stone. A large clay plug filling an open space in the front jackets of a smelting furnace, through which the taphole passes. *Standard, 1964.*

Tyndall effect. Reflection of strong beam of light by colloids suspended in solution. No such reflection is shown by true solutions. *Pryor, 3.*

tyndallometer; tyndalloscope. An instrument which measures the intensity of the light scattered at an angle from the incident beam by a dust cloud. It correlates well with the concentration determined by the thermal precipitator and surface area calculated from such a count. It needs to be calibrated for each type of dust against the thermal precipitator. Used in the Ruhr (Germany) coalfields. *See also* dust sampling. *Nelson.*

tyndallascope. *See* tyndallometer. *Nelson.*

type. a. Those differences in coals that are due to variations in the kind of plant material of which the coal is composed, whereby such varieties as common banded coal, cannel coal, algal coal, and splint coal are produced. *A.G.I.* b. A kind, particularly in petrology (rock type); either general (for example, basalt is a rock type) or particularly (for example, a particular basalt from a particular locality is a unique type specified by a description). *Challinor.*

type-D drift indicator. A single-shot borehole-surveying instrument utilizing photographic paper on which is recorded the compass bearing and inclination of the course of a borehole. The type-D instrument, when mounted in a special thin-walled protective container, is small enough to be used in an AX-size hole. *Long.*

type locality. a. The place at which a formation is typically displayed and from which it is named; also, the place at which a fossil or other geologic feature is displayed in typical form. *Fay.* b. The rock outcropping or mine from which a species of rock or mineral was first obtained. *Hess.*

type-M drift indicator. A single-shot borehole-surveying instrument that records the compass bearing and inclination of the course of a borehole through the action of a strong beam of light directed through the plumb bob onto a light-sensitive paper disk. It is similar to, but larger than, a type-D drift indicator. *Long.*

type metal. A series of alloys containing 54 to 95 percent lead, 2 to 28 percent antimony, and 2 to 20 percent tin, used to make printing type. *ASM Gloss.*

type mineral. The actual mineral specimen used for study resulting in its being identified as a new species. It is not uncommon to find different species resembling each other closely from the same type locality hence importance of a type mineral. *Hess.*

type of coal. a. The concept type with the restricted meaning recognized by the U.S. Bureau of Mines provides a means for classifying standard varieties of coal microscopically on the basis of simple proportions of anthraxylon or anthraxylon and opaque attritus, including their subdivision into banded and non-banded coals. There is no term in the Stopes-Heerlen nomenclature precisely synonymous with the word type as used by the U.S. Bureau of Mines and no similar type classification. *IHCP, 1963, part I.* b. Although the word type has the common meaning of variety, it was applied to coal with restricted significance by D. White (1909). According to White, a type of coal is a variety initially determined by the nature of the ingredient matter, the conditions of deposition and the extent of operation of the first or biochemical process of coal making. Although every individual coal belongs to one or another type of coal, no systematic and comprehensive classification of coal by type exists. Coals designated as humus coal, resinous coal, spore coal, leaf coal, bark coal, etc., represent coal types. Some coal chemists, at least since 1927, have used the term type with a meaning similar to that of the term rank but such a meaning of type is not generally recognized as valid by coal geologists and petrologists. *IHCP, 1963, part I.*

types. Scot. Irregularities in a mine roof; also called lypes. *Fay.*

Type S hydrated lime; special hydrated lime. An ASTM designation to distinguish a structural hydrate from a normal hydrated lime, designation Type N, that possesses specified plasticity and gradation requirements. It may be dolomitic or high calcium and is more precisely milled than Type N hydrates. *Boynton.*

type specimen. A specimen or individual designated as type of a species or lesser group and serving as the final criterion of the characteristics of that group. *Webster 3d.*

type variety. Variations in coal caused by differences in the physical constitution or makeup of coal, that is, differences in the quality or distribution of the banded ingredients throughout the coal specimen. *A.G.I.*

type-W drift indicator. A mechanical single-shot borehole-surveying instrument for use where exceptionally high temperatures are encountered in a hole. It records the compass bearing and inclination of a borehole by making a dot on a special paper by means of a plumb bob, incorporating a depressible stylus. *Long.*

typhon. Synonym for boss; stock. *Fay.*

typhonic rocks. Brogniart's name for rocks that have come from the depths of the earth, that is, plutonic and eruptive rocks. *Fay.*

typomorphic. a. Applied to minerals typically developed in only narrow ranges of temperature and pressure. *Bateman, 1950, p. 161.* b. Applied to minerals characteristic of the particular set of physical conditions which controlled their formation. *Holmes, 1928.*

typomorphic minerals. Minerals that are stable in a given metamorphic facies; for example, in Eskola's greenschist facies, typical minerals are albite, sericite, chlorite, talc, serpentine, epidote, calcite, and dolmite. All of these minerals are stable under the conditions of the greenschist facies, but some may also occur in other facies. *Compare* critical minerals. *Schieferdecker.*

tyre valve. Adjustable annular ring made of plastic, used to control aperture area at apex of hydrocyclone. *Pryor, 3.*

typrite. a. A variety of fergusonite found near Arendal, Norway. *Fay.* b. Same as sipylite. *Crosby, p. 21.*

tyrolite. a. A hydrous arsenate of copper, $Cu_9Ca_2(AsO_4)_4(OH)_{10}.9\text{-}10H_2O$, occurring in orthorhombic crystals, and in aggregates having a foliated micaceous structure. *Fay; American Mineralogist, v. 42, No. 1-2, January-February 1957, p. 123.* b. Synonym for lazulite. *Hey 2d, 1955.*

tryllite. The unnamed $(Cu,Co,Ni)_3Se_4$ of S. C. Robinson and E. J. Brooker, 1952, named by S. C. Robinson after Joseph Burr Tyrrell. *Hey, M.M., 1961.*

tyth. Eng. An ancient custom or duty which miners gave to the priests. Usually every twentieth dish. *Fay.*

tyuyamunite. A yellow, uranium mineral, $Ca(UO_2)_2(VO_4)_2.3H_2O$. It is the calcium analogue of carnotite. It is a strongly radioactive, orthorhombic mineral occurring in limestone, disseminated or in veinlets, associated with malachite, ferghanite, turanite, barite, calcite, and the vanadium minerals; also widely distributed in the Colorado plateau area, where it is associated with carnotite. *Crosby, pp. 51-52; Dana 17.* Synonym for calciorontite.

tzacutli. A Mexican name for asphalt. *Tomkeieff, 1964.*

U

u a. A symbol for internal energy, intrinsic energy per unit weight. *Zimmerman, pp. 41, 59.* b. Symbol for velocity, linear velocity, particle velocity, one of the three components of linear velocity or particle velocity, local velocity at time *t;* and for velocity of ions. *Handbook of Chemistry and Physics, 45th ed., 1964; p. F-101; Zimmerman, pp. 115, 166.* c. Abbreviation for unit. *Webster 3d.* e. Abbreviation for upper. *Zimmerman, p. 14.*

u a. Symbol for internal energy or intrinsic energy; internal energy or intrinsic energy per unit weight or per unit mass; internal energy or intrinsic energy per mole, per atom, or per molecule. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Zimmerman, p. 155.* b. Symbol for radiant energy per unit volume; density of radiant energy or radiant density. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Zimmerman, p. 179.* c. Symbol for ionic velocity; reaction velocity. *Handbook of Chemistry and Physics 45th ed., 1964, p. F-101.* d. Symbol for speed; average speed; most probable speed; speed at time *t;* linear speed or particle speed. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Zimmerman, p. 165.* e. Symbol for angle of slope in object space. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* f. Symbol for velocity in the x direction. *Zimmerman, p. 186.*

U a. Chemical symbol for uranium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.* b. Symbol for kilurane, a unit the name of which is derived from kilo and uranium, and which equals 1,000 uranium units. *Zimmerman, p. 474.* c. Symbol for internal energy, intrinsic energy for any weight. *Zimmerman, p. 41.* d. Symbol for radiant energy. *Zimmerman, p. 41.* e. Symbol for thermal transmission per unit area, overall coefficient of heat transfer. *Zimmerman, pp. 53, 108.* f. Abbreviation for unit. *Zimmerman, p. 114.* g. Abbreviation and symbol for upper, Upper. *Zimmerman, p. 114.*

U a. Symbol for potential energy; total energy; internal energy or intrinsic energy; total internal energy or total intrinsic energy; internal energy or intrinsic energy per mole; radiant energy. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* b. Symbol for overall coefficient of heat transfer. *Zimmerman, p. 147.*

U-bend die. A die, commonly used in press-brake forming, machined horizontally with a square or rectangular cross-sectional opening which provides two edges over which metal is drawn into a channel shape. *ASM Gloss.*

U-bit. A popular type rotary bit used in British mining practice. It has two cutting legs although some American and German bits employ three legs. A core is formed between the legs which is broken off as cutting proceeds, while some bits have a core cutting device consisting of a tungsten carbide tip in the center. *Fraenkel, v. 1, Art. 6:21, p. 21.*

uda. a. In ceramics, a purplish-brown pigment used in the decoration of Hindu pottery. *Standard, 1964.* b. Glazed pottery thus decorated. *Standard, 1964.*

Udden scale. A logarithmic scale for size classification of sediments, starting from 1 millimeter and progressing by the ratio of one-half in one direction and two in the other. This, with slight modifications, was adopted by Wentworth and by the Committee on Sedimentation. *A.G.I.*

udometer. A rain gage. *Crispin.*

u-galena. Galena containing Pb^{206}, uranium lead. *Hey 2d, 1955.*

ugandite. An extrusive rock containing leucite, augite, and much olivine in a soda-rich glassy matrix. A dark variety of olivine leucitite. *A.G.I.*

Ugine-Sejournet process. A direct extrusion process for metals that uses molten glass to insulate the hot billet and to act as a lubricant. *ASM Gloss.*

ugol. Russian name for coal. *Tomkeieff, 1954.*

uhel. Czech name for coal. *Tomkeieff, 1954.*

Uhligite. a. A black titanat and zirconate of calcium with aluminum titanate, $Ca(Zr,Ti)_2O_5$ with Al_2TiO_5. Isometric. Octahedrous. From Lake Magad, Tanzania, East Africa. *English,* b. Apparently given as an alternative name for gelvariscite, for the amorphous variscite of Leoben, Styria, Austria, and for gelfischerite of Roman-Gladna, Hungary. *English.*

uigite. A discredited term equal to thomsonite. *American Mineralogist, v. 45, No. 5-6, May-June, 1960, p. 756.*

Uinta formation. Strata of Eocene age and continental origin occurring typically in the Uinta Basin in Utah and Colorado. *C.T.D.*

uintaite; uintahite. A variety of natural asphalt occurring in the Uinta Valley, Utah, as rounded masses of brilliant black solid hydrocarbon. Also called gilsonite. *C.M.D.*

ukrainite. Monzonite containing 1 to 19 percent quartz. *A.G.I. Supp.*

ulexite; cotton ball. A mineral, $NaCaB_5O_9.8H_2O$, occurring in saline crusts on alkali flats in arid regions, as in Nevada, U.S., and Chile, where it forms rounded masses of extremely fine acicular white crystals. Triclinic. Also called boronatrocalcite. *Fay. See also* natronborocalcite. *Hey 2d, 1955.*

ullmannite. Sulfantimonide of nickel, NiSbS or $NiS_2.NiSb_2$; arsenic is usually present in small amount. Also called nickel antimony glance. *Fay.*

Ullrich magnetic separators. These machines have powerful electromagnets of wedge section. The material is treated on rolls on which magnetism is induced; they consist of alternate disks of soft iron and some non-magnetic material. The ore is fed over the first roll, which removes the most magnetic material, and the tailings go on to the second which is weaker, where a second separation is made. *Liddell 2d, pp. 388-389.*

ulmain. A subvariety of euvitrain. It is composed of completely jellified plant material that may, for example, lie at one end of a partly jellified stem and be observable microscopically. It differs from collain in that it is not believed to have been precipitated from solution. *Compare* collain. *A.G.I.*

ulmic acids. *See* ulmins. *A.G.I.*

ulmification. The process of peat formation. *Tomkeieff, 1954.*

ulmin brown. *See* Vandyke brown. *CCD 6d, 1961.*

ulminite. A variety of euvitrinite. The micropetrological constituent or maceral of ulmain. It consists of completely jellified but not precipitated plant material. Approved by the Heerlen Committee of 1935 as applicable in special cases for vitrinite devoid of structure. *Compare* collinite, a. *A.G.I.*

ulmins. The products of decay of vegetable matter and their prototypes occurring in coal as a gel. In the past, variously termed ulmic acids, humic acids, and humic substances. *A.G.I.*

ulrichite. A hypabyssal rock composed essentially of large phenocrysts of alkalic feldspar, sodic pyroxene, amphibole, and nepheline with smaller phenocrysts of accessory of olivine. Feldspar, pyroxene, and amphibole recur in the groundmass. A porphyritic variety of olivine-bearing phonolite. *A.G.I.*

Ulsterian. Lower Devonian. *A.G.I. Supp.*

ultimate analysis. a. The determination of the elements contained in a compound as distinguished from proximate analysis, which is the determination of the compounds contained in a mixture. *Standard, 1964.*

b. In the case of coal and coke, the determination of carbon and hydrogen in the material, as found in the gaseous products of its complete combustion, the determination of sulfur, nitrogen, and ash in the material as a whole, and the estimation of oxygen by difference. Note 1.—The determination of phosphorus is not by definition a part of the ultimate analysis of coal or coke, but may be specified when desired. Note 2.—When the analysis is made on an undried sample, part of the hydrogen and oxygen as determined is present in the free moisture accompanying the coal. Therefore, in comparing coals on the basis of their ultimate analysis, it is advisable always to state the analysis on both the as-received and dry basis. Note 3.—Inasmuch as some coals contain mineral carbonates, and practically all contain clay or shale containing combined water, a part of the carbon, hydrogen, and oxygen found in the products of combustion may arise from these mineral components. *ASTM D 121-62.* c. The principal reason for the ultimate analysis of coal is for the classification of coals according to rank, although it is often used for commercial and industrial purposes when it is most desirable to know the sulfur content of coal. Also known as total analysis of coal. *Cooper, pp. 396-397.*

ultimate baselevel. A baselevel at or below sea level, to which lands may be reduced by physical and chemical processes acting upon them to lower and destroy them. *Bureau of Mines Staff.*

ultimate bearing capacity. The average load per unit of area required to produce failure by rupture of a supporting soil mass. *ASCE P1826.*

ultimate bearing pressure. The pressure under which a foundation will settle with no increase of load. *Ham.*

ultimate compressive strength. That at which failure by crushing occurs. *Pryor, 3.*

ultimate CO_2. The percent of CO_2 which would appear in the flue gases if combustion were perfect. Varies with the fuel. *Strock, 10.*

ultimate elongation. The percentage of permanent deformation remaining after tensile rupture, measured over an arbitrary length including the section of rupture. *Ro.*

ultimately controlled variable. In flotation, the variable whose control is the end purpose of the automatic control system. *Fuerstenau, p. 542.*

ultimate recovery. The quantity of oil or gas that a well, pool, field, or property will produce. It is the total obtained or to be obtained from the beginning to final abandonment. Also called ultimate production. *A.G.I.*

ultimate strength. The ultimate strength of a material in tension, compression, or shear respectively, is the maximum tensile, compressive, or shear stress that the material can sustain, calculated on the basis of the ultimate load and the original or unstrained dimensions. It is implied that the condition of stress represents uniaxial tension, uniaxial compression, or pure shear, as the case may be. *Ro.*

ultimate-strength design. Design that is based on the expected behavior of a structure or structural element under loads up to and including failure load, in which the essential technique is to design the structure to fail at a load which exceeds the working load in the specified ratio given by the load factory. *Taylor.*

ultimate tensile stress. The load at which a test piece breaks divided by its original area. *See also* tensile strength. *Ham.*

ultrabasic. Containing less than 45 percent silica; containing virtually no quartz or feldspar and composed essentially of ferromagnesian silicates, metallic oxides and sulfides, and native metals, or of all three; said of some igneous rocks and of most varieties of meteorites. *Fay.*

ultrabasic rocks. Igneous rocks containing less silica than the basic rocks (that is, less than 45 percent) and characterized by a high content of mafic constituents, particularly olivine (in the peridotites), and amphiboles and pyroxenes (in the perknites and picrites, *C.T.D.* Also called ultrabasites.

ultrabasite. A gray-black, basic sulfantimonite of lead, silver, and germanium, $28PbS.11Ag_2S.3GeS_2.2Sb_2S_3$. Orthorhombic. Crystals of tetragonal habit. From Freiberg, Saxony, Germany. *English.*

ultra deep. S Afr. Mining below a depth hitherto warranted by conditions of temperature, etc. On the Witwatersrand ultradeep levels are reached at between 8,000 and 10,000 feet below the surface. *See also* deep level, b. *Beerman.*

ultrafiltration. Use of special membranes which permit passage of true solvents and solutes but are impermeable to colloids. Mainly used in bacteriology and may be assisted by suction or pressure. *Pryor, 3.*

ultraflotation. A recently developed process for use in fine-particle flotation. The underlying principle is the use of a finely ground, (—325 mesh) auxiliary mineral as a carrier for the fine particles to be floated. The fine particles form a slime coating on the carrier mineral; the carrier mineral is then floated and the fines are piggybacked into the froth. *Fuerstenau, p. 249.*

Ultralite. Trademark name for a red-violet synthetic sapphire. *Shipley.*

ultramafic. Synonym for ultrabasic. *A.G.I.*

ultramafic rocks; ultrabasic rocks. Rocks containing less than 45 percent SiO_2. *A.G.I.*

ultramafites. Igneous rocks in which there is an abnormally high content of ferromagnesian silicates, but which contain no feldspar; subdivided into picrites (with accessory plagioclase), pyroxenites, and peridotites. *C.M.D.*

ultramarine; ultramarine blue. a. A costly blue pigment formerly made by powdering lapis lazuli. *Webster 3d.* b. A brilliant blue pigment of similar composition but having commonly a reddish or greenish cast that is usually prepared by powdering the product from calcining essentially a mixture of kaolin, soda ash, sulfur, and charcoal or other reducing agent. *Webster 3d.* c. Any of various pigments that are usually produced by modifications of the above process or by replacing the sodium or the sulfur in ordinary ultramarine by other elements. *Webster 3d.* d. Synonym for lazurite; applied especially to artificial lazurite, and also by extension to artificial compounds allied to lazurite. *Hey 2d, 1955.*

ultramarine ash. A pigment used for gray tints and made by grinding the residue from lapis lazuli after the natural ultramarine has been removed. *Standard, 1964.*

ultramarine green. A pigment obtained as a byproduct in the manufacture of artificial ultramarine blue. *Bennett 2d, 1962.*

ultramarine red. A pigment obtained by heating ultramarine blue in the presence of nitric-acid vapors. *Bennett 2d, 1962.*

ultramarine yellow. A lemon-yellow pigment consisting of barium chromate. *Fay.*

ultrametagranite. Granite produced by replacement accompanied by partial melting. *A.G.I. Supp.*

ultrametamorphism. Melting of rock and creation of magma in situ. *A.G.I. Supp.*

ultramicroscope. One in which a strong beam of light (Tyndall beam) is viewed at right angles. Individual soluble particles too small to be seen under a microscope then appear as bright spots against a dark background. Ultramicroscopy operates below 0.25 μ. *Pryor, 3.*

ultramylonite. A homogeneous mylonite free of all parallel structures. *See also* buchite; flinty crush rock; hartschiefer; mylonite; pseudotachylyte; trap-shotten gneiss. *A.G.I.*

ultrasima. Layer within the earth underlying and heavier than the sima and presumably consisting of more basic material. *A.G.I. Supp.*

ultrasonic beam. A beam of acoustical radiation with a frequency higher than the frequency range for audible sound. *ASM Gloss.*

ultrasonic cleaning. Immersion cleaning aided by ultrasonic waves which cause microagitation. *ASM Gloss.*

ultrasonic drilling. A vibration drilling technique which can be used in drilling, cutting, and shaping of hard materials. In this method, ultrasonic vibrations are generated by the compression and extension of a core of electrostrictive or magnetostrictive material in a rapidly alternating electric or magnetic field. The most easily assembled is a magnetostrictive transducer and the most common magnetostrictive materials, which change in dimension when magnetized, are nickel and vanadium permandur. *Mining and Minerals Engineering, v. 1, No. 5, January 1965, p. 178.*

ultrasonic equipment. The word ultrasonic signifies vibration at a frequency greater than the maximum audible frequency, and should not be confused with supersonic, which signifies a velocity greater than that of sound. Ultrasonic vibrations can be generated by piezoelectric ceramics, by magnetostrictive devices, or by whistles in which there is a steel blade vibrated by a high-pressure jet of liquid. Ultrasonic equipment has been used in the ceramic industry for the dispersion of clay slips, for metal cleaning prior to vitreous enameling, and for flaw detection, particularly in large electrical porcelain insulators. *Dodd.*

ultrasonic frequency. A frequency, associated with elastic waves, that is greater than the highest audible frequency, generally regarded as being higher than 15 kilocycles per second. *ASM Gloss.*

ultrasonic generator. A device for producing elastic waves of ultrasonic frequency. *ASM Gloss.*

ultrasonic inspection; supersonic testing. A nondestructive method of testing, based upon the fact that ultrasonic waves are reflected and refracted at the boundaries of a solid medium, from which it is possible to obtain the echoes of a wave transmitted from the surface of a test piece. In addition to being reflected from the boundary of the specimen at which they are directed, the waves are also reflected back by any flaws which lie in the path of the wave. *Osborne.*

ultrasonics. The acoustic field involving ultrasonic frequencies. *ASM Gloss. See also* supersonic.

ultrasonic tests. Those in which high-frequency vibrations (inaudible to human ear) are used in determination of wall thicknesses, pulp densities, etc. *Pryor, 3.*

ultrasonic testing. *See* ultrasonic inspection. *Osborne.*

ultrasonic waves. Waves of ultrasonic frequency; they include longitudinal, transverse, surface, and standing waves. *ASM Gloss.*

ultrasonography. A modification of the use of ultrasonic waves for the detection of internal flaws in metals. By using a persistent screen cathode ray tube and causing the echoes to brighten the trace instead of deflecting it, an ultrasonic image is produced which can be examined and interpreted like a radiograph. *Osborne.*

ultraviolet. a. Of radiation, beyond the visible spectrum at its violet end; having a wavelength shorter than those of visible light and longer than those of X-rays. *Webster 3d.* b. Relating to, producing, or employing ultraviolet radiation. *Webster 3d.*

ultraviolet absorbing glass. Glasses can be made to absorb ultraviolet light, while transmitting visible light, by the inclusion of CeO_2 in the batch. Other elements absorbing ultraviolet light include chromium, cobalt, copper, iron, lead, manganese, neodymium, nickel, titanium, uranium, and vanadium. *Dodd.*

ultraviolet glass. Glass which allows the passage of ultraviolet light rays. Such glasses are low in ferric oxide and titanium oxide and high boric oxide and silica seem to be advantageous. Clear fused quartz is the most perfect glass but is too expensive for most uses. Wood's glass containing sufficient nickel oxide with potash has a color of such a deep blue that it is opaque to ordinary light, but is transparent to ultraviolet light from about 390 mu to about 310 mu. Ordinary glasses allow some ultraviolet rays to pass, but all are cut off by cerium oxide (Crooke's glass). Yellow glass colored by iron and manganese oxides is also opaque to them. *Nature, v. 127, Feb. 28, 1931, pp. 310-311.*

ultraviolet light. Black light. Invisible light rays from the portion of the specrtum that lies beyond the violet on the shorter wavelength side. Used to induce chemical activity and produce fluorescence in many substances, as luminous porcelain enamels. *Enam. Dict.*

ultra-violet rays. Electromagnetic waves in the wavelength between visible light rays and X-rays. Ultra-violet light furnishes a quick method of finding and identifying certain metals, for example, tungsten. *Nelson.*

ultraviolet transmitting glass. For high transmittance of ultraviolet light, a glass must be free from iron, titanium, and sulfur. Phosphate glasses and some borosilicate glasses have good ultraviolet transmittance. Uses include special windows and germicidal lamps. *Dodd.*

ultrawet. Alkylated monosodium benzene sulfonate, a wetting agent. *Pryor, 3.*

ulvite. A mineral, Fe_2TiO_4, cubic. An abbreviated form of ulvospinel. *Spencer 21, M.M., 1958.*

ulvospinel. A spinel, $TiFe_2O_4$, a common constituent of titaniferous magnetites, generally as very fine exsolution lamellae; from the Ulvo Islands, Angermanland Archipelago, northern Sweden. *American Mineralogist, v. 40, No. 1-2, January-February 1955, p. 138.*

umangite. A mineral, Cu_3Se_2, consisting of a copper selenide and occurring in dark red masses. *Webster 3d.*

umbauhobel. A plough developed from the Anbauhobel machine to allow the conversion of a Lobbe Hobel to give the plough an independent drive. *Nelson.*

umber. A naturally occurring brown earth containing ferric oxide together with silica, alumina, manganese oxides, and lime. Raw umber is umber which is ground and then levigated. Burnt umber is umber calcined at low heat. Used as paint pigment. *See also* limonite. *CCD 6d, 1961.*

umbrella. Protective hood over hoisting cage in mine shaft. *Pryor, 3.*

unmix. Proprietary flotation collector agent based on emulsified tall oil, fuel oil and water-soluble aryl-alkyl sulfonate used to treat hematite ores. *Pryor, 3.*

umohoite. A black to bluish-black, rare secondary mineral, close to $(UO_2)(MoO_4)$. $4H_2O$, the only known uranium mineral that contains Mo as a major constituent; contains 47.4 percent uranium. Monoclinic. *Frondel, p. 193.*

umpire. a. A person to whose sole decision a controversy or question between parties is referred. *Webster 2d.* As one who performs control assays. *Fay.* b. An assay made by a third party to settle a difference found in the results of assays made by the purchaser and seller of ore. *Fay.*

umpire assay. *See* umpire, b. *von Bernewitz.*

U.M. plate. Universal mill plate, or plate which is rolled to width by vertical rolls as well as being rolled to thickness by horizontal rolls. *Osborne.*

umptekite. A plutonic rock consisting largely of microperthitic feldspars and sodic amphibole, and with accessory sphene, apatite, and opaque oxides; very small amounts of interstitial nepheline may sometimes be present. A variety of sodic syenite similar to pulaskite. *A.G.I.*

unakite. A metamorphosed granitic igneous rock composed of abundant epidote and pink orthoclase, with subordinate quartz, and minor opaque oxides, apatite, and zircon. *A.G.I.*

unavoidable casualties. That which could not be avoided by the exercise of reasonable diligence and skill. *Ricketts, I.*

unbalanced cutter chain. A cutter chain which carries more picks along the bottom line than the topline. Most chains for cutting at floor level are unbalanced to assist in keeping the jib down. *See also* balanced cutter chain. *Nelson.*

unbalanced hoisting. The method of hoisting in small one-compartment shafts with only one cage in operation as opposed to balanced winding. *Nelson.*

unbalanced shothole. A shothole in which the explosive charge breaks down the coal at the back of the machine cut while leaving the front portion standing or in large blocks. This may happen with a deep bottom cut in a thin seam where the vertical distance from the explosive to the inner end of the cut is shorter than the horizontal distance to the exposed face of the seam. *Nelson.*

unbalanced stress. A stress that acts on a body and is not balanced by another and opposite stress. When an unbalanced stress acts on a body, that body is not in equilibrium, and movement (deformation) ensues. *Stokes and Varnes, 1955.*

unburned brick. Brick manufactured by processes which do not require kiln burning to develop the strength of the finished product. *A.R.I.*

unburned refractories. Refractories shaped without burning, by use of high pressures after deaeration to reduce voids between grains. Chemical bonding and metal encasement are also used. *CCD 6d, 1961.*

uncertainty principle. A principle in quantum mechanics. It is impossible to assert in terms of the ordinary conventions of geometrical position and of motion that a particle (as an electron) is at the same time at a specified point and moving with a specified velocity for the more accurately either factor can be measured, the less accurately the other can be ascertained. *Webster 3d.*

unchuck. To disengage the drill chuck from the drill stem. *Long.*

unclassified excavation. Excavation paid for at a fixed price per yard, regardless of whether it is earth or rock. *Nichols.*

uncompahgrite. A plutonic rock composed largely of melilite, with pyroxene, opaque oxides, perovskite, apatite, calcite, anatase, melanite, and occasionally phlogopite. *A.G.I.*

unconfined compression appliance; unrestrained compression apparatus. A portable appliance for carrying out shear tests at the site. It consists of two metal platforms, one being fixed, while the other can be moved vertically and supported in position by a coil spring. By rotating a handle the movable platform can be raised until a standard-size soil sample is held between two coned endpieces attached to the platforms. An undisturbed cylindrical soil sample is placed in position so that there is no tension in the coil spring and the autographic recording arm is adjusted. For the test, the handle is rotated until the soil specimen fails either by bulging or collapsing, or by shearing at an angle to the vertical axis. The compressive stress required to cause failure in a clay sample is at least twice the value of the shear stress. The sample must be sufficiently firm to be placed in the appliance. *Nelson.*

unconfined compression test. A crushing test carried out on a soil or rock specimen without lateral restraint. *See also* triaxial compression test, a; compression strength. *Ham.*

unconfined compressive strength. *See* compressive strength, b. *ASCE P1826.*

unconformability. *See* unconformity. *Fay.*

unconformability by erosion. An erosional unconformity; the presence of an irregular sinuous surface of contact between two contiguous strata, indicative of intervening elevation and erosion, not necessarily accompanied by flexure. *Fay.*

unconformability of dip. The break in the sequence of formations seen when strata lie on the previously uplifted and denuded edges of older rock. *Standard, 1964.*

unconformability of overlap. Discrepancy in areal extent between two contiguous superimposed strata, even where they have the same dip, the edge of one stratum overlapping that of the other; indicative of gentle subsidence without perceptible folding. Also called by European geologists, unconformability of transgression. *Fay.*

unconformable. Having the relation of unconformity to the underlying rocks; not succeeding the underlying strata in immediate order of age and in parallel position. *Fay.*

unconformable coast. *See* transverse coast. *Schieferdecker.*

unconformity. a. A surface of erosion or nondeposition, usually the former, that separates younger strata from older rocks. *See also* angular unconformity; disconformity; local unconformity; nonconformity. *Billings, 1954, p. 242.* b. A substantial break in the continuity of deposition, where one rock formation is overlain by another that is not the next in geological succession. *B.S. 3618, 1964, sec. 5.*

unconsolidated. Uncemented and/or compacted. *Bureau of Mines Staff.*

unconsolidated sediments. Deposits consisting of uncemented clastic or organic material. *Hy.*

unconsolidated strata. Rocks consisting of loosely coherent or uncemented particles, whether occurring at the surface or at depth. *B.S. 3618, 1964, sec. 5.*

unconsolidated surface deposits. Surface deposits such as moss, peat, sand, gravel, silt, or mud. *B.S. 3618, 1963, sec. 1.*

unconsolidated-undrained test; quick test. A soil test in which the water content of the test specimen remains practically unchanged during the application of the confining pressure and the additional axial (or shearing) force. *ASCE P1826.*

uncouple. To unscrew or disengage. *Long.*

unctuous. Greasy or soapy to the touch, as certain magnesian minerals. *Standard, 1964.*

uncut. a. A diamond the original shape of which has not been altered artificially. *Long.* b. Unadulterated. *Bureau of Mines Staff.*

uncut stone. *See* uncut. *Long.*

uncut value; unreduced value. S. Afr. Values and widths of reefs as established by sampling. The figures thus obtained are reduced by certain percentages to arrive at the values which are used for the calculation of ore reserves. *Beerman.*

undulation. a. A large, wavelike fold in the earth's crust. *A.G.I. Supp.* b. Theoretical rhythmic oscillation of the earth's surface in broad waves. *A.G.I. Supp.*

undation theory. A theory of mountain building proposed by van Bemmein that assumes that long broad anticlines of basement rock rose like hugh waves in the crust. The sedimentary cover and sometimes the basement itself slid off to form the folds and faults observed in orogenic belts. *A.G.I.*

under. *See* undermanager. *Nelson.*

underbed crack. A subsurface crack in the base metal near the weld. *ASM Gloss.*

underbreak. The rock which remains unbroken inside the neat lines in a tunnel or shaft sinking after firing a round of shots. *Compare* overbreak. *Nelson.*

underbreaking. *See* underhand stoping.

underburning. Caused by burning the enamel coating at a lower temperature than that recommended, insufficient length of time in the furnace, or too heavy application of the enamel. Underburning is likely to cause blistering or boiling of the ground coat through the cover coat, or the enamel may fishscale before the cover coat can be applied and burned. The underburning fishscale is easily recognized, inasmuch as it is considerably larger than the fishscale caused by overburning. All underburned ground coat pieces should be refired before cover coat enamels are applied. *Enam. Dict.*

undercast. a. An air crossing in which one airway is deflected to pass under the other. *B.S. 3618, 1963, sec. 2.* b. The lower airway of an air crossing. *B.S. 3618, 1963, sec. 2. See also* air crossing. c. An undercast is nothing more than an inverted overcast. Undercasts are not considered to be as efficient as overcasts, due to the tendency of water to collect in them. *Compare* overcast, a. *Kentucky, p. 90.*

underchain haulage. Haulage in which the chains are placed beneath the mine car at certain intervals with suitable hooks that thrust against the car axle. *Stoces, v. 1, p. 184.*

underchaining. A drive is underchained when it incorporates a chain of substantially lower rating than that indicated by normal selection procedures. *J&M.*

underclay. A bed of clay, in some cases highly siliceous, in many others highly aluminous, occurring immediately beneath a coal seam, and representing the soil in which the trees of the Carboniferous swamp forests were rooted. Stigmarian roots commonly occur as fossils in underclays, many of which are used as fireclays. Also called seat earth. *See also* fireclay. *C.T.D.*

underclay limestone. Synonym for freshwater limestone. *A.G.I.*

undercliff. a. S. Wales. An argillaceous shale forming the floor of many coal seams. *Fay.* b. Eng. That portion of a cliff which has fallen en masse along a considerable line of coast, and forms a subordinate terrace between the sea and the original shore. *Compare* talus. *Fay.*

undercloak. A layer, of plain clay tiles for example, between the laths and the roof tiling proper at the verge of a tiled roof. *See also* verge. *Dodd.*

underconsolidated soil deposit. A deposit that is not fully consolidated under the existing overburden pressure. *ASCE P1826.* Not yet in equilibrium with existing physical environment. Still being compacted. *Bureau of Mines Staff.*

undercooling. The same as supercooling. *ASM Gloss.*

undercurrent. a. A short sluice much wider than the main sluice, and set on a steeper grade, generally at right angles to the main sluice. It is designed to save fine gold that does not readily settle. A screen or grizzly in the bottom of the main sluice has its opening so proportioned that the fine gravel, sand, and gold with some water drop through, but the larger rocks and sufficient water to move them are retained in the main sluice. The discharge from the undercurrent either runs directly to the dump or is returned to the main sluice through a second or auxiliary sluice of flat grade. *Lewis, p. 385.* b. Use of retaining screen at head end of sluice in treating alluvial gravels. This arrests oversize material, the sands passing through plus the carrying water being the undercurrent. *Pryor, 3.* c. A current, as of water or air, below another current or below the surface. *Standard, 1964.*

undercut. a. To remove a horizontal section or kerf in the bottom of a block of coal to facilitate its fall. *B.C.I. See also* undercutting. b. To undermine, to hole, or to mine. To cut below or to mine. To cut below or in the lower part of a coalbed by chipping away the coal with a pick or mining machine. It is usually done on the level of the floor of the mine, extending laterally the entire face and 5 or 6 feet into the material. *Fay.* c. A machine cut along floor level in a coal seam, to ease its removal by hand, by machine, or by shotfiring. *See also* holing. *Nelson.* d. Excavation of ore from beneath a larger block of ore to induce its settlement under its own weight. *Nelson.* e. In stoping, removal either of footwall rock or of lower part of a flattish lode, bed, or seam of ore or coal, thus facilitating detachment of portion left hanging. Method used in block caving. Also called resuing. *Pryor, 3.* f. To enlarge borehole below casing. *Bureau of Mines Staff.* g. In founding, the part of a molder's pattern that would break the sand if drawn vertically from an ordinary mold. *Standard, 1964.* h. A groove melted into the base metal adjacent to the toe of a weld and left unfilled. *ASM Gloss.* i. A cavity or depression, generally in the side of a mold, made by a projection on a pattern or model. It prevents the model from being drawn in the usual way without damaging the mold. *Mersereau, 4th, p. 269.*

undercut atomizer. A device for passing a fine spray of compressed air and water to dilute the firedamp and allay the coal dust in the track of a coal-cutter jib. The spray is passed through a modified whale-type jib. *Nelson.*

undercut ignition. The ignition of an explosive mixture of firedamp and air in the undercut of a coal cutter due to frictional sparking. Firedamp in dangerous quantities often exists in a machine undercut. *See also* whale-type jib. *Nelson.*

undercut quarry. A quarry in which the walls slant outward (overhang working face) so as to make the floorspace wider with increasing depth. *Fay.*

undercutter. a. In salt mining, an electrically driven machine somewhat like a gigantic chain saw. It has a long, thin horizontal bar, about which revolves an endless chain with cutting bits. The most common type is an adaptation of the shortwall coal cutter, a drag-type machine with continuous pick-filled chains to cut at the floor or bottom of the seam. It can make a rapid, continuous cut across the entire width of the face. *Kaufmann, pp. 115-116.* b. *See* machineman, b. *D.O.T.1.*

undercutting. a. The making of a cut, by hand or coal cutter, along the floor level in a coal seam to ease its working by hand or breaking by explosive. *See also* floor cut; holing. *Nelson.* b. Applied to the process of cutting under the face of the coal with a machine so it can be shot down readily. *See also* undercut. *Fay.* c. A quarrying method that is intermediate between the open pit and the adit. Channel cuts, or separations made by wire saws or other means along the quarry walls, are slanted outward; thus the floorspace is enlarged gradually. Wings or buttresses of stone may be left at intervals for wall support. *AIME, p. 325.* d. Eng. Usually applied to machine-cut coal. *See also* kirving. *SMRB, Paper No. 61.* e. Faulty cutting of flat glass resulting in an edge that is oblique to the surface of the glass. *Dodd.*

undercutting machine. An electrically driven machine used to make a cut about 6 feet deep near the bottom of the coalbed. *Hudson.*

undercutting of old workings. A method of shaft sinking used in steeply inclined deposits, or in a vein which has been worked out at the surface, in which the shaft is sunk alongside the deposit, with a crosscut being made to the vein at a depth below the previous workings. This is done where it might be dangerous to penetrate the old workings because of inrushes of water and of other difficulties. *Stoces, v. 1, p. 202.*

underdip coal. Scot. Coal extending below the haulage level at the bottom of the shaft. *Fay.*

underdraft. A condition wherein a metal curves downward on leaving the rolls because of the higher speed of the upper roll. *ASM Gloss.*

underdrive press. A mechanical press in which the driving mechanism is located within or under the bed. *ASM Gloss.*

underearth. Forest of Dean. A hard fire clay forming the floor of a seam of coal. *Fay.*

underedge stone. The material which forms the floor of an ironstone mine. *Nelson.*

underfeed; underfed. To advance a diamond or other type or rock-drilling bit into rock at a lesser rate than that warranted by the condition of the rock and/or the condition of the bit. *Long.*

underfeed stoker. A mechanical stoker suitable for small boilers, such as the vertical, water-tube, and locomotive types. The coal is conveyed direct from the bunker or hopper by a feed worm which forces the fuel up through the bottom of the retort in which it is burned. Volatiles driven off must pass through the ignited fuel, thus eliminating smoke. The underfeed stoker operates most successfully on graded coals with an upper size limit of 1 to 2 inches. *Nelson.*

underfire. a. In ceramics, to fire (as brick) insufficiently. *Webster 3d.* b. To fire from beneath. *Webster 3d.*

underfiring. a. Firing at a temperature lower than that required to produce a proper degree of vitrification in ceramic products. *Bureau of Mines Staff.* b. Insufficient firing of porcelain enamel to mature it properly. *ACSB-3.*

underflow. a. The oversize material leaving a classifier. *Nelson.* b. Any movement of water below a structure, underneath ice or in the soil. *See also* equal-falling particles. *Ham.* c. The rate of flow or discharge of subsurface water. *Seelye, 1.* d. Same as undercurrent. *Standard, 1964.*

underflow conduit. A permeable deposit that underlies a surface streamway, is more or less definitely limited at its bottom and sides by rocks of relatively low permeability, and contains ground water that percolates approximately downstream. *A.G.I.*

underflow, screen. That portion of the feed material which has passed through the apertures in a screen deck. *B.S. 3552, 1962.*

undergetting. Eng. *See* shorts, d. *Fay.*

underglaze. Used in the decoration of pottery, where the design is applied to the ware before it is glazed. Examples of such decoration are incise decoration, embossing, and inlaying. Colors applied under the glaze are known as underglaze colors. *Enam. Dict.*

underglaze colors. Finely ground calcined oxides for colored designs beneath the glaze on ceramic surfaces. Used for coloring or decorating pottery, tile, terra cotta, and similar glazed ceramic surfaces. *CCD 6d, 1961.*

undergrinding. Insufficient reduction of particle size to produce effective liberation of value. *Pryor, 4.*

underground. a. Situated, done, or operating beneath the surface of the ground; therefore, tunneled. *Standard, 1964.* b. The place or space beneath the surface of the ground; a subterranean space or channel. *Webster 3d.* c. Ground or soil lying beneath the surface or beneath something else. *Webster 3d.*

underground bunker. A large capacity hopper, of 250 tons or more, to absorb peak deliveries and provide an even rate of feed to main transport systems, or winding shaft. *See also* bunker, underground. *Nelson.*

underground cable. A single or multiple conductor cable sheathed in lead or other waterproof materials, carried in a duct beneath the surface of the ground. *Crispin.*

underground connections. Mines or areas which are connected underground shall be considered as a single mine if the underground connections between previously separate mines or areas subject the men in the respective mines or areas to a reasonable likelihood of danger from mine fires or the products of fires, explosions or the forces and products of explosions, mine inundations, or mantrip or man-hoist accidents. Underground connections shall be taken into consideration when issuing withdrawal orders. *BuMines Coal-Mine Inspectors' Manual, June 1966, pt. 3-9c, p. 11.*

underground dam. Seal against water or spread of fire. *Pryor, 3, p. 122.*

underground drilling. Drilling from underground workings. *Long.*

underground exploration. a. The driving of advance exploring headings and up-and-down boring to establish the continuity and thickness of coal seams or other mineral deposits. *See also* exploratory drilling. *Nelson.* b. Extensions of a known ore deposit may be probed along its strike or dip in which shafts, drifts, or crosscuts may be driven. A study of the habits of known ore shoots is a desirable preliminary to underground exploration. *Nelson.*

underground fires. There are two types of underground fires; (1) those which involve exposed surfaces and are known as open, freely burning fires; and (2) those which may be wholly or partly concealed, and are invariably caused by spontaneous heating of the coal itself, known as gob fires. *Mason, V. 1, p. 283.*

underground foreman. *See* shift boss, d; pit boss, b. *D.O.T. 1.*

underground garage. See charging station; locomotive garage. *Nelson.*

underground gasification. A method of burning the coal in place to produce a combustible gas which can be burned to generate power or processed into chemicals and fuels. Air and/or steam is blown underground to support the controlled combustion in the coal seam. The resultant gaseous mixture is a low-heating-value fuel gas. Although still in the experimental stage by the U.S. Bureau of Mines, this method, if economically feasible, would permit the exploitation of poor-quality coal, and of coal seams which are too thin to mine commercially. It would also permit exploitation of coal in mines too dangerous for miners and for recovery of coal remaining in mined-out areas. *Kentucky, pp. 44-45; R.I. 5830, 1961, p. 2. See also* blind borehole process. *Nelson.*

underground geology. Usually implies direct evidence derived from shafts, wells, and borings, or obtained by geophysical methods. Also called subsurface geology. *Challinor.*

underground glory-hole method. A method used in large deposits with a very strong roof. In this method, the deposit is divided by levels and on every level chutes are raised to the next one. Mining starts from the mouth of the chutes in such a way as to develop a funnel-shaped excavation (mill, glory) with slopes so steep that the broken ore falls into the chutes and thus to the cars on the lower level. A sufficiently strong pillar is left for protection at the higher level. This method is also known as underground milling. *Stoces, v. 1, pp. 392-393.*

underground haulage. The transportation of coal or mineral from the working face to the shaft bottom. Haulage usually implies trams, tubs, or mine cars drawn by horses, locomotives or ropes, and electric or compressed-air haulage engines. Conveyors are not generally regarded as a haulage method. *See also* gravity haulage; haulage; locomotive haulage; main transport; subsidiary transport. *Nelson.*

underground milling. *See* underhand stoping. *Fay. See also* underground glory-hole method. *Stoces, v. 1, p. 393.*

underground mine conveyors. Sectional conveyors, usually of the troughed belt type, capable of being lengthened or shortened as mining operations advance or retreat, all as contrasted to above-ground conveyors having fixed lengths for reasonable permanent installations. According to location in the mine or usage, they may be known as face, room, gathering, main haulage, or intermediate haulage conveyors. *See also* belt conveyor; drag chain conveyor; flight conveyor. *ASA MH4.1-1958.*

underground openings. Natural or man-made excavation under the surface of the earth. *BuMines Bull. 587, 1960, p. 2.*

underground ore bin. *See* measuring chute. *Nelson.*

underground shaft. A shaft sunk from an adit, tunnel, or working level, through which mining operations are conducted. The upper end terminates underground. A winze or raise becomes an underground shaft when equipped and used for hoisting and the conduct of other mining operations. *Fay.*

underground station. a. An enlargement of an entry, drift, or level at a shaft at which cages stop to receive and discharge cars, men, and material. *Fay.* b. A pump station. *Fay.* c. An underground station is any location where stationary electric equipment is installed for the utilization of electricity. This includes pump rooms, compressor rooms, hoist rooms, battery-charging rooms, etc. *ASA M2.1-1963.* d. Excavation housing special equipment. *Pryor, 3.*

underground surveying. Distinctive features of underground surveying are that stations are usually in the roof instead of the floor; the object to be sighted and the crosshairs of the telescope must be illuminated; distances are usually measured on the slope; either the transit tripod has adjustable legs or a trivet is used; and often an auxiliary telescope is attached to the transit, either at one end of the horizontal axis or above the main telescope, with the line of sight of the auxiliary telescope parallel to that of the main telescope. Horizontal and vertical distances are computed from slope distances and vertical angles. The transit is set up at one station, being centered by plumbing, and the vertical distance from station to horizontal axis of transit is measured. A plumb bob is hung at the next station, with a point on the plumbline marked by some form of clamping target. The vertical angle to the point so marked is measured, and the distance from horizontal axis to target is taped. *Urquhart, Sec. 1, p. 106.*

underground transformer. A flameproof air-filled transformer of a size up to 300 kilovolt amperes, which can be used in inby near the face in safety-lamp mines. A nitrogen-filled transformer for mining use is the latest trend. *Nelson.*

underground transportation. The transporting of ore, rock, men, materials, and supplies through shafts and haulageways, including the loading of ore or rock into cars and carrying it to the surface. *BuMines Bull. 419, 1939, p. 3.*

underground water. This water may be divided into three classes: (1) meteoric water; (2) magmatic or juvenile water; and (3) connate water. *Lewis, p. 630. See also* ground water. *Fay.*

underground workshop. An underground room prepared at an accessible spot in an underground mine in which repairs can be made on the mining equipment used underground. *Bureau of Mines Staff.*

underhand quarrying of panel cores, Mitchell system. *See* underhand stoping, b. *Fay.*

underhand stope. A stope made by working downward from a level. *Bureau of Mines Staff.*

underhand stoping. a. Mining ore from an upper level to a lower, underhand. *Ballard.* b. Mining downward. The stope may start below the floor of a level and be extended by successive horizontal slices, either worked sequentially or simultaneously in a series of steps. The modifications consist in the working of the block by a series of slices parallel with the dip, each slice being worked from the top down and the slices being taken in sequence. The stope may be left as an open stope or supported by stulls or pillars. Filling can be used after the stope has been finished or may follow the stope as a backfill. Sometimes called horizontal-cut underhand; underhand quarrying of panel cores. (Mitchell system); underground milling; open-stope method. *Fay.* c. The bench is broken by drilling holes downward, and the ore is broken out at the end of a block. Excavation proceeds from the top towards the bottom of a block. *Compare* overhand stoping. *Nelson.* d. This method is particularly suitable for narrow highly-inclined deposits. The ore is broken down in descending steps or benches, thereby making two free faces available for blasting. Vertical holes are usually employed in underhand stoping, although horizontal holes at the bottom of the bench are occasionally used. The burdens on the holes may vary from 1 to 3 inches to 3 feet, and the spacing between holes from 4 to 8 feet, depending on the nature of the ground to be broken. As a rough rule, the burden may be taken as one-fourth to one-third the depth of the hole. When the rock does not break away at right angles to the shothole, and the angle of break approaches 120° to 125°, then it is common practice to use a sloping bench with only a small drilling face. Such benches are spaced 6 to 8 feet apart and only a single row of holes is used, the number of holes depending on the width of the stope, the hardness of the ore, and the relative strengths of the ore and the hanging walls and footwalls. *McAdam II, pp. 136-137.*

underhand work. Picking or drilling downward. *Fay.*

underhole. a. To cut away or mine out the lower portion of a coal seam or a part of the underclay so as to win or get the overlying coal. *Craigie, v. 4, p. 2,389.* b. To mine out a portion of the bottom of a seam, by pick or powder, thus leaving the top unsupported and ready to be blown down by shots, broken down by wedges, or mined with a pick or bar. In England, the terms jad, hole, undercut, kirve, and bench are synonymous. *Fay.* Also called undermine. *See also* undercut, b.

underlay; underlie. a. Corn. The departure of a vein or stratum from the vertical, usually measured in horizontal feet per fathom of inclined depth. Thus a dip of 60° is an underlay of 3 feet per fathom. The underlay expressed in feet per fathom is six times the natural cosine of the angle of the dip. The complement of dip; hade. *Fay.* b. The downward extension of a vein or bed beneath the ground. Mineral bodies lying under a given tract, though not outcropping on surface. *Weed, 1922.*

underlay shaft. a. A shaft sunk in the footwall and following the dip of a vein. Also called underlier. *Fay.* b. One which slopes at the dip angle of lode, but is carried below the ore. *Pryor, 3.* Also called a footwall shaft.

underlevel. A development level or drift, driven from the surface, in ironstone mining. *Nelson.*

underlevel drift. Eng. A drift from a pumping pit, to free-dip workings from water. *Fay.*

underlevel work. Clev. Mining ironstone by driving drifts into the hillside, instead of sinking shafts. *Fay.*

underlie. a. A term used to express the angle at which stulls or posts are set between walls. The setting angle is slightly steeper than the perpendicular to the vein, and the post thus tightens with the downward settlement of the hanging wall. Underlay. *Nelson.* b. In geology, to occupy a lower position than, or to pass beneath; said of stratified rocks over which other rocks are spread out. *Fay.* c. Corn. *See* underlay, a and b. *Fay.*

underlier. a. The strata or rock occupying a position directly below a specific rock formation. *Bureau of Mines Staff.* b. Eng. *See* underlay shaft, a. *Fay.*

underloading. a. A term used to explain enamel contamination caused by running a mill with a too small charge of pebbles, or sufficient pebbles but too little enamel, or both. This faulty practice may result in the pebbles pounding against the sides of the mill, allowing small chips of the pebbles and mill lining to contaminate the enamel. *Enam. Dict.* b. Insufficient charging of ball mill for proper grinding of enamel slip. *ACSB-3.*

underlooker. a. Undermanager; overman. *Mason.* b. Lanc. One who has the care and superintendence of the miners and of the workings, who receives his orders from the manager, and to whom the overmen and deputies report; a mine superintendent. *Fay.*

underlying. Lying under or beneath; fundamental. *Webster 3d.*

underlying beds. The rocks situated under a deposit or other strata. *Stoces, v. 1, p. 63.*

undermanager. a. In Great Britain, the underground mining engineer and senior executive official, and everything that has to do with the underground must be subject to his control, especially as regards safety and health of personnel. In some coalfields he is also known as the underlooker, but this term is becoming obsolete. *Mason, v. 2, pp. 670-672.* b. N. of Eng. A senior official responsible for the working of a seam or number of seams. Each separate ventilation system is required by law to have at least one undermanager. *Trist.*

undermine. To excavate the earth beneath, especially for the purpose of causing to fall; form a mine under. *Webster 3d.* See also undercut, b; underhole, b. *Fay.*

underofficial; lower official. In general, the term refers to all colliery officials subordinate to the undermanager. *See also* superior official. *Nelson.*

underpinning. a. Building up the wall of a mine shaft to join that above it. *Fay.* b. The act of supporting a superior part of a wall, etc., by introducing a support beneath it. *Fay.* c. A solid structure, as a new foundation or other support. *Fay.* d. The operation of deepening a foundation or of rebuilding or providing new permanent support under an existing wall or column without disturbing or damaging the superstructure. *See also* pretesting. *Ham.*

underplight. Rocks and beds forming the folds and sides of hollows, which though crumpled, are still united to the parent rock—the result of movement of ice or thawing soil over the land. *Arkell.*

underply. Scot. A band or division of the lower portion of a thick seam of coal. *See also* mining ply. *Fay.*

underpoled. A term used in copper refining to designate copper not poled enough to remove all suboxide, and which has solidified with a concave surface. *See also* overpoled; tough pitch, a. *Fay.*

underpoled copper. To reduce to metal the cuprous oxide from blister copper produced in a converter, green poles are pushed into the molten material to bring the percentage of Cu_2O below 0.5. If this reaction (which results in flat-topped ingots having a smooth fracture) is incomplete, the ingot fractures too readily and has a darker color. This shows it to have been insufficiently reduced or underpoled. *Pryor, 3.*

underream. To enlarge or ream a borehole below the casing. *Long.*

underreamer. A tool or device having cutters that can be expanded or contracted by mechanical or hydraulic means and used to enlarge or ream a borehole below the casing or drivepipe. Also called expansion bit; expansion reamer. *Long.*

underreamer bit. The assembled device consisting of the lugs or jaws attached to an expanding mechanism used to enlarge or ream a borehole below a string of casing. *See also* underreamer. *Long.*

underreamer cutter. See underreamer lug. *Long.*

undereamer lug. A diamond set or other type of expansible or contractable jaw on an underreamer bit. Also called underreamer cutter. *Long.*

underreaming. a. The widening out of the foot of a bored hole or of certain types of foundation piers in order to increase the load bearing area. *Ham.* b. *See* underream. *Long.*

underreaming bit. An expanding bit used to enlarge the diameter of the hole below the casing to allow the casing to be lowered further down the borehole. *B.S. 3618, 1963, sec. 3.*

underridge tile. A roofing tile for use at the top of a tiled roof. Such tiles are shorter than standard roofing tiles and are used to complete the roof along the ridge beneath the ridge tiles. *See also* ridge tile. *Dodd.*

underrope haulage. An endless rope haulage in which the ropes run under the cars. The cars are attached singly or in short sets by clips. *See also* overrope haulage. *Nelson.*

undersaturated. In petrology, applied to igneous rocks consisting wholly or partly of unsaturated minerals. The class of rocks is subdivided into nonfeldspathoidal and feldspathoidal divisions. *See also* unsaturated, a. *A.G.I.*

undersaturated rocks. Rocks containing unsaturated minerals. *A.G.I.*

underscreen water; backwater. Water which is fed into the cells of a washbox below the level of the screen plate. *B.S. 3552, 1962.*

undesea mining. The working of economic deposits (usually coal) situated in strata or rocks below the seabed. *Nelson.*

underseams. Scot. Lower or deeper coal seams. *Fay.*

undersea prospecting. The driving of exploring headings seaward from landside mine workings combined with up-and-down boring to establish higher or lower seams. A new technique developed by the National Coal Board, Great Britain, is exploring drilling from a tower which can be floated out to sea and grounded on the seabed. *See also* N.C.B. boring tower. *Nelson.*

undersea satellites. A string of basketball-size devices strung between Hawaii and California to explore uncharted Pacific area. Each satellite contains a gage to measure tides, a seismometer, and a transmitter. *Hy.*

undersea workings. *See* submarine mines. *Zern.*

undershot wheel. a. A vertical waterwheel into the circumference of which are set blades that are pushed by water passing underneath. *Webster 3d.* b. A waterwheel used for low heads, in which the power is obtained almost entirely from the impulse of the water on the vanes. *C.T.D.*

underside. The discharge end of a cylinder of a hydraulic-feed device in the swivel head of a diamond drill. *Long.*

undersize. a. That part of a crushed material which passes through a screen. *Fay.* b. Particles in a screen overflow which are smaller than the normal dimensions of the screen apertures. *B.S. 3552, 1962.* c. Material in a product of size smaller than the reference size; may be expressed as a percentage of the product. *B.S. 3552, 1962.* d. The smaller of two classified products. In the case of ore pulp or fine coal, the undersize is the overflow and the oversize the underflow. *See also* classifier, b. *Nelson.* e. A drill hole that is not to size because of gage loss on the bit and/or the reaming shell with which it was drilled. *Long.* f. A bit or reaming shell the diametric dimensions of which are less than specified as standard. *Long.*

undersize control screen. A screen used for the removal of undersize from a product. *B.S. 3552, 1962.*

undersize core. Core the outside diameter of which is less than standard. *Long.*

understressing. In fatigue testing, cycling at a stress level lower than that used at the end of the test. *ASM Gloss.*

undertaker. Commonly used throughout Alaska and the Yukon for a man who buries deadmen to hold dredge lines. *Hess.*

under the top. Eng. A road in which a layer of coal is left standing to form the roof is said to be "under the top". *Fay.*

underthrust. A low-angle reverse fault resulting from the sliding of the footwall beneath a relatively passive hanging wall. *Compare* overthrust. *Nelson.*

undertow. The current below water surface that sets seaward when waves are breaking upon the shore. *Schieferdecker.*

undertow mark. *See* groove cast. *Pettijohn.*

undertub system. The endless-rope system generally used on moderate and constant gradients where the floor is good. In this system the rope runs underneath the tubs or cars in the center of the rails. Curves are negotiated by a series of small vertical pulleys between the rails and are best of large radius. Clips are generally preferred to lashing chains and the system suits automatic clipping and unclipping. *Compare* overtub system. *Sinclair, V, p. 332.*

underviewer; underlooker. Eng. In coal mining, an underground foreman; in metal mining, a mining captain. *Fay.*

undervoltage relays. Like undercurrent relays, undervoltage relays indicate when voltage is not up to the level it should be. Undervoltage values result in the breaker tripping and staying out until the undesirable condition is corrected. *Coal Age, v. 71, No. 8, August 1966, p. 270.*

underwater breathing apparatus. A self-contained breathing unit for use in shallow underwater inspection, salvage or maintenance. The equipment consists essentially of a full face mask connected to a cylinder of compressed air or oxygen with a demand regulator. Suitable for about 30 minutes, and for longer periods may include an oxygen rebreathing chamber to remove carbon dioxide from exhaled breath. Bureau of Mines does not have an approval schedule for underwater equipment. *Bests, p. 670.*

underwater telephone system. A durable sonar system—consisting of a transducer, a receiver-transmitter unit, and a control box—enabling surface ships or submarines to communicate with one another via sound waves. *Hy.*

underwater television and inspection system. Remotely controlled television cameras, etc., operated via power cable from a surface ship. *Hy.*

underweight. a. The weight of that portion of the strata overlying a coal seam at the face which is supported by the timber or steel props. *See also* nether roof; overarching weight; traveling weight. *Nelson.* b. Aust. The weight of the roof which advances along the face of the coal, following the process of undercutting, in longwall work, and breaks down the portion that has been undercut. *Fay.* c. A diamond bit the crown of which is inset with diamonds so widely spaced that part of the crown is without cutting points and the bit cannot be made to cut. *Fay.*

underwinding. A rope or cable wound and attached so that it stretches from the bottom of a drum to the load. *Nichols, 2.*

undisturbed. Rocks that lie in the attitudes in which they were originally formed. *Compare* disturbed. *Fay.*

undisturbed sample. A sample which is as undisturbed as humanly possible, as distinct from a sample disturbed by boring tools. Special appliances are used to obtain such samples from boreholes, and the material is preserved in its natural state in airtight containers. Undisturbed samples are required so that the in place (in situ) properties of the soil may be determined. It is difficult to obtain undisturbed samples of sandy soils without considerable preparation. *See also* soil core. *Nelson.*

undisturbed soil sample. *See* undisturbed sample. *Long.*

undrained shear test. *See* quick test. *Ham.*

undulating. Rising and falling like waves; said of beds or crests of folds that are bent into alternate elevations and depressions. *Fay.*

unequal angle. A metal angle section with two legs of unequal length. *See also* equal angle. *Ham.*

uneven fracture. a. When the fracture surface is rough by reason of minute undulations, as in copper pyrites, etc. *See also* fracture. *Nelson.* b. A mineral's habit of breaking along rough, irregular surfaces. *Leet.*

unfaced quartz. A name given to defaced masses of raw quartz. *AM, 1.*

unfading green slate. *See* colored slates. *AIME, p. 793.*

unfaulted. Free from faulting. *Schieferdecker.*

unfired (unburned) brick. Brick manufactured by processes which do not require kiln firing to develop the strength of the finished product. *ACSG, 1963.*

ungaite. A general name suggested for oligoclase dacities. *Holmes, 1928.*

ungemachite. A colorless to yellowish basic hydrous sulfate of sodium, potassium, and ferric iron, $Na_4(K, Fe''')_2(OH)(SO_4)_3 \cdot 5H_2O$. Rhombohedral, Thick, tabular crystals. From Chuquicamata, Chile. A monoclinic form is called clinoungemachite. *English.*

unglazed tile. A hard, dense tile of homogeneous composition throughout, deriving color and texture from the materials of which the body is made. The colors and characteristics of the tile are determined by the materials used in the body, the method of manufacture, and the thermal treatment. *ASTM C242-60T.*

ungotten. Unworked rock of any kind. *Arkell.*

unholed. York. Bordgates or other headings not driven through into the adjoining roadway. *Fay.*

UNI Abbreviation for Unificazione Italiana; the prefix to the identification number of an Italian standard specification. *Dodd.*

uniaxial. Having but one direction in which light passing through the crystal is not doubly refracted. *Fay.* All minerals which crystallize in the tetragonal, trigonal, and hexagonal systems are uniaxial. *Compare* biaxial; isotropic. *C.T.D.*

uniaxial stone. One which has crystallized in the tetragonal or hexagonal system, and therefore has only one direction or axis of single refraction. *See also* biaxial stone. *Shipley.*

uniaxial stress. A state of stress in which two of the three principal stresses are zero. *ASM Gloss.*

uniclinal. a. Sloping in one direction; monoclinal. *Fay.* b. A deviation from normal inclination (uniclinal flexure). *Bureau of Mines Staff.*

uniclinal shifting. Streams following the strike of weak beds occasionally work laterally down the dip of the beds, a process which is termed uniclinal shifting. *A.G.I.*

unicline. The term monocline is used at present in two ways: the geologist understands by monocline a simple structural fold. This is the original and proper use of the term. The physiographer has used the term for the ridges produced by erosion of anticlines, that is, for monoclinal ridges of erosion, including hogbacks. For this type of ridge, a part of an anticline, the term unicline is proposed. This usage seems never to have been followed. *A.G.I.*

unidimensional consolidation. A test in which the volume change in a soil sample is observed when subjected to increasing increments of load. A soil sample, which may be 3 inches in diameter and 2 centimeters thick, is compressed between two porous stones and the movement under load noted. *Ham.*

unidirectional transducer. In many practical transducer designs the active surface is mounted in a structure in such fashion that radiation or reception takes place on one side only. In such cases the unit will show maximum response along a single bearing only and is said to be unidirectional. *H&G.*

unidirectional ventilation. A form of air travel; the air enters at one point, passes through the workings, and goes out at a distant point. The air utilizes what originally were returns as intakes and so cuts the resistance in the straightway ventilation one-fourth. Recirculation is made impossible where unidirectional ventilation is followed, and the mine is made safer. *Lewis, p. 729.*

uniformitarianism. The concept that the present is a key to the past. Synonym for principal of uniformity. *A.G.I.*

uniformity coefficient. An expression of variety in sizes of grains that constitute a granular material. *A.G.I.*

uniformly graded soil. A soil with a particle-size distribution extending over a limited range with one size predominating. *Nelson.*

uniform sand. A sand with particles of uniform size. *See also* graded sand. *Ham.*

uniform strain. The strain occurring prior to the beginning of localization of strain (necking); the strain to maximum load in the tension test. *ASM Gloss.*

Unifrax. A low-density nitroglycerin powder type of equivalent sheathed explosive. *McAdam II, p. 49.*

Unigex. A semi-gelatinous nitroglycerin equivalent sheathed explosive. *McAdam II, p. 49.*

unilateral rolling strata. Asymmetrical ripple or wavy bedding the steeper side of which indicates the direction of flow. *Pettijohn.*

unilateral stream. A stream with all tributaries entering from one side. *Bureau of Mines Staff.*

unilateral transducer. A transducer which cannot be actuated at its outputs by waves in such a manner as to supply related waves at its inputs. *Hy.*

unimolecular layer; monomolecular layer. Film that is 1 molecule deep, absorbed to surface of solid. *Pryor, 3.*

union. The usual trade term for a device used to connect pipes. It commonly consists of three pieces which are: (1) the thread end fitted with interior threads; (2) a small exterior shoulder; and (3) the ring which has an inside flange at one end while the other end has an inside thread like that on the exterior of the thread end. A gasket is placed between the thread and bottom ends, which are drawn together by the ring. Unions are very extensively used, because they permit connections with little disturbance of the pipe positions. *Strock, 10.*

union ell. An ell with a male or female union at one end. *Strock, 3.*

unionized. State of substance which has dissolved without dissociating into ions; solute retaining its compounded state. *Pryor, 3.*

union joint. A pipe coupling, usually threaded, which permits disconnection without disturbing other sections. *Strock, 3.*

Unions. High explosives; used in mines. *Bennett 2d, 1962.*

union shop. A shop or mine run according to the requirements of a trade union. *Compare* open shop. *Fay.*

union tee. A tee with male or female union at connection on one end of run. *Strock, 3.*

unique diameter. A line different from any other in a crystal, for examples, the *c* axis in both the tetragonal and hexagonal systems and the three axes of reference in the orthorhombic system. *American Mineralogist, v. 26, No. 10, October 1941, p. 618.*

Unirend. A TNT/ammonium nitrate type of equivalent sheathed explosive. *McAdam II, p. 50.*

uniselector. An electromechanical selector having only rotary motion. *NCB.*

unisilicate. In mineralogy, a salt of orthosilicic acid. *Standard, 1964.*

unit. a. Smelter contracts make frequent use of the work unit. A unit means 1 percent. Since a ton contains 2,000 pounds, a unit is equivalent to 20 pounds per ton of ore. The statement that manganese will be paid for at the rate of one dollar per unit, means that one dollar will be paid for each percent, or each 20 pounds of manganese in a ton of ore. *Lewis, p. 363.* b. One percent of a short ton, or 20 pounds avoirdupois. *Hoov, p. 172.* c. N.S.W. One percent or one-hundredth part of a ton of pure metal or metallic compound. Thus 1 ton of 1 percent ore contains one unit, or 1 ton of 20 percent ore, for example, contains 20 units. *New South Wales.* d. In sales of ore, concentrates, or metals, a unit is 1 percent of the specified substance. If, for example, the transaction calls for vanadium in long tons of concentrate, one unit is 22.4 pounds. *Pryor, 3.* e. Electrical energy; one kilowatt hour. It is approximately equivalent to 3,415 British thermal units, or 2.6552 multiplied by 106 foot-pounds; any quantity or dimension used as a standard. *See also* unit basis. *Nelson.* f. A determinate quantity (as of length, time, heat, value, or housing) adopted as a standard of measurement for other quantities of the same kind. *Webster 3d.*

unit basis. An important basis in connection with ore sales. In the case of tin concentrates, a unit means one-hundredth part of a ton, or 22.4 pounds of metallic tin. Thus, concentrates assaying 70 percent metallic tin would contain 70 units of tin per ton. Lead, zinc, copper, antimony, and arsenic ore-buying tariffs also use the term unit, which again means one-hundredth of a ton of the contained metallic content. In the case of wolfram or scheelite which are sold on a basis of their tungstic acid content (WO_3) a unit is one-hundredth part of a ton of contained tungstic acid. Molybdenite is sold on a basis of the molybdenum sulfide (MoS_2) content. Beryl is sold on the basis of the beryllium oxide (BeO) content, thus a unit would be one-hundredth part of a ton of BeO contained in the ore. The basis is related to the current price of the metals as determined by prices fixed by fixing authorities, government purchasing agencies, or quotations on the international metal markets, which vary from time to time. *Nelson.*

unit bed-material discharge. Discharge of bed material (material coarser than 0.062 millimeter) per unit width of a stream. *USGS Prof. Paper 462-F.*

unit cell. a. The arrangement of points in a crystal which forms a single geometrical figure, with all its points referable to the axes by which these are conventionally defined. The orderly repetition of the unit cell becomes, if sufficiently large, the visible crystal, while the unit cell itself is the smallest group of points (as atoms, ions or molecules in their correct spatial ratios) possible. *Pryor, 3.* b. Of flotation, a single appliance. *Pryor, 4.*

unit coal. a. Applied to prepared coal as for analysis, and being the pure coal substance considered altogether apart from extraneous or adventitious material (moisture and mineral impurities) which may by accident or through natural causes have become associated with the combustible organic substance of the coal. *A.G.I.* b. The pure or actual coal substance as derived from taking into consideration the corrected ash. The differentiation between the noncoal substance of a sample being analyzed and the coal itself. It is expressed by the formula: Unit coal $= 1.00-(W+1.08\ A+0.55\ S)$ where W=Water, A=Ash, and S=Sulfur. *A.G.I.*

unit die. In die casting, a die block that contains several cavity inserts for making different kinds of castings. *ASM Gloss.*

united veins. Where two or more veins unite, the oldest or prior location takes the vein below the point of union, including all the space of intersection. *Ricketts, p. 127.*

unit heater. A forced convection heating device of two types: (1) an assembly of encased heating surface with fan and motor (or turbine) and for connection to a source of steam or hot water; (2) an assembly of the above plus a fuel burner so that the device is for connection to a source of oil or gas (or supplied with coal) and not to steam lines or waterlines. *Strock, 10.*

uniting pressure. The pressure at which the individual particles of a metal powder will unite together to form a solid mass of metal. The following are the uniting pressures of a number of common metal powders: lead, 13 tons per square inch; tin, 19 tons per square inch; copper, 33 tons per square inch; antimony, 38 tons per square inch; zinc, 38 tons per square inch; aluminum, 38 tons per square inch; and bismuth, 38 tons per square inch. *Camm.*

unitized train. Trains made up entirely of coal cars that carry coal directly from the loading place to the point of delivery. *Encyclopaedia Britannica. Britannica Book of the Year, 1964, p. 569.*

unit of coal. The quantity of coal from which the sample is taken and which it is intended to represent. Most commonly the unit will be a consignment, but it might be part of a consignment or in certain cases a single wagon load of coal. It also might be a shift's output or a standard quantity of, say, 100 tons. *Nelson.*

unit of force. The unit of force usually adopted in mechanics is the weight of 1 pound, which is the force which just supports a weight of 1 pound freely suspended. A force of 5 pounds weight is equivalent to the force with which gravity acts on a mass of 5 pounds at sea level. *Morris and Cooper, pp. 141-142.*

unit of moment. The pound-foot, a unit in which the force is 1 pound and the perpendicular distance of its line of action from the fulcrum, 1 foot. *Morris and Cooper, p. 150.*

unit of power. The unit of power is horsepower, and 1 horsepower is the rate of working of 33,000 foot-pounds per minute.

1 horsepower=33,000 foot-pounds per minute
1 horsepower=550 foot-pounds per second
1 horsepower=746 watts

Morris and Cooper, p. 144.

unit of work. The unit of work usually adopted in engineering is the foot-pound. One foot-pound is the work done when a resistance of 1 pound is overcome through a distance of 1 foot, measured in the direction in which the force acts. *Morris and Cooper, p. 143.*

unit operation. Recognition, study, application, and control of the principles and factors utilized in a distinct and self-contained process (for example, filtration). This avoids the duplication of effort which attends study of filtration of oil, sugar, ore pulp, etc., as though each involved a unique set of principles. *Pryor, 3.*

unit pole. Magnetic repulsive force of 1 dyne acting at distance of 1 centimeter from a like pole. *Pryor, 3.*

unit power. The net amount of power required to remove a unit volume of metal in unit time, usually expressed as horsepower per cubic inch per minute. *ASM Gloss.*

unit pressures. The total pressure divided by the number of area units on which the load is imposed, such as the diamonds in a diamond-bit crown, usually expressed as pounds per square inch, tons per square foot, pounds per diamond, etc. *Long.*

unit process. Distinct and roughly self-contained section of series of operations, which can be studied by itself. In mineral processing, unit processes include such sections as crushing, grinding, classification, gravity treatment, pulp conditioning, flotation, thickening, leaching, filtration. *Pryor, 3.*

unit strain. Unit tensile strain is the elongation per unit length; unit compressive strain is the shortening per unit length; unit shear strain is the change in angle (radians) between two lines originally at right angles to each other. *Ro.*

unit stress. The stress or load per unit of area, usually taken per square inch of section. For instance, if a bar is 1 by 2 inches in section, the unit stress of the bar will be 1,000 divided by 2 (sectional area) equal 500 pounds. *Zern, p. 73.*

unit train. A system developed by the Baltimore & Ohio Railroad for delivering coal more efficiently in which a string of cars, with distinctive markings, and loaded to "full visible capacity," is operated without service frills or stops along the way for cars to be cut in and out. In this way, the customer receives his coal quickly and the empty car is scheduled back to the coalfields as fast as it came. *Bureau of Mines Staff.*

unit ventilation. A system of ventilation in which each working face is ventilated by a separate air current. *B.S. 3618, 1963, sec. 2.*

unit ventilator. A unit heater of type (1) but connected to a source of ventilation air and frequently provided with an air filter. *Strock, 10.*

unit water discharge. Water discharge for unit width of a stream. *USGS Prof. Paper 462-F.*

unit weight. a. Weight per unit of volume. *Bureau of Mines Staff. See also* dry unit weight; effective unit weight; maximum unit weight; saturated unit weight; submerged unit weight; unit weight of water; wet unit weight; zero air voids unit weight. *ASCE P1826.* b. The density of a material. *Ham.*

unit weight of water. The weight per unit volume of water; normally equal to 62.4 pounds per cubic foot or 1 gram per cubic centimeter. *ASCE P1826.*

univalent; monovalent. a. Having a valence of 1. *Webster 3d.* b. Having one valence; for example, calcium which has only a valence of 2. *Webster 2d.*

univariant equilibrium. Said of a system in which the variance (degrees of freedom) is one. *A.G.I.*

universal arc-shearing machine. A machine with a rotating jib head so that vertical or shearing cuts can be made in addition to the arcwall cut. An arcwall machine will cut a 12-foot heading to a depth of 6 feet in 10 minutes. Time is required for flitting, so that under good conditions up to twelve places can be cut in one shift. *Mason, V. 1, p. 106.*

universal clamp. A clamping device used on a drill column by means of which a horizontal arm can be affixed at any point on the vertical section of a drill column. *Long.*

universal coal cutter. A coal cutter with a jib capable of cutting at any height or angle. It may be mounted on crawler tracks. *See also* turret coal cutter. *Nelson.*

universal coupling. One which joins two driving shafts which rotate about differently slanted axes. *Pryor, 3.*

universal gas mask. Designed as an all purpose mask for protection against a great variety of toxic gases, vapors, and smokes, including carbon monoxide. It is equipped with an indicator which shows at a glance the remaining service time of the canister for CO. This mask is particularly effective for mines, fire fighting, and general industrial uses where the contaminants are of relatively low content. The U.S. Bureau of Mines also approves certain types of universal gas masks for only limited respiratory protection against dusts, fumes, mists, and smokes. *Bests, pp. 107, 108.*

universal grinding machine. A machine on which cylindrical, internal, or face grinding can be done as required in tool rooms and machine shops. *ACSG, 1963.*

universal joint. a. A connection between two shafts that allows them to turn or swivel at an angle. *Nichols.* b. Articulated joints permitting the transmission of rotary motion from the driving shaft placed at an angle to the driven shaft. *Compare* knuckle joint. *Long.*

universal-joint couplings. These couplings are used where shafts intersect at any angle or where pivoted members must be driven. If there is an offset in the two shafts, or if one or both shafts must change location during operation, two of these couplings are used, and one is fitted with a splined joint mating with the connecting intermediate shaft to allow axial movement. *Pit and Quarry, 53rd, Sec. D, p. 68.*

universal lay rope. *See* lang lay rope. *Sinclair, V, p. 7.*

universal machine. A power-driven coal cutter that will not only cut horizontal kerfs, but will also cut vertical kerfs at any angle, and is designed for operation either on track, caterpillar treads, or rubber tires. *ASA C42.85:1956.* Same as universal coal cutter.

universal mill. A rolling mill in which rolls with a vertical axis roll the edges of the metal stock between some of the passes through the horizontal rolls. *ASM Gloss.*

universal motor. An electric motor rated at less than 1 horsepower output which operates either on direct or alternating current. *See also* fractional horsepower motor. *Ham.*

universal pH indicator. Mixture of several indicator dyes, each of which changes color through a specific pH range, so that by suitably combining a wide color change and pH, reading can be obtained. *Pryor, 3.*

universal plant indicators. Indicator plants that are restricted exclusively to rocks or soils of a definite mineral content and not found under any other conditions. *Compare* local plant indicators. These plants have been used as indicators in prospecting and include the following:

Element	*Family*	*Genus & Species*	*Common Name*	*Locality*
copper	pink	Gypsophila patrini	kachim	U.S.S.R.
	mint	Acrocephalus roberti	— —	Katanga
	mint	Ocimum homblei	basil	Rhodesia
	moss	Merceya latifolia	copper moss	Sweden & Montana
selenium	legume	Astragalus bisulcatus	poison vetch	Western U.S.
	legume	Astragalus racemosus	poison vetch	Western U.S.
	legume	Astragalus pectinatus	poison vetch	Western U.S.
	sunflower	Oonopsis spp.	goldenweed	Western U.S.
	sunflower	Aster venustus	woody aster	Western U.S.
	mustard	Stanleya spp.	princesplume	Western U.S.
selenium & uranium	legume	Astragalus pattersoni	poison vetch	Western U.S.
zinc	violet	Viola calamineria (lutea)	zinc violet	Belgium & Germany

universal seismograph. An instrument registering all three components simultaneously. *Schieferdecker.*

universal stage. Microscope stage that can be rotated through both horizontal and vertical planes. The ordinary universal stage has four axes of rotation in addition to that of the common petrographic microscope. *A.G.I. Supp.*

universal testing machine. An instrument so designed that it is capable of exerting a tensile, compressive, or transverse stress on the specimen under test. Further, it can be adapted for the determination of Brinell hardness, ductility, cold bend, and other properties. The machine consists essentially of three systems: loading, weighing, and indicating, the loading being applied either mechanically or hydraulically. *Osborne.*

universal train. A roll train having adjustable horizontal and vertical rolls, so as to produce sections of various sizes. *Fay.*

unkeying. In attacking a rock face, the first effort of the miner is directed toward making a cut that will permit the succeeding shots to exert the greatest force with the minimum charge of explosive. In doing this unkeying, he takes advantage of any persistent seam in the rock face. *Stauffer.*

unkindly lode. Aust. A lode or vein that does not look promising. *Fay.*

unknown stone. In gemmology, any stone, the genuineness, classification, and species of which has not yet been determined by means of a gemmological test, by the person who is asked to identify it. *Shipley.*

unlimited pump. A deep-well pump operated from the level of the ground above. *Standard, 1964.*

unloader. a. A machine that unloads iron ore from boats and cars, by power, generally electric. *Mersereau, 4th, p. 383.* b. *See* tippler, a. *Nelson.*

unloader, car. *See* car unloader. *ASA MH4.1-1958.*

unloading conveyor. Any of several types of portable conveyors adapated for unloading bulk materials, packages, or objects from conveyances. *ASA MH4.1-1958.*

unloading trough. A short section of trough, designed for insertion in a standard shaker trough, which will allow the coal to be unloaded at that point by being diverted to either side by the unloading trough. C-clamps are used to hold the unloading section in place. *nes.*

unlocking. *See* liberation. *Pry , 4.*

unmanufactured mica. The commercial forms of mica (blocks, films, splittings, and scrap) before fabrication. *Skow.*

unoccupied and unappropriated land. Refers to land that is not in the possession of one who claims the right of possession thereto by virtue of a compliance with the law. *Ricketts, I.*

unoriented. a. A rock specimen whose original orientation in space, when collected, is unknown. *Stokes and Varnes, 1955.* b. Rock fabric that shows no ordered spatial arrangement. *See also* preferred orientation. *Stokes and Varnes, 1955.* c. A map or instrument whose internal coordinates are not coincident with corresponding directions in space. *Stokes and Varnes, 1955.*

unpaired terrace. A terrace formed when an eroding stream, swinging back and forth across a valley, encounters resistant rock beneath the unconsolidated alluvium and is deflected, leaving behind a single terrace with no corresponding terrace on the other side of the stream. *Leet.*

unpatented claims. a. Mining claims to which a deed from the United States Government has not been received. The claims are subject to annual assessment work, in order to maintain ownership. *Weed, 1922.* b. Those which require a hundred dollars of work to be done each year. Claims cannot be patented until five hundred dollars has been spent on them. *von Bernewitz.* c. A mining claim for which the holder has no patent. Under the Multiple Surface Use Act of 1955, discoveries of common varieties of sand, stone, gravel, pumice, cinders, and clay cannot be located as mining claims; however, it does not affect the validity of a discovery in these materials based on the presence of other valuable minerals. *Lewis, p. 28.*

unpreventable accident. An accident due to such things as mechanical failures, rock bursts, fires, etc. They are usually few in number but severe in results. *Spalding, p. 362.*

unproductive development. The drifts, tunnels, and crosscuts driven in stone, preparatory to opening out production faces in a coal seam or ore body. Horizon mining is characterized by a heavy outlay on the initial unproductive development. *See also* in-the-seam mining; productive development. *Nelson.*

unproven area. An area in which it has not been established by drilling operations whether oil and/or gas may be found in commercial quantities. *Williams.*

unreserved minerals. Those minerals which belong to the owner of the land on which or in which they are located. The owner of the land is their exclusive owner and can deal with them freely. To this group often belong the following minerals: limestone, dolomite, barite, fluorite, fireclay, plastic clay, glass sand, marble, and gypsum. *Compare* reserved minerals. *Stoces, v. 1, p. 654.*

unrestrained compression apparatus. *See* unconfined compression appliance. *Nelson.*

unripe amber. Gedanite. *Shipley.*

unripe diamond. Rock crystal or colorless zircon. *Shipley.*

unripe peat. Moor peat in the beginning stage of peat formation. Individual plant organs which compose unripe peat are clearly visible. *Stutzer and Noe, 1940, p. 91.*

unripe ruby. Red zircon. *Shipley.*

unsafe act. An act which is not in accordance with accepted or correct practice; an act which contravenes the Support Rules of the mine; any performance which exposes the individual to an unnecessary hazard. *Nelson.*

unsafe condition. Any environment or physical condition which may lead to an accident. *Nelson.*

unsaponifiable matter. Residue extracted from the alkaline solution after complete saponification of a fat, oil, or wax. *Shell Oil Co.*

unsaturated. a. Applied to minerals that are incapable of crystallizing from rock magmas in the presence of an excess of silica. Such minerals are said to be unsaturated with regard to silica and include the feldspathoids, analcime, magnesian olivine, melanite, pyrope, perovskite corundum, calcite, and perhaps spinel. *See also* undersaturated. *A.G.I.* b. Applied to air that contains less water vapor than the maximum or saturation content for the conditions pertaining. *Spalding, p. 240.*

unsaturated minerals. Those minerals that appear to be incapable of forming from rock magma in the presence of free or excess silica; examples are leucite and olivine. *A.G.I.*

unscreened coal. a. Coal for which no size limits are specified. *B.S. 3323, 1960.* b. Aust. Run-of-mine coal. *Fay.*

unsealing. The recovery of a sealed-off mine area that had been sealed in order to extinguish a fire. Two general systems that may be employed are (1) recovering the fire area in successive blocks by means of air locks, and (2) reventilation of the fire area after there is conclusive evidence that the fire has been extinguished. *Kentucky, pp. 278-279. See also* sealed area, reopening.

unslaked lime. Any form of quicklime. *Boynton.*

unsoiling. The act or process of removing soil, as in opening a quarry. *Standard, 1964.*

unsorted. Applied to clastic deposits made up of fragments of all sizes mixed together in an unsystematic or chaotic manner. *Stokes and Varnes, 1955.*

unsoundness. a. A quarry term that refers to all cracks or lines of weakness other than bedding planes that may cause rock to break before or during the process of manufacture. Various types of unsoundness are known locally as "joints," "headers," "cutters," "hairlines," "slicks," "seams," "slick seams," "dry seams," "dries," and "cracks." *Fay.* b. The condition of a solid metal which contain blowholes or pinholes due to gases, or cavities resulting from the liquid-to-solid contraction (that is, contraction cavities). *C.T.D.* c. As applied to portland cement, refers to slow expansion after the cement has set. The principal causes of this fault are the presence of free CaO, excess MgO, or excess sulfates. *Dodd.*

unstable. a. Readily decomposed; liable to spontaneous combustion or oxidation. *Pryor, 3.* b. The description applied to a structure liable to fail as a whole, usually by overturning or sliding. It also refers to a framework having fewer members than are required to make it a perfect frame. *Ham.*

unstable equilibrium. A body is said to be in unstable equilibrium if on being slightly disturbed, it tends to move farther and farther away from its original position of equilibrium. *Morris and Cooper, p. 167.*

unstable isotope. *See* radioisotope. *L&L.*

unstable protobitumens. These protobitumens originate from certain plant and animal fats and oils and, in contrast to stable protobitumens, show changes in their properties at an early stage of coalification. *IHCP, 1963, part I.*

unstable relics. A relict mineral that persists due to the sluggishness of a phase change, as opposed to stable relics. *A.G.I.*

unstable relict. *See* unstable relics.

unstable-type gravimeter. A gravity meter which utilized a moving system which approaches a point of instability such that small changes in gravity produce relatively large motions of the system. *See also* gravimeter. *A.G.I.*

unsteady flow. *See* steady flow, b. *Roberts, I, p. 2.*

unstratified. Not formed or deposited in beds or strata. *Fay.*

untrimmed sheet mica. The random thickness sheets obtained by rifting handcobbed mica. *Skow.*

unwatering. Pumping or draining the water from mines. *Compare* dewatering. *Hess.*

unwrought; unworked. Eng. Coal or other mineral which has not been mined or worked away. *Fay.*

up. a. Eng. A stall or heading is said to be up when it is driven or worked up to a certain line (a fault, hollows, boundary, etc.), beyond which nothing further is to be worked. *Fay.* b. Eng. On the bank or on the surface. *Fay.*

up-brown. Lanc. An inclined plane worked to the rise. *Fay.*

upcast. a. The opening through which the return air ascends and is removed from the mine. The opposite of downcast or intake. *Fay.* b. An upward current of air passing through a shaft, or the like. *Fay.* c. To cast up. *Webster 3d.* d. Turned or directed upward. *Webster 3d.* e. Material that has been thrown up as by digging. *Webster 3d.* f. Same as upthrow; opposite of downthrow, downcast; as, the upcast side of a fault. *Standard, 1964.* g. The lifting of a seam or bed by a dyke. Also called uptake. *C.T.D.*

upcast pit. Newc. The shaft up which the air ascends when ventilating the mine. *See also* upcast, a. *Fay.*

upcast shaft. a. A shaft through which air leaves the mine. *B.S. 3618, 1963, sec. 2.* b. The shaft up which the ventilating current of air returns to the fan. The term corresponds to main return or return drift in drift mining. Also called fan shaft; uptake. *See also* downcast shaft. *Nelson.*

updraft kiln. An intermittent kiln in which the combustion gases pass from the fireboxes through the setting and then through one or more chimneys in the roof. Such kilns are inefficient and are now little used. *Dodd.*

updraw. The process of continuously drawing glass of various cross sections, such as cane or tubing, by a method similar to the Fourcault process. *ASTM C162-66.*

updraw process. The continuous vertical drawing of glass rod or tubing from an orifice; to produce tubing, the rod is drawn around a refractory cone. This process has also been called the Schuller process, or Wood's process. *Dodd.*

updrift. The direction opposite that of the predominant movement of littoral material. *H&G.*

upgrade. a. To increase the commercial value of a coal by appropriate treatment. *B.S. 3552, 1962.* b. To increase the quality rating of diamonds beyond or above the rating implied by their particular classification. *Long.*

upgrading streams. In the case of the lost rivers of the Snake River Plains, instances are furnished of upgrading in which the process has not advanced far enough to permit the streams engaged in the work to cross the flat tract they invade and reach larger drainage channels. The streams from the southeast, coming from high mountains, are well supplied with material in suspension, and have been enabled to upgrade their courses across the comparatively narrow tract of flat country, and thus reach the main channel of discharge without being ponded. Synonym for aggrading stream. *A.G.I.*

upheaval. A lifting up, as if by some force from below, of stratified or other rocks. *Fay.*

uphill shaker conveyor. Any shaker conveyor which is so designed as to have the proper stroke for shaking the maximum amount of coal up a grade. On certain types of shaker conveyors this requires the replacement of certain parts of the drive to secure the desired stroke, rather than replacing the entire drive unit. *Jones.*

uphill teeming. *See* bottom pouring. *Dodd.*

up hole. a. A borehole collared in an underground working place and drilled in a direction pointed above the horizontal plane of the drill-machine swivel head. *Long.* b. A shothole drilled in rock at an upward angle. Also called upper. *Pryor, 3.*

up-hole drilling. *See* up hole. *Long.*

uphole shooting. In seismic exploration, the setting off of successive shots in a shothole at varying depths in order to determine velocities and velocity variation of the materials forming the hole walls. *A.G.I. Supp.*

uphole time. Used to denote the observed travel time of a seismic wave from the point of generation at a given depth in a shothole to a detector at the surface; and the observed time equivalent of the corresponding shot depth. *A.G.I.*

up-hole velocity. The speed, expressed in lineal feet per minute, at which the drill-circulation liquid flows upward in a borehole. *Long.*

U-pipe stove. A common type of heat-recuperation furnace. *Fay.*

upland. A highland; ground elevated above the lowlands along rivers or between hills. *A.G.I.*

upleap. Mid. A fault that appears as an upthrow. *Fay.*

uplift. a. Elevation of any extensive part of the earth's surface relative to some other part; opposite of subsidence. *Fay.* b. The upward water pressure on a structure. *ASCE P1826.*

up-over. Designating a method of shaft excavation by drifting to a point below, and then raising. *Webster 2d.*

up-over crib. A wedging crib placed on the top of a length of tubing, to shut off the water in a certain stratum. *Fay.*

upper. a. A drill hole driven in an upward direction. *Fay.* b. *See* uphole. *Pryor, 3.*

Upper. Being a later epoch or series of the period or series named; for example, Upper Carboniferous. *Webster 3d.*

Upper Barren Coal Measures. The part of the Carboniferous strata of the Appalachian field which is now assigned to the Dunkard group of the Permian series. Obsolete. *Fay.*

upper break. The upper bend of either a terrace or monocline, also known as head or upper change of dip. *Stokes and Varnes, 1955.*

upper explosive limit of flammability. The highest quantity of combustible gases which, when mixed with a given quantity of air (or oxygen), will just support a self-propagating flame. *Francis, 1965, v. 2, p. 437.*

upper leaf. Scot. The upper portion of a seam that is separated, by a parting, into two portions. *Fay.*

upper pickup. Highest point reached by a traveling block in pulling drill rods. *Long.*

Upper Pottsville series. See Kanawha series. *C.T.D.*

Upper Productive Coal Measures. The part of the Carboniferous strata of the Appalachian field that is now assigned to the Monongahela group of the Pennsylvanian series. Obsolete. *Fay.*

upper punch. In powder metallurgy, the member of a die assembly that moves downward into the die body to transmit pressure to the powder contained in the die cavity. *ASM Gloss.*

upper transit. The upper culmination of a heavenly body. *Ham.*

upraise. An auxiliary shaft, a mill hole, carried from one level up toward another. *See also* rise; raise, which are better terms. *Fay.*

upright. *See* post, l. *Dodd.*

upright fold. Fold with a vertical axial plane. *A.G.I.*

upright joints. Eng. Vertical joints. *See also* thorough joints. *Arkell.*

upright man, glass. One who smooths the edge of glass that has been cut, using hand tools. *D.O.T. 1.*

uprush. The rush of water onto the foreshore following the breaking of a wave. *Hy.*

upset. a. To increase the diameter of a rock drill by blunting the end. *Fay.* b. Scot. A narrow heading connecting two levels in inclined coal. Sometimes used as a synonym for raise. *Fay.* c. Aust. A capsized or broken skip. *Fay.* d. In Indiana, a narrow passage driven on a slope and leaving a wider pillar which is to be mined by slabbing or otherwise. *Hess.* e. In Alabama, a narrow working place driven from one pair of entries to another for the development of a long face in semi-long wall or long-wall mining. *Hess.* f. A tubular part such as a drill rod, the wall thickness of which has been increased by hot forging for a short distance on one or both ends, thereby reinforcing the area in which screw threads are cut. *See also* inside upset; outside upset. *Long.* g. The localized increase in volume resulting from the application of pressure which decreases the length or thickness during mechanical fabricating or welding. *ASM Gloss.* h. That portion of the welding cycle during which the pressure is applied. *ASM Gloss.* i. To enlarge an end of a bar by shortening it. *Nichols.*

upset man. a. A man who drives or develops an upset. *Hess.* b. A man who works in an upset. *Hess.*

upsetting. A means of increasing the diameter of a red-hot steel bar during forging by striking it on the end, a state which also occurs in riveting. *Ham.*

upset welding. A resistance welding process in which the weld is produced, simultaneously over the entire area of abutting surfaces or progressively along a joint, by the heat obtained from resistance to the flow of current through the area of contact of those surfaces. Pressure is applied before heating is started, and is maintained throughout the heating period. *ASM Gloss.*

upslope ripple. A ripple that climbs a sloping surface. *Pettijohn.*

upslope time. In resistance welding, time associated with current increase using slope control. *ASM Gloss.*

upstanders. Corn. Pieces of timber or boards fixed in the ground at a prospect shaft, to support the axletree or windlass. *Fay.*

upstanding. Scot. A term applied to stoop-and-room workings to denote that the pillars are in a sound condition and the roof not fallen. *Fay.*

up stoop. Scot. A working room is up stoop or in stoop when its length is equal to the side of the pillar to be formed. *Fay.*

uptake. *See* upcast; upcast shaft, b.

upthrow. The block or mass of rock on that side of a fault which has been displaced relatively upward. The term should be used with the definite understanding that it refers merely to a relative and not an absolute displacement. *Fay.*

upthrow fault. A fault of which the net slip has a vertical component directed upward. Synonym for thrust fault. *Schieferdecker.*

upthrow side. The higher side of a fault after displacement has occurred. *B.S. 3618, 1964, sec. 5.*

upthrust. An upheaval of rocks; said preferably of a violent upheaval; used also attributively. *Standard, 1964.*

upward-current washer. A washer in which separation takes place under the influence of an upward current of water or dense medium. *B.S. 3552, 1962.*

upward percolation. *See* sand leaching.

upward velocity. The rate at which drilling fluid progresses up the borehole. *Compare* up-hole velocity. *Long.*

upwarp. An area that has been uplifted, generally used for broad anticlines. *A.G.I.*

upwelling. The phenomenon in which colder subsurface coastal waters, usually rich in nutrients, move toward the surface to replace waters of the surface layer removed from the area by wind or current action. This effect is of great biological importance. *Hy.*

uraconite. An earthy, amorphous, lemon-yellow, hydrous uranium sulfate. *Standard, 1964.*

Ural amethyst. Same as Siberian amethyst. Also called Uralian amethyst. *Shipley.*

uralborite. A mineral, $CaB_2O_4.2H_2O$, in radiating fibrous aggregates from a skarn deposit in the Turinsk area, Urals, U.S.S.R. *Hey, M.M., 1964; Fleischer.*

Ural chrysoberyl. Alexandrite. Also called Uralian chrysoberyl. *Shipley.*

Ural chrysolite. Demantoid garnet. Also called Uralian chrysolite. *Shipley.*

Uralian. Upper Upper Carboniferous. *A.G.I. Supp.*

Uralian emerald. A green variety of andradite garnet, occurring as nodules in ultrabasic rocks in the Nizhni-Tagilsk District of the Urals, used as a semiprecious gem stone, though rather soft. Also known as Bobrovska garnet. *C.M.D.*

Uralian sapphire. Blue tourmaline. *Shipley.*

uralite. A fibrous or acicular variety of hornblende occurring in altered rocks and pseudomorphous after pyroxene. The word is often used as a prefix before the names of those rocks that contain the mineral. The name is derived from the original occurrence in the Urals, U.S.S.R. *Fay.*

Uralite. Trade name for a fireproof material, chiefly of asbestos. *Fay.*

uralitization. The processes whereby the primary pyroxene of igneous rocks is altered to uralite, a form of secondary hornblende paramorphic after augite, and generally, but not necessarily, fibrous. *Holmes, 1920.*

Ural olivine. Demantoid garnet. Also called Uralian olivine. *Shipley.*

uramphite. A mineral, $NH_4UO_2PO_4.3H_2O$, occurring as bottle-green flakes in the oxidation zone of a uranium-coal deposit; locality not given. Named from the composition, uranium ammonium phosphate. *Hey, M.M., 1961.*

uran-; urano-. Combining form meaning containing uranium; for example, uranothorite. *Webster 3d.*

urania ceramics. Ceramic products containing appreciable amounts of UO_2 (or thorium) which are used in atomic reactors. They are stable against corrosion. *Bureau of Mines Staff.*

uranian opal. A variety of opal having an apple-green fluorescence reputedly caused by the presence of minute amounts of uranium. *Crosby, p. 130.*

uranic. Of, relating to, or containing uranium. Used especially for compounds in which uranium has a higher valence than in uranous compounds. *Webster 3d.*

uranic ocher. Same as uraconite. *Standard, 1964.*

uranic oxide. *See* uranium dioxide. *CCD 6d, 1961.*

uranides. a. A name proposed for the elements beyond protactinium (protoactinium) in the periodic system in recognition of the occurrence of a transition group in which uranium is a prominent member and the first of a sequence of elements (neptunium, plutonium, and americium) with the same pattern of oxidation states. *NRC-ASA N1.1-1957.* b. A name proposed for elements of the last row of the periodic system in oxidation state +6. The compounds of the elements beyond uranium in this state are generally isostructural with the corresponding compounds of uranium. *NRC-ASA N1.1-1957.*

uraninite. Essentially, UO_2; isometric or amorphous; strongly radioactive; black, steel-gray, brownish-black, grayish, or greenish. *Crosby, pp. 52-53.* It is a complex uranium mineral containing also rare earths, radium, lead, helium, nitrogen, and other elements. Uraninite in the stricter sense, is applied to crystallized forms found in pegmatites. It contains thorium, cerium, lanthanum, and yttrium. The mineral found in Connecticut and North Carolina is of this variety. Pitchblende is the massive form, probably amorphous, and contains no thoria, but a specimen from Gilpin County, Colo., contained 7.6 percent zirconia. Pitchblende is found in metalliferous veins with sulfides. Both varieties contain radium. It contains from 65 to 90.7 percent of the combined oxides, UO_3 and UO_2. *See also* nivenite. *Sanford.*

uranite. a. A group name for a few related minerals, primarily autunite and torbernite. Autunite is also called calcium uranite, and torbernite is the same as copper uranite. *Webster 2d.* b. The original name of the element uranium. *Hey 2d, 1955.*

uranite lime. *See* autunite. *Bennett 2d, 1962.*

uranium. A radioactive, silvery-white, metallic element in group V of the periodic system. It occurs in the minerals uraninite (pitchblende), coffinite, carnotite, autunite, uranophane, davidite, and torbernite. It is found in phosphate rock, lignite, bituminous shales, and monazite sands. There are 14 radioactive isotopes (uranium 227 to uranium 240). The two principal naturally occurring isotopes are the fissionable uranium 235 (0.71 percent of natural uranium) and the nonfissionable, fertile uranium 238 (99.28 percent of natural uranium), which by capture of a neutron and a decay sequence yields fissionable plutonium 239, which can substitute for uranium 235 as a nuclear fuel or a nuclear explosive. Uranium 234 constitutes 0.0058 percent of natural uranium. The most stable (longest-lived) isotope is uranium 238 which has a half-life of 4.5×10^9 years and which has been used to estimate the age of the igneous rocks with which it occurs. Uranium has three allotropic forms: (1) alpha uranium (orthorhombic), up to 667° C; (2) beta uranium (tetragonal), from 667° C to 775° C; and (3) gamma uranium (isometric), from 775° C to 1,132° C (the melting point). Symbol, U; atomic number, 92; atomic weight, 238.03; valences, 3, 4, 5, and 6; specific gravity, about 18.95; melting point, 1,132.3°±0.8° C; boiling point, 3,818° C; insoluble in water, except when in a finely divided state; insoluble in alkalies and in alcohol; and soluble in acids. Uranium and its compounds are highly toxic, both chemically and radiologically. Used as a nuclear fuel when alloyed with zirconium, molybdenum, etc. or as the oxide or carbide, as an atomic-bomb explosive, as X-ray targets, and as a coloring agent in yellow glass and glazes. *L&L; CCD 6d, 1961; NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-86, B-142.*

uraniumaire. One who strikes it rich in uranium prospecting, mining, or promotion of stock activities. *Ballard.*

uranium alloys. Contact alloys. *Hess.*

uranium-ammonium carbonate. *See* uranyl-ammonium carbonate. *CCD 6d, 1961.*

uranium-barium oxide; barium diuranate. Yellow; BaU_2O_7; molecular weight, 725.5; insoluble in water; and soluble in acid. Used for coloring porcelain. *Bennett 2d, 1962.*

uranium borides. Three borides are known: UB_2, UB_4, and UB_{12}. The most attention has been paid to the tetraboride, the properties of which are: melting point, >2,100° C (but oxidizes rapidly above 600° C), specific gravity, 9.38 grams per milliliter, thermal expansion, 7.1×10^{-6}

(20° to 1,000° C), modulus of rupture (20° C), 60,000 pounds per square inch, electrical resistivity, 3×10^{-6} ohm-centimeter. *Dodd.*

uranium carbide. A compound of uranium and carbon which may have any one of three formulas, UC, UC_2, and U_2C_3. *Bureau of Mines Staff.*

uranium dioxide; uranic oxide. Brown to black; isometric; UO_2; molecular weight, 270.03; insoluble in water; soluble in nitric acid and in concentrated sulfuric acid; frequently pyrophoric in finely divided form; specific gravity, 10.96; and melting point, 2,500° C or 3,000°±200° C. A crystalline or pellet form is used to pack nuclear-fuel rods; also used in ceramics, and is a source of uranium for the fluorides used for isotope separation. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-235.*

uranium disintegration series; uranium decay series; uranium series; uranium-radium series; 4n + 2 series. a. The series of nuclides resulting from the decay of uranium 238. The mass numbers of all members of the series are given by 4n+2, where n is an integer; therefore, the sequence is also known as the 4n+2 series. It is also known as the uranium-radium series. Many synthetic nuclides decay in collateral series into this sequence. *See also* radium. *NRC-ASA N1.1-1957; Glasstone, 2, p. 133.* b. Uranium 238 to thorium 234 to protactinium 234 to uranium 234 to thorium 230 to radium 226 to radon 222 to polonium 218 to lead 214 plus astatine 218 to bismuth 214 to polonium 214 plus thallium 210 to lead 210 to bismuth 210 to polonium 210 plus thallium 206 to lead 206, the stable end-product. *Glasstone, 2, p. 133.*

uranium galena. Galena containing uranium lead of isotope, Pb 206. From Bedford, N.Y. *English.*

uranium hexafluoride. Colorless; monoclinic; UF_6; molecular weight, 352.02; deliquescent; specific gravity, 4.68 (at 21° C); melting point, 64.5° to 64.8° C; decomposes in water, in alcohol, and in ether; soluble in carbon tetrachloride and in chloroform; and insoluble in carbon disulfide. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-235.* Uranium-hexafluoride gas is the process fluid in the gaseous diffusion process. *L&L.*

uranium-lead; radium G. Lead 206 produced as the end-product of the radioactive disintegration of uranium 238 in the uranium disintegration series. *Glasstone, 2, p. 133.*

uranium leakage. *See* breakthrough, d. *Pryor, 3.*

uranium mica. *See* autunite.

uranium minerals. More than 150 uranium-bearing minerals are known to exist, but only a few are common. The five primary uranium-ore minerals are pitchblende, uraninite, davidite, coffinite, and brannerite. These were formed by deep-seated hot solutions and are most commonly found in veins or pegmatites. The secondary uranium-ore minerals, altered from the primary minerals by weathering or other natural processes, are carnotite, tyuyamunite and metatyuyamunite (both very similar to carnotite), torbernite and metatorbernite, autunite and meta-autunite, and uranophane. *Pearl, p. 47.*

uranium, natural; uranium, normal. Uranium, as found in nature, is a mixture of the fertile uranium 238 isotope (99.28 percent), the fissionable uranium 235 isotope (0.71 percent), and 0.0058 percent of uranium 234. *L&L; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-143.*

uranium nitride. Dark brown; crystalline; U_3N_4; specific gravity, 10.09; and is decomposed by water. Said to be used as nuclear fuel. *CCD 6d, 1961.*

uranium I. A name for alpha-emitting uranium 238, the natural parent of the uranium disintegration series; symbol, U_I or U_1; and half-life, 4.51×10^9 years. Its concentration in natural uranium is 99.28 percent. *NRC-ASA N1.1-1957; Glasstone, 2, p. 133; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-86.*

uranium oxide. The important oxides of uranium are UO_2, U_3O_8 and UO_3. The dioxide (melting point 2,880° C) is used as a nuclear fuel element. Uranium oxide has been used to produce red and yellow glazes and ceramic colors. *Dodd.*

uranium oxide, brown. *See* uranium dioxide.

uranium oxide, orange. *See* uranium trioxide; uranium orange; potassium diuranate.

uranium peroxide; uranium tetroxide. a. Yellow; crystalline; $UO_4 . xH_2O$ (the number of molecules of water of hydration varies according to the conditions under which the oxide is formed); hygroscopic; insoluble in water; decomposes at 115° C; decomposes in hydrochloric acid; and specific gravity, 2.5 (at 15° C). Used in ceramics and in pigments. *CCD 6d, 1961.* b. Pale yellow; crystalline; $UO_4 . 2H_2O$; molecular weight, 338.06; hygroscopic; decomposes at 115° C; nearly insoluble in cold water and slightly soluble in hot water; and decomposes in hydrochloric acid. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-235.*

uranium red. A ceramic stain for colored glazes suitable for firing temperatures up to 1,000° C. Increasing the uranium oxide content strengthens the color from orange, through red to tomato red. The glaze should be basic, preferably 0.5 mol SiO_2, 0.1 to 0.2 mol Al_2O_3, 0.1 mol K_2O, and the remaining bases chiefly PbO; B_2O_3 should not be present in significant quantity. *Dodd.*

uranium silicide. Beta USi_2 has a slightly anisotropic thermal expansion. *Dodd.*

uranium-strontium oxide; strontium diuranate. Yellow; SrU_2O_7; molecular weight, 675.77; and soluble in acid. Used for coloring porcelain. *Bennett 2d, 1962.*

uranium tetrafluoride; green salt. Green; nonvolatile; triclinic; needles; UF_4; molecular weight, 314.02; specific gravity, 6.70±0.10; melting point, 960°±5° C or 1,036°; very slightly soluble in water; insoluble in dilute acids and in dilute alkalies; and soluble in concentrated acids and in concentrated alkalies. Used in the preparation of uranium metal and uranium hexafluoride. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-235.*

uranium tetroxide. *See* uranium peroxide. *CCD 6d, 1961.*

uranium trioxide; uranyl oxide; orange oxide; orange uranium oxide. a. Red, orange, and yellow; UO_3; molecular weight, 286.03; insoluble in water; soluble in nitric acid and in hydrochloric acid; specific gravity, 7.29 or 8.34; and it decomposes on heating. Used in ceramics and pigments. *See also* uranium dioxide. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-235.* b. An intermediate product in the refining of uranium. *L&L.*

uranium II. A name for uranium 234, a member of the uranium disintegration series; symbol, U_II; emits alpha particles, and half-life, 2.48×10^5 years. Its concentration in natural uranium (formed by the decay of uranium 238) is 0.0058 percent. *NRC-ASA N1.1-1957; Glasstone, 2, p. 133; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-86.*

uranium 233. a. A fissionable isotope of uranium produced artificially by bombarding thorium with neutrons. Symbol, U^{233}; emits alpha particles; and half-life, 1.62×10^5 years. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-86.* b. A radioelement in the nepthunium disintegration series. *Glasstone, 2, p. 136.*

uranium 235; actinouranium; actinium-uranium. a. The readily fissionable isotope of uranium used in one type of atomic bomb. Concentrated from natural uranium by gaseous diffusion, by centrifugation, or by electromagnetic methods. Symbols, U^{235} and AcU. *CCD 6d, 1961.* b. The parent radioelement of the actinium disintegration series; emits alpha particles; half-life, 7.13×10^8 years; and it occurs as 0.71 percent of natural uranium. *See also* actinouranium. *Glasstone, 2, p. 135; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-86.*

uranium 238; uranium I. a. The abundant naturally occurring isotope of uranium; 140 times as plentiful as uranium 235 (99.28 percent of natural uranium as contrasted with 0.71 percent). It is nonfissionable but will capture neutrons in a nuclear reactor to eventually produce plutonium 239, a nuclide which can substitute for uranium 235 as a nuclear fuel or a nuclear explosive. This production of plutonium 239 is called breeding. Uranium 238 (obtained as natural uranium from which uranium 235 has been removed) can be used as a coloring agent, an analytical reagent, and in catalysis. Symbols, U^{238}; U_I; and U_1. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-86, B-143.* b. The parent radioelement of the uranium disintegration series which ends with stable lead 206. It emits alpha particles and has a half-life of 4.51×10^9 years. It is the longest-lived isotope of uranium and gives the element its atomic weight. Used to estimate the age of the igneous rocks with which it is associated. *Glasstone, 2, p. 133; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-86, B-143.*

uranium vitrol. *See* johannite.

uranium-uranyl oxide. *See* triuranium octoxide.

uranium X_1. A name for thorium 234, a member of the uranium disintegration series; symbol, UX_1; emits beta particles; and half-life, 24.10 days. *NRC-ASA N1.1-1957; Glasstone, 2, p. 133; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-84.*

uranium X_2; brevium. A name for protactinium 234 (protoactinium 234), a member of the uranium disintegration series; symbol, UX_2; emits beta particles; and half-life, 1.18 minutes. Sometimes called brevium. *NRC-ASA N1.1-1957; Glasstone, 2, p. 133; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-85.* Uranium X_2 (protactinium 234) undergoes isomeric transition in the uranium disintegration series to form uranium Z (also protactinium 234) which has a half-life of 6.66 hours and emits beta particles to form uranium II (uranium 234). *Glasstone, 2, p. 133; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-85.*

uranium Y. A name for thorium 231, a member of the actinium disintegration series; symbol, UY; emits beta particles; and half-life, 25.6 hours. *NRC-ASA N1.1-1957; Glasstone, 2, p. 135; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-84.*

uranium Z. a. A name for protactinium 234 (protoactinium 234), a member of the uranium disintegration series; symbol, UZ; isomeric with UX_2; emits beta particles; and half-life, 6.66 hours. *NRC-ASA N1.1-1957; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-85.* b. Uranium Z (protactinium 234) is formed from uranium X_2 (also protactinium 234) by isomeric transition in the uranium disintegration series. *Glasstone, 2, p. 133.*

uranmica. Synonym for torbernite; uranite, a. *Frondel, p. 192.*

uranniobite. Crystallized variety of uraninite; specific gravity 9.0 to 9.7. *Bennett 2d, 1962.*

uranocircite. Synonym for metauranocircite. *Crosby, p. 54.*

uranolite. A meteorite. *Fay.*

uranophane. A strongly radioactive, orthorhombic mineral, $Ca(UO_2)_2Si_2O_7.6H_2O$; lemon to straw yellow, also pale greenish-yellow to orange yellow. Uranophane is one of the more common uranium minerals; found usually as an alteration product of gummite after uraninite; usually associated with autunite and torbernite and less frequently with betauranotil. *Crosby, pp. 54-55.*

uranophyllite. Synonym for torbernite. *Crosby, p. 50.*

uranopilite. A very rare, strongly radioactive, possibly monoclinic, yellow mineral, $(UO_2)_6(SO_4)(OH)_{10}.12H_2O$; a secondary mineral found associated with gypsum and meta-uranopilite on altering uraninite. *Crosby, pp. 55-56.*

uranorthorite. A variety of thorium silicate; thorite containing a small percentage of oxide of uranium. *Fay.*

uranosphaerite; uranospherite. A very rare, strongly radioactive, possibly orthorhombic, orange-yellow or brick-red mineral, $Bi_2O_3.2UO_3.3H_2O$, found as an oxidation product of pitchblende associated with uranium arsenates, gummite, uranophane, and cobaltian wad. *Crosby, p. 56.*

uranospinite. A very rare, strongly radioactive, tetragonal, lemon-yellow to siskin-green mineral, $Ca(UO_2)_2(AsO_4)_2.8H_2O$; a secondary mineral found associated with troegerite, walpurgite, uranocircite, and zeunerite. *Crosby, p. 57.*

uranotantalite. Synonym for samarskite. *Crosby, p. 40.*

uranothorianite. Thorianite with uranium in partial substitution for thorium. *Crosby, p. 46.*

uranothorite. A uraniferous variety of thorite. *Webster 3d.*

uranous. Of, relating to, or containing uranium. Used especially for compounds in which uranium has a lower valence than in uranic compounds. *Webster 3d.*

uranous oxide. U_3O_8; the least important of the several oxides of uranium. *CCD 6d, 1961.*

uranous-uranic oxide. *See* triuranium octoxide. *CCD 6d, 1961.*

uranphyllite. Synonym for torbernite. *Frondel, p. 192.*

uranyl. The bivalent radical UO_2, or the ion UO_2^{+2}, formed by uranium trioxide (UO_3) in an acid solution. *Webster 3d.*

uranyl-ammonium carbonate; uranium-ammonium carbonate; ammonium uranyl-carbonate. Yellow; monoclinic; $UO_2CO_3.2(NH_4)_2CO_3.2H_2O$; molecular weight, 558.24; decomposes at 100° C in air; specific gravity, 2.773; decomposes in hot water; and soluble in cold water, in ammonium carbonate solutions, and in aqueous sulfur-dioxide solutions. Used in uranium-yellow glazes. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-152.*

uranyl uranate. *See* triuranium octoxide. *CCD 6d, 1961.*

urao. A hydrous sodium carbonate, $Ka_2CO_3.NaHCO_3+2H_2O$. Trona is an impure form of urao. *Sanford.*

urbainite. Proposed by Warren for a rock composed of hematite, ilmenite, rutile, sapphirine, and plagioclase. It is found at St. Urbain, Quebec, Canada. *Hess.*

urea; carbamide; carbonyl diamide. Colorless; tetragonal; NH_2CONH_2; molecular weight, 60.06; specific gravity, 1.335; melting point, 132.7° C; and very soluble in water and in ethyl alcohol. Used as a stabilizer in explosives. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. C-589.* Specific gravity, 1.32 (at 18° C, referred to water at 4° C); decomposes before reaching a boiling point; very soluble in methanol; soluble in absolute alcohol; and insoluble in chloroform. *Handbook of Chemistry and Physics, 45th ed., 1964, p. C-589.*

ureilite. A coarse-grained achondritic meteorite composed of olivine and augite enclosed in a fine mesh of nickel iron with carbonaceous matter (including diamond). The type is practically equivalent to a pallasite with less than 10 percent nickel iron. *Holmes, 1928.*

Ure's process. The treatment of quicksilver ores by heating in iron retorts with admixture of lime. *Fay.*

urethane foam. *See* rigid foam.

Urgonian. A division of the European Lower Cretaceous characteristically developed in certain parts of France and Belgium. *Standard, 1964.*

urnel; urnell; ournal. Eng. Kentish term for ragstone. *Arkell.*

urpethite. A yellowish-brown to brown soft hydrocarbon. *Standard, 1964.*

urry. Eng. A blue to black clay found next to coal in coal mines. *Standard, 1964.*

urtite. a. A plutonic rock composed largely of nepheline with minor aegirine, and apatite. Urtite is transitional into ijolite with increasing aegirine and decreasing nepheline. *A.G.I.* b. The Russians use the word in the Kola Peninsula on the Arctic slope to mean a nepheline syenite carrying 70 to 85 percent nepheline. The rock carrying 70 percent or less nepheline is called ijolite. *Eng. and Min. J., v. 131, May 11, 1931, p. 407.*

Uruguay amethyst. A term which, when used to describe a trade grade or trade quality, usually refers to a deep violet, very transparent amethyst. Also used to include all amethysts from an area along the border of Uruguay and Rio Grande do Sul, Brazil, which are mostly small and irregularly colored. *Shipley.*

usable area. The usable area for mica films is that area into which no edge cracks or open areas extend. *Skow.*

usable diamond. A resettable salvage diamond. *See also* usables. *Long.*

usable iron ore. The product of mine, beneficiating, or agglomerating plant which is shipped without further processing to the consumer. *BuMines Bull. 630, 1965, pp. 458-459.*

usables. Salvaged diamonds considered as being fit for resetting and reuse in another bit or tool. *Long.*

usable stone. Synonym for usable diamond. *Long.*

use charge. An annual rental charge assessed by the Atomic Energy Commission for inventories of enriched fissionable material. *L&L.*

used bit. A diamond bit so dulled by use that it is no longer of any value as a cutting tool. *Long.*

used diamond. A diamond that has been removed from a used bit; also, a carbon the edges and corners of which have been rounded by use but which is reusable. *Long.*

used stone. Synonym for used diamond. *Long.*

useful area. Working area of a screen. The nominal area, less any area occupied by fixings or supports which obstruct the passage of material over or through the screen deck. *B.S. 3552, 1962.*

useful beam. Any ionizing radiations from a sealed source that can be employed for the purposes for which the sealed source is used. *NCB.*

useful limit point. *See* apparent elastic limit. *Ro.*

useful pressure. The useful pressure for a mine fan is the natural ventilation pressure deducted from the total ventilation pressure required to circulate the air through the mine. *Roberts, I, p. 294.*

USGS Abbreviation for the United States Geological Survey. *Williams.*

U.S. Nu-Gel. Nongelatinous permissible explosive used in mining. *Bennett 2d, 1962.*

Usspurwies arch. An articulated yielding arch, provided by a single bolted joint at the crown. The joint is so designed that the bolt is not subjected to shear stress. The yield element is a rectangular box in which the foot of the arch rests. The resistance to yield is by means of a piece of crushing timber placed in the box from the bottom before setting. *See also* steel arches; steel support; Toussaint-Heintzmann arch. *Nelson.*

ustarasite. Sulfosalt $PbS.3(Bi,Sb)_2S_3$, as gray prismatic crystals in bismuth ore from the Ustarasaisk deposit in western Tyan-shan, Siberia. Named from locality. *Spencer 21, M.M., 1958.*

usual mining privileges. By this term in a deed, the grantee has and may enjoy the right to go upon the land and explore for, open and operate mines, take out and sell the products, and do all things incident to that work. *Ricketts, I.*

utahite. a. An orange-yellow iron sulfate mineral, $3Fe_2O_3.3SO_3.4H_2O$, from the Tintic District, Utah. It has a silky luster. *Fay.* b. A discredited term equal to jarosite or natrojarosite. *American Mineralogist, v. 42, No. 7-8, July-August 1957, p. 586.*

Utah jet. An inferior jet which came from Wayne County, Utah. *Shipley.*

utahlite. A compact, nodular variscite from

Lewiston, Cedar Valley, Utah. *English.*

utahlite matrix, An alternate name for amatrice. *Shipley.*

Utah turquoise. Misnomer for variscite. *Shipley.*

Utica shale. An important member of the Upper Ordovician succession in the eastern parts of North America, succeeding the Trenton limestone, and placed at the base of the Cincinnatian series. *C.T.D.*

utilites. A general term proposed by Wadsworth for all useful geological products. His subdivisions according to uses are: Ceramites, fictile or ceramic materials; chalicites, binding materials or limes, mortars, cements, etc.; chemites, chemical materials; chromatites, color materials or paints, pigments, etc.; coprites, fertilizers or mineral manures; cosmites, decorative materials or ornamental stones and gems; ignites, pyrotechnic materials; lubricites, lubricants or friction materials; metallites, ores or metalliferous materials; pharmacites, mineral medicines; pyrolites, refractory or fire resisting materials; rholites, smelting materials or fluxes; salites, salts and saline materials; tectonites, construction materials, as building and road materials; thermites, fuels or burning materials, or carbonites; tribolites, abrasives or attrition materials; and vitrates, vitrifying materials or glass, etc. These terms are not used. *Fay.*

U-tube manometer. The vertical U-tube is the simplest type of pressure gage and consists either of a single U-shaped glass tube having a uniform bore with vertical arms or two separate glass tubes connected to a cistern. The level of the liquid in the vertical U-gage can be read easily to 0.1 inch and in well-made instruments to 0.05 inch water gage. *Roberts, I, pp. 24-25.*

U^{233} Symbol for uranium 233. *CCD 6d, 1961.*

U^{235} Symbol for uranium 235. *CCD 6d, 1961.*

U^{238} Symbol for uranium 238. *CCD 6d, 1961.*

U-type furnace. A furnace for the firing of vitreous enamelware, which is carried along a U-shaped path so that ware enters and leaves the furnace at adjacent points. *See also* hairpin furnace. *Dodd.*

U-value. A unit of heat transmission used in heat loss calculations for buildings and defined as: Btu transmitted per square foot per hour per degrees Fahrenheit difference in air temperature between the two faces of the wall under consideration. The walls of a house should have a U-value of 0.20 or less. *Dodd.*

uvanite. A very rare, strongly radioactive, possibly orthorhombic, brownish-yellow mineral, $U_2V_6O_{21}.15H_2O$; occurs in asphaltic sandstone associated with carnotite, rauvite, hewettite, metatorbernite, hyalite, and gypsum; from Utah; resembles carnotite. *Crosby, p. 58; Larsen, p. 141.*

uvarovite; ouvarovite; uwarowit. A green-colored garnet, $Ca_3Cr_2(SiO_4)_3$. Isometric. *Fay; Dana 17.*

Uverite. The trade name for an antimony-titanium opacifier for porcelain enamel, having an approximate formula of $7CaO.CaF_2.6TiO_2.2Sb_2O_5$. When compared with tin oxide in a range of commercial enamels, it has proved to be equivalent in its effect on opacity, color, gloss, firing range, general workability, and durability. *Am. Ceram. Soc. J., v. 29, No. 4, April 1946, p. 93.*

uviol glass. Glass highly transparent to ultraviolet rays. *Bennett 2d, 1962* .

uvite. A hypothetical molecule of the tourmaline group to explain the composition of magnesia-lime tourmaline, $H_8Ca_6Mg_8Al_{10}Si_{12}B_6O_{62}$. From Uva, Ceylon. *English.*

uwarowit. *See* uvarovite. *Fay.*

V

v a. Abbreviation for volume. *Webster 3d.* b. Symbol for weight-volume; mass-volume; specific volume. *Zimmerman, p. 117.* c. Abbreviation for velocity. *Zimmerman, p. 115.* d. Symbol for group velocity; linear velocity or particle velocity; for one of the three components of linear velocity or particle velocity; velocity in the y direction; and for velocity of at time *t*. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Zimmerman, p. 166.* e. Abbreviation for volt; voltage. *Zimmerman, p. 117.* f. Abbreviation for voltmeter; vein; viscosity; variable and variation; vertical; visibility; vent; vector; vertex; valve; vacuum tube. *Webster 3d.* g. Abbreviation for vapor. *Zimmerman, p. 115.* h. Abbreviation for versus (against). *Zimmerman, p. 116.*

v a. Symbol for volume per unit weight; for volume per unit mass; specific volume; specific volume per unit mass; volume per mole or molal volume; volume per molecule or molecular volume; and for volume per atom or atomic volume. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Zimmerman, pp. 167, 368.* b. Symbol for velocity of sound waves and other waves. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* c. Symbol for speed, average speed; linear speed or particle speed; and for speed at time *t*. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Zimmerman, p. 165.* d. With carat above it, symbol for most probable speed. *Zimmerman, p. 165.*

V a. Chemical symbol for vanadium. *Handbook of Chemistry and Physics, 45th ed., 1964; p. B-1.* b. Abbreviation for volume; volume per mole or molal volume. *Zimmerman, p. 117.* c. Abbreviation for velocity; linear velocity; average velocity. *Zimmerman, p. 115.* d. Symbol for speed. *Zimmerman, p. 101.* e. Abbreviation for volt(s); voltage. *Webster 3d; Zimmerman, p. 117.* f. Abbreviation for voltmeter. *Zimmerman, p. 117.* g. Symbol for potential difference. *Webster 3d.* h. Symbol for potential energy. *Zimmerman, p. 41.* i. Abbreviation for vapor; vapor rate. *Zimmerman, p. 115.* j. Abbreviation for variable. *Zimmerman, p. 443.* k. Abbreviation for visibility. *Webster 3d.* l. Abbreviation for Roman numeral 5, and overscored as V, Roman numeral 5,000. *Zimmerman, p. 128.*

V a. Symbol for total volume; volume of a space; a cavity, and of a room; volume of configuration-space; volume per mole or molal value; volume per molecule or molecular volume; volume per atom or atomic volume. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Zimmerman, p. 176.* b. With subscript *c* as V_c, symbol for critical volume. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* c. Symbol for voltage, electric potential, or potential difference; for steady-direct current potential difference, and for effective potential difference. *Handbook of Chemistry and Physics, 45th ed., 1964; p. F-101; Zimmerman, pp. 162, 167.* d. Symbol for inner potential (metals). *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Zimmerman, pp. 162, 167.* e. Symbol for potential energy; also *V* in parentheses, as (*V*), is used. *Handbook of Chemistry and Physics, 45th ed., 1964; p. F-101; Zimmerman, p. 162.*

va a. Abbreviation for volt-ampere. *Webster 3d.* b. Abbreviation for variance. *Webster 3d.*

vaal-garin. Pale-colored blue crocidolite fibers, from the Cape field. *Sinclair, W. E., p. 484.*

vabanite. A brown-red jasper with yellow flecks. From California. *Shipley.*

vac Abbreviation for vacuum. *Webster 3d.*

vacancy. A type of lattice imperfection in which an individual atom site is temporarily unoccupied. Diffusion (of other than interstitial solutes) is generally visualized as the shifting of vacancies. *ASM Gloss.*

vacant land. Land is not vacant when occupied as a mining claim without discovery by one who is diligently prospecting it for minerals which it may contain. *Ricketts, I.*

Vacquier-Steenland method. A numerical method used in gravity interpretation for calculating the depth to the source of many typical total field anomalies. The method involves the computation of the curvature of the observed total intensity by superposition of a special grid over the intensity contours. The curvature is proportional to the second vertical derivative of the magnetic intensity. *Dobrin, p. 329.*

vacu-blast descaler. A machine for cleaning metal surfaces by a process which can be regarded as a development of sandblasting. Grit is directed through a gun onto the surface to be cleaned, and is then sucked back through the gun, together with the scale or paint removed from the surface into a reclaiming tank. Here the dust is separated from the grit, and it is then passed into a dust collector. An alternative gun is provided for use at right-angled intersections. The machine consists of three units, the gun, the reclaiming tank, and the dust collector. *Osborne.*

vacuity. The expansion space left above the liquid in a closed glass container. *Dodd.*

vacuum. a. A space entirely devoid of matter. *Webster 3d.* b. The degree of rarefaction of a partial vacuum, measured by the reduction of pressure from that of the atmosphere. *Fay.* c. A region in which the gas pressure is considerably lower than atmospheric pressure. A perfect vacuum, that is, one which contains no gas, is unobtainable, but, by the use of mercury-vapor pumps and liquid air traps, pressures down to 10^{-6} millimeter of mercury may be obtained. *C.T.D.* d. A method of producing ventilation by exhausting the air from the mine. *Fay.*

vacuum-and-blow process. A bottle-manufacturing process whereby glass is gathered by vacuum and subsequently blown. *ASTM C162-66.*

vacuum casting. a. The casting of metals in vacuum. Also called suction casting. *See also* vacuum metallurgy. *Henderson.* b. Slip casting in which the slip is de-aired before casting. *Bureau of Mines Staff.*

vacuum chamber. A section of an auger extrusion machine through which the plastic clay travels under a vacuum. *ACSG, 1963.*

vacuum common fine salt. VCF, evaporated salt made in vacuum pans, of ordinary purity and ordinary screen analysis. *Kaufmann.*

vacuum concrete. Concrete poured into a framework which is fitted with a linen filter in the form of a vacuum mat. As a result of the process ensuing the concrete attains its 28-day strength in 10 days and has a 25 percent higher crushing strength. *Ham.*

vacuum degassing. A process utilizing the advantages of vacuum melting or casting and the savings in continuous and pressure casting. One type of operation consists of inserting a refractory nozzle extending from a vacuum vessel through the slag layer of a heat of steel in a conventional ladle. When vacuum is applied the amount of steel exposed is cycled by lowering and raising the vessel. This method was developed by the Dortmund-Horder-Hutton Union (D-H). Another unit recently introduced in this country is called Ruhrstahl-Heraeus (R-H). This unit has two refractory tubes extending from the vacuum chamber which dip below the surface of the molten steel. After vacuum jets have raised the liquid steel to a certain level in the tubes, argon, or other gases, can be introduced through one tube. *BuMines Bull. 630, 1965, p. 859.*

vacuum deposition. Condensation of thin metal coatings on the cool surface of work in a vacuum. *ASM Gloss.*

vacuum fan. A fan for creating suction or partial vacuum. An exhaust fan. *See also* vacuum, d. *Fay.*

vacuum filter. a. A form of filter in which the air beneath the filtering material is exhausted to hasten the process. *Fay.* b. One in which the pulp is drawn into contact with a porous septum by means of a moderately high vacuum. Solids are arrested and filtrate drawn through. In the drum and disc types, filtration is continuous. Vacuum is produced by means of a pump. *See also* pulp, a. *Pryor, 3.*

vacuum filtration. The separation of solids from liquids by passing the mixture through a filter and where, on one side, a partial vacuum is created to increase the rate of filtration. It may be used to extract fine coal from the suspension or cyanide solution for reuse. *Nelson.*

vacuum firing. A process for the firing of special types of ceramic either to prevent oxidation of the ware or to reduce its porosity. Vacuum firing is used, for example, in the firing of dental porcelain to produce teeth of almost zero porosity. *Dodd.*

vacuum lifting. Lifting by a crane fitted with a suction pad, employed for such items as precast concrete components, large panes of glass, and sheet steel. *Ham.*

vacuum melting. Melting in a vacuum to prevent contamination from air, as well as to remove gases already dissolved in the metal; the solidification may also be carried out in a vacuum or at low pressure. *ASM Gloss.*

vacuum metallurgy. The processing of metals at elevated temperatures usually by induction heating in high vacuum. *Henderson.*

vacuum method. In flotation, a method in which the pulp, saturated with the air at atmospheric pressure, is allowed to raise to a height above the normal hydrostatic level of the pulp. In the course of this ascent, the dissolved gases precipitate from solution and form a vast number of very tiny bubbles which attach themselves selectively to the hydrophobic solids. *Gaudin 2, p. 417.*

vacuum method of testing sand. A method of carrying out a triaxial test on a sand sample by maintaining a partial vacuum in the rubber bag containing the sample. *Ham.*

vacuum mixer. A machine for the simultaneous de-airing and moistening of dry, prepared clay as it is fed to a pug. In the original design, the clay fell as a powder through a vertical de-airing chamber where water was added as a fine spray; from the bottom of the de-airing chamber the moist, de-aired clay passed into a pug. There have been several developments of this principle. *Dodd.*

vacuum press de-aired brick. Brick formed in a press in which air is evacuated from the die chamber as the brick is pressed. *A.I.S.I. No. 24.*

vacuum pressing. A method of forming brick shapes by which they are subjected to a partial vacuum during pressing in a power press. *HW.*

vacuum pump. a. A centrifugal or reciprocating pump which extracts steam or air from a chamber or pipe to create a partial vacuum. A vacuum pump, hand or power operated, is part of a pump station equiment where gravity flow is absent. *Nelson.* b. Pulsometer. *Webster 3d.* c. A pump for exhausting air or other gas from an enclosed space to a desired degree of vacuum. *Webster 3d.* d. A pump in which water is forced up a pipe by the difference of pressure between the atmosphere and a partial vacuum. *Fay. See also* air pump. *C.T.D.*

vacuum pug. A pug with a vacuum chamber in which the clay is de-aired before it passes into the extrusion chamber. *See also* pug, 1. *Dodd.*

vacuum refining. The same as vacuum melting. *ASM Gloss.*

vacuum system. A two-pipe steam heating system equipped with vacuum pumps to permit maintenance of pressure below atmospheric within the radiators. *Strock, 10.*

vacuum tube. A sealed tube or bulb with the contained gas exhausted to a pressure low enough to permit the passage of electric discharges between electrodes within the tube. The performance of the tube is characterized by electron conduction. *A.G.I.*

vadose. Applied to seepage waters occurring below the surface and above the water table; contrasted with phreatic, which refers to the ground water below the water table. *Holmes, 1928.*

vadose water. a. Water retained within the soil mass above the standing water level. *Nelson.* b. Held water. *Ham.*

vaesite. A nickel disulfide, NiS_2, cubic with pyrite structure; from the Kasompi mine, Republic of the Congo. *Spencer 17, M.M., 1946.*

vag. Prov. Eng. Dried peat or turf for fuel. *Standard, 1964.*

vake. Soft, compact, mixed claylike material with a flat, even fracture found most often in volcanic terrains. *Bureau of Mines Staff.* Not recommended.

vakite. a. A fragmental rock of mixed textures. *A.G.I.* b. A rock composed predominantly of vake. *A.G.I.* Not recommended.

valaite. A pitch-black resin of unknown composition. Found in thin crusts on dolomite and calcite in the Coal Measures of Moravia, Czechoslovakia. *Tomkeieff, 1954.*

Valanginian. Lowermost Lower Cretaceous. *A.G.I. Supp.*

Valantin conveyor cutter. A cutter chain on an armored flexible conveyor which cuts its own stable holes; pushed by pulsating rams; height 18 inches; minimum workable seam 20 inches; on gradients 0° to 20°; maximum length of face 45 yards. *Nelson.*

valbellite. A fine-grained variety of peridotite composed of olivine, hypersthene, and hornblende; locally pyrrhotite is an abundant constituent. *Holmes, 1928.*

vale; val. Corn. The place where the reserve of tin ore is placed to dry before it is put into the smelting furnace. *Fay.*

valence. a. The degree of combining power of an element or a radical. The number of atoms of hydrogen, sodium, fluorine, or other univalent element with which an atom of the element or a molecule of the radical will combine by means of bonds, or for which it can be substituted, or with which it can be compared. The oxidation state of an element in a compound. *Webster 3d.* b. A unit of valence; as, the four valencies of carbon. *Webster 2d.* Symbol, *z. Zimmerman, p. 166.*

valence bond. Linkage of pairs of electrons so as to unite their atoms as a molecule. When an element has more than one valence its commonest combination is called the principal valence. *Pryor, 3.*

valence crystals. Crystals whose atoms are held in position by covalent bonds; for example, diamond and silicon. *Newton, pp. 163-164.*

valence electron. One, usually on the outer shell of the atom concerned, available for transfer—normally to the outer shell of an atom which, by capturing it, partly or fully completes its own outermost electron shell. The number of outer-shell electrons thus transferable with relative ease determines the valence of an atom. In the opposite direction the number of holes in the outermost shell of the accepting atom determines its receiving capacity in terms of valence. An atom is negatively electrovalent when ionized by capture of one or more electrons, and positively (of plus valence number) under opposite conditions. The valence shell is the outermost shell of the atom. *Pryor, 3.*

valencianite. An orthoclase feldspar similar to adularia. It is from a silver mine at Valencia, Mex. *Webster 2d.*

valency. The number of hydrogen atoms or their equivalent, with which one atom of a given element will combine. *Pryor, 3.*

Valentine scale. Pocket-sized beam scale of Chinese origin, used in valuation of alluvial tin gravels. The beam is so calibrated as to read in catties per cubic yard when concentrates from washing of one-fourth cubic foot are weighed. *Pryor, 3.*

valentinite. Antimony trioxide, Sb_2O_3, in orthorhombic crystals. *Fay.*

Vallendar clay. An imported clay universally used in enamels twenty years ago. The clay was mined at Vallendar, Germany. *Enam. Dict.*

valleriite. A massive, soft metallic mineral resembling pyrrhotite in color, S,Cu,Fe,-Al,Mg,H_2O; a doubtful, impure mineral. *Dana 6d, p. 108.*

valleuse. *See* hanging valley. *Schieferdecker.*

vallevarite. A somewhat leucocratic monzonitic rock composed largely of andesine-microcline antiperthite, with small amounts of diopside, biotite, titanoferrite, and apatite. *Holmes, 1928.*

valley. a. Any hollow or low-lying tract of ground between hills or mountains, usually traversed by streams or rivers, which receive the natural drainage from the surrounding high ground. Deep, narrow valleys are more appropriately termed glens, ravines, gorges, or canyons, according to their size and the steepness of the valley walls. Usually valleys are developed by stream erosion; but in special cases, faulting may also have contributed, as in rift valleys. *C.T.D.* b. A small, subcircular basin eroded by solution in the crest of an uplift, and having a sink through which its sediments escape; used locally in Missouri. *Standard, 1964.*

valley brown ore. A local name for limonite or brown iron ore. Applied in Virginia to the comparatively pure high-grade ore found in the Cambro-Ordovician limestone which forms the Valley of Virginia. *See also* mountain brown ore. *Sanford.*

valley bulge. The condition of strata in a valley due to superficial disturbance under the influence of gravity, complementary to the condition of camber over the intervening hills. Valley bulges comprise a variety of displacements of the strata occupying the floors and lower slopes of valleys. They may have a simple anticlinal form or occur as a series of discontinuous elongated domes. *Challinor.*

valley drift. Outwash material confined to a valley. *Stokes and Varnes, 1955.*

valley glacier. a. A glacier extending into a valley. *Fay.* b. A glacier that occupies a valley and is fed from a névé reservoir. *Fay.*

valley-loop moraine. End moraines of valley glaciers are usually steep on both sides and made arcuate walls, convex on the downvalley side, extending across the width of the valley, and are hence called valley-loop moraines. *Stokes and Varnes, 1955.*

valley profile. Synonym for thalweg. *A.G.I.*

valley sink. An elongated sink or series of interconnecting sinks forming a valleylike depression. *A.G.I.*

valley tiles. Specially-shaped roofing tiles for use in the "valley" where two roof slopes meet; these tiles are made to fit into the angle. They lap and course in with the normal tiling. *Dodd.*

valley train. A deposit of glacial outwash forming an old flood plain in a valley. *Fay.*

Vallum diamond. Rock crystal from the Tanjore district, India. *Shipley.*

Valmeyeran. Middle Mississippian. *A.G.I. Supp.*

Val separator. A launder used for cleaning buckwheat, rice, and barley sizes of anthracite. It has three distinguishing features: (1) a mixing tank at the head end of the machine; (2) a baffle in the bottom of the machine next to the mixing tank to facilitate the stratification of the solids in specific gravity layers; and (3) the use of a screen and bed of slate in the free discharge boxes. *Mitchell, p. 388.*

valuation. a. The act or process of valuing, or of estimating the value or worth; appraisal. *Webster 3d.* b. The value or estimated price set upon a thing. *Webster 3d.*

value. a. The desirability or worth of a thing as compared with the desirability of something else; worth, as the value of a mine. *Standard, 1964.* b. The precious metals contained in rock, gravel, or earth; usually used in the plural. *Webster 3d.* c. To estimate or determine the worth of anything, as to value a mine. *Fay.* d. Can. Containing some metal as measured by assay. *Hoffman.*

values. a. The quantity of gold in a cubic yard or ton of placer gravel expressed in sterling or dollars. In a reef, the values are usually given in pennyweights of gold per ton of ore. *Nelson.* b. In mineral exploitation, the compounds separated from the ore body and worked up into a marketable state. Usually expressed as an assay grade. *Pryor, 3.* c. S. Afr. The uncut values from sampling are cut or discounted and, whatever has been calculated as values and width of the reef or reef channel, is adapted to the width at which stoping can be undertaken. The stoping width and values are those found in the ore reserves. Several inches on both sides of the reef are generally required for stoping operations. *Beerman.*

valve. a. Any contrivance inserted in a pipe or tube containing a lid, cover, ball, or slide that can be opened or closed to control the flow or supply of liquids, gases, or other shifting material through a passage. *Long.* b. An adjustable device which controls the available passage area in a flow system. A check valve (flap, ball, foot) permits flow in one direction only, being moved from its seat by the force of flowing fluid and pressed against it when this is reversed. Diaphragm, gate, and globe valves are moved across the flow by manipulation of a barrier. A needle valve has a round aperture closed gradually by a tapered rod, giving fine adjustment. *Pryor, 3.*

valves. *See* bypass valve; check valve; clack valve; delivery valve; flap valve; foot valve; gate valve; reflux valve; sluice valve; suction valve; tilting disk valve. *B.S. 3618, 1963, sec. 4.*

valve string. The string that opens and closes the valve in an oil thief. *Hess.*

valve tower. A tower built up within a reservoir to house the control valves of supply pipes drawing off water at different levels. *Ham.*

vamping. The debris of a stope, which forms a hard mass under the feet of the miner. *Fay.*

van. a. Corn. A test of the value of an ore, made by washing (vanning) a small quantity, after powdering it, on the point of a shovel. Vanning is to a Cornish miner what washing in a horn spoon is to the Mexican. *Fay.* b. To separate, as ore from veinstone, by washing it on the point of a shovel. *See also* vanner. *Fay.* c. A shovel used in ore dressing. *Fay.*

vanadate. A salt or ester of vanadic acid; a compound containing the radical, VO_4^{-3} or VO_3^{-}. *A.G.I.*

vanadic. Of, pertaining to, or containing vanadium. Used especially for compounds in which vanadium has a relatively higher valence than in vanadous compounds. *Webster 3d.*

vanadic ocher. A native yellow vanadium oxide found near Lake Superior. *Standard, 1964.*

vanadic sulfate. *See* vanadyl sulfate. *CCD 6d, 1961.*

vanadinite. A natural chlorovanadate of lead, $Pb_5Cl(VO_4)_3$; grades into mimetite, and endlichite. Color ruby red, orange red, brown, yellow; luster resinous to adamantine; hardness 3; specific gravity 6.7 to 7.1; soluble in strong nitric acid. Found in New Mexico, Arizona; Africa, Scotland, U.S.S.R. An ore of vanadium and lead. *CCD 6d, 1961.*

vanadite. Synonym for descloizite; vanadinite. *Dana 6d, p. 787.*

vanadium. A gray or white, malleable, ductile, polyvalent metallic element in group V of the periodic system. It is resistant to air, sea water, alkalies, and reducing acids except hydrofluoric acid. It occurs widely but mainly in small quantities in combination in minerals (such as vanadinite, patronite, carnotite, and roscoelite), in the ashes of many plants, in coals, in petroleums, and in asphalts. Usually obtained in the form of ferrovanadium or other alloys, or in almost pure metallic form containing small amounts of oxygen, carbon, or nitrogen by the reduction of ores, slags, or vanadium pentoxide (V_2O_5). Used chiefly in vanadium steel. Symbol, V; atomic number, 23; and atomic weight, 50.942. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-143.* Soft; isometric; valences, 2, 3, 4, and 5; specific gravity, 6.11 (at 18.7° C); toxic; melting point, variously reported as 1,710° C, 1,730° C, 1,890°±10° C, and 1,900°±25° C; boiling point, variously reported as 3,000° C, and about 3,400° C; has good structural strength; has good corrosion resistance to alkalies, to sulfuric acid, to hydrochloric acid, and to salt waters; oxidizes readily above 660° C; soluble in aqua regia, in nitric acid, in concentrated sulfuric acid, and in hydrofluoric acid; and insoluble in water, in hydrochloric acid, and in alkalies. Phosphate rock and some iron ores contain vanadium. Used as a carbide stabilizer in steel manufacture, in steel alloys, such as rust-resistant steels, spring steels, and tool steels, as a bonding agent in cladding titanium to steel, and as a target material in X-ray tubes. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-143, B-236.*

vanadium borides. Several borides have been reported, including the following: VB_2, melting point, 2,400° C, specific gravity, 5.0, thermal expansion is highly anisotropic. VB, melting point, 2,250° C, specific gravity, 5.6. V_3B_4, melts incongruently at 2,300° C, specific gravity, 5.5. *Dodd.*

vanadium garnet. A variety of grossular garnet containing 4.52 percent V_2O_3. *Spencer 21, M.M., 1958.*

vanadium hydromica. *See* roscoelite. *Crosby, p. 133.*

vanadium minerals. Those most exploited for industrial use are patronite (VS_4), roscoelite (vanadium mica), vanadinite, carnotite and chlorovanadinite. Metal is silvery, whitish, melting point 1,720° C; used in high speed steels and shock-resistant alloys, chemicals, ceramics and textiles. *Pryor, 3.*

vanadium ores. Vanadium does not occur native, but is found in the United States in the minerals carnotite, roscoelite, vanadinite, descloizite, volborthite, calciovolborthite, and aegirite. *Fay.*

vanadium pentoxide. Yellow to red; orthorhombic; V_2O_5; molecular weight, 181.88; specific gravity, 3.357 (at 18° C); toxic; melting point, 690° C; decomposes at 1,750° C before reaching a boiling point; slightly soluble in water; soluble in acids and in alkalies; and insoluble in absolute alcohol. Used in ceramics and as a catalyst. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-144, B-236.* Also used as a glass colorant, producing various tints of yellow and greenish-yellow. A pure emerald-green has been produced using this oxide by remelting for a long period of time under reducing conditions. A large excess of alkali leads to the formation of colorless vanadates. When used with cerium dioxide, the green color may be converted to pink or lavender by solarization. Vanadium in glass inhibits ultraviolet transmission. *Lee.*

vanadium steel. Steel alloyed with vanadium (usually 0.10 to 0.15 percent), an element which strengthens the steel and serves to remove the oxygen and possibly nitrogen. *Webster 3d.*

vanadium tourmaline. A variety of tourmaline containing 5.76 percent V_2O_3. *Spencer 21, M.M., 1958.*

vanadium yellow; tin-vanadium yellow. A ceramic color produced by the calcination, at about 1,000° C, of a mixture of 10 to 20 percent V_2O_5 (as ammonium metavanadate) and 80 to 90 percent SnO_2. A stronger yellow results if a small amount of TiO_2 is added. These colors can be used in most glazes and either SnO_2 or zircon can be used as opacifier. *Dodd.*

vanadium-zirconium blue; vanadium-zirconium turquoise. *See* zirconium-vanadium blue. *Dodd.*

vanadium-zirconium turquoise. *See* zirconium-vanadium blue. *Dodd.*

vanadoferrite. *See* ferroferrite. *Osborne.*

vanadous. Of, pertaining to, or containing vanadium. Used especially for compounds in which vanadium has a lower valence than in vanadic compounds. *Webster 3d.*

vanadyl. Either of two radicals composed of vanadium and oxygen: (1) the univalent, bivalent, or trivalent radical VO; for example, vanadyl sulfate ($VOSO_4$), and (2) the univalent radical VO_2. *Webster 3d.*

vanadyl sulfate; vanadic sulfate. a. Blue; crystalline; $VOSO_4$; molecular weight, 163.00; and very soluble in water. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-236.* b. Blue; crystalline; $VOSO_4.2H_2O$; and soluble in water. Used for blue and green colors in glasses and ceramics. *CCD 6d, 1961.*

Vanal. Trade name; a coating for the protection of refractories against slag attack. It contains vanadium and is claimed to prevent slags from wetting the refractory. *Dodd.*

vanalite. A mineral, $NaAl_8V_{10}O_{38}.30H_2O$, in bright yellow incrustations on weathered shales from northwest Kara-Tau, Kazakhstan, U.S.S.R. Named from the composition. *Hey, M.M., 1964; Fleischer.*

Van Allen radiation belts. Several belts of ionizing radiation extending from a few hundred miles to a few thousand miles above the earth's surface. The radiation consists of protons and electrons which originate mostly in the sun and are trapped by the earth's magnetic field. *L&L.*

Van Allen radiation zone. Powerful doughnut-shaped zone of radiation 1,000 to 3,000 miles above the earth's surface and parallel with the equator. *A.G.I. Supp.*

van Arkel and de Boer process. *See* iodide process. *Thomas.*

vandenbrandite; vandenbrandeite. A very rare, strongly radioactive, triclinic, dark green to almost black mineral, $CuO.UO_3.2H_2O$; a secondary mineral found associated with kasolite, sklodowskite, malachite, geothite, chalcocite, chalcopyrite, and uraninite; also found associated with curite, uranophane and cobalt wad; from Karungwe, Katanga, Republic of the Congo. *Crosby, pp. 58-59; Hey 2d, 1955.*

vandendriesscheite. A very rare, strongly radioactive, amber orange hydrous lead uranate; small pseudohexagonal crystals, commonly barrel-shaped; from Katanga, Republic of the Congo. *Crosby, p. 59.*

Van der Kolk method. A microscopic method for determining whether the refractive index of a mineral grain is higher or lower than that of a liquid medium in which it is immersed and viewed. Light rays from below the stage are cut off by inserting a suitable obstacle, and as the grain acts as a lens, and the eyepiece inverts the image, a shadow appears on the same side as the obstacle when the grain has the higher refractive index, and on the opposite side when the grain has the lower index. *Holmes, 1928.*

van der Waals' adsorption. Physical, as distinct from chemical cohesion. Normal adhesive forces between molecules, characterized by relatively low heats of adsorption. *Pryor, 3.*

van der Waals bond. a. A very weak bond found typically in the liquid or solid noble gases, and is due principally to induced polarization resulting from instantaneous dipoles caused by electronic motion. *Aplan, F. F., p. 171.* b. An interatomic attraction arising from electrical dipoles, either natural or induced. *VV.* c. Weak bonding in crystals. *Hurlbut.*

van der Waals forces. The weak attraction exerted by all molecules on one another, resulting from the mutual interaction of the electrons and nuclei of the molecules; it has its origin in the electrostatic attraction of the nuclei of one molecule for the electrons of another, which is largely but not completely compensated by the repulsion of electrons by electrons and nuclei by nuclei. These forces are involved in some kinds of adsorption and in the condensation and freezing of the inert gases and nonpolar covalent molecules. The linkage resulting from van der Waals attraction is sometimes called a van der Waals bond. *A.G.I.*

van Doran sampler. This sediment sampler consists of a plexiglas cylinder closed at each end by an ordinary rubber force cup. The two cups are connected by a length of surgical rubber tubing inside the cylinder, prestressed enough to permit the force cups to retain the sample in the cylinder. In the armed position the two cups are pulled outside the cylinder where they are restrained by a releasing mechanism attached to the outside wall. Two short loops of wire connect the cups to the releasing mechanism. The cups are released underwater by sending a messenger down the hydrographic wire. This sampler does not invert, which prevents use of reversing thermometers in conjunction with sampling. *H&G.*

Vandyke brown. A naturally occurring pigment derived from indefinite mixtures of iron oxide and organic matter. Obtained from bog earth, peat deposits, or from ochers containing bituminous matter. *CCD 6d, 1961.*

Vandyke red. A brownish-red pigment consisting of copper ferrocyanide. Sometimes used to refer to red varieties of ferric oxide. Used in pigments. *CCD 6d, 1961.*

vane. The target of a leveling staff; one of the sights of a compass or quadrant. *Webster 3d.*

vane anemometer. a. Consists of several light, flat vanes, usually eight in number, mounted on radial arms which are attached to a horizontal spindle. This rotor drives, through a suitable gear train, a counting mechanism which indicates the revolutions of the rotor. The indicating dial, usually graduated in feet of air, may be located either concentrically with the rotor, or in a plane at right angles to the plane of rotation. By observing the number of revolutions over a timed interval, the velocity of flow is found. The instrument is available in a number of forms, to cover velocities ranging from 30 to 6,000 feet per minute. *Roberts, I, pp. 45-46.* b. *See* anemometer. *Nelson.*

vane-axial fan. An airfoil (propeller) or disk fan within a cylinder and equipped with air guide vanes either before or after the wheel and including driving mechanism supports either for belt drive or direct connection. *Strock, 10.*

vane feeder. A device for feeding dry ground clay from a hopper to a tempering machine or mixer, for example. Vanes fixed to a horizontal shaft at the base of the hopper rotate to discharge the material. *Dodd.*

vane shear test. An in-place shear test in which a rod with thin radial vanes at the end is forced into the soil and the resistance to rotation of the rod is determined. *ASCE P1826.*

vane shear tester. A device used in soil testing, consisting of flat blades affixed to the end of a rod. It is forced into the soil, and the torque required to shear the soil, in situ, is determined as a measure of the shear strength of the zone tested by rotating the device. *Long.*

vane sheet. An intrusive sheet parallel to the structure of the country rock but not necessarily following the foliation. *G.S.A. Memo. 7, 1939, p. 322.*

vane test. A test to determine the shear strength of very soft deposits, such as clays and silts in place (in situ). The values obtained may be used to check the shear strength figures obtained in the laboratory. Boring is first employed to reach the depth required for a test, and the vane is then driven into the deposit. Four vanes or blades project from the embedded shaft at 90° intervals and as these are rotated in the deposit, they generate a cylinder of soil thus determining the unit shearing strength of the material in place (in situ). *See also* shear tests; cone penetration test. *Nelson.*

vane tester. Synonym for vane shear tester. *Long.*

vanner. a. A machine for dressing ore; an ore separator; a vanning machine. The name is given to various patented devices in which the peculiar motions of the shovel in the miner's hands in the operation of making a van are, or are supposed to be, more or less successfully imitated. There is an end-shake type, which includes the triumph concentrator. *See also* Frue vanner, for a general description of the side shake type. *Fay.* b. A miner who separates ore with a shovel or pan. *Webster 3d.* c. A wide, traveling, shaking rubber belt, for the concentration (dressing) of ores. *C.T.D.*

vanner grease belt. Consists of an endless rubber belt, 36 inches wide, running on rolls that are 6½ feet between centers. The outer surface is coated with grease. The structural assembly is oscillated transversely, and it is tilted slightly downward toward the tail pulley. Feed is dropped onto the greased surface near the tail pulley, and it is carried up the belt against a counterflow of water. *I.C. 8200, 1964, p. 72.*

vannerman. In ore dressing, smelting, and refining, one who operates a vanner to separate the valuable mineral from the gangue (waste minerals) in an ore. Also called vanner operator. *D.O.T. 1.*

vanning. Corn. a. A rough assay for cassiterite made by washing a pulverized sample on a flat vanning shovel. Largely superseded by use of vanning plaque, a white enameled dish on which heavy and light fractions of a finely divided wet sample can be separated and inspected. *Pryor, 3.* b. *See* van, b. *Fay.*

vanning machine. *See* vanner, a. *Fay.*

vanoxite. A rare, weakly radioactive, black mineral, $2V_2O_4.V_2O_5.8H_2O$, occurring in the Colorado Plateau area as a cementing material in sandstone, and as masses replacing wood; found associated with carnotite, gypsum, hewettite, pintadoite, tyuyamunite, and pyrite. *See also* kentsmithite. *Crosby, p. 83.*

vanthoffite. A colorless sulfate of sodium and magnesium, $3Na_2SO_4.MgSO_4$. Crystalline. From Wilhelmshall, Stassfurt, Germany. *English.*

vanuralite. A mineral, $(UO_2)_2Al(VO_4)_2(OH).8H_2O$, yellow, monoclinic; occurring at Mounana, Gabon Republic. Named from the composition. *Hey, M.M., 1964; Fleischer.*

vapart mill. A centrifugal grinder for pulverizing ore, coal, and coke. *Fay.*

vapor. a. Diffused matter (such as smoke, fog, mist, steam, or an exhalation) suspended floating in the air and impairing the transparency of the air. *Webster 3d.* b. A substance in the gaseous state as distinguished from the liquid or solid state; a gasified liquid or solid; a gaseous substance that is at a temperature below its critical temperature and therefore liquefiable by pressure alone. *Webster 3d.* Abbreviations, V and v. *Webster 3d; Zimmerman, p. 115.* c. Foul air in a mine. *Fay.*

vapor barrier. A material intended to prevent the passage of water vapor through a building wall so as to prevent condensation within the wall. *Strock, 10.*

vapor blasting. The same as liquid honing. *ASM Gloss.*

vapor degreasing. Degreasing work in vapor over a boiling liquid solvent, the vapor being considerably heavier than air. At least one constituent of the soil must be soluble in the solvent. *ASM Gloss.*

vapor density. The relative density of a gas or vapor as compared with some specific standard (as hydrogen). *Webster 3d.* Abbreviation, v d; symbol, 𝔇. *Zimmerman, p. 115.*

vapor galvanizing. A process for coating metal (usually iron or steel) surfaces with zinc by exposing them to the vapor of zinc instead of, as in ordinary galvanizing, to molten zinc. Also called sherardizing. *Fay.*

vaporimeter. a. An instrument for measuring the volume or the pressure of a vapor; specifically, one used in alcoholometry. *Webster 3d.* b. An apparatus in which the volatility of oils is estimated by heating them in a current of air. *C.T.D.*

vaporization. The act or process of changing a substance from a liquid to a gaseous state. *A.G.I.*

vapor-phase dispersion. *See* gaseous dispersion pattern. *Hawkes, 2, p. 415.*

vapor plating. Deposition of a metal or compound upon a heated surface by reduction or decomposition of a volatile compound at a temperature below the melting points of the deposit and the basis material. The reduction is usually accomplished by a gaseous reducing agent such as hydrogen. The decomposition process may involve thermal dissociation or reaction with the basis material. Occasionally used to designate deposition on cold surfaces by vacuum evaporation. *See also* deposition, b. *ASM Gloss.*

vapor pressure. a. The pressure at which a liquid and its vapors are in equilibrium at a definite temperature. If the vapor pressure reaches the prevailing atmospheric pressure, the liquid boils. *Hackh's Chem. Dict.* Symbol, *p. Handbook of Chemistry and Physics, 45th ed., 1964, p. F-100.* b. A component of atmospheric pressure which is caused by the presence of water vapor. It is expressed in inches of mercury. *Taylor.*

vapor suppression. A safety system that can be incorporated in the design of structures housing water reactors. In a vapor-suppression system, the space surrounding the reactor is vented into pools of water open to the outside air. If surges of hot vapors are released from the reactor in an accident, their energy is dissipated in the pools of water. Gases not condensed are scrubbed clean of radioactive particles by the bubbling. *L&L.*

vapor system. A steam heating system operating at pressure very near that of the atmosphere. *Strock, 10.*

Vaqueros formation. Strata of shallow water origin and of lower Miocene age. The formation includes the chief oil-bearing sands of the Caolinga District, Calif. *C.T.D.*

var Abbreviation for reactive volt ampere. *BuMin Style Guide, p. 61.*

vara. An old Spanish unit of length, used in the southwestern United States and in Mexico. One vara is equivalent to 33⅓ inches in Texas, 33 inches in California, and 32.9931 inches in Mexico. *A.G.I.*

V-arching. Rock failure above a tunnel due to ring stresses. These cause rock to crack across a weakness plane and fall. The final shape is a reentrant V rather than a rounded arching. *Pryor, 3.*

variable area method. A method of recording seismic impulses wherein the area of exposure of a photosensitive film or paper is proportional to the intensity of the seismic impulse. *A.G.I.*

variance. a. Defined as the square of the standard deviation, it is the average of the squares of the deviations of several observations. *Ham.* b. The number of unassigned variables in a materials system. *VV.*

variance analysis. Isolation by statistical methods of research, control, or cost accountancy, of causes of variation in a process, followed by determination of their magnitude as a step in process study or in managerial control by variance. *Pryor, 3.*

variance control. Scrutiny of working data as means of managerial control. Emphasis is placed on changes in a continuous or repetitive system rather than on performance norms. *Pryor, 3.*

variance in sampling. In statistical mathematics, the mean squared deviation of items from the established mean. *Pryor, 3.*

Varian nuclear magnetometer. This magnetometer is available in two models, one for airborne surveys and the other for use on the ground. Both measure the total magnetic field of the earth rather than its components. *Dobrin, p. 288.*

variation. The angle by which the compass needle deviates from the true north; subject to annual, diurnal, and secular changes. Called more properly declination of the needle. *Standard, 1964. See also* declination. *Fay.*

variation compass. A compass of delicate construction for observing the variation of the magnetic needle. *Webster 2d.*

variation diagram. A graphic representation of the variation in composition of the members of a series of related igneous rocks; for example, by plotting the bases as ordinates against silica as abscissae. *Holmes, 1928.*

variegated. Showing variations of color, especially reticulate patterns or mottling effects. *Stokes and Varnes, 1955.*

variegated copper ore. Bornite, erubescite. *Pryor, 3.*

variegated ore. Same as bornite. *Fay.*

variegated sandstone. Generally, a sandstone showing color variations or mottling. More specifically, a proper noun synonymous with the Triassic New Red Sandstone of England or the Buntesandstein of middle Europe. *Bureau of Mines Staff.*

variegated slate. *See* colored slates. *AIME, p. 793.*

varietal mineral. A characterizing accessory mineral either present in considerable amounts in a rock or distinctive of the rock. A mineral that distinguishes one variety of rock from another. In detrital rocks, the varietal minerals are usually of high specific gravity (heavy minerals) and/or are those most resistant to abrasion. Synonym for characterizing accessory mineral. *A.G.I.*

variety. In mineralogy, a mineral showing differences in color, other physical properties, or minor variations in composition from the material considered typical of the species. An example is emerald, the green-colored gem beryl. *Hess.*

varigradation. In geology, a process by which all streams of progressively increasing volume tend constantly, in a degree varying inversely with the volume, to depart from the normal gradients. *Standard, 1964.*

variole. A spherule of a variolite. *Webster 3d.*

variolite. A fine-grained igneous rock of basic composition containing small, more or less, spherical bodies (varioles) consisting of minute radiating fibers of feldspar, comparable with the more perfect spherulites of acid igneous rocks. The term would be better used as an adjective, that is, variolitic basalt, etc. *C.T.D.* Synonym for pearl diabase. *Fay.*

variolitic. Of, relating to, or resembling variolite. *Webster 3d.*

variolitic structure. A structure akin to spherulitic structure occurring in basaltic rocks, especially in the tachylytic margins of small intrusions, and in certain varieties of pillow lavas known as variolites. In some cases, the spherulites are made up of minute radiating fibers of plagioclase with interstitial glass, and in others they are less regular and consist of interferent sheaflike groups of labradorite rods diverted by grains of augite, olivine, or magnetite. *Holmes, 1928.*

variolitization. That variety of contact metamorphism, that gives rise to the formation of variolite. *Standard, 1964.*

variometer. A geophysical device for measuring or recording variations in terrestrial magnetism; a variable inductance provided with a scale. *A.G.I.*

Variscan orogeny. Series of late Paleozoic diastrophic movements beginning perhaps in Late Devonian and continuing to end of Permian. *A.G.I. Supp.*

Variscides. Mountain system raised in the latter part of the Paleozoic era particularly in central Europe; more or less equivalent to Hercynian. *A.G.I. Supp.*

variscite; utahlite. A soft green mineral, $Al(PO_4).2H_2O$, occurring as nodular masses in Utah. Used as a gem. Orthorhombic. *C.T.D.* Also called Amatrice. *Fay.*

variscite matrix. A mixture of variscite and other mineral or rock, especially amatrice. *Shipley.*

varislope screen. A suspended multiple deck screen with increased slopes in the second and third deck. It is used principally for coal and other large feed materials and combines scalping and sizing operations. The oversize lump material is removed on the top deck, egg or range size on the second, and nut size on the bottom deck. *See also* trislope screen. *Nelson.*

varistor. A material having an electrical resistance that is sensitive to changes in applied voltage. A typical example is the varistor made from a batch consisting of granular silicon carbide, mixed with carbon, clay and water; the shaped components are fired at 1,100° to 1,250° C in H_2 or N_2. Varistors are used in some types of telephone equipment. *Dodd.*

varnish. In ceramics, the lustrous surface or glaze on pottery, porcelain, etc. *Standard, 1964.*

Varnon. Trade name for hard fired superduty fireclay brick which resists the destructive action of carbon monoxide and other reducing gases. Dense, strong, good volume stability at high temperatures and has high rigidity under soaking heat conditions. Used as glass tank regenerator checkers; also line various metallurgical furnaces, rotary kilns, shaft kilns, carbon baking furnaces, and incinerators. *CCD 6d, 1961.*

varnsingite. A coarse-grained dike rock essentially composed of albite and augite, with accessory sphene, apatite, and magnetite. *Holmes, 1928.*

varulite. A dull olive-green phosphate of sodium, manganese, iron, and calcium, $Na_2O.5(Mn,Fe,Ca)O.2P_2O_5$. Granular masses. From Varutrask, Sweden. *English.*

varve. a. Any sedimentary bed or lamination that is deposited within a year's time. *A.G.I.* b. A pair of contrasting laminae representing seasonal sedimentation, as summer (light) and winter (dark) within a single year. *A.G.I.*

varved clay. Alternating thin layers of silt (or fine sand) and clay formed by variations in sedimentation during the various seasons of the year, often exhibiting contrasting colors when partially dried. *ASCE P1826.*

varves. Clayey soils containing thin alternate layers of different particle sizes; often combine the undesirable properties of clay and silt; formed from seasonal deposits from glacial streams. *Nelson.*

vaseline. Mixture of hydrocarbons left after distilling off petroleum. *See also* petroleum. *Pryor, 3.*

vashegyite. A white, yellow, rust-brown basic aluminum phosphate, $4Al_2O_3.3P_2O_5.30H_2O$. From Vashegy, Hungary; near Manhattan, Nev. *English.*

vat. A vessel or tub in which ore is washed or subjected to chemical treatment, as cyanide vat and chlorination vat. Used as a synonym for tank. *See also* vate. *Fay.*

vate. Corn. A square, hollow place on the back of a calcining furnace for drying tin ore before feeding it into the furnace. Also spelled vat. *Fay.*

vaterite. a. Two forms of artificial calcium carbonate, in spherules, are designated respectively, vaterite A and vaterite B. Less stable than aragonite and calcite. *English.* b. A naturally occurring mineral from Ballycraigy, Larne, northern Ire.; very finely fibrous or platy; found in hydrogel pseudomorphs after larnite. *American Mineralogist, v. 45, No. 11-12, November-December 1960, p. 1316.*

vaughanite. Suggested for the fine-textured limestones that occur at various horizons throughout the Paleozoic and Mesozoic sections, which contain few fossils in their composition, and break with a more or less pronounced conchoidal fracture. Limestones of this type approach rather closely the uniformity and fineness of texture seen in lithographic limestones. *A.G.I.*

vaugnerite. A dark plutonic rock composed of hornblende, biotite, and intermediate plagioclase, with minor orthoclase and quartz. A dark variety of granodiorite. *A.G.I.*

vauquelinite. A green to brownish-black fibrous mineral, $5(Pb,Cu)O.2CrO_3.P_2O_5$; hardness 3; specific gravity 6.0±. *Larsen, p. 210.*

vauxite. A light to deep blue mineral, $FeO.Al_2O_3.P_2O_5.6H_2O \pm 2H_2O$; no cleavage; triclinic. *American Mineralogist, v. 30, No. 7-8, July-August 1945, p. 550.*

V-bend die. A die commonly used in press-brake forming, usually machined with a triangular cross-sectional opening to provide two edges as fulcrums for accomplishing three-point bending. *ASM Gloss.*

V-bob. A strong frame shaped like an isosceles triangle, turning on a pivot at its apex and used as a bell crank to change the direction of a main pump rod. *Webster 3d.* It is used with Cornish pumping engines. *Fay.*

V-box. Sloughing box, used to separate slime (as overflow) from faster-settling portion of solids in pulp. Length 10 to 50 feet, slope 50° to 60° down to bottom discharge spigots through which thickened product is drawn by way of gates or goosenecks. *Pryor, 3.*

V-bricks. A series of perforated clay building bricks designed by the Building Research Station, England, in 1959-60; the name derives from the fact that the perforations are vertical. *Dodd.*

V-bucket conveyor elevator. *See* gravity discharge conveyor elevator. *ASA MH4.1-1958.*

V-coal. A maceral made of substances which predominate in the vitrainous and clarainous bands of coal. This name is applied to the microscopic coal particles found in the lungs of miners. *Tomkeieff, 1954.*

V-cut. a. In mining and tunneling, a cut where the material blasted out in plan is like the letter V; usually consists of six or eight holes drilled into the face, half of which form an acute angle with the other half. *Fay.* b. In underground blasting, a type of cut employed in which the cut holes meet in a V to pull the cut to the bottom of the holes properly. A single pair of holes may do in one kind of rock, but in another, two or three sets of V-holes entirely across the face may be needed. Also called vee cut; wedge cut. *Lewis, p. 165.* c. All edge cuts converging towards the central area of the mica piece. *Skow.*

v d Abbreviation for vapor density. *Zimmerman, p. 115.*

ve Abbreviation for vitreous enamel. *See also* vitreous enamel. *Dodd.*

V-draining. Somewhat related to double draining but is usually caused by loss of set in the ground coat which allows the draining enamel to sag in a minute V-formation. *ACSB, 3.*

veal; voun. Scot. A water box or chest, usually on wheels, for removing water. Also called ghost. *Fay.*

veatchite. a. A white hydrous borate of calcium, $Ca_2B_6O_{11}.2H_2O$, or 16 $[Sr_3B_{16}O_{27}.5H_2O]$ or 44 $[SrB_6O_{10}.2H_2O]$. In cross-fiber veins. Monoclinic. From Lang, Calif. *English; Dana 7, v. 2, p. 348.* b. A polymorph of veatchite. *Hey, M.M., 1961.*

vebe apparatus. A device developed by the Swedish Cement Association for the measurement of the consistency of concrete. It is a slump test in which the consistency is expressed in degrees, the value being obtained by multiplying the ratio of the volume of the test piece after vibration to that before vibration by the number of vibrations required to cause the test piece to settle. *Dodd.*

Vectolite. Compressed powdered iron oxide and cobalt oxide; used for lightweight permanent magnets. *Bennett, 2d, 1962.*

vector. a. An entity represented as a directed magnitude, such as velocity, which is defined as consisting of a speed and a direction. *See also* scalar. *Hy.* b. *See* hard vector. *Long.*

vector field. The same as resultant field. *ASM Gloss.*

vee. Mid. The junction of two underground roadways meeting in the form of a V. *Fay.*

vee cut. *See* wedge cut; V-cut.

vee jewel. A jewel bearing fitting into a cup-like depression. *Hess.*

veerer. Som. An old word for banksman. *Fay.*

vees; veez. a. A layer of soft clay or earth on the sides of a fault or dike. *See also* leatherbed. *Nelson.* b. The acute angle between the fault plane and a coal seam, for example, working the coal to the vees of the fault. *Nelson.* c. Scot. The line of fracture of a fault or hitch. *Fay.*

vee table. A pneumatic table, of U.S. design, for the drycleaning of coal and is an improved form of the S. J. table. *Nelson.*

vee thread. Synonym for V-thread. *Long.*

Vegard's law. The relationship which states that the lattice parameters of substitutional solid solutions vary linearly between the values for the components, with composition expressed in atomic percentage. *ASM Gloss.*

vegetable jelly. Same as fundamental jelly, carbohumin, etc. *Tomkeieff, 1954.*

vegetable stains. In mica, stains that are pale yellow, brown, green, or different clay color when viewed by transmitted light. No data are available to support the impression that these stains are organic in nature. Tests conducted indicate that they are finely dispersed particles of the various iron oxides. The difference between these stains and the so-called mineral stains is probably only in their concentration, density, or type of oxide. *Skow.*

vegetal. Of vegetable or plant origin. *von Bernewitz.*

vegetate. To crystallize; to exude. *Fay.*

vehicle. The oil or mixture of oils in which pigments are mixed and ground to an emulsion. *Hansen.*

veil. a. A removable plate to cover a screen, the action of which is not desired. *Zern.* b. Applied to white cloudlike or veillike aggregates of minute bubbles in raw quartz crystals. *AM, 1.*

vein. a. A zone or belt of mineralized rock lying within boundaries clearly separating it from neighboring rock. It includes all deposits of mineral matter found through a mineralized zone or belt coming from the same source, impressed with the same forms and appearing to have been created by the same processes. *Ricketts, p. 117.* b. A mineralized zone having a more or less regular development in length, width, and depth to give it a tabular form and commonly inclined at a considerable angle to the horizontal. The term lode is commonly used synonymously for vein. *Lewis, p. 20.* c. Vein or lode does not mean merely a typical fissure or contact vein, but any fairly well-defined zone, or belt of mineral bearing rock in place. *Fay.* d. A mineral deposit, usually steeply inclined. Used to describe a body that is usually smaller, and has better defined walls than a lode. *Nelson.* e. A rock fissure filled by intruded mineral matter. Many valuable minerals are codeposited with gangue stuff in veins. Usually the formation is steep to vertical, unlike a bedded deposit in which values are sandwiched horizontally. Vein is typically long, deep, and relatively narrow. *Pryor, 3.* f. An occurrence of ore, usually disseminated through a gangue, or veinstone. A vein and a lode are, in common usage, essentially the same thing, the former being rather the scientific, the latter the miners' name for it. *See also* lode; fissure; fissure vein. *Fay.* g. The filling of a fissure or fault in a rock, particularly if deposited by aqueous solutions. When metalliferous, it is called by miners a lode; when filled with eruption material, a dike. A bed or shoot of ore parallel with the bedding. Also called blanket deposit. *Standard, 1964.* h. A body of ore filling a rock fissure and usually deposited there from solution by underground water; a lode. *Webster 3d.* i. A comparatively thin sheet of igneous rock injected into a crevice in rock. When this intrusion is large, it is called a dike. *Fay.* j. An irregular, sinuous, igneous injection, or a tabular body of rock formed by deposition from solutions rich in water or other volatile substances. *Holmes, 1928.* k. A mineral body, thin in relation to its other dimensions, which cuts across the bedding and in which the minerals are later than the country rock. *B.S. 3618, 1964, sec. 5.* l. Sometimes used for a bed; for example, a coal seam or a bed of slate. *B.S. 3618, 1964, sec. 5.* m. A layer, seam, or narrow irregular body of material different from surrounding formations. *Nichols.*

vein bitumen. Synonym for asphaltite. *A.G.I. Supp.*

vein dike. a. The product of solidification of the so-called ore magma. *A.G.I.* b. Proposed by Spurr to designate pegmatitic intrusions and related bodies because they partake of the characteristics of both dikes and veins. *Stokes and Varnes, 1955.*

veined. Marked or streaked with veins or lines of color in various directions, as some marbles. *Fay.*

veined gneiss. Metamorphic rock formed by intrusion of magma into nonfissile country rock in numerous veins and dikelets extending in all directions. *A.G.I. Supp.*

veined texture. A texture marked by veins or streaks of mineral running in various directions. *Schieferdecker.*

veining. A type of subboundary structure which can be delineated because of the presence of a greater-than-average concentration of precipitate or possibly solute atoms. *ASM Gloss.*

vein intersection. a. The depth in the borehole at which the hanging and/or footwall of a vein is encountered. *Long.* b. The place where two or more veins cross or meet. *Long.*

veinlet. *See* stringer, e.

vein material. *See* veinstuff. *Nelson.*

vein miner. A miner experienced in the winning and working of mineral veins. *See also* metal mining. *Nelson.*

vein minerals. The minerals occurring in veins, especially the gangue; veinstone. *Fay.*

vein or lode claim. a. The terms "vein or lode" and "vein or lode claim" are used indiscriminately and interchangeably, and it follows that the term "vein or lode" is intended to be synonymous with the term "vein or lode claims". *See also* vein; lode. *Fay.* b. *See* lode claim. *A.G.I.*

vein quartz. Quartz occurring in veins consisting essentially of interlocking sutured crystals of quartz, the individuals varying widely in size. *Holmes, 1928.*

vein skirts. Derb. The walls of a lode. *Fay.*

veinstone. The valueless stone that occurs with the valuable minerals in lodes and veins. *Nelson.* Also called gangue; lodestuff; matrix; vein mineral; veinstuff. *Fay.*

veinstuff. a. The portion of the lode which is not ore. *See also* veinstone. *Fay.* b. The minerals occurring in veins of fissures. *C.T.D.* c. All the minerals and materials occurring within the walls of a vein. *See also* lodestuff. *Nelson.*

veins within placers. In mining law, the right to the veins within a placer claim does not go automatically to the locator of the placer claim. The lodes should be located separately but are limited to a width of 50 feet, 25 feet on each side of the centerline. When placers are being patented, the claimant of the veins should secure the exclusion of his lode by advertising the patent to that extent. After a placer patent has been granted, all new lodes that are discovered belong to the owner of the placer patent. *Lewis, p. 34.*

vein system. An assemblage of veins, as of a given area, district, or age taken as a whole. *Stokes and Varnes, 1955.*

vein walls. The rock surfaces on the borders of veins. If there is much replacement of the country rock along the fissure, the ore may grade into the wall rock and its walls may be indistinct. *Stokes and Varnes, 1955.*

veise. Scot. A joint in the coal strata. *See also* vees, c. *Fay.*

veld; veldt. a. African grassland that is usually nearly level, is often intermixed with scattered shrubs or trees, and is chiefly located in eastern and southern Africa. *Webster 3d.* b. Grassland similar to African veld (as in parts of California). *Webster 3d.*

velikhovite. A variety of pyrobitumen having a shining conchoidal fracture and occurring in the form of veins. It is partly soluble in organic solvent and its specific gravity is 1.2. In many ways it is similar to grahamite and it is assumed that it represents a weathering product of albertite. From the South Urals, U.S.S.R. *Tomkeieff, 1954.*

Vello process. A method for the production of glass tubing; molten glass flows vertically through an annular orifice; the central refractory pipe within the orifice is hollow and rotates. The process is considerably faster than the Danner process. *Dodd.*

vellum glaze. A semimat glaze having a satinlike appearance. *ASTM C242-60.*

velocities in pipes. Experience has proved that the following are allowable velocities in pipes for air 30 to 50 feet per second; compressed air 25 to 40 feet per second; steam 160 to 250 feet per second; water 5 to 10 feet per second. *Ham.*

velocity. a. In explosives, the speed at which the detonating wave passes through a column of explosives. These velocities are expressed in meters or feet per second. A high velocity explosive renders a shattering effect, whereas a low velocity explosive has a pushing or heaving effect. *Kentucky, p. 167.* b. Linear flow rate of air per unit time. Measured in feet per minute. *Hartman, p. 9.* c. A vector quantity which indicates a time rate of motion. *A.G.I.*

velocity determination. The determination of velocities and average velocities within the earth by seismic measurements. *A.G.I.*

velocity discontinuity. An abrupt change of the rate of propagation of seismic waves within the earth, as at an interface. *A.G.I.*

velocity distribution. Relation between seismic wave velocity and depth. *Schieferdecker.*

velocity gradient. Gradual changes in the velocity of propagation with distance within a single medium are known as velocity gradients. *H&G.*

velocity head. a. The constant difference of height of a liquid between a level surface in a tank and a uniformly flowing jet through an orifice. *Standard, 1964.* b. The distance a body must fall under the force of gravity to acquire the velocity it possesses. *See also* kinetic energy. *Seelye, 1.* c. The energy possessed per unit weight of a fluid, due to its velocity.

If at a given point the velocity is v feet per second, the velocity heat at this point is $\frac{v^2}{2g}$, g being the acceleration due to gravity in feet per second per second. Also called kinetic head. *C.T.D.*

velocity hydrophone. A hydrophone in which the electric output substantially corresponds to the instantaneous particle velocity in the impressed sound wave. *H&G.*

velocity level. The velocity level, in decibels, of a sound is 20 times the logarithm to the base 10 of the ratio of the particle velocity of the sound to the reference particle velocity. The reference particle velocity shall be stated explicitly. *H&G.*

velocity meter. A seismometer used to record vibrations of a period very close to its own free period. *A.G.I.*

velocity of air current. The higher the velocity of the air current the greater will be the resistance to air flow. It can be proved experimentally that the resistance is nearly proportional to the velocity squared. *Mason, v. 1, p. 215.*

velocity of approach. a. The average velocity of water in a channel at the point where the depth over a flow measuring weir is recorded. *Ham.* b. The mean velocity in the conduit immediately up stream from a weir, dam, Venturi throat, orifice, or other structure. *Seelye, 1.*

velocity of a stream. Rate of motion of a stream measured in terms of the distance its water travels in a unit of time, usually in feet per second. *Leet.*

velocity of detonation. a. The velocity with which the detonation or explosion of a mass of explosives travels through the mass itself. *Fay.* b. The velocity with which the shock wave traverses an explosive charge on detonation. *B.S. 3618, 1964, sec. 6.* c. The velocity of detonation of an explosive is usually determined by what is known as the Dautriche test. The basis of this test is that a length of cordtex detonating fuse detonates at a uniform speed, and if the two ends of a length of cordtex are detonated simultaneously the detonation waves will meet at the middle of the length of fuse. Similarly, if the two ends are detonated at different times, the distance from the middle of the fuse to the point where the two detonation waves meet is directly proportional to the interval of time between the detonations of the two ends of the cordtex fuse. Furthermore, if the distance can be measured, the interval of time between the detonation can be calculated, since the velocity of detonation of cordtex is known. *McAdam II, p. 17.*

velocity of retreat. An average velocity of flow of a liquid just downstream of a measuring weir. *Ham.*

velocity pressure. a. The pressure equivalent of the air velocity at any particular point. This is always positive. *B.S. 3618, 1963, sec. 2.* b. The pressure exerted by a moving fluid in the direction of its motion. It is the difference between the total pressure and the static pressure. *Strock, 10.* c. The algebraic difference between the total head and the static pressure. For an incompressible flow this is equal to $\frac{1}{2}pv^2$. *Roberts, I, p. 2.* d. In mine ventilation, the pressure exerted by the kinetic energy of air movement. *BuMines Bull. 589, 1960, p. 3.*

velocity profile. A seismic reflection spread designed to record data which may be used to compute average velocities in the earth to reflecting horizons by observation of time variations compared with geometrical ray paths traveled. *A.G.I.*

velocity ratio. The ratio of the distance through which the force applied to a machine moves, and the distance through which the load moves. *See also* mechanical advantage. *Ham.*

velocity reducing collector. This type of collector is designed to remove very large dust particles. It is often used ahead of other collectors to reduce the dust load, and to remove the particles most likely to cause abrasion. The velocity reducing collector has no moving parts and, in most instances, can be installed in front of the induced draft fan, reducing the abrasion of the fan blades. This type of collector also can be used under many high-temperature conditions. *Pit and Quarry, 53rd, sec. B, p. 268.*

velometer. A small portable instrument approximately 5½ inches square and 2⅜ inches thick. A hinged vane is attached to a pointer which moves over a scale on the face of the box. The instrument is connected by a short length of tubing to one of several different types of jets, which are held where the velocity or pressure of the air is to be measured. The impact or pressure of the air against the vane moves the vane and its pointer. The scale is calibrated to give readings directly in feet per minute or inches of water gage. *Lewis, pp. 714-715.* Although used mostly in industrial surveys of duct work, the velometer is finding use underground as well for rapid instantaneous velocity readings. Air entering a port on one side of the instrument deflects a vane, jewel mounted and spring held. The deflection of the vane, proportional to the velocity head, is registered by a pointer on the dial. *Hartman, p. 109.*

velvet. Profit; easily earned money. By analogy, a term used for galena in the Wisconsin zinc field when it can be separated from the blende without difficulty and sold as a byproduct. *Fay.*

velvet copper ore. Lettsomite. Perhaps $4CuO.Al_2O_3.SO_3.8H_2O$, in velvetlike druses; in spherical forms; bright blue. *Fay.* Synonym for cyanotrichite. *Hey 2d, 1955.*

vena contracta. a. A term used with reference to a jet of fluid discharged by an orifice. It is the point of minimum cross-sectional area at which the converging streamlines become parallel. *Nelson.* b. The minimum cross-sectional area of a jet of fluid beyond the hole through which it issues. *See also* coefficient of contraction. *Ham.*

venanzite. An extrusive rock composed of melilite, leucite, and olivine, and minor phlogopite. Olivine and phlogopite occur as phenocrysts; and these minerals plus melilite and leucite compose the groundmass. *A.G.I.*

vend. Products sold by coal mine annually. *Pryor, 3.*

vendeennite. A variety of fossil resin from Vendee, France. *Tomkeieff, 1954.*

veneer. a. In ceramics, any thin outer coating put on principally for appearance or decoration. *Standard, 1964.* b. In refractories, thin fireface wall of superior refractory brick that protects the major part of a furnace wall in service. *Bureau of Mines Staff.* c. A single wythe of masonry for facing purposes, not structurally bonded. *ACSG, 1963.*

veneered wall. A wall having a facing (of faience panels, for example) which is attached to the backing but not in a way to transmit a full share of any imposed load; the veneer and the backing do not exert a common action under load. *Dodd.*

Venetian chalk. A white compact talc or steatite used especially for marking on cloth. *Webster 3d.*

Venetian glass. A style of glass having an excessive amount of decoration, usually on a very light and delicate foundation. It was developed by the Venetian glassworkers in Murano. *C.T.D.*

Venetian red. A high-grade ferric-oxide pigment of a purer red hue than either light red or Indian red. Obtained either native as a variety of hematite red or more often artificially, by calcining copperas in the presence of lime. The composition ranges from 15 to 40 percent ferric oxide and from 60 to 80 percent calcium sulfate. The 40-percent ferric oxide is the pure grade and has a specific gravity of 3.45. *CCD 6d, 1961.*

Venetian white. A pigment consisting of a mixture of equal parts of white lead and barite. *Webster 3d.*

venite. A veined gneiss (migmatite) formed by differential recrystallization of solid rock in situ. *See also* arterite, a. *A.G.I.*

vent. a. An opening or hole for the escape or passage of something, as of a gas or liquid, or for the relief of pressure within something, as a boiler. *Webster 3d.* b. Scot. A chimney; a return airway. *Fay.* c. A small passage made with a needle through the stemming, for admitting a squib to enable the charge to be lighted. *Fay.* d. A hole, extending up through the bearing at the top of the core-barrel inner tube, that allows the water and air in the upper part of the inner tube to escape into the borehole. *Long.* e. A small hole in the upper end of a core-barrel inner tube that allows water and air in the inner tube to escape into the annular space between the inner and outer barrels. *Long.* f. A small opening in a mold for the escape of gases. *ASM Gloss.*

ventifact. A general name for any stone shaped by the abrasive action of wind-blown sand under (usually) desert conditions. *C.T.D.* A special term for the three-sided variety is dreikanter. *Bureau of Mines Staff.*

ventilate. a. To cause fresh air to circulate through (to replace foul air simultaneously removed), as a room, mine, etc. *Webster 3d.* b. To provide with a vent or escape for air, gas, etc. *Webster 3d.*

ventilating column. *See* motive column. *Fay.*

ventilating currents. The currents of air traveling in mines. *Peel.*

ventilating fan, mine. *See* mine ventilating fan.

ventilating pressure. a. The total pressure or force required to overcome the friction of the air in mines; namely, the pressure per square foot multiplied by the cross-sectional area of the airway. *Fay.* b. The pressure exerted on the atmosphere by the mine fan to overcome the resistance of the mine to the passage of a required volume of air throughout the mine necessary for its ventilation. *Kentucky, p. 62.*

ventilation. a. The atmospheric air circulating in a mine. *Fay.* b. The principal air-conditioning process concerned with control of air circulation. *Hartman, p. 73.* c. The provision of an adequate flow of fresh air along all roadways, traveling roads, workings, and service points underground. Ventilation is an essential factor in safety, health, and working efficiency and is also necessary to dilute and remove noxious or flammable gases and to abate such problems as dust and high temperatures. *See also* ascensional ventilation; auxiliary ventilation; descensional ventilation; fan; ventilation planning. *Nelson.*

ventilation, auxiliary. *See* auxiliary ventilation.

ventilation department. A department for the purpose of planning adequate and economic ventilation for all future projects and to provide frequent information on existing ventilation systems. *Nelson.*

ventilation doors. Doors constructed to close off the unused or no-longer-needed crosscuts to prevent the air from short-circuiting. *Lewis, p. 544. See also* door; separation door.

ventilation ducts. Two kinds are available: (1) flexible ducts generally consist of flexible tubes made from fabrics coated with rubber or polyvinyl chloride, a nonflammable substance. They are available in varying lengths. Flexible ducting is suited for use in temporary installations as in the bord-and-pillar mining of coal. It is suited also to crooked workings of limited extent. It has a higher resistance and a greater tendency to leak than rigid ducting; and (2) rigid ducts are made of steel plate in lengths suitable for underground transport, often 9 feet, and up to 24 inches in diameter. This type duct does not have to be accurately aligned and is therefore used, in the smaller sizes, in subsidiary work, particularly in crooked headings. For main tunnels where leakage must be minimized, flanged joints are used with a suitable gasket. *Roberts, I, p. 225.*

ventilation efficiency. One measure of the efficiency of a mine ventilation system is the ratio of the total amount (volume in cubic feet per minute) of air handled by the fan to the total amount of air actually getting to the working faces. If 200,000 cubic feet per minute are handled by the fan and only 100,000 get to the working faces, the efficiency is only 50 percent. *Kentucky, p. 85. See also* overall ventilation efficiency; thermometric fan test; ventilation standards; volumetric efficiency. *Nelson.*

ventilation man. *See* brattice man. *D.O.T. 1.*

ventilation plan. A plan or drawing, required by law, which shows the ventilation air currents in a mine and the means of controlling them. *B.S. 3618, 1963, sec. 1.*

ventilation planning. When a new mine is projected or a new seam to be worked from an existing mine, plans are prepared to show the proposed ventilating system, including the quantities of air and pressures and the principal appliances to control and distribute the air. Investigations and calculations are made to select a fan of the necessary type and size for the ventilation required. All this very important work comes within the general term ventilation planning. *See also* air requirements; pressure survey; ventilation survey. *Nelson.*

ventilation pressure. a. The pressure or force producing ventilation in a mine and measured by the height of a column of water it will support. The instrument used for this purpose is the water gage. The pressure represented by a column of water 1 inch high equals 5.2 pounds per square foot. Therefore, the ventilation pressure (pounds per square foot) is equal to the water gage reading times 5.2. *Nelson.* b. Pressure producing the flow of air, measured by the water gage, or the difference in level between the two ends of the water column in a vertical U-shaped tube, one end of which is connected to the air under pressure, for example, in the passageway leading to the fan, the other end being connected to the open air. In some cases the ventilating pressure is reported as feet or head of air under given conditions of temperature and pressure. This is called the motive column. *Lewis, pp. 705-706.*

ventilation, reversal of. In the case of a centrifugal fan, the reversal arrangement may consist of an emergency drift connecting the fan with the downcast shaft. The drift is normally sealed off by airtight doors. In the case of an axial-flow fan, it is only necessary to reverse the rotation of the fan. This arrangement entails a reduction in volume and pressure in the reversed air flow. *Nelson.*

ventilation regulator. *See* regulator, a. *Nelson.*

ventilation, splitting. Mine workings are usually subdivided to form a number of separate ventilating districts. Each district is given a specified supply of fresh air and free from contamination by the air of other districts. Accordingly, the main intake air is split into the different districts of the mine. Later, the return air from the districts reunite to restore the single main return air current at or near the upcast shaft. *See also* compound ventilation; regulator. *Nelson.*

ventilation standards. The standards prescribed by Regulations to provide air underground of a certain degree of purity. *Nelson.*

ventilation stopping. *See* stopping. *Nelson.*

ventilation survey. In order to distribute the air in a mine efficiently and economically, ventilation surveys are conducted. They may be classified as: (1) qualitative surveys to determine the proportion of flammable or poisonous gas, or dust, in the air which is being circulated through the mine, or in hot and humid mines to determine the conditions of air temperature and humidity; (2) quantitative surveys to determine the quantity of air being circulated through the mine workings for a variety of reasons. This is done by measuring the volume of air passing at different points in the circuit by means of the anemometer, in order to investigate the existing air distribution, particularly to the individual faces, the location of leakage, and the possibility of its reduction or elimination; and (3) pressure surveys in order to measure the pressure absorbed and the resistance of the roadways and faces included in the survey. This enables the power required to circulate the air in the different sections of the circuit and that expended in ventilating individual districts to be determined. The total power expended in ventilating the mine may then be summated and the cost estimated. *Sinclair, I, p. 133.* Systematic observation of air pressure, quantity and quality throughout a mine or part of a mine, to allow a detailed analysis of the ventilation of the system. *B.S. 3618, 1963, sec. 2.*

ventilation symbols. A set of standard letters, signs, or marks used on mine ventilation plans to represent certain appliances or constructions to direct and control the flow of air underground. For example, a regulator is denoted by R inside parallel lines which represent a roadway. *Nelson.*

ventilation tubing; ducting; air pipes. Sheet steel or canvas piping 12 to 24 inches in diameter for conducting air to, or from, a tunnel or hard heading face, or sinking pit. The tubing extends from an auxiliary fan to within a few yards of the face to be ventilated. The National Coal Board, Great Britain, has adopted a standard steel pipe which has welded seams and a bolted or a quick-release clip joint. *See also* auxiliary ventilation; flexible ventilation ducting; shaft-sinking ventilation. *Nelson.*

ventilator. a. A mechanical apparatus for producing a current of air underground, as a blowing or exhaust fan. *Fay.* b. A furnace for ventilating a mine by heating the upcast air. *Fay.* c. A device for providing fresh air to a room or other space by (1) introducing outside air, or (2) exhausting foul air. *Crispin.*

vent pipe. *See* vent tube. *Long.*

vent tube. a. Hose or piping conducting air-ejected drill cuttings from the borehole collar to a point some distance from the drill. *Long.* b. An exhaust pipe or tube. *Long.* c. A canvas tubing suspended from a wire in a mine opening to supply fresh air to a working place. *Long.*

ventubes. Tubes of sheet iron or canvas up to 100 centimeters in diameter with thin walls which can be easily connected. They are used in mine ventilation to lead the air wherever it is needed. Also called ventilation pipelines. *Stoces, v. 1, p. 534.*

Venturi. A contraction in a pipeline or duct to accelerate the fluid and lower its static pressure. Used for metering and other purposes. *Strock, 10.*

Venturian. Middle Pliocene. *A.G.I. Supp.*

Venturi blower. a. A device resembling a Venturi meter, that is utilized in directing the jet of compressed air for ventilating short headings. The device is commonly made at the mine, and one well-proved type is called the Modder Deep. These blowers are mainly used in conjunction with 14- or 16-inch ducting for the ventilation of headings several hundred feet in length. *Roberts, I, pp. 223-224.* b. An apparatus to induce a flow of air or gas in a duct by means of a jet of compressed air or water from a small nozzle in the duct. *B.S. 3618, 1963, sec. 2.*

Venturi flume. a. A type of open flume with a contracted throat that causes a drop in the hydraulic gradeline; used for measuring flow. *Seelye, 1.* b. A control flume which comprises a short constricted section followed by one expanding to normal width. *See also* control, i. *Ham.*

Venturi meter. A trademark for a form of the Venturi tube arranged to measure the flow of a liquid in pipes. Small tubes are attached to the Venturi tube at the throat and at the point where the liquid enters the converging entrance. The difference in pressure heads is shown on some form of manometer and from this difference and a knowledge of the diameters of the tubes, the quantity of flow is determined. *Webster 2d.*

venturin. A yellow powder used as an imitation of gold in japanning. *Compare* aventurine. *Standard, 1964; Fay.*

Venturi tube. A closed conduit which is gradually contracted to a throat causing a reduction of pressure head by which the velocity through the throat may be determined. The contraction is generally followed, but not necessarily so, by gradual enlargement to original size. Piezometers connected to the pipe above the contracting section and at the throat indicate the drop in the pressure head which is an index of flow. *Seelye, 1.*

vent, volcanic. *See* volcanic vent. *A.G.I.*

vent wire. A wire used by founders to make a hole in a sand mold for the escape of air or gases. *Standard, 1964.*

venule. A small vein; veinlet. *Standard, 1964.*

Venus's hairstone. Quartz containing needle-shaped crystals of rutile. *Standard, 1964. See also* sagenitic quartz. *Fay.*

verde antique. A dark-green rock composed essentially of serpentine (hydrous magnesium silicate). Usually crisscrossed with white veinlets of marble. Found in California, Georgia, Maryland, Massachusetts, New York, and Virginia. Used as an ornamental stone. *CCD 6d, 1961.* In commerce, it is often classed as a marble. *Sanford.*

verde di Corsica duro. It. A rock found on the Island of Corsica, of a changing green color, composed of diallage and labrador feldspar, and used for vases, inlaying, and other ornamental purposes. Also called corsilite. *Fay.*

verde salt. *See* thenardite. *CCD 6d, 1961.*

Verdet's constant. The rotation of the plane of polarization per centimeter per unit magnetic field in the Faraday effect. The value of the constant varies with temperature and is approximately proportional to the square of the wavelength of the light. *C.T.D.*

verdigris. a. An oxidation on the surface of copper. Also formed by treating copper with acetic acid. Used as a pigment. *Crispin.* b. A green or greenish-blue, poisonous pigment obtained by the action of acetic acid on copper and used chiefly in antifouling paints; as (1) a light blue powder or silky blue crystalline product $Cu(C_2H_3O_2)_2.CuO.6H_2O$; also called blue verdigris; and (2) a green product $2Cu(C_2H_3O_2)_2.CuO.6H_2O$; also called green verdigris. *Webster 3d.* c. The poisonous normal copper acetate $Cu(C_2H_3O_2)_2.H_2O$ obtained as a green powder or as dark green efflorescent crystals (as by the action of acetic acid on copper oxide). Used chiefly in making Paris green. Also called crystallized verdigris; neutral verdigris. *Webster 3d.* d. A green or bluish deposit especially of copper carbonate formed on copper, brass, or bronze surfaces. *Webster 3d.* e. True verdigris is basic copper acetate, also called blue verdigris or green verdigris according to the color. A false verdigris formed on uncleaned copper vessels may consist of basic copper carbonate, and the green patina which coats old copper and bronze statues is a basic copper sulfate, or if on copper exposed to sea air or to sea water, a basic copper chloride. *CCD 6d, 1961.*

verdite. A green rock, consisting chiefly of green mica (fuchsite) and clayey matter, occurring as large boulders in the North Kaap River, Republic of South Africa. *C.M.D.*

verditer. a. Verdigris. *Webster 2d.* b. Either of two basic carbonates of copper used as pigments, and prepared either by grinding the mineral azurite (giving blue verditer), and the mineral malachite (giving green verditer), or artificially. *Webster 2d.*

verdolite. Talcose-dolomitic breccia rock from New Jersey. *Schaller.*

verge. The gable edge of a tilted roof. At the verge the roofing tiles are edge-bedded, preferably on a single or double undercloak of plain tiles. This form of undercloak gives a neat appearance to the verge and slightly inclines the verge tiles so that rainwater is turned back onto the main roof. *Dodd.*

vergence. The direction of overturning of folds. *Challinor.*

verifier. a. A tool used in deep boring for detaching and bringing to the surface portions of the wall of the borehole at any desired depth. *Fay.* b. In gas testing, an apparatus by which the amount of gas required to produce a flame of a given size is measured; a gas verifier. *Standard, 1964.*

verite. A glassy, basaltlike lava containing phenocrysts of biotite, olivine, augite, and sometimes plagioclase, in a glassy groundmass; from Vera, Spain. *Webster 2d.*

vermeil. a. Vermillion. *Webster 3d.* b. An orange-red garnet; spinel; ruby. *Webster 3d.* c. A red varnish applied to a gilded surface to give luster. *Webster 3d.* d. Gilded silver, bronze, or copper. *Webster 3d.*

vermeil garnet. A trade term for any orangy-red garnet; same as guarnaccine garnet. Also sometimes applied to any brownish-red garnet. *Shipley.*

vermeil ruby. Orangy-red to red-brown corundum. *Shipley.*

Vermes. A group comprising the typically soft-bodied and more or less vermiform invertebrates, including the flatworms, roundworms, annelid worms, and minor forms, and usually held to be a purely artificial assemblage. *Webster 3d.*

vermicular quartz. Quartz occurring in wormlike intergrowths with feldspar. *Stokes and Varnes, 1955.*

vermiculated. Stones, etc., worked so as to have the appearance of having been eaten into by worms. *Crispin.*

vermiculite. A mineral of the mica group but hydrated, and with the property of expanding six to twenty times the volume of the unexpanded mineral when heated to about 2,000° F. A hydrated magnesium-aluminum-iron silicate containing approximately 39 percent SiO_2, 21 percent MgO, 15 percent Al_2O_3, 9 percent Fe_2O_3, 5 to 7 percent K_2O, 1 percent CaO, 5 to 9 percent H_2O, and small quantities of chromium, manganese, phosphorus, sulfur, chlorine, Platelet-type crystalline structure; high porosity; low density; insoluble in water and organic solvents. Found in Montana, North Carolina, South Carolina, Wyoming, Colorado; Republic of South Africa. Used in lightweight concrete aggregate; refractory; oil well drilling mud; insulation; fireproofing. *CCD 6d, 1961.*

vermilion; vermillion. a. A red pigment used in enormous quantities. Usually made from mercuric sulfide, HgS, tinted with puranitraniline. *Crispin.* b. A bright red pigment consisting of mercuric sulfide. Prepared synthetically (as by the reaction of mercury, sulfur, and sodium hydroxide) but formerly obtained from the mineral cinnabar. Color ranges from crimson when coarse-grained to nearly orange when finely divided. Both spellings are correct. *Webster 3d.* c. Synonym for alpha mercuric sulfide and for the mineral cinnabar which is natural alpha mercuric sulfide. *See also* mercuric sulfide, red. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-194.*

vermilion opal. Milky opal impregnated with cinnabar. *Schaller.*

vermilite. Vermilion opal. *Schaller.*

vermillion. In the Lake Superior region, the lowest of the stratified schists; the crystalline schists. *Fay.*

Vermontian orogeny. Post-Cambrian diastrophism. *A.G.I. Supp.*

vernadskite. a. A green basic hydrous sulfate of copper, $3CuSO_4.Cu(OH)_2.4H_2O$. Aggregates of minute crystals. An alteration product of dolerophanite. From Vesuvius, Italy. *English.* b. Equal to pseudomorphs of antlerite after dolerophanite. *American Mineralogist, v. 47, No. 5-6, May-June 1962, p. 812.*

Verneuil process. The technique invented by the French chemist Verneuil for the manufacture of synthetic corundum and spinel by fusing pure precipitated alumina, to which has been added a predetermined quantity of the appropriate oxide for coloring, in an oxygen-coal-gas furnace. *C.T.D.*

vernier. a. Small auxiliary scale in sliding contact with a main measuring scale on precision measuring instrument. It is calibrated so as to be slightly out of phase with the main scale. This gives a magnified reading of one main division and facilitates reading with an accuracy proportional to the recurrence of the markings which are in phase. If, for example, the main scale is graduated in centimeters and tenths, and the vernier is 0.9 centimeters divided into tenths, then a reading to the nearest 0.01 centimeter is registered where two marking lines meet. *Pryor, 3.* b. In a spudding drill, a brake adjustment that permits the line to pay out automatically as the hole deepens. *Nichols.*

vernier closure meter. An instrument consisting of two steel rods, graduated with a vernier scale and sliding over one another through a pair of clamps. Such an instrument may readily be made in a mine workshop and can be designed to read to either one-thousandth of a foot or one-hundredth of an inch without difficulty. Used to measure strain. *Isaacson, p. 195.*

vernier compass. Scot. A mining compass for measuring angles without the use of the magnetic needle. *Fay.*

vernier-reading manometer; micrometer-reading manometer. This series of manometers covers a range of pressures from 0.001 inch water gage to 40 inches water gage. Essentially the instrument is a U-tube consisting of two reservoirs connected by a flexible rubber tube. One of the reservoirs is fixed while the other may be lowered or raised to balance the applied pressure difference by means of a screw arrangement provided with either a vernier or micrometer reading attachment. *Roberts, I, pp. 33-34.*

Vernon shale. A division of the Middle Silurian of the Eastern United States; it consists of red shales laid down under continental conditions as loesslike deposits, underlying the Syracuse salt series. *C.T.D.*

verrankohle. Rolled fragments of brown coal found on the coast of Norway. *Tomkeieff, 1954.*

vers Abbreviation for versine. *BuMin Style Guide, p. 62.*

versant. One side or slope of a mountain range; as, the east versant. *Fay.*

versed sine. The versed sine of an arc is that part of the diameter included between the extremity of the arc and the foot of the sine. *Zern, p. 55.*

verte antique; copper green. A pigment essentially a bicarbonate of copper. Used for producing a corroded copper effect. Not to be confused with the serpentine rock, verde antique. *CCD 6d, 1961.*

Vertebrata. Animals which possess backbones, and were the last of the subkingdoms to appear. They show marked evolutionary stages. *Mason, V. 1, p. 28.*

vertex (of curve). *See* point of intersection, b. *Seelye, 2.*

vertical. a. A term used to define a direction which is perpendicular to a horizontal, or level, plane. *A.G.I.* b. Local usage for vertical fractures, especially in the Black Hills of South Dakota. *A.G.I.* c. Imaginary vertical line at any point in a stream or other body of water extending from the surface to the bottom. *A.G.I.* d. Said of deposits and coal seams with a dip of from 60° to 90°. *Stoces, v. 1, p. 56.* e. In aerial photographic mapping, a vertical line through the exposure station, or rear nodal point. *Seelye, 2.*

vertical accretion deposit. Sediment accumulated from river water which was spread out over a flood plain. *A.G.I.*

vertical aerial photograph. A photograph taken from an aircraft for purposes of aerial mapping or aerial geophysical prospecting; special cameras and techniques are employed. *See also* profile flying. *Nelson.*

vertical alinement. The longitudinal section of the centerline of a road, railway canal, or similar work of construction, showing clearly the gradients and vertical curves. *Ham.*

vertical angle. Angle of elevation or depression, measured from the true horizontal plane. *Seelye, 2.*

vertical auger drill. A mobile-type rotary drill used on opencast sites with no hard rock for drilling vertical blasting holes. It can drill a hole of 5 or 6 inches in diameter to depths of about 30 feet. Drilling is by means of a rotary cutting head with interchangeable cutting bits, the auger removing the cuttings from the hole. An overall speed of 30 feet per hour can be obtained. *See also* horizontal auger. *Nelson.*

vertical balance; vertical field balance. An instrument for measuring variations in the vertical component of the terrestrial magnetic field, usually by balancing the torque on a magnet system by means of a counter gravitational torque acting on counterweights. *A.G.I.*

vertical chain conveyor. Opposed shelf type—two or more vertical elevating conveying units opposed to each other. Each unit consists of one or more endless chains whose adjacent facing runs operate in parallel paths. Thus, each pair of opposing shelves or brackets receive objects (usually dish trays) and deliver them to any number of elevations. *ASA MH4.1-1958.*

vertical circle. Graduated circle on theodolite or tacheometer, by use of which the slope of the collimation line through sighting telescope is measured in survey work. *Pryor, 3.*

vertical collimator. An instrument in which the telescope sights vertically (upward or downward); used chiefly for centering a theodolite on a tower exactly over a station mark on the ground. It may be used for any vertical sight. *Seelye, 2.*

vertical component. That part, or component, of a vector that is perpendicular to a horizontal or level plane. *A.G.I.*

vertical curve. a. The curve between two lengths of a straight roadway which possess different gradients. The curve provides a gradual change for haulages from one inclination to the other. The curve leading to the top or brow of an inclined plane would be convex and concave at the bottom. *Nelson.* b. The graduated curve connecting two lengths of a railway or road which are at different slopes. *Ham.* c. The meeting of different gradients in a road or pipe. *Nichols.*

vertical cut. *See* shear cut. *Nelson.*

vertical drains. Usually column of sand used to vent water squeezed out of humus by weight of fill. *Nichols.*

vertical exaggeration. In a stereoscopic image, the increase in relief seen by the eye. *A.G.I.*

vertical fault. A fault in which the dip is 90°. *Fay.*

vertical field balance. *See* vertical balance. *A.G.I.*

vertical fold. *See* upright fold.

vertical gradient. The rate of change of a quantity in the direction of the vertical. *A.G.I.*

vertical gradiometer. An instrument for measuring the vertical gradient of gravity. *A.G.I.*

vertical guide idlers. Idler rollers of about 3 inches in diameter so placed as to make contact with the edge of the belt conveyor should the latter run too much to one side. Although vertical guide rollers are effective, they cause edge wear on the belting and their use is not favored. *See also* staggered idlers. *Nelson.*

vertical head. a. *See* hydraulic head, b. *Long.* b. The vertical distance a pump lifts a liquid. *Long.*

vertical hole. A borehole drilled vertically downward or upward. *Long.*

vertical intensity. The magnetic intensity of the vertical component of the magnetic field, reckoned positive if downward, negative if upward. *Hy.*

vertical line. One that is exactly upright, or it points straight up and down. *Jones, 2, p. 82.*

vertical load-bearing test. *See* load-bearing test. *Lewis, p. 576.*

vertical-loop methods. Inductive methods in which the coil that causes the current flow in the earth is set up in a vertical position. *Schieferdecker.*

vertical magnetometer. Instrument to measure changes in the vertical component of the magnetic field intensity. *Schieferdecker.*

vertical mill. A rolling mill in which the rolls operate vertically. *Osborne.*

vertical pendulum. Having a mass moving vertically. *Schieferdecker.*

vertical photograph. A photograph of a strip of country taken with an air-survey camera set truly vertical in the survey aircraft. The camera is provided with a wide angle lens and the photographs are taken at precisely controlled intervals so that stereoscopic pairs can be produced for subsequent detailed mapping. *Ham.*

vertical-position welding. Welding where the axis of the weld is essentially vertical. *ASM Gloss.*

vertical pump. This pump is often of the single-acting bucket or ram type with single or double cylinders and either with or without a flywheel. Vertical pumps may be used where headroom is adequate but area restricted, although horizontal reciprocating pumps are more generally used. *Sinclair, IV, p. 51.*

vertical reciprocating conveyor. A power or gravity actuated unit which receives objects on a carrier or car bed usually constructed of a power or roller conveyor. The object is then elevated or lowered to other elevations. *ASA MH4.1-1958.*

vertical ring drilling. Radial drilling in a vertical plane underground. *Long.*

vertical sand drain. a. A boring through clay or silty soil which is filled with sand or gravel to facilitate drainage of liquid from the soil. *Ham.* b. *See* perched water table. *Nelson.*

vertical screw conveyor. A screw convevor which conveys in a substantially vertical path. *See also* screw conveyor. *ASA MH 4.1-1958.*

vertical seismograph. An instrument that registers the vertical component. *Schieferdecker.*

vertical separation. In faulting, the separation between the two parts of the displaced index plane (bed, vein, dike, etc.) measured in a vertical direction. *A.G.I.*

vertical shaft. A shaft sunk at an angle of 90° with the horizon, or directly downward toward the center of the earth. *Weed, 1922.*

vertical shear. Reference is to a beam, assumed for convenience to be horizontal and to be loaded and supported by forces all of which lie in a vertical plane. The vertical shear at any section of the beam is the vertical component of all forces that act on the beam to the left of the section. The vertical shear is positive when upward and negative when downward. The shear equation is an expression for the vertical shear at any section in terms of x, the distance to that section measured from a chosen origin, usually taken at the left end of the beam. *Ro.*

vertical shift. The vertical component of the shift. *See also* shift, i. *Fay.*

vertical slice, overhand. *See* square-set stoping. *Fay, p. 641.*

vertical slice, underhand. *See* square-set stoping. *Fay, p. 641.*

vertical slip. The vertical component of the net slip; this is the same as the vertical component of the dip slip. Synonym for vertical component. *Schieferdecker.*

vertical takeup. A mechanism in which the takeup or the movable pulley travels in a vertical plane. *NEMA MB1-1961.*

vertical theory. The earliest view of subsidence in which it was supposed that the lines of break (limiting lines) were more or less vertical. Pillars left for support were accordingly formed immediately under the object to be protected, the question of dip being disregarded. *Briggs, p. 37.*

very thick band. A field term that, in accordance with an arbitrary scale for use in describing banded coal, denotes a vitrain band exceeding 50 millimeters (over 2 inches) thick. *Compare* thin band; medium band; thick band. *A.G.I.*

vesbite. An extrusive rock composed of leucite, subordinate aegirine augite, and melilite, with accessory apatite and opaque oxides. A melilite leucitite. *A.G.I.*

vesicle. A small cavity in an aphanitic or glassy igneous rock, formed by the expansion of a bubble of gas or steam during the solidification of the rock. *Fay.*

vesicular. a. Characteristic of, characterized by, pertaining to, or containing vesicles. *Fay.* b. Having a cellular structure; applied to fire clays which have become bloated by overfiring. *HW.* c. *See* cellular.

vesignieite. A vitreous lustered mineral, $Cu_3Ba(VO_4)_2(OH)_2$, occurring as lamellar aggregates and as polysynthetic twins with pseudohexagonal outline; yellow-green to dark olive-green; from Friedrichsroda, Thuringia, Germany. *American Mineralogist, v. 40, No. 9-10, September-October 1955, pp. 942-943.*

Vespertine. In geology, the tenth series of the Pennsylvania system of stratigraphy, comprising the Pocono sandstone of the Lower Carboniferous. Obsolete. *Fay.*

vestibule. The area at the entrance of drier tunnels where cars of greenware can be stored. *ACSG, 1963.*

vestorien. An artificial enamel used by the Romans in the early centuries of the Christian era, $CaO.CuO.4SiO_2$. Synonym for Egyptian blue. *Dana 6d, p. 1051.*

vestry. a. Eng. The productive part of the vein. *See also* carbona, a; bowse, a. *Fay.* b. Newc. Refuse. *Fay.*

vesuvian. a. Synonym for leucite. *Hey 2d, 1955.* b. Original spelling of vesuvianite; synonym for idocrase. *Hey 2d, 1955.* c. A mixture of calcite and hydromagnesite. *Hey 2d, 1955.*

Vesuvian garnet. An early name for leucite, an isometric mineral of no gem value or interest, except that its crystals resemble garnet crystals in form. *Shipley.*

vesuvianite. A mineral, $Ca_{10}(Mg,Fe)_2Al_4(SiO_4)_5(Si_2O_7)_2(OH)_4$. Tetragonal. Common in contact-metamorphosed limestones. A massive light green variety is known as californite. Also called idocrase. *A.G.I.; Dana 17; Fay.*

vesuvian jade. A jadelike variety of vesuvianite (idocrase). Also called californite. *English.*

vesuvite. A variety of leucite tephrite rich in leucite. *Holmes, 1928.*

Vesuvius salt. Same as aphthitalite. *Standard, 1964.*

veszelyite. A greenish-blue, hydrous, copper-zinc phosphatoarsenate, $H_{18}(Cu,Zn)_7(P,As)_2O_{21}$, crystallizing in the monoclinic system. *Standard, 1964.*

veteado. Sp. Streaky; veined. *Hess.*

Vezin's sampler. A mechanical sampling device that automatically selects one twenty-fifth or one sixty-fourth of the ore passing through. *Fay.*

V-flume. A V-shaped flume, supported by trestlework, and used by miners for bringing down timber and wood from the high mountains, at the same time using the water for mining purposes. Some of these flumes are many miles in length; one on the western slope of the Sierra Nevada mountains, in California, was over 40 miles long. *Fay.*

viaduct. A bridge carrying a road or a railway across a valley. *See also* aqueduct. *Ham.*

vial. Synonym for acid bottle. *Long.*

vibracone. A vibrating ore screen in which the feed is from a saucer-shaped distributer onto a conical surface kept in vibration by a ratchet motion. *Liddell 2d, p. 393.*

vibrate. To have a swinging or oscillating motion; to move or swing back and forth, as a pendulum; to have a period of vibration; to fluctuate; to vacillate; to sound, as the voice vibrates in the ear; to throb. *A.G.I.*

vibrated concrete. Concrete compacted by vibration during placing. *Taylor.*

vibrating ball mill. A ball mill supported on springs so that an out-of-balance mechanism can impart vibration to the mill, usually in the vertical plane and typically at about 1,500 cycles per minute. Advantages over the ordinary ball mill are increased rate of grinding (particularly with very hard materials), lower energy consumption per ton of product, and less wear. *Dodd.*

vibrating conveyor. a. A trough or tube flexibly supported and vibrated at relatively high frequency and small amplitude to convey bulk material or objects. *See also* oscillating conveyor. *ASA MH4.1-1958.* b. A metal trough mounted on flexible supports and free to move in a vertical plane. It is vibrated at an angle of about 30° to the horizontal. The material being conveyed moves in a series of gentle pitches and catches that blend to produce continuous, uniform flow. There is no tumbling or sliding of the material to cause wear of the trough. There are two basic types of vibrating conveyors: (1) the natural frequency types (those supported by heavy duty stiff coil or leaf springs), and (2) forced vibration types (those supported by rocker arms or rods pivoted at the trough and at the base connections). Materials can be moved downward, horizontally, or up to 10° slopes. It can convey coal, limestone, sand, coke, granite, gravel, etc. *See also* shaker conveyor. *Nelson.*

vibrating conveyor, balanced. *See* balanced vibrating conveyor. *ASA MH4.1-1958.*

vibrating conveyor, natural frequency. *See* natural frequency vibrating conveyor. *ASA MH4.1-1958.*

vibrating coring tube. A sediment coring tube designed to vibrate in such a way as to overcome the resistance of compacted ocean floor sediments, sands and gravel. *H&G.*

vibrating feeder. a. A feeder consisting of a trough which is subjected to high frequency oscillations, which impart a conveying motion; the rate of feed may be varied by varying the amplitude of the oscillations. *B.S. 3552, 1962.* b. *See* conveyor type feeder. *ASA MH4.1-1958.*

vibrating grate. A stoker developed in Germany and used increasingly in that country and in the United States. The hearth consists of a rigid water-cooled matrix. Coal is fed on to this at one end and is moved across it by the vibrating motion to discharge as ash at the other end. The vibrations, with an amplitude of about ⅛ inch and in progress for about 5 seconds every 2 minutes give a satisfactory feed rate. The rate of feed is controlled by altering the duration of the vibrations. *See also* underfeed stoker. *Nelson.*

vibrating grease table. This type table uses an electric vibrator to give a transverse motion to the table, which is of one-piece cast aluminum, 48 inches wide by 30 inches long. The table is designed with three 9-inch steps, having a drop of 2 inches between them. Slope is adjustable from 7° to 15° from the horizontal. This type table is used at the Kimberly mines in South Africa for concentrating the minus 3.33-, plus 0.59-millimeter fraction of pan concentrate and other material of plus 0.59-millimeter size. Efficiency is said to be 99 percent, and the ratio of concentration, 50,000 to 1. *I.C. 8200, 1964, pp. 70-72.*

vibrating grizzlies. Bar grizzlies mounted on eccentrics so that the entire assembly is given a forward and backward movement at a speed of some 100 strokes a minute. This is the type of grizzly now generally used ahead of a primary crusher. *Pit and Quarry, 53rd, Sec. B, p. 119.*

vibrating platform. A loading stage or structure with a double vibrating action which causes the coal or mineral to settle down in the mine car while being loaded. This settlement increases the car carrying capacity and reduces spillage during transit. *Nelson.*

vibrating roller. A roller provided with vibrating mechanism for consolidating soil. The roller may be of self-propelled or towed type. *Ham.*

vibrating screen. a. A commercial screen in which the cloth, wire, or bar deck is vibrated by solenoid, magnetostriction, or mechanically by eccentrics or unbalanced spinning weights. *Pryor, 3.* b. A screen oscillated either by mechanical or electrical means. The amplitude of movement of the vibrating screen is smaller than that of the jigging screen and its speed of oscillation is higher. *B.S. 3552, 1962.* c. A screen which is vibrated to separate and move pieces resting on it. *Nichols.* d. Machines of this type consist of one or more slightly inclined screening surfaces mounted in a robust frame. To increase the capacity and prevent blinding the screening surfaces are caused to vibrate. This may be done by mounting the screen on powerful springs and causing it to bear down on the underside of the frame. An alternative method used in the Hummer screen is to stretch the wire screen to a high tension and mount at some convenient point on the frame an electromagnet actuated by an alternating current. The magnet works against the springs on which the screen is mounted and in this way very rapid vibration can be secured and blinding greatly reduced. *Miall.*

vibrating screens (heated). Wire-mesh screens that are vibrated and heated electrically to increase efficiency. *See also* screens. *ACSG, 1963.*

vibrating-type conveyor. *See* conveyor, vibrating-type.

vibrating wire transducer. A device that can be used to measure ocean depth. The vibrating element is simply a very fine tungsten wire which is stretched in a magnetic field. The wire vibrates at some precise frequency which is determined by the length and tension of the wire. Pressure changes by varying the tension in the wire change the vibration frequency of the wire. *H&G.*

vibration. a. The act of vibrating; oscillation. Vibrations may be free or forced; longitudinal, transverse, torsional, or dilatational; also classified according to kind, as acoustical, electrical, flexural, etc. *A.G.I.* b. An oscillation wherein the quantity is a parameter that defines the motion of a mechanically system. *H&G.* c. The undesirable oscillatory movements of the drill string. *Long.*

vibration drilling. Drilling in which a frequency of vibration in the range of 100 to 20,000 cycles per second is used to fracture rock. Ultrasonic drilling is one of the better known methods of vibration drilling. *Mining and Minerals Engineering, v. 1, No. 5, January, 1965, p. 178.*

vibration gravimeter. A device which affords a measurement of gravity by observation of the period of transverse vibration of a thin wire tensioned by the weight of a known mass, useful for observation at sea. *A.G.I.*

vibration mark; chattermark; herringbone marking. A rare modification of a groove consisting of crescentic depressions, concave upcurrent. Presumed to result from unsteady action of inscribing tool. *See also* chevron mark; ruffled groove cast. *Pettijohn.*

vibration meter. A seismometer which is used for measuring vibrations of structures from other than seismic causes. *A.G.I.*

vibration method of roof testing. The finger tips are placed against the roof which is then struck a sharp heavy blow. Such a blow usually sets up easily felt vibrations in unsound roof. *Grove.*

vibration of foundations. The foundations of machinery installed in a building should be so designed that the frequency of the machine is 1½ to 2 times the natural frequency of the combined system of machines and foundations. *Ham.*

vibration test. An approximate grading test for coarse-grained soils. A flat paper-covered board is inclined at a slope of 1 in 24. The dry and powdered sample of soil is spread in a thin layer across the top of the board. The board is tapped sharply and repeatedly. The soil will travel down the board, the largest particles traveling faster and further than the smaller ones. Dependent on the degree in which the soil spreads out, a grading can be allotted to the soil. *Nelson.*

vibrator. a. An instrument which produces mechanical oscillations. *A.G.I.* b. Head motion of shaking table such as Wilfley table. Mechanism imparting vibration to screens, concrete consolidators, etc. *See also* Wilfley table. *Pryor, 3.* c. A tool which vibrates at a speed ranging from 3,000 to 10,000 revolutions per minute. It can be inserted into wet concrete as an internal vibrator or attached to formwork to compact the concrete. *See also* external vibrator; vibrated concrete; concrete vibrating machine; plate vibrator. *Ham.* d. A device for attachment to bins or chutes to produce a quivering action and thus assist in gravity flow of contained material. *ASA MH4.1-1958.*

vibratory pressing. A process for forming refractory shapes, in which the ground particles of refractory material are packed closely together by rapid impact-type vibrations of the top and bottom dies. Also called impact pressing. *HW.*

vibratory screen. A sizing screen similar to the shaking screen but the reciprocating movement imparted to it is of greater frequency and much smaller amplitude—1,000 revolutions per minute and one-fourth inch being typical. High-frequency vibration is more effective than the slow movement of the shaker in preventing blinding of holes and the screening is more effective. It may contain one, two, or three screen decks with water sprays for washing products when screening. Five products ranging from plus three-fourths to minus one-eighth inch are possible from a double deck screen. In general, the screen is inclined at from 12° to 14° for the coarser sizes and 17° to 21° for the finer sizes with counterflow operation. *See also* pool washing screen; varislope screen. *Nelson.*

Vibrex grease table. A device to concentrate and separate diamonds from gangue material. It is based on the principle that short sharp vibrations in rapid succession transmitted to a greased surface cause diamonds to become imbedded in the grease while water washes away other materials. *I.C. 8200, 1964, pp. 68, 72.*

Vibro-energy mill. Trade name; a vibrating ball mill designed to oscillate both horizontally and vertically, the vertical motion being of small but sufficient amplitude to prevent the charge from becoming tightly packed. *See also vibrating* ball mill. *Dodd.*

Vibroflotation. The trade name for a geotechnical process which uses vibration to compact clean sands and gravels. The vibration is combined with a water jet so as to give a high degree of compaction. *Ham.*

Vibrogel. Special gelatin dynamites; used for seismic studies. *Bennett 2d, 1962.*

vibrograph. An instrument for recording the ground vibrations caused by heavy quarry blasts. The relationship between the amount of vibration, the distance from the blast and the weight of explosive fired may be expressed thus:

$$A = \frac{K\sqrt{E}}{D},$$

where A=maximum amplitude in thousandths of an inch; K=constant depending on the quarry site; E=weight of explosive in pounds, and D=distance in feet. Where a vibrograph is available the constant K can be determined by firing a specimen blast of a given size at a given distance and measuring the amplitude of the record obtained. Amplitudes in excess of 40 thousandths of an inch may give rise to damage. A movement of 8 thousandths of an inch can be felt and if used an excessive number of times may give rise to complaints of nuisance and damage. Short-delay blasting methods with small diameter holes have reduced the vibration hazards. *See also* falling pin seismometer; seismograph, a. *Nelson.*

vibrotron. A pressure sensing transducer which converts hydrostatic pressure directly into an FM signal which can then be telemetered. *H&G.*

Vicat needle. An instrument for evaluating the consistency of cement in terms of the depth of penetration of a needle of standard shape and under a standard load; it was designed by L. J. Vicat, a Frenchman, in the early 19th century. *Compare* Gillmore needle. *Dodd.*

vicinal faces. Facets modifying normal crystal faces; they usually lie nearly in the plane of the face they modify. *C.M.D.*

vicinal forms. *See* vicinal faces.

Vickers' diamond hardness tester. A small impression machine, capable of testing very hard metals, finished components and very thin sheets. The diamond is similar to that used in the diamond pyramid hardness test. The duration of application of the load is controlled automatically, being always applied and removed in exactly the same manner. This machine may also be used with a ball indenter for the Brinell hardness test. *Ham.*

Vickers hardness test. A test to determine the hardness of very thin cases by indenting them with a diamond pyramid under a specified load and measuring the size of the impression produced by a low-power microscope. *Nelson.* The same as diamond-pyramid hardness test. *ASM Gloss.*

vicoite. An extrusive rock containing leucite and subordinate sodic sanidine, calcic plagioclase, and augite. A leucite-rich alkalic basalt. *A.G.I.*

Victoria green. A bright green ceramic color. A typical batch composition is: 38 percent $K_2Cr_2O_7$, 20 percent $CaCO_3$, 22 percent CaF_2, 20 percent SiO_2. This batch is calcined, washed free from soluble chromates, and ground. The coloring agent is stated to be uvarovite ($3CaO.Cr_2O_3.3SiO_2$). *Dodd.*

victualic coupling. A development in which a groove is cut around each end of pipe instead of the usual threads. Two ends of pipe are then lined up and a rubber ring is fitted around the joint. A pair of semicircular bands, forming a sleeve, are placed around the ring and are drawn together with two bolts. These have a ridge on both edges which fits into the groove of the pipe. As they are tightened, the rubber ring is compressed, making a watertight joint, while the ridges fitting in the grooves make it strong mechanically. Victualic pipe is faster to lay because in large sizes it does not have to be alined perfectly and screwed in. *Kentucky, pp. 118-119.*

victualic joint. A proprietary pipe joint which allows the pipes to move through several degrees after fixing but yet to remain watertight. *Ham.* This joint is designed to allow about 12° of movement without causing leakage. The pipes have specially shouldered ends which are contained by a circumferential rubber washer held by a special circumferential-type flange. The water has access to the inner part of the washer, on which it exerts pressure and thereby seals the joint. *Mason, v. 2, pp. 628-629.*

victualic piping. Commercial type of pressure piping with some flexibility due to construction of joints. *Pryor, 3.*

Vielle-Montagne furnace. A mechanical roasting furnace similar to the Ross and Welter type. *Fay.*

Vienna German silver. *See* German silver. *Hess.*

Vienna green. *See* copper acetoarsenite. *Bennett 2d, 1962.*

Vienna lime. A calcined dolomite with a special texture, porosity, crystallinity, and fossil origin used as a buffing compound. *I.C. 7192, Nov. 1941, p. 8.*

Vienna turquoise. An amorphous imitation of turquoise formerly manufactured in Vienna, Czechoslovakia, France, and England. More difficult to detect than the various blue-stained minerals which have replaced it as a turquoise substitute, it has approximately the same chemical composition, hardness, specific gravity, and fracture. *Shipley*.

Vienna white; Cremnitz white. A paint base composed of pure white lead, imported from Austria in small cubes. Also called Kremnitz white; Krems white. *C.T.D.*

vierendeel girder. An open frame N-truss without diagonal members, with rigid joints between the top and bottom chords and the verticals. Known also as open-frame girder. *Ham.*

viese; vise. a. Scot. Soft earth in a fissure or on the sides of a fault. *Arkell*. b. Scot. The line of fracture of a fault. *Arkell.*

viewer. Eng. A colliery manager or superintendent. *Fay.*

viger coal. Shrop. Name of a coal in Coalbrookdale. *Tomkeieff, 1954.*

vignetting. The decoration of a glass surface by firing-on a metal or other suitable powder; the surface is first coated with sodium silicate solution and the powder is then dusted on and fired in. *Dodd.*

vignite. A magnetic iron ore. *Fay.*

vigorite. a. An explosive resembling dynamite No. 2, and consisting of nitroglycerin with a more or less explosive dope. *Fay*. b. Bakelite. *Shipley.*

Vigorite No. 5, L.F. Permissible explosive; used in mines. *Bennett 2d, 1962.*

villamaninite. An iron-black disulfide of copper, nickel, cobalt, and iron with 1.5 percent selenium $(Cu,Ni,Co,Fe)(S,Se)_2$. Small cubo-octahedral crystals and radiating nodular masses. Isometric. From Villamin, Spain. Thomson suggests that it is a mixture. *English.*

Villela's reagent. An etching reagent consisting of 95 milliliters of ethyl alcohol, 5 milliliters of hydrochloric acid, and 1 gram of picric acid. *Osborne.*

villiaumite. A soft deep carmine sodium fluoride, NaF. Small crystals and grains in nepheline-syenite. Isometric. From Islands of Los, Guinea, Africa. *English.*

viluite. Grossularite. *Dana 6d, pp. 437, 444.*

Vindobonian. Middle Miocene. *A.G.I. Supp.*

vinegar spinel. Same as rubicelle. *Shipley.*

V-ing outcrop. The outcrop of a surface is said to 'V' when it makes a more or less sharp angle, typically an acute angle. Used particularly in connection with the outcrop of a uniformly dipping surface across a river valley. *Challinor.*

vinney. Copper ore, with a green efflorescence like verdigris. *Fay.*

vinogradovite. A titanosilicate, $Na_5Ti_4AlSi_6O_{24}.3H_2O$, monoclinic (pseudoorthorhombic), as white to colorless crystals and radial spherical aggregates in nepheline-syenite pegmatite from Kola, U.S.S.R. *Spencer 21, M.M., 1958.*

Vinsol resin. Trade name; a thermoplastic powder used as an air-entraining agent in the mixing of concrete. *See also* air entraining. *Dodd.*

vintlite. A hypabyssal rock composed of abundant calcic plagioclase and brown hornblende phenocrysts in a groundmass of sodic plagioclase, orthoclase, and quartz. A variety of quartz-diorite porphyry. *A.G.I.*

vinyl acetal resins. Prepared from polyvinyl acetate. Properties are toughness, adhesiveness, impreviousness to moisture, and stability toward light and heat. Used as an interlayer in safety glass and as a bonding resin. *Crispin.*

vinylidene chloride resins. The raw materials for this class of resins are crude oil and brine. Properties are high-tensile strength, resistance to abrasion, nonflammable, easy to machine, and good color range. Used for car seats, fish leaders, and as a bonding agent for abrasive wheels. *Crispin.*

Vinylite. Brand name for a synthetic thermoplastic resin. Refractive index, 1.4665 (at 20° C). Used as a solvent-type, thermoplastic adhesive for porcelain, metal, mica, stone, and glass. *CCD 6d, 1961.*

violaite. a. A highly pleochroic pyroxene from the Caucasus Mountains, U.S.S.R. *English*. b. Same as aegirite augite. *Hess.*

violane. A massive, deep blue form of the pyroxene diopside, quarried at San Marcel, Piedmont, Italy. *C.M.D.*

violarite. A violet-gray sulfide of nickel and iron, possibly $(Ni,Fe)_3S_4$, or $FeS.Ni_2S_3$. Nodules; isometric. From Clark County, Nev.; Julian, Calif.; Sudbury, Ontario, Canada; Alaska. *English.*

violet stone. Cordierite. *Shipley.*

violite. Same as copiapite. *Dana 6d, p. 965.*

virgate. To branch in diverging lines. *Webster 3d.*

virgation. A branching arrangement of fault-lines or topographic forms. *Webster 3d.*

Virgilian. Upper Pennsylvanian. *A.G.I. Supp.*

virgin. a. Unworked; untouched; often said of areas where there has been no coal mining whatever. *Mason*. b. New; an unexploited area or rock formation in which boreholes have not been drilled. *Long*. c. Applied to metals occurring elementally, as virgin gold, as distinguished from ore minerals which are chemical compounds. *Weed, 1922*. d. *See* native. *Fay.*

virgin clay. Fresh clay, as distinguished from that which has been fired. *Standard, 1964.*

virgin coal. An area of coal which is in place (in situ), and unimpaired by mining activities. *See also* maiden coal. *Nelson.*

virgin compression curve. *See* pressure-void ratio curve. *ASCE P1826.*

virgin diamond. *See* new diamond. *Long.*

virgin field. A mineral field in which there has been no mining. *Fay.*

Virginia silver A nickel or German silver. *Camm.*

virginium. Former name for the element having atomic number 87. Superseded by francium. *Webster 3d.*

virgin metal. Pure metal obtained directly from ore; also called primary metal. *ASM Gloss; Newton, p. 1.*

virgin steel. A deceptive name given to articles made merely of good cast iron. *Fay.*

virgin stone. *See* new diamond. *Long.*

virgula furcata. Another name for divining rod. *Hoov, p. 337.*

Virgulian. Upper Kimmeridgian. *A.G.I. Supp.*

viridine. A green variety of andalusite, $(Al,Fe,Mn)_2O_3.SiO_2$; from Darmstadt, Germany. Not to be confused with viridite, an iron silicate. *Larsen, p. 122*. Synonym for manganandalusite. *Hey 2d, 1955.*

viridite. A nearly obsolete term for indeterminable green alteration products of ferromagnesian minerals in rocks. *Webster 2d; A.G.I.*

virtual slope. The slope which shows the loss in pressure due to friction at any point in a system of fluid flow. *See also* hydraulic gradient. *Nelson.*

virtual value. The calibration of alternating-current instruments is based upon what is called the virtual value, and this corresponds to the direct-current value which would produce the same heating effect in a given resistance. The peak value of alternating voltage or current is 1.4 times greater than the virtual value. *Mason, v. 2, p. 419.*

vis Abbreviation for viscosity. *BuMin Style Guide, p. 62.*

visbreaking. A mild thermal cracking process designed for the purpose of reducing the viscosity of heavy residual oils. *Francis, 1965, v. 1, p. 280.*

visc Abbreviation for viscosity. *Zimmerman, p. 116.*

viscoloid A variety of celluloid. *Shipley.*

viscometer; viscosimeter. An instrument used to measure the viscosity of liquids. The Marsh funnel type measures the time required for a known amount of drilling mud to flow through an aperture of known diameter; other specific types are the Fann and Stormer viscometers. *See also* Marsh funnel. *Long.*

viscosimeter. *See* viscometer.

viscosity. a. Any resistance to deformation that involves dissipation of energy by internal friction. *Holmes, 1928*. b. In road building, the measure of the resistance to flow of a bituminous material, usually stated as the time of flow of a given quantity of the material through a given orifice. *Hess*. c. A liquid having a high viscosity rating will resist flow more readily than will a liquid having a low viscosity. The Society of Automotive Engineers (SAE) standard series of viscosity numbers is used to indicate the viscosities of lubricating oils. *Nichols*. d. The property of imperfect fluids by which they resist the action of a shearing stress. Measured by the shearing stress required to cause flow at a certain constant rate. *Holmes, 1928*. Abbreviations, vis and visc; symbol for coefficient of viscosity, η; and symbols for absolute viscosity, η and μ. *BuMines Style Guide, p. 62; Handbook of Chemistry and Physics, 45th ed., 1964, p. F-102; Zimmerman, pp. 116, 176*. e. The resistance of liquids, semisolids, and gases to movement or flow. *H&G.*

viscosity, absolute. a. The force which will move one square centimeter of plane surface with a speed of one centimeter per second relative to another parallel plane surface from which it is separated by a layer of the liquid one centimeter thick. This viscosity is expressed in dynes per square centimeter, its unit being the poise, which is equal to one dyne-second per square centimeter. *See also* poise. *A.G.I.* b. Drag or shearing resistance of air to motion. Measured in pounds-seconds per square foot. *Hartman, p. 9.*

viscosity coefficient. A quantitative expression of the friction between the molecules of water when in motion. It is the amount of force necessary to maintain a unit difference in velocity between two layers of water at a unit distance apart. It decreases rapidly with increase in temperature. *A.G.I.*

viscosity, kinematic. Ratio of absolute viscosity to mass density. Measured in square feet per second. *Hartman, p. 9.*

viscountess. Building slate 18 inches by 10 inches. *Pryor, 3.*

viscous. a. Adhesive or sticky and having a ropy or glutinous consistency. *Webster 3d*. b. Imperfectly fluid; designating a substance that, like tar or wax, will change its form under the influence of a deforming force, but not instantly, as more perfect fluids do. *Standard, 1964.*

viscous coal tar. *See* coal tar, viscous. *Bennett 2d, 1962.*

viscous damping. Viscous damping is the dissipation of energy which occurs when a particle in a vibrating system is resisted by a force the magnitude of which is a constant, independent of displacement and velocity, and the direction of which is opposite to the direction of the velocity of the particle. *Hy.*

viscous flow. A type of fluid flow in which there is a continuous steady motion of the particles and the motion at a fixed point always remains constant. Also called streamline flow; laminar flow; steady flow. *C.T.D.*

viscous resistance. The effect of surface friction between a particle and a liquid when the body moves through it. *Compare* turbulent resistance. *Newton, p. 77.*

Visean. Upper Lower Carboniferous. *A.G.I. Supp.*

viseite. A hydrous silicophosphate of aluminum and calcium, $5Al_2O_3.5CaO.3SiO_2.3P_2O_5.25\text{-}30H_2O$, as white, wartlike, optically isotropic masses. Named from locality, Vise, Belgium. *Spencer 17, M.M., 1946.*

vishnevite. The original spelling of wischnewite. *English.*

visibility. The ability of the eye to receive a visual impression, that is, it is the inward stimulus to the brain via the retina and optic nerve. *Roberts, II, p. 1.*

visibility meters. The general principle of such meters is to observe a portion of the visual field against its background and then to bring about a condition such that the observed difference in brightness reaches a threshold value so that it is only just discernible. The instruments differ in their means by which this end is achieved. The threshold may be produced quite simply by interposing a light-absorbing medium, such as an optical wedge, in the field of view. Other methods include reducing the contrast between the object and its background by superimposing a veiling brightness over the observed field. *Roberts, II, p. 100.*

visible horizon. *See* apparent horizon. *A.G.I.*

visible light. The light of the visible spectrum. *See also* invisible light. *Shipley.*

visible spectrum. That portion of the electromagnetic spectrum, the waves which normally produce, upon the human eye, color sensations of red, orange, yellow, green, blue, violet or their intermediate hues, or of white light if the rays are combined. Distinguished from radio, infra-red, ultraviolet, gamma, and X rays. *Shipley.*

Vissac jig. An air-operated pulsator jig in which air is alternately compressed and allowed to expand to produce pulsation. This jig has been used principally on sized bituminous coal. *Mitchell, pp. 426-427.*

visual acuity. The ability of the eye to see very small objects. It can be measured in a variety of ways, all of which are designed to detect the smallest detail which is visible, in terms of the angle subtended at the eye by the object viewed at a given distance away. *Roberts, II, p. 76.*

visual brightness range. The eye has the ability to function over a very wide range of brightnesses, from the order of 10,000 foot lamberts to a minimum discernible brightness or threshold of the order of 10^{-6} foot lamberts. But it cannot respond to the whole of this range at once. In any given environment visibility is bounded by the sensation of glare at the upper limit and the lower limit of discernible brightness at the threshold. What those limits are in terms of luminance depends on the eye adaptation level. *Roberts, II, p. 79.*

visual field. If the eyes are directed straight ahead, the visual field for each eye is determined by the facial contour, the nose determining the cutoff at about 60° to the nasal side of the axis of vision for each eye. On the temporal side, however, vision is possible over a wider angle, extending to about 95° from the axis. The total lateral extent of the field of vision therefore covers an angle of about 190° of which the central 120° comprises the binocular field, being covered by both eyes. The vertical extent of the field at the center is also binocular and again covers an angle of approximately 120°. *Roberts, II, p. 78.*

visual indicator. A device by which the winding or haulage engineman can see on a dial or panel the position of the cages in the shaft or the journey on the haulage plane. *See also* depth indicator. *Nelson.*

visual performance. The interpretation of stimulus by the brain and the outward action signal to the muscles of the body which result from that interpretation. *Roberts, II, p. 1.*

visual sampling. In evaluation of asbestos ore bodies, infers the measurement of all visible fiber seams in an average cross section of the ore to determine the percentage of fiber contained therein. *Sinclair, W. E., p. 166.*

vital capacity. The term for the greatest volume of air that a man can expel from his lungs after a full inspiration. In other words, it is the greatest volume of air that can be moved in and out of the lungs in a single breath. The average man's vital capacity is between 4 and 5 liters. *H&G.*

Vitasul. A trade name for a new chemical additive which eliminates or reduces considerably the danger of diesel locomotive fumes underground. Tests have established that the chemical, added to diesel fuel, reduced the carbon-monoxide danger from diesel locomotive exhausts to negligible proportions. The method of testing was by a modern variant of the live canary—yellow P.S. detector tube. The chemical has been approved for use underground in British coal mines. *Nelson.*

viterbite. An extrusive rock composed largely of sodic sanidine and leucite, with minor calcic plagioclase, augite, biotite, apatite, and opaque oxides. Leucite occurs as large phenocrysts. A variety of leucite-rich phonolite. *A.G.I.*

vitiated air. Air which has been rendered impure by the breath of men and horses, or by being mixed with the various gases given off in mines. It is frequently called return air. *Peel.*

vitrain. This term was introduced by M. C. Stopes in 1919 to designate the macroscopically recognizable very bright bands of coals. Very bright bands or lenses, usually a few millimeters (3 to 5) in width; thick bands are rare. Clean to the touch. In many coals the vitrain is permeated with numerous fine cracks at right angles to stratification, and consequently breaks cubically,—with conchoidal surfaces. In other coals the vitrain is crossed by only occasional perpendicular cracks. In the macroscopic description of seams only the bands of vitrain having a thickness of several millimeters are usually noted. Examination with the microscope shows vitrain to consist of microlithotypes very rich in vitrinite. After clarain, vitrain is the most widely distributed and common macroscopic constituent of humic coals. *IHCP, 1963, part I.* Occurs in lenticular bands, each derived from a single piece of original vegetable growth. When it constitutes 30 to 60 percent of total seam, termed abundant; over 60 percent, dominant; between 15 and 30 percent, moderate; below 15 percent, sparse. *Pryor, 3.*

Vitra-Tint. Opaque organic coating used on glass. *Bennett 2d, 1962 Add.*

vitreous. a. Having the luster of broken glass, quartz, or calcite. *Fay.* b. Amorphous. *Bureau of Mines Staff.* c. Consisting of or resembling glass. *Kinney.* d. That degree of vitrification evidenced by low water absorption. *See also* impervious; nonvitreous; semivitreous. *ASTM C242-60.*

vitreous antimony. *See* antimony glass. *CCD 6d, 1961.*

vitreous china. A white and dense, but not translucent type of pottery, used for the manufacture of sanitary ware. *Rosenthal.*

vitreous-china sanitary ware. A strong high-grade ceramic ware used for sanitary appliances and made from a mixture of white-burning clays and finely ground minerals. After it has been fired at a high temperature the ware will not, even when unglazed, have a mean value of water absorption greater than 0.5 percent of the ware when dry. It is coated on all exposed surfaces with an impervious noncrazing vitreous glaze giving a white or colored finish. A typical batch for this type of body is: 20 to 30 percent ball clay, 20 to 30 percent china clay, 10 to 20 percent feldspar, 30 to 40 percent flint, 0 to 3 percent talc; sometimes nepheline syenite is used instead of feldspar. *Dodd.*

vitreous coating. *See* vitreous enamel. *Bennett 2d, 1962.*

vitreous copper ore. Chalcocite. *Pryor, 3.*

vitreous enamel. An inorganic glass which is fused onto a metal article in the form of a relatively thin coating and provides protection against corrosion. *Dodd.*

vitreous fusion. Gradual fusion; having no sharp melting point. *Webster 3d.*

vitreous luster. The reflection of light so as to produce the appearance of broken glass. *Hurlbut.*

vitreous silenium; black amorphous selenium. a. One of the allotropic forms of selenium. It is brownish-black and is produced as a brittle, glassy mass having a specific gravity of 4.28. *Merriman.* b. Black; amorphous; Se; molecular weight and atomic weight, 78.96; vitreous luster; transformation temperature from amorphous selenium to hexagonal selenium, 60° to 80° C; boiling point (selenium), 684.8° C; insoluble in water; and soluble in sulfuric acid, in carbon disulfide, and in benzene. Amorphous selenium, which is black in vitreous form, is red in powder form. Six allotropic forms have been claimed for selenium but only three forms are established: (1) amorphous selenium; (2) monoclinic selenium; and (3) hexagonal selenium. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-134, B-215.*

vitreous silica. A glass made from silica; it may contain numerous small bubbles, in which case it is translucent; when free from bubbles it is transparent. An important property is extremely low thermal expansion, hence a high resistance to thermal shock; vitreous silica tubes, etc., find considerable use in chemical engineering. *Dodd.*

vitreous silver. Same as argentite. *Standard, 1964.*

vitreous slip. A slip coating matured on a ceramic body, producing a vitrified surface. *ASTM C242-60.*

vitric. An adjective designating (volcanic) ejecta consisting primarily of glassy material. It may be advisable to restrict the term to fragments made up of at least 75 percent by volume of glass, and to use the term vitric crystal for ejecta containing between 50 and 75 percent glass. In addition to the above usage, vitric may also be applied to any rock having the nature or quality of glass. *Stokes and Varnes, 1955.*

vitrics. a. Fused siliceous compounds, such as glasses and enamels, as distinguished from ceramics, or fused aluminous compounds. *Standard, 1964.* b. The art or history of glass production. *Standard, 1964.*

vitric tuff. An indurated deposit of volcanic ash dominantly composed of glassy fragments blown out during a volcanic eruption. The term should be properly restricted to tuffs containing more than 75 percent by volume of glass particles. *See also* tuff. *A.G.I.*

vitrifaction. *See* vitrification. *Fay.*

vitrifacture. The manufacture of vitreous or vitrified wares, as glass. *Standard, 1964.*

vitrifiable. Of, or pertaining to, a substance that can be vitrified. *Webster 3d.*

vitrifiable color. A metallic oxide mixed with glaze; used in ceramic color decoration. *Standard, 1964.*

vitrification. a. An act or instance or the process of vitrifying or making glassy; the condition of being vitrified; a vitrified body. *Webster 3d.* b. Any process tending to make a body more vitreous. Synonym for vitrifaction. *A.G.I.* c. The progressive partial fusion of a clay, or of a body, as a result of a firing process or, in the case of a refractory material, of the conditions of use in a furnace lining. As vitrification proceeds the proportion of glassy bond increases and the apparent porosity of the fired product becomes progressively lower. The vitrification range is the temperature interval between the beginning of vitrification of a ceramic body and the temperature at which the body begins to become deformed. *Dodd.*

vitrification range. The maturing range of a vitreous body. *ASTM C242-60.*

vitrification spalling. That resulting directly, or indirectly, from the permanent physical changes caused by vitrification. *Bureau of Mines Staff.*

vitrified. a. That characteristic of a clay product resulting when the temperature in the kiln is sufficient to fuse all the grains and close all the pores of the clay, making the mass impervious. *ACSG.* b. A nonporous, glass-bonded ceramic material. *VV.* c. Converted into glass. *Kinney.*

vitrified bond. A bond created by the fusion of ceramic materials, principally clays and feldspar. *ACSG, 1963.*

vitrified brick. A very hard paving brick burned to the point of vitrification and toughened by annealing. *Crispin.*

vitrified wheel. A grinding wheel with a glassy or porcelanic bond, sometimes called a ceramic bond. *ASM Gloss.*

vitriform. Having the form or the appearance of glass; glassy. *Webster 3d.*

vitrifusain. a. Vitrain in which all cavities are open but the cell-wall material has not developed the opacity characteristic of fusian. *A.G.I.* b. A coal constituent showing a transition between vitrain and fusain. *Tomkeieff, 1954.*

vitrify. To change into glass or into a glassy substance by heat and fusion. To make vitreous; especially to produce (as in a ceramic ware) enough glassy phase or close crystallization by high-temperature firing to make nonporous. To undergo vitrification or vitrifaction; to become vitreous. *Webster 3d.*

vitrifying. A stage in the heating of a clay when some of the ingredients have melted and have partially or completely closed the pores, as in stoneware and porcelain. The completion of this stage occurs at the point of maximum shrinkage without loss of shape. *See also* squotting. *Nelson.*

vitrifying clay. It is recommended that this term be dropped. *ACSB 1.*

vitrinertite. The term vitrinertain was introduced by B. Alpern in 1954, and in the modified form vitrinertite was adopted by the Nomenclature Subcommittee of the International Committee for Coal Petrology to designate a microlithotype consisting principally of the macerals vitrinite and exinite. Containing at least 95 percent of vitrinite and inertinite, the proportions of these two macerals may vary widely but each must be greater than the proportion of exinite and neither must exceed 95 percent. The inertinite may be present as fragments of fusinite or semifusinite, as sclerotinite, or as fine-grained or massive micrinite. It is generally rare in low rank coals, but seems to increase in importance in coals with less than 25 percent volatile matter in which exinite is not visible. *IHCP, 1963, part I.*

vitrinite. A group name comprising collinite and telinite. Differentiation between collinite and telinite depends in part on the method of observation. The distinction is more easily made in thin section or after etching a polished surface. Often there is uncertainty of distinction by reflected light and in such cases it is proper to use the general term vitrinite. *See also* collinite; telinite. *IHCP, 1963, part I.*

vitrinite bands. Well-defined bands or streaks of a uniform brilliant black appearance about 1/16 inch thick, sometimes up to 2 inches thick, constituting the major portion of bright coal. Under the microscope, these bands are found to be derived from separate small pieces of wood or bark, frequently retaining their original cell structure. Vitrinite bands form an excellent coking coal which is readily oxidized. *Cooper, p. 386.*

vitrinization. The process in coalification that results in the formation of vitrain. *See also* coalification. *Compare* incorporation; fusinization. *A.G.I.*

vitrinoid. Vitrain and similar material in coal. *A.G.I. Supp.*

vitriol. a. A sulfate of any of various metals (as copper, iron, or zinc, for example); especially a hydrate (as the heptahydrate) of such a sulfate having a glassy appearance or luster. *Webster 3d.* b. To dip (as metal) in dilute sulfuric acid. *Webster 3d.*

vitriolate. a. To convert into a sulfate, as a sulfide by oxidation. *Standard, 1964.* b. To subject to the action of or to impregnate with sulfuric acid or a sulfate. *Standard, 1964.*

vitriolic acid. An old name for sulfuric acid. *Webster 3d.*

vitriol ocher. Same as glockerite. *Standard, 1964.*

vitriol of Mars. Same as green vitriol. *Standard, 1964.*

vitriol, oil of. *See* sulfuric acid. *CCD 6d, 1961.*

vitriol peat. Peat containing much iron sulfate. *Tomkeieff, 1954.*

vitriol stone. A hard crystalline mass that consists chiefly of ferric sulfate and aluminum sulfate. Obtained by exposing pyritic schist to the atmosphere for some years, lixiviating the mass, and evaporating. Used in manufacturing fuming sulfuric acid. *Webster 3d.*

vitrit. A German name for vitrain. *Tomkeieff, 1954.*

vitrite. In 1955 the Nomenclature Subcommittee of the International Committee for Coal Petrology resolved to apply this term to the microlithotype consisting principally of collinite and telinite. It must contain at least 95 percent vitrinite and bands of vitrinite having a width of more than 50 microns are recorded as vitrite. It is the most abundant constituent of humic coals. It is particularly abundant in vitrains, rather less abundant in clarains, and limited to small amounts in durains. *IHCP, 1963, part I.*

vitro-. A prefix meaning glassy and used before many rock names, as vitrophyre, in order to indicate a glassy texture. *Fay.*

vitrobasalt. Basalt glass. *Webster 3d.*

vitroclarain. A rock-type coal consisting of vitrinite (collinite or telinite) and other macerals, mainly exinite, and in which the other macerals exceed vitrinite in quantity. *Compare* clarovitrain. *A.G.I.*

vitroceramic. One of several terms proposed for the type of ceramic product formed by the controlled devitrification of a glass. *See also* devitrified glass. *Dodd.*

vitroclarite. A type of coal intermediate between vitrite and clarite. *Tomkeieff, 1954.*

vitroclastic. Pertaining to a structure typical of fragmental glassy rocks, in which the particles usually have crescentic, rudely triangular outline, or somewhat concave borders (bogenstruktur). *A.G.I.*

vitrodurain. Durain in which much vitrain is present. Judged obsolete by the Heerlen Congress of 1935. *Compare* durovitrain. *A.G.I.*

vitrofusain. A coal constituent transitional between vitrain and fusain, and showing plant cell structure. The cell walls are soaked with vitrain, where the cell cavities are empty. It is not a mixture but a transition. Accepted by the Heerlen Congress of 1935 to designate material transitional between vitrain and fusain with fusain being predominant. *Compare* fusovitrain. *A.G.I.*

vitrofusite. A type of coal intermediate between vitrite and fusite. *Tomkeieff, 1954.*

Vitrolite. Trade name for a type of opaque glass with a fire-finished surface. *C.T.D. Supp.*

vitron. A unit of atomic structure, particularly in silica glass. Its basis is a pentagonal ring of five SiO_4 tetrahedra; these rings can be built up into three-dimensional clusters but only to a limited extent because of increasing distortional stress; a cluster of the pentagonal SiO_4 rings is a vitron. Its most important property, as a basis for the understanding of the properties of glass, is its fivefold symmetry which precludes the formation of crystals. *Compare* structon. *Dodd.*

vitrophyre. A porphyritic volcanic glass. *A.G.I.*

vitrophyric. a. Of, pertaining to, formed of, or characterized by vitrophyre. *Johannsen, v. 1, 2d, 1939, p. 236.* b. A term originally used by Vogelsang for the texture of quartz porphyries and orthophyres with glassy groundmasses. Cross, Iddings, Pirsson, and Washington would use it for porphyritic textures in which the groundmass is megascopically glassy. *Compare* granophyric. *Johannsen, v. 1, 2d, 1939, p. 236.*

vitrosity. Like glass. *Noke.*

vitrotelain. Telain (fragments of plant tissue completely soaked with structureless vitrain, that is, cell walls as well as cell cavities), with bands of structureless vitrain. Judged obsolete by the Heerlen Congress of 1935. *Compare* telovitrain. *A.G.I.*

Vitrox. Trade name for partly calcined cyanite manufactured by the Vitrefax Company. It is made in two grades—98 percent through 100 mesh, for use in a pottery body. A coarser grade is made for use as a grog in firebrick. *Hess.*

vivianite. A mineral, $Fe_3(PO_4)_2.8H_2O$, monoclinic. Colorless when unaltered, or blue to green, growing darker on exposure. Also called blue iron earth; blue ocher. *A.G.I.; Dana 17.*

vladimirite. A mineral, $3CaO.As_2O_5.4H_2O$, monoclinic, colorless radiating needles. *Spencer 20, M.M., 1955.*

vlair; vlare. a. Eng. Local name for fibrous carbonate of lime (beef, horseflesh) in the Lias, Lyme Regis. b. Eng. In West Somerset dialect this means a fracture in glass, when the cracks radiate from a center; a defect or flaw in anything. *Arkell.*

vlasovite. A mineral, $Na_2ZrSi_4O_{11}$, colorless monoclinic crystals from the contact zone of the Lovozero massif, Kola Peninsula, U.S.S.R. *Hey, M.M., 1961.*

vm Abbreviation for voltmeter. *Zimmerman, p. 117.*

V-method of roasting. The introduction of a supplementary roast heap between each two regular heaps, so that, if left untouched, there would be a continuous and unbroken roast heap the entire length of the roast yard. *Fay.*

V-notch. A device for measuring the flow of water in an open channel. Also called miner's inch; water inch (undesirable usage). *B.S. 3618, 1963, sec. 4.* Also known as a triangular weir and right-angle weir. *Griffith, S. V., p. 23.*

Vogel's red. A pure ferric oxide produced by precipitating ferrous oxalate which is then calcined. It has been used as a basis for some iron colors on porcelain. *Dodd.*

vogesite. a. A syenite lamprophyre of which the mafic minerals are generally hornblende, and sometimes augite, the dominant feldspar being orthoclase with accessory oligoclase or andesine when sufficiently fresh to be determined. *Holmes, 1920.* b. Pyrope. *Dana 6d, p. 437.*

vogle. In mining, same as vug. *Fay.*

voglianite. a. A soft, green, basic uranium sulfate, found in nodules or as earthy coatings. *Standard, 1964.* b. Validity of species is doubtful. All existing specimens, upon examination, have proved to be cuprosklodowskite. *Crosby, p. 14; Dana 7, v. 2, p. 600.*

voglite. An emerald-green to bright grass-green hydrous carbonate of uranium, calcium, and copper, $Ca_2CuU(CO_3)_4.6H_2O$; very rare, strongly radioactive, triclinic; occurs as an alteration product of uraninite, associated with liebigite. *Fay.*

voice amplifier. A lightweight, weatherproof, transistorized amplifying unit with a microphone for use with gas masks and other respiratory equipment. The unit, which may be attached to the mask or strapped to the wearer to permit free use of his hands, is powered by small batteries and has an extensive range. Used to maintain mobile communication in mines, rescue work, fire fighting, construction, maintenance, etc. *Bests, pp. 111, 112.*

void. a. A general term for pore space or other openings in rock. In addition to pore space, the term includes vesicles, solution cavities, or any openings either primary or secondary. Synonym for pore; interstice. *A.G.I.* b. Space in a soil mass not occupied by solid mineral matter. This space may be occupied by air, water, or other gaseous or liquid material. *ASCE P1826.* c. Porosity; unfilled space in unit volume of granular material compacted under stated conditions, and expressed as percentage or ratio of solid to void. *Pryor, 4.* d. That portion of a borehole from which the core could not be recovered. *Long.*

voidal concretion. A hollow limonitic concretion resulting from the weathering of clay ironstone. *A.G.I. Supp.*

void ratio. a. The ratio of volume of intergranular voids to volume of solid material in a sediment or sedimentary rock. *A.G.I. Supp.* b. The ratio of the volume of void space to the volume of solid particles in a given soil mass. *See also* critical void ratio. *ASCE P1826.*

vol Abbreviation for volume. *BuMin Style Guide, p. 62.*

vol. *See* vole. *Nelson.*

volatile. Capable of being readily evaporated at relatively low temperature. *ASTM STP No. 148-D.*

volatile combustible. That part of the combustible matter of coal which is driven off when the coal is heated in a closed vessel, chiefly compounds of hydrogen and carbon. *Fay.*

volatile fluxes. The volatile constituents of a magma. *Stokes and Varnes, 1955.*

volatile matter. a. Those products, exclusive of moisture, given off by a material as gas and vapor, determined by definite prescribed methods which may vary according to the nature of the material. In the case of coal and coke, the methods employed shall be those prescribed in the Standard Methods of Laboratory Sampling and Analysis of Coal and Coke (ASTM Designation D271) of the American Society for Testing Materials. *ASTM D121-62.* b. Technical term denoting the loss in weight of a dried sample of coal weighing 1 to 2 grams, that has been subjected to destructive distillation at 900° C for an hour. *Tomkeieff, 1954.* c. In coal chemistry, gas and distillate formed during pyrolysis. Synonym for volatiles. *Schieferdecker.*

volatiles. The volatile constituents (or rest magma) remaining after the less volatile ores have crystallized as igneous rocks. *A.G.I.*

volatile salts. Salts which when heated go straight to gas without melting and absorb a relatively large amount of heat in so doing. Common salt (sodium chloride) is the best example and is an ingredient of all permitted explosives up to more than a third in the more powerful types. Other examples of volatile salts are ammonium chloride (sal-ammoniac), potassium chloride, and borax. *Mason, V. 1, p. 162.*

volatilization. a. The act of vaporizing. *API Glossary.* b. In ceramics, colors improperly treated sometimes evaporate. *Noke.*

volborthite. A hydrous vanadate of copper, barium, and calcium, $Cu_3(VO_4)_2.3H_2O$, with small amounts of calcium and barium substituting for copper; possibly monoclinic; weakly to moderately radioactive; perfect cleavage in one direction; dark olive green to green and yellowish-green; a secondary mineral found with carnotite in sandstone. One of the principal ores of vanadium. *Sanford; Crosby, pp. 83-84.*

volcanello. A small volcano, especially when connected with an active one. *Standard, 1964.*

volcanic. a. Characteristic of, pertaining to, situated in or upon, formed in, or derived from volcanoes. *Fay.* b. Of mineral, originating from magma flowing from depths to the earth's surface through crater or vent. A volcanic pipe is consolidated material left when such a channel cools. *Pryor, 3.* c. Igneous rocks which have been ejected from volcanoes. *Gordon.*

volcanic agglomerate. A coarse volcanic material produced by explosions; occurs in the necks or pipes of old volcanoes. Not stratified. A coarse pyroclastic rock containing chiefly rounded fragments. *See also* agglomerate. *A.G.I. Supp.*

volcanic ash; volcanic tuff. *See* ash; tuff. *Fay.*

volcanic belt. A chain of volcanoes usually in a linear or arcuate arrangement and generally of great extent, and confined to orogens along the margins of the continents or within the ocean basins; for example, the volcanoes of the Aleutian Island chain comprise a volcanic belt. *A.G.I.*

volcanic bomb. A detached mass of lava shot out by a volcano which, as it falls, assumes a rounded form, like a bombshell. *See also* bomb. *A.G.I.*

volcanic breccia. a. A more or less indurated pyroclastic rock consisting chiefly of accessory and accidental angular ejecta, 32 millimeters or more in diameter, lying in a fine tuff matrix. If the matrix is abundant, the term tuff breccia seems appropriate. *A.G.I.* b. A rock composed mainly of angular volcanic fragments of either pyroclastic or detrital origin coarser than 2 millimeters in a matrix of any composition or texture or with no matrix. *A.G.I. Supp.* c. A rock composed of angular nonvolcanic fragments enclosed in a volcanic matrix. *A.G.I. Supp.*

volcanic butte. A special type of butte resulting from the differential weathering and consequent isolation of narrow vertical intrusions of igneous rocks. *Stokes and Varnes, 1955.*

volcanic chain. Synonym for volcanic belt. *A.G.I.*

volcanic chrysolite. Vesuvianite. *Shipley.*

volcanic clay. A term sometimes applied to bentonite, which is derived from devitrified and chemically altered glassy volcanic ash or tuff. *Stokes and Varnes, 1955.*

volcanic cluster. A group of volcanoes, volcanic cones, or volcanic vents without any apparent systematic arrangement. *A.G.I.*

volcanic coast. Shoreline or coast formed by volcanic rocks. *Schieferdecker.*

volcanic cone. A cone formed by volcanic discharges. *Standard, 1964.*

volcanic conglomerate. A rock composed mainly or entirely of rounded or subangular fragments, chiefly or wholly of volcanic rocks, in a paste of the same material. Conglomerates of this kind may have been formed by the accumulation of rounded materials ejected from volcanic vents or as the result of the aqueous erosion of previously solidified lavas. *A.G.I.*

volcanic dome. A volcanic form consisting of rounded masses of viscous lava squeezed out from the orifice, or of portions of older lavas or ejectamenta elevated by the pressure of new lava rising from beneath. The term dome is also applied as a geographical term to volcanic mountains of the type of Mauna Loa, in Hawaii. *Holmes, 1928.*

volcanic earthquake. A seismic disturbance which is due to the direct action of volcanic force, or one whose origin lies under or near a volcano, whether active, dormant, or extinct. *A.G.I.*

volcanic eruption. The breaking forth of lava, pumice, dust, etc., from the mouth of a volcano. *Standard, 1964.*

volcanic focus. The supposed seat or center of activity in a volcanic region or beneath a volcano. *Fay.*

volcanic glass. Natural glass produced by the cooling of molten lava or some liquid fraction of molten lava, too rapidly to permit crystallization, and forming such material as obsidian, pitchstone, sideromelane, and the glassy mesostasis in the groundmass of many effusive rocks. *A.G.I.*

volcanic island. An island that is formed as a result of volcanic action. *MacCracken.*

volcanic mud. a. Mud formed by the mixture of water with volcanic dust, ash, or other fragmental products of volcanic eruptions, often initially hot and flowing down the flanks of a volcanic cone as a hot lahar or mudflow. *A.G.I.* b. A deposit of fine-grained, usually calcareous, detrital volcanic material, commonly containing a high proportion of clay, on the sea floor around the margins of volcanic islands. *A.G.I.*

volcanic mud and sand. Deposits occurring around volcanic oceanic islands and coastlines. The deposits near shore contain fragments of volcanic rocks and minerals and are referred to as sands, while further out, the finer particles and alteration products form clayey or chloritic muds. *Holmes, 1928.*

volcanic neck. The filled up vent or chimney of a former volcano. *Standard, 1964.*

volcanic ore deposits. The major group of ore deposits of magmatic origin, designated as young by European mineralogists, which have been formed under near-surface conditions and very often in Tertiary or younger volcanic rocks. In a strict sense, deposits formed in relation to surface eruptions. *Schieferdecker.*

volcanic pipe. Sometimes the streams of lava are very fluid, and cool at the bottom and upper surfaces much more rapidly than in the interior. The rocks thus formed remain, while the interior molten lava flows on and caves are formed in this manner which are known as volcanic pipes. *A.G.I.*

volcanic plain. A lava flow, spreading out over a moderate slope, fills irregularities and may build a plain; and so also may volcanic ash emptied and strewn over the country on one side of the cone. *See also* lava plain. *A.G.I.*

volcanic rock. Any rock of volcanic origin; volcanic igneous rocks are those erupted as molten masses, forming lava flows, dikes in the crater walls, volcanic plugs, etc.; volcanic sedimentary rocks are the fragmental materials ejected in explosive eruptions, forming tuff, agglomerate, etc. *Fay.*

volcanics. A general collective term for extrusive igneous and pyroclastic material and rocks. *A.G.I. Supp.*

volcanic sand. Finely divided fragments of lava produced by volcanic explosions. *Standard, 1964.*

volcanic sandstone. Consolidated rock containing abundant sand-sized volcanic debris, either detrital or pyroclastic. *A.G.I. Supp.*

volcanic scoria. Vesuvianite. *Schaller.*

volcanic sink. A volcanic basin of engulfment, or downfaulting, with a floor area many times greater than the cross section of the associated vent. *Fay. Compare* caldera.

volcanic tuff. *See* tuff. *Fay.*

volcanic vent. An opening or channel in the earth's crust through which magmatic materials are transported and out of which volcanic materials (lava, pyroclastic detritus) are erupted at the surface. Central vents, representing the feeder channel or conduit of a volcano, are known as volcanic pipes. When filled with consolidated pyroclastic materials or solidified igneous rock, central vents are called volcanic necks or plugs. *A.G.I.*

volcanic water. Water in or derived from magma at the earth's surface, or at relatively shallow depth. *A.G.I. Supp.*

volcanism. Volcanic power or action; the quality or state of being volcanic (includes all phenomena connected with the movement of heated material from the interior to or toward the surface of the earth). *Webster 3d.*

volcanist. One who specializes in the study of volcanic phenomena; a plutonist. *Webster 3d.* A volcanologist. *A.G.I.*

volcanite. a. A volcanic rock composed essentially of anorthoclase and augite, and having the chemical composition of dellenite. *Holmes, 1928.* b. The name was suggested by the original occurrence on the Island of Volcano, one of the Lipari group, in Italy, where the rock is found as cellular bombs. *Fay.* c. Suggested in 1792 as a name for pyroxene and in 1869 as a name for selensulfur. *Dana 6d, pp. 10, 352.*

volcanity. The state of being volcanic or of volcanic origin. *Fay.*

volcanize. To subject to or cause to undergo and be affected by volcanic heat. *Webster 3d.*

volcano. A vent in the earth's crust communicating with a magmatic reservoir and commonly in the summit of a conical mountain built up of erupted material, from which are emitted molten rock or lava, fragmental solid material, hot water and mud, steam, and various gases. *Fay.* A volcano is called active while it is in eruption, dormant during a long cessation of activity, and extinct after eruptions have altogether ceased. *Webster 2d. See also* free-flowing volcano; explosive volcano.

volcanologist. One versed in the study of volcanic phenomena; a volcanist. *A.G.I.*

volcanology. A branch of science that deals with volcanic phenomena. *Webster 3d.*

volchonskoite. A clay mineral, a chromium-bearing montmorillonite. *A.G.I.*

Volclay. Trade name; a sodium bentonite from Wyoming. *Dodd.*

vole; vol. The place where tin ore is stored to be dried before being put into the smelting furnace. *Nelson.*

voler reductol. A lubricant for enclosed gear units; composed of high-quality mineral oil with a suspension of superfine colloidal graphite and silicone foam inhibitor. *Nelson.*

volforthite. Chemical formula probably $(Cu,Ca,Ba)_3(OH)_2VO_4 + 6H_2O$. A hydrous basic copper, calcium and barium vanadate carrying about 30.9 percent copper. Luster, pearly to vitreous. Color, olive-green to citron-yellow. Is translucent in thin splinters. Streak, greenish yellow. Hardness, 3 to 3.5. Specific gravity, 3.55. Occurrence: Perm, Russia, and at Henrietta mine, Yavapai County, Ariz. *Weed, 1918.*

volgerite. A discredited term equal to stibiconite. *American Mineralogist, v. 39, No. 3-4, March-April 1954, p. 406.*

Volgian. A division of the Jurrassic rocks of northern Russia. *Fay.*

volhynite. A porphyry containing plagioclase, hornblende, and biotite phenocrysts in a holocrystalline groundmass of feldspar and chlorite. The name was given by Ossovsky, and it is based on the original occurrence in Volhynia, U.S.S.R. *Fay.*

volley. In mining, the act of exploding blasts in sections. *Standard, 1964.* A round of holes fired at any one time. *Fay.*

vol pct Abbreviation for volume-percent. *BuMin Style Guide, p. 62.*

volt. a. The practical meter-kilogram-second (mks) unit of electrical potential difference and electromotive force (emf) that equals the difference of potential between two points in a conducting wire carrying a constant current of 1 ampere when the power dissipated between these two points equals 1 watt. It equals the potential difference across a resistance of 1 ohm when 1 ampere of current is flowing through it; the standard in the United States. *Webster 3d.* b. A unit of electrical potential difference and electromotive force equal to 1.00034 volts and formerly the standard in the United States. Also called the international volt. *Webster 3d.* Abbreviations, v and V; symbol, *V*. *BuMines Style Guide, p. 62; Webster 3d; Zimmerman, pp. 117, 259.*

voltabloc battery. This is a nickel-cadmium battery of comparatively recent introduction which is designed on entirely new principles. The plates consist of steel strip on which a base of nickel powder is sintered. The active material is absorbed in the pores of the sintered base so that the finished plate appears to consist of a homogeneous material, its proportions being very thin in comparison to its length and breadth. The plates are wrapped in a double covering, positive and negative alternating, so that each pair of plates is separated by a plastic fabric insulating sheet, and a sheet of cellulose tissue to absorb the electrolyte. The assembly of plates is compressed to form a block, placed in a plastic bag and enclosed in a close fitting steel container. It is then impregnated with electrolyte. The whole assembly is very rigid and stable. *Roberts, II, pp. 248-249.*

voltage. Electric potential or potential difference expressed in volts. *Webster 3d.* Abbreviations, v and V; symbols, *V* and E. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Webster 3d; Zimmerman, p. 117.*

voltage, circuit. *See* circuit voltage. *ASA M2.1-1963.*

voltage efficiency. The ratio of the equilibrium reaction potential in a given electrochemical process to the bath voltage. *Lowenheim.*

voltage, potential. Electromotive force. *Nichols.*

voltage regulation. This is the change in output voltage which occurs when the load is reduced from rated value to zero with the values of all other quantities remaining unchanged. *Coal Age, 1.*

voltaic cell. A cell consisting of two electrodes and one or more electrolytes which, when connected in a closed circuit, will give out electrical energy. *H&G.*

voltaite. A dull oil-green, brown to black mineral, partly soluble in water and without cleavage, $5(Mg,Fe,K_2)0.2(Al,Fe)_2O_3.\text{-}10SO_3.15H_2O$; Mohs' hardness, 3 to 4; specific gravity, 2.79. *Larsen, p. 53.*

voltameter. *See* coulometer. *Lowenheim.*

Volta's list. A list or series of metals, such that any one will be at a higher electrical potential when put in contact with any of those which follow, and at a lower potential if in contact with any metal before it in the series. The following is such a list: zinc, lead, tin, iron, copper, silver, and gold. *Fay.*

voltmeter. An instrument for determining voltage. *Crispin.*

voltzite. A mineral, Zn_5OS_4, consisting of a zinc oxysulfide and occurring in implanted spherical globules of a yellowish or reddish color. *Webster 3d.*

volumeter method. This method, for the determination of incombustible matter, is suitable for all dusts except those containing gypsum. The volume of a weighted quantity of dust is determined by immersion in methylated spirit and the incombustible matter in the dust is estimated by comparing this volume with the volumes of other similar dusts containing known properties of incombustible matter. *Cooper, p. 422.*

volumetric. Of or pertaining to measurement by volume, as opposed to gravimetric measurement. *ASTM STP No. 148-D.*

volumetric analysis. Quantitative chemical analysis in which known weight of sample is dissolved and reacted with a standard chemical solution of strength proportional to its normality or hydrogen equivalent. Completion of reaction (end point) is judged by change of color, incipient precipitation or effect on an indicator. *Pryor, 3. See also* dry assay; wet assay.

volumetric efficiency. a. The ratio of the total quantity of air passing along the faces to the quantity flowing in the fan drift. *Roberts, I, p. 252. See also* overall ventilation efficiency. b. The ratio, expressed as a percentage, of the total volume of air usefully used in a mine to the total quantity of air circulated. It is usually taken to be the total quantity of air reaching the working faces, compared with the total quantity entering the mine. *B.S. 3618, 1963, sec. 2.* c. For compressors, the ratio of the cubic feet of free air actually delivered as compressed air to the piston displacement of the compressor. *Lewis, p. 669.* d. The ratio of the volume of air discharged per revolution to the volume of the fan impeller. *Hartman, p. 182.* e. The volume of water which enters a pump cylinder for each piston stroke divided by the volume swept by the piston (piston area times stroke). *Nelson.*

volumetric glassware. *See* graduated glassware. *ASTM C162-66.*

volumetric grains. Eng. Grains of a definite size or diameter, but of a variable density which fall through water at different rates of velocity. *Fay.*

volumetric shrinkage. The decrease in volume, expressed as a percentage of the soil mass when dried, of a soil mass when the water content is reduced from a given percentage to the shrinkage limit. Also called volumetric change. *ASCE P1826.*

volume velocity. The rate of alternating flow of the medium through a specified surface produced by a sound wave. *Hy.*

volute. a. A spiral casing to a mine fan to provide an area of passage, which gradually increases in proportion to the increasing area of discharge from the fan. *See also* evasé chimney. *Nelson.* b. A spiral casing for a centrifugal pump or a fan designed so that speed will be converted to pressure without shock. *Ham.*

volute pumps. This type of centrifugal pumps is the most commonly used. The impellers may be open, closed or semienclosed, single-suction, double-suction or nonclogging. They discharge into casings which are progressively expanding spiral designs of one or more stages (multistage). The casings housing the rotating elements may be vertically or horizontally split, and a few designs have casings divided on an angle from the horizontal. Pumps in this class usually have a specific speed below 4,000 with single-suction impellers and a specific speed of 5,000 with double-suction impellers. *Pit and Quarry, 53rd, Sec. E, p. 86.*

von Neumann spike. The pressure peak leading the detonation wave prior to the establishment of the C-J state. *I.C. 8137, 1963, p. 76.*

vonsenite. A black borate of ferrous and ferric iron and magnesium, $3(Fe,Mg)O.B_2O_3.FeO.Fe_2O_3$. Coarse granular masses. Orthorhombic (?). From Riverside, Calif. *English.* Synonym for paigeite.

von Sterneck-Askania pendulum. A device for measuring the vertical component of gravity, characterized by the use of four pendulums in a single case. *A.G.I.*

von Wolff's classification. A chemicomineralogical classification of igneous rocks. *A.G.I.*

voog. A misspelling of vug. *Long.*

vooga hole. Same as vug. *Fay.*

Vooys process. A coal-cleaning process using a heavy suspension, consisting of clay and finely ground barite (—150 or —200 mesh) in water. A coal containing as little as 3.3 to 3.4 percent ash is steadily produced, with a yield practically equal to the theoretical float-and-sink yield. *Gaudin, p. 246.*

vorobyevite. A white or rose colored variety of beryl containing caesium. Same as morganite. From Lipowka, Ural Mountains, U.S.S.R.; Malagasy Republic. *English.*

vortex cast. *See* flute cast. *Pettijohn.*

vortex finder. Tube projecting into central vortex of hydrocyclone, through which the classified fine fraction of pulp leaves the system. *Pryor, 3.*

vough. Corn. Same as vug. *Fay.*

vou-hole; vooga. Corn. A natural cavity, hole, or chasm, in the earth or a mine. In Derbyshire, called shack. A vug. *Fay.*

voussoir. Any wedge-shaped piece of which an arch or vault is composed. The center voussoir is the keystone. *Sandstrom.*

VPB kiln. A kiln for the firing of building bricks; it consists of two groups of chambers in which the fire travel follows a zigzag course. The bricks are set on refractory bats and are put into, and subsequently drawn from, the kiln without the workmen having to enter the hot chambers. *Dodd.*

vrbaite. A thallium sulfarsenite and sulfantimonite, $Tl(As,Sb)_3S_5$. Gray-black in larger crystals, dark red in thin splinters. Orthorhombic. Intergrown with realgar and orpiment. From Allchar, Salonika, Macedonia. *English.*

V-ridge mica. *See* A-structure. *Skow.*

V-thread. A screw thread shaped like the letter V. *Long.*

V-type roller conveyor. *See* troughed roller conveyor. *ASA MH4.1-1958.*

vug. a. A small cavity in a rock, usually lined with a crystalline mineral incrustation. Sometimes written voog, vough, vugg, vugh, vogle, and incorrectly called bug, bug hole, vug hole. *See also* geode. *Fay; Long.* b. A cavity, often with a mineral lining of different composition from that of the surrounding rock. *Holmes, 1928.* c. A mining term for an unfilled cavity in a vein, generally with a mineral lining of different composition from that of the immediately surrounding ore. *Holmes, 1920.* d. The word is used by petroleum geologists for any opening from the size of a small pea to the size of a boulder. *A.G.I.*

vugg. A misspelling of vug. *Long.*

vuggy. Applied to rocks or mineral deposits abounding in vugs, as vuggy lode, vuggy rock. *Stokes and Varnes, 1955.*

vuggy lode. A lode or vein in which vugs or drusy cavities are of frequent occurrence. *Fay.*

vuggy porosity. Porosity due to vugs in calcareous rock. The term vugular is used by some writers but condemned by others. *See also* vug. *A.G.I.*

vuggy rock. Eng. A stratum of cellular structure, or one containing many cavities. *Fay.*

vugh. Corn. *See* vug. *Nelson.*

vugh-arching. When a pocket of rock in the periphery of an excavation is weaker than the remainder, it may fail under the ring stress. Fragments split away or fall out until all the weak rock is removed, forming an artificial vugh. This is called vugh-arching. *Spalding.*

vug hole. Synonym of vug. *Long.*

vugs. Unfilled cavities remaining in the midst of cavity-filling ore deposits. *Bateman.*

vugular. Synonym for vuggy. *A.G.I.*

vulcan coal powder. Explosive; used in mines. *Bennett 2d, 1962.*

vulcanism. Same as volcanism. *Fay.*

vulcanist. In geology, one who holds or taught the plutonic theory of the formation of rocks. *See also* plutonic. *Compare* neptunist. Usage obsolete. *Fay.*

vulcanite. a. A dark-colored, hard variety of vulcanized India rubber that differs from the softer rubber in having been vulcanized at a high temperature; ebonite. It takes a high polish, and is used for making combs, ornaments, etc., and in electrical work because of its fine insulating properties. *Standard, 1964.* b. A mineral, CuTe, with rickardite and native tellurium, as coatings on rock fragments from the Good Hope mine, Vulcan, Gunnison Co., Colo.; also synthetic. Orthorhombic. Named from locality. *Hey, M.M., 1961.*

vulcanites. A general name for igneous rocks of fine-grain size, normally occurring as lava flows, and thus in direct contrast with plutonites. *C.T.D.*

vulcanized rubber. A rubber which has been heated with sulfur; to change the properties of rubber by treatment with sulfur. *Nelson.*

vulcanizing. Process used to modify properties of rubber (strength, elasticity, stretch) by combination with sulfur, or a suitable sulfur-based compound, perhaps aided by heat and chemical accelerators. Used, among other things, in repair of damaged conveyor belts. *Pryor, 3.*

vulcanizing machine. Consists essentially of two heavy metal plattens which are placed one on each side of the previously prepared joint and clamped firmly together. Each platten is heated, and this combined application of heat and pressure over a period completes the joint. These machines are used to vulcanize the belt joints of conveyors. *Bureau of Mines Staff.*

vulcano type. In volcanology, the activity characterized by production of ash clouds. *Hess.*

vulcan powder. High explosive composed of 30 percent nitroglycerin, 52½ percent sodium nitrate, 10½ percent charcoal and 7 percent sulfur. *Pryor, 3.*

vulnerating. Weakening of glass in use, due to scratching and abrading which makes it more readily subject to breaking. *Bennett 2d, 1962 Add.*

vulpinite. A scaly, granular variety of anhydrite; it is cut and polished for ornamental purposes. *Fay.*

vulsinite. a. A variety of latite containing phenocrysts of sanidine, andesine, augite, and biotite in a groundmass of trachytic habit. *Fay.* b. The name is derived from the Vulsinii, an ancient Etruscan tribe inhabiting the region where the type specimens were obtained. *Compare* latite; trachydolerite. *Fay.* c. A variety of trachyandesite, similar to banakite, but somewhat richer in potash. *Holmes, 1928.*

V-value. *See* Nu-value. *ASTM C162-66.*

V-vat. a. A funnel box; also, having a groove or grooves of a triangular section. *Webster 2d.* b. A spitzkasten. *Standard, 1964.*

Vycor. A highly siliceous glass whose name is derived from Viking and Corning. A borosilicate glass is first made and this solidifies in two phases, one of which is soluble in dilute acid and is thus removed, leaving a highly siliceous skeleton. The porous ware is then heated at about 1,000° C; it shrinks considerably and nonporous high silica glass (96 percent SiO_2) is produced. *Dodd.*

vysotskite. A mineral, (Pd,Ni)S, minute grains or prismatic tetragonal crystals, isomorphous with braggite; from Norilsk, U.S.S.R. *Hey, M.M., 1964; Fleischer.*

W

w a. Abbreviation for west; western. *Webster 3d.* b. Abbreviation for weight; symbol for weight per unit time; weight rate; weight per unit of power; specific weight. *Zimmerman, pp. 100, 118, 119.* c. Abbreviation for work; symbol for work done by or on a system. *Zimmerman, p. 120.* d. Abbreviation for watt. *Zimmerman,* p. 118. e. Symbol for one of the three components of linear velocity or particle velocity and for velocity in the z direction. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Zimmerman, pp. 115, 166.* f. Abbreviation for water, wet, wide and width, waste, warm, wind, weather, wood, white. *Webster 3d.* g. Symbol for mixing ratio. *Zimmerman, p. 89.* h. Abbreviation for with. *Zimmerman, p. 120.*

w a. Symbol for weight. *Zimmerman, p. 167.* b. Symbol for work; work done by or on a system. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Zimmerman, p. 170.* c. Symbol for work energy. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* f. Symbol for rate of (*w*), also a symbol for work; work energy. *Zimmerman, pp. 155, 167.* e. Symbol for mixing ratio or water vapor content. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* f. Symbol for rate of flow per unit time or flow rate; mass flow rate. *Zimmerman, pp. 174, 367.* g. Symbol for phase velocity or wave velocity. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.*

W a. Chemical symbol for tungsten; derived from wolfram, the German word for tungsten. *Webster 3d.* b. Abbreviation for west; western. *Webster 3d.* c. Abbreviation for weight; symbol for quantity (weight) of matter; total weight. *Zimmerman, pp. 87, 110, 118.* d. Abbreviation for work; symbol for work done by or on a system. *Zimmerman, p. 120.* e. Abbreviation for watt; symbol for electric power expressed in watts. *Zimmerman, pp. 84, 118.* f. Symbol for energy. *Webster 3d.* g. Abbreviation for water. *Zimmerman, p. 118.* h. Symbol for free moisture content. *Zimmerman, p. 70.* i. Symbol for mass flow rate. Also abbreviated w. *Zimmerman, pp. 46, 67.* j. Symbol for residue or waste from distillation. *Zimmerman, p. 118.* k. Symbol for radiant flux density. *Zimmerman, p. 87.* l. Abbreviation for wide and for width. *Webster 3d.* m. Abbreviation for wire. *Zimmerman, p. 119.*

W a. Symbol for weight; weight, either as force of gravitational attraction on a mass or in the measurement of a quantity of matter. *Zimmerman, pp. 176, 184.* c. Symbol for work; work done by or on a system. *Zimmerman, pp. 146, 170.* d. Symbol for work energy. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* e. Symbol for energy. *Zimmerman, p. 173.* f. Symbol for free moisture content. *Zimmerman, p. 148.* g. Symbol for residue or waste from distillation. *Zimmerman, p. 148.* h. Symbol for radiant flux density; radiancy; radiance. *Zimmerman, pp. 156, 163.*

wabanite. Banded cream to black and gray to purple chocolate-colored slate from Massachusetts. *Schaller.*

wacke. a. Originally a German word used for more or less weathered basalt but later employed for various mixed and poorly sorted sediments. *A.G.I. Supp.* b. Abbreviation for graywacke; not recommended. *A.G.I. Supp.*

wacken. Rocklike clay, formed by the decomposition of basalts in situ. *Compare* graywacke. *Arkell.*

wad. a. A dark brown or black, impure mixture of manganese and other oxides. It contains 10 to 20 percent water, and is generally soft, soiling the hand. It is generally massive and of low specific gravity. A variety known as asbolite carries as much as 32 percent cobalt. Also called black ocher; earthy manganese; bog manganese. *See also* lampadite. *Fay.* b. In drilling, a term applied when rock cuttings tend to ball and adhere to drill string equipment and borehole walls in lumps. *Long.* c. In ceramics, a piece of clay used for various purposes, as a strip of moist clay laid around the rim of a seggar to form a bed for a superimposed seggar in the kiln. *Webster 3d.* d. Eng. Black lead; graphite. *Webster 3d.*

wad box. A simple hand-extrusion device for producing cylindrical fire clay wads for use during the setting of bungs of saggars. A wad box was also used in the old method of pressing handles and similar shapes of pottery ware; used for this purpose, the device was sometimes called a dod box. *Dodd.*

wad clay. a. A clay of high plastic tensile strength and plasticity which can be used to make a joint between saggers and other refractory materials. *ACSB-1.* b. A low-grade fire clay used in grouting the joints between saggers when they are setup in bungs in the kilns. *CCD 6d, 1961.*

wad coil. Eng. A tool for extracting a pebble or broken tool from the bottom of a borehole. It consists of two spiral steel blades arranged something like a corkscrew. *See also* spiral worm. Also called wad hook. *Fay.*

wadding. Paper or cloth placed over explosive in a hole. *Nichols.*

waddle fan. An earlier type of centrifugal fan. It had no external casing, but delivered directly to the atmosphere all around its periphery. The veins were curved backwards in the direction of rotation and the air was led into the fan by a curved inlet passage or throat. It was usually driven by steam at about 70 revolutions per minute; efficiency about 40 percent; external diameter of about 30 feet. *See also* Guibal fan. *Nelson.*

wadeite. A silicate of potassium, zirconium, etc., approximately $K_2CaZrSi_4O_{12}$, as hexagonal plates from Western Australia. *Spencer 15, M.M., 1940.*

wad hook. *See* wad coil; spiral worm. *Fay.*

wadhurst clay. A Cretaceous clay used for brickmaking in parts of Kent and Sussex, England. *Dodd.*

wadi. A river system clogged with sand, and is dry except during periods of rainfall. *MacCracken. See also* nullah.

wads. a. Balls or ropes of clay used to hold a leather-hard pot on the wheel for trimming. *ACSG, 1963.* b. Clay used to separate or seal saggers to even the kiln shelves or supports. *ACSG, 1963.*

Waechter's gold purple. A color, of various shades, that has been used in the decoration of porcelain. *Dodd.*

Waelz furnace. A rotary furnace used particularly for the calcination of nonferrous ores; chrome-magnesite linings have been used in waelz furnaces producing ZnO. *Dodd.*

Waelz kiln operator. In ore dressing, smelting, and refining, one who reduces low-grade zinc ore to maximum metallic concentration preparatory to extracting zinc in pure form, using an internally fired rotary kiln known by the trade name Waelz. *D.O.T. 1.*

Waelz process. A process by which low-grade ores, slags, or residues from retorts may be treated either for the recovery of zinc alone or for the recovery of zinc, lead, and tin. It employs a rotary kiln, and the zinc-bearing material mixed with fine coal is fed into the kiln and heated, so that the zinc is vaporized and converted to oxide fume. *Newton, p. 362.*

wafers. a. Small sheets of electroceramic material (for example, $BaTiO_3$), 0.001 to 0.01 inch thick, for use in electronic equipment, particularly in miniature capacitors, transistors, resistors, and other circuit components. *Dodd.* b. A name given to the rough slice obtained by sawing directly from a mother crystal or section. The process of manufacturing wafers is variously known as wafering, wafering from the crystal or slab, wafering from the mother crystal, and baloney slicing. *AM, 1.*

waff; waft. Scot. To fan out as firedamp from the working rooms. *See also* brush, d; dadding. *Fay.*

waffle ingot. An ingot of aluminum about three inches square and a quarter of an inch thick. *Webster 3d.*

waffler. A flight loader. *Nelson.*

waft. *See* waff.

wage. In ceramics, to knead, work, or temper as clay. *Fay.*

wageman. Leic. A collier who is paid by the day for performing a fixed amount of work. The American equivalent is company man; also timeworker as distinguished from pieceworker. A wage earner. *Fay.*

wage scale. A schedule of rates of wages paid for related tasks. *Webster 3d.*

waggon. *See* wagon. *Nelson.*

waging board. In ceramics, a board or table upon which potter's clay is kneaded. *Standard, 1964.*

wagnerite. A colorless, yellow, flesh-red or greenish mineral with imperfect cleavage, $3MgO.P_2O_5.MgF_2$ or $Mg(MgF)PO_4$. *Larsen, p. 106.*

Wagner turbidimeter. Apparatus for the determination of the fineness of a powder by measurement of the turbidity, at a specified level and after the lapse of a specified time, of a suspension of particles that are settling by gravity according to Stokes' law. *Dodd.*

wagon; waggon. a. An underground coal car. *Korson.* b. Any vehicle for carrying coal or debris. *Mason.* c. A railway truck used for long hauls and large tonnages. In Great Britain, the standard coal carrying wagon is a steel construction of 16-ton capacity. The average payload of British mineral wagons is increasing steadily. The new wagons are large hopper-bodied types of 21 or 24½ ton capacity. *See also* sidings; standard gage. *Nelson.* d. A mine car. The British spelling is waggon and in Great Britain it is synonymous with box, corf, hutch, skip, tram, and tub. *Fay.* e. Scot. A measure of weight equal to 24 hundredweight. Coal sold for delivery in carts is usually sold by the wagon of 24 hundredweight. *Fay.* f. A trailer with a dump body. *Nichols.*

wagon arrester. An appliance which can bring a wagon completely to rest and is usually used near the departure end of mine sidings. It can be rendered inoperative by remote control if required. *Nelson.*

wagon booster-retarder. An appliance which reduces the speed of wagons traveling above the design value, but for wagons traveling at speeds less than this, it releases energy by thrusting against the wheel flanges, therefore speeding up the vehicle. *See also* wagon retarder. *Nelson.*

wagon breast. Rooms or wide coal roadways into which the mine cars or wagons are taken. A pillar method of working a relatively thick, flattish coal seam. *Nelson.*

wagon drill. a. A drilling machine mounted on a light, wheeled carriage. *B.S. 3618, 1964, sec. 6.* b. A wheel-mounted pneumatic percussive type rock drill. Sometimes the name is applied to a wheel-mounted diamond drill machine. *Long.* c. Drills used, instead of hand-held machines, on road construction work, in excavating foundations for bridges, buildings, and dams and in quarrying. They are drifters mounted on a vertical steel frame that is carried on a light, mobile, three-wheeled chassis, having steel or rubber-tired wheels. Holes can be drilled to depths of 40 feet at any angle from the vertical to the horizontal. *Lewis, p. 88.*

wagoner. N. Staff. A man or boy who with a horse hauls mine cars underground. *Fay.*

wagon hole. Eng. The place where the tramway ends in a working place. *Fay.*

wagon mine. Same as snowbird mine. *Fay.*

wagon pinch bar. A device for moving railway wagons and locomotives short distances by hand. It consists of a cast-steel wedge-shaped tip with a wood handle. The tip is placed over the rail and under the wagon wheel and the up-and-down movement of the handle exerts sufficient pressure on the wheel to move the wagon. *Nelson.*

wagon rerailer. A device for bringing a derailed wagon back on to the track. It usually consists of ramp elements, which can be fixed at intervals along the track or temporarily fitted to the track just beyond the end of the wagon. The wagon is then pulled to cause the wheels to ride up the ramp and back on to the rails. *Nelson.*

wagon retarder. a. An appliance which reduces the speed of a wagon traveling in excess of a designed value (say, 3½ miles per hour), while having no effect on wagons moving at speeds less than this figure. The appliance is a self-contained hydraulic unit. *See also* automatic wagon control. *Nelson.* b. Another arrangement which is not automatic, consists of braking bars placed parallel with the running rails. When it is necessary to retard the wagons, the signalman pulls a lever which causes the braking bars to grip the wheel flanges and the friction reduces the speed. *See also* wagon booster-retarder. *Nelson.*

wagon rooms. Rooms driven in inclined seams in such a way that an adequate gradient is secured for the cars, which are often hauled to the heads of the rooms. *Stoces, v. 1, p. 350.*

wagon spotter. A wagon spotting appliance. It may be a bogey which is hauled backwards and forwards on a separate track installed between the main track rails, by a winch. A forward pull on the bogey raises a pair of arms to engage in the wagon axle, and a reverse pull lowers the arms to enable the bogey to be drawn back under the next wagon ready for the next pull. *Nelson.*

wagon tippler. A power-operated structure for discharging coal or other material from a railway wagon. One modern type is a 50-ton capacity side-discharge tippler and unloads at a rate of 30 wagons an hour, at the same time weighing and recording the tonnage discharged. *Nelson.*

wagonway. a. Sometimes used for the main haulage road in the bord-and-pillar method of working. *Nelson.* b. N. of Eng. An underground engine plane or horse road. *Fay.* c. Eng. *See also* rolleyway.

wailer. N. of Eng. One who picks out the rock and other rubbish that falls through a screen into the mine car with the coal. A variation of waler. *Fay.*

wain. A wagon used in the 16th century on the overland tracks for conveying coal to the staithe (or warehouse on the river). A wain held 8 bolls of coal, and a boll was equal to 2.23 hundredweight. *Nelson.*

wairakite. A zeolite, $CaO.Al_2O_3.4SiO_2.2H_2O$, the calcium analogue of analcime, but optically biaxial, monoclinic (pseudocubic). From hot springs at Wairaki, New Zealand. Named from locality. *Spencer 20, M.M., 1955.*

wairauite. Minute grains of CoFe, occurring with awaruite in the Red Hills serpentinites of Wairau Valley, South Island, New Zealand. Named from locality. *Hey, M.M., 1964; Fleischer.*

waiters-on. Eng. Men employed at the top of a shaft to run cars on and off the cage. *See also* pithead man. *Fay.*

waiting-on. N. of Eng. Time paid for at a fixed rate when normal filling work cannot be done because of events outside the men's control or when shift work is not available. *Trist.*

waiting on cement. *See* woc time. *Williams.*

waiver. Involves the notion of an intention entertained by the holder of some right, to abandon or relinquish instead of insisting on the right. It is a question of fact. Proof of waiver must include proof of knowledge of the facts upon which the waiver is based. *Ricketts, p. 617.*

wake. A region of reduced total head behind a body situated in the flow. The turbulent wake is another fluid mechanism in which energy is lost. *Roberts, I. p. 3.*

Wakefield sheet pile. Consists of three boards bolted or spiked together with the center board offset. This arrangement produces a tongue and groove which makes Wakefield sheetpiling fairly watertight if the piles are properly driven and tightly fitted together. *Urquhart, sec. 8, p. 107.*

wake loss. Losses occurring at the downstream end of the tub and arising chiefly from shock and eddying due to the higher velocity stream from the restricted area around the tub being projected into the lower velocity stream in the clear area downstream of the tub. *Roberts, I, p. 282.*

wala. A Ceylonese term for pit. *Hess.*

walaite. A variant spelling of valaite. *Tomkeieff, 1954.*

walchowite. A yellow, resinous, oxygenated hydrocarbon that occurs in brown coal at Walchow, Moravia, Czechoslovakia. It has a specific gravity of 1.0 to 1.069, fuses to a yellow oil at 250° C, and forms a dark brown solution in sulfuric acid. Also called retinite. *Fay. See also* duxite. *A.G.I.*

wale. a. A horizontal timber used to bind together piles driven in a row. *C.T.D.* b. Newc. To clean coal by picking out the refuse by hand. Those who do this are called walers or wailers. *Fay.*

waler. a. In coal mining, one who is employed to pick slate and stone from coal at the breaker or pit mouth. *Standard, 1964.* b. *See* wale; wailer. *Fay.*

Wales. An area comprising 13 counties in Great Britain bounded on the north and west by the Irish sea and on the south by Bristol Channel, known for its two large coal fields and iron smelting works. The South Wales coal field alone covers about 1,000 square miles with deposits ranging from bituminous and steam coal to anthracite. *Encyclopedia Americana.*

waling. a. Eng. Cleaning coals by picking out refuse. *Fay.* b. A horizontal beam forming part of a frame and holding poling boards, runners, or sheet piles against the sides of an excavation. *See also* face waling; timbering. *Ham.*

walk. a. To deviate from the intended course, such as a borehole that is following a course deviating from its intended direction. Also called deviating; wander; wandering. *Long.* b. A mass or slug of tempered clay, ready to be thrown into a mold for handmade brick. *Bureau of Mines Staff.*

walker. A walking dragline. *Nichols.*

Walker bunker conveyor. Trade name for a deep-sided chain-type bunker conveyor with a capacity of 22 hundredweight per yard run. It is fitted with steel crossbars 2½ inches deep and spaced at 12-inch centers. The unit is installed in line and under the raised discharge of the trunk conveyor. Normally the bunker conveyor is stationary and acts as a chute at the transfer point. When storage is required, it is run slowly backward as loading proceeds. When the load on the trunk conveyor is light or has ceased, the bunker is slowly advanced to discharge its coal. *Nelson.*

Walker disk machine. The first really practical disk coal cutter introduced by J. S. Walker, of Wigan, England, in 1868. It was designed for an undercut of 2 feet with a 4-inch kerf and was driven by a reciprocating compressed air engine. *Nelson.*

walker's earth. Shrop. Fuller's earth in Ludlow Shales. *Arkell.*

walker shutter. Aust. A shutter having a V-shaped cut in it, provided for large ventilation fans of Guibal type, which by cutting off the discharge of air gradually, reduces the vibration. *Fay.*

Walker vacuum mixer. See vacuum mixer. *Dodd.*

walking. a. The movement forward or backward of a dredge by first winding up on one side and then the other, swinging the boat from side to side and thereby advancing with a slight offsetting to the side. *Fay.* b. *See* walk. *Long.*

walking bar. A trunnion or walking beam. *Nichols.*

walking beam. a. The beam used to impart a reciprocating movement to the drilling column in percussive drilling. Also called rocking beam. *B.S. 3618, 1963, sec. 3.* b. An oscillating bar or beam, pivoted at the center and free to rock up and down. *Long.* c. On cable tool and churn drill rigs, the beam that carries the string of drilling tool at one end and is connected to a cranked drive wheel at the other. The rotation of the wheel causes the tool string to lift and drop; thus the hole is drilled by concussion. *Long.* d. A rigid member whose ends rest on supports that may move up and down independently, and whose center is hinged to the load it carries. Also called trunnion. *Nichols.*

walking-beam kiln. A tunnel kiln of unusual type, the ware (set on bats) being moved through the kiln in steps by a mechanism that alternately lifts the bats and sets them down further along the kiln. *Dodd.*

walking crane. A light crane traveling on an overhead channel iron and a single rail vertically beneath this in the floor. *Webster 3d.*

walking delegate. A business representative of a labor union appointed to visit members and their places of employment, to secure the enforcement of union rules and agreements, and at times to represent the union in dealing with employers. *Webster 3d.*

walking dragline. a. A dragline which is equipped with apparatus which permits it to "walk" by the alternate power movement of vertical booms fastened to large outrigger platforms so arranged as to push the equipment forward as work progresses. *B.C.I.* b. An excavator of very large capacity, equipped with walking beams operated by eccentrics in place of crawler tracks. Such machines can excavate 1,650 tons per hour of overburden to a depth of 100 feet. *Ham.*

walking ganger. A traveling ganger who is responsible for supervising the work of several gangs on a construction site. *Ham.*

walking miner. *See* Joy walking miner. *Nelson.*

walking props. Another name for self-advancing supports. *Coal Age, v. 71, No. 8, August 1966, p. 201.*

walking support. *See* self-advancing supports. *Nelson.*

walkout. Act of walking out or leaving; specifically, a labor strike. *Webster 2d.*

wall. a. The side of a level or drift. *Fay.* b. The country rock bounding a vein laterally. The side of a lode; the overhanging side is known as the hanging wall and the lower lying side as the footwall. *Fay.* c. The face of a longwall working or stall, commonly called coal wall. *Fay.* d. A rib of solid coal between two rooms; also, the sides of an entry. *B.C.I.* e. S. Afr. Sides of a reef, shaft, or level; footwall and hanging wall. *Beerman.* f. Eng. A headways place driven between and at right angles to two adjacent bords. Also called pointing. *SMRB Paper No. 61.*

wall accretions. Material adhering to the inner walls of a blast furnace between the water jackets and the feed door. *Fay.*

Wallace agitator. Mixing device driven by impeller used in pulp mixing and aeration, in cyanidation where strong agitation is needed. *Pryor, 3.*

Wallachian orogeny. Post-Pliocene diastrophism. *A.G.I. Supp.*

wall bars. Eng. Prop wood usually cut flat to fix against the roof, close up to the working face, where the roof is liable to break along the line of face. *Fay.*

wall boss. a. A man who supervises a crew of men operating a face conveyor. *Hess.* b. *See* room boss. *D.O.T. 1.*

wall builder. In metal mining, one who builds solid walls and pillars of stone or brick and mortar or concrete to support the walls and roofs of underground openings in a mine where these materials are used for support instead of timber. *D.O.T. 1.*

wall cake. *See* cake, b. *Long.*

wall cavitation. The development of enlarged sections in a borehole as the result of caving, erosive action of the circulated liquid, or erosion caused by drill rods rubbing against the borehole walls. *Long.*

wall clearance. The distance between the wall of the borehole and the outside of a piece of drill-string equipment when the string is centered in the borehole. *Long.*

wall closure. *See* closure. *Spalding, p. 76.*

wall coal. Scot. Breast coal; the middle division of three in a seam, the other two being termed top coal and ground coal. *Fay.*

wall-controlled shoots. Ore shoots that occur adjacent to certain favorable wall rocks that presumably influenced deposition from the mineralizing fluids. *Stokes and Varnes, 1955.*

wall cutting. Scot. Side cutting or shearing the solid coal in opening working places; trimming the sides of a shaft. *Fay.*

wall drag. The amount of friction resulting from the drill rods rubbing against the walls of a borehole or the inside surface of the casing lining a borehole. *Long.*

waller. a. Laborer who builds walls to support backfilling. *Fay. See* pack builder, b. *D.O.T. 1.*

wall face. Scot. The face of the coal wall; the working face. *Fay.*

wall friction. a. The drag created in the flow of a liquid or gas because of contact with the wall surfaces of its conductor, such as the inside surfaces of a pipe or drill rod or the annular space between a drill string and the walls of a borehole. *Long.* b. The drag resulting from compaction of loose materials around the outside surfaces of drive pipe, casing, etc. Also called skin friction. *Long.* c. Friction which arises between the back of a retaining wall and the retained soil. *Ham.* d. Frictional resistance mobilized between a wall and the soil in contact with the wall. *ASCE P1826.*

wall hook. A fishing tool shaped like a side rasp, but unlike the side rasp, the surfaces of the wall hook are smooth. *Long.*

walling. a. The brick or stone lining of shafts. *Fay.* b. Derb. Stacking or setting up ironstone, etc., in heaps, preparatory to being measured or weighed. *Fay.*

walling crib. Eng. Oak cribs or curbs upon which shaft walls are built. *Fay.*

walling curb. *See* curb; foundation curb; water ring. *Nelson.*

walling scaffold. See bricking scaffold. *Nelson.*

walling stage. A movable wooden scaffold suspended from a crab on the surface, upon which the workmen stand when walling or lining a shaft. *Fay.*

walling up. The building up of a layer of mud cake or compacted cuttings on the borehole sidewalls; the filling of cracks or caved portions of the borehole walls with cement. *Long.*

wall off. To seal cracks, crevices, etc., in the wall of a borehole with cement, mud cake, compacted cuttings, or casing. *Long.*

wallow. Mid. A windlass; a stowse. *Fay.*

wall packing. The compaction of sticky cuttings that collect and adhere to the walls of a borehole. *Long.*

wallplate. a. A horizontal timber supported by posts resting on sills and extending lengthwise on each side of the tunnel. On these wallplates the roof supports rest. *Stauffer.* b. A horizontal member, usually of wood, bolted to a masonry wall to which the frame construction is attached. Also called headplate. *ACSG.*

wallplate anchor. A machine bolt anchor with a head at one end and threaded at the other, and fitted with a plate or punched washer so that when embedded in the masonry it will be securely anchored and will hold the wallplate in place. *ACSG.*

wallplates. a. Corn. The two sidepieces of a timber frame in a shaft, parallel to the strike of the lode when the shaft is sunk on the lode. When not sunk on the lode, the two longest horizontal pieces of timber in a set used in a rectangular shaft. *Fay.* b. Scot. Vertical pieces of wood supporting the ends of the buntons in a wood-lined shaft. *Fay.* c. Endpieces; end plates. *C.T.D.*

wall rock. a. The country rock immediately adjacent to a vein or lode. *Nelson.* b. The rock forming the walls of a borehole. *Long.*

wall-rock halo. A dispersion pattern formed in the rock adjoining mineral deposits where the chemical composition has been modified by the ore-forming fluids. *Hawkes.*

wall-rock pattern. A channel dispersion pattern in which the minor elements of the walls of the channels have been modified. Wall-rock dispersion patterns of importance usually are those formed at the time the ore bodies were being deposited. *Lewis, p. 301.*

walls. a. Coal roadways in pillar-and-stall mining. *Nelson.* b. The side of an ore body defining where the ore ceases and the country rock begins. Walls may be definite or indefinite. *See also* footwall; hanging wall. *Nelson.* c. The hanging and footwalls of a lode are called "the walls." This term should not therefore be used for any kind of supports. Where ground control is by buildings of waste rock, these should be called packs or packwalls; where masonry supports are used they should be termed buildings. The brick, concrete, or stonework construction at the sides of an excavation built to carry a flat or arched roof are sidewalls or endwalls. *Spalding, p. 160.*

wallscraper bit. A rotary bit used to enlarge the diameter of a borehole. *B.S. 3618, 1963, sec. 3.*

Wallsend. Eng. A grade of coal for household purposes: originally from Wallsend, on the Tyne, but now from any part of a large district in and near Newcastle. *Standard, 1964.*

walls of a vein. *See* wall, a; wall rock, a. *Fay.*

wall tie. a. A rigid, corrosion resistant steel or other metal tie used to bond the two wythes of a cavity wall together; usually 3/16 inches in diameter and formed in a Z or a rectangle. *ACSG.* b. A strip or piece of metal used for tying a facing veneer to the backing. *ACSG.*

wall tile. Tile consisting of two or more adjacent flues, molded together and used in walls of a structure to afford the protection of an inner air chamber between the outer wall and the plastering or finish. *ACSG, 1963.*

wall white. A white scum that appears on bricks after they are set in the wall. *Fay. See also* efflorescence.

walpurgite. A very rare, moderately to strongly radioactive, triclinic, yellow to yellow-orange mineral; possibly $2Bi_2O_3.UO_3.As_2O_5.3H_2O$; a secondary mineral found associated with troegerite, zeunerite, uranosphaerite, torbernite, and uranospinite. Also spelled walpurgin. *Crosby, pp. 60-61.*

waltherite. A discredited term equal to walpurgite. *American Mineralogist, v. 41, No. 11-12, November-December 1956, p. 960.*

Walton filter. An emerald glass or beryloscope mounted to resemble a hand loupe and called an emerald loupe in Europe. Observed through it the filament of an electric lamp appears reddish yellow, light from this filament passing through most genuine emerald appears the same color; through a Brazilian emerald from Minas Geraes, green; through an epidote, red; a dioptase, green, etc. *Shipley.*

wammel. *See* wumble. *Hess.*

wander. a. An unintentional change in the course of a borehole. *Compare* deflect; walk; warp. *Long.* b. *See* band wander. *Pryor, 3.*

wandering coal. Scot. A coal seam that exists only over a small area; an irregular seam of coal. *Fay.*

wandering sequence. The same as random sequence. *ASM Gloss.*

wane. A defect in a timber or plank. *Crispin.*

want. a. An area in which a bed, usually a coal seam, is missing due to the presence of a normal or a lag fault. *B.S. 3618, 1964, sec. 5.* b. A localized disappearance of a coal seam, for reasons other than faulting; for example, washouts,, squeeze, and rolls. *B.S. 3618, 1964, sec. 5.* c. Scot. A clean rent or fissure in strata unaccompanied by dislocation. *Fay.* d. Eng. A portion of a coal seam in which the coal has been washed away and its place filled with clay or sand; a nip. *Standard, 1964. See also* balk; cutout, d.; washout. *A.G.I.* e. *See* fault. *Kentucky, p. 21.*

wapping. Leic. A roughly made rope or band of hemp or spun yarn. *Fay.*

Ward drill. A hand drill that can be used in a river on a barge or on a platform built on two large canoes. Basically, it consists of four straight poles, 5 to 7 inches in diameter at the large end, which are set into notches in planks to prevent their sinking into the ground. The poles are joined at the top by a shaft that holds the pulley for the drill wire or rope. The walking beam is activated by 8 to 10 men lining up on the crossarm. They pull down to raise the tools and vary their manner of movement depending on whether they are driving casing, drilling, or pulling casing. The Ward drill is most efficient in shallow ground but can be used in depths up to 90 feet. *Institution of Mining and Metallurgy. Symposium on Opencast Mining, Quarrying, and Alluvial Mining. London, 16-19 November 1964. Paper 8, pp. 2-3.*

warden. a. A protector. *Arkell.* b. S. Wales. Strong sandstone. *Nelson.* c. Aust. An officer empowered under the Mining Act with magisterial and executive authority over a goldfield. *Standard, 1964.*

wardite. A basic hydrous phosphate of aluminum, sodium, and calcium, $CaNa_4Al_{12}(PO_4)_8(OH)_{18}.6H_2O$; tetragonal?; encrusting layers, oolitic and crystallized; light bluish-green. Found in Cedar Valley and near Fairfield, Utah. *English.*

Ward-Leonard control. a. A method of controlling the speed of electric winding or other large direct current motors, employing a variable voltage generator to supply the motor armature, and driven by a shunt motor. *See also* automatic cyclic winding; Ilgner system. *Nelson.* b. In a modification, the Ward-Leonard-Ilgner system incorporates a heavy flywheel on the shaft of the generator which smooths out surges in the system. *Pryor, 3.*

ware boy. One who carries bisque ware on boards from bisque cleaning room or underglaze decorating shop to dipping room, and sets filled boards on drying racks. Also called dipper helper. *D.O.T. 1.*

ware carrier. *See* glost-ware carrier; greenware carrier. *D.O.T. 1.*

ware clay. A term sometimes used synonymously with ball clay. *CCD 6d, 1961.*

ware cleaner. One who smooths surface of glaze-dipped vitreous chinaware, such as sanitary fixtures and lavatories, with the fingers, removing checks, cracks, and loose material to prepare the ware for kiln baking. *D.O.T. 1.*

ware dresser. One who dresses and polishes glostware. Also called buffer. *D.O.T. 1.*

ware finisher. One who shapes handles and lips and other dips on pressed ware, such as pitchers, vases, and bowls. Cuts off required amount of molten glass from gob (mass of molten glass), held by gatherer, with nippers and attaches to pressed ware to form handles. Shapes attached handles while hot and pliable to desired contours, using a carbon stick. Manipulates carbon stick along top edges of heated ware to form lips and other decorations. Also called glassware finisher. *D.O.T. 1.*

ware former. A general term applied to a worker who forms clay into vessels or other objects by hand or by using molds or presses. *D.O.T. 1.*

ware presser. *See* flatware presser; hollow-ware presser. *D.O.T. 1.*

ware stripper. *See* glost-ware carrier; greenware carrier. *D.O.T. 1.*

ware washer. One who washes all baked pottery or porcelain ware before it is moved to another department. *D.O.T. 1.*

wargeare. Derb. A general term for all tools, ropes, timber, and other appliances necessary to carry on the work of a mine. *Fay.*

waringtonite. A hydrated sulfate of copper that shows an emerald green color. Synonym for brochantite. *Hey 2d, 1955.*

wark; werk. Eng. Black slaty stone overlying coal seams, Somerset coalfield. *Arkell.*

wark batch. Som. A spoil bank. *Fay.*

warm-air furnace. A vessel of steel or cast iron in which fuel is burned and over the surfaces of which air is passed and thus heated. In the heating trade, designated as a furnace and not to be confused with a boiler. *Strock, 10.*

warm-in boy. One who reheats glassware in a furnace for further processing. Grasps hot glassware with a long-handled pincer (snap). Inserts snap into furnace opening (glory hole), withdrawing it when glassware assumes an orange-red color. *D.O.T. 1.*

warming-in. Reheating glass to permit further working; also, for striking. *ASTM C162-66.*

warner. Eng. An apparatus consisting of a variety of delicately constructed machines actuated by chemical, physical, electrical, and mechanical appliances, for indicating the presence of small quantities of firedamp, heat, etc., in mines. *Fay.*

warning. a. Scot. Notice, given or received, of a workman leaving his employment. *Fay.* b. A notice, bulletin, or signal that serves to caution of the approach of danger. *Webster 3d.* As to warn workmen of the dangers usually encountered in a mine. *Fay.*

warning lamp. Eng. A safety lamp fitted with certain delicate apparatus for indicating very small proportions of firedamp in the atmosphere of a mine. *Fay.*

warning lines. The lines drawn on working plans to indicate the limit beyond which workings should not extend, for example, because of the proximity of disused or abandoned workings. *B.S. 3618, 1963, sec. 1.*

warning signals. Signals given to men in a mine to notify them that some danger exists as fire, etc., by blinking lights, sounding gongs or bells, or by shutting off the compressed air lines. *Fay.*

warp. a. York. Blue-brown, finely laminated, tough clay containing pebbles. *Fay.* b. The deposit of muddy waters artificially introduced into lowlands. *Fay.* c. The amount a borehole has wandered off course. *Long.* d. To deflect from a normal position of course. *Long.* e. In glass manufacturing, yarns extending lengthwise in the loom and crossed by the filling yarns. *Phillips.*

warpage. a. Distortion which may occur in a compact during sintering. *ASTM B 243-65.* b. The deviation from the intended or normal surface of a ceramic shape resulting from bending or bowing during manufacture. *A.R.I.*

warp dresser. In the asbestos products industry, one who winds strands of asbestos yarn from spools onto a beam, by machine, for use in weaving asbestos cloth. *D.O.T. 1.*

warped. Scot. Irregularly bedded, or plicated. *Fay.*

warped fault. Faulting accompanied or followed by folding or warping, particularly applicable to overthrusts and underthrusts. *Nelson.*

warping. a. The bending or twisting of a ceramic article in drying or firing. *Bureau of Mines Staff.* b. Change in the original contour of the enamelware produced during firing. *ACSB-3.* c. The gentle bending of the earth's crust without forming pronounced folds or dislocations. *A.G.I.* d. Conversion of a lagoon or tidal-flat area into a marsh. *Schieferdecker.*

warping dam. A dam raised on tidal-flat area to promote marine deposition. *Schieferdecker.*

warrant. a. A general term for the clay floors of coal seams, particularly when hard and tough. *Nelson.* b. Lanc. Synonymous with clunch and pounson. *Compare* warren. *Fay.* Also known as spavin.

warrant clay. *Staff.* Underclay. *Arkell.*

warren; warren earth. Lanc. Bind; clunch; etc. *Compare* warrant. *Fay.*

warren earth. Fireclay. Corruption of warrant. *Arkell.*

Warren girder. A triangulated truss made up only of sloping members between the horizontal top and bottom members with no verticals. *See also* N-truss. *Ham.*

warrenite. a. A general term for gaseous and liquid bitumens consisting of a mixture of paraffins, isoparaffins, etc. *Tomkeieff, 1954.* b. A pink variety of smithsonite containing 10.25 percent CoO. From Boleo, Lower California, Mex. Identical with cobaltsmithsonite. *English.*

Warrington. Strand construction in which one layer of wires is composed of pairs of large and small wires, thus 6 x 19 (6 and 6/6/1) equal laid. *See also* equal lay. *Ham.*

Warrington rope. A wire rope composed of 7 wires of the same size covered by 12 wires alternately large and small. *Lewis, p. 249.*

wart agate. Variety of carnelian of mammillary or small spherical growths. Often found as covering colored agate. *Shipley.*

warwick. Derrick. *Mason.*

warwickite. A dark-brownish to dull-black mineral found in prismatic orthorhombic crystals with perfect cleavage, $3(Mg,Fe)O.TiO_2.B_2O_3$; Mohs' hardness, 3-4; specific gravity, 3.4. *Larsen, p. 139.*

Warwick safety device. A safety appliance placed near the upper end of an inclined haulage road to stop a tram running wild down the incline. It consists of a heavy beam longer than the height of the roadway, and normally held up entirely at roof level, but hinged at the lower end. In the event of a tram running away from above, a haulage hand can pull a rope which releases the upper end of the beam which drops and stops the tram. *Nelson.*

Warwickshire method. A method of mining contiguous seams. *See also* bord-and-pillar. *Fay.*

wash. a. Applied to the defined bed of water-worn gravels, boulders, and sand in alluvial deposits and containing concentrations of the metal or mineral sought. *Nelson.* b. In coal mining, a washout. *Nelson.* c. The wet cleaning of coal or ores. *Nelson.* d. Soil, clay, stones, etc., overlying solid strata. *Hudson.* e. A western miner's term for any loose, surface deposits of sand, gravel, boulders, etc. *Fay.* f. Auriferous gravel. *Fay.* g. To subject, as earth, gravel, or crushed ore, to the action of water to separate the valuable material from the worthless or less valuable; as, to wash gold. *Webster 3d.* h. To pass a gas through or over a liquid for the purpose of purifying it, especially by removing soluble components. *Webster 3d.* i. To clean cuttings or other fragmental rock materials out of a borehole by the jetting and buoyant action of a copious flow of water or a mud-laden liquid. *Long.* j. The erosion of core or drill string equipment by the action of a rapidly flowing stream of water or mud-laden drill-circulation liquid. *Long.* k. The term belongs neither to the terminology of geology nor of law. The wash of a stream is the sandy, rocky, gravelly, boulder-bestrewn part of a river bottom. The cone of the stream is not synonymous with wash of the stream; nor conterminous with it. *Ricketts, I.* l. To overlay with a thin coat of metal by deposit from a solution, as steel washed with silver. *Webster 3d.* m. To dephosphorize molten pig iron by adding substances containing iron oxide and sometimes manganese oxide. *Webster 3d.* n. In founding, to coat, as a core or mold, with an emulsion, as of graphite, in order to improve the casting. *Standard, 1964.* o. A coating applied to the face of a mold prior to casting. *ASM Gloss.* p. Coarse alluvium; an alluvial fan. *Webster 3d.* q. The dry bed of an intermittent stream often at the bottom of a canyon. Also called dry wash. *Webster 3d.*

washability. Coal properties determining the amenability of a coal to improvement in quality by cleaning. *B.S. 3552, 1962.*

washability curve. A curve or graph showing the results of a series of float-and-sink tests. A number of these curves are drawn to illustrate different conditions or variables, usually on the same axes, thus presenting the information on one sheet of paper. Washability curves are essential when designing a new coal or mineral washery. *Nelson.* There are four main types of washability curve: characteristic ash curve, cumulative float curve, cumulative sink curve, and densimetric or specific gravity curve. *B.S. 3552, 1962.*

washback. *See* wash mill. *Dodd.*

washbanding. A form of pottery decoration, usually on-glaze, in which a thin layer of color is applied over a large surface of the ware by means of a brush. *Dodd.*

washboard. Unintentional waviness on the surface of glassware; also known as ladders. *Dodd.*

wash boring. a. Drilling by use of jet water applied inside a casing pipe, in unconsolidated ground. *Pryor, 3.* b. A test hole from which samples are brought up mixed with water. *Nichols.*

wash-boring drill. A drill rig utilizing the jet action of a high-pressure stream of water to produce a borehole in soft or unconsolidated material. *Long.*

wash-boring gear. The equipment used in wash boring. *Long.*

wash bottle; washing bottle. a. A bottle or flask fitted with two glass tubes passing through the stopper, so that on blowing into one tube a stream of water issues from the other tube. The stream may be directed upon anything to be washed or rinsed. *Hess.* b. A bottle for washing gases by passing them through liquid contained in it. *Hess.*

washbox. In coal preparation, the jig box in which feed is stratified and separated into fractions (heavier below and lighter above). A feldspar washbox has a bedding of that mineral. *Pryor, 3.*

washbox air cycle. The valve-timing cycle determining the periods of air admission and exhaust. *B.S. 3552, 1962.*

washbox cells. The individual portions into which the part of a washbox below the screen plate is divided by transverse division plates, each being capable of separate control. *B.S. 3552, 1962.*

washbox center sill. A sill fitted over a center extraction chamber. *B.S. 3552, 1962.*

washbox center weir. An adjustable plate situated between the feed end and the discharge end of a washbox and serving to regulate the forward movement of material through the box. *B.S. 3552, 1962.*

washbox compartments. The sections into which a washbox is divided by transverse division plates which extend above the screen plate to form a weir; each compartment usually comprises two or more cells. *B.S. 3552, 1962.*

washbox discharge sill. That part of the washbox over which the washed coal passes out of the box. Usually the discharge sill is a part of the discharge-end refuse extraction chamber. *B.S. 3552, 1962.*

washbox feed sill. That part of the washbox over which the feed passes when it enters the box. Usually the feed sill is a part of the feedend refuse extraction chamber. *B.S. 3552, 1962.*

washbox screen plate; grid plate; sieve plate; bedplate. The perforated plate or grid which supports the bed of material being treated. *B.S. 3552, 1962.*

washbox slide valve; washbox piston valve. A washbox air valve operated by means of a reciprocating motion. *B.S. 3552, 1962.*

wash-coal conveyorman. *See* coal washer, a. *D.O.T. Supp.*

wash dirt. a. The tailings or material discarded in the operation of washing an alluvial deposit for gold. *Nelson.* b. Gold-bearing earth worth washing. Also called wash stuff; washing stuff; wash gravel. *Fay.*

washdown spear. A fishing tool. *Long.*

wash driller. *See* diamond driller. *D.O.T. 1.*

wash-driller helper. *See* diamond-driller helper. *D.O.T. 1.*

washed clays. Purified clays, with low silica and grit. They result from mixing raw clay with water and allowing sedimentation to cause separation of the impurities from the clay. *CCD 6d, 1961.*

washed coal. a. Coal from which impurities have been removed by treatment in a liquid medium. *B.S. 3323, 1960.* b. Coal produced by a wet-cleaning process. *B.S. 3552, 1962.*

washed gases. Purified coal gas from which the chemicals benzene and naphthalene have been extracted by scrubbing with oil. *Cooper, pp. 391 and 396.*

washed out. Said of a coal seam when the bed thins out. *Mason, V. 1, p. 20.*

washer. a. A section, unit, or box in a coal washery. A small washery may comprise only one washbox. *Nelson.* b. Apparatus for the wet cleaning of coal, together with its immediate ancillary equipment. *B.S. 3552, 1962.* c. An apparatus for washing ore, etc., as a jigger or slime table; also, any similar machine used in coal washing. *Standard, 1964.* d. An apparatus in which gases are washed; a scrubber. *Webster 3d.* e. A small flat perforated disk, of metal or leather, used beneath a nut or pivot head, or at an axle-bearing or joint, to serve as a cushion or packing. *Standard, 1964.*

washer beltman. In bituminous coal mining, one who repairs belts used to drive coal-washing machines in washing plant. *D.O.T. 1.*

washer boss. *See* washery boss. *D.O.T. 1.*

washer foreman. *See* washery boss. *D.O.T. 1.*

washerman. *See* coal washer, a. *D.O.T. Supp.*

washer mica. Thumb-trimmed block mica of sufficient area to yield a disk 1 inch in diameter free of cracks and open areas. Now included in general term punch mica. *Skow.*

washer operator. *See* coal washer, a. *D.O.T. 1.*

washer-table man. *See* coal washer, a. *D.O.T. 1.*

washery. a. A place at which ore, coal, or crushed stone is freed from impurities or dust by washing. *Webster 3d.* Also called wet separation plant. *See also* washing apparatus; coal-preparation plant; dense medium washer; efficiency of separation. b. A coal preparation plant in which a cleaning process is carried out by wet methods. *B.S. 3552, 1962.* c. A building resembling a breaker used in reclaiming culm and fine coal from old banks. *Korson.* d. That part of a preparation plant where the merchantable coal is separated from the refuse by using differences in specific gravity, generally loosely used regardless of whether air, water, air sand, or water sand is used as the medium. *B.C.I.*

washery boss. In anthracite and bituminous coal mining, a foreman who supervises operations at the washery of a coal mine where the coal is sized and washed to prepare it for market. Also called washer boss; washer foreman. *D.O.T. 1.*

washery effluent. Surplus water discharged from a washery, usually to waste (after settlement of solids in suspension). *B.S. 3552, 1962.*

washery engineer. In anthracite coal mining, one who maintains and operates a steam engine to supply power for driving machinery in a washery plant where coal is sized and cleaned for market. *D.O.T. 1.*

washery products. The final products from a washery. *B.S. 3552, 1962.*

washery pump. A pump generally of simple construction and heavy design since slurry presents a difficult pumping problem owing to its erosive action. This type pump is generally of the single-stage type as heads are small, with a solid casing of steel or cast iron about twice the normal thickness to provide against erosive action. *Sinclair, IV, p. 118.*

washery refuse. The refuse removed at preparation plants from newly mined coal. *Bureau of Mines Staff.*

washery water. The water used in the wet separation of coal from shale by differences in density. *See also* recirculation of water. *Nelson.*

wash fault. Eng. A portion of a seam of coal replaced by shale or sandstone. Not a true fault. *Compare* want, b. *See also* washout. *Fay.*

wash gate. *See* wash mill. *Dodd.*

wash gold. Placer gold. *Hess.*

wash gravel. Gravel washed to extract gold. *Webster 3d. Compare* wash dirt, b. *Fay.*

wash hole. Eng. A place for refuse. *Fay.*

washhouse. A building on the surface at a mine where the men can wash before going to their homes. A changehouse. A dryhouse. *Fay.*

washhouse man. See changehouse man. *D.O.T. 1.*

washing. a. In metallurgy, that which is retained after being washed; as, a washing of ore. *Standard, 1964.* b. A thin coating of metal. *Standard, 1964.* c. Metal (as gold dust) obtained by washing. *Webster 3d.* d. The act or process of cleaning, carrying away, or eroding by the buoyant action of flowing water. *See also* wash, i and j. *Long.* e. In ceramics, the covering of a piece with an infusible powder which prevents it from sticking to its supports while receiving the glaze. *Fay.*

washing apparatus; washery. a. Machinery and appliances erected on the surface at a coal mine, generally in connection with coke ovens, for extracting, by washing with water, the impurities mixed with the coal dust or small slack. *Zern.* b. Machinery for removing impurities from small sizes of coal, or ore. *Zern.* c. *See* washer. *Hess.*

washing bottle. *See* wash bottle.

washing drum. *See* trommel. *Stoces, v. 1, p. 581.*

washing hutch. *See* hutch, e. *Fay.*

washing machine. Scot. A machine for separating impurities from small coal by means of water. *Fay.*

washing off. a. Removing printing paper from pottery ware that has been decorated by the transfer process. *Dodd.* b. U.S.; Aust. The periodical final cleaning out of all the gutters and appliances used in alluvial and lode gold mining. Synonymous with clean-up. Also called washing up. *Fay.*

washing plant. a. A plant where slimes are removed from relatively coarse ore, by washing, tumbling, scrubbing. *See also* washery. *Pryor, 3.* b. A plant designed to disintegrate diamondiferous gravel or ore by various screening, scrubbing, and washing processes, to produce sized screen fractions. *I.C. 8200, 1964, p. 149.*

washing screen. Flat screen or trommel on which passing ore is exposed to sprays or jets of water to remove as undersize any adherent mud or other fine material. *Pryor, 3.*

washing screws. In many plants where clean sand and gravel are commercial products, washing is done by washing screws, whose continuous helical blades arranged about shafts force the material up an inclined trough against a stream of water introduced at the higher end. This action carries away the soluble clay occurring with the material, and dumps the washed product over the higher end of the trough. These washers are frequently arranged in batteries and dumped in piles along a straight line in such a way as to allow easy conveyance to the drain bins or drain floor. This method is popular in the silica-sand industry. *Pit and Quarry, 53rd, Sec. B, pp. 172-173.*

washing soda. *See* sodium carbonate. *Bennett 2d, 1962.*

washing stuff. An earthy deposit containing gold that may be extracted by washing. *Webster 3d. See also* wash dirt. *Fay.*

washing trommel. *See* trommel. *Fay.*

washita. A rather coarse-grained novaculite, especially suitable for sharpening carpenters' or general woodworkers' tools. *Fay.*

Washita. The highest of the three subdivisions of the Comanchean of the Southern United States, and Mexico. *C.T.D.*

Washitan. Lowermost Upper or Uppermost Lower Cretaceous. *A.G.I. Supp.*

Washita oilstone. Novaculite of uniform texture, hard, compact, and white from Hot Springs, Ark. *Brady, p. 533.*

wash load. *See* fine material. *USGS Prof. Paper 462-F.*

wash metal. Molten metal used to wash out a furnace, ladle, or other container. *ASM Gloss.*

wash mill. A large tank fitted with stirrers (known as harrows or wash gates) for the cleaning of the impure surface clays used in the manufacture of stock bricks. From the wash mill, the clay slurry, together with a slurry of any lime or chalk that is to be added, is pumped into a settling tank known as a washback. *See also* stock brick. *Dodd.*

Washoe canary. A miner's slang term for a donkey; burro. *Standard, 1964.*

Washoe process. The process of treating silver ores by grinding in pans or tubs with the addition of mercury, and sometimes of chemicals, such as blue vitriol and salt. Named from the Washoe district, Nevada, where it was first used. *Webster 3d; Fay.*

wash ore. Crude iron ores containing readily liberated particles of true iron ore, loosely agglomerated with sands from which they can be separated by scrubbing treatment. *Pryor, 3.*

washout. a. A channel cut into or through a coal seam at some time during or after the formation of the seam, generally filled with sandstone—or more rarely with shale—similar to that of the roof. *Raistrick and Marshall, p. 79. See also* cutout; want; low. *A.G.I.* b. Barren, thin, or jumbled areas in coal seams in which there is no actual disruption and no vertical displacement of the coal and strata. These disturbances may be divided into three main types; namely, (1) classical washouts; (2) pressure belts; and (3) tremor tracts. Authentic washouts should be restricted to the first group. Also called rock fault; nip. *See also* roll. *Nelson.* c. Local thinning or disappearance of a coal seam due to erosion during or shortly after its formation. *B.S. 3618, 1964, sec. 5.* d. Local thinning or disappearance of a coal seam due to tectonic movement. *See also* nip out, b. *B.S. 3618, 1964, sec. 5.* e. Aust. The erosion of part of a seam by aqueous action.

See also want, d. *Fay*. f. Channellike features which cut or transgress the stratification of the underlying beds; may be small scour-and-fill structures or large erosional channels. Also called cutout. *Pettijohn*.

washout valve. Valve in a pipeline or a dam which can be opened occasionally to clear out sediment. *Ham*.

washover. a. To wash away or remove material from around the outside of casing pipe, drill stem, junk, or tramp materials in a borehole. *See also* washover shoe. *Long*. b. *See* storm delta. *Schieferdecker*.

washover bit. *See* washover shoe. *Long*.

wash-over crescents. Crescentic barchanlike depressions whose plane of symmetry parallels current direction. *Pettijohn*.

washovers. The material deposited by the action of the overwash. *Schieferdecker*.

washover shoe. A casing-shoe-like bit used to drill downward around a piece of drilling equipment stuck in a borehole. *See also* washover. *Long*.

wash pan. A pan for washing pay dirt in placer mining. *Standard, 1964*.

wash pipe. The pipe that ejects the jet of water through the bit, used in wash boring. *Long*.

wash place. A place where the ores are washed and separated from the waste, usually applied to places where the hand jigs are used. *See also* washery, a. *Fay*.

washpot. In tinplate manufacturing, a pot containing melted tin into which the plates are dipped to be coated. *Webster 3d*.

wash rod. A heavy wall pipe used in lieu of drill rods to conduct water downward inside and to the bottom of a drivepipe being sunk through overburden by a wash-and-drive method. *Long*.

wash sale. A practice in which promoters, through the connivance of brokers who pretend to carry through transactions and thus obtain false quotations, create a fictitious flurry of activity in the stock market. *Hoov, p. 289*.

wash stuff. *See* wash, f; washing stuff. *Fay*.

wash table. An inclined table used for cleaning ore in which the lighter material or gangue is washed away by water. The ore is fed onto the table and water is allowed to flow down the table carrying away the impurities. *Bureau of Mines Staff*.

wash trommel. Rotating horizontal drum which receives ore at one end and water at the other. Ore is tumbled countercurrent to water so that coarse solids are discharged continuously while water—now charged with mud and fine material—overflows at feed end. *Pryor, 3*.

wash tube. *See* wash rod. *Long*.

wash water. Water circulated through the drill string, past the bit, and thence out of the borehole between the rods and the walls of the hole while drilling or during washing operations. *Long*. *See also* water wash. *Fay*.

wash zone. The area which undergoes the erosive action by lapping and breaking of waves. *Schieferdecker*.

wasite. An altered variety of allanite. *Standard, 1964*.

wasserstein. The lime carbonate and other stony deposits made from heated water. *Hess*.

wassie. A large cleavage of a crystal split for cutting, as an octahedron divided into two pieces. *Hess*.

waste. a. The barren rock in a mine. It is also applied to the part of the ore deposit that is too low in grade to be of economic value at the time, but this material may be stored separately in the hope that it can be profitably treated later. *Lewis, p. 22*. b. The unpacked and unsupported area behind the working face. *Mason*. c. Neglected workings in a coal mine. *Gordon*. d. Space from which the coal seam has been removed. Also called condie. *See also* goaf; gob, S. Wales; cundy, Scot.; caving; pneumatic stowing. *Nelson*. e. Digging, hauling, and dumping of valueless material to get it out of the way; or the valueless material itself. *Nichols*. f. Refuse and impurities removed from the coal. *Hudson*. g. The refuse from ore dressing and smelting plants. Gob; goaf; old workings; also, the fine coal made in mining and preparing coal for market; culm; coal dirt; also used to signify both the mine waste (or coal left in the mine in pillars, etc.) and the breaker waste. *Fay*. h. Eng. A more or less empty space between two packs. *See also* goaf. i. N. of Eng. A return airway. *Fay*. j. In stone cutting, to reduce roughly to a flat surface by chipping. *Webster 2d*. k. Material derived by mechanical and chemical weathering and moved down sloping surfaces or carried by streams to the sea. *Webster 3d*. l. Cotton and similar material used for wiping machinery. *Hudson*. m. A working or shaft which has been abandoned and filled with refuse (goaf or gob), or with material from the fall of the hanging wall. *Standard, 1964*. n. *See* spoil, a. *Bureau of Mines Staff*. o. Broken or spoiled castings for remelting. *Standard, 1964*. p. Any material which is of no further utility to the particular process involved. *ASTM STP No. 148-D*. Abbreviations, w and W. *Webster 3d*.

waste bank. A bank made of earth excavated during the digging of a ditch and laid parallel to it. *Webster, 3d*.

waste blasting. On some coal faces the stone overlying the seam does not always fall in the wastes after withdrawing the supports. In order to avoid excessive weight on the face, which would cause dangerous roof conditions, it is desirable to blast down the stone in the wastes. Also, in thick seams, the overlying strata requires breaking down to provide sufficient stone for building packs. The holes for waste shots must be drilled from the face side so that the driller is working under a supported roof. Care must be taken to ensure that the holes are not drilled up into the solid strata, and that the burdens on the shots are not excessive. *McAdam II, pp. 131-132*.

waste coal. Eng. Coal obtained as a byproduct from mine waste. *Fay*.

waste concrete. Fresh concrete which, because of inferior quality or some other undesirable condition, is rejected before it is placed; defective concrete that must be removed after it has hardened. *Nelson*.

waste drainage. The controlled leakage of air through a waste to insure that large concentrations of mine gases do not accumulate in that waste. *B.S. 3618, 1963, sec. 2*.

waste dump; spoil pile. The area where mine waste or spoil materials are disposed of or piled. *Bureau of Mines Staff*.

waste edge support. A row of rigid timber or steel props or chocks set along the edge of the waste and parallel to the longwall face to induce the roof beds to break and to secure caving of the waste area. *See also* breaker props. *Nelson*.

waste-filled stopes. In these methods, support for walls and for men and machines is furnished by waste rock, tailing sand, etc., called filling or gob. In true waste filling, the ore body is excavated in sections alternating with filling, and it is sometimes referred to as cut-and-fill stoping. *Higham, p. 196*.

waste filling. Material used for support in heavy ground and in large stopes to prevent failure of rock walls and to minimize or control subsidence and to make it possible to extract pillars of ore left in the earlier stages of mining. Material used for filling includes waste rock sorted out in the stopes or mined from rock walls, mill-tailing, sand and gravel, smelter slag, and rock from surface open cuts or quarries. *Lewis, pp. 69-70*.

waste-heat boiler. One which uses heat of exit gases from furnaces to produce steam or to heat water. *Pryor, 3*.

waste-heat drier. A drier heated by waste heat from the cooling of fired ware, flue gases, or other sources. *ACSG, 1963*.

waste lubrication. Consists of packing oil-soaked waste in a journal box. Such lubrication is common practice on railway cars. *Crispin*.

wasteman. In anthracite and bituminous coal mining, a laborer who looks after and keeps clean the airways, haulageways, or working places of a mine. Also called cleanup man; dirt shoveler; jerry man; sweeper. *D.O.T. 1*.

waste plain. The debris cones along the foot of a mountain range usually so completely coalesce that they form a true plain, called often a waste plain or waste slope. *See also* piedmont alluvial plain. *A.G.I.*

waster. a. Tinplate below the standard weight and quality. *Standard, 1964*. b. Spoiled or imperfect casting or machined part which must be discarded although partly processed. *Pryor, 3*. c. A brick, structural or refractory, that is defective as drawn from the kiln; wasters in the refractories industry are crushed and reused as grog. *Dodd*.

waste, radioactive. Equipment and materials from nuclear operations which are radioactive and for which there is no further use. Wastes are generally referred to as high-level (having radioactivity concentrations of hundreds to thousands of curies per gallon or per cubic foot); low-level (in the range of 1 microcurie per gallon or per cubic foot); and intermediate (between these extremes). *L&L*.

waste raise. An excavation in the mine in which barren rock and other material is broken up for use as filling at the stope. *Stoces, v. 1, p. 271*.

waste rock. Barren or submarginal rock or ore which has been mined but is not of sufficient value to warrant treatment and is therefore removed ahead of the milling processes. *Pryor, 4*.

waste room. Scot. An abandoned working place. *Fay*.

waster waste. The lowest grade of waste tinplate. *Standard, 1964*.

wastes. a. Derb. Vacant places left in the gobbing, on each side of which rubbish is packed up for the better support of the roof. *Fay*. b. The unfilled or unpacked portions of workings in a mine. *T.I.M.E.*

waste stream. The loose rock debris being carried to the sea or the desert basins of the earth. This great waste stream covers much of the surface of the land, and may consist wholly of debris, or of debris and water in varying proportions. *A.G.I.*

waste water. a. Water from old mine workings. *Fay.* b. Water from any metallurgical process, or the overflow from a storage reservoir. *Fay.* c. Excess water allowed to run to waste from the water circuit. Also called surplus water; bleed water. *B.S. 3552, 1962.*

wasteway. a. A channel for carrying off superfluous water. *Webster 3d.* b. The channel required to convey water discharged into it from a spillway, escape, or sluice; a spillway. *Seelye, 1.*

wasteweir. a. The weir provided in reservoir construction to discharge all surplus water flowing into the reservoir in flood time so as to prevent the water level from rising above the limit allowed for in designing the dam. *C.T.D.* b. *See* weir, b. *Fay.*

wasting asset. Property (as mines or lumber tracts) subject to depletion. *Webster, 3d.*

wastings. Scot. Mine workings. *Fay.*

wastrel. Eng. A tract of wasteland; or any waste material. *Fay.*

watch. In ceramics, a trial piece of clay placed in the kiln, to be withdrawn and examined from time to time, as an index of the condition of the ware being fired. *Fay.*

watchers. Leic. Experienced colliers who go into the mine and examine the whole of the workings, with a deputy, every Sunday. *Fay.*

watchmen. Weak coal pillars left in workings to give warning of an impending collapse. *Briggs, p. 169.*

water. a. Clear, colorless liquid; H_2O; practically tasteless and odorless; specific gravity, 1.0000 (at 4° C); melting point, 0° C (32° F); and boiling point, 100° C (212° F). Water is the most common solvent. *CCD 6d, 1961.* Molecular weight, 18.0153; hexagonal, when crystallized as ice and snow; refractive indexes (liquid), 1.333, and (solid), 1.309 and 1.313; melting point, 0.000° C; boiling point, 100.000 C; and soluble in all proportion in alcohol. Also called ice; steam; water vapor; hydrogen oxide. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-179.* Abbreviations, w and W. *Webster 3d.* b. The transparency or luster of a precious stone or pearl; hence the aggregate of qualities that make it valuable. *Standard, 1964;* as, as diamond of the first water. *Fay.*

water absorption. The weight of water absorbed by a porous ceramic material, under specified conditions, expressed as a percentage of the weight of the dry material. This property is much quoted when referring to structural clay products; the apparent porosity is more commonly quoted for refractories and whitewares. The two properties are related by the equation: apparent porosity equals water absorption times bulk density. *Dodd.*

water agate. Same as enhydros. *Shipley.*

water ampule. A fire-resistant plastics container of water which is used as a safety precaution in shotholes. *B.S. 3618, 1964, sec. 6.*

water-ampul stemming. A water cartridge for stemming shotholes in coal or rock. The ampul consists of a plastic (polyvinylchloride) bag, 1¼ inches in diameter and 18 inches in length. When filled with water, and the neck of the bag tied off, the filled ampul is about 15 inches in length and holds slightly over one-half pint of water. Compared with dry clay or sand, the use of water ampuls for stemming, effects substantial reductions in both the airborne dust and the nitrous fumes produced by shot firing. This applies to both coal and rock blasting. *Nelson.*

water-avid surface. A term used to describe a surface that seems to prefer contact with water to contact with air. In flotation, minerals with a water-avid surface will not float, while those with an air-avid surface will. The object of reagent additions in flotation is to form a water-repellent surface on the minerals to be floated, and a water-avid surface on the minerals that are not to float. *Compare* air-avid surface. *Newton, p. 98.*

water bailer. *See* bailer, e. *D.O.T. 1.*

water balance. a. Scot. An arrangement by which a descending tank of water raises mineral in a shaft by a rope passed over a pulley. Sometimes used where water is abundant and can be run off at the pit bottom by means of an adit. *Fay.* b. An obsolete water-raising apparatus consisting of a swinging frame carrying a double series of troughs ascending in zigzag lines, and so adjusted to each other that, as the frame rocks in either direction, water may be passed to a higher level. *Standard, 1964.*

water baler. Aust. A man who bales water out of dip workings in places where it is not convenient to put in a pump. *Fay.*

water barrel. a. A barrel-shaped hoppit designed to collect and hoist water from the bottom of a sinking shaft. Water barrels are now obsolete. *See also* pneumatic water barrel; sinking pump. *Nelson.* b. A tank used for winding water from the sump at the bottom of a shaft; usually self-filling by means of a valve or series of valves in the bottom of the tank. Also called barrel; bailer. *B.S. 3618, 1963, sec. 4.*

water barrier. a. An area of solid mineral left unworked to protect a mine, or part of a mine, against entry of secondary water. *B.S. 3618, 1963, sec. 4.* b. *See* barrier pillar. *Nelson.*

water-base mud. A drill mud in which the solids are suspended in water. *Compare* oil-base mud. *Long.*

water-bearing formation. A relative term used to designate a formation that contains considerable gravity ground water. *A.G.I.*

water-bearing ground. Ground which lies below the standing water level. *Ham.*

water-bearing strata. Beds which yield a large quantity of water when bored or sunk through are said to be water-bearing. *Peel.*

water bed. a. A soil or rock layer that is laden with water or through which water percolates; sometimes, a swampy surface area. *Webster 3d.* b. A bed of coarse gravel or pebbles occurring in the lower part of the upper till in the Upper Mississippi Valley. *Fay.*

water blast. a. The expulsion of water under pressure, in mine workings, caused by trapped air expanding as the water level is lowered. *B.S. 3618, 1963, sec. 4.* b. Explosion caused by sudden inrush of water (not an ignition). *Mason.* c. Eng. The sudden escape of air pent up in rise workings under considerable pressure from a head of water that has accumulated in a connecting shaft. *Zern.* d. The discharge of water down a shaft to produce or quicken ventilation. *See also* trombe. *Fay.* e. A water-actuated ventilating device. *C.T.D.*

water blasting. Pulsed infusion shotfiring. *Nelson.*

water block. a. A sudden stoppage of water-flow past the face of a bit while drilling is in progress. *Long.* b. A hollow box or block of iron, through which water is circulated, to protect part of a furnace wall. *Fay.*

water blocking. Injection of water into a structure in such a way as to prevent drainage to and from adjoining properties. *Williams.*

water boiler. A research reactor, the core of which consists of a small spherical container filled with uranium fuel in an aqueous solution. Heat is removed by a cooling coil in the core. *L&L.*

water boss. Aust. The owner or holder of water or water rights, who sells the same for mining purposes. *Fay.*

waterbound. A general term indicating that water is the medium used to assist in filling the voids between mineral fragments and to improve compaction. *Nelson.*

waterbound macadam. A road surface of broken stone or gravel which is well rolled and then covered with a layer of sand or clay, watered in to fill the voids between the stones. *Ham.*

water box. a. A rectangular wooden pipe used in shafts for conveying water between garlands. *B.S. 3618, 1963, sec. 4.* b. A square, open, wooden tank car used for removing small amounts of water from low places in a mine. Also a tank car used for sprinkling the roadways to settle the dust. *Fay.* c. A water case attached to the outside of a furnace, to protect the iron from the effects of fire. Also called water block. *Standard, 1964; Fay.*

water break. A break in the continuity of the water film upon a metal when it is withdrawn from a bath. *ASM Gloss.*

water cage. A special cage running in guides in a special compartment of the shaft with a separate winding engine. Is used for removing water from mines at depths up to 600 feet. *Sinclair, IV, p. 28.*

water/carbon dioxide extinguisher. A plunger-type extinguisher composed of a container for water and a small cylinder of high-pressure carbon dioxide gas. Both the container and the cartridge for the carbon dioxide are made of copper or copper-lined steel to prevent corrosion. There are two advantages in using this extinguisher: (1) It can be recharged quickly underground, thereby enabling a prolonged attack to be maintained on a fire; and (2) The high-pressure carbon dioxide charge does not deteriorate even if the extinguisher remains unused for many years. It is suitable for use on freely burning mine fires, but not effective against oil fires or in cases where electrical equipment may be live. *McAdam, pp. 114-115.*

water cartridge. A waterproof cartridge surrounded by an outer case, the space betweeen being filled with water, which is employed to destroy the flame produced when the shot is fired, thereby lessening the chance of an explosion should gas be present in the place. *Fay.*

water cement. Same as hydraulic cement. *Standard, 1964.*

water-cement ratio. The ratio of the amount of water, exclusive only of that absorbed by the aggregates, to the amount of cement in a concrete mixture. This ratio is usually stated as follows: (1) by weight or (2) in terms of U.S. gallons of water per 94-pound sack of cement. *ASTM C125-66.*

water chamber. A water reservoir in a mine usually located at the lowest place commonly near the shaft station. Also called sump. *Stoces, v. 1, p. 568.*

water, chemically combined. Water which is chemically a part of the clay mineral and can be liberated only upon dissociation of the clay mineral at or about red heat. *ACSG, 1963.*

water chrysolite. Moldavite. *See also* tektites. *C.M.D.*

water circuit. The complete system of pipelines, pumps, sumps, tanks, troughs, and accessories used for the circulation of water in a washery, including the water treatment plant. *B.S. 3552, 1962.*

water circulation. The movement of water used as a cuttings-removal and bit-cooling agent downward through the drill string to the bottom of the hole and thence upward outside the drill string to the collar of a borehole while drilling is in progress. *Long.*

water color. The apparent color of the surface layers of the sea caused by the reflection of certain components of the visible light spectrum coupled with the effects of dissolved material, concentration of plankton, detritus or other matter. Color of oceanic water varies from deep blue to yellow and is expressed by number values which are a variation of the Forel scale. Plankton concentrations may cause a temporary appearance of red, green, white, or other colors. *See also* Forel scale. *Hy.*

water content. a. Of a bottom sediment is a ratio obtained by multiplying the weight of the water in the sample by 100 and dividing the results by the weight of the dried sample; expressed as a percentage. *H&G.* b. *See* moisture content, b. *ASCE P1826.*

water core. A hollow core through which water circulates in a mold used for cooling the interior of a casting more rapidly than the outside while the metal is solidifying, as in casting a cannon. *Webster 3d.*

water coupling. *See* water swivel. *B.S. 3618, 1964, sec. 6.*

watercourse. a. A natural or artificial channel for passage of water as a river, canal, flume, or drainage tunnel. *Fay.* b. Synonym for waterway. *Long.* c. A subsurface opening or passage in rocks through which ground water flows. *Long.*

water creep. The movement of water under or around a structure built on permeable foundations. *See also* piping. *Nelson.*

water curb; water ring. *See* garland, a. *B.S. 3618, 1963, sec. 4.*

water-current ripple mark. A ripple mark with an asymmetrical slope and a rounded crest formed by a water current. As the current velocity is increased, some of the particles begin to roll; this is termed the first critical point. After the first critical point is attained, ripple marks begin to form as numerous more or less equidistant ridges trending at right angles to the current. The ridges have gentle slopes on the stoss or upcurrent sides and steeper lee slopes. Current ripple marks migrate downcurrent. The sands in current ripple marks are coarsest in the troughs and finest on the crests. Also called aqueous current ripple mark; asymmetrical ripple mark; current ripple mark. *A.G.I.*

water cushion. A water load pumped into drill pipe during a drill-stem test to retard fill-up and prevent collapse of pipe under sudden pressure changes. *Wheeler.*

water-cutoff core barrel. A core barrel having a device in its head part that closes and stops the flow of drill-circulation liquid when a core block occurs in the inner tube of the core barrel. *Long.*

water cycle. Synonym for hydrologic cycle. *A.G.I.*

water dam. A permanent stopping to seal off a large body or feeder of water. It consists usually of a block of concrete between two brick endwalls and these are extended well into the surrounding ground. The contact points and all breaks in the strata are sealed by cement injection. The various pipes, pressure gages, etc., may be left through the stopping. *Nelson.*

water drive. A method of making a high-level oil well, nearing exhaustion, to continue producing by pouring water into abandoned low-level wells in hydraulic communication with the producing horizon. *See also* repressuring; swabbing. *Nelson.*

water drop quartz. Rock crystal containing inclusions of water and air. A curio stone. Similar to enhydros. *Shipley.*

watered. Eng. Containing much water—full of springs or feeders; for example, heavily watered mines, heavily watered measures, etc. *Fay.*

water engine. Scot. An engine used exclusively for pumping water. *Fay.*

water exchange. The volume and rate of water replacement in a specific location controlled by such factors as tides, winds, river discharge, and currents. *Hy.*

waterfall process. A method for the application of glaze materials to a ceramic body by mechanically conveying the ware through a continuously flowing (recirculated) vertical stream of the glaze suspension. The process is used in the glazing of wall tiles. *Dodd.*

waterflooding. The secondary-recovery operation in which water is injected into a petroleum reservoir for the purpose of effecting a water drive. *A.G.I.*

water flush. A system of well boring, in which percussive drills are used in connection with water forced down to the bottom of the hole through the drill rods. This water jet makes the tools cut better, and washes the detritus up out of the hole. *Fay.*

Waterford glass. Cut or gilded glass made in the Waterford district of Ireland and characterized by a slight blueness resulting from the presence of a trace of cobalt. *Dodd.*

water gage. a. An instrument for measuring the difference in pressure produced by a ventilating fan or air current. *C.T.D.* b. An instrument for measuring the ventilation pressure. In its simplest form, it consists of a glass U-shaped tube containing water. One limb is connected to the fan drift or return airway and the other is open to the atmosphere or intake airway. The difference in level between the water surface in the limbs of the U-tube is the water gage reading (or w.g.). One inch water gage is equivalent to a pressure of $62.5 \div 12 = 5.2$ pounds per square foot. *See also* inclined water gage; total ventilating pressure. *Nelson.* c. A measure of ventilating pressure, expressed in terms of the height of a column of water. *B.S. 3618, 1963, sec. 2.* d. A manometer used with a Pitot tube to indicate air pressure. *Pryor, 3.* e. A device that measures the pressure at which water is discharged by a pump or the volume of water flowing through a pipe or other conductor. *Long.* f. An instrument used to measure the depth or quantity of water, such as in a steam boiler or water storage tank. *Long.*

water gain. *See* bleeding. *Dodd.*

water gap. A pass in a mountain ridge through which a stream runs. *Webster 3d.*

water garland. *See* garland, a. *B.S. 3618, 1963, sec. 4.*

water gas. A poisonous, flammable, gaseous mixture made principally of carbon monoxide and hydrogen with small amounts of methane, carbon dioxide, and nitrogen, and usually by blowing air and then steam over red-hot coke or coal, used especially formerly as a fuel (as in welding) and after carbureting as an illuminant but chiefly as a source of hydrogen and as a synthesis gas. *Webster 3d.*

water-gas tar. Tar produced in the manufacture of carbureted water gas by the decomposition of petroleum oil by heat in the presence of blue gas. *ASTM D324–41.*

water gin. Scot. A gin actuated by a water wheel. *Fay.*

water glass; waterglass; soluble glass; liquid glass. a. A concentrated and viscous solution of sodium silicate or potassium silicate in water. Used as an adhesive, a binder, a protective coating, in waterproofing cement, and in bleaching. *C.T.D.* Colorless; amorphous; $Na_2O.xSiO_2$, in which $X = 3$ to 5; deliquescent; soluble in water; and insoluble in alcohol, in potassium-salt solutions, and in sodium-salt solutions. *See also* sodium tetrasilicate. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-224.* b. A water-soluble substance consisting of sodium silicate of varying composition that exists as a glassy mass, a stony powder, or a viscous syrupy liquid dissolved in water. Used as a fireproofing agent and in making artificial stone. *Webster 3d.* Also used in the manufacture of cements, in concrete hardeners, in cementing stones, as waterproofing in hydraulic mortars and in acidproof mortars, in cementing pipe insulations, in the manufacture of abrasive wheels and abrasive stones, in refining petroleum, in ore flotation, in lining Bessemer converters, as a binder in digestor linings, in acid concentrator linings, in ceramic cements, in drilling mud, and in the manufacture of silica gel. *CCD 6d, 1961.* c. A similar substance consisting of potassium silicate. Also called potash water glass. *Webster 3d.*

water grade. a. The inclination of an entry that is just sufficient to drain off the water. *Fay.* b. A grade determined by keeping the working place nearly parallel to the edge of the pool of water standing upon its floor. Water grade is sometimes incorrectly called water level. *Fay.*

water groove. Synonym for waterway. *Long.*

water hammer. a. The hammering noise caused by the intermittent escape of gas through water in mines. *Fay.* b. A concussion or sound of concussion of moving water against the sides of a containing pipe or vessel on a sudden stoppage or flow; especially, such a concussion or sound made by water in a steam pipe. *Webster 3d.* c. A sharp, hammerlike blow caused by the sudden stoppage of water flow in a long pressure conduit due to the rapid closing of valves. It may also be caused by the sudden collapse of steam bubbles upon entering cold water. *ASTM*

STP No. 148-D. d. Sharp pulsations in a water-piping system caused by the intermittent escape of entrapped air or the intermittent injection of water into the system by a reciprocating-piston pump. *Long.*

water hauler. a. One who collects in a water box (car) water that accumulates in low places at the mine entrance, along haulageways, or at the working face, bailing it into a car with a bucket or using a small hand pump. Also called waterman; water monkey; water tender. *D.O.T. 1.* b. A laborer who hauls water cars into a mine to supply water for sprinkling haulage roads and working places. *D.O.T. 1.*

water hoists. A simple method of disposing of mine water using tanks with the engine or motor on the surface. The machinery can be easily repaired and the plant is in no danger of being flooded. The high cost of the plant and the fact that the shaft cannot be used for other purposes while water is being hoisted are important disadvantages. Water is delivered intermittently and at a decreasing rate as the depth of hoisting increases. This method is less economical than pumping but is useful as an emergency measure in reclaiming a flooded mine. *Lewis, p. 632.*

water-holding capacity. The smallest value to which the water content of a soil can be reduced by gravity drainage. *ASCE P-1826.*

water hose. The hose running from the water swivel on the upper end of a drill stem on a diamond or rotary drill to the pump. *Long.*

water humus. Organic matter deposited in water basins. *Tomkeieff, 1954.*

water hydraulic. A water-actuated hydraulic feed mechanism on a diamond drill. Most hydraulic feeds now are actuated by hydraulic oil pumped through a closed system. *Long.*

water inch. a. The discharge from a circular sharp-edged orifice 1 inch in diameter with a head of one line above the top edge that is commonly estimated at 14 pints per minute and that constitutes an old unit of hydraulic measure. *Webster 3d.* b. A miner's inch. *C.T.D.* c. *See* V-notch. *B.S. 3618, 1963, sec. 4.*

water infusion. A technique being used abroad to suppress or prevent the formation of dust, in advance of mining a coal seam. Water (or sometimes foam or steam, which is costlier but more effective) is injected into the coal ahead of the face through long drill holes, as many as four to six per face and 20 to 60 feet in length. The liquid infuses into the seam along fractures and cracks and, under pressure, penetrates a considerable distance from the hole radially, wetting the coal well. It has proved very effective in reducing dust concentrations during subsequent mining, in some instances, as much as 80 percent. Water infusion originated in Great Britain (it is used in 25 percent of the dusty mines) and has been tried experimentally with some success in the United States. *Hartman, pp. 64–65. See also* pulsed infusion shot firing.

water infusion gun. A special tube which acts as a borehole seal in the water infusion process. The tube has two separate passages, one for the infusion water and the other admits hydraulic fluid to actuate the piston expanding the seal in the borehole. The hydraulic fluid is supplied by a hand pump and the infusion water by a power pump. *Nelson.*

water infusion method. A method being used by the U.S. Bureau of Mines to remove methane from mines. It consists of injecting water under pressure into the coal to push the gas out of the coal seam. Holes are drilled horizontally into the coal face and water is pumped into some of the holes at pressures varying from 200 to 650 pounds per square inch. This forces the methane out through the other holes and also from the exposed part of the coal seam. *Bureau of Mines Staff.*

water infusion pump. A power pump, mounted on wheels, to supply the high pressure water for coal seam infusion. It consists of an oil hydraulic circuit which drives two reciprocating rams which are in turn directly coupled to the two rams of the water pump. *Nelson.*

watering method. Dust control in coal mines by watering or by wetting agents. *Grove.*

watering off. Reduction of the productivity of a formation caused by invasion of the zone by the liquid phase of the drilling fluid. Wells commonly thought to have been mudded off more likely have been watered off. *Brantly, 1.*

water inrush. A heavy and sudden inflow of water into mine workings or shafts. *See also* inrush of water. *Nelson.*

water intoxication. A condition caused by drinking large quantities of plain water while the body is steadily losing chlorides through sweating. This is harmful because by so doing the saline content of the body fluids becomes diluted and in extreme cases water intoxication occurs. *Spalding, p. 262.*

water, ionization of. Even pure water is slightly conductive, its ionization proceeding thus: $-2H_2O=H_3O++OH^-$. Conductivity water is exceptionally pure, following special preparation. *Pryor, 3.*

water jackets. Cast- or wrought-iron sections of a furnace so constructed as to allow free circulation of water for keeping the furnace cool. Also called water block and water box. *Fay.*

water jet. a. A high-pressure stream of water ejected from an orifice. *Long.* b. The orifice through which a high-pressure stream of water is ejected. *Long.*

water-jet drilling. The drilling of boreholes in unconsolidated or earthy formations using the erosive power of a small-diameter stream of water forcefully ejected as the cutting tool. *See also* jet, c. *Long.*

water kibble. A large iron bucket with a valve in the bottom for self-filling: sometimes used in hoisting the water from a mine. *Standard, 1964. See also* water barrel. *Fay.*

water leaf. Scot. *See* top ply. *Fay.*

water level. a. A level roadway, constructed with an impervious seal or barrier on the dip side, to divert the flow of water along the level and prevent its seepage to workings on the dip side. The level dips slightly outwards to allow gravity flow. *See also* drainage tunnel. *Nelson.* b. *See* standing water level. *Nelson.* c. The level at which, by natural or artificial drainage, water is removed from a mine or mineral deposit. *Fay.* d. A drift at the water level. *See also* water grade. *Fay.* e. The level of underground waters in a mine, or the elevation to which water will rise in a mine, when the mine is not being drained. *Statistical Research Bureau.* f. The oil- or gas-water contact. The surface below which pore saturation is virtually 100 percent water, and above which there is an exploitable concentration of hydrocarbons. There is frequently no abrupt saturation change. *A.G.I.* g. A water surface; also its elevation above any datum; gage height; stage. *Seelye, 1.* h. Sometimes used as a synonym for water table. *Long.*

water-level mark. Small horizontal, wave-cut terraces on an inclined surface of unconsolidated sediment that mark a former water level. *Pettijohn.*

water leyner. A type of rock drill in which water is fed into the drill hole through the hollow drill steel, to remove the drill cuttings, and at the same time allay the dust. Also known as Leyner-Ingersoll drill. *Fay.*

water lime. a. Hydraulic lime. *Webster 3d.* b. A limestone from which hydraulic lime may be made. *Webster 3d.*

waterline. *a.* A line in fired cover coat enamel, where moisture has penetrated the bisque coating from wet beading enamel. Particularly encountered on kitchenware or washing machine tubs. *Hansen.* b. The height of the normal water level in a boiler measured from the floor. *Strock, 10.*

water load. S. Wales. The head, or pressure per square inch, of a column of water in pumps, etc. *Fay.*

water lodge. a. An underground reservoir. *C.T.D.* b. Eng. A lodge; a sump. *Fay.*

waterlogged. a. Workings or mines that have become filled with water, either because of abandonment or stoppage of operations. Such areas are always a danger to future workings in the same seam or in an underlying seam. *See also* inrush of water. *Nelson.* b. Land may be described as waterlogged when the water table is permanently located at or above ground level. *Nelson.* c. A condition of lands where the groundwater stands at a level that is detrimental to plants. It may result from over irrigation or seepage with inadequate drainage. *Seelye, 1.*

water loss. The amount of drill water that escapes into porous or fractured borehole wall rocks and hence does not return and overflow at the collar of the borehole. *Long.*

water lowering. *See* ground-water lowering. *Ham.*

water machine. *Scot.* A pump or other appliance actuated by a water wheel for raising water. *Fay.*

water mains. In coal mining, pipes made of cast iron or steel for the conveyance of water. The former are used when the water has corrosive properties and the greater thickness of metal will give a much longer life. Cast iron, however, has the disadvantages of great weight, low tensile strength and brittleness. When used under conditions where strata movements disturb the alinement of the pipe range, the flanges are likely to be broken away completely from the tubular portion. Mild steel pipes are most often used because of their lighter weight for a given bursting pressure and because disturbance of alinement is not so important, they are easily transported and the ductility of the metal allows the pipes to be readily bent. *Mason, v. 2, pp. 626–627.*

waterman. a. A laborer who quenches coke with water so that it may be drawn from the oven, using a sprinkling system of perforated pipes. *D.O.T. 1.* b. *See* water hauler. *D.O.T. 1.*

watermark. a. Any mark indicating the level at which the water has stood for a certain length of time. *Schieferdecker.* b. Eng. Oxford masons' and quarrymen's term for calcite veins in building stones, as in the Forest Marble at Bladon, and characteristic of Bath stones. *Arkell.* c. A shallow depressed spot sometimes appearing as a defect in vitreous enamelware. Also called water spot. *Dodd.* d. During transfer printing on pottery, a watermark may form if a drop of water dries on the ware, leaving a deposit of soluble salts. Also called water spot. *Dodd.*

water, mechanical. Water which is mechanically added to a clay mixture to produce plasticity for forming and which is lost by evaporation during drying or early stages of firing. *ACSG, 1963.*

watermelon tourmaline. Applied to tourmaline, the center of which is pink and the edges green. Often seen in crystals but not in cut stones. *See also* bocco de fogo. *Shipley.*

watermen. Corn. Men employed about water underground; especially those who drew water at the rag-and-chain pump. *Fay.*

water monkey. *See* water hauler. *D.O.T. 1.*

water-of-Ayr stone. A fine sandstone used with water instead of oil as a whetstone. Scotch hone. *Brady, p. 533.*

water of capillarity. The water held in the soil above the standing-water level by reason of capillary attraction. Also called held water. *Ham.*

water of compaction. Water furnished by destruction of pore space owing to compaction of sediments. *Stokes and Varnes, 1955.*

water of crystallization; water of composition; water of constitution; water of hydration. The water that combines with salts when they crystallize. It is a definite quantity and a molecular constituent of the crystalline compound. *Standard, 1964.* It is given off by the crystals containing it upon heating. *Fay.*

water of hydration. Water combined with inorganic compounds and not expelled when coal is dried at 110° C. *B.S. 3323, 1960.*

water of imbibition. a. The proportionate amount of water that a rock can contain above the line of water level or saturation. *Standard, 1964.* Also called quarry water. *Fay.* b. Water of saturation. *Standard, 1964.*

water of plasticity. The water which a clay material contains when it is workable or able to be formed. *ACSG, 1963.*

water opal. Same as hyalite. *Standard, 1964.*

water packer. An expandable device that is placed in a borehole to bar entry of water into the lower part of a hole or to separate two distinct flows of water from different strata. *See also* packer. *Long.*

water parting. The high land which forms the divisional line between two contiguous river basins is called the water parting. *A.G.I.*

water passage. An opening through which water is made to flow; a waterway. *Long.*

waterplane. a. In geology, the upper surface of a bed of water, as of ground water. *Standard, 1964.* b. *See* water table. *B.S. 3618, 1963, sec. 4.*

water-plasticity ratio. *See* liquidity index. *ASCE P1826.*

water pocket. a. A bowl in rock structure that has been formed by the action of falling water, especially such a bowl existing behind the waterfall when, in time of flood, the water shoots over it. *Standard, 1964.* b. A depression in an impervious subgrade down into which ballast has been forced. *Urquhart, sec. 2, p. 30.*

waterpower. a. The power of water derived from its gravity or its momentum as applied or applicable to the driving of machinery. *Standard, 1964.* b. A descent or fall in a stream from which motive power may be obtained; specifically, in law, the fall in a stream in its natural state, as it passes through a person's land or along the boundaries of it. *Standard, 1964.*

water pressure. Pressure at which water is discharged from a pump. *Long.*

water privilege. a. The right to the use of the water of a certain stream. *Standard, 1964.* b. The right to the possession and use of a fall of water for mechanical purposes. *Standard, 1964.*

waterproof cement. A cement with water-repelling properties which resists the movement of water through the mass. *ACSG, 1963.*

waterproofed stone dust. The proofing of stone dust to prevent the particles from caking or becoming sticky in humid atmospheres. Waterproofing is considered essential if stone-dust barriers are to operate effectively at humidities above 85 percent. *Nelson.*

waterproof electric blasting cap. A cap specially insulated to secure reliability of firing when used in wet work. *ASA C42.-85:1956.*

waterproofing. a. The process of rendering surfaces or materials impervious to water. Waterproofing can be effected (1) by the deposition of metallic salts or insoluble soaps, which process renders fabrics rainproof but does not interfere with the ventilating properties; (2) by impregnation with oils; and (3) by coating with rubber or varnish. The latter processes prevent the transmission of air. *C.T.D.* b. Concrete can be made more waterproof by surface treatment of the set concrete or by the addition of an integral waterproofer. For surface treatment, a solution of sodium silicate or of a silicofluoride may be used; silicones, drying oils, and mineral oils are also sometimes employed. Integral waterproofers include calcium chloride solution and/or various stearates. *Dodd.* c. Silicones have been recommended for the waterproofiing of brickwork. *Dodd.*

waterproofing walls. Making them impervious to water or dampness, by mixing a compound with the concrete, or by applying the compound to the surface. *Crispin.*

water pump. A device or machine that raises, transfers, or compresses water by suction or pressure, or both. *Bureau of Mines Staff.*

water putty. A powder which, when mixed with water, makes an excellent filler for cracks, nail holes, etc. Not suitable for glazing. *Crispin.*

water-quenched. Cooled with water, as in hardening steel. *Standard, 1964.*

water rate. The weight of dry steam consumed by a steam engine for each horsepower per hour. The result is stated in either indicated horsepower or brake horsepower. *Brantly, 2.*

water-repellent surface. *See* air-avid surface.

water retentivity. That property of a mortar which prevents the rapid loss of water to masonry units of high suction or initial rate of absorption and bleeding or water gain when the mortar is in contact with relatively impervious units. *ACSG, 1963.*

water right. a. The right to use water for mining, agricultural, or other purposes. *See also* water privilege. *Fay.* b. The right to appropriate water granted to miners by Federal laws; however, this right applies only to water on public domain. Rights-of-way are granted over public lands for ditches, canals, flumes, and for the construction of a reservoir to one who has a right to water. *Lewis, p. 35.* c. When one has legally acquired a water right, he has a property right therein that cannot be taken from him for public or private use except by due process of law and upon just compensation being paid therefor. One who has acquired a legal water right can only be deprived of it by his voluntary act in conveying it to another, by abandonment, forfeiture under some stature, or by operation of law. A water right is an independent right and is not a servitude upon some other thing, and is an incorporeal hereditament, being neither tangible nor visible. *Ricketts, I.*

water ring. a. A special form of cast-iron bricking curb whereby space is provided for building up the walling and also a channel or groove for collecting water running down the shaft sides. The rings are built into the shaft lining at intervals and pipes are arranged to conduct the water to the next lower ring or a sump. *See also* garland. *Nelson.* b. Aust. A trough cut into the wall of a shaft in which water collects, and is led down pipes to a pumping station. *Fay.*

water-rolled. In geology, more or less rounded and smoothed by the mechanical action of moving water, in the waves on a beach, or in the current of a stream. *Standard, 1964.*

water sapphire. An intense-blue variety of the mineral cordierite, occurring in the waterworn masses in certain river gravels; used as a gem stone. Also called saphir d'eau. *C.T.D.*

water seal. A water accumulation in a depression in an underground roadway or in a pipe, sufficient to form a seal. *B.S. 3618, 1963, sec. 4.*

water separation. *See* elutriation. *Osborne.*

watershed. The area contained within a drainage divide above a specified point on a stream. In water-supply engineering, it is termed a watershed and in river-control engineering, it is termed a drainage area, drainage basin, or catchment area. *A.G.I.*

water shutoff. a. The sealing off of salt-water bearing formations from oil-bearing zones to prevent harmful underground water pollution. This is ordinarily done by cementing. *Williams.* b. A device used to stop the flow of water, such as the water-cutoff device in the head of a water-cutoff core barrel. *Long.*

water sink. A pothole. *Standard, 1964.*

water slip. A fault or joint from which water flows. *Fay.*

water slot. A groove incised in the face and outside wall of a noncoring bit that serves as a waterway. Synonym for waterway. *Long.*

water smoke. To fire (a kiln) slowly in order to dry out the moisture from the bricks, before firing. *Standard, 1964.*

watersmoking. The first period of firing in which all mechanically held water is removed from the clay by the advancing heat. *ACSG, 1963.*

water-softener salt. A salt suitable for regenerating domestic water softeners. Its special size provides the necessary dissolution rate. *Kaufmann.*

water softening. Removal of excess calcium and magnesium. Boiling, or addition of lime, precipitates soluble carbonates:—

$$Ca(HCO_3)+Ca(OH)_2=2CaCO_3+2H_2O$$

Sulfates can be precipitated by soda-ash:—

$$CaSO_4+Na_2CO_3=CaCO_3+Na_2SO_4$$

Natural or artificial zeolites and resins are used in base-exchange (ion exchange) process to remove ionized Calcium, magnesium, etc. With calgon a complex is formed which does not react with soap:—

$$Na_2[Na_4(PO_3)_6]+CaSO_4=$$
$$Na_2[CaNa_2(PO_3)_6]+Na_2SO_4$$

Permanent hardness is due to Calcium and magnesium sulfates or carbonates, which are not precipitated by boiling. Temporary hardness is due to bicarbonates which are precipitated as carbonates by boiling, CO_2 being removed. *Pryor, 3.*

water-soluble oils. Oils having the property of forming permanent emulsions or almost clear solutions with water. *Fay.*

water spot. *See* water mark. *Dodd.*

waterstone. a. A stone whose cutting crystals break away rapidly from its bond. The use of water forms a gritty paste which acts in much the same way as oil when used on an oilstone. The Queer Creek and Hindostan stones are good examples of waterstone. *Fay.* b. Forest of Dean. A shale, so called in consequence of the wet soil that is found wherever it appears on the surface. *Arkell.* c. The formation name for certain flaggy micaceous sandstones and marls in the Keuper of the Midlands. *Arkell.* d. Eng. Quarrymen's name for the lowest bed in a Portland stone quarry at Long Crendon, Buckinghamshire. *Arkell.* e. A whetstone requiring water instead of oil. *Arkell.*

water streak. A fault in vitreous enamelware arising from drops of water running down the ware, while it is being dried, and partially removing the enamel coating. The obvious cause is the use of a slip that is too wet, when water streaks are liable to occur in any sharp angle of the ware; condensation of drops of water on parts of the ware during the drying process is another cause. *Dodd.*

water string. Casing used to shut off water-bearing formations encountered in the drilling of a well. *Williams.*

water struck. In brickmaking, made in a mold without pressure; said of slop bricks. *Standard, 1964.*

water struck brick. *See* soft mud brick. *ACSG, 1963.*

water supply. The undertaking by a public, or sometimes a private, authority of conserving, pumping and piping potable water to consumers. *See also* service reservoir. *Ham.*

water surface. In oil wells, the level or inclined plane between the oil, or gas, and the edgewater upon which the oil or gas rests. Not to be confused with ground water level or table. *Fay.*

water swivel. A device connecting the water hose to the drill-rod string and designed to permit the drill string to be rotated in the borehole while water is pumped into it to create the circulation needed to cool the bit and remove the cuttings produced. Also called gooseneck; swivel neck. *Long.*

water table. a. The upper limit or surface of the groundwater and it follows approximately the profile of the land surface. *See also* cone of depression; perched water table; waterlogged. *Nelson.* b. A gutter on the side of a road to carry off water. *Webster 3d.* c. The upper limit of the portion of the ground wholly saturated with water whether very near the surface or many feet below it. Also called ground water level. *Webster 3d. See also* free-water elevation. *ASCE P1826.* d. A slight projection of the lower masonry on the outside of the wall and slightly above the ground. *ACSG.*

water-table contour. A line drawn on a map to represent an imaginary line in the water table of a definite level. These contours are constructed from the data provided by the water-table levels, corrected for differences in surface level at the respective boreholes. A site investigation or opencast plan sometimes show water-table contours. *Nelson.*

water-table levels. Levels showing the depth of the water table below the surface; the depth at which water is encountered in trial pits or boreholes. *Nelson.*

water-table map. A contour map of the upper surface of the saturated zone. *Stokes and Varnes, 1955.*

water-table stream. Concentrated ground water flow at the water table in a formation or structure of high permeability. *Stokes and Varnes, 1955.*

water tender. A boiler house employee attending to feedwater of boilers, and usually also to blow-off valves. *Fay.*

water test. *See* floc test. *Dodd.*

watertight. a. A borehole in which the conditions are such that no loss of the circulated drill fluid occurs. *Long.* b. A connection, container or rock strata so tight as to be impermeable to water. *Long.*

water-to-cement ratio. The ratio between the weight of water and the weight of cement in mortar or concrete. The lower the water-to-cement ratio, the higher will be the strength of the concrete. *See also* Abram's law. *Ham.*

water tower. a. A standpipe or its equivalent, often of considerable height, giving a head to a system of water distribution. *Standard, 1964.* b. A tower in which a falling spray of water is used to wash gas, etc. *Standard, 1964.* c. A tower containing tanks in which water is stored, built at or near the summit of an area of high ground in cases where the ordinary water pressure would be inadequate for distribution to consumers in the area. *C.T.D.*

water transport. Water is used for transport in some mines, especially in placers and in claypits, and generally in mines in an elevated position and with a loose mineral. Also filling material is often transported into the mine by water. The broken material is simply mixed with a sufficient quantity of water, usually in the ratio of 1:1.5 to 1:1.3 (solid to liquid by weight) and this mixture flows through pans with a gradient of 1 in 50 or through pipes down to the place to be filled. The mixture of water and solid material can also be conveyed by pumps horizontally, or raised to a small height. *Stoces, v. 1, p. 190.*

water treatment. The purification of water to ensure that it is potable. Treatment would also include neutralizing acid water or softening water of more than moderate hardness to render it suitable for use in washing or in steam boilers. *Ham.*

water-tube boiler. *See* Babcock and Wilcox boiler. *Nelson.*

water turbine. A prime mover coupled to an alternator and using a purely rotary motion to generate an alternating current. The main types of water turbines are (1) the Pelton wheel for high heads; (2) the Francis turbine for low to medium heads, and (3) the Kaplan turbine for a wide range of heads. *Ham.*

water tuyere. A water-jacketed tuyere. *Webster 3d.*

water vapor. Water vapor may be present in the furnace atmosphere, either from charging moist ware in the furnace or from the products of combustion of the fuel, and may cause blistering of enamels. Where the amount of moisture is not great, the defect may take the form of a slight iridescence or scum on the enamel surface. *Enam. Dict.*

water vein. Any one of the small underground streams of water often flowing through beds otherwise barren of water. *Standard, 1964.*

water velocity. The rate, measured in feet per minute, at which water progresses through a conductor. *Long.*

water ventilation. A method of ventilation still used in some old metalliferous mines in which water is passed down perforated pipes suspended in shafts, cold air descending with the water. The action is partly due to cooling and partly to the entrainment of air by water. *Mason, V. 1, p. 200.*

water volume. The volume of water pumped through a pipe system or drill string per given unit of time, usually expressed in gallons per minute. *Long.*

water wash. The use of water to remove the soluble constituents of a mill product before further treatment. *Fay.*

waterway. a. A groove or slot incised in the surface of a bit or other piece of drill string equipment to provide a channel through which the circulated drilling fluid can flow. Also called watercourse; water groove; water passage; water slot. *Long.* b. Scot. The area in a clack or bucket for the passage of water. *Fay.*

water wheel. A wheel so arranged with floats, buckets, etc., that it may be turned by flowing water; used to drive machinery, raise water, etc. The overshot and undershot water wheel, the breast wheel, and the tub wheel are now largely discarded in favor of the turbine. *Standard, 1964.*

water witch. Another name for dowser, or one who operates a divining rod. *Hoov, p. 337.*

waterworn stones. Gem minerals, especially crystals, rounded by action of water rolling them against rocks or gravels in beds of rivers, lakes, or the ocean. *Shipley.*

water yardage. Ark. Extra payment to miners who work in a wet place, either by the yard of progress or the ton of coal mined. *Fay.*

water year. The year through which a flow of water is measured—as July 1 to June 30. *Hess.*

Watkin heat recorders. Cylindrical pellets (⅜ inch high, ¼ inch in diameter) made of a blend of ceramic materials and fluxes so proportioned that, when heated under suitable conditions, they will fuse at stated temperatures. They are numbered from 1 (600° C) to 59 (2,000° C). *Dodd.*

Watsonite. Trade name for a mica substitute consisting of scrap or flake mica dehydrated by heating and then sheeted with a flexible binder. *Brady, 4th ed, 1940, p. 306.*

watt. The absolute meter-kilogram-second (mks) unit of power that equals 1 absolute joule per second; the standard in the United States; equals 1/746 horsepower. *Webster 3d.* Abbreviations, w and W. *Webster 3d; Zimmerman, p. 118.*

wattevillite. A colorless mineral found in hairlike monoclinic crystals, $Na_2O.CaO.2SO_3.4H_2O$. *Larsen, p. 149.*

watt-hour. A unit of measurement of electrical work that equals 1 watt expended for 1 hour. *Crispin.* Abbreviations, whr and wh. *Zimmerman, p. 118.*

wattless component. *See* idle component. *Mason, V. 2, p. 419.*

wattless current. An alternative name for the reactive component of an alternating current. *C.T.D.*

wattmeter. An instrument for measuring electric power in watts, the unit of electrical energy, volt times amperes; therefore, combining the functions of a voltmeter and an ammeter. *Crispin.* Abbreviation, wm. *Zimmerman, p. 118.*

watt-second. A unit of measurement of electrical work that equals the rate of 1 watt expended for 1 second. Abbreviation, wsec. *Crispin.*

Waucobian. Lower Cambrian. *A.G.I. Supp.*

Waugh drill. *See* rock drill, b. *Fay.*

wauk. A lump of plastic clay body that is prepared by rolling and beating, either with the hands or on a tabletop, in the rough approximation of the shape to be made in a hand mold; customarily, to roll a wauk. *ACSG, 1963.*

wave. a. An optical effect due to uneven glass distribution, or to striae. *ASTM C162–66.* b. A disturbance which moves through or over the surface of the medium, with speed dependent upon the properties of the medium. *Hy.*

wave base. a. The two planes of control, baselevel and wave base, should be distinguished and the almost plains produced by subaerial and submarine degradation be given separate names. *A.G.I.* b. The plane to which waves may degrade the bottom in shallow water. *A.G.I.* c. The depth at which wave action ceases to stir the sediments. *A.G.I.* d. The greatest depth to which the bottom is stirred by the waves during storms. *A.G.I.* e. The ultimate limit of abrasion. *Schieferdecker.*

wave-beveled platform. *See* wave-cut platform. *Schieferdecker.*

wave-built platform; marine-built platform; built platform; wave-built terrace. Seaward continuation of the wave-cut platform, formed by sediments which accumulated in the deeper water beyond, after having been in transit across the wave-cut platform. *Schieferdecker.*

wave-built terrace. The wave-built terrace is distinct from the wave-cut terrace in that it is a work of construction, being composed entirely of shore drift, while the wave-cut terrace is the result of excavation and consists of the pre-existent terrane of the locality. The wave-built terrace is an advancing embankment and its internal structure is characterized by a lakeward dip. *A.G.I.*

wave-cut bench; wave-cut rock bench. A narrow platform cut by the waves. *Schieferdecker.*

wave-cut groove. *See* wave-cut notch. *Schieferdecker.*

wave-cut notch; wave-cut groove. Notch at the foot of a sea cliff, caused by wave action. *Schieferdecker.*

wave-cut plain. The agents of denudation are planing down the surface of the land and carrying materials toward the sea, where extensive plains are being constructed but, in the course of this work of degradation, plains may also be formed by the very work of destruction, distinct from the action of building. For instance, the waves, either of lake or sea, may saw into the land, forming wave-cut plains which are generally of small extent and lie beneath the water. Later, these may, perhaps, be raised above the surface. Synonym for marine-cut terrace; plain of marine abrasion; shore platform; wave-cut terrace. *A.G.I.*

wave-cut platform; marine-cut platform. The rock shelf that is produced by the combined action of the direct attack on the cliff base, the to-and-fro motion on the wave base, and the undertow. Also called cut platform; wave-eroded platform; wave-beveled platform; abrasion platform; marine erosion platform; wave-cut bench; wave-cut terrace. *Schieferdecker.*

wave-cut rock bench. *See* wave-cut bench. *Schieferdecker.*

wave-cut terrace. The submerged plateau whose area records the landward progress of littoral erosion, becomes a terrace after the formative lake has disappeared, and, as such, requires a distinctive name. It will be called the wave-cut terrace. As applied to either lakes or seas, a synonym for marine-cut terrace; plain of marine abrasion; shore platform; wave-cut plain; wave platform. *A.G.I.*

wave delta; storm delta. A deltalike deposit, formed by waves breaking over a barrier or any other elongated obstruction. *Schieferdecker.*

waved stratum. An obsolete term for a ripple-marked bed. *Pettijohn.*

wave-eroded platform. *See* wave-cut platform. *Schieferdecker.*

wave erosion. *See* marine erosion. *Schieferdecker.*

wave filter. A transducer for separating waves on the basis of their frequency. It introduces relatively small insertion loss to waves in one or more frequency bands and relatively large insertion loss to waves of other frequencies. *Hy.*

wave front. In seismology, the surface of equal time elapse from the point of detonation to the position of the resulting outgoing signal at any given time after the charge has been detonated. In a more restricted sense, the surface along which phase is constant at a given instant. *A.G.I.*

wave-front chart. In seismology, a diagram of a series of lines showing equal times from the point of detonation. In its construction, velocity information must be known or assumed. Charts are usually constructed so that horizontal and vertical scales are in length, but they can be constructed so that horizontal scale is in length and vertical scale is in time. *A.G.I.*

wave guide. A system consisting of a metal tube, or dielectric rod or tube, or a single wire, for the transmission of electromagnetic energy by a wave (not of transverse electric and magnetic mode type). *NCB.*

wave height. The vertical distance between wave trough and wave crest, usually expressed in feet. *Hy.*

wave interference. The phenomenon which results when waves of the same or nearly the same frequency are superposed, characterized by a spatial or temporal distribution of amplitude of some specified characteristic differing from that of the individual superposed waves. *Hy.*

wavelength. a. The distance between similar points on successive waves. *Hurlbut.* Symbol, λ. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-102.* b. The distance measured along a straight line radially from source and between crests of two successive waves. That of visible light varies between 3,900 angstrom units (violet) and 7,600 angstrom units (red). *Pryor, 3.*

wave level. Position of the sea surface above or below a reference plane at any specific time in the tidal cycle. *Hy.*

wave lines. *See* swash mark, a. *Pettijohn.*

wavellite. a. A natural hydrated basic aluminum phosphate, $Al_3(OH)_3(PO_4)_2.5H_2O$. Orthorhombic. Color, white, yellow, green; luster, vitreous; Mohs' hardness, 3.5 to 4; specific gravity, 2.33; usually occurs in radiating aggregates. Found in Pennsylvania, Arkansas; Europe; Brazil. Has been used as a source of phosphorus. *Dana 17; Fay; CCD 6d, 1961.* b. Synonym for gibbsite. *Hey 2d, 1955.*

wave-made ripple mark. A ripple mark produced by the up-and-down movement of the water caused by a wave along a shore. Wind does not make a wave ripple mark. The two sides of a wave ripple mark have similar slopes and the ridges are sharp, although, when these features are found preserved in the rocks, the sharp crests have usually been cut off by later movements of the water. *Stokes and Varnes, 1955.*

wave meter. An instrument to measure and record the wave spectra. *Hy.*

wave period. The time interval between the appearance of two consecutive wave segments at a given point, usually expressed in seconds. The wave segments considered must be the same, that is, the crests, troughs, etc. *Hy.*

wave platform. Synonym for marine-cut terrace; plain of marine abrasion; shore platform; wave-cut plain; wave-cut terrace. *A.G.I.*

wave pressure. The pressure imposed on a breakwater by waves can amount to 3 tons per square feet at an exposed site. *Ham.*

wave propagation. The radiation, as from an antenna of r-f energy into space, or of sound energy into a conducting medium. *Hy.*

wave refraction. The bending of the wave crests due to variations in the water depth, or to currents. *Schieferdecker.*

wave ripple marks. Ripple marks with symmetrical slopes, sharp crests, and rounded troughs produced by oscillatory waves. Water particles in wave motion move in more or less circular orbits at the surface of the water. This motion is communicated downward, but the circular orbits change to elliptical with the longer axes horizontal. Close to the bottom the ellipses are nearly flat and the motion is essentially a swinging back and forth. Any prominence on the bottom determines vortices alternately on the two sides, and ultimately a ridge develops with symmetrical slopes and a sharp apex. Wave ripples once formed are approximately stationary and do not advance in either direction. Wave ripple marks are formed on all sand bottoms of which overlying waters are agitated by waves that move the sands. Also known as aqueous oscillation ripple mark; oscillation ripple mark; oscillatory ripple mark; symmetrical oscillation ripple mark; symmetrical ripple mark. *A.G.I.*

Waverlyan. a. Lower Mississippian, includes Kinderhookian and Osagean. *A.G.I. Supp.* b. The system between Devonian and Tennesseean. Obsolete. *A.G.I. Supp.*

waves. In mica, alternate elevations and depressions of a broadly warped sheet. *Skow.*

wave spectrum. A concept used to describe the distribution of energy among waves of different period. Wave speed increases with wave length, so distant storms may be detected by the increase of energy in long period waves. Sea is fully developed when all possible wave frequencies possess energies appropriate to the spectrum for the prevailing wind speed. *Hy.*

wave velocity. A vector quantity which specifies the speed and direction with which a wave travels through a medium. *Hy.*

waviness. A wavelike variation from a perfect surface, generally much larger and wider than the roughness caused by toolmarks or grind marks. *ASM Gloss.*

wavy bedding; wavy lamination. Bedding characterized by undulatory bounding surfaces. May be related to ripple bedding if regular and to nodular bedding if less regular. *Pettijohn.*

wavy extinction. An irregular extinction of a mineral under the microscope due to bending or distortion of the crystal. *Fay.*

wavy lamination. *See* wavy bedding. *Pettijohn.*

wavy vein. A vein that alternately enlarges or pinches at short intervals. *Fay.*

wax. a. Used loosely for any of a group of substances resembling beeswax in appearance and character. In general, waxes are distinguished by their composition of esters of the higher alcohols and by their freedom from fatty acids. Mineral waxes include ozocerite and paraffin. *API Glossary.* b. Leic. Soft or puddled clay used for dams or stoppings, in the mine. *Fay.*

wax agate. Yellow or yellowish-red chalcedony with a pronounced waxy luster. Similar to yellow carnelian. *Shipley.*

wax coal. Same as pyropissite. *Tomkeieff, 1954. See also* earthy brown coal. *Fay.*

wax dam. Leic. A wall or dam of clay. Also called a wax wall. *Fay.*

waxes. Viscid substances that soften on heating so that they can be readily molded. There are mainly two classes: (1) mineral waxes, such the solid higher hydrocarbons, and (2) the animal and vegetable waxes that are esters of the higher monohydric alcohols. Microcrystalline waxes are used as binders for dry press mixes and also for glaze suspensions. *Lee.*

waxing. Leic. The operation of plastering a waste stack with clay. *See also* stack out. *Fay.*

wax opal. An early name for yellow opal with a waxy luster. *Fay.*

wax resist. A resist decoration formed by blocking out certain areas with wax so that no glaze, slip, or color will adhere. *See also* paper resist; resist. *ACSG, 1963.*

wax shale. Another name for an oil shale. *Tomkeieff, 1954.*

wax stone. Crude ozokerite associated with earthy matter. *Tomkeieff, 1954.*

wax tailings. Brown, sticky, semiasphalt product. Obtained in the destructive distillation of petroleum tar just before the formation of coke. *CCD 6d, 1961.*

wax wall. a. A wall of clay built around the gob or goaf, to prevent the entry of air or egress of gas. *C.T.D.* b. Leic. A clay wall about 10 inches in thickness built up from floor to roof, alongside a gob road a few feet within the goaf, to keep back or prevent fire stinks, etc. *Compare* wax dam. *Fay.*

wax walling. The building of clay lumps as a lining to the pack in order to reduce leakage. If about 15 to 20 percent of calcium chloride is added to the clay it will remain plastic. *Sinclair, I, p. 286.*

waxy residue. A residue of a waxy nature remaining after digesting coal with an oxidizing reagent, such as Schulze's reagent, and dissolving away the regenerated humic acids with an alkali. *Hess.*

way. a. N. of Eng. Any underground passage or heading driven more or less on the level of the coal, along which the produce of the mine is conveyed. A gate, road, or wagonway. *Fay.* b. The rails, sleepers, etc., upon which cars, tubs, or corves run. *Fay.*

wayboard. a. Eng. A thin layer or band that separates or defines the boundaries of thicker strata; as thick beds of limestone separated by "wayboards" of slaty shale; of sandstone separated by "wayboards" of clay. Also written weighboard. *Fay.* b. Leic. Beds of green marl among sandy shales in the Trias. *Arkell.*

way dirt. Leic. The slack, dust, and lumps of coal which fall from the cars upon the roads from the working places to the shafts. It is collected during the night and sent to the bank and used under the boilers. *Fay.*

way end. Scot. The inner extremity of the wooden railways formerly used in mines. The end of an entry or roadway. *Fay.*

waygate. The tailrace of a mill. *Fay.*

way head. Mid. The end of a way or gate next to the face. *Fay.*

waylandite. A white mineral, $(Bi, Ca)Al_3(PO_4, SiO_4)_2(OH)_6$, a member of the plumbogummite family; from Busiro County, Buganda, Uganda. *Hey, M.M., 1964; Fleischer.*

way leave. a. Established rights affecting land to which the enjoyer does not hold title—rights of carriage, powerlines, water, etc. *Pryor, 3.* b. Eng. A rent or royalty paid by the owner or lessee of a mine for conveying minerals belonging to one person through the property of another person. *Fay.* c. N. of Eng. The right of making and maintaining coal mine railways through private property which may intervene between coal mines and coal docks. *See also* easement. *Fay.*

way shaft. In mining, a winze. *Standard, 1964.*

w c^{-1}. Abbreviation for watts per candle. *BuMin Style Guide, p. 62.*

weak ground. Roof and walls of underground excavations which would be in danger of collapse unless suitably supported. *Pryor, 3.*

weak veins. N. of Eng. Veins so called when the strata on either side are but slightly displaced. *Fay.*

weald clay. Eng. A Cretaceous clay, often variable in composition even within the same claypit, used for brickmaking in parts of Surrey, Kent, and Sussex. *Dodd.*

wealden. Pertaining to a weald, or the geological formation named from it. *Standard, 1964.*

Wealdian. Variable unit of Upper Jurassic and Lower Cretaceous age. *A.G.I. Supp.*

wear. A process by which material is removed from one or both of two surfaces moving in contact with one another, for example, abrasion. Most wear phenomena have the common characteristic, namely, the mechanical overstressing of the surface material. Wear may be classified according to the manner in which the overstressing occurs. In singlesided wear or erosion, the contacting medium is a fluid, while doublesided wear is characterized by the presence of two mating solid surfaces. *Osborne.*

wearing course. The top, visible layer of surfacing which carries the traffic of a road. *See also* rolled asphalt; tarmacadam; tack coat. *Ham.*

wearing strip. The strip fo metal applied to any particular device to take the wear of moving parts or objects. In conveyor work, it refers to the strip which is sometimes applied to the chain conveyor troughs and on which the drag chain rides. *Jones.*

wear pad. a. In forming, an expendable rubber or rubberlike material of nominal thickness that is placed against the diaphragm to lessen the wear on it. *See also* diaphragm, b. *ASM Gloss.* b. A surface covered with a layer of abrasion-resistant metal; a surface in which an abrasion-resistant substance is embedded. *Long.*

wear resistance. *See* abrasion hardness. *Long.*

wear ribs. Hard metal ridges applied to the outside surfaces of bottom-hole equipment, built up as close as practicable, to the set-outside-diameter size of a reaming shell, which serve as wear pads. *Long.*

weather. To undergo or endure the action of the elements; to wear away, disintegrate, discolor, or deteriorate under atmospheric influences. *Webster 3d.*

weather coal. A name applied to weathered brown coal showing bright colors. *Tomkeieff, 1954.*

weather door. A door in a mine level to regulate the ventilating current. A trap door. *Fay.*

weathered. Changed by long exposure to atmospheric conditions. *Weed, 1922.*

weathered crude petroleum. The product resulting from crude petroleum through loss, due to natural causes during storage and handling, of an appreciable quantity of the more volatile components. *ASTM D288-57.*

weathered layer. In seismic work, a zone extending from the surface to a limited depth, usually characterized by a low velocity of transmission which abruptly changes to a higher velocity in the underlying rock. The name is erroneous, and the zone is more properly called the low-velocity layer. *A.G.I.*

weathered rock. Rock the character of which has been changed by exposure to decaying conditions found in the zone of weathering. *See also* weathered zone. *Long.*

weathered zone. A more or less indefinite surface zone wherein, the rocks have been exposed to the chemical action of air, water, plants, and bacteria, and to the mechanical action of changes in temperature. The rock so exposed usually crumbles and decays. *Long.*

weathering. a. The group of processes, such as the chemical action of air and rainwater and of plants and bacteria, and the mechanical action of changes of temperature, whereby rocks on exposure to the weather change in character, decay, and finally crumble into soil. *Fay.* b. Changes in color, texture or chemical composition at the surface of a natural or artificial material due to the action of the weather. *Taylor.* c. Exposing ore to the atmosphere for long periods in order that a part at least of the sulfide content may become oxidized and washed away by the rain. *Osborne.* d. *See* seasoning. *Osborne.* e. The attack of a glass or enamel surface by atmospheric elements. *ASTM C162–66.* f. The deleterious action of the atmospheric elements on ceramic products. *ACSG, 1963.*

weathering coal. Coal having a weathering index, as defined by the United States Bureau of Mines Standards, of 5 percent or more. *A.G.I.*

weathering correction. In seismic work, a time correction applied to reflection and refraction data to correct for the travel time of the observed signals in the low-velocity layer, or weathered layer. *A.G.I.*

weathering index. A measure of the weathering or slacking characteristics of coal. In determining the index, the United States Bureau of Mines applies the following test: A 500 to 1,000 gram sample of coal in lumps approximately 1 to 1½ inches in diameter is air-dried at 30° to 35° C, with humidity at 30 to 35 percent for 24 hours. It is then immersed in water for one hour, the water is drained off, and the coal is again air-dried for 24 hours. The amount of disintegration is determined by sieving on an 8-inch wire mesh sieve with 0.236-inch square openings, and weighing the undersize and oversize. The percentage of the undersize, after passing a blank sieving test, is the weathering or slacking index of the coal. *A.G.I.*

weathering of coal. The slow disintegration of coal in surface stockpiles under the action of the weather, particularly frost after a wet period. Up to 20 percent of fine or small coal may be so formed and this fine material adds to the danger of fire. *See also* spontaneous combustion, a. *Nelson.*

weathering of roadways. The disintegration or scaling of exposed surfaces of mine roadways, particularly in the case of clay or shale rocks. Gunite has been employed for roadway protection against weathering. *See also* guniting, a. *Nelson.*

weathering map. In seismic work, a map on which the low-velocity layer, or weathered layer, is plotted and contoured to show areal variations. *A.G.I.*

weathering potential index. A measure of the degree of susceptibility to weathering of a rock or a mineral, computed from a chemical analysis. *A.G.I.*

weathering shot. In seismic work, a small charge of explosive detonated at or just below the surface of the earth for the purpose of recording refraction seismic information about the shallow-surface layers, particularly the low-velocity layer or layers, the so-called weathered layer. In modern seismic work, such shots are seldom used, and the data is derived from uphole times recorded at shot holes, or from first arrival refraction times recorded in connection with the reflection shot. *A.G.I.*

weatherometer. An instrument or apparatus used for accelerated weathering tests on enamel ware in the laboratory. *Hansen.*

weather roasting. Air oxidation of sulfide ores at ordinary temperatures over many years. *Bennett 2d, 1962.*

weather stain. Discoloration from exposure to the atmosphere. *Standard, 1964.* Said of rocks and minerals. *Fay.*

weatherstone. Building stone, generally limestone, with a high degree of resistance to the weather, suitable for corner blocks, window sills, mullions, etc. *Arkell.*

weave bead. a. For twist drills and reamers, the central portion of the tool body that joins the lands. *ASM Gloss.* b. In forging, the thin section of metal remaining at the bottom of a cavity or depression or at the location of the top and bottom punches. The former type may be removed by piercing or machining; the latter, by the trim punch. *ASM Gloss.*

weaving foreman. In the asbestos products industry, a foreman who supervises workers engaged in warping, weaving, and winding of asbestos yarn and twisting or spinning of asbestos fibers with cotton, spun glass, or wire. *D.O.T. 1.*

web. a. The slice or thickness of coal taken by a cutter loader when cutting along the face. The thickness of web varies from a few inches with plough-type machines up to about 6 feet with the A.B. Meco-Moore. The term web tends to be restricted to thin or medium slices of coal. *See also* buttock. *Nelson.* b. Mid. The face or wall of a longwall stall in course of being holed and broken down for removal. *Fay.* c. For twist drills and reamers, the central portion of the tool body that joins the lands. *ASM Gloss.* d. In forging, the thin section of metal remaining at the bottom of a cavity or depression or at the location of the top and bottom punches. The former type may be removed by piercing or machining; the latter, by the trim punch. *ASM Gloss.* e. The comparatively thin vertical plate connecting the flanges of a rolled steel joist or a light alloy section, or the separated flanges of a plate girder. *Ham.*

Webb effect. The increase in volume of a pottery slip as deflocculation proceeds. *Dodd.*

Webber's method. The essence of the method consists in determining the percentage of error for values given by hand sampling by running bulk samples through a mill or sampling plant. The method is especially advisable in the valuation of large low-grade gold ore bodies. *Hoov, p. 69.*

weber. Equivalent in meter, kilogram, second (m.k.s.) system of the maxwell in the centimeter, gram, second (c.g.s.) system. One weber equals 10^8 maxwells. Abbreviation, wb. *Pryor, 3.*

weber-edger operator. One who feeds and regulates an automatic machine that smooths edges of automobile window glass. *D.O.T. 1.*

weberite. A fluoride of sodium, magnesium, and aluminum, Na_2MgAlF_7, as pale gray monoclinic grains in cryolite from Greenland. *Spencer 15, M.M., 1940.*

Weber process. A method for the manufacture of pig iron in which the ore is mixed with a proportionate amount of coal sufficient to smelt it, and after adding a binder the mixture is briquetted by means of a roller press into ovoids, which are subjected to low temperature carbonization between 550° and 600° C, followed by smelting in a low shaft furnace. *Osborne.*

webs. The partitions dividing tile into cells. *ASTM C43–65T.*

websterite. Proposed by G. H. Williams for the pyroxenites found near Webster, N.C., that consist of diopside and bronzite, with bronzite porphyritically developed. The name websterite had been previously used by A. Brogniart in 1822 for aluminite. *Fay.*

weddellite. Calcium oxalate, $CaC_2O_4.2H_2O$, in deep-sea deposits from the Weddell Sea, Antartic. *Spencer 18, M.M., 1949.*

wedding. Derb. The accidental meeting or collision between a loaded and an empty bucket in a mine shaft when hoisting with a swinging rope, without guides. *Fay.*

wedge. a. A wedge-shaped piece of wood for tightening timber or steel props or to tighten timber sets against the roof and sides. *See also* lag; lid; clits; cleats. *Nelson.* b. A piece that tapers from a thick end to a chisel point. *Nichols.* c. The act or process of changing the course of a borehole by a deflecting wedge. *Long.* d. The tapered wedge used to initiate the deflection of a borehole. *See also* deflecting wedge; Hall-Rowe wedge. *Long.* d. Tapered pieces of core that tend to bind and block a core barrel. *Long.* e. A piece of mica which, on splitting, yields pieces thicker at one end than at the other. *Skow.* f. In ceramics, to cut (clay) into wedge shaped masses and work by dashing together to expel air bubbles. *Webster 3d.*

wedge-and-sleeve bolt. A bolt designed for use in roof bolting. It consists of a ¾-inch-diameter rod, at one end of which is a cold-rolled threaded portion, the older end being shaped to form a solid wedge forged integrally with the bolt. Over this wedge is fitted a loose split sleeve of 1½ inch external diameter. The anchorage is provided by the bolt being placed in the hole and the bolt is pulled downwards while the sleeve is held by the thrust tube. Split by the wedge head of the bolt, the sleeve expands until it grips the sides of the hole. *Nelson.*

wedge bit. A tapered-nose noncoring bit, used to ream out the borehole alongside the steel deflecting wedge in hole-deflection operations. Also called bull-nose bit; wedge reaming bit; wedging bit. *Long.*

wedge brick. A brick with both large faces equally inclined toward the small end. *VV.*

wedged bottom. *See* slugged bottom. *Dodd.*

wedge capping. A winding rope capping consisting of two tapered iron wedges which encircle the rope, the end of which is prevented from unravelling by casting on a small block of white metal. The wedges are contained by a steel bow, over which four or five wrought-iron hoops are driven. The greater the pull on the rope, the more the wedges grip it as they are drawn into the encircling hoops. *Mason, V. 2, pp. 462–463.*

wedge clinometer. An end clinometer the bottom end of which is shaped to match the wedge-guide pin on the drive wedge; hence the two can be fastened together with copper shear rivets. When the drive wedge is driven into the wooden plug in the borehole, the copper rivets break, and after the clinometer has been removed from the borehole the relation of the bearing and inclination readings to the flat face of the projection on the bottom of the clinometer case can be used to orient and place the deflection wedge in a manner so as to direct the deflected hole to follow the desired course. *Long.*

wedge core lifter. A core-gripping device consisting of a series of three or more serrated-face, tapered wedges contained in slotted and tapered recesses cut into the inner surface of a lifter case or sleeve. The case is threaded to the inner tube of a core barrel. As the core enters the inner tube, it lifts the wedges up along the case taper. When the barrel is raised, the wedges are pulled tight, gripping the core. *Long.*

wedge cut. a. A cut in which the central holes are positioned to break out a wedge-shaped section of strata when fired. *B.S. 3618, 1964, sec. 6.* b. A drill hole pattern with the cut holes converging to form a V or wedge. The other holes are drilled to break to the opening made by the cut holes. *See also* Vee cut. *Nelson.* c. The type of cut most commonly used in drifting work, and it can be adopted for all strata conditions. It consists of pairs of holes, normally drilled horizontally, meeting or finishing close together at the back of the cut so that a wedge-shaped section of the rock face is removed on blasting. The holes should be drilled at an angle of approximately 60° to the face line. Accordingly, the depth of pull which can be obtained with this type of cut is governed by the width of the drift, as this determines the maximum length of drill steel which can be used. Normally, the pull ranges from 5 feet in a 12-foot-wide drift up to 6½ feet in a 15-foot drift. *McAdam II, p. 121.*

wedge guides. An arrangement to arrest the cage or skip in the event of an overwind with a multirope friction winder. The cage is forced by its momentum into the wedge guides. The frictional force, gradually increased by virtue of the wedging action of the guides, is relied on to bring the cage to rest and hold it in a stationary position with the aid of jack catches. *See also* detaching hook. *Nelson.*

wedge off. To deviate or change the course of a borehole by using a deflecting wedge. *See also* bypass; deflect. *Long.*

wedge-out. a. Edge or line of pinch-out of a lensing or truncated rock formation. *Wheeler.* b. Synonym for thin out. *A.G.I.*

wedge pilot. That part of the bottom end of a Hall-Rowe deflecting wedge that matches the guide pin on the upper end of the Hall-Rowe drive wedge and by means of which the deflecting wedge can be oriented to direct the deflected borehole in the intended direction. *Long.*

wedge pyrometer. An instrument for the approximate measurement of high temperatures. It depends on a wedge of colored glass, the position of which is adjusted until the source of heat is no longer visible when viewed through the glass; movement of the wedge operates a scale calibrated in temperatures. *Dodd.*

wedge reaming bit. a. A tapered or bullnose rotary bit used to restart drilling after a deflection wedge has been fitted into a borehole. *B.S. 3618, 1963, sec. 3.* b. *See* wedging reamer. *Long.*

wedge ring. Eng. A wedging crib. *Fay.*

wedge roaster. Multiple-hearth vertical furnace. Rabbles rotating on each circular horizontal hearth work the continuously fed material across alternately to periphery and then on next hearth below toward center, so that it gravitates through either a central or a peripheral opening and is at the same time exposed to rising heat or air blown through rabble arms. *Pryor, 3.*

wedge rock. An expression used on the Comstock lode to designate rock too poor to be classed as "pay ore" or even "second-class ore," but better than waste. It usually assays under five dollars per ton. When a car is placed on the cage to be hoisted, it is specially tagged in the case of good ore. If it be waste no tag is used; it became the custom to throw a wooden wedge on top of the car of very low-grade ore, hence the term "wedge rock." *Fay.*

wedge rose bit. A serrated-face, hardened-metal, noncoring, cone-shaped bit used primarily to mill off part of the stabilizing or rose ring on the top end of a Hall-Rowe deflecting wedge. *Long.*

wedge-set. A diamond bit the crown of which is covered with wedge-shaped configurations in each of which is an inset diamond. *Long.*

wedge-shaped cross-bedding. Cross-bedding with wedge-shaped outline in vertical sections. *Pettijohn.*

wedge shot. *See* wedge cut. *Pryor, 3.*

wedge socket fitting. A wire rope attachment in which the rope lies in a too-small groove between a wedge and a housing, so that pull on the rope tightens the wedge. *Nichols.*

wedge theory. The analysis formulated by Coulomb in 1776 of the force tending to overturn a retaining wall. Its basis is the weight of the wedge of earth which will slide forward if the wall fails. *See also* plane of rupture. *Ham.*

wedge torrential crossbedding. Torrential crossbedding with wedge-shaped crossbedded units. *See also* torrential crossbedding. *Pettijohn.*

wedge-wire deck. A screen deck comprising wires of wedge-shaped cross section spaced from each other at a fixed dimension; the underflow thus passes through an aperture of increasing cross section. Also called wedge wire sieve (undesirable usage). *B.S. 3552, 1962.*

wedge-wire screen. A screen designed to reduce or eliminate clogging of material. It consists of wedge-shaped parallel wires with their wide edges uppermost; used for dewatering coal on shaking or stationary screens. *Nelson.*

wedging. a. A method used in quarrying whenever the object is to obtain large, regular blocks of building stones such as syenite, granite, marble, sandstone, etc. In this method a row of holes is drilled, either by hand or by pneumatic drills close to each other so that a longitudinal crevice is formed into which a gently sloping steel wedge is driven. Usually several wedges are driven in, and the block of stone can be detached without shattering. *Stoces, v. 1, p. 112.* b. The act of changing the course of a borehole by using a deflecting wedge. *Long.* c. The lodging of two or more wedge-shaped pieces of core inside a core barrel and therefore blocking it. *Long.* d. The material, moss, or wood used to render the shaft lining tight. *Fay.* e. In pottery making, a process of repeatedly cutting clay on a taut wire and pounding it together again in order to remove the air before the clay is put on the potters' wheel. *Chemical and Metallurgical Engineering, v. 40, No. 7, July 1933, p. 371.*

wedging and blocking. *See* blocking and wedging.

wedging bit. *See* wedge bit. *Long.*

wedging crib. In a circular mine shaft, a steel ring made of segments wedged securely to rock walls for use as a foundation for masonry lining. Also called wedging ring; wedging curb. *Pryor, 3.*

wedging curb. a. Eng. A curb used to make a watertight packing between the tubbing in a shaft and the rock walls, by means of split deals, moss, and wedges, driven in between the curb and the rock. Also called wedging crib. *Fay.* b. *See* curb. *Nelson.*

wedging down. Breaking down the coal at the face with hammers and wedges instead of by blasting. *Fay.*

wedging out. Eng. Cropping out, or thinning out; said of coalbeds. *Fay.*

wedging reamer. A reaming bit used to ream down alongside and pass the deflection wedge when deviating a borehole. Also called wedge bit; wedge reaming bit. *Long.*

wedging shot. An opening shot. A center cut. *Fay.*

Wedgwood pyrometer. A device for the determination of high temperatures on the basis of the approximate relationship between the contraction of clay test pieces and the temperature to which they have been exposed. *Dodd.*

Wedgwood ware. In ceramics, a fine hard-ware-like porcelain, first produced by Josiah Wedgwood (1730–95) an English potter. It consists characteristically of a tinted clay ground with small white cameo reliefs typically of classical design and delicately minute detail. *Webster 3d.* The various varieties of earthenware include: (1) bamboo ware, yellow ware named from its color; (2) basalt ware, ware with a black body, used for relief placques, medallion portraits, vases, etc.; (3) cameo ware; (4) jasper ware; (5) pebble ware, ware with a variegated body of different colored clays called, according to pattern, agate, Egyptian, granite, lapis-lazuli, pebble, porphyry, serpentine, verdantique, etc.; and (6) queen's ware. *Standard, 1964*

week. In British coal mines, the week is the period between midnight on Saturday night and midnight on the succeeding Saturday night. *Nelson.*

wecksite. A mineral, $K_2(UO_2)_2(SiO_5)_3.4H_2O$, orthorhombic; from the Thomas range, Juab County, Utah. Resembles uranophane in appearance. *Hey, M.M., 1961.*

weeks manometer. An inclined water gage. *Nelson.*

weeldrous. Old ironstone workings. *Nelson.*

weeper. a. A hole in the ceiling of an underground aqueduct to let water from above drain through, or a hole in a retaining wall to permit the escape of water from behind. *Standard, 1964.* Also called weep hole. *Fay.* b. A small feeder of water. *B.S. 3618, 1963, sec 4.*

weep hole. a. A drainage outlet through a retaining wall. *Standard, 1964.* b. Openings placed in the mortar joints of the facing material at the level of flashing so as to permit the escape of any moisture collected by the flashing. *ACSG, 1963.*

weeping rock. A porous rock from which water oozes. *Fay.*

wegiel. Polish name for coal. *Tomkeieff, 1954.*

Weg rescue apparatus. Oxygen supply fed automatically to rescue worker through valve controlled by his breathing action, forming part of portable outfit carried by him. *Pryor, 3.*

wegscheiderite. A triclinic saline mineral from the Green River formation, Sweetwater County, Wyoming; consists of fibrous aggregates of tiny acicular to bladed crystals. *American Mineralogist, v. 47, No. 3–4, March-April 1962, pp. 415–416.*

wehrlite. a. A variety of peridotite composed essentially of olivine and monoclinic pyroxene; contains diallage. The name includes with diallage all other varieties of monoclinic pyroxenes. *Holmes, 1928.* b. A foliated bismuth telluride of doubtful formula, containing about 30 percent tellurim, and often some silver. *Fay.*

weibullite. A steel-gray sulfobismuthite and sulfoselenite of lead, $2PbS.Bi_2S_3.Bi_2Se_3$. Differs from galenobismutite in possessing two distinct cleavages. Originally described (1885) as a seleniferous variety of galenobismutite. May be a mixture of cosalite and guanajuatite. From Falun, Sweden. *English.*

Weibull's theory. A statistical theory of the strength of materials; its basic postulate is that the probability of fracture of a solid body depends on the volume under stress and on the stress distribution. This theory has been applied in studies of the strength of ceramic materials and their resistance to the stresses induced by thermal shock. *Dodd.*

weigh. S. Wales. A weight of 10 tons of coal, etc. *Fay.*

weigh basket; weigh pan. Any receptacle in which the coal is weighed after it is dumped from the mine cars. *Fay.*

weigh batcher. Modern batching plant in which all ingredients for a concrete mix are measured by weight. *Ham.*

weighboard. Eng. Clay intersecting or separating a vein. *See also* wayboard, a. *Fay.*

weigh bridge. Eng. A platform large enough to carry a wagon, resting on a series of levers, by means of which heavy bodies are weighed. *Fay.*

weigher. *See* weigher up. *D.O.T. Supp.*

weigher-and-crusher man. One who weighs zinc ore and other materials to be sintered, and crushes sintered ore preparatory to further reduction. *D.O.T. Supp.*

weigher up. One who weighs materials, such as coke, limestone, sand, and scrap metal on platform or other scales to obtain record of weight of materials received, or to weigh out material for a furnace charge. Also called metal man; scaleman; scale tender; weigher. *D.O.T. Supp.*

weighing. Eng. The crushing or falling in of the roof, more or less rapidly. *Compare* weight, e. *Fay.*

weighing device. A mechanical or electronic device for controlling or registering the amount of material being handled. Can be designed for batch or continuous weighing and can be equipped with either visual indicators or automatic registering equipment or both. Can also be arranged to control conveyor speed to compensate for lag in processing or nonuniform material load on conveyor. *ASA MH4.1–1958.*

weighing feeders. These feeders usually handle the feed continuously over a belt which is balanced so as to give a weighed feed. *Pit and Quarry, 53rd, Sec. B, p. 76.*

weighing-in-motion system. An electronic system which weighs individually loaded coal wagons as they roll over a rail scale, feeding the information into a totalizing printer which automatically prints out gross and net weights. It employs hermetically sealed load cells which accurately convert physical weight into electrical impulses. *See also* weightometer. *Nelson.*

weigh larry. A traveling hopper for receiving, weighing or measuring, and disturbuting bulk materials. Usually fitted with a scale either manually-operated or of the automatic recording type. Weigh larries may be suspended between overhead tracks, or carried on rails mounted below them. They may be hand-pushed or power-propelled, and some designs provide a riding platform or cab for the operator. A remote-control device for operating the bunker or bin gates is usually mounted on the larry chassis. *ASA MH4.1–1958.*

weigh pan. *See* weigh basket. *Fay.*

weight. a. Roof movement, especially when it can be seen or heard. Also called weighting. *Mason.* b. Eng. The settlement of the roof. *SMRB, Paper No. 61* c. Fracturing and lowering of the roof strata at the face as a result of mining operations. *See also* crush. *Nelson.* d. *See* bulk density. *Nelson.* e. Scot. The pressure of the upper strata on the coal face, by which, if the working is systematically carried on, the excavating of the mineral is facilitated. *Fay.* f. Eng. The number of hundred-weights (cwts) which are reckoned as one ton as between coal masters and workmen (hewers, trammers, banksmen, etc.). *Fay.* g. In founding, to place weights upon the upper box of a flask to prevent the parts from separating by pressure of molten metal. *Standard, 1964.* h. Relative heaviness; ponderability regarded as a property of matter. *Webster 3d.* i. The force with which a body is attracted toward the earth or a celestial body by gravitation and which is a quantity dependent on the place where it is determined. *Webster 3d.* Abbreviations, wt, w, and W; symbols, *w* and *W*. *BuMines Style Guide, p. 62; Handbook of Chemistry and Physics, 45th ed, 1964, p. F-101; Webster 3d; Zimmerman, p. 118.* j. The gravitational force acting on a body. It may be expressed in absolute units of force (dynes or poundals) or in gravitational units (pounds-weight or grams-weight), the latter being numerically equal to the mass of the body in pounds or grams. *C.T.D.* k. Standardized masses used for comparison with unknown masses, balances of various grades of sensitivity and sensibility being employed. For high-grade analysis, weights are often plated with noble metal to insure that diminution of mass with time, through corrosion, is minimized. Such weights should not be touched by hand. *C.T.D.*

weight batching. Weighing out and combining in correct proportions the cement and aggregates in a concrete mix. *Nelson.*

weight break. a. Cracks developing from the upper or tension side of the stratum caused by bending moment. Such breaks are induced in the nether roof in consequence of the moment exercised by the weight of the roof-stratum overhanging the face, cantilever fashion. The weight break differs from the shear plane in the more ragged and uneven character of the fracture, and in hading over the waste instead of over the unwrought coal. The tendency of the weight break is to produce a negative draw. Also called first break. *Briggs, pp. 171–172.* b. Eng. A break in the roof caused by the settlement of the roof. *SMRB, Paper No. 61.*

weight breaks. The breaks or fissures in the roof consequent on weightings. *TIME.*

weight dropping. A seismic technique by which energy can be sent downward into the earth without the necessity of drilling shotholes. This technique involves lifting a weight, then permitting it to fall and strike the ground. The waves from the impact are then recorded. In areas where drilling is difficult or unduly expensive, this technique may be highly advantageous. *Dobrin, p. 64–65.*

weighted average. Value assessed from a number of samples, each of which has been assigned an importance in accord with its position and general trustworthiness. In this connection a sample which was cross-checked by others would be more reliable than one which was isolated, particularly if the latter showed abnormal values or was for any other reason suspect. The cross-checked sample is sometimes called a weighted sample in mineral valuation of a deposit. *Pryor, 3.*

weighted average depth. A method of comparing the average depth of mine workings. It is based on the average depth from which the output is obtained weighed for the tonnage produced. *Nelson.*

weight indicator. An apparatus for recording and indicating the tension on a drilling line of a diamond or rotary drill. *Compare* tension drilling. *Long.*

weighting. a. Eng. Undergoing disturbance due to weight. Commonly known as being "on the weight" or "taking weight." Said of the roof of a mine. *Fay.* b. Applying weights to each of several observations so as to obtain a weighted value. *See also* weighted average. *Ham.*

weighting, mud. Increasing specific gravity of oil-well drilling mud with, for example, barytes. *Bennett 2d, 1962 Add.*

weightings. The occurrence of fracturing of the upper roof, with consequent rapid increase of the weight carried on the timber and packs supporting the roof, and distinct from the fracturing of the nether roof. *TIME.*

W.8 methanometer. A dual-scale direct-reading instrument for measuring the firedamp percentage in mine air. It gives firedamp readings over the range from 0.2 to 5 percent and graduated 0.1 percent per division on the scale. *Nelson.*

weight of application. The weight of application per unit area. Generally dry weight except when noted as wet. Also, generally expressed as grams per square feet for cover coat (this is square feet of area) and as ounces per square feet for ground coat, this being both sides or 2 square feet of area. *Bryant.*

weightometer. An appliance for the continuous weighting of coal or other material in transit on a belt conveyor. Different weightometers have slightly different constructional details. Essentially, the loaded belt runs over a suspended platform forming an independent part of the conveyor structure. The platform carries idler sets which support a given length of belt. The entire platform is suspended from the weighing levers of the scale, which integrates the continuous load passing over the suspended section of belt. A weighing system is important in coal mines where payment is made on output basis and where it is necessary to assess correctly individual face outputs. With reasonably uniform conditions and good siting, weightometers are accurate to plus or minus 0.5 percent. They require testing periodically. *See also* poidometer; weighing-in-motion system. *Nelson.*

weight percent. Percentage composition by weight; often written w/o. Contrast with atomic percent. *ASM Gloss.*

weight pit. The pit below the shaft station where heavy weights are attached to the guide ropes in order to keep them taut. Roughly, the weight needed is 1 ton for each 1,000 feet or rope. *Higham, p. 154.*

weight strength. The strength of an explosive per unit weight, expressed as a percentage of the value for blasting gelatin as a standard. *B.S. 3618, 1964, sec. 6.*

wellite. A mineral, $CaHAsO_4$, the arsenic analogue of monetite. *Hey, M.M., 1964; Fleischer.*

Weil's disease. *See* infective jaundice. *Sinclair, I, p. 195.*

Weinig flotation cell. Square type of machine in which air is blown down to join pulp entering cell below a mechanically driven impeller. *Pryor, 3.*

weinschenkite. a. A very rare, weakly radioactive, white mineral, $(Y,Er)(PO_4)\cdot 2H_2O$, occurring as spherules and radiating monoclinic needles on limonite at the Amber-Auerbach mine, Bavaria, Germany; a secondary mineral, usually deposited by meteoric waters. *Crosby, pp. 112-113.* b. A dark-brown hornblende of the magnesium-calcium group, but rich in sesquioxides and water, and poor in ferrous oxide. *Hess.*

weir. a. An obstruction placed across a stream for the purpose of diverting the water so as to make it flow through a desired channel, which may be a notch or opening in the weir itself. The term usually applies to rectangular notches in which the water touches only the bottom and ends, the opening being a notch without any upper edge. *Zern, p. 124.* b. A dam. *Fay.* c. That part of a dam, embankment, canal bank, etc., which contains gates and over which surplus water flows; specifically called wasteweir. *Standard, 1964. See also* measuring weir; spillway.

weir head. The depth of water is a measuring weir as measured from the bottom of the notch to the surface of the water upstream of the weir. The velocity of approach is not included in this. *Ham.*

weir table. A record or memorandum used to estimate the quantity of water that will flow in a given time over a weir of a given width at different heights of the water. *Fay.*

Weisbach triangle. a. In survey, for orientation of mine, use of theodolite at bottom of vertical shaft to sight on two plumb wires. Instrument set to a horizontal reading between the wires of about 30 feet of arc. By reiteration methods, close accuracy is obtained so that the azimuth angle of the shaft surface stations from which these plumb wires are suspended can be transferred to the underground workings. *Pryor, 3.* b. The highly attenuated triangle formed by the plan position of two shaft plumblines and one observation station. *B.S. 3618, 1963, sec. 1.*

weiselbergite. A variety of microporphyritic dolerite having a microlitic texture resembling that of augite andesite. Crystals of labradorite, augite, and iron ores are embedded in a groundmass composed of plagioclase and augite microlites with interstitial glass. *Rice.*

weissite. a. A bluish-black telluride of copper, Cu_5Te_3, massive. From Vulcan, Colo. *English.* b. Cordierite; fahlunite. *Dana 6d, p. 421.*

Wiess quadrilateral. The quadrilateral formed by the plan position of two shaft plumblines and two observation stations. *B.S. 3618, 1963, sec. 1.*

weld. A union made by welding. *ASM Gloss.*

weldability. The capacity of a metal to be welded under the fabrication conditions imposed into a specific, suitably designed structure and to perform satisfactorily in the intended service. *Coal Age, v. 66, No. 3, Mar. 1961. p. 91.*

weld bead. A deposit of filler metal from a single welding pass. *ASM Gloss.*

weld blisters. Blisters which occur along the line of a weld and originate in the weld. *Bryant.*

weld crack. A crack in weld metal. *ASM Gloss.*

weld delay time. In spot, seam, or projection welding, the time current is delayed with respect to starting the forge delay timer in order to synchronize the forging pressure and the welding heat. *ASM Gloss.*

welded dikes. Applied to pegmatitic and aplitic dikes, the boundaries of which have been obliterated by continued growth of the minerals of the granite into which the dikes have been injected. *Holmes, 1928.*

welded pumice. *See* welded tuff. *A.G.I.*

welded tuff. Tuff that has been indurated by the combined action of heat retained by the particles and the enveloping hot gases. *A.G.I. Supp.*

welder. a. A machine used in welding. *Webster, 3d.* b. One who is capable of performing a manual or semiautomatic welding operation. *Coal Age, v. 66, No. 3, March 1961, p. 91.*

weld gage. A device for checking shape and size of welds. *ASM Gloss.*

welding. The joining of two metal surfaces which have been heated sufficiently to melt and fuse them together. *Nelson.*

welding current. The current flowing through a welding circuit during the making of a weld. In resistance welding, the current used during preweld or postweld intervals is excluded. *ASM Gloss.*

welding cycle. The complete series of events involved in making a resistance weld. Also applies to semiautomatic, mechanized fusion welds. *ASM Gloss.*

welding force. The same as electrode force. *ASM Gloss.*

welding generator. Generator used for supplying current for welding. *Coal Age, v. 66, No. 3 Mar. 1961, p. 91.*

welding glass. Colored glass to protect a welder's eyes from injurious radiations. *See also* fusion. *ASTM C162–66.*

welding ground. The same as work lead. *ASM Gloss.*

welding heat. The temperature necessary in order that two pieces of material may be welded together; especially, the white heat at which bars of iron unite in a weld. *Standard, 1964.*

welding lead (welding cable). A work lead or an electrode lead. *ASM Gloss.*

welding machine. Equipment used to perform the welding operation, for example, spot-welding machine, arc-welding machine, seam-welding machine, etc. *Coal Age, v. 66, No. 3, Mar. 1961, p. 91.*

welding positioner. A jig or a fixture, easily rotatable in one or more planes, and to which welding work may be clamped for ideal positioning during welding. Also called welding manipulator. *Henderson.*

welding powder. A flux used in welding, usually consisting of borax, ammonium chloride, iron filings, and sometimes of a resinous oil; mixed in different proportions. *Standard, 1964.*

welding procedure. The detailed methods and practices, including joint welding procedures, involved in the production of a weldment. *ASM Gloss.*

welding rod. Filler metal in rod or wire form used in welding. *ASM Gloss.*

welding schedule. A record of all welding machine settings plus identification of the machine for a given material, size, and finish. *ASM Gloss.*

welding sequence. The order of welding the various component parts of a weldment or structure. *ASM Gloss.*

welding stress. Residual stress caused by localized heating and cooling during welding. *ASM Gloss.*

welding swage. A swaging tool used to aid in closing the seam of a weld. *Standard, 1964.*

welding symbols. A system of symbols devised by the American Welding Society for use on welding detail drawings to designate the type of weld, weld dimensions, etc. *Henderson.*

welding technique. The details of a welding operation which, within the limitations of a welding procedure, are performed by the welder. *ASM Gloss.*

welding tip. a. A replaceable nozzle for a gas torch that is especially adapted for welding. *ASM Gloss.* b. A spot welding or projection welding electrode. *ASM Gloss.*

welding transformer. Transformer used for supplying current for welding. *Coal Age,* *v. 66, No. 3, Mar. 1961, p. 91.*

weld interval. The total heat and cool times in making one multiple-impulse weld. *ASM Gloss.*

weld-interval timer. A device used in resistance welding to control heat and cool times and weld interval when making multiple-impulse welds singly or simultaneously. *ASM Gloss.*

weld iron. Wrought iron. A term suggested by an International Committee of the American Institute of Mining Engineers. *Fay.*

weld line. The junction of the weld metal and the base metal, or the junction of the base-metal parts when filler metal is not used. *ASM Gloss.*

weldment. A base or frame made of pieces welded together, as contrasted with a one piece casting or a bolted or riveted assembly. *Nichols.*

weld metal. That portion of a weld which has been melted during welding. *ASM Gloss.*

weld nugget. The weld metal in spot, seam, or projection welding. *ASM Gloss.*

Weldon mud. *See* Weldon process. *Fay.*

Weldon process. A process used formerly for the recovery of manganese dioxide in making chlorine from hydrochloric acid in a stoneware still, by adding lime to the still liquor and oxidizing with air to precipitate a mud containing calcium manganite and yielding chlorine when recirculated and treated with hydrochloric acid. *Webster 3d.*

weld steel. Puddled steel. A term suggested by an International Committee of the American Institute of Mining Engineers. *Standard, 1964.*

weld time. In single-impulse and flash welding, the time that the welding current is applied to the work. *ASM Gloss.*

weld timer. A device used in resistance welding to control the weld time only. *ASM Gloss.*

welfare. Care of the health, both mental and physical, of the men employed in an undertaking. *Spalding, p. 363.*

welfare department. A department which deals with matters of welfare at mines, such as pithead baths, canteens, transport of men to work, and at times advising on the organization of social functions connected with the mines. The welfare department is closely allied to the labor department. *Nelson.*

welfare officer. An appointment sometimes made at large mines or a group of mines. He is a good organizer and handles all welfare activities; he often deals with personal problems of the workmen which they may be reluctant to discuss with the manager. *Nelson.*

well. a. A shaft or hole sunk into the earth to obtain oil, gas, etc. *Webster 3d. See also* oil well; shallow well; deep well; artesian well. b. A hollow cylinder of reinforced concrete, steel, timber, or masonry built in a hole as a support for a bridge or building. *Webster 3d.* c. Commonly used as a synonym for borehole or drill hole, especially by individuals associated with the petroleum-drilling industry. *Long.* d. A slot in the front of a hydraulic dredge hull in which the digging ladder pivots. *Nichols.* e. A wall around a tree trunk that protects it from fill. *Nichols.* f. A small dark or nonbrilliant area in the center of an improperly cut, too thick diamond. *Hess.* g. The crucible of a furnace. *Fay.* h. A cavity in the lower part of some sorts of furnaces to receive falling metal. *Standard, 1964.* i. *See* trap, i. *Fay.*

well borer. *See* well sinker. *Fay.*

well-boring jar. *See* jars. *Fay.*

well-conditioned triangle. A triangle which is equilateral or nearly so. In such a triangle any error in the measurement of an angle will be reduced to a minimum. *Ham.*

well core. A sample of rock penetrated in a well or other borehole obtained by use of a hollow bit that cuts a circular channel around a central column or core. *A.G.I. Supp.*

well cuttings. Rock chips cut by a bit in the process of well drilling and removed from the hole by pumping or bailing. Well cuttings collected at closely spaced intervals provide a record of the strata penetrated. *A.G.I. Supp.*

well drain. *See* absorbing well. *Ham.*

well drill. A drill, usually a churn drill, used to drill water wells. *See also* churn drill. *Long.*

well driller. *See* cable driller. *D.O.T. 1.*

well-driller operator. *See* churn-drill operator. *D.O.T. 1.*

well-drill holes. Holes drilled by means of an apparatus known as the well drills, or similar to that, and used for blasting on comparatively large scale. Such holes are usually 5 or 6 inches in diameter and from 30 to 150 feet deep. *Fay.*

well foundation. A type of foundation excavated by sinking a small-diameter caisson which has men inside it. *Ham.*

wellglass fittings. A transparent lighting device widely used of all mains lighting devices in mines. Its distribution characteristics are simple, since there is no control of light other than that provided by the interior of the upper part of the fitting which absorbs a large proportion of the upward flux component from the lamp and reflects the remainder. It is usually to be found spaced at intervals of 20 to 50 feet, 6 to 7 feet high, along the centerline of roads 12 to 14 feet wide. In general, the most noticeable effect of such a layout is glare. *Roberts, II, p. 214.*

well-graded soil. A soil with a particle-size distribution which extends evenly over a wide range of sizes. *Nelson.*

wellhole. a. A large-diameter (about 6 inches) vertical hole used in quarries and opencast pits for taking heavy explosive charges in blasting. *Nelson.* b. Aust. The sump, or portion of a shaft below the place where skips are caged at the bottom of the shaft, in which water collects. *Fay.* c. Change room. *Hess.*

wellhole blast. A method of quarry blasting in which the explosive charges are placed in rows of vertical holes. Hole diameters vary from 4 to 10 inches; 6 inches being a popular size. In general, 6-inch holes drilled in a 60-foot face are allowed a burden of 20 to 25 feet and spaced 12 to 20 feet apart. The loading ratio varies from about 3 tons of rock per pound of explosive up to about 7 tons under favorable conditions. Deck loading is usually employed and a powerful gelatinous explosive is loaded at the bottom of the holes. *Nelson.*

wellhole blasting. This type of blasting is virtually benching on a large scale. The depth and burden of the holes are much greater, and in consequence the hole diameter must also be increased to insure sufficient concentration of the explosive charge. Wellhole blasting is used in limestones especially if the beds are horizontal and well-defined. It is not often used in highly abrasive igneous rocks because of the cost of drilling. *Fraenkel, v. 2, Art. 8:40, p. 5.*

wellhole pipe. One of the short fire clay pipes that were used to carry the flame upwards from the wellhole in the bottom of a bottle oven. *Dodd.*

Wellington formula. The Engineering News formula for calculating the load-bearing capacity of driven piles. *Ham.*

well log. A record of the formations penetrated by a borehole and their approximate thickness, as determined by an examination of the cuttings or core recovered. *See also* log. *Long.*

well logging. a. A widely used geophysical technique which involves probing of the earth with instruments lowered into boreholes, their readings being recorded at the surface. Among rock properties currently being logged are electrical resistivity, self-potential, gamma-ray generation (both natural and in response to neutron bombardment), density, magnetic susceptibility, and acoustic velocity. *Dobrin, p. 9.* b. In deep bores, measurement of resistivity of the formations drilled through. Electrodes are plunged into the drilling mud at controlled spacings. *Pryor, 3.* c. *See* electric log. *Nelson.*

Wellman producer. A furnace used for the manufacture of producer gas. *Fay.*

well packing. A bag of flaxseed or other absorbent material packed around the tube of an oil well to prevent access of water to the oil in the well. *Standard, 1964.*

well point. a. A vertical tube terminating in perforated pointed shoe, connected with others in parallel by way of a header pipe to a drainage pump, used to dewater sands. *Pryor, 3.* b. A pipe fitted with a driving point and a fine mesh screen, used to remove underground water. *Nichols.* c. A complete set of equipment for drying up ground, including well points, connecting pipes, and a pump. *Nichols.* d. *See* screen pipe. *Long.*

well-point pump. A centrifugal pump that can handle considerable quantities of air, and is used for removing underground water to dry up an excavation. *Nichols.*

well pressure. The natural pressure of the oil or gas in a well. It is often several hundred pounds per square inch and sufficient to cause the oil to rise to the surface. The well pressure is not related to the depth of the oil deposit below the surface. *Nelson.*

well puller. In petroleum production, one who pulls casing, tubing, or pumping rods out of gas or oil wells for repair and runs repaired equipment, testing devices, and servicing tools into well, using winches and cables or a hydraulic jack powered by steam or gas engines or tractor motor. Also called casing puller; clutchman. *D.O.T. 1.*

well record. The record of a drilled well. *See also* well log. *A.G.I. Supp.*

well rig. a. An assemblage of all mechanisms, including power motors, necessary to drilling, casing, and finishing a tube well.

Standard, 1964. b. Synonym for well drill. *Long.*

well sample. Cuttings produced in well drilling that are collected and saved as a record of the kinds of rock penetrated in the hole. *A.G.I. Supp.*

well seismometer. Special type of seismometer that is used when recording in a deep well. *Schieferdecker.*

well shooting. a. The firing of a charge of nitroglycerin, or other high explosive, in the bottom of a well for the purpose of increasing the flow of water, oil, or gas. *Fay.* b. In seismic work, a method or methods of logging wells so that average velocities, continuous velocities, or interval velocities are obtained by lowering geophones into the hole. Shots are usually fired from surface shot holes, but may be fired in the well itself, or perforating-gun detonations may be used. In continuous logging, a sound source is lowered in the hole together with recording geophones. *A.G.I.*

well sinker. A skilled tradesman, often native to the district, who digs for and forms a well using mainly hand-operated implements. *See also* steening. *Ham.* Also called well borer. *Fay.*

wells of Stromboli. Cavities at the summit of the volcano Stromboli, in Italy, containing water, probably condensed from vapor from the interior. *Standard, 1964.*

well-sorted. As used by geologists, it applies to material composed of grains of approximately uniform size. As used by engineers, it applies to material containing approximately equal amounts of several grain sizes. *Stokes and Varnes, 1955.*

well survey. Synonym for borehole survey. *Long.*

well tube. A tube or tubing used to line wells. *Standard, 1964.*

well-tube filter. A strainer on a driven well tube to keep out grit. *Standard, 1964.*

well-tube point. A point at the end of a perforated tube used for sinking wells. *Standard, 1964.*

well-velocity survey. Method of determining the velocity distribution by recording in a deep well. *Schieferdecker.*

well water. Shallow wells often contain water which is hard and impure, but deep wells usually give water which, although very hard, is free from bacteria, because of its filtration on passage through porous rocks, such as chalk. *Cooper, p. 360.*

Welsbach mantle. A narrow cylinder of fiber or artificial silk soaked in a solution containing about 99 percent thoria and 1 percent ceria which on heating becomes incandescent and highly luminous, thus greatly increasing the lighting power of gas (not acetylene, however), kerosine and gasoline. *Hess.*

Welsh bord. Aust. A room in which mine waste is stored in the middle, and a roadway is kept open on either side. *Fay.*

Welsh lay. A slate 3 feet long by 2 feet wide. *Standard, 1964.*

Welshman. a. A heavy steel ring about three or four inches inside diameter, used in withdrawing a bar which is stuck or frozen in a skull or iron. The ring is placed on the bar, a wedge inserted, and the bar backed out by sledging on the wedge. *Fay.* b. A native or inhabitant of Wales. *Webster, 3d.*

Welsh notch. A form of joint between the collar (or crossbar) and the arms (or uprights) of a timber set, developed in the Welsh coal mines. It is designed to be equally effective in resisting side and roof pressure. *See also* double timber. *Nelson.*

Welsh process. *See* English copper process.

welt. Large-scale topographic elevation, elongate in shape, with relatively steep sides. Generally parallel to continental coasts, a welt may rise above water level to form islands, island chains, or even mountain ranges. *Hy.*

wem. *See* whim. *Pryor, 3.*

wenkite. A mineral, $(Ba,Ca)_9Al_9Si_{12}O_{42}$-$(OH)_5(SO_4)_2$, hexagonal crystals in the marbles of Candoglia, Italy, are possibly related to cancrinite. *Hey, M.M., 1964; Fleischer.*

Wenlockian. Middle Silurian (restricted). *A.G.I. Supp.*

wennebergite. A variety of quartziferous porphyry characterized by phenocrysts of orthoclase, biotite, and quartz in a microcrystalline and chloritic groundmass containing abundant apatite and sphene. *Holmes, 1928.*

Wenner configuration. A direct-current resistivity method using a linear arrangement of four equally spaced electrodes. Current is supplied by the outside electrodes, while potential differences are observed between the inside ones. The array may be moved along a traverse using constant electrode spacing to obtain a horizontal profile, or it may be moved progressively out from its center to obtain a depth profile. *A.G.I.*

Wenstrom. A rolling mill similar to a universal mill but where the edges and sides of a rolled section are acted on simultaneously. *ASM Gloss.*

Wentworth scale. A logarithmic grade scale for size classification of sediment particles, starting at 1 millimeter and using the ratio one-half in one direction (and 2 in the other), providing diameter limits to the size classes of 1, one-half, one-fourth, etc., and 1, 2, 4, etc. This was adopted by Wentworth from Udden's scale with slight modifications of grade terms and limits. *A.G.I.*

Wenzel's law. Applies to the dissolution of a solid in a liquid. The rate of dissolution is proportional to the surface area of the solid exposed to the action of the solvent. *Newton, p. 150.*

wernerian. Of or pertaining to A. G. Werner (1750–1817), a German mineralogist and geoglogist, who classified minerals according to their external characters and advocated the theory that the strata of the earth's crust were formed by depositions from water; neptunian. *Webster 3d.*

wernerite. A common scapolite. A mineral of the scapolite group, intermediate in composition between meionite and marialite. *Fay.*

werneritite. Light-colored rocks consisting almost entirely of the mineral wernerite. *Hess.*

Wesco coal powder. Nongelatinous permissible explosive; used in coal mines. *Bennett 2d, 1962.*

wesseltons. Third-grade cut diamonds. *Hess.*

West African. A diamond produced in Southwest Africa, as opposed to a diamond produced in the Congo or in Brazil. Frequently used interchangeably with South African, as applied to diamonds produced in that area. *Long.*

western method. The method of laying brick in which the bricklayer employs the stringing method with shoved joints. *ACSG.*

westerwald clay. A refractory clay occurring in an area east of the Rhine between Coblenz and Marburg. These clays are of Oligocene origin and vary widely in composition from highly siliceous to clays that contain (raw) over 35 percent Al_2O_3. *Dodd.*

Westfalia pillar plough. A plough designed for the extraction of coal pillars and for short rapidly advancing development faces. The plough is guided along a panzer conveyor but the pulling forces are not transmitted to the conveyor structure. The plough is automatically advanced at each end of its short run, giving a rapid face advance. This requires the use of self-advancing supports in conjunction with hydraulic anchorages. *Nelson.*

Westfâlia plough. *See* hard-coal plough. *Nelson.*

Westfalia tandem plough. A plough designed for use in a seam with sticky coal. It consists essentially of two shortened plough bases connected by a heavy tension spring and carrying two adjustable booms fitted with cutting bits and connected at the apex to a cutterhead, which ploughs at roof level or at any lower level which will bring down the top coal. *Nelson.*

westfalite. A blasting explosive composed of ammonium nitrate and resin. *Webster 2d.*

westgrenite. A mineral, $(BiCa)(Ta,Nb)_2O_6$-(OH). *Fleischer.*

westing. A departure measured westwards. *Ham.*

Westinghouse retarder. In this retarder two hinged brake bars are set on each side of each of the rails and contact the inside and outside of the wheel faces a few inches above rail level. Pneumatic cylinders apply the power to the brake beams, forcing them inwards towards each other, thus gripping the wheel faces. This avoids side thrust on the wheels. *Mason, V. 2, p. 529.*

Westinghouse skotch. A device used for control of trams. It consists of a stop arm placed in each rail, which is raised 4 inches above rail level by a spring when the air supply to the operating cylinder is cut off. *Mason, v. 2, p. 527.*

Westlake process. An automatic process using vacuum gather for producing articles in paste molds, simulating the action of a hand shop. *ASTM C162–66.*

Weston photronic cell. This consists of a small box containing an iron disk thinly coated with the rare element selenium. When electromagnetic radiation in the form of light waves falls on this surface it sets up a potential difference between the iron and the selenium, which in turn causes a minute electric current to flow through the sensitive microammeter connected between them. The magnitude of this current is proportional to the intensity of the light, and it can be used as a measure. For use with miners' hand lamps the cell is mounted in a box, the microammeter being housed in the top or side. The lamp to be tested is placed in the box on a turntable and the candlepower is read off directly since the instrument is already calibrated. *Mason, v. 1, p. 248.*

Westphal balance; Mohr balance. A balance having the buoyancy of a float balanced by sliding weights. Used for determining specific gravity (as of liquids or mineral fragments). *Webster 3d.*

Westphalian. Middle Upper Carboniferous. *A.G.I. Supp.*

west sand process. A soil satbilization process applied to sand which is mixed with a special road oil. *Ham.*

West's solution. A liquid consisting of 8 parts of white phosphorous and 8 parts of sulfur to 1 part of methylene iodide. Useful in obtaining the refractive index by the Becke method. Refractive index, 2.05. *Shipley.*

weta material. A new refractory suitable instead of porcelain and quartz glass. Powdered SiC mixed with silicates and certain metals resists acids, alkalis, temperature shock and is not easily broken. *Bureau of Mines Staff.*

wet analysis. A method of estimating the effective diameters of particles smaller than 0.06 millimeter by mixing the sample in a measured volume of water and checking its density at intervals with a sensitive hydrometer. A test may take several days. *See also* mechanical analysis. *Nelson.*

wet- and dry-bulb thermometer. *See* hygrometer. *Nelson.*

wet-and-dry screening. In sizing analysis of fine material, preliminary screening by washing a weighed sample on a 200-mesh screen, perhaps with use of a dispersing agent such as sodium silicate. Removal of the minus fraction (which is settled and later brought into account) is followed by drying of the onsize and standard sizing analysis. Screen action is thus rendered more efficient. *Pryor, 3.*

wet assay. The determination of the quantity of a desired constituent in ores, metallurgical residues, and alloys by the use of the processes of solution, flotation, or other liquid means. *See also* assay; dry assay. *Nelson.*

wet blasting. a. Shot firing in wet holes. Special explosives are available for wet conditions and the detonator wires must be well insulated to prevent short-circuiting and misfires. *See also* submarine blasting. *Nelson.* b. The same as liquid honing except the liquid suspension is driven by an impeller wheel. *ASM Gloss.*

wet-bulb temperature. a. The temperature of the air as measured by a wet-bulb thermometer, and which is lower than the dry-bulb temperature (for all cases except when the air is saturated) in inverse proportion to the humidity. *Strock, 10.* b. The lowest temperature which can be produced in a given air by the evaporation of moisture into that air is known as the wet-bulb temperature. *Spalding.* c. A sweating human body closely resembles a wet-bulb thermometer, and provided the ventilation is brisk it resembles the wet-bulb of a whirling hygrometer. Evaporation takes place at the wet-bulb temperature. It is often claimed that the best single simple reading for comfort measurement in mines is the wet-bulb temperature. *Roberts, I, p. 132.*

wet bulb thermometer. An instrument which measures the evaporating power of the air. The wet bulb temperature is fixed for any given dry bulb temperature and moisture content of the air, or relative humidity. The bulb of the wet bulb thermometer is covered with a layer of muslin which is kept moist with water. As water is evaporated, heat is absorbed, and the thermometer is cooled below the dry bulb temperature. *Lewis, p. 697.*

wet cleaning. A coal-cleaning method that involves the use of washers plus the equipment necessary to dewater and heat-dry the coal. This method is generally used when cleaning the coarser sizes of coal. It is a more expensive method than air cleaning and creates the additional problem of water pollution. Coal can, however, be cleaned more accurately by this method than by air cleaning. *Kentucky, p. 300.* *See also* froth flotation; washery.

wet clutch; oil clutch. A clutch that operates in an oil bath. *Nichols.*

wet criticality. Reactor criticality achieved with a coolant. *L&L.*

wet cutting. A method of dust prevention in which water is delivered onto the moving cutter chain, through water pipes, and is carried into the cut where it is intimately mixed with the cuttings. This method is successful in seams up to 4 feet thick. *Mason, v. 1, p. 297.*

wet cyclone. *See* cyclone.

wet density. The ratio of the weight of a bottom sediment sample to its volume. *Hy.*

wet dock. A dock in a tidal estuary on the coast, the water being maintained at the high-tide level by dock gates. These are opened only at high tide. *Ham.*

wet drill. A percussive drill with a water feed either through the machine or by means of a water swivel, to suppress the dust produced when drilling. *See also* dust trap. *Nelson.*

wet drilling. In rock drilling for blasting purposes, injection of water through hollow drill shank to bottom of hole, to allay dust and danger of pneumokoniensis. *Pryor, 3.*

wet dust. Dust which has been mixed with moisture or which has become wet from water in the mine. *Rice, George S.*

wet gas. a. Natural gas that contains more or less oil vapors. It occurs with or immediately above the oil. Also called casing head gas. *Fay.* b. Gas partly saturated with liquid hydrocarbons. *Wheeler.*

wet gas wells. Gas wells that produce a gas from which gasoline can be obtained but which do not produce crude oil. *Mersereau, 4th, p. 199.*

wet gold-silver ores. Ores containing lead. On smelting the ore, the metallic lead trickles through the mass and collects the gold or silver which is later recovered. *Nelson.*

wet grinding. a. The milling of materials in water or other liquid. *ACSB-3.* b. Any milling operation carried on in water or a liquid. *Enam. Dict.* c. The practice of applying a coolant to the work and the wheel to facilitate the grinding process. *ACSG, 1963.* d. Comminution of ore in aqueous suspension; typically practiced in the ball milling of finely crushed rock. *Pryor, 3.*

Wetherill process. Recovering zinc from ores by heating the oxidized ore with coal on an open iron grate. The resulting zinc vapor is immediately reoxidized to zinc oxide, which is caught in dust chambers. *Bennett 2d, 1962.*

Wetherill's furnace. A furnace with perforated iron bottom, under which a blast is introduced, and upon which zinc ore (red oxide) is reduced. A muffle furnace for roasting zinc ores. *Fay.*

Wetherill's magnetic separator. An apparatus for separating magnetic minerals from nonmagnetic minerals. It consists of two flat belts, the upper of which is the wider, run parallel to each other and over long magnets set obliquely to the belts. Consequently magnetic particles are drawn up against the upper belt, and as they pass beyond the influence of the magnets, fall from the edge past the other belt into a bin. Another form operates by belts moving across the line of travel of the main belt. *Liddell 2d, p. 389.*

Wetherill vacuum casting process. In this process, the mold, arranged for bottom feeding, is placed inside a vacuum bell; the bottom of the mold is connected by a tube to a ladle containing the molten metal, which is sucked into the mold cavity when the vacuum is formed. It is claimed that this process gives increased yield of good castings because of exact control over pouring conditions; and a reduction in porosity and slag inclusions. *Osborne.*

Wethey furnace. A multiple-deck, horizontal furnace for calcining sulfide ores. It resembles the Keller furnace. *Fay.*

wet hole. A borehole that traverses a water-bearing formation from which the flow of water is great enough to keep the hole almost full of water. *Long.*

wet kata index. The wet kata thermometer consists of a body-temperature instrument with the bulb encased in a close-fitting, loosely woven, fabric thimble which remains wet while the cooling time is being measured. The cooling of the bulb is controlled by the effects of convection, radiation, and evaporation. The dry- and wet-bulb temperatures, moisture content, and air velocity of the surroundings will all affect the reading. *Roberts, I, p. 133.*

wet metallurgy. *See* hydrometallurgy. *Bennett 2d, 1962.*

wet method. Any hydrometallurgical process, as the cyanide process, flotation process, etc. *See also* wet process. *Fay.*

wet milling. The grinding of porcelain enamel materials with sufficient liquid to form a slurry. *ASTM C286–65.*

wet-milling plant. A mill in which a wet process is employed. *Fay.*

wet millman. *See* wet-pan operator. *D.O.T. 1.*

wet mining. a. In wet mining, water is sprayed into the air at all points where dust is liable to be formed, and no attempt is made to prevent the air from picking up moisture. It therefore soon becomes saturated and remains so throughout the ventilation circuit. *Spalding.* b. Mining for salt and other water soluble minerals as brine, rather than in the dry state. *Kaufmann, p. 142.*

wet mix. A concrete mix to which too much water has been added. *See also* water-to-cement ratio. *Ham.*

wet mixer. *See* clay maker. *D.O.T. 1.*

wet money. N. of Eng. Payment made to faceworkers who have to work in wet conditions. *Trist.*

wet natural gas. Natural gas which contains readily condensible gasoline, that may be extracted in quantity sufficient to warrant the installation of a plant. *Fay.*

wet- or dry-ground hollow casting. *See* drain casting. *ACSG, 1963.*

wet pan. An edge runner mill used for grinding relatively wet material in the refractories and structural claywares industries. The bottom has slotted grids with a proportion of solid plates on which the mullers can grind. *Dodd.*

wet-pan charger. One who adds water to mixture, in addition to clay, shale, or brick, in grinding pans in order to make it plastic. May be designated according to clay ground in pans, as silica-wet-pan charger. Also called wet-pan feeder. *D.O.T. 1.*

wet-pan operator. One who tends and supervises loading of wet pans used for grinding and tempering clay, performing essentially the same duties as described under dry-pan operator. Also called clay temperer; wet-mill man. *D.O.T. 1.*

wet place. Aust. A place is considered wet if men have to work constantly in 3 inches of water or more, or when water is constantly dripping on them from the roof. *Fay.*

wet-plant operator. One who works as a member of a crew, performing any one or a combination of duties concerned with extracting cadmium, lead sulfate, and zinc oxide from dust recovered in Cottrell precipitators. *D.O.T. Supp.*

wet-pressing; plastic pressing. Forming ceramic ware in dies from a plastic body by direct pressure. *ASTM C242–60T.*

wet process. a. A metallurgical process in which the valuable contents of the ore are dissolved by acid or other solvents; a leaching or lixiviation process. Opposed to dry process. *Fay.* b. The method of preparation of a ceramic body wherein the constituents are blended in sufficient liquid to produce a fluid suspension for use as such or for subsequent processing. Also called slip process. *ASTM C242–60T.*

wet puddling. The ordinary process of puddling in which the furnace is lined with material rich in oxide of iron. *Fay.*

wet rods. Scot. Pump rods inside the pipes in a bucket lift. *Fay.*

wet rot. Timber decay set up when mine props have not been treated with zinc sulfate, etc., and are exposed to alternations of moisture and drying out. *Pryor, 3.*

wet rubbing test. A test to determine the degree of attack of a vitreous-enameled surface after an acid-resistance test. *Dodd.*

wet sample. A sample consisting of sludge, drill cuttings, or other material wetted by the drill-circulation medium. *Long.*

wet screen analysis. *See* wet sieve analysis. *Bureau of Mines Staff.*

wet screening. The addition of water to a screen to increase its capacity and improve its sizing efficiency. The water is introduced either by adding it to the feed or by spraying it over the material on the screen deck. The latter method is also used in rinsing or washing ores, etc., to recover media in the heavy-media process. *Nelson.*

wet separation. A term used in connection with coal washing or other processes using fluid. *See also* coal-preparation plant; washery. *Nelson.*

wet sieve analysis. An American Society for Testing and Materials standard method of test, recommended for determining the grain sizing of materials in which slaking would occur, in normal industrial use. *Bureau of Mines Staff.*

wet sphere device. An instrument developed in Germany for the purpose of assessing climatic conditions in mines such as the wet- and dry-bulb temperatures, air velocity, barometric pressure, and radiation. The field of usefulness of the instrument is limited to mines where the workmen are normally sweating freely and wear few clothes. *Roberts, I, p. 134–135.*

wettability. a. Term used in connection with flotation process, to describe extent to which a specific mineral's surface attracts or rejects water (is hydrophilic or hydrophobic). Can be modified by wetting agents. *Pryor, 3.* b. A term used in wet separation to indicate the ease with which a solid can be wetted by a liquid. It is often an advantage to feed the raw coal or ore into a washer,in a wet condition. *Nelson.*

wettable sulfur. Sulfur treated so that it is easily dispersed in water. *BuMines Bull. 630, 1965, p. 903.*

wetted perimeter. The total length of surface in a channel or pipe which is in actual contact with water. *See also* hydraulic mean depth. *Ham.*

wetterdynamite. Originally, only guhr dynamites to which were added salts containing water of crystallization, as Glauber's salts, ammonium oxalate, etc., with the view of making them available in mines containing firedamp. *Fay.*

wetter-off. In glassmaking, a worker who detaches the blown glass from the pipe by touching it with a wet tool. *Fay.*

wetting. a. A phenomenon involving a solid and a liquid in such intimate contact that the adhesive force between the two phases is greater than the cohesive force within the liquid. Thus, a solid that is wetted, on being removed from the liquid bath, will have a thin continuous layer of liquid adhering to it. Foreign substances, such as grease, may prevent wetting. Addition agents, such as detergents, may induce wetting by lowering the surface tension of the liquid. For a contrast, *see* water break. *ASM Gloss.* b. A natural phenomena that affects the relative permeability of reservoir rock. Wetting of a solid by a liquid is commonly observed in the spreading of a liquid on a solid surface and the blotting of a liquid by a dry absorbent material. The effect on relative permeability occurs because wetting affects the curvature of the interface between reservoir fluids. This curvature causes the wetting fluid to occupy selectively the smaller interstices of the rock, the finer pores, and the corners adjacent to the grain contacts. The nonwetting fluid occupies the larger openings, thus decreasing the relative permeability of the rock. *Williams.* c. Liquid contact angle of less than 90°. *VV.*

wetting affect. When surface-active agents cause water to displace air at the surface of a solid-water-air system the surface tension of the solid-water phase has been lowered in comparison with that of the solid-air phase, by adsorption of the wetting agent (adhesional wetting). For a small particle wetting can be analyzed into three stages (adhesion, immersion, spread). Wetting out is a preliminary step in deflocculation. *Pryor, 3.*

wetting agent. a. A substance that lowers the surface tension of water and thus enables it to mix more readily. Wetting agents, such as bone glue and sodium carboxymethyl-cellulose, may be used for binding coal dust on mine roadways. Also called surface-active agent. *See also* wettability, b. *Nelson.* b. A reagent to reduce the interfacial tension between a solid and a liquid and so facilitating the spreading of the liquid over the solid surface. *B.S. 3552, 1962.* c. A chemical promoting adhesion of a liquid (usually water) to a solid surface. *Pryor 2.* d. *See* plasticizer. *Taylor.*

wetting coal dust. The spraying of mine roadways with water or treated with a wetting agent in order to (1) increase the difficulty of raising the dust deposit into the air to take part in an explosion, and (2) reduce the flammability of the dust raised in an explosion. *Nelson.*

wetting off. The severing of a handmade glass bottle from the blowpipe by means of a fine jet of water. *Dodd.*

wet unit weight; mass unit weight. The weight (solids plus water) per unit of total volume of soil mass, irrespective of the degree of saturation. *ASCE P1826.*

wey; weigh. Eng. A certain weight of coal usually 10 tons, upon which a royalty is paid. *Fay.*

wh Abbreviation for watt-hour. *Zimmerman, p. 118.*

whaleback. *See* whaleback dune. *A.G.I.*

whaleback dune. A general, self-explanatory descriptive term for elongate dunes with a rounded crest; has been applied to features ranging widely in size. *A.G.I.*

whaler. A horizontal beam in a bracing structure. *Nichols.*

whale-type jib. A coal-cutter jib which enables water to be taken, during cutting, to the back of the cut for dust suppression and prevention of gas ignition from frictional sparking. With an undercutting jib, it consists of a feed water pipe and four or five distributor pipes terminating in jets all arranged in the top plate of the jib. *See also* dust-suppression jib. *Nelson.*

wharf. A berth for shipping which is constructed parallel to the waterfront. *Ham.*

wharfman. A laborer who observes coke as it is dumped onto wharf to locate hot spots in coke, and quenches them with water hose to prevent burning of conveyor belts; also regulates flow of coke from wharf onto conveyor belts by manipulating levers of gates. *D.O.T. Supp.*

wharl; wharr. Newc. A sledge for hauling corves in low drifts. *Fay.*

whave. To turn while drying, as pottery. *Standard, 1964.*

wheal. Corn. A mine. *Nelson.*

Wheatstone bridge circuit. *See* Wheatstone bridge-type instruments. *Roberts, I, p. 87.*

Wheatstone-bridge-type instruments. These are instruments which make use of electrically heated filaments which burn the methane and measure the heat output by resistance pyrometry. One or more of the filaments form the arms of a Wheatstone bridge circuit, the out-of-balance current being a function of the methane percentage. *Roberts, I, p. 87.*

wheel. Corn. An abbreviation of water wheel, implying a water engine. *Fay.*

wheelabrator. A shotblasting machine of a type used for cleaning castings prior to vitreous enameling. This equipment has also been adapted to the testing of refractory bricks for abrasion resistance. *Dodd.*

wheelbase. a. The distance between the points of contact of the front and back wheels of any vehicle with the rails, or other surface, upon which they travel. *Fay.* b. The distance between the leading and trailing axles of a vehicle. *C.T.D.* c. The distance between the two axles of tubs or mine cars. In British coal mines, mine cars have wheelbases ranging from 2 feet 6 inches to 5 feet compared to the usual wheelbase of 1 foot 6 inches for pit tubs. As a result, considerably larger curves are required in a mine-car circuit, both in the track and in crossings and turnouts, than are common in pit-tub circuits. *See also* mine car; rail gage. *Nelson.*

wheel brae. a. Scot. A self-acting incline; a cousie. *Fay.* b. A flat or landing on the top of an incline. *Fay.*

wheel conveyor. A series of wheels supported in a frame over which objects are moved manually or flow by gravity. *ASA MH4.1–1958.*

wheel ditcher. a. A wheel equipped with digging buckets, carried and controlled by a tractor unit. *Nichols.* b. A machine that digs trenches by rotation of a wheel fitted with toothed buckets. *Nichols.*

wheel dresser. A tool for cleaning, resharpening, and truing the cutting faces of grinding wheels. *Crispin.*

wheeled tractor. A tractor fitted with large rubber-tired wheels which can travel comparatively fast over rough ground. *Ham.*

wheeler. a. Aust. One who drives horses drawing skips to and from working places, and the nearest collecting station. *Fay.* b. *See* pusher. *D.O.T. 1.*

Wheelerian. Lower Pleistocene or upper Pliocene. *A.G.I. Supp.*

wheelerite. A yellowish resin, found in the Cretaceous beds of northern New Mexico, filling the fissures of the lignite, or interstratisfied in thin layers. It is soluble in ether. *Fay.*

wheel excavator. A large-capacity machine for excavating loose deposits, particularly at quarries and opencast coalpits. It consists of a digging wheel, rotating on a horizontal axle, and carrying large buckets on its rim. *Nelson.*

wheelhouse. Brist. A shed for protecting the horse gin or other hoisting apparatus. *Fay.*

wheelman. a. Scot. The man who attends to the wheel or drum at an incline. *Fay.* b. *See* rollerman. *D.O.T. 1.*

wheel ore. An orthorhombic sulfide of lead, copper, and antimony, occurring commonly in wheel-shaped twins; the name bournonite is now more commonly used. *C.T.D.*

wheel pit. A pit in which the lower part of a flywheel runs. *Webster 2d.*

wheelrace. The place in which a water wheel is set. *Webster 3d.*

wheel runner. *See* incline man. *D.O.T. 1.*

wheel scraper. a. A scraper mounted upon an axle supported by a pair of wheels. It affords an easy means of conveying a loaded scraper to a dumping ground. *Fay.* b. *See* bowl scraper. *Ham.*

wheel sleeve. A form of flange used on precision grinding machines where the wheel hole is larger than the machine arbor. *ASM Gloss.*

wheel traverse. The rate of movement of the wheel across the work. *ACSG, 1963.*

wheel tree. Scot. A prop to which the pulley on a short self-acting incline is fastened. *Fay.*

whelp. A refractory brick of the same thickness and breadth as a standard square but of greater length, for example, 12×4½-×3 inches. *Dodd.*

wherk. Eng. A small unexpected turning in the stone, side, or ore, often accompanied by a small joint, Derbyshire. *Arkell.*

wherryite. A mineral, $PbCO_3.2PbSO_4.Pb(Cl,OH)_2.CuO$, pale green, finely granular, optically biaxial, from Mammoth mine, Ariz. *Spencer 19, M.M., 1952.*

whetstone. a. Eng. Inferior coal underlying the Silkstone seam in West Yorkshire. *Tomkeieff, 1954.* b. Natural rock shaped into a sharpening stone. *A.I.M.E., p. 2.* c. Any hard, fine-grained rock of which whetstones are made; honestone. A shaped stone used for giving a smooth edge to cutting tools. *Arkell.*

Whetwell stove. A firebrick hot-blast stove, on the regenerative system. *Fay.*

whewellite. Calcium oxalate, $CaC_2O_4{\cdot}H_2O$. In small colorless monoclinic crystals. From Saxony, with coal. *Fay.*

which-earth. Eng. A whitish earth found at Thame, Waterperry, and Adwell, mixed with straw, and used for sidewalls and ceilings; a natural mixture of lime and sand, flakes in water (like gypsum) without any heat. *Arkell.*

whim. a. A large capstan or vertical drum turned by horsepower or steampower for raising coal, or water, etc., from a mine. Also called whimsey; whim gin; horse gin. *Fay.* b. Drum on which hoisting rope is coiled. Also spelled wem. *Pryor, 3.*

whim driver. A laborer who drives a draft animal at the surface of a mine to supply power to a whim (large drum on which a cable is wound) used to hoist ore, coal, or rock in a shallow shaft. Becoming obsolete. *D.O.T. 1.*

whim gin. *See* whim; horse gear.

whim kibbal. Corn. A bucket or small tub used in connection with a whim for hoisting ore, rock, or water. *Fay.*

whim rope; whim chain. Corn. The rope or chain by which the kibble is attached to the winding engine or whim. *Fay.*

whimsey. Eng. An old word for the hoisting apparatus at a mine, now known as the winding engine; a whim. *Fay.*

whim shaft. A shaft through which coal, ore, water, etc., are raised from a mine by means of a whim. *Zern.*

whin. a. Igneous rock. When parallel to the bedding planes, it is called a whinsill; when cutting across the strata a whin dike. *Nelson.* b. A hard, compact rock. *Gordon.* c. Whinstone or whinrock. In Nova Scotia the miners apply this term to a thick-bedded rock composed of grains of quartz with argillaceous or feldspathic matter which might be called a graywacke. *Fay.* d. Scot; N. of Eng. Any very hard resisting rock encountered by miners. The Scotch name for greenstone. *Fay.* e. A whim or winch. *Webster 2d.* f. *See* dolerite. *B.S. 3618, 1964, sec. 5.*

whin dike. Scot. A dike or wall of igneous rock. *Fay.*

whin float. a. Scot. A horizontal sill or lava flow of igneous rock. *Arkell, p. 44.* b. Scot. A kind of greenstone, basalt, or trap, occurring in coal measures. *Fay.*

whinny. Resembling or abounding in whinstone. *Fay.*

whinsill. Basalt occurring in intrusive sheets, and intercalated in limestone beds of the subcarniferous of northern England. *Standard, 1964.*

whinstone. a. Basaltic rock; trap; also, any of various other dark resistant rocks, as chert. *Webster 3d.* Greenstone. *Fay.* b. A quarryman's term for any dark-colored rock, such as basalt or dolerite, which can be used as road metal. *Stokes and Varnes, 1955.*

whintin. Cumb. Spotted schist. *Compare* calamanco; linsey. *Arkell.*

whip. a. Horse gear once used in hoisting ore in which the load was raised by a rope passing over a pulley and pulled by a draught animal. Modern form occasionally seen has a car or lorry working backward and forward for shallow pitting. *Pryor, 3.* When used with a derrick or gin called whip-and-derry. *Fay.* b. One who operates such a hoisting apparatus. *Standard, 1964.* c. *See* rod slap. *Long.*

whip-and-derry. *See* whip. *Fay.*

whip gin. A gin block for use as a whip, as in hoisting. *Standard, 1964.*

whip out. The enlargement of a portion of a borehole caused by the eccentric rotation and slap of the drill rods. *Long.*

whipper. One who raises coal merchandise, etc., with a whip, as from a ship's hold. *Standard, 1964. Compare* coal-whipper. *Fay.*

whipping. a. The thrashing about of a moving rope, as a hoisting cable in a mine shaft. *See also* surging. *Fay.* b. Hoisting ore, coal, or other material by means of a whip. *Fay.*

whipping hoist. A hoist worked with a whip, especially if by steampower. *Standard, 1964.*

whipstick. N.S.W. Name applied to uranium minerals on the far South Coast. *New South Wales, p. 40.*

whipstock. a. Wedge-shaped device used to deflect and guide the bit away from vertical; procedure of deflecting hole. *Wheeler.* b. *See* deflection wedge. *B.S. 3618, 1963, sec. 3.*

whipstocking. a. Commonly used by petroleum-field drillers to designate the act or process referred to by diamond drillers as deflecting a borehole. *Long.* b. The deflection of an oil well at a predetermined depth by means of wedges. *See also* designed borehole deflection. *Nelson.* c. *See* wedging. *Pryor, 3.*

whipstock point. The point within the borehole at which a deflection or change in course is desired. *Long.*

whirl-balls. Spindle, tubular, ellipsoidal, or spherical balls of fine sandstone embedded in silt with their long axes vertical or steeply inclined; attributed to vortices in mudflows. *Pettijohn.*

whirler. a. A piece of tableware that has warped slightly during drying and/or firing; in consequence, such ware will' whirl' on its foot if spun on a flat surface. *Dodd.* b. A turntable used for checking the symmetry of a model in pottery making, or for the handmaking of a saggar. *See also* saggar. *Dodd.*

whirlering. The plaster molds for bone china hollowware are often revolved on a turntable while they are being filled with slip; this is known as 'whirlering' and the object is to prevent wreathing. *See also* wreathing. *Dodd.*

whirley. Scot. A hutch, hurley, or tub. *Fay.*

whirling hygrometer. a. In mining, a hygrometer used to obtain wet-bulb temperatures. The hygrometer is spun round and round at a speed of about 200 revolutions per minute, for at least 1 minute, and then read as quickly as possible. *McAdam, p. 160.* b. *See* Storrow whirling hygrometer. *Nelson.*

whirling table. Any of various apparatus for producing rapid rotary and usually horizontal motion. *Webster 3d.*

whirlstone. Eng. Usually applied to sandstone (not a freestone) in the Carboniferous Limestone Series of Cumberland. Sometimes applied to a dolomite, limestone, or shale. *Arkell.*

whirl-zone. Transition zone between slump sheet and overlying strata. *Pettijohn.*

whisket. Eng. A shallow, oval, coal bucket. *Fay.*

whistle pipe. Obsolescent form of fixed sample cutter, in which part of vertically falling stream of ore is deflected. *Pryor, 3.*

whistler. *See* squealer. *Fay.*

Whitby jet. Jet from the coal mines of Yorkshire, near Whitby, England. It was considered to be the most desirable quality of jet when jet was in vogue. *Shipley.*

white acid. A mixture of ammonium bifluoride and hydrofluoric acid. Used for etching glass. *CCD 6d, 1961.*

white agate. Same as chalcedony. *Fay.*

white alkali. a. A mixture of salts (as sodium sulfate, magnesium sulfate, and sodium chloride) forming a white crust on some alkali soils. *Webster 3d.* b. Refined soda ash. *Webster 3d.*

white alumina. A recrystallized product produced from a molten bath of 99 percent pure alumina. It is considered to be the most friable of the alumina abrasives. *ACSG, 1963.*

white antimony. The mineral valentinite, Sb_2O_3. *Fay.*

white arsenic. Commercially called arsenic. Arsenic trioxide, As_2O_3; the most important compound of arsenic. Obtained from the roasting of arsenical ores. *C.T.D.*

white-ash coal. Coal leaving a white ash. *Fay.*

white Bengal fire. A very brilliant light produced by means of pure metallic arsenic. *Fay.*

white beryl. A term often incorrectly but popularly applied to transparent stones which are in fact colorless. For example, white quartz is chalcedony and not rock crystal. The latter, being transparent, is colorless. *Shipley.*

white brass. An inferior brass containing more than 49 percent zinc. *Webster 3d.*

white bronze. A light-colored variety of bronze due to increased proportion of tin. *Standard, 1964.*

white carnelian. A term which has been used for white chalcedony with a faint tint of carnelian color or spots or splashes of that color. Also has been used even less accurately for white or milky-white chalcedony. *Shipley.*

white cast iron. Cast iron that gives a white fracture because the carbon is in combined form. *ASM Gloss.*

white cement. Portland cement made from nonferruginous raw materials, that is, chalk (or low-iron limestone) and china clay. The Fe_2O_3 content is <1 percent. *Dodd.*

white clay. *See* kaolin.

White Cliff sandstone. A 2,000-foot thick sandstone named from its outcrop in the Grand Canyon; a dune sand originally, of desert origin and of Jurassic age. Equivalent to the La Plata sandstone of southwest Colorado. *C.T.D.*

white coal. Waterpower: a French designation (houille blanche). *Standard, 1964.*

white cobalt. A name frequently applied to smaltite and cobaltite. *Fay.*

white copper. A white alloy of copper; paktong. Usually German silver. Synonym for domeykite. *Webster 2d; Fay; Hey 2d, 1955.*

white copperas. a. Coquimbite. *Webster 3d.* b. Goslarite. *Webster 3d.*

white copper ore. Synonym for kyrosite. *Hey 2d, 1955.*

white-countered gutta percha. A safety fuse in which the powder is enclosed in a thin tube of gutta percha, which is enveloped in a waterproof textile covering. Abbreviated, W.C.G.P. *Higham, p. 61.*

white damp. Carbon monoxide, CO. A gas that may be present in the afterdamp of a gas- or coal-dust explosion, or in the gases given off by a mine fire; also one of the constituents of the gases produced by blasting. Rarely found in mines under other circumstances. It is an important constituent of illuminating gas, supports combustion, and is very poisonous. *Fay.* Is colorless, odorless, and tasteless. It is absorbed by the hemoglobin of the blood to the exclusion of oxygen. One-tenth of 1 percent may be fatal in 10 minutes. *Hudson.*

white direct on. *See* one-coat ware. *ACSG.*

white earth. York. Bleached fire clay. *Arkell.*

white emerald. Caesium beryl. *Shipley.*

white feldspar. Synonym for albite. *Hey 2d, 1955.*

white flats. Shrop. Small, pale, rough nodules in hard shale. *Arkell.*

white flint. *See* flint glass. *Dodd.*

white flux. White; powder; a mixture of sodium carbonate (Na_2CO_3), sodium nitrate ($NaNO_3$), and sodium nitrate ($NaNO_3$). Used as an oxidizer in metallurgy. *Bennett 2d, 1962.*

white furnace. *See* Howell furnace. *Fay.*

white garnet. A translucent variety of grossularite which sometimes resembles white jade in appearance. *Shipley.*

white glass. *See* opal glass. *C.T.D.*

white gold. Gold alloyed with nickel or palladium to give it a white color. *C.T.D.*

white graniteware. *See* ironstone ware. *ACSG, 1963.*

white ground coat. White or opaque enamels to be applied directly to the steel as a ground coat. *ACSB, 3.*

white gunpowder. A blasting compound formed of potassium chlorate, potassium ferrocyanide, and sugar. *Standard, 1964.*

whiteheart malleable. *See* malleable cast iron. *ASM Gloss.*

white heat. A common division of the color scale, generally given as about 1,540° C (2,804° F). *Bureau of Mines Staff.*

white horse. a. Scot. Intruded white trap in a coal seam. *Fay.* b. A term used by quarrymen to denote a light-colored gneiss, aplite, or pegmatite. *Fay.*

white-hot. Heated to full incandescence so as to emit all the rays of the visible spectrum, in such proportion as to appear dazzling white. *Fay.*

White-Howell furnace. A revolving, cylindrical furnace for calcining calamine. *See also* Oxland-Hocking furnace. *Fay.*

white iron. An extremely hard cast iron, resulting when the casting is chilled in a metallic mold. *Crispin.*

white iron ore. An early name for siderite. *Fay.*

white iron pyrite. *See* marcasite. *Fay.*

white jade. a. White jadeite or nephrite. *Shipley.* b. Misnomer for white, translucent grossularite garnet from California. *Shipley.*

white latten. An alloy of copper, zinc, and tin in thin sheets. *Standard, 1964.*

white lead. Basic lead carbonate or lead hydroxycarbonate. Made by several processes of which the oldest and best known is the Dutch or Stack process. Used extensively as a paint pigment and for pottery glazes. *C.T.D.*

white lead ore. a. The mineral cerussite, $PbCO_3$. *Fay.* b. A decomposition product of sphalerite. *See also* white vitriol. *C.T.D.*

white lead, sublimed. *See* lead sulfate, basic. *CCD 6d, 1961.*

White Lias. The Upper Rhaetic, as opposed to the overlying Blue Lias. *Arkell.*

white limestone. The principal limestone division of the Great Oolite Series. *Arkell.*

white metal. a. A general term covering a group of white-colored metals of relatively low melting points (lead, antimony, bismuth, tin, cadmium, and zinc) and of the alloys based on these metals. *ASM Gloss.* b. A copper matte of about 77 percent copper obtained from the smelting of sulfide copper ores. *ASM Gloss.* c. Usually a tin-base alloy (over 50 percent tin); used for lining bearings and winding rope cappels. *Nelson.* d. N.S.W. Term applied to quartzites and hard sandstones used as roadstones. *New South Wales, p. 60.*

white-metal alloys. A mixture of zinc, tin, and copper, much used for the die casting of automobile hardware. *Crispin.*

white-metal cappel. A cappel in which the end of the winding rope (separated out into a brush) is embedded in a plug of white metal inside a socket. *Nelson.*

white-metal capping. A winding rope capping formed by opening out the wires of the rope for a length equal to that of the socket, cleaning them thoroughly of all grease, cutting out the hemp core, and finally drawing them into the warmed socket and running in the white metal, which is an alloy of lead, antimony, and tin. *Mason, v. 2, p. 462.*

white mica. Muscovite. *Webster 3d.*

white mineral press. A machine for briquetting flue dust. *Fay.*

white moss agate. Agate containing large areas of white inclusions. *Shipley.*

white mundic. Arsenopyrite; mispickel. *Fay.*

whiteness. An expression defining the nearness of approach of a color to a true white; an arbitrary expression defining the value of a weak gray. *Hansen.*

white nickel. Synonym for rammelsbergite; chloanthite. *Fay.*

white nickel ore. Chloanthite. *Fay.*

whitening. Tin-plating. *Standard, 1964.*

white oak. The hardest of American oaks. It is heavy and close-grained, and is used where strength and durability are required. *Crispin.*

white olivine. The mineral fosterite, Mg_2SiO_4. *Fay.*

white opal. A trade term for precious opal with any light body color as distinguished from black opal. *Shipley.*

white ore. Eng. Carbonate of lead; cerussite, Derbyshire. *Arkell.*

white pine. A straight-grained softwood, light in color; used extensively by patternmakers and joiners. *Crispin.*

white portland cement. Essentially the same composition as other portland cement (but more finely ground), being made from pure calcite limestones and white clays which exist in eastern Pennsylvania and in France. *Urquhart, Sec. 7, p. 12.*

white powder. *See* gunpowder, white. *CCD 6d, 1961.*

whiteprint. *See* blueprint. *Hess.*

white pyrite. Same as marcasite. *Standard, 1964.* Synonym for arsenopyrite. *Hey 2d, 1955.*

white rent. Eng. An annual tax of eightpence upon every tinner in Cornwall and Devon, paid to the lord of the soil. *Standard, 1964.*

white rock. Eng. A dolerite of nearly white color associated with coal in Staffordshire and elsewhere. *Fay.*

whitery. S. Staff. White clay in the Coal Measures. *Compare* blacktery. *Arkell.*

white salt. a. Salt dried and calcined; decrepitated salt. *Fay.* b. Salt refined and prepared mainly for household use. Also, vacuum pan salt used for salting skins; a distinction from rock salt. *Kaufmann.*

white sands. Sands which are usually quartzitic, and must be pure enough to resist heat and slags. They are used for the final layer in Siemen's steel furnaces. *Nelson.*

white sapphire. More widely called white corundum; the colorless pure variety of crystallized corundum, Al_2O_3, free from those small amounts of impurities which give color to the varieties ruby and sapphire. *C.M.D.*

white schorl. Albite. *Standard, 1964.*

white septarian band. Eng. A bed of paper shale in the Kimeridge Clay, Dorset. *Arkell.*

white silk stone. Same as satin spar. *Shipley.*

white silver ore. An old name for argentiferous tetrahedrite. *Fay.*

white sponge limestone. Eng. Part of the Inferior Oolite, Dorset. *Arkell.*

white spot. A fault sometimes occurring in pottery colors, for example, in chrome-tin pink and in manganese colors. It is caused by evolution of gas during firing, the glaze subsequently flowing over the crater left by the gas bubble without carrying with it sufficient color to match the surrounding area. *Dodd.*

white spruce. An inexpensive wood largely used for framing, flooring, etc. *Crispin.*

White's test. A method for the detection of free lime, for example, in Portland cement or dolomite refractories. A few milligram of the powdered sample is placed on a glass microscope slide and wetted with a solution of 5 grams of phenol dissolved in 5 milligrams of nitrobenzene with the addition of two drops of water. Microexamination (X 80) will reveal the formation of long birefringent needles if free CaO is present. *Dodd.*

whitestone. a. Aust. An indurated clay band in the Greta seam, thickly strewn with plant impressions. *Fay.* b. A literal translation of the German weisstein, the name of a rock now generally known as granulite, but sometimes called leptinite. *Fay.* c. Usually, a fine-grained rock of whitish appearance. *TIME.*

white tellurium. The mineral sylvanite, $(Au,Ag)Te_2$. *Fay.*

white tin. Metallic tin after smelting, in contradistinction to black tin or cassiterite. *Fay.*

white tombac. A variety of brass made white by the addition of arsenic. *Standard, 1964.*

white top. Applied by miners to masses of light gray shale or silty shale occurring locally between a coalbed and the normal dark-shale roof. They are sometimes unlaminated and occur in the form of roof rolls. The term appears to carry connotations depending upon the particular locality. *A.G.I.*

white topaz. Colorless topaz. *Shipley.*

white trap. a. Scot. An intrusive igneous rock, usually of basic composition, which has been bleached at the contact with coal or other carbonaceous rock. *Arkell.* b. *See* trap. *Arkell.*

white turf. An Irish name for the layer of peat found under "clearing." It is very light when dry, burns quickly, and leaves little or no ash. *Tomkeieff, 1954.*

white ultramarine. A white substance obtained when the ingredients used in the manufacture of artificial ultramarine are heated with access of air. *Standard, 1964.*

white vitriol. The mineral goslarite, $ZnSO_4 \cdot 7H_2O$. Also called salt of vitrol; zinc vitrol. *C.T.D.; Fay.*

whiteware. a. As applied in ceramics, refers to claywares made from clay bodies which fire to a white color. *Enam. Dict.* b. Ware with a white- or ivory-firing body. *ACSG.*

whitewash. a. A white scum of soluble sulfates which accumulates on the surface of a brick or other clay product during or after manufacture. *Fay.* b. A dilute lime hydrate suspension. Synonymous with milk-of-lime. *Boynton.* c. A fault in glass. *See also* scab. *Dodd.*

whiting. A white levigated and washed chalk used as a pigment and for polishing. According to its quality, it is known variously as Spanish white or whiting, and Paris white. *Standard, 1964.*

whiting substitute. A finely ground calcium carbonate, about 98 percent pure, contaminated by magnesia, silica, iron, or alumina, and should not be confused with chalk whiting or precipitated chalk. *BuMines Bull. 630, 1965, p. 886.*

Whiting system. In this system two grooved sheaves are placed in tandem and are coupled together by connecting rods. These sheaves are driven directly from the hoisting engine. One sheave is set at a slight angle with the vertical so that the rope will pass freely from one sheave to the other. The hoisting rope passes around the drive sheaves and then to a takeup sheave that is mounted on a horizontally movable carriage for taking up slack or when hoisting is changed from one level to another. A tail rope is used in this system, although it is not absolutely necessary. *Lewis, pp. 246-247.*

whitlockite. Calcium phosphate, $Ca_3(PO_4)_2$, with small amounts of Mg and Fe, as colorless rhombohedra from North Groton, N.H. *Spencer 16, M.M., 1943.*

Whitney stress diagram. Diagram showing the stress distribution in a reinforced concrete beam in accordance with the theory of ultimate load. *Ham.*

whits; witts. Corn. *See* tin witts. *Fay.*

Whitwell stove. A firebrick, hot-blast stove on the regenerative system. *Fay.*

whizzer mill. *See* Jeffrey crusher. *Pryor, 3.*

whole; whole mine. a. N. of Eng. That portion of a coal seam being worked by driving headings into it only, or the state of the mine before mining the pillars. *Fay.* b. Derb. Any ore that has not been mined. *Fay.*

whole body counter. A device used to identify and to measure the radiation in the body (body burden) of humans and animals. Uses heavy shielding to keep out background radiation, ultrasensitive scintillation detectors, and electronic equipment. *L&L.*

whole circle bearing. A bearing which defines the direction of a survey line by its horizontal angle measured clockwise from true north. *Ham.*

whole coal. Eng. A district of coal entirely intact. *See also* virgin coal. *Fay.*

whole cradle. N. of Eng. A working platform or scaffold of nearly the same diameter as the shaft, and suspended from the surface. *Fay.*

whole diamond. A diamond (as mined), the shape of which has not been modified artificially. *Long.*

whole flat. N. of Eng. A panel or district in which headings have been driven, prior to mining the pillars. *Fay.*

whole place. Eng. A place driven to form the pillars in the first working (bord-and-pillar). *SMRB, Paper No. 61.*

whole stalls. S. Wales. Two or more stalls having their faces in line or on a cleat with one another. *Fay.*

whole stone. Synonym for whole diamond. *Long.*

whole-stone bit. A bit the crown of which is either surface set or impregnated with whole diamonds, as opposed to an impregnated or surface-set bit in which the inset diamonds are fragmented diamonds. *Long.*

whole working. a. Newc. Working where the ground is still whole, that is, has not been penetrated as yet with breasts. Opposed to pillar work, or the extraction of pillars left to support previous work. *See also* whole flat. *Fay.* b. Eng. The operation of the first working of the seam to form it into pillars (bord-and-pillar). *SMRB, Paper No. 61. See also* working the whole.

whorled. Scot. The cage is said to be whorled when it is drawn up to or over the pulleys. *Fay.*

whorler. A potter's wheel. Also called whirler. *Standard, 1964.*

whorls. Scot. Pithead or shaft pulleys. *Fay.*

w hp Abbreviation for water horsepower. *Pit and Quarry, 53rd, sec. E, p. 82.*

whr Abbreviation for watt-hour. *BuMin Style Guide, p. 62; Zimmerman, p. 118.*

Wiancko pressure-measuring system. This pressure-measuring system is used to measure and record water pressure changes of 0.1 inch to 80.0 inches to a depth of 200 feet. The system includes three basic units. The underwater unit consists of a differential pressure gage in a housing which also contains a hydraulic filter to compensate for static pressures and a calibration relay circuit. The differential pressure gage produces an electrical signal which is proportional to the pressure variation by changing the ratio of two inductances. The electronic unit contains two resistances which complete a bridge circuit with the two inductances and produce a direct-current voltage proportional to the pressure variations. The recording unit is a recording milliammeter which serves as the indicating device for the pressure variation. *H&G.*

wich; wych. Celtic for salt spring; often used in England as the termination of names of places where salt is or has been found, as Droitwich, Nantwich, etc. *Fay.*

wichert. Eng. A subsoillike chalk, Haddenham, near Thame. *Arkell.*

wichtisite. A glassy phase of diabase or basalt, named from a Finland locality, Wichtis. *Compare* sordavalite. *Fay.*

wick. To place a soft twisted-cotton string between the rod joints as they are made up or coupled. *Long.*

wicket. a. N. Wales. A kind of pillar-and-stall, or bord-and-pillar, system of working a seam of coal, with pillars up to 15 yards and stalls up to 24 yards wide. Also called wicket work. *Fay.* b. A wall built of refractories to close an opening into a kiln or furnace; it is of a temporary nature, serving as a door, for example, in intermittent or annular kilns. *Dodd.*

wicket conveyor. A conveyor comprising two or more endless chains connected by crossbar and to which vertical rods are attached at spaced intervals. The crossbars are also provided with spaced projections at the level of same to form in effect a continuous carrying surface through which product cannot fall. *ASA MH4.1-1958.*

wicking. The soft twisted-cotton string used to wick drill-rod joints; the act of placing the cotton string on the rod joints. *See also* wick. *Long.*

wide-mouthed socket. A fishing tool similar to a bell-mouth socket, lacking a latch. *Long.*

wide opening. An underground excavation whose width is greater than two or three times its height. *Woodruff, v. 1, p. 62.*

widework. a. Eng. A form of the pillar-and-breast method of excavating coal. *Standard, 1964.* b. Room or chamber driving, as distinguished from entry or gangway driving or narrow work. *Fay.*

widia. Composite, consisting of sintered tungsten carbide cemented together by about 13 percent metallic cobalt; extremely hard and strong; used extensively in tool bits and other machine tools. *Bennett 2d, 1962.*

Widmanstätten structure. A structure characterized by a geometrical pattern resulting from the formation of a new phase along certain crystallographic planes of the parent solid solution. The orientation of the lattice in the new phase is related crystallographically to the orientation of the lattice in the parent phase. The structure was originally observed in meteorites but is readily produced in many other alloys with certain heat treatment. *ASM Gloss.*

widowmaker. *See* rock drill, b. *Fay.*

width. a. The thickness of a lode measured at right angles to the dip. *Fay.* b. S. Afr. In a borehole the width of a reef or lode is indicated by the distance traversed in the reef (borehole width) and the angle at which the reef has been intersected. On surface this angle may not be exactly known and is calculated. Accordingly, there is a corrected width, which is estimated, and a true width which can only be established by actual observation and measuring of the reef at right angles to its dip. It differs from the stoping width in which a certain amount of country rock on both sides of the reef or reef channel has been included. *Beerman.* c. That dimension measured at right angles to the direction of the thickness and length of tile. *ASTM C43-55.*

width of lode. The thickness of ore measured at right angles to the dip. The term true width is often used to describe this value, in which case width is used to denote the thickness passed through irrespective of the angle of dip. *Nelson.*

Wiedgerite. Trade name for a soft bitumen resembling elaterite, but containing much sulfur and water. *Tomkeieff, 1954.*

Wiegner sedimentation tube. Apparatus for particle-size analysis by sedimentation from a suspension in a tube (or cylinder) of relatively large diameter; the rate of sedimentation is indicated by the movement of the meniscus in a narrow side tube, joined to the large tube near the base of the latter and itself containing the dispersing liquid free from solid particles. *Dodd.*

wiggle stick. Synonym for divining rod. *A.G.I.*

wiggle tail. a. A rock-cutting tool or bit used to deflect a borehole that has an articulated pilot part, which also can be attached to a knuckle-jointed device and coupled to the bottom end of a drill string. Also called whipstock. *Long.* b. *See* rock drill. *Fay.* c. Nickname for hand-rotated stoper drill. *Bureau of Mines Staff.*

wightmanite. A mineral, $Mg_9B_2O_{12}.8H_2O$, in colorless, roughly hexagonal prisms; anorthic; from Commercial quarry, Crestmore, Calif. *Hey, M.M., 1964; Fleischer.*

Wilbert vaultmaker. In concrete products industry, one who makes asphalt lined concrete vaults. *D.O.T. 1.*

Wilcoxian. Lower or upper lower Eocene. *A.G.I. Supp.*

Wilcox miner. *See* Crawley-Wilcox miner. *Nelson.*

wildcat. a. A borehole and/or the act of drilling a borehole in an unproved territory where the prospect of finding anything of value is questionable. It is analogous to a prospect in mining. *Long.* b. To act or carry on recklessly or wildly. *Standard, 1964.* c. Originated or characterized by wild, irresponsible speculation; unreliable or unsafe by reason of reckless financiering; as, a wildcat bank. *Standard, 1964.* d. A mining company in which the management raises money, often by exaggerated and misleading statements intending to use the funds so raised for personal profit rather than for the development of the property and without regard to securing an adequate return to the investors. A malign intent is not a necessary characteristic, for the term is now used as follows: Specifically applied to a mining or oil company organized to develop unproven ground far from the actual point of discovery. Any risky venture in mining. *Fay.*

wildcat drilling. The drilling of boreholes in an unproved territory. Also called cold nosing; wildcatting. *Long.*

wildcat hole. A borehole drilled in an unproved territory. *See also* wildcat. *Long.*

wildcatter. a. An individual or corporation devoted to exploration in areas far removed from points where actual minerals or other substances of value are known to occur. Also called cold noser. *See also* wildcat. *Long.* b. One who drills wells in the hope of finding oil in territory not known to be an oilfield. *Webster 3d.* c. One who locates a mining claim far from where ore has been discovered or developed. *Fay.* d. One who organizes or assists in the organization of a wildcat. *Fay.*

wildcat territory. Applied to land which is not proven but is thought to be susceptible of development as petroleum-oil- and natural-gas-producing land. *Ricketts, II.*

wildcatting. a. Drilling wells for oil in territory not yet proven to be oil bearing. *Fay.* b. Locating mining claims outside of well-developed, or known mineral deposits, or far from the actual point of discovery. *Fay.* c. Organizing and exploiting a risky venture. *See also* wildcat. *Fay.* d. Can. Staking claims for quick sale. *Hoffman.* e. *See* wildcat drilling. *Long.*

wildcat well. A hole drilled to explore for oil or gas on a geologic structure or in an environment that has never produced. *A.G.I.*

wildcat work. *See* wildcat drilling. *Long.*

wild coal. a. Brittle slate interstratified with thin coal seams. Also called rashings. The roof of the Pittsburgh seam in western Maryland. *Fay.* b. Used among Scottish miners for inferior coal. *Tomkeieff, 1954.*

wilderness. Forest of Dean. Mottled red and gray grit. *Arkell.*

wildfire. Eng. An old term used by colliers for firedamp. *Fay.*

wild gas. Blast-furnace gas that does not burn steadily or properly. *Fay.*

wild heat (of steel). A heat of molten steel which is boiling violently, and so, if poured, honeycombs the ingot with contained gases. *See also* heat, b. *Webster 2d; Fay.*

wild lead. Zinc blende. *Fay.*

wildness. A condition that exists when molten metal, during cooling, evolves so much gas that it becomes violently agitated, forcibly ejecting metal from the mold or other container. *ASM Gloss.*

wild parrot. Term used by Scottish miners for impure parrot coal. *Tomkeieff, 1954.*

wild rock. Any rock not fit for commercial slate. *Hess.*

wild steel. a. Steel in or made from a wild heat. *See also* wild heat. *Webster 2d.* b. Said of liquid steel, especially rimmed steel, that is producing considerable effervescence. *Henderson.*

wild well. A well flowing while out of control. *Brantly, 2.*

wild work. A kind of bord-and-pillar system of coal mining in which the very narrow pillars left to support the roof are not recovered. *Fay.*

Wiles' process. A method of reducing iron ores in which the electric furnace is fitted with two or more hollow electrodes, through which the finely divided ore intimately mixed with reducing materials is introduced. *Osborne.*

Wilfley slimer. A form of shaking canvas table which is given a vanner motion. *Liddell 2d, p. 389.*

Wilfley table. Long-established and widely used form of shaking table. Plane rectangle is mounted horizontally and can be sloped about its long axis. It is covered with linoleum (occasionally rubber) and has longitudinal riffles dying at discharge end to a smooth cleaning area, triangular in upper corner. Compound eccentric is used to create gentle and rapid throwing motion on table, longitudinally. Sands, usually classified for size range are fed continuously and worked along table with aid of feedwater, and across riffles downslope by gravity tilt adjustment, and added wash water. At discharge end the sands have separated into bands, the heaviest and smallest uppermost, the largest and lightest lowest. *Pryor, 3.* The Dodd, Cammet, Hallett, and Woodbury are similar types. *Liddell 2d, p. 389.*

wilkeite. A rose-red, yellow member of the apatite group containing calcium silicate, sulfate, carbonate, and oxide in addition to phosphate. Hexagonal. Small crystals. From Crestmore, Calif. *English.*

Wilkinite; Wilkonite. Trade name for a colloidal bentonite (jelly rock) used in papermaking. *Spencer 20, M.M., 1955.*

Wilkinson oven. A pottery bottle oven designed so that the hot gases rise through the bag walls and the central wellhole, and descend between the saggers to leave the kiln through flue openings in the floor midway along radii. *Dodd.*

willemite. A natural zinc orthosilicate, Zn_2SiO_4. Troosite is a manganese-bearing variety. Yellow, green, red, brown, white color; luster, vitreous to resinous; sometimes fluoresces in ultraviolet light; Mohs' hardness, 5.5; specific gravity, 3.3. Found in New Jersey, New Mexico; Africa; Greenland. An ore of zinc; a phosphor. *CCD 6d, 1961.*

willen stone. Eng. An oolitic freestone used for cornices and chimney pieces; also, a good paving stone, Halston Northamptonshire. *Arkell.*

Williams' hinged-hammer crusher. A crusher with a rotating central shaft carrying a number of hinged hammers, which fly out from centrifugal force, crushing the feed against the casing. *Liddell 2d, p. 358.*

williamsite. a. An apple-green impure variety of serpentine. *See also* jade. *Sanford.* b. A translucent bright green serpentine, usually containing specks of chromite, used as a semiprecious stone. *Dana 6d, pp. 460, 669.* c. An old misspelling of willemite. *Dana 6d, pp. 460, 669.*

Williamson kiln. A tunnel kiln of the combined direct flame and muffle type for the firing of wall tiles and sewerpipes. This kiln differed from earlier tunnel kilns in that the hot combustion gases passed across, rather than along, the kiln. *Dodd.*

Williams' plastometer. A parallel plate compression apparatus for the testing of rubber; it has since been used quite considerably in the testing of clay. *Dodd.*

Williams' riser. An atmospheric riser. *ASM Gloss.*

Willison coupler. This coupler is provided with a lock retracting into the body of the main casting. The tail bolt is provided with an outer coiled spring or rubber springs to take tension and buffing shocks; inside is a small centering spring which returns the coupler to its central position after deflection on curves. This coupler has wide horizontal and vertical ranges and the unlocking of one coupler releases the other identical mating coupler. It also has a large buffing area and may be arranged to buff without coupling by means of a pin or by the operating arm being clipped back into a small ratchet. The coupling is designed for a drawbar pull of 10 tons with a factor of safety of eight, but pulls of 12½ tons can be catered for by a heavier type of spring drawgear. *Sinclair, V., pp. 278-279.*

will-o'-the wisp. Another name for methane. *Cooper, p. 190.*

willow blue. Cobalt blue diluted with white ingredients such as ground silica; a quoted recipe is 40 percent cobalt oxide, 40 percent feldspar, and 20 percent flint. *Dodd.*

willow pattern. In pottery, a design used in decorating willowware. *Webster 3d.*

Wilmot jig. A basket-type jig, the basket being suspended in a tank of water. The pulsations are effected by moving this basket upward and downward by means of eccentrics. Has been used extensively in the preparation of anthracite of all sizes and to a lesser extent of bituminous coal. *Mitchell, p. 428.*

Wilputte oven. A byproduct coke oven having two outer zones in the heating system and one double inner zone. In this oven, the gas is alternately burned upwards in the two outer zones with the products of combustion being carried down through the double inner zone and, on reversal, burned upwards in the double inner zone with the products of combustion being carried down through the two outer zones. *Camp, 6th ed., 1951, p. 210.* Known as a double-divided oven.

Wilson elevator. A type of elevator extensively used in the southern part of Africa. *See also* elevator. *Long.*

wilsonite. A rhyoandesite tuff containing frgaments of pumice and andesite in a matrix consisting of shreds of glass in a granular isotropic base. The rock has also been interpreted as a brecciated rhyolite flow, but the evidence appears to be against this view. *Holmes, 1928.*

Wilson producer. A furnace used for the manufacture of producer gas. *Fay.*

wilting coefficient (of soils). The ratio of (1) the weight of water in the soil at the moment when (with gradual reduction in the supply of soil water) the leaves of the plants growing in the soil first undergo a permanent reduction in their water content as the result of a deficiency in the supply of soil water to (2) the weight of the soil when dry. The ratio is expressed as a percentage. *A.G.I.*

Wilton stopper. Automatic arrangement which arrests mine car when it runs away downslope. The car displaces a pendulum beyond its nonactivating limit of swing and a pivoted rail then falls between the rail tracks below. *Pryor, 3.*

wiluite. a. A variety of vesuvianite. *Fay.* b. A green aluminum garnet. *Standard, 1964.*

wimble. Eng.; Scot. A hollow instrument for cleaning a hole in boring; a kind of shell auger. Some varieties of wimble, suitable for boring into soft clay, are called wimble scoops. Also spelled wammel; whimble; wumble. *Fay.*

wimble scoop. *See* wimble. *Fay.*

win. a. To extract ore or coal. To mine, to develop, to prepare for mining. *Fay.* b. To recover, (as metal) from ore. *Webster 3d.*

winch. a. A small hand- or power-operated drum haulage for light duties on the surface or underground in mines; a heavy-duty power winch fitted to the rear of a tractor. *See also* Pickrose hoist. *Nelson.* b. A synonym for hoist. Formerly, a manpower hoisting machine, consisting of a horizontal drum with crank handles. *Long.* c. A drum that can be rotated so as to exert a strong pull while winding in a line. *Nichols.*

winch, air-operated. A small compressed-air drum haulage or hoist, used for lifting, dragging, or skidding work in mines. With capacities ranging from 660 to 4,400 pounds, these winches have powerful piston motors and are capable of continuous operation. They are easy to move from job to job; used for shaft sinking and for moving wagon drills at quarry and opencast operations, etc. *See also* spotting hoist. *Nelson.*

winchellite. Same as lintonite. *English.*

Winchester. A straight-sided glass bottle of the type used for transporting laboratory liquids; the two British Standard Winchesters have volumes of 80 and 90 fluid ounces respectively, that is, approximately 2¼ and 2½ liters. *Dodd.*

Winchester cutting. A method of splay-cutting roofing tiles for the top course in the vertical tiling of exterior walls, so that the final course of tiles is perpendicular to the overhanging verge. *Dodd.*

winch, hand-operated. A small drum haulage or hoist, used underground and on the surface. A gear train is interposed between the handle and the drum. The handle is turned several revolutions to one of the drum. Two handles may be fitted and also a pawl and ratchet to prevent the load running back should the pressure on the handle be reduced. *See also* monkey winch. *Nelson.*

winchman, dredge. In metal mining, one who operates a power-driven winch on a gold dredge to move it from one working position to another during dredging operations, winding up the cables wihch are anchored at points in advance of the dredge. *D.O.T. 1.*

winch operator. *See* hoist operator. *D.O.T.1.*

wind. a. To hoist. *Long.* b. To spool rope or cable on the drum of a hoist. *Long.* c. Eng. A hand windlass or jackroll. *Fay.* d. To raise coal, etc., by means of a winding-engine. *Fay.* e. A steam engine used purposely for lowering and raising men in an engine pit or pumping shaft. *Fay.* f. A single journey of a cage from top to bottom of a shaft or vice versa. *Fay.* g. Air; air current. *Mason.* h. Compressed air. *Mason.*

wind abrasion. The process which wind-driven particles abrade each other and the exposed surfaces of any kind. *Stokes and Varnes, 1955.*

wind beam. A beam incorporated into a structure for the sole purpose of resisting wind pressure. *See also* counterbracing. *Ham.*

wind blast. a. Aust. A quantity of air driven out of mine workings with considerable force by a fall of roof. *Fay.* b. A blown-out or "windy" shot. *Fay.*

windblown coal. Staff. Miners' term for weathered coal. *Tomkeieff, 1954.*

windbore. Newc. The suction pipe at the bottom of a set of pumps. *See also* snorepiece; snorehole; strainer. *Fay.*

wind box. The compartment in the bottom of the converter that receives the blast and delivers it to the tuyeres. *Mersereau, 4th, p. 408.*

wind-deposition coast. A coast consisting of eolian material. *Schieferdecker.*

wind drift. Drift motion of the water caused by the stress exerted by the wind on the sea surface. *Hy.*

wind-driven current. The ocean current which develops as a result of the changes in density distribution caused by the wind drift. *Hy.*

winded. Coal that is more difficult to work because of the escape of gases before the pillars are worked off. *Mason, v. 1, pp. 103, 105.*

winder. a. An electrically driven winding engine for hoisting a cage or cages up a vertical mine shaft. *C.T.D.* b. *See* winding cage. *Nelson.* c. *See* card tender. *D.O.T. 1.*

winder brake. An appliance or equipment. capable of retarding or stopping the cages in a shaft in an emergency. The advent of modern dynamic braking and speed stabilization schemes have enabled an accuracy and smoothness of control which previously had been obtained only with Ward-Leonard control at considerable expense. *See also* brake; semi-automatic control. *Nelson.*

windfall. Can. Brûlee. *Hoffman.*

wind furnace. Any form of furnace using the natural draft of a chimney without the aid of a bellows or blower. *Fay.*

wind gage. An anemometer for testing the velocity of the air in mines. *Fay.*

wind gap. a. The low depression or notch in a ridge where a stream formerly flowed, and that is utilized for highways in crossing the ridge. *A.G.I.* b. Sometimes a river that has been cutting a water gap is diverted by capture while the general lowering of the land surface is in progress. The abandoned gorge remains as a notch in the crest of a ridge, and is termed an air gap or wind gap. *A.G.I.*

wind hatch. In mining, an excavation or opening for removing ore. *Standard, 1964.*

windhole. Eng. A shaft or other opening for ventilation. *Fay.*

winding. The operation of hoisting coal, ore, men, or materials in a shaft. The conventional system is to employ two cages actuated by a drum type of winding engine with steel ropes attached at either end of the drum, one over and the other under it, so that as one cage ascends the other descends and they arrive at pit top and bottom simultaneously. *See also* automatic cyclic winding; Koepe winder; winding cycle; winding rope. *Nelson.*

winding apparatus. The machinery and equipment for lowering and raising loads through the shaft or staple shaft. *Nelson.*

winding bar. The appliance on drop bottom ore or coal cars by which the doors are closed and held tight. *Fay.*

winding cycle In general, a cycle refers to any series of changes or operations performed by or on a system, which brings it back to its original state. In winding, the term usually refers to a complete wind, which comprises three phases: (1) acceleration to full speed; (2) period of full-speed running; and (3) retardation to rest. The time of the winding cycle is the sum of the winding time and the decking time in seconds. The time for changing mine cars is from 10 to 12 seconds for each deck of the cage, unless provision is made for simultaneous decking. The time required for filling and emptying skips is much lower. *See also* winding speed. *Nelson.*

winding drum; winding engine; winding rope. For haulage to surface through a mine shaft, the surface gear includes a winding drum of cylindrical or clindroconical form on which the winding rope (hoisting rope) is coiled as the cage, or skip or kibble, is raised, and from which it is paid off as the return journey is made. Two such receptacles are usually worked simultaneously in balanced hoisting—one rising as the other descends, from a compound drum. This last is driven by the winding engine. *Pryor, 3. See also* bicylindroconical drum; conical drum; Koepe sheave; parallel drum. ***Nelson.***

winding engine. a. The steam or electric engine at the top of a shaft which rotates the winding drum and thus hoists and lowers the cage or skip by means of a winding rope. In metal mining, the winding engine is usually called a hoist. Also called winder. *Nelson.* b. *See* winding drum. *Pryor, 3.*

winding engineman. The skilled man in charge of the steam or electric winding engine at a mine. *Nelson.* Also called hoistman.

winding guides; shaft guides. The purpose of winding guides is to permit winding to proceed safely at relatively high speeds by preventing collisions between the cages and between the cages and side of, or fittings in, the shaft. They must be rigid enough to prevent material deviation of the cages or skips from the vertical; strong, since a broken guide causes danger from damage; smooth, so as to offer as little resistance to the movement of the cages as possible; and firmly supported and maintained vertical. They may be of two types, rigid or flexible. The former may be of timber, and in new shafts have generally been replaced by steel channels, steel rails or angles; the latter are steel ropes of round or semi-locked section steel rods. Rigid guides are adopted in shafts of rectangular cross section and these and the shaft sides and fittings are small. Rope guides are used in circular and elliptical shafts where adequate clearances can be provided. Rope guides maintain the vertical automatically, and expand and contract with temperature variation without complication. *Sinclair, V., pp. 46-47.*

winding pulley. *See* winding sheave. *Nelson.*

winding rope. a. The rope which carries a cage, skip, or hoppit in a shaft. With the exception of locked coil ropes, a wire winding rope consists of a number of steel strands usually grouped together around a core of manila or fiber. The wires are twisted together symmetrically according to a definite geometrical pattern. All multi-strand ropes are layed up. The lay of a rope is the pitch of the strands and such a rope may take two forms. In a lang lay rope, the wires in the strands and the strands in the rope are twisted in the same direction, while in the regular or ordinary lay rope, the strands are twisted in the opposite direction to the wires in the strand. In general, the lang lay type of rope is favored. *See also* hoisting rope; scales lay; wire rope; wire-rope tests. *Nelson.* b. *See* winding drum. *Pryor, 3.*

winding sheave; winding pulley. A grooved pulley wheel, mounted on plummer blocks, at the top of the headgear. The winding rope passes from the cage or skip around the sheave and on to the winding drum. For normal loads, the sheave rim and boss are made of cast-iron and the spokes of round, mild steel. Winding sheaves range up to about 24 feet in diameter. Sheaves up to 8 feet in diameter are usually made whole, but above this size they are built in halves and bolted together. To give efficient service, the sheave diameter should be at least 96 times the winding rope diameter. *See also* Koepe sheave. *Nelson.*

winding speed. The velocity at which a winding engine lifts a cage or skip in a shaft. Winding speeds have reached up to 6,000 feet per minute for deep mines. The normal maximum speeds for deep shafts are 3,500 to 4,000 feet per minute and for geared winders a common maximum is between 1,500 to 3,000 feet per minute. The present tendency is towards heavier loads and lower winding speeds as these result in better winding efficiencies. Lower speeds are employed when winding men as opposed to winding coal or mineral. *See also* winding. *Nelson.*

windlass. a. A device used for hoisting, limited to small-scale development work and prospecting because of its small capacity. *Lewis, p. 239.* b. A drum, or usually a section of tree trunk set horizontally on rough bearings above shallow pit or shaft, and provided with handles at each end for manual rotation. Used to raise or lower buckets of spoil in exploratory pitting. *Pryor, 3.* c. Commonly used in England, Africa, and Australia to designate a hoist or winch. *Long.* d. A horizontal drum for winding, or for hoisting by winding; properly, one operated by radial arms, removable bars, or a pawl-and-ratchet mechanism; loosely, any form of horizontal hoisting drum, especially that form of winch familiar in well curbs, consisting of a drum and cranks. *Standard, 1964.*

windless. Derb. A place in the mine where the air is bad or short. Also called airless. *Fay.*

wind method. A system of separating coal into various sizes, and extracting waste from it, which in principle depends on the specific gravity or size of the coal and the strength of the current of air. *Fay.*

windmill anemometer. An anemometer in which a windmill is driven by the air stream, and its rotation transmitted through gearing to dials or other recording mechanism. In some instruments the rotating vanes and dials are in the same plane, that is, both vertical, while in others the dial is horizontal. In the windmill type, the operation of air measurement involves readings of the dials at the beginning and end of a measured period, and a watch or clock is required. Windmill instruments may be fitted with an extension handle providing a form of remote control, and used to measure the air speed in an otherwise inaccessible spot. *Mason, v. 1, pp. 224-225.*

window. a. A circular or an ellipsoidal erosional break in an overthrust sheet whereby the rocks beneath the overthrust are exposed. Synonym for fenster. *A.G.I.* b. Sometimes erroneously used for an inlier. *A.G.I.* c. In speleology, a natural opening above the floor of a passage or a room, giving access to an adjoining cavity or the surface; larger and less symmetrical than a porthole. *A.G.I.* d. The opening of a natural bridge. *A.G.I.* e. In flotation process the clear space sometimes formed on top of large mineral-loaded froth bubbles. *Pryor, 3.*

window glass. *See* sheet glass, a. *ASTM C162-66.*

window pipe. A dredge discharge pipe with one or more openings in the bottom. *Nichols.*

window-type sample. Synonym for door-type sampler. *Long.*

wind polish. The high gloss or luster developed on a rock in desert areas as a result of abrasion by and blown against it. *A.G.I.*

wind pressure. The pressure on a structure due to wind, which increases with wind velocity approximately in accordance with the formula $p = 0.003_{v}{}^{2}$, where p is the pressure in pounds per square feet of area affected, v is the wind velocity in miles per hour. *Ham.*

wind ridge. A type of ridge tile. *See also* ridge tile. *Dodd.*

windrift dune. Sand dunes formed in area of deep sand with a shrub cover and strong winds of constant direction. They may be a mile or more in length with a width of a few hundred feet. Best developed forms have more or less parallel wings. Usually found along shores; few, if any, are found in the interior of the United States. *J. Geol., v. 48, No. 2, Feb.-Mar., 1940, p. 129.*

wind road. a. Eng. An air passage for mine ventilation. *Fay.* b. Underground ventilation road. *Pryor 3.* c. *See* airway. *B.S. 3618, 1963, sec. 2.*

wind rose. A diagram which shows the proportion of winds blowing from each of the main points of the compass at a given locality, recorded over a long period. The prevailing wind with its average strength is thereby revealed at a glance. *Ham.*

windrow. a. A row of peats or sod set up to dry, or cut in paring and burning. *Standard, 1964.* b. A ridge of soil pushed up by a grader or bulldozer. *See also* travel mixer. *Ham.*

windrow ridges. A variety of ripple mark consisting of straight, tapered ridges parallel to current. *Pettijohn.*

winds. A variation of winze. *Fay.*

wind sail. The top part of canvas piping, which is used for conveying air down shallow shafts. *Zern.*

wind-scoured basins. Basins maintained or developed by deflation of the finer rock waste. *Stokes and Varnes, 1955.*

windsorite. A leucocratic, aplitic variety of quartz monzonite, containing a small percentage of biotite. *Holmes, 1928.*

windup. The amount of twist occurring in a string of drill rods when the string is rotated during drilling. There can be as many as several complete revolutions of the rod at the collar before the bottom member of the string begins to rotate. Also called wrap-up. *Long.*

windway. S. Staff. An airway leading from one road to another. *Fay.*

windy shot. A blast in coal mines which, due to improperly placed charges, wrong kind or quantity of explosives, or insufficient stemming expends most of its force on the mine air, and sometimes ignites a gas mixture, coal dust or both, thus causing a secondary explosion which may or may not spread throughout the mine. A shot which blows out without disturbing the coal. A shot that is not properly directed or loaded. A blown-out shot. *Fay.*

wing. a. Scot. The point plate of a tram crossing. *Fay.* b. A cutting chisel edge on a percussive bit, which extends from the center to the outside periphery. *Long.* c. One of the cutting edges on a finger or drag bit. *Compare* finger. *Long.* d. A side or limb on an anticline. *Long.* e. A projection on an air drill bit. *Nichols.*

wing belt tripper. A belt conveyor tripper having auxiliary conveyors extending laterally to one or both sides to provide wider distribution of bulk material being discharged. *ASA MH4.1-1958.*

wing bore. Scot. A side or flank borehole in a working place approaching old workings. *Fay.*

wing dam. *See* pierdam. *Schieferdecker.*

winged headland. A promontory having two spits extending in opposite directions. *Schieferdecker.*

winged pillars. Scot. Pillars of coal that have been reduced in size. *Fay.*

wings. a. The sides, or limbs, of an anticline. *See also* legs. *Fay.* b. Same as rests; keeps; chairs; dogs. *Fay.* c. *See* catch. *Pryor, 3.*

wingwall. A wall that guides a stream into a bridge opening or a culvert barrel. *Nichols.*

Winkelmann and Schott equation. An equation for assessing the thermal endurance (F) of glassware on the basis of the tensile strength (P), modulus of elasticity (E), coefficient of linear thermal expansion (oc), thermal conductivity (K), specific heat (C), and specific gravity (S):

$$F = \frac{P}{oc\,E}\sqrt{\frac{K}{SC}}$$

See also thermal expansion factors for glass. *Dodd.*

Winkler system. A fluidized gasification of coal process widely practiced in Germany on lignites of particle size 0 to 8 millimeters. The fuel bed is fluidized in a brick-lined cylinder 60 feet high and 16½ feet in diameter by an air/steam flow at 5,000 cubic feet per hour. The temperature in the reaction zone varies from 800° to 1,100° C. The finely divided fuel is fed into a grate near the base of the cylinder by a screw feed, and the ash is removed from the grate by a plough. Entrained dirt in the gas is removed by cyclones and is burned in boilers to provide steam. *Francis, 1965, v. 2, p. 391.*

winklestones. Eng. Pyrites nodules, particularly of warty, elongate shape, Sussex. *Arkell.*

winning. a. The excavation, loading, and removal of coal or ore from the ground; winning follows development. *Nelson.* b. The operation of (1) mining an ore, and (2) opening up a new portion of a coal seam. *C.T.D.* c. A new mine opening. *Fay.* d. The portion of a coalfield laid out for working. *Fay.* e. Mining. *Fay.* f. Scot. A pit (mine) and its associated equipment and machinery. *Fay.* g. Eng. *See* heading. *SMRB, Paper No. 61.* h. The combined process of getting (that is, excavating) and transporting a raw material such as clay to a brickworks or stockpile. *Dodd.*

winning bord. Aust. A room from which coal is being mined. *Fay.*

winning headings. The development headings off which oblique headings and conveyor panels are formed and worked (longwall) or the development drivages in the solid coal, about 15 yards apart, and off which bords and pillars are formed (pillar methods of working). *Nelson.*

winning headway. a. Newc. A headway driven to explore and open out the coal seam. *Fay.* b. N. of Eng. A crossheading, or one driven at right angles to the main gangway. *Fay.*

wining-off. Aust. A leading heading or drive in advance from which rooms, or bords, are opened. Any leading drift is termed a "winning." *Fay.*

winning pillars. Aust. Extracting coal pillars. *Fay.*

winnowing gold. Air blowing. Tossing up dry powdered auriferous material in air, and caching the heavier particles not blown away. *Fay.*

Winooski marble. A siliceous dolomite of a mottled chocolate, red, pink, yellow, and white color, and used as a marble for tiling and wainscoting; from Mallett's Bay, on Lake Champlain. *Fay.*

win out. Scot. To widen out, as where longwall working is being commenced. *Fay.*

winter dumps. A term used in Alaska for gold-bearing gravel mined during the winter and stored on the surface for sluicing in the spring and summer. *Fay.*

winter oil. A heavy railway-car and engine oil which has a solidifying point of below −20° F. *Fay.*

winter road. Can. Stumped right-of-way cut in heart of bush between waterways, passage for vehicles only over high snows of winter. *Hoffman.*

winze. a. A vertical or inclined opening, or excavation, connecting two levels in a mine, differing from a raise only in construction. A winze is sunk underhand and a raise is put up overhand. When the connection is completed, and one is standing at the top, the opening is referred to as a winze, and when at the bottom, as a raise, or rise. *Compare* underground shaft. *Fay.* b. A subsidiary shaft which starts underground. It is usually a connection between two levels, and is sunk in the ore body. *Higham, p. 34.* c. Can. Interior mine shaft. *Hoffman.*

winze driller. In metal mining, one who operates an unmounted, compressed-air, percussion-type rock drill in sinking winzes (passageways) from the surface to lower levels of the mine, or from one level to another. *D.O.T. 1.*

winze hoistman. In metal mining, one who operates an electric or compressed-air hoist to raise and lower men, ore, rock, and supplies in a winze (small underground shaft or incline connecting two or more underground levels). Also called winze hoist operator. *D.O.T. 1.*

winze hoist operator. *See* winze hoistman. *D.O.T. 1.*

winzes. S. Afr. Connections between levels made downwards. *Beerman.*

wiped joint. a. A joint wherein filler metal is applied in liquid form and distributed by mechanical action. *ASM Gloss.* b. A lead joint in which the molten solder is poured upon the joint, after scraping and fitting the parts together, and the joint is wiped up by hand with a cloth pad while the metal is plastic. *Strock, 10.*

wiper. a. A rod on which is held a piece of cotton waste or other absorbent material and used for drying a drill hole before charging with black powder. *Fay.* b. A form of cam. *Fay.*

wiper forming. A method of curving sections and tubing to a form block which is rotated relative to the wiper block, shoe, or roll. *ASM Gloss.*

wiping effect. Activation of a metal surface by mechanically rubbing or wiping to enhance the formation of conversion coatings, such as phosphate coatings. *ASM Gloss.*

wiping solder. *See* plumber's wiping solder. *Hess.*

wire. a. A continuous length of metal drawn from a rod. *Ham.* b. War. A haulage rope. *Fay.*

wirebar. A cast shape, particularly of tough pitch copper, which has a cross section approximately square with tapered ends, designed for hot rolling to rod for subsequent drawing into wire. *ASM Gloss.*

wire brush. A hand brush fitted with wire or thin strips of steel instead of bristles. Used for removing rust, dirt, or foreign matter from a surface. *Crispin.*

wire cable. *See* cable, c. *Long.*

wire cloth. Screen composed of wire or rod woven or crimped into a square or rectangular pattern. *Nichols.*

wire cut brick. Brick cut by wire from a column of clay extruded by an auger machine and not repressed. *A.R.I.*

wire-cut process. In the United Kingdom, the shaping of bricks by extruding a column of clay through a die, the column being subsequently cut to the size of bricks by means of taut wires. The equivalent term in the United States for this process is known as the stiff-mud process. *Dodd.*

wired glass. A form of sheet glass produced by rolling wire mesh into the ribbon of glass so that it acts as a reinforcement and holds the fragments together in the event of the sheet being fractured. *C.T.D.*

wire drag. A buoyed wire towed at a given depth to determine whether any isolated rocks, small shoals, etc., extend above that depth, or for determining the least depth of an area. *H&G.*

wiredrawing. a. Reducing the cross section of wire by pulling it through a die. *See also* Taylor process. *ASM Gloss.* b. The operation, accidental or otherwise, of reducing the pressure of steam between the boiler and the cylinder. *Fay.*

wire gage. a. A gage for measuring the diameter of wire or thickness of sheet metal. *Fay.* b. A standard series of sizes arbitrarily indicated by numbers, to which the diameter of wire or the thickness of sheet metal is usually made, and which is used in describing the size or thickness. *Fay.* c. A notched plate having a series of gaged slots, numbered according to the sizes of the wire and sheet metal manufactured; used for measuring the diameter of wire. Most widely used in the United States is the U.S. Standard Steel Wire Gage, which name has official sanction, without legal effect. The Birmingham gage is recognized in acts of Congress for tariff purposes. American Gage or Browne and Sharpe's gage are used for copper wires and all nonferric metal wires. *Crispin.*

wire gauze. A gauzelike texture of fine wire, as that used for the chimneys of flame safety lamps. *Fay.*

wire glass. Flat glass with embedded wire. *See also* safety glass. *ASTM C162-66.*

wire hanger. a. The hanger from which wire or cable is suspended. *Bureau of Mines Staff.* b. *See* wireman. *D.O.T. 1.*

wire-hanger helper. *See* wireman helper. *D.O.T. 1.*

wire line. As used in a general sense, any cable or rope made of steel wires twisted together to form the strands. Specifically, a steel wire rope five-sixteenths of an inch or less in diameter. *See also* cable, e; sandline. *Long.*

wire-line barrel. Synonym for wire-line core barrel. *Long.*

wire-line cable. A 3/16- or 1/4-inch wire rope used to handle the inner tube of a wire-line core barrel. *See also* cable, e. *Long.*

wire-line core barrel. Double-tube, swivel-type core barrels the outside diameters of which are of sizes made to be used in various sizes of diamond- and rotary-drill boreholes, and designed so that the inner-tube assembly is retractable. At the end of the core run, the drill string is broken at the top joint so that an overshot latching device can be lowered on a cable through the drill-rod string. When it reaches the core barrel, the overshot latches onto the retractable inner-tube assembly, which is locked in the core barrel during the core run. The upward pull of the overshot releases the inner tube and permits it to be hoisted to the surface through the drill rods; it is then emptied and serviced and dropped or pumped back into the hole, where it relocks itself in the core barrel at the bottom. *Long.*

wire-line coring. The act or process of core drilling with a wire-line core barrel. *See also* wire-line core barrel. *Long.*

wire-line dredging. In this method, digging tools or buckets are suspended on a steel cable and lowered to the sediment surface where they are loaded and retrieved. Includes the use of drag-bucket and clamshell dredges, and generally to a depth of not more than 500 feet below sea level. *Mero, pp. 243, 245.*

wire-line drilling. The drilling of boreholes with wire-line core-barrel drill-string equipment. *Long.*

wire-line drill rod. Drill rods having couplings that are nearly flush on the inside and designed so that the inner tube of a wire-line core barrel and overshot assembly can be run inside the rods. *Long.*

wire-line drill-rod coupling. A rod coupling designed for use on wire-line drill rods. *See also* wire-line drill rod; wire-line core barrel. *Long.*

wire-line drum. A winding drum or hoist on which the wire line is wound when handling the inner tube and overshot assemblies of a wire-line core barrel. *Long.*

wire-line hoist. *See* wire-line drum. *Long.*

wire-line socket. The socket connecting the wire line to a wire-line core barrel overshot assembly. *Long.*

wireman. In mining, one who installs and repairs underground power, light, and trolley lines, making extensions into new working places as openings advance. Also called lineman; mine wireman; wire hanger. *D.O.T. 1.*

wireman helper. In mining, one who assists wireman in installing and repairing underground power, light, telephone, and trolley lines. Also called wire-hanger helper. *D.O.T. 1.*

wire-mesh conveyor belt. A woven wire conveyor belt composed of various combinations of flattened-helical coils of wire which may (or may not) be joined by straight or crimped members. *ASA MH4.1-1958.*

wire-mesh reinforcement. Expanded metal, wire or welded fabric used as reinforcement for concrete or mortar. *See also* mesh. *Ham.*

wire pack. A circular pack, consisting of waste stone, built within woven fencing fixed to light props. The pack is still effective support after the props have failed. Wire packs are used for small openings in the Rand mines. *Nelson.*

wire rod. Hot-rolled coiled stock that is to be cold-drawn into wire. *ASM Gloss.*

wire rope. a. A rope made of twisted strands of wire. *See also* cable, e. *Long.* b. A steel wire rope used for winding in shafts and underground haulages. Wire ropes are made from medium carbon steels. *See also* flattened-strand rope; locked-coil rope; multiple-strand rope; winding rope. *Nelson.* c. Various constructions of wire rope are designated by the number of strands in the rope and the number of wires in each strand. The following are some common terms encountered: airplane strand; cable-laid rope; crane rope; elevator rope; extra-flexible hoisting rope; flat rope; flattened-strand rope; guy rope; guy strand; hand rope; haulage rope; hawser; hoisting rope; lang lay rope; lay; left lay rope; left twist; nonspinning rope; regular lay; reverse-laid rope; rheostat rope; right lay; right twist; running rope; special flexible hoisting rope; standing rope; towing hawser; transmission rope. *H&G.*

wire-roper anchor. A device for tieing off and securing the tension in the wire ropes of a wire-rope side-framed intermediate section. *NEMA MB1-1961.*

wire-rope side-framed intermediate section. An intermediate section consisting of interchangeable increments or parts in which the carrying idlers are supported by one or more steel wire ropes. Return idlers may or may not be supported from the ropes. *NEMA MB1-1961.*

wire-rope spreader. That part of a wire-rope side-framed intermediate section which maintains a horizontal plane a fixed distance between wire ropes but does not support the wire ropes. *NEMA MB1-1961.*

wire-rope support. That part of the wire-rope side-framed intermediate section which positions the wire rope or ropes with respect to the roof or floor. It may or may not have provisions for mounting a return idler. *NEMA MB1-1961.*

wire-rope tests. To insure that new ropes for use in mines comply with the appropriate British Standards, it is recommended that a percentage (10 to 20 percent) of all new haulage ropes should be tested. The tests are carried out on rope samples taken either when the ropes are delivered or when put into service. The former practice is preferred. The three main tests are tensile, torsion, and reverse-bend, which are covered by British Standard 236 and 330. *Nelson.*

wire ropeway. A ropeway using a wire cable or cables. Used for conveying ore and supplies in rough mountainous districts; a wire tramway. *See also* aerial tramway. *Fay.*

wire safety glass. A single piece of glass with a layer of meshed wire completely embedded in the glass, but not necessarily in the center of the sheet. When the glass is broken, the wire mesh holds the pieces together to a considerable extent. *See also* safety glass. *ASTM C162-66.*

wire saw. A saw consisting of one- and three-strand wire cables, up to 16,000 feet long, running over pulleys as a belt. When fed by a slurry of sand and water, and held against rock by tension, it cuts by abrasion. It cuts a narrow, uniform channel. This saw is used for cutting out granite, slate, marble, limestone, or sandstone blocks. *BuMines Bull. 630, 1965, p. 878.*

wire-saw operator. *See* wire sawyer. *D.O.T. 1.*

wire sawyer. In a stonework industry, one who operates a wire saw to cut very large blocks of granite, limestone, marble, slate, or sandstone into smaller blocks that can be handled on gang or circular saws. Also called wire saw operator. *D.O.T. 1.*

wire setter. One who tends electrically powered unwinding machine that supplies wire netting to be embedded in sheet glass. *D.O.T. Supp.*

wire silver. Native metal in the form of wires or threads. *A.G.I.*

wire strand. Several steel wires twisted together to form one strand of a wire rope or cable. *Long.*

wire-strand core. A core in which the number of wires shall not be less than the number of wires in a main strand of the wire rope and the individual wires shall be of an appropriate grade of steel in accordance with the best practice and design, either bright (uncoated), galvanized, or drawn galvanized wire. *ASA M11.1, 1960, p. 8.*

wire tender. One who inspects, tightens, and replaces the clay cutting wires of brick cutting machines. *D.O.T. 1.*

wire texture. A texture showing wirelike forms of native metals; often the core is granular and the outer zone is rindlike. *Schieferdecker.*

wire tramway. *See* aerial tramway. *Fay.*

wiring. Formation of a curl along the edge of a shell, tube, or sheet and insertion of a rod or wire within the curl for stiffening the edge. *ASM Gloss.*

wiry; filiform. A mineral occurring as thin wires, often twisted like the strands of a rope, for example, native copper. *Nelson.*

wischnewite. A pale blue sulfatic cancrinite, $3Na_2Al_2Si_2O_8.Na_2SO_4.3H_2O$, in which nearly all of its CO_2 is replaced by SO_3. Hexagonal (?). From Wischnewye Gory, southern Ural, U.S.S.R. Synonym for vishnevite. *English.*

Wisconsin. Fourth Pleistocene glaciation. *A.G.I. Supp.*

wisket; whisket. Lanc. A light basket weighing about 25 pounds, used for carrying coal, etc., up a shaft. *Fay.*

wisps. Whitish wisplike fractures resembling thin windblown clouds. Occur in some synthetic emerald but never in the genuine. *Shipley.*

witchet. N. Wales. *See* wicket. *Fay.*

withamite. A red to yellow variety of epidote, having a small quantity of manganese. *Standard, 1964.*

withdraw. To draw off; to take out supports. *Mason.*

withdrawal standard. The percentage of flammable gas in British coal mines at or above which workmen must be withdrawn. In safety lamp mines, it is 2 percent or over and in other mines 1¼ percent or over, or if any indication of gas is seen on the lowered flame of a safety lamp. *See also* ventilation standards. *Nelson.*

witherite. Native barium carbonate, $BaCO_3$, orthorhombic. *Dana 17.*

within-laboratory tolerance. The maximum acceptance difference between determinations carried out in the same laboratory on the same analysis sample by the same operator using the same apparatus. *B.S. 1016, 1961, Pt. 16.*

witness corner. A marker set on a property line leading to a corner; used where it would be impracticable to maintain a monument at the corner itself. *Seelye, 2.*

witness mark; witness stake. A mark or stake set to indicate the position (approximate or exact) of a property corner, instrument station, or other survey point. A witness may be a rock, tree, or other object. Examples: (a) a blazed tree on the bank of a river may indicate the corner which is at the intersection of some survey line with the center line of the stream, and therefore, cannot be marked directly; (b) a stake driven so as to stand out conspicuously, and marked with a station number, may witness a hub (with nail at exact station) driven flush with or below the surface of the ground. *Seelye, 2.*

witness post. Satellite beacon used to mark a claim when the correct boundary post is inaccessible. *Pryor, 3.*

wittichenite; wittichite. Described as a steel-gray or tin-white metallic mineral, Cu_3BiS_3; from Wittichen, Baden, Germany. *Dana 7, v. 1, p. 373.*

wittite. A lead-gray sulfo- and seleno-bismuthite of lead, $5PbS.3Bi_2(S,Se)_3$. Orthorhombic or monoclinic. From Falun, Sweden. *English.*

Witton-Kramer magnet. A circular magnetic separator suspended over a conveyor head pulley to extract small pieces of tramp iron. *Nelson.*

wits. *See* tin witts. *Fay.*

Witwatersrand. The gold mining district, now usually called the Rand, of the Republic of South Africa. *Nelson.*

wm Abbreviation for wattmeter. *Zimmerman, p. 118.*

wobble wheel roller. A skip body mounted on nine or more oscillating smooth rubber tired wheels for compaction and fine rolling of soil. *Nelson.*

woc time. Waiting-on-cement time. That period between the end of actual cementing operations and drilling out the cement plug or perforating the casing to permit the fluid entry to the well bore. *Williams.*

wodginite. A mineral, $(Ta,Nb,Sn,Mn,Fe)_{16}O_{32}$, in black grains. X-ray powder patterns resemble those of manganotantalite, but with some major differences, and the unit cell is monoclinic and contains 32 oxygen; from Manitoba, Canada. Named from locality. *Hey, M.M., 1964; Fleischer.*

woehlerite. Synonym for wöhlerite. *Hey 2d, 1955.*

Wohl block. A hollow clay building block designed for the construction of walls of various thicknesses and for use in ceilings. *Dodd.*

wohlerite. a. A complex silicate and columbate of calcium, zirconium, and sodium, $4\ [NaCa_2(Zr,Cb)Si_2O_8(O,OH,F)]$; sometimes contains appreciable fluorine. *Hey 2d, 1955.* b. The organic matter found in carbonaceous chondrites. Either the substance should not have been named or a name should have been chosen that was not already in use for a well-known mineral (wohlerite, a.). *American Mineralogist, v. 46, No. 1-2, January-February 1961, p. 244.*

Wöhler test. A fatigue test in which one end of a specimen is held in a chuck and rotated in a ball bearing placed on the other end. The ball bearing carries a weight and, as the specimen rotates, the stress at each point on its surface passes through a cycle from a maximum in tension to a maximum in compression. *C.T.D.*

Wohlwill process. The official process of the United States mints for refining gold. It consists in subjecting gold anodes to electrolysis in a hot solution of hydrochloric acid containing gold chloride, the solution being continuously agitated with compressed air. *CCD 6d, 1961.*

wolchonskoite. An amorphous, dull, bluish-green, fragile chromiferous clay. *Standard, 1964.*

wold. As a physiographic term, wold may be defined as a range of hills produced by differential erosion from inclined sedimentary rocks, and vale as the accompanying depression or strike valley. The gentler slope of the wold is a bajada and the steeper slope, a cuesta if this slope is not a cliff, and a caja if this slope is a cliff. The term wold, as here defined, is identical with cuesta as defined by Davis in 1899, and as the term cuesta is now commonly used. *A.G.I.*

wolf. a. The name of a naphtha-burning flame safety lamp. *Jones.* b. The name of carbide and electric lamps. *Bureau of Mines Staff.*

wolfachite. Described as a silver-white to tin-white metallic mineral from Wolfach, Baden, Germany, Ni(As,Sb)S. *Dana 7, v. 1, p. 326.*

Wolfcampian. Lower lower Permian. *A.G.I. Supp.*

wolfeite. A mineral, $(Fe'',Mn'')_2(PO_4)(OH)$, with Fe greater than Mn, monoclinic; previously included in triploidite $(Mn'',Fe'')_2(PO_4)(OH)$. Mineral first noticed (as tripoidite) at North Gorton, N.H. *Spencer 19, M.M., 1952.*

Wolf nickel-cadmium battery. While other nickel-cadmium batteries generally adopt either tubular or pocketed positive plate construction, the Wolf battery has individual features of interest. The supporting medium for the active materials consists of strips of compressed corrugated nickel foil. The method of construction is to perforate strips of the foil, which are pasted with active material. The strips are folded into corrugations and compressed into a cake. Two or more cakes are mounted in a pure nickel frame to form the finished plate. This method of construction results in a plate of satisfactory electrical conductivity, and no admixture of graphite or flake nickel in the active material is necessary. *Roberts, II, p. 248.*

Wolf process. A flotation process invented by Jacob D. Wolf in 1903. He used sulfochlorinated or other oils and aimed to secure a high extraction with a low grade of concentrate in the first step, and by washing with hot water to concentrate the concentrate in a second step. Apparently no commercial use was made of it. *Liddell 2d, p. 407.*

wolfram. a. A metallic element, number 74 in the atomic series, with melting point 3,370° C. It has been suggested for use in high-temperature reactors, especially as a shielding material. Formerly tungsten. Symbol, W. *NRC-ASA N1.1-1957.* b. Wolfram is sometimes used in Europe for the mineral wolframite. *Dana 6d, p. 982.*

Wolframine. A synonym of wolframite and tungstic ocher. *Hey 2d, 1955.*

wolframinium. A light aluminum alloy similar to romanium. *Webster 3d.*

wolframite. A mineral series, $(Fe,Mn)WO_4$, ranging from $FeWO_4$ (ferberite) to $MnWO_4$(huebnerite). Occurs as brownish-black monoclinic crystals, columnar aggregates, or granular masses in association with tin ores. An important ore of tungsten. *A.G.I.; Dana 17; Fay.*

wolframium. An alloy of aluminum and tungsten, containing 0.1 percent of the latter, resembling romanium. Tungsten is the scientific name. *Standard, 1964; Fay.*

wolfram lamp. A tungsten lamp. *Webster 3d.*

wolfram ocher. Synonym for tungstic ocher. *Hey 2d, 1955.*

wolfram steel. The same as steel. *Standard, 1964.*

wolfsbergite. a. (of Nicol). The same as chalcostibite. *Fay.* b. (of Huot) The same as jamesonite. *Standard, 1964.*

wolf's eye. Same as moonstone (feldspar); wolf's eye stone. *Shipley.*

wolf's eye stone. A rarely used name for tiger eye especially that which is partly silicified and, therefore, intermediate between tiger eye and hawk's eye. *Shipley.*

wolftonite. *See* hydrohetaerolite. *English.*

wolgidite. A variety of leucitite composed of leucite, magnophorite, diopside, and minor olivine and phlogopite. *A.G.I.*

wollastonite. A natural calcium silicate, Ca-

SiO_3; triclinic; found in metamorphic rocks. Color, white to brown, red, gray, yellow; luster, vitreous to pearly; Mohs' hardness, 5 to 5.5; specific gravity, 2.8 to 2.9. Found in New York, California. Used in ceramics; as reinforcing fiber in plastics, cements. Also called tabular spar. *CCD 6d, 1961; Fay.*

wollongite. *See* wollongongite. *Tomkeieff, 1954.*

wollongongite; wollongite. A bedded coal-like substance originally described as bituminous shale but later discovered to be similar to torbanite. From Wollongong, New South Wales, Australia. *Tomkeieff, 1954.*

wolsendorfite. A mineral, $(PbCa)O.2UO_3.2H_2O$, orthorhombic, as bright-red crusts in fluorite from Wolsendorf, Bavaria, Germany. Named from locality. *Spencer 21, M.M., 1958.*

Wommer safety clamp. A type of foot-operated drill-rod safety clamp the operation of which is similar to a bulldog safety clamp. Also called automatic spider. *Long.*

won. Eng. Proved, sunk to, and tested. Coal is won when it is proved and so developed that it can be worked and conveyed from the mine. *Fay.*

wonder metals. Applied to metals such as beryllium, magnesium, titanium, and zirconium that have been put into exceptionally expanded use since World War II. *Pearl, p. 44.*

wonder stone. a. A variety of breccia consisting of yellow crystals of calcite disseminated through dark-red earthy dolomite. *Standard, 1964.* b. A rockbound variety of rhyolite. *Bureau of Mines Staff.*

wood. a. Eng. Signifies mine timbers, bars, sprags, chocks, lagging, etc., which are all used in various ways for supporting the roof and sides of underground workings. *Fay.* b. Agatized, opalized, petrified, silicified wood; a material composed of opal or chalcedony (agate) and formed by the replacement of wood by silica. The replacement of the woody matter by the silica takes place in such a way that the original form and structure of the wood is preserved. *Sanford.* c. Consists essentially of cellulose, resins, proteins, and sap juices. A typical analysis is as follows: 50 percent carbon, 43 percent oxygen, 6 percent hydrogen, 1 percent nitrogen, and a calorific value of 7,300 British thermal units per pound. *Cooper, p. 384.*

wood agate. Agate formed by the petrification of wood. *See also* wood, b. *Fay.*

wood alcohol. *See* methanol. *Crispin.*

wood arsenate; wood copper. Fibrous variety of olivenite. *Bennett 2d, 1962.*

Woodbury jig. A jig with a plunger compartment at the head end, so that the material is given a classification in the jig. *Liddell 2d, p. 389.*

Woodbury table. A table of the general Wilfley-Overstrom-Card type, with riffles parallel to the tailings side, and a hinged portion without riffles (unlike the Card). The table top is a rhomboid, and the riffles gradually shorten as they near the tailings side. *Liddell 2d, p. 389.*

wood chain. S. Staff. A hoisting chain, the iron links of which are filled with small blocks of wood. *Fay.*

woodchuck cut. *See* burned cut. *Hess.*

wood coal. a. Charcoal. *Webster 3d.* b. Lignite. *Webster 3d. See also* board coal. *Fay.*

wood copper. *See* wood arsenate.

Wooddell scale. A scale of resistance to abrasion based on the following method: If specimens of different materials are mounted so that they present surfaces substantially in the same plane, and if the surfaces are subjected to a lapping operation with a properly selective abrasive, the harder materials will stand out in relief, whereas the softer ones will be cut or worn to a depth, depending upon their hardness. By averaging several readings a scale of hardness was established by which the quantitative values of the hardness of various materials could be determined. On the Woodell scale, diamond has approximately twice the hardness of boron carbide, 3.5 times that of tungsten carbide, and nearly 5 times that of corundum. *I.C. 8200, 1964, p. 6.*

wood distillation gas. *See* wood gas. *CCD 6d, 1961.*

woodenite. An extrusive rock containing phenocrysts of olivine and augite in a brown glassy groundmass rich in alkalies. The chemical composition is very similar to that of absarokite, and the rock may be classed as a glassy variety of alkalic basalt. *A.G.I.*

wooden tubbing. Up to the beginning of the nineteenth century, wood tubbing was still widely used in Great Britain. It consists of wooden staves which were driven down in soft ground during sinking to keep back water. The lining was stated to be capable of withstanding pressures up to a maximum of 130 pounds per square inch. The lining resembled the sides of a wooden tub and the word tubbing is doubtless derived from this similarity. *See also* tubbing, a. *Nelson.*

wooders. York. Timbermen employed in mines. *Fay.*

wood fiber. A material produced by grinding or shredding wood. *ASTM C11-60.*

wood flour. A pulverized wood product used in the foundry to furnish a reducing atmosphere in the mold, help overcome sand expansion, increase flowability, improve casting finish, and provide easier shakeout. *ASM Gloss.*

wood gas; wood distillation gas. Gas produced during production of charcoal by heating wood in absence of air. Usually used as a fuel at the production site. *CCD 6d, 1961.*

Woodhall-Duckham kiln. *See* rotary-hearth kiln. *Dodd.*

wood hematite. A finely radiated variety of hematite exhibiting alternate bands of brown or yellow of varied tints. *Fay.*

woodhouseite. A hydrated sulfate and phosphate of calcium and aluminum, $2CaO.3Al_2O_3.P_2O_5.2SO_3.6H_2O$, as small colorless rhombohedral crystals. Found in California. *Spencer 15, M.M., 1940.*

wood iron. A fibrous variety of chalybite (siderite), $FeCo_3$. *Fay.*

wood iron ore. Corn. Fibrous limonite, Land's End district. *Arkell.*

wood opal. Fossil wood transformed into opal. *Standard, 1964.*

wood peat. Peat formed from decayed wood, leaves, etc., in forests. *Fay.*

wood picker. *See* picker, i. *D.O.T. Supp.*

wood piling. A method of sinking a shaft through loose surface deposits by driving down vertically a ring of wood piles. As the piles are rammed downwards, the loose material is removed. Frames were set to prevent the piles being forced inwards. Each new set of piles reduced the dimensions of the excavation. To avoid this reduction in size, the piles were driven down at an angle away from the shaft space. *See also* iron and steel sheet piling. *Nelson.*

wood pillar. Eng. *See* chock. *SMRB, Paper No. 61.*

Wood process. A flotation process utilizing the surface tension of water, either fresh, acid, or salt. *Fay.*

wood pulp; paper pulp. Produced for its cellulose content and used for the making of various kinds of paper, paperboard, rayon, and nitrocelluloses. *See also* lignin. *CCD 6d, 1961.*

wood ringer. Eng. *See* ringer, a; dog-and-chain, a. *Fay.*

woodrock. A variety of asbestos resembling wood. *Standard, 1964.*

woodruffite. A psilomelanelike mineral with the composition, $2(Zn,Mn)O.5MnO_2.4H_2O$, from Sterling Hill, N. J. *Spencer 20, M.M., 1955.*

Woods filter. A very dark glass which absorbs almost all of the visible spectrum, but transmits ultraviolet rays. *Shipley.*

Wood's glass. A special glass that transmits ultraviolet but is almost opaque to visible light; such a glass was first made by Prof. R. W. Wood, Johns Hopkins University, and was used for invisible signaling during World War I. *Dodd.*

Woods Hole sediment analyzer. A method of particle size analysis based on measurement of pressure changes resulting from sedimentation in a suspension of the particles in water. It is applicable to coarse silts and fine gravels, and permits 150 tests to be made in a day. *Dodd.*

Wood's process. *See* up-draw process. *Dodd.*

woodstave piping. Piping formed from wood boards fitted and strapped together by encircling steel bands. *Pryor, 3.*

wood stilt. A piece of wood attached to the leg of steel girders to provide a measure of yield and prevent premature distortion and damage to the ring. *See also* stilt. *Nelson.*

woodstone. Petrified wood, as wood opal. *Standard, 1964.*

wood tin. A nodular variety of cassiterite, or tinstone, of a brownish color and fibrous structure, and somewhat resembling dry wood in appearance. *Fay.*

woodwardite. A mixture of copper sulfate and hydrous aluminum silicate, from Cornwall, England. *Dana 6d, p. 962.*

woody lignite. a. A fibrous lignite; usually brown in color and retains a distinct woody structure. *See also* earthy lignite. *Nelson.* b. A more or less descriptive term commonly, and to some extent indiscriminately, used in coal literature to apply to certain kinds of lignite. *A.G.I.*

woody peat. Synonymous with fibrous peat. *A.G.I. Supp.*

woody structure. A macrostructure particularly found in wrought iron and in extruded rods of aluminum alloys, that shows elongated surfaces of separation when fractured. *ASM Gloss.*

wool. a. Eng. Sandy shale or shaly flagstone with irregular curly bedding, Lancashire. *Compare* curly coal. *Arkell.* b. A fleecy mass of plain glass fibers. *ASTM C162-66.*

wool drag. A fault in ground laying resulting from accidental smearing of the color. *Dodd.*

woolpack. Eng. A concretionary mass of crystalline limestone occurring in the form of balls, varying greatly in size, in the Wenlock limestone. Also called ballstone. *Standard, 1964.*

wootz. A variety of steel made in India by the cementation process; the earliest known form of steel. Prepared from a black iron ore of Hindustan by a process analogous to the Catalan hearth. *Standard, 1964.*

wor. Abbreviation for water-oil ratio. Also abbreviated WOR. *BuMin Style Guide, p. 62.*

Worcester shape. A tea- or coffee-cup having the general shape of a plain cylinder, rounded sharply near the bottom, which has a broad but shallow foot. *Dodd.*

Worden gravimeter. A compact, small, temperature-compensated gravity meter in which a system is held in unstable equilibrium about an axis so that an increase in the gravitational pull on a mass at the end of a weight arm causes a rotation opposed by a sensitive spring. The meter weighs 5 pounds and has a sensitivity of 0.2 milligal. *A.G.I.*

work. a. The process of mining coal. *B.C.I.* b. Mid. A stall or working place in a mine. *Fay.* c. Eng. To get cut away, or excavate and remove any bed or seam, or part thereof, of coal, ironstone, or other mineral, whether underground or in open work. To mine. *Fay.* d. S. Staff. A side of work. *See also* side of work. *Fay.* e. To crumble and yield under the action of a squeeze. Applied to pillars or roof of a coal mine. *Fay.* f. To be slowly closing under the action of a squeeze. Applied to portions of the mine workings. *Fay.* g. Ore before it is dressed. *Fay.* h. A place where industrial labor of any kind is carried on. Usually in the plural as a saltworks, ironworks, etc. *Webster 3d.* i. Denoting that a creep or squeeze is taking place. *Hudson.* j. Work is measured, not in terms of time, but in terms of foot-pounds or inch-pounds. *Crispin.* k. Work is done by a force if the force overcomes a resistance and causes a body to move in the direction of that force. *Morris and Cooper, p. 142.* l. The amount of a force multiplied by the distance it has traveled. The practical unit is the foot-pound, and is force in pounds weight multiplied by distance in feet. *Mason, v. 2, p. 349.* m. The product of a force in terms of weight and the lineal distance through which it acts. *See also* horsepower. *Ham.* n. Objects which are to be, are being, or have been treated, as in cleaning or finishing. *ASM Gloss.*

workability. a. The same as formability. *ASM Gloss.* b. A term referring to the firmness of rocks, that is, the ease with which they can be drilled and broken out. *Stoces, v. 1, p. 102.* c. The relative ease with which concrete or mortar can be placed or used. *See also* consistency; Abrams' Law; plasticizer. *Ham.*

workability index of plastic refractories. A measure of the consistency and moldability of plastic refractories. *A.R.I.*

workability of concrete. That property determining the effort required to manipulate a freshly mixed quantity of concrete with minimum loss of homogeneity. *ASTM C125-66.*

workable. A coal seam or ore body of such thickness, grade, and depth as to make it a good prospect for development. In remote and isolated locations, other factors would influence its workability, such as access, water supply, transport facilities, etc. *See also* economic coal reserves. *Nelson.*

workable beds; workable veins. Any bed or vein that is capable of being worked, but usually applied to that coal seam or ore deposit which can be mined profitably. *Fay.*

workable tonnage. *See* probable reserves. *Nelson.*

work angle. In arc welding, the angle between the electrode and one member of the joint, taken in a plane normal to the weld axis. *ASM Gloss.*

work arm. The part of a lever between the fulcrum and the working end. *Nichols.*

workboard. A board, about 6 feet long and 9 inches wide, on which pottery ware may be placed and carried from one process to the next. *Dodd.*

work capacity. That limit of energy expended or absorbed within which a body is not unduly fatigued. *Brantly, 2.*

worked-out. a. A mine or large section of a mine from which all minable coal has been taken. *B.C.I.* b. Exhausted; said of a coal seam or ore deposit. *Fay.*

work hardening. a. The increase in the hardness and strength of a metal produced by cold plastic deformation or mechanical working. *See also* cold working. *Ham.* b. The same as strain hardening. *ASM Gloss.*

work index. *See* Bond's Third Theory. *Pryor, 3.*

working. a. When a coal seam is being squeezed by pressure from roof and floor it emits creaking noises and is said to be "working". This often serves as a warning to the miners that additional support is needed; sagging roof emitting noises and requiring additional timbering. *B.C.I.* b. A working may be a shaft quarry, level, opencut, or stope, etc. Usually in the plural. *See also* labor; workings. *Fay.* c. Scot. A name given to the whole strata excavated in working a seam. *Fay.* d. Scot. Making a noise before falling down, such as holed coal at the face, or unsupported roof strata. *Compare* work, e., f. *Fay.*

working a claim. To work a mining claim is to do something toward making it productive, such as developing or extracting an ore body after it is discovered. *Ricketts, I.*

working barrel. Corn. The cylinder in which a pump piston works. *Fay.*

working beam. Eng. A beam having a vertical motion on a rock shaft at its center, one end being connected with the piston rod and the other with a crank or pump rod, etc. A walking beam. Also, a brake staff. *Fay.*

working bit. Eng. Said of a vein large enough for a man to work in without breaking any of the adjacent rock. *Fay.*

working capital. The amount of money available to finance the operations of a company, beyond that required for the purchase of fixed assets such as property. *Truscott, p. 255.*

working chamber. The chamber in which men work at the foot of a pneumatic caisson. *See also* manlock. *Ham.*

working column. In casing a borehole, the last and deepest column in which work is carried on. *Stoces, v. 1, p. 85.*

working cost. The total cost of producing the mineral. *Zern.*

working cycle. A complete set of operations. In excavation, it usually includes breaking, loading, moving, dumping, and returning to the loading point. *Nichols.*

working drawing. Any drawing showing sufficient detail so that whatever is shown can be built without other drawings or instructions. *Nichols.*

working end. Part of a glass tank furnace: (1) in such a furnace as used for container glass, the term signifies the compartment following the melting end and separated from it by the bridge; (2) the end from which the glass is withdrawn in a glass tank furnace that has no bridge. *Dodd.*

working face. The place at which the work is being done in a breast, gangway, airway, chute, heading, drift, adit, or crosscut, etc. *See also* face, c. *Fay.*

working first. Aust. *See* whole working. *Fay.*

working furnace. Eng. A mine-ventilating furnace supplied with fresh air from the downcast shaft. *Fay.*

working gullet. The immediate excavation needed for the opencast working of ore. *Nelson.*

working-hole. In glassmaking, a small opening over pots enabling workmen to introduce or withdraw material required. *Bureau of Mines Staff.*

working home. Working toward the main shaft in extracting ore or coal as in longwall retreating. *See also* longwall. *Fay.*

working interest. The operator's mineral ownership involving the costs of drilling, completion, equipment, and producing in contrast to the (free) royalty interest. *Wheeler.*

working load. a. The maximum weight a hoist line or other rope or cable can carry under working conditions without danger of straining. *Long.* b. The same as proper working load. *Zern.*

working mold. *See* mold. *Dodd.*

working on air. A pump works on air when air is sucked up with the water. *Fay.*

working-on-the-walls. The eroding or corroding of blast furnace lining. *Fay.*

working out. Working away from the main shaft in extracting ore or coal, as in longwall advancing. *Compare* working home. *Fay.*

working pit. A mine shaft through which the ore and miners are carried, as distinguished from one used only in pumping. *Standard, 1964.*

working place. a. The place in a mine at which coal or ore is being actually mined. *See also* working face. *Fay.* b. The miner's room or chamber. *Hudson.*

working plan. Same as working drawing. *Fay.*

working range. The range of surface temperature in which glass is formed into ware in a specific process. The upper end refers to the temperature at which the glass is ready for working (generally corresponding to a viscosity of 10^3 to 10^4 poises), while the lower end refers to the temperature at which it is sufficiently viscous to hold its formed shape (generally corresponding to a viscosity greater than 10^6 poises). For comparative purposes, when no specific process is considered, the working range of glass is assumed to correpond to a vicosity range from 10^4 to $10^{7.6}$ poises. *ASTM C162-66.*

working rate. Scot. The rate per ton paid to a miner. *Fay.*

working room. Generally the space between the working face and the filling. *Stoces, v. 1, p. 252.*

workings. a. Any species of development; usually restricted in meaning to apply to the breasts, etc., in contradistinction to the gangways and airways. Often used in a broader sense to mean all the underground developments. *See also* working, b. *Fay.* b. The entire system of openings in a mine for the purpose of exploitation. Normally, usage tends to restrict the term to the area where coal, ore, or mineral is actually worked. *Nelson.* c. Colloquial for an anthracite mining operation. *Korson.*

working stress. a. The stress considered to be a safe maximum for a particular material under ordinary conditions. *See also* load factor. *Ham.* b. The maximum unit stress to which the parts of a structure are to be subjected. *Zern, p. 76.* c. *See* allowable stress. *Ro.*

working the broken. a. The extraction of the coal pillars in a pillar method of working. *See also* pillar extraction. *Nelson.* b. Same as second working; robbing pillars. *Fay.*

working the whole. The driving of the narrow coal headings to form pillars in a pillar method of working. *Nelson.*

work lead. a. Impure pig lead that is to be desilverized or refined. *See also* base bullion. *Standard, 1964; Fay.* b. The electrical conductor connecting the source of arc welding current to the work. Also called welding ground or ground lead. *ASM Gloss.*

work measurement. The determination of the proper time to allow for the effective performance of a specific task. The proper time is determined by taking into account all the factors affecting the execution of the task. Where machines are involved, the task is also dependent on the effectiveness of the machine and this is determined. *See also* method study; time study. *Nelson.*

workpiece. A part or piece upon which work is done in a processing operation. *ASM Gloss.*

work platform. A board or small platform placed at a suitable height in the drill tripod or derrick so that a man standing on it can handle the drill rod stands. *Compare* safety board. *Long.*

work shaft. A shaft which is in daily use for hoisting coal, ore, or men. *See also* air shaft. *Nelson.*

works manager. The general superintendent in an industrial plant. In many establishments same as chief engineer. *Crispin.*

work speed. A term relating to the process of grinding with abrasive wheels. In surface grinding, the work speed is the rate of table traverse, usually expressed in feet per minute. In centerless, cylindrical, and internal grinding, the work speed is the rate at which the object being ground (the 'work') revolves; this may be expressed either in revolutions per minute or in feet per minute. *Dodd.*

work stone. A plate in the bottom of a blast hearth or ore hearth having a groove down its center for conducting away the molten lead. *Standard, 1964.*

work study. Embodies the techniques of analyzing methods used in performing an operation and of measuring the work involved. Work study insures better use of materials, plant, and manpower, that is, higher productivity. *Nelson.*

work the twig. Prov. Eng. To use the divining rod. *Standard, 1964.*

world quake. An earthquake seismographically registered all over the world. *Schieferdecker.*

worm. a. A spiral tool shaped like a carpenter's wood-boring auger, with the bottom end shaped like the cutting end of a diamond point or mud bit. It is rotated inside a casing to loosen and clean out debris or to loosen and drill through tough clay at the bottom of a borehole. Also called worm auger; worm-type auger. *Long.* b. A gear with spiral threads cut in a cylinder. *Nichols, 2.* c. Also called worm coil. *See* wad coil. *Fay.* d. An exudation (sweat) of molten metal forced through the top crust of solidifying metal by gas evolution. *ASM Gloss.*

worm auger. *See* worm. *Long.*

worm conveyor. a. A conveyor consisting of a spiral plate encircling and fastened to a shaft lying longitudinally within a trough; rotation of the spiral pushes the material forward. Also called screw conveyor. *B.S. 3552, 1962.* b. *See* helical conveyor. *Ham.*

worm gear. A speed reduction unit in which a worm wheel is contacted at its outer edge by a worm placed either above or below the worm wheel and at right angles to the worm wheel axle. *Shell Oil Co.*

worming pot. In ceramics, a vessel that discharges through tubes, for forming strips or wormlike patterns on an article of pottery rotated in a lathe. *Standard, 1964.*

worm-type augur. *See* worm. *Long.*

worm wheel. A modified spur gear with curved teeth that meshes with a worm. *Nichols.*

worthite. A metal suited to a wide variety of wet, dry, and hot sulfur dioxide, sulfurous acid, and sulfite service. It is used in construction. *E.C.T., v. 13, p. 423.* Composition: 24 percent nickel, 20 percent chromium, 3 percent molybdenum, 3.5 percent silicon, 0.7 percent carbon, and the balance iron.

wough. a. Scot. The wall rock beside a vein of lead. *Webster 3d.* b. The side of a vein; wall. *Compare* ouges. *Arkell.*

wound rotor motors. Wound rotor induction motors differ from squirrel cage induction motors only in the construction of their rotor. The rotor instead of having short-circuited copper bars, has a definite winding connected for the same number of poles as the stator with the leads brought out to slip rings. These motors are frequently called slip ring motors. The stator and rotor are commonly called the primary and secondary respectively because under locked rotor conditions, the motor becomes a transformer with a given ratio. This ratio depends upon motor design and is not standardized. *Pit and Quarry, 53rd, Sec. 4, p. 6.*

woven-wire vibrating screens. Ore screening machines whose screens are woven of steel wire and stretched tightly on a metal frame. Near the center of the screen is fastened the vibrating element of a high-speed vibrator, which produces a vibratory motion at right angles to the plane of the screen. The bulk of the screening at the present time is done with screens of this type. *Newton, p. 73.*

wpc Abbreviation for watts per candle. *BuMin Style Guide, p. 62.*

WP-cut. This cut is developed from the Blasjo cut. The holes are arranged in a geometrical figure as an incomplete pyramid and not parallel in the planes of the sides as are those of the Blasjo-cut, and the throw has been reduced. It seems to have a somewhat lesser advance than the Blasjo-cut, but for tunnel widths below 7.5 meters (25 feet) a greater one than V-cuts and fan cuts. *Langefors, p. 194.*

WPR Abbreviation for water production rate. Also abbreviated wpr. *BuMin Style Guide, p. 62.*

wprd Abbreviation for water produced. Also abbreviated WPRD. *BuMin Style Guide, p. 62.*

wracking force. A horizontal force tending to distort a rectangular shape into a parallelogram. *Ham.*

wrap-drive conveyor. A conveyor in which the return strand of the belt is driven by a wrap drive which combines a drive pulley with a snub pulley. *NEMA MB1-1961.*

wrap forming. *See* stretch forming. *ASM Gloss.*

wrap-up. Same as windup, as applied to the twist in a drill-rod string. *See also* windup. *Long.*

wreath. In glassmaking, a wavy appearance in glass, especially flint glass, due to defective manufacture. *Standard, 1964.*

wreathing. A fault that sometimes occurs on the inside of cast whiteware as a slightly raised crescent or snakelike area; it is probably a result of orientation of the plate-shaped clay particles and can usually be prevented by increasing the viscosity and the thixotropy of the casting slip. *Dodd.*

wreaths. Leic. Four short pieces of hemp rope placed around the legs of a horse or pony and fastened together above its back, by which it was formerly lowered into or brought up out of a mine. *Fay.*

wreck. Scot. A breakdown, as in a shaft or on an incline. *Fay.*

wrecking bar. A steel bar usually from 1 to 2 feet in length, with one end drawn to a thin edge, the other curved to a claw. *Crispin.*

wrench. A tool that grips a nut or pipe and is provided with a handle or lever with which to turn the part gripped. *See also* pipe wrench. *Long.* Common types are adjustable wrenches, monkey wrenches, double-end S wrenches, box wrenches, T wrenches, and socket wrenches. *Crispin.*

wrench fault. A transverse strike-slip fault in an almost vertical fault plane. Synonym for flaw. *Schieferdecker.*

wringing fit. A fit of zero to negative allowance comparable to fits assigned to the first six nominal shaft sizes listed under class LN2 of interference locational fits in ASA B4.1-1955. *ASM Gloss.*

wrinkling. A wavy condition obtained in drawing, in the area of the metal that passes over the draw radius. Wrinkling may also occur in other forming operations when unbalanced compressive forces are set up. *ASM Gloss.*

wrist action. In a bucket, the ability to change its digging or dumping angle by power. *Nichols.*

wristpin. A cylindrical hollow pin used to fasten the piston to the connecting rod. *Shell Oil Co.*

writing sand. Eng. Micaceous iron ore, Dartmoor; formerly sent to London for drying wet ink. Before the introduction of blotting paper various fine sands were used for this purpose. *Arkell.*

wrought alloys. The type of alloys that are suitable for forming by mechanical means at temperatures below the melting point. Wrought alloys are used for rolling, drawing, extruding, and forging operations. *Light Metal Age, v. 16, No. 9, October 1958, pp. 17-24.*

wrought aluminum alloy. A light alloy which has been worked by cold rolling, forging, pressing, drawing or extension. *Ham.*

wrought iron. a. A commercial form of iron containing less than 0.3 percent and usually less than 0.1 percent carbon, and carrying also 1.0 or 2.0 percent of slag mechanically mixed with it and originally made directly from ore (as in the Catalan forge) but subsequently by puddling. *Compare* ingot iron. *Webster 3d.* b. A low-carbon iron containing a relatively high proportion of residual slag which gives it ductility and toughness. *Strock, 10.*

wrought steel. Weld steel. *Webster 2d.*

wsec Abbreviation for watt-second. *Crispin.*

wt Abbreviation for weight. *BuMin Style Guide, p. 62.*

wtd av Abbreviation for weighted average. *BuMin Style Guide, p. 62.*

wtd avg Abbreviation for weighted average. *BuMin Style Guide, p. 62.*

wt pct Abbreviation for weight-percent. *BuMin Style Guide, p. 62.*

Wuensch process. In metallurgy, a heavy suspension method for the concentration of ores where the waste has a specific gravity of 2.7 or more. Minerals having a specific gravity in excess of 5.25 must be used, since a suspension containing over 40 percent solids by volume is too plastic for use. Galena (specific gravity 7.4 to 7.6) and ferrosilicon (specific gravity 6.7 to 7.0) have been used. *Hess.*

wulfenite. A mineral, $PbMoO_4$, sometimes with calcium, chromium, vanadium. Tetragonal. Yellow, orange, or bright orange-red of resinous luster; found in veins with ores of lead. Specific gravity, 6.7 to 7.0; Mohs' hardness, 2.75 to 3. Found in Massachusetts, New York, Pennsylvania, Nevada, Utah, New Mexico, Arizona; Hungary, Austria, Germany; Australia. An ore of molybdenum. *Sanford; Dana 17; CCD 6d, 1961.*

wumble. Corn. An instrument for cleaning a hole when boring. *Hess.*

würm. Fourth Pleistocene glaciation. *A.G.I. Supp.*

wurtzilite. An asphaltic mineral resembling, and closely related to, gilsonite and uintaite. Also called aeonite; aegerite; elaterite; tabbyite. *A.G.I.*

wurtzite. A zinc sulfide of the same composition as sphalerite, ZnS, but hexagonal in its crystallization. *Sanford.* Also called wurtzite—2H, its cell contents being Zn_2S_2. *See also* wurtzite—4H for explanation of notation. *American Mineralogist, v. 33, No. 9-10, September-October 1948, pp. 653-654.*

wurtzite—4H; wurtzite—6H; wurtzite—15R. Three polymorphs of ZnS found in shrinkage cracks in clay ironstone concretions embedded in carbonaceous black shale of the lower Conemaugh formation at Western Pennsylvania and eastern Ohio. In the notation used, the number refers to the formula weights per unit cell, and H and R refer to hexagonal and rhombohedral forms. Wurtzite—4H is Zn_4S_4; wurtzite—6H, Zn_6S_6; wurtzite—15R, $Zn_{15}S_{15}$. *American Mineralogist, v. 33, No. 9-10, September-October 1948, pp. 653-654.*

wurtzite—8H; wurtzite—10H. Two polytypes, 8ZnS and 10ZnS, respectively, of wurtzite found at Joplin, Mo.; hexagonal. The wurtzite polytypes evidently form a homologous series (2H, 4H, 6H, etc.) resulting from growth phenomena based on screw dislocations. *American Mineralogist, v. 44, No. 11-12, November-December 1959, p. 1210.*

wüstite. An oxide of iron which does not occur naturally. It is metastable below 570° C. Quenched specimens are characteristically iron deficient having the formula Fe_xO where x may range from 0.83 to 0.95. *Bureau of Mines Staff.*

wyartite. A calcium uranium carbonate, near $3CaO.UO_2.6UO_3.2CO_2.12\text{-}14H_2O$, and occurs with ianthinite on uraninite from Shinkolobwe, Katanga, Republic of the Congo. *Hey, M. M., 1961.*

wych. *See* wich. *Fay.*

wye. a. Cumb. The beam-end connection above the pump rods of a winding and pumping engine. *Fay.* b. A fitting either cast or wrought that has one side outlet at any angle other than 90°. The angle is usually 45°, unless another angle is specified. The fitting is usually indicated by the letter Y. *Strock, 3.*

wye-connected; y-connected. A wye-connected power system is a system in which one end of each phase winding of transformers or alternating-current generators are connected together to form a neutral point, and the other ends of the windings are connected to the phase conductors. A neutral conductor may or may not be connected to the neutral point, and the neutral may or may not be grounded. *I.C. 7962, 1960, p. 23.*

wye level. The spirit level is attached to the telescope which rests in two Y-shaped supports. These are fastened to a horizontal bar to which the vertical axis is attached. The telescope can be taken out of the Y's, turned end for end, and replaced when testing the bubble for adjustment. *Crispin.*

wye rectifier circuit. A circuit which employs three or more rectifying elements with a conducting period of 120 electrical degrees, plus the commutating angle. *Coal Age, 1.*

Wyoming bentonite. A swelling type of bentonite that absorbs 7 to 11 times its dry volume of water to form a gel. *Bennett 2d, 1962.*

wyomingite. An extrusive rock containing leucite, phlogopite, and diopside (pyroxene) in a glassy groundmass having the composition of a mixture of sanidine and nosean. Superficially, the rock resembles leucitite, but it is chemically similar to phonolite and should probably be considered a phlogopite-leucite phonolite. *A.G.I.*

Wyoming jade. Nephrite from Wyoming. Jadeite also reported from Wyoming in 1944, was later proven to be nephrite. *Shipley.*

wythe. a. Each continuous vertical section of masonry one unit in thickness. *ACSG, 1963.* b. The thickness of masonry separating flues in a chimney. Also called withe or tier. *ACSG, 1963.*

wythern. Eng. A vein or lode. *Fay.*

X

x a. Symbol for unknown quantity. *Webster 3d.* b. Symbol for multiplication (or times); multiplied by; multiplication sign; for example 2×10^8. *Zimmerman, p. 72.* c. Symbol for by in expressing measurements or dimensions; for example, 2 x 4 inches or 2 by 4 inches. *Webster 3d.* d. Symbol for variable; for example, the chemical formula for waterglass, $Na_2O.xSiO_2$, in which x may have any value from 3 to 5. *Webster 3d; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-224.* e. Symbol for abscissa, x-coordinate, or horizontal coordinate in a plane Cartesian coordinate system. *Webster 3d.* f. Symbol for horizontal length. *Zimmerman, p. 62.* g. Symbol for distance in the direction of flow. *Zimmerman, p. 37.* h. Symbol for mole fraction; mole fraction in liquid. *Zimmerman, p. 70.* i. With subcsript v as x_v, the symbol for fraction by volume or volume fraction. *Zimmerman, p. 48.* j. With subscript w as x_w, the symbol for fraction by weight or weight fraction. *Zimmerman, p. 48.* k. Symbol for deviation from the mean. *Zimmerman, p. 138.* l. As a subscript, the symbol for axial. *Zimmerman, p. 193.*

x a. Symbol for variable; for example, the chemical formula for waterglass, $Na_2O.$-$xSiO_2$, in which x may have any value from 3 to 5. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-224, F-101.* b. Symbol for abscissa, x-coordinate, or horizontal coordinate in a plane Cartesian coordinate system. *Webster 3d.* c. One of the three rectangular coordinates (x, y, z). *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* d. Symbol for mole fraction and for mole fraction in liquid. *Zimmerman, p. 147.* e. Symbol for horizontal length. *Zimmerman, p. 186.* f. Symbol for distance in the direction of flow. *Zimmerman, p. 146.* g. With subscript v as x_v, the symbol for fraction by volume or volume fraction. *Zimmerman, p. 144.* h. With subscript w as x_w, the symbol for fraction by weight or weight fraction. *Zimmerman, p. 144.* i. As a subscript, the symbol for crystalline or solid; derived from Xl and Xtal, the abbreviations for crystal. Also given as x. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Zimmerman, p. 168.*

X a. Symbol for unknown quantity. *Webster 3d.* b. Symbol for multiplication (or times); for multiplied by; the multiplication sign. *Webster 3d.* c. Symbol for by in expressing measurements or dimensions; for example, 2 X 4 inches for 2 by 4 inches. *Webster 3d.* d. Symbol for variable. *Webster 3d.* e Symbol for power of magnification; for example, X 1,000 for 1,000 diameters (times) magnification. *Webster 3d.* f. Symbol to mark the place in question; for example, X on a map or on a photograph, as X marks the spot or location. *Webster 3d.* g. Symbol for reactance. *Zimmerman, p. 89.* h. As a subscript, the symbol for crystalline or solid; derived from Xl and Xtal, the abbreviation for crystal. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* i. Symbol for chemical group; especially used for a univalent anion or for a typically univalent negative radical in general formulas. *Webster 3d.* j. Abbreviation for xenon, but usually the chemical symbol Xe is used. *Webster 3d.* k. Symbol for mole ratio in liquid. *Zimmerman, p. 70.* l. Symbol for potential gradient in an electric field. *Zimmerman, p. 83.* m. Abbreviation for experimental; for example, X in X Wt for experimental weight. *Webster 3d.* n. Abbreviation for extra; for example, X in XF for extra fine. *Webster 3d.* o. Abbreviation for cross. *Webster 3d.* p. Overscored as X, the symbol for arithmetic mean. *Zimmerman, p. 11*. q. Symbol for item of data. *Zimmerman, p. 59*. r. Roman numeral 10, and overscored as X, Roman numeral 10,000. *Zimmerman, p. 128.*

X a. Symbol for reactance. Also given as *x*. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101; Zimmerman, p. 150.* b. With subscript *C* as X_C, the symbol for capacitive reactance. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* c. With subscript *L* as X_L, the symbol for inductive reactance. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* d. Symbol. e. Symbol for mole ratio in liquid. *Zimmerman, p. 148*. f. Symbol for potential gradient in an electric field. *Zimmerman, p. 171.*

xalostocite. A rose-pink variety of grossularite garnet. Also called rosolite; landerite. From Xalostoc, Morelos, Mex. *English.*

xanthate. Common specific promoter used in flotation of sulfide ores. A salt or ester of xanthic acid which is made of an alcohol, carbon disulfide and an alkali. *See also* X-reagents. *Bureau of Mines Staff.*

xanthiosite. Described as an amorphous sulfur-yellow mineral, $3NiO,As_2O_5$? *Dana 6d, p. 870.*

xanthitane. a. An alteration product of sphene (titanite). Its composition is analogous to the clays, but contains chiefly titanic oxide instead of silica. *Fay*. b. Synonym for anatase. *Hey 2d, 1955.*

xanthite. A name for yellowish to yellowish-brown vesuvianite from Amity, N.Y., with no particularly different characteristics from other vesuvianite. *Shipley.*

xanthochroite. A mineral, amorphous cadmium sulfide, as a thin coating on sphalerite, $CdS+xH_2O$. Related to greenockite, possibly its isometric modification. *English.*

xanthoconite. A silver-arsenic sulfide, $3Ag_2S.As_2S_5$. Contains 61.4 percent silver. *Sanford.*

xanthophyllite. A leek-green member of the brittle mica group of minerals, $14(Mg,Ca)O.8Al_2O_3.5SiO_2.4H_2O$; hardness 4.5 to 6.0; specific gravity 3.09. *Larsen, p. 179.*

xanthorthite. A yellow altered variety of allanite that contains considerable water. *Standard, 1964.*

xanthoxenite. A wax-yellow basic ferric phosphate, with FeO, MnO, CaO, MgO, Al_2O_3. Monoclinic. Thin plates. Near beraunite. From Rabenstein, Bavaria, Germany. *English.*

xanthus. An early name for heliotrope. *Hey, M.M., 1964.*

X-axis; x-axis. a. The axis of abscissas in a plane Cartesian coordinate system. *Webster 3d*. b. One of the three axes in a three-dimensional rectangular coordinate system. *Webster 3d*. c. One of the three optic axes (X, Y, and Z) in a biaxial crystal. The X-axis is the axis of a greatest ease of vibration. Light vibrating parallel to the X-axis travels with maximum velocity and is called the fast ray, the X-ray (not to be confused with the penetrating X-rays of extremely short wavelength), and the α-ray. The lowest index of refraction n_α in biaxial minerals is the index of the fast ray vibrating parallel to the X-axis. *Bureau of Mines Staff.*

X-coordinate; x-coordinate. a. An abscissa in a plane Cartesian coordinate system. *Webster 3d*. b. One of the three coordinates in a three-dimensional rectangular coordinate system. *Webster 3d.*

X-cut. Abbreviation for crosscut. *Zimmerman, p. 32.*

Xe Chemical symbol for xenon. *Handbook of Chemistry of Physics, 45th ed., 1964, p. B-1.*

xeno-. A combining form from the Greek xenos meaning guest, foreigner, strange, foreign, and intrusive. *Webster 3d.*

xenoblast. Applied to crystals that have grown during metamorphism without the development of their characteristic faces. *Compare* idioblast. *Holmes, 1928.*

xenoblastic. Applied to a texture of metamorphic rocks in which the constituent mineral grains lack proper crystal facies. Corresponds to the allotriomorphic- or xenomorphic-granular texture of igneous rocks. *A.G.I.*

xenocryst. Applied to allothigenous crystals in igneous rocks that are foreign to the body of rock in which they occur. *A.G.I.* *Compare* xenolith.

xenogenite. Suggested by Posepny for mineral deposits that are of later origin than the wall rock. The word means foreigners, and refers to their later introduction. *Compare* idiogenite. *Fay.*

xenogenous. Having an origin elsewhere. *See also* xenogenite. *Hess.*

xenolite. A silicate of aluminum, related to fibrolite. *Fay.*

xenolith. A fragment of other rock or of an earlier solidified portion of the same mass enclosed in an igneous rock; an inclusion; an enclave. *Fay.*

xenomorphic. Rohrbach's textural name for those minerals in an igneous rock whose boundaries are determined by their neighbors. Its antithesis is automorphic. Synonym for allotriomorphic, over which it has priority. *Fay.*

xenomorphic-granular. A term for the texture called allotriomorphic-granular by Rosenbusch. It is the texture of rocks in which the individual crystals interfere, consequently they do not have their own crystal boundaries. *Rice.*

xenon. A zerovalent, very heavy, inert, gaseous element in group O of the periodic system. Present in the atmosphere in the proportion of about 1 part in 20 million parts by volume. Symbol, Xe; atomic number, 54; and atomic weight, 131.30. *Fay; C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-144.* Colorless; valence, 0?; density of gas, 5.887 ± 0.009 grams per liter; specific gravity of liquid, 3.52 (at −109° C), and of solid, 2.7 (at −140° C); melting point, −111.9° C; boiling point, −107.1° ± 3° C; and the gas is soluble in water. In a vacuum tube xenon gas produces a blue glow when excited by an electrical discharge. Formerly considered inert and invariably having a valence of 0, but uncertain compounds of xenon have been reported recently. There are 23 or 24 known isotopes (xenon 121 to xenon 143). Obtained by the fractional distillation of liquid air. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-44, B-144, B-236.*

xenothermal ore deposit. Deposit formed at high temperature but at shallow to moderate depth. *McKinstry.*

xenotime. A yttrium phosphate, YPO_4, often containing small quantities of cerium, erbium, and thorium, closely resembling zircon in crystal form and general appearance, and occurring in the same types of igneous rock, as in granites and pegmatites as an accessory mineral. An important source of the rare elements named. Tetragonal. Moderately radioactive; yellowish-brown, reddish-brown, brown, pink, grayish-white, yellow, or greenish; has a perfect cleavage. *A.G.I.; Fay; Crosby pp. 85-86.*

xerography. A method of copying designs by means of a photoconductive plate and an electrostatic powder. It has been applied in the production of transfers for the decoration of glass and ceramic ware. *Dodd.*

xerophreatophytes. Phreatophytes. which are able to resist drought when necessary. *A.G.I.*

xerophyte. An organism that characteristically lives under dry conditions. *A.G.I.*

xeroradiography. A process utilizing a layer of photoconductive material on an aluminum sheet upon which is placed an electrical charge. After X-ray exposure, the electrical potential remaining on the plate in the form of a latent electrical pattern is developed by contact with a cloud of finely dispersed powder. *ASM Gloss.*

XF Abbreviation for extra fine. *Webster 3d.*

X-frame brace. A reinforcement bracing of a square set in which two diagonal pieces of timber cross to form an X. *Fay.*

xihuitl. Mex. Turquoise found by the Aztecs near the City of Mexico. *Fay.*

X-irradiate. Usually capital X. To irradiate with X-rays. *Webster 3d.*

xl; Xl Abbreviation for crystal. Also, xtal, Xtal. *Webster 3d.*

X-l hydrophotometer. A new transistorized self-calibrating device. The electrooptical system gives direct measurement of light transmission through a fixed distance in sea water. Heart of system is a sensor unit which contain a light source, photocell, and lens system in a watertight assembly *Hy.*

xonotlite. A pale pink, white, or gray hydrous silicate of calcium. $5CaSiO_3.H_2O$. Compact fibrous. Identical with eakleite. Santa Barbara County, California; Isle Royale, Michigan. *English.*

Xpdite No. 1. Explosive; used in mines. *Bennett 2d, 1962.*

Xplc. Carbon black for explosives. *Bennett 2d, 1962.*

X-radiate. Often capital X. To expose to X-radiation. *Webster 3d.*

X-radiation. Usually capital X. a. Radiation composed of X-rays. *Webster 3d*. b. Exposure to X-rays. *Webster 3d.*

X-ray; roentgen ray. a. Any of the electromagnetic radiations having the nature of visible light but a wavelength approximately between 0.1 angstrom and 100 angstroms that is usually produced by bombarding a metallic target with fast electrons in vacuum so that the spectrum of the radiation emitted consists of lines characteristic of the target material and that has the properties of ionizing a gas upon passage through it, of penetrating through various thicknesses of all solids, of producing secondary radiations by impinging on material bodies, and of acting on photographic films and plates and on fluorescent screens. A photon or a stream of photons produced by excitation of an atom by impact of a fast-moving electron. *Webster 3d*. b. Electromagnetic radiation, of wavelength less than 500 angstroms, emitted as the result of deceleration of fast-moving electrons (bremsstrahlung, continuous spectrum) or decay of atomic electrons from excited orbital states (characteristic radiation). Specifically, the radiation produced when an electron beam of sufficient energy impinges upon a target of suitable material. *ASM Gloss.* Used in the identification of metals, minerals, and other crystalline substances and in the determination of their crystal structure. *Hess.* c. A photograph obtained by the use of X-rays. *Webster 3d.* d. As a verb, to expose to the action of X-rays. To examine, to treat, or to photograph with X-rays; to irradiate. To employ X-rays. *Webster 3d.*

X-ray absorbing glass. Glass that resists the penetration of X-rays and gamma rays and ordinarily contains a high content of lead oxide. *Webster 3d.*

X-ray analysis. Use of X-rays by Laue method, by X-ray spectrometry, crystal rotation, or powder rotation method to photograph and establish lattice structure of crystals. This gives identification of species and elucidates the structural bonding of the constituents' elements. The hardness of an X-ray refers to its penetrating power, and is in inverse proportion to its wave length. *Pryor, 3.*

X-ray crystal analysis. The process of passing X-rays through crystals to determine the spacing of atoms and hence the nature of the crystal structure; the traces of the rays are recorded on photographic film and from their interpretation the desired information is obatined. *Sinkankas.*

X-ray crystallography. It was shown by Max von Laue that the planes of atoms in crystals act as a diffraction grating to X-rays, which are scattered by them and provide an accurate means of determining the details of the internal atomic structure. X-ray photographs of metals provide information which in many cases cannot be obtained by ordinary microscopic methods. The lines produced by each element, or phase, are characteristic; the general pattern enables the crystalline structure to be identified. *Ham.*

X-ray diffraction. Reflection at definite and characteristic angles from space lattices of crystals of X-rays which have been caused to bombard them, thus giving data for identification of characteristic lattice structure of a given species of mineral. *Pryor, 3.*

X-ray drill. A small portable drill making a ⅝-inch or ¾-inch diameter core to a depth of about 150 feet. *Cumming.*

X-ray microscope. An instrument in which X-ray diffraction patterns of crystals are translated into pictures showing the relative positions of the atoms in a crystal as if in a photomicrograph of very high magnification. *Webster 3d.*

X-ray photograph; X-ray picture. A shadow picture made with X-rays. Especially a picture revealing the internal structure of objects that are opaque to ordinary light but which are transparent to X-rays. *Webster 3d.*

X-ray spectrograph. An instrument in which the material being analyzed is subject to an intense beam of X-rays. Secondary X-rays are emitted, separated according to element (by passing through a crystal such as rock salt or calcite) and the intensity measured; used to analyze ores, slags, refractories, and other nonmetallic materials. *See also* spectrophotometer. *Nelson.*

X-ray spectrometer. Apparatus developed by Bragg for beaming X-rays on a crystal, from the planes of which they are then reflected. *Pryor, 3.*

X-ray spectrum. The spectrum of an emission of X-rays that is obtained by dispersion with either a crystal grating or a ruled grating. *Webster 3d.*

X-ray tube. A high-vacuum tube in which a concentrated stream of electrons from a thermionic cathode strikes a metal target and produces X-rays from the side of the tube at right angles in a quantity and intensity that is controlled by the cathode temperature, with a wavelength and hardness that depends upon the voltage applied to the tube terminals, and with a spectral character determined by the material of the target. *Webster 3d.*

XRT rod bit. A CDDA noncoring bit having a set diameter of 1.225 inches. More commonly called a 1¼ XRT drill-rod bit. Also called 1¼ BH bit, 1¼ RT bit. *Long.*

X-sect Abbreviation for cross section. *Zimmerman, p. 32.*

xtal; Xtal Abbreviation for crystal. Also, xl; Xl. *Webster 3d.*

XU; xu Abbreviation for X unit(s). *Webster 3d.*

X unit. Usually capital X. A unit used in expressing the wavelengths of X-rays or gamma rays. It is about 10^{-11} centimeter or 10^{-3} angstrom. One X unit equals 1.00202 ± 0.00003 X 10^{-3} angstrom. Abbreviations, XU and xu. *NRC-ASA N1.1-1957; Webster 3d.*

xylain. a. A subvariety of provitrain in which the woody origin of the cellular structure is microscopically visible. *Compare* periblain; suberain. *A.G.I.* b. Those constituents of coal derived from lignified tissues in which structures were retained. *A.G.I.*

xylanthite. A variety of fossil resin. *Tomkeieff, 1954.*

xylanthrax. Wood coal; charcoal: in distinction from mineral coal. *Standard, 1964.*

xylem. A complex plant vascular tissue, composed of such cells as tracheids, vessels, wood fibers, ray cells, and parenchyna cells; same as wood. *A.G.I.*

xylenite. A maceral composed of xylain. *Tomkeieff, 1954.*

xylinite. a. A variety of provitrinite. The micropetrological constituent, or maceral, of xylain. It consists of wood (xylem or lignified tissues) almost jellified in bulk but still showing faint traces of cell walls and resin contents under the microscope. *A.G.I.* b. A distinction of telinite, based on botanical origin (xylem or lignified tissues). To be used if desired but considered unnecessary by the Heerlen Congress of 1935. *A.G.I.*

xylite. Fibrous woody lignite. *Tomkeieff, 1954.*

xylith. A petrographic variety of lignite composed almost entirely of anthraxylon. *A.G.I.*

xylocryptite. Same as scheererite. *Tomkeieff, 1954.*

xyloid coal. Brown coal or lignite mostly derived from wood. *Tomkeieff, 1954.*

xyloidin. An explosive compound produced by the action of nitric acid upon starch or woody fiber, resembling guncotton. *Fay.*

xyloid lignite. A more or less descriptive term commonly, and to some extent indiscriminately, used in coal literature to apply to certain kinds of lignite. *A.G.I.*

xylolith. *See* magnesium-oxychloride cement. *Bennett 2d, 1962.*

xylonite. A thermoplastic material of nitrocellulose origin and resembling celluloid frequently used in making models for analysis by photoelasticity. *Ham.*

xylopal. *See* wood opal. *Fay.*

xyloretinite. A white hydrocarbon similar to hartite found in fossil wood. *Tomkeieff, 1954.*

xylotile. A silicate of iron and magnesium, $(Mg,Fe'')_3Fe'''_2Si_7O_{20}.10H_2O$, with Mg:Fe approximately 6:1. *Hey 2d, 1955.*

xylovitrain. a. Those coal constituents derived from lignified plant tissues and from which all structure has disappeared. *A.G.I.* b. Structureless vitrain. *Tomkeieff, 1954.*

Y

y a. Symbol for unknown quantity. *Webster 3d.* b. Symbol for ordinate, y-coordinate, or vertical coordinate in a plane Cartesian coordinate system. *Webster 3d.* c. Symbol for depth. *Zimmerman, p. 34.* d. Symbol for mole fraction in vapor. *Zimmerman, p. 70.* e. Symbol for equilibrium constant. *Zimmerman, p. 42.* f. With a superior asterisk as y^*, the symbol for the equilibrium value of the mole fraction in vapor or of the mole ratio in vapor. *Zimmerman, p. 42.* g. Abbreviation for year(s). *Webster 3d.* h. Abbreviation for yard(s). *Webster 3d.* i. Symbol for deviation from the arithmetic mean. *Zimmerman, p. 138.*

y a. Symbol for ordinate, y-coordinate, or vertical coordinate in a plane Cartesian coordinate system. *Webster 3d.* b. One of the three rectangular coordinates (x, y, z). *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* c. Symbol for altitude. *Zimmerman, p. 150.* d. Symbol for height. *Handbook of Chemistry and Physics, 45th ed., p. F-102.* e. Symbol for depth. *Handbook of Chemistry and Physics, 45th ed., p. F-102.* f. Symbol for thickness. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-102.* g. Symbol for mole fraction in vapor. *Zimmerman, p. 148.* h. With a superior asterisk as y^*, the symbol for the equilibrium value of the mole fraction in vapor. *Zimmerman, p. 148.*

Y a. Chemical symbol for yttrium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.* b. Symbol for unknown quantity. *Webster 3d.* c. Symbol for admittance. *Webster 3d.* d. Symbol for mole ratio in vapor. *Zimmerman, p. 70.* e. Symbol for item of data. *Zimmerman, p. 59.* f. Overscored as Y, the symbol for mean of data. *Zimmerman, p. 67.* g. Abbreviation for year(s). *Webster 3d.*

Y a. Symbol for admittance, the reciprocal of impedance. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* b. Symbol for Young's modulus of elasticity. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-101.* c. Symbol for mole ratio in vapor. *Zimmerman, p. 70.*

yag. Acronym and abbreviation for yttrium-aluminum garnet. *BuMines Bull. 630, 1965, p. 1,078.*

Y-alloy. An aluminum-base alloy of duralumin type, containing 4.0 percent copper, 1.5 percent magnesium, 0.7 percent silicon, 2.0 percent nickel, 0.6 percent iron, and 0.2 percent titanium. It has properties similar to those of duralumin. *C.T.D.*

yamaskite. A medium- or fine-grained rock composed of basaltic hornblende and titanaugite, with a small amount of anorthite, and accessory iron ores and biotite; olivine-bearing varieties are also known. *Holmes, 1928.*

yankee. In founding, a molder's lifting tool having a curved shank. *Standard, 1964.*

yanolite. Same as axinite. *Standard, 1964.*

yantar. Russian name for amber. *Tomkeieff, 1954.*

yard. The British standard of length, equal to 36 inches, 3 feet, or 0.9144 meter. *Ham.*

yardage. a. Price paid per yard for mining or cutting coal, usually by contract agreement, not on a tonnage basis. *B.C.I.* b. The extra compensation a miner receives in addition to the mining price for working in a narrow place or in deficient coal. Usually at a certain price per yard advanced. *Fay.* c. A system of payment to workmen in accordance with the number of yards driven, repaired, or packed; the length in yards of a drivage or face which a miner or contractor has excavated in a week or from one measuring day to the next. Also called yard work. *See also* piecework. *Nelson.* d. Relates to cubic yards of earth excavated. *Crispin.*

yardage man. In bituminous coal mining, a laborer who pries down loose roof rock with a bar after coal has been blasted from working face; picks out seam partings (layers of rock) in the coal working face prior to blasting, using a long handled pick. *D.O.T. 1.*

yardangs. Distinctive landforms carved out by the wind in desert regions. They consist essentially of round-bottomed chutes or troughs, separated by sharp ridges that range from a few inches to 25 feet or more in relief *Rice.*

yardang trough. A trough excavated by wind action, between two yardangs. *Leet.*

yard price. The price paid per yard driven (in addition to the tonnage prices) for roads of certain widths and driven in certain directions. *See also* yardage, b. *Fay.*

yard service. Transportation of rock from the quarry bank until the time it reaches the main transportation lines. *Fay.*

yardstick. A graduated, wooden, measuring scale 36 inches long. Such a scale made of metal would properly be called a 36-inch scale. *Crispin.*

yard work. *See* yardage, c. *Nelson.*

yark. Derb. To jerk a rope or other appliance used for lifting or drawing. *Fay.*

Yarmouth. Post-Kansan interglacial. *A.G.I. Supp.*

yarn. As applied to minerals, an asbestos material spun and prepared for weaving. *Sinclair, W. E., p. 484.*

yatalite. A pegmatoid rock (associated with a titaniferous series of diopside syenites and diorites) containing as its chief constituent uralitic actinolite (after diopside) wtih poikilitic inclusions of magnetite and sphene. The other minerals present are albite with microcline titaniferous magnetite, apatite, and sphene. *Holmes, 1928.*

yavapaiite. A mineral, $KFe(SO_4)_2$, monoclinic crystals on one specimen from the United Verde copper mine, Jerome, Ariz. Named after the Yavapai tribe, who inhabit the region around Jerome. *Hey, M.M., 1961.*

Y-axis; y-axis. a. One of the three optic axes (X, Y, and Z) in a biaxial crystal. The Y-axis is the intermediate optic axis at right angles to the plane containing optic axes X and Z. Light vibrating parallel to the Y-axis is called the intermediate ray, the Y-ray, and the β-ray. The middle-value index of refraction n_β in biaxial minerals is the index of the intermediate ray vibrating parallel to the Y-axis. *Bureau of Mines Staff.* b. The axis of ordinates in a plane Cartesian coordinate system. *Webster 3d.* c. One of the three axes in a three-dimensional rectangular coordinate system. *Webster 3d.*

Yazoo River. When streams raise their courses above the level of their flood plains, their tributaries cannot join the main stream. Usually the tributaries flow along the side of the flood plain until they reach some point farther downstream where the main stream swings against the valley wall. Many of the Mississippi behave in this manner. Because the Yazoo River is a good case, it is taken as the type example, and tributaries that run for some distance parallel to the main stream are called Yazoo rivers. *A.G.I.*

Yb Chemical symbol for ytterbium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Y-block. A test casting, in the form of the letter Y, used to appraise cast iron and other low-shrinkage alloys. Standard test coupons are cut from the leg of the Y-block. *ASM Gloss.*

y-connected. *See* wye-connected. *I.C. 7962, 1960, p. 23.*

Y-coordinate; y-coordinate. a. An ordinate in a plane Cartesian coordinate system. *Webster 3d.* b. One of the three coordinates in a three-dimensional rectangular coordinate system. *Webster 3d.*

yd Abbreviation for yard. *BuMin Style Guide, p. 62.*

year. Measure of time. Solar year (successive intervals between transits of first point of Aries) is 365.2422 mean solar days; civil year is 365.2425; and sidereal year 365.2564 days. *Pryor, 3.*

yeast. Fungi belonging to the ascomycetes in which the usual and dominant growth form is unicellular. *I.C. 8075, 1962, p. 64.*

yeatmanite. A silicoantimonate of manganese and zinc, $(Mn,Zn)_{16}Sb_2Si_4O_{29}$, as brown triclinic crystals from Franklin Furnace, N.J. *Spencer, 15, M.M., 1940.*

yed. Leic. *See* head, d. *Fay.*

yellow antimony; alpha antimony. a. Yellow allotropic form of antimony. Obtained by oxidizing antimony hydride at a low temperature. *Bennett 2d, 1962.* b. An unstable form of antimony. It can be obtained during the electrolysis of antimony trichloride, $SbCl_3$. As yellow antimony (alpha antimony) is deposited on the electrode, it forms a solid solution in the antimony chloride. When this solution is scratched or heated, metallic antimony (beta antimony) and clouds of antimony chloride form instantaneously, giving rise to the term explosive antimony. *CCD 6d, 1961.* There are four allotropic forms of antimony: (1) yellow antimony; (2) black antimony; (3) explosive antimony; and (4) metallic antimony or ordinary antimony. These allotropic forms are also designated alpha antimony (yellow antimony); beta antimony (metallic antimony); and gamma antimony. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-100, D-34.*

yellow arsenic. Same as orpiment. *Fay.*

yellow boy. Deposit from the acid waters of a mine or partial neutralization. Ferrous anhydride and other impurities including fine clay carried down with it. *Zern.*

yellow brass. An alloy of 70 parts copper and 30 parts zinc. It is an inferior alloy used where strength is not essential. *Crispin.*

yellow cake. a. Applied to certain uranium concentrates produced by mills. It is the final precipitate formed in the milling process. Usually considered to be ammonium diuranate, $(NH_4)_2U_2O_7$, or sodium diuranate, $Na_2U_2O_7$, but the composition is variable and depends on the precipitating conditions. *BuMines Bull. 630, 1965, p. 1,013.* b. A common form of triuranium octoxide, U_3O_8, is yellow cake, which is the powder obtained by evaporating an ammonia solution of the oxide. *CCD 6d, 1961.*

yellow coal. Same as tasmanite. *Tomkeieff, 1954.*

yellow copper; yellow copper ore. Same as chalcopyrite. *Fay.*

yellow copperas. *See* copiapite. Fay.

yellow copper ore. Synonym for chalcopyrite. *Hey 2d, 1955.*

yellow corundum. See oriental topaz.

yellow dog. Field name for a drill tripod or derrick lamp, consisting of a metal container with two spouts holding cotton wicks, on which the burning oil gives a very yellow light. *Long.*

yellow earth. Impure yellow ocher. *Webster 3d.*

yellow gravel. Eng. The lower subdivision of the Aptian sponge gravel, Faringdon, Berkshire. *Arkell.*

yellow ground. a. Weathered and decomposed kimberlite which extends 35 to 140 feet below the ground surface. It is richer in diamond than unweathered kimberlite in the same pipe. *I.C. 8200, 1965, p. 31.* b. S. Afr. The upper section of a diamond pipe, consisting of oxidized blue ground. *Beerman.*

yellow heat. A division of the color scale, generally given as about 1,090° C (1,994° F). *Bureau of Mines Staff.*

yellow lead ore. Same as wulfenite. *Webster 3d.*

yellow metal. a. Gold. *Webster 2d.* b. Muntz metal. *Webster 3d.*

yellow ocher. a. A mixture of limonite usually with clay and silica. Used as a pigment. *Webster 3d.* b. A moderate orange yellow that is yellower and darker than deep chrome yellow. *Webster 3d.*

yellow ore. a. Carnotite ore. *Ballard.* b. Corn. Chalcopyrite. *Fay.*

yellow orpiment. King's yellow, As_2S_3. *Webster 2d.*

yellow ozokerine. A product resembling vaseline, but less homogeneous, produced from crude ozokerite. *Fay.*

yellow prussiate. *See* potassium ferrocyanide.

yellow pyrite. Same as chalcopyrite. *Standard, 1964.*

yellow quartz. *See* citrine. *C.M.D.*

yellow ratsbane. Orpiment. *Webster 2d.*

yellow sands. Eng. The basal part of the Permian, Durham. *Arkell.*

yellow tellurim. Same as sylvanite. *C.M.D.*

yellow ultramarine. A pigment consisting of barium chromate. *Standard, 1964.*

yellow uranium oxide. *See* sodium uranate.

yellow ware. A yellow semivitreous ware or an earthenware with a colorless, clear glaze. *ASTM C242-60T.*

yenite. A rejected synonym for ilvaite. *C.T.D.*

yentnite. A coarse-grained granitoid rock essentially containing primary scapolite, plagioclase (oligoclase andesine), and biotite. *Holmes, 1928.*

yesosos. Mex. Copper ore in which calcite or fluorspar predominates as a matrix, Aguas. *Fay.*

yeth; yeath. English miners' term for black carbonaceous shale or clay. *Tomkeieff, 1954.*

yeild. a. The sliding or reduction in height of a support to accommodate roof pressure.

Nelson. b. The weight of valuable metal obtained per ton of ore. *Nelson.* c. The tonnage of coal per yard advance of a face, or per acre of coal seam worked. *Nelson.* d. The proportion of coal or ore obtained in mining; the product of a metallurgical process; extraction; recovery. *Fay.* e. To give way; to crush. Said of pillars of coal when they commence to give way or crush. *Fay.* f. The percentage of run-of-mine material which is marketable. *Hudson.* g. That portion of the weight of a rough diamond which constitutes the weight of a cut and polished gemstone or a diamond set in a tool. Expressed as a percentage of the rough weight. *I.C. 8200, 1964, p. 149.* h. The amount of a product obtained from any operation expressed as a percentage of the feed material. *B.S. 3552, 1962.* i. The permanent set of a metal when stressed beyond its elastic limit. *Ham.* j. Of concrete, the volume of compacted fresh concrete produced per 94 pound bag of cement. *Taylor.* k. Of lime, the volume of putty at a standard consistence that is obtained from a unit volume of quicklime. *Taylor.* l. The total energy released in a nuclear explosion. It is usually expressed in equivalent tons of TNT (2,4,6-trinitrotoluene, $C_7H_5N_3O_6$) (the quantity of TNT required to produce a corresponding amount of energy). Low yield is generally considered to be less than 20 kilotons; low-intermediate yield from 20 to 200 kilotons; and intermediate yield from 200 kilotons to 1 megaton. There is no standard term to cover yields above 1 megaton. *L&L.*

yielding arches. Steel arches installed in underground openings as the ground is removed. They are employed to support loads caused by changing ground movement or faulted and fractured rock. They are designed so that when the ground load exceeds the design load of the arch as installed, yielding takes places in the joint of the arch, permitting the overburden to settle into a natural arch of its own and thus tending to bring all forces into equilibrium. The arch is stronger after this yielding than before because of increased joint overlap. *Lewis, pp. 59, 61.*

yielding floor. A soft floor which heaves and flows into open spaces when subjected to heavy pressure from packs or pillars. *See also* creep. *Nelson.*

yielding prop. A steel prop which is adjustable in length and incorporates a sliding or flexible joint which comes into operation when the roof pressure exceeds a set load or value. *See also* hydraulic chock; hydraulic prop. *Nelson.*

yielding support. A support which incorporates a sliding or flexible joint or stilt to accommodate early pressure and thus delay damage and distortion of the support. Friction or hydraulic devices may be used so that a support, when subjected to a load above its set load, yields mechanically rather than by distortion. *Nelson.*

yield loss. The difference between the actual yield of a product and the yield theoretically possible (based on the reconstituted feed) of a product with the same properties (usually percentage of ash). *B.S. 3552, 1962.* Also called washing error (undesirable usage).

yield-pillar system. A method of roof control whereby the natural strength of the roof strata is maintained by the relief of pressure in working areas and the controlled transference of load to abutments which are clear of the workings and roadways. The methods consists in making certain coal pillars yield in small amounts. *See also* double packing. *Nelson.*

yield point. The lowest stress at which strain increases without increase in stress. Only a few materials exhibit a true yield point; for other materials the term is sometimes used as synonymous with yield strength. *Compare* yield strength; elastic limit; apparent elastic limit; proportional limit. *Ro.*

yield point of clay-water pastes. The minimum stress at which continuous flow takes place. This yield point will be evident in tensile, compression, torsion, and shear tests but will vary with the rate of stressing and will depend on the manner of specimen preparation. *ACSG, 1963.*

yield strength. The stress at which a material exhibits a specified deviation from proportionality of stress and strain. An offset of 0.2 percent is used for many metals. *ASM Gloss.*

yield strength elongation. A measure of ductility of a material. The strain or elongation corresponding to the yield strength. *H&G.*

yield stress. a. The lowest stress at which extension of the tensile test piece increases without increase in load. It is determined by observing the fall of the testing lever and checked by a pair of dividers on the original gage length. Many materials do not indicate a defined yield stress and in such cases the proof stress is used. *See also* working stress; high tensile steel; mild steel. *Ham.* b. Minimum stress required to shear (that is, exceed elastic recovery) a suspension such as the dense media used in mineral concentration. *Pryor, 3.*

yield value; yield point. Stress needed to deform a plastic system sufficiently to initiate flow. *Pryor, 3.*

yig. Acronym and abbreviation for yttrium-iron garnet. *BuMines Bull. 630, 1965, p. 1,078.*

Y level. A surveyor's level with a telescope supported in y-shaped rests and as a result capable of being rotated around its own axis or of being taken out of the supports and turned end for end for purposes of adjustment. *Compare* dumpy level. *Webster 3d.* Also called Y-theodolite. *Pryor, 3.*

yoderite. A highly pleochroic purple mineral, $Mg_2Al_6Si_4O_{18}(OH)_2$; monoclinic; occurring as a quartz-yoderite-kyanite-talc schist at Mautia Hill, Kongwa, Tanzania. *Hey, M.M., 1961.*

yogoite. A rock composed of approximately equal amounts of pyroxene and feldspar; a proposed name. It was later found to contain also, equal amounts of orthoclase and plagioclase, consequently falling under the monzonite group. The name is derived from Yogo Peak, Little Belt Mountains, Mont. *Webster 2d.* Osolete. *A.G.I.*

Yogo sapphire. Dark-blue corundum from Yogo Gulch, Mont. *Schaller.*

yoke. a. An interconnecting link between the twin cylinders of a hydraulic-feed diamond drill through which the action of the hydraulic-feed cylinders is transmitted to the drill rods and bit. *Long.* b. A clamp fitted to the casing at the collar of a drill hole, which when anchored by means of wedge bolts prevents grout pressure from forcing the casing out of the hole. *Long.* c. *See* spreader beam. *Ham.*

yoking. a. Eng. A collision of mine cars. *Fay.* b. Eng. In the plural, stakes placed at regular intervals for the purpose of asserting the ownership or making the boundaries of a mining claim. *Standard, 1964.*

yolk coal; yolks. Scot. Free or soft coal. *Fay. See also* apple coal.

yolks (Forest of Dean). Nodules. Arkell.

Yoredale rocks. Eng. The upper beds of the English Carboniferous limestone series, or those lying between the Carboniferous limestone proper and the millstone grit. They contain celebrated lead mines. *Fay.*

Yorkian. A term which has been proposed (instead of Westphalian) for the Coal Measures strata between the Lanarkian and the Staffordian. *Nelson.*

Yorkshire stone. A building stone of the English millstone grit. *Fay.*

yoshimuraite. Orange-brown tabular crystals or stellate groups in an alkali-pegmatite from the Noda-Tamagawa mine, Iwate prefecture and the Taguchi mine, Aichi prefecture, Japan. *Hey, M.M., 1961.*

young; youthful. Being in the stage of increasing vigor and efficiency of action; said of some streams; also, being in the stage of accentuation of and a tendency toward complexity of form; said of some topography resulting from land sculpture. *Compare* mature; old. *Fay.*

young river. A river which has begun to form a drainage system in newly raised or newly deformed land. It is characterized by a shallow, ungraded channel bordered by numerous lakes; by having but few short tributaries; and from variation in the hardness of its bedrocks, by frequent waterfalls. *Fay.*

youstone. Eng. An old term for Chinese jade, or nephrite. *Fay.*

youth. That stage in the development of streams when they are increasing in vigor and efficiency; or in land sculpture when topographic forms are being accentuated and are tending toward complexity. *Compare* maturity; old age. *See also* young. *Fay.*

youthful. *See* young.

yowah nut. A term which has been used for a subvariety of boulder opal which occurs in the form of tiny boulders. Usually of walnut or almond size. The center of some of these is opal, at other times ironstone covered with a thin band of opal. They are less often hollow. From near Yowah station in west Queensland, Australia. *Shipley.*

yo-yo. A device used in conjunction with belt conveyors that consists of a short reversible pan or flight conveyor, set at right angles to the belt and driven by it. When a mine car has been loaded with coal, the yo-yo is reversed, and this causes the coal to be dumped into the empty car behind, without having to stop the belt between loads. *Kentucky, p. 232.*

YP Abbreviation for yield point. *Webster 3d.*

Ypresian. Lower Eocene. *A.G.I. Supp.*

ys Abbreviation for yield strength. *BuMin Style Guide, p. 62.*

ytong. *A* cellular (lightweight) concrete made in block form from shale and lime, and subsequently hardened by autoclave treatment. *Compare* thermalite ytong. *Dodd.*

Y-track. A track at approximately right angles to a line of railroad, and connected with it by two switches, the plan of the whole approaching the form of a Y with a line joining the ends of its arms; used in place of a turntable. *Standard, 1964.*

ytterbia. *See* ytterbium oxide. *CCD 6d, 1961.*

ytterbite. Same as gadolinite. *Fay.*

ytterbium. One of the rare-earth metals of the yttrium group. Metallic luster; malleable; insoluble in water or reacts slowly with water; and soluble in dilute acids and in liquid ammonia. Used in special alloys. Symbol, Yb; valences, 2 and 3; atomic number, 70; and atomic weight, 173.04. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-145.* Bright silvery luster; soft; ductile; isometric; stable in air; melting point, 824° ± 5° C; and boiling point, 1,427° C. Two allotropic forms: (1) alpha ytterbium; specific gravity, 6.977; and stable up to 789° C or 798° C; and (2) beta ytterbium; specific gravity, 6.54; and stable from 789° C or 798° C up to the melting point. There are 14 known isotopes (ytterbium 164 to ytterbium 177). Occurs with other rare-earth elements in a number of rare minerals, but is obtained commercially from monazite sand which contains about 0.03 percent ytterbium. Ion-exchange techniques are used to separate ytterbium and other rare-earth elements from one another, and lanthanum or misch metal is used to reduce ytterbium oxide to ytterbium. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-144, B-236.*

ytterbium oxide; ytterbia. Colorless when free of thulia but tinted brown or yellow when containing thulia; Yb_2O_3. The weakest base of the yttrium group with the exception of scandia and lutetia. Slightly hygroscopic; absorbs water and carbon dioxide from the air; specific gravity, 9.2; and is soluble in hot dilute acids and less soluble in cold acids. Used in special alloys and in dielectric ceramics. *CCD 6d, 1961.* Molecular weight, 394.08; specific gravity, 9.17; and insoluble in water. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-236.*

yttergranat. A calcium-iron garnet containing a small amount of yttria. A variety of andradite. *Fay.*

yttria. A rare-earth oxide, not a mineral. *Bureau of Mines Staff.*

yttrialite. One of the rare-earth minerals. It is a silicate of the yttrium metals (43 to 47 percent); thorium (10 to 20 percent), and cerium metals (5 to 8 percent). Color on the fresh fracture olive-green, changing to orange-yellow on surface. Specific gravity 4.575. Found in Texas. *CCD 6d, 1961.*

yttrium. A metallic element in group III of the periodic system. It is usually classed with the rare earths. Found in gadolinite and other rare minerals. Symbol, Y; valence, 3; atomic number, 39; and atomic weight, 88.905. *C.T.D.; Fay; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-145.* Gray-black or dark gray metal; silvery luster; hexagonal; specific gravity, 4.34 or 4.45; relatively stable in air when massive, turnings ignite in air, and it is very unstable in air when finely divided; melting point, 1,495° ± 5° C; boiling point, 2,927° C; decomposes water, especially hot water; very soluble in dilute acids; and soluble in hot potassium hydroxide solutions. There are 15 known isotopes (yttrium 82 to yttrium 96), all of which are synthetic and radioactive except natural yttrium 89. Radioactive yttrium 90 exists in equilibrium with its parent strontium 90 as products of atomic explosions. Usually associated with rare earths which are common impurities in yttrium. Obtained commercially from monazite sand which contains about 3 percent yttrium and from the mineral bastnaesite which contains about 0.2 percent yttrium. Produced by reduction of the fluoride with calcium metal in calcium fluoride-lined bombs, using zinc fluoride as an additive. Used to reduce the grain size in chromium, molybdenum, zirconium, and titanium, to increase the strength of aluminum and magnesium alloys, in iron alloys, as an additive in other alloys, as a deoxidizer for vanadium and other nonferrous metals, in nuclear technology because of its high neutron transparency, and in yttrium garnets. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-145, B-237; CCD 6d, 1961.*

yttrium-aluminum garnet. Synthetic; $3Y_2O_3.5Al_2O_3$ or $Y_3Al_5O_{12}$; and has useful magnetic properties. Actually not a true garnet and should not be confused with any of the silicate minerals called garnets in the garnet group of minerals. Manufacture of yttrium-aluminum garnets is a commercial use of yttrium. Used in lasers and in microwave and other electronic applications. Acronym and abbreviation, yag. *Bull. 630, 1965, p. 1,078; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-145.*

yttrium carbide. YC_2; molecular weight, 112.92; yellow microcrystalline; specific gravity, 4.13^{18}. *Bennett 2d, 1962.*

yttrium carbonate. White to reddish; $Y_2(CO_3)_3.3H_2O$; molecular weight, 411.88; and insoluble in water. Used in incandescent gas mantles. Soluble in dilute mineral acids and in ammonium carbonate solutions; slightly soluble in aqueous carbon-dioxide solutions; and insoluble in alcohol and in ether. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-237.*

yttrium garnet. A variety of garnet containing a small amount of yttrium earths. *See also* yttergranat. *Fay.*

yttrium-iron garnet. Synthetic; $3Y_2O_3.5Fe_2O_3$ or $Y_3Fe_5O_{12}$; and has useful magnetic properties. Actually not a true garnet and should not be confused with any of the silicate minerals called garnets in the garnet group of minerals. Manufacture of yttrium-iron garnets is a leading commercial use of yttrium. Used as electronic transmitters, as filters for selecting or tuning microwaves, and as transmitters and transducers of acoustic energy. Acronym and abbreviation, yig. *Bennett 2d, 1962 Add.; Bull. 630, 1965, p. 1,078; CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-145.*

yttrium oxide; yttria. Colorless to yellowish; Y_2O_3; molecular weight, 225.81; isometric; specific gravity, 4.84 or 5.01; melting point, 2,410° C; insoluble in water and in alkalies; and soluble in dilute mineral acids. Used in incandescent gas mantles. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-237, B-277.* Also used in special ceramics, in optical glasses, and in arc welding. *CCD 6d, 1961.*

yttrium sulfate. White; $Y_2(SO_4)_3$; molecular weight, 465.99; specific gravity, 2.52; decomposes at 1,000° C; and soluble in water and in a saturated potassium sulfate solution. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-237.*

yttrocrasite. A very rare, moderately to strongly radioactive, possibly orthorhombic, massive mineral, $(Y,Th,U,Ca)_2(Ti,Fe_3,W)_4O_{11}$, occurring in granite pegmatites; black, coated with a dull brown alteration product. *Crosby, p. 86.*

yttrogarnet. An artificial mineral, $3Yt_2O_3.5Al_2O_3=Yt_3Al_2(A10_4)_3$, forming a continuous series of cubic mixed crystals with spessartine, $[Mn_3Al_2(SiO_4)_3]$. It is presumably present in natural yttrium-bearing spessartine (yttergarnet, yttriogarnet, emildine, erinadine). At about 1,970° C, it is transformed to yttroalumite. *Spencer 19, M.M., 1952.*

yttrotantalite. A tantalate and niobate of iron, calcium, yttrium, erbium, cerium, etc., occurring in black-brown orthorhombic crystals. A moderately radioactive mineral, $(Fe,Y,U,Ca,etc.)(Cb,Ta,Zr,Sn)O_4$, occurring in pegmatites. Also called yttrocolumbite. *Fay; Crosby, pp. 86-87; Dana 7, v. 1, p. 763.*

yttrotungstite. To replace the name 'thorotungstite' for a Malay mineral which contains rare earths (Yt, Ce) and no Th. *Spencer 19, M.M., 1952.*

yugawaralite. A monoclinic zeolite, $Ca_4Al_7Si_{20}O_{54}.14H_2O$, in altered andesite tuffs near the Yugawara hot spring, Kanagawa, Japan. Named from locality. *Spencer 20, M.M., 1955.*

yukonite. An aplite containing sodic plagioclase, abundant quartz, accessory biotite, apatite, and opaque oxides. An aplite with the composition of trondjemite. *A.G.I.*

yustone. Jade. *Shipley.*

Z

z a. Symbol for unknown quantity. *Webster 3d.* b. One of the three rectangular coordinates (x, y, z). *Webster 3d.* c. Symbol for the valency of an ion. *Zimmerman, p. 59.* d. Symbol for altitude. *Zimmerman, p. 7.* e. Symbol for elevation above datum plane or distance above datum plane. *Zimmerman, p. 41.* f. Abbreviation for zero. *Webster 3d.* g. Abbreviation for zone(s). *Webster 3d.*

z a. One of the three rectangular coordinates (*x, y, z*). *Zimmerman, p. 164.* b. Symbol for valence. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-102.* c. Symbol for the valency of an ion. *Zimmerman, p. 171.* d. Symbol for electrochemical equivalent. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-102.*

Z a. Symbol for unknown quantity. *Webster 3d.* b. Symbol for atomic number. *Webster 3d.* c. Symbol for gram-equivalent weight. *Zimmerman, p. 51.* d. Symbol for the number of molecular collisions per unit time or molecular collision frequency. *Zimmerman, p. 75.* e. Symbol for elevation above datum plane or distance above datum plane. Also given as z. *Zimmerman, p. 41.* f. Symbol for impedance. *Webster 3d.* g. Symbol for self-inductance. *Zimmerman, p. 57.* h. Abbreviation for zinc, but usually the chemical symbol Zn is used. *Webster 3d.* i. Abbreviation for Zone(s) and for zone(s). *Webster 3d.* j. Symbol for the time of day at the Prime Meridian which passes through Greenwich, England; for example, 0730 Z; for Greenwich (England) Civil Time, also abbreviated GCT; and for Greenwich (England) Mean Time, also abbreviated GMT; for example, nationwide synoptic weather reports for 1830 Z. *Zimmerman, p. 424; Bureau of Mines Staff.* k. Symbol for zenith distance, also abbreviated ZD. *Webster 3d.* l. Symbol for modulus of section. *Ham.*

Z a. Symbol for atomic number. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-102.* b. Symbol for gram-equivalent weight. *Zimmerman, p. 169.* c. Symbol for the number of molecular collisions per unit time or molecular collision frequency. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-102.* e. Symbol for elevation above datum plane or distance above datum plane. *Zimmerman, p. 185.* f. Symbol for impedance. *Handbook of Chemistry and Physics, 45th ed., 1964, p. F-102.* g. Symbol for self-impedance. *Zimmerman, p. 259.*

zaffer. Mixed arsenates and oxides of cobalt produced by roasting sulfidic ores. *Pryor, 3.*

zaffer blue. Same as cobalt blue. *Fay.*

Zahn cup. An orifice type viscometer; it has been used for the determination of the viscosity of glaze suspensions. *Dodd.*

Zamac alloys. Trade name for zinc die casting alloys. *Bureau of Mines Staff.*

zanthochroite. Amorphous cadmium sulfide; greenockite is the crystalline form. *American Mineralogist, v. 3, No. 7, July, 1918, p. 158.*

zaratite. A massive, vitreous, emerald-green, hydrous nickel carbonate, $H_{12}Ni_3CO_{11}$. Occurs usually as an incrustation. Also called emerald nickel. *Fay.*

zarnich; zarnec. Native sulfide of arsenic, including sandarac and orpiment. *Webster 2d.*

zavaritskite. A mineral, BiOF, from Sherlova Gory, East Transbaikal, U.S.S.R. *Hey, M.M. 1964; Fleischer.*

zawn. A cavern. *C.T.D.*

zax. A tool for trimming and puncturing roofing slates. *Webster 3d.*

Z-axis; z-axis. a. One of the three optic axis (X, Y, and Z) in a biaxial crystal. The Z-axis is the axis of least ease of vibration. Light vibrating parallel to the Z-axis travels with minimum velocity and is called the slow ray, the Z-ray, and the γ-ray. The highest index of refraction n_γ in biaxial minerals is the index of the slow ray vibrating parallel to the Z-axis. *Bureau of Mines Staff.* b. One of the axes in a three-dimensional rectangular coordinate system. *Webster 3d.* c. A line perpendicular to the plane of a polar coordinate system at the pole. *Webster 3d.*

Z-coordinate; z-coordinate. One of the three coordinates in a three-dimensional rectangular coordinate system. *Webster 3d.*

ZD Abbreviation for zenith distance. *Webster 3d.*

zeasite. An old name for a variety of fire opal. *Fay.*

zebra dolomite. Hydrothermally altered dolomite in the Leadville District of Colorado consisting of bands, generally parallel to bedding, that are light gray and coarsely crystalline, alternating with darker fine-grained bands. *A.G.I. Supp.*

zebra jasper. A dark brown jasper with lighter brown streaks. From India. Same as zebra stone. *Shipley.*

zebra rock. A banded quartzose rock of lower Cambrian age found in East Kimberly, Western Australia. *Hess.*

zebra roof. A type of roof for basic open-hearth steel furnaces, the feature being alternate rings of chrome magnesite and of silica refractories, hence the name from the dark and light stripes across the roof. The zebra roof was introduced in 1947 with a view to combining the merits of the two types of refractory; by 1952 there were 300 such roofs in service in the United States alone, but the zebra roof has now been displaced by the all-basic roof. *Dodd.*

zebra stone. Brown limonite with lighter brown layers of ancient shell material. *Shipley.*

Zeissig green. An underglaze color that has been used for pottery decoration. It is made by calcining a mixture of 10 parts barium chromate, 8 parts whiting, and 5 parts boric acid. *Dodd.*

Zeiss konimeter. A portable dust-sampling instrument. *See also* konimeter. *Nelson.*

Zellweger furnace. A long-hearth reverberatory furnace used at Iola, Kans. *Fay.*

Zemorian. Lower lower Miocene. *A.G.I. Supp.*

zenith. Point in celestial sphere directly above observer. *Pryor, 3.*

zeolite mimetica. Same as dachiardite. *English.*

zeolite process. a. A base exchange method of treating hard water, in which the zeolite, contained in a tank, removes the salts. The zeolite layer is regenerated by back flushing with brine. The process is not suitable for water containing sulfate of magnesium or any chloride, but in other respects it is a simple and effective method. *See also* colloidal water treatment. *Nelson.* b. *See* base exchange process. *Cooper, p. 371.*

zeolites. A class of hydrated silicates of aluminum and either sodium or calcium or both, of the type $Na_2O.Al_2O_3.nSiO_2.xH_2O$. The term originally described a group of naturally occurring minerals. The natural zeolites are analcite, chabazite, heulandite, natrolite, stilbite, and thomsonite. Artificial zeolites are made in a variety of forms ranging from gelatinous to porous and sandlike and are used as gas adsorbents and drying agents as well as water softeners. Both natural and artificial zeolites are now used extensively for water softening. The term zeolite now includes such diverse groups of compounds as sulfonated organics or basic resins, which act in a similar manner to effect either cation or anion exchange. *CCD 6d, 1961.*

zeolitic deposits. Deposits, particularly native copper, which occur in basalts accompanied by minerals of the zeolite group. *A.G.I.*

zeolitization. The process by which a mineral is converted into zeolite by alteration, for example, nepheline into thompsonite. *Fay.*

zeolitize. a. To convert into a zeolite. *Webster 3d.* b. To fill (as the openings in a rock) with zeolites. *Webster 3d.* c. To treat in a process using zeolite. *Webster 3d.*

zeophyllite. A white hydrofluosilicate of calcium and iron, $H_4Ca_4Fe_2Si_3O_{11}$. Rhombohedral. Spherical, radiated foliated. From Cross-Priesen, Bohemia. *English.*

zero air voids curve; saturation curve. The curve showing the zero air voids unit weight as a function of water content. *ASCE P1826.*

zero air voids density. *See* zero air voids unit weight. *ASCE P1826.*

zero air voids unit weight. The weight of solids per unit volume of a saturated soil mass. *ASCE P1826.*

zero group. The group of inert gases, having a valence of O, in the periodic system. *Webster 3d.*

zero-length spring. Special type of gravimeter spring for which the length is proportional to the applied force. *Schieferdecker.*

zero-order reaction. One which proceeds at a constant rate, virtually independent of pressure changes. *Pryor, 3.*

zero-point energy. Energy remaining in a substance at the absolute 0 of temperature. *Webster 3d.*

zero potential. The actual potential of the surface of the earth taken as a point of reference. *Webster 3d.*

zero-power reactor. An experimental nuclear reactor operated at such low power levels that a coolant is not needed and little radioactivity is produced. Critical experiments are said to run at zero power. *L&L.*

zero time. When conducting a mine ventilation pressure survey, zero time is the time of the commencement of the survey from the base station, and the reading of the control barometer there is taken as the pressure datum to which subsequent pressures are referred. *Sinclair, I, p. 140.*

zerovalent. Having a valence of 0. *Webster 3d.*

zero-zero gel. A condition wherein the drilling fluid fails to form measurable gels during a quiescent 10-minute time interval. *Brantly, 1.*

zeta potential; electrokinetic potential. The potential difference across an electric double layer, usually between a solid surface and a liquid. *Webster 3d.*

zeta-potential layer. The zone of shear surrounding a particle immersed in an electrolyte. *Pryor, 4.*

zeugen. They consist of soft rock with a layer of hard rock at the summit, and beneath the hard cap the soft rock is carved into slopes which resemble the typical denudation curve. Synonym for earth pillars. *A.G.I.*

zeunerite. A mineral, $Cu(UO_2)_2(AsO_4)_2.10\text{-}16H_2O$. Material which is isostructural with autunite and torbernite and contains 10-16 H_2O has not yet been found, but the name zeunerite is being reserved in the event that such a discovery is made. Artificial zeunerite is tetragonal. *Crosby, p. 61.*

zeuxite. Corn. An obscure mineral, probably tourmaline. *Fay.*

zeylanite. Same as ceylonite. *Standard, 1964.*

zhemchuzhnikovite. A mineral, $NaMg(Al,\text{-}Fe^{+3})(C_2O_4)_3.8H_2O$, in green trigonal crystals (violet in artificial light) from veinlets in coal in the Chaitumusuk deposits, Siberia, U.S.S.R. *Hey, M.M., 1964; Fleischer.*

Ziervogel process. The extraction of silver from sulfide ores or matte by roasting in such a way as to form sulfate of silver, leaching this out with hot water, and precipitating the silver by means of metallic copper. *Fay.*

zietrisikite. Incorrect spelling of pietricikite, a waxlike hydrocarbon similar to ozokerite. *Tomkeieff, 1954.*

zighyr; zigger; sicker. Corn. To percolate, trickle, or ooze, as water through a crack. From the German, sickern. *Fay.*

zigzag car loader. A form of vertical chute in which the chute is divided into independent sections that can be raised or lowered on a track arrangement. It is flexible and can be lowered to the bottom of the car, giving a solid stream of coal from loading pocket to car. *Mitchell, p. 802.*

zigzag fold. *See* chevron fold. *A.G.I.*

zigzag kiln. A transverse-arch kiln with staggered dividing walls, the fire travel thus being forced to follow a zigzag path. Such kilns find use in the firing of structural clay products. *See also* transverse-arch kiln. *Dodd.*

zigzag rule. A wooden rule (generally 6 feet long, folded zigzag fashion in 6-inch lengths), used by drillers, craftsmen, etc., to measure short distances. The rule usually is graduated in feet, inches, and fractions of an inch (sometimes in feet, tenths of a foot, and hundredths of a foot). *Long.*

zigzag transformer; grounding transformer. A zigzag transformer is a transformer intended primarily to provide a neutral point for grounding purposes. *I.C. 7962, p. 23.*

ziment water. Water impregnated with copper; found in copper mines. *Standard, 1964.*

Zimmermann's rule. A graphical method advanced by Zimmermann in 1828 for finding the lost part of a vein on the other side of a fault. *Nelson.*

zinc. A lustrous, bluish-white metallic element in group II of the periodic system. Symbol, Zn; atomic number, 30; atomic weight, 65.37; valence, 2; hexagonal; brittle at ordinary temperatures; ductile and malleable at 100° to 150° C; at ordinary temperatures, it corrodes in moist air but not in dry air; burns in air at high red heat raising white clouds of zinc oxide; low to intermediate hardness; fair conductor of electricity; specific gravity, 7.133 (at 25° C); melting point, 419.47° C; boiling point, 907° C (at 760 mm); insoluble in water; and soluble in acids, including acetic acid, and in alkalies. Always combined in nature; principal ore is the mineral sphalerite, ZnS; and other important ore minerals are smithsonite, $ZnCO_3$; hemimorphite, $Zn_2SiO_4 . H_2O$; franklinite, $(Fe,Mn,Zn)Fe_2O_4$; willemite, Zn_2SiO_4; and zincite, ZnO. Concentrated zinc ores are usually roasted to form zinc oxide which is reduced by heating with coal or coke in the absence of air and the metallic zinc is obtained by distillation and condensation. The metal is also produced by the electrolysis of zinc sulfate solutions obtained from leaching roasted ore with dilute sulfuric acid. Used in many alloys, including brass, bronze, nickel-silver, German silver, Babbitt or bearing metal, and soft solder, in die-casting alloys, in zinc-zirconium alloy which is ferromagnetic at very low temperatures, to galvanize iron, steel, and other metals to protect them against corrosion, in electroplating, in metal spraying, in photoengravers' plates and printing, in cable wrappings, in electrical fuses, and in zinc compounds. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-2, B-145, B-237; Webster 3d.*

zinc alloys. Zinc-base alloys, containing 3.0 to 4.0 percent aluminum, 0 to 3.5 percent copper, and 0.02 to 0.1 percent magnesium, are used extensively for die casting. This metal is also used extensively in brass, of which it is one of the essential constituents. Light aluminum-zinc alloys are also used. *C.T.D.*

zinc aluminate. $ZnAl_2O_4$; melting point, 1,950° C. This spinel, when made from industrial grade oxides, has a pyrometric cone equivalent >1,900° C, and RuL >1,700° C. Russian experiments indicate that it can be used as a refractory lining for electric furnaces melting aluminum, zinc, lead, or tin. It is rapidly attacked by alkalies. *Dodd.*

zincaluminite. A light-blue, hydrated zinc sulfate, with zinc and aluminum hydrates, $Al_6Zn_6S_2O_{21}.18H_2O$, that crystallizes in the hexagonal system. *Fay.*

zinc-ammonium chloride; ammonium-zinc chloride; ammonium tetrachlorozincate. White; orthorhombic; plates; $ZnCl_2.2NH_4Cl$ or $(NH_4)_2ZnCl_4$; molecular weight, 243.26; hygroscopic; specific gravity, 1.879; decomposes without melting at 150° C; and very soluble in water. Used as a welding, soldering, and galvanizing flux. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-149; Webster 3d.*

zincate. Any of various compounds (as the sodium hydroxozincates, $Na[Zn(OH)_3].3H_2O$ and $Na_2[Zn(OH)_4].2H_2O$) formed by the reaction of zinc oxide, or zinc, with solutions of alkalies. *Webster 3d.*

zinc blende. *See* sphalerite. *Pryor, 3.*

zinc bloom. *See* hydrozincite; zinc oxide.

zinc borate. Of variable composition; contains zinc oxide, ZnO, and boric oxide, B_2O_3, in various ratios. A typical specification is 45 percent zinc oxide and 34 percent boric oxide. May contain as much as 20 percent water of hydration. White; amorphous powder; soluble in dilute acids; and slightly soluble in water. Used as a flux in ceramics. *CCD 6d, 1961.* With zinc oxide-boric oxide ratio 3 to 2. White; triclinic crystals or amorphous powder; $3ZnO.2B_2O_3$; molecular weight, 383.35; specific gravity (of crystals), 4.22, and (of amorphous powder), 3.64; melting point, 980° C; soluble in water; and crystals are insoluble in hydrochloric acid, but amorphous powder is soluble in hydrochloric acid. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-237.*

zinc box. Wooden or enamel-ware rectangular box, with bottom grid which supports zinc shavings. Used in cyanide process to precipitate dissolved gold from pregnant solution. Its place now largely taken by use of zinc dust. *See also* Merrill-Crowe Process. *Pryor, 3.*

zinc calcine. Zinc sulfide ore or concentrates from which rock or gangue has been removed by merely mechanical means and which is then roasted to remove sulfur. *Hess.*

zinc carbonate; smithsonite; calamine. White; $ZnCO_3$; soluble in acids, in alkalies, and in ammonium salt solutions; insoluble in water; and it dissociates losing carbon dioxide at 300° C. Used in ceramics and as a pigment. *CCD 6d, 1961.* Colorless; hexagonal trigonal; molecular weight, 125.39; specific gravity, 4.398, and ranges from 4.30 to 4.45; Mohs' hardness, 4.5 to 5.0; nearly insoluble in water; and insoluble in ammonia, in acetone, and in pyridine. The mineral smithsonite is white to yellow or to brown and rarely green or blue. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-238, B-245.* Also used less accurately to refer to any of several basic carbonates of zinc, which include the zinc-ore mineral hydrozincite, $Zn_5(OH)_6(CO_3)_2$ or $2ZnCO_3.3Zn(OH)_2$, and synthetically prepared pigments of the same or similar composition. *CCD 6d, 1961; Webster 3d.*

zinc chloride. White; hexagonal; $ZnCl_2$; molecular weight, 136.28; deliquescent; poisonous; specific gravity, 2.91 (at 25° C); melting point, 283° C; boiling point, 732° C; very soluble in water and in ether; soluble in alcohol and in glycerol; and insoluble in ammonia. *Crispin; CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-238.* Obtained by the solution of zinc, or zinc oxide, in hydrochloric acid; or by burning zinc in chlorine. *Crispin.* Used in galvanizing iron, as a catalyst, as a dehydrating agent, as a condensing agent, as a wood preservative, as an ingredient in soldering fluxes, in burnishing and polishing compounds for steel, in electroplating, in glass-etching compositions, in petroleum refining, and in pigments. *CCD 6d, 1961.*

zinc chromate; zinc chrome; zinc yellow. Lemon-yellow; prisms; $ZnCrO_4$; molecular weight, 181.36; and soluble in acids. Used as a pigment. *Bennett 2d, 1962; CCD 6d, 1961.* Specific gravity, 3.40; insoluble in cold water and decomposes in hot water; soluble in liquid ammonia; and insoluble in acetone. *Handbook of Chemistry and Physics, 45th ed, 1964, p. B-238.* Of variable composition. The CP (chemically pure) zinc chromate, a yellow crystalline powder is said to be zinc chromate heptahydrate, $ZnCrO_4.7H_2O$. Also any of various basic salts, especially a golden-yellow pigment, $4Zn(OH)_2.ZnCrO_4$. Called zinc yellow, but this term is also applied to hydrated zinc chromate and to hydrated zinc-potassium chromate. *CCD 6d, 1961; Webster 3d.* Another zinc chromate is not yellow and has a different composition. Dark green to black; isometric; $ZnCr_2O_4$; molecular weight, 233.36; and specific gravity, 5.30 (at 15° C). *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-238.*

zinc chromate, hydrated; zinc chromate; zinc yellow. a. Zinc chromate heptahydrate, $ZnCrO_4.7H_2O$. *CCD 6d, 1961.* b. Basic zinc chromate, $4Zn(OH)_2.ZnCrO_4$; a golden-yellow pigment. *Webster 3d.*

zinc chrome. *See* zinc yellow. *CCD 6d, 1961.*

zinc colic. A form of colic thought to be caused by zinc-oxide poisoning. *Fay.*

zinc crown glass. An optical crown glass containing a substantial proportion of zinc oxide. *ASTM C162-66.*

zinc dithionite. *See* zinc hydrosulfite. *CCD 6d, 1961.*

zinc dust. Finely divided zinc, zinc oxide, and impurities, incidentally produced in the manufacture of spelter. It is sometimes used as an inferior paint (zinc gray). *Fay.*

zinc flash. A colored surface produced on red brick by the introduction of zinc into the fireboxes of a kiln at the conclusion of the firing; zinc vapors deposit on the brick and form various shades from yellow to green. *ASCG, 1963.*

zinc fluoride. White; ZnF_2; poisonous; soluble in hot acids; slightly soluble in water; insoluble in alcohol; specific gravity, 4.84 (at 15° C); and melting point, 872° C. Used in ceramic glazes and enamels and in galvanizing. *CCD 6d, 1961.* Colorless; monoclinic or triclinic; molecular weight, 103.37; specific gravity, 4.95 (at 25° C, referred to water at 4° C); boiling point, about 1,500° C; soluble in ammonium hydroxide; and insoluble in ammonia. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-238.*

zinc glass. A glass in which zinc oxide, ZnO, replaces part of the calcium oxide of ordinary lime soda glass. *CCD 6d, 1961.*

zinc gray. *See* zinc dust. *Fay.*

zinc green. Any of various green pigments that are essentially mixtures of zinc yellow and Prussian blue. *Webster 3d.*

zinc hydrosulfite; zinc dithionite. White; amorphous; ZnS_2O_4; and soluble in water. Used as a depressant in flotation. *CCD 6d, 1961.*

zincic. Relating to, containing, or resembling zinc. *Webster 3d.*

zinciferous. Containing zinc or yielding zinc. *Webster 3d.*

zincification. The act or process of zincifying. *Webster 3d.*

zincify. To coat or to impregnate with zinc; to galvanize. *Webster 3d.*

zincing. The act or process of heating iron plate with zinc or zinc salts; galvanization. *Standard, 1964.*

zincite; zinc oxide, red; zinc ore, red. Red to orange-yellow; hexagonal; ZnO; molecular weight, 81.37; luster, subadamantine; specific gravity, 5.6, and ranges from 5.43 to 5.70; and Mohs' hardness, 4.0 to 4.5. An ore of zinc. *See also* zinc oxide. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-238, B-246; CCD 6d, 1961.*

zinckenite. *See* zinkenite.

zinckiferous. Carrying zinc. *Weed, 1922.*

zincky; zinky; zincy. Relating to, containing, or having the appearance of zinc. *Webster 3d.*

zinc-magnesia chalcanthite. A variant of chalcanthite with the formula, $2[(Cu,Zn,Mg)SO_4.5H_2O]$. *Hey 2d, 1955.*

zinc melanterite. A member of the monoclinic melanterite group, in which iron is partially replaced by zinc. *English.*

zinc minerals. Main source of zinc is sphalerite, but some smithsonite (calamine), hemimorphite, zincite, willemite and franklinite are mined. Main uses of the metal are in galvanizing, sheet zinc, die casting, pigments, dry batteries and alloys—brass, manganese bronze, German silver, etc. *Pryor, 3.*

zinco-. The combining form meaning zinc; for example, zincolysis. *Webster 3d.*

zincoid. Of, relating to, or resembling zinc. *Webster 3d.*

zincolysis. A chemical decomposition produced by electrolysis, in which the action is referred to the zinc element. *Standard, 1964.*

zincolyte. A body or compound that is decomposed by zincolysis. *Standard, 1964.*

zinc ores. Zinc is not found native. *See also* calamine; franklinite; hydrozincite; nicholsonite; smithsonite; sphalerite; willemite; wurtzite; zincite. *Fay.*

zincous. Synonym for zincic. *Webster 3d.*

zinc oxide; zinc oxide, white; zinc white. White or yellowish-white; white turns yellow on heating; ZnO; odorless; absorbs carbon dioxide from the air; specific gravity, 5.47; soluble in acids; and insoluble in water and in alcohol. Used in pigments, in ceramic glazes, and in opaque glass. *CCD 6d, 1961; Webster 3d.* Hexagonal; molecular weight, 81.37; specific gravity, 5.606; melting point, 1,975° C; soluble in alkalies and in ammonium chloride solutions; and insoluble in ammonia. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-238.* Extensively used in glasses, in glazes, and in enamels. Also used in the manufacture of magnetic ferrites and other specialized ceramics. In Bristol-type glazes for earthenware products, zinc oxide in combination with alumina produces both opacity and whiteness to a fair degree, provided the lime content is low. Zinc oxide is a common constituent in high-grade fluoride opal glass, in tank window glass, and in some optical glass. Commonly used in dry-process, cast-iron enamels. *Lee.*

zinc-potassium chromate, hydrated; potassium-zinc chromate, hydrated; zinc chrome; zinc yellow. A greenish-yellow pigment that has the approximate composition, $4ZnO.K_2O.4Cr_2O_3.3H_2O$. Made by the reaction of zinc oxide, potassium dichromate, and sulfuric acid. *Webster 3d.*

zincrosasite. A variety of rosasite having Zn greater than Cu; from Tsumeb, Southwest Africa. *Hey, M.M., 1961.*

zinc scum. The zinc-silver alloy skimmed from the surface of the bath in the process of desilverization of lead by zinc. *Fay.*

zincsilite. The aluminum-free end-member of the montmorillonite-sauconite series, $Zn_3Si_4O_{10}(OH)_2.nH_2O$; from Batystau, Kazakhstan, U.S.S.R. Named from zinc silicate. *Hey, M.M., 1961.*

zinc skimmings. Zinc metal and oxide, floating on the molten zinc bath in the hot galvanizing process. *Bennett 2d, 1962.*

zinc smelting. The distillation of zinc. So-called because the reduction of zinc oxide by carbon proceeds simultaneously with the vaporization of the zinc metal. *Ency. of Chem. Tech., v. 8, p. 937.*

zinc spar. Synonym for smithsonite. *Webster 3d. See also* zinc carbonate.

zinc spinel. Synonym for gahnite. *Fay.*

zinc sulfate; zinkosite. Colorless; orthorhombic; $ZnSO_4$; molecular weight, 161.43; specific gravity, 3.54 (at 25° C, referred to water at 4° C); decomposes at 600° C; soluble in water, in methyl alcohol, and in glycerol; and slightly soluble in ethyl alcohol. Occurs as the mineral zinkosite. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-239.* Used in flotation. *Webster 3d.*

zinc sulfate heptahydrate; zinc sulfate, hydrated; zinc vitriol; white vitriol; white copperas; goslarite. Colorless; needles; $ZnSO_4.7H_2O$; odorless; astringent, metallic taste; effloresces in air; specific gravity, 1.9661; melting point, 50° C if heated rapidly; soluble in water and in glycerol; insoluble in alcohol; and its solutions are acid to litmus. Used in preparing zinc chemicals. *CCD 6d, 1961.* Orthorhombic; molecular weight, 287.54; specific gravity, 1.957 (at 25° C, referred to water at 4° C) and ranges from 1.9 to 2.1; Mohs' hardness, 2.0 to 2.5; melting point, 100° C; loses $7H_2O$ on heating to 280° C; and slightly soluble in alcohol and in glycerol. Occurs as the mineral goslarite, which is white or yellowish, formed by the oxidation of sphalerite (ZnS) in damp locations, especially in the presence of iron sulfides. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-239, B-243; CCD 6d, 1961.*

zinc sulfate hexahydrate; zinc sulfate, hydrated. Colorless; monoclinic or tetragonal; $ZnSO_4.6H_2O$; molecular weight, 269.52; specific gravity, 2.072 (at 15° C, referred to water at 4° C); loses $5H_2O$ on heating to 70° C; and soluble in water. *Bennett 2d, 1962; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-239.*

zinc sulfate monohydrate; zinc sulfate, dried. Colorless or white; crystalline; $ZnSO_4.H_2O$; molecular weight, 179.45; soluble in water, and insoluble in alcohol. Used in warm humid climates in place of the more common zinc sulfate heptahydrate because it is free flowing and less likely to cake. Used in electroplating. *CCD 6d, 1961.*

zinc sulfide. Colorless when pure, white, or yellowish; isometric or hexagonal; ZnS; molecular weight, 97.43; fluoresces; dimorphous: (1) alpha zinc sulfide (hexagonal) and (2) beta zinc sulfide (isometric), the isometric form changes to the hexagonal form on heating to the transformation temperature 1,020° ± 5° C; specific gravity, approximately 4.0, and ranges from 3.90 to 4.11; Mohs' hardness, 3.5 to 4.0; luster, resinous to adamantine; sublimes at 1,180° C or 1,185° C; melting point, 1,850° C (at 150 atm); insoluble in water; and soluble in acids. Alpha zinc sulfide occurs as the mineral wurtzite and beta zinc sulfide as the mineral sphalerite. Used as the most important source of zinc, as a source of sulfur for manufacturing sulfur dioxide, sulfuric acid, and other sulfur compounds, as a pigment, and in white glass and in opaque glass. *See also* zinc sulfide, alpha; zinc sulfide, beta. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-239; Dana, 7th ed., v. 1, 1944, pp. 210-211, 228; Webster 3d.*

zinc sulfide, alpha; wurtzite. Colorless when pure; hexagonal; ZnS; molecular weight, 97.43; specific gravity, 3.98 to 4.1; Mohs' hardness, 3.5 to 4.0; luster, resinous; transformation temperature from beta zinc sulfide to alpha zinc sulfide, 1,020° ± 5° C; sublimes at 1,180° C or 1,185° C; melting point, 1,850° C (at 150 atm); insoluble in water and in acetic acid; and very soluble in other acids. Occurs as the brownish-black mineral wurtzite which is unstable compared with its stable dimorph, the mineral sphalerite (beta zinc sulfide), to which it inverts during alteration and from which it is formed by heating sphalerite to the transformation temperature 1,020° ± 5° C. Can be crystallized from acid solutions above 250° C. *Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-239, B-245; Dana, 7th ed., v. 1, 1944, pp. 226-228.*

zinc sulfide, beta; sphalerite; zinc blende; zincblende; blende; black jack. Colorless when pure; isometric; ZnS; molecular weight, 97.43; specific gravity, 4.102 (at 25° C), and ranges from 3.90 to 4.11; Mohs' hardness, 3.5 to 4.0; luster, resinous to adamantine; transformation temperature to alpha zinc sulfide, 1,020° ± 5° C; sublimes at 1,180° or 1,185° C; melting point, 1,850° C (at 150 atm); insoluble in water; and very soluble in acids. Occurs as the mineral sphalerite which is nearly colorless, white, yellow, red, green, brown, and black; has perfect dodecahedral cleavage; and is soluble in hydrochloric acid. Sphalerite is the principal ore of zinc; a source of cadmium; and a source of sulfur for manufacturing sulfur dioxide sulfuric acid, and other sulfur compounds. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-239, B-245; Dana, 7th ed., v. 1, 1944, pp. 209-214.*

zinc sulfide monhydrate. Colorless, white, or yellowish; crystalline; $ZnS.H_2O$; molecular weight, 115.45; specific gravity, 3.98; melting point, 1,049° C; insoluble in water; and soluble in acids. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-239.* Used as a pigment and in white glass and in opaque glass. *CCD 6d, 1961.*

zinc vitriol. Old name for zinc sulfate heptahydrate. *Webster 3d.*

zinc white. Synonym for zinc oxide. Used as a pigment. It is the whitest of all pigments; is permanent; and is not poisonous, but it lacks the opacity and covering power of white lead or titanium dioxide. *Crispin; Webster 3d.*

zinc yellow; zinc chrome. a. A greenish-yellow pigment that has the approximate composition, $4ZnO.K_2O.4Cr_2O_3.3H_2O$. Made by the reaction of zinc oxide, potassium dichromate, and sulfuric acid. *Webster 3d.* b. *See* zinc chromate; zinc chromate, hydrated; zinc-potassium chromate, hydrated. *Bennett 2d, 1962; CCD 6d, 1961; Webster 3d.*

zinc-zirconium silicate. White; $ZnO.ZrO_2.SiO_2$; specific gravity, 4.8; density, 115 pounds per cubic foot; melting point, 3,800° C; soluble in hydrofluoric acid; insoluble in water and in alkalies; and slightly soluble in mineral acids and in hot concentrated sulfuric acid. Used as an opacifier in ceramic glazes. *CCD 6d, 1961.*

Zingg classification. Shape classification of rocks and sedimentary particles which distinguishes blades, discs, rods, and spheres. *A.G.I. Supp.*

zinkazurite A mineral found in small, blue crystals, probably a mixture of sulfate of zinc and carbonate of copper. *Fay.*

zinkenite. A steel-gray mineral, essentially sulfide of lead and antimony, $Pb_6Sb_{14}S_{27}$, occurring as columnar orthorhombic crystals, sometimes exceptionally thin, forming fibrous masses. Also called zinckenite. *Dana 17; Fay.*

zinkite. Same as zincite. *Fay.*

zinkosite. A white mineral altering on exposure to air. Found in orthorhombic rectangular or rhombic plates; $ZnO.SO_3$; and specific gravity, 3.7. *Larsen, p. 181.*

zinn; gediegen. Native tin. *Hess.*

zinnwaldite. A mica related in composition to lepidolite (that is, containing lithium and potassium) but including iron as an essential constituent; occurring in association with tinstone ores. Color, pale violet, yellow to brown, and dark gray. The formula is, $K_2O.Li_2O.2FeO.2Al_2O_3.6SiO_2.H_2O.F_2$. *Larsen, p. 163; Fay.*

zippeite. A basic sulfate of uranium. A very rare, strongly radioactive, orange-yellow to bright yellow mineral, $(UO_2)_2(SO_4)O.nH_2O$; probably orthorhombic; occurs as an alteration product of uraninite; found associated with gypsum, uranopilite, and limonite. Synonym for dauberite. *Crosby, pp. 61-62; Fay.*

Zipper. Trade term for a conveyor belt lacing or fastening appliance, which can be applied to any thickness and width of belt. A lever mechanism is used to supply the pressure. The appliance is totally enclosed and grease-filled as a protection against dust and damage. *Nelson.*

ziramics. A trade term proposed for the production of ceramic products consisting essentially of zircon. *Hess.*

zircite. *See* zirkite.

Zircofrax. Trademark for super-refractory products made from zirconium oxide and zirconium silicate. High refractoriness; great strength; high thermal conductivity; high resistance to attack by acids and acid slag; porosity about 25 percent; permeability low. Used in bricks and special shapes for ceramic kiln furniture and in chemical and metallurgical furnaces where severe slagging occurs. *CCD 6d, 1961.*

zircolite. A copyrighted trade name for colorless synthetic spinel. *Shipley.*

zircon. A mineral, $ZrSiO_4$, tetragonal. It varies in color from brown to green, blue, red, golden yellow, and colorless. Used as a refractory and as the gem, hyacinth. The chief ore of zirconium. Generally not radioactive; sometimes weakly to moderately radioactive. It is universally present in crystalline rocks, particularly granites, syenites, schists, and gneisses; a common mineral in river and beach placers; uranium- and thorium-bearing varieties are restricted to pegmatites and their breakdown products. The presence of zircon in placer deposits is nearly always indicative of the presence of monazite. Also called azorite. *Crosby, pp. 87-88; A.G.I.; Dana 17; Fay.*

zirconate. Any of various compounds (as sodium zirconate, Na_2ZrO_3) obtained usually by heating zirconium oxide and a metal oxide or carbonate. *Webster 3d.*

zircon ceramic. Any ceramic whiteware in which zircon, $(ZrO_2.SiO_2)$, is the essential crystalline phase. *ACSB-4.*

zircon flour. Finely milled zircon sand. Used as a mold wash. *CCD 6d, 1961.*

zirconia. *See* zirconium dioxide.

zirconia brick. Brick containing zirconium oxide; used in metallurgical furnaces. *Bennett 2d, 1962.*

zirconic. Of, relating to, or containing zirconium. *Webster 3d.*

zirconiferous. a. Containing zircon or yielding zircon. *Webster 3d.* b. Containing zirconium or yielding zirconium. *Webster 3d.*

zirconite. Synonym for zircon. *Hey 2d, 1955.*

zirconium. A lustrous, ductile, steel-gray or silvery-gray metallic element in group IV of the periodic system. Symbol, Zr; atomic number, 40; atomic weight, 91.22; valence, 4; hexagonal; specific gravity, 6.53 ± 0.01; ignites spontaneously in air when finely divided; in massive form, resists corrosion; has a low absorption cross section for neutron; melting point, 1,852° ± 2° C; boiling point, 3,578° C; insoluble in water and in cold acids; soluble in hot very concentrated acids, in hydrofluoric acid, and in aqua regia; and slightly soluble in alcohol. The ninth most abundant metal in the earth's crust, it occurs widely but only in combined form, especially in the minerals zircon, $ZrSiO_4$, and baddeleyite, ZrO_2. Zircon is the principal source of zirconium which is obatined commercially from sands containing zircon by converting the zirconium silicate to zirconium carbonitride, ZrCN, and then to zirconium tetrachloride, $ZrCl_4$, which being volatile is passed into molten magnesium in an inert atmosphere to reduce the chloride to a spongy mass of zirconium metal (the Kroll process). Zirconium resembles titanium and hafnium chemically; these three metallic elements are in the same group IV subgroup of the periodic table. Zirconium ores and concentrates invariably contain hafnium, and commercial-grade zirconium contains 1 to 3 percent hafnium. To become reactor-grade zirconium, further refining is required to eliminate hafnium. Used to resist corrosion by acids, alkalies, sea water, etc., in nuclear reactors as a structural material and as a cladding material for fuel elements, in an alloy (Zircaloy) for nuclear-energy applications, as an alloying agent in steel, as an alloying agent in nickel-chromium and in other nonferrous alloys, as a deoxidizer in metal castings, as a getter in vacuum tubes, in making explosive primers, in making lamp filaments, in alloys with columbium (niobium) and with zinc to make low-temperature, superconductive magnets, as a bonding agent for ceramic-to-metal seals, in high-intensity arc light, as an ingredient in flashlight powder, and as a suggested antidote for plutonium poisoning. *CCD 6d, 1961; C.T.D.; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B1, B-2, B-146, B-239; Webster 3d.*

zirconium carbide. Gray; metallic; isometric; ZrC; molecular weight, 103.23; specific gravity, 6.73 or 6.78; Mohs' hardness, 8.0+; melting point, 3,540° C; boiling point, 5,100° C; insoluble in water and in hydrochloric acid; soluble in oxidizing acids and is attacked by oxidizers; slightly soluble in concentrated sulfuric acid; and its fine powder is pyrophoric. Used as a cermet component, as a metallurgical additive, as a refractory, as a source of zirconium and zirconium compounds, and in incandescent filaments. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-239.*

zirconium diboride; zirconium boride. Gray; metallic; hexagonal; ZrB_2; molecular weight, 112.84; specific gravity, 6.085; melting point, about 3,000° C; Mohs' hardness, 8.0; excellent thermal shock resistance; poor oxidation resistance above 1,100° C. Used as a refractory for special high-temperature aircraft and rocket applications, as electrodes in metal refining, and as a metallurgical additive. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-239.*

zirconium dioxide; zirconium oxide; zirconia; baddeleyite. Colorless or white when pure, otherwise colorless, white, yellow, green, reddish-brown, greenish-brown, brown, and black; monoclinic below 1,000° C; ZrO_2; molecular weight, 123.22; specific gravity, ranges from 5.50 to 6.03; Mohs' hardness, 6.5; allotropic forms: (1) monoclinic up to about 1,000° C; (2) isometric or tetragonal from about 1,000° C to about 1,900° C; and (3) hexagonal trigonal or pseudohexagonal above about 1,900° C; melting point, 2,715° C or about 2,700° C; boiling point, about 5,000° C; insoluble in water and in most acids and alkalies at room temperature; and soluble in nitric acid, in hot concentrated hydrochloric acid, in sulfuric acid, and in hydrofluoric acid. Synthetic zirconia containing less than 2 percent hafnium idoxide (hafnia), HfO_2, is white and has a specific gravity of 5.6. The mineral baddeleyite, which is zirconium dioxide, occurs in various colors and contains as much as 3 percent hafnium dioxide. Zirconium dioxide is the most heat-resistant commercial refractory. Used in refractories, including furnace linings and refractory cements, in refractory utensils, such as cucibles, in cermets, in metallurgy, as a source of zirconium, in thermal insulation, in electric insulation, as an abrasive and a polishing agent, as a catalyst, as piezoelectric crystals, as an opacifying pigment in enamels and in glazes, in acidproof enamel, as an opacifier in white glass for indirect electric lighting, in incandescent lamps because of its brilliant luminosity when heated, and as a substitute for calcium oxide (lime) in calcium lights. *Bennett 2d, 1962 Add.; CCD 6d, 1961; Dana, 7th ed., v. 1, 1944, pp. 608-610; Handbook of Chemistry and Physics, 45th ed., 1964, pp. B-240, B-242; Webster 3d.*

zirconium glycolate. White; solid; $H_4ZrO(C_2H_2O_3)_3$; molecular weight, 253; decomposes without melting at 220° C; insoluble in water and in organic solvents; soluble in alkali solutions and in sulfuric acid. Used as a sesquestrant and as a source of high-purity zirconia. *Bennett 2d, 1962 Add.; CCD 6d, 1961.*

zirconium hydroxide. White; amorphous; gelatinous; $Zr(OH)_4$ or $ZrO_2.xH_2O$; specific gravity, 3.25; it loses all its water, decomposing to ZrO_2 at 550° C; soluble in dilute mineral acids; insoluble or slightly soluble in cold water; and insoluble in alcohol and in alkalies. Used in glass. *CCD 6d, 1961; Handbook of Chemistry and Physics, 45th ed., 1964, p. B-239.*

zirconium-iron pink. A ceramic stain suitable for the coloring of a variety of glazes maturing at 1,220° to 1,280° C. This firing range is greater than that permissible with chrome-tin pink or with chrome-alumina pink. *Dodd.*

zirconium lactate. White; pulpy solid; $H_4ZrO(CH_3CHOCO_2)_3$; molecular weight, 295; deliquescent; very slightly soluble in water and in the common organic solvents; soluble in aqueous alkalies; and it decomposes to the oxide without melting. Used as a source of zirconium dioxide. *Bennett 2d, 1962 Add.; CCD 6d, 1961.*

zirconium minerals. Principal ones are zircon and baddeleyite. Main uses are as refractories, ceramics, opacifiers, abrasives, enamels, insulators, and alloys. The transparent crystal is a gemstone. *Pryor 3.*

zirconium napthenate. Amber-colored; liquid; transparent; consistency equivalent to that of heavy lubricating oil; specific gravity, 1.05; very stable; and soluble in all common organic solvents. Unlike other metallic naphthenates, it possesses no drying properties. Used in enamels and in glazes. *CCD 6d, 1961.*

zirconium nitride. a. Brassy-colored; ZrN; produced by heating zirconium metal in nitrogen; specific gravity, 7.09; Mohs' hardness, 8.0+; melting point, 2,930° C; slightly soluble in dilute hydrochloric acid or in dilute sulfuric acid; and soluble in concentrated acid. Used in special crucibles, in cermets, and in refractories. *CCD 6d, 1961.* b. Yellow to brown; crystalline; molecular weight, 105.23; melting point, 2,980° ± 50° C; insoluble in water; slightly soluble in organic acids; and soluble in concentrated sulfuric acid, in hydrofluoric acid, and in aqua regia. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-240.*

zirconium oxide. *See* zirconium dioxide.

zirconium phosphate. Normal zirconium phosphate, ZrP_2O_7, has a reversible inversion at 300° C and at 1,550° C dissociates into zirconyl phosphate $(ZrO)_2P_2O_7$, with loss of P_2O_5 as vapor. Zirconyl phosphate is satble up to about 1,600° C and has a very low thermal expansion—1×10^{-6} (20° to 1,000° C). *Dodd.*

zirconium silicate. ($ZrSiO_4$), natural silicate of zirconium found in Brazil and elsewhere. One such deposit known as brazilite is said, in a semimanufactured form, to contain about 80 percent zirconium oxide. This product is employed as a refractory in the making of "zirkite" bricks and cement. In rare cases, used as a cobalt groundcoat constituent. Zirconium silicate is used in formulation of zircon enamels which depend upon crystallization of zircon compounds for opacity development. *Enam. Dict.*

zirconium-vanadium blue; zirconium-vanadium turquoise. A pigment for use in ceramic glazes. The composition is (parts by weight): ZrO_2, 60 to 70; SiO_2, 26 to 36; V_2O_5, 3 to 5. Alkali must also be present, for example, 0.5 to 5 percent Na_2O. In the absence of alkali, a green color is produced. *Dodd.*

zirconium-vanadium turquoise. *See* zirconium-vanadium blue. *Dodd.*

zircon light. A light, similar to a calcium light, but produced by incandescent zirconia instead of calcium oxide (lime). *Webster 2d.*

zirconolite. A metamict mixed oxide, $CaZrTi_2O_7$, containing also Nb, Fe, U, Ce, etc. In nepheline-pyroxenite. From Kola peninsula, U.S.S.R. Similar to zirkelite. *Spencer 21, M.M., 1958.*

zircon porcelain. An electroceramic made from a batch consisting of 60 to 70 percent zircon, 20 to 30 percent flux, and 10 to 20 percent clay; the flux may be a complex Ca-Mg-Ba-Zr silicate or other alkaline earth composition. Zircon porcelain has high mechanical strength and good thermal-shock resistance over a wide temperature range; electrically, it is a low-loss material. *Dodd.*

zircon refractory. Refractory products consisting substantially or enitrely of crystalline zirconium orthosilicate, $ZrSiO_4$. *ASTM C71-64.*

zircon, rutile, illmenite, monazite. A group of heavy minerals which are usually considered together because of their occurrence as black sand in natural beach and dune concentration. For marketing, complete separation of the rutile and zircon as high-grade products is necessary. Separation is effected by combinations of electromagnetic and electrostatic processes, together with gravity concentration. *Nelson.*

zircon sand. a. A very refractory mineral, composed chiefly of zirconium silicate, having low thermal expansion and high thermal conductivity. *ASM Gloss.* b. The natural zircon-bearing material found in Australia, India, and in Florida. *See also* zirconium silicate. *Enam. Dict.*

zircon spinel. Synthetic blue spinel. *Shipley.*

zircon syenite. A name originally given by Hausmann to certain Norwegian nepheline syenites which were rich in zircons. Later, it was practically used as a synonym for nepheline syenite, but is now obsolete. *Fay.*

zircon whiteware. Any ceramic whiteware in which zircon, ($ZrO_2.SiO_2$), is the essential crystalline phase. *ASTM C242-60.*

zirconyl. The bivalent radical ZrO^{+2} consisting of zirconium and oxygen; for example, zirconyl chloride is zirconium oxychloride, $ZrOCl_2$. *Webster 3d.*

zirctone. A copyrighted trade name for a bluish green synthetic sapphire. *Shipley.*

zirkelite. a. A name proposed by Wadsworth in 1887 to designate altered, basaltic glasses, in distinction from their unaltered or tachylitic state. *Fay.* b. A moderately to strongly radioactive, hexagonal mineral, possibly $(Ca,Fe,Th,U)_2(Ti,Zr)_2O_5$; black to brownish-black; transparent in very thin splinters, with a dark brown or reddish color. It occurs in pyroxenite with perovskite and baddeleyite; also as a detrital mineral in alluvial deposit; found associated with tourmaline, zircon, corundum, spinel, and monazite. *Crosby, p. 89.*

Zirkite. A trade name for a mixture of zircon and baddeleyite. *BuMines Bull. 630, 1965, p. 1106.*

zirklerite. A hydrous oxychloride of iron, magnesium, calcium, and aluminum, $9(Fe,Mg,Ca)Cl_2.2Al_2O_3.3H_2O$. Hexagonal, rhombohedral. Massive, fine granular. From Hanover, Germany. *English.*

zirlite. A light yellow, aluminum hydrate, $Al(OH)_3$, that is found amorphous, and is closely related to gibbsite. *Fay.*

Zn Chemical symbol for zinc. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Z number. The atomic number of an element. *H&G.*

zobtenite. A variety of gabbro gneiss containing knots or eyes of diallage surrounded by streams of uralite and embedded in a granular mass of epidote and plagioclase (saussurite). *Rice.*

zoic. In geology, containing fossils, or yielding evidence of plant or animal life; said of rocks. *Standard, 1964.*

zoisite; thulite. $Ca_2(AlOH)Al_2(SiO_4)_3$; one of the epidote group of minerals. Grayish-white, gray, peach-blossom to rose-red, green; white or uncolored streak; vitreous or pearely luster. Specific gravity, 3.25 to 3.37; Mohs' hardness, 6 to 6.5. Found in Tennessee, Massachusetts, Pennsylvania; Austria, Switzerland, Norway, Italy. An ornamental stone. *CCD 6d, 1961.*

zoisitization. The process of converting feldspar into zoisite. *Compare* saussuritization. *Webster 3d.*

zona. Sp. a. A layer or band of mineral in a vein. *Fay.* b. A zone, belt, or band of rock limited horizontally or vertically, and characterized by certain minerals or fossils. *Fay.*

zonal arrangement. A zoning of ore or minerals about a hot center, with high-temperature ores inside and low-temperature ores outside. *Bateman.*

zonal peat. Same as climatic peat. *Tomkeieff, 1954.*

zonal soil. Mature soil. *Pettijohn, 2d, 1957, p. 355.*

zonal structure. Especially used in miscroscopic work to describe those minerals whose cross sections show their successive concentric layers of growth. *Fay.*

zonal theory. A theory of ore desposition that holds that the ores originate in a zone of differentiation in the lower part of the zone of crystallization, where are formed the siliceous-aqueous-metalliferous residues, which, in passing upward through faults and fractures, deposit the ores in successive zones, each marked by its distinctive mineral associations. *A.G.I.*

zone. a. In coal mining, a certain series of coal seams with their accompanying shales, etc., which contain, for example, much firedamp, called a fiery zone, or if much water, a watery zone. *Zern.* b. A metal zone is equivalent to a mineral zone yet the terms mineral and metal are not synonymous. *Ricketts I.* c. The ground or mass bounded by horizontal or inclined planes or curved surfaces in which given chemical or physical conditions exist, for example, zone of saturation, zone of weathering. *Nelson.* d. A group of beds characterized by the presence of one or more specific fossils; for example, the zonal fossil or fossils. *B.S. 3618, 1964, sec. 5.* e. Geologically, a distinctively mineralized area, region, or level. In a specific lode or other deposit, the progressive change from upper to lower horizons. At top is outcrop or gossan, oxidized or weathered. Next is leached zone, impoverished by dissolution of its values (or part of them), which may be redeposited below in the zone of secondary enrichment. Below this is the primary, or unaltered zone which consists of the original sulfide formation. *Pryor, 3.* f. In mineral processing, with respect to a single particle, a zone is a region of surface differentiation (for example, of oriented molecules, passivation, etc.), not to be confused with a phase. A local variation in the lattice discontinuities may set up a zone of differentiated sorptive or chemical quality. *Pryor, 3.* g. In geology, used in the same sense as horizon to indicate a certain geological level or chonological position, without reference to the local attitude or dip of the rock. *Fay.* h. An area or region more or less clearly set off or characetrized as distinct from surrounding or adjoining parts; as, in a metalliferous region, the mineral zone. *Webster 2d.* i. A series of faces of a crystal whose intersection lines with each other are all parallel. *Webster 3d.* j. Any of the five great divisions of the earth's surface with respect to latitude and temperature: (1) Torrid Zone, bounded on the north by the Tropic of Cancer and on the south by the Tropic of Capricorn; (2) North Temperate Zone, bounded on the south by the Tropic of Cancer and on the north by the Arctic Circle; (3) South Temperate Zone, bounded on the north by the Tropic of Capricorn and on the south by the Antarctic Circle; (4) North Frigid Zone, bounded only on the south by the Arctic Circle; and (5) South Frigid Zone, bounded only on the north by the Antarctic Circle. *Webster 3d.* k. A region of oriented molecules. *C.T.D.*

zone axis. A straight line to which all faces of a given zone of a crystal are parallel. *Webster 3d.*

zone melting. Highly localized melting, usually by induction heating, of a small volume of an otherwise solid piece. By moving the induction coil along the rod, the melted zone can be transferred from one end to the other. In a binary mixture where there is a large difference in composition on the liquidus and solidus lines, high purity can be attained by concentrating one of the constituents in the liquid as it moves along a rod. *ASM Gloss.*

zone of aeration. The zone in which the interstices of the functional permeable rocks are not filled (except temporarily) with water. The water is under pressure less than atmospheric. *A.G.I.*

zone of capillarity. An area that overlies the zone of saturation and contains capillary voids, some, or all, of which are filled with water that is held above the zone of saturation by molecular attraction acting against gravity. *Fay.*

zone of cementation. That shell of the earth's crust living immediately below the zone of weathering, within which loose sediments are cemented by the addition of such minerals as calcite, introduced by percolating meteoric waters. *See also* metasomatism. *C.T.D.*

zone of combined fracture and flow. The part of the earth between the zone of fracture and the zone of flow where the rocks may break or flow according to conditions (as of deformation or strength of the materials). *Webster 3d.*

zone of deposition. The area in which continental glaciers deposit materials derived from the zone of erosion. It is usually covered with drift and has the general aspect of a plain. *Stokes and Varnes, 1955.*

zone of discharge. As suggested by J. W. Finch, the zone embracing that part of the belt of saturation that has a means of horizontal escape. *See also* gathering zone; static zone. *Fay.*

zone of eluviation. Synonym for A-horizon. *A.G.I.*

zone of enrichment. Interval below the oxidized zone in which a metal (usually copper) has been carried down in solution from the oxidized zone and redeposited as sulfide. *McKinstry, p. 659.*

zone of equilibrium. The ultimate length of a spit is attained when the tendency of longshore transportation to increase that length is just balanced by the opposite tendency of opposite currents. Because of the varying intensity of all shore processes, the equilibrium is never perfect, but only approximate, and the end of the embankment therefore advances and retreats intermittently over a narrow zone which might be called the zone of equilibrium. *A.G.I.*

zone of faces. A number of faces, belonging to one or several forms, the normals to which lie in one plane (the zone plane) and whose edges of intersection are parallel to a line passing through the center of the crystal (the zone axis). *C.T.D.*

zone of flow. Deeper environment in which rock fails by flow. *See also* zonal theory. *McKinstry, p. 659.*

zone of flowage. The subsurface part of the earth in which the fracturing of rocks is prevented by pressure, and all deformation is by a sort of flow. It includes the larger part of the earth, and underlies the zone of fracture, or that part of the earth's crust in which deformation may result in and be accomplished by fracture. Between the zone of fracture and zone of flow there is a zone of combined fracture and flow, where the rocks may break or flow according to the conditions of deformation, the strength of the materials, etc. *Stokes and Varnes, 1955.*

zone of fracture. As proposed by Van Hise, the upper portion of the earth's crust and in which rocks are deformed mainly by fracture. *See also* zone of flowage. *Fay.*

zone of influence. The zone of rock surrounding an excavation in which the additional stresses caused by that excavation are above a certain arbitrary value is termed the zone of influence. *Spalding.*

zone of oxidation. Upper zone of a mineral deposit that has become oxidized. *Bateman.*

zone of rock flowage. The deep part of the earth in which all rocks are under stresses exceeding their elastic limits. *A.G.I.*

zone of rock fracture. The upper part of the lithosphere in which rocks are under stresses less than those required to close their intertices by deformation of the walls of the interstices. *A.G.I.*

zone of saturation. a. An area which contains capillary or supercapillary voids, or both, that are full of water that will move under ordinary hydrostatic pressure. *Fay.* b. The zone between the water table and the lower limit of saturation—sometimes known as the zone of meteoric water. Mine workings in this belt of ground are liable to encounter large volumes of water. *Nelson.*

zone of secondary enrichment. The zone in which descending surface waters re-deposit their metallic content derived from the oxidized zone, with the formation in the upper part of this zone of native metals, oxides and carbonates, and in the lower part of secondary sulfide minerals. *Higham, p. 5.*

zone of substantial deformation. Same as destressed zone. *See* destressed area. *Isaacson, p. 238.*

zone of weathering. a. Down to the level at which ground water stands, the rocks are full of fractures and are exposed to atmospheric agencies, such as moisture, carbon dioxide, oxygen, etc. Here the rocks tend to decay, to be converted into carbonates and hydroxides, and to form soils. This zone is called the belt of weathering and is the one of rock destruction. *Stokes and Vernes, 1955.* b. In amosite and crocidolite ore deposits in South Africa, these occur from surface downwards as: silicified zone, leached zone, and fresh zone. *Sinclair, W. E., p. 484.*

zone refining. A method used in refining germanium and silicon to produce the ultrapure elements used in making transistors. *Newton, p. 378.*

zones. In a shaft furnace, the different portions (horizontal sections) are called zones, and characterized according to the reactions which take place in them, as the zone of fusion or smelting zone, the reduction zone, etc. *Fay.*

zones of lode. A lode may be divided into three main zones: (1) The unaltered ore at depth; (2) the gossan or altered surface portion of the lode, containing native metals, oxides, and oxysalts, the result of weathering of the ore; and (3) the zone of secondary enrichment which occurs between the first two zones, in which interaction between waters from the gossan and the unaltered ore has resulted in the production of new materials, often of considerable economic value. *Nelson.*

zone time. Standard time applied at sea in which the surface of the globe is divided into 24 zones of 15°, or of 1 hour, each. The 0 zone extends 7.5° east and west of the meridian of Greenwich (England), (the Prime Meridian), and the zones are designated by the number of hours that must be applied to the local time to obtain Greenwich time. Abbreviation, ZT. *Webster 3d.*

zoning. a. Concentric layering parallel to the periphery of a crystalline mineral, shown by color banding in such minerals as tourmaline, and by differences of the optical reactions to polarized light in colorless minerals like feldspar. *C.M.D.* b. Applied to the structure of a mix-crystal that is composed of isomorphous compounds arranged in layer or zones of different composition; successive zones having been deposited from a magma (or other liquid solution) which gradually changed in composition owing to the separation of crystal phases. *Rice.* c. In a mineral deposit, the occurrence of successive minerals or elements outward from a common center. *A.G.I.* d. Arrangement of minerals or mineral assemblages in zones. *McKinstry.* e. The division of a building or group of buildings into separately controlled spaces where different conditions can be simultaneously maintained. *Strock, 10.*

zonite. A name which has been used in Arizona for locally occurring jasper or chert of various colors. *Shipley.*

zonochlorite. A light and dark green gemstone similar to chlorastrolite. *Rogers, Dict. of Gems, 1933, p. 42.* Synonym for pumpellyite. *Hey 2d, 1955.*

zonolite. A trade name for a light, flaky material obtained by roasting vermiculite, which swells to fifteen times its original volume, forming golden yellow scales; from

Libby, Mont. A titanium-bearing jefferisite from Westcliffe, Colo., is similar. *English.*

zoogene. In geology, of, pertaining to, consisting of, resulting from, or indicative of animal life or structure. *Standard, 1964.*

zoogenic. Originating from animals or as a result of their activities. *A.G.I.*

zoolite; zoolith. A petrified animal; an animal fossil. *Standard, 1964.*

zooplankton. The portion of plankton composed of animals; unattached animals which are at the mercy of the currents. *Hy.*

Zopaque. Trademark for pure titanium dioxide manufactured from ilmenite and specially processed to control crystal growth. It is used in nearly every industry requiring a white opacifying agent. *CCD 6d, 1961.*

zorgite. a. Described as a brass-yellow metallic mineral with a dark and yellow streak, $PbSe.Cu_2Se.Ag_2Se$; possibly impure clausthalite with umangite. *Dana 6d, p. 53.* b. Aluminosilicate of Fe and K. *Hey 2d, 1955.*

Zr Chemical symbol for zirconium. *Handbook of Chemistry and Physics, 45th ed., 1964, p. B-1.*

Z reagents. The Dow series of xanthate flotation reagents consisting of:

Z. 3 = Pot. ethyl xanthate.
Z. 4 = Sod. ethyl xanthate.
Z. 5 = Pot. secondary amyl X.
Z. 6 = Pot. amyl xanthate.
Z. 8 = Pot. secondary butyl x.
Z. 9 = Pot. isopropyl zanthate.
Z.10 = Pot. hexyl xanthate.
Z.11 = Sod. isopropyl xanthate.
Z.12 = Sod. sec-butyl xanthate.

Pryor, 3.

ZT Abbreviation for zone time. *Webster 3d.*

zueing. *See* zur.*Fay.*

zundererz Ger. Tinder ore; an ore of antimony occurring in the Saxon mines in soft, flexible, tinderlike masses, of a blackish-red color and little luster. *Fay.*

zungite. *See* zunyite.

zunyite; zungite. A rare basic orthosilicate of aluminum in transparent tetrahedral crystals, containing fluorine and chlorine; it occurs in minute cubic crystals at the Zuni mine, Silverton, Colo. *C.M.D.*

zur; zueing; dezuing. Eng. The same as hulking a lode, viz, removing the soft side for facilitating the breaking down the harder part thereof. *Fay.*

zurlite. A white or green variety of melitite. *Standard, 1964.*

zurron. A rawhide sack, holding about 150 pounds, used by miners for carrying ore. *Nelson.*

zwieselite. A clove-brown variety of triplite. *Fay.*

zwitter. A Saxon miner's term for a variety of greisen. Only of significance in connection with tin ores. *Fay.*

zwitter ion. Complex ion which carries charges opposite in polarity, for example, $^+H_3N.CH_2.COO^-$. *Pryor, 3.*

zyglo. *See* fluorescent penetrant inspection. *Henderson.*

authorities and sources quoted in dictionary

The following is a list of authors and sources quoted as authority for the forms and uses of terms presented in this dictionary:

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geographical abbreviations

The accompanying list of abbreviations shows the localities in which certain words are in common use or where they may have been derived. These abbreviations are used throughout the text.

Arg	Argentina.
Ark	Arkansas, U.S.A.
Aust	Australia.
B.C	British Columbia, Canada.
Belg	Belgium.
Berks	Berkshire, England.
Bol	Bolivia.
Braz	Brazil.
Brist	Bristol coalfield, England.
Can	Dominion of Canada.
Cent. Am	Central America.
Ches	Cheshire, England.
Clev	Cleveland iron district, England.
Colom	United States of Colombia.
Corn	Cornwall, England.
Cumb	Cumberland coalfield, England.
Derb	Derbyshire coalfield, England.
Dev	Devonshire, England.
E. Ind	East Indies.
Eng	England.
Forest of Dean	Forest of Dean coalfield, England.
Fr	French.
Ger	German.
Gr. Brit	Great Britain.
Glouc	Gloucestershire coalfield, England.
Hid	Hidalgo, Mex.
Hind	Hindustan.
Ill	Illinois, U.S.A.
Ire	Ireland.
It	Italian.
Kent	Kent, England.
Lanc	Lancashire coalfield, England.
Leic	Leicestershire, England.
Mex	Mexico.
Mid	Midland coalfield, England.
Newc	Newcastle coalfield, England.
N.S.W	New South Wales, Australia.
N.Z	New Zealand.
Norf	Norfolk, England.
N. of Eng	North of England.
N. Staff	North Staffordshire coalfield, England.
Northumb	Northumberland coalfield, England.
N. Wales	North Wales.
Pac	Pacific Coast, U.S.A.
Pat	Patagonia, South America.
Penn	Pennsylvania, U.S.A.
Port	Portuguese (mostly in Brazil).
Prov	Provincial, United States, unless otherwise, specified.
Pr	Prussian.
Russ	Russia.
Scot	Scotland.
Shrop	Shropshire, England.
S. Afr	South Africa.
S. Am	South America.
S. Staff	South Staffordshire, England.
S. Wales	South Wales, Great Britain.
Som	Somerset, England.
Sp	Spanish origin but not necessarily used in Spain.
Sp Am	Spanish America.
Staff	Staffordshire, England.
Suff	Suffolk, England.
Sw	Swedish.
Trans	Transvaal, Republic of South Africa.
U.S.	United States of America.
U.S.S.R.	Union of Soviet Socialist Republics.
Venez	Venezuela.
W. Afr	West Africa.
War	Warwickshire, England.
Wis	Wisconsin, U.S.A.
York	Yorkshire, England.

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